DEMOCRACY AND THE ENERGY TRANSITION

Exploring the energy transitions' potential to further democratize the Dutch society.

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Abstract

Energy systems are not merely technological systems distributing energy, but rather socio-energy systems due to their ability to (re)distribute sociological matters. The energy transition changes the composition of conventional socio-energy systems into decentralized, more fragmented ones within the Dutch society. Democracy is assumed to be the best form of political arrangements because of its intrinsic strengths and instrumental value to any society. Three mainstream conceptions of democracy, being the aggregative, deliberative and competitive, interpreted the fundamental ideal of people having the ruling power differently. But all regard self-government among political equals as the underlying principle of democracy. Climate change mitigation -regarding some- demands freedom impeding measures, infringing upon the democratic ideal of self-government among political equals. The argument is that the energy transition is able to do the opposite by democratizing the Dutch society. Albeit depending heavily on the willingness of the public and institutional arrangements, citizenship will shift from an act of self-centred agency towards public minded agency and the influence of actors within socio-energy systems decreases. Hence, decisions taken are to advance the common good in the equal interest of all, thereby democratizing the Dutch society.

Contents

Introduction

The significance and occurrence of the energy transition in the Netherlands is evident. Rising concerns regarding the consequences of climate change – accelerated by global warming - and finite fossil fuels induce the need for an energy transition. The energy transition is the shift from fossil fuel based, Green House Gas (GHG) emitting, energy systems like coal, gas and oil, to clean (non-emitting) sustainable energy systems based on renewable energy sources, with the exclusion of nuclear and bio-mass. To achieve climate goals of the Paris Climate Agreement, the Dutch Government set strict goals regarding the energy transition for which urgent actions must be taken in order to achieve those (ECN et al., 2017). However, energy systems are more than technological systems aimed at distributing energy. Energy systems consist of sociological elements that must not be overlooked. According to Miller (2014), energy transitions consist of three key elements that stipulate ethical concerns and therefore caution in setting up new energy systems.

The first is that energy systems are systems that closely intertwine technologies with a wide range of people; investors, workers, engineers, industrialists, customers, users, citizens, etc. Hence, technical changes in energy systems "occur in parallel, and in relation to and exchange with, changes in values, decision, behaviours, relationships, practices and institutions" (Miller C. , 2014)

From this, the second key element follows. Being the case that technical changes in energy systems occur in some relation with sociological changes, it accordingly involves redistribution of sociological matters like power, wealth, risk, vulnerability and resilience (Miller C. , 2014)

The third key element according to Miller (2014) is that energy technologies are flexible in design with options for Photovoltaics (PV) panels, for example, ranging from implementations in small handheld devices to utility-based power plants. Different technical solutions subsequently induce a variety of different social and business models. Which in turn imply a broad range of solutions for socio-energy system design entailing -sometimes radically- different ethical profiles (C. Miller, May 2014). Hence, the energy transition consists of the reallocation of important societal outcomes and thus, energy systems are not merely technological systems but rather socio-energy systems. Therefore, it is necessary to design and plan for integrated socio-energy systems instead of technological systems. In order to combat climate change measures, that could threat freedoms valued in democracies are -by some- regarded as morally admissible. Could it be that the energy transition is able to do the opposite? For example, by achieving the climate goals while at the same time further democratizing the Dutch society. Though the end-state of socio-energy systems and resulting outcomes remain uncertain, expert's opinions hint towards a decentralization of energy systems, enabling citizens to reclaim ownership. The fundamental ideal for the Greek was that the people (demos) have the ruling power (kratos). The research question is therefore as follows. *Can a claim be made that in the energy transition mechanisms are present that would yield further democratization of the Dutch society?* If so, this thesis can contribute in the debate about the admissibility of 'authoritarian' measures by arguing that the opposite might be true.

We will begin by assuming democracy to be best form of cohabitation, being the best political arrangement for resolving conflicts arising from pluralism of disagreements among the public and governmental policy. In addition, democracy is often presented as the first requirement for peace, prosperity, equality and freedom (Robert B. Talisse, 2015) and no one has come up with an alternative yet. To correlate the energy transition with a further democratization of the Dutch society is not obvious. Firstly, because current debates are focussed on top-down, freedom impeding measures, rather than bottom-up. Secondly because the energy transition is executed to combat concerns regarding climate change and finite fossil fuels and not as a means to democratize a society. To answer the research question, we must first answer the question what is a democracy? There are three mainstream conceptions (aggregative, deliberative and competitive) that all attempt to capture the essence of democracy in different considerations and mechanisms, which will help us to draw up the principles that constitute a democracy. Because, while each conception holds considerations that are to be appreciated, democratic systems often resemble a compromise between different values and considerations. For each, that is conception, the total scheme of elements, in my opinion, adds up to conceptions who are either overly demanding (deliberative), under protecting minorities interests (aggregative) or fear the risk of dictatorial regime (competitive). Therefore, the three mainstream conceptions are elaborated upon in order to draw up a list of principles that ought to be present in any society that advocates to be a democracy. In section one of the first chapter the mainstream conceptions are discussed in more detail, accordingly. The principles of democracy are elaborated in section two.

As said, the true trajectory of the energy transition remains uncertain. However, due to expert opinions and the latest reports regarding the energy transition in the Netherlands, one can conclude that the energy transition will decentralize the Dutch energy market. This decentralizing effect constitutes two elements. The first is increased opportunity for communities and municipalities to build their own local energy grid. The second is the fact that decentralization institutes a mechanism that breaks up conventional socio-energy systems into smaller ones, decreasing the influence of socio-energy systems on the (re)distribution of sociological matters.

The first element holds that citizens face the opportunity to be incorporated or even initiate their own decision-making process. If so, the best mechanism to advance the common good is through deliberation. The act of deliberating is a mechanism through which citizens are trained and become better equipped in acting as democratic citizens.

The second element holds that corporations active in the realm of socio-energy systems due to the decentralization experience a decreasing ability to influence the (re)distribution of sociological matters. However, the actual impact of the energy transition on the Dutch democratic systems depends heavily on several variables. First is the willingness of the public to participate and deliberate, secondly, municipalities are able to exclude citizens from the decision-making process and third the legal position of ownership in the Netherlands ascribes owners full say over their properties. While the second and third variables can also work to further the democratization, the willingness of public is most determined factor for the ability of the energy transition to further democratize the Dutch society. The goals for sustainable growth as stated in the Energy Agreement for Sustainable Growth (The Social and Economic Council, 2013) are to be achieved either way, so if citizens are not willing to participate, it might be that the Dutch government is inclined to force decisions upon the public (top-down).

Before proceeding with the first chapter of this thesis, I would like to eliminate some misunderstandings. The first and foremost is that concerns regarding climate change and finite fossil fuels are indeed strong and valid arguments in favour of the energy transition, they are just not the focus of this thesis. Therefore, concerns or issues within the debates about climate change and finite fossil fuels are not incorporated in this thesis. This thesis is merely aimed at analysing the possibility of the energy transition to further democratize the Dutch society. Therefore, chapter one will explain democracy, like; what are the mainstream conceptions of democracy, what are there pros and cons, and what will I incorporate in the principles of democracy. Chapter two will discuss socio-energy systems, like, what exactly makes energy systems more than technological innovations aimed at distributing energy, how future energy systems will look like and which elements of the energy transition will be scrutinized in order to conclude, that the energy transition is able to democratize the Dutch society, but only if some choices are made correctly.

1. Democracy

1.1. Self-government among political equals

Judging whether the energy transition further democratizes the Dutch society can only be done if one is able to formulate principles that govern a democracy and reflect on them with elements present in the energy transition that initiate social changes able to democratize a society. So how should one understand democracy? Democracy is to be understood as citizens' political will-formulation, thus a political arrangement for citizens in a state to resolve conflicts about political policy, law and rules. Decisions taken on a democratic basis must therefore be aimed at achieving authority over citizens that oppose political policy, law and rules executed and enforced by the government. By any means, states claim authority over their citizens as well as an entitlement to use force to achieve compliance among those who oppose (Talisse, 2015).

Thus, mechanisms must be in place that ground claims made by the state. Democracy, just as the republic or liberal (Lockean) views, a form of political arrangement in which states attempt to ground these claims. Although other forms of political arrangements are possible, I presuppose democracy to be the ideal of living together due to its intrinsic strengths and instrumental value to societies. *"What we praise as an unmitigated social and political good is the democratic ideal, or perhaps the aspiration identified in the ideal of democracy. What we complain about is the condition of our attempts to realize that ideal in our real political order. We love democracy but find that our actual political order falls far short of that ideal"* (Talisse, 2015, p. 130). Hence, opportunities to further democratize a state, must be taken into serious consideration.

The fundamental ideal of democracy for the Greek was that people (demos) have the ruling power (kratos) (Talisse, 2015). Abraham Lincoln once put it as *government of the people, by the people and for the people* (Lincoln, 1863). These last sentences give a strong initial thought about the essence of democracy and democracies' claim for authority over other citizens, since in some sense, political policies, laws and rules are chosen by the public themselves. So, the question, democrats need to answer is how a citizen can oppose policies, laws and rules that are chosen by the public, but find himself to obliged to comply? In a democratic state, decisions involve the input of individuals who do not know each other and cannot talk face to face. Accordingly, the opportunities for compromise among citizens are few. Democratic decisions are high-stake, and errors can be costly, difficult and slow to repair. So, if citizens are to comply compromises, among whom are these compromises shared? The underlying principle of democracy can be formulated as *self-government among political equals* because citizens are thought of having *equal standing*, *rule together*. The fact that the law in question was produced in a democratic way means that you must obey it, even if you voted against it and continue to personally oppose it. Thus, democracy is an attempt to resolve the conflict between

political equality of all citizens and political authority claimed by the state" (Talisse, 2015). Hence, in a democracy, citizens are seen as equals regarding influence on political policy, laws and rules and the states claim for political authority is grounded in the thought that people rule together.

1.2. Mainstream conceptions of democracy

Different conceptions of democracy interpreted the thought of ruling together differently. In general, there are two distinctions to be made. 1) The process through which decisions are achieved and the basis on which authority is claimed. In addition, 2) the quality of the decisions taken insofar they contribute to a free and just society (Christiano, 2006). The three mainstream conceptions of democracy that are to be discussed in this thesis are *aggregative, deliberative* and *competitive,* all have different believes on how to ground legitimacy of the state. However, I have formulated a list of principles out of due discontent with each of the three conceptions. Each conception consists of elements that deserve consideration and some that do not. For each, that is conception, the total scheme of elements, in my opinion, adds up to conceptions who are either overly demanding (deliberative), under protecting minorities interests (aggregative) or fear the risk of dictatorial regime (competitive). The first conception that is to be discussed is the aggregative conception, the second is the deliberative and the third and final conception is the competitive. The conceptions will be discussed using the following format; summary of each conception, pros and cons and what is incorporated into the list of principles of democracy.

1.2.1. Aggregative conception of democracy

The aggregative conception of democracy relies on equal-vote majoritarianism. The principle of equal-vote majoritarianism holds that decisions are taken by the majority; policies, laws and rules that have aggregated the most votes under the public should be enforced. Thus, in the aggregative view the most important thing is that a collective decision be reached for which a plausible claim can be made insofar it reflects the will of the people, being the *popular will*. Insofar that it does, the aggregative view realizes the democratic ideal of self-government among political equals.

The aggregative view strives to achieve compromise between competing interests (Habermas, 1994). To realize one's own ends, citizens are not encouraged to privilege the rationale or deliberate the common good, but rather to advance their interests and preferences. This adds up to a political system in which *"the onus is no longer on the citizens to moderate her demands in light of what is best for all. The individuals job is to push as hard as she can for her own interests, counting upon others to do the same, and for the political system to balance it all out in such a way as to produce the outcome that is best for all"* (Heath, 2005, p. 9). The aggregative view grounds authority over decisions in the fact that every citizen has equal opportunity to vote, with each vote given equal weight.

The aggregative view is appreciated for its simplicity. The straightforward method of deriving decisions lacks the possibility to discuss the outcome, one could only oppose the interests and preferences behind the vote, the outcome itself is grounded in the mathematical equation of equal-vote majoritarianism. Furthermore, advancing interests and preferences does not ask a great deal of participation from citizens. Which implies the act of being a democratic citizen is to merely advance their own interests and preferences making citizenship an act of a self-interested agency.

However, as Heath (2005) duly notes, the information argument holds that, citizens may be misled, misinformed or even suppressed in taking the wrong decision. The essence of the argument is that citizens are not really aware of what their true preferences and interests are, in any case, the aggregative view does not assume citizens to sit back and reflect on them. The focus on private interests initiates a state in which citizens are ignorant on matters like the economic and political system, and unawareness about their own economic interests or even lack the ability to elaborate on political ideologies (Robert B. Talisse, 2015).

Moreover, constructing a coherent set of private interests and preferences, better known as the *popular will* is by some regarded as simply impossible. The total set of individual preferences and interests makes it (close to) impossible to distil an ordering of social preferences thereby inducing a *majority cycle*. To illustrate the majority cycle, consider the example shown in figure 1, three parties enjoying the same power must decide out of three choices (A, B & C). All have a different scheme of preferred choices (Elster, 2013). This scheme does not allow for a decision taken by the principle of equal-vote majoritarianism for there is no unanimous decision possible. This is not the case of course in all situations, but when due, one must find another mechanism through which a decision is achieved that can beat the approval of the public. A way to diverge from this issue is by flipping a coin, or some other 'luck' based mechanism. With that, reaching a decision is always possible, however, the decision itself will cease to reflect or express underlying preferences or interests.

The third and final objection to the aggregative view is the lingering possibility for majorities to overlook the interests and preferences of minorities. Even more when we consider the fact that political standing and influence are not always distributed evenly. *"We know that even today many democratic citizens overtly profess various kinds of racism, sexism, classism, and other discriminatory tendencies that typically lead individuals to ignore the voices of members of the disfavoured groups"* (Talisse, 2015, p. 142). Aggravatives statement that authority is grounded in the fact that each citizen has equal potential to bring in their own input, begins to sound hollow if the question remains whether each input is actually given equal weight.

I	**II**	**III**
A	B	C
B	C	A
C	A	B

Figure 1

Thus, the aggregative view is charitable for its simplicity and straightforward method of deriving decisions and lack of being overdemanding for citizens. Thus, the aggregative mechanisms will be incorporated in the list of principles of democracy. However, to counteract the disadvantages of this mechanism, a principle that ensures further advancement of the common good to contribute to society must also be incorporated.

1.2.2. Deliberative conception of democracy

The deliberative conception of democracy takes another approach in grounding authority over decisions than the aggregative conception. For deliberativists democracy is more than voting and elections, it holds that decisions are achieved by some process of public deliberation (Habermas, 1994). In deliberativism, the ideal thought is that collective decisions are arrived at by some form of collective reasoning. If citizens want to rule themselves as equals, they must also reason as equals (Cohen, 1996). Thus, the deliberative conception of democracy is distinct from the aggregative conception insofar it does not regard self-government as a process of preference aggregation to construct the popular will, but instead regards self-government as a process through which citizens express their opinions about the common good. In contrast with preferences and interests being up to vote in the aggregative view, what matters most in the deliberative conception is that all arguments and perspectives on any given issue are put forward and be given serious consideration. The deliberative conception grounds authority over decisions, in the process of deliberating, initiating equal opportunity for each citizen to exchange their reasons in support of their views regarding the common good (Talisse, 2015). In order words as Habermas put it "*the question having priority in legislative politics concerns how a matter can be regulated in the equal interest of all"* (Habermas, 1994, p. 5). Thus, in the deliberative conception of democracy, each citizen is put into a position in which they can reflect on their considerations, among other citizens, so they can reconstruct their reasons in support of their views in order to advance the debate about the common good and to maybe convince their fellow citizens. So, the deliberative conception view is held to respect your equality in virtue of the fact that it gives her reasons and the others a hearing (Robert B. Talisse, 2015). The advancement of society over time due to citizens who actively deliberate the common good contributes more to society than merely aggregating preferences and interests (aggregative conception). Citizens are actually advancing the common good. This feature counteracts issues of equal say rather than equal input and the lack of contribution to society from the aggregative conception. Since citizens are more involved, since deliberation is an ongoing process rather than periodical voting, it is understandable to imagine citizens being less ignorant and unaware, which is one of the critiques on the aggregative conception. However, the simplicity of the aggregative conception is not to be found in the deliberative one. Let us go over some drawbacks from the deliberative conception. Concluding that both principles, being deliberation and majoritarianism are incorporated in my list of principles but must be complementary each other rather than excluding each other.

Considering first the cognitive demands placed upon democratic citizens. Democratic citizens are expected to listen to the reasons offered by other democratic citizens who can be regarded as their political opponents. Even if citizens listen to each other, and even if citizens in the first place are willing to deliberate publicly with their fellow citizens, the deliberative conception requires that citizens must be willing to admit the potential wrongness, incompleteness and irrationalness of their views. Besides if so, be open to correct, revise or even abandon what might be longstanding or even cherished commitments or views, if public deliberation proves them flawed (Cohen, 1996). According to Cohen (1996), this inevitable leads to a course of deliberation in which some citizens will lose face, and some will no doubt feel humiliated and exposed in the process. Which in turn may have a negative effect for the odds of involving citizens in the democratic process.

While deliberating about reasons in support of one's views, deliberativists must come up with criteria why some reasons can, and others cannot contribute to the public debate. Because the aim is to regulate concerns in the equal interest of all (the common good), interests should matter for every other citizen. In other words, interests must be shareable among fellow citizens. Nevertheless, what is a *shared interest* and among which citizen ought it to be able to be shared? For an interest to be shareable, reasons in support of governmental policy cannot be based upon sociological consideration

like race, sex or class. Because if so, that policy might be in the interest of one class or sex while not being in the interest of another.

According to Talisse (2015), an appeal to the fundamental presupposition that each citizen is a free and equal citizen and the subsequent role for the state to respect each citizen as fundamentally free and equal individual. This would mean something like the following; *"A reason is public insofar as its force is consistent with regarding all citizens as free and equal partners in the collective project of democratic self-government"* (Talisse, 2015, p. 150). To put it more simplistic; every citizen should be able to formulate for themselves reasons why certain policy would be in their interest aside from sociological considerations.

As a result, a reasons publicity depends not only on its shareability, but on its shareability among free and equal citizens. Talisse (2015) proceeds by claiming that "*the content of the ideals of freedom and equality are among the things about which democratic citizens are divided, and these divisions often drive citizens' public policy disagreements; our conception of the publicity of a reason needs to do the work of separating those reasons that count in public deliberation from those that do not (….) the matter of what precisely it is to evince a due regard for the freedom and equality of each citizen is often precisely what divides citizens when they think about political policy*" (Talisse, 2015, p. 150). In addition, the question of how one ought to institutionalize such a society arises especially with regard to the deliberative conception. However, no one said ruling a state would be easy.

Perhaps the deliberativist could respond to these concerns. She might say that the core deliberativist ideal calls only for the opportunity for citizens to deliberate together, not the requirement that they do so. Moreover, perhaps the deliberative ideal could be realized in a system of deliberative representatives, thus freeing the average citizen from the seemingly unyielding burden of deliberative democracy. This resembles the thought that is held in the competitive conception of democracy.

1.2.3. Competitive conception of democracy

In contrast to the aggregative and deliberative forms of democracy, the competitive view considers the competition for political leadership as the central feature of democratic institutions. Democratic institutions act as a type of filter, making sure that through electoral processes only the most capable leaders advance, while at the same time preventing leadership to become entrenched. While the previous two conceptions (i.e. aggregative and deliberative) focus on what the state does with its power -governmental policy of legislation must somehow reflect the popular will (aggregative) or the common good (deliberative)- democratic institutions within the competitive conception focus on those who gets to enact it. Thereby shifting the emphasis away from the content of legislation to those who enact it (Heath, 2005). Hence, the ideal democratic system within the competitive view is one in which democratic institutions are designed to generate strong and capable leadership for a period. History of human affairs repeatedly shows that people need leadership, but leadership must not become too entrenched because power ultimately seems to corrupt. Therefore, citizens must be able to overthrow leaders who have ceased to be able to contribute to society (Talisse, 2015). The previous conceptions ground authority in the fact that governmental policy or legislation somehow reflects the popular will or the common good. For the competitive conception this is not possible and that raises an issue regarding the claim for authority.

Heath (2005) captures the essential difficulty of the competitive conception to claim authority based on the fundamental ideal of democracy "*The competitive perspective sees a lot more continuity between democratic systems and authoritarian systems of one stripe or another. On the one hand, this means that it is able to explain why monarchies, theocracies, aristocracies and oligarchies often enjoy considerable popular legitimacy. On the other hand, this means that it is unable to explain what many feel to be the qualitative superiority of democratic societies, when it comes to legitimacy. In particular,*

by breaking the connection between the popular will and the specific content of particular acts of legislation, the theory is unable to explain why governments that are viewed as legitimate in general are nevertheless able to engage in specific acts that are widely viewed as illegitimate" (Heath, 2005, p. 17). Hence, the competitive conception incorporates a fine line between the temptation to be a contributing, capable leader and the temptation to entrench himself in power long after he has outlived his usefulness, because control of the state apparatus gives the leader the ability to do so (Heath, 2005). To combat this phenomenon, particular emphasis is put on mechanisms to evict leaders when they have outlived their usefulness with the goal to create a powerful institutional structure that ensures a steady circulation of qualified people.

Hence, where the aggregative and deliberative conception bare upon governmental policy and legislation to reflect the popular will (aggregative) or the common good (deliberative) and therefore focus on the content. Rather, the competitive view shifts the focus on those who enact it. The strongest benefit to this is that it eliminates the necessity of deliberating or voting every decision and thus asks less continuous contribution from democratic citizens. While still, citizens may expect their interests and preferences to be considered. This is charitable because not every citizen wants to participate for their own reasons. That however, cannot ground decisions that overlook the interests and preferences of citizens that are not able or willing to participate. This conception of democracy is therefore less time consuming than the others and can be seen as sort of a middle ground between the deliberative and aggregative conceptions. Strong and capable leaders should have it in them to end deliberations before becoming endless discussion about the correct decision while the possibility remains for the public to evict a leader as soon as the leaders cease to act in equivalence with the general will. Decisions taken are to reflect equal interests of all citizens and chosen leadership on majority basis eliminates endless deliberation over the correct decision. However, corrupt systems may institute trivial attributes to leaders that are not to advance society as a whole but only the people running for leadership (Heath, 2005). The procedure through which candidates are selected is thus susceptive for corruption and campaign finance, while candidates themselves might pose arguments that would please the public while they i.e. the candidate actually endorses views detrimental to the equal interest of all. However, the control over the state apparatus implies the ability for leaders to entrench themselves in power long after they contribute to society. Democratic institutions must be designed to guarantee leaders can be evicted by the public.

1.2.4. Summary mainstream conceptions

All three conceptions of democracy incorporate mechanisms and considerations worth appreciation and criticism. It is not my purpose to settle or even to contribute to the debate of which conception should be endorsed. I have stated these conceptions to illustrate the different interpretations one can make regarding different democratic institutional frameworks. As a matter of fact, often, democratic systems are a compromise between the different mechanisms and considerations presented in the different conceptions. Therefore, to judge whether the energy transition is able to democratize the Dutch society, simply reflecting the energy transition with one conception of democracy institutes false conclusions. Consequently, to be able to judge whether the energy transition is able to democratize the energy transition, I have formulated a list of principles that incorporates favourable considerations from each conception in order to resemble a democratic system as concise as possible so that blindness for other institutional arrangements in the case of particular focus on one conception is eliminated.

The principle of *equal-vote majoritarianism* serves as a decision-making mechanism if deliberation is unable to produce consensus. On the other hand, deliberation further advances the quality of public debates and therefore is able to give further legitimacy to the outcomes of aggregative procedures. While strong and capable leadership can add a balancing role through an element of decisiveness when aggregative and deliberative procedures are unable to achieve consensus about the correct decision. If than, for example, one concludes that a society is further democratized because a mechanism is put in place merely to further guarantee governmental action to reflect majorities will while at the same time basic human rights are violated. The right conclusion is that majorities will is reflected in governmental policy, while the democratic system, deteriorated. Therefore, if one attempts to judge the democratization of a society, one must incorporate considerations of all three mainstream conceptions. The following list of principles, which I have formulated, incorporates four principles that must be analysed in order to achieve a sound and valid judgement about the democratization of a society, with in this case the Dutch society.

1.3. Principles of democracy

As said, the impact of the energy transition on the Dutch democratic system cannot be done by comparing it i.e. the energy transition with just á conception of democracy, because the Dutch democratic system reflects a compromise between mechanisms from each mainstream conception. Therefore, democracy is more than merely democratic institutions that reflect the mechanisms and considerations of just one conception of democracy. During the explanation of each conception I have hinted towards the mechanisms I incorporate in this list. In the following list the strengths from each conception are incorporated which should be interpreted as complementary to each other, thus ascribing equal value to each principle. In that sense, the following list is an ideal and although it is probably never reached, it does set the stage enabling one to judge the impact of the energy transition on the Dutch democratic system. We will now discuss the following principles more in detail.

1. **Principle of real majority-based decision:** *Governmental action must be equivalent to the majorities decision*
2. ***Principle of guarantying basis human rights:*** *Minorities must be guaranteed protection from majority decisions that might impede with human rights and minorities interests*
3. **Principle of participation:** *The more people participate the better they get equipped in acting as democratic citizens*
4. **The principle of shared interests:** *Decisions should be based on the common good rather than popular will*

1.3.1. Principle of real majority-based decision

This principle is based on the *equal-vote majoritarianism* principle but is distinct from it insofar it regards *equal input* of insufficient value to justify authority. What I mean with *real* is that it may not occur that based on majority rule, decision A should be enforced by the Government while the government enforces decision B. Hence, decisions on majority rule basis ought to reflect the popular will. I order to guarantee that decisions reflect the popular will, but the mechanisms must be in place. A recent case in the Netherlands illustrates that governmental action does not always reflect the general will. To everyone's surprise, during the presentation of the government agreement of cabinet Rutte 3, the dividend tax was eliminated. The exact details about this tax are not important, what is important is that while the opposition and public opinion opposed the measure, in the end, after many debates the measure remained intact. This stipulates the necessity for mechanisms to guarantee governmental action to reflect the general will, up until the point of course respecting basic human rights.

The principle of majority rule is incorporated in this set of principles -among others- because it is able to serve as a decision-making mechanism when deliberation is unable to reach consensus. In some cases, like the energy transition, time is pressing, implying that some decisions must be taken before they cease to be able to contribute to the matter. The process of deliberating only ends when consensus is reached "a*s a result, institutions that function in accordance with a pure deliberative principle such as juries, often find themselves 'hung' i.e. unable to come to a decision. Furthermore, even when they do achieve consensus it takes them an extraordinary long time to do so"* (Heath, 2005, p. 14). This does not imply that deliberation is not worth aspiring, to the contrary even. However, without a mechanism like the majority rule, the advancement of society might be an excessively long process.

Another argument in favour of majority rule is the uninformed citizens argument from Heath encountered in the deliberative conception of democracy. According to both Heath (2005) and Talisse (2015), citizens are mostly unaware of what is truly in the equal interest of all. Due to either ignorance on economic and political matters or unawareness of their economic interests and political ideologies. However, we have already established that the Dutch democratic systems reflects a compromise between each conception. Moreover, deliberation, according to Elster (2011) and Cohen (1996) can advance the public debate and thereby to civilize society. Thus, a principle that stipulates the advancement of the public debates must also be incorporated. However, as is duly noted by Heath (2005) "*yet in the end, we usually have to rely upon some other mechanism – such as majority rule or arbitration – to close down the discussion and impose a decision"* (Heath, 2005, p. 14).

1.3.2 Principle of guarantying basis human rights.

A downside of the aggregative view in justifying authority over decisions on a majority-based principle is the potential negligent of minorities' basic human rights. "*One need not look too far back in in the history of existing democratic states to find instances in which majorities have exercised various form of social power to marginalize, silence, demote and invalidate the interests, ideas, concerns and even the voices of minorities groups"* (Talisse, 2015, p. 128). Since political standing and influence are not always distributed evenly. "Arguably *the aggregative view can be extended beyond such straightforwardly procedural rights to some concerns about outcomes. For it might be said that collective choices that depend on discriminatory views – on hostility or stereotyping- do not give equal weight to interests of each who is governed by them"* (Cohen, 1996, p. 411). Cohen (1996) essentially describes the distinction - which I already made in the previous principle- of *equal say* versus *equal input*. Under cultural conditions where inequalities of political influence, power and standing are prevalent, equal voting is not sufficient for having an equal say in the democratic process. For the

citizens that have more political power, standing and influence, and thus social standing, might regard those who do enjoy a lesser social standing as unequal and therefore might forego their ideas, concerns, interests and even their voices (Robert B. Talisse, 2015) . Therefore, we must supplement the majority rule with a principle that guarantees the protection of basic human rights for all, including minorities. However, this does not institute a culture in which every citizen enjoys equal say in the democratic process. Therefore, we need another principle in which citizens are motivated to participate.

1.3.3. Principle of participation

To advance the debate further, as much citizens must partake in the decision-making process as possible. The more citizens deliver input, through voting or deliberation, the better decisions will reflect the general will. Obviously, this is not the case when some or more groups are relatively underrepresented. Think of it like taking a sample or survey; the more citizens -with equal distribution of backgrounds, culture, ages, race and so forth- are taken into account, the better a claim can be made that surveys or sample are to reflect the total public opinion. This principle originates from the argument that the more citizens from different groups and backgrounds are involved, the more different interests and preferences will come to the table. Hence, the better one is able to formulate a decision that is the equal interest of all. Whether or not citizens agree is upon them, but at least each citizen had equal opportunity to exchange considerations. Thus, this principle makes explicit the presupposition that every citizen must be able to partake in the decision-making process if they want and promotes it by adding the necessity for mechanisms that are to advance participation among citizens. While in the aggregative conception, citizenship is viewed as individualistic and self-centred agents seeking for political arrangements that suits his or her individual preferences, which we already established to be an incomplete view on citizenship. In contrast, citizenship is laden with the public minded task of contributing to the common good. Advancing democracy is an ongoing process of deliberating the common good, to be able to do that as vigorously as possible asks from every citizen as much participation as possible. This principle is also found in a democratic view that can be categorized as a sub view of deliberativism called *participationism*[1]. Therefore, decisions must reflect the general will based on as much participation as possible to the extent that basic human rights are respected. Mechanisms must be in place to guarantee this. The question remains: on what content ought decisions to be based? In order to advance society as a whole, deliberating the common good does a better job than merely aggregating preferences and interests. Thus, decisions must be based on shared interests.

[1] In participationism, democracy is envisioned as a large-scale collection of interlocking civic associations, where individuals come together to pursue aims and goods that serve the distinctive good of the whole (R. B. Talisse, 2015).

1.3.4. The principle of shared interests

To eliminate the possibility of an eternally ongoing attempt to reach consensus while deliberating, majority rule is somewhat of a necessary evil. In the aggregative view, the thought is hold that each citizens' own preferences and interests must be given equal consideration. However, as presented before, the unequal distribution of political standing, power and influence raises issues regarding equal say for each. Both the competitive and deliberative conception attempt to eliminate these issues. The legitimacy of the state in the competitive conception is grounded in strong and capable leaders that are to advance equal interests for all. While in the deliberative conception legitimacy is grounded in the fact that each citizen enjoys equal opportunity to advance their reasons in support of their views. In both cases, the correct decision must resemble a correlation with *shared interests*. Decisions based on shared interests are to eliminate issues regarding the uneven distribution of political standing, power and influence, and thus reflect the common good. What actually is to be understood as the common good, cannot be captured by aggregating private preferences and interests. Deliberating shared interests institutes a situation in which citizens are able to reflect on their- and their fellow citizens'- considerations. This enables them to reconstruct their reasons in support of their views in order to advance the debate about the common good. Because fellow citizens will do the same, they will not accept private interests and preferences as valid reasons in support of one's view (Cohen, 1996). Thus, deliberation advances the debate about what is good for the whole of society, better than aggregating private interests and preferences.

1.3.5. Concluding remarks on list of principles

These principles need to be present in every society advocating to be a democracy, but principles are not enough. Actually, the mechanisms put in place to guarantee these principles to be respected are more important than the principle itself. Whether or not these mechanisms are to be instituted or are already in place is not the focus of this thesis but does determine the level of democracy for a society. This thesis focusses on the potential of the energy transition to democratize the Dutch society. In the following chapter, I argue that this potential is indeed present, but the actual fulfilment of this potential depends – among other variables- on the presence of the mechanisms stated in each principle. Which leads to the following table. This table will evolve during this thesis in order to give a clear image of the argumentation.

Principles of democracy	Principle of actual majority-based decision	Principle of minority protection	The principle of participation	The principle of shared interests

Table 1.

2. Democratization of the Dutch society

The potential of the energy transition to democratize the Dutch society depends on its impact on sociological matters for which a correlation with one of the four principles of democracy can be drawn. Energy systems incorporate technologies and resources to enable a stable and resilient supply of energy. Upon these technological arrangements, societies can be build, maintained and grow. Because technological arrangements are flexible in design, it is more a question of how it can be arranged compared to what is arranged. With each unique arrangement different questions arise of justice and accessibility for people of different social classes, in different locations and with different backgrounds. Therefore, energy systems are not merely technological systems but rather socio-energy systems. In the next section, further elaboration on socio-energy systems is given. The fact that energy systems influence sociological matters does not directly imply that the energy transition will impact those. However, in section two I argue that one can conclude the energy transition to impact sociological matters by decentralizing energy systems. This phenomenon institutes two elements being; 1) decision making process becomes more democratic and 2) remunicipalisation, which is the act of reclaiming ownership of previously privatized public utilities by the public. If both elements continue to be present in the energy transition, it can be argued that the Dutch society will experience a positive democratization. As three out of four principles within the principles of democracy are correct: 1) decisions will better reflect majorities opinion, while 2) be based increasingly on shared interests and 3) through the process, citizens become better and more equipped to act as democratic citizens. those three principles will be argued in section three of this last chapter. So first, what makes an energy system, socio-energy systems?

2.1. Energy socio-systems

Energy systems are among the largest human enterprises, they are technological arrangements upon which societies can be build, maintained and grow and develop. Thus, merely reducing the energy-systems to the prices at which technologies can deliver energy in a useful form and the carbon emission they release, initiates a blindness for other important social aspects of the energy transition. How these social aspects will be interpreted and implemented in the energy transition will determine to great extent how citizens will judge the successfulness of the energy transition. Miller et al. (2013) states three dimensions present in the energy transition.

First up is the energy infrastructure, which is foundational to modern energy systems. Conventional energy systems bear upon “big, durable, well-functioning systems and services” (Edwards, 2009). Big because of their ability to vastly influence everyday life and durable because of their ability to exert influence for decades. Within these systems, technologies work together to provide a constant and reliable supply of energy. If one of these technologies fails, during an electricity blackout for example, “*computers shut down, elevators and trains cease to run, and hospitals and factories may have to cut back on their activity”* (Miller, C., et al, 2013, p. 141). The crashing of computer systems of the Dutch airport Schiphol recently -due to a power outage- led to the cancellation of flights and even a periodical closure of the airport itself (AD, 2018). Illustrating that although energy infrastructure and services are typically hidden from public view, they are highly significant in structuring social, economic and political organization (Miller et al., 2013). These are functional elements of infrastructure and there are also social consequences depending on infrastructural choices which are made.

Consider for example the Dakota pipeline case. This pipeline was routed through the territory of native Americans (Standing Rock Sioux Tribe). For the corporation involved, the Dakota pipeline would provide a more cost-effective, efficient manner of transporting oil and thus would foresee in an increase in profit margin. While for the tribe and community at the same time, the pipeline would contaminate sacred burial sites and drinking water (BBC, 2017).For the corporation the cost-benefit

analyses that led them to route the pipeline through the territory of native Americans, the infrastructure was merely a functional element of the energy system degraded to private interests aimed at increasing profits. While for the community, it clearly had social consequences. The huge controversy that surrounded this pipeline shows to what extent infrastructure can affect sociological matters.

The Dakota pipeline case highlights also the second social dimension stated by Miller (2013); the knowledge practices governing energy systems. The cost-benefit analyses that led to the routing of the Dakota pipeline illustrates the fact that energy systems are often reduced to prices at which technologies can deliver energy (Miller, C., et al, 2013) and thus reflect biases of particular groups to not take into account shared interests but rather economic interests. Which corporations should do to increase their profit margins to guarantee continuation of activities and the support of shareholders: welcome to capitalism. Corporations operate this way, not only in the U.S.A but also in the Netherlands, which I will return to with the Groninger Gas case in paragraph three of this chapter. The fact that corporations do so, seems to imply that the desirable path forward often looks very different depending on whether one is a policy-maker, an entrepreneur or a local citizen (Miller, C., et al, 2013). Moreover, renewable energy developments can exhibit the same problems as conventional systems do currently. According to Ottinger, to give greater credence to the "street science" of local communities within *deliberation* over renewable energy developments might rectify the situation (Ottinger, 2010). The right to participate in choosing whether and how energy systems will change, stipulates concerns about justice, in particular procedural justice, which is the third and final social dimension discussed by Miller. Due to the scope of this thesis and the research question being whether the energy transition can democratize the Dutch society, justice is not discussed further. The question to what extent the democratization of the Dutch society might happen due to the energy transition does not bear on questions of justice. That is a debate worth noting, but none that I would wish to settle or contribute to in this thesis. However, it does stipulate extra concerns regarding the design and implementation of new energy-systems. The energy transition is occurring evidently, hence *"all of this renders particularly acute the need for energy policies to become much more critically reflective about the nature and implications of energy transitions"* (Miller, C., et al, 2013, p. 139).

2.3. The energy transition

The energy transition is the shift from fossil fuel-based energy systems like gas and coal, to sustainable energy systems primarily based on renewable energy sources. I will elaborate further on the energy transition using reports from Tennet [2], ECN (Energieonderzoek Centrum Nederland [3], WUR (Wageningen University and Research)[4], Ecofys[5], and interviews conducted with Lennard van den Burg, Annelies Huygen and Kornelis Blok. Lennard van den Burg is active in the Business Development Sustainable Energy & Smart Grids department of TNO, the Netherlands Organisation for applied scientific research. Moreover, Van den Burg develops new innovative projects & initiatives that have a substantial effect on the sustainability, affordability and security of supply of our future energy system. Annelies Huygen is professor by special appointment 'Ordering Energy Markets' at the faculty of law of the University of Amsterdam (UvA) (see appendix I). Kornelis Blok is the director of Ecofys and professor of Energy System Analysis at the Technical University Delft (see appendix II), These reports and interviews combined give the latest insights about the potential future trajectory of the energy transition. Care has been taken to make a thorough and detailed description of the energy transition as much as possible. However, the definitive end-state of energy-systems afterwards the energy transition remains uncertain. Thus, future developments can accordingly have a positive or negative effect on the question whether the energy transition makes the Dutch society more democratic.

2.3.1. Facts and figures about the energy transition

According to the literature, the presence of the energy transition is evident. Tennet (2018) states *"The electric power system in the Netherlands and Germany continuously evolves to a system with a lower amount of conventional generation capacity (fossil fuel based) and an increasing amount of renewable generation capacity. This trend continued in 2017 with mainly coal plants exiting the market and wind capacity entering the market"* (Tennet, 2018, p. 20). While ECN (2016, p. 13) observes that *"transitions are in themselves nothing new, landscapes and living environments have always been subject to ongoing dynamics of human conduct. Energy supply including energy storage and transportation are*

[2] Tennet is a transmission system operator. The corporation is engaged in electricity transport and balancing between supply and demand of electricity. In this form it coordinates the Dutch electricity supply, the corporation is owned by the Dutch State (Ministry of Finance). Tennet. (2018, June 1). About Tennet. Retrieved from https://www.werkenbijtennet.nl/nl-NL/over-tennet/bedrijfsprofiel

[3] The ECN (Energy Investigating Centrum Netherlands), ECN develops new technologies and conducts pioneering research into innovative solutions in various ways to enable the transition to sustainable energy management. ECN does this with and for corporations, but also national governments and the European Union. In the following areas; solar energy, wind energy, biomass, energy efficiency, policy studies, environmental research and engineering & materials. ECN. (2018, May 26). Products and services. Retrieved from https://www.ecn.nl/nl/producten-en-diensten/

[4] Wageningen University & Research is a collaboration between Wageningen University and the Wageningen Research foundation. The strength of Wageningen University & Research lies in its ability to join the forces of specialised research institutes and the university. It also lies in the combined efforts of the various fields of natural and social sciences. This union of expertise leads to scientific breakthroughs that can quickly be put into practice and be incorporated into education. This is the Wageningen Approach. The scientific quality of Wageningen University & Research is affirmed by the prominent position we occupy in international rankings and citation indexes. WUR. (2018, June 1). About Wageningen. Retrieved from https://www.wur.nl/en/About-Wageningen.htm

[5] Ecofys is a leading international energy and climate consultancy. Ecofys has been at the forefront of energy thinking for over 30 years and are part of Navigant's global energy practice. A joint team of more than 600 experts delivers impact in the global energy and climate transition. Ecofys. (2018, May 26). About us. Retrieved from https://www.ecofys.com/en/info//about/

an important part of that human conduct. What is new, is the fact that electricity generation might be closer to home than before, besides the urgency and speed changes have to be made".

These developments are initiated by the Energy Agreement for Sustainable Growth (EASG) imposed by the Dutch Government, aiming for 16% of the total energy supply generated by renewable energy sources in 2023 (The Social and Economic Council, 2013). Where the goal of 2023 will be exceed reaching 17.3%, the goal of 14% renewable sources in 2020 is not to be reached which does not exceed 13% (ECN et al., 2017).

Current developments point at increasing importance of sun and wind powered power plants over other forms of renewable sources like geothermal and hydropower. Figure 2 displays the operational generation capacity in the Netherlands, which has increased by 60 MW in the Netherlands. The renewable capacity increased by 1 GW to a total installed renewable capacity of 7.2 GW, while the conventional capacity decreased by 0.9 GW to a total capacity of 21.3 GW. The increase of renewable capacity can be attributed to a higher onshore wind and solar PV generation capacity. The onshore wind capacity grew by 13% from 3.2 to 3.7 GW and the solar PV capacity increased by 27% from 2.0 to 2.6 GW. The offshore wind capacity remained constant at 1.0 GW. The decrease of conventional capacity is mainly caused by the closure of two units of the Maasvlakte hard coal plant (1.1 GW in total), as agreed upon in the EASG (Market Review 2017; Electricity market highlights, 2018).

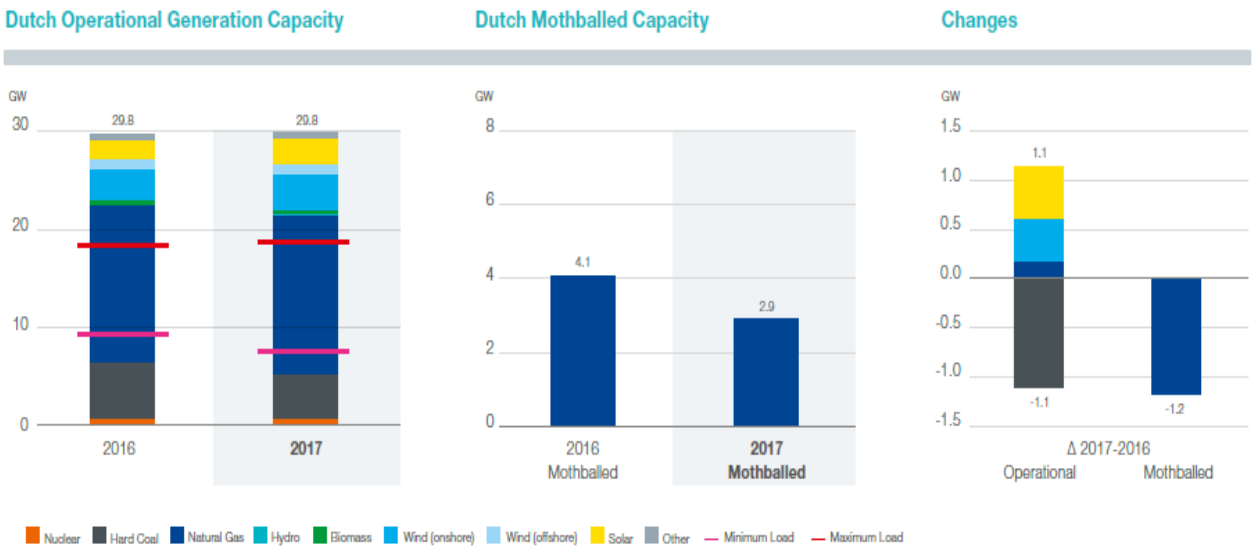

Figure 19: Operational and mothballed generation capacity in the Netherlands in 2016 and 2017. Source: TenneT NL, ENTSO-E Power Statistics, Nationale Energieverkenning 2017

Fig 2.

Furthermore, a shift in the different fuel types in the total electricity generation is observed by Tennet (2018). Due to the closure of the Maasvlakte coal plant, generation from hard coal decreased from 36 TWh to 30 TWh per year. The lower coal generation is compensated by an increase in generation from natural gas plants, "*whose total generation rose from 39 TWh in 2016 to 44 TWh in 2017*" (Tennet, 2018, p. 27). Thus, as seen in the figure the dominant renewable energy sources are solar and wind with a combined increasement of 40%. Although these figures show the energy transition is evident, they fall short in answering questions of allocation of recourses. Thus, the occurrence of the energy transition is evident, increasingly, wind and solar gain importance and presence in energy systems throughout the Netherlands. Though these numbers indicate the presence of the energy transition, they do not indicate whether the energy transition actually democratizes the Dutch society. To be able to do that, we must focus on another aspect of the energy transition observed by experts and initiated by the EASG; *decentralization of energy supply.*

2.3. Decentralization in the energy transition

The two most important elements –among others- that institute a decentralisation of the energy supply are 1) the Energy Agreement for Sustainable Growth (EASG) initiated by the Dutch Government (The Social and Economic Council, 2013) and 2) an increasing division between the urban area and the industry observed by experts (Burg, 2018; Blok, 2018).

The EASG consists of, in total, ten pillars that must guarantee successful execution of the EASG. The pillars range from energy saving policies to financing of sustainable investments. There are three pillars that (re)arrange the allocation of (renewable) power plants across the Netherlands and which are therefore relevant for this thesis:

- Pillar 2 of 10 and the first in this list consists of scaling up renewable energy supply;
- Pillar 3 of 10 and the second in this list aims at stimulating decentralized energy generation by local communities and municipalities;
- Lastly pillar 6 out of 10 and the third in this list states the closing of several hard coal plants before the first of July 2017. In Tennent's market review we can trace back that these coal plants are indeed closed (Market Review 2017; Electricity market highlights, 2018).

Governmental policy through these three pillars aims at stimulating the implementation of renewable energy solutions, while at the same time discouraging the exploitation of conventional fossil fuel-based systems like coal plants. The stimulation of renewable energy sources and discouraging fossil fuel-based does not really steer to a decentralization of the energy supply. For that, we must turn to pillar 3 in which is stated that municipalities and communities ought to take up a role in decentralizing the energy system. The Dutch government set goals regarding, for example, a total of 6000 MW of onshore windfarm (The Social and Economic Council, 2013). The number itself is not important, note that the Government has distributed this amount among all municipalities with the obligation to install an X number of windfarm.

The increasing responsibility for municipalities and communities including the declining costs of renewable energy solutions, according to Huygen and Van den Burg (2018), initiate a division in the manner of inducing energy between the urban area and the industry. To understand this, let me elaborate on what is meant with both the urban area and the industry. The urban area is the environment in which citizens live and find the necessities to live such as hospitals, schools, housing, groceries and other small business that support the lifestyle of citizens. The industry is the environment that holds corporations and are located strategically, because of the necessity for easy access to logistics and/or the need or presence of resources. These corporations like big oil refineries, chemical or steel manufacturers demand more energy per square meter than the urban area does. While the energy consumption for the urban area can, normally, be induced by relatively small parks of solar and wind powerplants located nearby. The Dutch government in the EASG allocated utility based offshore windmill- and solar parks for the inducement of energy for the industry. Huygen, Van den Burg and Blok (2018)observe this for the industry as well. Utility scale renewable solutions are necessary, while for the urban area, which in the Netherlands consists of mostly villages and towns located in rural areas, as also stated in the EASG, local solutions of smaller scale are to be initiated by communities and municipalities (Blok, 2018; Burg, 2018)

This implies that for the urban area, citizens can reclaim ownership of their energy by initiating local renewable energy systems themselves, while for utility based renewable energy systems influence on governmental policy can be exerted through lobbying, protesting and voting. At this point, I need to highlight the fact that the ability to initiate local energy systems depends heavily on the willingness and cooperation of the public to act in line with the EASG. If not, there is a chance that corporations will fil in the gap. That these windfarms or solar parks will be build is a matter of time due to the strict climate goals the Dutch Governments must achieve, in order the meet the Paris

Climate Agreement. Thus, willingly or unwillingly, at some point, every Dutch citizen will experience the impact of the energy transition to some extent. If left to corporations, the ability for the citizen to directly influence the decision-making process ceases. It may be the case that corporations incorporate the community's opinions in the design, though the influence will be significantly lowered. Adding this to our table, it looks as follows.

Principles of democracy	Principle of actual majority-based decision	Principle of minority protection	The principle of participation	The principle of shared interests
Democratizing elements of the energy transition				
Correct institutional arrangements are able to further democratize				
Decentralizing conventional socio-energy systems into smaller socio-energy systems				

Table 2.

2.3.1. Element one: localising energy supply initiates local engagement

Because municipalities are given more responsibility to install green and renewable energy projects, they can make a twofold choice. They can either involve citizens in the decision-making process or they do not. Municipalities in Zuid-Holland (Dutch province) chose to do the latter regarding several windfarm projects, the result is that the speed growth rate of installed capacity lacks behind what was expected (Ketelaar, 2017). On the question why citizens opposed these windfarms, they answered a lack of participation. Nevertheless, the public remains to support wind power in general. Therefore, at first sight it seems puzzling that installed capacity goals are not met. Studies investigating the public attitude towards windfarms showed strong general support for windfarms. However, this positive attitude will not automatically result in concrete support for any wind power projects, as shown in the example earlier. Concrete support depends heavily on the percieved visual quality of the site. If the percieved visual quality is negative, citizens regard the impact on scenery and the intrusion of the landscape as negative. They would oppose the wind projects while remaining in support of wind power in general. At first sight, thus, this seems to resemble the Not in My Backyard (NIMBY) principle (Lake, 1993) of opposition (Wolsink, 2000).

The conventional view of NIMBY-ism is that citizens are in favour of renewable energy sources but are opposed to them in their own area. Although everyone would be better off if the energy transition will be successful, this does not happen due to everyone's decision not to co-operate. Selfish motives are attributed to those harbouring NIMBY sentiments. "*For virtually all our failures to solve pressing social problems. Our inability to eliminate environmental degradation, traffic congestion, homelessness, crime, and poverty is ascribed to NIMBY. We could make giant strides in all these areas, it is claimed, if local communities would only abandon their selfish opposition to the waste incinerators, transit systems, housing projects, prisons, shelters and clinics society need to solve these pressing*

problems" (Lake, 1993, p. 87). Wolsink (2000), concludes that attributing the slow speed growth rate of installed wind capacity to NIMBY-ism is false, rather, top-down institutional arrangements must be blamed. "*Although attitudes and behaviour may be personal, they are apparently influenced by the decision-making process. These processes develop patterns that depend highly on the way physical planning is organised. These institutional factors can also be recognised in place making processes for wind power. Hence, the success of wind power appears to be strongly dependent on institutional arrangements within the policy domains of physical planning and energy"* (Wolsink, 2000, p. 58). The significance of institutional arrangements for wind power development is not unique for wind power, as this appears to be important for implementation of other renewable sources as well (Walker, 1995).

What if municipalities were to change the design of institutional arrangements to create institutional capital? *"institutional capital when engaging in sustainable spatial planning in open societies*. *Institutional capital has three dimensions: knowledge resources, relational resources, and the capacity for mobilisation. All three dimensions are bolstered by collaborative approaches to planning. A collaborative style in siting renewable energy infrastructure as well will probably be more effective than top down planning"* (Wolsink, 2000, p. 62). Regarding knowledge and relational resources an argument can be made that involving citizens will strengthen and increase these resources. Roopali Phadke's study in America (2013)-in which communities deliberated the pros and cons of windfarms in their vicinity- showed that deliberative workshops in communities can ensure to broaden and deepen the debate (Phadke, 2013). Equivalent to what Wolsink (2000) states in his article, the percieved impact on scenery is the determinant factor for support of particular wind projects. In addition, Phadke's study (2013) illustrated that citizens can set aside selfish motives and argue in favour of the common good; *"If my choice is to wind farms located next to Buffalo State Park or another coal generating plant in North Dakota, I'll say build the wind towers"* (Phadke, 2013, p. 253). This is a shared interest because cleaner air applies to the equal interest of all. What this study indicates, is citizens engaged in dialogue, possess the qualities to keep the common good in mind and to deliberate shared rather than private interests. Since the common good is based on shared interests -see the deliberative conception in chapter one-, a claim can be made that decisions are based on shared interests rather than in the case of top-down mechanisms. Thus, involving citizens in the deliberation process will advance *the principle of shared interests* based on two considerations instituting better knowledge resources.

First, citizens are involved in the deliberation process, therefore they are put into a position in which they can reflect upon and scrutinize their own reasons in support of their views. In addition, they are able to listen to other reasons and maybe even appreciate them. Thus, on the one hand the debate is advanced because ever better reasons are given in support of one's view and on the other hand, the debate is advanced because citizens become trained and accustomed to the act of deliberating. Both elements constitute better reflection over the question of what is the common good. This is the first potential mechanism within the energy transition that can democratize the Dutch society; a greater amount of trained, participating citizens deliberating the common good based on shared interests. However, I am a man of good faith in a citizen's ability to deliberate shared interests. If one does not one might respond to my previous claim saying that citizens are not able to deliberate shared interests and would always do their best to advance their own interests and preferences. This is understandable regarding the immoral things that people have inflict on each other in everyday life

If so, consider the second positive element of deliberation. According to Elster (2011), publicity might provide a remedy. For self-centred agents prone to advance their private interests and preferences, publicity can act as mechanism through which citizens are to state their preferences and interests as if they are shared interests (Elster, 2011). Once these 'shared interests' are stated, one cannot suddenly abandon or subvert their 'shared interests'. Creating public pressure to keep standing behind these shared interests. Thus, the public pressure of stating shared interests, although hypocrite

in a sense, seems to have a civilizing force (Elster, 2011). If true, one can imagine the extreme demands placed upon citizens to consider interests and preferences of different groups of citizens. For example, consider three citizens that are to achieve a decision, which incorporates shared interests to the extent that the common good is advanced for the whole state. It seems plausible, even with the best intentions, in which they might not succeed to take every possible interest and preferences into account. Nevertheless, especially nowadays, societies are multicultural and therefore consist of groups of citizens with very different preferences and interests. For an ordinary democratic citizen quite, a task to bear to consider all preferences and interests. According to advocates of the competitive conception, this is a task for strong and capable leaders. However, legitimacy of the competitive conception is not grounded in the content of governmental policy or legislation, but on those who enact it. Thus, only when the public opposes -which is only possible after a decision by a leader is taken- can one state that the leader has not succeeded in taking the correct decision. Thus, to advance the debate about the common good vigorously, deliberation is the best mechanism. Hence, these elements seem to institute a mechanism through which the energy transition can democratize the Dutch society if municipalities choose to involve citizens in the decision making by advancing the principle of shared interests.

One counterargument to this statement might be that citizens are already able to deliberate governmental policy in for example a gym or the local pub and accordingly, are able to reflect on theirs' and others' reasons. Thus, the argument holds that citizens are already trained and equipped in deliberating the common good and that the energy transition will not contribute enough to democratize the Dutch society. However, there are two differences between the type deliberation in this argument and the one involving the energy transition. The first is that citizens in the former type are deliberating in a setting without direct influence on governmental policy or local action. To the contrary, often it is the case that in this setting, citizens deliberate decisions who have already been taken or, for which they have no opportunity to directly influence the decision either by input or through voting. While in in the case of renewable energy systems, climate goals require urgent action. So, deliberation is not an act of 'small talk', but rather a true act of democratic agency. Because the community could design renewable energy solutions acceptable to the community, citizens are likely more motivated to participate. The more citizens feel they are governed by a decision affecting their lives, the more involved they will be. Thus, regarding *the principle of participation*, the energy transition is likely to motivate citizens in deliberating the design and trajectory of the energy transition for their community. As discussed in the principle of participation, citizenship is to be regarded as a public minded task of contributing to the common good rather than an individualistic and self-centred agent seeking for political arrangements that suits his or her individual preferences. The dependency on each other to institute renewable energy solutions acceptable to the community through a process of deliberation is also able to increase relational resources due to local engagement.

Concluding, if the correct institutional arrangements are chosen within the energy transition, citizens may become trained and better equipped in deliberating shared interests. Through increased relational dependence, local engagement can yield stronger, coherent communities better able to reach consensus about any future decisions. These can only emerge from reducing the arrogance of utilities, wind power developers, and public bodies involved.

2.3.2. Element two: decreasing ability for corporations to influence decision-making process.

The increase of renewable energy solutions changes the composition of dominant corporations within socio-energy systems. Large oil and gas corporations experience a position of dominance. To make fossil fuel-based energy systems viable corporations, like Shell and Exxon, rely upon utility scale exploitation, refinement and transportation (Miller, C., et al, 2013). The existing giants can only burden the costs of exploiting increasingly hard to reach resources. The initial knowledge, capital and technology necessary to exploit any fossil fuel resource prevents others from entering the market. As a consequence, conventional energy systems reflect the features of a tight job market. The vacancies in this case are the energy cases provided by employers, for example, local communities, while Shell and Exxon are among the few capable employees that can fulfil the energy case. Because the capital, expertise and technologies needed to fulfil energy cases can only be provided by just a few employees, the employers in the form of local communities are bound to cooperate, which creates a position of power for the corporations. The necessary inclusion of these corporations in the decision-making process enables these corporations to exert influence. The public and state apparatus simply do not own or have access to the attributes needed to build conventional energy systems. Lobbying and sponsorship are mechanisms to influence governmental policy that corporations enjoy due to the necessary inclusion.

However, renewable energy sources are cheaper and less complex than conventional ones and can therefore be installed by a range of different corporations (IRENA, 2018). New energy systems therefore resemble the opposite of a tight job market as in the case of conventional energy systems. This in any case lessens the position of power enjoyed by conventional oil-and gas giants. If they are not willing to participate, others will. This loss of dominance is thus created by less dependence on the expertise, capital and technologies provided by them i.e. oil-and gas giants. This decreased dependency is further advanced through a process of deliberation. Through deliberation, concerns about the uneven distribution of social standing that initiate a distinction between equal say versus equal input are eliminated. Recall from section two of this chapter that corporations within socio-energy systems, enjoy the opportunity to distribute sociological matters like wealth, risk, power and vulnerability through the choices they make in the design of socio-energy systems (Miller C. , 2014), I elaborated on this using the Dakota Pipeline case. Exxon and Shell due to their size, certainly have the ability to (re)distribute sociological matters. So, a decreasing dependency on attributes from corporations like Shell and Exxon decreases their necessity for inclusion. This institutes a shift in power, redirecting power back to the citizens. Hence, deliberation decreases the ability for corporations to exploit their position. As it is the content of the arguments that should yield the outcome in deliberation and not those who state it. Deliberation at the same time eliminates concerns about uneven social standing ascribing every deliberator equal standing making it harder for corporations to advance their economic interests in the decision-making process, since decisions need to be based on *shared interests* rather than private interests and preferences.

Regarding the principle of real majority-based decision, institutional mechanisms must guarantee governmental action to reflect the majorities will. The energy transition enables municipalities to redesign the decision-making process regarding energy systems. This will be illustrated in the following case about the exploitation of natural gas in the Netherlands. In the Dutch province Groningen, which lies in the top northeast of the Netherlands next to Germany, natural gas is exploited by the Dutch petroleum company (NAM) consisting of the Dutch State, Shell and Exxon (two of the largest corporations in the realm of socio-energy systems). Natural gas is of significant value for the Dutch State budget, in essence, it enables the existence of the Dutch socialistic state. Without the exploitation of natural gas, many state expenditures could not be paid. Therefore, every Dutch citizen relies to some extent on benefits gained from exploiting 'Groninger gas'. From the discovery of the gas field, in 1959, till 2014, the exploitation generated at least €240 billion, of which

Exxon and Shell combined earned at least several tens of billions (NOS, 2017). Understandably, Exxon and Shell benefit from continuing the exploitation, while also each Dutch citizen and the Dutch state enjoys significant benefits from the exploitation.

In 2012 however, studies concluded that earthquakes in Groningen are a direct consequence of natural gas exploitation. Where these earthquakes in early years were minor and quite rare, they have gained severity and frequency up until the point of destroying homes and spreading fear among Groninger' citizens (Huismans, 2018). While it is understandable that the Dutch government cannot take ad-hoc decisions, the influence of both Shell and Exxon within the NAM, slowed down the decision-making process to such an extent that governmental action did not reflect the publics opinion anymore and revolt under citizens started to arise (Huismans, 2018). Whether or not Shell and Exxon used their position in order slow the decision-making process remains an open question. Fact of the matter is that governmental action did not reflect the publics' opinion (Huismans, 2018).

If conventional socio-energy systems will be decentralized, the number of citizens that depends on socio-energy systems decreases since the conventional energy grid is fragmented. Conventional energy systems bear upon big, durable, well-functioning systems and services (Edwards, 2009). When these infrastructures are fragmented, the influence they have to impact everyday live deteriorates. The smaller the energy infrastructure becomes, the less significant they will be in structuring social, economic and political organization (Miller, C., et al., 2013). Problems encountered in the example of the Dakota pipeline would likely be less frequent and less severe. The second social dimension stated by Miller (2013) was the knowledge practice governing energy systems. The 'street science' will increase in credence due to decentralized energy systems and the subsequently lessened dominance position of corporations.

This would shift the desirable path forward from one based on corporations' interests to community interests, creating a situation in which questions of justice must be addressed considering the equal interest of all. One element though, the legal position of landowner that ascribes them full say over their properties, remains to be a barrier. In Drenthe (a Dutch province) two villages were to be enclosed by four rows of 200m high windfarm. These windfarms would be placed on a plot of land owned by the same farmer. The local community feared nuisance and loss of intrinsic worth of the landscape. Therefore, the local community protested against windfarms. In the process of deliberation, they highlighted their concerns and brought alternative locations and sources to generate the energy. Those alternative options would eliminate some public concerns and that would be acceptable for the community. Despite this, the Dutch Board of State (Raad van State) judged that the owner of the land -regardless of the pros and cons- was the one to decide (Raad van State, 2018). Although the community deliberated which decision had to be taken, the farmer in this example chose to favour the opposite of what the community favoured. Although both community and corporations involved learned something from the deliberation, the fact that the owner of the land has the legal position to decide in his own interest, eliminates part of the potential of the energy transition to advance the principle of real majority-based decisions. This brings about a situation in which decisions are able to reflect private interests and preferences rather than the majorities will. However, this could also have the opposite effect.

2.4. Wolfhagen case

The following case describes the German city Wolfhagen that fully exploited the potential of the energy transition to democratize a society. Through remunicipalisation, Wolfhagen citizens reclaimed ownership of their electrical grid. Martin Rühl, Wolfhagens' citizen, spotted that E.ON's 20-year license was about to expire and rather than resigning, he figured out that Wolfhagen had to reclaim the grid for itself. After going back and forth consultation groups of citizens and the municipality, he succeeded in the end. To make it work citizens ensured to 'buy over' the entire energy network as it were from E.ON. In order to determine how they should deal with it, they consulted each other through deliberation by ascribing each citizen an equal opportunity to become the owner of, for example, a windfarm, and equal control in the decision-making process. In this case, the full control ascribed to owners over their properties helped citizens to reclaim their energy grid. Instead of being motivated by private interests, the whole community saw that it was in the equal interest of all to make this work. The result amounted to less costs than before, full ownership over their energy grid and a stronger community sense. E.ON opposed this idea heavily, because if Wolfhagen would be able to reclaim their energy grid, more communities or municipalities could follow (Chakrabortty, 2018). Which indeed happened, according to the study of Kishimoto (2017), which showed that 284 municipalities including the second-biggest city of Hamburg followed. Leading to the final table.

Principles of democracy Democratizing elements of the energy transition	Principle of actual majority-based decision	The principle of participation	The principle of shared interests
Decision making process is further democratized		Involving citizens accordingly gets them familiar with political processes and learns them to better deliberate, appreciate opposing reasons and might even initiate a shift in believes, values and views	Citizens become trained and better equipped in acting as democratic agents. Decisions are based more on shared interests through deliberation and better equipped citizens.
Decentralizing conventional socio-energy systems into smaller less determining socio-energy systems	Less ability for corporations to influence decision-making process so the majority can reclaim decision-making power		Citizens deliberate the common good, while corporations act on behalf of economic interests. Thus, shared interests are valued more

Table 3.

3. Conclusion

To combat the negative consequences climate change and finite fossil fuels, governments are able to take freedom impeding measures. Top-down decisions will exclude citizens from the decision-making process. Although each mainstream conception of democracy holds different thoughts about how to ground legitimacy of the state, all ascribe to the ideal of self-government among political equals. Thus, excluding citizens from the decision-making process directly infringes upon the democratic ideal of self-government among political equals. The favourable mechanisms and considerations from each conception are incorporated in the 'principles of democracy' list, a list that seeks to compromise favourable considerations in the mainstream conceptions. The principle of real majority-based decisions should guarantee governmental action to reflect the majorities' will to the extent that basic human rights are not violated. Hence, the second principle holds that basic rights ought to be prevented from being violated. However, mere aggregation of preferences and interests does not contribute to society to the degree the mechanism of deliberation does. In addition, within aggregation, the problem of unequal social standing arises, creating the issue of equal say rather than equal input. In order to eliminate the issue of unequal social standing and advance the common good, deliberation is the best mechanism. Deliberation is resembled in the third and fourth principles of the principles of democracy list. The principle of participation ought to guarantee, that mechanisms either exist or put in place to enable citizens to participate in the decision-making process. Merely participating is not enough, if one would stop drawing up a list of democratic principles after the principle of participation, one could conclude that citizens ought to advance their private interests and preferences within the process of deliberation. This self-centred form of agency will not advance the common good. To do so, the content of decisions must be based on shared interests. Shared interests are interests that are in the equal interest of all; the energy transition is in the equal interest of all, insofar it is a resource through which severe consequences of climate change and finite fossil fuels can be prevented to damage society.

Thus, another opportunity to combat climate change arises. Top down decisions repeatedly slowed down the energy transition, the goal of 6000MW of onshore windfarms by 2021 will not be reached if those top down decisions continue. Citizens feel excluded from the decision-making process, which leads to protest and revolt. The resistance of the public towards renewable energy projects is often ascribed to NIMBY-ism. Nevertheless, ascribing resistance of the public to NIMBY-ism is false. Several scholars argue NIMBY-ism to have an opposite effect of what is assumed for a long time. Moreover, Phadke's study involving communities deliberating planned windfarms in their vicinity, showed that citizens are able to broaden and deepen the debate. Furthermore, the civilizing force of hypocrisy favours the statement that shared interests can advance decision to decision in the equal interest of all. Even if citizens are foolish enough to distrust the evidence supporting climate change, deliberation can prevent private interests from influencing decisions. Despite the mechanisms of public pressure, hypocrisy and participation. Why should citizens not be able to influence decisions that directly impact their lives?

Decentralized socio-energy systems create the opportunity for municipalities and citizens to initiate local energy grids. If municipalities choose to do so, they will need to enable citizens to participate in the decision-making process. This phenomenon institutes two elements being; firstly, decision making process becomes more democratic and because of two mechanisms. 1) Citizens become trained in scrutinizing and analysing reasons in support of views and subsequently get better equipped at recognizing what would be in the equal interest of all. 2) Participating citizens would limit the information argument of the aggregative conception; the focus on shared interests initiates a state in which citizens become less ignorant on matters, like the economic and political system, and more

aware about shared interests and experience resulting in an increased ability to elaborate on political ideologies.

The second element created by decentralization of the energy market creates two mechanisms able to democratize the Dutch society. 1) The diminished dominance of corporations within socio-energy systems. Declining costs and less complex, renewable, energy systems institute a range of different solutions, ranging from solar panels on rooftops to utility scale solar and windfarms. Local energy grids can therefore be adjusted to the needs and capabilities of a local community. Thus, multiple parties, other than conventional parties in conventional energy systems can provide the expertise, capital and special equipment. 2) The fact that corporations tend to act on behalf of economic interests as illustrated in the Groninger Gas case. The NAM could have chosen to immediately reinforce homes and compensate citizens, but due to the influence of Shell and Exxon, this still has not happened. If citizens deliberate the common good, decisions should resemble an advancement of equal interest for all. Thus, the common good limits the possibility for corporations to push through decisions based on economic interests. However, all of this is true insofar the public is willing to participate and regards deliberation an act of public minded agency. A public minded agent should be integer and reliable to eliminate possibilities of corruption and cognitive dissonance. Furthermore, the legal position of ownership in the Netherlands ascribes owners' full control over their properties, making them vulnerable to cognitive dissonance and for corruption from corporations. However, if communities initiate local energy grids together with plot owners like farmers, things can also go the other way. Either way, the energy transition has the potential to democratize the Dutch society albeit depending on mechanisms that would be foolish to endorse regarding the negative consequences of failing the energy transition.

References

AD. (2018, April 29). *Chaos op Schiphol* [Press release], Retrieved from https://www.ad.nl/binnenland/chaos-op-schiphol-storing-kan-ook-maandag-gevolgen-hebben~a44668a0/

BBC. (2017, February 07). *BBC world news* [Press release]. Retreived from http://www.bbc.com/news/world-us-canada-37863955

Blok, K. (2018, March 5). *Transformation of energy systems*. (J. Dijk, Interviewer).

Burg, A. H. (2018, March 12). *The energu transition.* (J. Dijk, Interviewer).

Chakrabortty, A. (2018, February 28). *How a small town reclaimed its grid and sparked a community revolution* [Press release]. Retreived from https://www.theguardian.com/commentisfree/2018/feb/28/small-town-wolfhagen-community-revolution-german-europe-energy-contract

Christiano, T. (2004). The authority of democracy. *The Journal of Political Philosophy, 12 (3),* 266–290.

Cohen, J. (1996). *Procedure and Substance in Deliberative democracy*. In J. Cohen, Democracy and Difference: Contesting the Boundaries of the Political, 95-108, New Jersey: Princeton University Press.

ECN & WUR. (2016). *De energietransitie: een nieuwe dimensie in ons landschap, 1-16,* Wageningen, the Netherlands: Wageningen University & Research, Environmental Sciences, Landscape Architecture group & ECN Energy research Centre of the Netherlands.

ECN et al. (2017). *Nationale Energie Verkenning 2017, 1-238,* Amsterdam, the Netherlands: ECN.

Edwards, P. B. (2009). Introduction: An agenda for infrastructure studies. *Journal of the Associoation for Information Systems, 10 (5)*, 364-374.

Elster, J. (2011). Deliberation, Cycles and Misrepresentation: Epistemic democracy in practice, 1-14, New Haven; Yale University Press.

Habermas, J. (1994). Three normative models of democracy. *Constellations 1 (1)*, 1-10.

Heath, J. (2005). The democracy deficit in Canada, 1-30, Toronto: University of Toronto.

Huismans, S. (2018, June 14). *Waarom zijn er aardbevingen in Groningen?* [Press release]. Retreived from https://www.npofocus.nl/artikel/7463/waarom-zijn-er-aardbevingen-in-groningen.

IRENA. (2018). *Renewable Power Generation Costs in 2017.* Abu Dhabi: International Renewable Energy Agency.

Ketelaar, T. (2017, augustus 21). *Wind is voor Zuid-Holland nu een besmette term* [Press release]. Retreived from https://www.nrc.nl/nieuws/2017/08/21/wind-is-voor-zuid-holland-nu-een-besmette-term-12619960-a1570634

Kishimoto, S., & Petitjean, O. (2017). *Reclaiming Public Services; how cities and citizens are turning back privatisation.* Amsterdam, The Netherlands: Transnational Institute (TNI).

Lake, R. (1993). Rethinking NIMBY. *Journal of the American Planning Associoation, 59 (1)*, 87-93.

Lincoln, A. (1863, November 19). Gettysburg, Pennsylvania, U.S.A.

Miller, C., Iles, A., & Jones, F.C., (2013) The Social Dimensions of Energy Transitions. *Science as Culture, 22 (2)*, 135-148, http://dx.doi.org/10.1080/09505431.2013.786989

Miller, C. (2014). The Ethics of Energy Transitions. *Ethics in Science, Technology and Engineering, 2014 IEEE International Symposium,* 1-5. Chicago, IL, USA: IEEE.

NOS. (2017, March 1). *Wat heeft Nederland aan al dat gas verdiend en wat willen partijen nu?* [Press release]. Retreived from https://nos.nl/artikel/2160767-wat-heeft-nederland-aan-al-dat-gas-verdiend-en-wat-willen-partijen-nu.html

Ottinger, G. (2009). Epistemic Fencelines: Air Monitoring Instruments and Expert-Resident Boundaries. *Spontaneous Generations, 3 (1)*, 55-67, http://dx.doi.org/10.4245/sponge.v3i1.6115

Phadke, R. (2013). Public Deliberation and the Geographies of Wind Justice. *Science as Culture, 22 (2)*, 247-255.

Raad van State. (2018, February 21). *Uitspraak 201608423/1/R6 en 201703826/1/R6.* Retreived from https://www.raadvanstate.nl/uitspraken/zoeken-in-uitspraken/tekst-uitspraak.html?id=94151

Talisse, R. (2015). *Engaging Political Philosophy, 1-176,* Abingdon, England: Taylor & Francis.

Tennet. (2018). *Market Review 2017; Electricity market highlights.* Arnhem: Tennet.

The Social and Economic Council. (2013). *Energy convenant for sustainable growth.* Den Haag: The Social and Economic Council.

Walker, G. (1995). Renewable energy and the Public. *Land Use Policy, 12 (1)*, 49-59.

Wolsink, M. (2000). Wind power and the NIMBY-myth: institutional capacity and the limited significance of public support. *Elsevier Renewable Energy, 21*, 49-64.

Appendix I: interview K. Blok

De rol van data in de energietransitie

Tegenwoordig meten we alles. Alleen al in een smartphone zitten verschillende sensoren die van alles kunnen meten: temperatuur, lichtsterkte, geluid en de bewegingen die de eigenaar maakt. Vroeger was het moeilijk om al deze data te verwerken, maar nu zijn er slimme algoritmes en snelle computers die daadwerkelijk iets met de data kunnen. Daarnaast is er genoeg geheugen (datacenters) om data op te slaan.

Nu gaat een slimme data-strategie over keuzes. Als je alles realtime meet, dan levert dat meer data op dan we kunnen behappen. Belangrijke vragen zijn daarom: hoe sla je data op? Wat wil je eruit halen? Wat doe je er mee? De groei van het aantal sensoren zet door, steeds meer applicaties zijn data gedreven. Data is in toenemende mate vrij beschikbaar (open data). Dat betekent dat het steeds eenvoudiger en goedkoper wordt om data gedreven diensten en oplossingen te ontwikkelen – niet alleen voor traditionele spelers, maar juist ook voor nieuwkomers. De uitdagingen zijn omgang met privacy en het waarborgen van de betrouwbaarheid van data. Daarnaast is het belangrijk om goed te weten wat er gemeten wordt.

Een voorbeeld hiervan is *geofencing*. Geofencing is het virtueel afbakenen van een geografisch gebied door middel van gps. Via het gps-signaal wordt vastgesteld of iemand thuis is en op basis daarvan wordt bijvoorbeeld de verwarming aangestuurd. Dit kan nog gedetailleerder: hoe bewegen gebruikers door een ruimte? De TU Delft heeft een systeem dat ervoor zorgt dat alle kamers en kantoren om 07:00 uur opgewarmd zijn, maar het systeem houdt er geen rekening mee dat de één om 07:00 uur begint en de ander pas om 09:00. Oftewel; het inspelen op individueel gedrag is ontzettend moeilijk, maar door de snelle ontwikkelingen in sensortechniek en rekenkracht staan we aan het begin van een enorme verbeterslag.

Impact op het energiemeetbedrijf

De beschikbaarheid van open data zal de energie- en meetmarkt openbreken. Er zijn grote tech-spelers (Google, Amazon) die beter in staat zijn de data te verwerken en te analyseren dan traditionele spelers in het energiesysteem. Het zal voor een meetbedrijf lastig worden om met deze bedrijven te concurreren. Zo'n disruptie overkomt meetbedrijven en het is zaak om nu na te denken wat de rol is die een meetbedrijf kan en wil spelen in de energietransitie. Wat is de unieke kennis die een meetbedrijf onderscheid waarmee een mogelijk overbodige rol kan worden gecompenseerd?

Het is niet zozeer de vraag of data een grotere rol gaan spelen in de energietransitie, maar vooral van wie de data wordt. Open data maakt dat andere marktpartijen en nieuwe toetreders gemakkelijk de rol van een meetbedrijf over kunnen nemen. Het aangaan van samenwerkingsverbanden met partijen die de capaciteit hebben om data slim te verwerken kan een goede strategie zijn. Bij gesloten data speelt een inhoudelijke vraag: hoe zorg je er als meetbedrijf voor dat de ICT-structuur meegroeit, zodat alle data verwerkt kan worden? En hoe voeg je vervolgens waarde toe?

Droomscenario

Het droomscenario van Kornelis Blok is dat er nooit energie gebruikt wordt als dat niet nodig is. Zo kan 30 tot 35% van het huidige energieverbruik bespaard worden in de gebouwde omgeving. Voorwaarde is een verbeterslag in algoritmes om deze besparing te bereiken. Die algoritmes moeten menselijk gedrag beter leren begrijpen. De hardwareis in principe aanwezig, de software zal verder ontwikkeld moeten worden.

Data wordt goedkoop en energieopwekking fluctueert in de toekomst. De ICT-transitie die nodig is om flexibiliteit op te vangen is onvermijdelijk. Bovendien leveren data meer inzicht en daarmee kansen op procesverbetering: bedrijven behalen dus ook economisch voordeel aan de ICT-transitie in het energielandschap. Deze transitie is mondiaal en gaat dwars door sectoren heen. Op het moment dat een partij als Volkswagen bijvoorbeeld niet investeert in elektrische voertuigen, stapt Tesla in en wordt Volkswagen min of meer gedwongen om dit ook te doen of wordt overbodig. Mogelijke tegenbewegingen zijn issues rond privacy in het analyseren van menselijk gedrag. Maar dit zijn eerder uitdagingen dan tegenbewegingen.

Het energiesysteem in Nederland in 2025

De opkomst van zonne- en windenergie zal doorzetten. Met de huidige koers zal het aandeel zon- en windenergie in 2025 rond de 50% liggen. Dit betekent dat energie op sommige momenten heel duur en op andere momenten heel goedkoop zal zijn; gemiddeld gezien waarschijnlijk wel goedkoper dan het nu is. De druk om energie te besparen blijft.

Ook tuinders moeten de komende tijd van (Gronings) aardgas af. De warmtepomp heeft de potentie om de aardgasmotor te vervangen. Tuinders wekken op dit moment veel energie zelf op door de aardgasmotoren. Dit staat onder druk, omdat stroom goedkoper is dan het ooit geweest is. Wat betreft elektriciteit moeten tuinders slim innoveren om de flexibiliteit in opwekking te compenseren. Dit biedt voor tuinders mogelijkheden. Tuinders maken bijvoorbeeld gebruik van assimilatiebelichting om ’s nachts fotosynthese op gang te houden. De aansturing van deze belichting kan veel preciezer dan nu gebeurt, wanneer data slim wordt verzameld en verwerkt. Bovendien ontstaan meer en meer micro-grids op basis van eigen opwekking (zon, wind, aardwarmte) en dat vraagt om andere, complexere diensten van een meetbedrijf of onafhankelijk dienstenaanbieder. Er zijn al bedrijven die dit kunnen en de vraag is of een meetbedrijf hier een rol in kan spelen. Dat vereist nader analyse.

Appendix II; interview A. Huygen & L van den Burg

Voor bedrijven is het op dit moment omslachtig om ODA's of andere partijen toestemming te geven voor het gebruiken en aggregeren van energiedata. Dat zouden ondernemers eenvoudig en digitaal moeten kunnen regelen. Op die manier wordt het gemakkelijker voor collectieven van ondernemers om besparingsmaatregelen door te voeren of om flexibiliteit in te regelen. Er is op bedrijventerreinen behoefte aan inzicht in energiedata – niet als statisch rapport, maar als levend en transparant document waarin voortgang inzichtelijk wordt gemaakt. Zo'n collectief 'dashboard' ontwikkelt TNO op dit moment.

Ontwikkeling warmtemarkt

In 2008 experimenteerde de eerste tuinder met geothermie en inmiddels zijn er zo'n 15 boringen, allemaal op particulier initiatief en met particuliere risicodragers. In het Westland bracht de testboring weliswaar niet het gedroomde resultaat, maar geothermie van 2,5 km diepte is wel nog een optie. Dit soort initiatieven markeert het ontstaan van een warmtemarkt. De ontwikkelingen zijn lastig te voorspellen. Wat is er technisch mogelijk, wat doen ondernemers en hoe beweegt de markt (ontwikkeling van de gasprijs)? Maar ook: hoe distribueren we warmte en wie doet dat?

Vooralsnog experimenteren vooral netbeheerders met warmtenetten, maar opschaling vraagt ook van hen een andere rol. Bestaande, kleinschalige warmtenetten (ca. 300 huishoudens) die volledig in handen van een lokale coöperatie of woningcorporatie (blokverwarming) – zij zijn verantwoordelijk voor opwek, bemetering en de infrastructuur. Maar in de toekomst zullen er meerdere bronnen zijn – WKK, geothermie en restwarmte bijvoorbeeld. Het afstemmen van warmtevraag en -aanbod is nu nog bij niemand belegd en dat biedt kansen voor netbeheerders en meetbedrijven.

Barrières

Financiën

Grootste barrière zijn vaak de financiën. Wanneer investeringen in duurzame energie zich snel en zeker terugbetalen, kunnen en zullen bedrijventerreinen snel verduurzamen. De overheid zou meer verantwoordelijkheid moeten nemen om dat soort investeringen financieel interessanter te maken. Dat kan bijvoorbeeld door de gasprijs en CO2-prijs te verhogen. Op dit moment wordt een soms perverse belastingen geheven op duurzaam opgewekte energie. Bovendien hebben bedrijven vaak langjarige energiecontracten die voor een lock-in zorgen en een eventuele overstap vertragen.

Standaardisatie

Hoge kosten zijn niet alleen een barrière voor investerende huishoudens en ondernemers, maar ook voor partijen die producten en diensten aanbieden die de energietransitie mogelijk maken. De acquisitiekosten zijn vaak hoog en dat maakt het lastig om een rendabel businessmodel op te starten en op te schalen. De hoge acquisitiekosten kunnen gedrukt worden door standaardisatie van oplossingen en processen. Daar ligt een rol voor de overheid, zo is er behoefte aan kennisprogramma's die opgedane kennis borgen.

Overheidsregie

Lokale overheden moeten invulling geven aan de energietransitie in de gebouwde omgeving. De gemeente moet vraag creëren, de markt moet in de vraag voorzien. Gemeenten kunnen hun taak op verschillende manieren invullen – van een energieloket tot het bieden van financieringsmodellen die sluiten (zogenaamde gebouw-gebonden financiering). Huishoudens betalen bijvoorbeeld niet aan een energieleverancier, maar zij betalen 10 à 15 jaar een maandelijks tarief aan een partij die de

woning energieneutraal maakt. Nu vinden gemeenten met weinig capaciteit alles zelf uit, dus ook hier zijn programma's die kennis borgen cruciaal.

Verouderde wet- en regelgeving

Wet- en regelgeving veranderen traag. In de Wet VET is er nieuwe experimenteerruimte voor energiecollectieven en dat is een goede ontwikkeling. In de Wet VET wordt opnieuw aangegeven dat meten een concurrerende markt is en de vraag is dus of netbeheerders daar een taak hebben. Energiebesparingsdiensten worden ook nu al veel aangeboden door ODA's. Wanneer netbeheerder-meetbedrijf-combinaties kunnen aantonen wat hoe hun werk het maatschappelijk belang dient, dan zou daar wel ruimte voor moeten zijn. Als de markt volwassen genoeg is, kan exploitatie worden overgenomen door de markt.

Naar aanleiding van een brief van Ed Nijpels, voorzitter van de borgingscommissie Energieakkoord moeten bedrijven aantonen dat ze energiebesparende maatregelen nemen die zich binnen vijf jaar terugverdienen. De wet bestaat al langer, maar handhaving bleef decennialang uit. Op zich een belangrijke stap, maar dat leidt wel de aandacht af van de lange termijn: de ambitie zou eerder moeten zijn om energieneutraal of zelfs netto energie producerend te worden.