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"Futures studies in the governance for sustainable development: Overview of different tools and their contribution to public policy making"

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This ESDN Quarterly Report focuses on the potential contribution of future studies and their analytical tools (foresight and scenarios) to governance for sustainable development (SD). Sustainable development is associated with a difficult multi-scale and multi-level transition requiring a long-term vision of the future and new approaches and tools to realise that vision. The examples offered in this report intend to show national- and international-level initiatives where futures studies have been employed successfully and integrated in the policy-making process, and we suggest that these tools are well-capable of supporting governance for SD.

In the first section the challenges for governance for SD are explored, and on this basis key features of governance for SD (interactionism, pluralism, reflexivity, long-term orientation, holistic approach) are identified. Following this several types of tools supporting a strategic approach to SD are highlighted. The second section focuses on futures studies (particularly visioning, foresight and scenario planning) and their placement in policy planning and strategic management processes in more detail. It describes the processes of foresight and scenario planning and identifies some of the conditions necessary for successful deployment of these tools. The third section offers an analysis of several case studies (national foresight programmes and horizon scans in the UK and the Netherlands, Belgian Federal Reports on SD, the report *Getting Into the Right Lane for EU 2050*, Environmental Outlooks of both the OECD and UNEP) of the application of futures studies. It focuses especially on the institutional embedding of these processes and their integration into the policy cycle. The conclusions specifically attempt to show how futures studies can support governance for SD.

Content

1 The role of futures studies in governance for sustainable development

1.1 Introduction

Sustainable development (SD) from the very time of the birth of the concept rests on the assumption that **society is able to steer its development towards more desirable futures**. "Sustainable development is not a spontaneous social product: it requires goal-directed intervention by governments and other actors", i.e. "some form of 'steering' – to ensure that societal development avoids 'unsustainable' outcomes" (Meadowcroft 2007b).

This ESDN quarterly report addresses the role of futures studies (i.e. the tools of visioning, foresight, scenarios and selected associated decision-support methods) in the context of governance for sustainable development. In this first section we first explore the governance challenges represented by SD, formulate key features of governance for SD, and then highlight some of the tools supporting a strategic approach to SD. The second section focuses on futures studies (particularly visioning, foresight and scenarios) and their integration in policy planning and strategic management processes in more detail. The third section offers an analysis of several case studies documenting the

application of futures studies, especially their institutional embedding and integration in the policy cycle, followed by conclusions.

1.2 Towards defining key features of governance for sustainable development

The conventional rationalist ideal of steering is based on "the unambiguous determination of goals, availability of knowledge to predict consequences and concentration of power to implement strategies" (Voß et al., 2007). These underlying assumptions about our ability to set sound and legitimate objectives, understand relevant causal relations and organize collective behaviour form the basis for traditional approaches in policy planning. In recent decades, however, it has been widely acknowledged that when dealing with societal transitions[1] of such a large scale and scope as the sustainable development project implies, **policy making by necessity meets 'wicked problems'** (Rittel & Weber 1973) for which these assumptions are not necessarily valid. The problems have been characterized as (Rayner 2006):[2]

- symptomatic of deeper problems
- offering unique opportunities that cannot be easily reversed
- unable to offer a clear set of alternative solutions
- characterised by contradictory certitudes
- containing redistributive implications for entrenched interests
- persistent and insoluble.

These situations have been described in slightly different terms by Funtowicz and Ravetz as when "facts are uncertain, values in dispute, stakes high and decisions urgent" (n.d.) and characterized by unpredictability, incomplete control and plurality of legitimate perspectives (1993; see also Giampetro & Mayumi 2006).

One could argue, as Meadowcroft (2007b) does, that problems with these characteristics "have *always* confronted political leaders, particularly in democratic polities: governments are bound to face multiple, conflicting, and perhaps incommensurate objectives; there will never be enough causal knowledge to tackle the issues that really worry us; and policy-makers must by definition deal with alternative centres of power". However, as he also acknowledges, "we may argue that the situation facing modern leaders is more acute than that which confronted earlier generations of decision makers" as goals are more numerous and more conflicted in today's complex and globally

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[1] Transition processes are "long-term (ca. 25 yrs.) processes of change that are co-evolutionary by nature and involve a broad range of societal groups" (Loorbach 2008).

[2] Similarly, Loorbach's (2008) 'persistent problems' are characterized by: large complexity; structural uncertainty; large number of actors involved; different perception by different actors; absent agreement on solutions.

interconnected societies, pathways of causation are less transparent, and power is more widely diffused (ibid.). One could also argue that decision making on issues such as global climate change is characterised by higher stakes and urgency.

Let us turn our attention to the problem of incomplete knowledge and limited 'knowability' in decision making associated with complex problems – i.e. situations of uncertainty[3] and ambiguity. Conventional planning as a 'goal-based optimization framework' deals with the future through prediction and preparation. However, **uncertainty is a key challenge** when dealing with complex, evolving systems and 'wicked' or 'persistent' problems. Uncertainty manifests in several ways (Knight 1964): (i) as *anticipation uncertainty* due to the fact that we cannot depend on our forecasting models; (ii) as *effect uncertainty* due to the fact that we cannot know all the consequences of our own actions in the future; (iii) as *implementation uncertainty* due to reflexivity causing that a policy cannot be implemented in the precise form in which it was formulated. Relevant is also the famous information paradox of Kenneth Arrow on the incalculable value of unknown information (1971) and recent research on 'bounded rationality' of decision makers. In addition, complex problems support multiple differing yet simultaneously valid interpretations. Weick (1995) calls this phenomenon ambiguity: "The problem with ambiguity is not that the real world is imperfectly understood and that more information will remedy that." Furthermore, "it is often not even sure whether or not values are really in dispute, whether or not stakes are truly high, and how urgent the decision is" (Giampetro & Mayumi 2006).

Steering towards SD therefore cannot be perceived as analogous to classic policy 'implementation' logic where to address a particular issue "officials need clear goals, an adequate causal theory, and substantial implementation potential" (Meadowcroft 2007b). Due to its scope and scale SD is not a *particular issue*. It rather represents **"a normative standard that serves as a meta-objective for policy"**, a 'normative point of reference for environment and development policy making', given substance (only) in every specific context (ibid.). Another interesting perspective is provided by Bagheri and Hjorth (2007) who suggest that sustainability is a 'moving target', "continuously evolving as we understand more about our socio-environmental system", and the transition towards sustainability is an evolutionary, non-deterministic process with the end point not known in advance. Therefore, as Meadowcroft (2007a) helpfully suggests, "governance for sustainable development is not reducible to one really big, ideal, SD strategy process".

Given this shifting character of SD targets the SD governance process needs to be reflective. **Reflexivity** was embedded into the concept of sustainable development from the very beginning since "[o]nly by reconsidering existing practices, critically appraising

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[3] For the purpose of this text we include under the term uncertainty also other problematic forms of incomplete knowledge (incertitude) other than probabilistic risk, i.e. ambiguity and ignorance (see Stirling 2003).

current institutions and exploring alternative futures is it possible to shift our development trajectory onto more sustainable lines" (Meadowcroft 2007a). 'Societal self-steering' required by the sustainable development concept therefore understandably "demands continuous reflection about the path that has been traversed and the future we have yet to build" (ibid.). In this context Meadowcroft (ibid.) speaks of 'reflexive governance' and "self-critical and reflective practices that contribute to the conscious re-ordering of social life". Similarly Bagheri and Hjorth (2007) promote the governance feature of **'adaptive flexibility'**, i.e. "the ability to address changing conditions through a process of continuous adaptive learning and the possibility to initiate new development trajectories". Reflexivity is also a feature of the concept of **strategic public management** (Steurer 2007) representing the 'configurational school' of strategy formation, pursuing a hybrid pattern of strategy formation combining both flexible strategy formation and systematic planning, facilitating recurring governance and management cycles.

One of the key foundations of SD is the **principle of stakeholder involvement**. As stated above, governance for SD implies a process of *societal* **self-steering**, including actions and interactions among many actors. It is by definition a collective enterprise, and it has to be participatory on the basis of both normative and instrumental rationales. The normative (or ethical) rationale relates to the need of SD governance to support interactive deliberative processes giving space to the voicing of needs, interests, values and aspirations of all society's members to arrive at a representation of societal value choices and as such build legitimacy for steering. The instrumental rationale for participation rests not only on the need to access knowledge distributed across all manners of societal actors, but involvement of societal actors serves also to collectively generate new knowledge and to actually enact societal change.

A key notion about 'societal self-steering' is also that the principal actor and bearer of the primary responsibility are still the national governments, due to their clear lines of accountability to the general population and their positions in territorial and legal contexts (see e.g. Meadowcroft 2007b). However, we have to admit that the government alone possibly "no longer has the necessary authority or means to produce a (political) position that adequately represents the general or collective interest" (van Zeijl-Rozema et al. 2008). Since sustainable development is a societal undertaking, governance for SD needs to be **interactionist**.

To sum up, governance for sustainable development has a number of key features. **Interactionism** refers to involvement of multiple societal actors in a deliberative process of collecting and generating knowledge and "construct an understanding of the public good that transcend particular interests, and can be shared widely" (Meadowcroft 2007b). The associated concept of **pluralism** refers to the complex character of systems or problems enabling a multitude of simultaneously valid perspectives and requiring for sustainable development to be redefined in different contexts, and also to a deliberative

culture in governance, promotion of extended peer communities (Healy 1999), and awareness of the fallibility of collective structures and therefore enabling various ideologies, forms of knowledge and institutional regimes to co-exist and evolve. **Reflexivity** refers to an ability of the governance system to transform itself in an iterative process, therefore ensuring adaptive flexibility to address changing conditions, limiting the 'stickiness' of institutions and helping prevent institutional lock-in. Plurality and adaptability enable experimentation (or what Loorbach (2008) calls 'keeping options open'), i.e. they on the one hand foster a decentralised diversity of approaches and thus strengthen institutional resilience, and on the other hand enable cultivation of fitting institutional solutions of appropriate scale (see 'the issue of fit', Young (2000)) in an innovation-fertile environment. The multi-level character and establishment of function-specific governance arrangements (Hooghe & Marks 2003) would lead to **polycentricity**, a highly complex system of decision points (Meadowcroft 2002), flexible enough to be able to adapt to external change and uncertainty, with diversity as a stabilising element (see also Newig & Fritsch 2009).[4] **Long-term orientation** refers to time horizons of generational time spans, especially relevant considering societal transition processes. **Holistic approach** refers to the need to address the multi-level and multi-scale[5] character of SD in an integrative and comprehensive manner, i.e. striving for integration of objectives and concerted action across all three domains (economic, social and environmental) as well as for vertical and horizontal policy coherence.

1.3   Tools for sustainability governance

Several 'tools' (in the broadest sense) are used by the governments to address these features, examples of which we suggest below. The need is by no means recent – for example, Agenda 21 (UN 1992) called for action to "review the status of [national] planning and management systems and, where necessary, modify and strengthen procedures so as to facilitate the integrated consideration of social, economic and environmental issues", including "[i]mproving the use of data and information at all stages of planning and management", "[a]dopting comprehensive analytical procedures for prior and simultaneous assessment of the impacts of decisions" and "[a]dopting flexible and integrative planning approaches that allow the consideration of multiple goals and enable adjustment of changing needs".

National sustainable development strategies (NSDSs)[6] are considered to be among the prime tools for realizing governance for SD and since Agenda 21 experienced a resurgence of interest in public sector planning. (For more on NSDSs see e.g. Steurer & Martinuzzi 2005.) In this context, OECD interprets 'being strategic' as "setting goals and

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[4] Note that polycentricity does not necessarily refer to decentralization and decision making at the lowest political-administrative level with corresponding jurisdiction.

[5] Referring to different temporal and spatial scales (see Holling 2001 and Martens 2006) but also to different domains and the resulting criteria (see Giampetro & Ramos-Martin 2005).

[6] As well as SD strategies realised at other political-administrative levels.

identifying means of achieving them", implying an underlying vision and setting of associated priorities, goals and direction while having "a comprehensive understanding of the concept [of sustainable development] and its implications, but not necessarily a comprehensive set of actions" (OECD 2001a). (However, as Meadowcroft (2007a) points out, it is helpful to keep in mind the distinction between a NSDS strategy process and "the broader practice of strategic decision-making and policy implementation for sustainable development".)

NSDSs exhibit a significant variety in mandate, scope and form (see e.g. Swanson et al. 2004; Steurer & Martinuzzi 2005; Meadowcroft 2007a). However, as indicated by the previous section, NSDSs should take a different approach from classic policy implementation. Already at the end of the first decade of experience with NSDSs the OECD (2001a) has observed that strategic approaches to sustainable development can be characterized by several features distinct to typical strategic actions of the government (see also EC 2004):

- move from developing and implementing a _fixed_ plan, ideas and solutions towards operating an adaptive system that can continuously improve governance to promote coherence between responses to different challenges
- move from a view that it is the state alone which is responsible for development towards one that sees responsibility with society as a whole
- move from centralised and controlled decision-making towards sharing results and opportunities, transparent negotiations, co-operation and concerted action
- move from a focus on outputs (e.g. projects and laws) towards a focus on outcomes (e.g. impacts)
- move from sectoral towards integrated planning
- move from a dependence on external assistance towards domestically-driven and financed development
- move towards a process which can accommodate monitoring, learning and improvement.

Integrated sustainability assessments/appraisals, i.e. deliberative processes of gathering and producing knowledge in support of decision making and institutional change, taking into account multiple scales and involving multiple stakeholders (see e.g. Stirling et al. 2007; see also the ESDN Quarterly Report on sustainability impact assessment from June 2007), can also be counted among tools supporting the process of negotiating pathways to more sustainable futures. E.g. strategic environmental assessments (SEA) often utilise scenario development and participatory planning methods for identifying possible pathways and intervention options.

Most relevant for this report are the 'tools' offered by **futures studies** (or futures research, futures sciences). Futures studies have been described as "the study of the

present reality from the point of view of a special interest of knowledge of the future; knowledge of the future considered characteristically as knowledge of contingent events" (Mannermaa 1986). They encompass a variety of tools and approaches such as foresight, scenarios, alternative futures or visioning, use methods of backcasting, scenario development and many others, and can have predictive, explorative and normative functions (Frame & Brown 2007). Looking into the past, already the Club of Rome report *Limits to Growth* published in 1972 was an SD-relevant exercise in long-term modelling and scenario building, although not married to a decision-making process.

Futures studies support governance for sustainable development and its new approach to policy planning and strategic management, attempting to tackle the challenges to conventional steering described above. In contrast to so-called 'blueprint thinking' operating from a fixed notion of final goals and corresponding visions the process of participatory transition towards sustainability is a goal-seeking process, with visions changing over time through variation and selection (Loorbach 2008). "In this new approach uncertainty does not function as a source of unwelcome tension between scientists, policy-makers and citizens. Rather, it becomes an essential component of the process as an aid to understanding inherent complexities, which generates information useful for theory building, experimentation and decision-making that may, previously, have been neglected." (Frame & Brown 2007)

Futures studies can also be integrated with SD strategy processes and can well support a management style based on the reflection and adaptive flexibility paradigm. For example, visions of sustainable future and the collective processes of their development and reconsideration are important since in contrast to traditional planning methods of 'goal-based optimization' planning/strategic processes for SD rest on a "process-based multi-scale approach guided by a target/vision" (Bagheri & Hjorth 2007). Visions are crucial in informing today's action – long-term sustainability visions should serve "as a guide for formulating programmes and policies and setting short-term and long-term objectives" (Loorbach 2008).[7] Backcasting (or so-called normative forecasting) might be also a very relevant approach, involving the development of normative scenarios aimed at achieving desired end-points (Bagheri & Hjorth 2007): "social learning and backcasting – rather than forecasting – are the most important processes to define a sustainable future and to plan for and navigate towards it". Instead of purely relying on causality and likelihood of different futures, backcasting judges these different futures on the basis of the desirability of their implications on the basis of criteria derived from values and norms, opening up the question 'what kind of future do we want?'.

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[7] SD strategies would benefit from visions as "[i]deally, a strategy process should combine a long term orientation with medium term objectives and short term actions" (Meadowcroft 2007a).

The next section is going to take a deeper look at the tools of visions, foresight and scenarios, their mutual linkages as well as placement in the processes of policy planning and strategic management.

2 Tools of futures studies

Futures studies have observed an enormous evolution in the second half of the 20th century. From early rudimentary tools developed in the early '50s, they are now fully-fledged disciplines employed in most realms of public policy. Traditional planning employed tools such as forecasting or modelling, but due to higher complexity in interactions and rising interdependencies of economical technological, environmental, political and social systems (greater uncertainty both in width and in depth; Slaughter 1995) new analytical instruments such as scenarios[8] and foresight[9] have emerged in the last 30 years (Cariola & Rolfo 2004). These tools are more capable to deal with complexity and uncertainty as well as conflicting objectives in public policy planning and by broadening the horizon on possible alternatives of future states (Coates 1999) help manage "interrelatedness of change" (Masini 2002).

This section aims to provide for an orientation and deeper look at mainly three key analytical tools: visions, foresight and scenarios. Visions, developed through a process of (en-)visioning, help to identify desirable future states, 'snapshots of the future'. Scenarios (also called 'alternative future states') are results of the process of scenario planning and help identify also the pathway which can be undertaken today for reaching the visionary image of the future. Foresight refers to a comprehensive process of examining the future, development of future options and choosing the most favourable one. Scenarios and visions can be both also integrated as parts of a foresight study (Bishop et al. 2007).

First we will outline these concepts and analyse how they can help policy makers in their policy-planning activities. Towards the end of the section we will provide a short overview of the linkages between these three tools.

2.1 Visions

'Vision' is a concept that is slippery and difficult to specify. According to Dator, vision is "the best possible real world you can imagine and strive for, always re-evaluating your

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[8] The term "scenario" has been used initially by Herman Kahn, developing scenarios regarding the threat of thermo-nuclear war, when working at the RAND Corporation in the 1950s on US military studies(Coates 2000)

[9] Since the 80ies, foresight studies have been integrated in national foresight programmes by governments, when planning for various policies especially in the field of technology and innovation first at national and then at regional level.(Alsan &Oner 2004)

preferences as you struggle towards it" (Stevenson 2006). On the one hand therefore, 'vision' refers to a possible and preferable future that can be realized. Any vision has to be 'linked to reality' in its chances of being realized (Masini 2002). On the other hand, 'vision' can refer to an imagined preferable future which cannot be realized. In this context, Carey (1999) frames visions as the "utopia or imagination, where we store our hopes of happiness".

Nonetheless, Polak (1973) claims that a prime project of civilisations is to create a positive, transformational image of the future. Vision does not only refer to an image of the future, but also to a project for the future, resting on the social structure from which it emerges, and hence it is historically and contextually bounded and shaped (Masini 1999). This image encompasses a long-term perspective which needs to be enabled through short-term actions. Visions are therefore often the starting points for foresight and scenario planning processes, examining boundaries of what is possible and preferable (Floyd & Zubevich 2010) and for setting the short-term and long-term policy goals and formulating strategies for reaching the visions. The process of the envisioning of best outcomes when dealing with future alternatives is therefore to be seen as a part of the foresight process which will be described below.

2.2   Foresight

Foresight means "opening to the future with every means at our disposal, developing views of future options, and then choosing between them" (Major et al. 2001). Foresight is, however, an elusive and oft-misunderstood term. Lacking a widely accepted definition, it is unclear conceptually when and whether it refers to a "process, to a human attribute or competence, or to products as to a national foresight programme" (ibis.). We will focus on foresight as a planning tool used in public policy and resulting in policy products such as the national foresight programmes.

Foresight originates as an analytical tool stemming from both management sciences and company practice (Aguilar 1967; Ansoff 1975; Porter 1980; Müller 2008). During the years it has evolved and spread into practice with notable success (Hérault 2006, Paillard 2006, Miles 2005) and, especially in the 1980s, it progressively found application also in the realm of public policy. In this period, it was further conceptually and methodologically developed as 'strategic foresight' (Habegger 2009; Schultz 2006, Leigh 2003, Boggs 1985).

2.2.1 Usage of foresight in public policy

Linked to the policy making process, foresight is a deliberate attempt to broaden the 'boundaries of perception' in order to expand decision-makers' awareness (Habegger 2009). Its purpose consists in clarifying the possible dynamics of new developments, so
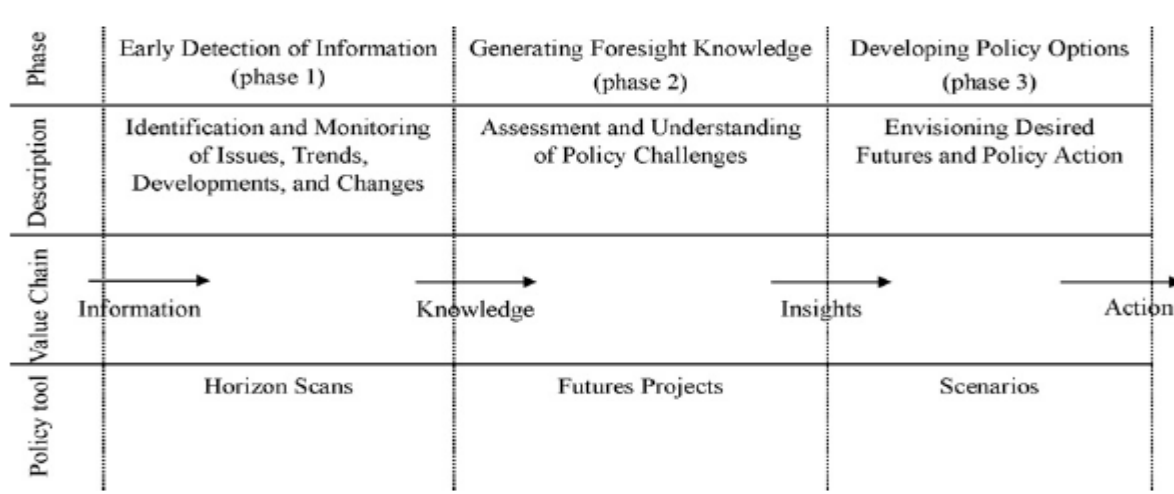
to avoid, or at least minimize, the risks and uncertainties they may bring about (Slaughter 1995). Strategic foresight has several functions relevant to policy making. Firstly, by providing systematic knowledge or anticipatory intelligence (ibid.) it offers information to policy-makers. Secondly, it acts as a driver of reflexive social learning-processes among policy-makers, in that it stimulates the generation of common public policy visions. In this way, by suggesting alternative policies in the presence it enables change in the future (ibid.). In this second function, foresight has a long-term interdisciplinary, participative and communicative content (Müller 2008). It supports strategic thinking and decision-making by developing a range of possible ways about how the future could unfold using techniques such as trend research and ex-ante estimation of the impacts of policies, forecasting/scenario building for anticipation of future developments, and identification of optimal policy tools for achieving the preferred outcomes (Müller 2008). It is also important to mention that institutional factors play a major role for the success and integration of foresight in the policy process.

In its beginnings foresight has been used mainly in the policy domains of science, technology and innovation policy. Lately governments have started to realize that strategic foresight offers a possibility to deal with emerging threats and opportunities beyond the focus of single policy issues. Strategic foresight can therefore help to address the holistic challenge of sustainable development as it is deliberately cutting across the traditional boundaries of policy areas and governments departments (Habegger 2009), although until now its usage in the sustainable development policy domain has not yet found strong resonance among scholars. Several countries (most notably the Netherlands and the United Kingdom) have integrated foresight in their programmes for societal or economic issues and development – "a trend that is likely to firm up in the future" (ibid.).

In order to better understand the impact of foresight studies on policy-making processes, it is vital to outline shortly the foresight process phases and the resulting policy inputs from such a process. Habegger (ibid.) distinguishes three phases: (1) early detection and analysis of information, (2) generation of foresight knowledge, and (3) development of future (policy) options.

The resulting products from the first phase are 'horizon scans' (also called environmental scans), developed in participation with policy makers and aiming to detect trends and challenges for the future. Horizon scans are expected to provide an understanding of what is happening in an organization's environments and why, and what processes induce and support change.

Figure 1: The process of strategic foresight and its linkages to policy making

Phase	Early Detection of Information (phase 1)	Generating Foresight Knowledge (phase 2)	Developing Policy Options (phase 3)
Description	Identification and Monitoring of Issues, Trends, Developments, and Changes	Assessment and Understanding of Policy Challenges	Envisioning Desired Futures and Policy Action
Value Chain	Information →	Knowledge →	Insights → Action
Policy tool	Horizon Scans	Futures Projects	Scenarios

Source: Habegger 2009

The second phase addresses the assessment and understanding of selected policy challenges. After information is scanned, collected, filtered, and processed, the gathered evidence is interpreted to figure out "the implications of the various possible future views for a particular organization in some future projects" (Horton 1999, in Habegger 2009). Futures projects on specific themes are developed basing on the horizon scans. They must be based on the best available evidence and capture a particular issue in all its relevant dimensions. The purpose is to draw a realistic picture of the present implications of possible future events across a broad range of policy areas (Slaughter 1995).

After envisioning best outcomes, insights generated through future projects lead to the development of policy actions (phase 3). As there is no such thing as 'the' future, a variety of potential futures is explored. Under conditions of 'heightened uncertainty' the best course of action is to look forward purposefully and to present alternative scenarios (Nye 1994). Scenarios are used in this strategic process as one possible method of foresight (see also Figure 2).

Habegger (2009) suggests that for foresight to effectively contribute to the policy-making process four factors must be present:

1) to pursue a holistic and broad policy perspective, cross-governmental processes must create an inter-operable working environment under the responsibility of more than one department;
2) to address the interactionist character of governance extension from cross-governmental to cross-departmental towards inclusion of other professional communities such as businesses, think tanks and the academic profession must be pursued;

3) in order to safeguard credibility and long-term reputation of the programme, best available evidence should be used in the forecasting activity;
4) reports from foresight should not serve as an end of itself, but as road-maps – however, to ensure their usage the support from policy makers is indispensable.

Ideally, strategic foresight is regularly repeated (i.e. enables reflexivity) and is solidly institutionally anchored. Thus it will more easily win support of relevant stakeholders in the parliament, government, administration and the general public as it may raise the government's strategic decision-making capabilities and thus has the chance to contribute effectively to the development and implementation of alternative public policies.

2.3   Scenarios and scenario planning

Similarly to foresight, scenario-planning also helps understand how the future might evolve, avoid dangers and minimize the risk of the future.[10] Scenarios try to question one's understanding of the world and uncover predetermined elements in the outside world allowing a better anticipation of future developments (Van der Heijden 2000). Scenarios are neither forecasts nor predictions, because they do not only extrapolate the data of the present to the future. Scenarios analysts try to develop pictures of how the future may unfold independently of current trends.

Scenarios can have various forms. "Scenario is a product that describes some possible future state and/or that tells the story about how such a state might come about. The former are referred to as end state or even day in the life scenarios; the latter are chain (of events) scenarios or future histories" (Bishop et al. 2007). However, it is important to add that scenarios are not only images or static snapshots of future states (vision), but rather dynamic 'movies' that consist of a logical sequence of images of the future. Moreover, they also consider driving forces, events and actions that lead to the future conditions as visualised in images of the future (Rotmans et al. 2000). (However, a scenario is not a strategy, although often the two terms are conflated (Coates 2000; Godets 2000).)

For a better comprehension of scenario planning, we outline below its seven-stage process derived from the existing literature (Ratcliffe 1999).

1) **Task identification and analysis**: Identification of the focal issue or question, or the specific decision. These tasks tend to be of strategic importance, and it is often at this stage that the time-horizon is determined. It can vary from 10 to 50 years into the future.

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[10] As a process, scenario planning is not always or necessarily linked to foresight. However, various authors see them as one possible foresight method (Popper 2008; Bishop et al. 2007, Habegger 2009).

2) **Key decision factor appraisal**: Specification of key factors influencing the success or failure of the decision (identified in step one). All key decisions relate to external and uncontrollable conditions.

3) **Driving forces**: This step involves listing and exploring the driving forces (cultural, demographic, economic, environmental, governmental, and technological) of changes in the macro-environment that influence identified key factors.

4) **Ranking**: This step comprises the ranking of key decision factors and the driving forces of change on the basis of their potential impact and uncertainty.

5) **Alternative projections**: A number of scenarios best capturing the dynamics of the situation and communicating the point effectively are selected.

6) **Scenario development:** This step represents the heart of the scenario planning process. It utilises techniques such as future mapping or backcasting.

7) **Interpretation**: This step poses the fundamental question of how the task, issue or decision identified in step one looks in the light of the scenarios constructed. This step allows to identify the weaknesses or strengths of the scenarios constructed and to turn the selected one(s) into a strategy.

2.3.1 Usage of scenarios in public policy

Scenario planning literature highlights a wide range of decision-support functions (Bishop et al. 2007; Bradfield 2005). Several studies attempting to evaluate the effectiveness of scenarios have confirmed their usefulness (Glenn and Gordon 2001; Light 2005). The functions relevant particularly for SD governance are:

- scenario planning helps policy makers to **make better sense of changes in their external environment** (Chermarck, 2006)
- scenario planning serves to spot **early warning signals** and refine perceptions of existing or emerging problems and corresponding problem-solving strategies (Lempert 2003; Ratcliffe 2000; Van der Heijden 2000)
- scenario planning helps to **manage conflicts between diverging societal interests and values**
- scenario planning helps **find common ground for future action**. A mixture of normative (strategic) and participatory scenarios is used most often for planning and also mobilizing action by different public and private actors (Selin 2006; Eriksson 2008).

Scenarios as used in government planning fall into two broad categories. On the one hand they are used as *thinking frameworks* aiming to develop and clarify practical choices, policies and alternative actions. On the other hand, by displaying the consequences of a particular choice or a set of choices already made, scenarios serve as *learning frameworks* aiming to evaluate actual proposed policy projects. Policy and its consequences are integrated into a story about some future state (Coates 2000).

Figure 2: Forms of scenario-based decision support
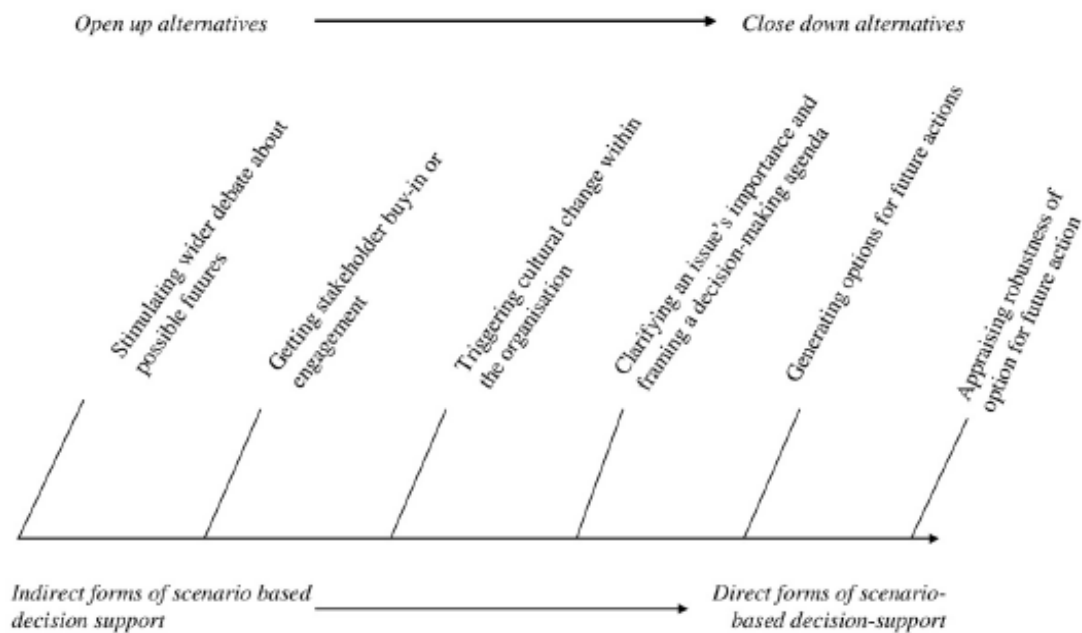
Source: Volkery & Ribiero 2009

In relation to the policy cycle Volkery and Ribiero (2009) distinguish between indirect and direct forms of scenario-based decision support (see Figure 2). The *indirect forms* of scenario planning are related to the early stages of policy making (policy issue identification, policy issue framing, agenda setting). Scenario-based decision support offers "risk-free space to visualize, rehearse and test the acceptability of different strategies without being involved in the constraints of day-to-day policy making" (ibid.). Broader participation of societal stakeholders and open-minded discussion improves the relevance of the exercise.

In the later phases of policy design and implementation *direct forms* of scenario planning can play a bigger role. More concrete advice and operational targets are needed in these phases. Less favourable scenarios are eliminated and focus is placed only on the preferable ones. Opportunities for broad-scale participation of societal stakeholders are limited as the choice among policy alternatives is a highly politicised process at the end of the policy-making cycle (ibid.).

Following factors determine the success of scenario planning:

- political backing
- level of involvement of the user/audience with the exercise[11]

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[11] The impact of scenarios is caused through the consultative process of developing the scenarios including an interaction between scenario developers and scenario users (scenario planning) rather than through a

- the will, insight and institutional capacity to undertake and absorb such a learning process (Ratcliffe 2000; Volkery & Ribiero 2009)
- skills and experience of those using the scenario outputs
- selection of the right methodology for set goals
- resources available for the project (Volkery & Ribiero 2009).

2.4 Relations between the three tools

As indicated above, the process of change usually starts with a vision of the future. Most futures practitioners confirm that a (shared) vision is needed for successful action, and the active development of vision is therefore to be encouraged (Van der Helm 2008). But since the power of ideas has not always been sufficient to affect societal behaviour, a shared vision alone – without follow-up actions – is not sufficient for shaping the future (Mc-Kenzie Mohr 1999; Stevenson 2006). The tools of strategic foresight and scenario planning then become useful since they serve as a bridge from the 'idea to change' to the 'means to change' (see Figure 3) providing evidence for and backcasting the pathways that lead to the vision (Stevenson 2006). Visions can thus be seen as drivers for the processes of foresight and scenario planning.

Alternately, in a more exploratory and less goal-oriented process, scenario-planning and foresight can help developing a shared vision through envisioning the best outcomes. In both scenario planning and strategic foresight processes, alternative futures can be constructed to meet varying futures that may lie ahead. They can be "possible, plausible, probable, desiderable or undesiderable or some combination" (Stevenson 2006). The range of these plural futures which are developed in foresight and scenario-planning processes allow a choice to envision the best outcomes and correct the present perception of future developments and broaden the horizon for developing a different vision. Figure 3 below shows the linkages and interrelations of these three tools.

The development of a strategy requires far more than the development of scenarios alone: it needs a strategic vision, clear goals and objectives, and an assessment of the core competencies and how they are divided (Godet 2000). However, scenario planning and foresight permit the development of some vital initial strategic insight, although the needs of various organizations will obviously differ (Wilson 1998). If scenario-planning activities in public policy serve only as learning mechanisms or evaluative methods for policy makers, strategic foresight can even bind them stronger through institutional establishments and ideally lead to elaboration of strategies and action plans.

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published product describing the scenarios that were created (Volkery & Ribiero 2009; cf. O'Neil et al. 2008).

Figure 3: From Vision to Change: Foresight and Scenarios as Bridging Methods to Social Change
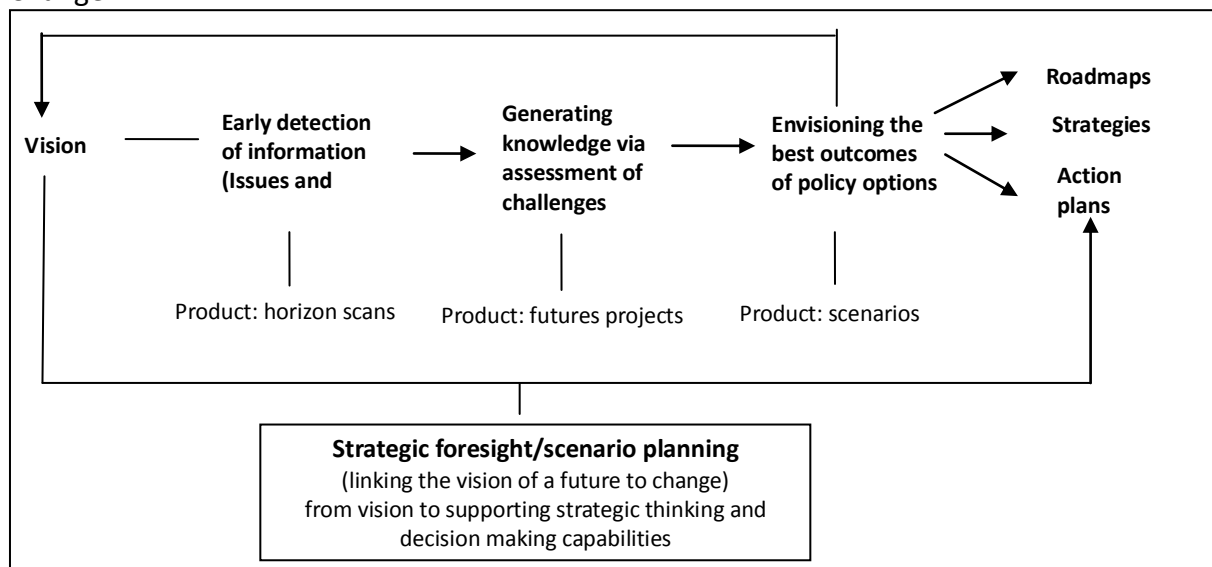
Source: own analysis

3 Examples of the usage of futures studies in public policy making

This section aims to provide some concrete examples of the usage of foresight and scenario planning exercises in the public policy-making process and their institutional embedding at the national (UK, the Netherlands), supranational (EU) and international levels (OECD, UNEP). Firstly, we will analyse the institutional setup and policy-making context of national foresight programmes in the UK and the Netherlands, focusing specifically on the horizon scans implemented in both countries. Secondly, we will take a look at the link between scenarios and foresight studies and strategic processes on SD in Belgium (biannual reporting of the Federal Planning Bureau for the SD strategy cycle) and at the EU level (a study of the Netherlands' Environmental Assessment Agency and the Stockholm Resilience Centre on the future directions of EU policies). Thirdly, we will explore scenarios utilised in the Environmental Outlooks of both OECD and UNEP and their relevance for SD.

3.1 National foresight programmes and horizon scans in the UK and the Netherlands

In contrast to other EU member states, the Netherlands and the United Kingdom have developed cross-sectoral foresight programmes that also include environmental, technological and social policies. (Other countries, e.g. Germany, Ireland or Austria,

focus more on technology policies instead.) Both countries have been actively engaged in the institutionalization of foresight processes at the national level and in the development of planning tools as horizon scans. In the framework of national foresight programmes, horizon scans are lately proving to be a valuable method for charting complete maps of possible future problems, threats and opportunity-filled developments that can influence governmental policies (COS 2007).

3.1.1 The National Foresight Programme of the United Kingdom

The National Foresight Programme of the UK was launched in 1994 and has been revised regularly in order to meet new challenges. It can roughly be grouped into three distinct activities such as horizon scans (sigma scan); future (foresight) projects; and the public outreach program (including a toolkit[12] and a network[13]).

Overall, the Foresight Programme is considered to be an effective tool for informing the policy-making process within the British government on strategic issues. While it was initially centred on science and technology policy – and still places a strong emphasis on these issues – it has continually broadened its scope. Today it provides policy-makers with a perspective on the whole public policy agenda. Furthermore, the Programme covers the whole spectrum of a comprehensive foresight process: from early detection and the generation of foresight knowledge to the development of policy options (as action plans). It links expert knowledge to a long-term perspective and employs sophisticated techniques for futures analysis to raise the government's strategic policy-making capabilities (Habegger 2009).

3.1.1.1   Institutional setup

The UK's National Foresight Programme is overseen by the Government Office for Science within the Department for Business, Innovation & Skills. It is headed by the Government Chief Scientific Adviser, who is responsible to the Prime Minister and the Cabinet Office for the overall quality of scientific advice within the government and for providing personal advice to them on scientific and science policy issue (Habegger 2009). The horizon scans (Sigma and Delta) are conducted by the UK Horizon Scanning Centre, based in the Foresight Directorate of the Government Office for Science. The Centre is an

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[12] The tool-kit is based on the work of Foresight Programme since 2002 and is intended to be informative and easy to use for futures analysts, policy-makers, strategists and people managing a futures process. While the toolkit offers some ideas and suggestions for ways to approach futures projects, it is not intended to be prescriptive or definitive.

[13] The Futures' Analysts Network (the FAN Club) is a forum where those who have an interest in horizon scanning and futures analysis can meet to exchange new ideas, innovative thinking and good practice. Meetings, which are open to all, are held four times a year.

inter-sectoral institution that provides a high-level strategic context to the departmental horizon scanning[14] interacting with those departments and informing them (UK 2004).

3.1.1.2   Focus and objectives

The aims of horizon scans in UK are: (i) to inform departmental and cross-departmental decision-making; (ii) to support horizon scanning processes carried out by other actors inside the government; and (iii) to raise awareness on the implications of emerging science and technology and hence enable other actors to exploit them (Horizon Scan Homepage).

3.1.1.3   Implementation

As mentioned above, the activities carried out within the National Foresight Programme of the UK can roughly be grouped into three distinct areas of horizon scans, futures projects, and the public outreach program. We will describe the horizon scans and futures projects in more detail.

Horizon scans: The horizon scans are generally products or policy tools resulting from the first phase of a comprehensive foresight process. They present results of detection of future trends and challenges to the policy makers and have an awareness building function towards the policy makers as well (see also the various phases of a foresight process in Figure 1). The Sigma Scan represents at the time of this writing a set *of* 271 *brief papers* on various topics exploring potential future issues and trends over the next 50 years which may have an impact on UK public policy. The scans provide possible implications, identify early indicators and reveal parallels to previous events. These horizon scans provide inputs for later in-depth treatment of the given issue through subsequent foresight process phases.

Futures Projects: The futures projects create an in-depth overview of a given issue and aim to develop a vision for tackling future challenges. They aim to go beyond horizon scanning in trying to directly affect both policy and funding decisions of the government in order to meet future challenges. This is achieved through various techniques like scenario building, and usually followed by action plans. Each topic is examined in a time horizon of at least 10 years, aiming for action-oriented outcomes, cross-disciplinary science and technology and cross-departmental issues, and commitment of its potential beneficiaries (King et al. 2007). Until now, seven futures projects were concluded dealing with issues of infectious diseases, infrastructure, flood protection, cyber crime prevention and others.

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[14] A variety of departments (such as the Ministry of Defence, the Department of Environment, Food, and Rural Affairs, the Department of Health, the National Health Service, and the Department for Business, Enterprise and Regulatory Reform) have established their own foresight programmes and several have implemented horizon scans (UK 2005).

The follow-up action plans have to be approved by the responsible minister, and then it is widely circulated to stakeholders and made publicly available. Furthermore, after one year the results are published and a follow-up meeting is held in order to asses whether and how the project findings are being addressed and are having impact (Habegger 2009).

3.1.2 Netherlands' Horizon Scan

The Netherlands has a long experience in combining technological and social foresight[15] in the area of environmental and sustainable development. *The Netherlands Horizon Scan* provides a view of the problems and opportunity-filled developments that lie on the future horizon for the Netherlands at the provincial, regional and municipal levels. It was initiated by the Commission for Consultation of Sector Councils (COS) as a new method to "improve the development of the right knowledge questions for future-directed policy making" (COS 2007).

The Netherlands' Horizon Scan shows that a broad strategic scan provides valuable inputs for policy-makers. This is due to the fact that it permits to identify, assess, and cluster future trends, issues, and developments (ibid.). The topics raised in the course of such a project will only be of sustained value, if a more comprehensive foresight process will follow and that transforms the identified knowledge (and the knowledge gaps) into insights for strategic decision-making.

3.1.2.1   Institutional setup

In contrast to the permanent capacities of the UK, the Netherlands Horizon Scan 2007 was a single foresight project carried out by a specifically established team under the responsibility of the COS. The sector councils are independent commissions, consisting of representatives from research, society, industry and government (ibid.). In 2008 the tasks of COS were transferred to the Knowledge Directorate of the Netherlands Ministry of Education, Culture and Science and it is foreseen to create a permanent facility outside the ministry (Habegger 2009).

3.1.2.2   Focus and Objectives

In the Netherlands, the aim of the Horizon Scan is to raise awareness in the country about future threats and opportunities and their impact on the society. Furthermore, it also intends to contribute to the policy agenda-setting process by providing information and feed the knowledge resulting form the Horizon Scans into the policy agendas. Its tasks are hence (COS 2007): (i) to identify and prioritize the topics explored by the

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[15] By 'technological and social foresight' we mean identifying fields of technological foresight that serve not only the goals of economic progress but also to human-wellbeing and social progress.

foresight studies and through other activities of the sector councils; (ii) to detect knowledge gaps and topics for further study; and (iii) to feed the results into strategic discussions in ministries, research organizations, societal organizations and the business sector.

3.1.2.3   Implementation of the Horizon Scan

In the Dutch experience, the Horizon Scan has been a two year-process, divided into four phases each delivering a different product: in the first phase, a **list of opportunities and threats** was constructed on the basis of specific selection criteria and a literature review. In the second phase, general public and board members evaluated this list and **identified some 150 problems**. The process stimulated discussions through a website as well as direct consultations. The third phase linked the identified threats and opportunities with one another into **trans-domain and trans-disciplinary clusters**. The clusters are (ibid.):

(1) Infrastructure for the future (food, agriculture, energy, traffic and transportation, housing, water, healthcare, communication)
(2) Changing economic and political world order
(3) Global approach to threatening infectious diseases
(4) Work and education in a new contex
(5) Opportunities for robotics and inter-connectivity
(6) two related transitions: creating and utilizing space (effects of the disappearance of agricultural subsidies)
(7) Handling conflicts and security policy constructively
(8) The engineerable and self-mutating human
(9) Accelerating the development of new energy sources
(10) Demographic issues

In the fourth phase, the involved scientists produced a **series of mini-reports**. Based on trends, expectations and current developments each essay sketched one or more images of the future. Based on these essays, the list of opportunities and threats, the cluster descriptions and the uncovered relations among them, the project team drafted an **alternative 'State of the Nation' report**. The goal was to raise awareness in the Netherlands about issues that require a longer-term perspective than the perspective adopted by the Queen in her own 'State of the Nation' address. Finally, the last phase involved the drafting of a final report and marked the start of an intense dialog on the results and their implications within and across government departments.

3.2   Linkages of long-term strategic planning to SD

This section tries to provide some examples of foresight and scenario tools utilised in strategic planning for sustainable development. Through both the British and the Dutch

Horizon Scans these two countries have adopted a cross-sectoral approach in their foresight programmes, including environmental and technological policies. However, they do not refer to sustainable development policies explicitly. Therefore the examples included in this section present the Planning Reports on SD of the Belgian Federal Bureau and the study on the future development of EU policies to 2050 by the Netherlands Environmental Assessment Agency and the Stockholm Resilience Centre. Both of them attempt to detect environmental, economic, social and policy challenges that have a crucial meaning for reaching a sustainable path.

3.2.1 Belgian Federal Sustainable Development Strategic learning and planning cycle

In the Federal Reports on Sustainable Development (Towards Sustainable development, 1999; A step towards sustainable development 2003; Belgian Federal Report on Sustainable Development, 2005), the Belgian Federal Planning Bureau evaluates the federal SD policy and describes the expected development in the future. The foresight parts of the reports inform the federal government and civil society about the desirable future alternatives and which measures should be taken to attain them. By doing so, they contribute to the ongoing social debate on which road to choose for sustainable development (FPB 1999, 2003, 2005). The Federal Reports integrate the tool of scenarios as an assessment and learning mechanism. Scenarios are developed for both the option of unchanged policy and for the option of a policy change along the lines of relevant hypotheses within the framework of sustainable development. Ad-hoc methods have been developed in order to build such scenarios, addressing the challenges of scientific uncertainty, risk assessment and very long-term (up to 2050) projections.

Federal Reports on SD are embedded in the legal framework for sustainable development policy since the 1997 law on co-ordination of federal sustainable development policies calls for the biannual publication of Federal Report on SD as well as for a four-year policy cycle of Federal Plans on Sustainable Development.

3.2.1.1   Institutional Setup

The Federal Planning Bureau (FPB) is a public interest body and conducts research on economic, socio-economic and environmental policy issues in the context of SD. The Task Force on Sustainable Development (TFSD) is the team working on this topic under both the direction and responsibility of the FPB. The FPB places its scientific expertise at the disposal of the government, parliament, social partners, and national and international institutions. Yet, their reports are independent and their results are not always included in the elaboration of the Federal Plan on Sustainable Development (see Figure 4 below). The results of TFSD's research are brought to the attention of the public and thus contribute to the democratic debate.

3.2.1.2 Linkages between the Federal Reports and long-term governmental planning

The potential for the Federal Reports to substantially affect the policy planning process for sustainable development is high – especially thanks to the fact that they are integrated in the legal framework for strategic planning for sustainable development policy as described above as well as into the Federal SD Strategy Cycle.

The Belgian Federal SD Strategy Cycle consists of the following stages (see Figure 4): (1) reporting by way of Federal Reports prepared by the Federal Planning Bureau; (2) preparation of a preliminary draft of the 4-year Federal Plan on SD, responsible institution is the Inter-departmental Commission on SD (ICSD); (3) consultation on the preliminary draft with the public, responsible institution is the Federal Council for SD; followed by (4) preparation of a draft Federal Plan by the ICSD; and (5) the debate and its adoption by the Federal Government; (6) implementation; and (7) monitoring. The iterative character of this strategy cycle should enable gradual improvement in SD planning (FPB 2005).

Figure 4: The Belgian federal 4-yearly SD Strategy Cycle

Source: FPB 2005

3.2.1.3 Scenario topics and techniques

For a better understanding of the way scenarios can be developed in the strategic planning process, it may be useful to outline shortly the scenarios and the various techniques used in the Belgian Federal Reports on SD.

In the first Federal Report (1999) three scenarios have been developed on the basis of different risk assessments as well as on the extrapolation of observed trends relevant for diverse policy topics (such as sustainable production and consumption patterns,

eliminating poverty and social exclusion, addressing climate change). The three examined scenarios were as follows:

1. Utilising scenario: Environmental and social risks are regarded as low, while risks associated to changes of production and consumption patterns are considered to be very high. Policy adopts a wait-and-see attitude towards environmental and social issues and rather aims to increase prosperity through economic activity.
2. Managing scenario: Environmental and social risks are considered as high and economic risks (changes in production and consumption patterns) are considered also high. Policy aims to change technological patterns towards cleaner production technologies and materials and thus achieve environmental and social objectives.
3. Safeguarding scenario: Environmental and social risks are regarded as very high, while economic risks as low. Policy aims to avoid environmental costs and technology policy is directed mainly towards renewable resources and energies.

Long-term effects of each scenario have been assessed using long-term global models. The relevance of such an exercise lies in its ability to identify main economic, social and environmental effects depending on the way risk is approached (FPB 1999).

In the second Federal Report (2003) the aforementioned approach was complemented with a systematic conceptual framework based on the analysis of complex systems. Rather than being based on the risk perception as in the first report, the three scenarios used in the second federal report were based on the different visions of policies necessary to steer the society towards SD (FPB 2003). A series of topics (e.g. energy production and consumption, marine biodiversity, health at work, tobacco consumption) were then integrated into this conceptual framework.

The third Federal Report (2005) employs backcasting as a method for scenario development. It starts from a vision of a desirable future in 2050, describes it in terms of long-term objectives and examines the possible ways to achieve it, including e.g. the role of international agreements.

All three reports share several characteristics. Firstly, they do not favour a specific view but rather aim to show various future states and the implications for government policies for achieving a more sustainable path. Secondly, they address SD as a cross-disciplinary issue, involving all three pillars. However, the Federal Reports still do not fulfil all functions that scenarios could fulfil in the policy-making process. For example, due to the lack of cooperation between the Taskforce on SD (responsible for foresight studies) and the institutions responsible for policy planning (such as the ICSD), scenario results are currently not efficiently fed into the policy-making cycle. The Belgian Federal Parliament is currently working on a revision of the 1997 federal SD policy law in order to reform the long-term planning process and make it more efficient with existing

structures and institutions. The third 4-year Federal Plan will be published only after the new law on long-term planning will be accepted by the parliament.[16]

3.2.2 Getting into the right lane for EU 2050

The Netherlands Environmental Assessment Agency and the Stockholm Resilience Centre have prepared an important report on the future of the EU in 2050, entitled "Getting into the Right Lane for EU 2050". It examines EU policy challenges until 2050 from a global perspective. It is supplemented by a background paper titled "Adapting EU Governance for a More Sustainable Future", issued by the Netherlands Environmental Assessment Agency. The paper analyses and describes the necessary adjustment and reform to the current EU governance structures and institutions in order to reach the vision mentioned in the first study. These two publications will be outlined shortly in this section.

3.2.2.1   Institutional Setup

The Netherlands Environmental Assessment Agency (NEAA) is the Dutch national institute for strategic policy analysis in the field of environment, nature and spatial planning. It focuses on policy-relevant research primarily for strategic decision-making by the Dutch Government, i.e. on long-term objectives and the policy instruments needed to achieve them.

The Stockholm Resilience Centre is a new international centre that advances transdisciplinary research for governance of social-ecological systems with a special emphasis on resilience, the ability to deal with change and continue to develop.

3.2.2.2   Focus of the report: three key visions

The aim of the report *Getting into the Right Lane for 2050* is to develop a visionary foresight for EU 2050 in a global perspective, focusing on sustainable development in specific three topics: land resources, food and biodiversity, energy and climate change, and transport and mobility. It starts with an SD vision for Europe in 2050, backcasting to the present and identifying key policy junctions at which EU will soon face strategic choices. The study aims to contribute to the political debate, especially now as the new European Commission is being formed, political agenda for the coming years is formulated and economic stimuli are revisited.

The report is intended to be the first in a series of reports on different spatial perspectives (global, regional and national). The second report entitled Growing within

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[16] Interview with Dieter Van der Beke working in the Federal Public Planning Service for Sustainable Development and also an ESDN Steering Member, 12.02.2010

Limits revisits resource issues from a global perspective, and the third report shall address pathways toward SD for the Netherlands.

A visionary agenda and pathways for EU 2050 have been developed in relation to three themes: *land resources, food and biodiversity; energy and climate change and transport and mobility in relation to low-carbon economy*. These three themes represent also cornerstones of sustainable development and are in line with key challenges identified in environmental assessments (IPPC 2007; OECD 2008; UNEP 2007; IAASTD 2009).Form the vision in each of the key topics, backcasting is used as method for describing the pathways, how to move towards the specific visionary goals.

The vision for the topic **land resources, food and biodiversity** is "to be able to produce food for nine billion people, while minimising impacts on ecosystems and halting biodiversity loss before 2030" (NEAA 2009a). For enabling this vision, increased agricultural productivity by investing in technology and diversified agriculture in EU, lower demand for animal products and reduced food losses are necessary. Strategic issues include the future system of agricultural subsidies, renewed impetus for biodiversity objectives, and the value of natural resources and ecosystem goods and services. For attaining the goal in 2050 more policy coherence should be aimed between the diverse programmes and strategies at the EU level in this area (i.e. Common Agricultural Policy post-2013, raw material strategy to be presented by the end of 2010).

The vision for the topic **energy and climate change** is that of a low-carbon energy system: an 80% reduction of 1990 levels in energy-related carbon dioxide emissions within the EU (ibid.). In ensuring a clean, affordable energy and securing energy supply towards 2050, the EU faces two key challenges – climate change and security of supply from imports. Major developments are needed in three areas: (1) technology development and deployment; (2) infrastructure development and adjustment; (3) a coherent framework of policies and institutions. In addition, global agreements on climate change are still needed.

The vision for the topic **transport and mobility** is to achieve low-carbon transport and reduce transport emissions by 80% by 2050 (compared to 1990 levels). The key challenges in attaining this vision include increasing greenhouse gas emissions from transport (increased by 27% over the period from 1990 to 2006), high energy consumption, high dependency/vulnerability of transport to unexpected changes in key external factors (particularly energy security) and increasing societal costs of transport due to climate change, congestion and noise (ibid.). The pathways to a low-carbon transport in 2050 include measures oriented towards development of low-carbon technologies, improvement of energy and logistic efficiency and transport modal shifts.

3.2.2.3 Focus of the background paper: governance structures

The background paper, published in October 2009, analyses the EU's capability of achieving the three EU 2050 visions described above in terms of governance and

institutional issues (such as administrative capacity choice of policy instruments, legitimacy of policy actions, diplomatic capacity). The paper identifies several internal and external governance structure challenges (see Table 1).

Table 1: EU internal and external governance challenges for Getting into the right lane for 2050

Internal governance challenges:	External governance challenges:
(1) *More EU decision powers* in some areas are needed for developing and deciding on set of policies in the field of energy, land use and transport. (2) *Improvement of policy coherence* between environmental policy and other domains (transport, agriculture and energy) and between environment and poverty reduction into EU policies (such as aid, trade and security) is needed. (3) *New policy instruments* are needed for reaching long-term targets (2030-2050), such as financial incentives in the form of taxation (carbon or energy taxes) and subsidies. (4) *EU budget* should be geared towards *more sustainability objectives*, as the 1% of Gross National Product may not be enough to support a common European transition towards more sustainability objectives.	(1) *European leadership can make a difference* in finding multilateral solutions and emphasising the importance it attaches to SD. (2) *Further alignment of EU external policies* and SD objectives at the political level is required. (3) *Speaking with one voice would be beneficial*, as the EU's ability to promote sustainable development objectives outside the EU is undermined by the use of different modes for external representation on various international issues. (4) *EU sustainable development policies can set global standards*. (5) *Sustainable development objectives can be mainstreamed further.* Sustainable development objectives could be further integrated into EU aid and trade policy. (6) *Resources and funding* to international environmental initiatives *need to be scaled up.*

Source: Van Schaik et al. 2009

The background paper identifies four various scenarios of possible future roles of the EU in the world in relation to these challenges. These are (Van Schaik et al. 2009):

Europe is a superpower, where international cooperation flourishes with a strong focus on public responsibilities for SD, the EU can lead the world as a 'sustainability force', a new SDS will guide policy development in the European Commission, and at the global level trade is made "pro-poor and green" (ibid.). EU will act in the international organization as representing all Member States. It is obvious that for future development this scenario may be "most beneficial to the EU's SD agenda", although the other scenarios my also become true.

Europe is globalised, where a high level of international cooperation with a strong focus on trade and foreign investments is reached, economic globalisation is the main driving force with externally the EU selectively looks after its own interests on global markets and internally becomes a pan-European free trade zone, where a new Lisbon Strategy will guide policy development in the European Commission while the EU is reactive to

environmental issues and policy coherence is needed in order to support economic interest, and at the global level the EU will focus on seeking multilateral solutions in order to address important market and private sector issues (ibid.).

Europe is mercantilist, where in a world characterised by rivalry international cooperation is limited and further global economic integration will come to a halt. In this scenario, trans-national cooperation will be possible only with some countries (e.g. the USA) and the EU develops into a trade block with the aim of preserving its own social security and ecological standards. Protection of national interests will play a high role, further EU enlargement (with the possible exception of Balkan countries and Iceland) is halted and EU governance will not be further reformed. European policies are aimed to strengthen 'self-sufficiency' (ibid.).

Irrelevant Europe implies that Europe is not able to profit form the benefits of economic integration due to its isolation from global politics. The EU is described as a "medieval state" where various legal, economic, security and cultural spaces co-exist with cooperation on national and regional levels. In the global arena EU member states build coalitions with other regions to influence global processes as the EU is not able to support multilateral cooperation (ibid.).

3.3 Environmental outlooks and strategic environmental challenges

In this section we are going to focus on two Environmental Outlooks produced by the OECD and the UNDP, respectively. The OECD Environmental Outlook, focused to a higher extent on the economic dimension of environment and environmental policies, differs from the UNEP Environmental Outlook also in its emphasis on a single baseline reference scenario against which specific policy simulations are compared for the purpose of policy analysis. UNEP's Outlook in contrast explores a range of four possible scenarios which provide a useful communication tool to illustrate the range of possible futures available, but are less amenable to the analysis of specific policy options. A shared conclusion of both Outlooks is that policy action now is cheaper than waiting for better solutions to emerge.

3.3.1 OECD Environmental Outlook

The purpose of the *OECD Environmental Outlook* is to help government policy-makers to identify the key environmental challenges they face, and to understand the economic and environmental implications of the policies that could be used to address those challenges. The aim is to provide more exact analysis of policy packages and of the costs and benefits of environmental policies. Consequently, this would help policy-makers take better, more informed policy decisions now.

The OECD has published two Environmental Outlooks so far: the 2001 OECD Environmental Outlook to 2020 (see also OECD 2001b), which provided the analytical basis for the OECD Environmental Strategy for the First Decade of the 21st Century, and the 2008 OECD Environmental Outlook to 2030. Both of them address mainly the OECD member countries, with a vision (until 2020 or 2030, respectively) based on economic performance, and both identify drivers of environmental change, sectors with highest pressure on the environment, and the resulting environmental impacts.

The 2008 Environmental Outlook was released at about the same time as a number of other forward-looking environmental analyses, such as UNEP's Fourth Global Environment Outlook (GEO-4; see below); the IPCC Fourth Assessment Report (AR-4); the International Assessment of Agricultural Science and Technology for Development supported by the World Bank, FAO and UNEP; and the CGIAR Comprehensive Assessment of Water Use in Agriculture. Through regular meetings and contacts, efforts have been made by the organisations working on these reports to ensure co-ordination and complementarity and avoid overlap.

The OECD Environmental Outlook 2008 includes the priority issues of climate change, biodiversity loss, water scarcity and health, and the key sectors exerting pressure on the environment (agriculture, energy and transport). The later, 2008, Outlook includes also simulation of the potential environmental, economic and social impacts of various policy actions based on a single-baseline and policy-neutral reference scenario. This scenario indicates what the world would be like to 2030 if currently existing policies were maintained, but no new policies were introduced to protect the environment. It identifies key environmental challenges for the future, presented as 'traffic lights' (see Figure 5). It also analyses drivers for environmental change in the area of consumption and production, technology, population dynamics and demographics, economic development and urbanization.

Figure 6: The OECD Environmental Outlook to 2030: challenges and drivers

	[Green Light]	[Yellow Light]	[Red Light]
Climate change		• Declining GHG emissions per unit of GDP	• Global GHG emissions • Increasing evidence of an already changing climate
Biodiversity & renewable natural resources	• Forested area in OECD countries	• Forest management • Protected areas	• Ecosystem quality • Species loss • Invasive alien species • Tropical forests • Illegal logging • Ecosystem fragmentation
Water	• Point-source water pollution in OECD countries (industry, municipalities)	• Surface water quality and wastewater treatment	• Water scarcity • Groundwater quality • Agricultural water use & pollution
Air quality	• OECD country SO_2 & NOx emissions	• PM & ground-level ozone • Road transport emissions	• Urban air quality
Waste & hazardous chemicals	• Waste management in OECD countries • OECD country emissions of CFCs	• Municipal waste generation • Developing country emissions of CFCs	• Hazardous waste management and transportation • Waste management in developing countries • Chemicals in the environment and in products

Source: OECD 2008b

Explanation: *Green light* = environmental issues which are being well managed, or for which there have been significant improvements in management in recent years but for which countries should remain vigilant. *Yellow light* = environmental issues which remain a challenge but for which management is improving, or for which current state is uncertain, or which have been well managed in the past but are less so now. *Red light* = environmental issues which are not well managed, are in a bad or worsening state, and which require urgent attention. All trends are global, unless otherwise specified.

3.3.1.1 Policy responses and governance implications for the future

The Environmental Outlook finds that the solutions to most pressing environmental problems such as climate change, biodiversity loss, water scarcity and health impacts of pollution are affordable and available if ambitious policy action is implemented today, and if countries work together in partnership to ensure comprehensive action (OECD 2008a). Ambitious policy actions to protect the environment can increase the efficiency of the economy and reduce health costs. In the long term, the benefits of early action on many environmental challenges are likely to outweigh the costs. Global 'OECD Environmental Outlook policy package' (a mix of complementary policies to tackle the most complex environmental problems in a cost-effective way with a strong emphasis on market-based instruments) was applied to show that, by combining specific policy actions, "some of the key environmental challenges can be addressed at a cost of just over 1% of world GDP in 2030, or about 0.03 percentage points lower average annual GDP growth to 2030" (OECD 2008b). As it seems, costs of those environmental policies measured in decline on GDP growth should not be an obstacle for the implementation of ambitious environmental policies. However, Environmental Outlook suggests that if no new policy actions are undertaken to tackle the environmental challenges, the critical issues (in the red light column) will worsen further.

3.3.2 UNEP Environmental Outlook: Global Environmental Outlook GEO-4

The fourth UNEP's Global Environment Outlook titled *Environment for Development (GEO-4)* identifies the key challenges and describes the state and trends from the years of 1987 to 2007 in all relevant environmental sectors (atmosphere, land, water, biodiversity, vulnerability of people from environmental challenges). It places sustainable development at the core of the assessment, particularly through issues dealing with intra- and inter-generational equity.

GEO-4 builds 4 scenarios to explore future alternatives for sustainable development up to 2050 titled 'Markets First', 'Policy First', 'Security First' and 'Sustainability First'. On their basis it explores how current social, economic and environmental trends may unfold, and what are the implication for the environment and human well-being. In addition, the scenarios examine different policy approaches and societal choices, i.e. the different pathways and futures that might be taken by societies in individual regions and the impacts of the various drivers. They are presented using narrative storylines and quantitative data at both global and regional levels. Each scenario outlines a pathway into the future up to the year 2050, shaped by divergent assumptions about actions, approaches, and choices. The analyses highlight the need and usefulness of valuation of environmental goods and services, and the role of such services in enhancing development and human well-being.

3.3.2.1   Governance and policy options for the future

The UNEP's GEO-4 suggests that in order to pursue a more sustainable path it is necessary to strengthen inter-linkages between policies and various environmental issues (air and water pollution, land degradation, climate change, biodiversity loss, and valuing ecosystems goods and services), i.e. increase integration of policies across levels, sectors, and time, strengthen local rights, build capacity among a wide range of groups in society and improve scientific understanding. Moreover, inter-linkages between environmental and development issues (poverty and hunger, implementation of the MDGs, addressing human vulnerability and well-being) should also be strengthened.

The proposed environmental policy agenda for the next 20 years and beyond has two tracks (UNEP 2007):
- expanding and adapting proven policy approaches to the more conventional environmental problems, especially in lagging countries and regions; and
- urgently finding possible solutions for the emerging environmental problems before they reach irreversible turning points.

4. Conclusions

The socio-economic transition of European countries towards a path of a more sustainable development is characterized by great uncertainty and several conflicts at the policy level (Rotmans et al. 2000). Sustainable development is a project requiring a long-term vision of the future and new approaches and tools to handle the "interface between short-term and long-term, the objective and value-laden, the quantitative and qualitative and the certain and uncertain" (ibid.). The examples offered in this report intend to show national- and international-level initiatives where futures studies (tools of horizon scans, scenarios and environmental outlooks) have been employed successfully and integrated in the policy-making process, and we suggest that these tools are well-capable of supporting governance for SD.

Scenarios and foresight studies have so far focused on specific themes, sectors or policy domains and in their specific contexts have proven their usefulness. The foresight programmes of both the Netherlands and the UK have proved to be effective in informing governmental strategic policy-making. Especially noteworthy is that in the UK the programme covers the whole spectrum of a comprehensive foresight process (from early detection and generation of foresight knowledge to the development of policy options in the form of action plans). Nonetheless, their deployment in an integrative and comprehensive manner required for SD has yet to be seen. Foresight has continually broadened its scope from technology to environmental policy and integrated a cross-sectoral approach, but it still puts emphasis on science & technology and innovation (although innovation entails opportunities to tackle societal and environmental challenges). The foresight study on SD from the NEEA is a first attempt in integrating all relevant SD topics in one futures study.

Apart of foresight, scenarios are informing decision making to help policy makers choose the most desirable future. Scenarios have been used in preparation of the biannual Belgian Federal Reports on SD developed by the Federal Planning Bureau, which form an element of the Belgian SD strategy cycle. The report *Getting into the Right Lane for EU 2050* by the Netherlands Environmental Assessment Agency and the Stockholm Resilience Centre, OECD's Environmental Outlook and UNEP's Environmental Outlook also use scenarios in different ways to chart pathways into the future.

Proper institutional and policy cycle integration seem to be key for the success of futures studies, as well as participation of stakeholders from a range of departments and societal groups. Futures studies are also sensitive on the quality of input and therefore best available evidence and appropriate methods should be used. Will of the policy makers to absorb the outcomes of the futures studies and use them as roadmaps also seems to be critical for the role of futures studies.

On the one hand, an especially vital role of futures studies for SD governance could be to develop a sustainable future of Europe based on a long-term vision (the 'EU2050'), identification of its 'safe operating space' (Rockström et al. 2009) within the planetary carrying capacity and a development of global development scenarios, which could then, with the right institutional support and societal commitment, be translated to mid- and short-term measures at national and sub-national levels. On the other hand, due to the complexity and multi-scale character of SD we should not expect that one overarching SD policy process, even with integrated futures studies, will be sufficient, and we also cannot completely discount the concern that with thus enlarged context futures studies will not be able to provide a coherent narrative for decision-making for SD. But aside of the usability of its output, such a process would still be vital for the positive effects stemming from the process itself in the sense of building societal legitimacy for steering and developing commitments (cf. the ESDN Quarterly Report on participatory mechanisms in national SD strategies from September 2008). In addition it also seems that futures studies could support the attempts to develop linkages of coherence among strategy processes across time, space, political-administrative levels, policy areas/sectors, policy issues and societal actors (including horizontal and vertical policy integration and e.g. clarifying and strengthening the link between the EU2020 and EU SDS/'EU2050' strategies).

Collectively, the described tools address many of the characteristics of SD governance described above. They support involvement of stakeholders from both within and outside of the political-administrative hierarchy (for example, foresight seems to require a cross-departmental and cross-sectoral approach) and in contrast to traditionally used participation tools they support involvement especially in the early phases of policy making. Due to the strong focus on evidence they bridge the science-policy gap. By examining various images and options of the future as well as enabling to discuss their normative basis they also support **pluralism**. They serve not only to elicit values and legitimize decision making, but to access knowledge and resources and get the whole society 'on board'. These tools therefore seem to address the SD governance challenge of **interactionism** very well.

As suggested in the first section, **uncertainty** seems to be the core challenge in governing complex systems. Foresight and scenario planning help policy makers tackle uncertainty by enabling to look ahead strategically, make better sense of changes in the external environment and reduce 'surprises' by spotting changes through early warning signals. As such they increase room for manoeuvre and improve the overall flexibility of governance. Moreover, these tools support **long-term thinking** by expanding the time horizon of policy making and enabling to identify optimal pathways through backcasting from a vision of the future. By their very nature they also support **reflexivity** – they are useful for not only informing policy makers, but also in acting as drivers for "reflexive social learning processes" and as mechanisms for policy learning and evaluation, especially through identification of potential consequences of policy scenarios. If they

become continuous and iterative processes they even strongly ensure **adaptive flexibility**. Through developing cross-organisational linkages and addressing the multi-scale character of SD issues these tools also support a **holistic approach**, **polycentricity** and vertical and horizontal policy coherence.

It remains to be seen whether the implications of SD being a complex issue of a whole-societal character and serving as meta-objective of policy would require a specific (methodological or procedural) approach towards futures studies and whether we, similarly to 'governance for SD' or 'evaluation for SD', will see an adaptation of existing tools and emergence of new tools in the direction of a future field of 'futures studies for SD'.

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Interviews

Interview with Dieter Van der Beke working in the Federal Public Planning Service for Sustainable Development and also an ESDN Steering Member, 12.02.2010