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Public Norms in Practices of Transitional Planning—The Case of Energy Transition in The Netherlands

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Abstract: The fallibility of intervening in complex realities is widely recognized in planning theory. The prevailing planning approaches of the last two decades may be summarized as attempts to make planning more responsive, corrective, and resilient, and also more sociocratic vis à vis the traditional government-centric rationalization of planning. These adaptations make sense, yet keep planning within the pragmatic scope of purposive aspirations and pragmatic problem solving. The pivotal statement of the article is that purposive systems run down in complex societies when not adequately sustained by institutionalizing sets of public norms. Public norms fulfil a different function than goal orientation. They provide a normative compass in times of uncertainty and set conditions to social interaction rather than organizing the performance of objectives or solving problems. The article aims to highlight the interrelationships of public norms and pragmatic strategies of planning. Empirically, the article addresses the major turning points of Dutch climate policy concerning the transitions of the electricity market, the major municipal–entrepreneurial initiatives of city-heating, and the decentralization of climate policies. The method of analysis is based on policy analysis of legislation, policy documents, and published contributions to public debates. The results of the analysis highlight the differences between the high policy aspirations and the outcomes. The results give evidence of the wicked problems in the complex energy transition. The discussion questions the mischievousness of 'good' planning intentions in complex social figurations, and critically examines the institutionalization of the material norms and the norms of politico-ordinance. The conclusions suggest that the social normalization of public norms in Dutch climate policies is not yet adequately materialized to effectively cope with wicked problems.

Keywords: public norms; institutions; legality; policy aspirations; purposive planning; pragmatism; wicked problems; energy transition

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1. Introduction

Planning has become more fallible in the non-place economic realms of post-modernity. In the current stage of urbanization, the disorderly convergence of major cities and decentralized areas in metropolitan-wide urban spaces appears to lack governability [1]. To guide this fragile process of urbanization toward more distinctive metropolitan spaces with 'sustainable qualities of place', the establishment of social and ecological conditions to economic expansion is indispensable [2,3]. Since the early 1990s, multi-scalar public policies and societal initiatives have been taken in most western city-regions to sustain the social and ecological dimensions of metropolitan growth. Yet, the trajectories toward a 'sustainable metropolis' appear to be thorny and obdurate. The metropolitan policy mission is characterized by a permanent state of negotiation by many agencies with divergent stakes. Its adversity is not just a matter of increasing plurality and dilemmic realities. It also reflects the inherent imperfectness and insolvency of purposive planning initiatives in complex realities where well-intended attempts of goal achievement may easily turn into reversed outcomes [4,5]. Some decades ago, Rittel and Webber were among the first to conceptualize the paradoxical nature of purposive planning in complex realities.

They related the mischievousness of good intentional planning and good governance to the intractable nature of 'wicked problems' [6,7]. They realized that there are no easy solutions to these complex problems that because of their very nature could not even be unequivocally defined themselves, reflecting the don't knows of what you do not know [6]. However, social and political responsibilities to attack social problems do not wave in face of social complexity. If there are no easy solutions, the challenge becomes how to cope with the intractability of well-intended but too simply structured public initiatives in far more complex social realities.

The fallibility of planning is well recognized in recent theories and practices of planning. The prevailing planning approaches of the last decades may be considered as attempts to make planning strategies more responsive, corrective, and resilient, and also more sociocratic vis à vis the traditional government-centric rationalization of planning. This is what the prevailing 'interactive', 'communicative', and, respectively, 'learning' approaches of planning have in common [8]. Even the 'complexity' approaches of planning are—if it comes to practical ways to go—in search of adaptive, dialogist, and experimental responses [9–11]. Apparently, when the problems of time become more intractable, more agility, adaptability, and interaction of planning are in the line of expectation. It may make sense to analyze urban development in its rather fragmented, dynamic, and experimental components and to gear interactive relationships, but what to do when this adaptability and agility fail to bring relief and when the sophisticated pragmatism of non-linear, cumulative problem-solving approaches itself becomes the problem rather than an asset of the planning experiences? What if the continuation of the purposive gaze—how cooperative, dialogic or adaptive it may be—remains failing to match the dynamic and complex configuration of society? Then, apparently, it will be necessary to take steps beyond the prevailing framework of purposive aspirations and pragmatic problem solving.

1.1. The Pivotal Statement of This Article Is That Purposive Systems Run Down When Not Adequately Sustained by Institutionalising Sets of Public Norms

Public norms fundamentally differ from policy goals or problem-solving pragmatism and fulfil a different function. They set normative conditions to social interaction rather than organizing the performance of objectives or solving problems. They provide a normative antenna in complex situations of uncertainty where people do not know the purposes of the other, but keep another to shared (and still to share) public norms of appropriateness [8,12]. A sustainable metropolitan transition depends on the vital interaction between the patterning of public norms and the purposive strategies of action, the "moments of opportunity opening up in the critical junctures of the dynamic trajectory of practico-institutional dialectics" [13] (p. 567). However, the search for public norms and institutional meaning seems to be undervalued in the prevailing purposive ridden (not seldom managerial) strategies of public policy [8]. Therefore, the article will pay explicit attention to the normative dilemmas of public action and its struggles.

Making the case of public norms is crucial, but also this cannot provide stability or certainty, not even when they institutionalize in new patterns of public norms. Institutions are defined sociologically in this text as the patterning "sets of public norms that condition social interaction" [12] (p. 1). It would be a mistake to consider the institutionalization of public norms as external framework conditions with a priori consolidated meaning. Public norms are not from an outside world, external to ongoing human interaction, and they are anything but fixated. They are reproduced, but also adapted, reinterpreted, and reset in new situations and different contexts. They have to be socialized and internalized as variable institutions in use: building up normative commitment in the same processes of action and partly by the same constituents of social action that practice planning [14] (p. 184). This is the crucial challenge of the institutional work that Ostrom indicated as commoning. Institutional norms often have a longer history and wider constituencies than situational goal-specific actions of planning, but their progressive meaning and relevance have to be validated time after time in new situational practices (actively sustained, reproduced, reinterpreted, and innovated). Their practical meaning is all but evident [15].

Institutional work requires efforts in a plural society [16], and usually reflects unsolved normative dilemmas and the continuation of social conflicts of interpretation [17,18]. Mahoney and Thelen emphasized the gradual nature of institutional change, reflecting the differences of vetoing power and discretionary spaces of those who articulate the meaning of institutions [19]. Rules are often not simply displaced by new rules, but change more gradually, for instance via new stepping stones that are layered between existing rules and new local contextualization [19,20]. For all these reasons, calling attention to the meaning of public norms does not immediately provide more certainty than a direct focus by planners on purposive policy strategies. The added value of searching institutional meaning is in directing the reflection of the public to the normative guidance and dilemmas of legitimacy—i.e., to the "normative judgment"— in addition to and in interaction with the "practical judgment" of purposive action strategies [8] (p. 76). A normative judgment is in search of appropriateness of what may be justified and accepted in a community as 'normal', a public reasoning about what you might expect from others and others from you (ranging from informal social and cultural rules [21–24], economic dependencies [25], to legal entitlement [26–28]). The practical judgment compares the purposive policy options to solve social problems, selects the most prudent and effective outcomes, and corrects errors in ongoing practices [8]. Both the normative antenna and the pragmatic devise are imperfect and contested in a plural society, but both are indispensable, and the public reins their dialectic in processes of social interaction [8].

1.2. The Article Aims to Unravel the Dialectic Interaction of Pragmatic Policiess and the Institutionalising Public Norms in Cases of Transitional Planning

In order to unravel the dialectic interaction between pragmatic policies and the institutionalizing sets of public norms, the article will investigate the realm of pragmatic policies in a selected field of policy transition. The empirical research will pay attention to the crucial shifts of the policy aspirations, the coalitions of policy-making, the policy programs and the implementation of policies. This part of the research questions the relations between the aimed and the realized outcomes of the selected policy transitions. I will examine whether evidence may be found of policy gaps, and whether wicked problems of policy-making may be observed that may explain the occurrence of not effective policy outcomes.

The next research question investigates the role of institutionalizing public norms. Processes of institutionalization address very different sorts of social, cultural, political, economic, or legal norms [25]. Informal cultural norms address the ways in which communities reproduce and reassess their cultural norms of appropriateness. These norms express the ways in which citizens cultivate their norms of a sustainable society [29]. Cultural norms may underlie the social acceptance of political and legal norms and their changes. Next, political norms of a selected field of policy transition address the general normative conditions of sustainable development [30]. The public norms of politico-ordinance arrange the ways in which the positions of subjects are interrelated (the processual 'rules of the game'), such as the political ordinance of freshly emerging markets of renewable energies. The role of the public norms of politico-ordinance is to condition the interrelationships between social subjects in such a way that concentrations of power (within the state or on economic markets) are controlled and countervailed. Finally, legal norms address the fundamental meaning of legality versus instrumental regulation of purposive policies. Legal norms include the reciprocal search of legal obligation in the multi-actor public action of city-regions. These institutional lenses may be used to examine the normative guidance of sustainable metropolitan transition, its dilemmas, and contestations. There is a wide array of institutional conditions. The search of institutional conditions in this article will be restricted to political norms (including material norms and norms of politico-ordinance). Quite a number of the political norms are institutionalized as legal norms.

In summary, the research in this article questions the dynamic interaction of the next three themes of energy transition in The Netherlands:

- The pragmatic policies at the selected field of policy transition, and their problems;

- The institutionalizing of material political norms at this changeable field of policy;
- The institutionalizing of public norms of political ordinance.

2. Material and Methods

The article investigates the Dutch policy case of energy transition, in particular the transition of the production and uses of fossil sources of energy into renewable sources and carriers of energy. The tendency toward electrification is pivotal in the programs of energy transition. The burning of fossil sources (natural gas and coals) is gradually being replaced into renewable sources of primarily solar and wind energy in order to reduce the greenhouse emissions. The selection of this particular field of policy transition is made because it is in the heart of recent climate policies in Europe and the member states. The recent climate policies face a huge challenge, including the recycling of industries, the restructuring of agro- and horticultures, the organization of mobility, the change of life-styles and food, the greening of the built environment, etc.. The transition of energy is only part of this wider challenge, but it has a strong impact on these adjoining fields and on the organization of social and economic life in metropolitan regions.

The examination of the energy-transition will be confined to, respectively, the shifts of the Dutch electricity policies, the major entrepreneurial efforts of urban municipalities on the recent heat markets, and the dilemmas of the decentralization policies of these transitions. Even within these restrictive demarcations of the case studies, the investigation implies an immense transition of capital-intensive and long-term financial investment in production, distribution, and uses of energies, a new commitment to uncertain trajectories and partly unknown technologies of renewable energies, and a completely different configuration and cooperation of committed subjects and agencies. The social and spatial implications for city-regions are immense.

The first part of the research deals with the policy shifts of the production and uses of electricity. I will identify the major policy shifts of the most important sources and carriers of electricity: natural gas, coal power, nuclear energy, biomass, wind power, solar energy, and hydrogen. These particular segments are selected simply because in The Netherlands they provide the largest contribution in this sector. The energy sector is very innovative, and a number of additional technologies is under experimentation, but it will take time and a lot of investment to upgrade the promising initiatives to the level of the national standard. The next part of the empirical research will focus on the recent urban heat markets in major cities. The two major cities Amsterdam and Rotterdam took a pioneering entrepreneurial role on these markets. The article analyses the two largest experiences of this sort in the two cities. Finally, I will investigate the decentralization of the energy transition operations and the dilemmas of top-down and bottom-up tendencies.

These cases of energy transition will be investigated from the conceptual perspectives and research questions that are outlined in the introductory section above. The method of research is based on policy analysis of the above mentioned pragmatic and institutional dimensions of policy transition. The analytical distinction of these dimensions is crucial. At the pragmatic dimension, purposive targeting and problem solutions are directly oriented to aimed outcomes, intending to effectively maintain or improve a concrete state of affairs. At the institutional dimension, public norms are being socialized in society to share normative conditions that rest on social and policy interactions. They do not aim to perform a specific intervention in a particular situation, but provide general normative codes of appropriateness to those who participate in these practical situations. Both dimensions have a distinct way of justifying policies. The pragmatic orientation relies on the practical judgment, comparing different options and selecting the most effective way to achieve the targeted outcomes. The institutionalizing dimension relies on normative judgment that justifies the normative conditions and role positions that enable and entitle them to act in an appropriate way. In practice, both dimensions are overlapping—certainly in periods of transition—and both are impregnated by social and political preferences. Both are changeable, but in their own distinctive way; pragmatic policies usually adapt faster to

circumstances than institutional norms that are more general and relate to experiencing with normative codes in many different situations [8,19]. The interaction between the two dimensions is essential for public policy-making. Yet, it is crucial to understand the underlying differences. Grounding the method of policy analysis on this sharp analytical distinction of the two dimensions enables identification of the different trajectories and potential distortions of their interrelationships.

To concretize this general research statement, the three selected themes of the research question will be made operational in the following way:

- The pragmatic policies and their actual functioning in case of wicked problems: This ingredient of the research scheme is relatively well to access as the purposive aspirations, and targets of policies are usually made explicit and the outcomes are monitored frequently. The analysis will identify the policy aspirations and concrete policy targets of each selected energy segment. The same will happen in the other two cases. Additionally, the social configuration of these policies will be studied, as many policies are made in coalitions (intergovernmental or/and in cooperation with social or economic organizations), and the change of these configurations in times of policy transition. Next, the ongoing implementation of these policies will be investigated. Finally, the policy intentions and the actual outcomes will be compared. A special focus in this policy evaluation goes to the emergence of wicked problems, highlighting the stalemates and reversed outcomes of planning measures in complex systems. It will be examined how policy-makers deal with these wicked problems.
- The institutionalizing material political norms: The identification of material public norms is the most difficult in the empirical research as these are often not formally established. In contrast to policy aspirations and policy targets, the material political norms that condition policy processes are not always made explicit or legal. However, in case of policy transition, the meaning of latent political norms may become manifest because of their contestation. In times of policy change, forerunners and laggards struggle about the existence and meaning of political norms that have to set conditions to daily policies. The differences of norm claimers and articulators may make the latent meaning of political norms manifest. Gradual institutional change is likely in processes of policy transition. In order to identify these different meanings, it is crucial to analyze the different positions of norm articulators in social configurations. The analysis may not rest with the position of public policy-makers, but should include the claims of contestation that in some cases even might turn to be the actual forerunners of the policy transition.
- The institutionalizing norms of political ordinance: Public norms of politico-ordinance are standard in public policies, but are often neglected in actual policy-making processes. The crucial role of public norms of politico ordinance is to arrange the conditions of countervailing powers, not only in the relationships between citizens and the state, but also in the relationships on economic markets. In processes of energy transition, new conditions are arranged on economic energy markets and sometimes also new sub markets are created by governmental interventions. Norms of political ordinance have to see not only on the conditions of market production, but also on access of civic actors and distributive conditions on state-created markets.

A complete analysis of the interrelationships of these three operational themes cannot be achieved within the framework of one article. The questions are deep, and the selected field of research is wide. Omissions will be inevitable. Completeness is not the aim of this systematic itinerary, the main mission is to deepen the questioning of the ongoing policy transition, deepening the question of how the pragmatic and the institutionalizing dimensions meet.

The material of research is studied over a period of twenty years, beginning with the start of the new millennium and ending in February 2021. The relevant policy reports, laws, legislative initiatives, and lawsuits are studied over this period with a close read since 2015, as the policies of energy transition increased strongly in the last five years. Additionally,

the reports of policy-monitoring and policy-advising agencies have been studied. As many policies are of a trans-scalar nature, I made a selection of relevant European policy reports and legislation, national reports, and local/regional reports. In order to analyze the contributions from business and social organizations, I closely followed the debates in the public media, including a detailed study of complete annuals of the national journals NRC and Trouw over the last four years.

In the next section, 'Results', the empirical findings will be presented rather descriptively as chronological narratives with a focus on the main shifts of policy-making. The next section, 'Discussion', contains the policy analysis deepening the examination of interrelationships of the pragmatic and institutionalizing dimensions of the energy transition in the Netherlands. A brief conclusion will complete the article.

3. Results

3.1. Turning Points of National Energy Policies in The Netherlands

3.1.1. Context

The necessity of climate policies towards industries and society has been widely felt in The Netherlands since before the beginning of the new millennium, although it has been addressed rather gradually by the Dutch government. The first stage of Dutch transition policies in the years zero focused mainly on voluntary agreements by the government and the business sector to save on the growing uses of energy. The shift of policies to renewable sources of energy was waiting for the next decade. There was no absence of policy aspirations and future policy reports to meet the change of climate, but daily reality proved more viscous. The state even planned, in 2007, a new cohort of coal power plants to be opened in 2015 and 2016. It required a poignant lawsuit in 2015 against the Dutch state by the civic environmental group URGENDA to alarm the cabinet [31]. The verdict of the court urged the government to reduce greenhouse emissions by 25% before the end of 2020 [31]. The Supreme Court reaffirmed the verdict in 2019 [32]. In the same year that the new coal power plants started (2015), the Paris Climate Agreement also sealed the commitment of the participant states to an operational climate response [33]. In this international treaty, the participating states committed themselves and one another to limit global warming to 1.5 degrees—ultimately 2 degrees—above pre-industrial levels of temperature.

Early in 2018, the Dutch government started a process of social negotiation, involving more than one hundred organizations of industries and civic organizations in five sector platforms (the built environment, mobility, industry, agriculture and land use, and electricity), culminating in the national Climate Agreement [34]. In the next year, the state adopted most of the negotiated results on behalf of the implementation of its new Climate Law, July 2019 [35]. This law sealed the aspiration to reduce greenhouse emissions in The Netherlands by 49% in 2030 compared to 1990 levels [35] (art. 2.2), increasing to a 95% reduction in 2050 [35] (art. 2.1). Jointly with other European states, the Dutch state promoted to raise this target to a 55% reduction in 2030 within the European context [36] (p. 6). The European Commission recently announced a policy to raise the reduction of greenhouse emissions to 55% by 2030 in the upcoming European Climate Law [37]. These European and national policy limits are policy aspirations rather than legal norms, but they at least seal the political intentions to strictly reduce greenhouse emissions.

The Dutch Climate Agreement collects the negotiated commitments and targets of the involved actors (although the final agreement is not supported by all social and environmental groups). It concerns a large set of joint policy aspirations and intentions rather than public norms. The multi-actor process of implementation is orchestrated by the administration (the Ministry of Economic Affairs and Climate Policy). Many policy initiatives are subsidized and facilitated by the government. It is a powerful group process coordinating the resources of cooperating governmental and private sector agencies, but general public norms (binding not just the participating groups, but also the not directly involved subjects and agencies) are scarce. It is a heavy loaded policy fabrication filled

with good policy intentions and resources, however, with openly delegated discretion at distance of politics, law, and civic society. The government initiated in the Climate Law a comprehensive program of plans with precise targets for the short and middle term, and the outcomes are monitored in the national climate and energy reports that annually update the expected greenhouse emissions toward 2030 [35]. A decentralizing planning and review cycle cascades downwards from the national, to the regional and local echelons to achieve the programmed objectives [35]. At the time of writing, it is too early to evaluate the outcomes of all these climate policies, as the implementation of most decentralized plans is still in stage of construction. The start of the programs, however, does not yet seem to be very explosive. The monitoring national office concluded that the short term political target of 25% greenhouse reduction in 2020 (following the Urgenda verdict of 2015) has not been realized in the aimed year [38]. None of the calculations and estimates reveal a reduction of more than 23% (while 25% was the minimally required target to fairly contribute to the international ultimate margin of limiting the growth of temperatures to ultimately 2 degrees) [38] (p. 29). The national planning office also critically warned that the citizen should not become the tailpiece of the new planning fabrication [38] (p. 8).

In order to analyze the Dutch energy transition in more length—both in institutional and in pragmatic terms—I will shortly deal with the main turning points over the last two decades. Table 1 provides the quantitative figures of the turning points that will be explained in the next sub sections.

Table 1. Production electricity in PJ (Peta Joules).

	2005 Realized	**2019 Realized**	**2030 Aimed**
Natural gas	210	256	165
Coal power	83	63	0
Nuclear	14	14	13
Renewable	27	81	330
- Biomass	19	20	10
- Solar	0	19	85
- Wind	7	41	235

Source: Selected by author from Klimaat- en Energieverkenningen, PBL [39] (Table 14, p. 180).

3.1.2. Turning Points of Natural Gas Production

Since the discovery of a huge gas bulb in 1959 (the 'Groninger field'), the extraction of natural gas became the largest source of interior energy production and a main source of export and national income. The financial interest may also explain the direct involvement of the government. The government (Ministry of Economic Affairs) took a fifty/fifty share in the operational extraction of natural gas in a joined production company with the private companies Shell and Exxon/Mobil. The privilege of the national gas stock diminished the urgency to care for alternative sources of energy. The main set of public norms by the Dutch government was related to the reliable availability of energy, the affordability of energy prices for households and industries, and a fair spread of energy production over different sources. The latter norm (the fair spread) stayed a bit latent in second half of 20th century because of the overabundance of natural gas, but it became manifest again in the beginning of the new millennium. Within this general normative framework, purposive programs were developed to amplify the gas infrastructure over the full country, to generate and attribute the gas incomes, and to facilitate major energy-dependent industries with price reductions in order to support their position in the international competition. In order to avoid too much dependency on the dominant national sources, the government arranged partial import of natural gas (besides the much larger proportion of natural gas export).

In the beginning of the new millennium, the golden gas era began to waver. The projections of future gas availability were lowering, necessitating a raise in the levels of

import. Even more dramatic, if not fatal, were the growing social concerns about seismic problems (earth tremors) in the full northern gas field, causing a lot of damage to the natural and the built environment. The public norm of seismic safety was activated by social contestation: a wide number of legal claims (to compensate damage) and growing political alarm in opposition to the narrow economically based gas policies [40]. Concerns were also growing about the change of climate. The extraction of natural gases has been increasingly criticized—despite of its high energy efficiency—because of the greenhouse emissions. The upcoming normative conditions of climate policies (the reduction of greenhouse emissions) could no longer be denied in the national and international energy policies. Eventually, the energy policy shifted drastically under the actual rein. The social and legal protests against the increasing earthquakes eventually urged the government in 2019 to terminate the extraction of natural gas in the Groninger field. Simultaneously, the government made this shift a part of its new climate policy, in line with the policy aspirations of the Climate Agreement and the Climate Law [34,35]. The gas infrastructure is still dominant in the country, but its uses have become increasingly dependent on import. Overall, the policies aim at a strict reduction of natural gas in 2030 (see Table 1). In the future energy policies, the government intends to promote a natural gas-free development for industries and households (Table 1). The providers of gas infrastructure are no longer legally obligated to connect housing or industries with gas infrastructure, the construction of new houses will no longer be connected with natural gas, and the prices of natural gas will be increased (all following 'gas free' policy guidelines of the Climate Agreement and the Climate Law) [34,35]. The existing infrastructure network of energy may stay in use in the future, but the government expects that the uses of natural gas will be replaced more and more by clean energy carriers (such as hydrogen or green gas) [41]. Until now, however, the uses of natural gas did not yet decrease according to the expectations, waiting for the growth of renewable electricity (compare the realized figures in 2019 and the aimed figure in 2030 in Table 1).

3.1.3. Turning Points of Nuclear Energy

How developed are the alternative sources to the extraction and import of gas? The production of nuclear energy is limited in The Netherlands. The government facilitated the investment of two nuclear plants around 1970, but it was socially contested from the beginning. The first nuclear plant (in Dodewaard) already closed in 1997, and the life time of the second (in Borssele) is programmed until 2033, but the Ministry of Economic Affairs and Climate Policy now explores extending its life 10 or 20 years afterwards [42]. Nuclear power may be preferred in some European states (e.g., France, Czechia, UK), but in The Netherlands, new investment in nuclear power is considered as risky and not cost-efficient. Yet, the nuclear debates are reviving, and new explorative studies of technological innovations have been started recently. It is a long-term deliberation anyway, as the construction of new nuclear plants would take about 20 years. Striking shifts of policy have not yet occurred in this segment of energy policy.

3.1.4. Turning Points of Coal Power Plants

The case of coal power plants is an extreme case in the European context of climate policies. The Dutch state was the latest in Europe to invest in a new cohort of coal power plants in 2007, and to switch this policy again in face of the new climate policies in 2019. The European liberalization of electricity markets in 1998 was a crucial regime shift at the background of these transitions. The electricity market used to be arranged as a government-led 'public utilities' market, but the implementation of the European liberalization in the 1990s urged the national states to separate the production of the goods via market corporations on the one hand and the public sector exploitation of the infrastructures on the other hand (the energy networks for transportation and distribution). From then on, private sector companies (including some state-owned companies) competed to conquer international markets by enlargements of scale and international mergers. As a result, also in The Netherlands, all major energy producers have become part of multinational corporations.

This tendency of economic concentration created new international hierarchies—if not oligopolies—on the European and global electricity markets, making the national states dependent on their decisions about production and delivery.

The Dutch state, guided by its institutionally consolidated normative commitment to guarantee the reliable availability of future energy, and frightened by an international example of lacking market delivery of electricity in California, and also alarmed by the decreasing projections of the national stock of natural gas, decided in 2007 to entice the international companies to invest in a new cohort of coal power plants in The Netherlands [43]. The economic ministry arranged favorable conditions and permits on behalf of the market, including ETS (Emission Trading Systems) rights, promises, and facilities to enable long-term delivery contracts with energy dependent major industries [43]. The concerns in society about the change of climate where large, but not strongly organized when these decisions were taken in 2007. Within the government, the concerns of climate were delegated to the (less influential) Ministry of the Environment, and did not essentially penetrate the prime bastions of economic decision-making [43]. Ironically, by the time the three huge coal power plants opened (in 2015 and 2016), the civic protests against fossil energy production had become effectively organized, and the Dutch state was effectively summoned by the effective lawsuit of URGENDA [31]. In the same year, the state committed to the climate obligations of the Treaty of Paris [33]. The only way to fulfil the URGENDA verdict and the international obligations was to reduce—if not to close—the brand new coal power plants that were just about to start. The state hesitated and delayed, and it first decided to close an old coal power plant (Hem 8 in Amsterdam, dating 1994), finally in 2019, a new law sealed the definitive closure of the new coal power plants before the end of 2030 [44]. A slowdown of their production was announced until the ultimate date of closure [45]. The hesitating shift of policy not just reflects the enduring primacy of the 'reliable availability' norms, but also the deeply interdependent entanglement of economic state planning and private sector investment. It is a costly interdependence. The benevolent policy facilities to enable the production of the new coal power plants have turned into tightened ties of damage claims in times of political de-investment. The final closure in 2030 will have to be compensated by public funds to meet the claims of industry.

3.1.5. Turning Points of Biomass Based Power Production

Bio-mass sources are considered as alternatives to fossil energy production in Europe. Heating or energy production out of biomasses—in particular the burning of wood—is not a new invention. There is a long and successful tradition of it, particularly in the timberlands such as in Scandinavia, Central Europe, or Eastern Germany. It was used at a modest scale in the urbanized The Netherlands as well, but the exponential growth of biomass energy (worldwide, not just in the Netherlands) took place only in the last decade as a result of purposive legislation and public policies. The European regulation in 2009 gave a strong incentive to the increases [46]. It qualified biomass energy production as climate neutral. A plant or tree takes in (enduring its lifetime) as much carbon as is emitted with its burning, and the replanting enables it to take in the same amount of carbon. It is a circular organic system enabling the green production of energy. For this reason, energy production plants (including a large part of the switching coal power plants), industries, and local waste incinerators that burn lots of biomass sources, are exempted of the obligations and financial costs of the Emission Trading System (ETS), as far as it concerns this organic part of resources (the ETS system urges about 11,000 large plants in Europe to buy carbon emission rights when they annually eject more than 20 megaton carbons). The 'green-making' of biomass in European legislation, the exceptions of ETS obligations, and additional European, national, and local subsidies enabled the large expansion of biomass based energy production in the last decade. The governmental price reductions and subsidies created a new biomass market, including an active commercial trade of biomass sources (with import and export industries). Simultaneously, it enabled governments to calculate this green production as a contribution to their internationally obligated policies of

reducing greenhouse emissions. Such interdependent political and economic conditions are the characteristic conditions of a path dependent trajectory of growth. Its self-reinforcing characteristics are not easy to return. Biomass has increased into a substantive source of renewable energy in most European states, and it is considered as a strategic green potential to balance the fluctuations of the time- and context-dependent solar and wind energies.

In The Netherlands, the use of biomass sources became a crucial pillar of the negotiated Climate Agreement, but expectations toward 2030 have lowered recently (Table 1). For the wider future, more is expected of the expansive production of wind power and the hydrogen energy carrier [34]. Ample facilities and governmental subsidies paved the way to enlarge the uses of biomasses. Vattenfall was planning a huge new biomass plant near Amsterdam to provide heat for city-heating, coal power plants shift to biomass (as far as technically possible), urban waste incinerators are facilitated to its use. Hundreds of small biomass plants (avoiding the ETS obligations that only start with a minimum of 20 Mw) are under construction in a decentralized system of implementation.

The growth of biomass, however, raised a lot of social and political controversy and eventually led to a turning point of policies in 2020. Burning of biomass is not a clean process, on the contrary, the cleaning starts only with the carbon intake by the substituting plantation, which takes a long time. European research warned already in 2017 and 2018 of the harmful emission of biomass sources [47,48]. Correspondingly, in The Netherlands, the press reported the results of a not-published study by DNV GL (on behalf of the Ministry of Infrastructure) concluding that the emission of a biomass plant causes more damage than that of a coal plant: 20% more nitrogen, 20% more fine dust, and 20% more carbon [49]. The main reason is that the burn efficiency of coals is much higher than that of biomass. The carbon intake of new plantation is also highly problematic because of the long carbon payback period. New plantation takes time to grow (the growth of a tree takes 80 years on average). The explosive growth of burning wooden pallets has disturbed the sustainable balancing act of what is taken for burning and the carbon intake of new plantation.

A growing normative concern of using biomass—in particular, wooden pallets—to produce energy, relates to the violation of natural areas and biodiversity. The Netherlands does not produce enough biomass to feed its demand. The young biomass market draws for 25% on import (from UK, USA, Canada, and Estonia). The biomass subsidies make it commercially attractive to cut parts of mature forestry abroad on behalf of this new 'greening' industry. The stimulation of biomass started rather organic with residuals and balanced sustainment of woody areas, but the commercial and political drivers have moved it to cutting forestry. Recently, some counter measures are taken, such as the taxation of the import of forestry biomass, and legal quality marks of biomass are increasing in number and intensity. These conditions, however, do not yet prevent the international exceeding of the fair share that the Dutch society might claim in global and European relationships [50]. The increased civic protests against the use of biomasses, a new effective lawsuit about nitrogen against the state (this time judged by the Council of State [51]), and open doubts in scientific and professional research eventually forced the government to switch its biomass policies in 2020 (Sociaal-Economische Raad, 2020 [50,52]). As a result, Vattenfall postponed the planned biomass plant nearby Amsterdam, and also the government examined strategies of biomass disinvestment. At the time of writing, the change of policy is not yet definitively decided. It is a complex case (there are many sources of biomass, although wood is by far the most important, and there are many different uses of biomass). Most probably, subsidies for future biomass investment will be terminated, at least for low-grade uses to produce energy. However, such as in the cases of natural gas and coal power, the processes of change are slowed down by the high political/economic interdependencies via governmental subsidies, fiscal facilities, legal rights, and long-term contracts. The private sector programmed its future investment in biomass activities under governmental facilities; hundreds of small biomass plants already received the legal permit and are making their current investment under financial promises. The larger plants are

still allowed to deduct the biomass emissions from the ETS obligations. Strategies of de-investment tend to arouse financial claims against the state. Furthermore, the government is aware that moving away from the biomass strategy is undermining one of the pillars of the 2030 targets under the Climate Agreement and the Treaty of Paris.

3.1.6. The Turning Points of Wind- and Solar Power

The shares of wind and solar power used to be historically low in the 'natural gas state' of the Netherlands, but recent mega investments—particularly in wind power with its high potential in the Dutch climate—indicate an exponential increase in the near future (the radical quantitative shifts are illustrated in Table 1). Wind and solar power are superb sources of renewable energy, but they are time and place bounded, and for this reason depend on innovative technologies of electricity storage. In national policy calculations, the availability of (adequate) wind is estimated at 2000 h annually (about 25% of the year) according to national expert Lensink [53]. Wind and solar sources are converted in electricity which may be saved in Norwegian lakes, in batteries, and via additional technologies (it is a very dynamic field of innovation), but up until now the saving capacities and their means of transportation are bound to limitations and high costs. A considerable use of fossil resources (mainly natural gas) has to balance the fluctuations of wind- and solar electricity over the year. Yet, wind- and solar power are principal triggers in the energy transition. The production of both sources is decentralized under the selective guidance of the government. Following the Climate Agreement (2019), the Ministry of Economic Affairs and Climate Policy established a subsidy fund (the SDE ++ fund today amounts to 5 billion Euro per year) to facilitate carbon reducing activities, among which solar and wind power investment are prominent [54]. The quantitative targets of energy transition are cascading down in the new intergovernmental planning system, but the spatial and environmental accommodation of the windmills and the solar panels is a local responsibility. The decentralized electricity production may be uploaded in the electricity networks (under certain conditions). The spatial and environmental fit, however, is a tough and not rarely contested experience, in particular in densely urbanizing spaces, considering the extensive and mono-functional needs of space, the noise of the windmills and the diffusing impact of spread windmills on landscapes. The local plans of implementation are programmed for next year according in the planning cascades. They will face these challenges.

The governments focuses its own solar and (particularly) wind power programs at mega wind and solar parks. Two initiatives stand out in this particular line of policy. First, mega parks in extensive agricultural areas, such as the polders. The national wind power programs on land primarily aim at the explosive energy demands of international ICT corporations and the digital economy. The Ministry of Economic Affairs and Climate Policy stated the cabinet's ambitious strategy to become "the digital frontrunner" at the European continent in competition with Frankfurt and Paris [55] (p.11). The preparation of a digital infrastructure is considered a crucial milestone to achieve this ambition. Energy is the main resource of the explosive growth of digital storage and transportation. Until 2030, eleven mega wind power parks on land are indicated in the national spatial policy documents and accommodated in local rural settings where farmland may easily be acquired by international investors [56,57] (pp. 102–103). Mega size co-locations of multiple data centers are situated at the edge of urban areas, in particular the main digital hub in the polder edges of the Amsterdam region (Amsterdam Internet Exchange), furthermore, individual 'hyper scales' of ICT multinationals are planned in the peripheral regions of the country. The Ministry of Economic Affairs and Climate Policy strongly promotes the growth of the digital economy in the international competition. A functional digital infrastructure is considered as a necessary milestone to accommodate the growing digital economies. Multinational ICT corporations select cheap international locations where they can secure future electricity needs in reliable infrastructures and can capitalize on green sources of energy. The Dutch energy infrastructure is very reliable, as the legal

system of economic ordinance obligates the supplying power networks to accommodate the growing demands of electricity. Furthermore, the state guarantees the availability of affordable green energies by subsidizing the non-profitable tops of wind power production. These conditions may explain the exponential growth of international data centers in the Netherlands.

However, the public debate is increasingly critical and concerned about the uncontrolled pace of growth of data centers. Storing and transporting international electronic data is not something like planning a Silicon Valley: it is a low graded economic function. A functional digital infrastructure is a necessary condition for the modern industry and society, but this would not require the maximization of international digital storages. The explosive growth of data centers has a dramatic impact on the energy system. Data centers are huge energy users. One of the first new hyper scales on behalf of digital storage at the edge of the Amsterdam region, the wind park Zeewolde, will produce two to three times more electricity than all electricity of households and industries in peak moments of the city of Amsterdam; it is subsidized with 923 million E. Nearby, Wind Park Blue will receive 846 million, Windplan East is even 30% larger, and the amount of subsidy is not yet known [58]. Vattenfall produces 1.3 TWh (1.3 billion kw-h) in the peripheral northern location Middenmeer [58]. Both Google and Microsoft situated a hyper scale data center in this park (consuming 60% of its electricity) [59], and both are constructing a new hyper scale in the park. The eleven estimated hyper scales in 2030 amount to 3.6 TWh [56]. The concerns about this exponential growth are not just local (the noise and hindrance of widely visible-200 m high-windmills, and the new disparities of rural land prices), but larger concerns refer to the dramatic impact on the energy system. Wind power is produced only 25% of the time and data centers require reliable provision full-time around the year. The additional needs of electricity create capacity and continuity problems for the power networks that are obligated to deliver; the additional sources, however, depend mainly on (the import of) natural gas [60]. The green side of wind power is only a minor part of the explosive energy needs of the disproportionally growing digital infrastructure. Additionally, last but not least, the attribution of huge wind park subsidies to accommodate the needs of tax-exempted multinational corporations also does not contribute to the support of the tax paying public.

Secondly, the Dutch government is arranging a new generation of mega off-shore wind power parks (including some solar power fields) in the North Sea. The financial case of off-shore wind parks used to be very thin, but an efficient move by the economic Minister Kamp in 2016 enlarged the size of the tenders via new legislation (about ten times larger) and arranged flexible conditions (such as the arrangement of transport by the state corporation Tennet) [61]. Since then, the economies of scale and innovation lowered the price of wind power at sea from 10 cents Kwh to 1 cent (on behalf of Tennet). As a spectacular result, the most recent Dutch off-shore wind power parks at the North Sea are internationally the first to be realized subsidy-free. Yet, the economic future of the off-shore parks is uncertain. The efficient production sharpens the mutual competition of the wind parks. The abundant wind power is produced at peaks and for all at the same time. This has a large impact on the price of wind power. The park managers (usually led by oil companies and energy giants) attempt to contract large packages in the market in order to control the risks of fluctuation. Does it lead to a reduction of greenhouse emissions? This is still very uncertain. Will reduction be made effective by making this wind power accessible for households and for the electrification of transport and cars? It may also be used for industries, however, will it be used in a balanced way, considering the additional needs of energy in the windless times of the year, in order to guarantee a sincere reduction of carbon emissions? Or is it just a commercial consideration by the consortia that own the wind parks? The arranging Ministry thus far neglected these questions of politico-ordinance. Whose energy, and for what uses? The ministry freely tenders and accommodates the productive fields of the sea and enabled an efficient production, but it does not put any further public condition on the economic process. The stream of outcomes is reported in

the daily press: the first productive wind park Borssele 'contracts 25% to fertiliser complex Yara', 'Amazon contracts 50% of park Egmond, 'Shell uses a large part of its wind park for its petrochemical industries', etc. . . . A lot of the industrial uses of off-shore wind power relate to the relatively new carrier of renewable energy: hydrogen.

3.1.7. The Turning Points of Hydrogen

Hydrogen is a crucial strategic option for the European Commission and for most member states in the mid- and long term, primarily on behalf of energy-intensive industries and heavy transportation [37]. Hydrogen is not a source but a carrier of energy: the production of this gas requires first the electrolysis of water and energy (usually natural gas in the current practices). The challenge is to green the production of hydrogen. Hydrogen is labelled 'grey' in case of using fossil energy, it is called 'blue' when the greenhouse emissions are captured and stored, and it is called 'green' when it is produced by clean sources, such as wind or solar power. Hydrogen has many advantages: It enables high temperatures for industries, it can easily be stored, it may convert time-bounded sources such as wind and solar power on behalf of permanent uses, it may be combined with sources such as natural gas (for instance 90% natural gas and 10% hydrogen), and it can easily be transported via (existing) pipelines to deliver hydrogen gas to clients. The challenges are in the production of it: the production of hydrogen wastes about one third electricity that cannot be reused, and further the high costs of production via electrolysis. The European Commission strongly promotes the production of hydrogen. It established a partnership with international corporations and social partners (Clean Hydrogen Alliance) to enable a joint investment agenda "to stimulate a roll out of production and use of hydrogen" [37] (p. 21). The political priority is to invest in green hydrogen, but in the draw up of new international hydrogen infrastructures, blue and grey uses will be inevitable [37]. The Commission aims at the production of 40 GW in 2030, to be graded up dramatically until 2050. Jointly with Germany, France, Italy, Spain, and other states, the Dutch government is actively involved in the international hydrogen strategies. These strategies not only relate to the production of hydrogen, but also to its transportation and distribution. Clean production rests mainly on the off-shore wind power parks and the solar power of tropical countries. From there, it has to be distributed primarily to the heavy transportation services and the international concentrations of heavy industry. The government promotes in its hydrogen policy vision the Netherlands, particularly the Seaport Rotterdam, as the main European hub in the international hydrogen transportation networks, building on existing infrastructures and pipelines [62]. With regard to the national production, the government aims at 3 to 4 GW in 2030 based on the off-shore wind parks [34]. This may be called ambitious; the production of green hydrogen would require 30% growth of national electricity [63], and subsidy of 5 billion Euros to bridge the non-profitable tops [64].

The international promotion of the hydrogen strategy raises high expectations in business and society. The main clusters of energy-dependent industries prepare plans and consortia to invest in their own electrolysis plants for the production of hydrogen (namely the petrochemical industries in Rotterdam Seaport, the fertilizer industry in Zeeland, the steel industry in Seaport Amsterdam, and the industries in Eemshaven within the north of the country). They contract the off-shore parks for direct delivery of wind power on behalf of hydrogen electrolysis. Private investment in electrolysis plants requires the public bridging of non-profitable tops. Regional authorities and corporations prepare ambitious plans to make hydrogen the spearhead of regional economic strategies under the expectation of European and national subsidies. The operational preparation of hydrogen production plans already exceeds the programming by the government. The aspirations of the northern region of the country alone to become the international spot of hydrogen production (in cooperation with Shell and additional private companies) already exceed two times the total plans of the government for 2030. Only these would require a doubling of the off-shore production of wind power. The government will not

be able to accommodate all claims of ambitious industries and regional authorities, but the expectations are in line with the national and international strategies of promotion and the government searches way to expand its programs (including extended funds of subsidy) [53,54].

Critical observers are not only concerned about the subsidy driven nature of new hydrogen markets (the non-profitable tops of investment are not bridged by making the greenhouse emissions more expensive via taxation but by subsidizing the most polluting industries). There are also concerns of climate policy. The national assessment agency (PBL) notes that the production of hydrogen requires 30% additional electricity. If wind power is used, this cannot be used for directly reducing greenhouse emissions, but will be lost in producing hydrogen. Additionally, the electrolysis will not use green electricity the year around (25% wind power availability), and the expensive electrolysis plants will need the full year exploitation to make their operating effective and economically efficient. This calculation might lead to more rather than less greenhouse emissions [39]. The expansion of the best places for off-shore parks is constrained by other uses and will not easily be made free. The earlier mentioned dilemmas about 'whose wind power' become overtly manifest in the case of electrolysis planning. Where does the wind power go? Will it directly reduce the greenhouse emissions the growing electricity uses in society (households, cars, etc.) or will it be primarily usurped by the industrial energy users (such as already occurring in the case of the large wind parks)? Industrial uses are needed as well, but it is crucial to balance the different potentials of use. The government is in a crucial position to arrange this balance. The mega wind parks (both off-shore and on land) and the hydrogen market are for a large part created via the financial and legal support of the public sector. Taking the critical observations, the norms of political ordinance do not just matter the enabling of the economic production of wind parks, electrolysis firms, and systems of CCS (carbon capture and storage) by permitting the optimal spaces and bridging the non-profitable tops. It should also include a balanced ordinance of balanced climate policies and the norms of social distribution.

3.2. Pioneering City Entrepreneurialism

3.2.1. Heat Company Rotterdam

The next case-study of energy transition concerns the poignant case of proactive cities, taking an entrepreneurial role themselves when private markets are not yet ready for transition. I will discuss the two largest Dutch initiatives in Rotterdam and Amsterdam. The seaport city of Rotterdam is the largest center of fossil energies along the western coast of Europe; it is the principal nerve of energy production, distribution, and consumption, good for 20% of the national carbon production (almost all by the harbor industries and heavy transportation). The city is very alert on climate policies because of the huge impact of energy transition on the future economic position of the seaport, its heavy industries, and the local society. Both the city and the seaport authority are keen to sustain the international network infrastructure position in times of transition. They actively explore the renewable options off-shore and on land, such as wind and solar power, thermal energy, hydrogen and reductive strategies of energy-saving, and Carbon Capture and Storage. Additionally, city-heating, capitalizing on the waste of nearby harbor industries, appears a prominent case. The availability of huge volumes of waste heat of petrochemical industries on the one hand and the need to heat the expansive urban areas on the other, shape the chances of a new market of city heating (including also a carbon market delivering carbon emissions to the adjacent greenhouses). Making the connection of waste heat and city-heating, however, took so much transaction costs to complete the business case that the city decided (in 2006) to try its own chances. The city established the independent-but city-owned-heating company Rotterdam (WBR) aiming to heat 500,000 dwellings [65].

The first attempt to tap waste heat from Shell refinery, however, proved too expensive. In 2009, a new attempt linked up with the waste heat of the incinerator of the seaport region (AVR). The incinerator used to be a public sector agency, but had been privatized in

2006. The mutual claims in this privatization urged the municipality to pay off the new private equity owner via a favorable contract with the new municipal heat company. The heat company WBR realized the distribution of heat to new residential neighborhoods in Rotterdam South (50,000 houses since 2015). However, the contract with the incinerator eroded the commercial position of the heat company for the long term as the waste heat was contracted too expensively, making the company a playing tool of capricious city politics [66]. Meanwhile, the first competing market initiative started a pipeline in 2014 to Rotterdam North more efficiently. A new political prestige project had to save the entrapped heat company: the construction of a smart regional roundabout (enabling decentralized in- and outputs) leading from the seaport around the south-east of Rotterdam to the city of Leiden. It was enabled by a joint 140 M capital injection of Rotterdam and the Province of South Holland. Yet, it appeared much too risky. The local distributer in Leiden (NUON) negotiated a high price (on the long term) in order to meet the uncertainties of deliverance. Again, politics had miscalculated the commercial impact of uncertainties, the province opted out, and the heat company remained in a hopeless position with two commercially chilling contracts in the long term (both at the supply side and at the demand side). The deeply indebted WBR had to be dissolved in 2019 [67].

3.2.2. Amsterdam Waste and Energy Company

The entrepreneurial pioneering of Amsterdam's huge waste incinerator is not essentially different. Amsterdam had an efficient incinerator in the 1990s that also produced electricity out of waste. The combined ecological and commercial prospects of this municipal agency enticed the city to invest 338 million (cumulating to 450 million) in a new high-efficiency technology with the largest burning capacity in the country [68]. The city proudly re-labelled the waste incinerator into the Amsterdam Waste and Energy Company (AEB), as it produces both heat and electricity by burning waste. However, since the start of the new kettles in 2009, the company ran into problems [69,70]. The waste market suffered a crisis of waste supply because of reduced consumption and also because of better separating, reuse, and recycling of waste. It was not possible to run 24 h efficiency, which is needed to return the huge investment. The incinerator suffered since the beginning from the technical overcapacity. The municipality tried (in vain) to sell the incinerator, but this also would not have compensated the costs of investment. The decreasing resources urged AEB to import waste (25% from UK). Next, the city decided to make the AEB company independent (still city-owned, but at distance from daily politics in order to enable free operating on the waste and energy markets). However, politics did not abstain of the political sustainability claims. The company was in commercial need of higher efficiency, while politics claimed the reduction and better separating and reusing waste [67]. The municipality subsidized a separating installation, and it also kept tight control of the heat division (Westpoort Warmte) that exploits city-heating for 35,000 houses. The double pressure on the company (by the market and by politics) and its failing management led to technical problems in 2019 (halting two thirds of the operations longer than a year) whilst the financial losses and debts were increasing [69,71]. A new attempt to sell the company failed in 2019, leading to a political crisis (the alderman resigned when private sale of the company was barred by the political majority).

Today, again attempts are taken to sell the company in the nolens/volens climate of political Amsterdam. The city bought back the city-heating daughter Westpoort Warmte. It is contracted until 2047 to heat 30,000 dwellings, and the city is already seeking to expand this service for another 35,000 residences [72]. The indebted incinerator is for sale, but selling the indebted plant will not cover the huge investment. It seems inevitable that the financial losses have to be taken. The even more radical solution to the split-up position between commercial and sustainable goals by de-investing the overcapacity is not yet in consideration. It might be the best option because privatizing technical overcapacity to the market might hostage the climate even more when the market would manage to run it

efficiently. The overcapacity is the real problem, but not yet addressed. The urging debt of 400 million E, makes it difficult perhaps to make radical decisions.

The municipal waste/energy plants are not uncontroversial. The large urban incinerators belong to the top ten category of pollutants in The Netherlands. However, as organic waste is counted as 'climate neutral', AEB has to register only one third of its emissions (0.58 instead of 1.5 megaton carbons in 2019) [73]. For the same reasons, AEB is excepted of the European ETS regime. Further controversy relates to the use of high temperature heat for heating the built environment. It is hotter than needed to heat recently constructed neighborhoods. Local climate groups insist on using lower degrees of heat from decentralized sources such as data centers, or using alternative methods. They already successfully defended at the court the claim to renounce AEB city-heating and to use alternative sources (deliberately complicating the economic case for collective city heating in new neighborhoods). The progressive urban entrepreneurs of two decades ago (sharing their combined commercial and ecological opportunities) have moved today to the benches of the accused.

3.3. Decentralization of Energy Transition

At local level, a curious encounter about the challenge to reduce greenhouse emissions is taking place between that the top-down initiatives that are cascading down in the intergovernmental planning system and the bottom-up initiatives of communities and cooperative organizations. The national planning system decentralized most of the implementation of the nationally agreed targets. However, it is not a complete decentralization as the government secures the minimal target margins and it also protects its own policy targets in the case of particular national economic interests, such as demonstrated in some cases above, while enabling local and regional policy-makers to tailor the allocation of available options and to finalize the spatial and environmental fit. Following the negotiated results in the Climate Agreement, the government conditions (via output margins and precise timelines) the strategic regional visionary plans and the eventual plans of local implementation [34]. The local operational plans operate within the hierarchical targets and have some space for policy deliberation and civic participation. The central aim is to reduce the use of fossil energies and greenhouse emissions in neighborhoods and industrial areas. This is mainly to be achieved via energy saving programs, heat strategies, and the target of a gas-free development of the new and (increasing over time) existing neighborhoods. To stimulate the local transition, the government also facilitates a number of local experiments. At the time of writing, the regional visionary strategies are almost definitively established. They cumulate—in an indicative way—the whole range of policy options from which definitive selections will be made in the local plans of implementation. For instance, in the region to which Amsterdam resorts included in its search area, all roofs in the built environment are to be covered with solar panels, and also all optional spaces for windmills, such as the complete double sides of the two main connection canals [72]. This is not yet decided, as the definitive selections will be made in the municipal operational plans. However, the cascading targets do not leave much space to select; implementing these options will become challenging, in particular in the densely populated urban regions. With regard to the heat market, the government arranged new rules of ordinance enabling the municipalities to make collective decisions at level of the neighborhoods [74]. The municipalities are empowered to select the producer of heat to serve the neighborhood [74].

On the other side of the spectrum, well-informed and organized eco-dwellers are generating their own bottom-up initiatives in local communities and in cooperative forms of organization. These initiatives contain the organization of alternative ways to reduce greenhouse emissions, social and political manifestation, and legal ways of litigation. Not seldomly, these civic activities turn against the formal planning system of energy transition. For instance, the production of electricity, gas, and city-heating in Amsterdam largely depends on a huge natural gas-based power plant, the municipal incinerator AEB, and the aimed (but postponed) biomass heat plant of Vattenfalls. Well-organized eco-dwellers

successfully combated the establishing of the new biomass plant (litigation), and they refuse to accept the city-heating by the incinerator and also turn against the fossil gas-based power plant. They further refuse to accept municipal policies to make collective city-heating decisions obligatory at neighborhood level because of the urban uses of fossil resources, and they made their case successful at the court [75]. Nationally organized cooperative groups urged the parliament to open the aimed ordinance rules of the heat market in order to secure the accessibility for alternative ways of heating. Meanwhile, low-scaled initiatives are taken to isolate and heat the homes in alternative ways.

4. Discussion

4.1. Pragmatic Policies and Wicked Problems

The Netherlands is among the European states with the highest policy aspirations of climate policy, but it would be exaggerating to qualify the Dutch energy transition of the electricity sector as an international forerunner. The outcomes of the policies to reduce greenhouse emissions are delayed and inadequate, not only weighed to the own aspirations and policy targets of the national government, but also to the minimal requirements of international obligation. The Netherlands is not the only state to face disappointing progress, as most of the international participants of the Treaty of Paris share this paradox of well-intended policy programs and lagging outcomes. Yet, the arena has gone into motion. Changing the trajectories of the energy sector is changing the direction of a massive fabrication of durable interdependencies, characterized by capital-intensive investment and long-term obligations of legal contracts. The national monitoring institute concluded that the energy sector is moving even faster than the aimed changes in the other climate related policy sectors (industry, agriculture, mobility, built environment) [38]. The twenty years' odyssey of gas, coal power, biomass, wind, solar, and hydrogen power demonstrates above all how complex it is to effectively achieve purposive change. The policy intentions are there, but all singular tracks of policy change meet unexpected obstacles and complications, even wind power. The recent volumes of wind power production are impressive—even in the international comparison—but it is arranged in such a way that it leads to more rather than to less greenhouse emission. The production of renewable sources of energy is crucial to meet the intentions of climate policies, but the conditions under which it is organized do matter.

Most policy trajectories are well intended, but unfold in complex contexts where autonomous forces take over and cause unexpected dynamics, not seldom against the aimed missions. The central aim of 49% carbon reduction in 2030 (recently upgraded to 55% at level of Europe) ascending to 95% reduction in 2050 is clear: this policy aim has been made the cornerstone of the Climate Law (both in the Netherlands and in Europe) [35,76]. The progresses in practice, however, are not just delayed, making a 55% reduction in 2030 almost utopian (the monitoring institution estimates that 34% is more realistic in the current pace of energy transition) [39], but also appear to be counterproductive to the aimed outcomes in a number of cases. I do not intend to enumerate all planning fallibilities in this complex process of policy transition. I mention some indications of irreverent cases:

- Starting a new cohort of coal power plants at the time of climate change in order to guarantee future energy availability.
- Promoting biomass while neglecting the greenhouse emissions of burning wood for energy production and even calculating these as greenhouse reduction; stimulating the (inter-) national trade of forestry pallets by subsidizing the uses of biomass.
- Explosive growth of wind power production yet resulting in more greenhouse emission. Using wind power to attract relatively low-graded, but energy-slurping business from abroad (storage of international data); undermining the social support of wind power by providing public funds and accommodating not even taxed international business.
- Accommodating off-shore wind power parks and subsidizing the non-profitable tops of hydrogen electrolyzers and carbon capture and storage systems with public funds

on behalf of the most polluting industries of the country; without setting additional prices on greenhouse emissions.

- Turning the most committed eco-dwellers into opponents of the planned energy transition.

Making errors is not uncommon in planning transitions that are committed to unknown futures in complex contexts. However, counter + productive initiatives of planning belong to the essence of the wicked problems that are discussed in the introduction. These problems are too complex to be 'simply' solved. The crucial challenge is how to identify these wicked problems and to cope with them. We hypothesized that purposive systems cannot stand on its own in complex missions; in order to keep track in uncertain contexts, it is necessary to be supported by a robust framework of public norms. In the next, we discuss the institutionalization of the 'material public norms' of Dutch energy policy, and, respectively, the 'process norms of politico-ordinance'.

4.2. Flawed Material Norms

The prevailing policies of energy transition may be characterized as purposive managerial processes: purposive missions, negotiation, exchange of interest, the sharing of resources, cooperation, targeting, problem solving, the organization of flexibility, and adaptability of the process of implementation. It is a highly dynamic and pragmatic approach, running from problem to problem and from interest to interest. This pragmatic attitude is needed to make progress (whether in technocratic or in sociocratic practices), however, resting on its own shoulders, this style of planning is vulnerable. It consequently runs the risk of running off-course when not simultaneously guided by actively sustained and validated sets of public norms. The interaction of purposive action and public norms is needed to keep a compass when things become complex. I do not claim that public norms would bring unequivocal solution in questionable purposive practices. Public norms are also human-made, and their meaning depends on actual validation in transitional contexts. Often, the processes of social normalization are conflictive as well. However, they express a different way of deliberation and judgment in ongoing social and policy interaction.

The Dutch government decided to arrange the energy transition as a managerial process, orchestrated by the economic administration (the Ministry of Economic Affairs and Climate Policy) [34]. The Climate Law defined the central mission as an ambitious aspiration of carbon reduction, to be elaborated in a wide number of objectives and targets. The goal-seeking process was actively supported by horizontal negotiation in five round tables, including the important social and economic agencies (business and willing/non-willing civic groups). This horizontal style of planning is a well-known approach of organizing commitment among groups that bring their own resources (knowledge, capital, etc.) to forge policy cooperation. This horizontal 'polder model' may bow on a long tradition in the Dutch political culture. The style of managing aspirations and objectives is also adaptive and flexible, making responsive action possible when the circumstances change. However, it is also a form of corporative, centralized, and relatively unbounded policy power, bundling the intentions and resources of the powerful involved participants, but keeping out the other (often less powerfully organized). In sense of normative legality, most of this negotiating and horizontal style of policy-making is soft, such as the Council of State observed [77]. Most policy missions are delegated in open way to the administration, not very well confirmable by the parliament or the court (that usually depends on marginal control), and thus also not by the citizen. There were recently quite a few controversial legal cases on climate policies in the Netherlands but all of these referred to the obligations of international treatises (in particular referring the European Treaty of Civic Rights). Aspirations and objectives are not binding. Legal obligation of the prevailing management is mainly sought in stage of implementation, marking the risks of operational performance, in particular via private law contracts. Even the central mission is defined as an aspiration rather than a set of mutually binding public norms. The lack of the normative deliberation leads to fallibility and even perverse decisions when things go different than expected

in complex cases of transition. For instance when market actors take the incentives (the permits, the subsidies, the fiscal options) of purposive programs, but use it with different intentions and outcomes than expected; or when the government becomes jailed in its own subsidy programs, that constrain and delay the change of policy trajectories; or when carbon emission is calculated as carbon reduction because calculating it as harmful emission would undermine the agreed purposive programs of carbon reduction. I will discuss the underlying normative framework of this policy in more detail.

The case-studies of energy transition demonstrate that only one normative condition stands out through the whole period of analysis: it is the care for the adequate and reliable availability of energy. It is a crucial normative condition to secure the interests of industries and households, not surprisingly well internalized in economic policies. However, the other public norms that may enrich and complete the whole range of normative deliberation are far less socialized and internalized within the decision-making bodies of the climate policy coordinating economic department. The additional public norms had to be dragged in by the insurgent public via social action, lawsuits and opposing media and information strategies. The real normative dilemmas that may arise in the encounters of a plurality of public norms and ongoing purposive practices are not yet internalized in the decision-making centers. In the case of natural gas extraction, it took decades to bring the public norms of seismic safety and protection of the population to the deliberation of decision-making. In the case of coal power production, it took eight years and an eventual verdict by the court to set the stage for public norms of climate proof energy policies (reduction of greenhouse emissions), and it will take another ten years to disinvest and buy-off the coal power practices. It took about five year's social and legal contestation to bring the public norms of nature care and biodiversity in the centers of decision-making in the case of biomass trade and production. The public norm of social distribution—a crucial denominator of social support to energy transition—is not yet adequately internalized in policies to subsidize the non-profitable costs of new energy investments on behalf of energy-dependent, heavily polluting industries at the costs of the public in the cases of mega wind power parks, hydrogen, and Carbon Capture and Saving CCS techniques without increasing the prices of greenhouse emission by taxing the polluting activities. It will take one more year for the next round of social contestation when the cascading targets of national energy transition urge the implementing local planners to twist a considerable amount of windmills in compact urbanized settings, while spacious mega wind parks on (polder-) land and off-shore are exploited to attract energy-dependent (foreign) commercial interests. The public norm of carbon reduction is not essentially deliberated in these policies. Additionally, the fact that the huge subsidy funds for renewable energy (5 billion annually) are mainly fed with levies from households, small and medium enterprises, and service industries will not soften the normative distributive conflicts in society.

The analysis demonstrates that it takes time to institutionalize new public norms. Institutional change usually does not occur abruptly because public norms are supported in wider constituencies than specific policy missions, and they are embedded in the positions and mindsets of the constituents. Path dependent relationships may delay the progress of change. The claimants and articulators of the meaning of public norms contest the conservation versus the change of normative meaning, which may result in conversion, new layering, and other halfway milestones in the process of institutional change [19]. The investigated cases give evidence of these milestones, in particular in the definition of policy objectives. Policy objectives are not new institutions, but may pave the way for gradual institutional change. In all the above mentioned cases, policy intentions point into new directories, while the actual processes of policy-change are still hampered and constrained by path dependencies. The arrival of new technologies of renewable energy is pivotal, but the deliberation of normative conditions about their production and uses has not yet matured. The problem in these cases is not in the promotion of promising renewable energies, not in the occurring of planning errors, and also not in the emergence of unexpected complexities. The problem is in the yet inadequately matured normative

frameworks which not only lack the internalization of crucial public norms within the decision-making entities but even more the encounters and conflicts between these norms and the ongoing planning practices that both are needed to sophisticate and to validate plural normative judgements in practice. Political norms are not single and unequivocal conditions to practices of policy-making. The significance of normative judgment grows and may enrich in conflictive practices, it cannot be proclaimed from abstract external positions. Without this dialectic feedback, the normative judgement of transition policies is not only flawed at the time of decision-making but it will also lack practical intelligence at times of correction of the inevitable failures. Complex transition processes, such as energy transition, are impossible without making failures. The correction of failures requires the accounting and enriching of normative dilemmas in practical contexts of action.

4.3. Flawed Public Norms of Political Ordinance

Public norms of politico-ordinance condition the mutual relationships between the involved actors on relevant markets and their interrelationships with the state. The role of these norms is to counterbalance the concentration of uncontrolled power in society. This may protect citizens against uncontrolled power by the state, and also by uncontrolled power by economic or social concentrations of power. One of the most effective logics of public norms in environmental policies is derived of the basic social and economic premise that the negative effects on the environment and the climate should be fed back to those who cause the harm. They are made accountable. Harmful emissions above a certain level may be prohibited or sanctioned; there are many ways to elaborate this normative device. The European Union introduced in 2005 the Emissions Trading System (ETS) on this fundament; it does not prohibit carbon emission, but arranges a market of emission rights within ceilings, making emission in this way more expensive and selective when the emission space is tightened [78].

The ETS system appeared not very effective in its first decade, although the ceilings are tightening and the effectiveness is increasing following the rise of ambitions in the Green Deal [76]. Extra pricing greenhouse emissions became a critical issue in the political decisions on the Climate Agreement in a number of European states, including the Netherlands. Adversaries of this normative change claimed that it might lead to international economic leakages and might harm the international position of competitiveness of the business sector while protagonists emphasized the impact on the climate policies and also argued that the international economic playing field was already covered with public subsidies and tax exemptions. The government eventually established a law enabling financial sanctions of large greenhouse emissions in addition to the ETS system [79]. However, the expectation of new economic destabilization (following the COVID-19 pandemic) created the grounds to decrease the level of price sanctions to zero in the next coming four years [79]. The continuing lack of focused sanctioning greenhouse emission sets a high price on Dutch energy policies. Pricing greenhouse emissions holds a strong incentive for industries to invest in less greenhouse emission, and makes alternative technologies more affordable. The higher costs of greenhouse emission may decrease the gap of non-profitable costs of economic investment in clean technologies. Returning the tax incomes to the industries in case of investment in clean technologies would give an additional strong incentive to reduce greenhouse emissions and might partly mitigate the international economic leakages.

The current investment in new energy technologies, however, leans heavily on public subsidies of non-profitable tops of investment. Providing subsidies and enabling favorable contracts, however, are not just beneficial policies, on the contrary, they entangle the government in interdependent relationships with the business sector. Subsidies create new artificial markets with new dependencies. The subsidies are bound to long term private sector investment and strike back at times of policy change. The negative impact of long term subsidy and facility entanglement was demonstrated already in the case of coal power policies, currently it is manifested in the shifting of biomass policies, it is likely to become visible in the re-arranging of the contested uses of mega wind parks, and it is laying a

mortgage on future hydrogen subsidies. The negative effects of this policy of 'beneficiary entanglement' become visible in times of policy change: the negative impacts become manifest in the delayed recognition of erratic policy decisions, which at all investigated occasions had to be forced by social contest and litigation. They are visible in the awkward political calculation of losing programmed output of energy transition in times of change, and they cause a delay to decide for political change. They become manifest in the delays of correcting erratic investment, and in the deterrence of financial and legal claims by the constrained private sector. Finally, they become manifest in the delayed and slowing strategies of political disinvestment. The viscosity of the subsidy mechanisms is repeated in the strategies of re-investment. The long load-times are embarrassing considering the short term urgencies of climate change. As noted above, the subsidies of the 'non-profitable tops' of commercial investment also have a negative effect on distribution. The subsidies are at the expense of the public, and this also goes for the costs of de-investment and re-investment. The classic role division of state and private sector ordered the state to define the conditions and the private sector to calculate its risks of investment under these conditions. Today, these relationships have often become more mixed up, sometimes for good reasons. In the case of Dutch energy policies, however, the classic relationships appear to be almost inverted. The state is deeply entangled in the roles of production and investment while the normative public conditions have flawed.

The delicate nature of politico-ordinance is also demonstrated at the urban level of scale in the cases of municipal entrepreneurialism in Amsterdam and Rotterdam (the largest of this sort in the country). The cases illustrate the courage of proactive cities to take their own steps in the energy transition at a moment that markets and higher tiers of government have not yet come into action. Both cities are strongly committed to the case of the climate. However, public entrepreneurship in wild transition markets with aggressive private equities is not without risks. Both cities took a proactive attitude in a stage that the new heat and electricity markets were not yet bolstered. Both the Rotterdam Heat Company (WBR) and the Amsterdam Waste and Energy Company (AEB) expected to combine profit making initiatives and environmental targets in a 'green enterprise'. WBR aimed at heating 500,000 dwellings by using industrial waste heat, AEB intended to capitalize on early electricity successes and invested 450 million in a huge waste treating technology in order to produce electricity and heat for a large number of housing in a climate neutral way. Again, the policy intentions were good, but the outcomes revealed no more than 10% of the policy aspirations, a huge loss of public capital, and swabbing environmental qualities far from being climate neutral. Both entrepreneurial initiatives ended dramatically. One may wonder under what conditions their performances could have taken more effect.

The normative conditions of politico-ordinance were poor in both cases. The two cities organized their entrepreneurial agencies independently at a certain distance of the political circuits of decision-making, but in reality politics actively meddled in the targeting of entrepreneurial objectives and in the practical operations, such as drawing long-term contracts on behalf of the production, transportation, and the delivery of the heat. The seaport city of Rotterdam has many stakes in business: local politics did not hesitate to fill the financial gaps that were created by its earlier erratic contracts with new contracts that later turned out to be even worse. The public-owned enterprise went bankrupt. In the Amsterdam case, the publicly owned enterprise was parachuted by a mega investment (increasing to a debt of 400 M) creating a technical overcapacity that never could be run efficiently. The management was poor, and local politics continued to put new political aims on its shoulders. Eventually, a subdivision (the heating company) was bought back by the municipality; the rest will be sold to the market. Both cases demonstrate that a public enterprise cannot be organized as a political marionette. It might be run as a public sector agency, controlled by politics and the political budget, or it might be enabled to act as an independent agency controlled by the laws of the market. In both cases, the municipality has to secure clear normative conditions that guide the behavior of these organizations. A

crucial observation is that pioneering public organizations in new arising markets have to be extremely keen on the roles they can and may play. There must be very strict normative conditions when politics and entrepreneurial activity are brought in one hand. In both case studies, politics frequently took the chair of the enterprise and the enterprises from their side were leaning all the time on municipal support. The mix of roles took bizarre proportions in both cases. The city of Amsterdam combines ownership, debt claiming, and commissioning of the AEB, political Rotterdam obligated its heating company WBR both at the supply side and at the demand side with sick contracts for the long term. The government better first focuses on the normative dilemmas into the order of new markets before enthusiastically running their purposive cases.

The final question of politico-ordinance relate to the case of decentralization. It mirrors the tension between the narrowing top-down cascades of the decentralizing planning system and the bottom-up initiatives instigated by active eco-dwellers. Apparently, the environmental concerns and the change of climate have changed the nature of utility markets. Concerned citizens and environmental groups no longer take for granted the routine top-down planning of environmentally critical utilities. They claim the right to participate, to get access to the system with alternative initiatives, and to secure the interests of the climate and environment. The standard provisions of city-heating systems still rely on fossil sources, in particular natural gas or biomass, and also create an alibi market for harmful emissions of fossil industries rather than urging them to clean their production. Additionally, matters of social distribution polarize the planned ways of energy transition. The questions 'who's energy it is?', 'whose rights?' [80–82] are urgent and challenge the politico ordinance of supply driven utility markets. This tension reflects a frequent bias in post-war arrangements of utility markets that tend to focus on the production and exploitation relationships between the government and the utility producing agencies and on conditions of price-setting, but neglect the constituent roles of users and self-producing 'pro-sumers' and cooperatives. Ironically, the most committed protagonists of energy transition have to fight their access to and participation in the closed regimes at the supply side of the planned energy transition. In the Dutch case, the associated cooperatives managed to struggle a small opening in the recent economic ordinance of the heat market [74], but building a widely supported energy transition will need a more robust (financial and legal) support for cooperatives and other local initiatives.

5. Conclusions

The article aimed to explain that public planning is not just a managerial challenge of organizing purposive aspirations and problem solving by negotiating the mutual shares of the involved participants. The gap between well-intended policy-aspirations and lagging outcomes urges a pattern reflection. Collective action in a complex society requires a more intelligent understanding and positioning of planning, including the search of public norms that hold normative expectations and may enable them to search for a sense of orientation when purposive policies, intervening in more complex contexts, become uncertain and obscure. In the very complex case of Dutch energy transition, uncertainties and complications have been raised in all singular tracks of policy transition. In all occasions, the planning processes unfolded differently—if not contrary—than expected at forehand, as on all occasions, political interventions are employed by market actors according to their own routines, creating autonomous realities, and often social and economic complications (even more than technological complications) were raised in the employment of a renewable source. New sources or carriers of renewable energy are not completely clean and require additional (often fossil) sources to be balanced through the year, or require considerable energy investment (such as in the case of hydrogen). The problems and the reversed effects are not as much caused by the new technologies as such, but by the complex relationships under which they are produced, distributed, and used. Undoubtedly, a wide variation of ways to reduce greenhouse emissions and to develop renewable sources will be needed, but not without deliberate selections and not uncontrolled. The article concludes that the

intelligence of planning has to grow via further maturing the deliberation and enrichment of conflictive normative conditions.

In the case of Dutch energy transition, pragmatic attitudes are prevailing in the policies of energy transition. The institutional underpinning of normative deliberation, including both material norms and norms of politico-ordinance, is still immature in this stage, being dependent on the opposing claims of the insurgent public. The internalization of conflictive public norms may help to sophisticate and effectuate the practices of pragmatic energy transition policies.

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