5. Transition management: a reflexive governance approach

René Kemp and Derk Loorbach[1]

INTRODUCTION

This chapter discusses the concept of transition management that has been adopted by Dutch policy makers for working towards sustainability. Transition management can be described as forward-looking, adaptive, multi-actor governance aimed at long-term transformation processes that offer sustainability benefits. Transition management relies on each of the strategies of reflexive governance delineated in the introduction of the book: knowledge integration, anticipation of long-term systemic effects, adaptivity of strategies and institutions, iterative participatory goal formulation and interactive strategy development. It helps to influence and organize evolutionary processes of societal change in a reflexive manner.

Transition management could be viewed as 'evolutionary governance' as it is concerned with the functioning of the variation–selection–reproduction process at the societal level: creating variety informed by visions of and experiments for sustainability, shaping new pathways and reflexively adapting existing institutional frameworks and regimes. It is a model for escaping lock-in and moving towards solutions that offer multiple benefits, not just for users but also for society as a whole. It is not an attempt to control the future but an attempt to incorporate normative goals into evolutionary processes in a reflexive manner. Learning, maintaining variety (through portfolio management) and institutional change are important policy aims. In this chapter we outline the model of transition management and describe Dutch transition policies in the energy sector.

A CHANGING WORLD

Our society is always changing. Over the past decades, however, driven by transnational trends such as internationalization, informatization and individualization (Schnabel, 2000), the process of social change has become

increasingly complex. Choices at a societal level are the outcomes of interaction between the individual actions and strategies of a large number of actors that have different perspectives and goals. Increasingly, policy-makers are for example forced to take into account the issues of societal actors and social partners in the process of policy-making (Mayntz, 1994; Kooiman, 1993). This happens at different levels in parallel, generating complex multi-level governance structure (Scharpf, 1994; Kohler-Koch, 1999). Coordination within this structure seems absent since the overall picture is that of a battlefield with numerous competing networks and actors that all try to realize their own agenda, at the expense of other ones.

The liberal approach towards business and the individual, which has been dominant since the 1980s, has fostered this development that allowed for varied individual choices and stimulated competition. Although economic growth and technological progress have resulted from this approach, environmental and social benefits have not. This becomes clear in a number of societal sectors and systems that now face major revisions since they were previously based on 'old' solutions which are not sustainable: the energy-supply system, the health-care system, mobility and transport, agriculture and urban development. In all these sectors, symptomatic problems like power shortages, traffic jams or cattle diseases (to name a few problems) lead policy-makers to react with force to such incidents, while ignoring the complexity of the problems. These 'sustainability problems', also called 'wicked' problems, are so complex because they are related to economic, social as well as spatial and ecological issues. The problems are manifested at different levels, involve many actors (not just business actors) and they require a very long time to manage effectively.

The need to develop our society in a sustainable direction has been acknowledged at different levels, both at the local as well as at international levels (for example: UN, Agenda 21). Implementing sustainable development however is a cumbersome process since the notion itself is inherently ambiguous and subjective (Kasemir and Van Asselt, 1999). This does not mean however that it cannot be operationalized (Rotmans, 1998). To do so, sustainable development must be related to a specific context: something is developed sustainably. This can be for example the sustainable development not only of a region or city, but also of a utility system like energy provision or the mobility system. But what sustainable development means in such a specific context is again open to debate, since different actors with different values at different levels of society will try to put forward their definitions and goals. It is thus something highly subjective and the meaning of it will change over time. It is a continuing quest that involves both learning about solutions to problems and learning about needs. Finding sustainability thus becomes a learning-by-doing exercise; experimenting with partnerships,

new institutions, new technologies and new regulations within the ecological limits defined.

Taking such a comprehensive approach towards sustainable development requires a redefinition of policy-making in this context; a more evolutionary and adaptive strategy is needed that allows for self-organization within certain limits, both ecological limits as well as social limits (often set by government, but they can include social norms as well). The central focus of such a strategy should be to realize long-term and large-scale innovations or transitions towards more environmentally and socially benign societal systems (such as agriculture or energy supply). Since realizing long-term, diffuse sustainability goals should be the aim of such policies, an emphasis on interaction, experiment and learning is crucial. In this chapter we will first address the concept of transition as a 'systems' way to view societal change. Secondly, we will present the approach of transition management as a new form of governance for sustainability and will focus on the reflexive elements in the strategy.

## WHAT IS MEANT BY TRANSITION AND TRANSITION MANAGEMENT?

The basic underlying assumption of transition theory is that society changes in a rather evolutionary and organic way, to a certain extent comparable to the behaviour and development of ecosystems (for example, Gunderson and Holling, 2002), and is therefore inherently complex. On a societal level, we can recognize patterns of variation and selection (of new technologies, but also of new fashions, ideas, politicians and so on) and of co-evolution (between politics and economy for example). Although drawing straightforward parallels between ecosystems and societal systems is not possible at this point, transition theory tries to make instrumental use of insights from disciplines such as ecology, complexity and systems science.[2] Systems-thinking in terms of causal relations, feedback mechanisms, resilience and thresholds is central to the transition concept and essential for transition management.

A key notion is transition. Before we can go into transition management, it is necessary first to define the notion of transition. According to the fourth Dutch national Environmental Policy Plan (NMP-4 2000) and the ICIS-MERIT report that provided the scientific background to the NMP-4, 'a transition is a gradual process of societal change in which society or an important subsystem of society structurally changes' (Rotmans et al. 2000, p. 19). A transition is the result of the interplay of developments that sustain and reinforce each other. Transitions are not caused by single variables – a

price change, policy act or a new technology – but are the result of developments in various domains which sustain each other: technology, economy, institutions, behaviour, culture, ecology and images/paradigms (p. 20). The process of transition is non-linear; slow change is followed by rapid change when things reinforce each other, which again is followed by slow change in the stabilization stage.

Although transitions are characterized by non-linear behaviour, the process itself is a gradual one, typically spanning one or two generations (25–50 years).[3] The nature and speed of change differ in each of the transition stages:

- In the predevelopment phase there is very little visible change on the societal level but there is a lot of experimentation.
- In the take-off phase the process of change gets under way and the state of the system begins to shift.
- In the breakthrough phase structural changes take place in a visible way through an accumulation of socio-cultural, economic, ecological[4] and institutional changes that react to each other; during this phase, there are collective learning processes, diffusion and embedding processes.[5]
- In the stabilization phase the speed of societal change decreases and a new dynamic equilibrium is reached.
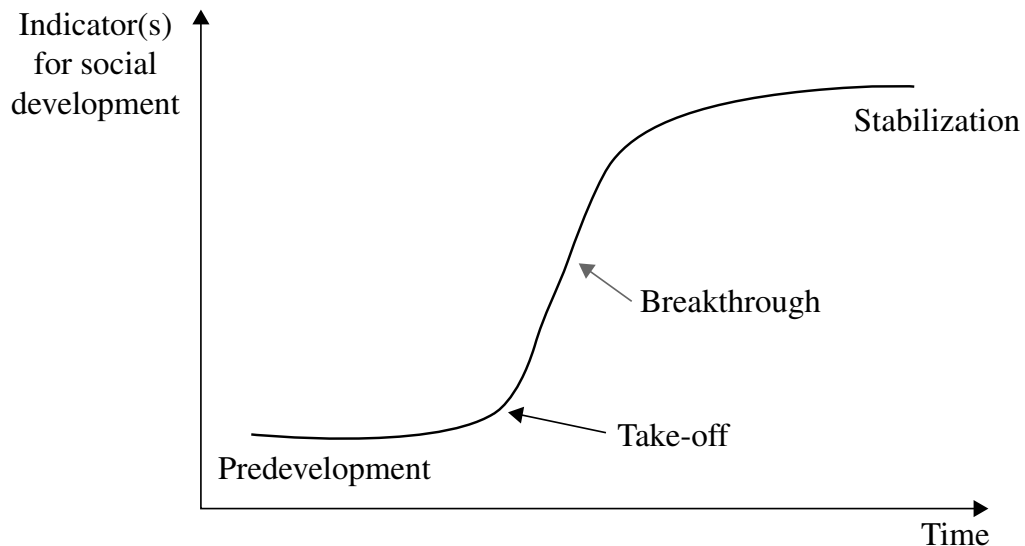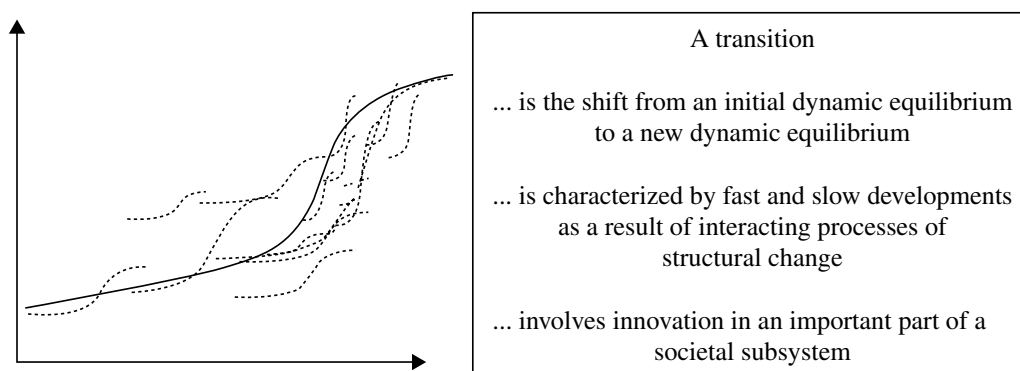

Source: Rotmans et al., 2000 and 2001

Figure 5.1   Four phases of transition

Transitions require a number of interacting system innovations (see also Figure 5.2): organization-exceeding, qualitative innovations which are realized by a variety of participants within the system, and which fundamentally change both the structure of the system and the relations between the participants.[6] System innovations transcend the level of an individual, an individual firm or individual organization, but take place at the level of, for instance, a sector, a branch, city or region (Dirven et al., 2002). This involves innovation of production and consumption processes, technological innovation, institutional innovation and political–governmental innovation. Within these system innovations in turn, innovations occur at the individual level, in terms of product, process and project innovations. An example is a possible future energy transition to biomass, which will necessarily involve interacting system innovations in transport (bio fuels), electricity generation (co-combustion, gasification of biomass), agriculture (bio crops), as well as in policy (integral biomass policy regarding energy, biodiversity, space use, agriculture and transport) and culture (to surmount barriers among the public against alternative energy carriers).[7] To achieve these system innovations, experiments and innovations are needed for example with regard to technologies (new engines, new infrastructures, and new production facilities), behaviour (in use and production of energy) and regulation (subsidies, market conditions, legal regulations). Transitions can thus be seen as a cascade of innovations at different levels and at different speeds.

Transitions are interesting from the viewpoint of sustainability, because they offer the prospect of a magnitude of environmental benefits, alongside wider social benefits through the development of systems that are inherently more environmentally benign. However, transitions of course also

A transition

... is the shift from an initial dynamic equilibrium to a new dynamic equilibrium

... is characterized by fast and slow developments as a result of interacting processes of structural change

... involves innovation in an important part of a societal subsystem

Source: Butter et al., 2002

Figure 5.2   *A transition is the result of system innovations and other innovations and changes*

offer the perspective of breaking down existing systems, infrastructures and institutions, which will mean the loss of investments and thus opposition. Examples of system innovation are: a biomass energy supply, industrial ecology and customized mobility.

A second concept that is used to describe transitions is the multi-level model originating from innovation studies (Rip and Kemp, 1998 and Geels, 2000 and 2002a), which is being used in the TIN-20 project (Technology in the Netherlands in the 20th century) to describe the contextual history of technology in the Netherlands. This model differentiates three levels of socio-technical systems: macro-landscape, meso-regimes and micro-niches. In the context of transitions, these levels can be interpreted in terms of (1) societal landscape, (2) dominant-actor networks and institutions (regimes) and (3) micro-behaviour. The societal landscape is something that surrounds us and consists of the macro economy, political culture, demography, natural environment and worldviews. The term landscape refers to the socio-technical surface structure of the land with its gradients, which makes certain advances easier to accomplish. The landscape is rather autonomous and changes relatively slowly. The second, arguably most important, level for functional systems is the meso-level of regimes: the dominant infrastructures and technologies in combination with the rules, roles and belief systems that underlie strategies of companies, organizations and institutions and policies of political institutions. Regimes give stability and guide decision-making but (because of that) also have a high level of inertia and tend to reproduce rather than innovate. In this sense, regimes often tend to block change. At the micro level (niche level) there are those individual actors, technologies and local practices that present or develop alternatives to the dominant regime. At this level, variations to and deviations from the status quo can occur as a result of new ideas and new initiatives, such as new techniques, alternative technologies and social practices.

A transition is the result of interaction between changes and innovations at these different levels; slowly changing trends lead to new ways of thinking (paradigms) that lead to innovation and vice versa. Giving these interdependencies, a transition can be accelerated by one-time events, such as a war or large accident (for example, Chernobyl) or a crisis (such as the oil crisis) but not be caused by such events. Transitions are the result of endogenous and exogenous developments: autonomous trends and changes influence transitions as well as innovations and changes that emerge from within the systems. Technical change interacts with other changes, social change and economic change, which means that one should look for process explanations (multiple causalities rather than individual causal patterns).

Attempts at steering are done by actors who are part of transitions. Policy-making or rather governance, is thus situated in a context of socio-technical

systems that offer functional services and disservices, housing interests and organizations with capabilities and mental models, who function in a world of beliefs, values, capital goods, prices, settlements, lifestyles and novelties. By definition, complex systems are highly chaotic and impossible to steer in the sense of command-and-control because of numerous feedback loops, inert institutions and unpredictable developments. Rather than focusing on individual components of these systems, governance for sustainable development should try to find governance strategies at a systemic level and try to change the 'condition' of the system for the better. This idea has been accepted by the model of transition management of Rotmans and others (Rotmans et al., 2000; Kemp and Rotmans, 2001, 2002; Loorbach and Rotmans, 2002). Through transition management one tries to influence the direction and speed of transitions by coordinating and enabling the processes that occur at different levels in a more systemic and evolutionary way, which leaves room for variation and selection mechanisms and innovation. This can be done in many different ways, through various types of steering mechanisms, none of which incidentally can be prescribed or even repeated in detail.

In the following pages we will give a description of our model of transition management accepting that there are other models. When we speak of transition management we mean the ICIS-MERIT model of transition management in whose development we were involved ourselves. It is an attempt at goal-oriented modulation, not an attempt to achieve predefined outcomes through planning and control. Transition management works with dynamics not against them. Ongoing developments are exploited strategically. Transition management for sustainability tries to orient dynamics to sustainability goals. The goals are chosen by society through the political process: the systems to satisfy these goals are worked towards in an adaptive, forward-looking manner. The goals and policies for furthering the goals are constantly assessed and periodically adjusted in development rounds. Policies will differ across the different transition phases. In early phases, policy should be concerned with the formulation of transition goals and engage in the formulation of sustainability visions (quality images), which are re-assessed during later phases. The attention to innovation will be a continued feature of all phases; it is not just something for the early phases.

A schematic view of transition management is given in Figure 5.3.

Policy actions are evaluated against two types of criteria: (1) the immediate contribution to policy goals (for example in terms of kilotons of CO_2 reduction and reduced vulnerability through climate change adaptation measures), and (2) the contribution of the policies to the overall transition process. This means that under transition management, policies have
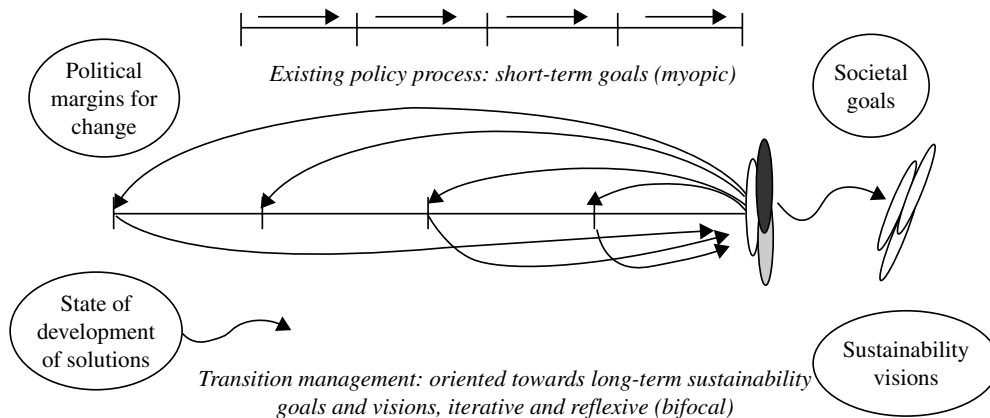
Figure 5.3   Current policy versus transition management

a content goal and a process goal. Learning, maintaining variety and institutional change, are important policy aims, and policy goals are used as means for change. The evaluation and adaptation of policies (strategies, involved actors, progress and so on) in development rounds brings flexibility to the process without losing a long-term focus.

Transition management is thus bifocal and based on a two-pronged strategy of simultaneously stimulating system improvement and system innovation. No choice is made between system improvement and system innovation, but special attention is given to system innovation (representing a new trajectory of development or transformation), given the many barriers to this type of change. Through its open-endedness, transition management breaks with the old planning-and-implementation model aimed at achieving particular outcomes and is based on a different, more process-oriented philosophy. This helps to deal with complexity and uncertainty in a constructive way. Transition management is a form of process management against a set of goals chosen by society. Societies' problem-solving capabilities are mobilized and translated into transition programmes, which are legitimized through the political process.

Key elements of transition management are:

● systems-thinking in terms of more than one domain (multi-domain) and different actors (multi-actor) at different scale levels (multi-level); how developments in one domain or level gel with developments in other domains or levels; trying to change the strategic orientation of regime actors;
● long-term thinking (at least 25 years) as a framework for shaping short-term policy;

- back-casting and forecasting: the setting of short-term and longer term-goals based on long-term sustainability visions, scenario studies, trend analyses and short-term possibilities;
- a focus on learning and the use of a special learning philosophy of learning-by-doing and doing-by-learning which includes carrying out experiments to develop required knowledge and the other way around;
- an orientation towards system innovation and experimentation;
- learning about a variety of options (which requires a wide playing field);
- participation by and interaction between stakeholders.

TRANSITION MANAGEMENT: HOW?

The foremost reason for engaging in transition management is that we are locked into trajectories driven by short-term benefits instead of longer-term optimality (Kemp and Soete, 1992). Uncertainty, short-term costs, the need for change at various levels and vested interests all create barriers to system innovation. Some concerted action is needed but public policy is highly fragmented and oriented towards short-term goals. Transition management is supposed to deal with these problems. In the past section we described the basic idea behind transition management. We will now discuss the basic steps or elements. Before we do this it is important to note that transition management is not an instrumental activity. The actual policies are the outcome of political negotiations and the processes of co-evolution, which inform further steps.

The process of transition management consists of a number of activities, which can only be defined in general terms, because they are largely dependent on the nature of the transition problem at hand and, because of the interactive nature of transition management, on the actors involved. As such, transition management is an approach rather than a method; it has to be adapted and individualized for every specific context or problem.

Transition Arenas and Multi-actor Governance

The transition arena as a new institution for interaction can be considered a meta-instrument for transition management and facilitates interaction, knowledge exchange and learning between the actors. The transition arena is an open and dynamic network in which different perspectives, different expectations and different agendas are confronted, discussed and aligned where possible. In its first phase, the transition arena is a relatively small

network of innovators and strategic thinkers from different backgrounds that discusses the transition problem integrally and outlines the transition goals. In this phase, it is important to come up with creative, inspiring and integrating goals and ideas. Further on in the process, the network will expand to include less strategically oriented actors (such as local authorities and people with practical knowledge about processes of change) in order to develop transition paths and link these to existing (not only governmental) policies. Finally, short-term experiments and actions are derived from the goals and paths and more operationally oriented organizations and actors will be involved.

The establishment and organization of a transition arena forms the basis of the transition management process. The selection of participants for this transition arena is of vital importance; they need to reflect the complexity of the transition at hand. These participants need to have some basic competences at their disposal: they need to be visionaries, forerunners, have to be able to look beyond their own domain or working area and be open-minded. They must function quite autonomously within their organizations but also have the ability to convey the developed vision(s) and initiate it within their organizations. Apart from this, they need to be willing to invest a substantial amount of time and energy into playing an active role in the transition arena process. Often, only a handful of such people exist within specific societal networks and they are easily identified because of their standing, function or networks. It is nevertheless important to specify explicitly the criteria based upon which the participants of the transition arena are selected and to document these criteria.

Problem Definition

The starting point for transition management for sustainability is the persistent problems of existing functional systems. Because of the system-inherent nature of the problems they do not have a single 'owner'. Rather than looking for a villain to blame, one looks for a common problem definition in which all problems are considered, not just those problems that can be dealt with relatively easily. Transition management is targeted at widely acknowledged problems that require a response for which no ready-made solution is (or will be) available. Often these are not single problems but a range of problems. For energy for example, the problems are dependence on scarce (non-renewable) resources (oil, natural gas), emissions of greenhouse gases stemming from the combustion of fossil fuels that cause climatic change, price volatility from shortfalls in supply often as a result of wars, and the military conflict over oil resources and oil power. By developing a shared problem perception based on the input of different actors,[8]

those actors involved will adjust their own problem definitions and perceptions because of a better understanding of the nature of the problem and the perspectives held by other actors and accordingly their behaviour (that is, second-order learning). This however will only come about if enough time and energy is invested in these discussions. A problem here is that each solution to these problems has its own disadvantages. In the short term there are all kinds of tradeoffs. The aim of transition management is to provide an environment in which these trade offs are made visible and can be negotiated. This will be a collective task for which one needs transition goals that reflect societal aspirations.

Transition Visions and Transition Goals

A long-term vision of sustainability can function as a guide for formulating programmes and policies and the setting of short-term and long-term objectives. To adumbrate transitional pathways, such a vision must be appealing and imaginative so as to be supported by a broad range of actors. An inspiring final vision is useful for mobilizing social actors, although they should also be realistic about innovation levels within the functional subsystem in question. The overall vision helps to set qualitative standards or goals for the system as a whole. There is also a role for quantitative standards based on the boundaries within which we want our development to take place. For example, a sustainable energy supply system has been defined in the Netherlands as reliable, cost-effective, and carbon-low with the official goal of a reduction of 30 per cent in CO_2 emissions by 2020.[9]

The inspiring, imaginative and innovative vision is translated into transition images at a sub-system or thematic level, for example biomass or clean gas. (What would energy production and consumption look like?) Rather than considering transition images as optimal societal blueprints, we consider them as integral target images, which evolve over time and are dependent on the required insights and learning effects. The transition images embrace transition goals, which are qualitative rather than quantitative, multi-dimensional, and should not be defined in a narrowly technological sense, but should represent the three dimensions of sustainability: economic, ecological and socio-cultural. Ideally the images should be democratically chosen and based on integrated risk analysis, but this does not imply a consensus on these goals since a number of (even contradicting) images and goals can be chosen.

The transition images could be thematic or sectoral, but have to present an inspiring future state of that specific sector or theme. This means that the starting points of the overall vision are translated into the institutional, economic, ecologic and socio-cultural aspects associated with that specific

final image. The images should be adjusted as a result of what has been learned by the actors in the various transition experiments. The participatory transition process is thus a goal-seeking process, where the transition images change over time (the transition goals are likely to remain the same). This differs from so-called 'blueprint' thinking, which operates from a fixed notion of final goals and corresponding visions.

Transition Paths and Interim Objectives

Transition paths are possible routes towards the final images. The images do not necessarily have to be consistent (only with the vision) and multiple paths can be developed for one image (see Figure 5.4). It is important to incorporate interim goals and objectives in the transition paths that become more concrete the closer they are to the present. The transition paths however also have to reflect the necessary trend breaks and behavioural and institutional changes, the uncertainties associated with the pathway and the barriers and chances for implementation. Finally, practical experiments (programmes) are planned, which are targeted at exploring the transition paths derived from the analysis and developed strategy.

The vision, in combination with the images, the transition paths and the experiments, forms the joint transition agenda at the tactical level. This is where coalitions come together around specific options or expectations, for example specific technologies or new institutions. For example, one could think of developing new consumption patterns for sustainable agriculture; a coalition to develop this idea and explore it further would include local
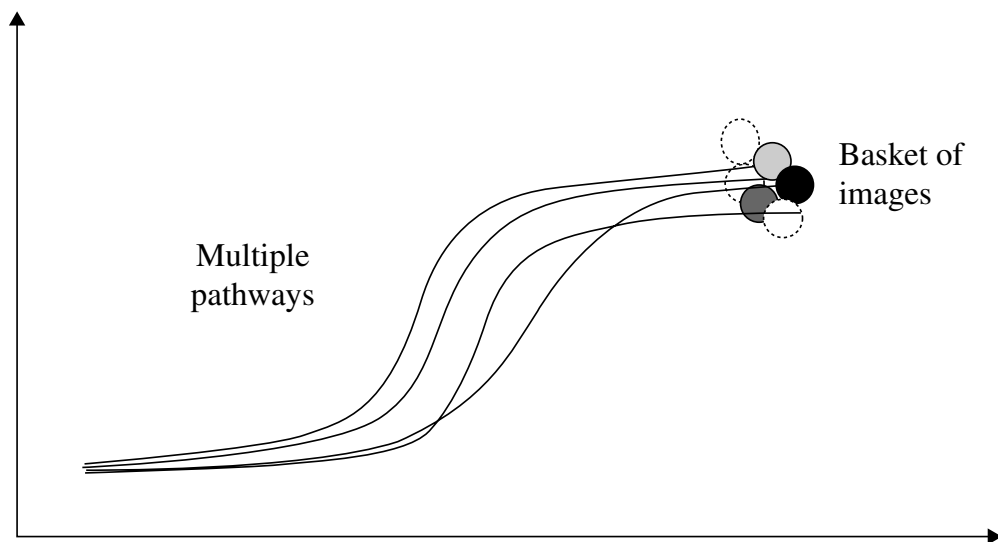
Figure 5.4   Transition visions: images and pathways

and national government, agriculture, business, NGOs and knowledge institutes. A transition path towards a sustainable energy supply could be via the use of biomass; a coalition there would include biomass producers, factories, the transport sector, national and local government, NGOs, and so on. These coalitions can develop experiments to test their ideas and to provide input for the overall transition programme. The development of transition paths is aimed at both comprehending in a more integral way the possible routes that specific innovations can go within a specific transition context as well as 'translating' the visionary and long-term goals at the strategic level to everyday practice at the operational level.

Programmes for System Innovation

Another important element of transition management includes programmes for system innovation for exploring visions of sustainability. An example is a programme for integrated mobility, identified by Kemp and Rotmans (2002) as suitable by combining user benefits with sustainability benefits. An integral part of such programmes is the real use of new technologies in society to learn from practice and facilitate processes of mutual adaptation and institution building. Experiments with new solutions and instruments are an important element of transition management. The experiments should be based on the images and should also inform them. For instance one could think of a series of consecutive experiments with electric mobility or integrated mobility. They should be undertaken as part of programmes for system innovation. They should be designed for specific learning purposes and not be undertaken in the ad hoc manner of today's experiments with sustainable technologies.

Such support programmes should be time-limited and flexible so as to prevent the creation of 'white elephants'. The choice of the programmes should be based on assessments of sustainability benefits and user benefits.

Evaluating and Learning

Transition management involves monitoring and evaluation as a regular activity and the use of so-called 'development rounds', where what has been achieved in terms of content, process dynamics and knowledge is evaluated.

The interim objectives are the first aspect of evaluation: have the objectives been achieved, and if not, why? Have there been any unexpected social developments or external factors that were not taken into account? Have the actors involved not complied with the agreements that were made? The second aspect of the evaluation concerns the transition management process itself. The set-up and implementation of the transition process is

scrutinized. How do the actors concerned experience the participation process? Is it dominated by certain parties (vested interests)? Is it too consensual (too cosy), or is there too little commitment? Are there other actors who should be involved in the transition process? Are there other forms of participation that must be tried out?

The final issue for evaluation is the amount of learning or 'enrichment' that has taken place in the previous period. A special point of attention is what has been learned from the experiments carried out to stimulate the transition. What have been the most important learning moments and experiences? Have these led to new knowledge and new circumstances? And what does this mean for future policies? Monitoring and evaluation (of experience but also goals and visions) are key elements of transition management. In our model of transition management, learning is a policy goal in its own right.

Creating Public Support and Broadening the Coalition

A continuing concern is the creation and maintenance of public support. This is important for continuing the process and preventing a backlash, which may occur when quick results do not materialize and setbacks are encountered. One route to follow is through participatory decision-making and the societal choice of goals, by engaging for example in experiments with technologies in areas in which there is local support for them. The experience may take away fears elsewhere and give proponents a weapon. With time, solutions may be found for the problems that limit wider application. Education can also allay fears but real experience is probably a more effective strategy. In niches new instruments (such as road pricing) may be tried.

The interactions between actors will change within the context of transition management. First and foremost the wider public is involved in policy-making, through the choice of transition goals and discussions about the future, and there is a greater orientation to innovators who are encouraged to come up with imaginative solutions. The innovators may be incumbent companies or outsiders. The latter group is more likely to come up with radical solutions. Transition management thus involves a change in governance, that is, the ways in which the plurality of interests is transformed into coordinated action, through deliberation, responsibilities and roles (Eising and Kohler-Koch, 1999, p. 5). There is still a great deal of deliberation as in the Dutch polder model and other models of interactive governance, but transition management is directed strongly to innovators and not the actors with large vested interests and is only consensual with regard to the overall ambition (or urgency) of sustainable development and the overall qualitative vision.

TRANSITION MANAGEMENT AS REFLEXIVE GOVERNANCE

Transition management, as formulated by Rotmans and us, is a form of reflexive governance. It aims at dealing with real and perceived problems of forms of modernization and tries to avoid – or at least deal proactively – with risks and negative side effects of solutions. Each of the five elements of reflexive governance is addressed in transition management, even if it was developed prior to the theoretical framework of reflexive governance. It was informed largely by insights from innovation literature and systems theory. This section will describe in what ways each of the five elements is part of transition management.

Knowledge Integration

Transition management can be best described as a process of learning-by-doing and doing-by-learning. Sustainability as such is not a fixed goal that can be worked towards but rather a journey of discovery. In order to explore new solutions and strategies, transition management relies on the involvement of a diverse number of actors in the transition arena. Not only will the different actors bring in different competencies, roles and networks, they will each provide a different kind of knowledge. Within the transition arena, in-depth discussions amongst the different participants will lead to confronting their different perspectives and to developing shared perceptions of the problem[10] besides the development (integration) of new knowledge and the identification of gaps in knowledge.

This way, different elements of knowledge are integrated into a common understanding of the complex problems and processes at hand. These elements of knowledge are by definition very diverse (ranging from technical knowledge about regulation, codes, or procedures to 'soft' or 'tacit' knowledge about behaviour, institutions or other practical issues) so that a lot of energy has to be invested in the process in order to develop a general level of understanding amongst the participants. By trying to discover 'sustainability' in the form of new goals and solutions, also the lack of relevant knowledge in certain areas will become clear. New questions will be posed, which in turn will generate development of new knowledge. This process of (re)combining different knowledge elements is referred to as coproduction of knowledge in which scientific knowledge is often only one part (Gibbons et al., 1994).

A further goal of transition management is of course to diffuse the new knowledge (ideas, goals and solutions, innovations, alliances, competences, etc.) into larger networks rather than to keep it within the transition arena

per se. Transition management therefore is a network strategy that also tries to use the networks of the participants in the transition arena to spread the thoughts developed there. The discussions with other actors (about the (complex) system, its problems and dynamics, but about strategies as well), will have to be extensive and confrontational enough to lead to second-order learning amongst the participants. In practice, this means that the participants will reflect on their own dispositions, their own practices and their own roles within the larger context. They will supposedly take home such new insights as well as the new ideas on cooperation, solutions, and so on. By creating within their own organizations new 'arenas' that address more specific elements of the common approach and strategy, they will contribute to realizing a structure of arenas and thus knowledge and experiences can be shared and exchanged between these arenas. If actively pursued, such an elaborated structure could be seen as an instrument for knowledge production, knowledge diffusion and knowledge integration (McElroy, 2003).

Anticipation of Long-term Systemic Effects

Especially in the programmes for system innovation there is anticipation of long-term systemic effects through the use of scenario-analyses and trend-analyses, back-casting and forecasting exercises and identification (and selection) of innovations. Insights from innovation studies about self-reinforcement are used for creating paths while at the same time one is careful not to get locked into sub-optimal solutions by opting for a flexible, adaptive approach and by engaging in portfolio management. In this way the anticipation and control dilemma of Collingridge (1980) – with control possibilities being largest when you know the least about the problem – is dealt with. It is still possible that side effects become apparent at a later time, when the technologies are in use, but the chances of this happening are reduced. Transition management combines elements of push and control, which is one of its advantages.

Transition management does not aim to control the future (to use Wildavsky's term) by engaging in comprehensive planning (based on blueprints). It relies heavily on market forces for the delivery of functional services for the obvious reason that no authority can plan for the efficient delivery of specialized services. Yet transition management does not blankly rely on market forces, but is concerned with the conditions under which market forces operate, by engaging in 'context control' so as to orient market dynamics towards societal goals. The context control consists of regulations, economic instruments (the use of taxes, subsidies and emission trading), the use of policy goals and covenants and specific types of planning (such as land use planning). It consists of the government's acting to

secure circumstances that will maximize the possibilities for progressive social development by promoting innovation and mitigating negative effects (Meadowcroft, 1997, p. 27).[11]

Anticipative strategies help to deal with three problems of intelligent change: (1) ignorance: uncertainties about the future and the causal structure of experience, (2) conflict: inconsistencies in preferences and interests, (3) ambiguity: lack of clarity, instability and endogeneity in preferences and interests: (March and Olsen, 1995).[12] Like Lindblom, March and Olsen are very negative about the use of expert intelligence, saying that 'the history of efforts to act intelligently in democracies is a history of mistakes'. They are especially critical about political change based on anticipatory rationality, based on backward reasoning from anticipated consequences:[13]

> Too many atrocities of stupidity and immorality have been based on anticipatory rationality, and too many efforts to improve human action through importing technologies of decision engineering have been disappointing. (March and Olsen, 1995: 198–9)

This clearly shows the limitation of the use of anticipatory outcomes but is probably too negative with regard to anticipation. In transition management, experiences inform next steps more than grand visions do.

Adaptivity of Strategies and Institutions

Making adaptive steps forward is also a key element of transition management. Transition management opts for a step-by-step process, which is also characteristic of incrementalism. A step-by-step approach has three advantages: first, it is feasible because it is not disruptive from the viewpoint of special interests; second, the costs of a certain step being a mistake are kept low; third, it allows one to change course (one gets less locked into particular solutions)[14] and fourth, useful lessons may be learned informing further steps. Even though it is generally seen as slow it may bring change faster than more dirigistic approaches. Charles Lindblom powerfully states the case for incremental politics:

> Abstractly considered, incremental politics looks very good. It is intelligently exploratory when linked with sequences of trial and error. It reduces the stakes in each political controversy, thus encouraging losers to bear their losses without disrupting the political system. It helps maintain the vague general consensus on basic values (because no specific policy issue ever centrally poses a challenge to them) that many people believe is necessary for widespread voluntary acceptance of democratic government. Moreover, incrementalism in politics is not in principle slow moving. It is not necessarily, therefore, a tactic of conservatism. A fast-moving sequence of small changes can more speedily accomplish a drastic

alteration of the status quo than can a mere infrequent major policy change. (Lindblom, 1979: 520)[15]

Transition management is an incrementalist strategy for changing societal systems.[16] The reason for this is that with new technology systems, as with politics, you can't get it right the first time. There are too many variables; one has to opt for small steps in what is generally perceived as 'the right direction' by trying different solutions (cf. Lee, 1993). By means of this process in an iterative way, the 'right direction' will be redefined, as will the associated goals. Like politics, technologies are not born perfect (Latour, 1991; Rosenberg, 1976) but require adaptation before they constitute a good solution. It is often insufficiently realized that the efficiency of markets rests on the weeding out of suboptimal designs of products and technologies through market competition. Evolutionary change, founded on trial and error, while wasteful in the short term, is often the most intelligent approach in the long run. This view has greatly influenced the vision of transition management.

Transition management does not argue for blind incrementalism and takes into account criticisms levelled against incrementalism such as lack of orientation, conservatism, and negative stance against analysis (Weiss and Woodhouse, 1992). Analysis plays a role in the choice of incremental steps (doing by learning). Analysis also has an important role to play in the determination of goals, the identification of visions of sustainability for meeting such goals, and the determination of steps (policy steps and technology steps) to learn about the visions and make a contribution to them. This is not so easy. According to Weiss and Woodhouse (1992; 260) incrementalism whilst intellectually appealing has never been very helpful to practitioners, as it has failed to set forth a strategy for making fairer, more intelligent, or otherwise better social choices. Transition management is believed to be more helpful in making a number of concrete proposals, one of which is to develop the long-term vision and intermediate goals to inform incremental action. Whether this leads to better decisions is still an open issue, but practice has already shown at least that novel and alternative steps are identified.

Iterative Participatory Goal Formulation

Transition management relies on iterative participatory goal formulation within transition arenas (as we discussed at length in section 5). Goals chosen by and in society are continuously re-assessed, together with policies to move closer to those goals. One of the crucial elements in transition management is its own evaluation, both in terms of process as well as
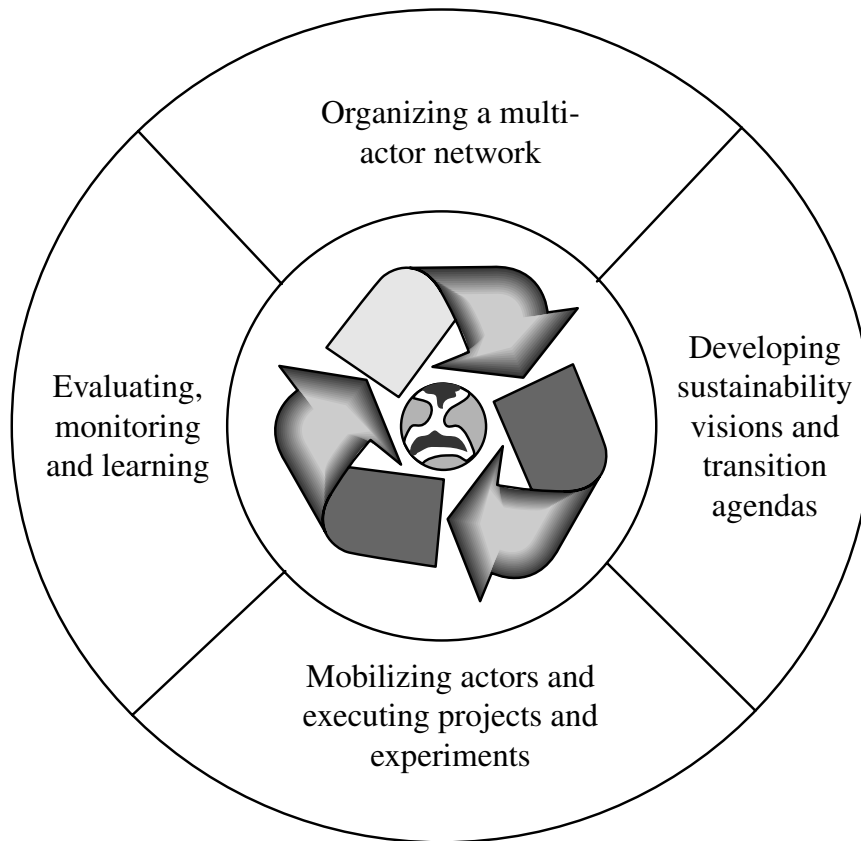
Figure 5.5   Activity clusters in transition management

content. By organising evaluation systematically, formulated goals, experiments and policy approaches can be adapted, which leads to a new round of learning-by-doing. The cyclical and iterative element of transition management is portrayed in Figure 5.5.

Experiential learning plays an important role in this. A real problem here of course is that you not only want to learn about a singular solution but about system innovation, and to facilitate processes of change. To learn about system innovation one should do strategic experiments as part of programmes for system innovation. Results from evaluation should feed into the projects and the overall programme; it should inform decisions at the operational and strategic level. Lessons learned depend on how experiments are designed and the types of experiments that are being undertaken. Having a good portfolio of experiments is therefore important. Experiments not only help provide information about technology and instruments but also help actors to learn about goals. It is important to engage in higher-level learning about both goals and approaches.

The participatory nature of transition management also allows for iterative problem-formulating and goal-formulating processes between different

types of actors. For example the interaction between scientific knowledge, practical experience from practitioners and the regulatory context can lead to new insights into problems, complementarities, innovation and uncertainties. Through a systemic evaluation and adaptation of the programmes the process moves forward.

Interactive Strategy Development

Interactive strategy development is necessarily a part of transition management. In the Netherlands over the last decade, a standard practice has been to involve societal actors in policy-making, searching for agreement on environmental and economic issues. The famous or infamous Dutch polder model is a clear example of this involvement of stakeholders, which was based on negotiations to reach consensus between the vested interests (actors in the regime). The goal of transition management is to facilitate and organize outsiders, trying to empower them to be able to develop and implement alternatives. Through transition management, outsiders, especially innovators, are given room and listened to. The transition arena is created for this. Through transition management citizens and citizens' organizations including NGOs are involved in policy-formulation as well as business interests. They are involved in the setting of goals and in discussions of possible futures. Participation is not merely used to generate public support although this has some important advantages, noted by Coenen (2002). Citizen involvement enhances the legitimacy of policy, helps to reduce the risk of conflict and offers an additional source of ideas and information. Through their involvement people and organizations learn about problems and solutions. Citizen involvement is not a substitute for government; a clear role is expected of and needed from the government (Coenen, 2002).

The question thus is how to organize participation and interaction while maintaining effective governance. The solution offered by transition management is to place the process in the centre and rely on mutual adaptation against a set of collectively chosen long-term goals. When organized properly, transition management thus enables self-coordination and steering among actors without controlling the process in the classical top-down control mode. This mechanism has been described on a broader level by Lindblom (1965, 1997) as partisan mutual adjustment: in a generally understood environment of moral rules, norms, conventions, and mores, interdependent actors modify their own behaviour just enough to accommodate the differing purposes of others, but not so much that the mutual adjusters lose sight of collective goals.

For transition management, this implies organising and facilitating interaction, while not influencing the content of the process, since the outcomes
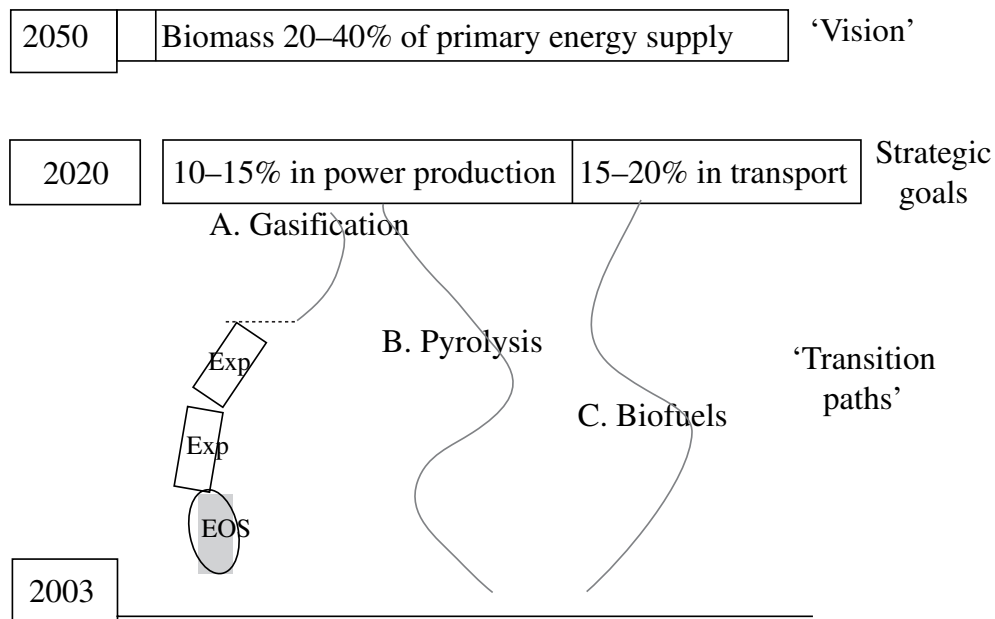
are the result of the interaction itself and not of individual choices or demands. By co-developing visions and agendas and collectively carrying out practical projects and experiments, the mutual adjustment of these perspectives and expectations takes shape.

TRANSITION POLICIES FOR ENERGY

Transition management as developed by Rotmans and others is not a theoretical fancy. The Dutch government uses the model of transition management to manage four transitions: the transitions to sustainable energy, sustainable mobility, sustainable agriculture, and the biodiversity and natural resource transition. This section will describe how this abstract model is translated into policy in the energy area. The ministry responsible for this transition is the Ministry of Economic Affairs (responsible for industry and energy). This ministry has been very active since 2001 in developing transition policies for the transition to a sustainable energy-supply system by 2050 (see www.energietransitie.nl). In 2001, the Ministry of Economic Affairs started consulting various stakeholders (companies, researchers, NGOs) to assess whether they saw possibilities for the transition to take place, and if so, what the chances were. Based on these conversations and an intensive scenario-study (LTVE), they selected five 'robust elements' or subprojects in the transition to a sustainable energy system, with a time horizon of 2030:

- Biomass International;
- New Gas Services;
- Sustainable Industrial Production;
- Toward a Sustainable Rijnmond (an industrial ecology project);
- Policy Renewal.

In 2002, the Ministry started Project Implementation Transition management (PIT), which was meant to investigate whether the selected subprojects would meet enough support, enthusiasm and commitment from the relevant stakeholders to create a climate in which they would be willing and able to work together. The project was initially financed with 35 million euros and supported by an eight-person staff. The main conclusions from this phase were that the transition approach proved to be appealing to the majority of the stakeholders and they would be willing to invest (time and money) and commit themselves to such a process under the condition that the transition management approach would be made more concrete, that more explicit visions for the future would be developed, and that the

| 2050 | Biomass 20–40% of primary energy supply | 'Vision' |

| 2020 | 10–15% in power production | 15–20% in transport | Strategic goals |

A. Gasification

B. Pyrolysis

C. Biofuels

'Transition paths'

Exp

Exp

EOS

| 2003 |

Note: Exp = experiments; EOS = R&D

Source: presentation of Hugo Brouwer from Ministry of Economic Affairs in the Netherlands at final BLUEPRINT workshop in Brussels in 2003

Figure 5.6   The Dutch vision for biomass

government would support the transition endeavour both financially as well as process-wise.

Based on these findings, the green light was given for the implementation of phase 2 in 2003. The objectives of this phase were to develop a long-term vision on energy in general and for each of the sub-projects supported by all relevant actors, to have these actors committed to the process, to map possible paths, barriers and necessary preconditions for the transition, to set up plans for knowledge development and knowledge sharing and communication, to chart international developments and finally to develop transition experiments. For biomass this resulted in the following vision[17] which is to be adapted with time.

Different options are explored. A portfolio approach is used also with respect to research. So-called 'Spearhead' projects were selected as part of the new energy research strategy on the basis of two criteria: knowledge position of the Netherlands and contribution to a sustainable energy system. The two criteria resulted in the following categorization of projects: 'spearhead projects', 'knowledge export projects', 'knowledge import projects' and 'irrelevant' (for those projects that scored low on both accounts). The portfolio approach used in finance to hedge risks fits with transition management.

Following these developments, 35 million euros were made available in 2004 for strategic experiments. In the 'Policy Renewal' project the Ministry is reconsidering its instruments and interactions with society. They are opting for a more participatory and interactive type of governance. An example of this is the establishment on 21 January 2004 of an 'intervision group for the energy transition', an independent think tank composed mostly of non-energy experts and independent people.

Different ministries are now using the model of transition management and applying it in their own way. It is too early to evaluate outcomes, but what already seems apparent is that the approach leads to integration of activities across the spectrum. The first successes, in terms of agreements, projects, subsidies, inspiring images and so forth, serve as a flywheel and attract an increasing number of actors to the process. However, organizing the process, especially within the context of the existing institutional frameworks, has proven to be difficult because of the tension between the existing interests and institutionalized routines and the innovation promoted by the transition network. Through engaging in transition management activities, the barriers to innovation become clear and conflicting interests are identified. This leads to tension, negative feedback, irritation and sometimes conflict, but these are necessary to achieve the intended changes. The exploitation of win–win options does not get you far. So far also little progress has been made in involving citizens in the transition process in a direct way. The goals of 20–40 per cent biomass for example have been chosen by business interests. The selected transition goals of reliability, cost efficiency and reductions in carbon dioxide emissions were chosen by the government.

CONCLUSIONS

In this chapter we outlined the concept of transition management that is currently used in the Netherlands for managing the transition to sustainable energy, sustainable mobility, sustainable agriculture, and the biodiversity and natural resource transition, and delineated the reflexive governance characteristics. Transition management for sustainable development consists of deliberate attempts to work toward social, economic and ecological objectives in a gradual, forward-looking manner in full recognition of system dynamics and windows of opportunity to effect change. Transition management is concerned with the normative orientation of socio-economic processes and seeks to overcome the conflict between long-term imperatives and short-term concerns. Because of its focus on the evolutionary dynamics of socio-technological innovation processes, transition management pays particular attention to learning, maintaining a variety of

options (through portfolio management, see also Chapter 8 by Weber in this book) and institutional change – to avoid becoming locked into 'evolutionary traps' and to escape existing ones.

Transition management employs an integrative and multi-scale framework for policy deliberation, choice of instruments, and actions by individuals, private and public organizations, and society at large. Transition management is inclusive and calls for setting long-term and intermediate goals, alignment of short-term and long-term policies and strategic experimentation in addition to traditional policies. Because it aims for long-term change through relatively small steps, the risk of getting locked into suboptimal solutions is limited.

In this chapter we explained why transition management de facto is a form of reflexive governance, even though it was developed independently of theories of reflexive modernization (Beck, 1997) and reflexive governance. Transition management is based on each of the strategies of reflexive governance delineated in the Introduction to this book: knowledge integration, anticipation of long-term systemic effects, adaptivity of strategies and institutions, iterative participatory goal formulation and interactive strategy development. Alternative labels are evolutionary governance, directed incrementalism (Grunwald, 2000) and goal-oriented modulation (Kemp and Rotmans, 2001).[18]

It should be clear from what we said that transition management is not a megalomaniac attempt to control the future but an attempt to orient dynamics to sustainability goals in a reflexive manner. Policy is concerned with the dynamics of variation, selection and reproduction, not just with obtaining predefined policy outcomes. By opting for relatively small steps transition management seems feasible, and by implementing it not only the knowledge problem but also the governability problem (Mayntz, 1994) can be addressed. Whilst the idea of managing variation-selection processes sounds very abstract, the model of transition management offers practical suggestions for how to do it, in terms of institutions and instruments. It is not an instrument as such, but a new perspective for decision-making and governance.

NOTES

1. We thank Bernhard Truffer, Jan-Peter Voß and Dierk Bauknecht for comments on an earlier version of the chapter.
2. Senge (1990) has also underlined the importance of systems-thinking for enabling interaction, learning and cooperation. More recently, Midgley (2000) has synthesized most recent work on systems thinking under the heading 'critical systems thinking', a looser way to apply systems properties and use systems language. For transition management,

systems-thinking is not a straitjacket, but rather a way to identify main drivers, be aware of side effects and develop more integrated strategies.

3. The time span is not a defining characteristic but a result.

4. Because of changes in human activity, technologies and production processes used, the ecological impact of the activities changes.

5. In Rotmans et al. (2000 and 2001) this phase is called the 'acceleration phase'.

6. Transitions can be seen as system innovation at the highest level of societal systems. These societal systems can be broken down into sub-systems (for example the regulatory, the technological or the user sub-system) at which level system innovations take place. Within these sub-systems, simple or singular innovations occur.

7. Other examples of system innovation are: biomass-based chemistry, multiple sustainable land use (the integration of the agricultural function with other functions in rural areas) and flexible, modular manufactured construction (Ashford et al., 2001).

8. Discussions within the transition arena have to be based on a systems approach, which allows for a more comprehensive and integrated analysis of the problem. The focus has to be on the issue of what the structural origins of all the individual (symptomatic) problems of the different actors are.

9. See also section 7. The website www.energietransitie.nl gives an overview of the result of discussions amongst Dutch actors related to energy, which resulted in the vision, images and transition experiments.

10. The discussions are based on a participative systems analysis in which the different participants contribute specific knowledge about specific parts of the system so that they together develop an integrated image of the systems at hand and the main causal relations and dynamics within this system.

11. Context control may be viewed as a form of planning (see Meadowcroft 1997, p.27).

12. A nice discussion of adaptive policy with operational elements is Walker et al.'s paper (2001).

13. The criticism of anticipatory rationality should probably not be taken as criticism of anticipation or a call for short-sightedness but as a criticism of a particular method for dealing with the future: strategic planning. According to Club of Rome member Mesarovic (2001), sustainability requires anticipatory democracy.

14. We take the view that path dependencies cannot altogether be prevented, each act will influence future acts in ways that are not entirely clear. Incrementalism, portfolio management and the stimulation by policy of robust solutions help to circumvent but not altogether prevent the problem of suboptimal solutions. Lindblom (1997) proposes relying on the 'intelligence of interaction' by relying on partisan mutual adjustment.

15. Of course there is a danger of conservatism but forces of conservatism (in the form of special interests, veto powers, and timid/unimaginative thinking) always play out themselves, at any time and place, as noted by Lindblom in a defence to his critics.

16. Not just incremental steps are taken. From a contemporary point of view, we have discontinuous policies and steps.

17. What is referred to here is what we described in section 5 as a basket of images. From all scenario studies, it was concluded that biomass will play a significant role in any future energy supply system. The form in which biomass will be used however is uncertain. Within the context of the overall vision for a sustainable energy supply, different images have been developed (gasification, pyrolysis and biofuels), linked to different transition-paths, which together must lead to the overall ambition.

18. Similarly, transition management could also be considered an example of a 'mixed scanning approach', a hierarchical mode of decision-making that combines higher-order, fundamental decision-making with lower-order incremental decisions that work out and/or prepare for the higher order ones (Etzioni, 1986). The fundamental choices are the long-term goals, the creation or abandoning of programmes for system innovation, reliance on certain ways of decision-making. The fact that we can use different labels for transition management shows that the ideas behind it are not new; what is new is the operationalization of these ideas.

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