Governing Ethically the Sustainable Transition, An Institutional Design Framework

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Abstract: The thesis is framed within the field of transition studies, and it focuses on better understanding the socio-technical dynamics of sustainable transitions. More specifically, the research concentrates on the challenges presented by the energy transition, the radical shift from a model of development based on fossil fuels to one based on renewable energy sources. As it will be argued in the dissertation, such a structural transformation of the socio-technical organization of a society raises the challenge of complexity. Governing sustainable transitions requires the management of both social, technical, and ecological variables in their structural interconnectedness. As a result, decision-makers are faced with the difficult problem of governing complex adaptive systems, where the transformation of the physical infrastructure of an energy system cannot be managed in isolation from the adaptive responses of its social and ecological components. Therefore, the thesis will highlight how the radical transformation of energy systems cannot be considered separately from the social issues that it brings about. The aim of the thesis is then to articulate the role of morality within the governance of the energy transition. In this respect, it will argue that achieving a responsible and responsive governance is a key precondition for the moral acceptability and social acceptance of sustainable transitions.

For Melina
and my family.

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Summary

Climate change has been defined as the biggest moral problem that humanity faces today (Gardiner 2011). Furthermore, there is now overwhelming evidence from the scientific community on the fact that this environmental catastrophe is in fact human driven (IPCC 2021). Therefore, societies need to rapidly shift from a carbon-based economy to a new model of sustainable development. As a result, in the last decade a new literature on sustainable transitions has flourished. In this regard, a sustainable transition has often been defined as a radical transformation of a socio-technical system towards a sustainable development (Geels & Schot 2010, Markard et al. 2012). Nonetheless, governing sustainable transitions is one of the most complex challenges which decision-makers face today, as they involve the management of a complex network of social actors, public and private institutions, physical and digital infrastructures, technological innovations, and natural ecosystems. Accordingly, sustainable transitions cannot be governed in a technocratic way, solely by setting new bodies of rules or by incentivizing the penetration of sustainable technologies within national markets. There is a growing awareness on the fact that designing policies in abstraction from their interconnections with social actors can lead to delays and failures in the implementation of new rules, plans, and projects. Socio-technical transitions are, then, deeply complex transformations of our societies that can lead to contestations, frictions, and stalemates when new policies are not responsive to the society in which they are formulated (Sovacool et al. 2017). Therefore, governing a sustainable transition requires the development of an analytic understanding of the interconnections between new transition policies and the social, technical, and ecological variables to which they apply.

Focus of the Thesis

The thesis is then framed within the field of *transition studies*, and it will focus on better understanding the socio-technical dynamics of sustainable transitions. More specifically,

the research will concentrate on the challenges presented by the *energy transition*, the radical shift from a model of development based on fossil fuels to one based on renewable energy sources. As it will be argued in the dissertation, such a structural transformation of the socio-technical organization of a society raises the challenge of complexity. Governing sustainable transitions requires the management of both social, technical, and ecological variables in their structural interconnectedness. As a result, decision-makers are faced with the difficult problem of governing complex adaptive systems, where the transformation of the physical infrastructure of an energy system cannot be managed in isolation from the adaptive responses of its social and ecological components. Therefore, the thesis will highlight how the radical transformation of energy systems cannot be considered separately from the social issues that it brings about.
The aim of the thesis will then be to articulate the role of morality within the governance of the energy transition. In this respect, it will argue that achieving a *responsible* and *responsive* governance is a key precondition for the *moral acceptability* and *social acceptance* of sustainable transitions. Accordingly, the development of the work will be organized around two main research questions:

Q1: How can responsibility be achieved in the cooperative governance of energy transitions?
Q2: How can we design energy institutions which are responsive to all societal stakeholders?

Raising these two questions responds to one main objective of the research: the development of an articulated understanding of the moral implications of designing new institutions in a sustainable transition. In this regard, these research questions are aimed at filling an important knowledge gap within the academic debate on sustainable transitions, namely the articulation of a comprehensive framework connecting the design of new institutions with the moral perceptions of stakeholders.

Theory and Methods

To achieve these objectives the thesis is structured around a mixed methodology, combining the theoretical elaboration of a new framework with the empirical test of its main insights, through the ethnographic investigation of an energy community. For what concerns the theoretical apparatus, the thesis mainly combines the contributions coming from applied ethics, science and technology studies, and political economy to develop an original pragmatist theory of cooperative governance within the energy transition. Here, the work establishes a close dialogue with the Institutional Analysis and Development

Framework, developed by the political economist Elinor Ostrom, and proposes that such a framework can be fruitfully extended to account for the moral implications of designing new institutions in the energy transition. To test the insights provided by the Extended IAD Framework, the research benefits from the analysis of the energy community of Schoonschip, in the city of Amsterdam. Here, in a one year long observation of the internal dynamics of a nascent energy community in the Netherlands, the work will assess the fitness of the elaborated framework to the real-word dynamics surrounding the ethical issues raised by sustainable transitions. This mixed methodology allows the research to ground its theoretical proposals in the concrete analysis of the socio-technical dynamics of transitions, thereby articulating a framework which stands the test of its theoretical implications.

Overview of the Thesis

To collocate the research subject within the existing debate, *Chapter 1* focuses on the articulation of the relevant literature surrounding sustainable transitions. In this respect, it aims at framing transitions within the moral challenge of climate mitigation. The chapter is then organized around the exposition of the political and moral problem of climate change.

To address its political dimension, the work proceeds by sketching a history of climate governance with a particular focus on the European scale. This recognition contributes to highlight the complex issues inherent in the governance of climate change: the difficulties of gathering a strong political will around the reduction of greenhouse gases, and the problems in finding a point of agreement in the management of sustainable transitions. To explore the moral basis of this enduring disagreement, the chapter provides an overview of the ethical issues raised by the governance of climate change. Here the work focuses on an analysis of collective action problems in the government of the climate crisis, on the examination of the question of intergenerational justice in the mitigation of global warming, and on the articulation of the concept of collective responsibility for the management of sustainable transitions. The chapter continues then with the articulation of the multiple dimensions of governing the sustainable transition, by analyzing three levels of climate governance, namely the scale of the smart city, of its technical infrastructures, and among these the challenges presented energy systems.

Accordingly, *Chapter 2* starts by addressing the first research question, by asking how *responsibility* can be achieved in a cooperative governance of sustainable transitions. Here the research is especially concerned with the changes necessary to the *structure of government* in order to manage the complexity inherent in governing sustainable transitions. Its task will be to show that governing complex adaptive systems requires a change from a centralized and hierarchical approach to the management of social-ecological systems to a decentralized and cooperative one. Nonetheless, the goal of the chapter will be to show how cooperative governance networks can avoid responsibility gaps and guarantee an accountable model of government.
The chapter starts then by investigating the collective action problems inherent in the management of the climate crisis, and it proposes both an economic formalization of climate change as a tragedy of the commons, and an ethical formalization of climate change as a problem of many hands. It proceeds then to elaborate a critique of the traditional solutions to collective action problems, as they are usually framed within centralized and hierarchical models of governance. Here, the work articulates the limits of these approaches when faced with the complex nature of social-ecological systems, and proposes instead that a decentralized and cooperative model of governance is more suited for governing sustainable transitions. It concludes by raising the problem of the coordination of collective agency within cooperative governance networks and it ends with the proposal of five design principles for avoiding responsibility gaps within the collective management of social-ecological systems.

Chapter 3 addresses instead the second research question, by asking how it is possible to design institutions which are responsive to all the relevant societal stakeholders. The dissertation focuses here again on the challenge of complexity in the management of sustainable transitions, but through the lenses of the *process of governing*. The goal of the chapter is to show that a technocratic approach to decision-making, based on rigid tools for policy-prescription, is increasingly ill-suited to manage the adaptive nature of complex systems. Accordingly, the thesis proceeds with a critique of the standard ethical approaches to policy-prescription, like the utilitarian calculation of costs and benefits and the deontological setting of universal standards and regulations. In fact, the research will analyze how, faced with the evolving and dynamic nature of complex systems, traditional ethical frameworks organized around fixed and universal principles show a scarce potential to provide useful moral tools matching the need for increasingly adaptive models of governance. It advances then the potential of a pragmatist approach to the process of policy-prescription, based on a model of cooperative governance responsive

to ways in which the moral perceptions of societal stakeholders coevolve with the emergence of new problems and opportunities within sustainable transitions. The research aims then at providing a bottom-up theory of institutional development, centered on the role of meanings, values, and norms in creating collaborative and adaptive structures of shared agency within sustainable transitions. It achieves this purpose by extending Elinor Ostrom's Institutional Analysis and Development Framework to account for the role of these moral constructs within the process of institutional development.

Chapter 4 focuses on the pragmatist theory of institutional development elaborated within the Extended IAD Framework, and applies it to the governance of the energy transition. To achieve this aim, it incorporates the insights provided by the Energy Justice Perspective and the Multi-Level Perspective to provide a comprehensive meta-framework able to articulate the process of institutional development within the socio-ethical aspects of the energy transition. Accordingly, the extended IAD Framework can provide an important theoretical tool for investigating how the institutional changes required by the energy transition can be articulated in relation to the moral dimensions explored within the Energy Justice literature. Furthermore, it also accommodates the theoretical inputs developed within the multi-level perspective of Frank Geels, by analyzing the role of socio-technical regimes and innovation niches within the extended IAD Framework.

Chapter 5 aims then to evaluate the efficacy of the meta-framework proposed, by testing it on the field through the ethnographic research of an energy community. In fact, to ground the research in the empirical analysis of social data, a case study has been selected, the energy community of Schoonschip, in Amsterdam-North. Here, the dwellers have started a cooperative based on the collective production of solar power and the automatic sharing of electricity based on a smart grid, allowing for the distribution and exchange of energy over the neighborhood. In this regard, the ethnographical investigation, conducted on the field through participant observation and a series of narrative and expert interviews, will provide the basis for the exploration of the moral perceptions of a community around the various dimensions of energy transitions. More specifically, the empirical research helps to highlight the way in which meanings, values, and norms are interconnected within the development of an energy community. The ethnography also shows how frictions between the existing institutional regime and niche innovations can produce tensions within the internal socio-technical dynamics of a community. The chapter main contribution is the proposal of a set of socio-ethical

conditions for the emergence and development of an energy community, based on the presence of a community spirit, shared values, and trust.

To conclude the research is aimed at filling a gap in the present literature on sustainable transitions as most theories of governance have so far disregarded the role of morality in the development of new energy institutions. The dissertation provides then an original work, articulating an analytical understanding of the interconnections between socio-technical variables in the development of new projects, policies, and institutions in sustainable transitions, by showing the importance of meanings, values, and norms in the achievement of a responsible and responsive model of cooperative governance.

1

The Moral Problem of Climate Change and its Multi-Level Governance

"We are the first generation to be able to end poverty, and the last generation that can take steps to avoid the worst impacts of climate change. Future generations will judge us harshly if we fail to uphold our moral and historical responsibilities".

Ban Ki-moon, Secretary General of the United Nations

1.1 Introduction: Climate Change

In May 2000, in the Newsletter of the International Geosphere-Biosphere Programme, a somewhat unremarkable, one page long, article by the ecologist Eugene Stoermer and the atmospheric chemist, and Nobel Prize Winner, Paul J. Crutzen, bore the name "The Anthropocene". The term that this short article popularized would know, afterwards, a remarkable fortune and diffusion in both scientific and popular discourse. The term "Anthropocene" referred to the "central role of mankind in geology and ecology" in determining "major and still growing impacts of human activities on earth and atmosphere" (Crutzen, Stoermer 2000, p. 17). In this short text, the two researchers made the claim that the world had entered a new geological epoch: leaving behind the Holocene, humanity, with its growing and capillary impact on the earth system, had brought about the Anthropocene.

The two scholars proposed that this new geological era started in the last part of the 18th century, with the industrial revolution changing the shape of the human productive system. During the following centuries humanity would know an impressive demographic growth, witnessing the decuplication of its population; a huge geographical expansion with more than 75% of Earth's land area today transformed by human action (Ellis and Ramankutty 2008); and, the authors reported, systemic impacts on all earth ecosystems,

from oceans to atmosphere, from land to our planetary fauna and flora, significantly depleting all the natural resources of the planet.

Whilst the concept of Anthropocene has gained a central position in the theoretical discourse on climate change, there have been a number of scholars developing arguments in favor of reframing the concept more precisely, with the aim of adding some nuance and sophistication to the otherwise monolithic nature of the term. For instance, between the most critical voices, the sociologist Eileen Crist has highlighted how the very concept of Anthropocene is at risk of reproducing an anthropocentric perspective which paradoxically reinstates the problem of human-centeredness while trying to correct it (Crist 2013). In this way, the problem of the objectification of nature as a domain under human control fails to get theoretically displaced, but is merely repeated – the diagnosis of Crutzen is already part of the disease. Instead of advocating for humans to become better managers of a natural resource, Crist aims at displacing the anthropocentrism inherent in the term and proposes a view based on the ecological integration of the human organism within the larger ecosystem.

Another influential critique to the concept has come from Andreas Malm who asked whether the concept of Anthropocene, which depicts a generic humankind as a new geological agent, is in fact at risk of hiding the structural differences in power, agency, and therefore responsibility within capitalist society. As Malm argues, these structural inequalities are "a condition for the very existence of modern, fossil-fuel technology. The affluence of high-tech modernity cannot possibly be universalized – become an asset of the species – because it is predicated on a global division of labor that is geared precisely to abysmal price and wage differences between populations" (Malm, Hornborg 2014).

According to the environmental historian Jason W. Moore, a more proper term would then be "Capitalocene", as it better articulates the role of capitalism in "organizing nature, as a multispecies, situated, capitalist world-ecology" (Moore 2016, p. 6). These reflections have undoubtedly helped to deconstruct many of the dangerous presuppositions inherent in the first conceptualization of the term. Nonetheless, it can be proposed that as the concept gets reconstructed to express a more nuanced array of meanings, "Anthropocene" can still be regarded as a promising way to articulate how a bundle of social, economic, and technological drivers - creating a world-ecology based on a precise power structure - has radically changed the relation between human society and nature.

One of the most concerning impacts of this societal development is the continuous growth of greenhouse gases emissions in the atmosphere, causing global temperatures to rise to dangerous degrees (IPCC 2014). This greenhouse effect occurs because the earth surface, warmed by the sun radiation, emits heat which gets then absorbed by

greenhouse gases concentrated in the atmosphere, such as water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone (O_3). Therefore, once the heat accumulated by these gases is emitted back into the atmosphere, the Earth System is subject to an increase in temperature.

Of course, the greenhouse effect has been for most of our planetary history a natural phenomenon, crucial in making Earth's temperatures reach levels able to support life. However, after the Industrial Revolution, global temperatures have kept rising due to growing emissions of greenhouse gases (GHG), most significantly CO_2, caused by human activity. Capturing the fact that the rise of global temperatures has a human cause, this phenomenon has been called the "anthropogenic greenhouse effect". As the International Panel on Climate Change (IPCC) has shown, "each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850" and according to the most up to date climate data analyzed by the World Meteorological Organization "average temperatures for the five-year, 2015-to-2019 and 10-year, 2010-to-2019, periods are almost certain to be the highest on record" (WMO Provisional Statement on the State of the Global Climate 2019, p. 3).

In this respect, anthropogenic emissions of greenhouse gases are caused particularly by growing demographic numbers, increased energy consumption, industrial development, land use change, and consuming habits. The IPCC has showed that the main drivers of global emissions are respectively: direct energy emissions by electricity and heat production (25%); indirect energy emissions as fuel extraction, refining, processing and transportation (10%); agriculture, livestock and other land use change (24%); industry (21%); transportation (14%); buildings (6%) (IPCC 2014).

In the last thirty years, the scientific awareness around the nature of climate change has grown both quantitatively and qualitatively; what was first defined as a problem inside the fields of climatology and meteorology is now understood inside the much broader framework of Earth System Sciences. The Intergovernmental Panel on Climate Change, the UN body representing the biggest international platform for the study of the climate emergency, counts today hundreds of scientists from physical, biological, economic, and social sciences, giving their contribution to the understanding of climate as a phenomenon involving the entire Earth System.

In fact, the term "earth system" reflects the interdependent nature of physical, chemical, and biological processes characterizing our planet; these processes can be organized around six main "spheres", namely: the atmosphere, the hydrosphere, the cryosphere, the lithosphere, the biosphere, and the anthroposphere (Cornell et al. 2012). This systemic approach has raised awareness on the fact that the phenomenon of climate change will

involve broad and pervasive effects on all planetary systems, causing a real anthropogenic global change. In fact, one of the founding research programs addressing the study of the earth system, the International Geosphere-Biosphere Programme, has stated that such a system "includes the planet's natural cycles — the carbon, water, nitrogen, phosphorus, sulfur and other cycles — and deep Earth processes. Life too is an integral part of the Earth system. Life affects the carbon, nitrogen, water, oxygen and many other cycles and processes. The Earth system now includes human society. Our social and economic systems are now embedded within the Earth system. In many cases, the human systems are now the main drivers of change in the Earth system" (IGBP 1987).

Therefore, the Anthropocene, as Stoermer and Crutzen had first claimed in 2000, is inextricably linked to a planet-wide ecological disruption of the Earth System: the anthroposphere is now the main determinant of climate change, and indeed mitigating the impacts of such an ecological emergency determines the biggest social, political, and ethical challenge of our time. Unfortunately, all current scientific data shows that world governments are far to meet this challenge: effective and immediate climate action is required if we want to avoid world-wide social and ecological disruption. As the IPCC has claimed governments should strive for keeping rising global temperatures at a +1.5°C threshold as compared to pre-industrial levels; nonetheless, as a recent Report by the IPCC has shown, "human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels" and "Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate (high confidence scenario)" (IPCC, Global Warming of 1.5 ºC, 2018, p. 4).

At the Framework Convention for Climate Change of 2015 in Paris, the most important climate conference of the last decade, world leaders committed their respective countries to reach voluntary climate targets, signing among wide international celebration what would later be called the "Paris Agreement". Unfortunately, according to the United Nations Environmental Program, following the targets set under the Nationally Determined Contributions in Paris, global temperatures will likely increase well over the 1.5°C threshold, reaching the worrying level of 3.2°C by the end of this century (UNEP, Emissions Gap Report 2019).

According to the IPCC and the UNEP, crossed the 1.5°C threshold, there is a large, and increasing, probability of great disruptions in the Earth System, with devastating effects such as: coastal flooding and erosion affecting 6 million people by the end of the century at 1.5°C levels, and 16 million people at 2°C levels; increased intensity, and likely frequency, of droughts, storms and extreme weather events; rising sea levels up to 1 meter by 2100, increasing acidification, and decreasing oxygenation; flooding of rivers and

lakes; melting of arctic ice, mountain glaciers, and permafrost; the disruption of marine ecosystems and fisheries, and 70% loss of coral reef at 1.5°C levels, and complete loss at 2°C; disruption of terrestrial ecosystems, desertification, and increasing wildfires; an increased loss of natural habitat for insects, impacting pollination of flowers and plants; a loss of biodiversity, and reduction of natural habitats resulting in dangerous impacts for animal species such as tigers, snow leopards, asian rhinos, orangutans, african elephants, polar bears, and penguins; a decrease in food production in the face of demographic expansion; increased human mortality for heat waves; and finally, increasing economic and political stresses due to probable health-, food-, migration-, and war crises.

These effects, even if serious for the entire world, will impact disproportionally the southern hemisphere developing countries, resulting in harsher living conditions for millions of people, increasing migratory fluxes, and stronger regional tensions. Already struggling countries will face great stresses on infrastructure, healthcare, and food supply systems. For limiting the effects of global warming, it is therefore crucial to reduce global CO_2 emissions. Currently 42 Gt of CO_2 are released every year into the atmosphere (IPCC 2018).

To keep the rise of global temperatures at a 1.5°C target, the IPCC has introduced the concept of "carbon budget". The carbon budget sets a maximum threshold for total historical emissions, calculated from pre-industrial levels, granting to keep temperature rise at the 1.5°C target. From pre-industrial levels onwards, the world has already consumed 2200 Gt of its CO_2 budget, leaving nowadays countries only 580 $GtCO_2$ to reach "a 50% probability of limiting warming to 1.5°C, and 420 $GtCO_2$ for a 66% probability" (IPCC, Synthesis Report, 2018, p. 12). At the current rate of emissions, 42 $GtCO_2$ per year, the world will consume its carbon budget in 13 years for the 580 Gt target, and 10 years for the 420 Gt target. There is wide scientific agreement that if global temperatures are to be kept at a 1.5°C increase, emissions should be cut drastically to reach a total of around 25 gigatons/year by 2030. Nonetheless, under the commitments signed in Paris in 2015, emissions will likely reach 60 Gt/year by the same year (UNEP, Emissions Gap Report, 2019). In climate science, the gap between yearly emissions under current commitments and yearly emissions necessary for reaching the 1.5°C target has been called the "emission gap".

Nonetheless, under every estimate, global emissions will likely continue to rise, widening an already alarming emission gap. In spite of the overwhelming majority of climate scientists, making clear that a rise in temperature over 2°C can have dangerous impacts on the earth system, world leaders seem unable to converge on effective climate action.

1.2 A Brief History of Climate Governance and the Response of the EU

The issue of climate governance is therefore one of the most pressing questions that governments face today. To better understand the socio-political stakes of managing climate change, it can be helpful to first trace a brief history of the institutional response to the climate crisis. This proposed genealogy of global climate governance addresses how the recognition of the existential risk posed by climate change has developed through a series of scientific and institutional efforts. Of course, any such genealogy can only be partial at best, but the intent of this endeavor is to provide the reader with an overview of some of the most crucial moments in the process of institutionalization of climate action.

For understanding the challenges of the climate crisis it's important to delimit the scope of the investigation to a precise political space. It can therefore be useful to focus the attention on the analysis of the European Union governance in the area of Climate Action. Tracing this schematic genealogy allows the research to better articulate how climate governance has evolved within the European Union in response to the commitments taken on the international stage within a succession of intergovernmental agreements. The goal of this section is therefore to provide a genealogical reconstruction of climate action within the EU, and understand the most important steps of this unfolding history.

From a methodological point of view, the choice of focusing on the EU in analyzing climate governance reflects on the one hand the necessity of considering a governance space with a wide enough scale to be an important geopolitical actor in the global climate challenge; on the other hand, it provides a sufficiently homogeneous governance structure, where climate action is defined by a common political strategy and regulation. Furthermore, Europe is an interesting candidate also for its historical role as a 'first mover' in the fight against climate change. In fact, the EU has established itself as a leading actor in tackling climate change with a long history of environmental and climate policies tracing back already to the early 90s. In the next section I will then trace a genealogy of the key historical events that shaped EU climate policies throughout the last five decades.

1972, Club of Rome: One of the seminal contribution to the issue of environmental governance was the publication in 1972 of "The limits to Growth" (Meadows et al. 1972). The report was commissioned by the Club of Rome, an organization created in 1968 to tackle the existential risks facing humanity by bringing together important figures from scientific, economic, and political arenas. The work collected the effort of a team of researchers from the Massachusetts Institute of Technology who carried out one of the first studies on the anthropogenic impact on global natural resources. While its scientific

results were not uncontroversial and were subject to criticism by economist and scientists (Solow 1973), the Limits to Growth has been successful in bringing to public awareness the fragility of the planetary ecosystem in the face of a supposedly indefinite economic expansion. In fact, the report was crucial in highlighting problems and limits of the current model of development, and in providing simulations of the effects of a continued economic and demographic growth in a world with finite resources. It represented one of the first formulations of the idea that human development and agency was constrained by what the Earth System Science would later name "planetary boundaries".

1987, Our Common Future: In 1987, the United Nations (UN) established the World Commission on Environment and Development (WCED), whose main goal was to draw critical attention on the importance of a global strategy for sustainable growth. Its output was the redaction of the Brundtland Report, later published in a volume titled "Our Common Future" by Oxford University Press (WCED 1987). The historical contribution of the Brundtland Commission to the moral problem of climate change was the development of the concept of "sustainable development". Within the report, the concept was defined as model of development "that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987). More specifically, the concept of sustainable development has been articulated along two main dimensions within the Brundtland Report: "the concept of 'needs', in particular, the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs. (WCED 1987). The historical importance of this formulation of sustainable development was the extension of the traditional notion of economic development beyond the spatial boundaries of a specific nation state and beyond the temporal horizon of the historical present. By opening the idea of development to inter-national and inter-generational concerns, the Brundtland Commission made a significant step forward in redefining contemporary climate policy.

1987, Single European Act: The need for developing environmental policies beyond national borders found a political support in the European Community. In this regard, the approval of the Single European Act (SEA) in 1987 represented an important first step in the elaboration of a common policy for the management of the environment in Europe. In fact, the main goal of the Single European Act was the creation of a single market, as the absence of harmonized laws and shared policies in the continent had produced during the 1980s an economy which was excessively compartmentalized within national borders. This political will for a more integrated governance at the European level created a fertile

political substrate for the development of a common environmental policy. In fact, an historical result of the Single European Act was the introduction of an "Environment Title" which created for the first time a legal framework for the development of a shared European policy aimed at preserving the environment, protecting human health, and ensuring a sustainable use of natural resources. In this way, the act marked a step away from a state-based governance and towards the establishment of a cooperative governance where the European Council could approve Europe-level laws on the basis of a qualified majority vote. This was done mainly with the purpose of avoiding state-based legislative differences to create market distortions inside the European internal economy but, crucially, the Single European Act also marked the beginning of a common environmental regulation and policy.

1988, Intergovernmental Panel on Climate Change: The United Nations Environment Programme (UNEP) and the World Meteorological Organization constituted the Intergovernmental Panel on Climate Change (IPCC) in 1988. This event marked a fundamental step towards the establishment of a broad scientific platform for analyzing climate change data, resulting in the further spread of overwhelming scientific consensus on the anthropic character of the climate crisis. This work resulted in the production of a First Assessment Report in 1990, organized around three axes: Scientific Assessment of Climate Change, Impacts Assessment of Climate Change, and Response Strategies. The report had an historical relevance in providing the most extensive scientific analysis of the reality of anthropogenic global warming. In fact, the executive summary was adamant in making two points extremely clear for policy-makers: "there is a natural greenhouse effect which already keeps the Earth warmer than it would otherwise be" and "emissions resulting from human activities are substantially increasing the atmospheric concentrations of the greenhouse gases: carbon dioxide, methane, chlorofluorocarbons (CFCs) and nitrous oxide. These increases will enhance the greenhouse effect, resulting on average in an additional warming of the Earth's surface. The main greenhouse gas, water vapor, will increase in response to global warming and further enhance it" (IPCC, First Assessment Report, 1990, p. 11).

1992, Earth Summit of Rio: After the collapse of the Berlin Wall in 1989 and the end of the Cold War, a new atmosphere of global relief brought world leaders together at Rio for the United Nations Conference on Environment and Development (UNCED), also known as the "Earth Summit". Strongly impacted by the publication of the First Assessment Report of the IPCC, the summit was successful in creating the UN Framework Convention on Climate Change (UNFCCC), which aimed at the "stabilization of greenhouse gas

concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system" (UNFCCC, Article 2, Objectives). The UNFCC represented the first major international treaty to address the pressure exercised by human activity on the earth's ecosystem and to articulate a global political effort in the fight against climate change. Although the Rio Summit was only partially successful in generating effective national governance strategies for aggressively reducing the risks of global warming, the Conference nonetheless has had the merit of fostering a sprawl of local governance experimentations. The challenge of scaling up such initiatives, though, would be a pressing challenge from the Rio Conference onwards.

1990/1997, 1st phase of EU Climate Action: In 1990, in preparation of the Intergovernmental Conference for a Political and Economic Union, the European Council fixed a set of guidelines for its environmental strategy in an Annex called "The Environmental Imperative". The incipit of the document read: "As Heads of State and Government of the European Community, we recognize our special responsibility for the environment both to our own citizens and to the wider world. We undertake to intensify our efforts to protect and enhance the natural environment of the Community itself and the world of which it is part. We intend that action by the Community and its Member States will be developed on a coordinated basis and on the principles of sustainable development and preventive and precautionary action" (European Council, Annex II 1990). In this document, the Council clearly stated for the first time the three main pillars of the EU climate action: reducing GHG emissions; increasing energy efficiency; and favoring the spread of green technologies and renewable energy sources (RES).

With regard to the commitment to reduce emissions, Europe first proposed a form of taxation on emissions. This measure stemmed from the acknowledgement that markets were prone to structural failures in pricing efficiently environmental externalities. This failure results from the difficulty of including, in the price of assets, relevant information about how their production might cause as a by-product the depletion of environmental resources. Nonetheless, quantifying environmental externalities by recurring to a form of taxation on GHG emissions encountered significant opposition from the United Kingdom, who demonstrated to be unwilling to submit its domestic economy to a wider system of European taxation. As a result, the discussion that followed was significantly stalled by a lack of agreement on a common market design for pricing environmental externalities.

In the area of Energy Efficiency (EE), the European Council adopted the Programme "Specific Actions for Vigorous Energy Efficiency" (SAVE) on the October of 1991. The Programme mainly tackled the challenge of a more energy efficient economy by defining efficiency standards in the sectors of constructions, domestic appliances, and transports;

by incentivizing investments in energy efficiency; and by providing better information and training for EU citizens to foster more sustainable consumer behavior.

With respect to the transition towards more sustainable energy sources, Europe effectively approved in 1993 a common strategy, within the ALTENER Programme for Alternative Energy, setting the indicative target of "increasing the contribution of renewable energy sources to the coverage of total energy demand from nearly 4% in 1991 to 8% in 2005". Finally, the 90s marked the beginning of the progressive liberalization of the energy market inside the EU, executed through two Directives in the First Energy Package, respectively approved in 1996 for electricity and in 1998 for gas; the transposition into national laws would concern all the successive decade with the final enforcement in 2007. The liberalization was aimed at building a more efficient energy market and a fairer energy provision for all customers, by incentivizing a competitive market for energy supply.

1997, Kyoto Protocol: On the month of December 1997, UN member states came together in Kyoto and took a further step towards the goal of cutting greenhouse gases emissions, by agreeing on a set of legally binding targets. The signature of the Kyoto Protocol marked a crucial step forward with respect to the simple declarations of intent made in Rio five years before, and still represents today the only legally-binding international treaty on climate change. Of all member states, European countries set the strictest targets and committed to decrease GHG emissions by 8% in the First Commitment Period (2008-2012).

The Kyoto Protocol also provided three market-based mechanisms for cutting emissions: an international Emissions Trading System (ETS), the Clean Development Mechanism (CDM), and the Joint implementation (JI). The trading system was introduced with the strong support from the US and, despite some resistance, from the EU. The ETS envisaged an emission market where virtuous countries, remaining under the set thresholds of GHG emissions, were allowed to sell emission credits to countries exceeding their emission quotas. The Clean Development Mechanism had instead the role of allocating saleable emission credits for certified emission reductions (CER) to countries developing sustainable emission-cutting projects in developing countries. In turn, the Joint Implementation mechanism permitted developed countries implementing emission-cutting projects in other developed countries to earn emission reduction units (ERUs) to be added to the total domestic emission-reduction sum.

Even though the Kyoto Protocol was ambitious in setting trading mechanisms for emission with an international scope, most subsequent implementations were brough about at the national scale. In this regard, the EU represented a significant exception.

Nonetheless, the Kyoto Protocol, by establishing different targets for developed and developing countries, represented an important historical recognition of "common but differentiated responsibilities" in tackling climate change. In fact, this policy transposed years of ethical debate around how environmental responsibility had to be distributed differently between historical emitters like industrialized economies and emerging economies.

1998/2006, 2nd phase of EU Climate Action: To implement the Kyoto Protocol the EU launched the European Climate Change Programme (ECCP) in June 2000, collecting all member states, representatives from the relevant departments inside the European Commission, sectoral experts, industrial actors, and environmental Non-Governmental Organizations. The ECCP ratified a pledge for an 8% cut in GHG emissions by 2012 for all member states, aligned with the goal of maintaining the rise of global temperatures below the threshold of 2°C as compared to pre-industrial levels. The ECCP launched 11 eleven working groups, with the aim of identifying sustainable pathways to emission reductions, focusing respectively on "Flexible mechanisms: emissions trading; Flexible mechanisms: Joint Implementation and Clean Development Mechanism; Energy supply; Energy demand; Energy efficiency in end-use equipment and industrial processes; Transport; Industry; Research; Agriculture; Sinks in agricultural soils; Forest-related sinks".
After the initial disagreements within EU members on a common taxation system to price environmental externalities, the EU ultimately converged on a cap-and trade system for GHG emissions. The introduction of a cap-and-trade system was the most important measure to be established by the European Climate Change Programme: this massive governance project represented the first emission trading scheme in the world and the one covering the largest geopolitical area, a characteristic still holding today. From its effective operationalization in 2005 until nowadays, this emissions trading scheme functions by setting a cap on emission for more than 11.000 power stations, industrial plants and airlines in Europe, and covers 45% of the total EU greenhouse gases emissions. The caps on emissions are decided by each state individually and allocated to the various companies either by free distribution, a solution mostly applied in the first 'learning-by-doing' period, or by auction, the currently preferred method. Companies have in this way the duty to set in place monitoring measures for their greenhouse gas production and, at the end of each year, they must give back emission allowances according to the actual emission levels recorded.
For a virtuous company staying below its emission quota, the trading scheme provides the possibility of either keeping the remaining emission allowances for the next year or to sell them to other companies. On the opposite side, companies exceeding their

emission quotas can either choose to purchase them from virtuous companies or to incur in heavy non-compliance fines.
In this way, the cap-and-trade scheme managed to put in place a structure of incentives to shift to a more sustainable productive process, without negatively impacting on the productivity of companies. As a matter of fact, a report from the Organisation for Economic Co-operation and Development (OECD) shows that productivity, profitability, or competitiveness have not been negatively impacted by the introduction of the ETS, while achieving a 10-14% decrease in emissions between 2005 and 2012. Apart from the implementation of the ETS, the European Climate Change Programme also approved a number of important Directives focusing on the promotion of Renewable Energy Sources, Co-generation plants, bio-fuels in the transport sector, and building efficiency.

2007/2010, EU Climate and Energy Package: Scientific evidence from the IPCC Third Assessment Report, and a growing number of economic studies on the impact of climate change convinced Europe to adopt more ambitious goals in the upcoming period. An EU report from 2005, "The Impacts and Costs of Climate Change", made clear that the social costs of a business-as-usual policy towards climate change would result in not only an environmental catastrophe, but in an economic one as well. As we can read, "most experts believed that under conditions of low temperature change (2˚C), the marginal social costs would be low, most probably below Euro 15/tCO_2. In contrast, for high temperature change (>4 °), the expert response was that costs would be high: probably greater than Euro 30/tCO_2 and plausibly as high as 140Euro/tCO_2" (The Impacts and Costs of Climate Change, Final Report, 2005).
Therefore, in the face of the imminent end, in 2012, of the first commitment period of the Kyoto Protocol, in 2007 member states of the EU decided to take steps towards a new European policy for Climate Change, and agreed on a set of legally binding environmental targets to be met for the year 2020. This proposal was made official with the ratification of the Climate and Energy Package, in 2008. The Package's most important directive was the introduction of the "20-20-20" targets - Europe had to meet the following ambitious goals by 2020: cutting greenhouse gases by at least 20% with respect to 1990 levels; improving energy efficiency by 20%; increasing the rate of Renewable Energy Sources to 20% of the total energy production.
Concerning the first target of 20% emission cut, the measure distributed the burden of implementing the cuts differently for ETS and non-ETS sectors. For ETS sectors, such as power plants, industrial plants and airlines, covered by the European cap-and-trade scheme and representing 45% of the total EU emissions, a target of 21% reduction was set with respect to levels of 2005; while for the remaining non-ETS sectors, such as other

transport companies, farming, waste and households, covering the remaining 55% of the EU emissions, targets were to be defined nationally and within a differentiated distribution of responsibilities they had to add up to a 10% cut with respect to 2005 levels. For what concerns the 20% energy efficiency goal, the EU introduced the Energy Efficiency Directive in 2012. The Directive included a number of important measures to be adopted throughout the EU to improve energy efficiency, deciding for the introduction of binding National Energy Efficiency Action Plans (NEEAP), the setting of standards and labels for various products, the implementation in the energy and gas market of smart meters, achieving 1,5% energy savings for energy companies, incentivizing the sensibilization and protection of energy consumers by providing more data transparency of energy consumption, and various measures devoted to increase buildings' energetic efficiency.
With regard to the third goal, the EU followed the same differentiated logic in allowing for national plans to add up to the 20% target in the share of Renewable Energy Sources, to be defined inside the National Renewable Energy Action Plans (NREAP). Furthermore, in 2009 the EU approved the Renewable Energy Directive, fixing a 10% share of renewables target in the transport sector, to incentivize the progressive shift towards sustainable biofuels. The Directive also created Cooperation Mechanisms for EU states to join forces in establishing and funding renewable energy projects; and in giving virtuous countries exceeding the targets the possibility of selling clean energy to other countries struggling to meet the 20% goal of energy from renewables.

2009, Copenhagen Summit: In 2009 UN members met in Copenhagen for the 15th United Nations Climate Change Conference. The Summit was the object of high expectations due to the rapidly approaching end of the Kyoto Protocol, and world leaders were expected to converge on a new legally binding treaty for tackling climate change. But, with the disappointment of the international community, the Conference was marked by multiple dead ends in climate negotiations, mostly in response to the difficulties of financing large scale environmental policies and strategies in the face of the 2007-08 financial crisis. The Copenhagen Accord, to which countries committed by the end of the Summit, only ratified the validity of the Kyoto Protocol, with nothing more than declarations of intent made by countries in committing to more sustainable pathways, such as maintaining global temperature rise below the threshold of 2°C. The results of the Copenhagen Summit were finally ratified by the Cancun Agreement of the following year.

2015, Paris Agreement: Heading towards the establishment of a new international agreement on effective climate action, the EU was in favor for a less rigid governance system than the one championed in Kyoto. In fact, the major shortcoming of Kyoto was

represented by the limited number of countries willing to submit to its system of legally binding targets, given that among the 192 parties to the Kyoto Summit only 37 industrialized countries accepted binding enforcement mechanisms. While the Copenhagen Summit marked a failure with regard to the establishment of a new binding international Protocol, Europe recognized a small step forward in the Copenhagen legacy of extending the voluntary commitment to sustainable targets to an international community of 114 countries. Leading up to the upcoming United Nations Framework Convention on Climate Change (UNFCCC) to be held in Paris in 2015, the EU supported a mixed approach, striving for the creation of both a 'top-down' and legally binding international framework, like the one exemplified by Kyoto, and a 'bottom-up' and voluntary approach based on nationally determined targets, as in the Copenhagen Accord.

Even if, in the years that followed, actors failed to agree in negotiations on any legally binding framework, the Paris Convention represented an important step in creating a large international platform for committing to reduced emission. On December 2015, the UNFCCC signed the Paris Agreement, where all the 195 participant countries and the EU, agreed to "strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius" (UNFCCC, Paris Agreement, p.4). In Article 2 of the Agreement, three main goals have been set for a socially and environmentally sustainable development (UNFCCC, Paris Agreement, p.4):

> *"Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change;*
>
> *Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production; and*
>
> *Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development."*

In keeping in line with these commitments, each country needed to come forward with "Nationally Determined Contributions" (NDCs), where targets, plans and monitoring mechanisms have to be set in place, even if without submitting to any specific binding enforcement mechanism. While not providing a legally binding framework, the Paris

Agreement has had the merit to put a greater emphasis on transparency requirements, so that countries would need to demonstrate some form of political accountability on the commitments taken. Furthermore, the Agreement provided incentives for developed countries to fund adaptation projects in developing countries to increase their resilience to the upcoming devastating effects of the climate crisis.

1.3 Ethical Issues in the Governance of Climate Change

As it appears from this analysis of the challenges that climate change poses to governing bodies, the mitigation of the effects of global warming is a governance problem riddled with ethical issues. In a 2019 interview to The Associated Press, the President of Seychelles Islands, Danny Faure, made an appeal to the world, asking for quick responses to the progressive submersion of thousands of coastal settlements and islands by rising sea levels, calling for "responsible global action". This formula highlights two crucial elements in the definition of what constitutes the ethical dimension of climate change mitigation: the importance of a collective coordination of agency and the centrality of responsibility towards the effects of global warming. As a matter of fact, it can be advanced that reaching an effective form of collective climate action will be the most important ethical challenge that world leaders have to tackle in the years to come. Significantly, "Time for Action" is the title chosen for the 25th UN Framework Convention on Climate Change, held in Madrid in December 2019.

Nonetheless, the ethical question of climate change mitigation is far from being a recent issue; in fact, the necessity of the mitigation of climate change has sparked a lively ethical debate on what constitutes a "sustainable development" already from the publication of the report "Our Common Future" in 1989 (WCED 1987). As already summarized, the idea of a "sustainable development" was first introduced by the Brundtland Commission in 1989, where it was defined as a societal development that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987).

Already from its inception, the question of climate change is therefore intertwined with the philosophical question of what constitutes a just distribution of resources, both from a spatial perspective across different countries and from a temporal perspective between different generations. It can therefore be advanced that to properly introduce the ethical problem of governing climate change, three main dimensions are of crucial importance for policy-makers: the problem of achieving a meaningful collective agency, the challenge of intergenerational justice, and the issue of collective responsibility.

1.3.1 Climate Change and Collective Agency

The problem of collective action is one of the fundamental questions defining the field of climate ethics. Starting from its theoretical beginnings in the 1960s, the concept of collective action has come to frame a class of cooperation problems where social agents would be better off cooperating but achieve less than optimal results by acting in a self-interested way. In this regard, climate change has often been formalized as one such collective action problem, where humanity as a whole would be better off coordinating towards the abatement of carbon emissions, but has failed to do so by engaging in self-interested and uncooperative behavior.

The theory of collective action problems was first articulated by Mancur Olson in 1965 within his book *The Logic of Collective Action*, where social agents cooperating in a collective action to achieve a public good were shown to individually have a rational incentive to "free-ride" on the efforts of other members of the collective, and act in a self-interested way. In fact, Olson's theory posits that "unless the number of individuals in a group is quite small, or unless there is coercion or some other special device to make individuals act in their common interest, rational, self-interested individuals will not act to achieve their common or group interests" (Olson 1965). Therefore, in the face of a public good a collective needs a system of social sanctions and social rewards constituting a "selective incentive" to collaborate.

Importantly, Garrett Hardin expanded Olson's analysis of collective action problems to include common goods, like many natural resources systems. In this regard, the main difference between public and common goods can be articulated as the distinction between goods which are non-excludable and non-rivalrous (and therefore not subject to overuse), like national defense, roads, and parks, and goods which are non-excludable but rivalrous (and therefore subject to overuse), with natural resource systems like the atmosphere, water basins, fishing grounds, and forests as examples. Within his seminal work *The Tragedy of the Commons*, Hardin argued that individuals in a collective having access to a common resource would have a rational incentive to act according to self-interest and overuse it, thereby causing the eventual depletion of the resource (Hardin 1968). Therefore, according to Hardin, the ominous implications of the tragedy of the commons highlighted the necessity of fundamentally extending our morality and elaborate a new form of collective responsibility. Like Olson, Hardin believed that the development of this new collective responsibility should ultimately lead to the creation of a system of "mutual coercion, mutually agreed upon" (Hardin 1968).

As a matter of fact, it can be argued that one of greatest problems affecting the effective management of the climate crisis is an engrained form of moral parochialism in

developing ethical norms which apply only the narrow boundaries of the community in which one is embedded.

As Peter Singer notes, "our ancestors lived in groups of no more than a few hundred people, and those on the other side of a river or mountain range might as well have been living in a separate world. We developed ethical principles to help us to deal with problems within our community, not to help those outside it. The harms that it was considered wrong to cause were generally clear and well defined. We developed inhibitions against, and emotional responses to, such actions, and these instinctive or emotional reactions still form the basis for much of our moral thinking" (Singer 2011). In the face of an increasingly polluted environment, Singer contends that our normative apparatus is fundamentally unfit for the moral consideration of the pollution of the atmosphere, as its effects are so far removed from our immediate experience. In fact, this engrained moral parochialism affects the possibility of collective action at every level, from the individual to the institutional dimension.

Furthermore, the results of this moral inadequacy to the consideration of the aggregated effects of pollution are increasingly devastating. Accordingly, a recent study published on the academic journal *The Lancet* estimates that "more than five million extra deaths a year can be attributed to abnormal hot and cold temperatures" (Qi Zhao et al. 2021). As Singer observes, "causing imperceptible harm at a distance by the release of greenhouse gases is a completely new form of harm, and so we lack any kind of instinctive inhibitions or emotional response against causing it. We have trouble seeing it as harm at all" (Singer 2011). In this way, the climate crisis exemplifies a collective action problem, which requires a fundamental extension of our moral apparatus to create a new form of collective responsibility towards the aggregated effects of our individual behaviors at the planetary scale.

Within the climate ethics literature, Stephen Gardiner has developed an influential analysis of climate change as a "perfect moral storm" (Gardiner 2006, Gardiner 2011). On Gardiner's account, climate change is essentially a problem of collective agency. This agency failure is due to three main "storms", namely: a global storm, an intergenerational storm, and a theoretical storm. The first two moral storms can be seen as a failure of collective action in dealing with both the spatial and the temporal dispersion which characterizes climate change, the third moral storm can be interpreted as a failure of theory, in grounding a proper understanding of such collective action. As a matter of fact, for Gardiner, collective action fails for three main reasons: the "dispersion of causes and effects"; the "fragmentation of agency"; and "institutional inadequacy" (Gardiner 2011).

In what Gardiner calls the global storm, the spatial dispersion of causes can be understood if one considers the myriad of drivers of global warming, from individual consumption to agricultural land use, from the breeding of livestock to major industrial emissions, all contributing to the pollution of the atmosphere. As for the spatial dispersion of effects, it's a striking and ethically problematic feature of climate change that its impacts have a distinct non-local character, and they occur mostly uncorrelated to their location of origin, often distributing benefits and burdens unevenly between rich and poor countries. For what concerns the fragmentation of agency, Gardiner observes that climate change is characterized by a structural lack of unified agency; fractured into a multiplicity of decisional centers, from individuals to private companies and public institutions, climate change is a crisis that embodies what Garret Hardin called the Tragedy of the Commons (Hardin 1968). This, according to Gardiner, reflects a structural condition of climate action in which, for states, it would be collectively rational to cooperate to reduce total emissions, but it is at the same time individually rational not to restrict emissions and benefit from industrial growth without costly investments in a green economy. This fragmentation of agency, based on a clash of national interests, is also at the base of the last reason grounding the global storm, institutional inadequacy. The current political model, based on nation states, is largely inadequate to provide a remedy to this crisis of decision-making. No institution is currently acting at the same global scale of climate change; this gap between the local nature of institutional agency and the global nature of the climate problem is what grounds the inadequacy of current institutions.

Let's now examine the second aspect of the ethical problem of agency in dealing with climate change, the intergenerational storm. Here the dispersion of causes and effects is linked to three main temporal phenomena, characteristic of greenhouse gases: the resilience of GHG emissions, the back-loading of current effects, and the deferring of future impacts. The first aspect, the resilience of emissions, refers to the fact that greenhouse gases have a life as long as 200 years in the case of the atmospheric carbon cycle. As for the second aspect, the back-loading of climate change reflects the fact that the current rise in global temperatures is due to emissions emitted decades ago. This fact, of course, raises the third and most pressing ethical problem of climate change, namely that current emissions will most likely affect next generations decades from now, what Gardiner calls the "deferring of future impacts". For Gardiner's second dimension, the fragmentation of agency, cooperating to tackle the climate crisis involves even more structural problems in the case of intergenerational coordination. Here, the Tragedy of the Commons reveals itself in the lack of individual reasons for a generation to limit the pollution of the atmosphere when the consequences will be borne by future generations.

In this case, temporal coordination fails for deeper reasons than in the spatial case: generations only partially coexist, and thus solving problems of cooperation by incentivizing reciprocity or submission to common institutions seems like a structurally unattainable solution. As a result, an answer to the third and last dimension of the intergenerational storm, namely institutional inadequacy, seems all the more hopeless when dealing with temporally deferred agents.

As for the third storm, the theoretical storm, Gardiner observes the shortcomings of both our scientific and moral theories, in dealing with the complexity of a problem like climate change. According to the American philosopher, the combination of these three storms results in a high risk of moral corruption, a situation where the intentions of agents risk being corrupted by self-deception, moral manipulation, selective attention, and akrasia, and resulting in the stagnation of agency. It is therefore important for philosophers to articulate new forms of moral theory able to give proper moral consideration to the global aggregation of harms which is the pollution of our atmosphere.

Accordingly, classic ethical approaches like utilitarianism, Kantianism and virtue ethics have been considerably challenged by the necessity of accounting for collective action problems like climate change. In fact, these "ideal theories" have often struggled in finding an agreement on the morality of individuals' polluting actions, casting a doubt on the possibility of defining any individual duty to restrict one's own carbon footprint.

For what concerns utilitarianism, an action is considered wrong when it produces bad consequences, and the evaluation of consequences is usually based on the aggregated well-being that an action brings about. Nonetheless, it seems difficult to account for a moral wrongdoing for individual actions that produce as byproducts an infinitesimal increment of the pollution of the atmosphere. In fact, as Williston observes, it seems "difficult to link individual actions to discernible changes in the climate, let alone to the harms they cause" (Williston 2018).

As for Kantianism, an action is deemed right when it follows a maxim that one can rationally will to be a universal law. Apparently, Kantianism might represent a better alternative for the moral consideration of the aggregated harms of pollution at the root of global warming. Nonetheless, Kant's conception of rationality is based on an evaluation of one's own maxim as universalizable without contradictions in the will, but it seems difficult to see many acts involving the unintentional pollution of the environment as conducive to a contradiction in the will. As Sinnott-Armstrong argues "my maxim when I drive a gas guzzler just for fun on this sunny Sunday afternoon is simply to have harmless fun. There is no way to derive a contradiction from a universal law that people do or may have harmless fun" (Sinnott-Armstrong 2005). Finally, some philosophers have argued for

the advantages of virtue ethics in dealing with the climate crisis. Within the ethics of virtue, an action is considered good when it expresses a virtuous trait of character like temperance, modesty, or dignity.

Therefore, according to philosophers like Ronald Sandler, virtue ethics can represent a promising moral approach able to sidestep the theoretical quicksand encountered in the moral calculus of global consequences for individual emissions. Conversely, according to a virtue ethics approach, having a moderate lifestyle which cuts down significantly on personal emissions can be regarded as leading to the formation of a more virtuous character, regardless of the fact that an exemplary life may ultimately add up to no discernible changes in the world. Nonetheless, as Sinnott-Armstrong observed, it still remains problematic to regard many actions as vicious; in fact, the philosopher argues "how can we tell whether driving a gas guzzler for fun "expresses a vice"? On the face of it, it expresses a desire for fun. There is nothing vicious about having fun. Having fun becomes vicious only if it is harmful or risky" (Sinnott-Armstrong 2005). And even if some could see the act of driving a gas guzzler for fun as in principle expressing of a vicious character, "to apply this principle, we need some antecedent test of when an act expresses a vice. You cannot just say, 'I know vice when I see it', because other people look at the same act and do not see vice, just fun" (Sinnott-Armstrong 2005).

Accordingly, a new approach to climate ethics is emerging, adopting a more pluralistic and pragmatic perspective in the articulation of climate issues. As Williston argues, approaches defined within "ideal-theories" like Utilitarianism, Kantianism, and Virtue Ethics can actually be misleading by postulating an ideal world of full ethical compliance in the face of a non-ideal political reality and counterproductive by creating a theoretical rigidity around established ethical positions making it harder to understand other points of view (Williston 2018). In this regard, the philosopher Laura Valentini has proposed the development of non-ideal theories, grounded on the assumption of only partial ethical compliance, a pragmatic and realistic approach to the tackling of global issues, and a more procedural and less substantive perspective based on the progressive construction of shared ethical frameworks. It can be proposed that a pragmatist approach to the issues of climate ethics can represent a promising candidate for creating such a non-ideal theory. Accordingly, the task of the following chapters will be to articulate a way in which climate governance can be grounded on a plural and cooperative process of responsibilization.

1.3.2 Climate Change and Intergenerational Justice

As it was previously discussed, Stephen Gardiner called the moral conundrums raised by the future impacts of the climate crisis the "intergenerational storm" (Gardiner 2011). In

fact, the delayed nature of the harmful impacts of atmospheric pollution implies that most of the burdens derived from current emissions will be borne by future generations. Therefore, within climate ethics, the discussion on intergenerational justice has revolved around the moral consideration of the distribution of benefits and burdens among the present and future generations. As Henry Shue observed, "we now realize that the carbon-centered energy regime under which we live is modifying the human habitat, creating a more dangerous world for the living and for posterity. Our technologically primitive energy regime based on setting fire to fossil fuels is storing up, in the planet's radically altering atmosphere, sources of added threat for people who are vulnerable to us and cannot protect themselves against the consequences of our decisions for the circumstances in which they will have to live" (Shue 2010, p. 146).

It is thus important to clarify the ethical relevance of future generations in dealing with climate change. In this regard, certainly one of the first formulations of intergenerational justice as applied to the issue of climate change has been the introduction in the political vocabulary of the concept of "sustainable development" by the Brundtland Commission. Here, sustainable development was defined as a socio-technical configuration that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987). Therefore, the concept of a sustainable development has been centered from the beginning around the idea of strong moral reasons for protecting the environment for future generations.

As expressed in the report, "many present efforts to guard and maintain human progress, to meet human needs, and to realize human ambitions are simply unsustainable - in both the rich and poor nations. They draw too heavily, too quickly, on already overdrawn environmental resource accounts to be affordable far into the future without bankrupting those accounts. They may show profit on the balance sheets of our generation, but our children will inherit the losses. We borrow environmental capital from future generations with no intention or prospect of repaying. They may damn us for our spendthrift ways, but they can never collect on our debt to them. We act as we do because we can get away with it: future generations do not vote; they have no political or financial power; they cannot challenge our decisions" (WCED 1987, p. 16). This passage emphasizes a crucial element, namely the idea that the pollution of the environment constitutes a breach of the intergenerational pact, a failure in the exercise of our prospective responsibility, by borrowing environmental capital from future generations that we will never be able to repay. In this way, the present generation is imposing a harm on future generations that is structurally without any possibility of being compensated for. In fact, as Brian Barry has argued, the idea of sustainable development is a necessary condition for

intergenerational justice, "for the principle of responsibility says that, unless people in the future can be held responsible for the situation that they find themselves in, they should not be worse-off than we are" (Barry 1997, p. 98).

Nonetheless, theories of injustice based on harms imposed on future people encounter a considerable challenge in dealing with future altering policies. This fact is well analyzed by Edward Page, observing how "harm-based accounts of injustice [...] are incompatible with the fact that the very social policies which climatologists and scientists claim will reduce the risks of climate change will also predictably, if indirectly, determine which individuals will live in the future" (Page 1999, p. 1). As Page explains, it seems difficult to account for harms imposed on future persons as a form of injustice, where the same policies that produce the harms constitute, at the same time, the "necessary conditions of their coming into existence" (Page 1999, p. 1). In this regard, Derek Parfit is perhaps the philosopher who had the biggest impact in theoretical treatment of the meta-ethical problem of future persons in intergenerational definitions of justice. For addressing the ethical problems disclosed by policies affecting future people, it is helpful to start from a now classical thought experiment devised by Parfit in his article *Future Generations, Further Problems* (Parfit 1982, p. 118):

> *Depletion: Suppose that, as a community, we must choose whether to deplete or conserve certain kinds of resources. If we choose Depletion, the quality of life over the next two centuries would be slightly higher than it would have been if we had chosen Conservation, but it may later be much lower. Life at this much lower level would, however, still be well worth living.*

Parfit uses this thought experiment for exposing what he calls the "Non-Identity Problem", namely that choosing any such future altering policy like Depletion will significantly affect the future direction of history in a way that will impact the way people will live and reproduce, so that people born under Depletion would not have been born under Conservation, and vice versa (see Heyd 2014, Meyer 2015). This fact has profound implications over "person-affecting views" of value, where it is generally assumed the validity of such a principle like "wrongs require victims", according to which a choice cannot be said to be wrong if it will be worse for no one (Parfit 1982). Cases like Depletion become, under any such person-affecting view, morally problematic because they might seem to imply that since people born under Depletion would otherwise not exist, even if they enjoy a quality of life significantly lower to Conservation but still worth living, then Depletion is actually not harming anyone, and could even be regarded, in fact, as beneficial.

Come to this point, scholars have generally chosen two different roads to prevent the counterintuitive implications of a person-affecting view of value: the first is to abandon it and support an impersonal view of value, the second is to amend the person-affecting view in a way that prevents such implications. On the first alternative, scholars have defended an Impersonal View about the nature of value, where an action is considered good when it brings about a world, or state-of-affairs, which is considered to be valuable, independently of the particular identities inhabiting it (Heyd 2014, Singer 2011). Usually, the impersonal view has taken the form of a utilitarian approach, where good is framed in terms of the maximization of aggregated utility in a state of affairs. On the second alternative, framed usually inside a deontological approach, scholars have defended modified and improved forms of the person affecting view of value.

One such alternative is elaborated by Parfit in *On What Matters*, and it provides an expansion of its fundamental principle by reformulating it as "wrongs require potential or actual victims" (Parfit 2011a). This view expands the morally relevant set of affected persons from actual to potential persons, and introduces the idea of general persons. Within this approach, a general person is defined as "a large group of possible people, one of whom will be actual". Moreover, Parfit continues, we should therefore accept a "No-Difference View", stating that it makes no difference whether our action would be worse for actual persons as opposed to merely potential persons. According to this view (Parfit 2011b, p. 221):

> *We always have reasons [...] not to act in ways that would lower the future quality of people's lives, and these reasons would be just as strong whether or not - because these lives would be lived by different people - these acts would not be worse for any particular people.*

Therefore, according to Parfit, we should deny the validity of principles like "wrongs require victims" and affirm that "it is bad if those who live are worse off than those who might have lived" (Parfit 1982). Framed in this way, a person-affecting approach, adopting such a No-Difference View, can posit the existence of moral reasons for granting a sustainable development to future generations: as in Deontological approaches based on the respect of rights of future persons (Shue 2011), or their vital interests (Barry 1997); or as in Contractualist approaches grounded in the recognition of the equal moral status of persons (Scanlon 1998).

As Parfit's example shows, trade-offs must often be made between values in the politics of societal development, as in the choice between the sustainability or the profitability of two policy options. In fact, where a policy like *Conservation* secures a sustainable, but less

profitable, development; a policy like *Depletion* could grant a profitable future path, even if significantly less sustainable.

Here, Jeroen van den Hoven claims that it can be helpful to consider the role of technology in solving policy dilemmas, by introducing innovations that can meet both value dimensions at the same time. In this way, innovation acts by actively reconfiguring the material constraints of a given situation. Therefore, a form of "Responsible Innovation" can help to turn value trade-offs into feasible options and, in this way, "avoid moral overload by expanding the opportunity set, [...] changing the world in such a way that we can live by all our values" (van den Hoven et al. 2011, p. 150). Nonetheless, whether such an optimistic option is always available, remains a matter of dispute.

1.3.3 Climate Change and Responsibility

As previously discussed, the concept of sustainable development defined a model of societal growth that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987). After having examined the idea of sustainable development in relation to future generations, it is important to analyze the implications of this concept for the present time. In fact, next to intergenerational justice, the idea of a sustainable development passes from the achievement of a fair distribution of duties and responsibilities at the international level. In fact, the Brundtland Commission made clear that "widespread poverty is no longer inevitable. Poverty is not only an evil in itself, but sustainable development requires meeting the basic needs of all and extending to all the opportunity to fulfil their aspirations for a better life. A world in which poverty is endemic will always be prone to ecological and other catastrophes. Meeting essential needs requires not only a new era of economic growth for nations in which the majority are poor, but an assurance that those poor get their fair share of the resources required to sustain that growth" (WCED 1987).

The Commission had therefore an important historical role in making explicit the responsibility of national governments in tackling the huge disparities present in the world. Nonetheless, two main ethical problems arose in the attempt of operationalizing the concept of sustainable development: how to distribute the costs of climate mitigation between world countries? How to balance the needs of poor countries of economic development in the face of the necessity of reducing global emissions? As a matter of fact, from the establishment in 1992 of the United Nations Framework Convention on Climate Change, the international community has split over what represents the best answer to these questions.

As a first theoretical distinction, it can be pointed out that within climate governance responsibility has been usually framed as either backward-looking, intended as a form of remedial responsibility for past emissions, or as forward-looking, conceived as a form of prospective responsibility for effective climate mitigation (van de Poel et al. 2015).

Within the governance of climate change, it is possible to isolate three main families of criteria advocated by world countries in the articulation of a fair distribution of burdens for climate mitigation: a backward-looking approach based on a Responsibility Criterion, where a fair distribution of burdens should take into account the historical responsibilities of developed countries to the present climate crisis, based on their historical emissions; a forward-looking approach based on a Capacity Criterion, where a fair distribution of burdens should take into account the actual capacities of each country of taking climate mitigation measures, based on the actual "ability to pay" of each country (Ringius et al. 2002); and a forward-looking approach based on a *Need Criterion*, where a fair distribution of burdens should take into account the "rights to development" of the global poor, based on the right to "subsistence emissions" in meeting the basic needs of a human life (Shue 1993).

Within climate negotiations, these criteria have been the locus of harsh controversies and endless disputes among world governments. In this regard, one of the main arguments provided against the Responsibility Criterion for historical contributions has been the lack of scientific awareness of the climate problem during large part of the industrial development of western economies (Singer 2011). This objection has played an important role in establishing the year 1990 as a reference point for measuring the reduction of emissions, when broad scientific data became finally largely available to global governments about the reality and seriousness of climate change.

Furthermore, not all emissions can be considered as equal. Here, the philosopher Henry Shue has played an important role, within the ethical debate on climate change, in distinguishing between "subsistence emissions" and "luxury emissions". As Shue pointed out, in the calculation of past emissions, subsistence emissions should not be given the same weight as luxury emissions; in fact "just as the methane emissions from beef feedlots are in service of the desires of the wealthy, many of the CO_2 emissions in China and India could be—I am not assuming that they all in fact are—in service of the needs of the poor. Some agricultural methane emissions are a luxury, and some industrial CO_2 emissions are a necessity. By the standard of equity we do not want to leave all the former uncontrolled and control all the latter" (Shue 1993, p. 57). Accordingly, in the moral consideration of historical responsibilities, poor countries should not be considered liable to pay for living on subsistence emissions.

For what concerns the Capacity Criterion, one of its main expressions has been the Ability to Pay Principle. According to this principle, countries should bear the costs of a sustainable transition according to their respective ability to pay, as either measured in terms of national gross domestic product or in terms of a broader social, technological, and institutional development. Nonetheless, some parties have lamented that such a principle of responsibility distribution may act as a punishment for the more virtuous countries, which managed to achieve economic growth without substantially contributing to the pollution of the environment. In this respect, even if one admits that there has been historically a strict correlation between carbon emissions and economic development, following a Capacity Criterion could imply that some countries will pay more than demanded by the consideration of their historical responsibilities (Williston 2018).

As a recent study by Sælen & Tørstad shows, among major world emitters, the United States, Australia, and Russia all claim a form of Capacity Criterion in determining a fair distribution of emission permits, while China, India and Saudi Arabia often make reference to the Responsibility Criterion and the Need Criterion for allocating emissions quotas among countries (Tørstad & Sælen 2017). This subdivision mirrors, with few exceptions, a normative disagreement between developing countries, advocating for some consideration of the historical responsibilities of developed economies and for the recognition of the rights to development of emerging economies, and developed countries advocating across-the-board effective policies in reducing global temperatures. This normative disagreement reflects a focus on two different aspects of the climate problem: a focus on the *causes* of the problem, as reflected in the Responsibility Criterion of historical contributions, and a focus on the *effects* of policies, as reflected in the Capacity Criterion or the Need Criterion for effective mitigation policies.

One important exemplification of the Responsibility Criterion in international climate governance was the application of a principle of differentiation in the Kyoto Protocol between Annex I and non-Annex I parties, broadly reflecting the distinction between developed and developing countries. At the Kyoto Conference, the biggest supporters of this approach were Brazil and China, asking for the recognition of the historical responsibilities of developed countries in bringing about the current climate problem, as their industrial development has been the major historical driver of global warming (Singer 2011). Within the Kyoto Protocol, this responsibility criterion was expressed by the "Polluter Pays Principle", stating that the distribution of costs for the mitigation of climate change should be proportional to the historical emissions of a given country. Nonetheless, this principle was famously rejected by the United States, and the establishment of legally binding targets for reducing GHG emissions ultimately resulted in the missed ratification

of the Treaty by the US Senate, lamenting the unfairness of such allocation of responsibilities.

This fact can help explain the rise of a different approach after Kyoto, namely the creation of voluntary targets in the form of Intended Nationally Determined Contributions. This strategy supported a more pluralistic normative approach, where each country could choose to commit to reducing emissions according to different concepts of fairness. According to the study carried out by Sælen & Tørstad, among the world major emitters, this pluralistic approach finds support mainly by the EU, Japan and Indonesia.

As Dale Jamieson recognized, "the point of attributions of responsibility is practical. Given its modernity, flexibility, and the cross-cutting nature of its dimensions and uses even on particular occasions, it is not surprising that it is a domain in which pluralism dominates. One attribution (or conception) of responsibility does not immediately drive out another. As Bernard Williams writes, 'There is not, and there never could be, [...] just one correct conception of responsibility [...]. We ourselves, in various circumstances, need different conceptions of it'" (Jamieson 2015, p. 36). It is therefore helpful to consider responsibility not according to an *ex-ante* and substantial normative approach but according to an *ex-durante* and procedural account of responsibilization, based on a plurality of meanings of responsibility.

This paragraph has then contributed to highlight how "ideal theories" face important problems when faced with the wicked problems disclosed by the governance of climate change. The struggle of finding an agreement on the ethical grounds for limiting one's own carbon footprint, on the moral status of future generations, on the fairness of attributing specific responsibilities to single nations, suggests the importance of acknowledging the intrinsically complex, plural, and contextual definition of ethical issues in the management of the climate crisis. More and more, the urgency of global warming and its devastating impacts on all ecosystems requires a less rigid approach to these substantive issues and the recognition that a pragmatic approach might fare better in dealing with the complexity of governing sustainable transitions.

Accordingly, this review of the debate around the ethics of climate change has brought into light the potentiality of a pragmatist, cooperative, and plural approach to governing climate change, based on a gradual process of collective responsibilization.

1.4 Three Socio-Technical Scales of Climate Governance

Faced with the repeated failures of converging on a global strategy for tackling the climate crisis, a growing number of scholars has proposed the importance of a more polycentric

and multi-level approach to the management of climate change (Ostrom 2010; Bodin 2017; Carattini et al. 2019). Within this literature, polycentricity is defined as a model of governance based on "multiple governing authorities at different scales rather than a mono-centric unit", with each center retaining a considerable independence from others in the definition of the strategies tackling a given a policy-problem (Ostrom 2010). With respect to the problem of climate governance, the Nobel laureate in economics Elinor Ostrom argues how (Ostrom 2014):

> *Given the decades-long failure at an international level to reach agreement on efficient, fair, and enforceable reductions of greenhouse gas emissions, continuing to wait may defeat the possibilities of significant adaptations and mitigations in time to prevent tragic disasters. [...] Rather than only a global effort, it would be better to self-consciously adopt a polycentric approach to the problem of climate change in order to gain the benefits at multiple scales as well as to encourage experimentation and learning from diverse policies adopted at multiple scales.*

Accordingly, faced with the collective action problem which is the management of the climate crisis, it is increasingly recognized how climate governance can be articulated not only at the global level, but at many different scales, by the establishment of cooperative networks of institutional and social actors. This paragraph articulates then the multi-scalar challenge of governing the climate crisis polycentrically, by exploring the issues raised by climate governance at three different socio-technical scales: first it explores the role of smart cities within the governance of climate change; it proceeds then to analyze more specifically the challenges of managing the technical infrastructures of our built environment within sustainable transitions; and it concludes by focusing on the issues around the management of energy infrastructures in the realization of an energy transition.

1.4.1 The Role Smart Cities in the Governance of Climate Governance

Today, half of the world, more precisely 55% of the total population, lives in cities; according to the United Nations Department of Economic and Social Affairs this number is bound to rise to 68% in 2050 (according to the World Urbanization Prospects of 2018), and reach an 85% share by 2100 (OECD, The Metropolitan Century, 2015), with a staggering total of 9 billion people living in cities by the end of the XXI century. This shift will be characterized by the massive displacement of billions of people from rural settlements to urban areas, taking place mostly in developing countries. With more than

40 megacities counting over 10 million people by 2030, it is not an overstatement arguing that the design and governance of our cities will define the future of our societies.

While the city has become the crucial nexus of today's Earth System, its development has been marked in the last 30 years by a revolution in its infrastructure. From the 1990s onwards, the fast pace of technological innovation has created the conditions for an increasing digitalization of infrastructural systems: next to the traditional transport, energy, water and waste systems, information, and communication technologies (ICTs) have deeply impacted the management of cities (Nam and Pardo 2011, Chourabi et al. 2012, Kitchin 2013).

This historical change has created a fertile ground for the emergence of the concept of "digital city". Following Cocchia, it is possible to trace the development of this concept from its beginning in the 1990s, to its full-blown adoption in the 2000s (Cocchia 2014). The idea of the digital city was fostered by the large diffusion of the Internet and digital devices, and was shaped around the vision of a city driven by e-services, where technological advancement was projected to reshape urban life and its governance through the capillary diffusion of ICTs. The city, furthermore, was to become a hybrid object, at the same time digital and physical, fueled by a gradual informatization of the urban environment, having at its center the concept of space/code: software as the producer of new forms of space (Kitchin & Dodge 2011).

In the late part of the 2000s, nonetheless, the explosion of the financial crisis of 2008, and the enforcement of the Kyoto Protocol for reducing global CO_2 emissions in 2005, brought a new awareness of the necessity for a more sustainable growth, and broadened the idea of the future city to include much more than just urban digitalization.

It is in this historical context, at the beginning of the XXI century, that the concept of smart city appears for the first time (Cocchia 2014). Among its main drivers, the European Union's ratification in 2010 of the "Europe 2020 Strategy", putting at its center three main priorities: "smart growth: developing an economy based on knowledge and innovation; sustainable growth: promoting a more resource efficient, greener and more competitive economy; inclusive growth: fostering a high-employment economy delivering economic, social and territorial cohesion" (European Commission 2010, p. 8)".

Europe has been therefore a crucial force in promoting a central role of "smart" innovation as a driver of societal growth, while guaranteeing at the same time a better social and environmental sustainability. With the introduction of the term "smart" within the Europe 2020 Strategy, scholarly literature shifted rapidly its focus away from a purely digital idea of the future city to a new concept of "smart city" (Cocchia 2014). It is in this context that Caragliu proposed a now classical definition of smart city, built upon the six pillars of

smart economy, smart mobility, smart environment, smart people, smart living and smart governance (Caragliu et al. 2011, p. 50):

> *We believe a city to be smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance.*

With smartness at the center of this new conception of the city, innovation has been seen as opening the possibility of a new form of "intelligent city" (Komninos 2006). Where industrial cities were understood through physiological metaphors, linking the city to the mechanical functioning of the body, with its circulatory system and a system of arteries, a new urban physiology finds the nervous systems as the main metaphor for understanding the information-driven smart city. For Michael Batty the future of the urbanized world is a "Planetary Nervous Systems" (Batty et al. 2012), for Taewoo Nam and Theresa Pardo the new smart city is an "artificial nervous system, which enables them to behave in intelligently coordinated ways" (Nam & Pardo 2011).

This new urban intelligence is propelled mainly by three conceptual drivers: *technological drivers*, with a revolution of information and communication technologies changing the shape on urban infrastructures, *human drivers*, where new emphasis is put on knowledge, creativity and diversity as forms of smart social capital, and *institutional drivers*, where a progressive shift from central government to participatory forms of e-governance fuel a new inclusive decision-making (Nam & Pardo 2011). As Batty writes (Batty et al. 2012, p. 483):

> *The concept of the smart city emerged during the last decade as a fusion of ideas about how information and communications technologies might improve the functioning of cities, enhancing their efficiency, improving their competitiveness, and providing new ways in which problems of poverty, social deprivation, and poor environment might be addressed.*

As a result of this conceptual genealogy, it possible to propose to frame the smart city at the crossroad of two major historical changes: a new awareness of the opportunities of technological innovation, creating the basis for a tech-driven and growth-driven city, and a new awareness of the limits of economic and demographic expansion, creating the ground for a more sustainable and inclusive urban governance.

These two conceptual cores of the smart city context are reflected in the literature, which can be divided in *opportunity-driven conceptions*, as the one proposed by Harrison where the city is seen as "connecting the physical infrastructure, the IT infrastructure, the social

infrastructure, and the business infrastructure to leverage the collective intelligence of the city" (Harrison et al. 2010); and *risk-driven conceptions*, as the one put forward by Chourabi stating that "making a city "smart" is emerging as a strategy to mitigate the problems generated by the urban population growth and rapid urbanization" (Chourabi et al. 2012).

Despite the optimistic perspective underlining the idea of smarter cities, looking at technological and social innovation as the keys for a better urban future, many authors have underlined several limits of the smart city; particularly Kitchin has argued that smart cities should be reoriented along three crucial dimensions:

- from a technocratic view, based on a "rationalistic, mechanical, linear and hierarchical" interpretation of the city, where urban management is framed as an engineering problem for the efficient functioning of the infrastructural machine around a number of real-time data variables; to a more participatory and interconnected view, integrating technical solutions inside the specific social, political, and legal tissue of local practices, better suited to manage the "complex, open, multi-scalar, contingent and relational" nature of the city; (Kitchin 2016a; Kitchin 2016b)
- from a realistic epistemology of the city as a fixed object of knowledge, readable through analytics for data-sets which are often quantitative and mono-dimensional, and grounded on a scientific approach which is "reductionist, mechanistic, atomizing, essentialist, and deterministic in how it produces knowledge about cities"; to a pragmatist epistemology, putting at the center the recognition that the city is a reality in the making, where social actants constantly interact and reshape the nature of the city, and where knowledge is gathered more by practice and experience, than from a theoretical modeling; (Kitchin 2016a; Kitchin 2016b)
- from a means-driven approach, focusing mainly on technological innovations and justifying ex-post their potential application in solving narrow-scope urban problems, like traffic congestion or energy efficiency; to an ends-driven approach, giving priority to wide-scope societal values, where the design of technical innovations responds to societal goals fixed ex-ante in the innovation process. (Kitchin 2016a).

Shifting away from the ideal conception, the practical implementation of the smart city vision has also fallen short of providing a definitive answer to urban problems. A recent study lead by Hannele Ahvenniemi analyzed the epistemological apparatus of smart city

frameworks, through the lenses of their performance indicators (Ahvenniemi et al. 2017). The study focused on performance indicators because of the crucial role they play in the interpretation of the city, both in an epistemological sense, by selecting relevant dimensions along which urban reality is measured, and in a normative sense, by setting benchmarks that define the success of the performance in the relevant dimension, in meeting an established quality standard. Performance indicators have been selected to explore 10 sector categories, divided in "Natural environment; Built environment; Water and waste management; Transport; Energy; Economy; Education, culture, science and innovation; Well-being, Health and safety; Governance and citizen engagement; and Information and Communication Technologies (ICTs)" (Ahvenniemi et al. 2017). As the study shows, smart city frameworks privilege both economic and social indicators, while significantly disregarding environmental sectors.

It can be advanced that a picture emerges of the epistemological framework of the smart city: an anthropocentric apparatus – here perhaps to be understood in the Foucauldian sense of episteme, as a knowledge-power apparatus (Foucault 1966) – that puts at the center the well-being of humans, as sustained by an innovation-driven economic growth, while failing to give proper consideration to environmental concerns. Most significantly, smart city frameworks systematically disregard two crucial dimensions of environmental governance, Energy and Transport, despite huge investments by part of the EU in these sectors. In fact, for Ahvenniemi, the smart city represents a socio-technical system that systematically "emphasize human and virtual environment instead of the physical one" (Ahvenniemi et al. 2017).

It can therefore be suggested that the idea of the smart city must be included in the broader frame of a Sustainable City. In this regard, the 11th UN Sustainable Development Goal, advocating for "Sustainable cities and communities", can be considered as a promising perspective for the future of our cities (UN SDGs 2017). As the UN states "cities occupy just 3% of the Earth's land but account for 60 to 80% of energy consumption and at least 70% of carbon emissions". It is thus a crucial challenge of the upcoming future to build cities that are driven by a larger awareness of our "limits to growth" (Meadows 1972), by a better consideration of wider societal values (Kitchin 2016b), and by our "common but differentiated responsibilities" (UN, Rio Declaration, 1992) to leave "enough and as good" (Locke 1689) for present and future generations.

1.4.2 The Role of Infrastructure in the Governance of Climate Change

Infrastructures play an important role in the creation of a Sustainable City. In fact, today's infrastructural systems crucially determine the Earth System: the design of our transport,

energy, water, waste, and communication systems is a key element in tackling the biggest challenges that the world faces. The idea of a sustainable development, put forth by the UN with the formulation of 17 Sustainable Development Goals, passes therefore from the design of better infrastructural systems. Reducing poverty and inequalities, developing mitigation and adaptation strategies for climate change, reducing pollution of the environment, fostering economic, social, and cultural growth, all these societal goals are in large part determined, for the good as for the bad, by how infrastructures will be designed.

Given the centrality of infrastructure in defining the challenges of today's world, it is helpful to start this analysis from a precise definition of the term "infrastructure". Many scholars, from various disciplinary fields, have attempted the elusive conceptualization of what represents an infrastructure; among these, we will draw on three definitions.

The first belongs to the anthropologist Brian Larkin, pioneering the emergent field of "infrastructure studies"; according to Larkin "infrastructures are material forms that allow for the possibility of exchange over space. They are [...] built networks that facilitate the flow of goods, people, or ideas and allow for their exchange over space. As physical forms they shape the nature of a network, the speed and direction of its movement, its temporalities, and its vulnerability to breakdown" (Larkin 2013, p. 327).

The second definition informing the analysis has been developed by a research team of the Environmental Change Institute of Oxford, and recites: "infrastructure is the collection and interconnection of all physical facilities and human systems that are operated in a coordinated way to provide infrastructure services. An infrastructure service is the provision of an option for an activity by operating physical facilities and accompanying human systems to convert, store and transmit flow entities" (Otto et al. 2016, p. 3).

The third definition comes from the US Commission on Critical Infrastructure Protection, and defines infrastructure as "a network of independent, mostly privately owned, man-made systems and processes that function collaboratively and synergistically to produce and distribute a continuous flow of essential goods and services" (President's Commission on Critical Infrastructure Protection 1997, as in Edwards 2003).

Building on these definitions it can be proposed that there are three main characteristics defining infrastructures:

- infrastructures are large technical systems that facilitate the flow of goods, people, and information;
- infrastructures involve the spatial and temporal interconnection of both human networks and technical systems as socio-technical systems;

- infrastructures provide services which are essential (granting basic functionings inside a society) and universal (granting access to everyone).

As so defined, we can follow Oughton in dividing infrastructural systems of today in five main sectors: Energy; Transport, Water, Waste, and Communication (Oughton et al. 2018). As evidenced by this list, infrastructures can be seen as fundamental enablers of individual basic functionings inside a society: life without energy, transport, water, waste, or communication infrastructures seems today an intolerable burden. Some philosophers have even argued whether infrastructures, like transportation systems, can be considered kinds of Rawlsian primary goods, as "things … a rational man wants whatever else he wants" inside a liberal democracy (Rawls 1971, p. 92, as in Karel Martens 2017).

We can then claim that these socio-technical systems have, and have had, a central role as the backbone of our society, and as Edwards has suggested, they are co-essential to the very project of Modernity (Edwards 2003). As Edwards recognizes, "to be modern is to live within and by means of infrastructures, and therefore to inhabit, uneasily, the intersection of these multiple scales" (Edwards 2003). The same point has been made by Larkin, when he argues that infrastructure is indeed a product of the Enlightenment, grounded on a cosmopolitical conception of the free movement of people, goods, and ideas, around which progress becomes possible (Larkin 2013).

As a matter of fact, infrastructure, it can be argued, has been one of the major drivers of the stabilization of human life in the natural environment within industrial societies. This stabilization has been defined by a feedback loop between crucial technological innovations and changing social practices. Infrastructure, as a socio-technical system, has been the product of a continuous "co-evolution" of technology and society (Swierstra 2015a, Swierstra 2015b).

Indeed, these interpretations might be facets of a complex historical phenomenon analyzed under different perspectives. As Edwards suggests, depending on the scale at which we look at infrastructure, different causal patterns might emerge: at the *meso-scale* of large technical systems, infrastructure can be seen as a techno-political apparatus, deployed by national governments to organize and control the social and physical environment of States; at the *micro-scale* it can be observed how giant infrastructural projects were either re-appropriated by individuals by using them in unexpected ways (as the history of the telephone, reconstructed by Fisher, tells us how a business device was soon turned into a social device), or failed because they were not able to fit inside particular social rules, habits, and institutions; at the *macro-scale* of the historical succession of societies, infrastructures can be seen to respond to a slow functionalist

evolution of socio-technical systems, as gas lamps get replaced by light bulbs and neon lights, and the telegraph by phones and smartphones (Edwards 2003).
Therefore, the key insight of this hermeneutical recognition is that "any new infrastructure must somehow integrate with an installed base that includes not only artifacts but human habits, norms, and roles that may prove its most intractable elements" (Edwards et al. 2009, p. 366). Infrastructure is inherently socio-technical, articulating the fundamental entangling between technical and social systems. As Martin Franssen recognizes "there is an important class of artifacts, in the sense of man-made constructs, that cannot be seen as a single connected material object, nor as having a single user or even a sequence of single but distinct users. Typical examples are the infrastructures that form the backbone of our societies: the air and road transportation systems, the electricity and gas networks. Such artifacts have a diffuse multitude of users, a multitude that is, moreover, heterogeneous in that the purposes for which the users participate in its use may be quite different. It is increasingly being recognized that artifactual constructs of this sort have particular properties that set them apart from other artifacts, and pose special problems to the people who are involved in designing and implementing them, which has led to their being referred to by the special term 'socio-technical systems'" (Franssen 2009).

Building on these insights, we will now approach the recent literature on the governance of infrastructure. The 1960s and 1970s were two decades characterized by large-scale infrastructural developments, carried out by strong national governments through a centralized approach to planning. These decades thus represented a period of structural reforms, financed by public investments in mostly long-term infrastructural plans; in these years developed countries set in motion an astounding number of new projects in transportation, energy and water systems (Wegrich et al. 2017). As Wegrich recognizes, the main logic of centralized planning was fueled by "rational decision-making based on novel tools such as cost–benefit analysis" (Wegrich et al. 2017, p. 8).
But as studies started to analyze the legacy of this reform period, major shortcomings of such a centralized and hierarchical planning started to emerge, eventually brining about a paradigm shift in the management of infrastructure. In fact the author argues that (Wegrich et al. 2017, p. 8):

> *The concepts and theories developed in this line of research have been instrumental for the evolution of political research and the rise of the governance paradigm, in particular concerning the limits of hierarchical control, the political character of implementation, and the network-type structure of decision-making, as well as the internal fragmentation of government.*

As a result of the increasing complexity of infrastructural systems, the centralized model of government-driven infrastructure management was gradually supplanted by decentralized forms of public-private networks.

As Hammerschmid states, the biggest limits of the hierarchical model are to be traced in a Motivation Problem and an Information Problem (Hammerschmid 2017). The Motivation Problem reflects the limits of government decision-making as politicians are often guided by short-term electoral gain in choosing over policy priorities, significantly disregarding the pure maximization of welfare as a political goal; while the Information Problem reflects the limits of a centralized model in coordinating complex projects within governance networks, as hierarchical organizations are ill-suited in gathering sufficient knowledge of the single actors constituting it, and effectively managing it. It should be then acknowledged that "if organizational systems dealing with complex tasks wish to avoid the perils of over-centralization, they need to rely on horizontal coordination via negotiated decision-making to a substantial extent" (Hammerschmid 2017, p. 32).

Nonetheless, it important to remark that this shift towards an increasingly "horizontal coordination" of infrastructural projects raises serious problems with respect to the accountability, responsibility, and democracy of the process of decision-making. In fact, while governance networks are better suited to confront the complexities, uncertainties, and ambiguities of infrastructural planning, it is at the same time crucial to create alternative accountability mechanisms for these public-private partnerships.

While public administrations answer directly to citizens for their decisions, governance networks have to find other ways of implementing forms of political and moral accountability. While scholars like Jacint Jordana have underscored the importance of creating "social accountability mechanisms such as open participatory mechanisms (Mulgan 2003) or specific democratic innovations (Smith 2009)" (Jordana 2017) to provide more accountable forms of decision-making, serious research must be done on the ethical side, to provide a solid theory of accountability and responsibility in governance networks.

As previously argued, infrastructure has been one of the major drivers of the stabilization of human life in the natural environment inside industrial societies. Nonetheless, today the forgotten relation with the natural environment, produced by the stabilizing effects of modern infrastructures in creating an artificial environment for modern life, has resurfaced with dramatic urgency, as the impacts of industrial development on our planet have proved devastating. The question of how to design responsible and accountable governance networks for the management of infrastructure is therefore a crucial issue for determining how contemporary societies can respond to the societal demand for a

sustainable transition. Framing responsibility within governance networks is then a crucial step in creating accountable mechanisms of decision-making within the struggle to tackle the climate crisis.

1.4.3 Energy Systems and Climate Governance

Among all technical infrastructures, energy infrastructure represents the socio-technical system which has the biggest impact on the environment. In fact, the production of electricity and heat is the main driver of global warning, accounting for more than 35% of global greenhouse gases emissions. As a result, in the last decade, the academic field has shown a growing interest in the study of energy governance; this raising attention is certainly the result of the urgent need for an *energy transition* to renewable energy in both developed and developing countries (Florini, Sovacool 2009; Dubash, Florini 2011; Goldthau, Sovacool 2012; Van de Graaf 2013; Van de Graaf, Colgan 2016; Markard 2018).
In this respect, to better articulate the concept of energy governance, it can be helpful to start from a definition provided by Florini and Sovacool, where energy governance is framed as the set of "collective efforts undertaken to manage and distribute energy resources and provide energy services" (Florini, Sovacool 2009). Moreover, the term "energy transition" can be conceptualized as indicating the necessity of transitioning from an energy system based on fossil fuels to a more sustainable energy system, with greater levels of energy security, affordability, accessibility, and safety.
In fact, it is important to stress that, as many scholars have argued, the energy transition cannot be conceived as a purely technical conversion to renewable energy sources, but has to be accompanied by an understanding of the interconnections of the energy system with the broader political, economic and social context in which innovation is embedded (Geels, Schot 2007; Turnheim et al. 2015).
For instance, to give one example of this interconnection of social and technical aspects, scholars are increasingly concentrating on the uneven distribution of benefits and burdens in sustainable transitions, as the weakest sections of the population have historically paid a harsher price when subjected to such radical transformations of the society (Geels et al. 2017). Therefore, this shift in academic attention to the subject of energy governance has been motivated by the necessity of finding concrete answers to the new challenges that policy-makers face in the management of this historical transition away from carbon-based technologies. As Sovacool rightly argues, the "current energy systems are simply unsustainable on all accounts of social, economic, and environmental criteria" (Sovacool 2016, p. 202).

To answer these pressing challenges, the entire configuration of the energy system has to undergo a radical change. It has been argued that the interconnection of technical, economic, political, and social components characterizing the energy system renders the governance of the energy transition one of the most complex challenges that policy-makers face today (Goldthau, Sovacool 2012). As a matter of fact, Goldthau and Sovacool propose four main factors contributing to the complexity of the energy system: first, its vertical complexity, as energy production is structurally a layered system of extraction and transportation of resources, construction of plants and farms, transmission and distribution networks, and finally electricity supply to the built environment and agriculture; second, its horizontal complexity, characterized by governance networks spanning through multiple geographic scales and geopolitical actors; third, its high costs, due to the capital intensive nature of energy infrastructure and from the many externalities created by energy production; fourth, the strong path dependency of the sector, where the high costs of construction and the long-term horizon of infrastructural plans create various forms of lock-in mechanisms (Goldthau, Sovacool 2012).

Furthermore, the energy market is undergoing a radical transition as well, being strongly impacted by the urgency of tackling climate change through the development of sustainable energy technologies, by geopolitical changes due to the rapid rise of energy demand in developing countries like China and India, and by the growing volatility of fossil fuels prices as natural reserves are increasingly in the hands of autocratic or politically unstable governments (Van de Graaf 2016).

This mixture of economic, political and environmental aspects within the management of the energy transition has been defined the Energy Trilemma (Gunningham 2013). This concept describes the complex nature of the governance of energy systems in a sustainable transition, where policy-makers must keep in consideration economic factors, like the affordability and accessibility of energy services; political factors, like the security of energy provision for all citizens and the elimination of energy poverty; and finally environmental factors, like the mitigation of climate change through the spread of renewable energy sources (Heffron, McCauley 2017).

Furthermore, as Benjamin Sovacool underlines, the development of a transition away from carbon fuels should not be considered as a monolithic phenomenon but as a multiplicity of sectoral transformations “including renewable electricity, biofuel, nuclear power, smart grids, electric vehicles, and land use management” (Sovacool 2021, p. 202). Basing his framework on over two decades of studies in political ecology, Sovacool warns about the potential dangers of an ungoverned transition, where the emergence of phenomena of enclosure, exclusion, encroachment, and entrenchment could produce

new forms of dispossession, degradation, and destruction. Within this political ecology framework, enclosure refers to the privatization of public assets and natural resources, exclusion indicates the parallel phenomenon of dispossession suffered by marginalized communities, encroachment designates the possible damaging of natural environments by climate mitigation projects, and entrenchment points to the widening of inequalities, as green project may increase an unfair distribution of resources (Sovacool 2021). All these phenomena, resulting from a misgoverned transition, risk to have a negative impact on both human and natural environments, thereby exacerbating the resistance to the diffusion of sustainable projects by the most impacted sectors of society.

Jochen Mackard has offered another influential account of the intricacies of energy governance in this historical phase, identifying five key characteristics of sustainable transitions: the central role of public policies (1), the high level of complexity and uncertainty (2), the value-laden and contested nature of these socio-technical transformations (3-4), and finally the dependency of energy systems on the geopolitical context in which they are embedded (5) (Markard 2018).

Moreover, it is important to acknowledge that the energy transition is undergoing a gradual shift from an early phase, characterized by the emergence of new technologies adopted only by a small number of innovation niches, to a more mature phase, defined by the accelerated adoption of innovative technologies and by the growing instability of the existing socio-technical regime (Markard 2018). As Mackard recognizes, preparing to this second phase implies developing an articulated understanding of a changing energy landscape, where the interaction of multiple technologies requires a greater attention to system integration policies; the decline of established industries demands new transition policies both for supporting newcomers and for protecting closing businesses; sector reconfiguration makes the management of normative frictions a delicate matter for decision-makers; and systemic transformation must not be achieved at the expense of efficiency and accountability (Markard 2018).

Nonetheless, there is currently a lively debate among scholars on the speed of energy transitions. Within this literature, the concept of transition has been taken to mean “a particularly significant set of changes to the patterns of energy use in a society, potentially affecting resources, carriers, converters, and services” (O’Connor 2010). On one side, authors like Vaclav Smil have put forward a view framing transitions as slow technical transformations which span numerous decades to fully complete: “energy transitions have been, and will continue to be, inherently prolonged affairs, particularly so in large nations whose high levels of per capita energy use and whose massive and expensive

infrastructures make it impossible to greatly accelerate their progress even if we were to resort to some highly effective interventions" (Smil 2010).

To reach this result, Smil grounds his outlook on a historical analysis of the last three great energy transitions – namely from biofuels to coal, from coal to oil, and from oil to natural gas – to find that it has taken "two or three generations, or 50–75, years for a new resource to capture a large share of the global energy market" (Smil 2017). While Smil is careful not to affirm that this historical investigation implies a similarly slow transition to renewable energy sources, he also contends that "the odds are highly in favor of another protracted process" (Smil 2017). In fact, it must be recognized that the data at our disposal on the pace of the energy transition at the global level seem to support the idea of a slow transition, as renewable energy passed from representing 6% of the total primary energy consumption in 1970 to the 16% of today (Our World in Data, Ritchie & Roser 2020).

Nonetheless, on the other side, a number of scholars have contributed to elaborate a more nuanced interpretation of energy transitions. Among them, Benjamin Sovacool has helped to develop an alternative view of transitions by highlighting how "(1) we have seen fast transitions in terms of energy end-use and prime movers, (2) examples of rapid national-scale transitions in energy supply do populate the historical record, (3) the drivers of future transitions may differ fundamentally from the drivers of historical transitions; we can sufficiently learn from previous trends so that favorable future energy transitions can be expedited" (Sovacool 2016). To provide some examples of fast transitions at the national scale, if one calculates the time that it takes for an energy source to arrive at 25% of the whole market share, it took only eleven years for nuclear energy to arrive at this threshold in France, ten years for natural gas in the Netherlands, and three years for combined-heat-and-power in Denmark (Sovacool 2016).

While it is not possible to expect that similar transformations of the energy system will occur ubiquitously throughout the world at the same pace, there are some further reasons which point to a potential faster rate of the current transition with respect to previous historical periods: first, where past transitions were driven by an abundance of new resources, future ones might be increasingly driven by scarcity; second, where previous transitions were fueled by commercial opportunity, the transition to renewables is motivated by the environmental necessity of tackling climate change; third, innovation can play a major role in creating exponential curves of technology development and implementation (Sovacool 2016). The most important lesson to be learned is that a purely techno-economic analysis, focused solely on industrial and market dynamics, risks obscuring the ways in which governing bodies can contribute to accelerate the speed of transitions, as highlighted by the socio-institutional frameworks developed in recent years

by scholars like Frank Geels, Andreas Goldthau, and Benjamin Sovacool (Sovacool, Geels 2016).

Among the frameworks elaborated to frame transitions from a broader socio-technical perspective, Frank Geels has certainly developed one of the most influential works in the literature (Geels, Schot 2007). In a seminal paper, Frank Geels and Johan Schot have presented a "multi-level perspective" articulating a "typology of transition pathways" based on three socio-technical levels of analysis: niche-innovations, socio-technical regimes and socio-technical landscape (Geels, Schot 2007). According to the multi-level perspective, transitions are socio-technical transformations articulated along three phases: "(a) niche-innovations build up internal momentum, through learning processes price/performance improvements, and support from powerful groups, (b) changes at the landscape level create pressure on the regime and (c) destabilization of the regime creates windows of opportunity for niche innovations" (Geels, Schot 2007).

A now classic example is provided by the "Energiewende", or energy transition, which occurred in Germany during the 1980s and 1990s. In fact, the development of research and development programs during the Seventies contributed to a certain diffusion of solar and wind technologies at the local level in a number of energy communities throughout the country. To be sure, the development of these innovation niches was not enough to destabilize the existing socio-technical regime constituted by the fossil fuel industry in the country. Nonetheless, a powerful landscape shock was, in this regard, the Chernobyl disaster occurred in 1986 in the Soviet Union, which amplified an already diffused anti-nuclear sentiment in Germany and created the conditions for the development of a broader space for renewable energy in the country energy mix. As a result, in the face of a growing environmentalist movement, the German government launched a series of policies, like feed-in tariffs for renewable energy and green subsidies, which contributed to a large diffusion of wind turbines and solar energy in the country.

Therefore, what the multi-level perspective provides to policy-makers is an understanding of transitions as complex and layered processes which require the mobilization of "a range of items such as financial instruments (taxes, subsidies, grants, loans), regulatory instruments (standards, laws, performance targets), and processual instrument (demonstration projects, network management, public debates, consultations, foresight exercises, roadmaps)" (Geels et al. 2017). Furthermore, decision-makers should support the development of niches in the early phases of a transition, by facilitating governance networks and by developing innovation policies, which contribute to the creation of protected enclaves within the existing socio-technical regime. Governments should instead aim at developing more targeted policies to pressure the existing regime, like

carbon taxing, cap-and-trade systems, and more restrictive regulations greenhouse gases emitters (Geels et al. 2017).

1.5 Conclusions

This chapter has then helped to highlight the various challenges inherent in the governance of climate change. It started by analyzing and problematizing the concept of Anthropocene and it proceeded by exposing the systemic impacts of human activity on all earth ecosystems. It continued by providing a brief history of the governmental efforts to tackle the climate crisis. As it was shown, the trans-national governance of climate change has been marked by the struggles on the global stage to converge on a collective agreement on a set of regulations for climate mitigation. The next paragraph has explored the moral aspects which ground the persisting disagreements between world nations on what constitutes a fair distribution of duties and responsibilities. The dissertation has then suggested the potential for a polycentric governance of the climate crisis based on the creation of cooperative networks at multiple scales. The chapter has then closed by articulating the challenges of the complex governance of climate mitigation at the scale of the city, of its technical infrastructures, and of its energy systems.

Accordingly, this review of the relevant debates around the moral challenges of the multi-level governance of climate change has brought into light the need for a new approach. Here, the manuscript has briefly assessed the potential of a cooperative and pluralist approach to governing climate change, based on a gradual process of collective responsibilization. Nonetheless, the research has also brought forth the challenges of a more participatory model of governance; here, the promise of cooperative governance has raised the problem of how to avoid responsibility gaps, the potential of a plural governance has raised the question of how to achieve a responsive model of decision-making. This first chapter has then contributed to define one main objective for the research: the development of an articulated understanding of the moral implications of designing cooperative institutions in a sustainable transition. Therefore, the goal of the thesis will be to answer to the question of how it is possible to formulate collective responsibility within a horizontal structure of cooperative governance; and how can societal institutions be designed in order to respect the plurality inherent in the many moral perceptions around sustainable transitions. The next two chapters will provide then two theoretical frameworks articulating a theory of responsible and responsive cooperative governance. The insights of these frameworks will be applied in the successive chapters to the specific challenge of the governance of the energy transition.

2

Collective Responsibility in the Cooperative Governance of Climate Change

2.1 Introduction

To a large degree, the mitigation of the effects of climate change represents the greatest ethical and political challenge that our society faces today. The urgency of taking tempestive and effective climate action has been recognized by the United Nations as one of the key goals for sustainable development (UN General Assembly 2015). As the Intergovernmental Panel on Climate Change (IPCC) has claimed, "each of the last four decades has been successively warmer than any decade that preceded it since 1850." (IPCC 2021). Anthropogenic emissions of greenhouse gases are the main drivers of such an increase in global temperatures and they derive from increased energy consumption, industrial development, growing demographic numbers, land-use change, and consumption habits. To maintain the commitments of the Paris Agreement of limiting the increase in global average temperatures to 1.5 °C with respect to preindustrial levels, governments have to accelerate the transition toward sustainable development.

However, the management of sustainable transitions requires the coordination of complex socio–technical–ecological systems, which are characterized by the intertwinement of natural ecosystems, institutional regulations, private markets, infrastructures, technological innovations, and user practices (Geels, Schot 2007; Geels et al. 2017). As Oran Young has recognized, "sustainable development is a broad objective that calls for a melding of economic, social, and environmental factors, both to enhance the well-being of individual humans and to produce resilient socio-ecological systems from the local to the global level" (Young et al. 2017). The management of such complex adaptive systems (Miller et al. 2009), which involves the expertise necessary for organizing the layered composition of technical, economic, environmental, and social challenges, is no longer within the reach of central administrations within nation states. To a large

extent, centralized command-and-control practices are proving to be at best a partial solution to the challenge of governing the complexity of the sustainable transition (Berkes et al. 2008).

Within the academic literature, a variety of new approaches for the management of social-ecological systems has emerged: from polycentric governance, which is centred around the multiple and nested centres of decision-making involved in devising context-specific solutions to environmental problems (Ostrom 2009; Ostrom 2010a), to adaptive governance, which is based on the dynamic capacity of social networks to self-organize, share knowledge, and respond adaptively to emergent social–ecological phenomena (Folke et al. 2005; Schultz et al. 2015), to collaborative governance, which is grounded in the ability of multiple stake-holders, both public and private, to effectively share information and mutually learn from best practices in the achievement of common societal goals (Ansell et al. 2008).

All of these approaches have emerged as an answer to the shortcomings of centralized regulation and downstream implementation in managing social–ecological systems, and they have contributed to a shift in the academic discourse toward cooperative and participatory models of governance. The advantages of these governance networks are the increased ability to adapt quickly to emergent phenomena, to provide fine-grained information on local impacts, to deploy articulated expertise in technological innovations, and to allow for effective multi-level coordination across government scales (Bodin 2017). In fact, as the scale and complexity of policy problems has increased exponentially, public policy has under-taken a "governance revolution" (Klijn, Koppenjan 2020), where a vertical and centralized conception of public administration, focused on the structure of government, has been gradually supplanted by a horizontal and decentralized model of governance, centred instead on the process of governing, opening the management of policy problems to governance networks of societal actors from public, private, and civil society sectors (Klijn, Koppenjan 2015).

This shift to the cooperative management of social–ecological systems has nonetheless brought about new challenges: a less structured decision-making process, a multiplicity of actors with diverging perspectives and interests, and the necessity of a continuous reciprocal adaptation of plans and policies. Therefore, the moral question of a sustainable future revolves around the successful management of the increasingly complex nature of the Earth system's governance (Kanie, Biermann 2017). The responsibility toward present and future generations for a sustainable transition forces all societal actors to address the question of how to achieve responsible collective agency. Hence, this chapter will concentrate on how governance can today answer to the planetary crisis that is climate

change; at its centre, this paper outlines two main challenges that a theory of governance has to meet when managing the effects of anthropogenic global warming: the fragmentation of agency between a collection of self-interested societal actors (Gardiner 2010) and the resulting risk of failing to achieve any meaningful form of responsibility. It will be argued that a promising solution lies in the creation of a framework for responsible cooperative governance within the management of social–ecological systems.

The chapter will develop by modelling climate change as an instance of the Tragedy of the Commons in the economic literature (Hardin 1968) and as a Problem of Many Hands in the ethical literature (Thompson 1980; van de Poel et al. 2015). Within the economic literature, much work has been carried out on the formalization of climate change as a collective action problem (Ostrom 1990; Ostrom 2005; Paavola 2012; Carattini et al. 2019). Here, I will first offer a reconstruction of Garrett Hardin's original argument, framing commons as dilemmatic situations characterized by a tension between individual and collective rationality. For what concerns the formalization of climate change as a Problem of Many Hands, I will follow the work of van de Poel in his *The Problem of Many Hands: Climate Change as an Example* (van de Poel et al. 2012). Here, van de Poel argues, climate change can be analysed as a dilemmatic situation characterized by a tension between individual and collective responsibility.

The chapter will then show how Elinor Ostrom's work has contributed to offer a theoretical solution to the tragedy of the commons by framing this rational dilemma within a theory of cooperative governance. I will then proceed by sketching out Michael Bratman's theory of shared agency, and argue that such a theory can provide the conceptual basis for solving the problem of many hands in climate governance by laying out a set of conditions for distributing responsibilities within cooperative governance networks.

2.2 An Economic Formalization of Climate Change: The Tragedy of the Commons

It is first important to sketch in further detail how climate change has been formalized, inside economic theory, as a problem of "common resources" management in Garret Hardin's 1968 article The Tragedy of the Commons (Hardin 1968). That paper, framed within a Malthusian logic (Van de Walle et al. 1977), addresses one main challenge for our civilization: Earth is be-coming too densely populated, which puts an unprecedented burden on our shared resources, namely, the commons. The core of Hardin's argument is to be found in the theoretical impasse reached in managing common-pool resources within a model of individual rationality. The argument develops by drawing a now

renowned scenario: a group of herders lets their herds graze in a common pasture. Each herder will try to rationally maximize his utility by steadily growing his herd; at a certain moment, though, a certain threshold will be reached and an additional increment of one animal to the field will incur in the overgrazing of the pasture. At this point, so Hardin's argument goes, the addition of one animal will represent, for each herder, both a positive and a negative component of utility (Hardin 1968):

> *The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of one additional animal, the positive utility is nearly +1.*
> *The negative component is a function of the additional overgrazing created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsmen, the negative utility for any particular decision-making herdsman is only a fraction of −1.*

As the scenario shows, the depletion of a common-pool resource occurs when the resource stock is consumed by the appropriators faster than its regeneration rate (Ostrom et al. 1994). Nonetheless, irrespective of the consequences, in economic terms for each herdsman, the marginal benefits of adding cattle to the graze are larger than the marginal costs. Therefore, the rational conclusion to be drawn by any herdsman, faced with a decision between cooperating or defecting in the collective action, will be to "free-ride" and unilaterally choose what is in his best interest; the result will be the gradual addition of cattle to the pasture, with the further consequence of eventually depleting the commons. For Hardin, this shows how a model of individual rationality, applied to the management of a common resource, results in its eventual depletion: this fact constitutes the conceptual core of the Tragedy of the Commons. As Hardin commented, in commons dilemmas, we face a tragic situation where we lack a solution that has a "technical" character, where "a technical solution may be defined as one that requires a change only in the techniques of the natural sciences, demanding little or nothing in the way of change in human values or ideas of morality" (Hardin 1968).
It is possible to describe this technical failure in a game-theoretic language by framing the common pasture as an interactive decision-making game, where the optimal choice at the individual level paradoxically constitutes a suboptimal choice at the collective level (Ostrom et al. 1994). As a result, in a Tragedy of the Commons, each herdsman, who is in the dark with respect to the other herdsmen's decisions, has an incentive to unilaterally defect, or "free-ride," rather than cooperating; this failure of coordination in a collective action ultimately results in an outcome that is not an equilibrium, and thus represents a

cooperation problem (Guala 2016). As Hardin saw, this failure to cooperate would eventually place unsustainable pressure on common resources. Nowadays, an infinite number of tragedies of the commons, caused by unilateral and self-interested decision-making, feeds the daily reports on the ongoing catastrophe that is climate change: oceans are undergoing progressive acidification, human and non-human life is threatened by the erosion of natural habitats, the atmosphere is becoming increasingly polluted, and global temperatures are rising. At every level, from nation states to city administrations, private companies, and consumer habits, human conduct is proving to be dramatically inadequate to prevent the depletion of our commons, bringing about an environmental and social disaster of unprecedented dimension. What Hardin provides is a game-theoretic analysis of such a disaster, showing how an insular model of homo economicus, moved by the maximization of individual utility, is bound to meet its anthropological limits when faced with the problem of managing a common resource.

2.3 An Ethical Formalization of Climate Change: The Problem of Many Hands

Coming to the ethical analysis of the Tragedy of the Commons, this section tackles the problem of climate change in terms of our moral responsibility to prevent it. The aim will be to argue how commons dilemmas constitute not only a rational impasse but also a moral one, as climate change can be modelled as a case of "collective responsibility without individual responsibility." This responsibility gap constitutes what, in the literature, has been called the Problem of Many Hands. Here, the meaning of responsibility will be taken as close to its etymological sense, as answering for one's actions; specifically, agents will be regarded as responsible for an action φ, when they are causally linked with a harm that they cannot reasonably justify, making their action blameworthy in an objective-reasons implying sense (Parfit 2011a; Parfit 2011b).

Where responsibility is usually framed within the context of past actions, in terms of remedial responsibility, here responsibility will be analysed not in its backward-looking sense, but rather its forward-looking sense, as a form of prospective responsibility: we bear such a responsibility when we should prevent some event to bring about a bad outcome. To the degree that climate change poses an unprecedented threat to both present and future life on Earth, it can be maintained that preventing its devastating impacts represents a clear case of prospective responsibility (Gardiner 2011). Within metaethical theory, Ibo van de Poel has suggested that we hold a prospective responsibility (PR) when the following conditions apply (van de Poel et al. 2011; van de Poel et al. 2015):

1. Capacity condition: the agent is capable of moral agency;
2. Causal efficacy condition: the agent is causally efficacious in bringing about the outcome;
3. Normative condition: bringing about the outcome is morally wrong.

Let us now examine how these three conditions apply to the actions of individuals in the case of climate change as an instance of a Tragedy of the Commons. Starting from the capacity condition, the attribution of moral capacity is regarded as a fundamental attribute of every person capable of intentional action. To the extent that an agent is capable of intentional agency, it can be claimed that such a person satisfies the capacity condition. As for the causal efficacy condition, it is possible to ask: can individuals prevent the depletion of the shared resource in a Tragedy of the Commons? Baylor Johnson, in *Ethical Obligations in a Tragedy of the Commons*, has convincingly argued that it seems difficult to maintain (Johnson 2003). Looking closely at Johnson's argument, it is possible to see that the philosopher's reflection centres around the impossibility of being causally efficacious in uncoordinated agency:

> *[…] voluntary, unilateral reductions of use have no reasonable expectation of success when the situation faced strongly resembles a Tragedy of the Commons in other respects. It is very unlikely that most commons users will adopt such widespread restraint without organized assurances that others will mirror one's own restraint. The reasons are those given above: the incentives users have in such cases; each user's knowledge that her restraint is likely only to reward less scrupulous users; each user's awareness that every other user sees the same discouraging prospect; the need for nearly universal restraint in order to effectively protect the commons or reassure users that their sacrifice is not in vain.*

As it appears from the excerpt, what determines the absence of causal efficacy is not just the limited agency of the person but also the structure of the coordination game that every actor faces. Indeed, many philosophers have held that no individual person can be reasonably regarded as causally efficacious in preventing climate change (van de Poel et al. 2015; Jamieson 2009; Sinnott-Armstrong 2010; Singer 2011). Coming to the third, and final, normative condition for prospective responsibility, it can be asked whether any individual actor is engaging in some form of wrongdoing. Within the field of climate ethics, Walter Sinnott-Armstrong has argued, in *It's Not My Fault: Global Warming and Individual Obligations*, that no individual actor can be held responsible for a form of wrongdoing in the case of climate change (Sinnott-Armstrong 2010). Here, the author claims, no plausible

moral principle can determine a wrongdoing in failing to limit our carbon footprint, since individuals are neither sufficient nor necessary for determining global warming as a harm, individuals act under no intention of harming, and individual harms cannot be simply aggregated since global warming is an emergent, threshold phenomenon. A similar point is made by Johnson by arguing how an individual does not engage in wrongdoing in a commons dilemma because unilateral restrictions cannot be effective in preventing the depletion of the resource, the moral duty to unilaterally restrict the consumption of the resource might be overridden by the sacrifice and competitive disadvantage it entails, and finally, no one person's use of the commons is large enough to cause its depletion (Johnson 2003).

Therefore, it seems that from a moral perspective, no forward-looking responsibility can be attributed to individuals for preventing the depletion of our planetary resources. I submit that this fact constitutes a form of Moral Tragedy of the Commons. Conversely, from the point of view of the collective, these three conditions seem to be met: regarding the capacity condition, as long as humanity achieves some form of coordinated agency, it can be regarded as capable of intentional and moral agency; regarding the causal efficacy condition, as a collective, humanity can certainly be causally efficacious in preventing the climate crisis; and finally, regarding the normative condition, as a whole, humanity can be considered morally blameworthy for bringing about the devastating intergenerational crisis that is climate change.

As it appears from the reconstruction proposed, it can be advanced that there is symmetry in a Tragedy of the Commons between the dilemmatic disconnect between individual and collective rationality in its economic formalization and between individual and collective responsibility in its ethical formalization: just as there are collective reasons, but not individual ones, to prevent the depletion of common resources, there are collective moral reasons, but not individual ones, for preventing the disastrous effects that climate change will bring about. This dilemmatic situation, in which we have a fundamental gap between individual and collective responsibility, was first described by Dennis Thompson in *Moral Responsibility and Public Officials* as the Problem of Many Hands (Thompson 1980). According to Ibo van de Poel, the Problem of Many Hands can be defined as follows (van de Poel et al. 2015):

> *The Problem of Many Hands (PMH) occurs if a collective is morally responsible for φ whereas none of the individuals making up the collective is morally responsible for φ.*

Therefore, it can be argued that the Problem of Many Hands provides a useful ethical formalization of commons dilemmas, as in the case of climate change. As it appears from the reconstruction that has been proposed, we can advance the thesis that whenever a rational failure, such as a Tragedy of the Commons occurs, a parallel moral failure occurs as a Problem of Many Hands, since "free-riding" the commons is not irrational or irresponsible at the individual level, while it constitutes a rational and moral failure at the collective level. Indeed, as argued, such is the case of climate change in the absence of a cooperative political environment, where an individual can find no rational or moral demands to reduce one's own carbon emissions, while humanity as a whole should answer to both rational and moral demands for urgent climate action.

2.4 Conventional Solutions to the Tragedy of the Commons: Governments and Markets

Within the field of economics, to face the structural shortcomings of such collective action problems, two proposals have traditionally been advanced, both of which are grounded in the establishment of institutions: on the one hand, the appeal to the institution of the state, by turning the commons into a public good; on the other hand, the appeal to the institution of private property, by turning the commons into a private good. Where, in the first case, the structure of the coordination game gets changed through the power of the state by introducing sanctions that modify the structure of individual incentives for defecting in the mutual effort and deviating from the equilibrium; in the second case, the coordination problem is solved by eliminating the very necessity of a collective action, as the commons get partitioned between the different actors, and the role of coordination is thereafter provided by the market.

As Elinor Ostrom pointed out, the debate revolved for the better part of the 1970s and 1980s around a fundamental opposition between defenders of the "market" formula and supporters of the "Leviathan" solution (Ostrom 1990). On both views, the failure of individual rationality in a commons dilemma requires the creation of an external institution to enforce rules on the actors to prevent their eventual depletion. Hardin pointed out how the pollution of our environment represents such a case: while it is rational for an individual to indefinitely profit from activities that produce the pollution of the environment as by-products, it is not rational for the collective as a whole to engage in such activities beyond a point where their aggregated effects produce a net disadvantage in the balance of benefits and costs (Hardin 1968).

On the one hand, many economists saw a solution to the problem of negative externalities, such as a polluting factory, in the workings of the invisible hand of the

market. Basing their arguments on Coasian bargaining (Coase 2007), economists argued that when an economic activity produces some externality, a market on the externalities, allowing for a bargain between the parties involved, will reach a Pareto efficient outcome. Nonetheless, as Hardin correctly assumed, for many cases of pollution of natural resources - such as our rivers, seas, and atmosphere - defining and enforcing clear property rights would seem difficult, if not impossible. Furthermore, as Coase himself pointed out, in most cases of polluting externalities, the spread of the impacts among a large number of individuals would make the organization of a bargain extremely costly, making transaction costs extremely high. Elinor Ostrom systematized these observations, pointing out the limits of privatization in solving commons dilemmas when: (1) resources are nonstationary, (2) resources are global or have a large geographical extension, (3) it is difficult to place boundaries and protect the private property, and (4) resource flow is unevenly distributed in both space and time (Ostrom et al. 1994). In fact, many common resources such as oceans, water basins, coral reefs, animal habitats, the atmosphere, and many of the Earth's ecosystems, are difficult, and indeed at times impossible, to privatize. As a result, the problem of negative externalities in many commons dilemmas seems to be simply unsolvable via the simple mechanism of the market.

On the other hand, Hardin eventually became a supporter of the public management of commons, arguing that "if ruin is to be avoided in a crowded world, people must be responsive to a coercive force outside their individual psyches, a 'Leviathan' to use Hobbes' term" (Hardin 1968). In this picture, the authority, as a Leviathan, must act in the collective interest by modifying the structure of incentives producing the externalities and restore optimal coordination in the management of the commons. For economists advocating a bigger role of the state in solving externalities, the action of government has to take the form of Pigovian taxation, designing incentives or establishing sanctions to change the structure of payoffs in the game and restore coordination between the actors involved, so as to internalize the externalities and prevent a less-than-efficient outcome from being realized. In this way, the actors can carry on their activities based on the exploitation of the common resource without depleting it. However, Ostrom claimed that turning commons into public goods was bound to face some shortcomings when (1) creating new institutions may turn out to be slow or difficult, (2) creating new institutions has high costs, and (3) institutions may demonstrate inefficient in managing the commons (Ostrom et al. 1994).

Interestingly, within environmental governance, the "market" solution, of Coasian inspiration, is at the base of contemporary cap-and-trade systems (Coase 2007, Coase 2014). These markets work by setting a maximum threshold of emissions within a country

and allowing companies to trade in emission permits according to their productive necessities. In contrast, the "Leviathan" solution, of Pigovian inspiration, grounds contemporary forms of carbon taxation (Pigou 2017). In this case, the negative externalities are internalized through a different form of carbon pricing: a Pareto efficient outcome is secured by setting a tax on emissions equal to the social costs generated through the polluting activities. Nonetheless, these measures have provided only local solutions to the issue of climate change, and global governments have failed, until today, to converge on a common set of climate regulations.

2.5 Conventional Solutions to the Problem of Many Hands: Organization and Authority

As we saw, within the field of applied ethics, van de Poel defines the Problem of Many Hands as a dilemmatic disconnect between individual and collective responsibility. Within his philosophical framework, the Problem of Many Hands is framed as resulting from a failure to effectively distribute responsibility in a group (van de Poel et al. 2015). The argument develops by pointing out how whenever a collection of agents lacks a proper organizational structure, no single actor has a formally defined role with a respective array of task-responsibilities. This is a consequence of the impossibility of properly discharging the collective responsibility among an uncoordinated collection of agents, since the group lacks an organizational structure for effectively distributing responsibility at the individual level.

The main proposal of van de Poel is then to suggest that, to prevent the occurrence of the Problem of Many Hands, a collective needs a better organizational structure for efficiently distributing responsibilities among the various actors. Accordingly, van de Poel seems to follow the work of Grossi, Royakkers, and Dignum in *Organizational Structure and Responsibility* by claiming that increased organization is to be achieved through the establishment of clearer *authority*, defining a hierarchical structure of responsibility delegation from a decisional centre; better *coordination*, granting an increased flow of relevant information and knowledge between the actors involved; and increased *control*, securing a stricter supervisory activity (Grossi et al. 2007; Zwart 2015). According to van de Poel, we can sketch a taxonomy of three different types of groups to which the Problem of Many Hands applies in cases of prospective responsibility (van de Poel et al. 2015):

1. *Organized groups (also sometimes called 'corporate agents') that can formulate and adopt collective aims by a collective (decision) procedure;*
2. *Collectives involved in a joint action. The joint action is characterized by a collective aim that is in some sense [...] shared by the members of the collective;*

3. *Occasional collections of individuals that lack a collective aim but that nevertheless can be reasonably expected to form a collective in one of the two above senses to avoid harm or to do good*.

Van de Poel suggests that, as one moves from organizations down to collectives and collections, the progressive fragmentation of agency and the resulting impossibility to distribute responsibilities back at the individual level creates the conditions for the emergence of responsibility gaps like the Problem of Many Hands. Therefore, preventing responsibility gaps from occurring requires organizing a group in a hierarchical structure that is centred around authority, coordination, and control.

While these conditions constitute the basis for the design of a clearer organization within hierarchical entities, like corporations or public administrations, it should nonetheless be noticed how such conditions are ill-suited to provide a proper ground for the coordination of governance networks in the management of the environment. In fact, a centralized conception of vertical organization best applies to traditional public administration where hierarchical trees and command and control practices define the structure of task-delegation within a group of public officials (Klijn, Koppenjan 2015). However, crucially, governing social–ecological systems administrations are confronted with complex problems that are difficult to solve by a unique decision-making centre (Folke et al. 2005; Berkes et al. 2008). The analysis and the management of complex feedbacks between social and ecological systems requires the aggregation of a multiplicity of actors from public, private, and civil society sectors that provide a diverse range of expertise in articulated knowledge domains.

Accordingly, the complexity of social–ecological systems is increasingly mirrored by the complexity of governance networks. This creates a new set of challenges at the substantive, strategic, and institutional levels: different actors hold different perceptions of policy problems, they follow different interests involving different and sometimes contrasting strategies, and finally, decision-making spans across different institutional settings, often with the superimposition of many accountability mechanisms (Klijn, Koppenjan 2015). Such interdependent structures clash against a vertical organization of decision-making. As Klijn and Koppenjan argue "mutual dependencies make it impossible for each of the involved actors to act in isolation, or as principals and agents" (Klijn, Koppenjan 2015). This structural interdependency renders it difficult to organize governance networks along hierarchical lines. Accordingly, the governance of social–ecological systems has taken an increasingly polycentric character, where multiple and

diverse decision-making centres interact through a hybrid matrix of competitive and cooperative ties.

2.6 The Role of Cooperative Governance in Managing the Climate Commons

One of the biggest merits of Elinor Ostrom has been the redefinition of our understanding of commons situations. During her career, she helped to establish a third theoretical solution, between market and state proposals, to the Tragedy of the Commons.

2.6.1 Polycentricity in Commons Situations

Where the conventional theory of collective action predicted that, when faced with a commons dilemma, the actors would inevitably run into the destruction of the shared resource if not regulated by an external institution, the work of Elinor Ostrom, starting with her seminal essay *Governing the Commo*ns, focused on providing empirical and theoretical insights to show that this was not an inevitable outcome (Ostrom 1990). Indeed, on many occasions, actors faced with a common resource were able to reach an agreement among themselves and mutually enforce a contract that efficiently allocated the resource among the participants. What Ostrom discovered was that the set of assumptions made by neoclassical economists, which framed the commons situation as a game played by self-interested actors striving to maximize immediate utility and not engaging in communication, did not apply in many real-world situations. Ostrom and her team showed that agents, within a repeated game and allowed to have face-to-face communication, were shown to be "extremely successful in increasing joint returns" (Ostrom 2010b). By repeating the game, the communication between actors allowed for the emergence of collective forms of learning and normativity: the emergence of the reputation of players, the emergence of trust in other players, and the emergence of mutual monitoring and sanctioning behaviours. In this way, the actors were able to devise and enforce a cooperative strategy, allowing them to reach Pareto efficient allocation of resources (Ostrom 1990). This theoretical insight allowed Elinor Ostrom to elaborate with Vincent Ostrom, her husband and colleague at Indiana University, a theory of polycentric governance, where decentralized, multilevel, and cooperative decision-making grounded a new understanding of institutional networks (Ostrom et al. 1961; Ostrom 2010a; Ostrom 2010b). The Ostroms framed polycentric systems as being "characterized by multiple governing authorities at differing scales rather than a monocentric unit" where each governance unit "exercises considerable independence to make norms and rules within a specific domain" (Ostrom 2010b). Polycentric systems were originally conceived by

Vincent Ostrom as redundant governance systems where the compresence of competition and cooperation among decision-making centres was able to secure levels of dynamism and coordination at the same time. What Elinor Ostrom contributed was a dynamic under-standing of how increased cooperation can emerge in the face of commons dilemmas. As the analysis of commons dilemmas had already brought to the fore, the progressive establishment of cooperative networks within polycentric systems presents the double advantage of allowing mutual learning between actors and fostering the emergence of coordinated action by means of shared normative structures setting common goals and rules. In fact, as Ostrom claimed, polycentric systems constitute a governance architecture that is likely to "enhance innovation, learning, adaptation, trustworthiness, levels of cooperation of participants, and the achievement of more effective, equitable, and sustainable outcomes at multiple scales" (Ostrom 2010b). In what is perhaps the most in-depth study of polycentric governance of climate change, Jordan et al. frame polycentricity as a theory built around five propositions (Jordan et al. 2018a): "(1) governance initiatives are likely to take off at a local level through processes of self-organization; (2) constituent units are likely to spontaneously develop collaborations with one another, producing more trusting interrelationships; (3) the willingness and capacity to experiment is likely to facilitate governance innovation and learning about what works; (4) trust is likely to build up more quickly when units can self-organize, thus increasing collective ambitions; (5) local initiatives are likely to work best when they are bound by a set of overarching rules that enshrine the goals to be achieved and/or allow conflicts to be resolved."

However, where polycentricity has shown great promise at small- and meso-scales, many have voiced caution regarding the possibility of governing a global phenomenon like climate change cooperatively (Jordan et al. 2018a; Jordan et al. 2018b). In this regard, Felix Ekardt has argued that cooperative networks work best only when the "cooperation of other participants is to be expected, when the situation is manageable, and norm violations are noticed and sanctioned". As a matter of fact, all of these characteristics are problematic to assume within the global governance of climate change (Eckardt 2020). Nonetheless, some considerations might contribute to weakening the concerns around the development of cooperative action in tackling the climate crisis. In fact, despite the predictions of classical game theory, we assisted in recent decades to the creation of a myriad of cooperative initiatives in climate governance, from public–private partnerships to transnational networks of municipalities and regions. The United Nations Environmental Program currently counts 269 international networks of non-state actors in its Climate Initiatives Platform. Accordingly, these numbers contribute to present some

evidence that the existence of "conditional cooperators" in the climate commons is far more widespread than assumed by rational choice models. Therefore, faced with the rapidly growing reality of cooperative governance networks, the most pressing question seems to be no longer whether such governance architectures could play a role in the management of climate change, but which role should we assign to them.

2.6.2 Climate Action: The Complementary Role of Cooperative Governance Networks

In addressing the challenge of the environmental governance of climate change, Ostrom has argued that conventional approaches that strive for the creation of global institutions have so far turned out to be too slow for the urgency of climate action, global regulation without local participation is bound to be ineffective, and finally, universal norms are often unresponsive to contextual situations and problems (Ostrom 2009). Within the fight against climate change, creating global institutions for governing the sustainable transition has proved to be extremely difficult so far. Since the 1990s, transnational efforts to converge on a shared and legally binding agreement between world governments have largely failed. Starting from the Rio Conference in 1992, the collective effort to create a global institution that can enforce a shared body of rules in tackling climate change has fallen short. In particular, as the Kyoto Summit in 1997 failed to gather widespread political support around common measures and regulations against global warming, there has been increasing recognition that climate governance can benefit from a more cooperative and horizontal structure.

In fact, the limits of the universalist approach of the Kyoto Protocol have been at the base of the different approach toward environmental governance championed within the 2015 Paris Agreement. This new international agreement moved away from the top-down logic of treaties and shifted toward a more flexible and bottom-up model, based on Nationally Determined Contributions, where targets, plans, and mutual monitoring mechanisms have to be set in place in the absence of any higher-order institution. This more flexible mechanism has allowed for a much larger commitment, with 191 countries and the EU among its signatories.

As this shift away from rigid governance structures can be traced back to a form of realpolitik, it is also the case that Ostrom's work has brought a new awareness to the potential of cooperative governance when dealing with the climate crisis (Jordan et al. 2018a). Nonetheless, Ostrom always warned against the tendency to believe in policy panaceas that advocated for a single solution to the management of social–ecological systems (Ostrom 2007). In fact, the theory of polycentric governance was never intended

to be the only answer to the challenge of meaningful climate action. In an important sense, Ostrom's main critique of the standard top-down approach that advocated for the creation of a global institution for tackling climate change is that such a theory is too one-sided and it disregards the evolutionary dynamics of cooperation. In this regard, a theory of bottom-up and polycentric governance should be considered a necessary complement to top-down and centralized approaches for three main reasons.

First, where top-down theories tend to provide a static answer to the challenge of climate change, usually framed in the form of abstract institutional architectures with a universal reach, Ostrom's approach can bring forth an evolutionary understanding of institutional emergence that is based on increasing cooperative ties among a differentiated set of local actors that progressively strengthen their mutual trust, align their goals and values, and only ultimately come to a shared framework of norms and rules. In this sense, the Kyoto Protocol represented an attempt to put the cart before the horse by proposing a universal normative structure, without the previous establishment of a meaningful body of cooperative ties based on mutual trust, shared goals, and aligned values. In this respect, the genealogical development of the Sustainable Development Goals and the bottom-up structure of the Paris Agreement marked a step forward in the comprehension of the evolutionary character of institutional emergence. Ostrom's theory of institutional development can therefore provide a better understanding of the process through which we arrive at the creation of shared institutions (Ostrom 2005).

Second, cooperative governance networks are essential for providing a bottom-up structure of local participation, which is essential to complement the top-down imposition of a set of global regulations. As Ostrom pointed out, the institutional costs of regulatory enforcement are bound to be unsustainable without the creation of collaborative networks for climate action at every governance scale (Ostrom 2009). Local participation, from neighbourhood initiatives to transnational municipal networks, is key for complementing top-down regulations with bottom-up cooperative action. In this regard, the emergence of cooperative networks for climate action at every scale has contributed to disprove the classic assumption of rational choice theory, which predicts that no actor faced with a commons dilemma will change his behaviour unless an external authority enforces rules from above (Ostrom 2009). Governance networks, such as the Global Covenant of Mayors or the C40 Cities Climate Leadership Group, have proven effective at gathering widespread political support around climate initiatives. Furthermore, sub-state actors have often proven themselves capable of leading the way in setting ambitious targets of emissions reductions that far exceed those of national governments (Gallaraga et al. 2017; Jordan et al. 2018a). Even if we currently lack clear data for measuring the

effectiveness of such initiatives, the progressive construction of shared commitments, data sets, research and innovation programs, and financing platforms represents an encouraging first step in the elaboration of cooperative strategies for flexible climate adaptation and effective climate mitigation (Bertoldi et al. 2020; Heikkinen et al. 2020; Palermo et al. 2020).

Third, where centralized institutions can create stable, predictable, and durable governance architectures, polycentric networks can supplement the relative rigidity of top-down organizations with increased levels of institutional flexibility (Young 2005; Young et al. 2020). The advantages of adopting such a polycentric structure rely on the increased adaptiveness, institutional flexibility, and resilience of governance networks. In this respect, polycentric networks present a larger potential for establishing a social–ecological fit between institutional architectures and ecological interlinkages within the Earth's system. The polycentric, redundant, and flexible nature of cooperative governance networks is better suited to respond more swiftly and adaptively to evolutionary changes in complex social–ecological systems (Bodin 2017). As Oran Young has argued, "as we move deeper into a world of complex systems characterized by non-linear change, bifurcations and emergent properties, there is a growing premium on creating governance systems that are agile or nimble in responding to changes in the issue areas they address" (Young et al. 2020).

Accordingly, a value-driven and goal-based model of climate change governance could grant political accountability in setting climate targets while allowing for a level of policy flexibility that can better address the local differentiation of social and ecological conditions in the Earth system. To be sure, polycentric governance, with its emphasis on diversity and multiplicity in governance theory, can lead to institutional disorder and uncertainty when left unchecked (Biermann et al. 2020). Accordingly, as Young emphasizes, the design of climate governance architectures must rely on the pragmatic balance between the dynamic benefits of policy fragmentation and the stabilizing effects of policy hierarchization (Young et al. 2020). In this respect, policy systematization, prioritization, and integration are essential tools within the process of institutional emergence (Kim et al. 2020). However, institutional simplicity by means of excessive hierarchization risks reducing the institutional fitness to govern the complex nature of social–ecological interlinkages within the Earth system. Accordingly, we should strive to maintain a balance between "the perils of institutional reductionism and institutional overload" (Young et al. 2020). It can be argued that two great pragmatist lessons lie at the heart of Elinor and Vincent Ostrom's theory of governance: the refusal of untenable dualisms balkanizing the theoretical space in supporters of states or markets, of

centralization or decentralization, and the proposal of a theory of governance based on a dynamic understanding of collective agency as a process of institutional emergence.

2.7 Framing Responsibility in the Cooperative Governance of Climate Change

As argued, a large scholarly literature has been accumulating on how cooperative governance offers a promising approach in the management of social–ecological systems in the face of climate change. At this point, some problems can be raised: if cooperative governance networks are not organized along hierarchical lines, how can collective responsibility be distributed back to individual actors in the absence of a central authority? Can governance networks properly discharge the collective responsibility for preventing climate change? How do these networks have to be designed in order to allow for the coordinated agency necessary to distribute responsibilities across a collective? This section will then take charge of laying the building blocks of such a theory of collective responsibility in governance networks by grounding it on the social ontology of shared agency (Bratman 2014). Once this is accomplished, the ultimate goal will be to propose a theory of cooperative governance that can avoid the emergence of responsibility gaps like the Problem of Many Hands.

2.7.1 The Shortcomings of the Hierarchical Model

Let us, first, recapitulate the terms of the problem: humanity is the leading cause of climate change; this fact constitutes a prospective responsibility, i.e., a responsibility toward the future, to prevent this environmental crisis from occurring. As previously argued, prospective responsibility obtains when a societal actor is capable of moral agency, is causally efficacious in preventing the outcome to occur, and bringing about the outcome is normatively wrong. Van de Poel argues that only a form of organization based on authority, coordination, and control can properly discharge its prospective responsibility by creating effective mechanisms for distributing responsibilities at the individual level.

Once this conclusion has been established, most authors within environmental ethics have focused on the role of national institutions in mitigating climate change. In fact, within this hierarchical approach, only national governments are regarded as bearing the collective responsibility for preventing the climate crisis due to their ability to properly discharge this responsibility through an organized and effective structure of decision-making, and therefore, be causally efficacious in solving it (Gardiner 2010; Sinnott-Armstrong 2010; Singer 2011; van de Poel et al. 2015). Accordingly, individual persons—

but also other societal actors, which can be said to have an organized agency like firms, municipalities, regional institutions, etc.—are believed to lack a full responsibility to address the climate crisis, as they cannot be regarded as effective at mitigating the effects of global warming. Therefore, the argument continues, national governments bear the full responsibility to establish a set of global measures to grant a sustainable transition. Unfortunately, this solution is not fully satisfactory. What these authors seem to underestimate is the fact that the problem of responsibility is just moved to a higher level, but its structure remains the same since up until this point governments were not able to converge on the creation of a global institution.

If we follow this hierarchical model, the absence of a global institution that can distribute collective responsibility implies the implosion of the individual responsibility of national governments to prevent climate change. Hence, it seems that governments are facing a paradigmatic case of the Tragedy of the Commons and, consequently, a paradigmatic case of the Problem of Many Hands. In fact, even if nation states could be, but ultimately are failing to be, causally efficacious in governing a sustainable transition (second condition for PR), it still seems problematic to regard such a failure as a form of wrongdoing (third condition for PR) because unilaterally restricting the consumption of the commons can be seen as both ineffective and unfairly competitively disadvantageous, and continuing to consume it as neither sufficient nor necessary to cause climate change. Accordingly, the international governance of climate change can be seen as another instance of collective responsibility without individual responsibility, and therefore, as an instance of the Problem of Many Hands. Reached this point, we encounter a dead-end: only national institutions can be causally efficacious in the transition and only to the degree that they converge on a global institution that distributes the collective responsibility for climate action among them; such an institution is missing, making the single countries ultimately not responsible. Which options remain available in this scenario? At this point, it is important to notice that a hierarchical approach rests on two basic assumptions:

- *Pragmatic assumption*: only national or international institutions are causally efficacious in tackling climate change;
- *Theoretical assumption*: only a hierarchical structure organized around a decision-making centre can effectively distribute responsibility.

At the pragmatic level, it can be pointed out how between the first 100 global economic revenue collectors, only 29 are states, while 71 are corporations (Babic et al. 2017). Even setting aside the mere question of economic power and resources, a study by the Climate

Accountability Institute showed that just 20 companies have contributed to 35% of the global greenhouse gas emissions since 1965 (Climate Accountability Institute 2018). Additionally, one can also consider sub-state institutions as a promising vector for effective change in sustainable governance; for instance, as Jordan argues, "more than 100 regional governments have committed themselves to reducing emissions by at least 80 per cent by 2050, a target exceeding that of most sovereign states" (Jordan et al. 2018a). In fact, we assisted in recent decades to a flourishing of climate networks between actors as diverse as regions, such as the Governors' Climate and Forests Task Force; municipalities, such as the C40 Cities Climate Leadership Group, the Global Covenant of Mayors, and the International Council for Local Environmental Initiatives; and more broadly, a vast array of public–private partnerships.

Once this is taken into consideration, it seems clear that a much larger range of social entities, from corporations to subnational actors such as regions and municipalities, can be causally efficacious in tackling climate change. Furthermore, at the theoretical level, the idea that only an organization structured along hierarchical lines can discharge our collective responsibility for climate mitigation is also questionable. Therefore, the main challenge of the next pages will be how to achieve an effective distribution of responsibility in cooperative governance networks. My strategy will be to take the philosophy of shared agency developed by Michael Bratman in his *Shared Agency: A Planning Theory of Acting Together* (Bratman 2014) and argue that it can provide a theoretical grounding for the design of an organized distribution of moral labour in governance networks, so as to allow for the creation of responsible governance.

2.7.2 A Theory of Shared Agency: Five Design Principles for Cooperative Governance

Michael Bratman has spent his career working on a grand project aimed at the articulation of a full theory of human agency. Since his seminal work *Intention, Plans, and Practical Reason*, Bratman has focused on the crucial role of intentions in defining what constitutes the essential nature of our agency (Bratman 1987). According to Bratman, an intention is essentially a plan to achieve a goal. Accordingly, what sets intentions apart from desires is their peculiar role in practical rationality to settle our conduct through time: intentional action does not derive from responding to the momentary whims of the will, but from following those ends that we decide to treat as the reasonable guides of our action through life. In the vocabulary of Bratman, intentions are characteristic psychological planning states that constitute higher-order, conduct-controlling pro-attitudes, that settle upon deliberation our cross-temporal agency on certain goals (Bratman 1987; Bratman

1999; Bratman 2007). For Bratman, every time we act intentionally, we respond to a cognitive structure of norms of intentional rationality, such as norms of (1) plan–belief consistency, as plans should be consistently grounded on our beliefs; (2) means–end coherence, as plans should be coherently supported by subplans that devise the right means to our ends; (3) plan agglomeration, as plans should consistently add together in a coordinated structure of agency over time; and finally, (4) cross-temporal stability, as plans should be stable in order to organize agency through time.

After sketching this general picture of intentional action, it is then possible to proceed to frame cooperative agency as a form of shared intentionality. As a matter of fact, Bratman has made a major contribution to the field of social ontology by creating a theory of shared agency that is grounded on the role of intentions in coordinating cooperation between agents (Bratman 2014). According to Bratman, collective action can be analysed under the lens of shared intentions; sharing a goal with others, in this perspective, constitutes the basic glue of sociality. In its most simple description, when a group of agents takes on a collective action based on a shared aim, we can formalize the intention of each of the members as expressing "I intend that we J" (where J is the shared activity): this structure of practical rationality is what allows the embedding of individual actions in a collective endeavour, and thus, to have intermeshing intentions.

Bratman's thesis is that, as the normative structure of individual intentions is rich enough to grant intrapersonal coordination of individual agency across time, the very same normative structure can allow interpersonal coordination of individual agency across the social space. This mirrors the Nagelian recognition that we are, as rational agents, under the necessity of coordinating ourselves both intra-personally across time and inter-personally across social interactions (Nagel 1979). Therefore, the same norms of practical rationality described above can supply the normative structure of our cooperative agency (Bratman 2014). In this way, for Bratman, the four norms of individual practical rationality give rise to four associated norms of social plan–belief consistency, social means–end coherence, social plan–agglomeration, and social cross-temporal stability (or social consistency, social coherence, social agglomeration, and social stability).

Therefore, we come to a crucial question for the development of a theory of cooperation: which are the essential rational conditions for achieving a consistent, coherent, and stable shared agency? Bratman's answer is that our shared agency meets the criteria for social consistency, coherence, and stability when these five conditions apply: (1) *intention condition*: each intends that we J and the intentions of each are interlocking (each intends to J by way of the intention of each that we J) and reflexive (each intends that we J by way of their own intention that we J); (2) *belief condition*: each believes that if the intentions of

each in favor of J are persistent and interdependent, we will be effective at J-ing; (3) *interdependence condition*: each continues to intend that we J only if each continues so to intend such that there is interdependence in persistence; (4) *common knowledge condition*: it is common knowledge that 1–3 is occurring; (5) *mutual responsiveness condition*: each adapts their relevant subplans and actions by way of public mutual responsiveness to each other's sub-plans and actions in a way that keeps track of the shared intention to J by means of our intermeshing plans.

When a collective agency is organized around these five conditions, we reach a form of cooperative agency. Hence, it can be suggested that Bratman's theory of shared agency can provide a rational structure for sketching some design principles for cooperative governance. Indeed, within Bratman's theory of shared agency, cooperation is bound to lose its gluing power as the number of decision-making centres scales up, but this does not imply that cooperation is less effective as we scale up the dimension of the governance units over which decision-making centres preside. It can then be advanced that governance networks are cooperative structures insofar as:

1. actors share a goal and elaborate interlocking and reflexive policies;
2. actors believe that if the policies are persistent and interdependent, the network will be effective in reaching the goal;
3. such policies are interdependent in persistence;
4. the network grants common knowledge to all actors by way of relevant information flow;
5. actors achieve mutual responsiveness in elaborating subplans, so as to achieve intermeshing of plans.

These conditions represent a set of practical rationality norms for the coordination of agency within cooperative networks and, it can be argued, they provide a set of design principles for cooperative governance networks. To the extent that polycentric networks are structured in such a way, they can be said to act cooperatively. Once these conditions apply within a governance network, the group can engage in a shared deliberation about the distribution of responsibilities among its members. Such a shared deliberation is a form of shared agency, first, because it is embedded within the shared intentional activity, second, because such deliberation is itself a form of shared intentional activity, and finally, because the proposals made within a shared deliberation are raised from within a structure of shared commitments to a common goal (Bratman 2014). Therefore, when a collective is faced with a prospective responsibility within a cooperative agency structure, Bratman's theory provides the actors with the rational instruments for engaging in a

shared deliberation that provides an agreed-upon policy that distributes responsibilities among the participants (Bratman 2014). The five design principles for cooperative governance networks represent functional criteria for avoiding the fragmentation of agency and, hence, they constitute essential requirements for preventing responsibility gaps like the Problems of Many Hands. We then take Bratman's theory to provide the rational foundation for a theory of cooperation in governance networks. The capacity to effectively discharge the collective responsibility for preventing climate change is thus met without reference to an authority that delegates tasks, but by a shared deliberation based on common goals; interlocking, persistent, and interdependent policies; common knowledge; mutual responsiveness; and therefore, intermeshing plans.

2.7.3 Responsibilization: A Processual Account of Moral Change

One important consequence of developing this analysis of responsibility within cooperative governance is that our prospective responsibility for climate action can no longer be considered dependent upon a higher institution that takes charge to distribute it. Hence, the theoretical assumption of centralized approaches, according to which only a vertical institution can effectively discharge responsibility, has ultimately been demonstrated to be unwarranted. The moral consequence is that, at this point, responsibility falls back into the hands of the many actors that can be causally efficacious in preventing climate change by cooperating. As it was previously claimed, there is no reason for holding corporations and subnational actors like regions and municipalities as not causally efficacious in tackling climate change. This recognition amounts to a redistribution of moral labour from governments alone to a much larger array of societal actors, which share with these the prospective responsibility to coordinate and cooperate in order to mitigate the effects of climate change.

In this regard, cooperative networks will vary in their degree of normative alignment: from relatively fragmented and voluntary forms of loose cooperation based on shared goals to increasingly organic and binding forms of tight cooperation, involving the emergence of shared normative practices of value setting, value prioritization, and finally, value operationalization by means of the systematic organization of an institutional body of norms. In a pragmatist spirit, we should see collective responsibility not only as an abstract requirement of practical reason but also as a concrete instance of moral evolution, as an emergent and continuous process of responsibilization in the face of a new societal challenge. Just as Ostrom provides us with an economic theory of institutional emergence in the face of social dilemmas, pragmatism can be regarded as complementary to Ostrom's analysis in proposing an ethical theory of moral emergence

in the face of new practical problems. For this reason, we should avoid framing responsibility exclusively as the act of responding to abstract and universal reasons of morality; instead, we should complement it with an understanding of responsibility as a societal process of responsibilization in the face of the emergent threat of climate change. The concern for the top-down establishment of a series of moral and legal norms should therefore be accompanied by the articulation of a bottom-up process of decision-making that is characterized by participatory, transparent, and flexible procedures that allow for the development of shared goals, values, and norms.

To conclude, we should redistribute the moral responsibility for swift climate action from national governments to a much larger array of actors encompassing firms, municipalities, and subnational regions. This responsibility is based on their potential to be causally efficacious in preventing climate change and in their ability to create a spectrum of cooperative structures that can properly discharge the collective responsibility for climate action through shared policies. Therefore, states, regions, cities, and firms are not discharged of their individual responsibility to act until the establishment of a global institution. Accordingly, this implies a great reduction in the severeness of the moral dilemma that is the Problem of Many Hands regarding climate change. Where interests, goals, or values are aligned, the creation of cooperative networks should be regarded as a promising way to organize a process of responsibilization within the global governance of climate change. Waiting for a global agreement to discharge our responsibility to act might be a strategical failure and indeed a morally unwarranted conclusion.

Therefore, the prospect of meaningful climate action at the global level is considerably expanded, even if it can still be difficult to attribute such a prospective responsibility to individual persons. Nonetheless, as many authors have emphasized, individuals still retain a prospective responsibility as citizens to mobilize in order to pressure states, regions, and cities to take serious measures to tackle the moral and ecological crisis that is climate change (Gardiner 2011; van de Poel et al. 2012; van de Poel et al. 2015). Furthermore, even if individual persons cannot be said to bear the full responsibility for climate action, it might as well be a question of moral integrity to be consequential with our political responsibilities and apply the sustainable behaviour we ask of our governments to our individual lives (Hourdequin 2010; Hourdequin 2011). Furthermore, it is possible to argue that individuals have a prospective responsibility as consumers to boycott, when possible, those corporations that are among the main contributors to climate change. These recognitions amount to a further weakening of the Problem of Many Hands regarding climate change, as the gap between collective and individual

responsibility for single citizens is, ultimately, a matter of degree and not of sharp opposition. Furthermore, the fact that we might not be fully responsible for meaningful climate action at the individual level does not exclude the fact that we might find alternative ways of living sustainably that are still preferable and more meaningful. Indeed, the appreciation for nature, simplicity, and the ecological character of human life, while not part of what is morally required, acquires perhaps even more meaning in its gratuitousness.

2.8 Conclusions

In this chapter, I aimed to reconstruct how climate change has been formalized as a Tragedy of the Commons in economic theory and as a Problem of Many Hands in ethical theory. I then proposed a conceptual connection between these two dilemmas and claimed that whenever a rational failure like the Tragedy of the Commons occurs, a parallel moral failure occurs, namely, the Problem of Many Hands, since "free-riding" the commons is not irrational or irresponsible at the individual level, while it constitutes a rational and moral failure at the collective level. I then proceeded to analyse how classical solutions to both dilemmas, which are usually framed in terms of the establishment of vertical structures of decision-making, are not the only possible answer to the challenge of the responsible governance of climate commons. I take Elinor Ostrom's theory of polycentric governance as a promising candidate to complement this classical top-down model with a bottom-up approach based on horizontal structures of governing with increasing levels of cooperation.

At this point, three questions have emerged: how can collective responsibility be distributed back to individual actors in the absence of a central authority? Can governance networks properly discharge the collective responsibility for preventing climate change? How must these networks be designed in order to allow for the coordinated agency necessary to distribute responsibilities across a collective? The theory of shared agency of Michael Bratman has provided, in this regard, the theoretical basis for sketching five design principles for cooperative governance networks. I argued that such networks can properly discharge responsibilities by engaging in a shared deliberation when cooperative networks are built around a shared goal; interlocking, persistent, and interdependent policies; common knowledge; mutual responsiveness; and thus, intermeshing of plans. I further claimed that we should frame collective responsibility not only as an abstract requirement of practical reason but also as a concrete evolutionary process of responsibilization. In the face of climate change, cooperative networks will certainly evolve in their degree of normative alignment: from fragmented and voluntary forms of

loose cooperation based on shared goals to increasingly organic and binding forms of tight cooperation that involve the emergence of shared normative practices of value setting, value prioritization, and finally, value operationalization by means of the systematic organization of an institutional body of shared norms.

The chapter has then contributed to show how institutional emergence and moral emergence can be analysed as two aspects of a process of collective responsibilization. Faced with the limits of the "technical resources" offered by economic rationality in a Tragedy of the Commons, Hardin wrote that the world "requires a fundamental extension of our morality" (Hardin 1968). For Hardin, this was to be found in the coercive power of a Leviathan; I hope to have shown a way in which our morality can be fundamentally extended within a cooperative structure of collective agency.

3

A Pragmatist Ethics for Governance Networks, The Institutional Role of Meanings, Values, and Norms

3.1 Limits of Traditional Ethical Approaches

In the previous chapter I addressed how the governance of climate change is increasingly framed within a cooperative structure. This chapter will shift the focus from the structure of government to the process of governing, by analyzing the theoretical tools that standard ethical approaches provide to decision-makers in order to prescribe a preferred course of action. As William Dunn recognizes in *Public Policy Analysis*, policy-making has an important normative dimension; in fact "policy analysis is partly descriptive. It relies on traditional social science disciplines to describe and explain the causes and consequences of policies. But it is also normative, a term that refers to value judgments about what ought to be, in contrast to descriptive statements about what is" (Dunn 2018, p. 4). In fact, the choices of decision makers are often informed by ethical approaches in evaluating different policy options. Within this chapter I will concentrate on two main approaches, namely utilitarian models based on the calculus of benefits and costs, and deontological models based on the imposition of universal norms.

The dissertation will therefore examine how, in the management of climate change, the "governance revolution" was not accompanied by a parallel revolution in the normative tools informing policy analysis. In fact, where the management of social-ecological systems was revolutionized by stressing the importance of processual, networked, and cooperative forms of governing, the ethical frameworks which inform policy analysis have remained fundamentally anchored to modern conceptions of value monism, as in utilitarian approaches based on Cost-Benefit Analysis, and moral universalism, as in deontological approaches advocating for global regulatory frameworks.

As a result, updating our ethical tools for a contemporary theory of governance requires moving away from what Robert Audi has called "master principle ethics" in his *Moral Value and Human Diversity* (Audi 2007), and recognizing that, as the governance of climate poses

one of the most complex policy problems of our time, its solution cannot come in the form of a single authority organizing human agency, be it a political Leviathan (Hobbes 1651) or ethical universal principles (Kant 1788, Bentham 1780).

As a matter of fact, the disconnect between the plural dimension of agency in nowadays society and the univocal dimension of practical rationality in policy prescription, marks a fundamental tension within the practice of governance between its social ontology and its methodology, exposing the contradictions inherent in a plural decision-making governed by a single normativity. As many scholars have showed in these years, this tension can give rise to wearing stalemates in the process of environmental governance, with value conflicts emerging at a late phase of implementation, resulting in delayed processes and untimely corrections (van de Poel 2009, Pesch et al. 2017, Cuppen et al. 2019). Therefore, in this chapter I will try to lay the foundation for a wider program of research aiming at the construction of a *value-pluralist* and *context-sensitive* pragmatist ethics, based on the meaningful organization of collective agency through the participatory construction of shared meanings, values and norms.

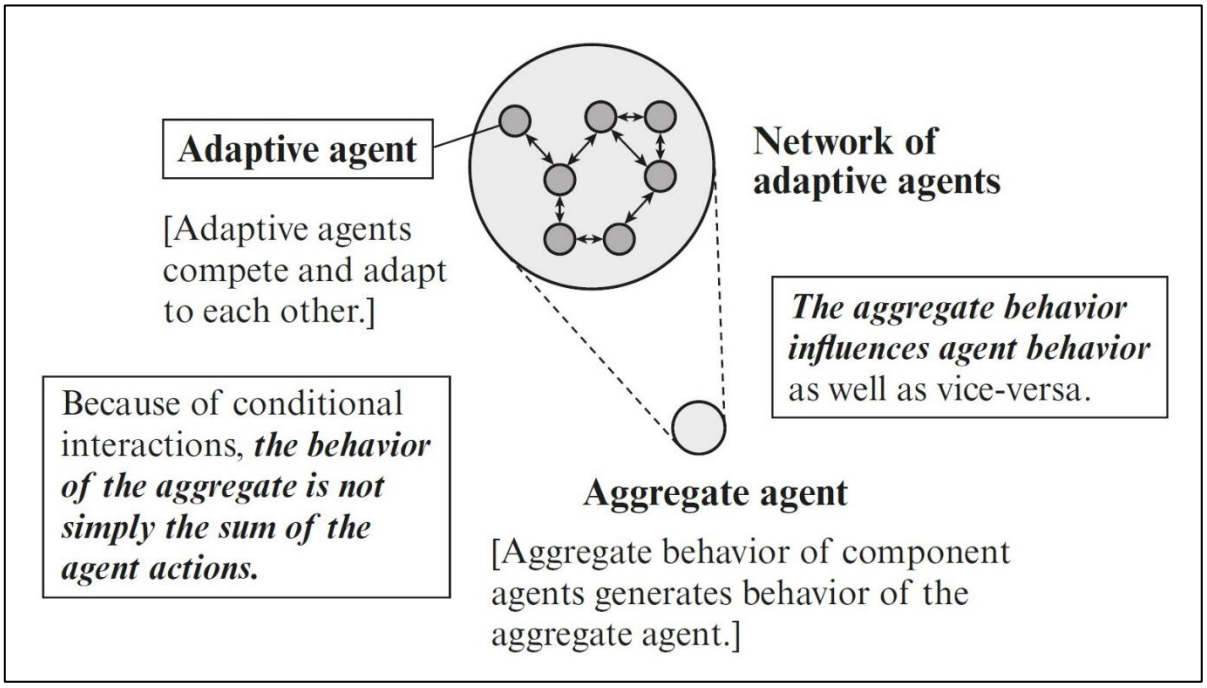

Figure 3.1: Complex Adaptive Systems (Holland 2012).

Hence, the main goal of this chapter will be to analyze the limits of classical ethical approaches, such as Utilitarianism and Kantianism, when applied to Complex Adaptive Systems like the interconnected arrangements of social, technical, and ecological variables which are the object of climate governance. Therefore, the chapter highlights how governing complex adaptive systems, as "systems that adapt or learn when they interact" (Holland 2014), requires the development of a responsive and dynamic approach

to policy-prescription able to deal with non-linear dynamics, emergent phenomena, and sudden changes in directionality.

It will be argued that traditional ethical systems, based on a *simple* and *hierarchical* view of morality, present different problems in providing meaningful guidance in the governance of social-ecological systems, characterized by an increasingly *complex* and *networked* structure. But where utilitarianism and deontology come short of providing useful moral tools for tackling today's most pressing issues, the development of a pragmatist framework for institutional analysis can provide a resilient moral theory, able to accommodate the intrinsic complexity and plurality of contemporary climate governance.

3.2 The Limits of Utilitarianism in Complex Adaptive Systems

The utilitarian approach has historically dominated the field of environmental governance. Certainly, the methodological strength of utilitarianism lies in the promise of simplifying the practice of decision-making to a matter of aggregative calculus. In fact, the strong focus of utilitarianism on the aggregative maximization of welfare has been at the base of environmental economics, the mainstream approach in the evaluation of policy options within environmental governance.

The explicit foundation of this theoretical approach is the belief in the reducibility of all evaluative practice to one fundamental unit of measure: wellbeing. It is indeed possible to sum up five distinctive features of utilitarianism: a *welfarist* conception of value as well-being, an *impartialist* stance on the equal value of everyone's well-being, a *consequentialist* focus on the outcomes of actions, an *aggregative* view resulting in the calculus of all positive and negative consequences, and a *maximizing* rationality set to produce the best possible outcome (Reichlin 2013).

Centered around the simple aggregative calculus of good versus bad consequences, utilitarianism has therefore provided the conceptual foundation for developing the standard evaluative method in public policy, the Cost-Benefit Analysis (CBA). William N. Dunn, in his *Public Policy Analysis*, defines the three main axioms of rational choice models like Cost-Benefit Analysis as positing a single-decision maker (1), acting with certainty about outcomes (2), and producing immediate consequences (3) (Dunn 2018). Utilized since the second half of the nineteenth century, CBA is based on the definition of alternative courses of action, a selection of relevant stakeholders, and the evaluation of the consequences of each alternative in terms of the net benefits against costs that the different options bring about for the set of stakeholders. According to a utilitarian

approach, the course of action to be chosen is the course of action that maximizes the net surplus of happiness minus suffering.

Due to its quantitative methodology, CBA has become the standard technique for estimating the value of alternative policies within environmental economics, with a history dating back to the analysis of water development projects in the early twentieth century in the US (Field 2016). This evaluative methodology owes certainly its widespread diffusion to the drastic simplification inherent to the utilitarian conception of morality, where human ethics ultimately reduces itself to a consequentialist calculation of courses of action in terms of benefits and costs they bring about, analyzed either in hedonistic terms, as pleasure versus pain, or in expressivist terms, as preference satisfaction versus preference frustration. (Singer 1993; De Lazari-Radek, Singer 2017).

In fact, where hedonistic utilitarianists make a meta-ethical commitment to a form of monism about value, holding that the only intrinsic value in the universe is the property of feeling pleasure, preference utilitarianists commit themselves to a form of pluralism about value, maintaining that preferences or desires are the multiform bearers of intrinsic value. Cost-Benefit Analysis sits firmly within this second tradition and takes preference satisfaction as the fundamental unit of measure for calculating the overall well-being produced by a course of action. CBA is also committed to an Act Utilitarian view of morality, therefore espousing the fundamental Act Utilitarian Principle stating: "*an act is right when it produces the best consequences*". Cost-Benefit Analysis is then the expression of Preference Act Utilitarianism, according to which a policy choice is right when the course of action taken maximizes the aggregated preferences of the stakeholders.

Cost-Benefit Analysis takes this Preference Act Utilitarian premise and usually makes a further methodological move, by establishing monetary price as the fundamental proxy for the measurement of preferences. For economists engaging in CBA, therefore, preferences are revealed through a form of pricing. Such pricing methods can be either *direct*, by asking stakeholders either their Willingness-to-Pay for receiving goods and services or their Willingness-to-Accept for giving up goods and services, or *indirect*, by looking at consumer behavior in the market and thus extrapolating their revealed preferences. Within environmental economics, willingness-to-pay is usually framed as a function either of *preservation value* of natural resources, of *option value* for maintaining the option for using natural resources, or *bequest value* for leaving intact natural resources to future generations (Sagoff 1988). As for indirect methods, the value of an environmental resource, such as clean air, is for example deduced from price differences between house purchases in polluted and non-polluted areas; consumer behavior is

therefore revealing of how much an economic agent is willing to spend for living in a less polluted area.

3.2.1 Classic Critiques to Utilitarianism and Cost-Benefit Analysis

Throughout the centuries, various critiques have been moved to utilitarianism, from philosophers so diverse as Friedrich Nietzsche, John Rawls, Bernard Williams, Robert Nozick, Derek Parfit, Amartya Sen, and Martha Nussbaum. For practical purposes we will draw from these critiques and group objections to Cost-Benefit Analysis into three different clusters, as critiques to utilitarianism tout court, critiques to preference-based versions of utilitarianism, and finally critiques to using monetary prices for proxy of preferences, as in Cost-Benefit Analysis.

On the first cluster of critiques to utilitarianism, we can list three powerful objections to it: first, an aggregative conception of value maximization is *blind to the distribution* of welfare, therefore forcing us to claim that a world in which A has 10 units of utility, B has 3, and C has 1 (total 14) is to be preferred to a world in which A, B, and C have each 4 units of utility (total 12) (Nagel 1970); second, as Rawls has argued, by means of aggregative calculus, we *disregard the separateness of persons*, leading to disrespect the dignity of each person's individual reasons for well-being, therefore offering a problematic justification to systematic discrimination against minorities, where such a discriminatory society would produce more aggregate utility (Rawls 1971); and third, as Nussbaum has noted, its *focus on utility is misleading* since it debases the importance of freedom, thus potentially turning society into an engineering problem of utility maximization where individual choice is kept in few consideration (Nussbaum 2011).

As for the second cluster of critiques, preference-based utilitarianism has been questioned from many different angles. The first challenge consists in what Parfit has called the *problem of irrational preferences*, as preference-based accounts of intrinsic value seem to have no conceptual tools to argue against a present preference for enjoying an activity that will later result in a great future harm (Parfit 2011) – betting the house at the casino, car racing on a highway, or polluting the environment for immediate gains are all fitting examples. The second challenge has come from the economist Amartya Sen, who argued that the empirical *problem of adaptive preferences* – the tendency of disadvantaged persons to reduce their preferences by unconsciously lowering their standards – is a theoretical threat to all preference-based views, since the sole focus on preference maximization can embed in its very method ingrained inequalities (Sen 1999). The third challenge rests on the *problem of preferences comparability*, since the utilitarian calculus of maximizing preferences requires that, for instance, faced with the choice between

building a new factory or preserving a local forest, it is possible for a decision-maker to establish a comparison between the preference for increased employment versus the preference against loss of biodiversity on the base of some unit of measure, and to able eventually to order these two preferences along two different cardinal levels of utility (Reichlin 2013). As many philosophers have argued many preferences seems to be incomparable, since there seem to be no principled way of establishing how many new jobs can offset the destruction of an animal habitat, of a leisure site, or of the aesthetical pleasure of looking at a beautiful natural landscape; these preferences are simply not precisely comparable, or quantifiable according to cardinal utility levels. And finally, the fourth challenge can be formulated as the *problem of future well-being*, since this kind of analysis calculates well-being only on the base on present, actually expressed, preferences, but remains oblivious to impacts on future generations and their potential preferences.

The third cluster of critiques has concentrated instead on the specifics of Cost-Benefit Analysis, especially on the theoretical possibility of measuring preferences by means of a monetary proxy: the first revolves around the pretense that willingness-to-pay can be a good measure of personal priorities, but this presupposition seems to be problematic.

In fact, indirect methods base their valuation on the questionable equivalence between the observed consumer's willingness to pay for a determinate good or service in the market and his own actual perceived well-being but first, inferring actual wellbeing from consumer behavior is not as straightforward as it might initially appear – in fact there is an abundance of examples of highly priced goods and services that not automatically translate to actual individual wellbeing; second, inferring an internal preference from an external observable choice falls short of evaluating contextual factors influencing the choice, as market failures like non-competitive markets, information asymmetries, and principal-agent problems can contribute to distort prices (Sagoff 1988).

As for direct methods, they base their valuation on the questionable premise that agents can correctly evaluate complex policy options and can give a good estimate of an environmental or ecological risk, but this assumption is often unwarranted. The second critique has focused on the fact that monetary price methods are *blind to interpersonal variations in the strength of preferences*, since two agents with identical willingness-to-pay with respect to a good or service can benefit to different degrees from having their preferences satisfied, as their preferences can have different strengths. A third critique hinges on the fact that, as intrinsic value is indirectly measured on the base of monetary value, this measurement remains *blind to interpersonal differences in income*, thus not considering the fact that 100 dollars spent by a high-income or a low-income household

are not easily comparable. It becomes then questionable how much willingness-to-pay is a good measure of utility, both in absolute terms and interpersonally.

3.2.2 The Shortcomings of Cost-Benefit Analysis in Complex Adaptive Systems

But while these critiques are still relevant and should be taken into serious account, almost no work has been done on the specific challenges that complexity poses to Cost-Benefit Analysis. Given the centrality of CBA in Environmental Economics, it is of the uttermost importance to assess the performance of CBA as an evaluative tool with regard to complex adaptive systems like social-ecological ones. To develop such an assessment, it is first useful to clarify some key features: social-ecological systems (SES) are networks of both human (socio-technical) and non-human (ecological) *micro-level entities* interacting and therefore giving rise to *macro-level emergent phenomena*, which in turn feedback on these entities producing a continuous dynamic of change and reciprocal adaptation (Schluter et al. 2019). Within the field of social ontology such an emergent structure can be conceptualized by a diagram representing an emergence base of social-ecological interactions (X) at time t giving rise to an emerging phenomena (Y), which in turn feeds back to the emergence base (X^{t+1}) at time t+1, and thus giving rise to a new emerging phenomena (Y^{t+1}) (Page 2015).

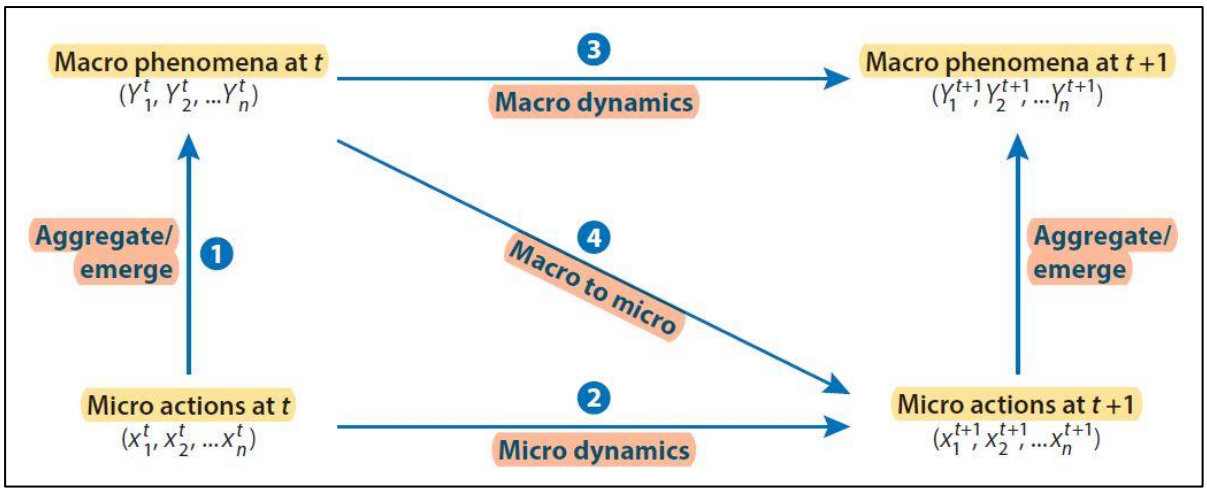

Figure 3.2: The aggregation diagram (Page 2015, p. 27).

Furthermore, it is important to clarify that the approach adopted here is committed to a form of *ontological realism* about emergence and assumes a *moderate methodological holism* that conceives both holist and individualist explanations as indispensable in social sciences. Therefore, it holds a non-reductive perspective claiming that in genuine cases of emergence, macro-level entities, or properties, are not reducible to micro-level ones. Here, adapting from List and Spiekermann, genuine cases of emergence should be understood as cases in which emergent properties are instances of *modal multiple*

realizability, such that a macro-level property E can be considered emergent when its causal effects on micro-level entities hold counterfactually across a variety of possible worlds, independently of the actual instantiation of causal effects on specific individuals (List, Spiekermann 2013). In these cases, we can maintain that emergent properties are ontologically and epistemologically non-reducible to individual ones. For instance, when in social science one affirms that "the structural pattern of relations (i.e. the topology) of a social network can have significant impact on how actors actually behave" and that this "clearly has implications for actors' abilities to manage environmental challenges" (Bodin, Crona 2009, p. 366), one is already committing oneself to a form ontological realism about emergence, where a macro-level phenomena exercises a *downward causation* on micro-level constitutive entities which is multiply realizable across a variety of possible worlds, independently of its actual micro-level instantiations.
Coming then to Cost-Benefit Analysis we can raise three orders of problems that make it a weak candidate to be a fitting method for decision-making within complex adaptive systems.

First, Cost-Benefit Analysis is based on a methodological atomism, grounded on individual preferences, which is ill-adapt at considering system-level effects. In fact, CBA is a prescriptive tool for decision-making that takes as starting point micro-level properties such as individual preferences, and presupposes that a global-level policy which maximizes the aggregated preferences will automatically translate back at the individual level without modifying the context within which such preferences raised. In this model, individuals are taken as fundamentally isolated, both from their social and ecological context, and therefore CBA does not take into account the possibility that a policy which maximizes aggregated preferences could result in different social-social, social-ecological or ecological-ecological interactions, thereby modifying the context within which these preferences were expressed.
It is therefore questionable whether maximizing the aggregated preferences of individuals, considered in isolation, can really result in producing the best consequences when applied to complex adaptive systems like social-ecological ones, where system-level interactions are a crucial variable. As Christopher Ansell writes, "rational choice models rely on a portrait of atomistic, optimizing agents as a starting point for explaining larger social aggregates. [...] Although these assumptions are useful for some purposes, they are too restrictive to explain how change can arise amidst constraint, too simplistic to account for complexity, and too linear to deal with processes such as innovation and learning that move up and down levels of analysis" (Farjoun, Ansell, Boin 2015, p. 2).

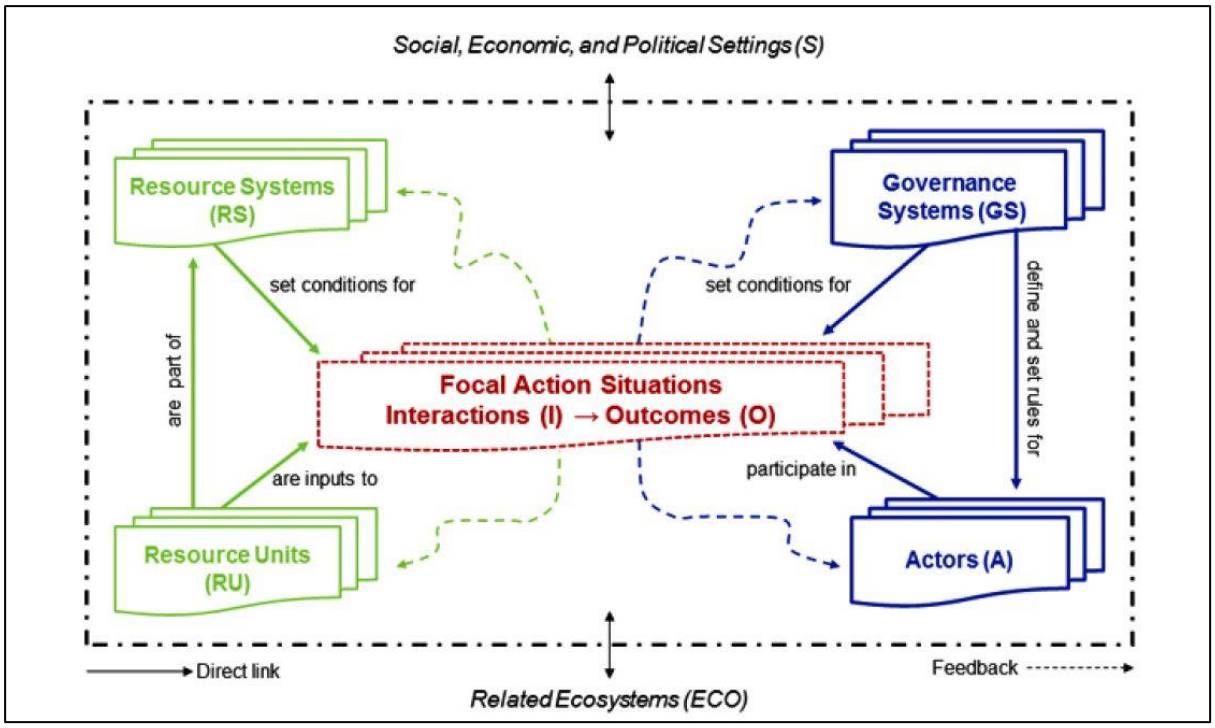

Figure 3.3: Revised social-ecological system (SES) framework with multiple first-tier components (McGinnis & Ostrom 2014).

Within the Social-Ecological Systems Frameworks, Elinor Ostrom and Michael McGinnis have individuated seven main variables influencing the emergent dynamics of these systems: *actors* (A) embedded in *governance systems* (GS), and in larger *social, economic and political settings* (S), interact within *action situations* (AS) to produce outcomes which impact *resources units* (RU) embedded in *resource systems* (RS), and in larger *related ecosystems* (ECO). As the diagram below shows, these seven variables are continuously evolving due to feedback loops and reciprocally adapting, at times reaching stable configurations, at times reaching a tipping point which sets abrupt changes in the system (McGinnis & Ostrom 2014).

The promise of Preference Utilitarianism is that it is possible to create more utility at the global level of social-ecological systems just by focusing on the individual level of actors (A), therefore postulating that maximizing the aggregated preferences of individuals, taken in isolation from the complex web of interactions in which they are embedded into, will in fact translate to a better global outcome. But this promise quickly runs the risk of turning into a hopeful wish, as this approach aims at fine tuning a better system by just looking at one of its variables. As it appears clear at this point, the main limits of Cost-Benefit Analysis within social-ecological systems are its *methodological individualism*, grounded on individual preferences, its *methodological atomism*, assuming actors in isolation from their social-ecological contexts, and its *methodological reductionism*, conceptualizing society as a sum of micro-level entities, therefore failing to consider the

interconnectedness of actors with the larger complex adaptive systems within which they are embedded. As Mark Bevir recognizes "neoclassical economics instantiates a concept of rationality suited to the modernist emphasis on atomization, deductive models, and synchronic analysis. Economic rationality is a property of individual decisions and actions; it is not tied to norms, practices, or societies save insofar as these are to be judged effective or ineffective ways of aggregating individual choices" (Bevir 2010, p. 21).
CBA provides, then, a decision-making methodology that is best suited to relatively *simple* and *stable* situations, where individuals can be reasonably isolated from their contextual systemic interconnections, but which is bound to fare badly in front of *complex* and *evolving* systems, where multiple feedback loops between micro-level and macro-level properties make it impossible to abstract from social-social, social-ecological and ecological-ecological interactions. With reference to the three axioms of Cost-Benefit Analysis, positing a *single-decision maker (1)*, acting with *certainty about outcomes (2)*, and producing *immediate consequences (3)*; it seems therefore problematic to see how the *certainty* and *immediacy conditions* can obtain in complex systems, since emergent dynamics actually *mediate* between the action taken and its final effects and therefore make the eventual outcomes far from being *certain* (Dunn 2018).

A second reason making Cost-Benefit Analysis ill-suited as an evaluative methodology in complex systems can be found precisely in the first axiom of rational choice models drawn by Dunn, namely the presupposition that the choice must be carried out by a single decision-maker. Here, the main weakness of this centralized approach to decision-making lies in the assumption of a subject with unbounded rationality and perfect information. In fact, a single decision-maker has only limited mental capacity to control the many variables influencing the consequences of alternative policy options in a complex system, and the evolving and adaptive nature of social-ecological systems makes the retrieval of information difficult and, to the point of transaction cost economics, costly to achieve.
In fact, a central governing body will often struggle in gathering and integrating insights from different knowledge systems, making it a bad candidate for managing complex systems where a variety of areas of expertise is required. Orjan Bodin has underscored the importance of networked governance in managing social-ecological systems, since they tend to "(i) enhance the generation of new knowledge through social learning (ii) better integrate important insights from different knowledge systems, and (iii) diffuse knowledge and best practices among a multitude of actors" (Bodin 2017, p. 1).
Therefore, it can be maintained that such a centralized model of environmental governance presents a *problem of social-ecological fit* with respect to the environmental context in which is embedded: its social layer, characterized by a *centralized* and *vertical*

administrative structure, does not match the ecological layer, defined by a *networked* and *interconnected* nature. Furthermore, the *rigid* administrative structure of centralized governance systems is unfit to properly address the continuously *evolving* and *emergent* dynamics of complex adaptive systems, making them far less resilient to abrupt change (Folke et al. 2005).

As stated in a seminal paper of Carl Folke on the *Adaptive Governance of Social-Ecological Systems* "research on adaptive governance of social-ecological systems illustrate that the management of ecosystem and landscapes is complex to apprehend and implement and, therefore, cannot easily be subject to planning and control by a central organization, such as a national government" (Folke et al. 2005, p. 463). All these factors contribute to make a model based on a single decision-maker ill-suited to the adaptive governance of climate change.

3.3 The Limits of Deontology in Complex Adaptive Systems

The other major strand of ethical theory is represented by deontology: a family of approaches conceptualizing morality not as based on the good ends of action, as in utilitarianism, but on the right principles guiding it as, for instance, in Kantian philosophy. As deontology frames morality as fundamentally based on following rules, it is mostly an ethical position committed to a form of moral universalism, claiming that moral principles must hold true universally, independently of geographical or historical context. Within environmental governance this ethical approach has given rise to a set of proposals advocating for universal environmental norms.

Among these, some scholars have defended the necessity of a universal *Grundnorm*, coordinating the action of countries at a global level, developing such a proposal within an explicitly Kantian framework (Young et al. 2017; Kim and Bosselman 2015). According to Kim and Bosselmann, such a *Grundnorm* should be formulated along the lines of an *obligation to protect the Earth's ecological* integrity. Here, the concept of ecological integrity should be understood as the respect of planetary boundaries so to guarantee "the continued healthy or proper functioning of … global - and local - scaled ecosystems and their ongoing provision of renewable resources and environmental services" (Mackey 2005, as in Kim and Bosselman 2015). The scholars have therefore proposed that such a *Grundnorm*, tackling the major moral problem of climate change, should be regarded as a "dictate of reason" and thus recognized by everyone as promoting the "highest global common good", namely ecological integrity.

After the Paris Agreement, this fundamental principle should then act as a hierarchical ordering principle for a new global agenda, organizing the otherwise non-hierarchical

definition of the seventeen UN Sustainable Development Goals, and establish a "common-denominator" fundamental goal "at the apex of the goal-system hierarchy", able to sort out possible conflicts among them. (Kim and Bosselman 2015). In this perspective, the goal of eliminating poverty should be regarded as a subordinated goal, with respect to the higher-order goal of protecting ecological integrity. For the authors, this fundamental moral obligation must then translate to the legal level, to determine a legally binding universally recognized *Grundnorm* constituting a form "global eco-constitutionalism". At this point, two main families of critiques can be moved to this proposal, and in general to deontological approaches to environmental governance.

First, a practical critique can be moved on some difficulties of articulating such a deontological system of universal rules. One concern, for instance, revolves around asking whether it is likely that such a global convergence on a single *grund* principle can be found and sustained unanimously by the entire community of nation states. On a historical note, we can observe, with Elinor Ostrom and others, that such a convergence not only has since now failed to obtain but, more to the point, it has also hindered the possibility of making progress on a less demanding set of common commitments (Ostrom 2009, Young 2017). In fact, the shortcomings of the Kyoto Protocol of establishing a legally binding framework of rules for global climate action have given rise to a more successful approach, championed in the Paris Agreement, based on Nationally Determined Contributions. Another concern is that *grundnorms* can result either *too vague* for actually providing concrete boundaries to the action of states or *too controversial* when it comes instead to specifying a detailed distribution of responsibilities among countries. Again, on a historical note, we should bear in mind that climate change debates have been dominated by disagreement on different principles guiding the distribution of responsibilities, where countries have defended a number of criteria: "polluter pays", "ability to pay", "need" and "equal obligations" are just the more commonly advocated, but a complete list of proposals would be more extensive.

Second, it is possible to question deontological approaches from a purely theoretical point of view by asking whether a broadly Kantian system of ethics can be successfully applied to complex adaptive systems like the ones exemplified by social-ecological linkages in the Anthropocene. In its *Critique of Practical Reason*, Kant famously established the supreme principle of morality as the Categorical Imperative (CI). On what it is arguably its most powerful formulation, the Categorical Imperative is expressed by what Kant called the *Formula of the Universal Law of Nature*, which states that *it is wrong to act on some maxim unless we could rationally will it to be true that everyone acts upon it.* (Parfit 2011, based on Kant 1788). An influential formalization of the Categorical Imperative, advanced first by

John Rawls and after adopted by his students Barbara Herman, Onora O'Neill and Christine Korsgaard, has come to be known as the *CI-Procedure* (Millgram 2005). According to the *CI-Procedure*, an agent faced with a moral decision should: *identify one's own maxim* (subjective principle of volition); *universalize the maxim*; *check for contradiction in conception*, where the universalized action is either self-contradictory or frustrates one's original intention; *check for contradiction in the will*, where the universalized action frustrates what you could rationally will; *if not contradictory then proceed to act*. Such a moral procedure, when applied, should give rise to invariably right actions, following principles which are true in all possible worlds, independently of the context in which they arise.

As a first notation it can be argued that this procedure is questionable when applied to complex systems, especially in the execution of its second step, namely imagining the *universalization of the maxim*. Again, it is crucial to consider that in social-ecological systems it is not always possible to foresee the global effects of a universalized practice, because it is in principle very difficult to assess system-level impacts of a universalized practice in terms of the interaction between human and ecological systems. In fact, social-ecological systems are characterized by continuous interactions between two mutually adaptive systems, and therefore they give rise to constant feedback loops, creating non-linear dynamics, emergent phenomena and sudden changes in system directionality. A good example is provided by the recent attempt of protecting monarch butterflies in the US: as this specie has been declining due to the erosion of their primary food source, milkweed, many environmentalists started planting a common tropical variety in their gardens to help monarch butterflies from going extinct. But tropical milkweed growing year-round, instead of seasonally like the autochthone variety, resulted in year-round monarch breeding patterns. This, in turn, resulted in eradicating migratory behaviors which ultimately exposed the specie to increased infection risks by parasites growing on the plants (Satterfield et al. 2015). The practice thus rapidly backfired due to side effects difficult to foresee at the beginning. Where the categorical imperative postulates a subject with unbounded rationality and perfect information imagining a world in which a maxim is universalized, complex systems theory highlights our epistemological limits when it comes to imagining a maxim turning into a universal practice within a social-ecological system.

Moreover, a second problem is that Kantian ethics, as based on prescribing *context-independent principles*, is particularly ill-adapt in dealing with *thresholds*, where an action might be considered neutral in its impact on a given system until a certain critical level, but after passing such a tipping point its impact might prove to be harmful. Such cases

are known in the literature as *crossing lawn problems*, as they are well represented by imagining a lawn not suffering from being crossed by one person for shortening his path to a destination, but starting to turn into a muddy trail as the passage is increased. Faced with *ecological thresholds*, Kantian ethics can be seen as erroneously characterizing every action impacting an eventual threshold as immoral, independently of the fact that the action is performed past, in proximity of well within the specified critical point.

Indeed, as Parfit recognizes "Kant's Law of Nature Formula works best when it is applied to maxims or acts of which three things are true: it would be possible for many people to act on this maxim, or in this way; whatever the number of people who act in this way, the effects of each act would be similar; these effects would be roughly equally distributed between different people" (Parfit 2011, p. 302). It is clear that the second condition does not hold in crossing lawn problems since the effects of each agent change as they approach a critical threshold. Since resource management has to be constantly sensitive to shifting ecological thresholds in defining the acceptable levels of resource consumption, asking "what if everyone did this" is not always a useful question to start from for defining morally permissible actions.

Finally, a third problem might raise from the fact that the Categorical Imperative is intended to be a generator of *moral standards* giving rise to a *fixed body of guiding rules*, expected to hold universally, independently of the specific context in which they apply. But as complex systems are evolving, a deontological approach based on fixing global rules runs the risk of being too rigid for eliciting the differentiated and real time responses needed for effectively managing emergent phenomena, and is therefore bound to be structurally delayed with respect to changing system dynamics. Furthermore, the moral generalism that Kantian ethics is committed to results in postulating that an action holds the same moral meaning independent of the context in which is carried out. But more often than recognized context matters: with regard to the proposed grundnorm of ecological integrity, it seems straightforward that a governmental agent choosing carbon intensive investments over more costly sustainable ones in the context of a developed economy engages in some form of wrong-doing, but it is less straightforwardly so for an agent governing a country in extreme poverty. In this regard, the philosopher Henry Shue has famously introduced the important distinction between subsistence and luxury emissions; a distinction that a grundnorm of ecological integrity would not be able to individuate (Shue 1993).

It is then possible to suggest that a Kantian ethics is ill-suited to guide decision-making when applied to social-ecological systems, since the effects of universalizing a practice are largely uncertain and it bounds us to a fixed system of context-independent rules, which

is unfit in dealing with ecological thresholds and that runs the risk of being too rigid for organizing collective behavior in a complex and differentiated world.

It is important to notice, at this point, that both of the approaches discussed above conceive ethics as a system fundamentally organized around a unique *master principle*, be it the *Kantian Formula of the Law of Nature* or some form of *Utilitarian Principle* for maximizing either well-being or preference satisfaction. The notion of *master principle theories* has been proposed by Robert Audi in his *Moral Value and Human Diversity*, to highlight the limits inherent in proposing a unique moral principle to be our sole moral guide (Audi 2007). Expanding on Audi's proposal, it is possible to sketch some key features characterizing master principle theories, in order to better assess their performance when applied to complex systems. We can then propose that Kantianism and Utilitarianism, as *master principle theories*, are grounded on the following presuppositions:

- *Ethics as Subject-based*: morality is centered on the Subject's decision-making. This Subject is thought as unboundedly rational and with perfect information. Morality is thus a product of the will which engages in practical reasoning.
- *Ethics as Universal Law*: morality is grounded on a universal legislation. As both approaches start from the Subject, global coordination within society is obtained by postulating a universal law, which grants scalability from the individual to the collective dimension either by Kantian universalization-without-contradiction or by Utilitarian aggregation-without-Pareto-inefficiency.
- *Ethics as a-priori*: moral conduct is defined a-priori. Utilitarian or Kantian principles are conceived as dogmatically fixed from the beginning; their legitimacy lies in the claim that these principles state moral truths, thus expressing an eternal moral reality.

Master principle theories embody, therefore, a *top-down and hierarchical logic*, where a single master principle, with universal application and a-priori definition, is supposed to provide support for the entire construction of human morality. But crucially, this *top-down and hierarchical logic* clashes against the *bottom-up and networked nature* of emergent social-ecological phenomena, creating a *problem of fit* between the Subject's practical rationality and the complex web of social-ecological interactions in which he's embedded within.

It is then possible to individuate three main tensions within master principle theories between the *complexity of social-ecological systems* and the limits of individual rationality, between the *contextual differentiation of social-ecological systems* and universal principles of conduct, and finally between the *evolutionary dynamics of socio-ecological systems* and

eternal moral realities. The aim of the next section will be to explore the possibility of an ethics based on emergent community values, that give rise to context-based and adaptive moral principles.

3.4 A Pragmatist Account of Morality within Institutions

At this point, I will set out to elaborate an ethical framework able to provide policy makers with moral tools to be employed within a complex and ever evolving socio-technical-ecological world. This theoretical framework can be considered as broadly framed within the pragmatist tradition, building upon the philosophical works of Charles Sanders Peirce, John Dewey, Hillary Putnam and Elizabeth Anderson. In fact, where master principle ethics is conceived around an *individualist, universalist and a-priori* conception of morality, pragmatism can offer a much-needed alternative, better suited to the management of complex systems, centered around a *collectivist, contextualist, and a-posteriori* view of morality.

These two approaches display a fundamental difference in how morality is ultimately conceptualized: where master principle ethics frames morality as a rational activity of a subject, engaging in practical reasoning to find an objective realm of universal principles guiding human conduct; pragmatism thinks instead about morality as a collective activity, where principles are emergent social structures, with the pragmatic function of setting goals and solving problems and conflicts in society. Therefore, the task of this chapter will be to articulate how morality can break outside of the boundaries of the *individual* and *universal* perspective and be recast as a *collective* and *contextual* endeavor.

The meta-ethical framework which will be here proposed will respond to one main concern: the world, its problems, and its government have changed dramatically since the Enlightenment, nonetheless the theory of decision-making guiding our governance systems is still informed by ethical projects largely developed during the XVIII century either by Immanuel Kant or Jeremy Bentham. Ultimately, this implies a disconnect between the complex ontology of the contemporary world and simple nature of the mainstream normative frameworks, a disconnect between our societies and our ethics.

Complex socio-technical-ecological interactions within the Earth System have given rise to *plural*, *networked* and *layered* structures of governance, better suited to deal with the complex problems that societies face. In fact, today decision-making is often a cooperative activity, organized in networks of societal agents, nested in a multi-level system of governance. The ethical framework developed here will thus move in the direction of providing a plural, contextualist and multi-level ethical theory. The theoretical challenge of the framework will then be to try to strike a balance between an approach malleable

enough to allow for many plural goods while at the same time providing a theory solid enough to avoid falling into simple relativism. As Parfit has once recognized "*if there is no single supreme principle, that, I agree, would not be a tragedy. But it would be a tragedy if there was no single true morality*"; indeed, if there were no single true morality, one might be forced to eventually regard ethics as a pointless enterprise.

The framework here proposed articulates in a conceptual scheme organized around three layers: at its base, the first layer is constituted by *meaningful livings*, casted in terms of meaningful interactions of an agent with its socio-technical-ecological environment; the second layer comprises *values*, socializing meaningful livings into shared moral goals; and finally, the third layer is represented by *norms*, operationalizing values into informal or formal institutional structures. For purposes of simplicity, it can be proposed that meaningful livings provide an agent with reasons for action, values respond to reasons, and norms are established for the sake of values. Once this basic picture has been established let us now turn to clarify how these building blocks are conceptualized in greater detail. First, some clarifications must be given on what constitutes *meaningful livings* and why such events can be said to be bearers of value and therefore provide us with reasons to promote them.

3.4.1. Meanings

To start introducing this ethical framework, it is first important to articulate how pragmatism can offer an alternative to the impasses of master principle ethics. Accordingly, I will argue that a pragmatist ethics is better positioned to deal with the complexity of social-ecological systems. In fact, where master principle ethics propose a morality built on the rationality of individuals, formulating universal principles of conduct valid across all contexts, pragmatism can offer an emergentist theory of morality, based on the development of contextual and adaptive moral tools which help a specific community to achieve its goals and to solve its conflicts and problems. In this regard, one of the main advantages of pragmatism is that it provides us with the theoretical tools for the elaboration of a holistic theory of value, based on a fundamentally relational view of the individual as always embedded within a specific social, technical, and ecological environment.

In many ways, the definition of what is valuable is a foundational gesture within an ethical theory. In this respect, two main approaches have historically characterized the philosophical investigation on the nature of value: *subjective theories* claiming that values are broadly defined by individual desires, preferences, or projects; and *objective theories* arguing that values must be defined according to some objective representation of what

is good in itself, independent of all subjective attitudes. As Parfit puts it, "according to Objectivists, though many reasons for acting can be claimed to be given by the fact that some act would achieve one of our aims, these reasons derive their force from the facts that give us reasons to have these aims. These are the facts that make these aims relevantly good, or worth achieving. According to Subjectivists, we have no such reasons to have our aims. Some Subjectivists even claim that it is we who, with our desires or choices, make things good" (Parfit 2011, p. 46).

These two approaches reflect a dualist view, deeply rooted in the philosophy of modernity, which sees the world as divided between a subjective and an objective realm. Accordingly, where subjectivists trace the origin of all value within the atomistic and ever-changing inner world of individuals' aims and desires, objectivists connect values to an outer realm of universal and fixed moral entities. As argued, the utilitarianism of preferences informing all economic sciences seats squarely within the first subjectivist field, while a whole class of deontological positions, positing a whole class of universal values such as life, liberty, equality, or human dignity as the moral grounds for human rights or central capabilities, represent an objectivist view of value.

From a pragmatist point of view, both subjectivist and objectivist approaches are problematic. A subjectivist view frames values as expressions of a subjective will and understands morality as the aggregation of a multitude of desiring atoms. Nonetheless, if subjectivism were to be a correct theory of value, morality should be an ever-changing kaleidoscope of individual preferences. From a pragmatist perspective, the reason why subjectivism should be rejected is that it is a philosophical approach which fails to account for the interconnectedness of individuals and, accordingly, for the social role of morality in stabilizing conflicts and organizing the cooperative agency of a collectivity by establishing a shared system of meanings, values, and norms. As John Dewey writes in *Human Nature and Conduct*, "subjective morals taken wholesale sets up a solitary self without objective ties and sustenance" (Dewey 1922, p. 55).

On the other hand, an objective view frames values as eternal realities and conceives morality as the normative respect of a set of fixed and universal ends. Contrary to the chaotic flux which characterizes the subjectivist moral world, objectivism gives a representation of morality as an immutable realm of ideal objects. Therefore, what pragmatists have criticized is the fact that this philosophical approach is at odds with the slow but constant evolution of moral customs that has characterized human history. Oftentimes, a changing social, technical, or physical environment has forced societies to modify their values and update their moral convictions. For instance, old values like chivalry have slowly faded with the end of the feudal system and new values like

sustainability have emerged in the face of a deteriorating environment. What objectivism fails to account for is the interconnection of human affairs with the environment in which they are embedded. As John Dewey writes "objectivity is saved but at the expense of connection with human affairs" (Dewey 1922, p. 52).

According to pragmatism, the dualist philosophy of modernity, positing a stark separation between subject and object, has jeopardized the possibility of formulating a felicitous theory of value. In this perspective, value can be either defined as purely subjective, as a creation of the individual's will, or purely objective, as a mirroring of an ideal realm. In response to the modernist project, the Pragmatist tradition has aimed at dissolving the opposition between subject and object by framing reality as fundamentally relational, a continuous interaction between humans and the environment in which they are embedded. As Steven Fesmire has observed, "debates about moral conduct remain at an impasse. Is it rule-governed or arbitrary, objective or subjective? Responding to this deadlock, numerous moral philosophers in the past two decades have rejected the Janus faces of absolutism and relativism and challenged the Enlightenment foundations of mainstream twentieth-century moral theory" (Fesmire 2003, p. 1). In fact, moral philosophers are increasingly trying to overcome this dualistic inheritance of modernity and to understand morality as the "ways human beings actually make sense of tangled circumstances and compose meaningful lives" (Fesmire 2003, p. 1).

Indeed, all the fathers of pragmatism, from Charles Peirce to William James and John Dewey, explicitly rejected the dualism of subject and object grounding the modern division between mind and world*, res cogitans* and *res extensa*. Among them, Charles Peirce had the merit of helping to reframe the individual as constitutively continuous with the society in which he is embedded. According to the American philosopher, the basic epistemic relation should not be the one obtaining between a subject and the world, but between a community and the world. The mind, for Peirce, is never a private substance that one can separate from the interaction with other minds: the mind is intrinsically social, a plurality constituting a "community of inquiry" (Peirce 1877). In fact, Peirce saw inquiry, or the search for truth through the shared medium of language, as springing from the practical necessity of coordinating social action on a common account of reality.

In this regard, John Dewey pushed the anti-dualist project of pragmatism even further, by showing how the subject is not only fundamentally continuous with the community in which he is embedded but also with the larger environment surrounding him. Dewey beautifully expresses this idea when he writes that "human nature exists and operates in an environment. And it is not 'in' that environment as coins are in a box, but as a plant is in the sunlight and soil" (Dewey 1922). In fact, neither "subject" nor "object" are

foundational concepts for Dewey: experience and nature – giving the title to his masterwork – is the foundational relation characterizing our world (Dewey 1925). Dewey, in this way, frames the experiencing subject as constituted on the base of its embeddedness within a given environment, and not in a dualistic opposition to it.
In an important way, the bet of pragmatism is then to posit that experience and nature constitute a more basic and telling relation than the conceptual opposition between subject and object. This is revelatory of five crucial differences between the pragmatist and the modern project:

- *a privilege to continuity over separation*: where subjectivity is logically opposed to objectivity, experience is functionally included in nature - experience is, in fact, a natural phenomenon; pragmatism thus stresses the primacy of the relation between the mind and the world, not their separation;
- *a privilege to interaction over representation*: as modernism starts from the basic picture of a subject representing an object in thought, pragmatism start from the basic scheme of an agent interacting with an environment – the fundamental relation of pragmatism is therefore interactive, and only successively representative;
- *a privilege to collectivity over individuality*: where modernism interprets the mind as a subjective substance opposed to the objective world, pragmatism sees the human communicative mind as a collective phenomenon emerging within a cooperative specie;
- *a privilege to process over essence*: as modernism portrays the mind as an essence separated and independent from reality, pragmatism sees the mind as a supervenient phenomenon within nature – the mind is thus a complex functional process supervening over a simpler substrate of organic matter;
- *a privilege to solution over explanation*: the goal of modernism is the explanation of the objective world by the subject in order to establish a *mastery* over it; pragmatism, instead, sees humankind as intent in solving practical problems in order to establish a *fitness* between its form of life and the surrounding environment.

It is then now possible to ask: what is for pragmatism the foundational element of morality? The answer which will be proposed here is: the experience of meaningfulness. Here, I will intend meaningful as synonymous with significance, importance, purposefulness. Dewey certainly attributed to meaning a central role within moral philosophy, as he writes that “morals means growth of conduct in meaning; at least it

means that kind of expansion in meaning which is consequent upon observations of the conditions and outcome of conduct. It is all one with growing" (Dewey 1922, p. 280).

The first thing which is important to underline is the centrality of the category of experience in the moral philosophy of Pragmatism. The central role attributed to experience answers to the necessity of steering moral thought away from abstract and dogmatic theorizing and back to "the ways human beings actually make sense of tangled circumstances and compose meaningful lives" (Fesmire 2003, p. 1). In this regard, a morality grounded on the experience of meaning embodies a thoroughgoing empirical approach which frames moral inquiry as a process of human learning and growth, starting from the actual situation in which one is embedded. As Mark Johnson observes, Dewey's "empirical approach demands that ethical theory begins with the primitive situations of life in which moral experiences are had. In this sense moral subject matter is always experienced as a part of a situation" (Pappas 2018, p. 4).

The second important aspect of a pragmatist conception of morality is a focus on meaning. Compared to a subjectivist approach which frames the individual as the exclusive origin of value, the pragmatist approach helps to cast value as intrinsically holistic by framing meaning as a process of moral signification of reality by an agent embedded in a given environment. As Hildebrand writes "economists speak of 'interest satisfaction' as if human conduct could be understood by aggregating the preferences of numerous atomic individuals. But no 'interest' is ever meaningful in such strict isolation; interests (needs, desires) are meaningful only as understood within the social and historical contexts that help form them" (Hildebrand 2008, p. 64).

In a pragmatist philosophy, meaningfulness is always found by starting from a specific interaction with a given social, technical, or ecological environment: one will find mastering a craft meaningful, another will see the research for a cure for cancer as meaningful, another will feel that bonds of friendship are what gives meaning to one's life, another will seek on a mountain the quiet experience of meaning.

From a material point of view, meaningfulness is always established on the base of a specific context determining a landscape of problems and opportunities, limitations and affordances, that already informs the character of the agent's interaction with the environment: the meaning of finding a revolutionary cure is informed by the environmental presence of a disease, the meaning of having a child could change in a dramatically overpopulated world, the meaning of climate activism is informed by rising global temperatures. As the experience of meaning is obtained by attributing an existential value to an experienced reality, it is then important to recognize how the definition of meaningfulness is continuously informed by the material presence of a

specific, and evolving, environmental context, which pre-exists and pre-directs the experience of meaning by determining a space of both problems and opportunities.

From a social point of view, the experience of meaning is constantly mediated by the specific culture in which one is embedded. As Dewey writes "the meaning of native activities is not native; it is acquired. It depends upon interaction with a matured social medium" (Dewey 1922, p. 90). Meaningfulness is then a fundamentally holistic experience stemming from the embeddedness of a certain activity within a specific social, technical, and ecological environment. Meaningfulness arises in the evolving interaction of a specific agent - *this* person, with *this* life story - with a specific element of the environment - *this* object, *this* person or group, *this* place - in a specific context - *these* material affordances, *these* material problems, *this* social, technical, ecological environment. Hence, meaning is neither the expression of a subject, nor the correct representation of an object; meaningfulness is, in fact, fundamentally holistic, both in its narrative dimension, as one's experience is determined by how it relates to one's life story, and in its contextual dimension, as one's experience is determined by the specific material, ecological and social context in which it is embedded.

A third important aspect in the definition of a pragmatist theory of meaningfulness is that the search for meaning is a pragmatic endeavor. The question of meaning, the inquiry into what is meaningful, emerges when a given situation is problematic, internal or external conflict arises, and psychological or social tensions come to the surface. For Dewey then, the search for meaning originates as a search for the resolution of a sudden crisis of personal conduct or societal customs in a given problematic situation. Faced with a problematic situation, the inquiry into what is meaningful engages us in a process of existential deliberation, where previous conduct is examined, the comprehension of environing conditions and consequences of action is deepened, and imagination explores new avenues of conduct and new "experiments of living" (Anderson 2015).

In fact, the American philosopher observes "progress means increase of present meaning, which involves multiplication of sensed distinctions as well as harmony, unification", and adds "good consists in the meaning that is experienced to belong to an activity when conflict and entanglement of various incompatible impulses and habits terminate in a unified orderly release in action" (Dewey 1922, 210). The experience of meaning is encountered when a given activity is found to restore the unity of action in a situation characterized by conflicts and tensions. This activity sets then a new "end in view" in our practical life. Therefore, faced with a problematic situation, the inquiry into what is meaningful helps us to set new "ends-in-view" (Dewey 1939). In fact, Hilary Putnam observes that for Dewey "ends are neither laid up in a Platonic heaven nor the mere

whims of individuals; they are, rather, ends-in-view, they guide conduct" (Putnam 1995, p. 200). In this way, the establishment of new ends-in-view contributes to a steady process of moral change, where the traits, aims, and rules of conduct assume novel and richer meanings.

According to pragmatism, then, moral progress is not only the path towards the resolution of practical problems but also towards the enrichment of meaning. The goal of the moral philosophy of Dewey is well expressed by the pragmatist philosopher Steven Fesmire, arguing that "the radical character of Dewey's conception of moral cognition is thus most evident in the way he rejects the traditional assumption that there must be correct values given in advance of any moral deliberation or judgment and capable of guiding our actions. He replaces this with an imaginative process of moral inquiry directed toward composing the situation in a way that enriches and deepens meaning, releases energies, and reduces conflict—not just for the individual moral agent but for the largest possible morally relevant community (which may include more-than-human nature) (Fesmire 2019).

A natural objection to such a theory of meaningfulness could be that it is, at best, suited for a descriptive explanation of social reality, but not for a normative account of moral life. One such objection could be to point out how *meaningful* and *good* are not overlapping concepts: some may find being a terrorist a meaningful life, some could join a depraved cult and feel fulfilled, some will see in organized crime deep bonds of loyalty. Here, two main answers are in order. First, a negative response: if one simply affirms that there is a separation between "good" and "meaningful", one ends up disconnecting the normative from the existential, severing ethics from life. Once this severing has occurred there is not much to be done in order to save ethics from its eventual irrelevance in the life of persons; in this way, ethics will be only able to be framed as *Law*, as the imposition of an external order on life, separated from what is the lived experience of mattering. Here, an entire tradition of continental philosophy, ranging from Michel Foucault to Giorgio Agamben, will have good reason in pointing out how separating *norm* from *life* opens the way to the violent capture of life under a *law* established by an *external power* (Foucault 1975, Agamben 2014). The challenge is therefore to provide an account of how the existential and the normative mutually inform each other by establishing a plurality of *forms of life* (Wittgenstein 1953, Agamben 2014). In fact, one of the great contributions of Wittgenstein is to have showed how meaning arises when norms are connected to life through a practice to constitute a *form of life*.

Once this aspect has been addressed, it becomes essential to give a second, positive, answer to the realist challenge about the normativity of meaning. Here it can be advanced

that it is crucial to understand that the *experience* of meaning should not be understood just as a passive emotional response to a specific interaction; far from it, experience, in a Deweyan spirit, should be regarded as a fundamentally holistic phenomenon in which three aspects play an important role: a passive dimension expressed by an emotional reaction to an experience deemed meaningful; an active dimension resulting in the engagement with what one finds meaningful; and a rational dimension instantiated in the reflective valuation of such an engagement. In the philosophy of Dewey, experiences are never just *had experiences*, but also *enacted experiences* and *known experiences*.

In fact, as experiences of meaning are strong vehicles of personal identification, the emotional response to the experience of meaning sets, in the psychology of the individual, a rational commitment to treat a certain activity as setting an end guiding one's agency over time (Bratman 2007). But the meaning of an activity, far from been decided once and for all by an original emotional response, is always susceptible to be reflectively evaluated on the base of the consequences that it brings about. As previously articulated, for pragmatists knowledge, be it epistemic or moral, should not be regarded as a private endeavor, but as the result of a fundamentally collective practice. The engagement with a specific meaningful activity cannot be evaluated, in a community, solely on the basis of personal criteria: evaluation, as an individual *cognitional* process, cannot prescind from a collective *re-cognitional* process. As Dewey writes, "others do take account of what we do, and they respond accordingly to our acts. Their responses actually do affect the meaning of what we do" (Dewey 1922, p. 316). One has to remember that "we live mentally as physically only *in* and *because* of our environment. Social pressure is but a name for the interactions which are always going on and in which we participate, living so far as we partake and dying so far as we do not. [...] It calls attention to the fact that considerations of right are claims originating not outside of life, but within it" (Dewey 1922, p. 327).

Accordingly, the evaluation of an action is always defined starting from the two-faceted meaning that it assumes for the agent who performs it and for the collective in which one is embedded. Just as the existential interpretation of an experience occurs on the base of a shared *space of meanings*, the normative evaluation of meaningful agency arises on the base of a shared *space of reasons* (Sellars 1956, Brandom 1994). Between the individual and the society in which he is embedded there is not a straight line but a circle; as Dewey writes (Dewey 1908, p. 3):

> *[ethics] has to study the inner process as determined by the outer conditions or as changing these conditions, and the outward behavior or institution as determined by the inner purpose, or as affecting the inner life.*

To the extent that one's actions are rarely executed in a social vacuum, the evaluation of meaningful livings pertains then to the collective inquiry into what is mutually justifiable as valuable. Hence, as meaningful livings get enacted, for a community it becomes crucial to achieve some degree of social coordination of agency by socializing individual meanings into shared values, so to be able to set some common ends for collective agency. This marks the transition from the existential domain, based on the individual experience of meaning, to the normative domain, based on the shared evaluation of actions: by this process of social coordination, meaningful livings develop into moral values, individual experience develops as collective rationality, and existential meaning develops as normative truth.

3.4.2 Values

At this point, it is possible to introduce the second layer of this multi-level pragmatist framework, namely *values*. As I argued, the experience of meaning is not a neutral feeling but is, within a pragmatist framework, eminently linked to agency. As Dewey says, what is meaningful is "affective-motor", it certainly affects the person, but only to move her to engage further with this activity. Phrasing this Deweyan insight within the vocabulary of the contemporary philosophy of action, it can be said that the experience of meaning sets within the psychology of the individual a *self-governing policy* to treat a determinate meaning as providing an end guiding one's agency over time (Bratman 2007). I will then argue that values have the function of socializing such individual ends and therefore to constitute *collective policies* to treat a determinate end as *mutually justified* in guiding collective agency over time. As Bratman recognizes, "value judgments are tied to intersubjective pressures to which self-governing policies need not be directly accountable" (Bratman 2007, p. 8). In fact, as previously argued, whilst meaning at the individual level is warranted by direct experience, meaning at the collective level must be warranted by normative structures of mutual justification.

But which can be a criterion of justification for a pragmatist ethics? Here an answer can come by going back to the roots of pragmatist philosophy: pragmatism is based on an idea of inquiry as a social practice through which a community establishes what is true by setting for a cooperative inquiry based on the foundational role of experience. When it comes to moral truth, pragmatism will accordingly give rise to a pluralistic and contextualist ethics, where what is moral is defined on the basis of the plural experiences of a collective in its interaction with a specific contextual environment. But this pluralism and contextualism do not revert to a form of relativism, since from a methodological point of view the pragmatist conception of inquiry implies that in order to establish any truth

everyone should have access to experience in action. In fact, within a pragmatist perspective, the method of inquiry is structurally linked to the practical ideal of a cooperative agency. As Dewey writes, "what I have called the mediating function of liberalism is all one with the work of intelligence" (Dewey 1939).

The philosopher Hilary Putnam explains well Dewey's cooperative understanding of inquiry by pointing out how "what Dewey is concerned to argue, early and late, is that democracy is the precondition for the application of intelligence to the solution of social problems. [...] The need for such fundamental democratic institutions as freedom of thought and speech follows, for Dewey, from requirements of scientific procedure in general: the unimpeded flow of information and the freedom to offer and to criticize hypotheses" (Putnam 1994, p. 217).

Therefore, since for pragmatism experience should lay at the foundation of every inquiry, it can be advanced that the experience of meaning in action, what I will call *meaningful agency*, constitutes a conceptual primitive of moral pragmatism, a positive term without which the very pragmatic method of inquiry fails. In this way, I submit that meaningful agency can be considered as the central criterion for the mutual justification of moral values and norms. In fact, as the experience of meaning represents a conceptual primitive for a pragmatist ethics, it can be advanced that a value is mutually justifiable only to the extent that it grants to all members of the community the possibility to engage with those activities that they regard as meaningful. It can then be said that *meaningful agency* represents a practical value for pragmatism and, complementarily, *meaningless patiency* represents a practical disvalue, as it denies the very possibility of the experience of meaning in agency. Nonetheless, this is not a truth established a-priori, but a regulative assumption inherent in the very pragmatic method (Heney 2016).

In this picture, values are rational insofar as they promote the possibility of meaningful agency. But where granting meaningful agency sets only an empty and formal condition for the definition of values, their substantive content is determined both negatively by the necessity of solving the contextual problems which prevent a unified agency in the collective and positively by the necessity of reaching a shared conception of what constitutes a path for the development of a meaningful life for the whole community.

Values are therefore elaborated starting from a specific context of interactions, both social (human-human), technical (human-technology), and ecological (human-environment); this context constitutes a landscape of both practical affordances and limitations that informs the definition of values as collective ends. In this picture, values are established as moral tools that map from a specific *context of interactions* (as input) to

meaningful collective agency (as output) by the establishment of *shared ends*. Whether the relations

context of interactions → value (end-setting) → meaningful collective agency

are relatively simple and linear or complex and dynamic is ultimately an empirical matter. In a simple case, where for example crime is plaguing a small community, the emergence of the value of *security* can constitute a pretty straightforward goal for the collective, in order to regain meaningful agency; but in a more difficult governance scenario, where rising unemployment is jeopardizing in complex ways the very material means for meaningful agency, many different values can be posited as constituting a fitting end to reorganize a collective towards meaningful agency – the collective may be said to lack more economic *efficiency*, or greater fiscal *solidarity*, or better systems of *social safety*.

Therefore, the degree of linearity to which collective agency, organized towards an end, translates into meaningful agency at the individual level is a function of the complexity of the supervenience relation passing between the social level and the individual level. Once a society reaches a certain critical point of complexity, the relation between the functioning of its social institutions and the effects these engender in the life of the individuals composing it becomes structurally non-linear, dynamic, and emergent. Hence, the position of values able to translate from the social level of institutions to the individual level of meaningful livings becomes largely, at this level of complexity, a matter of hypothesized means-end relations.

Therefore, when we say that a value is intended to set an end, able to organize a collective, in a given context, towards meaningful agency, this affirmation is to be read only as a hypothetical statement, expressed in the form of abductive reasoning, that will have ultimately to be tested according to the practical consequences it will give rise to. Accordingly, *safety*, in a dangerous environment, will constitute a value to the extent that it is *shown* to allow individuals to be less exposed to risks; *sustainability*, in a polluted planet, will be valuable insofar as it *effectively* grants people a better future; *charity*, in a divided society, will be valuable as long as it *practically* allows a person to regain agency in life. As portrayed in these examples, a value has to be able to reorganize a context of socio-technical-ecological interactions, constituting either a space of limitations or affordances, by setting a new end able to effectively promote meaningful collective agency.

Values are therefore two-faceted moral tools that are rational on one side, as they respond to objective reasons for promoting meaningful collective agency, and motivational on the other side, as they respond to subjective reasons for solving

contextual problems limiting one's agency and for achieving meaningful ends. But the fact that reasons are twofold does not amount to a case of overdetermination because objective reasons to promote the meaningful agency of each person are defined in abstraction from what is deemed meaningful, and therefore allow for subjective reasons to express the very content of meaningful action. In this way, objective reasons to promote meaningful agency underdetermine collective courses of action and they are given substance only by the positive expression of meaningful ends: accordingly, meanings set a direction to the shapeless rational demand for the mutual recognition of meaningful experience in agency.

Accordingly, this definition of value allows to propose a solution to a longstanding problem in practical reasoning about values, namely the fact that values seem to be more objective than the mere subjective expression of a desire and more subjective than the mere representation of an objective good. As Gary Watson recognized in his *Free Agency*, value judgements must be different from purely subjective desiring (one can desire things one does not value), but also from purely objective judging good (one can fail to desire something one judges good) (Watson 1975).

Casting values as moral hybrids, able to admit both rational constraints for the mutual recognition of agency and motivational appeals for the internal expression of meanings, helps avoiding the apparent contradiction between values as purely objective structures and values as purely subjective expressions. Values, then, present us both with objective reasons for promoting the mutual recognition of agency and with subjective reasons for promoting the collective expression of shared meanings. In this picture, values amount to intersubjective claims to raise a specific meaning as providing a fitting end for collective agency. Sometimes values will be formed by the simple socialization of individual meanings, as a collective is found to be relatively homogeneous in its formulation of a meaningful life (think here to the long history of communitarian experiments of living), other times values will be formed inversely by their capacity to grant differences and constitute useful social mediations in the expression of diverging individual meanings (think here of complex values like *pluralism*, or *diversity*, typical of larger governance units like cities and nations). In fact, given a specific context, different stakeholders will often hold different values as relevant for a collective - sometimes these will partially overlap, sometimes they will radically conflict (van de Poel 2009, 2015).

But eventually, to the extent that values represent moral tools for the coordination of collective action, these conflicts will either have to be dissolved by devising socio-technical solutions able to support different value dimensions at the same time (van den Hoven et al. 2011), to be resolved by means of democratic deliberation (Dewey 1916, Putnam 1994),

or to be maintained and therefore to re-draw the social assemblage of actors to allow the emergence of new different *experiments of living* (Stuart-Mill 1859).

I have then sketched a picture where values represent fundamentally social constructs where a specific meaning is advanced as a fitting end for meaningful collective agency. But here a clarification is in order: where we can say that one *has a reason* for promoting the mutual recognition of agency, one only *gives a reason* for upholding a determinate meaning as a fitting value around which collective agency is to organize. This is due to the fact that meaningful agency constitutes an intrinsic value, within the pragmatist method, but the shared ends orienting collective agency which we commonly call "values" constitute only an *extrinsic value*, an instrumental one, as they are valuable only insofar as they are shown to be means to the promotion of meaningful agency throughout a collective. As a value constitutes a means to an end, many diverse values will often form possible means to the end of meaningful collective agency. Values are therefore only partially commensurable as, on the one side, they can be evaluated on the base of their practical effects in enabling meaningful agency, but on the other side there is always a plurality of values able to reach such an end.

Therefore, where the recognition of mutual agency is a *rational process* grounding the very normative structure of collective agency, the advancement of a determinate value as a collective end is ultimately the result of a *deliberative process* where such a value is agreed upon as being conducive to the promotion of meaningful agency.

Now, at this point something must be said in order to correct the impression that value creation, as a means of socializing meaning, is exclusively a constructivist process. In fact, rational deliberation is more the exception than the rule when it comes to the evaluation of collective ends; oftentimes, values are semantic tools which emerge spontaneously from the social, technological, and ecological network of actants characterizing a specific social-ecological context. From an historical point of view, values have often surfaced in the public debate as a result of newly constituted problems or opportunities that suddenly modified the boundary conditions of a specific society. For instance, as modern societies started to be increasingly based on the documental recording of human agency, the value of *privacy* emerged as a response to the changing meaning of personal integrity in a panoptic society, and thus enabled social actors to set limits to the harmful exploitation of personal information; as the means of production of industrial societies contributed to the pollution of the environment to a degree that would jeopardize the very existence of essential natural resources, the value of *sustainability* emerged as a response to the changed meaning of nature, and allowed the establishment of a new model of societal development.

A specific meaning has then often emerged as a value as a result of reaching a place of practical relevance in interpreting a changed social or ecological context (think again of sustainability in the context of climate change). But the process of value emergence, which pertains to the descriptive, should not prevent a moral theory, with a prescriptive aim, to propose that emergence should be complemented by a form of shared deliberation upon which values should stand as the ends of a society after being exposed to collective rational scrutiny.

We then propose that values should be conceptualized as collective self-governing policies to treat a determinate end as mutually justified in allowing or promoting meaningful collective agency. To summarise, values are then:

- self-governing and end-setting collective policies;
- forming evolving and adaptive moral tools with instrumental value;
- constituting complex mappings from particular contexts to meaningful collective agency;
- where context is informed by specific practical problems and affordances;
- rising from the necessity of coordinating social (human-human), technical (human-technology), and ecological (human-environment) interactions.

In line then with Michael Bratman (2014) and Michael Tomasello (2019), the theory here proposed embraces an interpretation of sociality as an emergent phenomenon based neither on mutual interest nor mutual obligation, but characteristically grounded on normative structures of shared intentionality, where a collective is formed on the base of values as shared ends. As emphasized before, whether a collective converges on the base of value alignment, or develops some meta-values able to accommodate divergent value dimensions (*pluralism*, *multiculturalism*, *diversity*, etc…), or re-organizes along different, separated experiments of living is ultimately a matter of empirical outcome.

What is relevant for our discussion, is to propose that values represent moral tools aimed at organizing collective agency towards shared ends; hence, they amount to social structures of practical rationality which act as goal-setting collective policies, expressed in the form of shared intentional plans (Bratman 2006, 2014). In a pragmatist spirit, values are then casted in the form of practical, contextual, and evolving structures of collective agency, intended to provide mappings from contexts of interaction to meaningful collective agency. In this way, pragmatism best explains values as grounding the multiplicity of *experiments of living* that constitutes our world. Morality, in a pragmatist perspective, is fundamentally a collective and cooperative form of sense-making, an

ongoing activity guided by the ever-changing experience of meaning in the interaction with a given social, technical, and ecological context.

This grants to a pragmatist approach a much greater ability to establish a dialogue with a theory of adaptive governance, than the rigid moral systems of deontological and utilitarian ethics. In fact, faced with the complex and dynamic nature of socio-technical-ecological systems, a pragmatist account of morality provides a theoretical foundation for understanding the development of social institutions as an evolving system of moral tools aimed at resolving contextual problems in a changing environment. In fact, while the top-down logic of master principle ethics provides decision-makers with fixed and universal prescriptive tools which are ill-suited for the governance of complex systems, a pragmatist account of morality as a fundamentally holistic and dynamic process of moral sense-making can help to move towards a more participated form of bottom-up governance, better suited to elaborate contextual and adaptive solutions to the challenges of complexity facing our societies. Finally, it is possible to see how preference utilitarian forms of rational choice theory, which dominate social sciences from economics to political science, from public policy to environmental economics, are still based on a view of collective action as constituted exclusively by self-interested monads, which are driven towards social *coordination* only insofar as this advances their individual preferences.

A pragmatist theory of collective agency can instead contribute to cast sociality as characteristically based on *cooperative* structures of collective intentionality (Bratman 2014). In a pragmatist perspective, sociality is then fundamentally cooperative, and does not simply amount to the coordination of competitive monads, carried out either by a market or by a state, respectively incentivizing or forcing them into smooth interaction. From a pragmatist point of view, cooperation is then fundamentally achieved by the continuous construction of values as shared ends, forming a normative structure of practical rationality contributing to guide the collective action towards the solution of societal problems.

3.4.3 Norms

It is then now possible to introduce the last layer of this pragmatist multi-level ethics, namely *norms*. Here, I will argue that norms have the function of operationalizing values into shared institutional structures, with either a formal or informal definition, that operate by regulating collective agency towards the achievement of social ends. In this sense then, norms can be said to be established *for the sake of* values, and therefore to ground a conception of the right on the base of a conception of the good. As mentioned before, a concept of the right detached from the experience of meaning and the

deliberation on value, clears the way to the establishment of morality as the imposition of a rule from above, a Moral Law which must then find its justification in the representation of an ontologically independent domain of moral "pure statements" (Scanlon 2014).

Nonetheless, a morality depicted as an external set of norms of conduct represents an ethical conception that obliterates the connection between morality and experience; in this way, it hinders the very possibility of moral growth, it casts moral education as a passive routine of rule following, and ultimately it contributes to the slow erosion of a personal sense of responsibility towards one's own choices (Balistreri 2020). As Dewey writes, "a truly humane education consists in an intelligent direction of native activities in the light of the possibilities and necessities of the social situation. But for the most part, adults have given training rather than education" (Dewey 1922, p. 96).

Furthermore, as in practice the redaction of these universal moral laws is believed to be the task of a restricted group of philosophers, one should perhaps ask, as Elizabeth Anderson does in her *Moral Bias and Corrective Practices – A pragmatist Perspective*, "why rely on the intuitions of philosophers over the intuitions of the folk?" (Anderson 2015). Casting norms as anchored in the shared deliberation on what is valuable helps then to grant that *all the persons* having a stake in the way of working of a society are adequately represented. Moreover, this cooperative process allows a true form of moral education, which lays its foundations in experience and not in blind obedience. This follows the fundamentally Deweyan insight that intelligence is to be conceived as fundamentally continuous with action, and that their separation into an untenable dualism can only contribute to the establishment of a society separated between those who think and decide and those who act and execute (Putnam 1994).

To attempt a more precise definition of norm, it can be advanced that a moral norm establishes what must or must not, should or should not, may or may not be done in a collective in order to promote a given valuable end. For instance, to the extent that *safety* is valued, a foreman *must* see to it that none of his employees is exposed to unreasonable risks; to the extent that *autonomy* is valued, a doctor *may never* impose a medical treatment on an unwilling patient; to the extent that *sustainability* is valued, a citizen should reduce the amount of trash that he produces. Of course, in a complex society, manifolds of values will give rise to complicated norms with many provisos, restrictions, and applications clauses, but the basic picture will remain unaltered. Furthermore, as values change and evolve by responding to new problems and imagining new futures beyond them, moral norms, and their organization in a coherent system for social coordination, will mutate as well.

Meanings, values, and norms constitute, therefore, dynamic moral tools which are always formed in relation to the context in which they are developed. In fact, norms are always established starting from a given context informing the ways in which a given value can be translated into agency, and their validity is defined to the degree to which they allow a value to be effectively translated into practice. Norms are then always defined in a context characterized by the limitations and affordances which constitute the social, technical, and environmental landscape of a collective. In this frame, what stabilizes a norm into existence is the fact that they perform the function of coordinating collective action into a form of organized agency. As Elizabeth Anderson has written, norms are intrinsically pragmatic as (Anderson 2015, p. 22):

> *[…] principles have a function. They are tools for solving moral problems—problems that arise from the facts that people need to live together, and need each other's assistance and cooperation, to survive and realize nearly everything worthwhile in life.*

But, differently from a long-standing tradition in pragmatism that sees moral norms only as functional to the solution of *problems* as *negative effects* that a collective must *overcome* through cooperative agency, here moral norms will be framed to the same extent as functional to the promotion of *values* as *positive ends* that a collective can *achieve* through cooperative agency. This corrects a somewhat arid tendency, within pragmatism, to see morality as stemming purely from the necessity of overcoming an obstacle; instead, morality arises to the same degree from the positive imagination of a possible future to be achieved collectively. An ethical theory which accounts for the overcoming of an obstacle, but has nothing to say about how we proceed from there, is bound to remain an incomplete theory of moral meaning. "Be generous", "To each according to his needs", "Be kind", "Turn the other cheek", "Return a favor", "Have courage" are all examples of moral norms which are at best only partially rooted in the removal of obstacles, and that find their deepest reason in the positive expression of moral meanings. If one tries to translate this line of reasoning on the political side, it becomes clear how politics cannot just be founded on the removal of obstacles, as Dewey intended when he wrote that the state is founded on the necessity of managing the negative externalities of private transactions (Dewey 1927, p. 15):

> *The public consists of all those who are affected by the indirect consequences of transactions to such an extent that it is deemed necessary to have these consequences systematically cared for.*

The political, in fact, finds its proper space in the removal of obstacles as much as in the positive imagination of future paths of development, it deals with the actual as much as with the possible (Veca 2018). That the organization of social life is fundamentally shaped by the category of possibility, it is also evident if one considers the one-to-many relation passing between environmental context and meaningful agency, between this meaningful agency and values, and between these very values and norms. Ultimately morality consists in the social exploration of possible meanings – but it is also important to remember that such an exploration proceeds thanks to the friction with the solid ground constituted by the mutual recognition of meaningful agency. In this way, morality enables a form of *meaningful collective agency* which finds its full expression in the various *forms of life* constituting our *experiments of living*.

But while the present theory leaves structurally open the moral contents of such forms of life, a pragmatist ethics can nonetheless suggest a working method for arriving at any definition of the moral life. In this regard, it can be suggested that, insofar as meaningful collective agency is grounded on the mutual promotion of meaningful agency and the mutual prevention of meaningless oppression, such a method should be articulated around a prioritarian distribution of services and goods, a democratic procedure of decision-making and a pluralistic recognition of ways of life.

It should be prioritarian because the collective definition of shared ends rests on the very possibility of every individual to experience meaning in action, and therefore the more one is deprived of the material means for action the more one should have access to as much of a provision of goods and services as compatible with the attainment of such a shared end. It should be democratic because the collective definition of shared ends is a cooperative endeavour based on the possibility of every individual to have a saying in the public debate on pursuable ends. It should be pluralistic because the collective definition of shared ends is grounded on the underlying plurality of meaningful ways of life. Again, it must be stressed how the definition of these methodological norms is not grounded in any a-priori ethical domain of “pure statements”, but they embody a set of *regulative assumptions* which are internal to the very pragmatist logic of inquiry.

To conclude, it can be advanced that norms constitute a normative infrastructure of rules, standards, and codes aimed at organizing collective agency towards the attainment of shared ends. As collectives become more complex and the attainment of societal goals becomes more and more mediated by emergent social institutions, these systems of norms ultimately should evolve from informal to formal apparatuses, regulating the very life of modern societies.

3.5 A Pragmatist Theory of Institutional Development

At this point, it is then possible to explicitly suggests how such a pragmatist multi-level ethics can apply to a theory of governance. Specifically, the goal of this section will be to embed the pragmatist theory elaborated here within a theory of institutional development, providing decision-makers with a more refined tool for understanding how social institutions can emerge and develop in order to solve new tensions, conflicts, and problems. The development of social institutions will be therefore linked to the slow emergence of a shared body of meanings, values, and norms which have the role of guiding collective action towards the solution of contextual problems. As Elinor Ostrom points out, "contextual variables are essential for understanding the initial growth and sustainability of collective action as well as the challenges that long surviving, self-organized regimes must try to overcome" (Ostrom 2005, p. 287). In fact, decision-makers have often designed policies in abstraction from the moral perceptions of the target communities, creating institutional environments characterized by increasing tensions between civil society and public administrations. A managerial and technocratic way of governing social-ecological systems leads often to fierce opposition to new projects and policies, falling short of forecasted policy outcomes. Therefore, it is crucial to provide decision-makers with an analytical understanding of the interconnections between institutions and the socio-ethical variables characterizing the target communities.
Accordingly, I will try to explicit the role of moral variables within the development of institutions by expanding what is arguably the most advanced theoretical framework for the study of institutions, the Institutional Analysis and Development Framework, elaborated by the Nobel laureate Elinor Ostrom. According to Ostrom's analysis, institutions are defined as (Ostrom 2005, p. 3):

> *[…] institutions are the prescriptions that humans use to organize all forms of repetitive and structured interactions including those within families, neighbourhoods, markets, firms, sports leagues, churches, private associations, and governments at all scales.*

According to Ostrom, *action arenas* constitute the very central element of an institutional arrangement, and they constitute the main stage where the interactions of the individual agents take place in a given context of analysis. More precisely, *action arenas* are holistic units formed by the *participants* involved and by an *action situation* in which the individuals observe the information available, select actions, interact with each other, and realize *outcomes*. More specifically, within the IAD Framework, an action situation defines the structure of the coordination game that the participants face and it can be analysed as

articulated in seven main variables: (1) the *participants* involved; (2) the *positions* they occupy, defining the scope of the agency of an actor in a given social role (judge, doctor, voter, etc..); (3) the *potential outcomes* they can achieve, establishing a matrix of outcomes assigned to the available actions for any given participant; (4) a set of *action-outcome linkages*, defining the set of actions, or moves, available to any participant, and associating them with variable degrees of certainty to expected outcomes; (5) the *control* exercised, measuring the degree of control that participants exercise over the linkage between actions and outcomes; (6) the *information* possessed by the participants about the structure of the action situation, and finally (7) the *costs and benefits* assigned to actions and outcomes by participants.

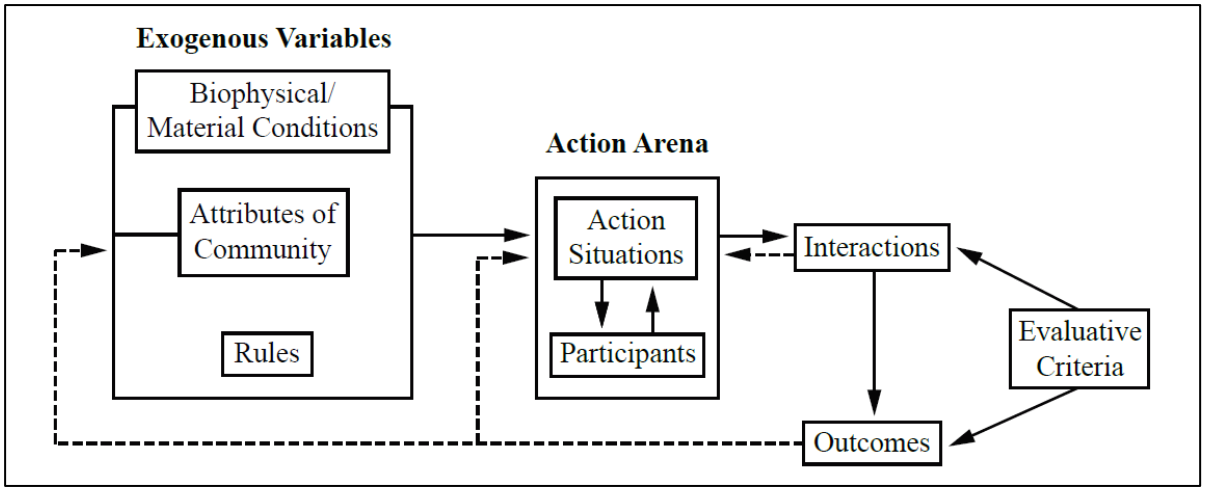

Figure 3.4: A framework for institutional analysis (Adapted from Ostrom, Gardner & Walker 1994, p. 37).

Furthermore, it should be pointed out that action arenas are affected by a set of *exogenous variables*. According to Ostrom, such *exogenous variables* which affect action arenas are fundamentally three: the *bio-physical attributes* of the environmental context, the *socio-technical attributes* of the community, and the *institutional attributes* forming the set of formal rules and standards that regulates the life of the community. Moreover, it is important to underline that both interactions and outcomes are the subject of evaluative assessment by the participants involved. Nonetheless, it is also clear that such evaluative criteria represent for Ostrom fixed values, as she cites as examples moral concepts like "equity", "resilience", "accountability", and "efficiency".

Now, after exposing the basic theoretical variables of the IAD Framework, it is possible to ask how Ostrom's theory intersects with the moral framework developed here. Firstly, it can be observed how the variables identified by Elinor Ostrom in her institutional analysis present a good match with the variables identified within the multi-level pragmatist ethics which was delineated before. The fundamental picture of a set of actors, informed by a given context of social, technical, and environmental conditions, who interact with each

other giving rise to outcomes which are assessed according to a set of given values is fundamentally shared by both approaches. Furthermore, what Ostrom's Framework can offer to the pragmatist ethics elaborated before is the analytical definition of action situations, which in the proposed framework remains fundamentally implicit.

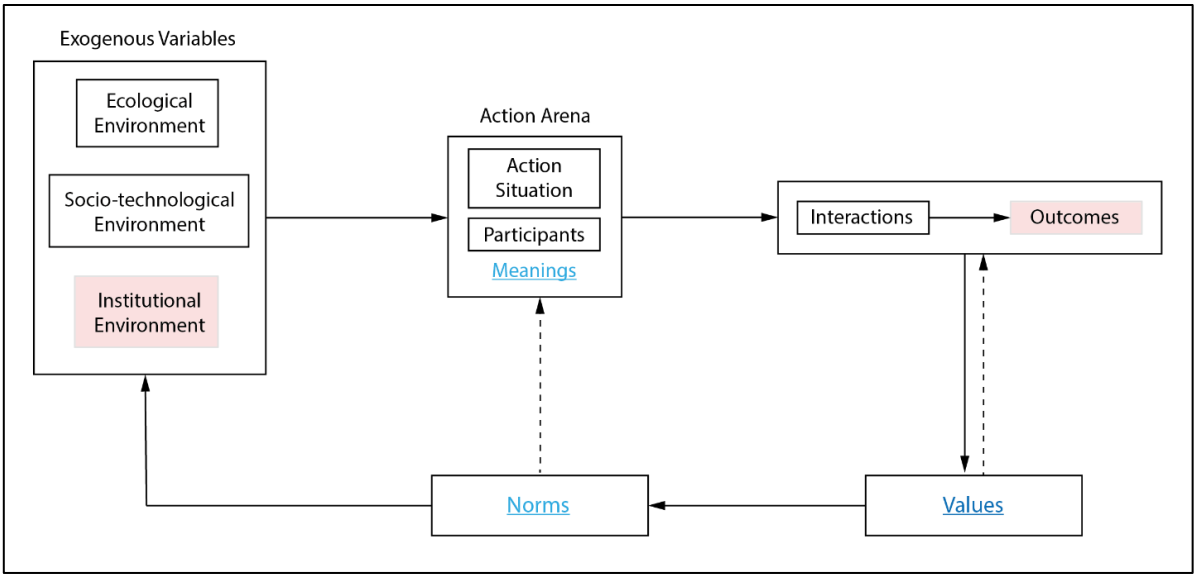

Figure 3.5: The role of moral terms within Elinor Ostrom's IAD framework.

Conversely, it can be pointed out that the developed analysis of *meanings*, *values* and *norms* can contribute to incorporate some ethical insights within the IAD Framework. Firstly, the elaborated pragmatist ethics can help to correct the impression that values are fundamentally static entities in Ostrom's theory of institutions, and that they are assumed as fixed from the start according to a criterion which finds no explanation within the theory. Values, as we have seen, are fundamentally dynamic and contextual moral tools to solve specific societal problems, which coevolve with changes within the social, technological, and environmental context in which they are embedded. Secondly, a pragmatist ethics can contribute to make explicit the role of *norms* within the IAD Framework and connect them both with *values*, showing how norms are in fact operationalization of values, and with *institutional rules*, showing how norms slowly evolve and inform the institutional formal apparatuses of a given community. Finally, the overall theory of moral emergence elaborated in the previous paragraphs provides an analytical understanding of the role of morality in creating and maintaining a cooperative agency. In fact, a pragmatist framework can provide a better understanding of the evolution of systems of shared meanings, values, and norms as processes of collective sense-making which are able to federate a collection of individuals around a shared account of societal development. We can then propose a modified conceptual diagram of the process of

institutional development, which makes explicit the role of *meanings*, *values*, and *norms* in achieving and maintaining the collective agency of a community.

As the modified diagram shows, values are not just fixed criteria for assessing interactions and outcomes, but they are moral tools which are constantly evolving in relation to these very interactions and the outcomes they give rise to. Furthermore, the moral norms which a community constructs for operationalizing values will contribute to organize the ways in which the participants will behave in an action situation and, once they stabilized, they will ultimately inform the evolution of the institutional rules of a society. Therefore, it can be advanced that elaborating policies for the management of social-ecological systems should be less based on a top-down approach focused exclusively on the setting of universal rules and more on a bottom-up governance based on the setting of contextual goals, framed as a participatory process able to be more responsive to the emergence of novel and contextual meanings, values, and norms.

As Oran Young argues, governing complex systems implies a series of challenges for traditional approaches based on the establishment of fixed bodies of rules: "high levels of connectivity make it hard to establish boundaries regarding the identity of the subjects to whom regulations would or should apply. Directional changes reduce the usefulness of rules expected to apply to behaviour that occurs repeatedly in more or less similar settings over indefinite periods of time. Nonlinear patterns of change heighten the need to establish arrangements that are capable of adapting agilely to rapidly changing circumstances. Above all, the centrality of emergent properties produces frequent surprises that raise questions about the continued usefulness of established governance practices" (Young 2017, p. 2).

Accordingly, shifting the management of social-ecological systems towards a more participatory process of collective goal setting can contribute to create more adaptive models of governance. In a pragmatist spirit, the elaboration of new policies for solving the complex challenges of the climate crises can be framed as a process of collective inquiry based on a multiplicity of experiments of living. As Carl Folke writes, "this is the foundation for active adaptive management wherein policies become hypotheses, and management actions become the experiments to test those hypotheses" (Folke et al. 2005, p. 447). To conclude, the chapter shows a way in which a pragmatist ethics, founded on a pluralist and contextual definition of morality, can help establish a better dialogue with the complex nature of contemporary governance, where collective agency is defined as the creation of participated and bottom-up forms of decision-making.

4

The Role of Meanings, Values, and Norms within the Governance of Energy Systems

4.1 Introduction: Climate Change and the Energy Transition

To a large degree the mitigation of the effects of climate change represents the greatest ethical and political challenge that our society faces today. The urgency of taking tempestive and effective *climate action* has been recognized by the United Nations as one of the key goals for a sustainable development (Sustainable Development Goal 13). To maintain the commitments of the Paris Agreement of limiting the increase in global average temperatures to 1.5 °C with respect to pre-industrial levels, governments have to accelerate the transition towards clean and renewable sources of energy. Nonetheless, according to the last data available this goal is still far from being met as oil still supplies 31.5% of the global energy supply, followed by coal at 26.9%, natural gas 22.8%, biofuels and waste 9.3%, nuclear 4.9%, hydro 2.5%, while other renewable sources, among which wind and solar, only represent 2.1% of the global energy supply (IEA World Energy Balances, 2020).

This does not imply that the world has known no significant improvement in the sustainability of the overall energy system. There is, as a matter of fact, a huge variety among world countries in the speed and extent of the transition to renewable energy. Among the greenest countries one can find Iceland, with 77% of energy supply coming from renewable sources; Sweden (66%); Brazil (45%); Norway (42%), and New Zealand (35%) (BP Statistical Review of World Energy 2020). Among the world superpowers, Europe has currently an average of 15% in the share of renewable energy, followed by China (12%), United States (9%), India (8%) and Russia (6%). In fact, the three biggest changes in the energy supply of the last decades have been an increase of natural gas at the expense of coal, with new forms of coal-to-gas conversion; the expansion of nuclear generation, especially in the Asian region; and the steady growth of wind and solar, with China,

Europe, and the United States leading the way in total investments (IEA World total energy supply by source 1971-2018).

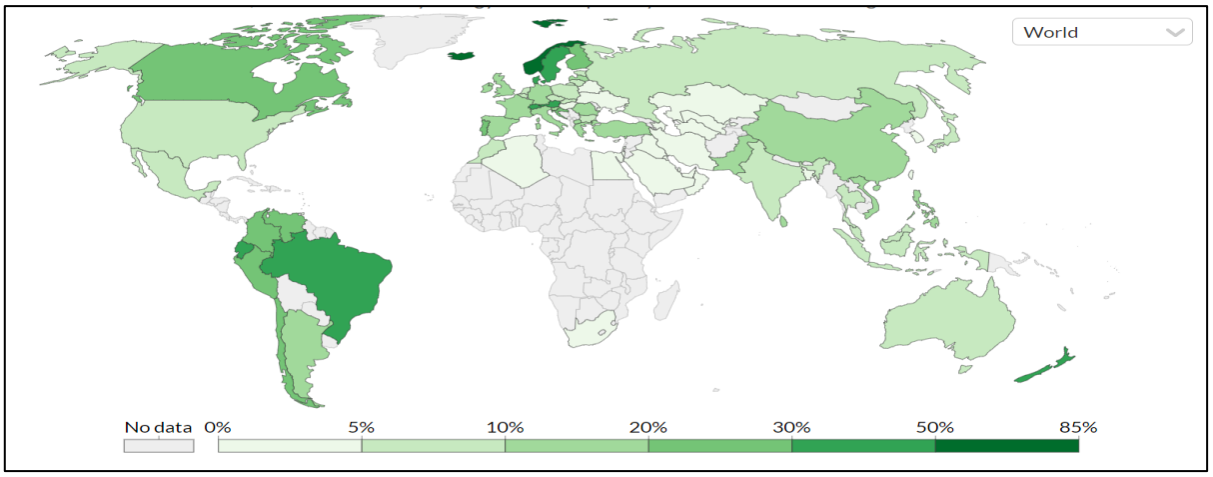

Figure 4.1: Share of primary energy from renewable sources (Our World in Data 2019).

Unfortunately, next to these partial improvements primary energy consumption has still continued to grow in absolute terms both for oil (0.9% in 2019) and natural gas (2% in 2019), while it has only shown a small diminution for coal (-0.6% in 2019) (BP Statistical Review of World Energy 2019). These factors contributed to a 0.5% increase in carbon emissions from energy use for the year 2019, against a 10-year average growth of 1.1% (BP Statistical Review of World Energy 2019). Furthermore, the total energy consumption has increased 1.3% globally in 2019, against a decade long average of 1.6% (BP Statistical Review of World Energy 2019).

This continuous growth in energy supply and consumption has been one of the main causes of increasing greenhouse gases emissions. Therefore, even if renewable energy has grown at an average rate of 2% since 1990, the energy transition remains still too slow to meet the global targets set by the Paris Agreement of limiting the increase in global average temperatures to 1.5 °C. In fact, the transition from non-renewable (oil, coal, natural gas and nuclear) to renewable energy (hydro, biofuels, wind and solar) has proved dramatically slow if we consider that non-renewable sources constituted 86.8% of the total energy mix in 1971 against the 86.1% recorded in 2018 (IEA World total energy supply by source 1971-2018).

Even if OECD countries have progressively reduced their weight in the global Total Primary Energy Supply (TPES) by nearly 40%, the slowness of the transition finds its origin in the huge economic and industrial growth of Asian countries in the same period, which triplicated their weight, and Middle-Eastern countries, which saw their contributions increase by seven times (IEA World total energy supply by source 1971-2018). Indeed, an historical result of both a practical difficulty and a political failure to decouple economic

growth from non-renewable energy in emerging and developed economies. In fact, fossil fuels will continue to provide roughly 80% of the total global energy supply by 2035, while biofuels, wind, and solar will still supply only 9% by the same year (McCauley 2017).

Furthermore, what is most concerning is that the national targets for emissions reduction indicated by the signatories of the Paris Agreement in their Nationally Determined Contributions (NDCs) are dramatically inadequate to limit the increase in global temperatures to 1.5 °C. As a matter of fact, the recent *NDC Synthesis Report* of the United Nations has indicated that the reduction of emissions resulting from the aggregated Nationally Determined Contributions will be around -1% in 2030 compared to 2010 levels, worryingly far from the necessary -45% emission reduction estimated by the Intergovernmental Panel on Climate Change (IPCC) to meet the 1.5°C goal (UN, NDC Synthesis Report 2021).

As the Sixth Assessment Report of the Intergovernmental Panel on Climate Change established, the impacts of this political weakness are clear from a scientific point of view: rising sea levels and ocean acidification; more extreme weather events like storms, floods, heatwaves, wildfires, and droughts; crop damages due to changing weather patterns; and finally, health problems like heat-strokes in the elderly population and increased respiratory and vascular diseases in polluted urban areas. What is even more problematic is how the effects of climate change will disproportionally impact developing countries (IPCC, Climate Change 2021: The Physical Science Basis). According to the Global Climate Risk Index, the ten countries who most suffered the impacts of climate change over the last 20 years are Puerto Rico, Myanmar, Haiti, the Philippines, Mozambique, the Bahamas, Bangladesh, Pakistan, Thailand, and Nepal (Global Climate Risk Index 2021). These ten countries are all developing economies and are all situated in the Global South.

In order to prevent the aggravation of the climate crisis, the world has therefore to take serious action to comply with its remaining *carbon budget*, the maximum amount of CO_2 emissions necessary to limit global warming to 1.5°C with respect to pre-industrial levels. Therefore, at the current rate of emissions of 42 Gt per year, the Mercator Research Institute on Global Commons and Climate Change has estimated that the current carbon budget of 285 Gt will be exhausted within the next 7 years for meeting the 1.5°C goal and the current carbon budget of 1.035 Gt will be exhausted within the next 25 years for the 2°C goal. Avoiding exceeding this emissions quota passes therefore from the steady reduction of greenhouse gases emissions in the atmosphere until the point of net zero emissions.

Unfortunately, the longer global emissions keep rising, the steeper the path to net zero becomes, as the reduction rate of emissions becomes increasingly difficult to materialize

without avoiding large scale economic disruptions and the resulting societal tensions. This implies a growing reliance on hypothetical solutions like carbon negative technologies, where CO_2 is sequestered from the atmosphere through industrial or biological processes.

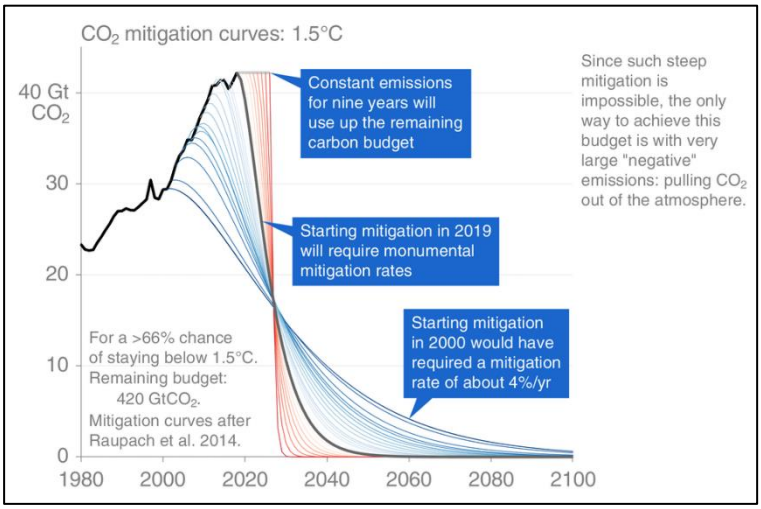

Figure 4.2: Emissions budget from IPCC (Andrew 2018).

In current climate scenarios, carbon capture and storage technologies are estimated to remove on average 12Gt of CO_2 per year (almost 1/4 of current emissions) (Fajardy et al. 2019). Nonetheless, the strategical, technical, and financial viability of these technologies remains today deeply contested, as high costs are hindering their commercial diffusion. It is perhaps telling that, as of today, only 21 facilities in the whole world are operating with carbon removal technologies. Worryingly, under current policy commitments it is very likely that the world will reach by 2100 an increase of temperatures between 3-4°C with respect to pre-industrial levels (Hausfather & Peters 2020).

4.2 From a Centralized to a Decentralized Energy System: Birth of the Smart Grid

The necessity of achieving the deep decarbonization of the energy grid requires a transition to new forms of clean and renewable energy. Currently most of the world supply of renewable energy comes from hydropower, followed by wind, solar, geothermal, biomass, waste, wave, and tidal energy. Among these, the most diffused sources of generation are hydropower, where energy is produced by a turbine actioned by falling or fast-running water, which counts alone for over 60% of the total share of renewable energy supply; wind, where a turbine is actioned by the kinetic energy of air currents (20.3%); and solar, where light is turned into energy by the photovoltaic effect in a semiconducting material (10.3%); while the other forms of generation - biomass, waste, wave and tidal - account combined for the 9.2%.

Among these, the energy sources presenting the smallest carbon footprint, calculated on the base of life-cycle emissions are wind turbines, photovoltaic panels, and concentrated solar power (CSP) technologies. These renewable energy sources are perhaps our best

chance for achieving the widespread diffusion of clean and renewable energy. Unfortunately, both solar and wind technologies present problematic rates of consumption of key mineral resources such as copper, lithium, nickel, cobalt, and other rare earth elements.

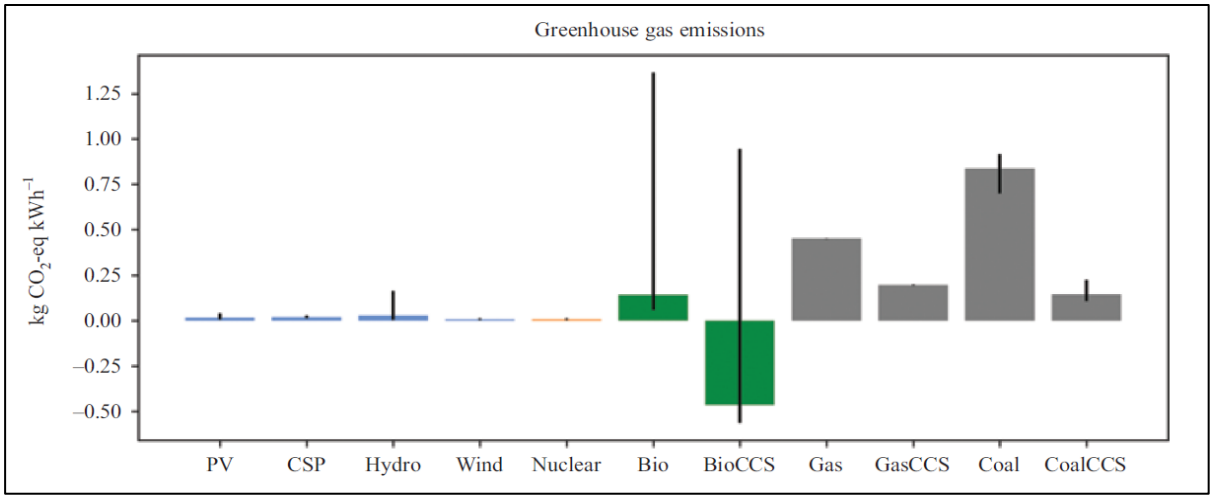

Figure 4.3: Life cycle greenhouse gas emissions for 11 main types of electricity productions for the year 2013 (Probst, Castellanos & Palacios 2020).

An alternative form of low-carbon energy is of course represented by nuclear power produced by atomic fission, but there is an ongoing debate over its potential classification as a clean source, since it produces radioactive waste, and as a renewable source, since the amount of uranium-235 on the planet is finite. Moreover, nuclear power presents some further shortcomings as nuclear power plants pose risks of calamitous accidents with extreme environmental impacts and they still constitute an expensive investment, with high technology costs, with respect to clean and renewable sources of energy like wind and solar. It is certainly true that fourth generation reactors have shown improved safety, sustainability, efficiency, and overall costs, but the intrinsic complexity of nuclear technology associated with the severity of the potential impacts of technological failure forces governments to take in serious consideration the possibility of *normal accidents* (Perrow 1984; Clearfield, Tilcsik 2018).

Nonetheless, nuclear energy cannot be easily discarded from the energy mix of future grids and can represent a potentially fruitful option for providing base-load energy with low life-cycle emissions, especially as safe forms of nuclear generation are researched and perfected. In fact, nuclear, wind, and solar power constitute energy sources with extraordinarily low embodied energy use and carbon footprint (Pehl et al. 2017).

Furthermore, natural gas power plants with carbon capture and storage (CCS) represent an efficient way of providing supply flexibility to balance the intrinsic intermittency of renewable energy sources like wind and solar (Del Granado et al. 2020). To be sure,

natural gas with CCS is far from being a zero emissions technology, and while it greatly reduces direct outflows from power generation, it still does not reduce environmental pollution completely and natural gas supply chains continue to pose problems in terms of CO_2 emissions (Arvesen 2020). Nonetheless, natural gas with CCS may represent a promising transitional solution to the problem of grid flexibility and resilience in the early phases of the energy transition.

Another technology which is uniquely positioned to tackle the problem of CO_2 emissions is Bioenergy with Carbon Capture and Storage (BioCCS). As of today, it constitutes the only form of power generation which achieves negative carbon emissions. Taking advantage of the fact that plants remove carbon from the atmosphere and store it internally, producing bioenergy from wood, crops, and agricultural waste, while capturing combustion emissions and storing them underground, could represent a way of producing carbon negative electricity. Therefore, planting new crops and forests for BioCCS would result in the actual removal of carbon from the atmosphere. Nonetheless, this solution cannot represent our main strategy for reaching net zero emissions, since developing biomass crops and forests at the scale required for meeting the 1.5°C goal would require a massive reconversion of cropland (around 50% of the total) marking a huge loss in ecosystem diversity.

What follows from these considerations is the fact that renewable energy must be at the center of future energy systems. This poses two great technical challenges to the design of future energy systems: control the increasing complexity resulting from the distributed nature of renewable energy sources and managing the intermittent nature of the renewable energy supply. In fact, the organization of future energy systems will be increasingly complex, transitioning away from a centralized model of energy provision, where energy is transmitted from a small number of large power plants, through high-voltage transmission networks and low-voltage distribution networks, down to the final consumer.

Future grids will be increasingly articulated around the compresence of multiple energy sources, organized in high, medium, and low-voltage networks: hydro, natural gas, and nuclear will provide most of high-voltage energy, whereas wind and solar farms will provide medium-voltage energy, and finally residential solar, wind, or hydro-power will constitute smaller low-voltage energy networks. To manage in real time the intermittent nature of these variable renewable energy sources (VRES) - wind, solar, tidal and wave power are notable examples - grids will have to be designed with increasing energy storage and conversion capacities, in order to provide dispatchable energy in the system and to maintain load balancing throughout power fluctuations.

In this regard, a variety of technologies must be developed in order to answer to the differentiated challenges of hourly, daily, weekly, and seasonal balancing. For instance, grid operators increasingly face the problem of integrating midday spikes of solar power supply, resulting from the diffusion of photovoltaic panels in residential and commercial buildings, with base-load energy from nuclear and carbon power plants, whose production is efficient and cost-effective only when generation is continuous and relatively steady. This misalignment between renewable energy supply, clustered around daytime hours, and peak-demand, concentrated mostly after sunset, represents a growing problem for base-load facilities struggling to adapt cost-effectively to the "duck curve" of net load demand (CAISO 2016). Therefore, in order to solve the increasing variability of energy supply, grids will have to rely on energy storage technologies like household batteries or storage facilities. In this regard, capturing excess power supply at larger scales implies the increasing adoption of energy conversion technologies like pumped hydro, power-to-hydrogen, power-to-gas, power-to-heat, and air compression. Furthermore, electric vehicles represent a promising way of providing dispatchable energy when vehicle-to-grid technologies allow for the integration of transport and energy infrastructures. Here, V2G storage technologies will be essential in allowing electric vehicles to store excess energy supply and discharge it back to the grid when demand increases.

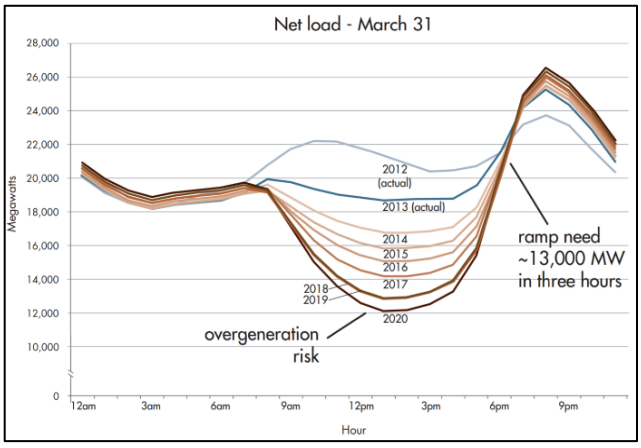

Figure 4.4: The Duck Curve (CAISO 2013).

Nonetheless, even if these solutions will have an important role in achieving grid flexibility at the local scale, storage technologies alone cannot represent a cost-effective way to transition to a fully renewable energy system. In this respect, the integration of local scale storage with regional scale expansion of transmission lines, allowing the balancing of energy supply and demand between wide geographical areas, can provide increasing levels of renewable energy while allowing significant financial optimization (Crespo, Del Granado 2020). Within the EU, the Energy Union represents such a strategic plan for the creation of a diversified and integrated energy infrastructure opening the way to the establishment of an internal energy market. In fact, the Energy Union aims to foster levels of energy security, affordability, and sustainability by expanding the transnational transmission networks connecting the different European countries.

The necessity of integrating of renewable energy systems both at small- and large-scales, will certainly require an increasing digitalization of the energy infrastructure. In this regard, energy systems have to evolve into smart grids allowing for the real-time management of energy supply and demand by grid operators. As argued, traditional energy systems have been organized along a centralized model where few large power plants distributed energy to the end-users through large transmission and distribution networks characterized by unidirectional energy flows. Within this model, the management of short, medium, and long-term fluctuations in energy demand and supply was mostly carried out through load forecasting methods based on the modelling of historical and meteorological data, which are ill-suited to answer to the largely unpredictable nature of renewable energy supply.

Smart grids are instead characterized by a decentralized model of energy distribution where next-generation transmission and distribution networks will have to allow for bidirectional energy flows between distributed energy sources and storage facilities. For example, a microgrid of households powered by solar panels will receive energy from the grid during night-time hours, while dynamically allowing for the exchange of energy between households and for the supply of excess energy back to the grid during daytime hours. The Smart Grid is then characterized by the presence of distributed energy sources, energy storage technologies, and real-time communication between supply and demand, resulting in the intelligent digital management of load balance throughout the energy network (Tuballa, Abundo 2016). To provide a more precise formulation, we can say that:

> *a Smart Grid is a digitalized power system, characterized by bidirectional energy flows, that balances in real-time electricity supply and demand through sensing and processing information technologies enabling high levels of reliability, resilience, and security throughout a distributed network with high penetration of renewable energy sources.*

Therefore, smart grids allow within the energy system for the creation of greater *reliability*, defined as the ability to dynamically meet demand; *resilience*, defined as the capability of withstanding and recovering from natural or technological disruptions; and *security*, defined as the capacity to provide a stable and sufficient energy supply to end-users.

A crucial effect of the development of smart grids, is the emergence of self-generation within households, communities, and businesses, a phenomenon called “prosuming”. The prosumer, in this regard, is a societal agent who undertakes the microgeneration of energy through distributed energy sources, like solar panels, wind turbines, hydropower,

or geothermal energy. The rapid expansion of prosuming in developed countries, such as the United States, Europe, and Australia, can be regarded as resulting from the combination of an increased sensitivity of households and businesses towards sustainable practices with the falling economic costs of renewable energy technologies. This convergence of environmental, technological, and economic drivers has opened the way to what has been called the “prosumer era” (Parag, Sovacool 2016). In fact, an important economic incentive of prosuming lies in the abatement of energy bills, for households where generation covers only a part of the total consumption of energy, and in profitable financial models, for self-sufficient households producing a net surplus of energy.

The key technologies allowing this expansion of consumer engagement in energy generation are photovoltaic panels, smart meters and devices, home batteries, and energy management systems. Smart meters are electricity, gas, or water digital metering systems with communication capacities. Within smart grids, they play a double role: first, they provide data to users on energy consumption patterns; second, they send near real-time data to grid operators in order to allow for load balancing throughout the network and for developing a variety of pricing strategies (Dileep 2020).

With respect to the first role, smart meters are thought to be conducive to more consumer engagement and to lead to greater sustainability within consuming behaviors, by informing users about energy consumption levels and sensibilizing households about inefficiencies, overconsumption, or downright waste. With respect to the second role, smart meters are essential in providing a communication platform that allows utilities to match in real-time supply and demand of energy throughout daily fluctuations. This is done either by throttling energy generation, switching down generation units, storing excess energy in facilities, communicating to networks of charging stations or smart devices to temporarily reduce consumption, or by demand-side management.

Concerning this last point, the management of energy demand has recently become a viable alternative to the reduction of electricity supply, a process which is often too slow to answer efficiently to demand spikes. In this regard, the digitalization of energy grids with smart meters has allowed for the development of dynamic pricing schemes by part of grid operators able to influence demand patterns to match the energy supply at any given time. Smart meters work, in this case, as communication devices which inform users about changes in electricity tariffs or make explicit request for energy reduction. At this point, the digital platforms for energy management within households can be set to automatically adjust the electricity demand of smart devices or electric vehicles, or to switch energy supply from the public grid to either stored or renewable private energy,

so as to maximize cost-efficiency. In this way, grid operators can reduce power consumption during periods of peak-demand through demand-side management.

As smart grids become increasingly governed by information technologies (IT), energy systems are exposed to a growing threat of cyber-attacks from malicious agents like terrorist groups and foreign adversaries. In fact, the first cyber-attack on a power grid was carried out against Ukraine in December 2015. In this occasion, a group of hackers organized an attack which was able to penetrate into the information systems of three energy utilities and disrupted the supply of electricity for as many as 230.000 consumers for a duration of six hours. It is therefore possible to divide cyber-attacks on IT systems in five major categories: "corruption of information - when data on a system or communications channel suffers improper modification; denial-of-service (DoS) - when access to the system is denied for authorized users; disclosure of information - when critical information is disclosed to unauthorized persons or systems; theft of resources - when system resources are used by unauthorized entities; and finally, physical destruction - when physical harm or destruction is achieved through the use of ICS" (Limba et al. 2017, p. 562).

With the progressive digitalization of energy infrastructure, power plants and substations are increasingly managed through automated information systems. Nonetheless, many energy businesses show a worrying lack of cyber-security investments. In fact, the perception that such cyber-attacks are rare and highly unlikely pushes many energy utilities to systematically disregard these hacking threats. In order to minimize the potential damages of malicious attacks on energy infrastructures it is then essential to develop risk management strategies aimed at increasing the resilience of digital networks within smart grids, by designing IT systems able to respond quickly to attacks, adapt flexibly to local failures in the network, and allowing for the quick regeneration of system integrity.

But security breaches are not the only kind of concerns regarding the development of smart grids. With the digitalization of energy infrastructure and the roll out of smart meters, the privacy of end-users has become a heated topic of debate. In fact, with the introduction of smart meters within households, utilities have potentially access to a variety of data. As Horne argues, "smart meters transmit information about consumer electricity use to utility companies at vastly shorter time intervals than before. Data can be transmitted to the utility company on a minute-to-minute basis, rather than being read once a month by a meter reader going to each home" (Horne et al. 2015, p. 4). Where information is not sufficiently protected, utilities can extract from meter readings of residences a variety of data, such as physical presence within the habitation, composition

and behavioral patterns of households, types of appliances being used with distinct power signatures; and finally combine all this information into detailed consumer profiles. Where this information is not adequately protected, power utilities can use the data gathered from households for commercially exploitative purposes, such as targeting users with personalized marketing strategies or selling private data to third parties.

In fact, according to Ann Cavoukian "privacy concerns arise when there is a possibility of discovering personal information such as the personal habits, behaviors and lifestyles of individuals inside dwellings, and to use this information for secondary purposes, other than for the provision of electricity" (Cavoukian 2009, p. 284). Therefore, it is crucial to include privacy considerations already from the early phases of smart grid design. In this regard, Ann Cavoukian's model of 'privacy-by-design' can help to secure a high level of control over personal information for energy users; here, privacy should be assumed by default as a standard requirement of any digital metering system, and should be articulated in identity anonymity, data control, data usage transparency, and data storage security.

4.3 Tackling the Energy Trilemma: Sustainable Transitions and the Role of Energy Justice

The re-design of our energy systems is therefore a crucial aspect of the sustainable transition, especially if one considers that power and heat generation account for 44% of the total global CO_2 emissions (IEA CO_2 Emissions from Fuel Combustion 2020). As the International Energy Agency (IEA) has acknowledged, coal-fired power generation remains the biggest source of CO_2 emissions among power generation sources, "accounting for 30% of all energy-related carbon dioxide emissions" (IEA Global Energy & CO_2 Status Report 2019). But next to the crucial question of a sustainable transition to clean and renewable energy, it is also important to emphasize that sustainable transitions have not only a technological dimension, but also a social one.

In this regard, two streams of literature have emerged to analyze the social dimensions of the Energy Transition: one stream rooted in STS studies, articulating a *descriptive framework* for understanding sustainable transitions as evolutionary disruptions within socio-technical regimes (Geels, Schot 2007; Verbong, Geels 2010; Turnheim et al. 2015; Geels et al. 2017a; Geels et al. 2017b); and another stream rooted in Environmental Ethics, developing a *prescriptive framework* for Energy Justice, analyzing the moral requirements for a just transition (Gunningham 2013; Heffron et al. 2015; Sovacool, Dworkin 2015; Heffron, McCauley 2017; McCauley 2018). Within science and technology studies (STS), the most influential approach to the analysis of transitions has been the Multi-Level

Perspective developed during the early 2000s by Frank Geels. This theoretical approach starts from the recognition that "transitions entail major changes in the 'socio-technical systems' that provide societal functions such as mobility, heat, housing, and sustenance" (Geels et al. 2017a, p. 464). Therefore, providing a multi-level perspective on transitions means articulating a "big-picture socio-technical understanding" which analyzes societal change across multi-scalar interactions between niche-innovations, sociotechnical regimes, and sociotechnical landscapes (Rip & Kemp 1998; Geels 2002; Geels, Schot 2007).

In fact, according to the multi-level perspective, it is possible to study transitions as evolutionary transformations of society articulated along three main analytical levels: the first level is represented by niches, which constitute small and protected spaces, within the larger society, where disruptive innovations can emerge and develop, away from market pressures; the second level is given by socio-technical regimes, forming the existing set of institutions, regulations, standards, and practices which is responsible for path dependency within a given socio-technical system, as various forms of lock-in act as a consolidation of the existing regime; and finally, the third level is provided by landscape developments, where external shocks can put pressure on the existing regime, opening widows of opportunity for emerging socio-technical innovations (Geels, Schot 2007).

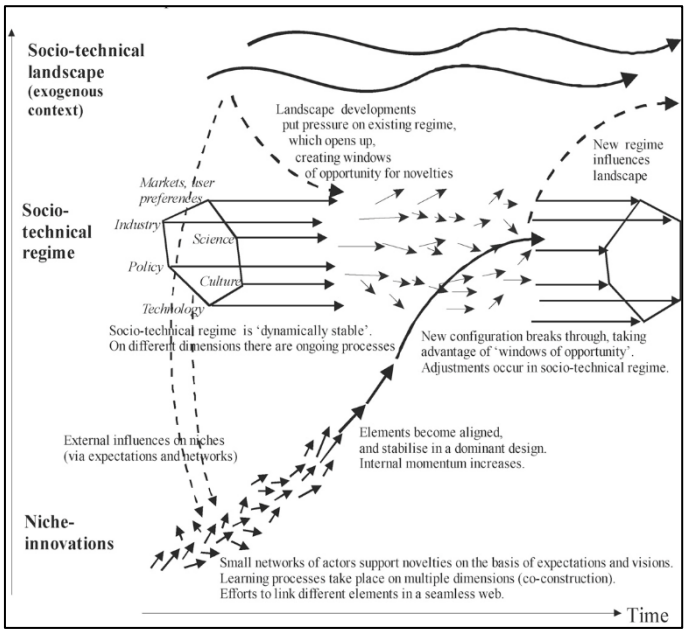

Figure 4.5: Alignment of ongoing processes in a socio-technical regime (Geels 2011, p. 27).

In this regard, the work of Frank Geels has helped to shed a light on the fact that the transition to deep decarbonization is as much a technical matter as it is a social one (Geels et al. 2017a). In fact, for Geels the energy transition can be represented as a socio-technical challenge that requires the coordination of technological innovations, infrastructural systems, institutional frameworks, market rules, and user practices.

The acceleration of socio-technical transitions is therefore a process built around three mutually reinforcing drivers: "increasing momentum of niche innovations; weakening of existing systems; and strengthening exogenous pressures, which when aligned can create windows of opportunity" (Geels et al. 2017b, p. 1242). Accordingly, governing the energy transition relies on the smooth coordination of these socio-technical dimensions, and

meeting these challenges is crucial to achieve broad societal acceptance and business support (Geels et al. 2017a).

For what concerns the applied ethics literature, the work of scholars has instead focused on the individuation of some crucial challenges of ethical import for policy-makers, centered on the importance of fairness within large-scale societal transformations like the energy transition. In this respect, the emergent framework for Energy Justice has posited that the complex socio-technical challenge which is the sustainable redesign of our energy system should be built around three main moral axes: granting to everyone the availability and reliability of energy supply, or *energy security* (1), the affordability and accessibility of energy services, or *energy equity* (2), and the *environmental sustainability* of the whole energy system (3).

Governing ethically the energy transition requires therefore the capacity of public administrations to tackle the complex nature of this Energy Trilemma (World Energy Council - World Energy Trilemma Report 2012). Many authors have in fact highlighted how meeting the challenge of Energy Justice implies weaving together these three dimensions of the trilemma by granting at the same time *energy security*, *energy equity* and *environmental sustainability* to all societal actors (Gunningham 2013; Heffron et al. 2015; Heffron, McCauley 2017; McCauley 2018).

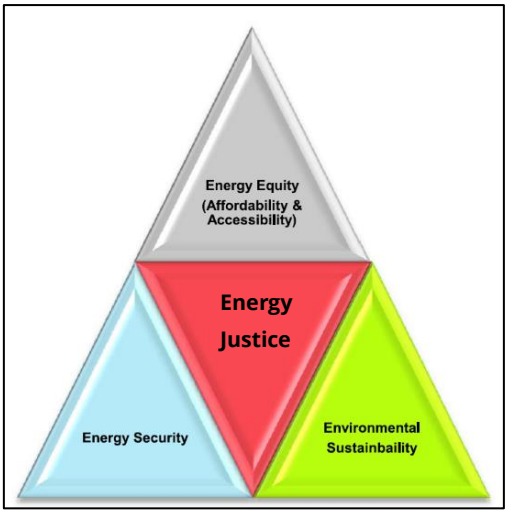

Figure 4.6: World Energy Trilemma.

In this regard, the question of *energy security* is especially relevant in emerging and developing economies, where there has been often a systemic lack of stable energy supply for end-users, as energy systems are frequently under-financed and struggle to keep up with growing energy consumption of an industrial sector in rapid expansion. Furthermore, both developing and developed countries are more and more exposed to reliability challenges in the energy supply as extreme weather events put local grids under unprecedented stress; the recent case of the Texas energy crisis is such an example.

As a matter of fact, the sources of disruption for energy systems can be numerous, encompassing not only environmental disasters but also management failures, cyber-attacks, and geopolitical tensions and conflicts. Within the EU, the development of the Energy Union is an essential element to grant a broader integration between national energy infrastructures, enabling regional grids to withstand temporary disruptions of the energy system. The ability of importing electricity from a neighbouring EU country plays

therefore a key role in building a more resilient energy system able to adapt to temporary drops of renewable energy supply and able to reduce the geopolitical overreliance of Europe on foreign energy.

Another key challenge that decision-makers have to meet is how to grant that the energy transition will also be a *just transition* (McCauley, Heffron 2018). Within the academic debate, the last decade has seen a flourishing of literature on the problem of energy justice. In this regard, many authors have emphasized how energy justice should be articulated around three main dimensions as distributional, procedural, and recognitional justice (McCauley et al. 2013, Sovacool 2013, Heffron et al. 2015). The governance of the energy transition should in fact grant a fair distribution of costs and benefits; allow transparent, accountable, and inclusive procedures of decision-making; and be sensitive to how different social groups might be impacted disparately according to their race, gender, age, health, abilities, education, and socio-economic status.

Among the distributional aspects, many authors have highlighted how energy should be considered a basic right within nowadays society, and have therefore stressed the importance of preventing the phenomenon of energy poverty by securing that everyone be provided with accessible and affordable energy. But a fair distribution of costs and benefits also requires the moral consideration of the effects of toxic waste disposal, pollution impacts, siting of energy projects, and local resources exploitation on particular populations. Furthermore, fairness is also a crucial aspect within the market design of tariffs and incentives.

For what concerns, instead, the procedural aspects of the transition, grassroots activism and academic research have helped to articulate the nascent concept of *energy democracy*. Within the energy democracy framework, the possibility of a just transition implies the necessity of "destabilizing power relations" (resist), "reversing histories of dispossession, marginalization and social and environmental injustices" (reclaim), and "replacing monopolized fossil fuel energy systems with democratic and renewable structures" (restructure) (Burke, Stephens 2017, p. 35). According to the framework, these changes are essential for achieving a true democratization of the energy system: transitioning from a centralized to a decentralized model of energy generation implies the shift from the privatization to the social ownership of energy, and opens the way to the empowerment of local communities in mitigating the effects of climate change. As this shift of socio-political power materializes, the energy transition is then thought to acquire an inclusive structure that will foster more legitimacy, accountability, and transparency of decision-making.

For what concerns the recognitional aspects of energy justice, many scholars have analyzed the governmental failures "to accord some groups of people equal respect and equal rights as others" (Walker, Day 2015, p. 71). In fact, the lack of recognition for certain groups has often led to a systematic disregard for the well-being of entire sectors of society. The reality of energy poverty in the European Union, impacting more than 50 million homes, is one such example of decades of political failures to provide all households with a basic service like electricity. Marginalized groups of people like the elderly population, low-income households, or individuals with mental health issues have often paid a high price for the social and political neglect of their well-being. Phenomena like winter deaths in northern countries and the regular casualties of heat waves in southern states are a such a testimony of the recognitional injustices in our societies.

In this regard, many scholars have adopted the Capability Approach developed by Martha Nussbaum and Amartya Sen to analyze the recognition of individual's well-being in the energy sector (Day et al. 2016, Hillerbrand 2018, de Wildt et al. 2020). In fact, in *Conceptualising Energy Use and Energy Poverty Using a Capabilities Framework*, Rosie Day frames energy poverty as "an inability to realize essential capabilities as a direct or indirect result of insufficient access to affordable, reliable and safe energy services, and taking into account available reasonable alternative means of realizing these capabilities" (Day et al. 2016, p. 260). It can be argued that the Capability Approach can be regarded as an important tool for individuating recognitional injustices for three main reasons: first, its focus on individuals and not aggregated numbers for evaluating the fairness of outcomes; second, its strong emphasis on the recognition of central capabilities as a right of every person; third, its ability to look beyond the simple provision of services, and focus on how different groups of actors can encounter different levels of adversity in converting the services provided into actual well-being (Hillerbrand 2018). In this respect, the Capability Approach can be useful to analyze how the transition to renewable energy systems, while beneficial for middle- and high-income households, risks to produce wider inequalities as poor households cannot afford renewable technologies and remain systematically excluded from a provision of better and cheaper energy services.

Finally, the last challenge to the governance of the transition is constituted by the practical and moral imperative of *environmental sustainability*: this involves the development of a more efficient energy system, the investment in clean and renewable energy sources, and the reduction of both air and water pollution. In fact, among the regions with the strongest commitment to the energy transition, Europe has set forth a plan for a "European Green Deal" which aims at securing by 2030 a 40% cut in greenhouse gas emissions (as compared to 1990 levels); a 32% share for renewable energy in the overall energy mix;

and a 32.5% improvement in energy efficiency. These commitments represent an intermediate step with respect to the final goal of reaching net zero emissions by 2050, an achievement that would make Europe the first carbon neutral continent.

This vision for net zero emissions is built upon seven strategic pillars: maximize the benefits of energy efficiency, including zero emission buildings; maximize the deployment of renewables and the use of electricity to fully decarbonize Europe's energy supply; embrace clean, safe and connected mobility; a competitive EU industry and the circular economy as a key enabler to reduce GHG emissions; develop an adequate smart network infrastructure and interconnections; reap the full benefits of bioeconomy and create essential carbon sinks; tackle remaining CO2 emissions with Carbon Capture and Storage (CCS) (EU - Going Climate Neutral By 2050).

Nonetheless, these targets are still falling short of keeping in line with the commitments of the Paris Agreement of limiting the increase in global average temperatures to 1.5 °C with respect to pre-industrial levels. Many environmental organization have criticized in this respect the European Green Deal for being too bland: meeting the targets of the Paris Agreements requires securing a 57% cut in greenhouse gas emissions already by 2030. Another reason for criticism has been the overreliance on the hypothetical development of effective technologies for Carbon Capture and Storage (CCS). In fact, we currently lack any credible technical solution for the large-scale deployment of carbon capture and storage. Even worse, touting "net zero" scenarios which are based on significant contributions from CCS might be an incentive to maintain the status quo, by positing magic bullets like wide-spread carbon removal and carbon negative technologies.

Furthermore, the European Environmental Bureau has criticized the Green Deal for failing to produce any concrete measure to stop subsidizing the fossil fuel industry and to take serious action against toxic chemicals in industrial processes and products. As this analysis has showed, meeting the three challenges of *energy security*, *energy equity*, and *environmental sustainability* is therefore an essential prerequisite for achieving effective Energy justice.

This analysis has reconstructed how the energy transition has been framed within the descriptive frameworks of science and technology studies, focusing especially on the Multi-Level Perspective of Frank Geels, and the prescriptive frameworks of applied ethics, concentrating on the development of Energy Justice. While the two perspectives are complementary, we currently lack an understanding of how to integrate these socio-technical and ethical frameworks within a theory of institutional development. Without this further step decision-makers are left without a precise understanding of how new

institutions can be developed in order to answer the socio-technical challenges of a just transition.

4.4 Integrating the Socio-Technical Challenges of Energy Justice within Institutions: A Pragmatist Perspective

While a large literature on energy justice has emerged, there is an increasing recognition of the necessity to bridge the gap between theory and practice in the energy transition (Heffron, McCauley 2017). In fact, while the energy justice framework has provided important theoretical insights in articulating the moral dimensions of the energy transition, little work has been done on how energy justice can be institutionalized within energy systems. It is therefore crucial to explore "how energy justice can become a delivered policy outcome" (Heffron, McCauley 2017, p. 660). In this respect, a full theory of just transitions should, first, provide an account of how injustices become institutionalized in energy systems and, second, elaborate a conceptual framework that helps decision-makers to understand how to articulate the moral dimensions of energy justice into the development of new energy institutions.

For what concerns the first aspect, John Byrne has elaborated a comprehensive framework for investigating the processes of institutionalization of injustices in energy transitions (Byrne et al. 2002; Lee, Byrne 2019). In this theoretical framework, environmental injustices are encoded in the progressive commodification of nature by means of the "normalization of pollution, technocratic authoritarianism, and a rise of the Anthropocene" (Lee, Byrne 2019, p. 2). In this perspective, the social conflicts which arise around energy injustices are rationalized by political, economic, and technical ideologies as the necessary results of industrial development. This marks a fundamental tension in society between a top-down and technocratic perspective which looks at energy as a commodity and a bottom-up and democratic perspective which understand energy as a common. Lee and Byrne frame the institutionalization of energy injustices as a product of structural and ideological drivers.

For what concerns the first driver, energy injustice is analyzed a product of three institutional characteristics of energy systems, namely: "(1) preference for large-scale technical systems and distancing of system designs from local decision-making processes, (2) centralization of energy production and concomitant distancing of supply from users, and (3) widespread 'risk-taking' tendencies portrayed by designers and proponents of current energy supply systems as a necessary 'price to pay' for technological innovation and social progress" (Lee, Byrne 2019, p. 1). According to the authors, these institutional

drivers within energy systems are reinforced by four broader political, economic, and technical ideologies which play a justificatory role in their institutional persistence. These ideological drivers are (1) a top-down ideology of decision-making; (2) a technical interpretation of sustainability; (3) an economic understanding of fairness; and (4) a belief in the path dependency of the modern energy paradigm.

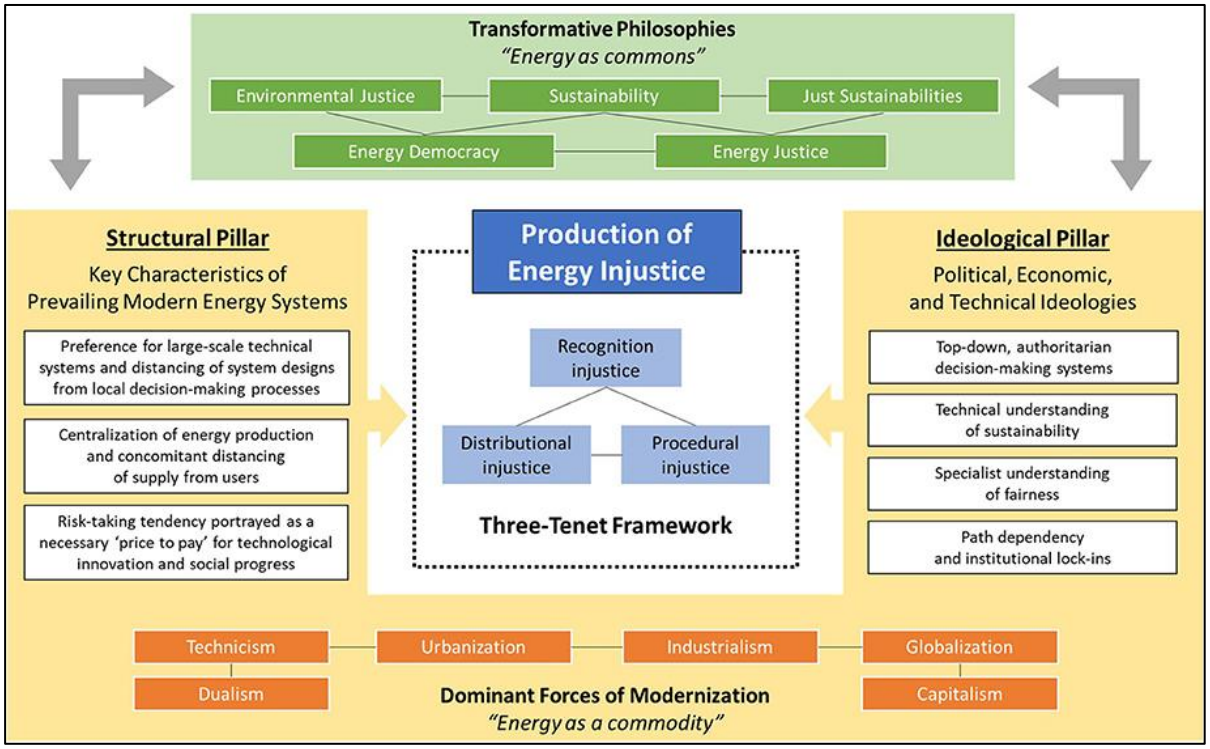

Figure 4.7: Conceptual framework for understanding the production of systemic energy injustice (Lee & Byrne 2019).

There is one clear lesson to be learned from Byrne's analysis of institutional injustice within energy systems: the necessity of transitioning to a sustainable energy system is increasingly in tension with the top-down and technocratic ideology of traditional decision-making models. Decoupling energy from fossil fuels implies opening energy systems to a more democratic and inclusive decision-making. Therefore, the process of institutional legitimization within energy systems must shift from technocratic legitimacy, framed as the authority of established politico-economic interests, to democratic legitimacy, framed as the authority of all societal stakeholders.

Following the lesson of Responsible Research and Innovation, the definition of legitimacy has to be broadened from a small group of technocratic authorities to a broader network encompassing all societal stakeholders (Owen et al. 2012). As Edenhofer recognizes "the technocratic model with its clear-cut policy recommendations, is often turned into a symbolic legitimation model. This means that certain political standpoints in scientific studies (i.e., the proposed objectives and means) are allegedly justified by referring to a

consensus; however, these are in fact strongly biased towards certain disputed political or social standpoints in a non-transparent manner (e.g., by concealing their value judgments or uncertainties)" (Edenhofer, Kowarsch 2015, p. 57). What is required is a model of decision-making which avoids the technocratic pitfalls of modernist social science and that builds legitimacy not exclusively on technical expertise but also on a wider societal participation (Kowarsch et al. 2016, Bevir 2011).

In the last decades, environmental governance was mostly informed by an approach to policy-making which frames technical expertise as a value-neutral source of authority. This tendency has been particularly pervasive within the "energy sector, which has traditionally been presented as a technoscientific domain reserved for experts" (Szulecki 2018). In this regard, the Delft school of ethics of technology has played a major role in highlighting how technocratic models of governance can spur social controversies around innovation, which stalemate the implementation of environmental projects and policies (Pesch et al. 2017, Correlje et al. 2015, Taebi et al. 2014). In what Sabine Roeser has called the "technocratic pitfall" the emergence of value conflicts around energy projects and policies is regarded by decision-makers exclusively as a symptom of misinformation, ignorance, or special interests (Roeser 2011). Symmetrically, political, economic, and technical authorities often display a systematic disregard for the value-laden nature of the supposedly "objective" judgements they advance in their policy assessments.

Therefore, it is important for policy-makers to recognize that controversies occur when stakeholders' values are not properly addressed in the development of energy projects and policies. As Ottmar Edenhofer points out there is a pragmatist lesson to be remembered regarding the entanglement of facts and values in the production of knowledge (Edenhofer, Kowarsch 2015, Putnam 2004). Pragmatism has the merit of having highlighted how "inquiry is always and essentially related to human action and value-laden objectives" (Edenhofer, Kowarsch 2015, p. 59). It can therefore be argued that the technocratic model of energy governance represents a double failure: first, a moral failure of including all stakeholders in a democratic process of decision-making; second, a pragmatic failure of gathering a broad social acceptance of the innovations required by the energy transition. This double failure can be formulated as a parallel crisis of *moral acceptability* and *social acceptance* of an institutional model of energy governance.

Coming to the second aspect, the failure of the technocratic model requires researchers to elaborate alternative institutional models of energy governance able to address the new challenges of a distributed energy systems. In fact, one fundamental aspect of the energy transition will be the redefinition of authority from few large companies to all energy prosumers. Therefore, any framework trying to articulate a new definition of

institutions within the energy transition should center around the complementary role of public engagement and social acceptance (Wolsink et al. 2020).

In this respect, the institutional settings for decision-making will have to account for the engagement of all societal stakeholders in order to reach the social acceptance and the moral acceptability of new energy policies and projects. Choices like the composition of a country's energy mix, the phasing out of carbon fuels, the diffusion of nuclear power, the adoption of carbon capture and storage, the reliance on natural gas, the deployment of massive geo-engineering projects, the conversion of natural environments in biomass crops, the siting of energy projects, the spatial distribution of energy services, the financial design of energy markets, they will all constitute contested policy arenas which cannot be addressed with a top-down model of technocratic governance. What is required is therefore the development of a meta-framework able to articulate the development of energy institutions both along the moral dimension of energy justice and the socio-technical dimension of transition pathways to social acceptance.

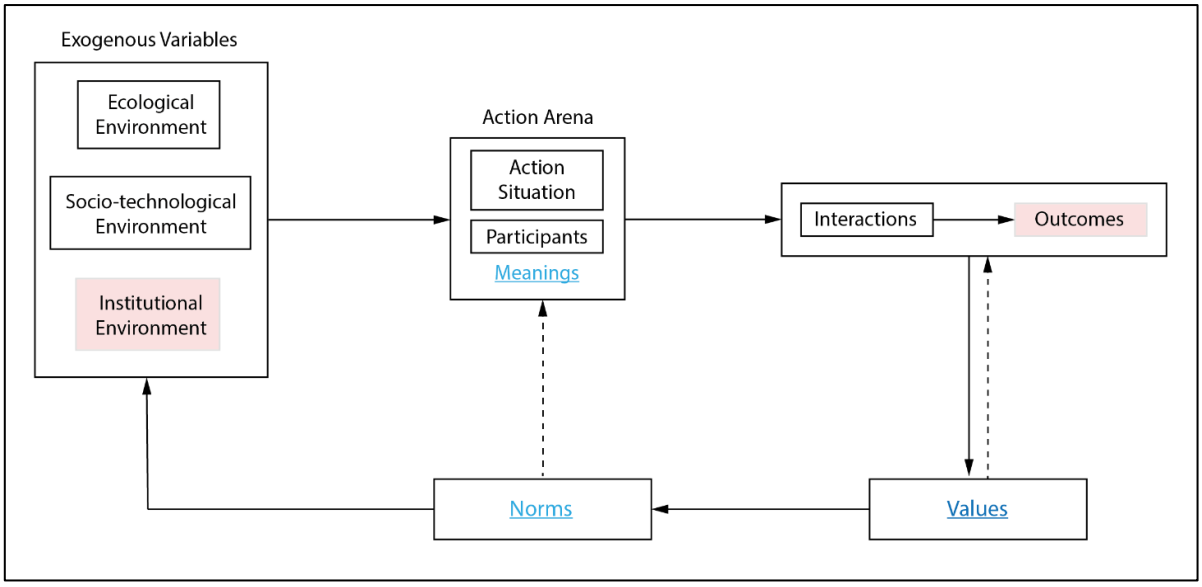

Figure 4.8: The role of moral terms within Elinor Ostrom´s IAD framework.

In this regard, the Institutional Analysis and Development Framework of Elinor Ostrom can provide the basis for constructing a pragmatist theory of cooperative governance able to integrate the moral and socio-technical dimensions of the energy transition. As it was argued previously, the IAD Framework articulates a theory of institutional development that provides decision-makers with an organic understanding of the main variables influencing human interactions in an institutional setting. The main focus of the IAD framework is therefore on institutions intended as the rules that "humans use to organize all forms of repetitive and structured interactions" (Ostrom 2005, p. 3).

In particular, Ostrom's framework provides a dynamic understanding of the process of institutional development: a theoretical articulation of how social institutions affect the interactions of societal agents and the resulting outcomes in a given social, ecological, and technical environment. The central element of Ostrom's institutional analysis is the Action Arena, a social space for coordinated decision-making where a set of actors interact to produce an outcome in a structured situation. As developed already in Chapter 2, the IAD framework can be extended to better address the moral dimensions of structured human interaction along a pragmatist understanding of moral emergence. In this extended framework, institutional development has been linked to the normative dimension of meanings, values, and norms which organize social interactions in cooperative action.

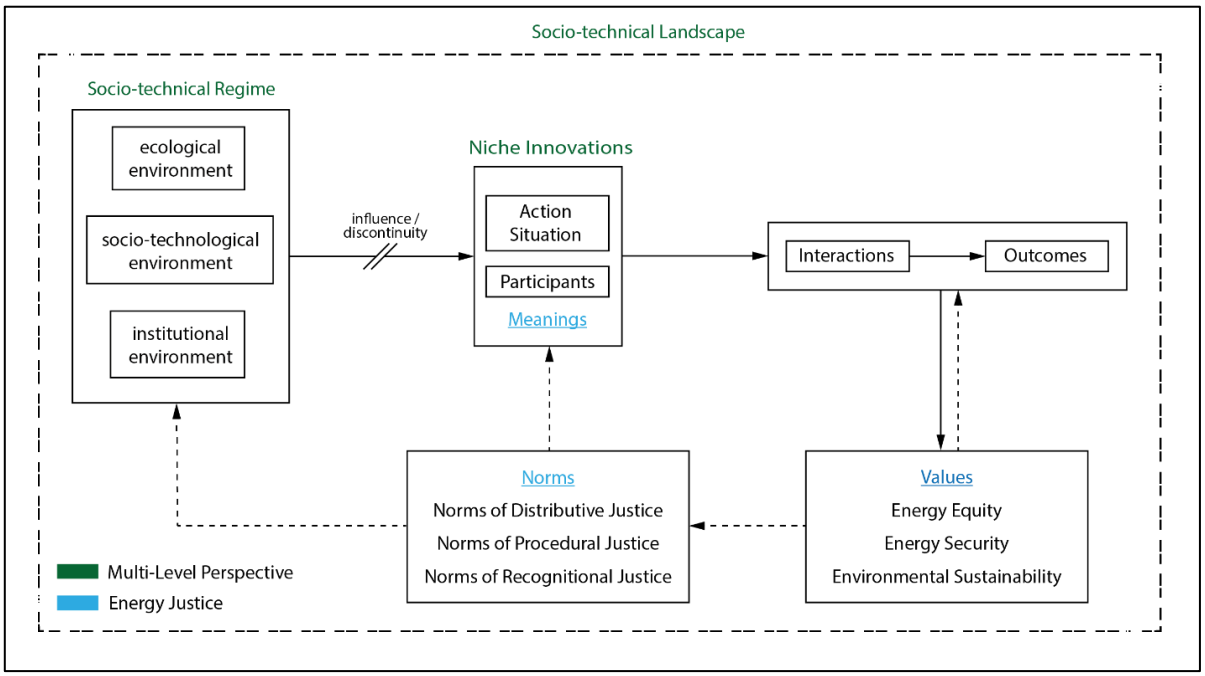

Figure 4.9: The role of the multi-level perspective and energy justice in the Extended IAD Framework.

Accordingly, the Extended IAD Framework can provide an important theoretical tool for investigating how the institutional change required by the energy transition can be articulated in relation to the moral dimensions explored within Energy Justice. In this context, the necessity of an energy transition has brought to the fore a set of new values developed within the Energy Justice Framework, such as energy equity, energy security, and energy sustainability. Successively, these values have been operationalized by the scholarly literature in a set of norms, such as norms of distributive, procedural, and recognitional justice. Furthermore, this pragmatist reading of the IAD Framework can help to contextualize the normative claims of energy justice within an evolutionary understanding of moral change. In this sense, this pragmatist theory of collective agency

offers a more precise understanding of how moral meanings, values, and norms co-evolve with the changing social, technical, and ecological (STE) environment.

Therefore, the Extended IAD Framework better explains the interconnected nature of techno-moral change (Boenink et al. 2010), and does not incur in the risk of hypostatizing a set of values or principles as universal moral realities. In this perspective, the set of moral meaning, values, and norms are expected to variate as the environmental conditions informing these moral concepts undergo an evolutionary change. This framework can therefore better articulate how, for instance, a changing ecological environment has given rise, coupled with a new social concern for global warming and the technical development of renewable technologies, to the emergence of new values like energy equity, energy security, and environmental sustainability.

Furthermore, the Extended IAD Framework can accommodate the insights provided by the Multi-Level Perspective of Frank Geels. In this integrated meta-framework, technological niches can be modeled as action arenas where a set of actors interact in a given socio-technical-ecological environment to co-construct an innovation network. In this respect, the endogenous variables of such innovation niches are both technological, economic, social, political, and cultural. According to the Multi-Level Perspective, these innovation niches are in a twofold relation to the socio-technical regimes which encompass them: on the one hand, niches are disruptive forces which actively re-shape the socio-technical characteristics of a given regime; on the other hand, socio-technical regimes inevitably inform the development of innovation niches. Within Ostrom's IAD framework, such socio-technical regimes can be modeled as the environmental characteristics – socio-technical as well as ecological, a point not sufficiently emphasized by Geels - which constitute the exogenous variables of an action situation.

According to Geels, the resulting tensions between "niche innovations and existing regimes typically play out on multiple dimensions, including: economic competition between old and new technologies; business struggles between new entrants and incumbents; political struggles over adjustments in regulations, standards, subsidies, and taxes; and discursive struggles over problem framings and social acceptance" (Geels et al. 2017a, p. 466). As socio-technical innovations within niches grow to reach widespread adoption, societies ultimately undergo a regime substitution "accompanied by far-reaching adjustments in infrastructures, policies, industrial and market structures, lifestyles, and views on normality" (Geels et al. 2017a, p. 466).

Therefore, the Extended IAD Framework can provide a useful tool for decision-makers which articulates the complex interweaving of moral and socio-technical dimensions within the Energy Transition. In this way, it integrates the insights coming from science

and technology studies and from applied ethics in a comprehensive conceptualization of their reciprocal relations and feedbacks.

4.5 Conclusion: A Cooperative Framework for Bottom-Up Energy Governance

To conclude, this chapter has proposed a conceptualization of energy transitions based on a pragmatist theory of institutional development. This endeavor has developed by taking Elinor Ostrom's theory of institutional development and expanding it to constitute a comprehensive pragmatist meta-framework able to integrate the moral analysis of energy justice and the socio-technical analysis of sustainable transitions. Therefore, it provides decision-makers with a pragmatic tool for analyzing the complex interplay of variables which influences the development of energy institutions, policies, and projects. As McGinnis has recognized, Ostrom's framework provides a theoretical analysis of the "decomposition of institutional contexts into their component parts as a prelude to understanding how these parts affect each other and how institutions shape outcomes" (McGinnis 2011, p. 4).

In particular, the Extended IAD Framework can help policy-makers to understand how meanings, values, and norms contribute to the emergence, development, and transformation of institutions within sustainable transitions. Furthermore, it contributes to show how the lack of proper consideration for the moral relevance of meanings, values, and norms in energy institutions can amount to a dysfunctional governance of energy systems. In fact, absent an understanding of the ways in which morality and institutional development are interlinked within socio-technical systems, decision-makers can fall prey of a technocratic tendency to implement energy policies and projects without considering the moral perceptions of societal actors on what constitutes a fair, equitable, and sustainable energy system. Hence, what the institutional framework proposed here provides is an analytical account of the ways in which institutions, technologies and morality inform each other in a given socio-technical system. Furthermore, the processual account of institutional design offered by this pragmatist theory of institutional development, provides a way to conceive the governance of energy systems as a bottom-up process of moral and institutional emergence, able to avoid the pitfalls of a top-down interpretation of government. Therefore, where technocratic models of governance have historically failed to include stakeholders and to gather broad societal acceptance of new innovations, projects, and policies, the processual account of institutional development here proposed can contribute to provide decision-makers with a more participatory, inclusive, and democratic model of energy governance, able to meet both the challenge of moral acceptability and societal acceptance of sustainable transitions.

5

Energy Communities and the Energy Transition, An Ethnographic Study

5.1 Introduction

This closing chapter presents the results of an original ethnographic investigation of the energy community of Schoonschip, in the city of Amsterdam. The aim of the chapter will then be the assessment of the theoretical insights provided by the Extended IAD Framework in the light of the sociological analysis of the empirical data collected on the field. More specifically, the ethnography explores the role of the moral perceptions of stakeholders in the development on an energy community. By focusing on the role of moral constructs within the creation of new energy institutions, the chapter helps to highlight a set of three socio-ethical conditions for the emergence and development of a successful model of energy community: the presence of a community spirit, the role shared values, and the importance of trust.

The work develops then by articulating the collocation of community spirit, shared values, and trust within the Extended IAD Framework. Read through the lenses of the pragmatist theory of institutional development developed in the Extended IAD Framework, the research will argue how: a shared sensibility for what is meaningful lies at the base of the creation of a community spirit; how shared values build on this shared sensibility by articulating a set of normative goals for the collective, allowing the coordination of cooperative agency; and how the establishment of community norms is important in creating a social environment where the participants can trust that their shared values will be respected and promoted. Therefore, it frames the three socio-ethical conditions emerged from the ethnographic investigation within the pragmatist ethics of meanings, values, and norms proposed in Chapter 3 and Chapter 4.

The Chapter begins by analyzing the role of energy communities within the energy transition, by addressing the most important frameworks developed in the academic

literature. It continues by focusing on the Dutch energy landscape, thereby giving an essential contextual analysis of the socio-technical regime influencing the development of energy communities in the Netherlands. The dissertation will then concentrate on the reconstruction of the foundation and development of Schoonschip in the neighborhood of Buiksloterham, in Amsterdam North. Finally, the chapter will conclude with the articulation of the ethnographic insights collected on the field through participant observation and through a series of narrative and expert interviews with the members of the community and with the professional figures that coordinated the technical design of the smart grid. Here, the dissertation will close by framing the role of community spirit, shared values, and trust in the process of institutional development proposed in the previous chapters.

5.2 The Role of Energy Communities in the Energy Transition

Without doubt the role of Energy Communities within a larger societal transition to a sustainable energy system has received an increasing attention within the academic literature (Walker, Devine-Wright 2008; Seyfang, Haxeltine 2012; Van der Schoor et al. 2016; Wirth 2018; Creamer et al. 2018; Hewitt et al. 2019). Nonetheless, as Gordon Walker has emphasized, whilst the phenomenon of community renewable energy has only recently gathered a widespread attention by both academics and policy-makers, the theoretical bases of this form of participative localism date back at least to the 1970s, with the establishment of theories of "soft energy paths" (Lovins 1977), "small-scale development" (Schumacher 1974) and "appropriate technology" (Dunn 1978) (Walker 2010).

Surely, the growing interest in Energy Communities results from the potential inherent within these projects to kickstart a process of diffusion of sustainable technologies and practices in developed and developing countries. More broadly, many governments have seen in energy communities a strategic chance to expand the diffusion of renewables, initiate processes of local regeneration, and prevent the public resistance towards energy projects. In fact, Energy Communities play a vital role within the European Green Deal, as recognized in the Renewable Energy Directive which establishes a set of strategic policies for an energy transition based on renewable energy in the EU.

In this respect, the Clean Energy Package has had the merit of recognizing for the first time "the rights of citizens and communities to engage directly in the energy sector" (Caramizaru, Uihlein 2020, p. 7). Accordingly, the emergence of the phenomenon of community energy has forced European institutions to formulate a working definition of "Energy Community" within its legal system. Within this European framework, a

Renewable Energy Community is defined as a legal entity (EU, Renewable Energy Directive 2009/28/EC):

1. *which, in accordance with the applicable national law, is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity;*
2. *the shareholders or members of which are natural persons, SMEs or local authorities, including municipalities;*
3. *the primary purpose of which is to provide environmental, economic or social community benefits for its shareholders or members or for the local areas where it operates, rather than financial profits.*

In this regard, the EU recognizes that energy communities can assume many institutional forms, ranging from associations to cooperatives, foundations, public-private partnerships, shared ownerships, non-profit organizations, or community-based enterprises. Nonetheless, all these institutional forms share a set of core attributes which are constitutive of energy communities like a participative governance, the control and ownership of energy services by the community, and the centrality of environmental, economic, and social benefits in defining the purpose of the project (Roberts et al. 2019). For what concerns the geographical distribution of these projects within Europe, energy communities are mostly concentrated in Northern countries, especially in Germany, as a result of five decades of governmental support for an "Energiewende". The Energiewende, or energy transition, represents a set of policies instituted by the German Government for a sustainable transition to a more clean, decentralized, and democratic organization of the energy system, a regime shift which was kickstarted by a strong movement of opposition to nuclear energy in the 1970s and 1980s. In fact, especially in the aftermath of the Chernobyl disaster, the German Government between the 1990s and early 2000s passed a series of laws which granted the quick expansion of renewable energy in a more decentralized energy system. As the European Union issued a set of directives for increasing competitiveness and efficiency of the energy sector, Germany responded first by liberalizing the energy market, second by supporting clean energy through Feed-In-Tariffs, and third by gradually phasing out nuclear power plants. In this way, the proliferation of Community Renewable Energy (CRE) initiatives in Germany under the Energiewende contributed to the further diffusion of energy communities in neighboring countries like Denmark and the Netherlands.

For what concerns Denmark, the country has strongly incentivized the local diffusion of wind parks now for five decades. As a result of these forms of support from federal and local government, more than 65% of the total existing installed wind capacity in Denmark is in the form of a citizen ownership model (Gorrono-Albizu et al. 2019). In this respect, a crucial step in the creation of a more democratic and participated energy system is represented by the Danish Renewable Energy Act that requires for all wind projects a 20% minimum threshold of citizen ownership.

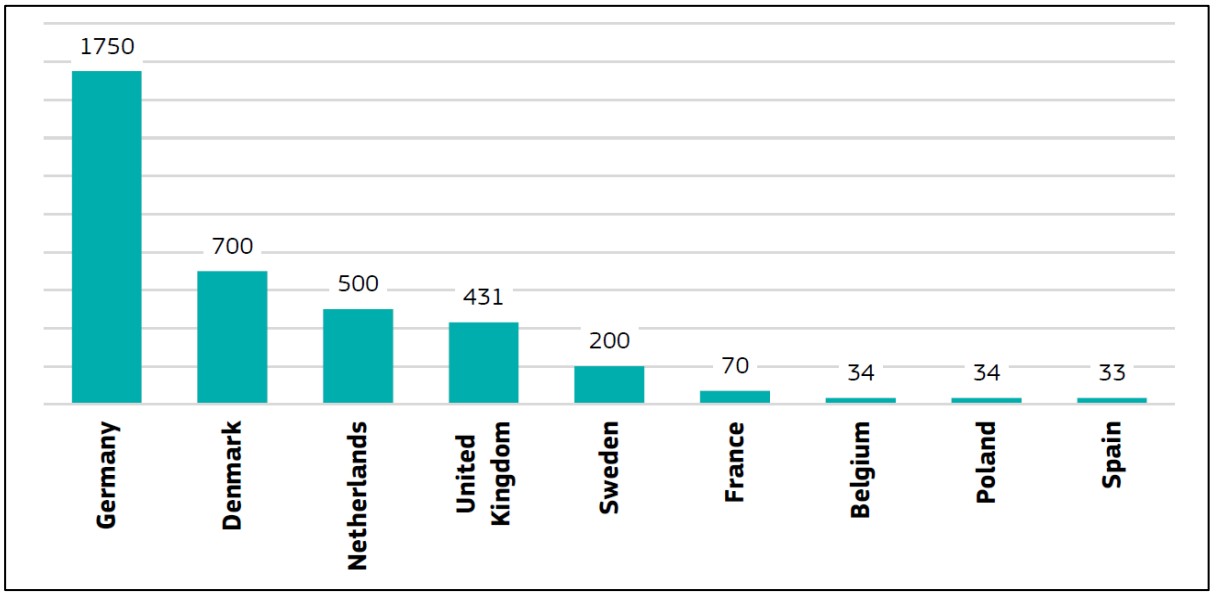

Figure 5.1: Approximate number of community energy initiatives from the nine countries of the 24 case studies (Caramizaru & Uihlein 2020).

Whist the national governments of both Germany and Denmark allocated a large quantity of resources to the establishment of green policies in support of local grassroots initiatives, the Dutch government has showed a greater lack of commitment and responsiveness with respect to community renewable energy. In this regard, the national subsidies for renewable energy, implemented through the Stimuleringsregeling Duurzame Energie (SDE++), have been devised as to benefit mostly large companies rather than local communities. In fact, the Dutch government has historically engaged in partnerships with the existing energy regime of energy producers, grid operators and local institutions, while substantially disregarding the nascent phenomenon of grassroots initiatives within the energy sector.

Therefore, as Oteman argues, the Netherlands presents a policy strategy and discourse which is mainly economical, creating a misfit with the environmentalist character of most local initiatives, whereas both Germany and Denmark have established policies framed within a broader environmental, social, and economic rationale, which creates a much better fit with the interests and values of energy communities (Oteman et al. 2014).

For what concerns the United Kingdom, the diffusion of community energy has followed a different path and has not been influenced to the same degree by the development of state-based policies for a sustainable transition. In fact, the spreading of community energy in the UK has been the result of a bottom-up emergence of successful models generating a cascading effect of interest in these new institutional forms. As Anna Berka writes, "community energy in the UK emerged at the periphery through replication of demonstrator projects, a gradual emergence of regional intermediaries that worked to lobby and adjust market support mechanisms designed primarily to facilitate large-scale commercial development and, eventually, the more systematic adoption and expansion of support frameworks pioneered by a pro-active devolved Scottish Government" (Berka 2017, p. 4). In fact, for a long-time large-scale developments were the exclusive beneficiaries of the support schemes for renewable energy provided by the UK government. It is only recently that smaller producers have been able to receive a financial incentive in investing in community energy through the establishment in 2009 of a Feed-in-Tariff. With the establishment in 2014 of its first "Community Energy Strategy", the UK Government has finally taken a more targeted approach to local energy initiatives by creating a set of policies which encourage commercial developers to share the ownership of renewable energy projects with local communities (Goedkoop, Devine-Wright 2016).

An Energy Community can be thus analyzed as a socio-technical system, where both technological and social innovations cohabit and reciprocally inform the development of sustainable local institutions. In this respect, energy communities are often regarded as a space for technological experimentation, allowing for the development of renewable energy technologies, and for social innovation, enabling the emergence of various forms of social empowerment, inclusive decision-making, and sustainable life-styles.

From a technological point of view, Energy Communities can represent a pathway to a more sustainable energy system with greater levels of clean and renewable sources, increased energy efficiency, and energy security. Within this technological perspective, an energy community can be described as a project based on the generation of renewable energy at the community level, where the electricity is either self-consumed, shared internally among the prosumers and/or supplied externally to other energy users. Additionally, an energy community can provide a series of further energy services, such as energy efficient buildings, energy storage, smart grid integration and management, and various forms of vehicle-to-grid e-mobility, such as charging stations, car-sharing, or car-pooling.

Nonetheless, far from being a monolithic reality, energy communities present a wide spectrum of initiatives ranging from relatively small and simple projects to large scale

systems integrating many green technologies within a complex digital infrastructure. For instance, in its most simple form, an energy community can consist in a group of households purchasing collectively solar panels and sharing the energy produced. Another example can be represented by a group of citizens sharing a vision of society and investing in a wind turbine in order to produce both environmental and financial benefits. In its more complex forms instead, an energy community can be organized as a microgrid which generates most or all of its power from local renewable energy sources, attaining high levels of self-sufficiency in its degree of independence from the grid, which intelligently controls the supply of electricity from generators, the demand from households, and the storage capabilities installed through a digital system managing in real-time an efficient balancing of loads both internally within the microgrid and externally with the central grid.

From a social point of view, Energy Communities are regarded as a promising vector for both environmental, economic, and social benefits at the local level. Within this social perspective, the diffusion of community energy projects is often thought to lead to greater levels of democratization, participation, and inclusivity within the governance of the energy system, therefore contributing to increase its fairness, granting a wider public acceptance of clean energy, and therefore kickstarting the diffusion of a new sustainable transition.

One influential way of interpreting community energy has been through the lenses of the Multi-Level Perspective of Frank Geels, by framing Energy Communities as niches of socio-technical innovation (Seyfang, Haxeltine 2012). According to Frank Geels' definition, niche innovations are "emerging social or technical innovations that differ radically from the prevailing socio-technical system and regime, but are able to gain a foothold in particular applications, geographical areas, or markets (e.g., the military), or with the help of targeted policy support". In this respect, Energy Communities can be read as societal niches that allow for the development of radical innovations both at the social and technological level which are not aligned with the current energy regime, and which act as catalysts for the development of a more sustainable energy system.

According to Seyfang and Haxeltine, niches have such an innovation potential because they constitute a "protected space where sub-optimally performing experiments can develop away from regime selection pressures" (Seyfang, Haxeltine 2012). In this regard, by expanding of Frank Geels' notion of niche innovations, Seyfang and Haxeltine apply the tools of Strategic Niche Management theory to identify three key conditions enabling the diffusion of sustainable technologies and practices into the broader society: first, the internal management of expectations, as communities can experience some

disappointment in the tension between long-term goals and short-term results; second the external construction of social networks, as local initiatives can encounter problems in finding commercial and institutional partners; and third the importance of developing tools for experiential learning within these projects, as purely conceptual approaches, while raising awareness on important topics, ultimately fail to build a sense of "group membership, belonging, identity, community, self-expression, lifestyle creation, and reciprocal exchange" (Seyfang, Haxeltine 2012).

Therefore, the role that innovation niches can play within the energy sector is to allow the dissemination of new technologies and practices, thereby allowing a gradual regime shift towards a more sustainable energy system. In this way, Seyfang and Haxeltine individuate three main drivers of regime change within innovation niches: first, by increasing the number of niche projects; second, by increasing the scale of projects; and third, by allowing the penetration of sustainable practices and technology into the existing socio-technical regime (Seyfang, Haxeltine 2012). Thus, next to a purely technological definition of innovation, which focuses on the disruptive character of new energy technologies like renewable sources and smart grid management, a socio-technical analysis of energy communities should also focus on the social innovations which are embedded in the emerging institutional forms of "community organization" within the energy sector.

Another interesting aspect of energy communities is the fact that they represent a hybrid institutional model, between market and state solutions, within the energy sector, where citizen organizations, local authorities, and commercial enterprises can cooperate together in the establishment of community projects. In this regard, there is still relatively little agreement among scholars on the precise extension of the concept of "community" in the phenomenon of community energy.

Among the first attempts to define conceptually this emerging reality, the work of Gordon Walker and Patrick Devine-Wright has helped to articulate energy communities as socio-technical entities characterized first by "a *process dimension*, concerned with who a project is developed and run by, who is involved and has influence" and second by "an *outcome dimension* concerned with how the outcomes of a project are spatially and socially distributed—in other words, who the project is for; who it is that benefits particularly in economic or social terms" (Walker & Devine-Wright 2008, p. 498). According to this framework, Energy Communities are socio-technical units characterized by a process which is *open and participatory*, as opposed to closed and institutional, and by outcomes which are *local and collective*, as opposed to distant and private. But already in this seminal work, the authors recognize a fundamental fuzziness inherent in scholarly definitions of "community" by individuating a spectrum of interpretative positions which spans from

perspectives focused exclusively on procedures (group A), to perspectives centered solely on outcomes (group B), and to mixed approaches taking both variables into consideration (group C). Admittedly, this theoretical articulation reflects the mobilization of concepts borrowed from moral theory, where the phenomenon of community energy is analyzed through the lenses of a process-based perspective, widely adopted within deontological approaches, and an outcome-based perspective, characterizing consequentialist approaches (Creamer et al. 2019). Therefore, the explicit relation with moral theories of Energy Justice gives this conceptual framework a perspective which is not limited to the descriptive, but that engages actively with the prescriptive dimension.

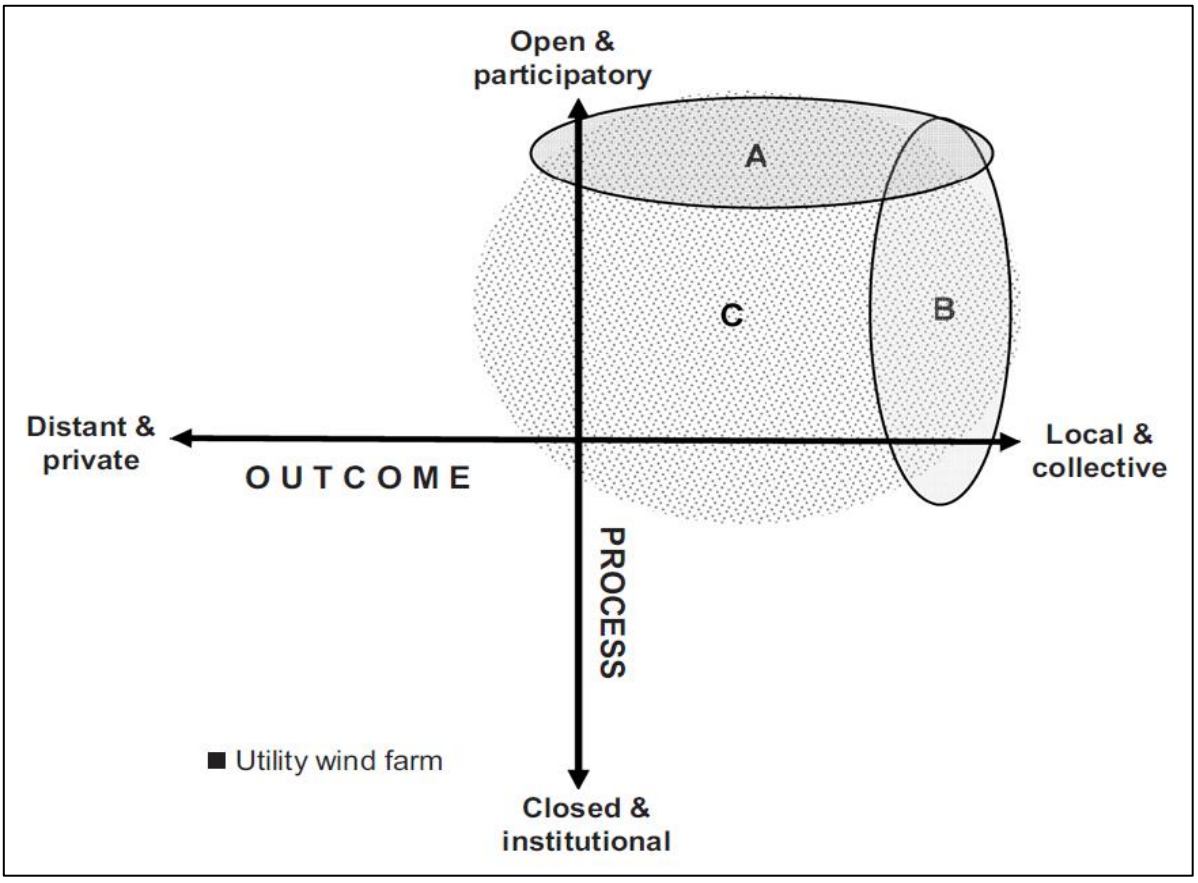

Figure 5.2: Understanding of Community Renewable Energy (Walker & Devine-Wright 2008).

A less normatively charged approach is offered instead by the work of Stefano Moroni, which understands energy communities as "institutional orders" that denote "groups of individuals who voluntarily accept certain rules for the purposes of shared common objectives (only or also) relating to energy; that is: (1) purchasing energy as collective groups (2) and/or managing energy demand and supply, (3) and/or generating energy" (Moroni et al. 2019). Here Moroni connects the analysis of energy communities with social ontology and characterizes Energy Communities as social groups coordinated in a collective action by means of a shared body of rules. In this sense, an energy community

can be said to represent an institutional order which is established in order to achieve a shared goal, thereby constituting what the author defines as an "intentional community" (Moroni et al. 2019). Nonetheless, intentional communities, far from being a unitary reality, constitute a heterogeneous array of institutional forms. According to Moroni, one important distinction in the analysis of energy communities is between "place-based" initiatives, where a community is defined by its connection to a specific location, and "non-place-based" initiatives, where a community is defined on the base of common interests, goals, and values. A further difference can be traced between "single-purpose" communities, which are constituted on the exclusive base of an energy project and "multi-purpose" communities which can collect a range of other services. This fundamental heterogeneity in the institutional forms of community energy should alert policy-makers to refrain from treating the phenomenon of energy communities with a unique policy approach.

Moreover, not all authors agree on the necessity of establishing a set of common characteristics able to circumscribe the phenomenon of community energy. In this respect, Emily Creamer has proposed that the definition of community should remain fundamentally open, arguing that the phenomenon of community energy should be understood as "ethnographically emergent" (Creamer et al. 2019). Therefore, in this framework, what researchers should pay most attention to is not the abstract definition of what community energy means but the concrete analysis of the sociological processes that constitute the emergent meaning of "community" in a given context.

The broadening of energy governance to community organizations has sparked an interest in their potential to foster a greater democratization of the energy system (Seyfang, Haxeltine 2012; Van der Schoor et al. 2016; Van Veelen 2018). Within this debate, Van der Schoor has offered an influential interpretation of energy communities as a force challenging the *obduracy* of the energy system, the resistance to change inherent in every socio-technical regime (Van der Schoor et al. 2016). Here the author, taking from Social Movement Theory, argues that Energy Communities constitute a new form of social movement, where the concept of movement is taken to mean "a special type of social conflict, which presupposes a clear definition of competing actors and of the resources they are fighting for or negotiating to take control of" (Van der Schoor et al. 2016, p. 96). In this framework, energy communities are a form of grassroots innovation which challenges the dominant energy regime based on a centralized system where few large-scale companies mass-produce electricity based mostly on fossil fuels. In the course of the ethnographic analysis undergone, Van der Schoor has found that energy communities are organized around three main goals: "realization of sustainable goals, keeping financial

means within the region and democratic governance of energy resources" (Van der Schoor et al. 2016). Local energy initiatives can, therefore, kickstart a process of decentralization in the energy system, where the production of electricity is spread to a whole new set of small and medium size producers and where communities of prosumers have the potential to create new governance paradigms which are more sustainable, regional, and democratic.

While the literature on energy communities tends to stress the potential for democratic engagement, there is still a relative lack of research on the actual inclusiveness of local energy initiatives. Especially within civil society organizations the concept of "energy democracy" has often been associated with a more decentralized and participatory energy system, where community organizations have a central role in the governance of energy services. Within the energy democracy movement, the phenomenon of community energy is usually conceptualized as challenging the existing regime of multi-national corporations. Therefore, the spreading of local initiatives, where community organizations play a fundamental role in redefining the decision-making around the production and distribution of energy services, is framed as a new form of citizen empowerment.

Nonetheless, as Bregje Van Veelen has highlighted, this set of theoretical assumptions still lacks an empirical confirmation rooted in a detailed analysis of community energy projects (Van Veelen 2018). In fact, despite the democratic potential inherent in the emerging institution of community energy, oftentimes "the ideals of inclusive decision-making and robust accountability procedures can be at odds with the practicalities of meeting them" (Van Veelen 2018, p. 15). Van Veelen traces three main sources of tension between the ideal of a democratic governance and the practical limitations of community organizations:

- First, the ideal of broad citizen engagement can be contradicted by limited active participation and by the narrow leadership structure of these projects. To this effect, the degree to which the governance of local initiatives is representative of the broader community is often questionable and constrained by the necessity of a timely and efficient decision-making.
- Second, the ideal of procedural fairness can be contradicted by the lack of accountability procedures, as oftentimes such rules are figured out as the projects evolves. This is due especially to "a lack of active members with sufficient time and knowledge, pressure to meet tight deadlines, and the increasing complexity of projects and organizational structures" (Van Veelen 2018, p. 11).

- Third, the ideal of democratic governance can be put at risk by the difficulty of separating informal and formal spaces of exchange. In the presence of disagreements, this blurring of the personal/professional boundary can ultimately lead to forms of withdrawal of dissenting minorities from the community life.

What Van Veelen's research stresses, therefore, is that the context in which energy communities are embedded strongly influences the democratic character of these projects. In fact, the inclusiveness of these projects depends on both internal and external factors within the local institutional context: for what concerns the internal factors, the presence of pre-existing local leaderships and a scarce propensity for participation and openness in decision-making procedures can often lead to the reproduction of local power structures; for what concerns the external factors, the absence of institutional incentives, the presence of strict deadlines, and the increasing complexity of projects and networks can lead community organizations to more hierarchical and technocratic forms of governance. In this regard, the research of Van Veelen strongly suggests the importance of intermediaries in the coordination of complex projects.

The literature on energy communities is therefore shifting from a research focused on conceptual meaning to one centered around practical consequences. As Emily Creamer puts it, the questions that we are supposed to ask, facing the emergent phenomenon of community energy, are today practical ones: "What material changes has Community Renewable Energy produced, and to what consequence? Is there evidence that Community Renewable Energy can meaningfully contribute to just energy transitions, and in what contexts and under what conditions?" (Creamer et al. 2019, p. 5). In other words, now that articulated frameworks have been established analyzing the conceptual space of local energy initiatives, research must concentrate on the preconditions, performance, and effects of community energy. According to Creamer, we should then start by asking "what does community renewable energy do in practice, what does it enable, empower, inspire, include, exclude, obscure or obstruct?" (Creamer et al. 2019, p. 2).

Berka and Creamer address the question of energy communities' role in the sustainable transition within their paper *Taking stock of the local impacts of community owned renewable energy* (Berka, Creamer 2018). In this important article the two scholars individuate seven dimensions along which it is possible to measure the performance of energy communities: socio-economic regeneration, knowledge and skills development, social capital, increased support on renewable technology, energy literacy and environmentally benign lifestyles, access to affordable energy, and empowerment. Therefore, rather than assuming that these outcomes are inherent in the institutional model of an energy

community, the two authors start with the available data to develop a meta-analysis of the existing evidence for the benefits of community renewable energy.

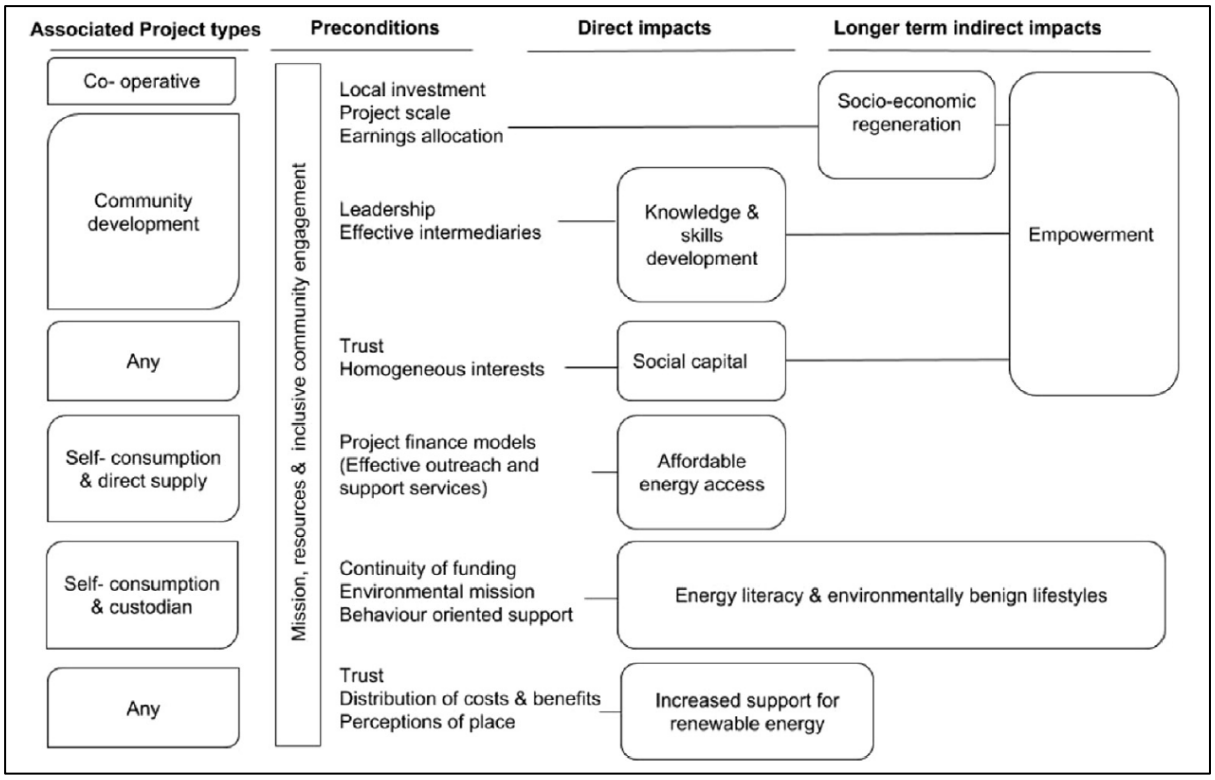

Figure 5.3: Summary of direct impacts from project development and longer-term indirect impacts, showing preconditions and associated project types (Berka & Creamer 2018, p. 3412).

In this respect, the available data shows that these projects are likely to bring *socio-economic regeneration* within a community, but only where one finds a good supply of professional profiles, where earnings are distributed back to stimulate local activities and social services, and where the capital financing these initiatives is locally sourced. Even stronger data supports the assumption that grassroots initiatives stimulate the *development of knowledge and skills*, especially in the areas of management, organization, financing, and sustainable technologies, but these results are strongly dependent on the achievement of broad active participation from communities. For what concerns the role of *social capital*, an ample literature is developing on the crucial role of strong interpersonal networks in fostering the creation of successful initiatives. Another important aspect of energy communities is their capacity to gather increased *support for renewable technology*, and there is now solid data to demonstrate how realities with a high social capital and a fair distribution of benefits are likely to decrease the opposition to renewable energy projects. With respect to the possibility that grassroots initiatives can spread *energy literacy and more sustainable ways of living*, Berka and Creamer register a paucity of empirical data in support of this theoretical assumption.

In fact, while there seems to be a strong argument for CRE to spread awareness on environmental issues, there is a lack of studies on the direct and indirect impacts of energy communities on territories. Access to more *affordable energy* is also thought to be an outcome of community energy, but various projects differ substantially in this respect. As a matter of fact, a number of studies suggests that more affordable energy is dependent on strong local organizations being able to shoulder the initial investments for the wider community, it is often limited to households with high initial energy consumption and low prior energy literacy transitioning to lower consumption patterns and higher literacy levels, and is facilitated by the presence of direct supply of energy to consumers and by the presence of net accounting schemes by grid operators.
Furthermore, in spite of the inclusive ideals present in these groups, the possibility of *collective empowerment* is often stifled by socio-economic structures which tend to reproduce social disparities, thereby selecting people with high education and income levels to be part of these projects. Oftentimes leaders are already important figures within the community and, absent efforts to establish an open and inclusive process of collective participation, there is a risk of replicating forms of social exclusion in these local realities. The conclusion that Berka and Creamer reach is that the inclusiveness of energy communities and the presence of public values are central elements in the success of these projects (Berka, Creamer 2018). Specifically, the authors argue that the "degree of effective early and wide community engagement determines whether a CRE project will have a positive impact on social capital" (Berka, Creamer 2018, p. 3412); the inclusiveness of energy communities is, furthermore, a crucial determinant of the increased support for renewable technologies and of socio-economic regeneration. For what concerns the second element of success in establishing local energy initiatives, the authors suggest that projects centered around public values, as opposed to commercial values, are more likely to generate benefits for the broader community, especially where grassroots initiatives are "a response to structural socio-economic decline or global environmental problems that are perceived as beyond the agency of individuals" and are "motivated and designed to fill gaps in essential public goods, services and amenities" (Berka, Creamer 2018, p. 3414) Differently, where projects are established mostly for commercial interests, the benefits are usually enjoyed exclusively by a narrow group of local investors.

5.3 Energy Communities within the Dutch Natural Gas Regime

Before moving on to the analysis of the Schoonschip community, it is important to first provide a more precise depiction of the socio-technical regime in which this innovation niche has emerged (Geels et al. 2017a, Geels et al. 2017b). To develop this broader picture,

it is then useful to start analyzing in detail the institutional context within which the energy community of Schoonschip is situated.

As noted before, the Netherlands is significantly lagging behind among other European countries with respect to the penetration of renewable technologies within its energy system. In fact, as of 2019, the Dutch energy system reaches merely a 9% share of renewable energy as measured with respect to its gross final energy consumption, making it the third last country in the EU for share of renewable energy, second only to Malta and Luxemburg (Eurostat 2019). Furthermore, the last data available suggests that the country has missed its target of 14% energy from renewables by 2020, by recording a 11% share of renewable energy by the same year, thereby missing its goal by more than a fifth (CBS - Statistics Netherlands 2020).

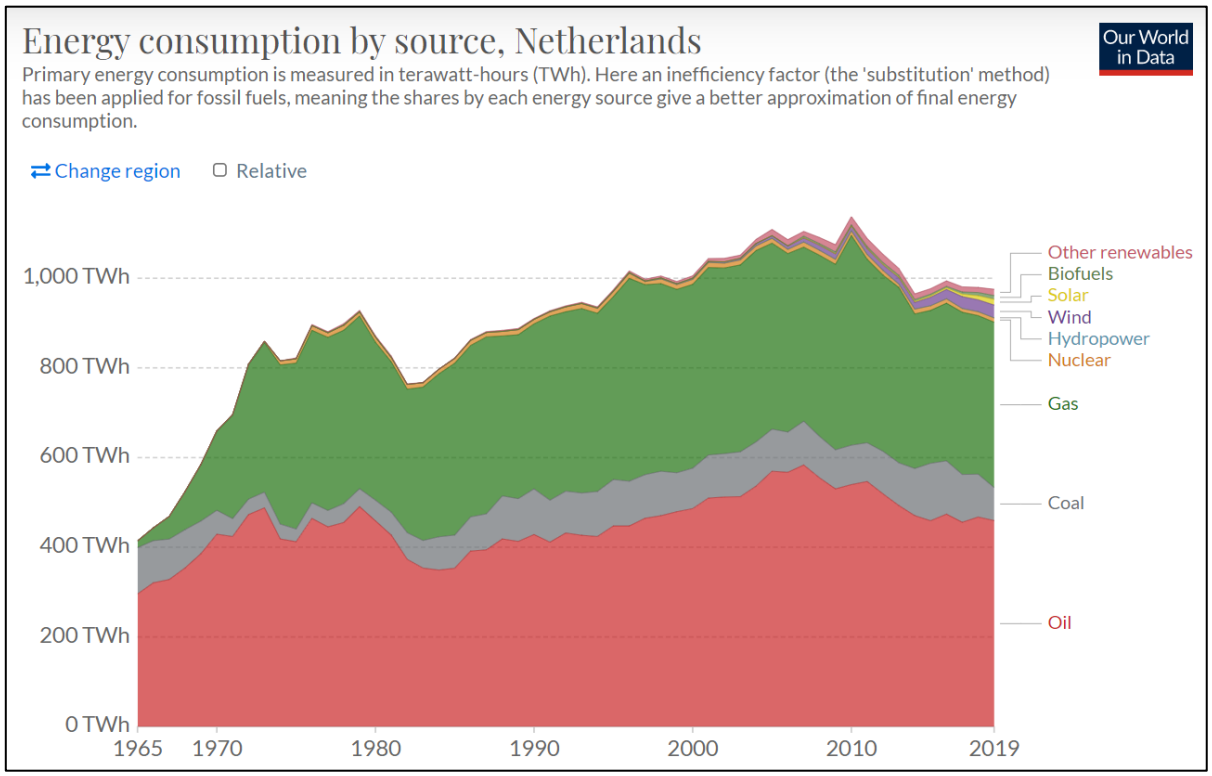

Figure 5.4: Energy consumption by source, Netherlands (Our World in Data 2019).

This difference with respect to other northern countries like Germany or Denmark is an historical result of the abundance of natural gas within the northern regions of the country. In fact, the Groningen gas field is the largest natural gas field in Europe, the tenth in the world, and supplies more than 42% of the entire energy mix of the country, with oil representing 37%, coal 11%, biofuels and waste (5%), and the remaining 5% divided among nuclear, wind, solar, hydropower and geothermal (IEA Report 2020). Owned in partnership by the Dutch Government, Royal Dutch Shell and Exxon Mobil, this massive reserve of natural gas has helped to generate a powerful commercial interest for fossil

fuels and has granted a huge lobbying power to a small number of industrial players in the Dutch energy sector (Verbong, Geels 2007). As Mulder and Perey report, "the proceeds from natural gas exploitation go into the government budget (90%) and to the mining companies (10%). Since its discovery in 1959, the Groningen gas field has yielded about 288 billion Euros for the government's finances, whereas the mining companies (ExxonMobil and Royal Dutch Shell) earned 29 billion Euros" (Mulder and Perey 2018, p. 25).

Therefore, the commercial interest in the exploitation of regional gas reserves and the influence of fossil fuels lobbies in the Dutch energy sector has contributed to the particular slowness of the energy transition in the country, and it is still stifling the possibility to set ambitious targets for the future. In the last years, the Dutch government has showed a greater political will to support a transition to a low-carbon energy system, by adapting the national targets to the European goal for a 32% share of renewable energy by the year 2030; but this goal still falls short of the 65% of Germany and, most significantly, the 100% of Denmark.

The growing support for an energy transition in the Netherlands is a result of the confluence of two general trends in the Dutch energy system: first, the progressive depletion of gas fields at fast rates within the country; second, the emergence of public protests and unrest after the intensifying of earthquakes due to gas extraction activities (Cuppen et al. 2019). For sure, the discovery of the Groningen gas field in the 1950s has constituted for the Netherlands a chance of breaking out of a predominantly coal-based energy system and has represented a great source of revenues for the national budget, enabling the establishment of a large welfare state.

But the positive perception around natural gas as an energy source has shifted dramatically when, on the evening of the 12 August 2012, an earthquake of 3.6 magnitude on the Richter scale has caused serious damages in the northern region of the country. The earthquake marked the apical point of an escalation of seismic activity in the region. In fact, the first earthquakes around Groningen started already during the 1980s, twenty years after the beginning of gas production in the region, to reach a magnitude of 3 on the Richter scale in the October of 2003. From then on, the region has recorded a series of tremors with similar magnitudes with a regular cadence. In 1993, the Dutch Advisory Committee for Earthquake Research established that the extraction of gas from the soil could lead to telluric activity, but it significantly downplayed the potential magnitude of the earthquakes and the correlated damages (Mulder, Perey 2018).

Unfortunately, the underestimation of risks linked to gas extraction has been an institutional product of the systematic lack of formal risk assessments in the procedures

of decision-making around the Groningen gas field, which have been oriented exclusively towards a logic of resource supply maximization. As Stanley Reed has reported on the New York Times, "decades of extraction have reduced pressure on the gas-bearing rocks below the surface, causing them to contract. That has led the ground to sink by about a foot, and earthquakes have rumbled. More than a thousand tremors have been recorded since the mid-1980s. Thousands of homes and buildings have been damaged, including some of the region's rich stock of medieval churches. Residents readily say they fear harm should quakes shake loose chimneys or ceilings" (Reed 2019).

The Dutch government, under increasing pressure from civil organizations and local municipalities, has decided to phase out gradually the production of gas in the Groningen gas field; the final date of stop to all extractive activities has been first fixed by 2030, and only recently moved to 2023 due to widespread resistance towards further extraction. Furthermore, another cause of tensions has been the siting of energy projects, which is often being perceived as the result of aggressive and opaque forms of public management, thereby creating widespread discontent among the local communities and producing an erosion of trust in the fairness of decision-making processes (Cuppen et al. 2019).

As a result of this economic and institutional context, natural gas has historically established a true socio-technical regime within the country, by showing various forms of lock-in mechanisms (Geels 2019). First, the natural gas regime constituted a strong *economic lock-in* due to the very low marginal costs of gas production in the gas field of Groningen, which made it one of the cheapest, most flexible, and largest gas fields in Europe (Mulder, Perey 2018). Second, the oil crisis in the 1970s and the nuclear crisis kickstarted by the Chernobyl disaster in the 1980s helped to establish natural gas as an important alternative resource for the Dutch energy system; thereby, creating a *technological lock-in* for gas extraction and production in the country. A third form of *institutional lock-in* has been represented by the role of the Dutch state in the management of natural gas in the Netherlands, whose historical partnership with Shell and ExxonMobil contributed greatly to the enlargement of government budget, with gas revenues making up around 5% of yearly national revenues. In fact, even in front of the liberalization of the European energy market during the 1990s, the Dutch state continued to have a large stake in the production of natural gas within the country. Furthermore, another source of institutional lock-in derived from the central role that the Ministry of Economic Affairs has played within the Dutch energy sector, which has contributed to create a strongly economistic approach to the management of energy resources and has significantly delayed the adoption of renewables within the country (Oteman et al. 2014).

Fourth, the Dutch government has found itself in a *political lock-in* with respect to natural gas extraction as the enormous amount of liquidity generated by the Groningen gas field granted the creation of a generous welfare state in the Netherlands, with the result of locking-in gas extraction and production for more than seven decades. It is then possible to conclude that the current energy system based on natural gas forms a true socio-technical regime within the Netherlands. The various forms of lock-in mechanisms present within the energy system are a result of the stabilizing effects derived from "the alignments between technologies, policies, user patterns, infrastructures, and cultural discourses that have been created in previous decades" (Geels 2019).

As a result, community initiatives have suffered from a lack of political support in the Netherlands, especially with respect to other neighbouring countries like Germany and Denmark. In fact, the phenomenon of community renewable energy is fairly novel in the Netherlands (Boyd 2017). Moreover, local energy initiatives have historically lacked any consistent form of financial funding by part of the central government (Oteman et al 2014). Therefore, energy communities have represented a phenomenon which has built from the bottom-up within the country, occasionally with the help of commercial partners, civil associations, environmental groups, and local administrations. As a matter of fact, the Dutch history of community energy has been defined by its grassroot orientation, participatory spirit, and local character since its emergence during the 1980s. Following the work of Marieke Oteman, it is possible to reconstruct the development of community energy in the Netherlands as articulated in four major phases: a first period defined by the first wind pioneers between 1985-1991; a second period characterized by Frisian village turbines in 1991-1997; an intermezzo due to the liberalization of the energy market in 1997-2000; a third phase marked by the new solar pioneers in 2000-2009; and a fourth phase spanning from 2009 to today characterized by the diffusion of solar energy communities (Oteman et al. 2017).

In this regard, the phenomenon of energy communities arose in the Netherlands during the 1980s as a response to three main drivers: first, the Club of Rome published in 1972 its influential report *The Limits to Growth*, which raised global awareness on the unsustainability of our model of economic development and its devastating impacts on the Earth System (Meadows 1972); second, the explosion one year later of the oil crisis raised concerns for an energy system too dependent on petroleum, as oil prices skyrocketed by more than 300% in 1973 as a result of the oil embargo imposed by Saudi Arabia on the Netherlands for granting US airplanes to refuel in their bases during the Yom Kippur War; third, anti-nuclear sentiments and protests grew throughout the Seventies in the country, as environmental groups, critical scientists and left-wing political

parties created a powerful anti-nuclear front, concerned by the incidents in the novel reactors in Dodewaard and Borssele in the Netherlands and by the Three Mile Island accident in Harrisburg, Pennsylvania in 1979 (Berkers 2018; Oteman et al. 2017).

As a result, a first wave of pioneers, mostly farmers, established a small number of energy cooperatives during the late Eighties (1985-1991). These projects were organized around the collective purchase of a wind turbine by a small community and these initiatives were mostly inspired by an environmentalist perspective and by the ideal of local independence. Between 1991 and 1997, the number of energy communities remained virtually stable, with the only exception of Friesland, where nine different villages started new energy cooperatives built around wind energy and were motivated mostly by financial gains. These projects were aimed at generating streams of income to be reinvested locally in order to provide new services for the surrounding communities. The beginning of the phenomenon of energy community was therefore organized around grassroots initiatives and never obtained any institutional support, as the Dutch energy system was strongly concentrated in the hands of the state and a few big industrial players who saw the decentralization of the energy system as synonymous with inefficiency.

The following years were marked by the liberalization of the energy market, a period of huge changes in the regulatory landscape around energy production, transmission, and distribution. The instability which ensued, with new actors emerging and established names rapidly losing ground, created a chaotic transformation in the energy landscape which was at odds with the necessity of long-term planning intrinsic in energy projects like the collective ownership of wind turbines. The liberalization of the energy represented therefore a powerful *landscape development* putting pressure on the existing socio-technical regime which was organized around few large industrial players in a centralized energy system (Geels et al. 2017).

In fact, the liberalization had a huge impact on the power of large national companies, which lost ground both to larger international corporations and to smaller emerging suppliers of green energy. In the span of six years – from 1998 to 2004 – the energy regime had heavily reorganized its power structure, with established and emerging actors entering what once was a relatively stable and protected industrial environment (Kooj et al. 2018). As De Bakker summarizes, energy companies passed from 8 in 2004 to 47 in 2016, opening the way to an energy system with "a greater variety of suppliers of renewable sources of energy" (De Bakker et al. 2020). Other powerful landscape pressures were, on the one side, the development of a political responsiveness to the growing concerns around climate change, spurred by the ratification of the Kyoto Protocol by the European Union in 1997 and by a series of institutional reports like the *Stern Review on the*

Economic Impacts of Climate Change (2006) and the *IPCC Fourth Assessment Report* (2007), and on the other side, the spread of an environmental sensibility in the wider population prompted by Al Gore's documentary *An Inconvenient Truth* (2006) (Oteman et al 2017).

These two landscape developments played a crucial role in the emergence of a third wave of pioneers in community energy between 2000 and 2008. This third wave of grassroots initiatives was influenced by the upcoming commercial availability and affordability of solar energy, as photovoltaic panels became more accessible to consumers around the world. The energy communities that emerged in this third phase were therefore characterized by the collective purchase of solar panels within local communities aimed at both environmentalist goals, like reaching high levels of green energy, and financial goals, like generating small returns derived from the resale of green electricity to the central grid. In this regard, the introduction of net metering schemes by the Dutch Government in 2008 has played an important role in the financial feasibility of investing in renewable energy, by granting prosumers the possibility to sell back to the grid their excess supply of energy in order to abate the costs of electricity production. Furthermore, among the measures in support of sustainability, the government passed in 2008 a new scheme called Stimulering Duurzame Energie, or SDE, to promote sustainable energy though a series of subsidies for the production of renewable energy and Combined Heat and Power (CHP).

Nonetheless, as Marieke Oteman highlights, one of the main obstacles to the diffusion of renewable energy was the lack of political determination by the Dutch government to clearly steer the energy system towards a green path. Grassroots initiatives benefitted greatly from the introduction of the SDE scheme, but the momentum in favor of community renewable energy generated by this measure was muffled by the introduction of the SDE+ scheme in 2011, which excluded private households from the access to green subsidies and awarded them only to companies and organizations. As Henk-Jan Kooij has argued, this was the result of a discursive shift undertaken by the Rutte government in 2010, which changed its focus from renewable to nuclear energy, by claiming that renewables are "expensive, overregulated, and ineffective, and an answer to (future) energy scarcity should be found in - surprisingly - nuclear power". (Kooj et al. 2018, p. 57). In fact, as a result of the center-right liberalism of Mark Rutte's government and of the utilitarian management of the energy system by the Ministry of Economic Affairs, the energy transition started to be framed especially in terms of energy security rather than in terms of environmental sustainability. In this picture, nuclear power started to gain traction as a strong candidate for a reliable and competitive carbonless energy system, while renewable energy was perceived as comparatively unreliable, fragmented, and

more expensive. Mark Rutte has, in fact, spoken in favor of converting the energy region of Groningen from natural gas to nuclear power, claiming in an electoral debate on Dutch television that "We need nuclear power [...] One could build a nuclear plant in Borssele and there is also a place in Groningen [...] Groningen would like to be the energy province. We will stop with natural gas, but Groningen also wants to be the place for the energy transition and there are enormous opportunities in nuclear energy" (Groninger Internet Courant 2021).

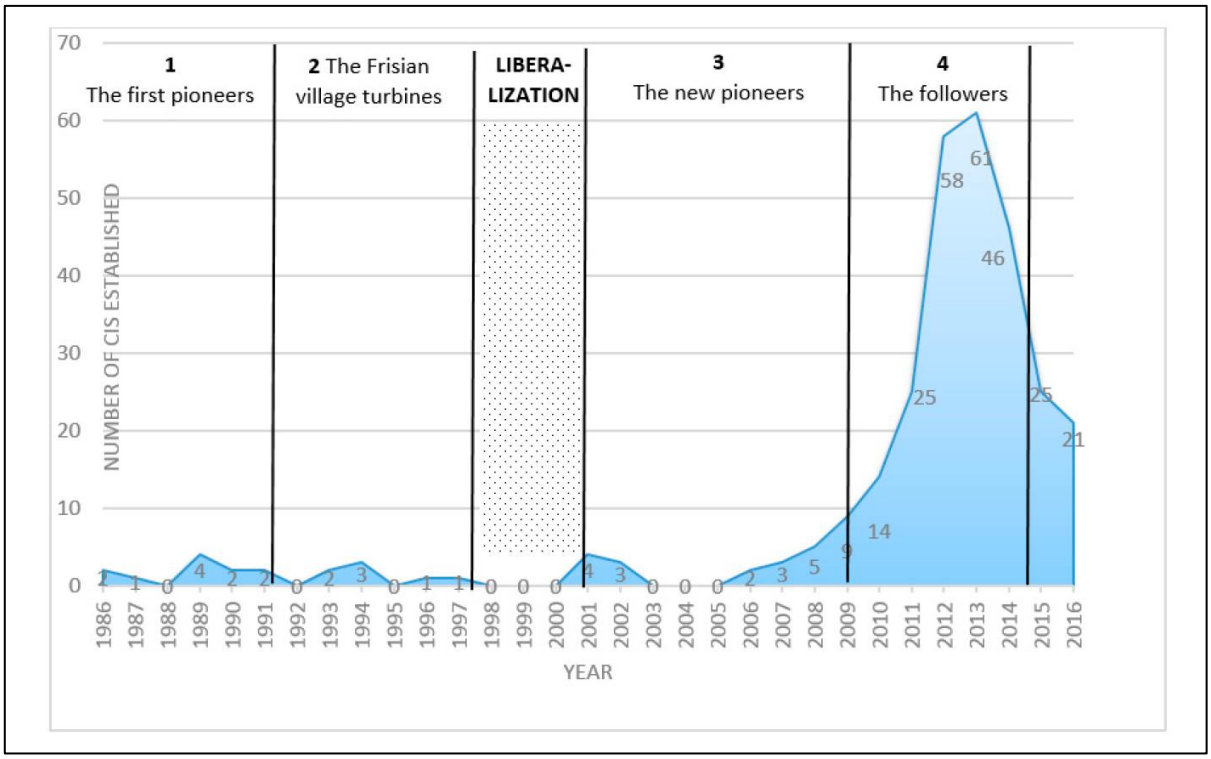

Figure 5.5: Number of Dutch grassroots initiatives for renewable energy established per year (Oteman, Kooij, Wiering 2017, p. 6).

Not surprisingly, this shift in political support behind renewable energy has slowed the expansion of grassroots initiatives in the country. As the graphic above shows, the explosion of grassroots initiatives recorded after the introduction of important policies in 2008 like net metering and green subsidies was soon capped by an institutional environment losing interest in fully investing in a more decentralized energy system. Nonetheless, the fourth wave of grassroots initiatives has been characterized by a steady growth of energy communities, which passed from 40 in 2009, to more than 500 in 2021, structured in many institutional forms, such as cooperatives, foundations, and associations (Oteman et al. 2017).

Building on the experience of the first solar communities, the new wave of grassroots initiatives has spread thanks to the abatement of prices of sustainable technologies like solar panels, the transmission of knowledge between established and new projects, the

availability of information on success stories on the web, the introduction of regulations like net metering schemes, the occasional support from local and regional administrations and, finally, the emergence of organizations, companies and networks specialized in providing local organizations with different forms of expertise required to manage the complex nature of energy communities.

Furthermore, the broadening of the number of projects corresponded to a broadening of the motivations behind community energy. As Oteman writes "whereas the traditional wind cooperatives had a strong environmental motivation, and the Frisian turbines were built to generate local revenue, the motivations for the third and fourth wave GIs are much more diverse and include various economic, environmental and societal arguments" (Oteman et al. 2017). Adopting green technologies, fostering sustainable practices, lowering energy bills, generating financial benefits, strengthening social bonds, creating better services for local territories, all these motivations form a complex web of drivers at the base of the emerging phenomenon of community energy in the Netherlands.

Unfortunately, the central administration has continued to disregard the phenomenon of energy communities. In fact, the Energy Agreement for Sustainable Growth, passed by the Dutch government in 2013 and representing one of the most important energy policies of the last decade, has set only modest goals for of renewable energy, aiming at reaching a 14% share of renewables by 2020, against a European target of 20% by the same year. Moreover, as Jessica Boyd has argued "as a means of meeting these goals, the government networks with the market/business partners as opposed to local communities. This is a result of the authority of the Ministry of Economic Affairs in the Dutch energy sector" (Boyd 2018). In this respect, the Energy Agreement has represented another instance of an economistic approach to energy governance centering exclusively on large market actors, which "focuses on the economic attainability of the energy transition and discusses activities and goals in terms of employment opportunities, payback times and smart investments" (Oteman et al. 2017).

As a result, within the Dutch energy system there has been a structural lack of institutional fit between the bottom-up discourse of grassroots initiatives, centered around environmental concerns, local communities, and social cohesion and the utilitarian view of the central government centered around an economistic approach to energy system and focused on large industrial players. However, both the Paris Agreement (2015) and the European Green Deal (2019) have contributed to create a more widespread political support for an energy transition based on green and renewable energy. Influenced by this new political climate, the Netherlands have set somewhat more ambitious goals, aiming

to reduce greenhouse gas emissions by 49% by 2030 (against a European target of 55%), as compared to 1990 levels, and by 95% by 2050 (against a European target of net zero emissions).

The establishment in 2019 of the Climate Agreement, following the 2013 Energy Agreement, reflects this change of pace by the Dutch government in the fight against climate change. Within the Climate Agreement, the Netherlands seem to focus on two main avenues for creating a sustainable future: the development of off-shore wind parks in the North Sea and the multiplication on land of wind and solar projects. Concerning this second dimension, the government seems disposed to grant decentralization a larger role within its energy system, with "citizens (such as "prosumers"), districts, public authorities, public institutions, network operators, businesses and civic organizations collaborating on an extensive web of local and regional, small and larger renewable sources of electricity, effectively integrated into the network, public space and systems of renewable heating" (Climate Agreement 2019). There seems to be, therefore, a favorable prospect for a breakout of sustainable technologies and practices outside of their current containment within small socio-technical niches and for community energy to become finally institutionalized within the Dutch energy regime. Nevertheless, it remains an open question whether the future development of the Dutch energy system will track the environmental targets stated in the Climate Agreement and implemented in its National Environmental Climate Plan.

5.4 The Energy Community of Schoonschip in Amsterdam

Once this picture of the *socio-technical regime* constituted by natural gas in the Netherlands has been established, it is then possible to explore how *innovation niches* are constituted and which conditions enable their emergence, development, and replication into the surrounding socio-technical environment. In order to explore how a communities are "ethnographically emergent" (Creamer et al. 2019) and constitute an array of diverse institutional models within the energy transition, the research will focus on the energy community of Schoonschip in Amsterdam.

Schoonschip is a floating residential community built in the Johan van Hasselt Canal in Buiksloterham, a neighborhood of Amsterdam-North, and it is composed by 30 floating houses connected by a system of floating jetties. The neighborhood of Buiksloterham, once a small village of farmers in the province of North Holland, got incorporated into Amsterdam in 1921 to become an industrial port area in the north of the Dutch capital, where industries, oil laboratories, and shipbuilding factories formed the largest part of the built environment. As industries and laboratories progressively moved out of

Buiksloterham, the neighborhood slowly turned into a post-industrial wasteland with polluted soil and run-down buildings. For decades it remained a sparse residential area for the working class, scattered with few commercial activities and garages.

But in the last 10 years the neighborhood has undergone a radical transformation as the municipality of Amsterdam changed the zoning rules to incentivize its transformation into a testing ground for grassroots initiatives aimed at the regeneration of its residential and commercial tissue. In the span of less than a decade, the cheap prices and the relatively laissez-faire attitude of the city administration attracted a multitude of new projects, where "innovative", "sustainable" and "circular" were the ever-present buzzwords populating the masterplans of design studios and the blackboards of young entrepreneurs' offices. Very rapidly, a new crowd of young and creative people started to fill the empty lots with offices, coworking spaces, residential projects, small shops, and coffeehouses. As a result, the old inhabitants of the neighborhood saw the prices of properties going up, with rents rising for habitations and commercial activities, as the urban phenomenon of gentrification was once again replicating itself with all of its socio-economical tropes.

The vision for a new sustainable neighborhood ultimately materialized as a masterplan for a "Circular Buiksloterham", where a network of local organizations and professional offices anticipated its bright future by announcing "We conceive of Buiksloterham as an engine for the broader transition of Amsterdam. Its polluted lands and open spaces can become the center of the implementation of new clean technologies and a hub for the closure of urban material cycles. The activities needed to close these local material flows can be used as a driver for local industry and the strengthening of local social networks. IT-based interventions can smartly connect local residents with one another and boost the efficiency of resource flows. Urban biodiversity and climate adaptation measures are conceived as a core strategy to bring long-term local resilience to the area. As such, Buiksloterham can serve as a blueprint and live experiment for how such formerly peripheral areas worldwide can be transformed into a motor for change and regeneration in cities (Circular Buiksloterham - Vision and Masterplan 2014). Schoonschip has been one of the signers of the Circular Buiksloterham manifesto.

As a community, Schoonschip developed over the course of more than a decade. The idea for a sustainable neighborhood on water came to Marjan the Blok, a young woman who had only recently finished a Film and Television Master from the University of Amsterdam, as she was shooting in 2008 a documentary on the geWoonboot, a prototype for a sustainable boat managed by the green energy advocate Pauline Westendorp. The geWoonboot was part of a local green energy exhibition, and its goal was to demonstrate

that living on water sustainably was not a futuristic utopia but in fact something that could be considered part of "ordinary" reality (gewoon-boot literally translates to "ordinary boat").

This floating building has been built to be self-sufficient in both its energy production and water supply, as solar energy and rainwater provide its essential sustainable resources. As for its use, the geWoonboot is advertised as a meeting space for teams looking for an "atmospheric and quiet" work environment. The fact that utopias can be brought to be part of ordinary reality must have caught Marjan de Blok's imagination. Fascinated by the geWoonboot, she started talking about the idea of living sustainably on water to her friends and soon the embryonic vision for the Schoonschip neighborhood came together. This 'normal utopia' was an ambitious project from the beginning: on the project's online homepage one is welcomed by the words: "Schoonschip, the most sustainable floating neighborhood in Europe, developed by residents".

Figure 5.6: Schoonschip 1 (https://www.spaceandmatter.nl/work/schoonschip)

Nonetheless, even if utopias can become part of our normal experience, the process to get there was not at all straightforward. From its first conception in 2008 to the first families moving into their floating houses in 2020, the project took more than twelve years to be planned, authorized, and constructed. Started as a group of around twenty friends with a shared vision for a sustainable lifestyle and a desire to live together in a small community project, the group soon organized around the newborn "Foundation Schoonschip". An important first step was the awarding of a subsidy from the Steering Committee for Public Housing Experiments which was crucial in helping to kickstart the planning of the project. In fact, with the financial support of this subsidy, the small group

of friends was able hire a consulting company to execute a plan for the development of their vision. This professional relationship between the Schoonschip Foundation and the consulting company was formalized in a *Collectief Particulier Opdrachtgeverschap* (CPO), a legal entity which allows a collective of future residents to hire an advisor to guide them as clients in the realization of a social project. In 2009, with a concrete plan in their hands, the group was finally able to obtain a loan from the Province of North-Holland – the project was starting to become a reality.

The search for a location to the project was the next step; initially the choice fell on the Houthavens, a port in the West borough of Amsterdam once serving as a storage for lumber. Unfortunately, the area was already part of a plan of development. The choice ultimately fell on the Van Hasselt Canal in Amsterdam-North; at the end of 2010, the future inhabitants of Schoonschip had finally a designated place for their normal utopia to take place. An important step towards the realization of Schoonschip was the involvement of two crucial actors in the project. The first was the architectural studio "Space&Matter", which executed the urban masterplan of the project.

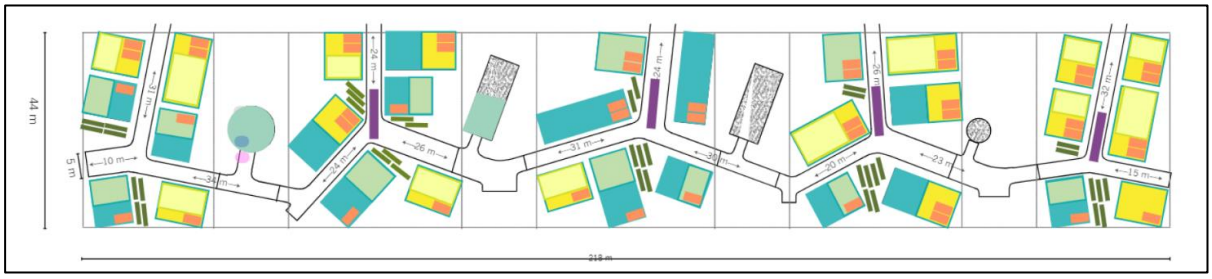

Figure 5.7: Schoonschip 2 (https://www.spaceandmatter.nl/work/schoonschip)

The masterplan is organized around a central spine constituted by a floating pier connecting all the floating houses. This pier creates a system of jetties which allows residents to walk freely between the "arks", thereby facilitating social exchanges during the daily movements of Schoonschip inhabitants. Another interesting element of the urban plan has been the choice of rebelling against the homogeneity and repetitiveness of traditional development projects. To achieve a greater diversity building types, materials, and styles, the design of the floating houses has been left open to residents, who either self-designed or co-designed their habitations with a multiplicity of architectural studios involved. Furthermore, opening the design process of the neighborhood has made Schoonschip a breeding ground for a vast and diverse array of experimental technologies and solutions.

A central element in the conceptual articulation of Schoonschip's masterplan has been the idea of social sustainability, where strong neighborhood relations are an essential part of the urban concept. The masterplan has been devised as to create an urban space which

allows and encourages the development of a tightknit community and to provide a physical infrastructure which is able to fit the participatory character of community organizations.

The role of Metabolic within the project was instead the development of an articulated feasibility study of the sustainable aspects of the project. The expertise of this consulting office specialized in providing strategies and tools for circular and sustainable projects was essential in transforming the high environmental ambitions of the "Schoonschipers" into a concrete reality. In this regard, an important step towards the development of Schoonschip has been the organization of a series of community meetings with the Metabolic team which produced a shared vision for the sustainable design of the project. From these meetings Metabolic was able to lay out a set of ambitious goals: Schoonschip would receive 100% electricity from renewable sources, 100% of heat and hot water supply from renewable technologies, 100% self-sufficiency of water for sanitation and plant irrigation, 60-80% recovery of nutrients from wastewater and organic waste, and the sourcing of 60-70% vegetable and fruit production from local rooftop gardens and greenhouses.

The sustainability plan imagines Schoonschip as "an urban ecosystem embedded within the fabric of the city". The neighborhood is marked by a circular approach aimed at re-using and recycling black and grey water, organic waste, and rainwater. But this approach is not limited to the technologies adopted in the project but involves a bigger conception of a circular community where the solar energy produced by households is shared, food is collectively purchased and distributed among the households, a mobility platform allows renting neighborhood cars and bikes, and homes are always exchanging and borrowing all sort of things through group chats on social application. As Schoonschip was finally equipped with an urban design, a sustainability plan, and a feasibility study the group was then able to present the project to the Municipality of Amsterdam which opened a tender for the lot on the Johan van Hasselt Canal.

In the October of 2013, almost two years later, an alderman of the Municipality of Amsterdam communicated to the Schoonschipers that they had won the tender. In fact, the municipality saw the project as a new important step within the regeneration of Buiksloterham and the philosophy behind Schoonschip was a perfect fit for the new image of a green and dynamic post-industrial neighborhood. In a somewhat anticlimactic fashion, after the approval of the project from the municipality, the inhabitants of Schoonschip were stuck for the following years in the swamps of bureaucracy, gathering housing permits, parking spots authorizations, safety assessments, fire safety protocols and environmental passes. Some of these bureaucratic steps required an enormous

amount of time and resources to be solved, often at the risk of jeopardizing the entire project. It would take five years for the first floating arks to be dragged by tugboats in the waters of the canal and to be docked there.

In 2020 the neighborhood had finally been completed, all the 30 floating houses were docked on the piers of the van Hasselt Canal, and all the families were living inside their new homes. Schoonschip today counts 46 households, spread across the 30 floating "arks", and hosts a total of 144 inhabitants. Looking at the future, the inhabitants have a variety of plans devoted to opening up the project to Buiksloterham and the rest of the city: they want to open a common room providing insiders and outsiders with a space for meetings, dinners, yoga sessions, movie nights, or parties; they want to open up the car sharing platform to other local residents; they want to organize every year a neighborhood festival open to everybody; and they are organizing guided visits for interested people, making presentations to tell their experience, and building a digital platform where the Schoonschipers share how they developed the project and which lessons they have learned along the way.

5.5 The Socio-Ethical Basis of an Energy Community: An Ethnography of Schoonschip

In this section, the research will draw on the insights developed within an ethnographic investigation on the energy community of Schoonschip, situated in the neighborhood of Amsterdam-North, to unpack the many dimensions which constitute the enabling factors of a successful energy community. The goal of the ethnographic research is to provide a better understanding of the ways in which a particular socio-ethical context influences the emergence and development of community energy. The empirical research has then the function of framing a set of socio-ethical conditions for the development of a successful local energy initiative, by highlighting the crucial role of community spirit, shared values, and trust, as crucial elements in the constitution of an energy community.

In order to gather these results, the empirical investigation has been developed through a qualitative methodology based on semi-structured and narrative interviews. Semi-structured interviews were carried out with professionals and experts working on the technical aspects of the energy system; in turn, narrative interviews were conducted with members of the community, and they had the purpose of providing "an opportunity for the participant to narrate his or her experience" (Allen 2017). Furthermore, narrative interviews are particularly apt at "capturing and analyzing lived-in worlds and related constructions of meaning", thereby providing a crucial insight into the subjective and

collective experience of participating in an energy community (Wirth 2014). These conversations, lasting from 40 minutes to 2 hours, have helped to bring into focus the various social and ethical factors which underlie the constitution of a community organization within the energy sector. The interviews, consisting in a total of ten conversations, were analyzed and coded manually through a tagging system, which helped to identify three main thematic files: community spirit, shared values, and trust.

5.5.1 The Importance of Community Spirit in an Energy Community

A first result of the ethnographic investigation has been the individuation of "community spirit" as an important socio-ethical condition for the emergence and development of an energy community. In this respect, community spirit, intended as a shared attitude towards life or a shared sensibility for what's meaningful in life, has been an important catalyst for the aggregation of the group around a common project.
In fact, within the community of Schoonschip, the presence of a community spirit has been an element strongly felt by many of its members. Oftentimes, in the interviews, the sense of a community spirit has been framed as a shared vision of what constitutes a meaningful life or a shared attitude towards life's opportunities and obstacles or even as a common feeling of responsibility towards the environmental challenges of our times. For instance, one of the Board members of the Schoonschip Foundation reports:

> *I really feel like Schoonschip is a small cultural community, you know? Of course, it's a community and I also see it as some kind of cultural thing that is developing. So that's.. that's really interesting to see. [Jean]*

The idea that Schoonschip as a project has grown around a common spirit, expressed by the feeling of belonging to a cultural community, has been therefore an important element in the ethnographic exploration of this grassroots initiative. In this respect, the narrative interviews have helped to highlight three main facets of this community spirit: *a sensibility for environmental activism*, *an enterprising attitude towards overcoming obstacles*, and *a pioneering character in exploring life on water*.
Narrative interviews have been therefore crucial in articulating the lived-in worlds of meaning which constitute both the ideal and practical orientation of a community: the particular point of view on the world, the specific sensibility through which the issues of our time are felt, and the distinct attitude with which such issues are addressed. It is interesting to note that the aggregation around this common spirit has acted as a social glue from the beginning, as a process of mutual recognition of affinities between the various persons involved. The empirical research then corroborates the fundamental

insight of the pragmatist theory of institutional development elaborated in the third chapter, by showing how a community can emerge and develop on the basis of a shared sensibility grounding a collective "experiment of living" (Chapter 3).

In defining the cultural identity of Schoonschip, the interview with Markus is instrumental in painting a more detailed picture of how environmentalism in a crucial determinant of the Schoonschip spirit:

> *[…] I mean, basically, everybody in our village is very much involved with sustainability and with making a better world, this is really something which is.. which is quite important. We haven't formalized this, I mean, you don't have to sign a paper which says "If you want to join us, you must fight for a better world". It's.. you know.. it's just the spirit of the group. And I guess, also, if you look at the houses and the way things are built, and all the experimental stuff we are doing, it just attracts people who are on that side of the society. [Markus]*

It can be then proposed that the first element which characterizes the Schoonschip spirit is the felt sense of urgency in taking action in the face of the climate crisis and the importance of participating in the construction of a better world. Thomas has been one of the co-founders of this grassroot initiative and he expresses well the ethos of Schoonschip when he affirms that "we have to start living differently in order to combat the consequences of climate change. I see it as the greatest responsibility of our time to be part of the solution. Many people just carry on as usual: flying all over the world for vacations, eating meat, buying too much stuff. While all the information is there. We can't say we didn't know. Where is the anger and indignation, the action? That really hurts me sometimes" (schoonschipamsterdam.org).

Schoonschip certainly has been created with the idea of being "part of the solution", by envisioning an urban future which is radically different from the standard developments which characterize the most part of Amsterdam's new housing projects. This concern for taking action is surely at the center of the community spirit of Schoonschip, and it is echoed by the words of Olga who reports how she has "become aware of the negative influence that we humans have on our environment. We all have a responsibility to change our lifestyle, whether it's building a sustainable home, grocery shopping locally, or refusing a plastic straw in your drink. Everyone can do something. Participating in Schoonschip encourages us to live more consciously and allows us to share our ideas. This is how change comes about" (schoonschipamsterdam.org).

In the case of Schoonschip, the community spirit has been strongly shaped by this environmentalist sensibility. Therefore, sharing this environmental sensibility has played an important role, within the development of Schoonschip, in aggregating the group

around a shared *world of meanings*: a common perception of living sustainably as intrinsically meaningful, as it responds to the one of the biggest issues of today's world.

The second element characterizing the Schoonschip spirit is the determined and enterprising attitude that is required in order to realize such a complex and ambitious project. One of the most challenging aspects of realizing this energy community has been the tension between existing regulations and institutions, which are well suited for standardized projects, and the experimental and original character of innovation niches. In fact, Schoonschip represented an unconventional project in many respects. First, the fact that houseboats are not categorized as immovable properties by the Dutch law has created numerous problems in the development of the project. Among these, one of the most time-consuming issues has been the difficulty of granting parking spots to floating houses, as these are usually assigned to a specific lot. Jean recalls this difficult negotiation with the municipality of Amsterdam in an interview:

> *But then, the plan said that your parking spot must be realized on your own lot. How do you do that on water? So they said "Oh, shoot. Oh, we didn't think of that". So then we said "Okay, so do we get 46 parking spots?" And they said "No, you'll get none". So then we said "Oh, shoot". But you know, then it was really like the Schoonschip spirit, you know, what happened is that we established a Working Group for Mobility. And we started lobbying with all kinds of mobility providers and said "Listen, we are an interesting project as an experiment, we have 46 households trying to live in a sustainable manner, we are willing to get rid of our own cars, can you provide us with, you know, with electric cars that we can share?" So, they had three big companies, they pitched their ideas, and we just chose the best. [Jean]*

This passage perfectly underlines the resilience that neighborhood members regard as a central part of the community spirit. As Geels argues, innovation niches are constantly subject to pressures from the existing socio-technical regime, encountering "instrumental, discursive, material and institutional forms of power and resistance" (Geels 2014, p. 21). In this case, the uniqueness of constructing a neighborhood on water created a friction between the innovation niche and the existing institutional order, as the Schoonschipers experimented with a housing solution which was not framed within the existing laws and regulations. In fact, regulators have often struggled with the legal definition of houseboats, torn between recognizing these projects as real estate and being able to collect taxes from them or defining floating houses as boats and retaining the ability to displace them at will.

Faced with this institutional resistance, the ethnography helped to highlight how the entrepreneurial spirit of these "niche pioneers" is a key resource in the development of

the project. In this respect, the decision to sell their vehicles and to institute a car sharing hub, open to the whole neighborhood, is certainly a good example of this ability of turning a legislative obstacle into an opportunity for exploring new dimensions of sustainability.
A second unconventional aspect of the project, which proved to be extremely challenging, was the development of a private smart grid. In fact, Schoonschip has been built on the idea of producing renewable energy collectively through solar panels and storing the excess electricity produced in home batteries. Within the project, the role of the smart grid consists in matching in real-time the network's energy demand and supply, managing power consumption, generation, and storage in an integrated way at the community level. The construction of a smart grid was therefore an essential part of the efficiency, security, and resilience of the energy system. With the construction of a smart grid, the neighborhood needed only a minimal provision of electricity from the central grid during the winter months.

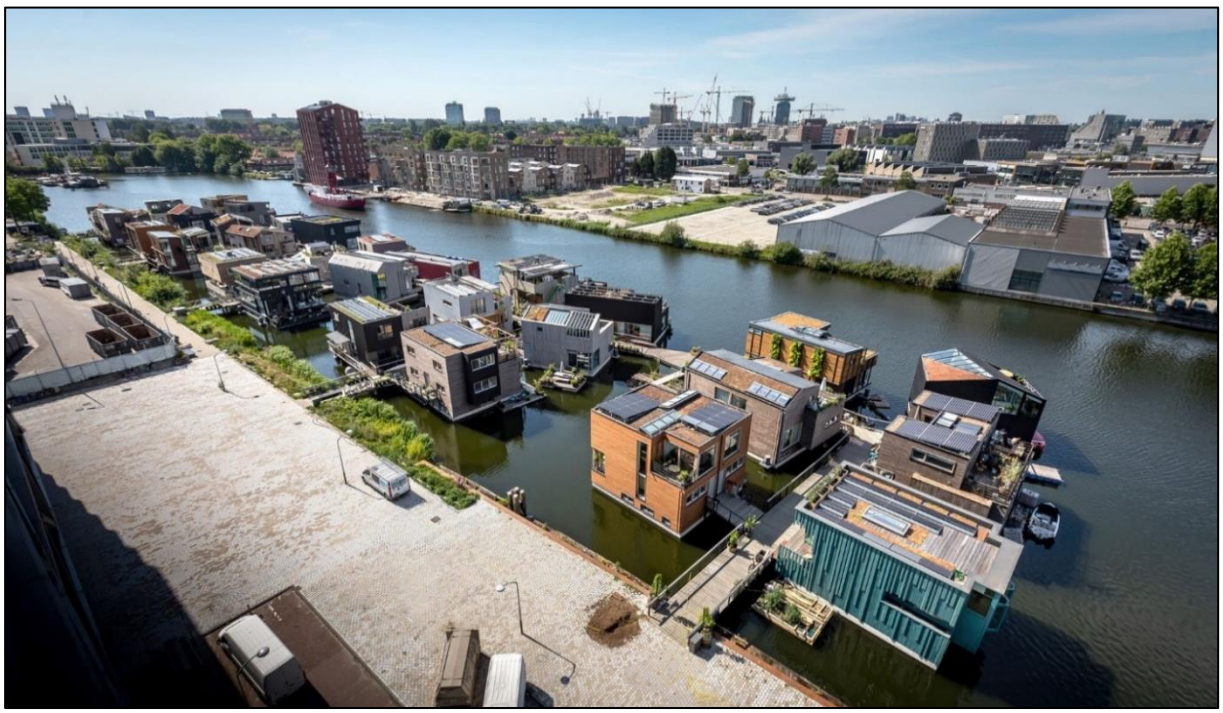

Figure 5.8: Schoonschip 3 (https://www.spaceandmatter.nl/work/schoonschip)

Furthermore, the smart grid provided a strong incentive in the financial feasibility of the project by helping to optimize the use of electricity within the neighborhood and by reducing the demand for electricity from the national grid. Philipp Gladek, the designer of the smart grid, emphasized how, without the possibility of building a smart grid, the project would have needed a bigger connection to the grid and the expenses would have been much higher for the inhabitants of Schoonschip, as "they would have had to spend about 70,000 euros more" and "they would have needed a transformer and a special

building that feeds-in the energy with lots of extra costs. And they were able to avoid these costs by getting a small connection".

Nonetheless, despite Europe's support to renewable energy, the current Dutch legislation does not allow the development of private smart grids and the entire energy system was at risk of being financially unsustainable. In order to pursue the green vision which inspired the project from the beginning, Schoonschip had to obtain an exemption from the Dutch Energy Law. In fact, the project was lucky to benefit from a changing institutional environment moving towards a larger support of grassroots initiatives in the country. As a result of this discursive shift, the inhabitants of Schoonschip were able to obtain a formal exemption and to be admitted in the "Experiments Powergrid" governmental program, which was established in 2016 by the Netherland Enterprise Agency. This program allowed for the first time Cooperatives and Owners Associations to run privately a smart grid with only one grid connection, without the necessary involvement of an external company providing the energy supply.

Nonetheless, despite the increasing support by Dutch institutions, the institutional rigidity of this novel program was ill-suited to adapt to the variety of institutional forms characterizing the phenomenon of community energy in the Netherlands. As a result, since the program was only accessible for cooperatives and owners associations, the Schoonschip Foundation had to go through a long bureaucratic process in order to create a Cooperative, while maintaining its Foundation status. After two years, the project had to cease both its Foundation and Cooperative legal status and transition to an Owners Association, as the double institutional system created problems of legal prevalence between the two forms. Furthermore, another institutional hurdle is constituted by the fact that the exemption is only temporary and will have to be renewed after ten years. Nonetheless, it is clear from the interviews that the determination of the Schoonschippers was a crucial element in the successful completion of the project. When asked about which was the biggest struggle for him, Sasha answers:

> *I think that the project took so long. That was challenging on the one hand, but it was also.. again, I mean, I'm never just seeing things negative. And it was challenging, but not so much to keep faith in it. Because we all believed it will happen. I never had a problem with that, I knew that it will happen. "It will happen". If you don't have that spirit it's a problem, but I think it's my nature. So, I was pretty sure of that.*

This interview highlights another nuance of the community's entrepreneurial spirit, namely the importance of retaining a strong conviction even in the face of adversities. This thought is repeated in the words of the founder, Marjan de Blok, who in an interview

by Julien Toublanc states: “the project was my idea, and I was pulling the idea but then the idea became the project, and the project was pulling us [...] this place was going to be here, no matter what, it was already written” (open.spotify.com/episode-MarjianDeBlok-Schoonschip). Both these interviews highlight the importance of determination in shaping these projects; the attitude of feeling like “it will happen” or “it’s already written” has been a strong element characterizing the spirit of the pioneers of community energy. Jeroen echoes Sasha’s and Marjan’s sentiments when he reflects that “a group of people building their own houses is a different group from those who just buy a house from a project developer. It's a different kind of people. A lot of people here have their own office or are entrepreneurs. It's more that kind of people, more proactive” (open.spotify.com/episode-MarjianDeBlok-Schoonschip).

The ethnographic investigation was then important in recognizing that sharing a proactive attitude towards overcoming the many obstacles inherent in pioneering new ways of life is an essential part of the success of a grassroot initiative. In this respect, it contributed to strengthen the importance of a common spirit in the development of an energy community.

The third element which characterizes the Schoonschip spirit is represented by a shared fascination with being pioneers in the construction of a floating utopia on water. In fact, there are at least two senses in which this pioneering spirit emerges in the community. The first is straightforward emphasis on the environmental ambitions of the project: a visitor of the neighborhood online page will find clearly stated that “Schoonschip aspires to be a frontrunner and pioneer: a breeding ground for the latest sustainable techniques and solutions” (schoonschipamsterdam.org). As any innovation niche, Schoonschip is therefore a place for experimentation and for pushing the boundaries of technologies, institutions, and practices of living. The idea of being pioneers of a sustainable frontier is lived by the inhabitants as a special feature of the project; Markus emphasizes exactly this aspect when he realizes that “it feels like a privilege to be part of such a sustainable pioneering project” (schoonschipamsterdam.org).

Nonetheless, there is also a second, and perhaps more fundamental, sense in which this pioneering spirit is felt by the Schoonschippers. It expresses in the sensation of bringing a utopia to life in the real world, by exploring a somewhat uncharted territory where a group of pioneers can choose freely their way of life, their values, their organization, their habitat. In this respect, the words of Marjan de Blok are revelatory (inhabitat.com):

> *It started when I was making a short documentary about a sustainable floating house about 11 years ago. I completely fell in love with the concept of living on the*

> *water as sustainable as possible. It gave me a great feeling of freedom and it seemed like the answer to a lot of challenges we were facing and still are facing.*

As the founder of Schoonschip, Marjan was immediately struck by the idea of living sustainably on water. This solution was pioneering in two senses: first, it provided a possibility for experimenting an entire array of technological innovations which were more respectful of the environment; second, it opened a new frontier of urban life by allowing to redefine the traditional boundaries of the city and to explore living on water. Certainly, the possibility of being in such a close contact with the natural environment within the boundaries of a European capital made a strong impression on the Dutch documentarist. But it is perhaps the interview with Jean which brings forth more explicitly this unique connection between freedom, living on water, and the pioneering spirit of Schoonschip:

> *The image of living on the water is like being a cowboy, like being kind of against rules, you know. It has a little bit that romantic feeling of "now we are completely independent". And that is an interesting notion of living on the water, you know, the "cowboyhood". If you're pioneering, if you want to be a pioneer, then living on the water is just.. is kind of.. it feels like a logical combination to me.*

The work on the field, therefore, has helped to individuate three facets of community spirit in the floating neighborhood of Schoonschip: an environmental sensibility for activism in the face of climate change, an entrepreneurial attitude for overcoming obstacles through determination and resourcefulness, a pioneering character prone to explore new frontiers of living sustainably. These three dimensions have been found to be important building blocks of a shared "world of meanings" aggregating the members of the energy community (Wirth 2018). At the same time, these three dimensions of community spirit represent the social catalysts of the project as they favored the organization of a collective around a common idea of a sustainable life on water.

Therefore, within the pragmatist theory of institutional development proposed in the previous chapters, the emergence of community spirit can be explained as the recognition of sharing one's own sensibilities, attitudes, and character with other members of the social space. The fact of sharing a common perception of what constitutes a meaningful life is therefore interpreted as an important precondition for the development of a cooperative agency in a given action arena. It contributes then to cast community spirit as based on the sharing of meaningful livings between the members of an innovation niche.

5.5.2 The Importance of Shared Values in an Energy Community

The project of Schoonschip developed therefore on the mutual recognition of a common spirit in pioneering new sustainable solutions in the fight against climate change. A network of tight relationships quickly formed on the base of these shared sensibilities, attitudes, and characters, enabling the creation of a real community. Nonetheless, as the initial group of friends grew larger, the project needed to take a more definite and organized form. Building on this common spirit, the most important step was to give the project a precise direction, to set a shared goal so that the group could start to coordinate and cooperate concretely towards the realization of their dreams. Within the history of the project, the definition of a set of shared values has certainly been the most important element in the process of bringing Schoonschip to life. As a matter of fact, the definition of a series of values which were deemed foundational by the members of the community has allowed the group to gather around a unique, although multifaceted, vision for a floating neighborhood.

In this respect, the ethnographic investigation has helped to identify three main values which have guided the development of project: the importance of *sustainability*, the centrality of *community*, and the search for *inclusivity*. The crucial role of values in the realization of Schoonschip is an element which is found ubiquitously in the narrative interviews conducted; in this regard, the comment of Jean is revealing:

> *I mean, that was the whole thing, of course, that we started with shared values.*

In other words, the establishment of a set of shared values acted as the main driver guiding the practical development of the cooperative effort. Once certain cardinal values had been established, the community had finally a more precise sense of direction for Schoonschip. The ethnography helped then to recognize how the definition of a set of shared values was instrumental in creating a cognitive framing for the goals they wanted to reach as a collective. In this regard, it contributed to corroborate a fundamental insight of the pragmatist theory of institutional emergence offered in the previous chapters, namely that values are crucial social constructs with the pragmatic function of promoting a meaningful collective agency (Chapter 3).

The centrality of values in the project is well reflected in Schoonschip's motto, "socially sustainable and feasible". This motto highlights well the role of environmental, social, and financial values in the evolution of the project.

Among these different aspects of sustainability, the value of *environmental sustainability* was very important for Marjan de Blok and for the rest of the Schoonschippers. In the

application for the municipal tender, the group clearly expresses the cardinal role that sustainability plays in the project: "It is our goal to realize a sustainable, floating neighborhood in Amsterdam. Schoonschip strives to become a decentralized concept, wherein food and energy production are integrated into social living and working conditions which will result in a positive effect for the environment" (schoonschipamsterdam.org)

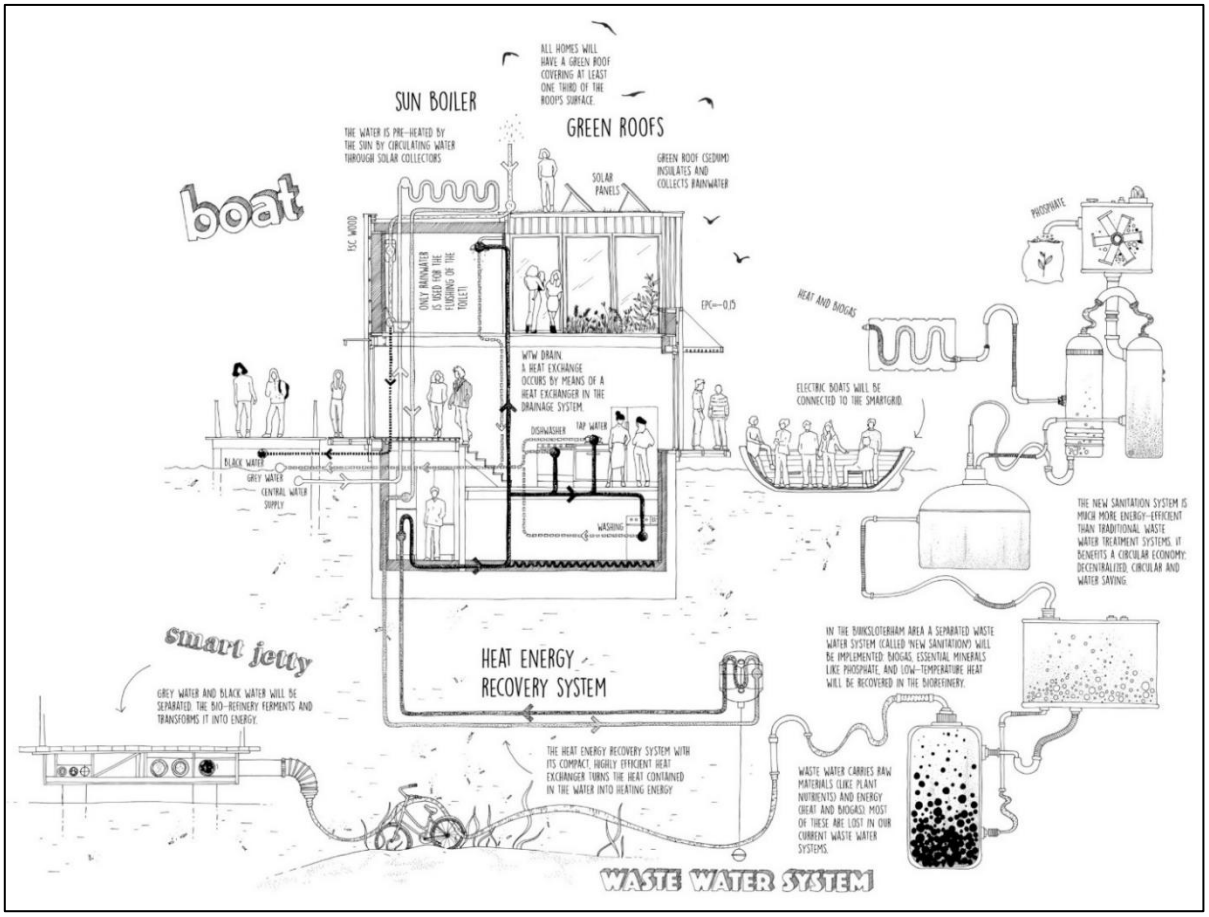

Figure 5.9: Schoonschip 4 (https://www.spaceandmatter.nl/work/schoonschip)

The value-laden character of the project is reflected in the personal motivations for joining the endeavor; when asked about the reasons to participate, Matthijs answers "for me it is the largest testing ground for sustainability in which I can participate. We will try to make a difference in every conceivable area" (schoonschipamsterdam.org). The words of Matthijs are echoed by Corinne and Petr, who reflect "we believe it is crucial for the future to live more sustainably. Working on this together with all Schoonschippers and sharing knowledge is a great motivation – and helps us to make adjustments. We have learned so much about sustainable living during our meetings over the years" (schoonschipamsterdam.org). From these testimonies, it is possible to observe how the

value of sustainability played an essential role in giving a directionality to the collective action by setting a shared end for the collective (Chapter 3).

From the point of view of the energy system, the value of sustainability has materialized in the importance of reaching the greatest levels of self-sufficiency in the generation of renewable electricity. In fact, being able to be independent from the central grid, where most of the energy is still produced with fossil fuels, has been a decisive factor since the inception of the project. In fact, it is important to remember that the original input from which Schoonschip developed was the self-sufficient geWoonboot of Pauline Westendorp. The idea of a self-sufficient neighborhood on water has always constituted the founding vision for the sustainable community of Schoonschip. In one of the interviews conducted, Philip Gladek, the designer of Schoonschip's smart grid, reports how the idea of sustainability:

> *was aligned with their vision of having more independence over their energy systems, you know, the kind of 'fit for future' smart energy solutions. So, in the end they decided to go for self-sufficiency and what this meant was committing to invest in their own grid, investing into batteries, and other technologies. And they didn't have subsidies, so it was a big.. you know, in this whole project everything in the end turned out to be more expensive than planned, and actually the energy system had an actually good business case behind it, so this is part of the reason why it was green lighted. But everything else in the construction process, and in building their houses, all the costs kept going up and up. So, this created a lot of financial pressures in general. [Philip]*

Determined to reach high levels of energy autarchy, the group members had to withstand the high costs involved in pioneering technological innovation. Moreover, the absence of governmental support, either through subsidies or targeted programs, contributed to put even more stress on the financial resources of the community.

These testimonies help to show how, alongside the positive aspects of these grassroots initiatives, the development of an innovation niche is always accompanied by struggles with the existing socio-technical regime. For instance, Pear reports the challenges of living sustainably, by reflecting on "how difficult it is made by regulations, what a hassle it is to realize such a neighborhood. You run into a lot of things. For example, we want to generate our own energy. Then you think that this would gradually be a piece of cake in the Netherlands, and it turns out that you still have to go through endless tax, legal, notarial, and municipal obstacles in order to arrange that. You have to figure out a lot" (schoonschipamsterdam.org). Another challenging aspect addressed in the interviews is the expensiveness of sustainable solutions, as technological innovations imply greater

costs for the green pioneers due to the lack of economies of scale; Petr and Corinne, looking back at the process of constructing their house, consider that "the only drawback is that sometimes attractive innovative sustainable options are still very pricey, and we have to be careful with our budget" (schoonschipamsterdam.org).

Next to sustainability, the value of *community* has played a major role in the project. In fact, environmental sustainability was conceived from the beginning as intrinsically linked to the dimension of social sustainability. Social sustainability is perceived by the Schoonschippers as the presence of a tightknit community, built around a common spirit, shared values, and a sense of reciprocal trust. Many persons have joined the project for the appeal of a neighborhood where social interactions are meaningful and escape the anonymousness which characterizes the experience of urban life. For Sasha, the designer of the urban plan and now an inhabitant of Schoonschip himself, social sustainability means the creation of a resilient and socially cohesive neighborhood; on the site of his architectural firm, Space and Matter, one can read: "Schoonschip is not only sustainable in an ecological sense, but also socially: the residents work closely together to realize and improve their residential area and coordinate their plans" (spaceandmatter.nl). Asked in one of the interviews conducted about the development of the urban concept for the neighborhood of Schoonschip, Sasha remembers:

> *The pillars were, I mean, first of all, the strong vision of "the group". So, we had to translate that, the fact that the group wants to live together, into an urban plan. So, what does it mean? There were a lot of questions. And I suggested "Yeah, maybe it should be more like a village". So, this idea of, "Okay, they really work all together", that translated into an urban plan where all the jetties are connected with each other. That was not originally in the plan from the municipality, but I thought they had to be connected, otherwise, you wouldn't have this social interaction. It would be only via land, and that would not have done the trick. And I really experienced this, because in the beginning, we had the houses and the piers, not that pieces in between, because the boats had to come in there. And you really felt that you had less to do with the neighbors from the other pier. Because you don't just go around and reach them there. And you even don't talk to them because there was a bit too much distance. So that was something that struck me, and we thought "Now we need this village, how can we generate this?". And we came up with this one jetty which connected all the houseboats, that's how we translated that into the urban plan, but it started with this idea of a village on water. And that is the result of listening really carefully to what the people say in these workshops. [Sasha]*

Defined along the course on many workshops with the future inhabitants, the idea of recreating a village on water provided the key design solution for the spatial program of

Schoonschip. In this way, the idea of creating a unique jetty connecting all the boats translated into architectural form the aspirations for a lively and tight community life. The value of community is therefore embodied in the very masterplan of the project.
In fact, communal life has been found to be a central value for all the people involved. As founder of the project, Marjan reflects on the stark difference between the anonymity of urban life and the meaningfulness of community life: “for me personally my life changed completely. I moved from a top floor small apartment in the busy west of Amsterdam to the north. Living on the water means living with the weather. But the biggest change for me is the social part. Sharing a village or neighborhood with people that you know is a big change compared to living in a house in a street where you hardly know any neighbor” (inhabitat.com)
After Marjan, Thomas was the second person to embark in the project; he was a close friend of Marjan and shared with her the professional career of being a filmmaker. When asked what prompted him to participate, he answers “I think it would be great fun to live loosely/fixedly in a close-knit community. I have tried to involve many friends and like-minded people in the project, and it has been successful. I think it would be wonderful to have such a rich social environment as a basis, in a self-designed house in a fantastic location in Amsterdam” (schoonschipamsterdam.org).
Olga shares with Thomas this appeal for a meaningful social life in the neighborhood “we look forward to having like-minded, open, and conscious neighbors and to be such neighbors ourselves. To live in a neighborhood where you can easily knock on each other's doors, but where your privacy is also respected. And of course, we hope that the children will become friends with each other and with us, the adults” (schoonschipamsterdam.org). The idea that the children of the Schoonschippers can find a good social environment around them while growing up plays as a key element in many interviews: Marjolein says that she is also “looking forward to a neighborhood with neighbors that you know, where the children are at home with a number of children. So that they feel safe and secure in the neighborhood in which they grow up and are inspired by the people they grow up with” (schoonschipamsterdam.org). The ethnography has then helped to highlight the characteristic role of values in creating and maintaining a cooperative structure of shared agency within a group (Chapter 3).

Another important pillar in the development of Schoonschip has been the value of inclusivity. In fact, the idea of building an inclusive community was a strong priority in the project and it was articulated along two separate dimensions: first, the idea of being inclusive by being affordable, so that the costs would not be a barrier to the participation in the community; second, the idea of being inclusive by welcoming diversity, so that the

project could host a wide variety of social actors. Nonetheless, meeting these two dimensions of inclusiveness proved to be challenging. For what concerns the affordability of the houses, a number of factors compromised the financial sustainability of the project. Among these, the biggest challenge was represented by the legal restrictions imposed by the municipality of Amsterdam, limiting to a maximum of 30 the number of residential lots to be constructed along the Johan van Hasselt Canal. Given the fixed costs necessary for building a floating house, this legal restriction implied that the lots would be too expensive for most of the people involved in the project. In order to solve this problem and make the community accessible to a wider array of actors with different economic possibilities, the group had to spend a considerable amount of time and resources in order to find a solution that could grant the development of 46 households, instead of the 30 allowed by the municipal plan. Remembering this phase of the project, Jeroen recalls:

> *Well, we wanted to make it sustainable, social, and affordable. The funny thing is that to make it affordable, it actually took us more time. We wanted more households than planned. And there was a lot of negotiation with authorities and banks. So, we had to wait about 4 or 5 years to find ways in the regulation to make it possible for us. So, regulations of the local authorities, regulation of the banks for mortgages, et cetera.. [Jeroen]*

As the testimony of Jeroen reports, it took the group five years in order to formulate a solution which could get a permission from the municipality of Amsterdam and satisfy the requirements for mortgage eligibility by the local Triodosbank. To solve these bureaucratic restrictions, the group was advised to implement a series of 15 shared lots, where two families would live in a single houseboat under the legal form of a Housing Association. The community had to create 15 separate housing associations for each of the floating boats hosting two families. Also, the search for a bank willing to grant a mortgage to the families proved to be extremely complex, as executives were not familiar with this type of legal institution. In fact, banks were mostly concerned by the legal difficulties presented by a case in which a family within a shared lot wants to leave and sell the house while the other is still remaining on the property, as the housing association of the two families is the legal owner of the house. Triodosbank was the only bank in the country which had an experience with housing associations and was willing to be a mortgage broker for the project. To this day, the shared lots of Schoonschip represent a solution which is unique in the Netherlands.

Once again, these adversities faced by the community reflect well the institutional friction between innovation niches and socio-technical regimes in a societal transition (Geels &

Schot 2007). The final result was a success in many ways, as the project could be accessible by a much larger share of the society. Nonetheless, the project remains out of reach for many, and some initial members of the community had eventually to drop out.

Figure 5.10: Schoonschip 5 (https://www.spaceandmatter.nl/work/schoonschip)

One of the biggest let downs in the project remains the failure to include social housing. On the site of Schoonschip one can read about the attempt to develop social housing on the project: "Schoonschip aspired to be affordable for households of all backgrounds, so we divided the options into five income categories, including social housing. We had several meetings with housing corporations in the early stages of the project to explore the options and under which conditions they would be prepared to build social housing on a few of the vacant lots. In the end, we were left with only one interested party, but they didn't want to join for less than six lots. By that time this wasn't a realistic option for us anymore, and we didn't have six lots available anymore" (schoonschipamsterdam.org). Sasha recollects these events in a narrative interview and observes:

> *But that was interesting, also in terms of ethics, because the group really did their best, I was not involved in that, but the Board did their best to make it socially sustainable and more inclusive. There was even this idea at the beginning, we said that we wanted to have 20% social housing in the project. And there were attempts to do that and to sell six of the houseboats to a Housing Corporation. They were interested, but then the property would have been divided among the owners in six houses which were still available, which were scattered all over the project. And the Housing Corporation said "No, no, we want them clustered together, otherwise we*

> *cannot do the deal". So unfortunately, that didn't work out. Which I think is really a sad thing. Because now it seems to be like this elite community place. [...] Honestly, I have to say that on this level it failed, I have the feeling. Because, I mean, now there are no rental apartments in there, right? And still I'm strongly convinced that we are still looking for new ideas and new projects and everything. And the inclusiveness is really the challenging part, but also in terms of the business model and the development strategy. But here in Schoonschip, I mean, they do a lot, and everyone does a lot for the neighborhood and everything, right? But this particular part would have been nice to have it in there, right? Like if there would have been six social houses, for example. [Sasha]*

By failing to be more affordable, the project has undeniably missed on its initial ambitions. During the development, an infinite series of technical, legal, financial, and bureaucratic problems hindered the eventual affordability of households in Schoonschip. As often happens, the forecasted prices of construction soared along the way, as building on water revealed itself to be more expensive than expected. Furthermore, another big reason for the growing expenses has been a rigid and unsupportive institutional system, which costed the community incredible amounts of time and resources in order to overcome its regulatory restrictions.

For what concerns the second aspect of inclusiveness, namely its openness to diversity, the project offers, again, only mixed results. In this regard, some inhabitants are worried about the homogeneity of Schoonschip:

> *You know, both Marjan, and I, and also Thomas, we knew each other, professionally, but we also became friends. So, I think it was more friendship related than it was professionally related, but then you know, you can.. The end result is that, you know, you can see many people that knew each other already and that were both in media or something, you know? And that's sociological, you could say, you know? That's also challenging because, you know, it becomes a bubble, you know, if you're monocultural. [Jean]*

The genesis of Schoonschip certainly says a lot about the reasons why the project failed to be more diverse, as the group formed around a few established friendships built in her professional career by Marjan de Blok. Accordingly, most of the group is made by individuals who belong to the creative sectors of media, television, and film-making industries, or by architects willing to experiment building their own sustainable house. Diversity is somewhat achieved in other dimensions as Jean observes:

> *On the other hand, I must say, if you really look at the inhabitants of Schoonschip, now, there's only some people of color. But if you really look at the origin, then you*

> *will find there are many nationalities, like, you know, people who were not originally born in the Netherlands, or whose parents were not born in the Netherlands, but Europe, like, Germany, Poland, or outside of Europe, so from Lebanon, people from Ghana, you know? So, you could say, yes, of course, it's not the majority, but it is.. it is kind of a diverse community. [Jean]*

Also, the group has managed to be quite diverse along other dimensions, such as the age segments of the various inhabitants of the neighborhood. When interviewed by Joulien Toublanc, Marjan de Blok explains well the lights and shadows of the inclusiveness of Schoonschip: "the ages are very different from zero to seventy. There are a lot of people working on film and television and media, because that's my profession. I have a lot of friends who work there. And architects. Yeah, a lot of creative people. [...] The only thing that I would have liked to be different is that it's really a white project. So, it's the 'white elite' kind of thing. Even though I don't count myself into that category, because I was not born with a lot of money, or born with a certain status. But the way we built is still really expensive". In this respect, the project was undoubtedly influenced by the narrowness of the social network from which it originated.

The problem of 'elitism' is therefore a central problem of innovation niches, where the development of innovative solutions can be seen as a luxury reserved to the few, rather than the many. Nonetheless, it should also be remembered that the trajectory of innovations often involves an initial phase with narrow spread and high costs, only to be followed by a second phase characterized by a wider spread and lower costs, as technologies benefit from the effects of economies of scale. As innovations gradually supersede the existing socio-technological regime, novel technologies, initially lacking in competitiveness, start to catch up with the other products in the market, to eventually supplant them as the new technological standards (Geels et al. 2017a).

Nonetheless, in these initial phases of sustainable transitions, niches are often perceived as spaces reserved to an established 'elite', and they are often denied any role in benefitting the rest of society. Markus is clear in expressing the worries of the community members towards being perceived as a foreign elite invading the neighborhood:

> *The north of Amsterdam used to be a place, you know, where working people lived. It wasn't such a good place, you know, for like.. Only just, like, ten years ago, nobody wanted to live here, there were a lot of industries, and the neighborhood was pretty bad. And so, just recently, it started developing, and, of course, we sometimes feel as intruders, you know? And there's also a little conflict going on, with the people who originally lived here, they see that prices are going up. All those.. what they call 'rich people' come here, and they take it over. And they know the gentrification issue which is of course playing out here. And that feeling, I think we're very aware of*

> *that. Because we have this WhatsApp group, and we've had a lot of conversations already about this. And then people sometimes feel not so good, and they try to think of ways to get more connected to rest of Amsterdam North. For instance, like "Can we do something here in our neighborhood, like organizing a festival?" or "Let's organize a dinner and invite the rest", you know? These kinds of initiatives. This way of life that we think is very sustainable, because we have built these beautiful places with a lot of natural materials, actually costs a lot of money. And I'm not saying that you have to be rich, you know, to be able to live here. But in what sense would this be an example for the rest of the world to follow as long as it's so expensive? And then I get back to this issue of the original inhabitants of Amsterdam North, who are actually not rich at all. And they see us coming in and that feels a bit like, yeah, like a separation. [Markus]*

In this passage, the dynamics of gentrification are well represented. The arrival of a myriad of innovative projects and business in Amsterdam North has contributed to create a steady rise in property and rent prices. In the process, many of the original inhabitants, having access to lower salaries, have been displaced by this phenomenon. In this regard, the community is trying hard to reconnect the project to the wider neighborhood, with the smart grid now spreading to the whole neighborhood, the mobility hub providing cars that everyone can book with an app, and there are lots of projects trying to provide more occasions for social interaction too, like neighborhood dinners and festivals.

It can then be proposed that the values of sustainability, community, and inclusiveness have a played a major role in providing a practical orientation to the collective action of the community. The ethnography, in this respect, has contributed to show how cooperation is fundamentally achieved by the collective construction of values as shared ends, forming a normative structure of practical rationality contributing to guide a collective action towards the solution of societal problems.

Nonetheless, while Schoonschip has been a successful project in managing to meet both its sustainable and communal aspirations, it represents a partial failure to realize an inclusive community with a diversity of social and economic backgrounds. Nonetheless, it is important to frame the project within the wider context of urban commercial developments. As Sasha reflects:

> *Schoonschip "is a private initiative and there are so many success stories. They managed within ten years to achieve these incredible innovations in so many fields. Compare it to a commercial developer, who most of the time doesn't give a fuck about all the sustainability and the social cohesion and everything. So, you have to compare it with these projects and not with an ideal world. But then I think it's also about priorities. So the projects we are doing now as Space and Matter, there is where we are really putting the effort. Because the sustainability part or the*

> *technological part are always something you can solve. But the business model and the social inclusiveness are huge challenges to overcome, because I think most of the good sustainable projects are done with people who can afford it. Right? But making something possible for the people who don't have the means, this is the challenge in order to scale up and spread these projects. [Sasha]*

One of the biggest problems encountered by grassroots initiatives is the complexity of the projects in which a small local community is involved. In the case of Schoonschip the desire to achieve results along so many different dimensions of sustainable innovation certainly contributed to the mixed results in the creation of affordable solutions accessible to every stratum of society. Furthermore, as Sasha underlines, to achieve a greater scalability of sustainable projects across society, it is of paramount importance that affordability is made a priority and appears organically in the developments from the beginning of planning activities.

5.5.3 The Importance of Norms of Trust in an Energy Community

In the previous section, we have examined how values are fundamental in orienting a community towards a set of practical goals. Values are therefore essential in the construction of collective agency as they create a shared cognitive framework which allows the group to direct its efforts towards a common objective. Nonetheless, setting a normative goal is not a sufficient condition for the achievement of coordination and cooperation within a community.

To reach this aim, a group has to develop a series of concrete norms creating an institutional environment where people can be trustful that the values they share will be respected and promoted. For instance, this set of norms is essential in granting that the attainment of the shared goals will be achieved by a fair distribution of benefits and burdens. As Goedkoop underlines "trust is a concept which is often linked in the literature to fairness, and it is stated that it is in fact impossible to understand the role of one of these concepts without the other - judgments of fairness can lead to trust and vice versa" (Goedkoop, Devine-Wright 2016). Elinor Ostrom calls these set of social rules the 'norms of trustworthiness', as they create an institutional environment within which individuals can trust that the other members will truly cooperate with them in the attainment of community goals and values (Ostrom 2009).

In this regard, the ethnographic investigation was crucial in examining how 'norms of trustworthiness' are established within an energy community. To create an environment where trust could emerge, the Schoonschip community created an array of institutional norms fostering a good cooperation: norms defining a clear organizational structure,

norms grounding a fair form of decision-making, and norms granting a transparent process of reporting. The empirical research has helped to highlight an interesting insight into the role of trust in the project, namely that trust has played a double role constituting both a precondition and a result of the common endeavor. As a matter of fact, this double connotation of trust has been already recognized among scholars, as Gordon Walker reminds us that "much of the literature on civic engagement argues that trust is both a necessary characteristic and a potential outcome of cooperative behaviors" (Walker et al. 2010).

For what concerns the first aspect, the ethnography helped bringing to fore how without a trusting relationship established from the start between the members of the group, it would have been difficult for the project to take off. When Jean recollects his feelings when he was first asked whether he wanted to join the project, he observes:

> *I just thought "Wouldn't it be really nice? I like Marjan, she is a really nice colleague, a good friend of mine. Wouldn't it be fun living together?" You know? "And I like Thomas, why not?" And then you start with other people, you find these other people, and you start building Schoonschip. And by doing so, you are automatically building this community, because we already knew each other before we started living here, because we created it ourselves. That is a very interesting phenomenon. I mean, you will seldom have that, you know, that you are together building a place that you finally live in. That's interesting. [Jean]*

As it appears from the testimony of Jean, the presence of a circumscribed circle of friends, with established relations of trust among them, acted as a catalyst in the genesis of the project. In this way, the presence of strong interpersonal networks of relations acts as a key determinant of cooperative agency, and constitutes an important reservoir of social capital in a grassroot initiative. In fact, according to Anna Berka "social capital facilitates the collective articulation of shared visions and the values that underpin them, fosters the perception of shared identity, and increases the availability of information and knowledge among community members, giving individuals the 'confidence to invest in collective activities, knowing that others will also do so'" (Berka, Creamer 2018, p. 3407).

Nonetheless, social capital, as expressed in trusting relationships, also represents an outcome of cooperative efforts. The words of Markus reflect well the twofold nature of trust in a community initiative, where the presence of trustworthy relationships represents both a driver and an effect of the shared agency:

> *What is my feeling about how this thing could work somewhere else? It is a difficult question to answer, because some things are going to have impact, I think, and they are very interesting also for other projects to follow. And other things will be very*

> *difficult to copy, and this because of what I told you yesterday about the social cohesion in our neighborhood, you know? Because we are a group of friends and that doesn't happen too often, you know? This common ground we have because of the trust, because of the journey we made together to get here, which took a lot of years and a lot of gathering and decision making, which really formed our group. So I think that this is a very hard thing to copy. And basically it is the base a lot of the innovation that is going on here. [Markus]*

In this quote, trust gets fundamentally framed as a proxy of relations of friendship, and as the history of Schoonschip shows us, friendship represented both the ground on which the narrow circle of initiators kickstarted the project and the result of the 'common ground' established along 'the journey we made together to get here'. In fact, as Markus underlines, what 'really formed the group' are the years of 'gathering and decision making', where opinions were exchanged, problems were addressed, decision were made, and norms and rules established.

It is this second aspect, where trust is cast as an outcome of cooperative behavior, which is most interesting to analyze here, by trying to make explicit the role of social norms in establishing an institutional environment where actual and aspiring members of the group could feel trustful that their investment of energy, time, and resources would reward their efforts. It is possible to divide these norms of trust in three major groups: institutional norms, decision-making norms, and transparency norms. The goal will be to show that moving in an institutional environment which creates clear, fair, and transparent norms of community organization helped to create trust among the Schoonschippers, creating the possibility of the emergence of tight social bonds within the community.

For what concerns institutional and decision-making norms, Schoonschip assumed a series of legal forms along its development, first as a Foundation in 2010 (or *Stichting Schoonschip*), an institution which continues to this day and which is supposed to be extinguished when the construction phase will be fully completed; a Cooperative Association (or *Cooperatieve Beheer*), running from 2016 to 2019; and an Owners Association (or *Vereniging Van Eigenaren*), established in 2018 and still in effect. Here we will focus on the Foundation Schoonschip and the Owners Association.

As a matter of fact, these institutional forms performed different functions in the development of Schoonschip. As Jeroen reports in a narrative interview:

> *We have two different organizations. For building it we did a Foundation and for living here we have an Association. The foundation is more top down. The Foundation has a Board, so they decide and then they explain. And for living here*

> *we have an Association. And the highest organ is the Assembly, where we all come together, and we decide. And in the Foundation the highest organ is the Board. So now we have these two entities. We have the foundation and the Association. And the Foundation is about getting things realized. [Jeroen]*

As Jeroen explains, the Foundation has a more vertical structure, with a Board which is in charge of making decisions in the name of the wider group. The vertical structure of the Foundation was justified to the group as a necessary step towards the achievement of a more efficient decision-making process. As reported on the online site, "building as a community meant we were all dependent on each other, which meant that meeting deadlines and meeting each other's demands at the same time proved to be quite the challenge" (schoonschipamsterdam.org). The complexity of the project made the presence of a participatory form of decision-making extremely time-consuming, which in turn implied that respecting the deadlines was increasingly hard for the group.

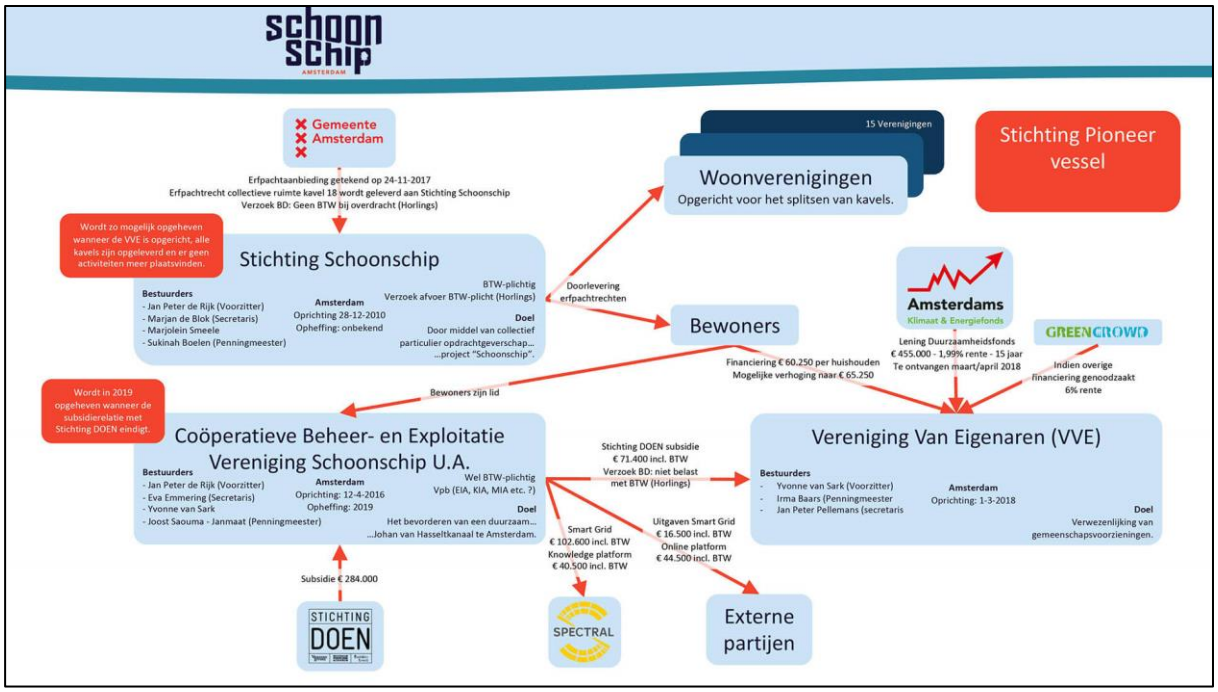

Figure 5.11: Schoonschip 6 (https://schoonschipamsterdam.org)

In this respect, it is interesting to observe that the project was facing what is essentially a trade-off between the value of efficiency and the value of inclusiveness in the management of its construction process. The institutional organization of the Foundation was therefore crucial in managing to strike a balance between these two opposing value dimensions and create a normative setting where the community could be trustful that the project would meet the deadlines for its construction while at the same time granting that the voices of its members would be heard.

Accordingly, the establishment of a series of norms was essential in creating a fair and trustworthy institutional environment: first, the establishment of monthly members meetings where the community would get informed on the plans of the Board and would vote on the various subject matters with a majority rule; second, the institution of working groups, were expert members of the community would research and report to the Board on thematic areas of development such as smart grid, mobility, food; and third, the creation of a weekly newsletter which made public the advancements of the project to the Schoonschippers.

This layered structure – with a Board, thematic task forces, and the broader community – created a clear institutional structure where the values of efficiency and inclusiveness would be maintained simultaneously, without sacrificing one at the expenses of the other. Hence, establishing a series of norms defining an efficient and inclusive institutional space for decision making, allowed the community to be trustful that their values and ambitions would be respected and promoted. In this way, the ethnography has contributed to validate the pragmatist insight that norms have the pragmatic function of operationalizing values into a shared institutional structures, that operate by regulating collective agency towards the achievement of social ends.

Furthermore, the signing of a 'Schoonschip Agreement' was important in securing that the value of sustainability would be respected by all the members of the community. Among other norms, the agreement created a sustainability passport with a menu of solutions for climate-neutral buildings which made explicit a series of requirements for the sustainability of the constructions, both in terms of energy efficiency, carbon neutrality, renewable sources, smart grid compatibility, water saving and recycling, and sustainability and circularity of materials. Nonetheless, it is interesting to observe that the value of sustainability has often created a tension with the value of affordability, as constructing with sustainable and circular materials on water turned out to be too expensive for many of the families involved in the project. Accordingly, the Board had to relax the norms around sustainability for construction materials, especially to allow the use of concrete for the foundations of the floating houses and of metal for the frames of the panoramic windows on the canal. These normative restrictions represent another interesting instance of the mediating role of norms between different value dimensions.

As the project has gotten closer to its completion, the tight schedule of the construction phases has relaxed, and the Foundation has been superseded by a more horizontal and participative form of Owners Association. The association has the role of coordinating the management of Schoonschip in its collective spaces, and it is constituted by a democratically chosen Board, which plays a coordinating role, and by an assembly, which

holds a decision-making role. As the construction phase has come to an end, the association has considerably relaxed the rhythm of the assemblies, and gathers only four times a year to decide on community events, shared spaces, neighborhood projects, and practical problems to be addressed. As the budget is now governed by the Owners Association, it is interesting to listen to the testimony of the community as it reports that "during the development of Schoonschip the collective budget was managed by the corporation. The corporation's board had been given the mandate to spend according to the budget and as they saw fit. It goes without saying that these expenses had to be justified to the group. The Dutch tax authorities requested that once the owners association had been founded, the budget would be transferred there. This slowed down the process significantly, as now we would have to vote on each expenditure. Earlier on this would have been impossible to work around, as there were many moments that required immediate action" (schoonschipamsterdam.org).

Once again, this reflection makes clear the trade-off present between the dimensions of efficiency and inclusiveness in the project. As a matter of fact, the presence of this fundamental tension has been recognized already by Van Veelen, highlighting how the ethnographical investigation of the phenomenon of community energy in Scotland "showed that it can be difficult for community groups to negotiate tensions around how to be inclusive and representative of the wider community while meeting 'very, very, very tight deadlines'" (Van Veelen 2018, p. 11). When Jean is asked about his feelings with respect to the inclusiveness of the association, he observes:

> *We just, you know, went on with the way we did decisions, which is quite traditional, I think, because, you know, we have this association of owners, with a Board. And then, of course, the board can make certain decisions, but then when there are bigger issues, they have to go to the association and ask us and then we vote. That's a good majority of the decisions made. But, well, I think our Board is doing a real good job. Because sometimes, you know, when it's not so clear, when you still have a big minority that is not satisfied, then they just take it to another level and do some more research or they even go back to the group and say "Okay, we have this decision, but we're not really happy with it. So can we think about it one more time?" So I think it's a traditional, more or less a traditional way of decision making. But then, I think, you know, they do it in a quite good way. [Jean]*

It can be argued therefore that the institutional setting of Schoonschip first as a Foundation and then as an Owners Association, together with a sensibility for listening to contrary voices, promoted a trustworthy cooperation in the community, by finding in every phase a balance between the participatory aspirations and the administrative exigences of the project.

In this respect, it is important to underline how norms, far from corresponding to the simple institutionalization of values, are often complex and layered normative configurations that try to mediate between different value dimensions at the same time. The creation of a layered institutional structure – with a decisional board, a number of consultive thematic task forces, and a voting community – is one such example of a normative structure built to meet different value dimensions contemporarily. For what concerns the institutional design of the energy system in a grassroot initiative, the ethnography has helped to highlight how achieving a high level of energy democracy is a crucial condition for the success of energy communities. In fact, the foundation of an energy community is a financial effort which requires a great amount of trust in the project and in its institutional organization.

Being one of the members of the energy task force, the testimony of Markus reflects well the close connection between the inclusiveness of the participatory decision-making and the generation of trust in the community:

> *There were, of course, a lot of things to think about and a lot of stuff to figure out. And most of the times we do the thinking, and we make a proposal for our Board. And then of course the group decides, because we have what in Holland you call an Owners Association. Which also brings me to a very important aspect, as you were looking at the way decisions are made and energy democracy. Because I sometimes get called from people who are doing research as well, and a lot of times it is about the technical side of things. But I always try to stress, you know, that the point is that all this technical stuff, and all the smart grids, it's nice, it's interesting, it works now, finally, but it is only possible if you have this kind of group, I think. Because you need so much trust, you know, to do these kinds of experiments, because people put a lot of money in the project. And when we started people really had to invest a lot of money, I think even up to something like 70.000 euros, without even knowing if it was really happening. I think that there are a lot of projects.. they can't even start, you know, if you don't have this feeling that you can trust each other and that everybody believes that it's really going to happen. [Markus]*

As Markus reports, the creation of a smart grid is an expensive investment to make, and it requires much more than the availability of figures with technical, legal, or administrative expertise in the community. The broad engagement of the collective in decision-making constitutes a crucial aspect of a trustworthy institutional environment. As Goedkoop concludes “a consistent finding is that shared ownership is undermined by a lack of trust, with negative expectations of the different parties of one another”.

Furthermore, as the creation of a smart grid requires the partnership with professional figures external to the community, it is of paramount importance that these firms learn

to communicate well their plans and actions to the members of the group. In this regard, the dialogue between communities and firms can replicate the tension between democracy and efficiency already encountered. Communities often perceive external companies as being too technocratic and profit-driven in their management of issues, while professional figures tend to view communities as places of never-ending debate and inefficiency. The interview with Phillip, who was in charge of the technical design of the smart grid in Schoonschip, elucidates this tension between internal and external perceptions on the governance of energy:

> *You have this group of people that's highly motivated and wants to achieve a sustainable lifestyle and build their dream homes. And then they organize themselves, you know, in a very kind of democratic way, and in the end, well, the bigger decisions are then voted on by the community. And oftentimes things end up taking a lot of extra time, because the level of knowledge is pretty low. And there's a lack of decisiveness and accountability in the process because people are kind of volunteering, and no one's really taking the reins and, like, making shit happen. So usually what happens is, they have the same discussions over and over. Like one time they discuss, "Oh, yeah, collective procurement of PV, we need to do it, to benefit from the lower price and more efficiency and insulation". And then, you know, three months later, everyone forgot what they discussed, or no decision was reached, and then they have the same discussion again, and eventually, time pressure kicks in. And then they have to choose a sub optimal route just because they couldn't organize themselves properly. And so this is kind of a symptom of these projects that you see often. But nonetheless, they did it, because everyone is very much aligned with this vision of sustainable lifestyle. [...] From the process perspective, one of the learning lessons would be that, you know, having this kind of democratic voting process and letting everyone weigh in on all decisions, it leads to lots of inefficiency. And you also have someone who knows a cousin's boyfriend that knows something about PV panels and is saying "Hey, why don't we choose this battery or whatever?" And then you end up having to spend a lot of time explaining to people why that's bonkers. And you have all these kind of random actors throwing in their two cents. And it leads to this huge inefficiency and confusion and lack of decision making. So my general recommendation is like 'Okay, find really like trusted partners, experts that you can rely on and, sure, get second opinions if you have doubts, but really just fucking do what the experts tell you and don't try to reinvent wheels by yourselves, because that's really the death of efficiency'. And I mean, anyone, if you ask anyone from Schoonschip about how efficient the process was he will start laughing slash crying. [Philip]*

As all these testimonies report, energy communities seem to be torn between inclusiveness and efficiency in their development. Trust certainly plays an important role

in finding a balance between these two aspects: where trust is missing, companies may lose a lot of time explaining their solutions to unreceptive assemblies; instead, where partnerships are built on trusting relationships, the decision-making process can be significantly more efficient while retaining a space for information and discussion. In order to solve these frictions between actors such as communities and private firms, the scholarly literature increasingly emphasizes the role of intermediary organization specialized in managing the very complex networks which an energy initiative may involve. In fact, often local groups see the technocratic organization of projects by private actors as profit-driven, while energy companies regard the participatory structure of communities as leading to inefficiencies and unaccountability.

As Emily Creamer observes "there is a growing recognition of the potential role that effective intermediary organizations can play at the boundaries between public, private, and community actors, encouraging and enabling new relationships in a complex context" (Creamer et al. 2018). In this regard, Goedkoop stresses as well the important role of intermediaries between actors as figures of "great help to identify one another and rather crucial for getting the process of shared ownership started, supporting what Hargreaves et al. called the "brokering" role of these actors" (Goedkoop, Devine-Wright 2016).

Among the different types of norms of trustworthiness, transparency rules are among the most important. As the participation to Schoonschip implied fairly high financial investments from the future inhabitants, it was especially important to set clear and effective norms of transparency for the collective budget. In fact, aside from the costs of the private houses, the Schoonschippers had each to deposit a sum of 70.000 euros to constitute a collective budget for the development of the shared infrastructures, such as the jetties, electricity and plumbing, and for the compensation of the Board. In this regard, the online page of Schoonschip is clear in explaining the role of transparency norms in creating an environment of trust: "How do you convince people to invest so much money? The budget was public and would be updated after every annual members meeting, which meant that there was total transparency when it came down to seeing where the money (our money) came from and how it was spent" (schoonschipamsterdam.org).

Interestingly, norms of transparency were not only devised to cover the actual expenditures of the Board, but they also regarded the risks associated with the development of the project. To communicate to members the risks involved with their financial investments, the financial commission created risk profiles for the community, thereby informing the collective of potential worst-case scenarios in the process of construction. Finally, the board organized a series of meetings where the members would

have the opportunity of being updated on the last development in the project, while at the same time strengthening their social relations.

To conclude, the ethnographic investigation was an important tool for discovering the importance of norms in transposing the values of the community into an institutional order in which the members of the community could trust that their environmental and social values would be met. Specifically, the community of Schoonschip can be regarded as a successful initiative, able to create a trustworthy institutional environment by devising good institutional, decision-making, and transparency norms for its members.

5.6 Conclusion: The Role of Community Spirit, Values, and Norms in the Extended IAD Framework

The ethnographic investigation has helped to highlight the way in which meanings, values, and norms are interconnected within the development of an energy community. As argued, the importance of a community spirit has been an essential element in gathering a group around a shared "world of meanings". Moreover, values have played a crucial role in giving a directionality to these shared sensibilities of the community, by providing a set of practical goals to be achieved by the collective. And finally, norms have been found to be key tools in the establishment of a trustworthy institutional environment, where members of the community could see their values respected and promoted. The ethnography has also showed how frictions between the existing socio-technical regime and niche innovations can produce tensions in a community.

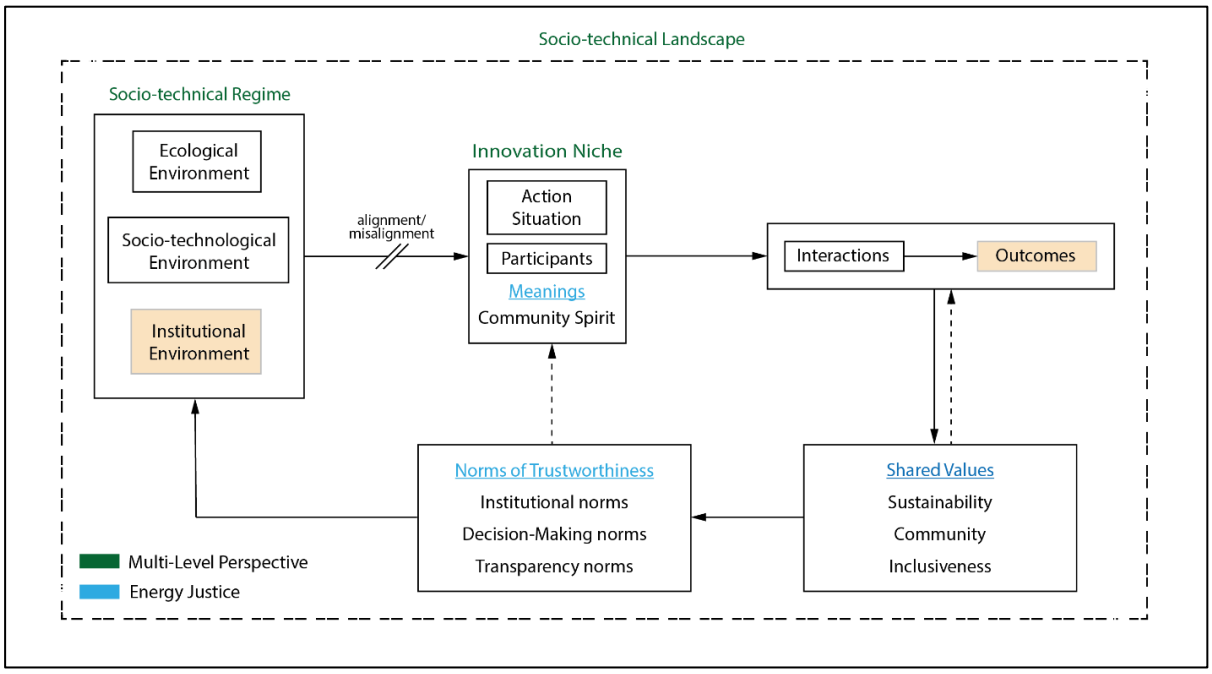

Figure 5.12: The role of Community Spirit, Shared Values, and Trust in the Extended IAD Framework.

In this respect, two main problems have emerged: first, the lack of access to financial support for grassroots initiatives both from governments and from financial institutions; second, the misalignment between existing regulatory frameworks and the organization of energy communities. For what concerns the first aspect, the difficulty of the Schoonschippers to access mortgages for Housing Associations from national banks can be considered paradigmatic; moreover, the lack of subsidies to the community for the construction of private smart grids can be seen as another instance of an unsupportive political environment towards local energy initiatives. For what concerns the second aspect, the current legislation of the European Union makes it extremely difficult for energy communities to develop private smart grids, as the members of Schoonschip had first to create a Cooperative in order to be eligible for an exemption and successively be selected in a special experimental program of the Dutch government in order to be allowed to develop a neighborhood smart grid. Furthermore, the difficulties in obtaining a legal recognition for shared habitations from the municipality of Amsterdam represented another case of institutional friction between the existing legislation and the models of living pioneered in grassroots initiatives. Finally, it was very hard to obtain the permits to construct a sustainable neighborhood on water, as national laws lacked an established framework for the recognition of floating habitations. Needless to say, all these external factors influenced the internal dynamics of the community, by creating tensions and uncertainties during the development of the project, as the duration and cost of construction grew exponentially in order to find solutions compatible with the existing regulations. Moreover, these institutional frictions are reflected in the emergence of value tensions between the environmental aspirations of the members and the affordability of constructing a sustainable neighborhood today. To conclude, the Institutional Analysis and Development Framework developed by Elinor Ostrom and extended in the present work to account for the role of normative concepts can be considered as a helpful tool for researchers and policy-makers to articulate the ways in which niche innovations are sensitive to the institutional environment which characterizes the external socio-technical regime. Moreover it provides decision-makers with an analytical understanding of the interconnections between socio-technical variables in the development of new plans, policies, and regulations, by showing how meanings, values, and norms in innovation niches are responsive to the larger institutional context in which they are embedded.

6

Conclusions

The research has been aimed at filling some important knowledge gaps in our current understanding of the governance of sustainable transitions. As discussed through this dissertation, faced with the problem of climate change the socio-technical systems which define today's societies must undergo a fundamental change in order to establish a sustainable relation with the broader ecological environment they are embedded in. But decision-makers still lack an articulated body of knowledge on how to govern such a radical shift in the socio-technical organization of society. As it was shown, transitioning to a more sustainable society implies a sweeping renovation of our technical infrastructures; nonetheless there is still much work to be done in the conceptual investigation of the interconnections between these technical challenges and the broader societal and ecological issues they give raise to.

As Markard has reminded us, "energy supply, for example, is confronted with a rapid depletion of natural resources, air pollution and greenhouse gas emissions, nuclear risks, uncertainties related to short- and long-term security of supply, and energy poverty" (Markard et al. 2012, p. 955). Therefore, governing the complex interweaving of ecological, technical, and social layers in a sustainable transition within the energy sector implies a deep rethinking of how policy-makers design energy institutions. In fact, on the one hand, if decision-makers leave the process of innovation merely into the hands of markets, the energy systems of the near future could replicate and even broaden already existing inequalities and injustices. On the other hand, also a technocratic approach, where decisions are mostly kept within a small circle of officials and technicians, could miss important signals from society and contribute to a large disengagement and resistance to sustainable practices.

In this respect, the research has helped to highlight how transitioning to a more sustainable energy system requires an inclusive approach to the governance of energy systems, open to all societal stakeholders, and a responsive attitude towards how these

stakeholders perceive new energy policies, initiatives, and projects. Accordingly, the research has argued how the governance of energy systems has to display a more participatory approach, responsive to *all* the members of society, in order to effectively achieve the goals of the energy transition.

In fact, as many authors have already argued, achieving a sustainable transition is dependent on the careful consideration of the moral concerns raised by a changing energy landscape (McCauley, Heffron 2018; Sovacool et al. 2021). In this regard, the concerns for justice - in all of its distributional, procedural, and recognitional aspects - are indeed far from being a mere preoccupation with the morality of innovation. While the moral acceptability of new energy institutions is obviously a crucial concern for any attempt to create a good governance of sustainable transitions, it is of paramount importance to understand that the creation of an inclusive and responsive energy system is an essential element in achieving a widespread social acceptance of new green technologies, a strong support for new collective models of energy sharing, and a broad diffusion of new sustainable ways of life. A sustainable transition that brings benefits only to a selected number of medium- and high-income households able to afford an investment in green technologies is bound to fail to keep the promise of effective climate mitigation. The creation of a more sustainable society does not depend solely on the abatement of the prices of green technologies, but crucially on the creation of a widespread culture of sustainability. In this respect, the dissertation has argued that achieving a sustainable transition passes through the design of inclusive and responsive energy institutions.

Therefore, this research has contributed to highlight how a participatory approach to the governance of energy systems actually shows a much greater chance of succeeding in creating a widespread support for sustainable initiatives than a technocratic approach. Next to the development of large-scale green energy projects and to the creation of affordable small-scale green energy technologies, transitioning to a sustainable model of development means gathering a broad support for a sustainable lifestyle, with more attention for using sustainable materials, sharing energy and mobility services, and reducing wastes and excesses in energy consumption. Accordingly, two crucial questions which have to be tackled by policy-makers if governments want to achieve a broad engagement with the sustainable transition: who is entitled to participate in the organization of new energy institutions and what are the processes through which decisions are made. Therefore, the *institutional design* of energy systems, the choice of the *structures* and *processes* of collective decision-making, is an essential challenge of every sustainable transition. The thesis has then concentrated on the challenge of governing

ethically the sustainable transition, by analyzing how energy institutions should be designed in order to grant the existence of responsible and responsive energy systems. In the first part of the dissertation, the manuscript has focused on the challenges of a *responsible governance of energy systems*. Here the research was aimed at answering one main research question:

***Q1**: How can we avoid responsibility gaps in the networked governance of energy systems?*

Accordingly, the work has developed an original theoretical proposal by elaborating five design principles for responsible governance networks. The research has focused here on the *structure of collective decision-making* by analyzing the problems raised by governance networks in the decentralized management of socio-technical-ecological systems. In fact, the decentralization of energy systems has called into question the accountability of governance networks, as the absence of hierarchical structures of decision-making challenges a coordinated and supervised distribution of responsibilities. As Brisbois argues, "decentralized electricity systems have a fundamentally different system architecture. As decentralized assets proliferate and many consumers shift to being "prosumers" (i.e. those who both produce and consume electricity), electricity systems are increasingly characterized by a mix of centralized and decentralized generation assets. This requires new governance models. Decentralized governance can be structured in many ways. However, all iterations involve a rescaling of governing activities, and an increase in both the number of actors and in overall system complexity. This has implications for how accountability for the generation and provision of electricity is ensured" (Brisbois 2020, p. 17). In fact, if on the one hand, the complexity of managing sustainable transitions calls for a greater integration of public administrations, private actors, and civil society, on the other hand, the creation of such governance networks, characterized by horizontal relations without a definite hierarchical structure of decision-making, exposes the management of energy systems and projects to an increased risk of responsibility gaps. As Klijn and Koppenjan write "governance networks mostly emerge from efforts to increase the effectiveness of public policies and service delivery in situations of interdependencies", nonetheless "it is difficult to hold actors accountable for outcomes when these outcomes are realized in close collaboration with other actors in processes that are opaque and hard to assess. Network accountability is important because it contributes both to the effectiveness and to the legitimacy of networks. It is associated with the assignment of tasks and responsibilities" (Klijn, Koppenjan 2015, p.

223). Therefore, the research has built upon the theory of shared agency developed by the philosopher Michael Bratman to propose five design principles for avoiding responsibility gaps in cooperative governance networks (Bratman 2014). More specifically, the dissertation has argued that governance networks can be considered responsible and accountable when the actors are organized around a common goal fixed by shared deliberation; they present interlocking, persistent, and interdependent policies; they effectively share the relevant information; they are mutually responsive to their actions; and thus, the achieve a coordinated and cooperative agency by successfully intermeshing their plans and policies. Therefore, the thesis proposes that when governance networks are organized around a form cooperative agency, they prevent the formation of responsibility gaps, and they are able to properly discharge their prospective responsibility for a secure, affordable, and sustainable energy system.

In the second part of the manuscript, the research has focused instead on the challenges of a more *responsive governance of energy systems*. Here, the dissertation was organized around a second research question:

***Q2**: How can we design energy institutions which are more responsive to all societal stakeholders?*

The original contribution of the thesis was then the development of an original framework which articulates the role of stakeholders' moral perceptions within the development of new energy policies, initiatives, and projects. Accordingly, the thesis has centered here on the process of collective decision-making by studying how the governance of energy systems should be responsive to the moral meanings, values, and norms of stakeholders in order to achieve its policy-outcomes. As Pesch writes "socio-technical systems embody public and social values and any change may affect these values", therefore "many recurrent controversies are a consequence of ignoring or underestimating these moral implications in the planning and development of energy projects, which especially seem to relate to the fact that different project-owners and affected publics articulate divergent justice claims" (Pesch et al. 2017, p. 1). The work has then concentrated on the elaboration of a pragmatist theory of institutional emergence, where the elaboration of new policies is seen as framed within a complex system of interconnections with the social, technical, and ecological environment characterizing a given policy context. In this regard, the aim of the argumentation was twofold: on one level, it argued for a more *systematic approach to policy-analysis*, where policy-outcomes are framed as dependent from the social, technical, and ecological variables which characterize the context in which they are

formulated, and not in abstraction from it; on another level, it advanced a more *contextualist approach to policy-prescription*, where the normative judgements assumed to select what constitutes the best policy-option are framed as dependent on the meanings, values, and norms of all the stakeholders impacted, and not defined a-priori according to universal ethical principles.

On the first level of analysis, the question of the design of responsive energy institutions lead to the formulation of a further sub-question:

***SUBQ 2.1**: Which is the best theoretical framework for analyzing the systematic interconnections between social, technical, and ecological variables and policy outcomes?*

Therefore, on the first layer of analysis, the work has shown how a linear and compartmentalized interpretation of the process of policy-making, where policy-outcomes are casted as solely dependent on the *strength* and *efficacy* of the measures of implementation by public administrations, is bound to be misleading by forecasting outcomes in abstraction from the public moral perceptions on these very issues. The energy transition is unfortunately filled with case studies highlighting how governments forecasting outcomes in isolation from the moral perceptions of the public have often faced huge resistance in the implementation of energy policies, initiatives, and projects.

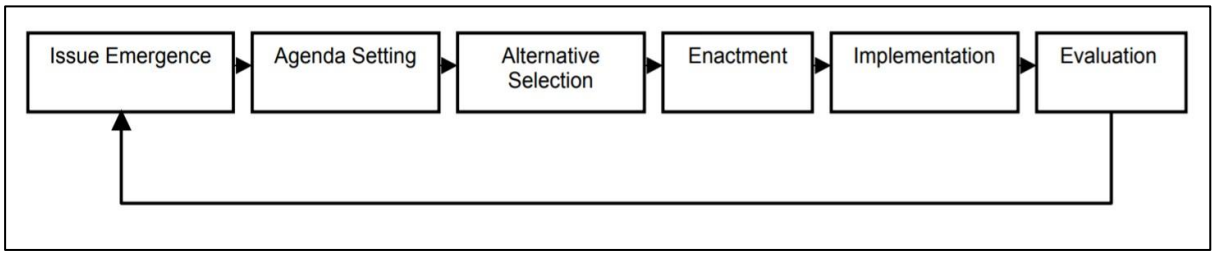

Figure 6.1: Stages Model of policy (Birkland, 2011).

The thesis proposed instead that the Institutional Analysis and Development Framework, developed by the Nobel laureate in economics Elinor Ostrom, was a superior candidate for articulating the systemic interconnections between energy policies and social, technical, and ecological variables (Ostrom 2005, Ostrom, McGinnis 2014). As Ostrom writes, "the IAD framework is based on a dynamic view of policy processes as systems. [...] A framework provides the basic vocabulary of concepts and terms that may be used to construct the kinds of causal explanations expected of a theory. Frameworks organize diagnostic, descriptive, and prescriptive inquiry. A theory posits specific causal relationships among core variables" (Ostrom, McGinnis 2014, p. 2).

In this regard, the advantage of Ostrom's framework lies in the formulation of the process of institutional development as a collective action problem, where a group of social actors (or *participants*) interact within a specific context (or *action arena*) giving rise to outcomes which are influenced by the physical, social, and institutional environment in which they occur. Therefore, Ostrom's work has provided an important insight into the process of policy-making by casting it as an interactive process, where the connection between a policy setting a new rule and its policy-outcome is always dependent on the evolving interactions between the social, technical, and ecological variables which constitute the context of decision-making. In this way, the thesis has argued for a more *systematic approach to policy-analysis*, where policy-outcomes are articulated as dependent from the social, technical, and ecological variables which characterize the context in which they are formulated, and not in abstraction from it.

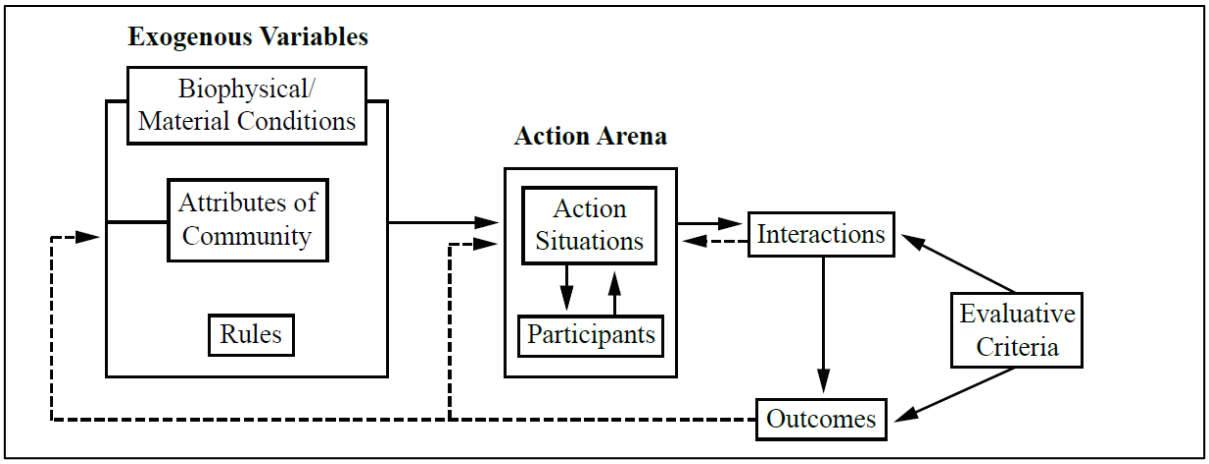

Figure 6.2 The IAD Framework (Adapted from Ostrom 2005).

The original contribution of the thesis consists, in this respect, in opening up the black box of the evaluative criteria which define the normative dimension of collective decision-making. Are evaluative criteria fixed, as Ostrom herself seems to quickly assume in her theoretical work, or are moral perceptions also emerging and developing social constructs? The research has then raised a second sub-question, aimed at exploring the role of moral terms within the process of institutional development:

***SUBQ 2.2**: What is the role of the moral perceptions of stakeholders about energy policies, initiatives, and projects in the process of policy-prescription?*

In this respect, the dissertation has advanced a more *contextualist approach to policy-prescription*, where the normative judgements assumed to select what constitutes the

best policy-option are framed as dependent on the meanings, values, and norms of all the relevant stakeholders. The argumentation was organized around a first *pars destruens*, which points out the weaknesses of top-down and universalist positions for policy-prescription, and a second *pars construens*, which proposes a new bottom-up and contextualist approach for the assessment of policy alternatives.

The *pars destruens* has concentrated on a critique of the mainstream ethical approaches which guide policy-makers in the normative assessment of policy-options, namely the utilitarian calculus of costs and benefits and the deontological application of universal principles. According to these normative positions, the choice of a given course of action among other alternatives is warranted by the application of universal moral principles such as the "the best action is the one that brings about the best consequences" or "the best action is the one that respects our duties and obligations". A first original contribution of the thesis was the elaboration of a critique of such ethical approaches based on "universal principles" in the management of complex systems, such as the interconnected networks of social, technical, and ecological variables characterizing the energy transition. As Oran Young argues, governing complex systems implies a series of challenges for traditional approaches based on the establishment of fixed bodies of rules: "high levels of connectivity make it hard to establish boundaries regarding the identity of the subjects to whom regulations would or should apply. Directional changes reduce the usefulness of rules expected to apply to behaviour that occurs repeatedly in more or less similar settings over indefinite periods of time. Nonlinear patterns of change heighten the need to establish arrangements that are capable of adapting agilely to rapidly changing circumstances. Above all, the centrality of emergent properties produces frequent surprises that raise questions about the continued usefulness of established governance practices" (Young 2017, p. 2). The governance of the energy transition implies the management of such a complex system, where social, technical, and ecological variables are constantly changing, evolving, and reciprocally adapting. The research has argued then that traditional ethical approaches to policy-prescription, based on universal principles defined a-priori, are inherently unfit to adapt to the evolving dynamics of complex systems.

Accordingly, a second original contribution was the elaboration of a *pars construens*, which proposes a new bottom-up and contextualist framework for the assessment of policy alternatives. Prescribing policies for the management of sustainable transitions should be less based on a top-down approach, focused exclusively on the application of fixed and universal moral principles, and more on a bottom-up approach, responsive to the changing and contextual moral perceptions of stakeholders as they co-evolve with the

emergence of new facts, new problems, and new opportunities. A technocratic stance to policy-making, based on the rigid calculation of benefits and costs, has often proven blind to the emerging moral perceptions of stakeholders involved, like the importance of *privacy* in the deployment of smart meters, the problems of *affordability* of energy services in a changing energy landscape, the challenges of the *responsibility* for a secure energy supply in a decentralized energy system, the concerns for the *fairness* of feed-in tariffs. Faced with a technocratic approach to decision-making, publics have regularly developed an antagonistic posture towards public administrations, and opposed new energy policies, initiatives, and projects perceived as imposed from above (Cuppen et al. 2019). As Richard Owen has written in a seminal paper on the governance of innovation "responsiveness is a key dimension that allows options to be kept open; it is the antidote to lock in and path dependence. [...] Importantly, it not only embeds the concept of responding to a changing information environment, that is, being adaptive, but also to responding to the views, perspectives, and framings of others – publics, stakeholders – that is, being deliberative" (Owen et al. 2013, p. 35). Accordingly, shifting the organization of energy institutions towards a more participatory process of collective goal setting can contribute to create a more adaptive, responsive, and democratic model of governance.

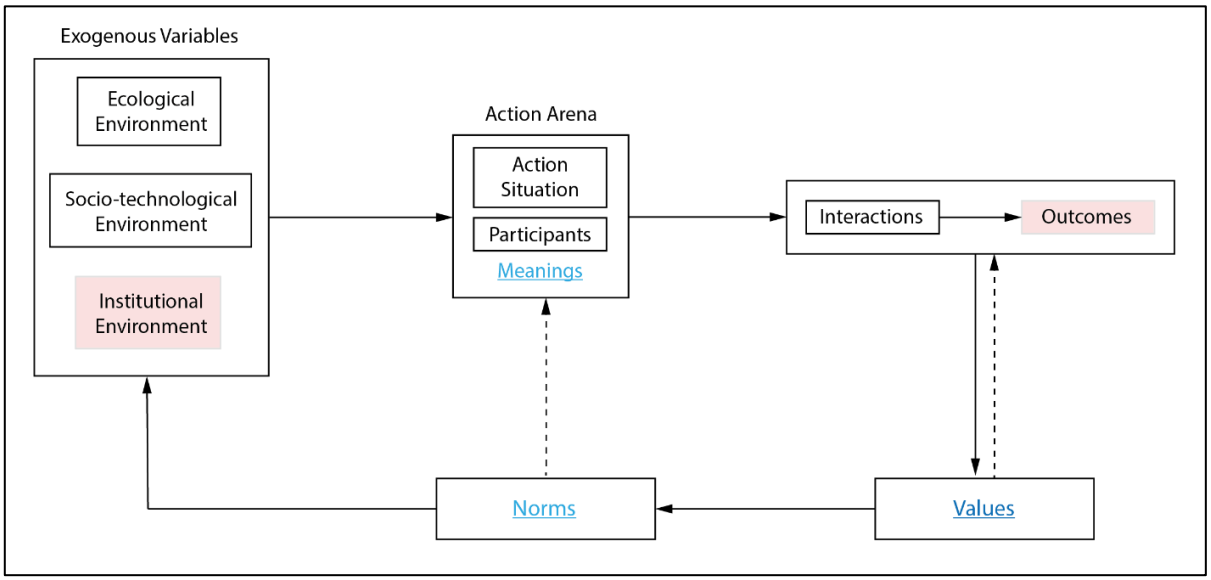

Figure 6.3: The role of moral terms within Elinor Ostrom's IAD framework.

The research has then proposed to extend the Institutional Analysis and Development Framework, developed by Elinor Ostrom, to account for the role of the moral perceptions of stakeholders in the development on new institutions. This new extended framework gives policy-makers a better understanding of the interconnections between these socio-ethical variables and policy outcomes, and it casts the process of institutional development as dependent on a collective process of moral sense-making, where policies

are informed by the moral perceptions of the stakeholders involved. It does so by articulating a pragmatist theory of moral emergence, where morality is conceptualized as a collective endeavor, where meaningful livings, values, and norms represent emergent social structures, with the pragmatic function of solving novel problems and conflicts in society, and organize communities around new shared goals. Therefore, the framework articulates around three main layers: at its base, the first layer is constituted by *meaningful livings*, casted in terms of meaningful interactions of an individual agent with its socio-technical-ecological environment; the second layer comprises *values*, socializing meaningful livings into shared moral goals; and finally, the third layer is represented by *norms*, operationalizing values into informal or formal institutional structures. Within this pragmatist approach, morality is then conceptualized as a process of progressive institutionalization of moral perceptions, with the practical aim of organizing the community around shared meanings, values, and norms.

In this respect, the diagram unpacks and articulates the role of moral variables in Ostrom's theory of institutional development. It shows how the emergence of moral constructs is an essential part of collective action problems, crucial in coordinating interactions towards shared goals and values, and achieving cooperation according to shared norms of conduct. It opens up the black box of "evaluative criteria", which are framed as fundamentally fixed according to Ostrom. The Extended IAD Framework achieves then three main results. First, it encourages policy-makers to pay more attention to the meaningful experiences of all stakeholders impacted by a new policy, initiative, or project. Second, it corrects Ostrom's assumption that values are static criteria within the development of new institutions. Instead, according to this pragmatist approach, values are fundamentally dynamic and contextual moral tools aimed at solving specific societal problems, which coevolve with changes within the social, technological, and environmental context in which they are embedded. Third, it contributes to explicit the role of *norms* within the IAD Framework and connects them both with *values*, showing how norms are in fact operationalization of values, and with *institutional rules*, showing how moral norms inform the institutions of a community. Therefore, this theory of moral emergence provides a better analytical understanding of the role of morality in creating and maintaining a cooperative agency and in designing new participatory institutions. In this regard, a pragmatist approach can help to frame the evolution of shared systems of meanings, values, and norms as processes of collective sense-making, able to federate a collection of individuals around a shared account of societal development. Accordingly, shifting the management of sustainable transitions towards a more participatory process of collective sense-making can contribute to create more adaptive models of governance,

able to respond quickly to directional changes, nonlinear patterns, and emergent properties within socio-technical-ecological systems.

At this point, the research has raised a third sub-question, aimed at conceptualizing the Extended IAD Framework within the existing literature on the energy transition:

SUBQ 2.3 *What can the Extended IAD Framework offer to the existing debate on energy transitions?*

Here, the main contribution of Chapter 4 was to highlight the potential of such an institutional framework to complement the insights provided by the two most influential approaches for the analysis of energy transitions: the Multi-Level Perspective and the Energy Justice Framework. The first approach is rooted in Science and Technology Studies, and articulates a *descriptive framework* casting sustainable transitions as evolutionary disruptions of a socio-technical regime, caused by the emergence of innovations niches (Geels, Schot 2007; Verbong, Geels 2010; Turnheim et al. 2015; Geels et al. 2017a; Geels et al. 2017b); the second approach is rooted in Environmental Ethics, and develops a *prescriptive framework* for Energy Justice, based on the three dimensions of energy equity, energy security, and environmental sustainability (Gunningham 2013; Heffron et al. 2015; Sovacool, Dworkin 2015; Heffron, McCauley 2017; McCauley 2018).

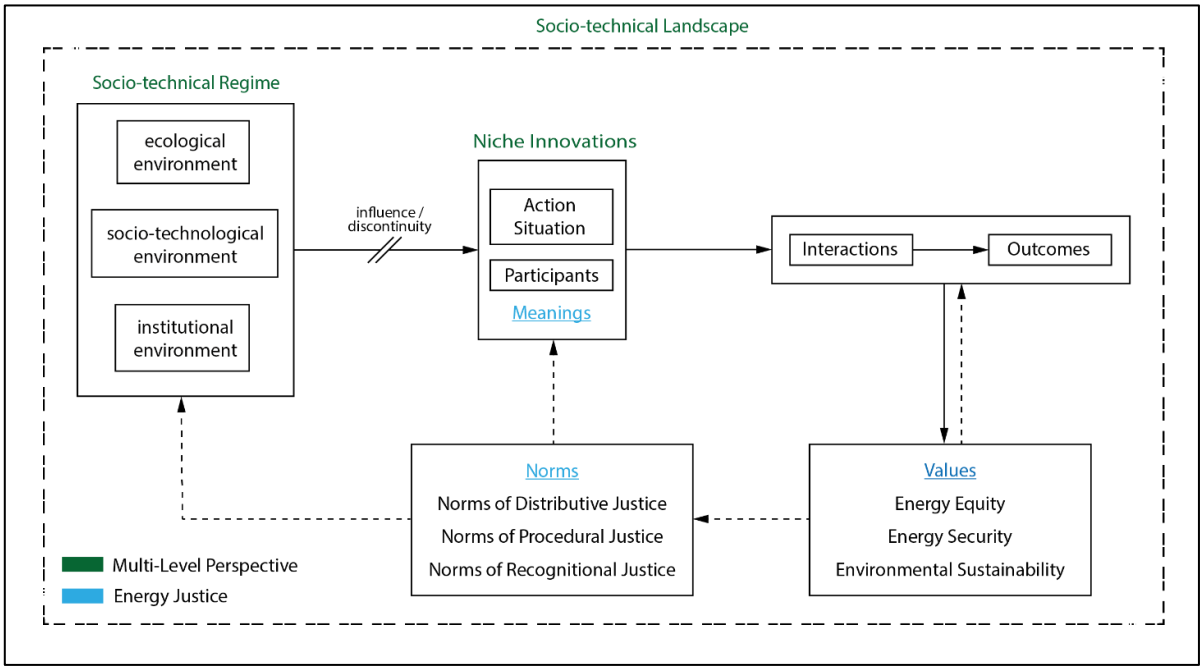

Figure 6.4: The role of the multi-level perspective and energy justice within the Extended IAD Framework.

Where the multilevel perspective describes how institutions are disrupted in a socio-technical transition, the energy justice perspective prescribes instead how institutions

should be organized in a just transition. Nonetheless, within these two approaches institutions remain fundamentally static components, and the question of institutional change is not sufficiently thematized. Accordingly, the pragmatist theory of institutional development elaborated in the research contributed to bridge these two theoretical frameworks by providing an analysis of how institutions can develop in order to meet the ethical challenges of the energy transition. What the Extended IAD Framework can offer then is a theory of responsible governance which articulates the insights of the multilevel perspective and the energy justice perspective within a comprehensive account of institutional development.

The result is a meta-framework which provides policy-makers with an analytical understanding of the complex interconnections between social, technical, and ecological variables in the management of sustainable transitions. It represents a dynamic tool for policy-analysis aimed at helping decision-makers to navigate the complex management of sustainable transitions by encouraging a participatory model of governance, responsive to the meanings, values, and norms of the stakeholders involved. It shows how innovation niches are arenas for collective action, which can lead to the desired outcomes only if the moral perceptions of the participants are kept into consideration and inform the development of new energy institutions, policies, and projects. Therefore, the research has proposed that when a governance system allows for a constant feedback between the policies defining the broader institutional regime and the moral perceptions of stakeholders about the issues raised by disruptive innovations, the energy transition will achieve higher levels of both social acceptance and moral acceptability, contributing to a wider support for sustainable policies, initiatives, and projects. After having articulated a comprehensive meta-framework for inclusive and responsive governance, the research has then raised a fourth sub-question, regarding its application to the real-world dynamics within energy transitions:

***SUBQ 2.4**: Are the theoretical inputs provided by the Extended IAD Framework warranted by the analysis of empirical data collected on the field?*

To answer this sub-question, the work has benefitted from an original ethnographic research on the energy community of Schoonschip, a floating neighborhood in the city of Amsterdam. The empirical investigation has been structured around a participant observation of the life of the “Schoonschippers”, coupled with a series of narrative

interviews with the members of the community and expert interviews with the professionals involved in the planning, design, and management of the project. The ethnographic work was aimed at investigating the socio-technical dynamics around the foundation of a sustainable community, based on the sharing of renewable energy. More specifically, the research has concentrated on two main sociological dimensions of community energy: the internal dynamics of innovation niches, exploring the sociological factors behind the emergence of an energy community; the external dynamics with the broader socio-technical regime, articulating the support, or resistance, of local institutions to the formation of grassroots initiatives.

For what concerns the internal dynamics of innovation niches, the work on the field has helped to highlight three main factors influencing the emergence of energy communities: the presence of a community spirit, the importance of shared values, and the significance of a trustworthy environment. In fact, gathering around a *community spirit* was shown to be a crucial aspect of the emergence of grassroot initiatives. Within the project of Schoonschip this shared ethos was exemplified by a sensibility for environmental activism, an enterprising attitude towards overcoming obstacles, and a pioneering character in exploring life on water. Building on this social capital, energy communities were found to benefit from the definition of *shared values*, orienting the cooperative effort towards the realization of a set of collective goals. In this respect, the ethnographic investigation has helped to identify three main values which have guided the development of Schoonschip: the importance of sustainability, the centrality of community, and the search for inclusivity. Finally, the empirical research highlighted how *norms* are crucial in creating a social environment where mutual trust can emerge. Elinor Ostrom calls these rules “norms of trustworthiness”, as they create a social order in which individuals can trust that other members of the community will truly cooperate with them in the attainment of community goals and values (Ostrom 2009). Within the sustainable neighborhood of Schoonschip, the emergence of trust was facilitated by: norms defining a clear organizational structure, norms grounding a fair form of decision-making, and norms granting a transparent process of reporting.

Accordingly, the ethnographic investigation has helped to highlight the ways in which meanings, values, and norms are interconnected within the development of an energy community. The empirical data, therefore, contributed to validate the Extended IAD Framework, by showing how the presence of a community spirit is essential in gathering a group around a shared “world of meanings”; values are crucial in giving a directionality to these shared sensibilities, by providing a set of collective goals to be reached; and

norms are key in the establishment of mutual trust, where members can be confident that their values will be respected and promoted.

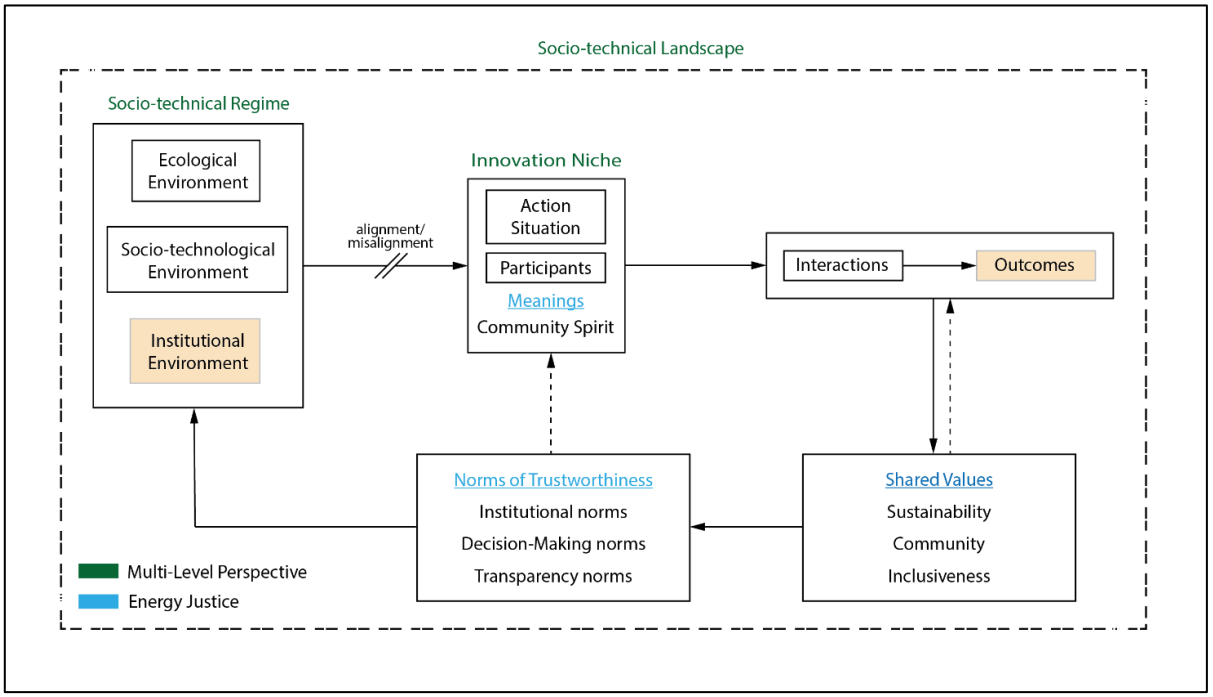

Figure 6.5: The role of Community Spirit, Shared Values, and Trust within the Extended IAD Framework.

For what concerns instead the external dynamics of innovation niches, the empirical investigation has shown how policy outcomes are difficult to be reached in a sustainable transition when the institutions of the existing socio-technical regime are misaligned with the sensibilities, values, and organizations of actors in innovation niches. In the construction of Schoonschip, an unresponsive institutional and financial environment has repeatedly threatened to sink this grassroot initiative. In this respect, pioneering new sustainable ways of communal life, with a vast array of shared services – from electricity, to mobility, to neighborhood spaces – has often lead to problems in interfacing with the existing regulations of both institutional and financial actors. Furthermore, the ethnographic research has highlighted how the external dynamics between niches and the broader regime can have repercussions within the internal dynamics of the community. In fact, the frictions between regimes and niches can produce normative tensions within the very communities, by creating conflicts between the values and norms guiding the cooperative effort. For instance, within the development of Schoonschip, the increasing costs of the bureaucratic struggles with the city administration have often put the value for *sustainability* in conflict with the aspiration for an *inclusive* neighborhood, *affordable* by all people.

Therefore, it can be proposed that the ethnographic research has provided an empirical support for the analytical claims advanced within Extended IAD Framework. Nonetheless,

future research would certainly benefit from a broader analysis, aimed at assessing the insights of the Extended IAD Framework across different phases of a single project and across different types of community organization. In fact, the floating neighborhood of Schoonschip is an excellent example of the early dynamics of a nascent energy community and is characterized by its status as a non-profit association. Within the European Union, community organizations can span from associations, to cooperatives, limited partnerships, trusts and foundations, community owned enterprises, and public-private partnerships (Caramizaru et al. 2020). In this respect, the proposed set of socio-ethical conditions for the emergence of energy communities – community spirit, shared values, and norms of trustworthiness – could be further tested, and possibly, further expanded, with a more in-depth research of these different types of community organization. Nonetheless, while the ethnographic investigation of Schoonschip could only provide a partial picture of the dynamics of the energy transition, it is nonetheless important to point out that the development of the project corroborated the fundamental insights of the Extended IAD Framework in sketching a theory of cooperative agency based on the progressive institutionalization of moral perceptions. In this regard, it can be concluded that the pragmatist theory of institutional development elaborated within the dissertation can be a useful tool for policy-makers to understand the complex socio-technical dynamics of energy transitions, and to achieve a responsible and responsive form of cooperative governance.

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Governing Ethically the Sustainable Transition, An Institutional Design Framework

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