

Innovation policy for the Dutch energy transition

Operationalising transition management?

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1. Introduction

The term transition is a key term of the fourth national environmental policy plan (NMP4, 2001), which put forward transition management (Rotmans et al, 2000) as a new policy approach for dealing with persistent and highly complex societal problems such as climate change, loss of biodiversity, overexploitation of resources and health risks related to the use of dangerous, non-natural substances. The NMP4 selected the energy supply, mobility, agriculture and the use of biodiversity and natural resources as priorities for developing transition management activities. The Ministry of Economic Affairs (holding responsibility over energy and innovation policy) has since the NMP4 been the leading actor in the so-called 'energy-transition'. Several activities have been undertaken, based on the basic principles underlying transition management; long term visions as framework for short-term action, a multi-actor approach and a focus on learning and experiments. The approach has stimulated the involvement of a large number of stakeholders and led to the developments of shared visions, ambitions and strategies, experiments and projects. Besides, the approach itself has generated questions regarding regular policies, for example innovation and technology policies, and led to debates on policy integration and barriers in existing regulations. This discussion has been actively picked up by the Ministry and governmental advisory boards for energy and environment (Energieraad and VROM-raad 2004). It is an example of policy learning in which it was believed that sustainability requires some fundamental changes in functional systems, which in turn require policy-innovation. In this paper we will look at why the Ministry was interested in fostering an energy transition

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(where we will see that economic reasons, notably the willingness to create green energy business, was an important consideration). The paper will describe the policies and stakeholder process, which will be assessed from a transition management perspective. This means that the paper uses the multi-level, multi-phase transition management framework (Loorbach 2004b) to evaluate the energy-transition approach as developed by the ministry of Economic Affairs, in terms of content (what types of visions and experiments are developed?) and in terms of process (what kind of actors are involved, what instruments are used?). Special attention will be given to the nature of the policies developed and their difference with and implications for 'regular' policies. We will compare the difference with past policies and the changes in the system of governance. The paper will also seek to answer a more speculative issue: What are the prospects of the Dutch approach to achieve a transition and a flourishing sustainable energy business?

2. Sustainable Development and the need for alternative governance

Many countries are committed to sustainability but are struggling with how to do this. Following the Brundtland report *Our Common Future* (WCED, 1987) sustainable development came to be defined as redirection of trajectories of change in ways that combine economic wealth, environmental protection with social cohesion. After the initial optimism about win-win opportunities it is increasingly understood that there are tradeoffs between the three goals in any type of development (at least in the short term) and that each development tosses up new problems for society. Approaching SD as a continuous process of change means that it cannot be translated into a blueprint or a defined end state from which criteria could be derived and unambiguous decisions be taken to get there: as a multi-dimensional and dynamic concept sustainable development can neither be translated into the narrow terms of static optimisation nor is it conducive to strategies based on direct control, fixed goals and predictability (Rammel et al., 2004, p.1). We face a dynamic process where the starting point cannot be a fixed idea of sustainability, rather it must be a social consensus what we consider to be unsustainable (Wilkinson and Cary, 2002 quoted in Rammel et al, 2004). The consensus view is that sustainability "refers to a process and a standard—and not to an end state—each generation must take up the challenge anew, determining in what directions their development objectives lie, what constitutes the boundaries of the environmentally

possible and the environmentally desirable, and what is their understanding of the requirements of social justice” (Meadowcroft 1997, p. 37).

Different countries have taken up different strategies to cope with the challenge of ‘managing’ sustainable development. A lot of countries opted for sustainability councils and the development of sustainability indicators. The Dutch government followed a different track. It believed that sustainability requires fundamental changes in functional systems of for example energy, transport and agriculture. It conceptualised the quest towards sustainability as an issue of managing transitions in functional societal systems. Transitions are highly non-linear processes of change that result from the interference of fast and slow dynamics at different levels of scale. Transitions are societal transformations involving economic, ecologic, technologic, institutional, cultural and other changes. The process at the societal level is typically spanning one or two generations (25-50 years). Historic analysis of societal transitions² (Geels and Kemp 2000; Van der Brugge, Rotmans, and Loorbach 2005; Verbong 2000) supports the idea that transitions involve changes at different conceptual levels and go through different stages (Rotmans, Kemp, and van Asselt 2001).

The transition approach opens the way for dealing with five central problems related to modern-day policy-making for sustainable development (Kemp 2005):

- *Dissent*

Complex societal problems related to sustainability are characterized by dissent on goals and means. Different people have different perspectives on the (nature) of the problem and preferred solutions.

- *Distributed control.*

In pluriform societies control cannot be exercised from the top. Control is distributed over various actors with different beliefs, interests and resources. Influence is exercised in at different points, also within government, which consists of different layers and silos, making unitary action impossible.

- *Determination of short-term steps.*

² The transition concept has always been used to distinguish different phases: for example the demographic transition is visualised by a double s-curve; one indicating birth- and one indicating death rates (Davis, 1945).

It is unclear how long-term change may be achieved through short-term steps. Short-term action for long-term change presents a big problem to policy makers. There exists little theory on this.

- *Danger of lock-in*

There is a danger that one gets locked in to particular solutions that are not best from a longer term perspective.

- *Political myopia.*

From historical studies we know that transitions in sociotechnical systems take one generation or more and thus span various political cycles. Long-term policies in some way must survive short-term political changes.

From this the following strategies emerge as useful strategies for managing sustainability transitions: problem structuring, participatory integrated assessment, system analysis, vision-development, portfolio-management, iterative decision-making and adaptive policy, experiments, cooperation, and commitment to transitions. Managing transitions might seem to be a contradiction in terms due to the inherent complexity, uncertainty, chaos and the consequent low level of control we can exercise. From a traditional point of view we could indeed establish that direct influence, power and control seem to be less effective in bringing about desired change in a straightforward manner. This can however be challenged with complex systems' thinking: unexpected side effects or spin-offs are by definition to be expected although the precise content cannot be calculated. Similarly, dynamic patterns in complex societal systems can be observed and analyzed, although their precise nature and direction cannot be predicted. Another example is the reality of diversity; the complex systems' paradigm holds that different positions within a systems lead to a different assessment of the state of the system and thus to different policies (problems and solutions). Even though a certain level of awareness of such complexity already seems to exist among some policy-makers, the transition-concept combines and integrates a number of insights and provides coherent explanations.

From a complex systems' perspective, societal dynamics are perceived as chaotic, complex, and impossible to manage in the traditional sense of planning and command and control. Transition management views social change as a result of the interaction between all relevant actors on different societal levels within the context of a changing

societal landscape. Managing social change thus becomes the organisation and coordination of this interaction. Managing transitions is by definition a highly uncertain and sometimes chaotic process, in which an attempt is made to link different actors and organisations with different time horizons, ambitions and values in order to enhance the change that new, sustainable, structures emerge because of co-evolutionary processes. For policy-makers, such an approach implies a totally different way of dealing with policy-making and of organising the process (Kemp 2003).

3. The transition management framework

Based on the concept of transition management (Kemp and Loorbach 2003; Loorbach and Rotmans 2005; Rotmans, Kemp, and van Asselt 2001) the multi-level framework for transition management (Loorbach 2004a) is developed to enable analysis as well as structuring of transition management activities. In this section we will first introduce the concept and the framework before taking a closer look at the activities undertaken in the context of the energy transition. It has to be noted here that there is difference between the energy-transition as a long-term process of societal change and the process managed and facilitated by the Ministry of Economic Affairs. In this paper we refer to the latter when we mention the energy-transition.

Transition management is oriented towards both system improvement (improvement of an existing trajectory) and system innovation (representing a new trajectory of development or transformation). Transition management breaks with the old planning-and-implementation model aimed at achieving particular outcomes. It is based on a different, more process-oriented philosophy, aimed at processes of variation and selection. Transition management is a form of process management against a set of goals set by society whose problem solving capabilities are mobilized and translated into a transition programme, which is legitimized through the political process. Transition management is iterative and adaptive. It does not aim to realize certain particular paths but sets out to explore new paths in a forward-looking, yet adaptive manner. It does not consist of a strategy of forced development, going against the grain but uses bottom-up initiatives and business ideas of alternative systems offering sustainability benefits besides user benefits.

Key elements of transition management are:

- Long-term thinking (at least 25 years) as a framework for short-term policy.
- Backcasting: the setting of short-term and longer-term goals based on long-term sustainability visions and short-term possibilities.
- Thinking in terms of more than one domain (multi-domain) and different scale levels (multi-level); how developments in one domain (level) gel with developments in other domains (levels); trying to change the strategic orientation of regime actors.
- A focus on learning and the use of a special learning philosophy of 'learning-by-doing'.
- An orientation towards system innovation.
- Learning about a variety of options (which requires a wide playing field).

To structure and operationalise the transition management approach in terms of evolutionary governance (Kemp 2003), the multi-level framework for transition management distinguishes between three levels at which governance activities occur:

- **Strategic level:** processes of vision development, strategic discussions, long term goal formulation
- **Tactical level:** processes of agenda-building, negotiating, networking, coalition building
- **Operational level:** processes of experimenting, project-building, implementation

At each level, specific types of actors participate, specific (policy) instruments are used and different competencies are needed. Taking an actors' perspective, transitions are the outcome of the interactions between actors on one level and interactions between levels. Actor strategies inform short-term activities, and competing companies for example will follow similar trajectories. Innovation within this context is multi-level innovation ranging from product-innovation to organizational and system innovation. Transitions as societal innovation only comes about when the innovation processes at different levels interact and reinforce each other. As such, transition management can be considered as a form of multi-level governance (Hooghe and Marks 2001; Scharpf 1994) whereby state- and non state-actors are brought together to co-produce and co-ordinate policies in an iterative and evolutionary manner on different policy levels.

This evolutionary, iterative perspective builds upon the ideas of advocacy coalitions (Sabatier and Jenkins-Smith 1999) and partisan mutual adjustment (Lindblom 1979; Lindblom and Woodhouse 1993) as drivers for social change. Different groups with different belief systems, stakes and ambitions try to put their issues on the (political) agenda and thus protect or further their interests. Through these processes of negotiation, adaptation, co-production and sometimes dispute, actors change or adapt their views, redefine their own place and role in the system and are able to rephrase the problems perceived. These processes take place at each level, creating competition (processes of variation and selection) between visions, agenda's and actions and between, institutions, networks, companies and individuals.

At the **strategic** (systems') level most important is giving direction to developments by developing leadership capacity, long-term orientation and integrated strategies. Transition management therefore aims at redefining leading visions, ambitions and goals within the context of a constantly changing society. This is by definition not a democratic process (Lindblom and Woodhouse, 1993), and should therefore be carried out by strategic actors in a transition-arena, which is explicitly linked up to societal strategic networks. At the **tactical** level, transition management targets existing institutions, regimes and structures in order to 'open them up' or tries to develop new, competing ones. The transition agenda is the main instrument, allowing for negotiation processes and broader stakeholder involvement through network governance. On a thematic or subsystems level, different strategies can be developed in coalitions, networks, firms etc. At the **operational** level, transition management aims at influencing the variation and selection process through creating room for self-organization, experimentation, learning and knowledge co-production. Implementation and execution of transition experiments is the main focus, stimulating innovator and entrepreneurs to come up with innovations and alternatives. At this level, even top-down regulation of directives could suffice.

By linking different levels of governance through a cyclical, iterative process, transition management aims to enhance the change that novel ideas and innovations can emerge and break through to constitute new societal structures. The introduction of new interdependencies between actors, new possibilities for co-operation and interaction and a long-term orientation and framework that structures short-term activities, transition management can provide a stimulating and enabling context for the up-scaling of societal

innovation dynamics. Basic starting point is that the actual progress of related to the issues, is directly linked to the process itself. Based on systems' and transition analysis, the participatory process is organized and structured. The multi-level framework for transition management encompasses the whole array of governance activities that in interaction could constitute a new, evolving system of governance.

Level	Goals TM	Activities TM	TM-instruments	Actor- competences
Strategic	<i>Anticipation</i>	<i>Problemperception & structuring</i>	<i>Integral system analysis</i>	<i>Systemthinking, abstract thinking</i>
	<i>Coordination</i>	<i>Exchange of perspectives, agenda development</i>	<i>Transitionarena Transitionagenda</i>	<i>Communication skills, Strategic insight</i>
	<i>Orientation</i>	<i>Vision development</i>	<i>Scenario-development Transition images</i>	<i>Creativity, imagination</i>
Tactic	<i>Variation</i>	<i>Stimulation</i>	<i>Transitionagenda Transitionpaths</i>	<i>Thinking in terms of co-production</i>
	<i>Selection</i>	<i>Analysis, negotiation</i>	<i>Transition monitoring Transition-evaluation Innovation-networks</i>	<i>Analytic capacity & negotiation skills</i>
	<i>Networking</i>	<i>Coalition and network development, institutionalisation</i>	<i>Arena's of arena's Innovation networks</i>	<i>Communication, consensus-building</i>
Operational	<i>Development</i>	<i>Experiment</i>	<i>Experimenting room</i>	<i>Learning and communication</i>
	<i>Innovation</i>	<i>Implementation</i>	<i>Testing grounds, projectes, action</i>	<i>Project management</i>

Table 1. The multi-level transition framework

A good example of how societal innovation takes place as result of interaction between different levels of governance is the transition in Dutch waste-management (Loorbach 2003). Long term planning (through national environmental plans) and envisioning or the formulation of ambitions¹ triggered activities at the lower system levels; the development of new technologies and practices, new rules and regulations for these technologies and practices. In turn, the new way of dealing with waste (recycling and waste-separation, new treatment possibilities) influenced the long-term images and ambitions. The current waste-management system is characterized by a high degree of efficiency throughout the whole chain; collection, transport, treatment and recovery. This transition was very much problem-driven: shortages in waste capacity and the need to find better ways of managing waste at affordable costs. A sustainability vision in the form of a waste hierarchy was guiding decisions. The transition was not planned but the outcomes of many decisions and policy events. The Dutch waste management council (AOO), established in 1990, played an important and central role in the transformation process. Negotiations between different layers of government and with private waste companies took place within the AOO with the actors agreeing on the general direction of creating a modern and efficient system of waste management with less waste being landfilled. In other words, in transitions a new system emerged out of the seemingly chaotic and spontaneous processes in interaction with diverse governance activities by different actors at different system-levels.

4. The approach of the Ministry of Economic Affairs

Of the various Ministries involved in implementation of the NMP4, the Ministry of Economic affairs became the strongest proponent of transition management. To many, this was surprising because the Ministry's main goal had been to serve the interests of business. They were mainly interested in sustainable energy for business reasons. Why then did this Ministry embrace the concept of transition management and was it so active in implementing it? The reasons for why the Ministry of Economic Affairs got interested in transition management are described in the Ministry's policy white paper "Innovatie in Energiebeleid" (EZ 2004). The first, arguably foremost, reason is that they hoped to create sustainable energy business. They were hoping that the Netherlands would become a preferential location of innovative, sustainability-oriented companies. The second reason that is stated is that a sustainable energy system requires system innovations, which require a cooperative long-term approach such as transition management. Third, the energy transition would help the Ministry in changing its relationship with business, making it more interactive and participatory, co-aligning societal goals and business goals. As they write:

A third reason for the transition approach is to be found in the changing relationship between market and government. Steering is no longer the province of government. This means that in the energy transition stakeholders should co-determine the directions with chances informing those directions. Policy goals should be broadened so that business, societal organisation and knowledge institutes recognize their own ambitions in them. The advantage of this is that a broadly shared sense of opportunity can emerge, creating chances for new products and systems in new corners of the market (EZ 2004), p. 9.

An important starting point for the Ministry was that the world-wide energy system based on fossil fuels was believed to be non-sustainable environmentally and economically. A transition to alternative fuels was viewed inevitable, by being a first mover the Netherlands wanted to benefit from this change. The approach of Transition management developed by Rotmans, Kemp and others as an iterative approach towards long-term change based on innovation and learning fitted the Ministry's vision of how to manage the transition process. In the words of the Minister of Economic Affairs Hans Weijers in 2001:

In my opinion the government should not work from self-designed, predetermined future images that fix choices for a long time. What it should do instead is to stimulate and search for new initiatives in society that lie the basis for developments that help to go beyond existing energy policy objectives, starting from a shared concept of sustainability. The concept of transition management requires different ways of thinking and doing-things on the part of government, including the Ministry of Economic Affairs. I want to play an active part in this. I have asked people of the Department to work out the concept the coming half year (EZ 2001).

Thus, when the Ministries started implementing transition management, the concept itself was only roughly sketched. Especially the stakeholder process aspects were weakly developed. In the period between 2001 and 2005, one could say the concept of transition management was simultaneously theoretically deepened and operationalized in an iterative manner through involvement of transition-researchers in the implementation. Several activities have been undertaken as part of transition management by the Ministry of Economic Affairs.

The Ministry started with making an inventory of all relevant actors and activities related to sustainable energy nationally and internationally. Based on this inventory, supported by scientific data, the working group 'lange-termijn visie energievoorziening' (long-term vision for the energy supply-system), produced the scenario report 'Energy and Society in 2050'. This report combined the analyses of different trends related to economic growth, energy consumption and industrial development with projections about yield and supply of (alternative) energy-resources ranging from fossil resources to biomass. In its analysis, the report distinguished four possible future-worlds along the axes long term (gain) versus short term (gain) and regional versus international. In each of these 'worlds' (scenario's)- 'Global solidarity', 'Global markets', 'Regional networks' and 'Regional isolation'—the need for and sources of energy were identified. Based on this analysis, the so-called robust elements of the future energy system were believed to be those that fit in all four scenario's (in the Lange Termijn Visie Energie, LTVE, 2000).

A sustainable energy-supply systems was defined along the three dimensions of sustainability by the following three functional goals:

1. reliable provision of energy services;

2. low prices thanks to economic efficiency and market dynamism;
3. minimal negative environmental and social impacts.

Low-carbon was singled out as the most important environmental aspect, which means that the energy transition is about cheap, reliable and low-carbon energy. Apart from the functional goals – having to do with the way in which services are provided -- there were non-functional goals defined. Officially stated non-functional goals are the creation of energy business and contribution to policy renewal. It is also being stated that there should be no negative impacts elsewhere (for example the use of biomass should not create environmental or social problems in developing countries). A last goal was self-sufficiency but this applies more to the EU than to the Netherlands. It should be noted that none of the goals was quantified beforehand. The non-quantification is deliberate. Apart from the many uncertainties that make it difficult to set goals, it is believed that the formulation of qualitative ambitions instead of quantitative targets keeps open the process of change.

These were translated in “main routes” of the energy transition, which are:

1. Efficient and green gas
2. Chain efficiency (efficient energy and material use throughout production-use chains)
3. Biomass resources (for products, materials and energy)
4. Alternative motorfuels
5. Sustainable electricity.

The Energy and Society in 2050 report was evaluated by the Central Planning Agency (CPB) and an independent German institute (Fraunhofer Institute) and was presented at the website of the Ministry. In the Netherlands internal meetings, working groups, stakeholder meetings, a website-forum and a final conference were organized by the Ministry to discuss the report and at the same time create a platform and support for the approach of transition management. These discussions also showed that the choice for the main routes was recognized by the stakeholders and supported by the market. Although there were some discussions about the involvement of solar and wind-energy, the consensus was that these options were not innovative enough and should not be part of at least the first phases of the process.

The first four routes selected are new strategic routes for policy, the last one – sustainable electricity – was already chosen as a strategic route. For these four new routes transition-arena's or platforms were set up to enable and facilitate discussions within the framework of the over-all ambition and the context set by the scenario-study. Within the different main routes (or sub-themes), paths were worked out by the transition teams “new gas”, “biomass international”, and “modernizing energy chains”. In addition 80 ideas (70 proposals) for transition experiments have been collected in the areas of new gas, biomass, energy-efficiency and industrial ecology. The overall aim of the transition experiments and paths was to achieve an energy system characterized in the over-all vision through learning about different options, bottlenecks and uncertainties.

The general approach thus was to formulate general qualitative ambitions which served as a framework for similar discussions on the level of the different options (main routes). For each of these options “ambitions” were formulated by the transition teams based on stakeholder consultation and interaction with social groups. The general conditions within which the discussions should take place were set by the exploratory phase of the scenario-study and the participatory process underlying it. The real debates however about how specific options could or should be used and what their potential would be, were held on the sub-level of the main routes. This meant a bottom-up definition of options and sometimes an explicit choice for leaving different, competing, options open.

The discussions about biomass for example provided a new forum for interaction of a wide variety of stakeholders active in this field and for debates about different perspectives on the issue. It soon became clear that although there was a shared interest in developing the biomass-network and concrete ideas for application, there was much difference in the expectations of the yield of different sources of biomass and the best way to process these forms of biomass. These discussions already were very functional in providing insight into the complexity of the issue and the variety of options. While not all actors agreed with the specifics, a more general level of understanding was created to enable convergence with regard to formulating ambitions and transition-paths.

The ambitions for biomass that were agreed on consist of a share of 10-15% for biomass in power production and a share of 15-20% in transport in 2020. For 2050 there is an ambition of 20-40% biomass in primary energy supply. Industry, ngo's, the Ministry and scientists who also formulated possible routes to these outcomes set the goals. The strategic goals for 2020 were called 'ambitions', something to aspire to. It should be noted that the ambitions are not "hard goals" for policy; they will not be used for hard-nosed political evaluation. They are soft goals reflecting uncertainty about the options and the economic and political-administrative context. They will be adapted with time. A quintessential element of transition management is that no collective choice is made as to energy technologies and sources. The three transition paths are composed of 30 technological and societal options that will be explored in the so-called transition coalitions; coalitions between technology-developers, companies, researchers, ngo's and government.

One example of a coalition which was developed by the industry itself in the context of this process is the community on bioplastics (BCPN). Different actors developing different kinds of bioplastics (plastics based on biomass), ranging from flower-pots to plastic bags and pens, organized themselves into a branche organisation to develop a community, facilitate debate and provide a communication channel for the community toward government and society. Within three years, they have developed a logo, website, a strategic agenda and some succesful examples. During this time, discussions of the organisation with the government have led to progress which could not have been achieved by individual companbies, such as the possibilities created by almost all municipalities to include bioplastics in the compost. This was for a long time not possible because of the lack of coherence in the sector, the fact that bioplastics could not be recognized, retail would not sell it, regulations prohibited it and consumers would be confused by it. Through the creation of a learning community including all the stakeholders, and slowly working towards a shared agenda, different conditions were slowly changed to enable the breakthrough of bioplastics on a larger scale.

Next to organising the stakeholder process, the Ministry has tried to undertake activities supporting the development of the transition-network. For example there has been an evaluation of existing policy programmes from the point of view of their contribution to

the energy transition. One such programme is the GAVE programme, a chain demonstration programme for climate-neutral fuels, where it was concluded that it was too technology-focussed (NOVEM, 2003). Another policy integration exercise was the evaluation of the government energy RTD (EOS) where 63 projects have been analysed on the basis of two criteria: knowledge position of the Netherlands and contribution to sustainable energy system. This led to the identification of “arrowpoint” projects that scored high on both accounts. Projects with a positive contribution to a sustainable energy system and weak knowledge position of Dutch firms were labeled “knowledge import” themes whereas projects with opposite scores were labeled “export themes”. The EOS evaluation appears not to be a direct result of the government’s commitment to transition management, showing that the government was already using a strategic portfolio approach for energy R&D.

Three other visible initiatives are: the establishment of a so-called “service point transitions” at the Ministry responsible for the Environment (VROM) which is also responsible for overall coordination of sustainability policy; a transitions newsletter; and the establishment of an “intervision group” advising the Ministry about its energy transition policy. The intervision group consists of societal experts of high repute which should make sure that policy is not exclusively supply oriented but also takes account of issues of acceptance and other societal concerns such as livability. The group consists of mostly non-energy experts. Most of them had been involved in politics and several had held Ministerial positions.

Two new instruments of transition management are the “Regeling Ondersteuning TransitieCoalities (OTC) for transition experiment coalitions and the “Unieke Kansen Regeling” of 35 million euro for transition experiments. In order to qualify for support the experiments should

- be part of an official transition path
- involve stakeholders in an important way
- have explicit learning goals for each of the actors of the consortium.

For transition experiment coalitions 1.5 million euro is available. This is for feasibility studies with a maximum support of 50,000 euro. Both instruments are on top of the 173 million euro for energy innovation. It is hard to tell how much money overall is involved in transition management projects. In 2003 the Dutch government allocated 226 million euro for project on sustainable system innovation, half of which were related to sustainable energy. By way of comparison, the Carbon Trust in the UK being the main instrument for the transition to a low-carbon energy system has committed £29.9 million (45 million euro) to the discovery and development of low carbon technologies and businesses.

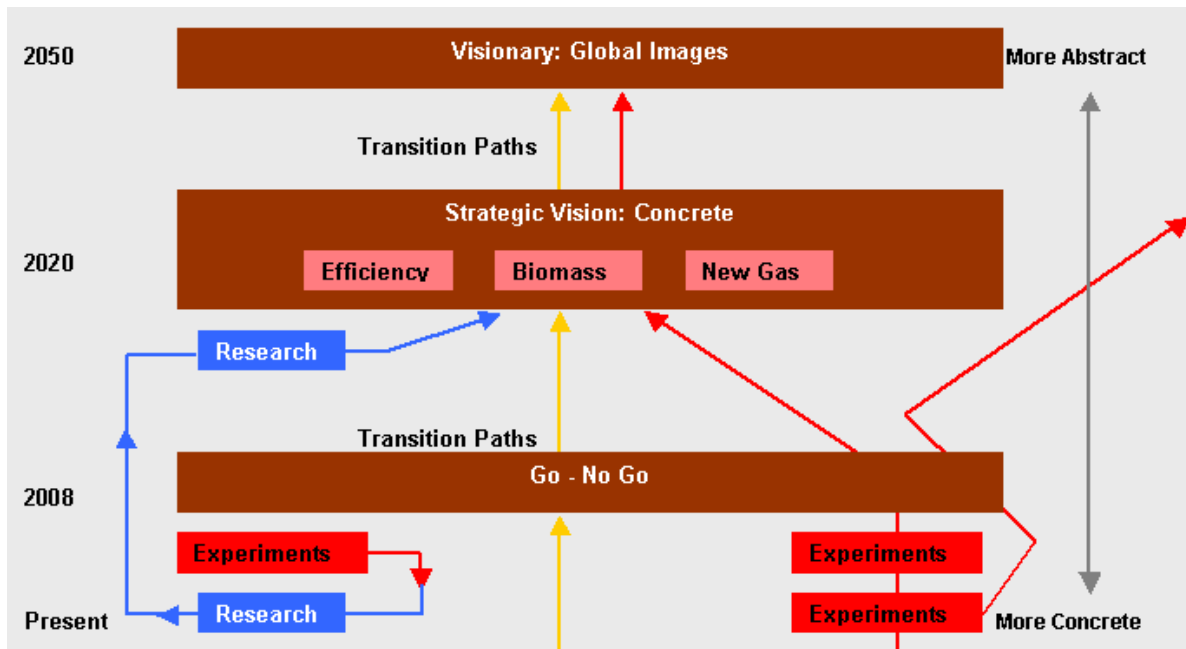
A recent example of a transition coalition executing a transition experiment co-funded by the Ministry is the 'Warmtebedrijf Rotterdam' (Heating Company Rotterdam, HCR). This coalition of industries, local and regional government, housing corporations and energy companies, has developed an experiment in which warm waste-water from industries is re-used to heat houses. The project first starts to provide heating for 4500 houses, but plans to upscale this in the future. Energy companies will build the first heating network, which in the future could be expanded to provide up to half a million consumers in 2020 (ambition). The first phase provide emission reduction (6% of Dutch Kyoto targets). Out of the total cost of 124 Million Euro's, 27 million is uneconomic and will be covered by the Ministry (20M) and the city Rotterdam (7M). Interesting detail is that just after liberalization of the Dutch energy market, the local government of Rotterdam and the Ministry thus created a new (public) utility company.

Another noteworthy initiative of the Ministry of Economic Affairs is the establishment of the team "policy renewal". This project should help the government to change its relationship with business. To this end the project team consulted with business and other stakeholders, seeking answers on 4 central questions:

- Do they agree with the ambition of the Ministry and approach of transition management?
- What would they like to get in return for their involvement?
- Does the energy transition require changes in policy; what changes in policy and instruments are needed?

- How may profit-opportunities be enhanced and risks be reduced through financial support and other types of measures?

From these consultations emerged that the Ministry should be trustworthy; manage its own affairs well; be consistent and create greater consistency between different policy domains; be able to bring together parties (match-making); not be too much technology-oriented but find a balance between technology and organization; be a partner of forerunners; offer financial support, and finally be committed to sustainability and the new approach of transition management (Beleidsvernieuwing 2003).



5. Energy transition management?

The question addressed in this section is whether the transition management approach taken by the Dutch ministry of Economic Affairs constitutes a break in policy? It is hard to answer this in a categorical way. There is a great deal of continuity and use of regular policy instruments, and a great deal of things certainly are not new: there existed already an innovation policy through which various options were supported financially and the government was already supporting collaboration between knowledge holders. Markets remain the main mechanism of coordination. But also some a great deal of novel aspects are introduced: the commitment to a transition and identification of transition paths, the joint formulation with stakeholders of strategic goals, the use of learning goals

and the open communication about progress. This has meant a far more integrated approach than was used before, thereby creating an integrative policy-framework that is slowly integrating existing policy options and approaches.

Taking a closer look at some of the changes that have occurred during the transition-policies undertaken by the Ministry of Economic Affairs shows that there certainly is reason to believe that more integration, more investment and more attention has been achieved. The Ministry's budget for transition-policies for example rose from around EUR 200.000 in 2000 to roughly EUR 80 Million for 2005. Part of this budget is 'relabelled' money, which would otherwise also have been invested, only in more traditional energy research and experiments. Part of the money however is in new funds such as the UKR and the OTC-funds. Besides these investments, the Ministry is also committing a growing number of officials to the process, creating an evolving learning-community within the Ministry. Two other funds noteworthy are the Bsik-funds, a national research fund of over EUR 800 million, out of which close to 200 million is spent on innovative energy-research, and the Energy Research Fund (EOS) which is now directly linked to the energy-transitionmanagement. Besides the direct investments, it seems, that the transitionmanagement approach is also leading to convergence and integration of existing funds, subsidies and investments.

According to the Ministry the transition approach gives new impulses to the innovation system in three ways (EZ 2004):

- the process of visioning in the sub trajectories with active involvement of business, governments and societal organizations and knowledge institutes, resulting in shared sense of direction
- novel coalitions have been founded of parties who were previously each others enemies (an example being the biomass coalition of business and the environmental movement and the involvement of Greenpeace in offshore wind energy).
- Niche markets are being sought for a number of transition paths.

The use of the phrase "new impulses" by the Ministry shows that it is not altogether new. Perhaps the greatest change is that transition issues are being openly discussed not just within the government but also in society. There also certainly is a greater orientation to

innovation and to innovative firms. Whereas past policy was very much oriented to non-innovative firms, transition policy is oriented to forerunners.

At the strategic level, the transition management framework distinguishes anticipation, coordination and orientation as crucial activities for directing systemic change in a specific (in this case, sustainable) direction. The ministries activities have stimulated and facilitated intensive discussions about future developments between different stakeholders. Visions have been developed for the over-all energy system as well as for the chosen sub-systems. The use of scenarios, formulation of ambitions, identification of transition paths by stakeholders and the planned support for transition experiments fits the original model of transition management. No definitive choice is made as to the future energy system: different paths are explored in a bottom-up iterative manner. It is interesting to note that the government uses the metaphor of a “journey to the south” (with the South being a more sustainable energy system) in which the means of travel is not predetermined. As a result, an increased political and societal sense of urgency has been established and a shared understanding about the conditions for a future energy-system has been developed.

With regard to the development of coalitions and networks at the tactical level, the approach also shows very concrete results in terms of the amount of actors involved in the process (from around 10 in 2000 to several hundreds by the end of 2004), the amount of multi-actor coalitions formed and supported around specific energy options (over 75) and the amount of societal groups engaged and societal debate stimulated. This has also led to initiatives taken up by societal actors themselves, such as the coalition mentioned before that drew up a manifest on market-policy interaction, cooperation between environmental NGO’s and business, and projects between municipalities, technology developers and local businesses. There thus seems to be a constant interaction between societal dynamics, steering activities and the way in which policy-development is taking place, leading to all sorts of spin-off both in terms of traditional results such as reports, covenants and projects as in terms of network-development, (policy) learning, behavioral change and redirection of existing trajectories (mainly investments).

Society is involved in it, which is visible in the following societal initiative. In 2003, a coalition of business and environmental groups published a manifest called “market and environment” about frame conditions. It believed that a transition could not happen without a change in frame conditions. The unusual coalition of green groups and business made a plea for the use of a (trans) European emission trading system for greenhouse emissions with clear long-term ceilings besides a forceful national innovation policy. It also made a plea for continuing the support of energy-efficiency besides the support of renewables in Europe. They did not want the government to pick winners and wanted greater continuity in policy which would be better secured under generic policies. The manifest was concerned with transition issues and represented the view of proactive energy companies.

The coalition addressed a root problem for transitions, one that is often noted by economists that the economic frame conditions have to be right. This is a problem in any country and difficult to manage because of vested interests and the belief that these interests have to be seen to. Perhaps the commitment to transition helps to create a more level playing field for energy options in which the external costs -- in the form of economic damage from climate change and pollution -- are priced. It is too early to tell whether this will happen. The commitment to transitions did allow for certain reforms to be discussed but has not yet resulted in an adaptation of the policy framework. It is being realized by the administration that existing rules and regulations may create a barrier to system innovation. Transition experiments are allowed to depart from existing regulations. The details of this however are unclear.

In a general sense, the community building, the discussions set in the context of the larger debate and the commitment of the Ministry of Economic Affairs to the process have set the conditions for convergence in the thinking about sustainable energy. It created an increased sense of urgency (with regard to government and NGO's) and increased sense of opportunity (for business, but NGO's as well). The conference on Innovation in Energy which presented the outcomes of the first phase of transition management in addition showed the growing attention of the regular policies and politics for the approach. Initial scepticism has waned, the Minister himself has shown great commitment and there is much discussion of the concept of transition management.

For the coming years the following things are on the policy agenda: revision of generic policy (for instance greening of the tax system) based on experiences with the energy transition; widening of the group of stakeholders involved in the energy transition; discussion of energy transition policy with other countries (in the EU and IEA); review of the energy research strategy (EOS); monitoring and evaluation of the energy transition process; active communication; investigation of the link between current policy and transition approach (EZ 2004).

The changed decision-making and attention to innovation also fit with the transition management model. The energy transition policies are very much policies for innovation. It is more about support than about control. For market pull, the Ministry of Economic affairs (responsible for energy and innovation) which is in charge of the energy transition will rely on the greenhouse emission trading scheme of the European Union which should create pull for low-carbon technologies. The commitment to a low-carbon energy transition so far did not lead to important changes in frame conditions. Biomass actors are waiting for a tax exemption for biofuels, which should give biofuels a competitive edge. This has not happened yet, although discussions have reached other Ministries (of financial affairs and of the environment).

At the operational level, the policy has been successful in addressing innovators, supporting and setting up transition-experiments (over 70) and creating attention. Now, the focus has to shift more towards applications and involvement of the pack through embedding results of the transition processes into regular policies. The policy process in general has become more open, especially for innovators. Dominant players in the energy transition are energy companies but also the environmental movement is involved in it in a collaborative way. In the energy transition environmental NGOs are collaborating with business. This occurs especially in the biomass transition. This would not have happened without energy transition policies. Local communities are not really involved. Issues of acceptance are raised primarily through the intervention group. It can be argued there is too much support and too little attention to risks and problems of acceptance with energy innovations.

6. Conclusions

In the Netherlands sustainability is believed to require fundamental changes in functional systems. The solution is believed to lie in system innovation, a change in functional systems, not the improvement of the existing systems. Dutch policy makers got interested in transitions to alternative new functional systems in energy, agriculture and transport. In this paper we described energy transition policies in the Netherlands. Energy is one of the subsystems in which the concept of transition management is being applied. Other areas in which transition management is applied are: transport (transition to sustainable mobility), agriculture, and natural resource use (biodiversity and natural resource transition).

The transition management approach is used in the energy area for both economic reasons and environmental reasons: it is believed that an innovation-oriented approach helps to create energy business. The fact that energy policy and innovation policy is the responsibility of the Ministry of Economic affairs was a factor here. Transition management allowed the Ministry to pursue its innovation agenda. Business creation in the name of sustainability is thus an important element but there is a genuine belief that sustainability requires system innovation and a different policy approach, which is the second reason for adopting transition management. A third reason is to make policy more open (new government-business relationship, reflecting a new view of the Ministry's own role).

The Dutch transition approach is innovation-oriented and bottom-up with long-term visions guiding societal experiments. Various paths are explored simultaneously to avoid lock in adherence to certain paths. This makes sense given the uncertainty about what option is best. In doing so Dutch authorities rely on the wisdom of variation and selection processes rather than the 'intelligence' of planning. A mechanism of self-correction based on policy learning and social learning is part of transition management. It offers a framework for policy integration, helping different Ministries to collaborate. Whereas other countries are engaged in managing transitions in an implicit way, the Netherlands does so in an explicit way. The commitment to transitions allows for cooperation between Ministries but also to make political choices, which are needed for bringing production and consumption closer to sustainability. It is not a substitute for politics but a new framework for politics.

7. References

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