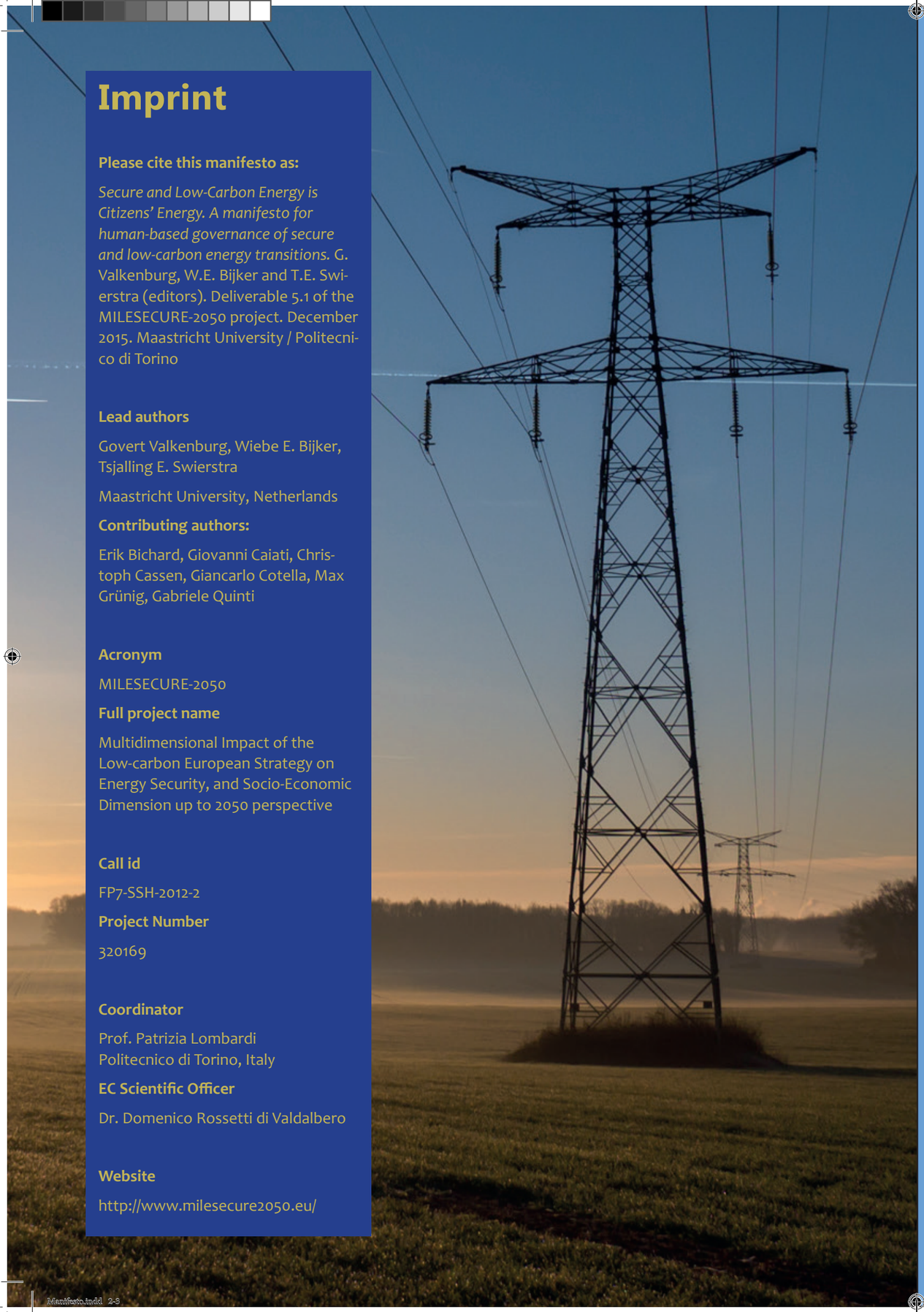
EU low carbon & energy security
MILESECURE-2050

Secure and low-carbon energy is citizens' energy

A manifesto for human-based governance of secure and low-carbon energy transitions



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Lead authors

Govert Valkenburg, Wiebe E. Bijker, Tsjalling E. Swierstra

Maastricht University, Netherlands

Contributing authors:

Erik Bichard, Giovanni Caiati, Christoph Cassen, Giancarlo Cotella, Max Grünig, Gabriele Quinti

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Coordinator

Prof. Patrizia Lombardi
Politecnico di Torino, Italy

EC Scientific Officer

Dr. Domenico Rossetti di Valdalbero

Website

http://www.milesecure2050.eu/

Preamble

Two major challenges are impending upon Europe's energy future: the achievement of a **secure energy supply**, and a move from dependency on non-renewable to a reliance on **renewable energy sources**. The challenges call for **energy transitions**: changes that concern entire energy systems, not just some of their parts. These changes are structural, as they modify the way energy provision is organized at the level of society. They are radical, since they may demand abandoning existing technologies even if they still work. And the changes are fundamental, because they require that we start thinking in novel ways about energy, its provision, and how a good and just society is organized around energy.

Transitions do not only pose **technological** challenges, but involve enormous **social**, **political** and **economic** changes as well. Changes concern market relations, social and institutional roles and responsibilities, and the emergence of new actors. Most policy documents and future visions focus on economic, geo-political and technological changes. Insofar as social processes are concerned, they are discussed at an aggregate and undifferentiated way: as a **human factor**, which is at best the receiver of policies and economic transactions, and at worst a residual category containing the overflows of economic and technological interventions. However, this human factor deserves more substantive attention: much more light is to be shed on **people** and the many roles they take.

People are an important resource of relevant **knowledge**. Because of the far-reaching consequences of energy transitions, it is vital to make use of the widest possible range of knowledge: not only technological and scientific expertise, but also local, practical and even tacit knowledge, knowledge created by civil society, and anticipatory perspectives on how society should be organized. First, this wide range of knowledge is needed to identify problems and threats to secure and low-carbon energy provision. Second, it is needed to project and implement necessary changes. And third, it is needed to anticipate the wider consequences, both of the challenges addressed by energy transitions, and of the changes made by those very transitions.

Yet, **people** can also be a source of **resistance**. In the course of a transition, it may change what it means for an individual to be a citizen, a consumer, or a producer of energy, or to hold any other identity or role. People may resist such deep social changes, if they are insufficiently engaged in owning and defining the problems that are to be solved through transitions, if they are insufficiently included in decision processes, and if they are insufficiently allowed to bring in their concerns and interests. These are the challenges facing the **legitimacy** of transition processes.

However, the **people** are also a source of **action and creativity**. Through reflection and anticipation, people are also able to find new solutions, and to find new orientations in their lives. With these changes come new repertoires of action. Thus, people are a resource of flexibility, improvisation and problem solving. It is about the people who drive the transition. And it is about how they do so at all levels of organization that matter to energy transitions.

The present manifesto offers guidance towards a more thorough inclusion of **people as citizens** into processes of **governance of energy transitions**. We call for actions that serve low-carbon and secure energy development through top-down as well as bottom-up approaches, and through visionary grand narratives as well as local initiatives. Whether at the local level or at central governments, people should be cherished for their knowledge, for their creativity, and because **people are why energy transitions matter in the first place**.

This manifesto is to be read by citizens and administrations, by communities and corporations, by Europeans and villagers, and by experts and consumers. In short, by the people to whom energy transitions matter.

10 Diagnoses

The challenge of energy transitions*

1. The 2050 goals of a secure and low-carbon European energy system are no longer negotiable, yet too little progress has so far been made. The goals require at once decision and action at the shortest possible term, and visionary anticipation with respect to long-term transitions.

2. Low-carbon and secure energy transitions are heterogeneous processes, including political, technological and social aspects. Citizens and communities play a crucial part, but so far their role has been developed poorly, and they have even been excluded from governance processes, rather than involved and engaged.

The context of energy transitions

3. Problems do not exist in isolation, but in an institutional, social and political and technological context. This context to a large extent determines which solutions are feasible and which are not.

4. Energy transitions are situated in current high-carbon societies, against the background of vested interests and influential societal structures. Currently, European contexts are insufficiently geared towards empowering individuals and facilitating local initiatives.

Perspectives on energy transitions

5. When treating complex problems such as energy transitions, different perspectives, highlight different aspects of the problem and prioritize different solutions. Perspectives may differ between actors, between scientific disciplines, or between cultures.

6. Multiple perspectives jointly constitute a creative resource which is needed in order to successfully address energy transitions. Perspectives of citizens are currently underrepresented since citizens are insufficiently enrolled as contributors of knowledge, which leads to poor alignment between energy technologies and social practices.

Governance of energy transitions

7. Governance is the distributed process of controlling the organization of society. Its distribution poses important challenges to processes of decision making, democratic accountability, and the enrolment of stakeholders. Without proper methods, governance will fail to engage important parts of society, the cooperation of which is indispensable for energy transitions.

8. Governance of energy transitions is a matter of coordination across social groups, industrial sectors, scientific disciplines, and levels of administration. This coordination currently insufficiently enrols the citizen, at all levels of administration.

Strategies towards secure and low-carbon energy

9. Visionary leadership is needed to keep track of the overall direction of energy transitions. At the same time, strategies must be open-ended and foster processes of continuous learning, negotiation and adaptation, and leave room for innovation at the local level and offer methods for transfer of innovation across regions and contexts.

10. European strategies towards secure and low-carbon energy must maximize synergy between local initiatives and central government, between top-down and bottom-up approaches, and between technological and economic approaches and citizen-centred perspectives.

*) These diagnoses are presented in pairs. The first diagnosis of each pair is more or less generic. The second diagnosis is more specifically based on MILESECURE-2050 empirical research.

10 Remedies

What is to be done with energy:

1. Secure and low-carbon energy should be central on governance agendas from the municipal to the national, European and global levels. Also, they should be treated in tandem, not as separate projects.

2. Investments must be made to facilitate enrolment and engagement of citizens in dealing with energy challenges.

What is to be done with society:

3. Investments should be made such that the context becomes receptive towards a broader range of socio-technical solutions for energy challenges, both regarding low-carbon and security. This includes supporting experiments, addressing hegemonies, and articulating externalized costs.

4. Investments should not only be made directly into the energy infrastructure, but also more broadly into the context, such that citizens can play a more prominent role in dealing with energy challenges. This is about empowering citizens by providing them with information and resources, and about transforming civic society such that citizens' knowledge becomes more appreciated.

How we should know about energy transitions:

5. A richness of perspectives should be cherished to make sure that the interests and knowledge of as many as possible social groups can be incorporated. Particularly qualitative and human-centred accounts deserve more attention in comparison to quantitative, technological and scientific accounts.

6. Getting relevant perspective heard requires inviting relevant parties to voice those perspectives. Investments should be made to emancipate groups that are currently not sufficiently heard.

Democracy is to be at the core of energy transitions:

7. Processes of governance should engage and include individuals, small groups and local organizations.

8. Processes of governance should be arranged in such a way that they prevent the emergence and reproduction of unfortunate structures, including social and political injustice.

Democracy is not only about deciding, it is also about doing:

9. In transitions towards a secure and low-carbon energy system, people should be addressed as a resource of governance, as citizens rather than just as consumers.

10. In transitions towards a secure and low-carbon energy system, people must be empowered as experimenters, as owners of problems and perspectives, and as the very source of legitimacy for political action.

The challenge of energy transitions

1. **The 2050 goals of a secure and low-carbon European energy system are no longer negotiable, yet too little progress has so far been made. The goals require at once decision and action at the shortest possible term, and visionary anticipation with respect to long-term transitions.**

2. **Low-carbon and secure energy transitions are heterogeneous processes, including political, technological and social aspects. Citizens and communities play a crucial part, but so far their role has been developed poorly, and they have even been excluded from governance processes, rather than involved and engaged.**

Europe will need radical changes in the energy system to deal with the challenges ahead in the decades and centuries to come. The move towards a low-carbon and secure energy system is no longer negotiable: it has to be done, and it has to be done at speed. The challenges of low-carbon and secure energy are all-encompassing, and require transitions in the energy system: changes that are at once small and gradual if viewed in detail, and radical and fundamental if viewed at the long-term and macro level. Because of their pervasive nature, coordination across all sectors of society is needed.

The current European energy system contains numerous features that are not possible to sustain in the long run. Most prominently, keeping to the current rate of carbonization is incompatible with the aim to keep global temperature increase below 2 degrees Celsius. In addition, the current energy mix contains too large a dependency on depleting energy sources, chiefly fossil fuels. Importantly, dependency on fossil fuels incurs an exposure to potentially adverse geopolitics and global markets.

To reduce these exposures, local approaches and state-level approaches to energy management must be better integrated than they are today. Important connections are missing between local and municipal initiatives, and regional, national and international negotiations about energy security and low-carbon targets. Production of energy is insufficiently localized, citizens are poorly engaged in the management of energy, and it is difficult for new parties to enter global markets that are often dominated by established parties.

It is often uncritically assumed that a greener energy system and a more secure one go hand-in-hand, and that both are realised by creating diversified and localized energy infrastructures. However, analysis reveals that the problem is much more complex. A diversified power mix allows indeed for renewable sources. Yet, single-source and centralized power production facilities keep offering important and complementary potentials to secure provision. Similarly, localized power systems may create local resilience and independence. Yet, they may for their feasibility be dependent on network connections, network coordination, and sometimes even on backup by centralized power plants.

The European Union has implemented policies on energy security as well as carbon reduction. These are largely shaped as collections of mono-dimensional targets. However, it has not been successful at integrating energy security and climate change mitigation, nor at addressing them comprehensively. Security and low carbon are in practice not necessarily in conflict, nor is it necessarily the case that supporting one also supports the other. Rather, intricate challenges abound when trying to serve both, in addition to keeping an eye on human wellbeing and social coherence.

Also, strategies have so far not been sufficiently geared towards accommodating the citizen. The challenges of secure and low-carbon energy require transitions that concern entire societies. They are not exclusively the affair of national and European governments and their experts, but equally of the corporate world, NGOs, and not least of citizens, local communities and municipalities. The challenges necessitate rearranging the supply of energy just as much as they require changing the demand side. The latter means that private persons may have to revise their energy consumption, that builders and housing corporations bear important responsibilities, and that governments and societal players must ensure that citizens are engaged and enabled to assume their responsibilities. And corporate players bear important responsibilities, because of their large share in energy economies. Transitions are at once local and global, and public and private.

Currently, the realm of citizens, end-users, and local practices is insufficiently addressed. That is to say, people are included in energy transitions, but largely as consumers and passive followers of decisions made elsewhere. Governments have so far performed poorly when it comes to providing information about both necessary changes and the potentials to achieve them, to enrolling and engaging citizens in broader developments, and to facilitating local initiatives. In practice, when energy transitions are concerned, many groups are underrepresented in governance processes. By consequence, changes related to transitions are often sub-optimally embedded in society and meet with resistance: people mistrust authority, see little or no urgency in energy issues, and think poorly of their own capacities to change things.

People offer a vast potential for coping with energy challenges, but this potential is still largely unrealized. The problem is not that citizens should be made to do more of what governments want them to do, but rather that they are insufficiently empowered and supported to develop and voice valuable perspectives, and to take effective action. Since transition processes are dispersed throughout society, local initiatives are paramount. These must be at once inclusive and non-elitist, and integrated with current energy and policy systems. It is important to provide people with an idea of the things that can and need to be done, with the idea of a government supporting them, and with a view of the chances and economic potentials that are there for them to reap. Also, they must be enabled to generate and realise their own ideas of the things that can and need to be done.

1. **Secure and low-carbon energy should be central on governance agendas from the municipal to the national, European and global levels. Also, they should be treated in tandem, not as separate projects.**

2. **Investments must be made to facilitate enrolment and engagement of citizens in dealing with energy challenges.**

How context matters

3. **Problems do not exist in isolation, but in an institutional, social and political context. This context to a large extent determines which solutions are feasible and which are not.**

4. **Energy transitions are situated in current high-carbon societies, against the background of vested interests and influential societal structures. Currently, European contexts are insufficiently geared towards empowering individuals and facilitating local initiatives.**

People do not act in a void, but always from a specific point in space and time: their context. This context influences their specific perceptions and understandings of a problem. This context consists of specific possibilities and impossibilities, of things people can and cannot do, and of solutions that are or are not feasible.

Probably the dirtiest and least efficient internal combustion engine known is the two-stroke engine found in mopeds. A simple measure to improve air quality in cities would be the abolition of mopeds.

However, after being placed in context, the problem shows its social aspects. In practice, the moped is typically used by blue-collar workers. The moped matches both their budget and their mobility needs. Abandoning the moped would deprive members of one particular social class of their mobility.

It is the context that makes clear that the problem is at once social and technical.

Identifying a problem therefore involves taking the context into account in which the problem arises. The context determines why a problem matters and for whom it matters. It is not self-evident which groups or individuals are most likely to bear the consequences of a problem, or who is in the best position to solve it. Only when a problem is assessed in its proper context, a seemingly technical problem can for example be recognized as being at the same time a problem of social justice. And only when considered in context it may become clear that a technologically possible solution is at the same time socially undesirable. Finally, it is the context that determines who is responsible for solving a problem, and for deciding which solution is best.

A context can contain numerous causes for inertia and resistance to change. Institutional structures have a tendency to keep themselves in place. Technological standards are explicitly meant to keep things stable for a period of time. And even cultural preferences are implicitly meant to do exactly that: to make sure that a society remains stable over a longer period, such that people can navigate through it. Also, the context is populated by corporate players which are influential through their market positions and their commercial strategies. This all means that changes are less likely to be accepted if they are less compliant with these technological, institutional and cultural fixtures.

In the case of energy transitions, the context is extremely broad: transitions pervade all spheres of life, and operate at all possible levels of society. The context includes European rules and regulations, but also regional development plans, national policies and politics, municipal administrations, technological infrastructures and developments, available knowledge and expertise, local and private affairs, corporate strategies and market positions, and a lot more. On top of that, the financial crisis has since 2008 put important constraints on certain developments and on the potential for innovation to emerge. Finally, Europe is a heterogeneous collection of countries, some being more advanced than others, in socio-economic terms as well as in their achievement of climate and energy goals. This entails that contexts differ significantly across Europe.

Existing social and technological contexts largely determine how we use energy. This concerns technical as well as social infrastructures. And even more importantly, contexts ultimately shape how we think about energy. The current social context prominently includes a general lack of sense of urgency, mistrust in authority and in the capacity of administrations to address problems and represent interests, and fear about losing jobs, housing and general quality of life. Also, social arrangements show great complexity, which makes it difficult to attribute responsibilities, which contributes further to the aforementioned difficulties.

A large proportion of commuters are dependent on auto mobility for going to work. This is currently a fossil-fuel dependent mode of transportation. The infrastructure is conducive to sustaining this mode: sunk costs in petrol provision make switching to other fuels unattractive. Thus, people are effectively locked into using fossil fuels. If no compensation is offered, they are unlikely to seek other forms of transport which may be less fossil dependent. This context determines how successful other modes of transport than auto mobility will be.

The European Internal Market sets strict limitations to government intervention, such as subsidies to facilitate energy transitions. Equally, international trade rules limit the ability of governments to ban the import of specific products or services or place heavy tax penalties upon them.

These mechanisms are important contexts within which the problems facing governments are defined: these contexts render specific solutions unfeasible and others attainable.

Thus, people are uncertain about what they can do and about what they should do. Also, social injustice and a lack of solidarity – within societies as well as between EU member states – contribute to a reluctance among citizens to accept responsibility. Large swaths of society are not addressed as owners of the problems of transition; they are not engaged in decision-making processes; and it remains unclear to them how their interests are safeguarded.

Yet, there is also cause for optimism. Contexts contain unrealized potentials and opportunities for change and development. For example, we currently witness an increasing use of physical human energy: the use of the bicycle as a means of transport is growing. And local initiatives towards low-carbon and secure uses of energy pop up everywhere. These developments merit further cultivation.

If we acknowledge that the context in which a problem is perceived is key to the solutions that are thought to be available for addressing that problem, we can take the next step and recognize that solving the problem of low-carbon energy security partly resides in making the context more productive and receptive for solutions. For instance, insofar as people think of themselves as powerless in face of big corporate players in the energy market, they should be empowered not only by being offered new possibilities for action, but also by pointing out the possibilities they already have. Numerous inspiring examples exist of local successes defying counterproductive top-down regulations.

Enabling local initiatives requires at least two actions. First, central governments should make arrangements such that local initiatives have a more conducive context to flourish in. This is not only about establishing physical facilities, but also about enabling people, providing them with relevant and credible information, and making them feel both responsible for and capable of finding a solution. The second action is that governments should ensure that citizens are included in processes of decision making: even if things are ultimately decided at the central level, this should be done in such ways that problems as well as solutions are clearly connected to the citizens and local communities for whom they matter.

3. **Investments should be made such that the context becomes receptive towards a broader range of socio-technical solutions for energy challenges, both regarding low-carbon and security. This includes supporting experiments, addressing hegemonies, and articulating externalized costs.**

4. **Investments should not only be made directly into the energy infrastructure, but also more broadly into the context, such that citizens can play a more prominent role in dealing with energy challenges. This is about empowering citizens by providing them with information and resources, and about transforming civic society such that citizens' knowledge becomes more appreciated.**

The need for multiple perspectives

5. **When treating complex problems such as energy transitions, different perspectives, highlight different aspects of the problem and prioritize different solutions. Perspectives may differ between actors, between scientific disciplines, or between cultures.**

6. **Multiple perspectives jointly constitute a creative resource which is needed in order to successfully address energy transitions. Perspectives of citizens are currently underrepresented since citizens are insufficiently enrolled as contributors of knowledge, which leads to poor alignment between energy technologies and social practices.**

Energy transitions and their end goals are not clear-cut and unambiguous, and cannot be approached as projects to be carried out. Rather, they are heterogeneous processes, in which diverging goals are pursued on the basis of multiple problem definitions. Different perspectives, or viewpoints, highlight different problems, goals and options for action. In pursuit of successful transitions, it is vital to make use of a wide range of perspectives, because this is the only way in which all aspects of a problem can be brought to the fore. This pertains to academic projects investigating transitions such as the MILESECURE-2050 project, but also to governance processes concerning energy transitions.

When facing such transitions, it is a vital knowledge strategy to include plural perspectives. This pluralism is an important resource of creativity. Inviting different perspectives is not something to be done after problems have been defined and options for action have been selected. Quite the contrary, it should be done at the earliest possible stages of any development, and it starts with inclusion of perspectives in the very definition of problems.

In addition to being a fruitful knowledge strategy, bringing in multiple perspectives is also a democratic requirement. In a pluralist society, people will be divided over important issues. It requires explicit attention to bring out the perspectives of groups whose voices are seldom heard. In a general sense, energy transitions will not be achieved if considerable parts of society are excluded from decision-making and implementation processes. Governance structures must not be arranged in such a way that conflict is brought to a head, but in such a way that diverging perspectives are productively combined in widely shared definitions of common objectives.

The 'cybernetic' or self-regulation perspective is an innovative way of looking at the interaction between people and energy. It captures the dynamic and iterative process in which people rearrange both themselves and the energy system. Hence, this is more than just the acceptance of a pre-defined policy, and includes the active shaping of those changes. In this perspective, people are not just users or consumers, but take part in the process as citizens.

Cybernetic processes are essential since energy systems in transition need continuous social adjustments to strike a new balance. Cybernetic processes consist amongst others of close monitoring of processes, permanent revision of regulations, and management of tensions and conflicts. They require proper communication, negotiation, and the active participation of citizens.

Macro-economic models show that low-carbon transport modes need investment at the earliest possible stage, and that failure to implement carbon taxation in combination with investment in low-carbon technologies, will lead to high costs because of lock-in at a later point. This only comes to the light if this particular, economic perspective is brought in early. At the same time, the full actionability of this insight can only be assessed if it is combined with other perspectives, notably business perspectives on the consequences of such radical changes, and consumer/citizen perspectives on the needs for particular transport modes.

Pluralism of perspectives does not only matter to the definition of problems and the identification of interests. It is also needed to speak saliently to a range of policy domains. Different policy domains address different types of problems. Yet the management of transitions addresses many different policy domains, and necessitates their coordination. Transition governance must at once speak to technological practices, to local communities, to environmental management, to companies, and all this at the full range of levels between micro and macro. The task is not finding one unified perspective that speaks properly to all policy areas, but rather finding ways to mobilize and coordinate a multitude of perspectives and foregrounding the most relevant ones for each policy area.

Mobilizing perspectives is not only about inviting more thoughts, but also about narrowing down: at some point, conclusions have to be drawn. At some points a monodisciplinary perspective is preferable, and at other points a multidisciplinary perspective. Sometimes discussions and analyses have to be broad, sometimes specific and focused. Sometimes jargon is unavoidable, sometimes plain language is preferable. Sometimes perspectives need to be combined to bring in the broadest range of options, sometimes it is necessary to narrow down the choices. Sometimes complexity should be accepted and cultivated, sometimes it has to be reduced. Sometimes, economic indicators provide a useful reduction of complexity and multiplicity, at other points the loss of complexity must be compensated by telling elaborate stories alongside the numbers.

Such a heterogeneous approach can only be productive if commonalities between perspectives are mobilized, and not pitted against one another in a confrontation for its own sake. For example, technological and pro-social (i.e. aimed at the inclusion of the needs of all people) perspectives can together come to solutions benefiting specific groups, such as heating controls that are particularly useful for elderly people. If neglecting a particular perspective leads to disregarding the needs of significant social groups, acceptance will not be achieved. But integration of perspectives is also needed between different policy areas, such as financial regulation, trade, economic and fiscal policies, coordination.

On the policy side, technological and economic perspectives currently dominate. On the side of the broader public, perspectives are to a considerable degree guided by a fear of losing control over one's own life, mistrust in authority, and a lacking sense of urgency and empowerment with respect to energy issues. Therefore, we need to invest in the capacity of individuals and local communities to manage their own affairs. Understanding of technological and environmental issues must be promoted, such that people become better equipped to frame their perspectives and to stage them. Information should be made available, and people should be enabled to unite and act upon such information.

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6. **Getting relevant perspective heard requires inviting relevant parties to voice those perspectives. Investments should be made to emancipate groups that are currently not sufficiently heard.**

Governance

7. **Governance is the distributed process of controlling the organization of society. Its distribution poses important challenges to processes of decision making, democratic accountability, and the enrolment of stakeholders. Without proper methods, governance will fail to engage important parts of society, the cooperation of which is indispensable for energy transitions.**

8. **Governance of energy transitions is a matter of coordination across social groups, industrial sectors, scientific disciplines, and levels of administration. This coordination currently insufficiently enrols the citizen, at all levels of administration.**

Cloughjordan Ecovillage, Ireland, boasts more than 50 low-energy houses and work units. These have been a collective effort of the local community. It is an example of how a local community can take control over the implementation of low-carbon footprint living areas. It offers course in sustainable building, exposes and celebrates its successes by offering guided tours to visitors, and welcomes newcomers and supports them in building their own 'green' house.

Membership and management are aimed at social inclusion, consensus and maximum freedom for citizens. This offers a great counterbalance for top-down styles of government. At the same time, this initiative of local governance is not a substitute for such top-down styles, but works in a way that is complementary to it.

Governance is what happens if people take control of organizing their world. This is partly done collectively in political and other societal institutions. But it is also done outside those institutions, in communities, associations, families, sites of debate and discussion, sites of knowledge production, etc. This is specifically the case if issues matter in dispersed sites, if they require action from heterogeneous actors, or if the issues themselves are so complex that not all aspects can be attended to at once.

The concept of governance expresses the aspiration to manage affairs in a collective and integrated way, once we recognize that those affairs cannot be handled by single actors or by single sites of political power. Good governance is about connecting stakeholders, about making decisions collectively and with inclusion of all relevant stakeholders, about creating legitimacy, and about attributing accountability justly. It is thus more than only establishing formal democratic institutions.

The main challenge for governance is exactly that it is dispersed: there is no single site of power, and processes of decision making, inclusion, and democratic accountability are therefore not straightforwardly orchestrated. There is no guarantee that citizens will engage in such processes and share their perspectives. Especially given the problems discussed in the previous chapter, of citizens' perspectives being dominated by mistrust in authority and by a lacking sense of urgency, it is not straightforward that this will happen. By consequence, the legitimacy and effectiveness of decisions are likely to be precarious. Since governance is not something that happens in a single place, there must be an ecology of institutions in which processes of governance unfold. Institutions and actors should be aware that they are part of this ecosystem, and they should take care to preserve the abilities of the ecosystem to function as a whole.

Investing in small-scale photovoltaic installations and other renewable sources can be an uncertain affair for private individuals: the return on investment is dependent on future energy prices and unforeseen policy changes, hence the break-even point is at an indeterminate point in the future.

Central governments have the possibility to carry some of the burden of this uncertainty. Feed-in tariffs with guaranteed grid access and purchase guarantees for renewable energy generation are top-down policies, typically at the national level, which can enable local communities to develop local energy transitions. It levels the playing field in such a way that these technologies stand a fair chance.

In the case of energy transitions, governance is further complicated by the fact that these transitions include issues that stretch across all levels from the local to the global, and pertain to a great number of economic, political and societal actors. Apart from administrative bodies at any level, these actors include incumbent energy and other companies, scientific communities, media, NGOs, citizens, neighbourhood committees, etc. Moreover, energy transitions are dynamic processes with the emergence, every day, of new actors, and changes in the relative positions of those actors.

A first ideal for governance to aspire to is to include all relevant knowledge, from an indefinite range of sites. Attention must be paid to relevant knowledge that is not available at formalized institutions, such as local knowledge and tacit knowledge of citizens. Public debate, open-source knowledge production, and knowledge production by local communities are prime examples. This class of knowledge is indispensable because implementation of energy transitions will take place in social practices, and citizens' knowledge is needed to align transitions with what matters in those practices. Methods must be devised to circulate and translate this knowledge between different levels of organization and government.

A second ideal for governance is more closely related to what is classically called politics: the process of confronting and balancing different viewpoints and different interests, and carrying these into conclusions that have a binding and legitimate character. Such processes, to which political debate, expert advice to government bodies, and advisory committees offer important contributions, must be arranged in such a way that no unjust prioritization of interests takes place, and that the highest possible legitimacy is constructed. If this fails, it is likely that citizens will resist the decisions made.

The third function of governance consists of the accommodation and mobilization of local initiatives. Not all that matters to energy transitions, or to society at large, can or should be done by governments or other formal institutions. Citizens and local communities show an impressive degree of creativity. However, at the local level, many things are also going by unnoticed while in fact they merit upscaling, diffusion and sharing because they have the potential to benefit large swaths of society. It is a waste not to capitalize on this better, if only because examples taken from local contexts are more likely to meet with acceptance elsewhere, than are measures taken on theoretical grounds by central governments. This is not to say that the neighbourhood and municipal levels are more important than regional, national and international levels, but it does imply that more attention should be paid to making local and central initiatives operate more in a complementary way.

Fourth, governance in the end also includes processes in a 'command and control' style that implement and execute decisions. These include the specification and execution of laws, taxation, and the building of big infrastructures. In the case of energy transitions, changes in infrastructures are vital and require governmental action. Since this kind of decisions deeply influence the social and technological structures of society, it is important that they are arranged in such a way that the governance functions of collecting knowledge, making legitimate decisions, and empowering citizens, are preserved.

Good governance is not only about procedures and arrangements that serve the realization of goals. It is also about preventing parties from unjustly dominating the debate, and about the inclusion of all legitimate interests. If no particular attention is paid to who gets access to sites of decision making, it is likely that such sites will be dominated by parties that already have an economically or socially dominant position, which will effectively sustain their dominance – both in terms of influence, and in terms of their relative economic position. Also differences in social and economic standing between states are likely to be sustained if no explicit measures are taken and materialized into governance structures. Along the same lines, the reduction of citizens to an abstract and undeveloped 'human factor' is likely to sustain itself. Therefore, explicit measures should be taken to include the citizen into governance processes.

7. **Processes of governance should engage and include individuals, small groups and local organizations.**

8. **Processes of governance should be arranged in such a way that they prevent the emergence and reproduction of unfortunate structures, including social and political injustice.**

Strategies

9. **Visionary leadership is needed to keep track of the overall direction of energy transitions. At the same time, strategies must be open-ended and foster processes of continuous learning, negotiation and adaptation, and leave room for innovation at the local level and offer methods for transfer of innovation across regions and contexts.**

10. **European strategies towards secure and low-carbon energy must maximize synergy between local initiatives and central government, between top-down and bottom-up approaches, and between technological and economic approaches and citizen-centred perspectives.**

Energy transition goals have been determined both in the medium term up to 2020-2030 and in the long term up to 2050 and beyond, at the national, EU, and international levels. The current Conference of Parties, Paris 2015, is expected to further consolidate these aims. The end goals enjoy a large degree of acceptance. Nonetheless, the steps needed to reach these goals are not clearly determined and suffer from a high degree of disagreement and controversy. A clear vision on how to achieve the goals is lacking, and there exists divergence between different transition-oriented processes.

If there is anything that stands out as a particularly underdeveloped theme within this unstructured

landscape, it is the underdeveloped notion of the role of people: how they can be engaged as knowledgeable, creative, and acting citizens. As explained in the previous chapter, governance is a heterogeneous process, and different parts of the process require different strategies. Thus, emancipating the citizen might turn out differently in different situations.

The complexity of energy transitions, as sketched in the four previous chapters, requires permanent revision of goals, actor and institutional roles, and socio-technical practices and tools. Therefore, governance requires a strategy learning and experimentation. This learning process relates to citizens in at least two ways. First, citizens should be enrolled as participants in learning. Learning is not something that only takes place by governments asking experts to clarify particular issues, but something that takes place throughout society, and in something in which citizens play vital roles as producers and translators of knowledge. Second, citizens are part of what is to be learnt about. Transitions matter to their lives, and knowledge about exactly how transitions matter is needed to align them.

Both learning and the evocation of the potential of the people differ between the various functions of governance specified in the previous chapter. In the first function, which centres on the acquisition of knowledge beyond what is available in institutionalized forms, learning might most concretely be mobilized as soliciting problem definitions and perspectives from the relevant audience. This gathering of information serves the deep monitoring of social practices in which transitions are to take place, without which a proper alignment between those practices and the technological changes would be impossible. People as a source of knowledge are to be mobilized at all geographical levels of organization: from the neighbourhood to the European level.

The second governance function, carrying different interests and perspectives to legitimate decisions, should have a keen eye on including the broadest array of legitimate interests which is vital to prevent dominance of vested interests and incumbent parties. Inclusion of the citizen at this point means taking examples from local initiatives, as well as learning from the heterogeneous perspectives and problem definitions voiced outside formal institutions.

MILESECURE-2050 has shown that enabling local and distributed actors to take control of energy transitions in the end produces a faster and more successful move towards low-carbon and secure energy. This success also holds in economic terms: if more decisions are left to local actors and lower governments, the economic cost of transition is likely to remain lower than in the case of top-down implementation of transitions.

The German free state of Bavaria has explicitly made agrarian and estate actors part of the transition process. Energy issues are essentially spatial issues: both production of renewable energy and the transport of energy require space. Therefore, it is an explicit part of Bavarian policy that communities and inter-municipal bodies are granted the sovereignty over renewable-energy projects. A comparably large degree of energy independence is hoped to emerge this way.

The third function, accommodating and mobilizing local initiatives, should be approached as seeking sites for social and technological learning and experimentation. Mobilizing the citizen in this case means facilitating local initiatives, learning from what communities and individual citizens achieve, and empowering people to develop their own creativity. This requires that knowledge be made easily available and that access to resources including means of financing is guaranteed. And not least, it means that people are taken seriously as owners or co-owners of transition problems. It requires that they are seen as experts within their specific niches, and experts from whom society at large can learn something.

The fourth function, implementing decisions once they are taken, requires prudence and sensitivity with respect to the other functions. Infrastructures, regardless whether we think of physical ones such as energy and transport networks or of cultural ones such as laws, institutions and consolidated social practices, have the potential to constrain our actions. Therefore, it is of great importance to make sure these constraints do not work against the potential of people in the other governance functions. Infrastructures should be arranged in such a way that they can accommodate the socio-technical experimentation in local initiatives which is needed to inform energy transitions. They should be geared towards enabling all social groups to voice their perspectives and define their problems. And they should be arranged in such a way that conventional politics is not captured by vested interests.

This gamut of strategies is of course a recursive and never-ending process in which the context itself changes, leading to new problem definitions, new rules and regulations, new opportunities for experimentation etc. It is important to realize that citizens are continually repositioned as a consequence, and that strategic choices will have to be revised periodically as a result. To see people as citizens means that they are reckoned far more valuable participants than a mere 'human factor'. They must play a role in all phases of governance, in each of the functions sketched above, and at each geographical level of organization. The concrete experiences, many of which have been elicited by MILESECURE-2050 research, offer valuable input to these processes.

In addition, it is important to realise that these generic ideas need adaptation to specific national contexts. As mentioned earlier, differences between EU member states are considerable. This is yet another reason why inclusion, learning and adaptation are of utmost importance. Only if those are in place, will citizens, communities and countries be able to play their due part in the overarching goal of building a low-carbon and energy-secure Europe.

9. **In transitions towards a secure and low-carbon energy system, people should be addressed as a resource of governance, as citizens rather than just as consumers.**

10. **In transitions towards a secure and low-carbon energy system, people must be empowered as experimenters, as owners of problems and perspectives, and as the very source of legitimacy for political action.**

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