Government expert organisations in-between logics

Practising participatory knowledge production at the PBL Netherlands Environmental Assessment Agency

Eva-Maria Kunseler

The studies in this thesis have been carried out at the PBL Netherlands Environmental Assessment Agency, the Netherlands.

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Eva-Maria Kunseler

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1.

General introduction

1.1 Blog[1] on energetic science

PBL is a frontrunner in the development of novel, open and transparent science. Our assessments are internationally renowned, and have proven to be robust, because we assure our up-to-date knowledge on methods and uncertainties. The utilisation of [open assessment] methods [within the organisation] and [reflection on] our positioning at the 'science–policy interface' receives less attention but would deserve it.

Two times we needed a crisis. The 'de Kwaadsteniet' affair resulted in a novel approach to uncertainties and modelling; the IPCC crisis generated a novel vision on an 'open assessment procedure'.

[…]

It is of utmost importance to utilise this novel approach. At this moment, scientists are almost absent in the political arena […] By identifying, weighing and refuting arguments where needed, we can play a very important role as science-policy interface. I am glad that we invest in this.

Maarten Hajer, 7 November 2011

This blog of former Director Maarten Hajer (2008-2015) of the PBL Netherlands Environmental Assessment Agency[2] illustrates his view on what counts as 'good' advice and on what counts as the agency's legitimate role at the science–policy interface. He mentions the reputation of PBL's (international) assessments and assumes that PBL's efforts in developing novel, open and transparent science has contributed to the robustness hereof. In his view, the agency's successful combination is that of being an established legal authority that succeeds in creating authority in concrete situations supported by novel methods and procedures (see also Hajer, 2012). The accumulation of authority over time enables PBL to enact an influential and credible role at the Dutch science-policy interface. When credibility has been contested in the past, this has led PBL to formulate novel strategies and procedures to deal with complex environmental policy issues marked by uncertainties and value differences in contested political settings.

At the time this blog was posted, I had been working at PBL for almost four years. I had just started my PhD research under the auspices of the open assessment methodology programme[3] to theorise my experiences with stakeholder participation in PBL projects. The blog subscribed to my methodological aspirations to internalise participatory approaches within PBL's environmental policy assessment repertoire. Participation has been introduced at PBL as a means of reflexively dealing with uncertainty by involving external actors in the assessment process (Hage et al., 2010). The theory is captured within guidance documents for uncertainty assessment and communication (Petersen et al., 2013) and for stakeholder participation (Hage and Leroy, 2008).

Overall, these methodological developments at PBL can be appreciated in the wider context of a call for reflexive science. Reflexive science is promoted by scholars from

[1] This blog was posted on an internal website for PBL employees.
[2] in Dutch: *Planbureau voor de Leefomgeving;* a literal translation of this name would be 'planning bureau for the living environment'; further abbreviated to PBL.
[3] PBL's open assessment methodology programme attends to the role of uncertainties and values, and reflects on assumptions and normative choices in PBL's assessment practices.

various disciplinary backgrounds[4], all being concerned with the role of knowledge in policy processes. The basic premise of reflexive science is that it appreciates the limits of science in providing unquestionable authoritative understanding of complex 'unstructured' problems in society (Jasanoff, 2003; Sarewitz, 2011). Unstructured problems are characterised by an inconclusive knowledge base and various and conflicting values and perspectives on which knowledge (and policy) is needed to define, structure and solve these problems (Hisschemöller and Hoppe, 1996). Climate change is the classical example: knowledge about the origins and effects of climate change is inconclusive and the desirable course of action is informed by controversy over values (e.g. economy first vs. ecology first) and interests. A reflexive orientation to such problems is informed by an attitude of humility (Jasanoff, 2003). Humility brings in the acknowledgement of the limits of one's own viewpoint and the appreciation of alternative viewpoints. Experts have to become more aware of the social and moral implications of their own representations and of the disciplinary, institutional and cultural frameworks they are embedded in. In order to synthesise the understanding of a given problem from different (disciplinary and practical) perspectives, knowledge is best produced interactively across knowledgeable actors in the field. By emphasising humility, reflexivity and participation, a reflexive science induces new epistemic and social understandings of what scientific advice entails (Jasanoff, 2005b): on what counts as 'good' advice and on what counts as the legitimate role of scientific advisers.

In the PBL organisation the implementation of more reflexive ways of working has been identified as crucial for maintaining its credibility and influence as an authority at the science–policy interface, especially under unstructured problem conditions and a shift towards multi-actor and multi-level governance. At the same time, implementation is identified as a huge challenge: PBL researchers lack a shared understanding of the underlying theory of the guidances, and encounter frictions with institutionalised expectations and ways of working (Hage et al., 2010; Petersen et al., 2011). The actual mode of working at PBL is largely informed by modernist logic, which is implicated in the Dutch planning bureau model (Halffman and Hoppe, 2005). Modernist logic embodies technocratic beliefs in the value freedom of scientific knowledge and the disinterestedness or political neutrality of scientists (Weingart, 1999). Even when novel, more reflexive ways of working are introduced in these settings, they tend to become encapsulated within expert-driven technocratic ways of working (Regeer and Bunders, 2009). Scholars in science–policy studies have pointed out how, in practice, therefore, innovative attempts like transdisciplinary research or participatory assessment appear to deviate little from, and can even reinforce, a technocratic style of working (Reinecke, 2015; Turnhout et al., 2013). Experts tend to "do […] more of the same under a different name" (Van der Hel, 2016: 173). Thus, while experts have started talking about how to reform technocratic frameworks of expertise, they hardly seem to have succeeded in practice (Turnhout et al., 2016).

[4] The field of science–policy studies is largely composed of and influenced by scholarly work in the sociology of science (e.g. Giddens, 1990; Beck et al., 1994; Nowotny et al., 2001), in political sciences (e.g. Hajer and Wagenaar, 2003; Fischer, 2009), in science and technology studies (e.g. Knorr-Cetina 1981; Gieryn, 1983; Latour, 1987; Jasanoff, 2004) and in policy sciences (e.g. Funtowicz and Ravetz, 1993; Hoppe 2009a).

1.2 Research focus

In this thesis, I employ a practice perspective to explore how scientific advisers mobilise modernist and reflexive logic interchangeably, which effects (i.e. challenges and dilemmas) this produces and how these effects are being anticipated. I essentially focus on what scientific policy advisers count as being scientifically sound, policy-relevant and independent advice. These core values guide their practice, but under co-existing logic the interpretations and perceptions attributed to these values differ, giving way to variations among experts' understanding of the relation between knowledge production and use, their legitimate position, scope of activities as well as particular challenges faced (Turnhout et al., 2013). I conduct this study in an institutional setting of a government expert organisation[5], the PBL Netherlands Environmental Assessment Agency. The agency explicitly conveys its reflexive aspirations while it has been established under a modernist paradigm of scientific knowledge production. I reveal how practitioners in this agency manage to work in-between logics.

The institutional setting of a government expert organisation is particularly suitable for asking how practitioners operate in-between logics for two reasons. First of all, the staff of these organisations is used to anticipate contradictory demands because of their dual function at the science–policy interface. In scientific terms government scientific advisers have to assure a valid and sound science and in political terms they have to assure the policy relevance and acceptability of their advice. Implicated in the dual – scientific and political – nature of government scientific advice is the problem of dual accountability (Jasanoff, 2011). On the one hand, government expert organisations are accountable to the world of science, to produce sound knowledge in line with quality standards of rigour, autonomy and policy detachment. They are accountable to the world of politics, on the other hand, to assure connectivity to political interests and policy developments as to ensure their advice meets the needs of their audiences (Lentsch and Weingart, 2011). In organisational and financial terms, government expert organisations are unavoidably bounded to their policy clients, whilst their scientific autonomy is highly important to ensure trust in independent and critical advice (OECD, 2016). The dualistic nature of government scientific advice is strikingly captured by Jasanoff (1990) with the term 'serviceable truth': expert agencies have to generate "a state of knowledge that satisfies tests of scientific acceptability and supports reasoned decision making, but also assures those exposed to risk that their interests have not been sacrificed on the altar of an impossible scientific certainty"(p.250).

A second reason, emerging from the former, is that the credibility and influence of these organisations largely depends on the way they manage to successfully anticipate frictions that inevitably arise from these contradictory demands. Their authority depends on the way they manage to interrelate the various demands and expectations under a convincing impression of relevant, independent and sound advice (Hajer, 2009). Especially under circumstances marked by value conflicts, uncertainties and high decision stakes even the slightest impression of a partisan position at the expense of an impossible certainty can be problematised and lead to contestations over the quality of advice and legitimacy of expert advisers. This situation in scientific advice to governments is identified as the 'paradox of scientific authority' (Bijker et al., 2009;

[5] Government expert organisations are defined in this thesis as statutory bodies which perform their internal operations independently, particularly from their clients. Their activities are grounded in or based upon scientific expertise. Their mandate essentially comprises advising the legislative or the executive on science-related policy issues (Lentsch and Weingart, 2011: 354).

Gluckman and Wilsdon, 2016). The paradox here is that scientific policy advisers are increasingly expected to 'solve' unstructured problems, but are unavoidably exposed to public criticism on the credibility of their advice. This paradox has puzzled many scholars in science–policy studies (Beck et al., 1994; Giddens, 1990; Weingart, 1999; Bijker et al., 2009; Jasanoff, 2005b; Wynne, 1993; Dijstelbloem and Hagendijk, 2011; Jasanoff, 2006). One of the critical issues, in their view, is the lack of trust in experts' detached, privileged and objective status, accompanied with the growing public alienation to 'techno-bureaucratic' institutions. Whilst experts apparently represent the scientific framings of an issue, social meanings are inevitably imposed by such framings. In this way, experts tend to narrow down the normative discussion and neglect the broader implications of an issue for society (Fischer, 2009; Wynne, 2006). Publics, accordingly, question the political role of institutions that generate those scientific framings (e.g. the IPCC in the field of climate science and politics), especially when they feel a lack of connectivity to their own values and concerns. On the other hand, scientific advice is still crucially important as one element in the governance of problems and policy-makers do not abandon their reliance on expert bodies. In view of Weingart (1999): "[t]here is no alternative to using scientific expertise to give political decisions an instrumentally more reliable base and provide them with a higher legitimacy, even if uncertainty is encountered. Thus, the science–politics link is firmly institutionalised and not likely to change fundamentally or disappear" (p.159). The rich body of social constructionist studies on knowledge production illustrates that the basic premises underneath modernist foundations of expert agencies do not hold in empirical settings, such as the linear 'get the facts right, then act' conception of science–policy interactions and the value-free nature of scientific knowledge (Latour, 1987; Knorr-Cetina, 1981). Nonetheless, established beliefs in these modern ideals are hardly abandoned. Quality standards of 'detached, scientific and objective' advice and the 'speaking truth to power' ideal of science in politics are very persistent (Weingart 1999).

I use PBL as a paradigmatic case for government expert organisations that operate under co-existing reflexive and modernist logics. PBL is established under a modernist paradigm of scientific knowledge production but explicitly attempts to come to grips with the call for a reflexive science[6]. This development raises epistemic and institutional challenges as the empirical studies of Hage et al. (2010) and Petersen et al. (2011) have pointed out. PBL is a government-funded expert organisation in the Netherlands. Its 250 fte staff (of which approximately 200 fte researchers) aims to produce policy-relevant studies in an independent and scientifically sound manner in the domain of spatial planning, nature and environment (PBL, 2017). In my exploration of the PBL organisation I will focus on case settings where PBL practitioners attempt to connect novel, participatory forms of knowledge production to their traditional assessment repertoires. New concepts, ideas and methodologies for participatory knowledge production have found to challenge traditional research cultures in environmental expert settings (Van der Hel, 2016; Beck et al., 2014; Lövbrand, 2011). Such innovative participatory attempts in the PBL organisation are therefore likely to be highly prone to frictions between modernist logic and reflexive logic.

[6] PBL is in the process of developing its vision for 2025. The draft vision attends to issues of normativity, credibility contestations, method and product innovation and PBL's role in multi-actor and multi-level governance settings (PBL, 2016). Prominently featuring such issues in a vision document indicates how PBL's strategic agenda for future profiling and organisational priority-setting is informed by reflexive logic.

The qualities and competences of researchers have been identified as crucially important for a successful alignment of different knowledge cultures (Regeer and Bunders, 2009). As yet there appears to be limited attention in academic studies to the practical experiences and concerns of the researchers working in government expert organisations. It therefore appears sensible to connect to the life-world of these 'practitioners' who operate in-between logics on a daily basis. What matters to them? What are they worried about? If we apply the lens of practice, which more nuanced picture emerges of what it means to produce government scientific advice in-between logics?

1.3 Research questions and aims

This thesis is about the everyday practice of scientific advice to governments. More precisely, this thesis centers on the life-world of practitioners at a government expert organisation who find themselves in-between logics: they are inclined to adopt more reflexive ways of working, while they are bounded by modernist structures, norms and ways of working.

The main question this study attempts to answer is the following:

RQ. How do environmental experts at the PBL work under co-existing modernist and reflexive logics?

This question is divided into more operational sub-questions. First, I aim to get a picture of the practical concerns which govern and affect PBL practitioners in their day-to-day work. I focus on assessment settings where PBL practitioners attempt to connect participatory forms of knowledge production to their traditional assessment repertoires. In these settings, tensions and frictions over how to work in-between logics are most likely to emerge. This leads to the first sub-question:

1. *Which practical concerns arise when PBL practitioners attempt to connect participatory forms of knowledge production to their traditional assessment repertoires?*

Second, one way or the other, inconsistencies between co-existing logics are being anticipated in particular ways. They are coped with, knowing that the different expectations and demands on what counts as policy-relevant, scientifically sound and independent advice are likely to remain co-existent. This leads to the second sub-question:

2. *How do PBL practitioners cope with co-existing logics in their day-to-day work?*

This thesis aims to contribute to ongoing academic debate in science–policy studies about the paradox of scientific authority by exploring the paradox from within: at a government expert organisation where environmental experts have actively started questioning, challenging and innovating their practices inspired by changing governance dynamics, complex problems, incidents or credibility crises, while they aim to safeguard their credibility and influence as an authoritative agency at the science–policy interface. For this purpose I use the lens of practice to concentrate on how practitioners at the PBL Netherlands Environmental Assessment Agency work under co-existing logics. In this way, this thesis aims to go beyond explanations that point to tensions or frictions emerging under co-existing modernist and reflexive logics, but that hardly come to grips with what they mean and imply for practitioners 'doing' science advising.

1.4 Outline of this thesis

Chapter 2 summarises the scholarly work on scientific advice to governments and the functioning of government expert organisations at the science–policy interface. In chapter 3 I explain the research design of my practice approach and explicitly attend to my role as researcher-practitioner. Chapter 4 introduces the PBL organisation at the nexus of its past and future.

In chapters 5 to 9, I report the findings of my empirical studies of practitioners' everyday operation under co-existing logics. Each chapter takes a different angle on the practical concerns that emerge during attempts of advancing participatory knowledge production in the PBL organisation. These chapters have been published as self-standing papers in different journals.

Chapter 10 summarises the main findings from the papers and answers the research questions. In chapter 11 I discuss the theoretical contributions of my research and identify practical implications for researchers in government expert organisations.

2.

Theoretical background

2.1 Scientific advice to governments

The subject of scientific advice to governments and the roles and activities of experts and government expert organisations have become an important area of study and theorising in science–policy studies. This area of social constructionist research is associated with a range of studies that have developed conceptual insights and have offered descriptive, as well as critical and analytical accounts of the functioning of experts and organisations at the science–policy interface. I take as my point of departure the studies that focused on the boundary work performed in interactions between scientists and policy-makers (see for instance Jasanoff, 1990; Halffman, 2003; Hoppe, 2009a;). Boundary work structures the division of labour between experts and policy-makers. It entails demarcation and coordination activities, in order to protect science from unwanted interference and to define proper interaction between science and policy (Halffman, 2003). These studies show how scientific policy advisers manage to bring the demands of scientific soundness and policy relevance into alignment in a situated manner, by acting responsively to e.g. the nature of the policy problem and stage of the policy process (Hilgartner, 2000; Campbell Keller, 2009; Hoppe, 2009a) within the limits imposed by cultural and institutional arrangements (Jasanoff, 2005a; Renn, 1995; Halffman, 2005). Such studies directed attention to the socially constructed and political dimensions of science–policy interactions. Knowledge and the societal contexts in which it is produced cannot be seen as separate entities but are intertwined at many levels (Jasanoff, 2004).

I draw on these foundations to identify two co-existing logics, which guide scientific advisers in their conceptions of the purpose of their job, the quality principles they intend to adhere to and the roles they intend to perform. These logics are constituted in, and constitutive of wider cultural, institutional, social and epistemic understandings of the nature of science and its role in society.

Section 2.2 explicates how modernist and reflexive logic guide and justify different understandings of what counts as scientifically sound and policy-relevant advice.

Section 2.3 turns to the topic of participatory knowledge production and illuminates the tensions that arise between modernist logic and reflexive logic in practice.

2.2 Logics of scientific advice

How do government expert organisations at science–policy interfaces produce effective knowledge for policy? Providing an answer to this question is guided by ideas on what counts as good advice and what is assumed to be a legitimate role for scientific policy advisers. Such ideas are informed by socially constructed, historical patterns of values, beliefs, and rules by which scientific policy advisers interpret their activities and provide meaning to their social reality. In (neo)institutional theory, these patterns are understood by the concept of 'institutional logic': broader institutional systems shape the cognition and behaviour of actors. Institutional scholars have demonstrated how multiple logics can create diversity in practice by enabling variety in cognitive orientation and contestation over which practices are appropriate (Friedland and Alford, 1991). In the context of my attempt in this section to describe and summarise the theory of science advising I draw on the concept of institutional logic to disentangle and differentiate attributes of two logics informing the practice of advice-giving, which I termed modernist logic and reflexive logic. I have listed the historical foundations of

these logics in table 2.1 in terms of their ontological, epistemological, sociological and political dimensions. In the next two subsections I will explicate these foundations and illustrate how they have informed purposes, roles and quality principles for government scientific advice, which today guide policy-makers, experts and publics in their perceptions of what counts as good advice (see table 2.2).

In my subsequent analyses of everyday practices of government scientific advice, I explicitly distance myself from the institutional school of thought and show affinity to the notion of logic as it has been introduced in practice theory (see section 3.1).

Table 2.1 *Foundations of modernist logic and reflexive logic*

	Ontological foundations	**Epistemological foundations**	**Sociological foundations**	**Political foundations**
Modernist logic	Reality as singular, one-sided, universal	(Logical) positivism; emphasis on reality as objectively knowable (empiricism, reductionism, scientism)	Modernisation; social progress and technological optimism; science and technology solve societal and environmental problems	State-centred society; hierarchical policy processes; technocratic and bureaucratic relations between expertise and policy
Reflexive logic	Reality as pluralistic, perspectival, constructed	Social constructivism; emphasis on reality as constructed (pluralism, relativism)	Reflexive modernisation; awareness of social complexity of environmental problems; science is responsive to societal needs to generate applicable, integrated and robust knowledge	Network society/ mode-2 society; open, flexible multi-level and multi-actor governance networks; deliberative relations between expertise and policy

2.2.1 Modernist logic

In socio-historical perspective, the institutionalisation of the function of scientific advice-giving in government expert organisations can be traced back to the political and intellectual currents of the Enlightenment in 18th century Europe (Lentsch and Weingart, 2011). As a political movement, it promoted individual liberty and religious tolerance in opposition to the absolute monarchy of state and church at that time. As intellectual movement it entailed the broad social consensus to use reason, and especially scientific reason, instead of prejudice and religious traditions to guide human action in order to progress towards welfare (Dahler-Larsen, 2012). This historical period, as well as the ensemble of social norms, beliefs and attitudes, is known under the heading of modernity. As a normative ideal, modernity's vision of a society relying on the value-free expertise of intellectuals and scientific innovation is still very much present in contemporary society[7]. I build on the premises of modernity to formulate the attributes of government scientific advice informed by modernist logic, which are summarised in table 2.2.

[7] Giddens (1990) identifies the period of late 20th century until present as the period of 'high modernity' in which the potential for scientific and technological progress is highly reliant on the expertise of scientists, engineers, bureaucrats and other intellectuals.

Modernist logic has become deeply embedded in legal and institutional remits for government expert organisations under influence of three intersecting powerful discourses. The first is technocratic discourse. Government expert organisations are conceived as technocratic enterprises that produce an objective answer to a policy question. They utilise scientific knowledge as primary source to generate instrumental knowledge for use in decision-making. The second is the managerial discourse guiding modern bureaucracies. It is rooted in New Public Management (mid-20th century) and values efficient and effective, well managed, science–policy interfaces: science supplies knowledge on policy demand (McNie, 2007). More recently, a third enveloping discourse on evidence-based/evidence-informed policy tends to re-discipline governing towards the pursuit of measurable targets, control and prediction. Expertise offers rigorously established objective facts in a timely and relevant manner to inform policy-making (Wesselink et al., 2014).

Speaking truth to power

Under modernist logic, scientific advice provides neutral input for policy (Jasanoff, 2011). Clearly, what has to be avoided is that science-based claims are made into objects of political discussion and vice versa, that politics becomes scientised (Cash et al., 2002; Guston, 2001; Pielke Jr., 2007). The scientific enterprise is tasked to progress towards finding a truth. This modernist image of a science 'speaking truth to power' (Wildavsky, 1987) is inspired by a strong belief in 'the scientific method' that produces sound science, that is, positive knowledge of natural phenomena. The school of logical positivism is committed to a reductionist belief that ordering the world is possible, which then leads to a singular knowledge outcome that is accepted as the Truth (until falsified). Scientific experts need to keep sufficient distance from the decision-making processes in which their knowledge is used. The influence of policy-makers and political interest groups on the production of policy-relevant science would make the results less acceptable to a wider range of actors. Yet, a sense of fit to the political and organisational time scales of policy-making is of utmost importance to assure knowledge utilisation (van der Steen and van Twist, 2012). Effective methods of science communication help to ensure that scientific knowledge is meaningfully considered in the policy-making process.

Bridging the gap

Under modernist logic, scientific fact-finding takes shape apart from, and prior to politics where it is decided how to act upon those facts given the social values at stake (Jasanoff, 2011). Knowledge production and use take place in separated domains. The presumption under this view is that science–policy interfaces would not function properly without organisations in place acting as a 'bridge' between the domains of science and policy (see figure 2.1). These 'boundary organisations' provide stability in the often contested boundary area between the political and the scientific domain. Boundary organisations exist at the frontier of the two relatively different social worlds of politics and science, and they have distinct lines of accountability to each (Guston, 1999; Guston, 2001). By stressing the independence of the scientific knowledge production from political processes they assure compliance with both criteria for usable knowledge and with criteria related to the scientific content of knowledge (Lentsch and Weingart, 2011). Under modernist logic, the strategies of boundary organisations are

primarily oriented towards keeping the two worlds apart, e.g. by preventing the strategic use of knowledge and by coordinating the operational misfit between demand for and supply of knowledge (McNie, 2007; Van Enst et al., 2014).

Figure 2.1 *Government expert organisations as a bridge between the science and policy domain (adapted from Turnhout et al., 2007)*

The norm of objectivity

The term 'objective' means, in its dictionary definition, not influenced by personal feelings or opinions in considering and representing facts (Oxford dictionary, 2017a). Objectivity, in other words, roots in the neutrality and autonomy of science itself and underscores the detachment of knowledge-making from its use in politics. In the context of government scientific advice the term objectivity has a dual role in assuring the quality of the knowledge itself and in assuring the quality of the process of knowledge production (Jasanoff, 2011). In this first role, the objectivity rests on a positivist epistemology, that is the default mode of modernist science, with its inherent claim and ambition of science seeking to properly represent nature. Procedures for ensuring the rigour and reliability of science are grounded in professional disciplinary quality norms (Daston and Galison, 2007). In its second role, the connotation of objectivity reflects the process of knowledge-making as an independent and detached activity, not influenced by points of view advocated in political and governance processes. This double objectivity, scientific and political, is achieved in practices of scientific policy advice with the use of credibility-enhancing strategies (e.g. peer review) and appeal to a scientific rhetoric of fact-based and evidence-informed research, in order to serve policy makers and other audiences in rational decision-making (Hilgartner, 2000; Jasanoff, 2011). Institutionalised forms of scientific advice to governments, therefore, routinely commit to objectivity as a central identity norm to ensure that the advice has credibility and influence in society (Bijker et al., 2009; Hilgartner, 2000; Jasanoff, 2005).

2.2.2 Reflexive logic

Under the sociological and political currents of reflexive modernisation (Beck et al., 1994), modernity has become reflexive towards its own foundations, its institutions and principles. The modernist ideal of science and technology progressing linearly towards welfare had demonstrated side-effects and trade-offs, bringing about issues of ambiguity, uncertainty and complexity. In the environmental field, unintended negative health and ecological effects have been associated to the unrestrained use of science and

technologies. Ambiguity, uncertainty and complexity have become inherent features of so-called 'wicked' (Rittel and Webber, 1973) or 'unstructured' problems (Hisschemöller and Hoppe, 1996) in contemporary society. There is no consensus about the facts among scientists and there are various and conflicting values surrounding these problems. Under these problem features, there is no single way of framing a problem, but only a pluralistic conception of reality that inevitably relates to social and political interests and configurations in society. These problem features have been identified as an inevitable part of mode-2 societies (Nowotny et al., 2001) or network societies (Castells, 1996). The interdependencies between elements of complex biophysical, political, institutional, cultural and economic processes and the various actors involved, marks the societal complexity involved in solving such problems. The solution one chooses depends on the problem perspective and framing. Under these conditions, experts have to do justice to wider public responsibilities of science and "try to come to grips with the ragged fringes of human understanding – the unknown, the uncertain, the ambiguous and the uncontrollable" (Jasanoff, 2003: 227). The modern image of science speaking truth to power is not appropriate under these conditions. Experts should instead acknowledge the plurality of problem perspectives and draw on various knowledge forms (e.g. academic, professional, experiental) to understand the complexity involved and become responsive to societal needs to generate knowledge that is applicable for societal problem-solving. I build on these premises of reflexive modernisation to explain the attributes of reflexive logic (see table 2.2).

Socially robust knowledge

Under reflexive logic, scientific advice provides socially robust knowledge with interactive and deliberative forms of knowledge production. Social robustness refers to knowledge that is relevant to and accepted by actors in the context of its application. The scientific advisory process assures the integration of knowledges and perspectives, without necessarily privileging science as an input. The pressing question for quality assurance centres not on the quality of outcomes, but on the quality of the process (Maasen and Weingart, 2005; Hajer and Wagenaar, 2003; Fischer, 2009; Fischer, 2000; Irwin, 1995). Holding roots in the political theory of deliberative democracy (e.g. Dewey, 1927[8]), scholarly approaches developed over the past years to methodologically advance the production of socially robust knowledge have included, but are not limited to work on: mode-2 science (Gibbons et al., 1994; Nowotny et al., 2001), transdisciplinary research (Pohl and Hirsch Hadorn, 2007), post-normal science (Funtowicz and Ravetz, 1993) and deliberative policy analysis (Hajer and Wagenaar, 2003). These approaches may foster the ability of experts to acknowledge and integrate a plurality of knowledge forms (e.g. academic, professional, experiential) by using participatory, argumentative and interpretive policy-analytic methods.

[8] "Dewey (1927) worried that citizens would be unable to fulfill their cornerstone role in the democratic process. In face of the unfolding techno-industrial society, he saw the need for a new relationship between experts and citizens. Toward this end, he called on experts to play a major role in helping citizens understand the issues, thus permitting them to perform their democratic assignment." (cf. Fischer, 2009: 4)

Knowledge brokerage

Under reflexive logic, the boundaries of what belongs to science, policy and other fields of expertise and what does not, and who represents these worlds, are understood as the temporary outcome of debates and negotiations (Halffman, 2003). Boundary work is characterised by exchange of arguments, meanings and interpretations of what the knowledge is about and how relevant, challenging or good it is considered to be in view of particular problem perspectives and framings. Experts participate in and navigate these debates, in part through flexible role-playing and by employing widely different professional capacities (e.g. Mayer et al., 2004; Pielke Jr., 2007). Boundary organisations, in this view, "put scientific and political elements together, take them apart, establish and maintain boundaries between different forms of life, and coordinate activities taking place in multiple domains" (Miller, 2001: 487). They act as 'knowledge brokers' who understand and take into account contesting issues, values and rationales and organise productive interactions between them (see figure 2.2). The term 'knowledge brokerage' is used by experts in widely different capacities (Turnhout et al., 2013), some affording a fairly strict distinction between science and policy, representative of the 'bridging the gap' orientation (informed by modernist logic). In a reflexive understanding of the term, 'brokering' involves a non-linear, iterative process of co-creation whereby all actors involved, including the knowledge broker, are relevant knowledge holders and become partners in a joint deliberative process, in which the knowledge broker essentially performs an intermediary function.

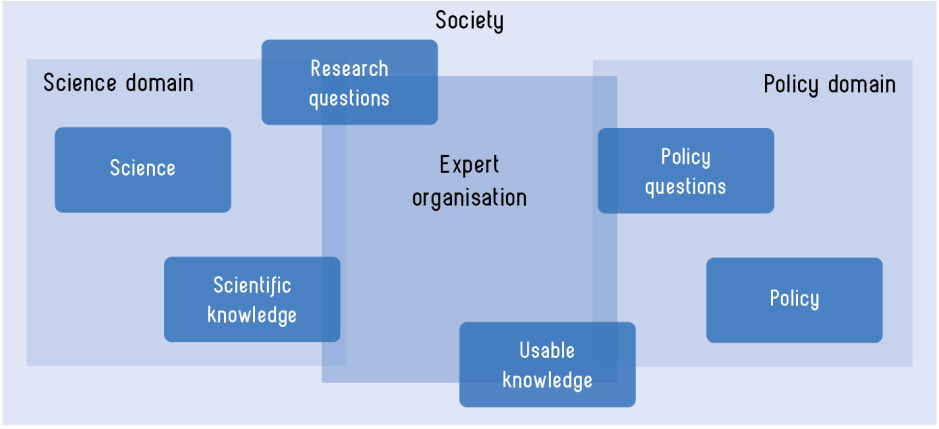


Figure 2.2 *Government expert organisations as 'knowledge broker' in interaction with science, policy and society (adapted from Turnhout et al., 2007)*

Attitude of humility

The term 'humility' means, in its dictionary definition "the quality of having a modest or low view of one's importance" (Oxford dictionary, 2017b). The notion of humility is central to reflexive logic, as it underscores the fallibility of science and its socially constructed and value-laden nature. Jasanoff (2003) has introduced the terminology of 'technologies of humility' as "to make apparent the possibility of unforeseen consequences; to make explicit the normative that lurks within the technical; and to acknowledge from the start the need for plural viewpoints and collective learning"

(Jasanoff, 2003: 240). An attitude of humility accompanies the recognition and acknowledgement of social complexity and brings forward an epistemic (and moral) appeal to the enterprise of scientific advice. Methodological approaches proposed by science–policy scholars under reflexive logic advance an attitude of humility in scientific knowledge production by putting an emphasis on:

- Perspective plurality: the management of perspective plurality (Funtowicz and Ravetz, 1993); the inclusion of a broad range of relevant perspectives in an appropriate balance (Lentsch and Weingart, 2011); value-neutrality with respect to a spectrum of values (Douglas, 2004)
- Uncertainties: the assessment of uncertainties (Funtowicz and Ravetz, 1993); openness and transparency of the information input and knowledge base (Lentsch and Weingart, 2011)
- Deliberation: the extension of the peer community (Funtowicz and Ravetz, 1993); iterative processes of interaction between scientific and other social domains (Nowotny et al., 2001); the creation of deliberative spaces to facilitate learning and collaboration (Hajer and Wagenaar, 2003)

Essentially, humility also asks from scientific experts that they become aware of their own epistemic and normative assumptions and of the way in which societal expectations permeate scientific practice (Jasanoff, 2003). Called for in this regard is the need for organisational learning within bodies of expertise, in order to facilitate knowledge exchange and collective learning about prior (institutional, societal) commitments framing knowledge, identities and practice (Wynne, 1993; Lentsch and Weingart, 2011; Pallett and Chilvers, 2015). This social, interactive and reflexive perspective on organisational learning has much in common with Schön's idea of reflective practice: 'reflective practitioners' skilfully master problematic or novel situations by acts of reflection-in-action, i.e. they reflect on their actions in response to feedback from the 'situation's backtalk' (p.269). Donald Schön (1983) argues that the disposition of reflexivity is part and parcel of reflective practice. Acts of self-critical reflection may (purposefully) challenge deeply entrenched societal structures and dominant ways of thinking and acting. Similarly, sociologists such as Bourdieu (1977) and Giddens (1990) assume that experts who take into account their position in the world, also become aware of the effects this produces on their accounts of that world (in: Fischer, 2009). Under reflexive logic, experts should thus be technically competent, but their claim to authority is substantially based on their ability to manifest this special knowledge by counselling humility and pluralism in the face of unavoidable contingencies and indeterminacies (Schön, 1983).

Table 2.2 *Attributes of modernist logic and reflexive logic of scientific advice to governments*

	Purpose of scientific advice	Role of experts at the science – policy interface	Quality principles for scientific advice
Modernist logic	SPEAKING TRUTH TO POWER Experts employ technical methods to produce empirically confirmed and logically consistent statements to inform evidence-based decision making	BRIDGING THE GAP Experts mediate domains of science and policy and work to keep them apart	NORM OF OBJECTIVITY Experts seek to properly represent nature in a rigourous, independent and detached manner by the use of credibility-enhancing strategies and appeal to scientific rhetoric
Reflexive logic	SOCIALLY ROBUST KNOWLEDGE Experts employ interactive and deliberative methods to integrate knowledges and perspectives to inform societal problem-solving and actions	KNOWLEDGE BROKERAGE Experts bring different perspectives and rationales in line and organise productive interactions between them	ATTITUDE OF HUMILITY Experts seek to address perspective plurality and uncertainties, and engage in deliberation and collective learning by acting as reflective practitioners who enact reflective practice

2.3 Logics in tension in participatory knowledge production

Amidst increasing interest in participatory forms of appraisal and decision-making, the practice of experts and expert agencies, despite being central to promoting this 'participatory turn', has remained largely invisible in studies of science and participation (Chilvers, 2008; Regeer, 2009). This section addresses the implications of participatory knowledge production for government expert agencies.

Participatory forms of knowledge production may generally be motivated by three reasons: democratic reasons of citizen empowerment, equity, and social justice; instrumental reasons such as improved decision legitimacy, credibility, and trust; and substantive reasons of enriching the knowledge basis of appraisals, thus enhancing their quality (Funtowicz and Ravetz, 1993; Pellizzoni, 2003; Hage et al., 2010).

Participatory knowledge production has been promoted by scholars in the field of science–policy studies based on the premises that this will strengthen the public accountability, quality, effectiveness, and legitimacy of scientific expertise in society (e.g. Funtowicz and Ravetz, 1993; Nowotny et al., 2001; Jasanoff, 2003). In order to adopt participatory knowledge production within standard research practice, these scholars have argued for an intellectual 'shift' in knowledge production systems (Hessels and van Lente, 2008). The rationale for this shift originates in reflexive logic (see section 2.2.2). Participatory knowledge production, in this sense, essentially involves a non-linear iterative process of co-creation whereby all actors involved productively interact to generate socially robust knowledge.

However, experts often operate within institutionalised knowledge production systems, linked to a techno-bureaucratic policy culture, that foster a modernist image of government scientific advice producing objective facts that are passed on to policy-making. As a consequence, scholars identified how participatory activities in environmental science–policy research may start off as reflexive endeavours but hardly take shape as intended. (Felt et al., 2012; Hegger and Dieperink, 2014; Lövbrand, 2011;

Van der Hel, 2016; Löfmarck and Lidskog, 2017). Typically tensions arise that are illustrative of the clash between logics. These tensions relate to e.g. differing expectations about the purposes of participatory assessment or about the quality principles and standards guiding participatory assessment design and outcomes. In the case of the EU-funded ADAM (Adaptation and Mitigation Strategies: Supporting European Climate Policy) project, for example, the team's aspiration to co-produce socially robust knowledge on the one hand, and the urge for timely and specific policy advice turned out to be incompatible: *"Instead of turning into an innovative site for policy re-examination and learning, the ADAM project was time and again asked to respond to a restricted policy community's interpretations of useful knowledge*" (Lövbrand, 2011: 234). Lövbrand (2011) mentions how the project team struggled to open up space for critical engagement with the plural framings that underpin contemporary climate adaptation issues, but was restricted in its efforts in the face of limited policy interest in this reflexive dimension.

2.3.1 Encapsulation

Tensions between different expectations and understandings of participatory knowledge production are often accommodated in intuitive and routinised ways, in alignment with institutionalised structures, norms and approaches. In this way, participatory aspirations, informed by reflexive principles, tend to become (unwittingly) encapsulated within modernist knowledge cultures (Beck et al., 2014; Turnhout et al., 2016; Turnhout et al., 2013; Reinecke, 2015; Pallett and Chilvers, 2013). This process of encapsulation is illustrated within figure 2.3. Even if stakeholders play a substantive and instrumental role in bringing in new knowledge and insights, their contribution becomes easily scientised within technical assessment processes (Löfmarck and Lidskog, 2017), a phenomenon described as 'technocracy of participation' (Chilvers, 2008). Experts are inclined to manage and control participatory processes, which relates to, in view of Wynne (2006), the pervasive instrumental approach which defines modern science. Experts inadvertently impose their scientific framings and techno-managerial ways of working on the process, hereby 'closing down' the process, which precludes reflection upon the needs, requirements and conditions of the other participants (Fischer 2009; Wynne 1993). IPCC's reform attempts to 'open up' the review process for public scrutiny have, for example, hardly challenged the technocratic framework and IPCC's linear view on its relation to its publics (Beck et al., 2014; Turnhout et al., 2016; van der Sluijs et al., 2010).

It is through processes of encapsulation that compatibility with modernist logic is ensured (see figure 2.3). Reflexive aspirations become captivated within institutional structures, norms and ways of working. On the outside, this process of encapsulation may remain hidden from view. For example, "terms like knowledge brokerage may hide this reality by fashioning these with an attractive label and a new-found legitimacy" (Turnhout et al., 2013: 10). Another illustrative example is how researchers of the EU-funded Future Earth research platform legitimated the innovative potential of their platform in terms of knowledge co-production, whereas they advanced the institutional design of their global platform in resonance with ideas and values of scientific independence and autonomy (Van der Hel, 2016).

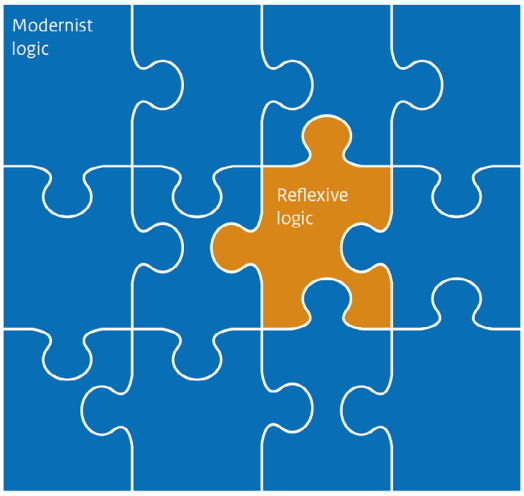


Figure 2.3 *Encapsulation during participatory knowledge production*

In effect, the tendency to encapsulation of participatory knowledge production naturally arises in institutionalised research settings. This is due to persistent systems of reference, such as accountability structures or routine ways of working, which are largely informed by modernist logic. Paradoxically, for participatory processes to be meaningful to the different participants, the process has to assure a degree of compatibility with such formal, organisational requirements at the home institutions of the actors and principals involved. Regeer (2009) has strikingly phrased the inclination towards encapsulation in relation to her case setting of an intermediary organisation as follows: "TransForum aims for a change from a linear Knowledge Infrastructure to an open-ended and interactive Agro Innovation System. In effect, TransForum is accountable to the same regimes it is trying to change. This is bound to provoke forms of resistance not envisioned in more traditional types of boundary organisations." (p. 174)

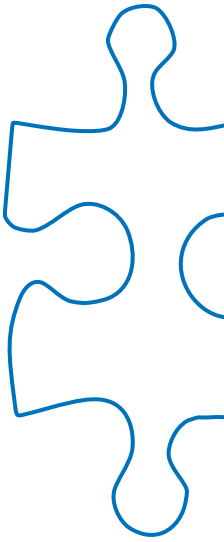
The process of encapsulation may as well explain the intransigent nature of the paradox of scientific authority, introduced earlier on (see section 1.1). The paradox of scientific authority has emerged in response to contestations over the legitimacy of scientific evidence and expertise in political processes. The argument is that experts are not to be trusted in political settings, as they do not hold up to quality standards of autonomy, detachment and neutrality. At the same time, expert advice is being sought with growing urgency to grapple with wicked and unstructured problems. As a 'resolution' to deal with the paradox, experts are inclined to open up their procedures to increase transparency and public involvement (e.g. as we see happening at IPCC or IPBES, see Turnhout et al., 2016). In this way, they aim to cultivate trustworthiness. They attempt to act responsively to the socio-political sensitivities and the various frames and social and emotional elements (Fischer, 2009) that characterise wicked problem settings. Their attitude of humility, however, hardly make sense if experts are unprepared to deal with the system barriers they will unavoidably encounter when they attempt to enact their participatory aspirations and intentions (Pallett and Chilvers, 2013). The road towards a more reflexive science essentially has to evolve amidst an inclination to 'defaulting' into more traditional types of organisation (Regeer and Bunders, 2009;

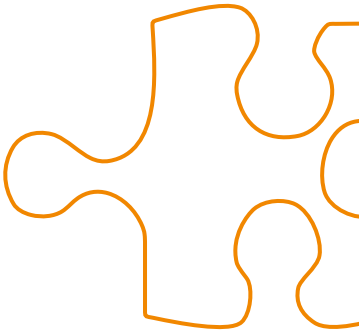
Pallett and Chilvers, 2013). In other words, it appears hardly feasible to resolve the tensions between modernist and reflexive logics that inescapably arise in institutionalised settings of participatory knowledge production. They may not be resolved easily and most likely continue to co-exist in contemporary practices of scientific advice to governments.

The challenge for this thesis is, therefore, to explicate and unveil the strategies in place in government expert organisations for coping with the tensions and frictions produced under co-existing logics. The turn to practice theory offers a framework suitable to do so.

3.

Research design





3.1 A practice approach

Practice theories are inspired by the interpretive turn in social theory (Nicolini, 2012; Schatzki et al., 2001). Philosophers of science associated with the interpretive turn (such as Heidegger's phenomenological works and Wittgenstein's later work on the role of language) consider the social world not as a collection of external 'facts', but as a subjectively experienced construct. From this perspective the goal of the social sciences lies in the interpretive understanding of the subjective meaning of social practices within a life-world that the researcher is embedded in. A practice approach serves to acknowledge and recognise the practical intelligibility (i.e. 'logic of practice' (Bourdieu 1977, 1990) or craftsmanship (Schön, 1993) displayed by practitioners in their everyday practice. A practice view enables me to go further than simply observing or realising that tensions and frictions emerge in practice under co-existing modernist and reflexive logics. The observation of tensions can, from the angle of practice, lead to an inquiry of whether and how scientific advisers mobilise modernist and reflexive logics interchangeably, which effects (i.e. challenges and dilemmas) this produces and how these effects are being anticipated.

What is to be gained by adopting a practice view on government expert organisations in-between logics? In response to this question, I largely draw on Nicolini (2012) who spelled out the basic, shared characteristics of contemporary practice theories (p. 7,8):

- Practices come first, not practitioners[9] (i.e. agency) or institutions. As such, to study practice implies taking practice as the basic unit of analysis. Appreciating practice as central research object means taking the mundane activities in the practice context as the main focus of inquiry.
- Practices are located in a historical and social context that give structure and meaning to what people do. These structures and meanings are produced and reproduced in practice. It takes social structures and institutions not simply as given but considers how they are interpreted and re-interpreted in the day-to-day work of social actors. Thus, the lens of practice is suitable for the study of science–policy interfaces as a social practice (van den Hove, 2007).
- Practices are meaning-making, identity-forming and order-producing activities. They draw upon and reproduce structural features of wider social and political systems (Giddens 1984; Jasanoff, 2004). As such, practices seek to recursively represent a particular understanding of the world (Callon, 1998 in Arts et al., 2014).
- Practices are relational. They are composed by and transpiring through a bundle or network of practices. Understanding how knowledge production takes shape in a government expert agency also implies understanding how these activities are connected to alternate practices in, for example, policy settings.
- Seen through the lens of practice, organisations are always open to contestation and this keeps them continuously in a state of tension and change (Arts et al., 2014). A practice is in continual evolution and by definition different and

[9] Practice theories understand actors and groups as *homines practici* who interpret, improvise and perform, guided by what can be rendered accountable in practice. This differs from the conception of actors in rational choice theory and institutional theory. In rational choice theory an actor is conceived as a *homo economicus* who acts as a rational decision-maker, and in institutional theory as a *homo sociologicus* who acts as a norm-following individual.

changeable but also bounded by the limits imposed by the extant conditions and criteria of acceptability and appropriateness (Nicolini, 2012).

Nicolini (2012) has brought "this multiplicity together to offer some ideas on how to study the complex phenomenon that is practice." (p.213). His core suggestion is to reiterate two basic movements: zooming in on the accomplishments of practice, and zooming out of their relationships in time and space.

3.1.1 Zooming in and out

In this thesis the focus on practice should not be radically interpreted. I do not actively trace down the material, cognitive, affective elements and complexes of scientific advisory practice, but I zoom in on the acts and concerns of practitioners who seek to orient and give meaning to their practice under co-existing logics. Following the Heidegerrian tradition to practice theory, to practise always means to care, or to take care of, something. Practices are oriented to and are performed in view of the accomplishment of the *meaning* and *direction* that they carry. For those who are involved in it, the accomplishment of a practice is experienced as being governed by a drive that is based on both *the sense of what to do and what ought to be done*. For example in deciding "whether specific data are of acceptable quality", explains Majone (1989), the policy analyst "applies standards that derive from his own experience, but also reflects on the professional norms of colleagues, as well as culturally and institutionally established criteria of adequacy" (cf. Fischer, 2009: 123).

The Danish researcher Bent Flyvbjerg suggests a focus on practical activity and practical knowledge (phronesis[10]) in everyday situations in organisations to surface the practical concerns which orient the daily work of practitioners (Flyvbjerg, 2006b; Flyvbjerg, 2006c). In my research context, practical concerns are reflected in the challenges and dilemmas that practitioners bring forward when they (attempt to) conduct participatory knowledge production under co-existing logics.

Studying these concerns will explicate the differing interpretations that practitioners adhere to the meaning and direction of their shared practice and how they bring them in alignment under a shared idea of what counts as good advice. Hence the lens of practice offers an analytical perspective to explore how modernist and reflexive logics are being brought in alignment. Alignment refers to the 'bringing in line' of different worlds (Wenger, 1998). Alignment is about matching expectations, but also about connecting to broad systems of styles and discourses, such as political and societal trends, or intellectual developments in scientific disciplines (Regeer and Bunders, 2009). Alignment, in the context of this thesis, centres on the coordination activities of practitioners in matching differing expectations of the purpose, quality and role of scientific advice to governments.

The design of my research is informed by an interpretive, naturalistic approach which enables me to "study things in their natural setting, attempting to make sense of, or interpret, phenomena in terms of the meaning that people attribute to them" (Denzin

[10] In Aristotle's words *phronesis* is an intellectual virtue that is reasoned, and capable of action with regard to things that are good or bad for man. From an Aristotelian point of view *phronesis* is the most important intellectual virtue that involves judgements by a social actor and decisions made in a value-rational manner. The other two virtues are theoretical understanding (*episteme*) and the employment of technical know-how (*techne*) (Flyvbjerg, 2006b).

and Lincoln, 2013: 3). It is important to underscore that I do not try to access the inner motives and personal values and beliefs that guide the conduct of the PBL practitioners. Yet, I am aware how their orientation and sense of accountability are, of course, specific to the historically situated role and identity of the PBL organisation. I respond to Schatzki's suggestion that "[f]ully understanding the real time in which an organisation functions requires grasping the nexus of pasts and futures" (Schatzki, 2006: 172). Hereto, I introduce the PBL organisation in chapter 4 in view of its emergence and evolution at the Dutch science–policy interface.

This brings me to the process of zooming out. In order to understand what happens at the PBL organisation, I also need to understand what happens somewhere else – in the policy setting, or somewhere in the societal arena. How, for example, does a PBL researcher talk with a policy-maker about the topic of her study; how does this affect the policy-makers' ways of handling the topic in his negotiations with stakeholders, and so on. "Zooming out of practice thus requires moving between practice in the making and the texture of practices which causally connect this particular instance to many others" (Nicolini, 2012: 229). Since I am particularly interested in studying experts' practical concerns emerging during participatory knowledge production and can only do as much within a particular research, I restrict my processes of zooming out to a reflection on the relations between PBL practice and policy practice, with a particular focus on their shared *object of concern* – today's complex environmental problems, in the final chapter of this thesis.

3.2 Research strategy and methods

The general research strategy of my practice study of government expert organisations in-between logics is a single case study approach. Case studies are in-depth investigations of a single instance of a phenomenon in its real-life context (Yin, 2014). I selected the PBL Netherlands Environmental Assessment Agency as a paradigmatic case (Flyvbjerg, 2006a). A case is paradigmatic if it develops a metaphor for the domain that the case concerns. In this thesis, the metaphor of 'in-between logics' serves to explore how government expert organisations established under a modernist paradigm of scientific advice come to grips with the call for a reflexive science (see chapter 1). I assume that the narratives that I develop about this case can pertain more widely to expert organisations which have to operate under changing governance dynamics and unstructured issue configurations and are simultaneously bounded by institutionalised expectations and ways of working. In a wider sense, this case may reveal how scientific advisers experience and act upon contradictory expectations on what counts as 'good' advice in contemporary society. Paradigmatic cases also highlight more general characteristics of social phenomena in question, as with respect to the paradox of scientific authority in this thesis. My practice study of the PBL organisation illustrates how practitioners give meaning to the paradoxical situation confronting today's bodies of expertise: expertise is needed more and more, while it is trusted less and less (Bijker et al., 2009). Scientific knowledge is needed to tackle unstructured problems in which knowledge is inconclusive and values in dispute, whereas the normative bias in scientific advice and its political use are publicly scrutinised at the same time. This thesis aims to provide insights that may serve other (government) expert organisations in getting to grips with the paradox of scientific authority in contemporary society.

The choice of the PBL is motivated by three premises:

1. The debate over the authority and credibility of governmental expert bodies in the science–policy interface is as lively in the Netherlands as anywhere else (Halffman, 2009a; Halffman and Hoppe, 2005).
2. PBL presents itself as a learning organisation. It actively attempts to move from a technocratic model of science advising to the paradigm of 'post-normal science' (Petersen et al., 2011).
3. A practice-based approach asks for situated research in the practice setting. The researcher cannot maintain distance from the experience of practice. Choosing the PBL enabled me to enact a role as practitioner and researcher, and to ensure a productive dialogue between them.

The PBL conducts policy assessment studies in the field of spatial planning, environment and nature with the aim to "contribute to improving the quality of political and administrative decision-making" (PBL, 2017). Three types of studies are: policy evaluation studies, outlook /foresight studies and methodological / conceptual studies. These studies largely differ in terms of the very nature of the assessment (e.g. with respect to methods and tools in use), and the function or purpose of the study (e.g. with respect to its contribution to policy, the research orientation). For each of these three types of assessment studies I selected a case in which practitioners attempted to design and conduct their assessment in a participatory manner.

3.2.1 Data collection

A practice approach asks for situated site-specific methods including observation with varying degrees of participation within the practice context under study. To investigate the practical knowledge of PBL practitioners in context of local project conditions, and more widely pertained organisational and institutional conditions, I alternated a *global view* on the practice of science advising at the PBL organisation in the period from 2008 to 2015 with a *detailed view* into three particular assessment studies that had been conducted in the same period.

I participated to different degrees in three assessment settings, in a range from being a full project team member to being a relative outsider; the duration of participation ranged from a few months to several years. I conducted conversational interviews with project team members, internal supervisors, policy clients and stakeholders and I observed what practitioners do and how they make sense of what they do. I supplemented these interviews and observations with document analysis of project-related documentation, including e-mails, project plans and meeting reports (e.g. of stakeholder workshops, internal project meetings, project evaluations). The three assessment settings, my involvement in these studies and data sources are listed in table 3.1. The table includes a reference to the chapter in which more details about data collection and findings of my research in these respective assessment settings can be found.

Table 3.1 *Details of (data collection in) three PBL assessment studies*

	Sustainable City study *Reported in chapter 5 and 6*	**Nature Outlook study** *Reported in chapter 6*	**Assessment of the Human Environment study** *Reported in chapter 7*
Type of study	Methodological study: method development of urban sustainability appraisal	Outlook study: policy-oriented foresight study on nature and nature policy	Policy evaluation study: assessment of nature, spatial planning and environmental policies
Legal basis and policy function	Unsolicited study initiated by PBL management board with the aim to develop an urban sustainability assessment framework	Statutory product, conducted every four years for the Dutch Ministry of Economic Affairs (also responsible for nature affairs) with the aim to inform agenda-setting for long-term nature policy development	Statutory bi-annual product, linked to the parliamentary budget discussions with the aim to assess the state of environment, nature and spatial quality and evaluate policy performance in these areas
Participatory assessment approach	Participatory backcasting	Normative-oriented foresight	Reflexive evaluation
My role in this case setting	Project team member responsible for the design of the sustainability appraisal framework	Internal evaluator of the quality and effectiveness of the project's process and implementation	Project team member responsible for the design of the participatory process
Period of involvement	Early 2008 to late 2010	Spring to Autumn 2012	Early 2011 to Autumn 2012
Data sources	- Project documentation - Participant observation	- Project documentation - Semi-structured interviews with 22 participants including seven project team members, five internal peers of the internal supervisory board and ten participating stakeholders	- Project documentation - Semi-structured interviews with five project team members - Participant observation

I additionally participated within knowledge exchange activities that were initiated and coordinated by PBL's information, data and methodology department in the time span of 2008 to 2015 (since September 2014 I am positioned at this department myself, and I therefore partly coordinated these activities myself). My data collection here draws on participant observation, interviews (conducted both by myself and others) and a close reading of meeting notes and (strategic) documents, such as management and audit reports[11]. These research activities enabled me to gain insight into the provisional assumptions about the merit and challenges of participatory knowledge production, the role perceptions and the way in which practitioners orient their work in light of how they experience PBL's room to maneouvre at the Dutch science–policy interface. These knowledge exchange activities, my role in the settings and data sources are listed in

[11] An international scientific audit was conducted in Autumn 2012 to assess the quality of PBL's work over the period from May 2008 to May 2012 (PBL Audit Committee, 2013). The committee consisted of eight members including Lea Kauppi, Leen Hordijk, Judith Innes, Sheila Jasanoff, Pushpam Kumar, Wolfgang Lutz, Richard Moss, Jeroen van den Bergh.

table 3.2. I also refer the chapter in which more details about data collection and the findings of my research on these respective activities are discussed.

I thus observed what PBL practitioners do and how they do it, I listened to how they talk about their work, and talked with them about their views and I acted and intervened within their work being a practitioner myself. All these research activities have led me to develop a degree of familiarity with PBL's assessment practices. It allowed me, as researcher, to identify the meanings and orientations attached to the everyday practice of science advising in-between logics.

3.2.2 Data analysis

I conducted qualitative content analysis using qualitative analysis software (MAXQDA 11) to guide my search for patterns across the data (Weiss, 1995). I made use of this software in the three selected case settings to identify crucial episodes and decisive moments in the local project settings during which practitioners, in interaction amongst themselves and with their peers and clients, discussed on how to advance the participatory aspirations in light of the various institutional expectations and policy demands they were confronted with. I started from these episodes and moments as guidance for initial coding (such as type of challenges experienced by practitioners), and iterated the analysis by connecting the preliminary patterns with categories derived from theory.

For the analysis of the agency-wide activities I made use of qualitative content analysis in a similar way, but I focused on the crucial dilemmas and challenges emerging from practitioners' reflections on expert roles, boundary work, open assessment methodology and the agency's position at the science–policy interface.

Table 3.2 *Details of (data collection in) knowledge exchange activities at PBL*

	Seminar on expert roles *Reported in chapter 8 and 9*	**Implementation of open assessment methodology** *Reported in chapter 9*	**PBL Academy course on boundary work** *Reported in chapter 9*	**Strategy-formation process** *Reported in chapter 8*
Characteristics of the activity	The seminar took place on 18 January 2011 from 14:30h-18:00h in Theatre Concordia, the Hague. The aim of the seminar was to develop a more sophisticated understanding of PBL's expert roles. About 40 PBL practitioners participated in an open space set-up in which they could raise their ideas and concerns. The group included managers as well as senior and junior experts. No selection procedure was followed.	Study conducted by external consultant in organisational anthropology from spring 2014 to spring 2015. The aim was to reflect upon the implementation of open assessment methodology.	MSc. course developed by Open University Heerlen and tailored to PBL context, teached by university teacher in period from autumn 2014 to spring 2015. The aim of the course was to exchange experience on boundary work and to strengthen understanding of recent literature on science-policy interfacing. Eight PBL practitioners (including seven senior project leaders and myself) participated in the course.	PBL's strategy formation activities in the period from 2008 to 2015. The aim of strategy formation was to set ambitions for PBL's strategic positioning under changing societal, political, economic, administrative and organisational conditions.
Data sources	- 10 interview reports of semi-structured interviews with 10 project leaders conducted by organisers (including myself) prior to the seminar - Nine session reports drafted by the session chairs - Summary report drafted by the organisers (including myself)	- 15 interview reports of conversational interviews conducted by consultant with 13 PBL practitioners (10 methodology and modelling experts and 3 project leaders) and two external experts in reflexive monitoring - Summary report of methodology workshop on 16 June 2015 drafted by consultant	- Participant observation - Documentation of the course activities and individual course assignments of participants	- 16 interview reports of semi-structured interviews conducted by PBL's integrity officer with policy clients and collaboration partners - PBL's strategic plan (the charcoal sketch, November 2011), seven departmental implementation plans (June 2012) and progress reports - Scientific audit reports (PBL Audit Committee, 2013) and PBL's response to the audit committee (PBL, 2013)
My role in this activity	Co-organiser	Coordinator (since Autumn 2014)	Participant	None

3.3 Reflective research orientation of a researcher-practitioner

The principal objective of the study of practice is, as Nicolini (2012) suggests "to generate images of organisational life […] as a contingent and ever-changing texture of human practices." (p.240) How to practically study organisational life through the lens of practice? According to Nicolini (2012) "it requires a patient, craft-like, and necessarily time-consuming articulative work of getting close to the practice and the practitioners." (p.240). Implicit in the idea of zooming in and out is that studying practice requires choosing different angles for observation and interpretation, without necessarily giving prominence to any one of these.

But how to decide on these different angles or interpretation frameworks; hence, which types of research to conduct? And how to come to grips with the implications of this type of research for the role of the researcher?

I turn to the seminal work on the 'reflective practitioner of Donald Schön (1983) to come to grips with these issues. According to Schön, research in the practice context may serve to enhance the practitioner's capacity for 'reflection-in-action' (see also 2.2.2). Research can be a medium that guides practitioners in surfacing not only their assumptions and techniques, but also reveals the institutional assumptions and routines they are embedded in. The essence of doing research in the practice context of a government expert organisation is, therefore, to critically reflect upon the everyday practice of these scientific experts (i.e. practitioners in government scientific advisory work). This may support their reflective practice and enhance the reflexive capacity of practitioners who have to operate in-between logics. According to Schön (1983), practice researchers can do so in four ways:

Repertoire-building research (p.315-317): One way of orienting practice research is to describe and analyse the repertoires that practitioners bring to each situation anew. Repertoire-building research, in the context of my thesis, relates to my study of the evolution of the balancing act between credibility, salience and legitimacy in participatory foresight (see chapter 6). The idea here is that practitioners become aware of the circumstances that inform the balancing act in participatory assessment processes. In this way they learn to recognise challenges or dilemmas with quality assurance in similar settings of participatory knowledge production.

Research on the process of reflection-in-action (p.320-323): When practitioners invent a new strategy of action they are often influenced by the intrusion of familiar, patterned responses. These responses serve the function of protecting practitioners from exposure to failure, but they also assure their continued performance according to familiar routines. This research angle enables practice researchers to observe practitioners engaged in action, and when combined with intervention, it enables the researcher to understand which circumstances change practitioners' understanding of the situation and their role in it, and how this may shift the direction of action. For this thesis I worked with the PBL researchers who practised environmental policy evaluation under co-existing evaluation imaginaries (see chapter 7). The idea of this type of reflective research is that practitioners become aware of the contingent and dynamic nature of their actions and the conditions that affect it. In so doing, they also become aware of their own intuitive understandings of and responses to shifting directions of action.

Frame analysis (p.309-315): A third angle of practice research centres on the ways in which practitioners frame the nature of their work and make sense of their roles and activities. Frame analysis, in context of this thesis, reveals the constructed identities of

the PBL derived from actors' reflections upon the (future) profile and position of the agency in a changing society (see chapter 8). The idea here is that when practitioners become aware of their tacit frames, they also become aware of the possibility of alternative ways of framing the reality of their practice.

Research on practitioners' fundamental action orientation (p.317-320): The fourth reflective angle of my practice research looks into the way in which practitioners justify their experiments with deliberative assessment with reference to the objectivity norm. PBL's fundamental action orientation towards objectivity safeguards its credibility and scientific authority. In this thesis I explored how practitioners tend to diversify their understanding of what it means to be objective in participatory settings (see chapter 9). This type of reflective research makes practitioners more aware of the ways in which they restructure the meaning and direction of their actions.

When applying the four reflective research angles outlined above, researchers and practitioners enter into modes of collaboration. The researcher cannot maintain distance from the experience of practice. "Whether he is engaged in frame analysis, repertoire building, action science, or the study of reflection-in-action, he must somehow gain an inside view of the experience of practice. Practice research requires a partnership of practitioner-researchers and researcher-practitioners." (p.323) According to Schön (1983) one way to organise this partnership is for the practitioner to take time out to become a reflective researcher, who moves in and out of research and practice careers. I organised this partnership by operating a dual function as policy researcher at PBL and as external PhD[12] candidate at the Vrije Universiteit (VU) Amsterdam. In this way I could ensure 'estrangement', a balance between 'stranger-ness' and 'insider-ness', which enabled me to move back and forth between analytic views on the situation and familiarity with the situation (Yanow, 2000).

3.3.1 My role as researcher-practitioner

In order to guide this process of 'moving in and out', I was inspired by the hermeneutic circle (see figure 3.1). To me, it served as reflective instrument[13]. The hermeneutic circle illustrates the dialogical relationship between my interpretive stances and insights emerging from engagement with my research subjects. During the research process, I alternated my perspective, that is, I zoomed in on the PBL practices from the reflective research angles suggested by Schön (1983), as described above. In hermeneutics a "*first grasp*" serves as the starting point for reflection and interpretation of what is going on in practice. Each new examination improved my understanding of the practice of government scientific advice at the PBL. In this way, my understanding deepened. I have

[12] My individual external PhD trajectory can be compared to a Doctor of Public Administration (DPA) programme such as the one offered by University College London (UCL, 2017) or to the PhD programme for civil servants of the Netherlands School of Governance (NSOB, 2017).

[13] Heidegger (1927) used the concept of 'hermeneutic circle' (following the development of hermeneutics in the 19th century) to envision a whole in terms of a reality that was situated in the detailed experience (the parts) of everyday existence by an individual. The use of the hermeneutic technique originated in bible interpretations, then extended to all kinds of texts, and today it is also used to analyse non-textual products of human culture. Critics pointed out that the circle holds a self-referential risk of 'a snail biting its own tail' (Gadamer 1975). I acknowledge this risk and explicitly draw on the dialogical interpretation of the circle as it is developed by Gadamer (1975) and Schön (1983), who interpret the hermeneutic circle as a reflective instrument to organise "a conversation with the situation" (Schön, 1983: 346) in order to reach a new understanding of reality.

alternated two views: a global (i.e. organisational) view of scientific advisory practice at the PBL, and a detailed view into particular cases and local conditions, based on the data reported in tables 3.1 and 3.2. The continuous dialogue between the various angles and views improved my sensitivity in finding new aspects to the individual parts of the research (see conclusions in chapter 10). In the subsequent paragraphs I explain the 'parts' of my research, as they are presented in detail in the respective chapters.

Chapter 5 – My first grasp originated in my experience as project team member in PBL's **Sustainable City project**. I started working at PBL on 2 January 2008 as policy researcher in the department 'Quality of the living environment'. I soon got involved in one of its projects – the Sustainable City project – initiated late 2007 and running from 2008 to 2010 with the purpose of generating integrated options for strategic, long-term sustainable urban development policies in the Netherlands. I was responsible for the design of the appraisal framework to assess policy options across three themes: health, liveability and energy. A long-running debate at PBL about the need to address values and worldviews in a more participatory way in sustainability assessments had motivated us (i.e. the project team) to engage stakeholders in the assessment process using participatory backcasting and to pay a great deal of attention to the organisation of stakeholder dialogues. I struggled to converge the huge amount of 'data' from the stakeholder dialogues with the model-based trajectory in which we assessed the impact of visions and options for urban sustainability. On the one hand, deliberation with a group of extended peers generated understanding of the complexity of and value debates in urban sustainability. Yet, on the other hand I also realised that conducting participatory backcasting in the PBL setting was challenging, in terms of process management or interdisciplinary collaboration. But I was mostly puzzled by the question whether participation (with respect to issues of stakeholder selection; knowledge integration) had essentially benefited or reduced the scientific quality and policy relevance of the study.

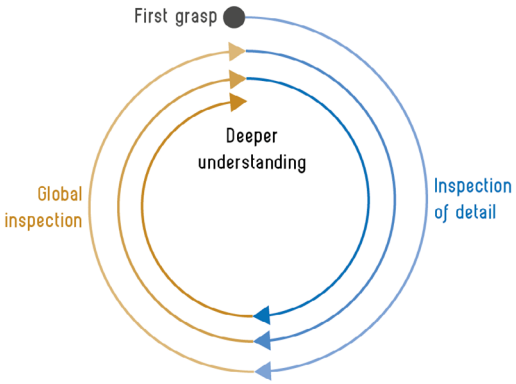


Figure 3.1 *The hermeneutic circle, based on Heidegger (1962)*

Chapter 6 – I subsequently started *exploring in detail* why practical concerns about the scientific quality and policy relevance of participatory assessments had been left largely unattended – in my perception at least – during the assessment process. This direction

for further inspection was motivated partly by my engagement from spring to autumn 2012 in a project evaluation of one of PBL's statutory products: **the Nature Outlook 2010 – 2040**: a (four-yearly) national foresight study on nature perspectives. Again different views on scientific quality and policy relevance, and how these had been informed by participation, were displayed. It triggered me to conduct a comparative interpretive analysis of the perceptions of practitioners and their peers on the impact of stakeholder participation for a set of quality attributes, known from assessment literature (i.e. salience, credibility and legitimacy (Cash et al., 2002)). My research orientation at this stage resonates with Schön's type of *repertoire-building research*. In this thesis I focus on the repertoire in use for quality assurance during processes of participatory knowledge production. The building of a repertoire takes shape as a balancing act between the three quality attributes of salience, credibility and legitimacy. I analyse the dynamics of the balancing act between salience, credibility and legitimacy during the participatory assessment trajectories of the Sustainable city project and the Nature Outlook project. These two cases serve as exemplars for identifying the perceived quality impacts of participatory knowledge production within the PBL organisation.

Chapter 7 – Meanwhile, I became engaged as project team member in one of PBL's other statutory products: the biannual **Assessment of the Human Environment study** from early 2011 to late 2012. Our intention was to improve the scientific quality and policy relevance of this statutory assessment as evaluations of its previous editions had demonstrated the need for improvement. Within the project team we exchanged ideas on how scientific quality and policy relevance should and could be improved. My initial role was to explore the merits and risks of participatory activities with policy-makers and civil society actors. Our assumption was that bringing in their perspectives and knowledges would improve the quality of the assessment process, while generating ownership and support for the study at the same time. Yet, early in the process this participatory intent was rejected and replaced by a traditional technical evaluation approach (i.e. experts produce 'facts and figures') with 'additional' deliberative policy analysis (i.e. governance analysis). I wondered how this shift could be explained and I turned to Dahler-Larsen (2012) work on the Evaluation Society to find how evaluation practices both embed and are embedded in evaluation imaginaries (that is, societal views on what evaluation 'is' and 'should do'). I *explored in detail* how evaluation approaches and social imaginaries of evaluation had been co-produced in this case setting. Reconstruction of the process reflected attributes of modernist and reflexive logics; practitioners invented a new strategy of action but also wanted to assure the continued performance of the assessment study according to familiar routines. My research orientation resonates here with Schön's type of *research on the process of reflection-in-action.* I observed, but also intervened in the assessment process, and in this way came to understand which external and internal circumstances changed practitioners' understanding of the situation and their role in it, and how these shifted the direction of their actions.

Chapter 8 – Engagement in these three projects served to comprehend in detail the practical concerns experienced by PBL researchers in situated research settings. On the one hand, this could have led me to conclude that there are dominant routines and expectations limiting PBL's room to maneouvre on the kind of knowledge products that can be delivered, the kind of advice that can be given, the way problems are formulated and the way of working that is followed. On the other hand, I also experienced, that

researchers were willing and attempting to include participatory elements in their assessment studies. An *organisational-level inspection* of documented material of **strategy formation and knowledge exchange activities** enabled me to deepen my understanding of the meaning and direction carried by local practice. I identified how PBL practice was informed by three co-existing identity frames: the integrated assessment specialist, the think-tank and the trustworthy expert, shared among four actor groups –practitioners, management, clients and external peers. My research orientation at this stage connects to Schön's *frame analysis*: the study of the ways in which practitioners frame the reality of their practice to make sense of their roles and activities. I retrieved insight into the logics implicated within these identity frames to illustrate how the frames reflected practitioners' understandings of what PBL is and should do.

Chapter 9 – Discussions with colleagues about participatory knowledge production always seemed to get back to one single issue: how to safeguard objectivity in these processes? The norm of objectivity was deemed to be put at risk in interactions with stakeholders, while the added value of these interactions was also recognised. Practitioners' practical concerns about the quality of knowledge, the role of values and the legitimacy of their expert roles – shared in interviews and group discussions – reflect internalised notions of objectivity and scientific authority, and how these were challenged by the very initiative of discussing participatory modes of knowledge production and assessment. I turned to an *organisational-level inspection* of **knowledge exchange activities**. Although the activities were not necessarily restricted to a discussion of PBL's roles and the design and quality of deliberative assessment approaches, as it turned out, concerns related to these matters attracted considerable attention. I connect here to what Schön refers to as r*esearch on practitioners' fundamental action orientation*. I studied how practitioners tend to restructure what objectivity means in deliberative assessment settings, so that they can validly say that their assessment study meets the norm of objectivity.

3.4 Validity

As a consequence of my engagement within my research setting, my own experiences and the meanings I attach to them are unavoidably entangled with those of the practitioners under study. I confronted my own experiences with the perspectives of PBL researchers by means of member checking of the quotes and in informal conversations about specific projects or situations and my (preliminary) analysis thereof. The intersubjective testing has contributed to the internal validity of the study. Intersubjectivity is an important asset in interpretive inquiry, given that the interpretation of meanings and relationships can have different connotations depending on one's point of reference (Burawoy, 1998). I explicated my own point of reference using the hermeneutic circle as reflective instrument (see figure 3.1). In the view of standpoint theorists (e.g Harding, 1995) it is exactly this type of 'strong objectivity' (as compared to 'weak objectivity') that enables researchers to strengthen the internal validity of their research by reflecting on their social situatedness in the social matrix and the implications this has for their position, their perspectives and their power.

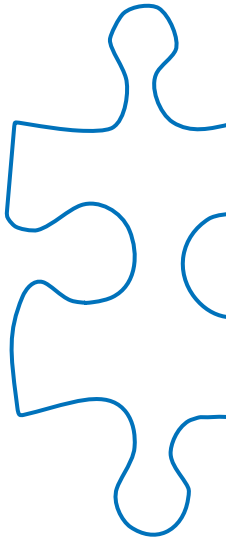
Moreover, internal validity is also assured by 'triangulation'. Triangulation refers to the attempt of understanding a specific phenomenon more comphrensively (Patton 1990). I have applied three types of triangulation: 'data triangulation' which refers to the use of a

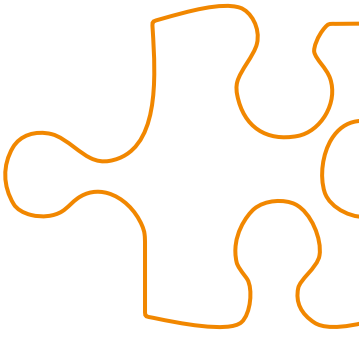
variety of data sources in the study (i.e. documents, conversations, observations); 'methodological triangulation' which refers to the use of multiple methods (i.e. participant observation, interviewing, document analysis) to study a single problem; and 'theory triangulation', which refers to the use of multiple perspectives to interpret a single set of data (i.e. the four reflective research angles).

Since this research comprises three in-depth case studies and uses several other exemplary materials in an alleged paradigmatic case, questions may arise about the external validity of the findings and conclusions. I use the lens of practice to concentrate on how practitioners at the PBL Netherlands Environmental Assessment Agency operate in-between logics within the fields of environment, nature and spatial planning. Other expert organisations have their own organisational identity and cultural foundations, but they all attempt to come to terms with the ideals of participation, transparency and reflexivity in contemporary society, whilst most of them have likely been established under a modernist paradigm. In chapter 11 I will aim to provide insights that may be of use for other (government) expert organisations at the science – policy interface.

4.

An introduction to the PBL Netherlands Environmental Assessment Agency





4.1 PBL in short

PBL presents itself as "autonomous research institute in the fields of the environment, nature and spatial planning. [It]… contributes to improving the quality of political and administrative decision-making by conducting outlook studies, analyses and evaluations in which an integrated approach is considered paramount" (PBL, 2017). PBL holds the legal status of policy analysis agency and aims to generate policy-relevant studies in an independent and scientifically sound manner. The PBL works for the cabinet and parliament of the Netherlands. It is organisationally based at the Ministry of Infrastructure and the Environment, which is also one of its primary clients. Other government departments – in particular the Ministry of Economic Affairs, the Ministry of the Interior and Kingdom Relations and the Ministry of Foreign Affairs – may also ask PBL to conduct research into issues related to the environment, nature and spatial planning. The PBL is largely government-funded[14]; its budget is supplemented with (international) research funding. PBL was confronted with a 25% budget decrease in the period from 2008 to 2015 (PBL, 2012c). In 2008 the PBL was created from a merger of the Netherlands Institute for Spatial Research (in Dutch: *Ruimtelijk planbureau*; abbreviated to RPB) with the Netherlands Environmental Assessment Agency (in Dutch: Milieu,- en Natuurplanbureau; abbreviated to MNP). Director-General of the PBL in the first period from 2008 –2015 (covered in this thesis) was Professor Maarten Hajer. Since 1 November 2015 Professor Hans Mommaas has been the Director-General.

4.2 PBL's institutional background

Understanding the PBL organisation at the nexus of its past and future requires insight into (changing) Dutch advisory arrangements and the position of planning bureaus. PBL is one of three planning bureaus (translated to English as policy analysis agencies) in the Netherlands. There are three policy analysis agencies in the Netherlands. Besides PBL, these are the CPB Netherlands Bureau for Economic Policy Analysis (in Dutch: *Centraal Planbureau*, abbreviated to CPB) and the Netherlands Institute for Social Research (in Dutch: *Sociaal Cultureel Planbureau*, abbreviated to SCP). The planning bureaus are "knowledge institutes that provide the Dutch government with knowledge about the present and future state of the country and how it is affected by the government's policies" (Halffman, 2009a: 41). Planning bureaus are small (PBL is the largest one including around 250 fte employees), independent, and relatively influential subsets of the public bureaucracy. "Originally intended to be a key ingredient in a planned economy, they have evolved into agencies where academically trained experts collect and interpret scientific data to assess their policy relevance" (Huitema and Turnhout, 2009: 577). It is through their skilful performance of independence that they can provide policy-makers with knowledge that is considered reliable and neutral to an extraordinary degree (Halffman, 2009a). The term independence thus has a specific meaning: "planning bureaus claim that blatant political influence will not alter their advice, even if unwelcome." (Halffman and Hoppe, 2005: 139). PBL's independence is secured by regulation through the Protocol for the Policy Analysis Agencies, article 4, which states that Dutch policy analysis agencies bear sole responsibility for the content and quality of their work and that policy-makers should refrain from interference with research contents and methods (Government Gazette, 2012). The institutionalisation of

[14] The desirable balance between national government funding and external funding is 80 to 20. (Article 10 in Government Gazette, 2012).

the planning bureau function has resulted in a shared protocol of principles and rules that was formulated originally in 1996. The protocol defines the planning bureau function. It marks the three core values of planning bureaus: independent from day-to-day policy concerns, based on scientific standards, and relevant for strategic policy. The basic understanding of these values coincides with modernist logic. Knowledge has to be instrumental for policy use, covered by scientific certification to assure that employees act in a politically neutral fashion. The PBL depicted its bridge function in the field of nature and biodiversity policy in 2014 as in figure 4.1: monitoring and modelling activities were highlighted as scientific input to evaluation and foresight studies, to result in policy-relevant knowledge for use in policy and society (PBL, 2014b).

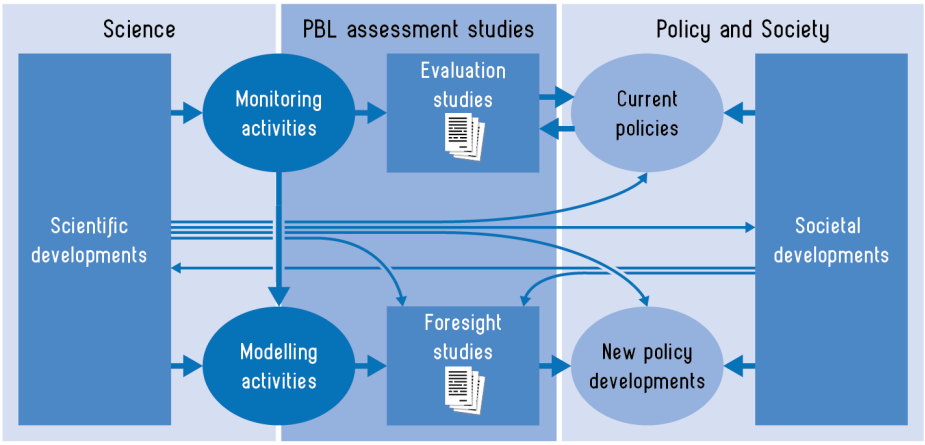


Figure 4.1 *PBL as a bridge between the science, policy and society domains (PBL, 2014b)*

The MNP, one of PBL's two precursor agencies, was modelled in close resemblance[15] with the original planning bureau function installed at the CPB in 1947. Many of its reports present numbers, frequently as the outcome of model calculations, and often the work of the bureaus is presented in the media as impact calculations (in Dutch: *doorrekeningen*). Pesch et al. (2012) give an account of the MNP's genesis. They offer a short chronological overview of the main developments in the institutional history of the MNP. In short: "*In the 1980s an organisation that could function as planning bureau in the field of environmental politics was thought to fulfil the double role of providing objective knowledge and advancing environmental policies. [....] In this period members of parliament expressed a wish for independent scientific information so as to facilitate accountable decision-making processes. The establishment of an environmental planning bureau was thought to guarantee such information. [...] In the early 1990s procedures to obtain legal status for a planning bureau were launched, finally leading to the formal establishment of an environmental assessment agency [until 2005 as part of the RIVM] with planning bureau status in 1996.*" (p.491)

PBL's other precursor agency, the RPB, has always conceived of its role rather differently, stressing design and creativity more than the prediction and certification

[15] Powell and DiMaggio (1991) refer to this type of institutional behaviour as mimetic isomorphism: mimicry involves the conscious use of approaches of other cases as recipe for new problems. MNP's establishment was motivated by the lack of objective environmental information, and a planning bureau was thought to guarantee such information.

practices that are so central to the other planning bureaus (Halffman, 2009b). Van der Wouden et al. (2006) and Lagendijk and Needham (2012) give an account of RPB's institutional history. The RPB "*was established in 2002 in response to criticism on the National Spatial Planning Agency [in Dutch: Rijksplanologische Dienst, established in 1965*[16] *as a directorate general of the Ministry of Spatial Planning, Housing and the Environment] […] for its lack of scientific depth and independence. […] Conducting research into spatial developments and trends is the core business of the RPB. The results of the agency's research are used to create new insights concerning the nature of policy problems, and to develop alternative policy and scenarios*." (van der Wouden et al., 2006: 37)

"Like the other planbureaus, the RPB was instituted as a state-funded, statutory body with a brief to provide high-quality (academic level) research output serving the interests of an assigned policy domain, independent from the associated state departments. It was empowered to produce research and advice, on its own initiative and at the request of the central government." (Lagendijk and Needham, 2012: 477)

These variations in the planning bureau function originate from historical path-dependency and marked differences of the policy fields at MNP and RPB. The field of nature and environmental policy is influenced by (international) commitments to (future) environmental target levels. The field of spatial planning is a decentralised and interactive policy domain informed by concepts and visions of quality of space and spatial development. As a consequence, the planning bureau function knows variations in how the agencies have shaped their independence and appropriate distance to policy and politics, and the kind of expertise they provide to policy-makers. MNP has been oriented to the integrated systems analysis and impact calculations. It served policy-makers with several statutory reports, in particular with respect to the progress of environmental policy and policy goal attainment towards international environmental commitments. In contrast, the statutory tasks of the RPB were limited to the monitoring of land needs and spatial policy development (Halffman, 2009a). With an undertone of disciplining policy-makers into budgetary constraints or previously agreed targets, the MNP has been questioning policy intentions. This has put MNP on conflicting terms with government departments on certain occasions (Halffman, 2009a; de Vries, 2008). But the idea of a planning bureau provided sufficient interpretative flexibility to allow the MNP to readjust its self-image as a planning bureau. Therefore, the MNP could explore new routes without discarding the interdisciplinary systems approach it wanted to exploit (Pesch et al., 2012). Conversely, the RPB has been criticised for misinterpreting its task and its right to exist was called in question. RPB had always stressed its interpretative capacities in helping policy-makers to interpret novel concepts and visions of spatial planning for their policy practice. It envisaged for itself a role as think-tank, to think along with policy-makers on what they could choose as policy frames and targets. In 2007, the audit committee pointed out that: "The RPB has interpreted incorrectly its task […] it should have done it differently […] A planbureau should be critical, but not exclusively so, and it should subject policy alternatives to a sober evaluation. It should gather and focus that knowledge which is relevant for policy. It should develop a thorough knowledge of the policy fields, the policy processes, and how decisions are made. It is good that a planbureau is self-assured, but it should not place

[16] Its precursor agency was the National Planning Service (*Rijksdienst voor het Plan*) which had been installed under occupation in 1940 to assess land needs and draw up spatial plans (Vuijsje, 2002 in Halffman, 2009a).

itself above the rest of the world" (Don, 2007:22 in Lagendijk and Needham, 2012: 486). This corrective action illustrates clearly how flexibility of the planning bureau function can be stretched only to the extent that there remains a fit with institutional expectations on what it means for a planning bureau to generate advice in a policy-relevant, scientifically sound and independent manner. The merger of the MNP and RPB in 2008 had to strengthen the capacities of both institutes, by bringing the interpretative capacities of RPB and the modelling capacities of the MNP together under the same heading.

4.3 The (changing) policy advisory system in the Netherlands

The PBL functions in a larger policy advisory system of interdependent and competing actors and organisations (Craft and Howlett, 2013). The notion of a policy advisory system (Halligan, 1995) refers to the complex system of actors who cooperate in various ways to provide the advice that helps decision-makers shape policies. The configuration of actors and their relationships are unique for each jurisdiction, and within each jurisdiction the configuration may vary from policy sector to policy sector (Halligan, 1995; Craft and Howlett, 2012). On the national level, scholarly analyses have identified marked differences among advisory practices with respect to the types of actors engaged, the role of the public and the utilisation of advice (Hermann et al., 2015). These distinctions have been attributed to (country-) specific configurations of political cultures (Halffman, 2005; Jasanoff, 2005a; Renn, 1995). The political culture in the Netherlands is characterised by a configuration of market-oriented, deliberative and neo-corporatist elements.

Typically, the planning bureaus represent the neo-corporatist state tradition[17] of the Netherlands (Hoppe and Halffman, 2004; Halffman, 2009a). The role of the planning bureaus is to act as the 'linesman of politics' who set the boundaries for the political negotiations between interest groups (Halffman and Hoppe, 2005). Hence, their practices fit a traditionally determined authoritative role among a limited group of interest representatives and government (Halffman, 2009a). Although the authority of expertise in society seems to be deteriorating, the planning bureaus are still often represented in the public debate as a practice of neutral calculation. They produce a 'serviceable truth'[18] by assessing policy outcomes in a neutral and unpartisan way. Halffman (2009a) has identified them as powerful institutes that discipline policy-makers into rational policy-making. The authority of planning bureaus is created, first and foremost, by politicians and policy-makers who discipline each other with claims of expertise. They accept PBL's knowledge as best-guess statements that create the playing field they operate and bargain in, because "questioning this would lead to a swamp of policy unpredictability" (de Vries, 2008).

The composition and functioning of a policy advisory system can change over time, inspired by 'grand' transitions. Acknowledging these variations, the advisory system in

[17] I understand neo-corporatist advice-giving as a synthesis of features of a corporatist style (interest groups intermediate their interests with the state) and a consensus-seeking approach (deliberation is oriented towards the creation of consensus). Organised social partnerships intermediate their interests with the state through institutionalised deliberation routines in the so-called 'poldermodel'. This style of advice-giving is characteristic of European continental countries (such as Germany, Austria, the Netherlands and Belgium) (van den Berg, 2017; Hermann et al., 2016).
[18] See section 1.1

the Netherlands over the past decades can roughly be characterised by two simultaneous trends: *(1) a neoliberal inspired technocratisation trend; and (2) a move towards a more interactive-deliberative style of science and governance* (Halffman and Hoppe, 2005; van den Berg, 2017). These trends have also affected the planning bureaus and their role and position in society:

1. Under influence of New Public Management discourse (centered on operating costs and efficiency arguments) advisory system reforms in the 1990s made 'independent expertise' the guiding principle of the advisory system. The provision of neutral expertise became the dominant function of the advisory system. This function replaced the traditional advisory orientation to the channelling and voicing of pillarised civil society interests (which still is the primary orientation in Germany for example). In the Netherlands there has been an increased tendency to control and steer policy advice. This has stimulated the use of ad hoc advisory committees and consultancies who are more likely to advise policy-makers in ways supportive of their strategy. The appeal to and authority of permanent advisory bodies as independent and critical internal or external advisors has decreased (Halffman and Hoppe, 2005; van den Berg, 2017). Given both the increased complexity of policy issues and the increased political pressure on the executive, ministers often feel better served by committees whose composition can be better tailored and more easily controlled than permanent advisory bodies and councils. For the PBL and the other planning bureaus, this development may have inspired the formalisation and legalisation of the planning bureau function. Their independent position at an arm's length position of government departments has been specified in the Government Gazette (2012).

   The tendency of control has been informed by the powerful technocratic discourse of calculation and numbers, which disciplines governing towards the pursuit of measurable targets, control and prediction. This discourse may have inspired the establishment of the PBL and the SCP as counterforces to the disciplining force of economic numbers and modelling done by the CPB. Yet, still today, the hegemony of CPB remains largely unchallenged[19]. Several scholars have argued, for example, that political parties can hardly resist the disciplining force of the assessment of election programmes (Hoppe and Halffman, 2004; Huitema and Turnhout, 2009; Pesch et al., 2012). Different from the calculative orientation of the planning bureau function, other scientific advisory bodies have been founded under this discourse, although they have started to perceive of their task differently, such as the Council for Government Policy (in Dutch: Wetenschappelijke Raad voor het Regeringsbeleid, WRR)[20], whose expertise relies on interpretation more than on calculation, or the Rathenau Institute, which has started in 1994 with participatory forms of bringing experts, citizens, stakeholders and policy-makers together (Halffman, 2009a).

[19] One of the explanations for CPB's large influence on policy is that CPB researchers and policy-makers in the Ministry of Economic Affairs are trained in the same ideological school (de Vries, 2008; Halffman, 2009a).

[20] The WRR was established initially in 1973 to predict the future of society and coordinate other planning bureaus, but soon gave way to problem analysis and interpretation across policy sectors and disciplines. Nowadays, the Council resembles a think-tank more than a planning bureau (Halffman, 2009a; Scholten, 2009; Scholten and van Nispen, 2014).

2. Under influence of democratic science and deliberative governance discourses, expertise is increasingly understood as a collective resource in public debate wherever this takes place (in media, forums, parliament). In these settings "it is never a priori clear where relevant expertise will come from. New actors appear around new issues, bringing in their own knowledge or their own concerns" (Halffman and Hoppe, 2005: 143). Implicated in these discourses is the central role of a critical (educated) citizenship that tends to question the authority of classical-modernist order and the unprecedented power of its institutions (Hajer, 2009). Illustrative hereof are critical questions of industry and environmental organisations about assumptions underneath planning bureau assessments and the objections of several political parties to the planning bureau assessments of party programmes in the past (Halffman, 2009a). Assessments are also occasionally been questioned by competing schools of thought. Thus, the position of the planning bureaus and the status of their knowledge is not above all doubt or criticism. The CPB has recently been subjected to high public, political and peer criticism (Hollanders, 2016; de Beer, 2016). CPB is accused of its 'tunnel vision' and its 'fossilised models'. This critique comes down to CPB's performance as (stealth) advocate of the neoliberal economic ideology. Also PBL has been criticised in the past for its environmental advocacy position (see 4.4). The launch of an Open Planning Bureau[21] strikingly illustrates how deliberative and democratic initiatives of expertise production can instantly arise, motivated by criticism on the credibility and influence of established orders. Under these developments experts and established expert agencies are confronted with questions on how to perform their roles for policy and society, on how to deal with uncertainties and on how to relate to the networked nature of policy formation.

All in all, the planning bureaus remain an important source of expertise within the Dutch policy advisory system as the part of the institutionalised neo-corporatist system of influential advisory bodies that is maintained under managerial and technocratic discourses of expertise. At the same time deliberative discourses of expertise become more prominent (van den Berg, 2017; Halffman and Hoppe, 2005). Similar patterns and shifts can be found in other countries (Reinecke, 2015; Reinecke et al., 2013). In Austria, for example, a hybridisation of deliberative and neo-corporatist patterns is gradually shaping the science–policy landscape especially in emerging policy fields like climate adaptation policy (Hermann et al., 2015). Yet, the planning bureaus tend to remain hesitant towards the utilisation of participatory modes of knowledge production. They adhere to scientific knowledge as primary knowledge form and to interaction with government departments as their principal clients. A similar hesitating acknowledgement of the plural and distributed nature of expertise has for example been found in German advisory institutes (Heinrichs, 2005). Hesitation is informed, as scholars argue, by bureaucratic survival issues (Halffman and Hoppe, 2005) and by the fear of making visible the contingent aspects of the construction of expertise as it may undermine credibility (Hilgartner, 2000; Bijker et al., 2009).

[21] In November 2016 a Dutch research institute for social innovation (Waag Society) launched the Open Planning Bureau: a co-creative initiative to assess the election programmes of political parties based on an alternative conception of welfare. They criticise the narrow financial-economic frame of the CPB, and call into question its mandate to calculate the 2017 election programmes (https://www.waag.org/nl/nieuws/wat-het-open-planbureau)

4.4 Steps into the direction of a reflexive mode of working at PBL

The authority of the planning bureaus is unrivalled in Dutch politics. There are no other knowledge institutes in the Netherlands that can compete with the planning bureaus' status, while criticism or public objection remains rare. Halffman (2009a) argues that the continued exclusive position of the planning bureaus is puzzling "in a time when the intellectual discourse about the role of experts in public policy favours a modest role for experts, an awareness of multiple expert perspectives, of the fallibility of prognoses, or of the negotiated boundary between fact and value"(p. 43). This section explores how reflexive logic has gained grounds in PBL's assessment practices in the recent past, while modernist logic remains institutionally and rhetorically powerful.

Empirical research at the PBL (and at its precursor agencies, the MNP in particular) (including Huitema and Turnhout, 2009; Hoppe, 2009; Hage et al., 2010; Petersen et al., 2011; Pesch et al., 2012; Lagendijk and Needham, 2012) offers insightful illustrations of the level of adaptability that PBL tends to display under changing circumstances. What the various cases have in common is that they analyse the (re-)positioning of PBL at the science–policy interface and/or how PBL anticipated developments to attend to issues of dealing with uncertainty, perspective plurality and stakeholder participation in the past.

4.4.1 Repositioning at the science–policy interface?

Previously conducted studies of the PBL organisation in relation to its interface position have explored PBL's performance as a boundary organisation in the Dutch policy advisory system.

A first angle of scholarly reflection centres on PBL's performance of independence. Huitema and Turnhout (2009) identified how the PBL staff portrayed their independence as an act of balancing between engagement with policy-relevant questions and avoidance of being considered part of the policy system. Correspondingly, Hage et al. (2010) argued that independence is stressed at PBL in order not to get caught up in political power-play. The authors indicated that too close contact with stakeholders was, accordingly, perceived by PBL researchers as a threat to PBL's independent position. On the basis of interviews with staff members, they identified three main reasons for this: "First, […] PBL risks being regarded as an environmental lobby organisation. Reportings by the PBL on environmental issues and the publication of assessments of the impact of certain policy measures, are often used by environmental movements. Joint activities with (environmental) NGOs could strengthen this lobbying image and cast doubt on the neutrality of PBL. Second, a similar, too close interaction with non-scientific stakeholders, in general, feels like a threat to scientific independence and quality. Third, some PBL employees, generally, have little faith in stakeholders, as they could 'run off' with preliminary research results and (ab)use them for their own political cause. As a result, PBL employees have their reservations towards stakeholder participation that goes beyond one-way communication. They regard stakeholder participation as a useful tool for gathering new knowledge, but they prefer to study them, rather than learn from them" (p.258-259). This empirical study of Hage et al. (2010) closely resembles other findings demonstrating the tendency to instrumentalise participatory knowledge production employed within expert organisations (see section 2.3).

Another angle of reflection upon the position of PBL at the science–policy interface has centred on its performance of different types of expert roles. Scholars have identified how the MNP tends to function as an issue advocate, "a scientifically informed analyst of environmental issues" (Pesch et al., 2012: 500). MNP staff interviewed by Huitema and Turnhout (2009) considered issue advocacy legitimate as it demonstrated MNP's independence from policy, whereas they simultaneously considered it risky vis-à-vis its policy relevance and credibility. Therefore a 'science arbiter' role (i.e. addressing policy-relevant questions that are answered on the basis of models) was the more preferred position among MNP staff (Huitema and Turnhout, 2009). Studying the short-lifespan of the RPB, Lagendijk and Needham (2012) also highlighted RPB's advocacy position and how this was met with a lot of critical responses in policy circles[22]. As a consequence, RPB's research was not considered policy-relevant enough (see also 4.2).

Huitema and Turnhout (2009) and Pesch et al. (2012) identified how the MNP staff preferred the 'knowledge broker' role as the ideal-typical role. Their preferences for 'if then' formulations and their emphasis on the importance of serving users by providing policy alternatives pointed into this direction (Huitema and Turnhout, 2009). Similarly, Hage et al. (2010) argued that the Guidance for Stakeholder Participation could further endorse an already ongoing change within the PBL: "from a measuring institution to an integrating network function, with the PBL as a knowledge broker" (p.263). Also Lagendijk & Needham (2012) suggested that brokerage could, in their view, have provided more scope than advocacy for setting the agenda and conveying certain ideas and beliefs.

All in all, what the various empirical studies of RPB and MNP have in common is that they illustrated the performance of expert roles not to be an autonomous choice of the researchers. Role performance is unwittingly shaped by fluctuating conditions in the political context. The scholars argue that more insight into the functioning of a boundary organisation and the dynamics involved in its practices will help to obtain better insight into effective ways for bringing science-based knowledge into the political domain.

4.4.2 Towards a reflexive mode of advising, or not?

PBL 's orientation towards dealing with uncertainty, perspective plurality and stakeholder participation has been informed by a credibility crisis in the past. Scientific uncertainties became an explosive issue for the MNP in 1999, when a senior statistician of the RIVM, Hans Dekwaadsteniet, wrote a letter to a national newspaper, claiming that the RIVM's results were deceptive because most of its observations on the state of the environment were based on model calculations and not on actual measurements. Subsequently, a systematic and coherent approach to uncertainties was developed together with Utrecht University, culminating in the publication of the Guidance for Uncertainty Assessment and Communication (van der Sluijs, 2008). This Guidance includes a checklist urging researchers to specify assumptions about the problem; to

[22] Halffman, 2009b:12 puts it this way "policy makers are generally not prepared to spend their expert resources to organise their own opposition for very long. [...] This makes a reflexive / advocacy mix a dangerous profile for long-term survival when an organisation is directly dependent on the executive" (cf. Lagendijk and Needham 2012: 488). Lagendijk and Needham (2012) suggest that a strong advocacy position is likely to be attainable for think-tanks only after having built up a strong reputation and a strong embedding in political and policy cycles.

involve relevant stakeholders; to indicate the limits of the available data and theories; and to report uncertainties adequately (Petersen et al., 2013). As a consequence of the de Kwaadsteniet affair, the PBL (then RIVM/MNP) deliberately started a process of organisational and cultural change concerning the issues of uncertainty, its management and its role in scientific advice. Since the Uncertainty Guidance pointed at stakeholder participation as an important way of dealing with uncertainties in environmental assessments, it was decided to take a further look at the possible role of stakeholder participation in PBL assessments, which has resulted in the development of a Guidance for Stakeholder Participation (Hage and Leroy, 2008; Hage et al., 2010).

Yet in practice, ambitions for and opinions of PBL researchers on uncertainty assessment and stakeholder participation have been shown to differ substantially from the theory underneath the guidance documents (Wardekker et al., 2008; Hage et al., 2010; Petersen et al., 2011). Wardekker et al. (2008) identified, for example, a preference among MNP researchers for a quantifying approach to achieve uncertainty reduction. Uncertainty was perceived of as being undesirable, but inevitable. This stance reflects their appeal to a scientific rhetoric in which the facts remain separated from the values. Similarly, van Asselt and Rotmans (2002) pointed out how PBL researchers were inclined to adhere to a positivist epistemology in integrated assessment modelling. Only a large minority opted for a deliberative view (and constructivist orientation) in which uncertainty was perceived to create opportunities for putting the role of science into perspective (Wardekker et al. 2008; Van Asselt and Rotmans, 2002). Hage et al (2010) identified a similar inclination towards a modernist conception of knowledge production when asking PBL researchers for their opinions on stakeholder participation. The authors found that "participation is mostly instrumental and seldom substantial and, therefore, consultative rather than interactive. Gaining new insights, perspectives and knowledge from the stakeholders is put forward as a secondary motive, clearly beyond obtaining support. Stakeholder participation as a means of reflexively dealing with uncertainty by PBL was hardly mentioned at all, even though this was the main reason for developing a Guidance for Stakeholder Participation" (p.258).

Nonetheless, these activities seem to have initiated a process of change that is still ongoing. Yet, to alter the way of thinking and of handling uncertainty at PBL requires a shared understanding of the basic values and beliefs underlying a reflexive mode of advising. In view of PBL's institutionalised position as 'normal science' institute at the science–policy interface this involves a change in working procedures, which is a slow process that is naturally met with resistance (Petersen et al. 2011). An indication that steps into the direction of reflexive logic at PBL are not undisputedly accepted became strikingly apparent in February 2010 when PBL was assigned the task by the Dutch cabinet and parliament to review the IPCC fourth assessment report (AR4) in response to political and media debate about mistakes in the regional assessment part. PBL's former Director (from 2008 to 2015) Maarten Hajer[23], a renowned scholar in deliberative governance, initiated a deliberative assessment repertoire by inviting critical peers and publics to contribute to the review of potential mistakes (PBL, 2010a; Hajer, 2012). While this experimental deliberative approach was found to have restored the credibility and legitimacy of PBL and climate science in general, Hajer (2012) and Tuinstra and Hajer (2014) also demonstrated that it was met with a lot of resistance. For

[23] Hajer also authored the successful publication 'the Energetic Society' (Hajer, 2011) which initiated internal debate within the agency about the added value of deliberative policy analysis.

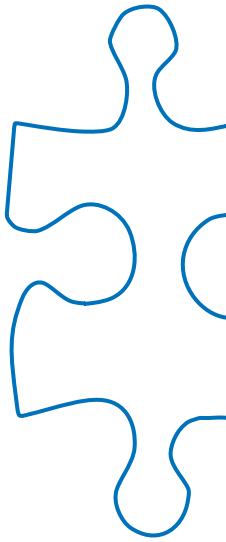
example, the deliberative repertoire was scrutinised by the climate science community, both inside and outside of the organisation, who found it irresponsible to engage with climate skeptics and lay people. Climate skeptics initially considered the approach to be illegitimate as PBL had been a part of the climate science community contributing to the mistakes (Hajer, 2012; Tuinstra and Hajer, 2014).

Hence we see how method innovation with deliberative experiments and guidance documents induced a search for new epistemic and social understandings of the exclusive position of a planning bureau. At the same time PBL cannot risk losing its appeal to "the idea that science-based expertise could be used to objectify political statements so that these become comparable" (Pesch et al., 2012: 495). Thus, it appears from these studies that reflexive logic cannot be institutionalised overnight.

5.

Advancing the methodology of participatory assessment

Designing an analytical-deliberative approach in the Sustainable City project



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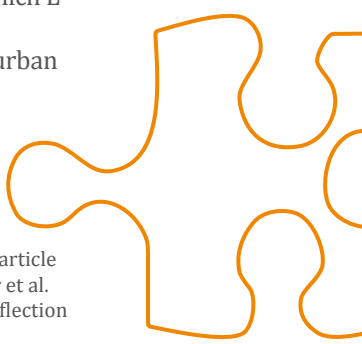


I significantly contributed to the article writing. A major part of the article content corresponds with the text of a symposium reader (Kunseler et al. 2010, available in Dutch at www.pbl.nl) and I firstly authored the reflection section.

Experts in government expert organisations, these days, have to come to grips with the call for a reflexive science. This chapter describes and illustrates the analytical-deliberative approach in PBL's Sustainable City study. It shows how PBL practitioners aim for a more prominent inclusion of perspective plurality and plural knowledges on urban sustainability.

The PBL has developed its own methodology for sustainability assessment (MNP 2004;2007a, 2007b). It consists of a context-specific combination of formal, analytical methods (calculation tools, environmental models) and deliberative methods (expert elicitation, stakeholder dialogues) (de Vries and Petersen, 2009). The term 'analytic-deliberative' was introduced by Stern and Fineberg (1996) in the field of risk management for integrating analytic reasoning with deliberation and interpretation. In PBL's Sustainable City study, the PBL practitioners (including myself, acting as full project member in the period from 2008 to 2010) attempted to advance this methodology. They developed model-based narratives with participatory backcasting (Dreborg, 1996; Robinson, 2003; Quist and Vergragt, 2006) to create and develop desired images of a future sustainable urban city together with extended peers in stakeholder dialogues.

I illustrate how the PBL practitioners in this urban sustainability assessment study implemented their post-normal science aspirations during the scenario design, execution of stakeholder dialogues and framing of output. It is purely descriptive in nature, without (hardly) any analytical depth and reflection, and therefore illustrative of how PBL practitioners conceive of and process the challenges they encounter in day-to-day practice. This chapter offers the starting point for the reflective research orientation in the subsequent chapters.

5.1 Introduction

The sustainable city has become a leading paradigm of urban development throughout the world and is a space of socio-ecological regulation (Whitehead, 2003). In the Netherlands, sustainability is a prominent topic in socio-political discussions about the design and development of urban areas. The realisation of a sustainable urban living environment requires strategic choices in spatial planning in reciprocation with and between other areas of relevance. In the 2007 coalition agreement, the Balkenende IV Cabinet promoted cohesion among all actors and areas where sustainability can and must be implemented: 'We can only achieve these goals together. Citizens, businesses and government entities will have to make structural sustainable choices' (Balkenende IV Cabinet, 2007).

The Dutch National Spatial Strategy 'Space for Development' interprets sustainability along the lines of the 'three-P approach' (people, planet, profit) as reflected in the policy ambition ". . .to strengthen economic, ecological and sociocultural values in spatial areas in an equitable and cohesive development that results in an increased attractiveness of the space" (Ministry of Housing, Spatial Planning and the Environment (VROM), 2006). Balancing between inner-city development and strengthening of the quality of the living environment is key to achieving a cohesive strategy for sustainable urban development.

The PBL Netherlands Environmental Assessment Agency (PBL) adopted in 2004 'sustainable quality of life' as a focus for policy assessment (MNP, 2004, 2007a, 2007b). In the context of urban development this term implies that the present and future urban population is healthy and can enjoyably function in an urban setting that motivates active participation and meets its present and future energy needs in a sustainable way. In early 2008, a policy assessment study entitled 'The Sustainable City' started under this flag. The aim of this study was to generate integrated options for strategic, long-term urban development policies in the Netherlands. It started from the assumption that today's policy on urban development is too fragmented and that side effects and trade-offs on sustainable quality of life are not well considered. To identify those policy options that will trigger sustainable urban development, desirable images of a future sustainable city in 2040 and roadmaps to identify actions on a timeline from 2040 back to present were developed in dialogue with experts from various disciplines with different perspectives, insights and opinions. Using this method, which is known as participatory backcasting, in combination with modelling exercises, resulted in model-based narratives for a sustainable city in 2040. This paper provides insight into the way these model-based narratives were developed. The assessment process takes an analytical–deliberative approach, involving participation of stakeholders, combining quantitative and qualitative methods and techniques and interdisciplinary collaboration. For PBL standards, this study could be classified as innovative and experimental (Petersen et al., 2011). The lessons learnt from an evaluation of the research process are presented in this paper.

In this paper, we start by briefly examining PBL's methodology for sustainability assessment as it was adopted in 2007 – when the Sustainable City study was defined – and as it evolved thereafter. We explain that this methodology accounted for the research design chosen at the end of 2007. Next, we present the research process and findings of the Sustainable City study. For some specific details of the study, we refer to an earlier paper by Dassen et al. (2010) and methodology reader by Kunseler et al. (2010) about the Sustainable City study. We conclude with a reflection on the way the

methodology was put into practice and served in attaining the aim of generating integrated options for strategic, long-term urban development policies.

We feel that this paper holds valuable insights for readers interested in what sustainable development entails for urban design and development and in the challenges unstructured issues such as sustainable quality of life pose for policy and the assessment of policy. An important note here is that the findings resulting from the study were generated primarily as a means to further focus the stakeholder dialogue. In that respect, the findings have to be elaborated and complemented further before they can be placed in a useable framework for decision making.

5.2 Designing the research process

5.2.1 Sustainability outlooks and methodology for sustainability assessment

The PBL had already carried out two Sustainability Outlook projects prior to the Sustainable City study. In these outlooks the global developments (MNP, 2004, 2007a) or the national spatial developments (MNP, 2007b) were the context for exploring sustainable development as a leading paradigm for strategic policy-making. The First Sustainability Outlook (MNP, 2004) was followed by a methodological evaluation in 2006 (Petersen, 2006). More recently, de Vries and Petersen (2009) and Petersen et al. (2011) analysed PBL's methodology for sustainability assessment from a broader scientific perspective.

De Vries and Petersen (2009) argue for the importance of an integrated framework for sustainability assessments. They explain that "the methodology should be a context-specific combination of formal, analytical methods (tools and models) and participatory methods (experts' elicitations, games)". The objective of the methodology is to assist in the construction of more comprehensive and adequate models of (non-)sustainable development, which help politicians and citizens formulating strategies for action. De Vries and Petersen (2009) then postulate that hundreds of definitions of sustainable development have been given. Despite the inherent pluralism, the common notion is that "sustainable development is a quest for developing and sustaining qualities of life. […] The nexus between sustainability and quality of life is the degree to which developing and/or maintaining a quality of life for a human population has consequences which impair the options for developing and/or maintaining an aspired quality of life, later and/or elsewhere." (p.1007) Starting point is that a sustainability assessment should investigate the ability to continue and develop a desirable way of living vis-à-vis later generations and life elsewhere on the planet. Evidently, people hold different values and beliefs about the way societies sustain quality of life for their members. The first step, therefore, is to analyze people's value orientations and the way in which they interpret sustainability problems i.e. their beliefs. The next step is to translate the resulting worldviews into model-based narratives, i.e. scenarios. The qualitative and quantitative outcomes are then investigated in terms of associated risks and opportunities and robustness of policy options.

The importance of taking values into consideration in sustainability assessments can be explained by the notion of post-normal science. Where 'normal' science strives for certainty and consensus about values, post-normal science accepts uncertainty and conflicting opinions that are inherent to complex issues. These issues require input from external experts, interested parties and stakeholders from various disciplines with

different perspectives, insights and opinions, the so-called 'extended peers' (Funtowicz and Ravetz, 1990; Ravetz, 1999). In the Sustainability Outlook projects, value orientations towards a number of macro problems of high complexity (e.g. poverty) were collected from media and ranked by surveys (MNP, 2004) or obtained from policy documents (MNP, 2007a, 2007b). The resulting archetypical worldviews became the basis for four different model-based narratives, here called scenarios, for policy analysis, with emphases on the domains of transport, energy and food. The use of different worldviews provides a way to deal with the plurality of perspectives on sustainability problems. Obviously, for a policy assessment on sustainable development to be able to play a significant role in structuring the policy debate, stakeholders need to be engaged and feel represented in the worldviews used. Petersen et al. (2011) explain that the level of stakeholder participation in the Sustainability Outlook projects was kept relatively low. Still the presentation of value-laden aspects of a problem that could also have been treated in a more 'objective' manner constitutes progress in the direction of post-normal science (Petersen et al., 2011).

5.2.2 Framing sustainability in an urban context

In order to meet the objective of the Sustainable City study to arrive at integrated options for strategic, long-term urban development policies in the Netherlands, we transformed the macro problems addressed in the First Sustainability Outlook into an operational programme suitable for an urban context. We started from the perspective that the daily urban system is the geographical unit where quality of life is generated and people make most of their choices also affecting the lives of others. The daily urban system is the area in and around a city where people commute to work on a daily basis and exercise social and recreational activities. Interviewing 30 scientists and practitioners active in the field of urban design and development led to the conclusion that, for our study, sustainable quality of life can be operationalized starting from three main themes, namely 'health', 'liveability' and 'energy' (production and consumption). Health, liveability and energy are closely knit in the context of sustainable urban design and development and are compatible with the Dutch policy focus for sustainable area development (see Dassen et al., 2010, for a survey of Dutch policies). It was recognised that policy on health, liveability and energy is highly fragmented, whereas, for achieving sustainability, policy coherence is crucial. The cohesiveness of a policy and its execution significantly determine how successful the various levels of governments, professional organisations and citizens will be in fostering improvements in urban areas.

5.2.3 Participatory backcasting

As values, beliefs and knowledge claims were expected to play an important role in the Sustainable City study, the integration of different kinds of knowledge was regarded as a prerequisite for meeting the research goals. Extensive in-house expertise concerning urban health, liveability and energy, and ready-to-use models, was regarded to be less present and less mobilisable in the scientific network than was the case for the macro problems addressed in the Sustainability Outlooks. Moreover, for "long-term complex issues, involving many aspects of society, as well as technological innovations and change"(Dreborg, 1996, p. 814), normative uncertainty is high and a diversity of perspectives therefore needs to be addressed. Extended peers were therefore given a more prominent role than in the previous Sustainability Outlooks. A way to organise the

involvement of extended peers was thought to be found in the method of participatory backcasting (Michiels van Kessenich, 2009). In essence, participatory backcasting consists of creating desired images of the future in a stakeholder dialogue, then producing and analysing the road-map that could lead to such a desired future. Robinson (2003) described this type of backcasting as "a second order generation form of backcasting" (p. 854). He pointed out that the development and creation of desired images of the future should be a part of the research process and not, as in first generation backcasting, already normatively defined beforehand. Robinson (2003) emphasised the importance of social learning, interactive social research and the involvement of lay knowledge. As suggested by Quist and Vergragt (2006), participatory backcasting can be applied in multiple sectors. Within these multiple sectors, multiple actors interact. Policymakers, scientists, representatives of nongovernmental organisations, interest groups and market parties all have certain interests in the policy-making process (Quist and Vergragt, 2006) and should therefore be involved in the participatory backcasting process (Dreborg, 1996).

Using the PBL guidance for stakeholder participation (Hage and Leroy, 2008), a large group of scientists and practitioners was contacted and selected for participation in the backcasting process. This group consisted of people from fields relating to health, liveability and energy that overlap with urban design and development. In total, about 100 experts actively participated in the study. The selection of the stakeholders and the use of participatory backcasting as a research method in the Sustainable City study are described in more detail by Michiels van Kessenich and Leroy (2009) and Michiels van Kessenich (2009).

5.2.4 Stakeholder workshops

The group of stakeholders was divided into four tracks: health, liveability in the growing city, liveability in the shrinking city and energy. The liveability group was subdivided into growth of cities and shrinkage of cities because both are relevant realities for the Netherlands in the near future. Participatory backcasting was organised around two rounds of dialogue in stakeholder workshops, for each track separately. In a third and final workshop the tracks were combined. During the workshops at least five members of the research team were present taking notes, making audio recordings of the discussions (during part of the time) and taking photographs of the flip-charts or other material produced by the participants. This material was used to make reports. The reports present the storylines as they emerged from the discussions. At every workshop, various discussion techniques were used. The discussions further evolved within and among small subgroups, which made it too complicated to completely report and reproduce all the arguments made during the discussions.

The first round of dialogue focused on creating desired images of a sustainable city in 2040. Back-office, the desired images from each track were developed into 'visions' for a sustainable city. To further work out the spatial layout of the future sustainable city, prior to the second round of workshops, there was an attempt using an internet forum to further concretize the visions in terms of their implications for urban functional areas. In the second workshop round, these urban functional areas, including public space, meeting places and recreational areas, mobility, energy saving facilities, public services, housing and work, energy production and energy distribution, offered the context for developing road maps. The visions on a Sustainable City in 2040 were used as the

starting point for generating an overview of actions and necessary efforts and placed on a timeline starting from now until 2040. Back-office, the (more) concrete and specific actions and necessary efforts were combined into a set of 'options'. For the third round, the total stakeholder group was merged and extended with policy-makers from governmental departments involved in policies affecting urban design and development. At this meeting, held on 21 April 2010, this group had joint discussions on the feasibility of the visions and options for the sustainable city. More specifically, they were asked to give their ideas about the role of the national government. What knowledge should the national government have and what should the government want, do or be able to do to contribute to the realisation of the sustainable city? With the objective to facilitate the stakeholder discussions on these questions, a comprehensive analysis on the visions and options provided by the stakeholders in the eight preceding workshops was started after the second round of workshops. The analysis and the resulting model-based narratives are presented in the next sections.

5.3 The road towards model-based narratives

In this section the findings from the stakeholder dialogues are presented and combined with modelling exercises to develop model-based narratives. This analytical–deliberative approach enables iterative reflection on analytic and normative constructs of sustainability. Deliberation among stakeholders produced a normative interpretation of the concept of urban sustainability. The analytical elements added consistency through critical comparison with the value and belief constructs, to result in model-based knowledge claims on sustainability (Kunseler et al., 2009).

5.3.1 Sustainability values

Across the workshops, the stakeholder groups repeatedly and consistently stressed certain aspects of urban life, design and development as important preconditions or manifestations of urban sustainability. In our analyses of the stakeholder dialogues we focussed on these so-called storylines. In the workshops on urban health, the stakeholders emphasised the importance of a city environment that promotes more physical activity and is less dependent on individual car usage (Michiels van Kessenich and Leroy, 2009). In the liveability track on growth of cities, the stakeholders interpreted a sustainable city as an environment that promotes social cohesion, support and diversity. In the track on demographic shrinkage, the strengthening of the local economy and social networks by smart re-use of homes and space was emphasised. In the energy track, the stakeholders embraced the idea that the total energy demand of the city can be met through energy saving and local energy production using various renewable sources (Folkert 2009). The main storylines from the health (HE), liveability (LI) and energy (EN) tracks were combined into the following set of sustainability values:

1. The urban living environment leads to reduction of energy use for transport (EN).
2. The urban living environment leads to reduction of energy use for other sectors (EN).
3. The urban living environment offers space for sustainable energy production (EN).
4. The urban living environment is free from environmental risks (HE).
5. The urban living environment is resistant against climate changes (HE, LI).
6. The urban living environment offers space for natural diversity (HE, LI).
7. The urban living environment offers green areas and water in the vicinity (HE).
8. The urban living environment stimulates physical activity (HE).
9. The urban living environment offers properly accessible facilities (LI).
10. The urban living environment offers space for gatherings (HE, LI).
11. The urban living environment is flexible (HE, LI, EN).
12. The urban living environment offers space for vitality and diversity (LI).
13. The urban living environment offers something people can identify with (LI).

The sustainability values provided the basis for further exploring the future city in a concrete and quantitative way, which is explained in the section on urban simulation.

5.3.2 Scenario design

Based on analysis of the findings of the two workshop rounds, roughly two dominant, opposing governance perspectives could be distinguished with regard to who is involved and what is needed, and how to create a sustainable urban living environment. One governance perspective considers sustainable urban design to be a task for the public sphere. To mobilise city dwellers, the central government takes a strong directive role. This is at odds with the other governance perspective, where the central government sets up a guiding framework and gives leeway for initiatives of the market, organised citizens or individual citizens. The two different perspectives on the governance of a sustainable urban living environment are the basis for a scenario axis with collective interest on the one end versus individual freedom of choice at the other end. The assumption is that the way in which the relationship between the market and government will change is a reflection of the social attitudes towards the importance of collectivism versus the importance of individualism.

The other axis is composed of the driving force of population growth. Growth and shrinkage of cities is an important topic in the Dutch spatial planning debate and holds crucial implications for the urban dynamics. The extent to which the composition and size of the population of cities in 2040 can change is described in an earlier scenario study by the three Dutch Planning Offices: the Welfare, Prosperity and Living Environment study (WLO). The WLO scenario study portrays how certain driving forces affect Dutch society and will unfold until 2040 in a trend-driven way where policies remain unchanged (CPB, MNP and RPB, 2006). The demographic changes are mainly dependent on macro level developments such as economic growth and migration policy. For this study the WLO scenario basis and driving forces were taken as a starting point. See Figure 5.1.

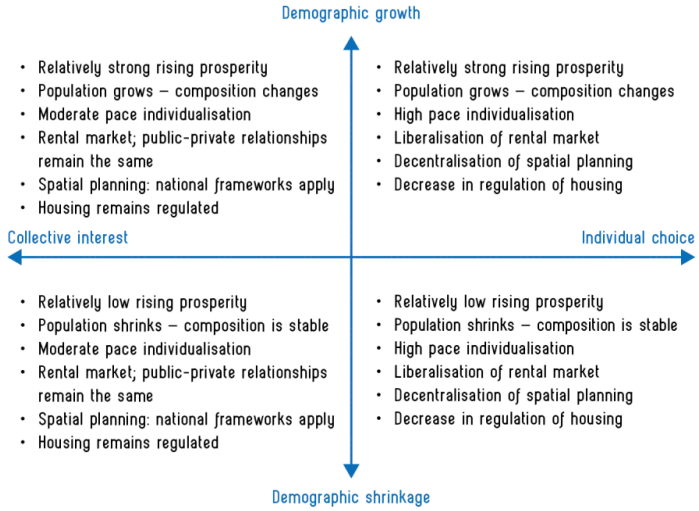


Figure 5.1 *Scenario basis and driving forces*

Starting from the WLO scenarios, 'business as usual' (BAU) scenarios were developed for an urban setting of population growth or population shrinkage. Sustainability scenarios are developed for an urban setting that is governed with a focus on freedom of choice (the individual perspective) or alternatively along the lines of collective interest (the collective perspective). Therefore, assumptions had to be defined on the implications and carryover effects of these governance perspectives on the design of physical space in the context of either a growing or a shrinking city. These combinations result in four sustainability scenarios. These four scenarios hold the same demographic and economic template as the BAU scenarios: population composition, demand for transport and energy et cetera. Each scenario offers a consistent description of a sustainable city in 2040. In the two scenarios that describe the sustainable city from a collective perspective, government holds authority over the organisation of the urban infrastructure, public space, transport system and the energy system. Efficient use of space is the central pillar of the governmental approach for the design of a sustainable urban environment. In the sustainable city scenarios where the individual perspective is dominant, the attractiveness and use of dwellings and their immediate residential environment is central. The housing market and the energy market are dominated by a diversity of actors, giving market parties an important position. Reduced regulations make flexible and diverse space usage possible.

The sustainability scenarios are further composed into different scenario variants. Options derived from the roadmap exercise in the second stakeholder workshop are clustered into packets. Clustering took place on three dimensions: the responsible actors, the type of planned change and the policy theme. Matching packets are grouped into scenario variants. In additional interviews[24] with a number of people after the second round of workshops, input was delivered for variants that demonstrate a social

24 These workshops were held with Paul Schnabel of the Netherlands Institute for Social Research, Rinie van Est of the Rathenau Institute, Tanja van der Lippe of Utrecht University, Maarten Hajer of The Netherlands Environmental Assessment Agency and Jules Hinssen of Telos, the Brabant Centre for Sustainable Development.

trend break in attitude and behaviour towards the city environment. Figure 5.2 offers an overview of the BAU scenarios and the sustainability scenarios with the set of variants.

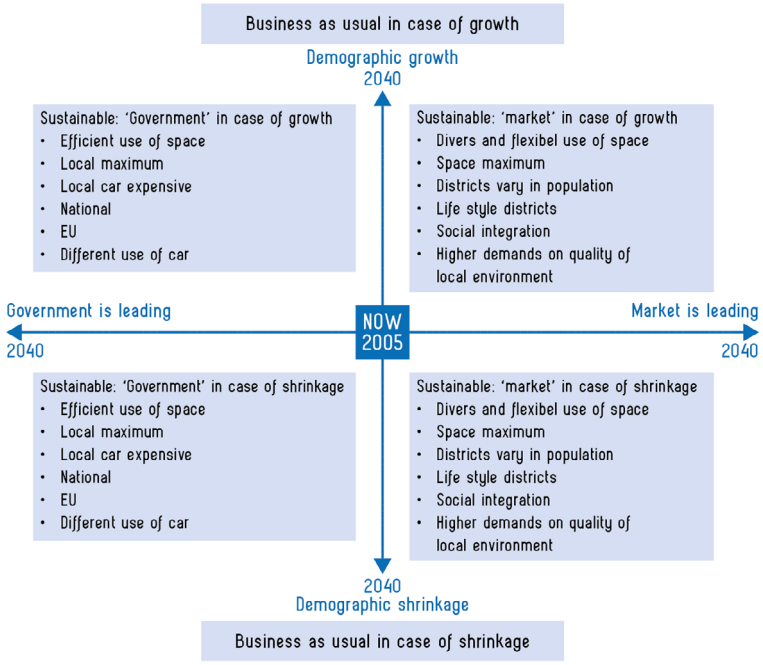


Figure 5.2 *Overview of the sustainability scenarios and set of variants*

5.3.3 Urban simulation

The future development of an existent city was simulated using the aforementioned sustainability scenarios to assess their effects in terms of potential, social impact and coherence. The effects are expressed in indicators that are derived from the aforementioned sustainability values (see Dassen et al., 2010 and Kunseler et al., 2010 for the set of indicators).

The Urban Strategy model of the Netherlands Organisation for Applied Scientific Research (TNO) played a central role in the urban simulation. Urban Strategy is an interactive, decision support system that offers an overview of the built environment in which changes can be implemented in an interactive way, for example by adding residential areas, road closures or environmental zones where only clean trucks are permitted. The effects of these types of intervention on the quality of the surroundings are calculated using various state-of-the-art calculation models for air quality, noise, accessibility, safety, parks and gardens, and water (TNO, 2010). For the calculation of the complete list of indicators (see Dassen et al., 2010), part of the Urban Strategy output was fed into impact models for health, liveability (Leidelmeijer et al., 2008) and energy (van Cranenburg et al., 2009). For the calculation of health in the Sustainable City project, we developed a health impact assessment model that includes relationships for a number of health risk factors and their possible effects. The current capabilities of the model are given by Dassen et al. (2010).

The urban simulation offers the possibility to explore the interaction between the various options and features urban mapping. In the simulation, the modelled impacts of the options are based on current knowledge about these mechanisms. As far as possible, the mechanisms underlying the impacts on options as described by the stakeholders were used. In limited cases, mechanisms were added or modified based on literature study. For example, the demolition or construction of a neighbourhood affects the composition of the residents of other neighbourhoods, but also the flow of traffic, and thus both the accessibility and population exposure to traffic emissions in a wider area. This example demonstrates that it is important to simulate subsequently the change in population distribution followed by its impact on parameters such as traffic, resulting in a change in the accessibility to facilities and the population's exposure to traffic exhaust.

Tables 5.1 and 5.2 display an overview of the results of the urban simulation for the scenario of population growth and shrinkage respectively. The results are expressed in thematic potential (health, liveability and energy), in potential of meeting the sustainability values and in social impact (separated for the themes of health and liveability). For the classification of the scores, basically, we used the most recent (2005–2009) percentage change. The changes were grouped under the following four percentage categories: 2–10, 10–25, 25–50 and greater than 50. The score for health was based on the degree to which the maximum improvement can be achieved. The liveability score was standardised on the poorest and best liveability score for the largest 30 Dutch municipalities. The 'most liveable' municipality in the most recent study by the Ministry of Housing, Spatial Planning and the Environment received a score of 4.27 (Ede) and the 'least liveable' municipality scored as 3.83 (Rotterdam) (VROM, 2009). Energy neutrality is expressed as the degree to which local sustainable generated energy canmeet the needs for the built environment, for transport and for agriculture in and around the city. The energy conservation possibilities for each of these sectors were balanced against their needs (van Cranenburg et al., 2009).

The indicators for the three sustainability themes and the set of sustainability values are in the table in the first column. The scores for the BAU scenarios are in the second column and the scores for the sustainability scenarios are in the adjacent columns. The sustainability scores are based on the analyses of the options in which the EU, the national government or the local government are the important actors. The total score in the sixth column is based on the total set of combined options. The scores for the potential with an assumed trend break in behaviour or attitude are displayed in the seventh column. The last column shows which trend breaks would be involved.

Table 5.1 *Findings for the growing city*

Findings for the growing city (○ changes smaller than 2 per cent, ● favourable change ranging from 2 to 10 per cent, ■ favourable change ranging from 10 to 25 per cent, ● favourable change ranging from 25 to 50 per cent, ■ favourable change larger than 50 per cent compared to the present, ● unfavourable change ranging from 2 to 10 per cent, ■ unfavourable change ranging from 10 to 25 per cent, ● unfavourable change ranging from 25 to 50 per cent, ■ unfavourable change larger than 50 per cent compared to the present. n/a means that aspect was not assessed).

	BAU	With the options from the dialogue on the sustainable city					
		EU	National	Local	Total		Different attitude
Potential (thematic)							
Health (compared to maximum achievable)	■	○	○	○	■	■	Healthier lifestyle
Liveability	○	n/a	n/a	●	●	●	Different appreciation of the social environment
Energy neutrality	○	■	■	●	●	●	Shift to public transport and non-motorised traffic
Potential (sustainability values)							
1a. Energy for transport	●	■	■	■	●	■	Shift to public transport and non-motorised traffic
1b. CO_2 emissions from transport	■	●	●	●	■	●	Shift to public transport and non-motorised traffic
2a. Energy other	■	●	■	●	■	■	Increase in appreciation and use of the dwelling
2b. CO_2 emissions other	●	●	●	●	●	●	Increase in appreciation and use of the dwelling
3a. Local energy production	○	■	■	●	■	■	Increase in appreciation and use of the dwelling
4a. Traffic noise annoyance	●	●	●	■	○	●	Shift to public transport and non-motorised traffic
4b. Air pollution	●-■	●-■	●-○	■-○	■-■	■-■	Shift to public transport and non-motorised traffic
4c. Poor quality dwellings	●	n/a	●	○	●	■	Increase in appreciation and use of the dwelling
5a. Vulnerability to heat stress	○	n/a	n/a	●	●	n/a	
6a. Urban biodiversity	●	n/a	n/a	●	●	n/a	
7a. Proximity of public green spaces	●	n/a	n/a	■	■	n/a	
8a. Physical activity	●	n/a	n/a	○-●	○-●	●	Shift to public transport and non-motorised traffic
9a. Proximity of facilities	●	n/a	n/a	■	■	n/a	
10a. Meeting places	○	n/a	n/a	●	●	n/a	
Social impact (thematic)							
Differences in human health between neighbourhoods	Unchanged	n/a	n/a	Decrease	Decrease	Large decrease	Healthier lifestyle
Differences in liveability between neighbourhoods	Decrease	n/a	n/a	Decrease	Decrease	Large decrease	Different appreciation of the social environment
Accumulation	Unchanged	n/a	n/a	Decrease	Decrease	n/a	

For example, the first row of potential (sustainability values) in Table 5.1 demonstrates that, without further policy, the demand for energy for transport increases intensely (it was calculated to be 40%; reported as a range of 25–50% in the table). This demand can be changed into a positive trend of 20% in comparison to the current demand with options that require effort from the EU (third column). Efforts from the national government (fourth column) can only reduce the negative trend. Local governments (fifth column) can create approximately the same effect. In combination (sixth column: total), the options have the greatest effect; a substantial reduction in the demand for energy for transport can be achieved by almost 40% in comparison to the present situation. An even greater reduction is possible – almost 60% – if in the future half of all car mobility in the city is replaced by public transport, bicycle or foot (seventh column). The social impact is expressed qualitatively to the degree to which the differences in health and liveability between districts increase or decrease.

The opportunity and concerns for sustainable development for a city with demographic shrinkage and a city with demographic growth are completely different. For the 'shrinking city' the decreasing spatial pressure offers the greatest opportunity for physical improvement of the living environment and the local generation of sustainable energy. A reduction of the liveability through a lack of occupancy is the greatest concern here. For the 'growing city', the proximity of facilities and the possibilities for social contact and exchanges between residents and businesses offer the greatest opportunities. The curtailment of the external effects of traffic (CO2 emissions, noise annoyance) is the greatest concern here.

Table 5.2 *Findings for the shrinking city*

Findings for the shrinking city (○ changes smaller than 2 per cent, ● favourable change ranging from 2 to 10 per cent, ■ favourable change ranging from 10 to 25 per cent, ● favourable change ranging from 25 to 50 per cent, ■ favourable change larger than 50 per cent compared to the present, ● unfavourable change ranging from 2 to 10 per cent, ■ unfavourable change ranging from 10 to 25 per cent, ● unfavourable change ranging from 25 to 50 per cent, ■ unfavourable change larger than 50 per cent compared to the present. n/a means that aspect was not assessed).

	BAU	With the options from the dialogue on the sustainable city					
		EU	National	Local	Total		Different attitude
Potential (thematic)							
Health (compared to maximum achievable)	■	○	○	○	■	■	Healthier life style
Liveability	●	n/a	n/a	■-■	■-■	■	Different appreciation of the social environment
Energy neutrality	●	■	●	●	●	●	Shift to public transport and non-motorised traffic
Potential (sustainability values)							
1a. Energy for transport	●	■	●	●	■	■	Shift to public transport and non-motorised traffic
1b. CO_2 emissions from transport	■	■	●	■	■	■	Shift to public transport and non-motorised traffic
2a. Energy other	●	●	■	●	■	■	Increase in appreciation and use of the dwelling
2b. CO_2 emissions other	●	■	■	●	■	■	Increase in appreciation and use of the dwelling
3a. Local energy production	○	■	■	●	■	■	Increase in appreciation and use of the dwelling
4a. Traffic noise annoyance	■	■	■	■	■	■	Shift to public transport and non-motorised traffic
4b. Air pollution	●-■	●-■	●-○	●-○	■-■	■	Shift to public transport and non-motorised traffic
4c. Poor quality dwellings	●	n/a	●	○	●	■	Increase in appreciation and use of the dwelling
5a. Vulnerability to heat stress	■	n/a	n/a	●	■	n/a	
6a. Urban biodiversity	●	n/a	n/a	●	●	n/a	
7a. Proximity of public green spaces	■	n/a	n/a	■	■	n/a	
8a. Physical activity	○	n/a	n/a	○-●	○-●	●-■	Shift to public transport and non-motorised traffic
9a. Proximity of facilities	■	n/a	n/a	●	●	n/a	
10a. Meeting places	●	n/a	n/a	●	●	n/a	
Social impact (thematic)							
Differences in human health between neighbourhoods	Unchanged	n/a	n/a	Decrease	Decrease	Large decrease	Healthier life style
Differences in liveability between neighbourhoods	Large increase	n/a	n/a	Decrease	Decrease	Large decrease	Different appreciation of the social environment
Accumulation	Decrease	n/a	n/a	Decrease	Decrease	n/a	

5.4 Model-based narratives about governance for sustainable urban development

The outcome of the urban simulation has been confronted with the storylines that constitute the outcome of the stakeholder dialogues, leading to two model-based narratives about governance for sustainable urban development. These narratives were presented at the meeting on 21 April 2010 (see Kunseler et al., 2010). In this presentation the outcomes of the quantitative scenario analyses were given a predominant place. The overall notion derived from the findings of the scenario analysis is that the sustainability potential of a number of options is substantial. The current unfavourable trends in a large number of areas can be reversed with sustainable development. This requires a number of important and related choices by government as well as large and collective efforts by government, market parties and citizens, as is demonstrated with two model-based narratives. When one party takes the lead a certain trade-off between the sustainability values eventually develops. In order to generate an effect on all sustainability values, an administrative and societal transition towards a holistic, all-inclusive sustainable urban development would provide impetus.

5.4.1 Governmental efforts

The important choices for sustainable urban development are in the areas of transport and infrastructure and the use and production of energy. The EU can contribute a great deal to sustainable urban development regarding these items by making regulations about the use of fossil fuel, emissions, noise from roadway vehicles and energy consumption by all sorts of electrical devices. Furthermore, it seems as if the EU has an

important role in the development of a super-grid for the distribution of locally and centrally generated power. The national government can reduce the concerns for the cities in many ways with environmental and congestion-related mobility policies. The layout of the environmental-related mobility policy is dependent on the execution of European policies. The national government can also make a significant contribution in the area of energy, for example by instituting an energy performance standard for existing buildings, establishing a feed-in fee for locally generated energy and stimulating the development of smart grids. In the absence of efforts from higher governmental levels, the possibility for local governments to achieve progress regarding the environment, conservation of energy and sustainable generation of energy is limited.

5.4.2 Collective efforts

From a collective perspective to sustainable urban development the mobility and energy transition requires collaboration across multiple actors. The local government can encourage the necessary efforts by private parties and can contribute to a sustainable quality of the urban living environment in a much broader way. The following is a sample of what this involves:

- collaboration with housing corporations to achieve housing improvements aimed at interior climate, comfort, use and energy performance of the dwelling
- collaboration with residents to reduce car usage in their direct neighbourhood in order to reduce noise annoyance and improve air quality, to reduce parking pressure and to reduce CO_2 emissions
- collaboration with entrepreneurs, real estate developers and real estate investors to retain and improve facilities in the neighbourhood in ways that promote physical activity and social contact and that reduce CO_2 emissions
- collaboration with a number of parties to promote diversity in neighbourhoods to reduce differences in liveability between neighbourhoods and districts and to reduce health inequalities between population groups.

5.4.3 Administrative and societal transition

Each individual model-based narrative alone cannot foster sustainable urban development. Collective efforts would provide more freedom of choice, diversity and flexibility, but risks to human health and inequalities in living standards would increase. The other narrative where governments have the instruments and can take measures to force market parties and citizens towards sustainable energy and mobility is likely to fail, if only because the societal support is lacking, especially for measures that have the highest sustainability potential. In other words, exchanges of sustainability values will take place from taking either perspective. An administrative transition towards different relations between government, market parties and citizens is necessary to generate cohesion and achieve progress on all sustainability values. Governments need to take on widely varying roles and should be able to facilitate the necessary resources by market parties and citizens with diverse, coordinated instruments and measures.

A sustainable city is a city that tries to tempt its residents and businesses to enjoy ‘the good life’. A higher level of sustainability may be reached when citizens, civic and private organisations start to value (more) aspects of urban design and development that contribute to and create a sustainable quality of life. The joint creation of value is what

makes these cities fundamentally different from others. Creation of value develops, as certain changes in beliefs occur on what quality of life implies; a societal transition to sustainable quality of life. Examples are a healthier lifestyle, a higher appreciation and use of the nearby living environment and a different appreciation and usage of cars and other modes of transportation. In such situations, governmental efforts would be reinforced or could in part even become obsolete. The willingness of city dwellers to adjust their lifestyle and behaviour for the benefit of a sustainable urban living environment can have a great effect on quality of life. However, this willingness, as of yet, is scarce in today's society. An essential question is how an administrative change may stimulate behavioural change. This question, in our opinion, should be focused on in further studies on sustainable urban development.

5.5 Reflection

This section reflects on the way in which the Sustainable City study attempted to generate policy-relevant knowledge on sustainability in the context of urban design and development.

The aim of the PBL study was to generate integrated options for strategic, long-term urban development policies in the Netherlands. Thus far, the study has resulted in defining the key elements and contours for such options using an analytical–deliberative approach. The study has offered a consistent and creative direction for system change and a better understanding of the implications of sustainable quality of life in an urban setting. A set of sustainability values and two central governance perspectives have resulted from the stakeholder dialogues. These findings provided the creative basis for the model-based narratives. Consistency was added through urban simulation exercises, in this way bringing in explanatory power through model analyses (Dammers, 2010). Designing the research process as an analytical–deliberative approach enabled bridging of normative and analytic knowledge. Subsequent iterations of such 'bridging' processes are expected to result in knowledge quality improvement (Kunseler et al., 2009). Iteration was more successful for the energy theme than for the health and liveability theme. The reason for this may have related to the more consensual and concrete stakeholder interpretation of energy in the context of sustainable urban development, which has enabled for urban simulation based on the stakeholders' discussion. The stakeholder deliberations in the health and liveability themes resulted in rather broad and vague notions of these topics and much 'back-office' interpretation had to be added to enable fitting these notions in urban simulation exercises.

The post-normal science (PNS) strategy was central in the study. PNS had been a useful strategy for problem signaling by generating a better and shared understanding of the complexity of urban sustainability in deliberation with a group of extended peers. This approach has offered room for learning e.g. in terms of changing paradigms and 'mindsets'. The study has accordingly generated insight into critical steps and possibilities for intervention. The participatory backcasting approach had served the purpose of organising deliberation among a group of stakeholders. Nonetheless, the method could have been applied in a more structured manner, which would presumably have resulted in more solid model-based narratives. There could have been more attention to the setting of the system boundaries, more room for iteration to enable for bridging normative and analytical knowledge, more in-depth analytical studies including literature review and modelling work and more attention to the narratives that resulted

from dissensus among the stakeholders instead of focusing on creating consensus (Petersen et al., 2011). It was not recognised until later in the research process that an explicit and comprehensive exploration of the storylines of the stakeholders would have offered more detailed narratives on the governance processes for sustainable urban development. This might have resulted in earlier recognition of the need for insights from literature (for instance Kemp et al.,2007; Kemp, 2010) on administrative and societal transition for sustainable urban development. Moreover, the values and worldviews of the stakeholders have not been identified and a balancing of normative perceptions on sustainable urban development has therefore been lacking. Involvement or participation of other groups could possibly have led to other storylines and therefore to other model-based narratives.

The study has not yet delivered the integrated options for strategic, long term policies for sustainable urban development. In the follow-up to this study it is therefore necessary to further investigate the model-based narratives in terms of associated risks and opportunities and robustness of policy options (de Vries and Petersen, 2009). The added value of the study is that it offers policy-makers a consistent and creative direction for system change and better understanding of the implications of sustainable quality of life in an urban setting. Further work on policy options will therefore have to be established with – and not for – policy-makers and politicians (van Asselt et al.,2010). Deliberation with policy-makers and politicians is important in order to gain clarity as to whether or not the model-based narratives are technologically, institutionally and socially feasible and correspond with the existing visions of governance for sustainable urban development and how this can be realised through the formulation, execution or acceleration of policy.

5.6 Reflection continued[25]

A final note on the centrality of the post-normal science approach in the Sustainable City study. Post-normal science was introduced in this chapter in comparison to 'normal science' (see section 5.2). The initial normal / post-normal distinction coincides with the earlier introduction of modernist versus reflexive logic. The normal/post-normal distinction closely resembles the epistemological and ontological foundations of modernist and reflexive logics (see table 2.1 in section 2.2). Normal science strives for certainty and consensus about values, assuming that it would be possible to come to agreement on a single, universal notion of urban sustainability. Post-normal science was introduced in this chapter as an approach for addressing uncertainties and conflicting opinions, conducive to a pluralist, constructed idea of urban sustainability. In the subsequent sections, it was illustrated how PBL researchers in the Sustainable City study designed and conducted their urban sustainability assessment with 'extended peers' in an analytical-deliberative manner. In the reflection paragraph it shows how, during this process, the quality interpretations on what counts as scientifically sound and policy-relevant knowledge seemed to have fluctuated and changed during the assessment process. For example, the initial drive for knowledge quality improvement via stakeholder participation, was scrutinised in the end for the limited social robustness of the knowledge generated during those participatory activities. The practitioners noted how they had paid limited attention to the diversity of values and

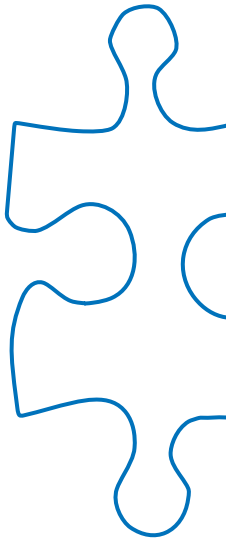
[25] This section is added for the purpose of explaining how the descriptive study of the Sustainable City has served to illuminate the 'first grasp' of my understanding of co-existing logics in PBL's everyday practice.

worldviews of the stakeholders, which could have resulted in a potential normative bias. Moreover, the practitioners recognised how a lack of iteration across, and integration of, analytical and deliberative activities may have contributed to the limited scientific rigour of the assessment. Thus, it appears, without going into detail here, that quality issues emerge in participatory assessment processes under the co-existence of modernist and reflexive logic.

6.

Practising the balancing act between salience, credibility and legitimacy

Generating foresight knowledge with stakeholders in the Sustainable City project and the Nature Outlook project



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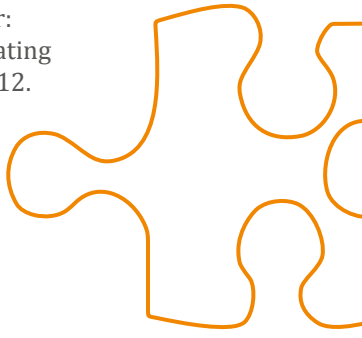


The challenge for PBL practitioners is to ensure that stakeholder participation benefits the salience, credibility and legitimacy of assessment processes, while it does not compromise one of these attributes in an unacceptable manner. This chapter reflects on the design of PBL's participatory practices from the angle of a balancing act.

This chapter reconstructs and compares the quality repertoires of the PBL practitioners as they emerged during two participatory assessment studies – the Sustainable City study and the Nature Outlook study. Because the literature review on the effectiveness of stakeholder participation was done in the field of policy-oriented foresight, both studies are positioned in this chapter as participatory foresight studies. They differentiate by type of study and legal basis (see table 3.1 in chapter 3). Preconditions, like these, as the chapter will explain, have guided the project teams of both studies to make different (path-dependent) choices and to enact different strategies in order to achieve effective participation within the dynamics of their research setting.

6.1 Introduction

In the last decades the use of foresight in policy contexts has increased, and so have attempts to understand how effective foresight knowledge can be generated in science–policy settings. While 'foresight' is a concept that covers a wide array of prospective practices (Öner, 2010), we focus on policy-oriented foresight practices. Policy-oriented foresight aims to raise awareness among policy-makers, politicians and the general public about alternative perspectives on future needs and the implications hereof for present-day actions (van Asselt et al., 2010b), accordingly triggering a process of broadening up the framing of existing policy discourses (Stirling, 2006).

Despite an ever increasing body of literature reflecting on and suggesting ways to conduct policy-oriented foresight (see e.g. (Fobé and Brans, 2013; van 't Klooster, 2007; van Asselt et al., 2010b; van de Kerkhof and Wieczorek, 2005; Van der Steen and van Twist, 2013; van der Steen and van Twist, 2012), challenges are experienced in practice by those involved in foresight studies. Foresight researchers seem to lack sensitivity to particular concerns of politicians and policy-makers (Rijkens-Klomp, 2012; Van der Steen and van Twist, 2013; van der Steen and van Twist, 2012), to struggle with the positioning of present-day policy framings in their studies (van Asselt et al., 2010b), to have difficulties in ensuring a diversity of perspectives for building rich narratives of the future (Chilvers, 2008; Stirling, 2006), and to experience problems in reconciling different and sometimes conflicting ideas and knowledge claims for creating plausible and practical scenarios (Andreescu et al., 2013; van 't Klooster, 2007). Accordingly, futures practitioners often fail to generate effective foresight knowledge for policy. Effectiveness is considered here as an emerging property based on three qualities that participants and users attribute to scientific assessment processes (to which we count generating foresight knowledge): salience, legitimacy and credibility (Cash et al., 2002; Eckley et al., 2001; Farrell and Jäger, 2005; Farrell et al., 2001). Salience refers to the extent to which the particular concerns of users are addressed; legitimacy refers to the trustworthiness of the process – respectful of diverse views and concerns – in the eyes of various audiences; credibility refers to the trust audiences put in the scientific and technical quality of the study at hand (Farrell and Jäger, 2005; Cash et al., 2002). These qualities enable one to reflect upon the outcome of assessment processes: has the assessment produced effective knowledge that is perceived of as credible, legitimate and salient among different audiences simultaneously (Cash et al., 2002; Cash et al., 2003)? Perceptions of salience, credibility and legitimacy originate and evolve during the process as a function of the interaction between assessment characteristics, for example, the initiation and goal of the assessment, the organisation of science-policy interaction, how uncertainty is being managed, how the scope of the problem under consideration is framed, the spatial scale of the assessment and the capacities of the participating actors (Eckley, 2002; Mitchell et al., 1998; Tuinstra et al., 2006). In this paper we focus on one particular element in the assessment design of policy-oriented foresight practices: the interaction across participating actors. We explore how foresight researchers interact with stakeholders. Stakeholders, in our definition are users (i.e. policy-makers) and other social actors who are relevant to and knowledgeable on the issue that is at stake.

Participation in policy-oriented foresight is essential in order to enrich the policy process with new perspectives, knowledge and values on future needs and present-day actions. For example, stakeholders bring in diverse opinions and views on how the future (should) look(s) like and different ideas about respective solutions and actions needed in the short term (Funtowicz and Ravetz, 1993; Stirling, 2011; van der Sluijs et

al., 2010). Including and integrating their knowledge is a way to address uncertainties inherent in studying the future, which accordingly increases the credibility of foresight knowledge (Salter et al., 2010). Moreover, futures practitioners deliberately seek to bring together a plurality of views, concerns and insights from science, policy and practices in generating foresight knowledge with stakeholders to increase both the salience (e.g. more relevant issue are addressed; (Van der Steen and van Twist, 2013) and legitimacy (e.g. by expanding the inclusiveness of diverging values, beliefs and interests (Stirling, 2006) of the knowledge that is produced in foresight processes.

Engaging with stakeholders can also create problems for futures practitioners, such as a bias to focusing on short-term policy needs (which will impact salience), a lack of scientific underpinning of stakeholder ideas (which has consequences for credibility), issues related to the composition of the stakeholder group (which has impact on legitimacy) (Andreescu et al., 2013; Borch and Mérida, 2013; Van der Steen and van Twist, 2013). The challenge for futures practitioners is therefore to ensure that stakeholder participation benefits the salience, credibility and legitimacy of foresight knowledge while it does not compromise one of these qualities in an unacceptable manner. Salience, credibility and legitimacy are also partly dependent on each other and trade-offs and synergies among them exist (Cash et al., 2003). Earlier work has demonstrated that the appropriate balance has been found to vary according to the user characteristics and the social and political context within which the assessment is conducted (Eckley, 2002; Farrell and Jäger, 2005; Tuinstra et al., 2006), e.g. the position of the issue at the policy agenda and the characteristics of the issue domain itself (Mitchell et al., 2006), policy-makers and other actors' values, belief systems or cultures (Turnhout et al., 2008) and the openness of users to different sources of advice (Eckley et al., 2001). The balancing act is therefore highly dynamic, and may vary in relation to the different actors involved, changing contexts and the actions taken to deal with trade-offs (Sarkki et al., 2014).

The balancing act in ensuring legitimacy, credibility and salience while involving stakeholders in foresight practices is at the centre of our paper. In this paper we point out that finding the appropriate balance is difficult because the qualities are interpreted differently by different actors as their perceptions essentially reflect particular understandings of reality. The way futures practitioners choose to know and represent these realities shapes their perceptions in return (Jasanoff, 2004). For example, a dominant perception of foresight researchers is that too close contact with stakeholders is a threat to their independent position (Hage et al., 2010). This perception originates in cultural and historical formations of science-based advisory systems (Jasanoff, 2005a) that also characterise policy-oriented foresight settings (van Asselt et al., 2010b). In turn, stakeholder participation enables researchers to reflect upon the realities they encounter among the 'plurality of perspectives', which may accordingly modify dominant quality perceptions in critical ways.

We explore how stakeholder participation impacts on the salience, credibility and legitimacy attributed to foresight knowledge. We particularly focus on the quality perceptions that exist among the foresight researchers and their peers. We use two in-depth case studies of foresight projects conducted at the PBL Netherlands Environmental Assessment Agency (*Planbureau voor de Leefomgeving* – PBL). The PBL is not necessarily presented as an *example par excellence* but rather as the *locus* for learning more about the interaction of foresight researchers with stakeholders in policy-

oriented foresight. The cases offer insight into the daily work of foresight researchers involved in environmental, nature and planning issues.

Our work is particularly relevant for scholars and practitioners who are interested in understanding how foresight is conducted at the science-policy interface. Similar relevant work assesses the collaborative efforts of researchers and stakeholders, displaying path-dependency in terms of perceived credibility, legitimacy and salience for different stakeholders through time (Schut et al., 2013) and a lack of shared understanding within interdisciplinary research teams on criteria for the assessment of collaborative efforts (Podesta et al., 2013). Our research on the balancing act in policy-oriented foresight points aims to generate further insight into the intricacies of participatory efforts and is accordingly relevant to a number of related practices, such as collaborative policymaking (Innes and Booher, 2010; Vasileiadou and Tuinstra, 2012), participatory knowledge production (Jasanoff, 2003a; Maasen and Weingart, 2005), participatory risk management (Garcia Homa et al., 2009), participatory technology development (Mettler and Baumgartner, 1998) and open risk assessment (Pohjola and Tuomisto, 2011).

6.2 The effectiveness of participatory foresight under debate

For the purpose of this paper we interpret participatory foresight as stakeholder participation in one or several steps of a policy-oriented foresight process: in the development of narratives of the future; in assessment activities to identify impacts, trade-offs and synergies; and in the formulation of suggestions for short-term policy action. Furthermore, we consider as stakeholders all social actors who are relevant to and knowledgeable on the topic at hand. However, for empirical reasons we discern between the 'clients' or users of the foresight activity (policy-makers on environment, nature and planning issues) and other stakeholders. The futures practitioners involved are not considered as stakeholders. In making these distinctions we follow the actors in our cases, who made these distinctions as well.

In the following we discuss the added value of stakeholder participation as well as the problems it may raise with regard to salience, legitimacy and credibility, as discussed in foresight literature[26].

Empirical studies evaluating the policy impact of foresight practices problematise the limited *salience* of foresight knowledge for policy-makers (Fobé and Brans, 2013; Habegger, 2010; Kaljonen et al., 2012; Rijkens-Klomp, 2012; van Asselt et al., 2010b; Van der Steen and van Twist, 2013; van der Steen and van Twist, 2012). Policy-makers perceive foresight knowledge to be of limited use in their daily practices due to a lack of connectivity to the political or organisational logics of policy-making (Rijkens-Klomp, 2012; Van der Steen and van Twist, 2013; van der Steen and van Twist, 2012). Connecting the long-term planning horizon of foresight with present-day concerns in policy and society often remains a hard thing to do. In this respect, valuable attempts have been made to develop criteria or principles for improving the link between foresight and policy (Fobé and Brans, 2013; Habegger, 2010; Rijkens-Klomp, 2012; Van

[26] A discussion of the various forms of and conditions (e.g. who may participate?) for effective stakeholder participation is out of the scope of this paper. Insightful studies on this topic are for example available in the field of environmental policy (Cuppen, 2012), health (Deverka et al., 2012), education (Brandon and Fukunaga, 2014) and design (Manzinia and Rizzoa, 2011).

der Steen and van Twist, 2013; van der Steen and van Twist, 2012): for example, appropriate timing and conveying actionable messages are suggested. When futures practitioners become more responsive to cues in the political and bureaucratic domain, it becomes meaningful and valuable for a policy-maker or a politician to use that knowledge (van der Steen and van Twist, 2012). Engaging users and other stakeholders in foresight processes allows insight into socio-political dynamics, which may accordingly facilitate connectivity to the logics of daily practices. However, stakeholder participation may also create problems for the salience of foresight knowledge. Since stakeholders hold particular values, perspectives and interests that are associated with their daily practices, they prefer particular courses of actions over others (Stirling, 2008). When present-day concerns and needs tend to dominate the foresight study, the study may hardly challenge us to think about how the world might be different. Under the heading of 'futuristic difference' (van Asselt et al., 2010b), discontinuity, non-linearity and change are advocated as the essential values of policy-oriented foresight. "According to futuristic difference, scenarios should be radically different and should significantly deviate from the past" ((van Asselt et al., 2010b): 113). Developing visionary futures asks for a somewhat distant position to the past and present. It requires a great deal of imagination to trigger the exploration of future possibilities (Dammers, 2000). Particular research designs involving participatory backcasting explicitly aim to facilitate this (Dreborg, 1996; Robinson, 2003).

Moreover, prevailing preferences may create problems for the *legitimacy* of foresight knowledge. Preferences in existing policy discourses can dominate the definition and scope of a foresight study (Berkhout et al., 2014; van Asselt et al., 2010b). This often goes unnoticed. When stakeholders and researchers 'hide' political preferences or when they do not allow room for alternative problem interpretations, this makes foresight vulnerable in the sense of perceived legitimacy. While normative framings are unavoidable (van den Hove, 2007), researchers should learn to explicitly acknowledge the political choices implicit in the policy discourses they both work within and help to establish (Wesselink et al., 2013). The challenge for foresight researchers is to frame the content of their work in a policy-relevant manner, while maintaining an open view towards alternative framings of problems and solutions, in order to ensure legitimacy. Stakeholder participation can ensure diversity in views and concerns whereby all those interested and affected by a decision or action should have the feeling that their perspectives are taken into account. Transparency is important here as well. While this does not mean that direct participation by all affected is needed (or possible), multi-perspective dialogues can facilitate transparency (Borch and Mérida, 2013). Fruitful dialogues strike a balance between stakeholders with alternative viewpoints and ideas (heterogeneity) and stakeholders who share similar ideas and who are involved in the same network (homogeneity) (van de Kerkhof and Wieczorek, 2005). However, while participation in itself increases the legitimacy of the exercise to the participants, it might decrease legitimacy to others who e.g. do not trust certain participating groups (Treffny and Beilin, 2011).

Stakeholder participation facilitates, but may also jeopardise, the *credibility* of foresight knowledge. Including local knowledge improves the social robustness of the foresight exercise, as it enables foresight researchers to recognise, articulate and accommodate diverse insights and perspectives about the future. Subsequent iterations of narrative development, impact assessment calculations, design activities and the formulation of policy actions help to assure trust in the consistency of the process and generate

acceptance of foresight knowledge. Transparent reporting of assumptions and judgments about foundational assumptions, parameters and choices in each iteration step may additionally improve trust in the scientific quality of the process (Kloprogge et al., 2011; van der Sluijs et al., 2008). Iteration may simultaneously complicate scientific quality control for futures practitioners, since they have to couple an understanding of the social origins, linkages, and implications of the narratives of the future with technically sophisticated elements of the assessment methods, such as integrated models (Garb et al., 2008). Conform a historic deterministic tendency that dominates foresight practices, researchers are inclined to stress the available knowledge about relevant causal mechanisms, accordingly anchoring future claims from stakeholders in historical knowledge. Past, present and future are envisioned as a continuum to ensure that scientific claims of plausibility are met. As such, this deterministic tendency compromises the 'futuristic difference' ideal of policy-oriented foresight. The challenge for futures practitioners is to use knowledge about the past and present in support of the exploration of possible futures instead (van Asselt et al., 2010b).

Therefore, while interaction with clients and other stakeholders is essential to generate salient, legitimate and credible foresight knowledge, interaction with stakeholders also confronts futures practitioners with a sea of meanings, aspirations and convictions. It is a very real challenge for practitioners, as well as foresight theorists, to make sure that involving stakeholders benefits the effectiveness of foresight knowledge while it does not comprise one of the qualities in an unacceptable manner. Table 6.1 summarises the potential benefits and drawbacks we identified in literature about stakeholder participation in foresight research.

Table 6.1 *Potential impacts of stakeholder participation on the salience, legitimacy and credibility of foresight knowledge (based on a summary of literature findings, not exhaustive)*

Salience		**Legitimacy**		**Credibility**	
+	-	+	-	+	-
Facilitating connectivity to the logics of daily practices	When distance to present is not pursued the futuristic difference of foresight knowledge is limited	Improving diversity in views and concerns, whereby all those interested and affected should have the feeling that their vision is taken into account	Political preferences may (implicitly) dominate the definition and scope of the study	Contributing to the social robustness of foresight knowledge	Deterministic tendency in foresight practices anchors future claims in historical knowledge

6.3 Research design

We examined two foresight projects of the PBL Netherlands Environmental Assessment Agency (PBL) to explore how foresight researchers in practice attempt to balance salience, credibility and legitimacy while generating knowledge in interaction with policy-makers and other social actors. The cases are introduced in the next paragraph. The PBL is selected as the locus for in-depth case study research, since it is the Dutch

scientific policy advisory body under government responsibility with a long-standing international tradition in foresight (van Asselt et al., 2010a) and a respectable position in both science and policy worlds regarding assessments on environmental, spatial planning and nature issues (Halffman, 2009a). Producing policy-relevant, independent and scientifically sound knowledge are mentioned as core values of the PBL. Hence, we can expect that balancing salience, legitimacy and credibility is crucial to the daily activities of PBL employees. The two foresight projects were selected as cases for in-depth study because stakeholder participation was a central activity in the projects and they could therefore be identified as participatory foresight studies. Moreover, both projects were innovative in their participatory aspirations to explore perspectives, knowledge and values on future needs and respective solutions and actions needed in the short term.

As part of the open assessment research programme of the PBL methodology department, the first (EK) and fourth author (AP) – both full time employees at the PBL during the duration of the projects – initiated this study to explore how participatory processes contribute to the core values of the advisory body. Our research perspective is informed by interpretive and naturalistic inquiry (Lincoln and Guba, 1985), making the varied and multiple meanings attributed by the participating foresight researchers and their peers, as well as the interaction across them and the participating stakeholders the basis for our study (Creswell, 2003). We collected data using participant observation, interviewing and document analysis. EK observed the process while participating as an embedded researcher in case 1, the Sustainable City project, where EK participated as a project team member with six other PBL researchers during the principal period of the project, from April 2008 to the project's evaluation in Autumn 2010. EK was responsible for the development and implementation of the project's sustainability appraisal framework. Through intense and active involvement in the project EK was able to observe the crucial issues in the process. Moreover, EK contributed to a team evaluation in July 2010. Every team member filled an evaluation form with open-ended questions to express his or her individual experiences of the process. Followed by group discussion to reflect upon these experiences and identify lessons learned. Additional lessons learned were formulated in review sessions in July 2010 with four internal peers who had been distantly involved and in October and November 2010 with four external peers who were identified as experts in (participatory) foresight. In case 2, the Nature Outlook project, EK conducted interviews as part of an internal project evaluation trajectory from April to October 2012. Together with another PBL researcher, EK evaluated the innovative features of the project: the stakeholder participation trajectory, the interactive communication strategy and the normative scenario development. The evaluators selected 22 interviewees on criteria of diversity and comprehensiveness, including seven members of the core project team, five members of the internal supervisory board and ten participating stakeholders, including governmental policy clients of the project's external supervisory board as well as local policy-makers and representatives from business, NGOs and public organisations who had participated in the stakeholder workshops. The evaluators conducted semi-structured interviews and the interview reports were sent back to participants for *member checking*, as standard practice for ensuring validity in qualitative analysis (Creswell, 2003). The interviewees were asked to carefully look whether the summaries reflected their views, feelings, and experiences. Moreover, to review the accuracy and completeness of the evaluators' interpretations, additional member checks were organised through discussions with the project team in August and September 2012. The evaluation resulted in a set of lessons

learned and suggestions for future foresight studies. Document analysis of project plans, meeting notes and discussion memos enabled for additional insight into what had happened in the two projects.

EK's embeddedness enabled us to obtain an understanding of the dynamics of participatory foresight processes, while we ensured the intersubjectivity of our interpretations in dialogue among ourselves and with several project members of the two cases during the reconstruction of the foresight processes. Intersubjectivity is an important asset of interpretive research since people's actions and events are likely to be viewed differently as interpretations of the meaning and relations across can have different connotations depending on one's own point of reference (Burawoy, 1998). Our analysis of the participatory foresight projects within their socially and historically constructed context uncovered a maze of institutional assumptions, intuitions, actions, observations, experiences, surprises and reflections. For the purpose of reconstruction we used a guiding question: How did the involvement of stakeholders impact on perceptions of credibility, legitimacy and salience?

We coded the data in an iterative way (Weiss, 1995) to find patterns across the data using MAX QDA 11. First of all, we selected excerpts that pointed to the challenges encountered with stakeholder participation. We differentiated among conceptual, methodological and managerial challenges, while not pretending to forsake their interconnectedness. Secondly, we identified how these challenges had come into existence, pointing to strategies in use by the foresight researchers to organise their participatory processes. In reconstructing how these strategies were enacted, changes in the socio-political context of the projects and the internal dynamics of the participatory efforts were highlighted and labelled as explanatory circumstances for the quality perceptions of the projects. The case reconstructions in the next sections reflect the various perceptions attributed to salience, credibility and legitimacy by the foresight researchers and their peers.

6.3.1 Case introduction

Case 1 – Sustainable City

The Sustainable City (SC) project was a two-year project initiated by the PBL in early 2008. The project built on a long- running internal debate about the methodology of sustainability assessments. Previous sustainability assessment studies had been criticised for their technocratic approach in designing worldviews (Petersen et al., 2011). Therefore, the SC project served as an experiment to further develop PBL's sustainability assessment methodology using stakeholder participation to open up to a variety of insights and views about the meaning of sustainability in urban contexts. Simultaneously, the project had a policy-oriented objective: to generate integrated options for strategic, long-term urban development policies in the Netherlands to display the complementarities and trade-offs across various urban environmental and planning issues. The project team developed desired images of a sustainable city in 2040 and roadmaps to identify actions on a timeline from 2040 back to the present in dialogue with stakeholders. Using this method, which is known as participatory backcasting, in combination with modelling exercises and design activities, resulted in model-based narratives for a sustainable city in 2040, which were discussed at a stakeholder symposium in spring 2010 (Dassen et al., 2013).

Case 2 – Nature Outlook

The PBL produces a Nature Outlook (NO) every four to five years under statutory obligation, in collaboration with researchers from Wageningen University and Research centre (WUR). The most recent NO project was conducted from late 2008 to early 2012, excluding the exploration and dissemination phases. In response to a governmental request, the focus was initially set on generating insight into ecosystem services – which was at that time perceived of as an appealing concept for future nature policy development. During the project, the team anticipated on policy changes and political tendencies and accordingly changed its focus to discuss the fundamental motivations and values underlying nature policy. In interaction with policy clients and other stakeholders the project team developed four nature perspectives, entitled 'Vital Nature', 'Functional Nature', 'Recreational Nature' and 'Tailored Nature', and conducted an assessment of their implications. Besides participation, various other techniques were used including literature study, impact modelling, spatial design, governance analysis and expert judgement. A report was presented to the State Secretary of economic affairs, agriculture and innovation and to a wider audience in a symposium setting early 2012 (PBL, 2012b).

6.4 Case analysis

The foresight researchers in the Sustainable City project and the Nature Outlook project involved stakeholders during various stages of the process, particularly in the narrative development: images and roadmaps for a sustainable city in 2040 (SC) and nature perspectives (NO). To a lesser extent, stakeholders also contributed to the formulation of policy actions. Stakeholders did not actively take part in impact assessment and design activities. They were informed about the findings and could reflect upon draft reports. Section 6.4.1 reconstructs the project design of the projects to illustrate how stakeholder participation had been motivated by expectations of increased credibility, salience and legitimacy. Table 6.2 summarises the design choices. The research teams in the two projects encountered challenges while enacting their participatory efforts, using different strategies. The strategy of the SC team was to ensure openness to diversity throughout the project, while the strategy of the NO team was to anticipate ongoing policy developments. These strategies and their impacts on perceptions of salience, credibility and legitimacy are illustrated with case reconstructions in Section 6.4.2 and summarised in tables 6.3 and 6.4.

6.4.1 Project design

The policy-oriented foresight projects aimed at broadening up the framing of existing policy discourses on urban sustainable development policy (SC project) and nature policy (NO project). While the composition of the two project teams, as well as the institutional history, policy issue domain and socio-political setting of the two projects differed, their motivation for organising stakeholder engagement was rather similar. Both teams principally involved stakeholders to accommodate uncertainties on how the future should look like and to capture different ideas about respective solutions and actions needed in the short term. Stakeholder input was considered essential to ensure the *credibility* of foresight knowledge. The PBL researchers designed their projects in iterative process cycles of stakeholder activities – workshops, dialogues, interviews – and 'back office' activities including modelling, literature study and spatial design

activities to encourage reconciliation across knowledge forms, sources and methods during the foresight process. While the research team in the SC project experimented with analytical-deliberative working (Dassen et al., 2013), the NO project team partially drew upon their experiences and systematised the policy-oriented foresight approach using a scenario cycle framework (Dammers, 2010). At the same time, the policy relevance of the projects was explicitly pursued, as mentioned in the problem statement of the project plans, through interaction with clients and other potential users by inviting them for participation in the stakeholder activities. Moreover, communication and dissemination strategies were developed as part of the project planning. The user orientation was expected to foster the *salience* of their work. The stakeholders in both projects were carefully selected to ensure diversity among the group of stakeholders to capture various domains, interests and expertise. Moreover, project team members were selected among various disciplines including e.g. sociology, public administration, environmental modelling, ecology, etc. to capture the wide range of qualitative and quantitative expertise needed. To facilitate transparency in the process and to create commitment among stakeholders the NO project created an interactive website for posting working documents and newsletters. The SC project prepared readers to inform the stakeholders about the progress. These procedural activities were undertaken to ensure the *legitimacy* of the foresight processes in both projects.

Therefore, both project teams made concrete design choices with respect to the interaction with stakeholders and users, thus using stakeholder participation in order to achieve legitimacy, salience and credibility.

Table 6.2 *Design choices in the Sustainable City and the Nature Outlook projects*

	Salience	**Legitimacy**	**Credibility**
Project design of stakeholder participation	- Users are invited to participate in the stakeholder activities - Communication/ dissemination strategies are developed	- A diverse group of stakeholders is selected to capture various domains, interests and expertise - Procedural activities (e.g. website, newsletters, readers) facilitate transparency and create commitment among stakeholders	- Participation is enacted to accommodate uncertainties about the future and address short-term implications - Iterative process cycles of stakeholder activities and 'back office' activities ensure reconciliation across knowledge forms, sources and methods during the foresight process

6.4.2 Dynamics in the research setting

Whereas the well-considered designs of the two projects demonstrate the attempts of the project teams to generate salient, credible and legitimate foresight knowledge, dynamics in the research setting – including changes in the socio- political context and internal dynamics of the participatory efforts – affected the salience, credibility and legitimacy of the knowledge generated in the two projects.

Case 1 – Sustainable City project: openness to diversity

Building upon PBL's methodology for sustainability assessment (de Vries and Petersen, 2009; Petersen and et al., 2006); reflected upon in Petersen et al. (2011), the project was initiated mainly out of methodological and knowledge development interest. From previous PBL projects, it had become clear that values and beliefs about the way societies sustain quality of life had to be explored more interactively, and accordingly stakeholders were engaged to explore their value orientations towards sustainability problems. Exploratory conversations with scientists and local policy practitioners demonstrated a variety of insights and views about the meaning of sustainability in urban contexts when addressing three different themes: 'Health', 'Quality of life' and 'Energy'. Using participatory backcasting (designed according to (Quist and Vergragt, 2006) and building on previous experiences in a pioneering foresight project on climate policy options (van de Kerkhof and Wieczorek, 2005), the project was designed as a participatory experiment which centred on several dialogue rounds involving approximately 100 stakeholders working on many different practical issues related to urban sustainable development.

Co-framing was considered essential for legitimacy purposes, that is, for developing images of a sustainable city that are respectful of diverse views and concerns in society, as well as for creating the necessary commitment from stakeholders to the project. At the same time, this co-framing approach attributed credibility to the project as it resulted in richer narratives, which accordingly improved the social robustness of the study. For example in the 'Health' theme the discussion shifted from the intended focus on quantifiable definitions of health in view of cause–effect relationships, to descriptive narratives about happiness and self-reliance. The SC project team tried to encapsulate all stakeholder ideas throughout the steps of the foresight process, first of all in an array of desirable future images, secondly in coherent thematic roadmaps and thirdly in building policy scenarios for the purpose of urban systems simulation modelling and impact assessment on health, quality of life and energy. The project team experienced difficulties in processing the research material in a systematic and well- balanced manner. Normative and cognitive elements of the stakeholder ideas were mixed without clear logic in iterative cycles of divergence and convergence, affecting the perceived credibility of the study. Moreover, the project suffered from a lack of focus with too many parallel trajectories going on, not only having implications for the planning but also for the perceived legitimacy of the process: "the participatory backcasting approach was continuously supplemented with other methods and techniques", as one team member explained to us. The internal peers experienced the process as 'opaque', reflecting concerns about the legitimacy of the process. They mention that the project seemed "to get increasingly more complicated" with "insufficient profound analysis". Towards the end, the project made an explicit quantitative turn due to time constraints. In collaboration with external modelling companies, several SC project members 'fitted' the stakeholder ideas to model parameters, whereas other project team members did not grasp this translation step and 'got lost' despite their high commitment to the project.

An external reviewer suggested that the legitimacy and credibility troubles can be traced back to the conflict between the "technocratic orientation and quantitative methods 'traditionally' in use in scenario studies at the PBL and the deliberative orientation and qualitative methods suiting the participatory model of the project". This conflict was fuelled by disciplinary misunderstandings across the team members, which is explained

by one team member in the following way: “team members with a social science orientation – including EK – favoured a discursive approach to explore the various positions in the debate and how these positions were shaped by language and practices, whereas the members with a natural science background adhered to a reductionist approach aiming for plausible scenarios of the ultimate sustainable city”. Since this conflict in rationales was not made explicit despite clear signals such as differing opinions about the need for making detailed notes and argumentation analysis of the workshops, it caused a discrepancy in ideas about the purpose of the project and the research approach: “the project seemed to have a dual purpose, characterising and assessing the potential of urban sustainability on the one hand and raising societal awareness about the plurality of sustainability views on the other hand”, in the view of an internal reviewer. Hence, there was a lack of common understanding among the researchers participating in the foresight process on how to integrate the quantitative and qualitative strategies, which reflects the co-existence of fundamentally different ‘foresight cultures’ at the PBL. In this case, the traditional quantitative foresight approach ‘won over’ the ambition to discursively express a plurality of urban sustainability perspectives (compare for example to (van 't Klooster, 2007; van Asselt et al., 2010b).

As the project also aimed for policy-relevant outcomes, the research team had been in contact with the Directorate of Urbanisation. The policy-makers were open and eager to draw insights from the project to develop urban sustainability into a more coherent policy field. However, due to a reorganisation in the ministry, the Directorate ceased to exist halfway the project. Towards the end of the project, the researchers invited policy-makers from various policy units to discuss about urban sustainability. Nevertheless, these policy-makers were not open to accept or understand the complex ‘helicopter view’ of the project, since their orientation was rather fragmented, suiting their own policy issues. Moreover, the topic did not raise socio-political debate at that time. As such, the research team had no opportunities for timely delivery of input to political or societal processes. In the end, the outcomes of the project could not be traced down to relevant policy messages, accordingly affecting its salience.

In short, the co-framing strategy in the SC case was envisioned as part of a participatory experiment to enhance the legitimacy, credibility and salience of PBL’s sustainability assessments. The process was complicated by a lack of systematic and transparent processing of the outcomes of the stakeholder dialogue and difficulties experienced in integrating qualitative and quantitative trajectories, which raised credibility and legitimacy concerns. Developments beyond the control of the research team – the policy context changed during the project – troubled the project’s salience.

Table 6.3 *Impacts of the participatory strategy in the Sustainable City project on salience, legitimacy and credibility*

Salience		Legitimacy		Credibility	
+	-	+	-	+	-
Facilitating more coherent policy development on urban sustainability	No relevant policy messages formulated, also due to changing policy circumstances and lack of political momentum	Developing images of a sustainable city that are respectful of diverse views and concerns in society; Creating commitment from stakeholders to the project	Lack of clarity and transparency of the foresight process, partially due to parallel trajectories	Contributing to richer narratives of a sustainable city	Difficulties in processing the research material in a systematic and well-balanced manner

Case 2 – Nature Outlook: anticipating ongoing policy developments

At the start of the NO project, in 2008, the nature policy arena was dominated by an ecological development discourse focusing on the implementation of EU regulations. Triggered by the global economic crisis and subsequent financial cutbacks in Dutch nature conservation policy (among other environmental and planning issues) in autumn 2010, social actors in the nature policy arena gradually started discussing the problems of this dominant ecological discourse. The PBL actively participated in strategic policy discussions about the (implications of) financial cutbacks in nature policy. Since these discussions took place while the NO project was running, close connections and overlapping networks were established between the PBL researchers and stakeholders active in the policy debate and the researchers and stakeholders participating in the NO project. This way, elements of the initial body of thought from the NO project were already disseminated in policy and society. Simultaneously, it allowed the research team to become aware of the intricate political circumstances and sensitivities surrounding the policy debate. Especially since previous nature outlook studies had been criticised in this respect (Vader et al., 2004), the NO project team was particularly keen on ensuring connectivity with present-day policy and societal concerns. Accordingly, the NO team proactively responded to requests for additional reports, organised working sessions and gave presentations, even when these activities did not necessarily coincide with the scope and activities of the project.

Their anticipatory strategy required appropriate timing of interim publications and tailored presentations, accordingly asking high flexibility of the research team in the focus and planning of their work. The flexible course of the project caused delay and misunderstandings among team members due to "a lack of clarity about the focus and the progress of the project" – as one team member explained it to us. For example ''an explicit decision to develop alternative policy scenarios was made rather late in the project'' – according to another team member. A further implication was that additional capacity and budget were needed to finalise the project.

Despite these managerial challenges, the salience of the NO project seems to have been effectuated by the continuous interaction with stakeholders and interim reporting and presentation activities. Overall, the stakeholders that we have interviewed indicated that

the PBL played an important role in opening up the nature policy discourse to alternative perspectives. The four nature perspectives were framed as appealing metaphors and positioned in a 'simple' conceptual framework to support strategic thinking among actors involved in nature policy. The PBL researchers reported how attention to alternative perspectives of nature reframed the critical and pessimistic atmosphere in the politicised debate about the budgetary rearrangements in nature conservation policy. Discussing the potentials of alternative nature policy arrangements, raised new opportunities, which brought along a more open and positive atmosphere. The "political attention for nature triggered the functionality of the Nature Outlook study" in view of a member of the external supervisory board, and this enhanced its salience. PBL researchers indicated that the anticipatory strategy to ongoing policy developments was initiated and intensified during the project through personal efforts: "I actively pursued a seat at the policy table", as one member of the internal supervisory board pointed out. These anticipatory efforts initiated ad-hoc policy requests and NO project team members together with other PBL researchers had to produce "interim reports where the already available information was reported", as the project leaders explained to us. Hence, the project team was challenged to connect the long-term perspective of the NO project with short-term policy needs. Consequently, however "the scenarios tell more about the present-day policy framings than about the future", in view of a team member, which indicates that the salience of the study in terms of its futuristic difference may have been compromised by anticipating ongoing policy developments. Thus, among the participants, the impact of the anticipatory strategy on the study's salience was positively interpreted in terms of the study's facilitating role and its connectivity to policy needs, with some concerns in terms of its property to think about how the world might be different.

Similarly, we identified how our interviewees attributed different perceptions to the credibility of the study. Some PBL researchers argued that the anticipatory strategy had jeopardised PBL's independence, reflecting institutional-level credibility concerns. In the view of a member of the internal supervisory board, the perspective 'Tailored Nature' was added in the project to accommodate concerns about the economic value of nature, even though "it is unclear whose norms and values are reflected in this narrative and whether they are realistic and representative". Whereas another member of the internal supervisory board countered this concern by reflecting on the communication style: "the equal presentation of four nature perspectives sustains our independent position". Also at a methodological level, credibility concerns were raised as well as refuted. Several PBL researchers criticised the arbitrariness of the four perspectives: why these four and not others? Although selection criteria of 'internal consistency' and 'diversity' had been used by the project team – resulting in the removal of a fifth perspective – internal criticism remained. Concerns about the plausibility of the scenarios were raised, for example, the scientific quality of the impact assessments of the four nature perspectives was perceived as an issue of concern, since the rigour and the origin of impact calculations differed and accordingly the "nature perspectives were not assessed in an identical and comparable manner", as one team member explained to us. Concurrently he argued that credibility was not necessarily at stake, since each approach was "systematically processed and transparently explained using triangulation of knowledge sources: literature study, stakeholder activities and modelling work". Hence, the credibility perceptions differed according to the criteria one adhered to, informed by standards in qualitative or quantitative inquiry. These criteria were ambiguous and

subject of debate, reflecting the co-existence of different 'foresight cultures' at the PBL (compare to case 1 and for example to (van 't Klooster, 2007; van Asselt et al., 2010b).

During the project, nature had become a politically sensitive topic. Social concerns about the 'demolition of nature' appeared in media to raise attention to the negative implications of the budgetary rearrangements in nature policy. Unwittingly, "PBL entered the battle field" as one member of the internal supervisory board explained to us. Nature conservation-minded actors were of opinion that "the framing of values and concerns into four perspectives legitimised this political tendency". In their view, the PBL implicitly supported the policy rearrangements, compromising the study's trustworthiness. At the same time, the participatory efforts in the NO project also created 'ownership' of the four nature perspectives among social actors with tailored dissemination activities, accordingly increasing the study's legitimate role in facilitating strategic debate. Hence, the politicised setting affected the legitimacy attributed to the project by actors outside and within the PBL, both in a positive and negative way.

Therefore, by anticipating socio-political changes in the nature policy arena, the NO team increased the salience, credibility and legitimacy attributed to its output. At the same time, legitimacy and credibility concerns were raised, although the problematic nature of these implications seemed to have been outweighed by the high salience of the project in facilitating strategic debate.

Table 6.4 *Impacts of the participatory strategy in the Nature Outlook project on salience, legitimacy and credibility*

Salience		Legitimacy		Credibility	
+	-	+	-	+	-
Anticipatory efforts, intertwined with sociopolitical momentum and openness of policy process, ensure connectivity of the long-term perspective of the project to short-term policy needs	Concerns about the study's property to think about how the world might be different: scenarios reflect present-day policy framings	Ownership of the four nature perspectives is created among social actors	Alternative nature perspectives legitimate the political tendency to question nature policy; PBL enters the political battle field	Framing the four nature perspectives as appealing metaphors in a simple framework opens up the nature policy discourse to alternative perspectives	Concerns about arbitrariness of the four perspectives and the rigour of impact calculations

6.5 Discussion and conclusion

Foresight researchers initially – consciously or unconsciously – designed their participatory activities in a comprehensive attempt to benefit the quality of the foresight knowledge. Engaging and interacting with various social actors was key in the teams' perception to ensure the legitimacy, credibility and salience of their work. However, in the implementation of the foresight projects, the project teams encountered problems in balancing legitimacy, salience and credibility. In both projects, it has proven difficult to make deliberate choices about the focus and scope of research activities in response to changing socio-political contexts and internal dynamics of the participatory efforts in a

way that simultaneously ensured the salience, credibility and legitimacy of foresight knowledge.

There was a tendency in the teams to focus on a particular quality attribute that was motivated by their experiences in previous projects, which demonstrates a path-dependency in their quality perceptions. The participatory strategies enacted by the team enforced this tendency with positive and negative implications for the balancing process. The co-framing strategy in the Sustainable City project was motivated by a methodological ambition to explore value orientations on urban sustainability in a collaborative effort with stakeholders. The team put extensive efforts in ensuring the legitimacy of the stakeholder dialogues by engaging a diversity of social actors with different perspectives, knowledge and values on future urban sustainability needs. Co-framing implied that images and roadmaps of a sustainable city were formulated in interaction with the stakeholders. The team encountered problems in the reconciliation of the abundance of stakeholder ideas into narratives and assessment parameters. The explorative approach of the project team in using multiple analytic approaches hampered the credibility of the study since methodological rigour was considered missing. Because of the limited transparency and focus of the project, internal peers also questioned the legitimacy of the knowledge that was produced. Moreover, the salience of the project was perceived as low by the participating actors due to developments beyond the control of the research team – the policy context changed during the project.

The anticipatory strategy of the Nature Outlook team was motivated by the need identified from lessons learned of previous Nature Outlook studies to better ensure the salience of their work. The team actively pursued policy connectedness by strategically positioning itself vis-à-vis policy developments, that is, by anticipating them, to an extent. The team put extensive efforts in interacting with policy clients and other stakeholders to create appealing future visions, but also in disseminating and improving them 'in conversation with' actual policy debates about future nature policy. Although the anticipatory strategy had some negative implications for the process in the sense that high flexibility, more capacity and budget were needed, the strategy had generally positive implications for the outcome. This resulted in high salience attributed to the foresight knowledge. At the same time the team had to deal with contested credibility and legitimacy perceptions. The politicised setting caused legitimacy concerns with respect to the trustworthiness of the process, while the lack of comparable assessments of the four nature perspectives caused concerns regarding credibility. Since the relevance of the foresight study was perceived by all involved as extraordinarily high, remarkably, this impact seemed to overrule the credibility and legitimacy concerns that were posed.

Using two in-depth case studies, we illustrated that stakeholder participation by itself did not necessarily challenge salience, credibility and legitimacy, but complicated the process to some extent. The anticipatory strategy in the Nature Outlook triggered the team to prioritise interfacing, timely outputs and clear messages over other activities. Whereas in the Sustainable City case, openness to a diversity of stakeholder perspectives contributed to a more complex and in-depth assessment and reinforced the project's explorative orientation. The participatory efforts revealed different co-existing foresight cultures. Traditional quantitative foresight approaches were mixed with qualitative discursive approaches, while the inherently different quality perceptions adhered to these foresight cultures remained largely unreflected. Due to the experimental status of the Sustainable City project the process of the Sustainable City

case was characterised by methodological debates, reflecting (implicit) discrepancy among the foresight researchers and their peers on how they should judge the validity of stakeholder knowledge (compare for example to van 't Klooster (2007); van Asselt et al. (2010b) who revealed positivist–constructivist tensions in policy-oriented foresight). These epistemic discrepancies were identified as lessons learned for interdisciplinary working and proved useful for the Nature Outlook team. The team managed to balance credibility and legitimacy to the extent that quality concerns were taken serious and internally debated. One important conclusion is therefore that innovative foresight projects only prove effective when issues over validity and quality are transparently addressed and debated.

This leads to the question how one can ensure that participatory processes add value to a (foresight) project. In this respect we can conclude that designing stakeholder participation in foresight activities alone cannot ensure legitimacy, credibility or salience. In contrast, it can jeopardise them, if there is no reflexive positioning of the team with conscious strategies to counter-act emergent and unexpected problems.

One of the main challenges for futures practitioners is, therefore, to ensure that the diverse interpretations of salience, legitimacy and credibility are made explicit and are reflected upon by making tacit frames explicit (Schön, 1983), for example by addressing disciplinary preferences for foresight methodology. This is the first reflection step. Once practitioners notice that they actively construct the reality of their practice they become aware of the variety of perspectives available to them. Cultural and psychological self-reflexivity enable foresight researchers to critically examine the collective and intersubjective elements of the foresight practice they are embedded in (Hedlund-de Witt, 2013). Foresight researchers should acknowledge the multiplicity of understandings, as well as their conditional nature. In this way, it is possible to reflect upon the plurality of legitimate interpretations of foresight practices (Stirling, 2006). Stakeholder participation can help attune reflective futures practitioners in the first reflection step, by providing such a plurality of perspectives. In this way, stakeholder participation does not become a problem for balancing legitimacy, credibility or salience, but can benefit the effectiveness of foresight knowledge as it is intended for. We suggest follow-up research to attend to the quality perceptions that stakeholders – and in particular users – attribute to salience, credibility and legitimacy. User expectations largely influence the room for cultural change in policy-oriented foresight settings (van Asselt et al., 2010b).

Another challenge for futures practitioners is to strategically position themselves towards changing circumstances, which involves that futures practitioners remain open to changing socio-political circumstances and engage in a 'conversation with the situation' (Schön, 1983). This is the second reflection step. What allows this to happen is that practitioners acknowledge the external influences on the foresight process. The Nature Outlook team pursued salience by positioning itself vis-à-vis policy developments triggered by political circumstances in need of visionary input about alternative nature perspectives, to consciously ensure this salience, through interaction with relevant stakeholders. Further research to explore the influence of (changing) socio-political circumstances on foresight practices is needed as it has been relatively unaddressed in foresight literature. Whereas it is argued that the impact of foresight can be facilitated *by* foresight researchers when they design the process and formulate foresight knowledge in a responsive way to fit political and organisational cues (van der Steen and van Twist, 2012), vice versa the influence of dynamics in the policy setting *on*

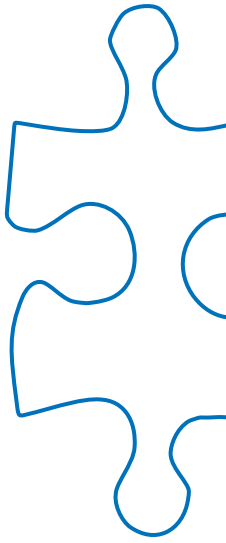
foresight processes remains largely unexplored. Stakeholder participation can help in raising contextual awareness. Integrating deliberative politics in the design of policy-oriented foresight may help to embed the process within broader political and organisational contexts and safeguard against domination and capture by powerful actors (Voß and Bornemann, 2011).

To conclude, how can reflection be made practical to convince foresight scholars and futures practitioners with various epistemic backgrounds to act accordingly? We suggest the use of a more comprehensive repertoire of mixed methods and tools in (policy-oriented) foresight in combination with a pragmatist orientation to 'what works' from a meta-paradigmatic perspective (Creswell, 2003; Hedlund-de Witt, 2013; Morin, 2008). In this way, foresight researchers become 'reflective futures practitioners', who are capable of balancing salience, credibility and legitimacy when generating foresight knowledge in interaction with stakeholders.

7.

Practising environmental policy evaluation under co-existing evaluation imaginaries

Creating facts that matter in the Assessment of the Human Environment project



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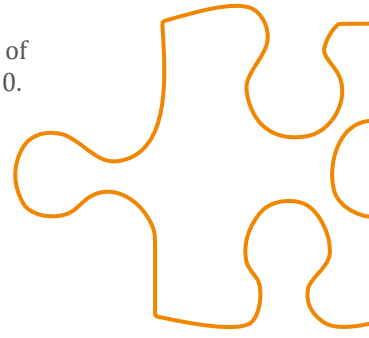


Different understandings among practitioners on what counts as scientifically sound and policy-relevant advice have emerged from wider societal views on what policy assessment is and should do. Inspired by the concept of evaluation imaginaries (Dahler-Larsen, 2012), this chapter deepens reflection on how practitioners select and combine different approaches given the diverse expectations and circumstances that inform their actions.

This chapter reflects on the new strategy of action developed in the assessment process of the 17th Assessment of the Human Environment study. This is an influential environmental policy evaluation study in Dutch government and politics, which informs budgetary allocations to environmental policy programmes. By means of participant observation, intervention (I was involved as full project team member in the period from early 2011 to late 2012) and document analysis I was able to identify the inconsistencies emerging within the assessment setting between innovative attempts and familiar patterns. The chapter identifies the creativity employed by practitioners in going beyond modernist approaches towards the inclusion of reflexive elements in a flexible and situated manner during the assessment process.

7.1 Introduction

In recent decades, increasing awareness of the multi-actor, multiple perspective, and polycentric character of many policy processes has led to the development of a variety of different perspectives on the styles and roles of policy evaluation, and to new analytical tools and approaches – for example, argumentation approaches and participative policy analysis. However 'traditional' policy analysis approaches, characterised by a focus on system modelling, are still dominant in evaluation practice, even if methodological plurality is widely accepted (Højlund, 2014; Sanderson, 2000; Thissen, 2013). In the field of environmental policy evaluation, the setting of this chapter, these traditional approaches are strongly represented. At the same time new approaches gain influence to evaluate policy as multi-level/multi-actor governance constellations. We see environmental policy evaluation as a systematic investigation and assessment of the implementation, effects and/or side effects of an environmental policy activity, in order to inform policy decisions or actions concerning this activity. Further to policy analysis, evaluation research contains an element of assessment or appraisal alongside a set of criteria or principles (Crabbé and Leroy, 2008).

Several authors reject and problematise the common distinction made in the field of environmental policy evaluation between the views, schools and styles in policy analysis, such as 'technical' and 'deliberative' models (Owens et al., 2004), 'rationalistic' and 'constructivist' approaches (Huitema et al., 2011) or positivist and post-positivist traditions (Adelle and Weiland, 2012; Turnpenny et al., 2009). In practice, none of these approaches seems to be applied in a pure form and such distinctions have therefore been criticised as simplistic (Mayer et al., 2004; Adelle and Weiland, 2012; Owens et al., 2004). Instead, there is a need for sensitive selection and combination of approaches. For example, it is suggested to better link policy performance assessments and assessments of policy processes (e.g. on learning and politics of policy-making) (Adelle and Weiland, 2012); to differentiate by type of policy supporting activity (Mayer et al., 2004); and to tailor approaches to the object (the kinds of questions being asked) and objective (the end to which the evaluation is being conducted) of appraisal in particular contexts (Owens et al., 2004). These authors are aware that epistemic cultures and policy structures affect the selection and combination of approaches in policy evaluation. Yet, they largely seem to ignore the influence of 'wider' societal expectations upon evaluation processes and practice. Recursive relations exist between (micro-level) evaluation processes and practices and (macro-level) societal views on evaluation. Evaluation practitioners and evaluating organisations secure their legitimacy by acting responsively to these (diverse and potentially conflicting) societal expectations.

The claim in this chapter is that the organisational context is more important, in terms of explaining the selection and combination of evaluation approaches in practice, than the literature so far has acknowledged. We therefore aim to empirically explore how different evaluation approaches are selected and combined under the influence of co-existing, but contradictory societal views on what environmental policy evaluation 'is' and 'should do'. How in their everyday work do evaluation practitioners work with the multitude of evaluation approaches, given the diverse societal expectations to evaluation?

To address this question we introduce the concept of 'evaluation imaginaries': evaluation imaginaries are social constructions that "define the purpose and meaning … of particular forms of evaluation in light of the society in which they unfold" (Dahler-Larsen, 2012: 99). A case study of evaluators involved in a prominent Dutch

environmental policy evaluation study in the PBL Netherlands Environmental Assessment Agency, illustrates how practitioners select and combine different approaches by drawing on two different evaluation imaginaries, which, as we demonstrate, creates both tensions and opportunities. This case reflects a more general tendency in environmental policy evaluation to draw on a tradition of technical-rational approaches to assess policy performance, while calls for novel approaches to assess complex policy processes are slowly gaining ground (Adelle and Weiland, 2012). Both the PBL organisation, as well as the specific assessment study are, therefore, important in that they reflect the state of the art in environmental policy assessment.

The next section introduces a sociological and historical analysis of evaluation theory (Dahler-Larsen, 2012) to apprehend the influence of evaluation imaginaries underpinning environmental policy evaluation. Subsequently, we explore how co-existing evaluation imaginaries and evaluation processes and practices are mutually constructed, using the notion of co-production. The fourth section reports the findings of a case study in the PBL organisation, and aims to bring empirical evidence to the discussion on simultaneous use of different approaches. The final section concludes the analysis and points to theoretical and practical implications.

7.2 The role of evaluation imaginaries in environmental policy evaluation

The starting point is that evaluation approaches are ultimately linked to different societal ideas, norms and values on what evaluation 'is' and 'should do'. This is what we call evaluation imaginaries[27]. The *modernist evaluation imaginary* embodies modern beliefs in rationality and control and emerged as an attempt to replace tradition, prejudice and religion with a technological mode of thinking that was assumed to 'linearly' advance wealth and progress (Dahler-Larsen, 2012). The *reflexive evaluation imaginary*[28] embodies ideals of continuous learning among policy actors and emphasises the participation of different actors in the evaluation process, acknowledging that the outcome of evaluation will always be contingent upon the different viewpoints of these actors (Dahler-Larsen, 2012).

Table 7.1 illustrates how societal views on what evaluation 'is' and 'should do' embodied by modernist and reflexive evaluation imaginaries differ in their understanding of the evaluation purpose, the characteristics of the evaluand, the evaluation criteria and the evaluation design.

[27] The concept of imaginaries as socio-historical formations is derived from Castoriadis (1987a, 1987b) and put in perspective of evaluation theory by Schwandt (2009) and Dahler-Larsen (2012).
[28] Reflexivity comprises awareness of the way in which any representation of the purposes, conditions or consequences associated with (environmental) governance systems and interventions are socially contingent on the disciplinary, institutional and cultural systems they are embedded in (Stirling 2006).

Table 7.1 *Comparison of evaluation characteristics under modernist and reflexive evaluation imaginaries*

	Modernist evaluation imaginary	Reflexive evaluation imaginary
Evaluation purpose	Evaluation is a mechanism for accountability assurance: assessing the performance of a policy programme	Evaluation is a mechanism for policy learning: supporting the process of continuous reflection on visions, strategies, actions and contexts
Characteristics of the evaluand	A causal chain of policy variables (i.e. inputs, outputs, outcomes)	A complex multi-actor and multi-level policy constellation
Evaluation criteria	Rationalistic principles of effectiveness and efficiency	Good governance principles including juridical, economic-managerial and political criteria
Evaluation design	Technical-analytical process: evaluators assess policy performance through systematic collection and technical analysis of information about policy progress and effects	Deliberative-analytical process: evaluators engage with the various actors involved in policy-making to obtain understanding of policy complexity and assess policy in a responsive manner

7.2.1 Environmental policy evaluation under evaluation imaginaries

The recognition that political interventions intended to produce progress (i.e. welfare) may fail, led to the demand for policy evaluation. In this sense, the modernist evaluation imaginary has facilitated the emergence of the policy evaluation field. In a similar vein, the term 'environmental policy evaluation' was first coined to modern ideals of rationality and control. Evaluation had to ensure accountability of governmental policy activities for the reduction or prevention of environmental problems in cost-effective ways (Adelle and Weiland, 2012; Davies et al., 2006; Owens et al., 2004). The 'textbook' concept and everyday practices of various types of environmental policy assessment – e.g. including regulatory impact assessment (RIA) and sustainability impact assessment (SIA) – are still often based on modernist ideals of rationality, procedures, oversight and predictability (Adelle and Weiland, 2012; Durning, 1999; Owens et al., 2004; Turnhout, 2010). Environmental policy evaluators aim to facilitate better decision-making through the provision of technical information about policy performance, presented in 'distance-to-target' or cost benefit comparisons. Technical information is often produced with system modelling techniques, and processed in indicator-based assessments (Crabbé and Leroy, 2008). Indicators are perceived of as 'objective' scientific tools, that proceduralise the 'objectivity' of assessment processes (Rozema et al., 2012). The political determination of policy goals is presumed as relatively uncontroversial and stable before, during and after the evaluation period (Dahler-Larsen, 2012). The evaluator adopts the policy goal as officially and formally set. In doing so, the evaluator, in fact, adopts the complexity reduction of social reality as defined by policy-makers (Crabbé and Leroy, 2008).

Under the heading of reflexive modernisation (Beck et al., 1994) environmental policy evaluation gained influence as a permanent process of continuing reflection upon the (side effects of) environmental risks in areas of daily life (Dahler-Larsen, 2012). The learning orientation encouraged evaluators to break with the conventional logic of accountability and to embrace the uncertainty and complexity of potential policy impacts in multi-actor and multi-level constellations of environmental policy planning and implementation. This shift has been accompanied by alternative models of the

policy process, e.g. incremental and chaotic views on decision-making processes (Radaelli, 1995) and studies revealing the social construction of knowledge and expertise (Knorr-Cetina, 1981; Latour, 1987). The myth of objective and generalisable scientific methods as well as the assumption of a linear transmission of knowledge to its users was questioned. More responsive and participatory forms of evaluation were introduced via, for example, participatory procedures in various forms of environmental impact assessment (Owens et al., 2004; Salter et al., 2010; Turnpenny et al., 2009; van Asselt and Rijkens-Klomp, 2002). A broader range of stakeholders with diverse interests towards environmental policy were seen as legitimate players in evaluation to play a role in, for example, selecting and developing relevant evaluation criteria and indicators (Albaek, 1998). Rationalistic principles of effectiveness and efficiency were positioned next to other 'good governance' principles, e.g. including criteria of participation, transparency and fairness as well (Crabbé and Leroy, 2008). In this way, evaluators become sensitive to the unique conditions existing in the context in which a policy programme unfolds (Abma, 2006; Stake, 2004). They seek to capture the many perspectives of local stakeholders on a particular policy programme.

7.2.2 Implications of the co-existence of evaluation imaginaries for environmental policy evaluation practice

The field of environmental policy evaluation has developed an abundance of approaches that focus on different questions using different methods (Adelle and Weiland, 2012), which, in fact, as we point out, is a direct result of the *co-existence of the modernist and reflexive evaluation imaginaries*. This section elaborates on the implications of the co-existence of evaluation imaginaries for evaluation practice. We draw on insights from science and technology studies (STS) to explain how the co-existence of modernist and reflexive evaluation imaginaries informs processes of selecting and combining evaluation approaches in organisational contexts. STS scholars (Irwin, 2008; Pallett and Chilvers, 2015) suggest a way of viewing organisations as objects constantly in the process of becoming – dynamic, multiple, performative and open-ended. Organisations represent networks of different local practices of organising and knowing. The notion of 'co-production' as developed by Jasanoff (2004) has played a highly significant role within this body of work. She elaborates on the mutual construction of micro-worlds of scientific practice and macro-categories of political and social thought. In the context of our study, co-production is used as interpretive device to explore the recursive relations between (micro-level) evaluation processes and practices and (macro-level) societal views on what evaluation is and should do.

In order to capture the significance of this device, we first explore why, drawing on an institutional perspective[29], the modernist evaluation imaginary has been so influential in the environmental policy evaluation field. In this perspective, the (level of) institutionalisation of evaluation imaginaries largely and often unconsciously defines the appropriate evaluation approach (Dahler-Larsen, 2012). Institutions are socially constructed historical patterns of values, beliefs and rules that guide evaluation practice and give meaning to concepts, practices, principles, norms, ethics, values and artefacts

[29] Evaluation scholars largely draw on the sociological school in institutional theory, which emphasises the ways in which action is structured and order made possible by shared systems of rules which have to be understood in the cultural and historical frameworks in which they are embedded (Powell and DiMaggio, 1991).

associated with evaluation (Højlund, 2014). As a consequence, evaluation processes and practices are largely informed by routines. Routines are informed by a shared understanding of legitimate action. In other words, institutions ensure that methods, skills, norms and processes align with and perpetuate the tradition of the modernist evaluation imaginary (Dahler-Larsen, 2012), which is maintained and enforced by the historical and cultural characteristics of European environmental policy[30] (i.e. strong legal roots, sector-focused). Turnpenny et al. (2008) illustrated how formal rules 'instruct' the scope and priorities of national-level policy assessments including e.g. specific guidelines for how evaluative data should be collected, and used in organisational and policy contexts. Informal rules, such as close cooperation between ministries and research agencies in the environmental field, enforce the continuance of established practices – ensuring that evaluation practices do not deviate too much from its functional scope (Turnpenny et al., 2008). As a consequence, evaluation practitioners are captured in a 'competency trap' – a self-reinforcing process of capacity-building for technical, indicator-based assessment approaches (Nykvist and Nilsson, 2009). Modernist institutions are enmeshed in three pillars of organisational life: in the values guiding evaluation research (normative pillar), in evaluation–policy arrangements (regulatory pillar) and in evaluation approaches (cognitive pillar). It is through the mutual reinforcement of regulatory, normative and cognitive pillars that the hegemony of the modernist evaluation imaginary in environmental policy evaluation can be explained.

From an institutional perspective, the reflexive evaluation imaginary may gain influence in environmental policy evaluation practice via diffusion of standard rules and structures. Some signs into this direction are formal integrating policy efforts led by the sustainability discourse (Turnpenny et al., 2008) and the proliferation in the evaluation field of guidances and tools to engage with multiple actors (European Commission, 2001; European Commission, 2009). Nevertheless, when it comes to institutionalisation, reflexive ideals seem to largely remain at the level of rhetoric. Familiar modernist concepts, goals and instruments that for decades have dominated policy evaluation in environmental areas such as energy, transport, agriculture and housing persist (Nilsson et al., 2008; Van der Knaap, 1995; Voß et al., 2006). An institutional perspective leads us to conclude that modernist institutions have shaped practices in the field of environmental policy evaluation that have proven resilient to change.

A practical view on organisational life, using co-production as interpretive device, allows us to unravel the assumed stability of modernist institutions, and explore how institutions, identities and imaginaries are mutually constructed in local practices. Local practices are characterised by bounded instability, i.e. novelty does emerge, but with a sense of continuity with earlier institutional innovations (Pelling et al., 2008). Alternative codes of meaning are continuously being shaped, interpreted and created. In this way, diversity is created in practice leading to contestation over which practices are appropriate. Such processes largely occur locally, without a demand for, or intention of, total, systemic change. Actors in and around the organisation may begin to challenge promises and values in their local process that are inconsistent with statements, norms and values in the organisation or in society at large. On the one hand, these inconsistencies may be experienced as *tensions* that result from the need to select or justify relevant approaches to work, while evaluations are often performed in an

[30] The scope of our study is limited to literature on national-level policy assessments in Europe.

intuitive, unreflective and routinised way (Dahler-Larsen, 2012). On the other hand, the inconsistencies resulting from the co-existence of evaluation imaginaries in the evaluation process may also create more *freedom* for practitioners, who can pick and choose among different approaches and methods. In this process, elements of alternative evaluation imaginaries may be mobilised and novel evaluation approaches may be created, while traditional ones are contested but remain still in place. This means, for instance, that indicators to assess policy performance (characteristic of the modernist evaluation imaginary, see table 7.1) may trigger learning when policy deficit or progress once revealed is put in the broader systemic perspective of the societal dilemmas the policy aims to address. This of course is a characteristic of the reflexive evaluation imaginary. In such a case, a technical evaluation tool meets a learning-oriented evaluation purpose, normally associated with the more deliberative approaches (Owens et al., 2004). The opposite is also true. Participatory policy analysis does not always result in mutual learning, for instance when participation is instrumentally used by experts to improve impact or public support rather than as a tool for opening up the evaluation process to alternative views and knowledges. A phenomenon described as 'technocracy of participation' (Chilvers, 2008).

Inspired by the notion of co-production we hypothesise, therefore, that the co-existence of modernist and reflexive evaluation imaginaries in today's societies has brought inconsistencies in evaluation praxis. Inconsistencies are revealed when elements of modernist and reflexive evaluation imaginaries are mobilised simultaneously. As a consequence, distinctions between intentions, approaches, and outcomes of the evaluation dissolve. In our empirical analysis, we examine how these inconsistencies are perceived and acted upon by evaluation practitioners.

7.3 The case of the Assessment of the Human Environment study and research design

On 24 September 2012 the PBL Netherlands Environmental Assessment Agency (*Planbureau voor de Leefomgeving* – PBL) published its Assessment of the Human Environment 2012 report (PBL, 2012a). It covers the policy domains of spatial planning, physical environment and nature along six themes: climate and energy, sustainable food, landscape and nature, water, mobility, and environmental law and urban planning. An Assessment of the Human Environment report has been produced biannually since 2010 and, before that, 15 times on an annual basis in the environment and nature domain, following statutory regulations. Its original objective is to offer the Dutch government and parliament support for policy prioritisation and budget allocation based on insights about anticipated policy performance. Over the years, the assessment study has faced requests to generate more actionable, reflective and solution-oriented assessment knowledge (Maas et al., 2012). The changes within the context of this particular study relate to organisational changes at PBL level. PBL is one of the government-funded Dutch planning bureaus[31]. The PBL advises the Dutch government in policy areas of

[31] There are two more planning bureaus: SCP – Social and Cultural Planning Office of the Netherlands and CPB – Netherlands Bureau for Economic Policy Analysis. Planning bureaus are governmental policy-analysis agencies. The term 'planning bureau' is a typical Dutch invention. The first planning bureau, CPB, was established in the aftermath of the Second World War. The name is somewhat misleading; these institutes are not involved in planning the economy, or else, but in the provision of policy-relevant knowledge. For these reasons, they prefer to use terms like assessment agency, as in their English names,

nature, spatial planning and the environment, by means of producing independent[32] policy assessments studies. Triggered by a credibility scandal in 1999, the PBL unwittingly embarked on a transition from a technocratic mode to a more reflexive mode of advising; yet in so doing it found itself confronted with a paradoxical situation. The PBL has been attempting to innovate its practices to become more reflexive and interactive, yet it cannot 'escape' modernist assumptions that underpin its practices: "given the institutionalised role of the Netherlands Environmental Assessment Agency at the Dutch science–policy interface and regular reorganisations (the latest due to a merger), the modest progress made in the direction of a PNS [post-normal science[33]] strategy should be considered a substantial result. It is not clear how much further the agency could go even, without losing some of its credibility in the policy domain (based on the image of 'normal science') (Petersen et al., 2011).

This article zooms in on the evaluation process of the 17th Assessment of the Human Environment study. We use this as a paradigmatic case (Flyvbjerg, 2006a) in the hope of learning how inconsistencies are perceived and acted upon by evaluation practitioners who operate under co-existing evaluation imaginaries. Our analytical perspective is informed by interpretive and naturalistic inquiry (Lincoln and Guba, 1985). The basis of our research are the varied and multiple meanings attributed by practitioners and their peers[34] to the nature and role of their evaluation study. Their meanings are reflected within interactions that occur during the evaluation process (Creswell, 2003). We examine crucial episodes and decisive moments during the evaluation process in the period from February 2011 to October 2013. These highlight what the evaluation practitioners, in interaction among themselves and with their peers, think needs to be done to secure the legitimacy of the evaluation process and its outcomes. We conducted qualitative content analysis of email exchanges, meeting notes and discussion memos produced by the project team during this period. This enabled us to identify (see table 7.1) how elements of modernist and reflexive evaluation imaginaries are mobilised (first-order analysis) and inconsistencies emerged and were experienced as tensions or opportunities (second-order analysis). In addition, we draw upon participant observation conducted by the first author of this article (EK). EK observed the process while participating as an embedded researcher and as a full member of the project team responsible for methodology support. Experience and proximity to the studied reality are at the very heart of case study research (Flyvbjerg, 2006a) and offer insight into the contingent and partial processes of organisational change and innovation (Pallett and Chilvers, 2015). Embedded research blurs the distinction between analysis, practice and experience. Intersubjectivity is therefore an important quality of interpretive research since people's actions and events are likely to be viewed differently and will have

although their Dutch names are anchored in law and have become commonplace in Dutch political parlance (Halffman and Hoppe, 2005).

[32] Independence is secured by the Regulation for Policy-Analysis Agencies: article 4; meaning that the planning bureaus are solely responsible for the content and quality of their work and policymakers should refrain from interference with research content and approaches (Government Gazette, 2012).

[33] Funtowicz and Ravetz (1993) introduced the term 'post-normal science' for issue-driven knowledge production in a context of hard political pressure, values in dispute, high decision stakes, and high epistemological and ethical systems uncertainties. In the context of this chapter, post-normal science can be positioned as a strategy under the reflexive evaluation imaginary.

[34] Internal peers refer to colleagues who acted as sparring partners or formal supervisors, and were regularly consulted for advice. External peers refer to policy scientists who were consulted for advice, or to policy-makers in government departments who were perceived of as the 'target audience' of the study, and played a role in supervision and reflection at different stages in the evaluation process.

different connotations depending on the researchers' point of reference (Creswell, 2003). We ensured the intersubjectivity of our interpretations in dialogue among ourselves and with project members during the reconstruction of the evaluation process. The reconstruction of the 'Assessment of the Human Environment 2012' process described in the next sections is split into four phases that highlight key moments and episodes in the project (see Figure 7.1):

1. *the conceptual phase (February–August 2011)*: the project team set the ambition for the study;
2. *the 'individual chapters' phase (August 2011–February 2012)*: the project team conducted thematic policy assessments;
3. *the integration phase (February 2012–September 2012*: the project team formulated 'overall' policy messages;
4. *the evaluation phase (September 2012–October 2013*: the project team and internal peers evaluated the project.

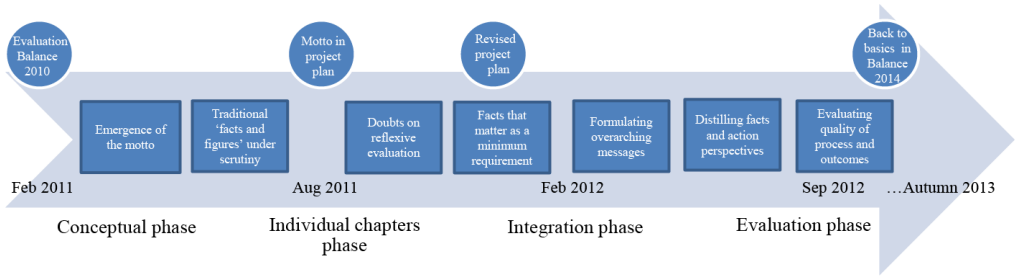


Figure 7.1 *The 'Assessment of the Human Environment 2012' process.*

7.4 How evaluation practitioners deal with co-existing evaluation imaginaries

Figure 7.1 presents the timeline of the four phases of the project, together with crucial episodes (in squares) and decisive moments (in circles). Table 7.2 summarises our analysis of inconsistencies emerging during the evaluation process in terms of tensions or freedom experienced.

7.4.1 Conceptual phase

In February 2011 the PBL management team assigned a team of five employees the task of developing a strategy for an innovative design of the Assessment of the Human Environment 2012 study. This task was motivated by an internal evaluation study addressing the policy relevance and quality of the 2010 study: "*How useful is this 'Balance'*[35] *for policy-makers? The environmental balance, the nature balance and the spatial balance (i.e. the monitor spatial planning) are integrated into one product. How recognisable are these domains for the policy-makers in the diverse government departments? Are the conclusions and messages in the 'Balance' due to its high integration*

[35] The Assessment of the Human Environment study is typically referred to by PBL practitioners as 'the balance' (balans in Dutch), referring to its original purpose of providing a state of the art overview of policy performance.

level not too general or abstractly formulated? Which policy-maker recognises him/herself in one of the messages?" (PBL, 2010b)

Table 7.2 *Implications of inconsistencies emerging during crucial episodes of the evaluation process in terms of tensions and freedom*

Crucial episodes	Tensions emerging	Freedom created
Emergence of the motto	The team combines elements of both modernist and reflexive imaginaries and points to potential conflicts between them.	
Traditional 'facts and figures' under scrutiny	The team weighs the merits of policy learning against organisational concerns and risks.	A pragmatic distinction between 'what' questions and 'how' questions is proposed by the practitioners.
Doubts on reflexive evaluation		Team members agree on pursuing the study's traditional character of policy performance assessment and decide to explore the potential for reflection upon the persistence of policy dilemmas in relation to each individual policy domain.
Facts that matter as a minimum requirement	Policy performance assessment is identified as the 'strength' of the study and as the minimum level of analysis.	Choice of evaluand, evaluation methods and evaluation criteria in individual chapters are informed by policy needs and availability of (quantitative) policy targets.
Different overarching messages		Three types of messages are distinguished to do justice to the diverse set of policy themes covered within the study.
Facts and visions as political leeway		In view of upcoming elections new 'facts and figures' as well as novel action perspectives are added on request of strategic policy-makers.
Evaluation phase	Using multiple approaches is perceived to have generated a complex mix of messages.	The added value of the Balance study is indicated by users in learning terms, whereas they principally refer to modernist evaluation outcomes.

The emergence of the motto 'moving from policy performance to policy learning'

With the aim of improving the study's policy relevance and quality, the team reflected on the ambitions and purpose of the 2012 assessment study. After intense deliberations, they made three suggestions to the PBL management board. Their first reflects on the evaluation purpose: "*To make more out of the Balance study than 'traffic lights'*[36] *conclusions, we have to obtain insight into the systemic attributes of policy issues, which would allow us to identify new and realistic action perspectives*." The second suggestion concerns the evaluation design and points to the need for increased interaction with target groups in order: "*to obtain insight into the questions and needs of our target groups and to use their knowledge during the evaluation process*". The third suggestion

[36] Traffic lights are figures of 'distance to target', coloured in red, orange, yellow and green to indicate the probable level of target achievement compared to a policy reference (PBL, 2012a).

addresses the complex nature of the evaluand: "*we are in need of policy evaluation methods for the analysis of networked and multi-actor governance settings*" (excerpts from internal memo to PBL management board meeting, March 2011).

While the team characterised evaluation purpose, evaluand and design following the reflexive evaluation imaginary (see Table 7.1), they also mobilised elements of the modernist evaluation imaginary when discussing organisational risks and barriers. They pointed to a potential conflict between deliberation about policy complexities and PBL's assessment mandate of providing factual information about policy performance. Another risk was identified with respect to PBL's independent position in interaction with policy-makers. They stressed the need for clear roles and responsibilities to safeguard independence. Lack of capacity and skills on how to conduct governance analysis and participatory evaluation was also identified as an issue of concern. These articulated risks indicate how PBL's evaluation logic is firmly grounded in regulative, normative and cognitive institutions, supporting the persistence of a modernist evaluation imaginary.

Yet, to improve the usability and quality of the study innovative ambitions were articulated in a motto for the study: 'moving from policy performance to policy learning'. Communicating this motto to strategic level policy-makers and internal peers facilitated external and internal commitment to a reflexive agenda. In particular, the phrase going beyond 'facts and figures' served well to legitimate the newly defined reflexive orientation of the evaluation study.

Traditional 'facts and figures' under scrutiny.

In order to enact the motto: 'moving from policy performance to policy learning', the team started developing an analytical and methodological framework. Suitable methods were obtained from literature reviews and expert consultations with policy scientists. The team intended to design the evaluation in a reflexive manner by improving interaction with policy clients and enabling analysis of complex multi-governance constellations. The need for participatory design and governance analysis was motivated by the motto 'moving from policy performance to policy learning'. At the same time, concerns and risks were conveyed. Underlying assumptions of and conditions for evaluation were still largely grounded in presumptions of rationality, control and predictability under the modernist evaluation imaginary. Discussions in the team centred for example on appraisal of the merits of policy learning against concerns and risks concerning objectivity: what is the validity of 'policy insights' as a source of knowledge? Are actors' perspectives qualified? What is the risk of losing control when collaborating with policy-makers?

A pragmatic distinction between 'what' questions (e.g. What is the quality of the living environment? What is the attributed policy contribution to quality improvement? What is the distance-to-target? What are the trade-offs across policy domains?) and 'how' questions (e.g. How are policies implemented? How do multi-actor dynamics affect policy performance? How can the performance of policy be improved? How are trade-offs justified?) was proposed by one of the practitioners. This pragmatic approach was later referred to as the systems approach. This approach builds on the PBL assessment tradition of systems modelling in the physical and ecological domains, but 'adds' sociological and institutional perspectives to it. The systems approach was well-received by the other team members, since it offered a tailored guidance to accommodate

different types of evaluands, and to sustain both the study's statutory role of assessing policy performance (addressing 'what' questions) and the policy learning ambition of explaining policy performance in terms of multi-actor dynamics and path-dependency in policy-making (addressing 'how' questions).

In sum, motivated by *the ambition* to ensure the study's legitimacy in view of usability and quality concerns about the previous edition, the team formulated the motto 'moving from policy performance to policy learning', and accordingly mobilised the reflexive evaluation imaginary. This turned out to be inconsistent with dominant organisational beliefs in rationality and control reflecting the high *level of institutionalisation* of the modernist evaluation imaginary in the PBL setting. The tension between both logics became explicit in discussions over the statutory role and independent (i.e. distanced, objective) position of PBL. A systems approach served to accommodate the inconsistency between modernist and reflexive logics, allowing more freedom for researchers to choose the evaluand (what or how question) they considered appropriate.

7.4.2 Individual chapters phase

In August 2011 a new research team was put together to integrate the ideas developed in the conceptual phase into thematic policy assessment studies. Four out of five team members from the conceptual phase (including the first author of this article, EK) and five new members started to interpret and process the innovative ambitions of the assessment study. Doubts were displayed: "*we have conceptually elaborated the new approach, so implementation has to take place accordingly. While nobody really seems to believe in it or realise what it is actually about, we all act as if we believe it would work*" (Excerpt from email exchange within the project team, September 2011).

Doubts on reflexive evaluation

While reflexive aspirations had proven rhetorically powerful, conversations about the need for methodology support to implement reflexive approaches (i.e. participatory design, network governance analysis) highlighted many doubts, e.g. about the need for a participatory design, but also about the move towards a learning-oriented evaluation considering PBL's evaluation mandate. Team members agreed to pursue the study's traditional character of policy performance assessment and to explore the potential for reflection upon persistent policy dilemmas in view of societal dynamics and complex governance constellations in relation to each individual policy domain.

When the motto 'moving from policy performance to policy learning' was discussed with policy-makers in the Ministry of Infrastructure and the Environment – the principal 'client' of the evaluation study – similar doubts were raised about the legitimacy of this move. The reflexive evaluation ambition was considered useful in an abstract sense. Who would disagree with improved usability and more realistic action perspectives? At the same time, the 'change of direction' was questioned in view of PBL's evaluation mandate. The policy-makers emphasised PBL's capacities and strong position in providing 'hard' facts and figures. Moreover, they pointed to the danger of weakening the division of responsibility between PBL and their own work. They considered themselves to be in charge of policy interpretations and the formulation of action perspectives, while PBL's role – in their opinion – was to remain 'neutral' towards policy

developments. Their responses express the strong institutionalisation of linear knowledge–policy arrangements under a modernist evaluation imaginary.

'Facts that matter' as a minimum requirement

Half-way the project, the traditional policy performance assessment approach was explicitly identified as a minimum requirement, and reformulated as 'facts that matter' approach. This approach illustrates the stories behind performance indicators. In this way, policy progress is put in perspective of persistent dilemmas in the broader policy system and political context (final project plan, December 2011). The reflexive aspiration of policy learning could this way be attended to. Meanwhile the participatory aspirations were reduced to a set of workshops with policy-makers, instead of the initially envisaged joint fact-finding trajectory with diverse social actors. This tendency of downplaying participatory aspirations was guided by the argument that a 'facts that matter' orientation did not require full public participation, other than in framing and aligning the choices made in the assessment process with policy needs during review and consultation meetings.

Although every team member responsible for a chapter initially set out to express policy performance in 'facts that matter', assessment approaches soon started to deviate in each chapter. Choice of evaluand, evaluation methods and evaluation criteria were principally guided by the characteristics of the policy field such as the level of consensus on policy goals and availability of (quantitative) policy targets, but also by disciplinary preferences, sectorial interests, policy needs, personal motivations and capacities and practical considerations such as the availability of data. While several chapters principally adhered to a technical-causal model for the assessment of target achievement (addressing 'what' questions), other chapters – completely or partially – conducted governance analysis to explore policy dilemmas, addressing the multiple social relations across policy actors and identifying tensions and windows of opportunities (addressing 'how' questions). Moreover, reflexive evaluation approaches were considered more appropriate for 'unstructured'[37] policy topics in agenda-setting stages, than for 'structured' policy topics in their implementation stages. While the food chapter and the mobility chapter explicitly reflected on current policy framings to raise awareness and influence agenda setting, the climate and energy and water chapters hardly questioned policy frames, and focused on impact assessments to identify trade-offs emerging during policy implementation.

In summary, this phase reflects how various combinations of evaluation approaches appear in individual chapters. This was influenced by *the characteristics of the policy field, individual aspirations and capacities*. Nonetheless, all strived to surpass 'traditional' performance assessments with facts that matter.

7.4.3 Integration phase

From February 2012 onwards the team worked intensively on overarching policy messages and recommendations. As overall outcome of the assessment study the assessment findings from the various chapters were to be integrated.

[37] The term 'unstructured issues' refers to issues that are characterised by complexity on both cognitive and normative dimensions (for a definition see the work of Hoppe, 2009a).

Different overarching messages

Attempts to formulate policy messages were initially oriented towards harmonising and structuring the content of individual chapters. These attempts turned out to leave limited room for the characteristics of the diverse policy issues addressed in each individual chapter. Instead of using a generic framework, three types of messages were subsequently distinguished:

"*In case of concrete, measurable targets and a considerable level of acceptance of the policy target and unambiguous knowledge of the system, it is possible and relevant to assess effectiveness (to what extent does policy contribute to target achievement?) and efficiency (against which efforts/costs?)*

When targets (or policy ambitions) are not defined in a 'SMART' manner it is relevant to evaluate the policy strategy or programme in terms of its potential trade-offs and opportunities.

In addition, the participatory, responsive and transparent character of policy can be assessed if relevant for explaining the performance of policy with respect to the role of policy actors such as local governments" (Excerpt from internal meeting notes, February 2012)

Facts and visions as political leeway

On 23 April 2012 the Dutch Cabinet resigned due to a political conflict over budgetary changes. The implications for the assessment team were considerable. The visionary and strategic policy documents that had served as point of reference now turned out to be no longer politically relevant. Strategic level policy-makers suggested in a review meeting to emphasise on 'facts and figures' (e.g. with respect to CO_2 emission target achievement by 2020) to inform the process of budgetary priority-setting. In view of upcoming elections they also encouraged the team to formulate action perspectives. An example of such an action perspective is: 'systems of food production and consumption can be rearranged to better accommodate societal and economic needs' (PBL, 2012a). Policy-makers were particularly interested in learning about the 'tensions' or trade-offs between policy developments in various policy fields: "*Tensions are of interest and can be addressed more explicitly. Tensions can play a role in political debate. There is no need for ready-made policy solutions, as this is the responsibility of policymakers. Anyhow, better action perspectives are needed. What are the right choices to make? Not solely at the level of facts and figures, but in terms of: in this or that way you can handle these tensions.*" (Excerpt from meeting notes, external supervisory meeting, 24 May 2012)

In sum, at this stage, the project team had identified three types of overarching messages to do justice to the various types of policy messages that had emerged from the individual chapters' assessments. We see how *political dynamics* offer room for reflexivity in the integration phase, as policy-makers were in need of reconsidering their policy objectives and strategies. Simultaneously they indicated the need for traditional facts and figures that provided them with 'hard' evidence to (re)position themselves and (re)gain political control.

7.4.4 Evaluation phase

On 24 September 2012 the Assessment of the Human Environment report was presented to the Minister of Infrastructure and the Environment at a dissemination event with policy-makers, PBL researchers and news journalists.

Although different categories of policy messages had been distinguished to facilitate readability, the report was perceived to contain complex policy messages: "*While one section discusses the effectiveness of current policy, building on performance assessment outcomes, the next section starts questioning the objectives underpinning these policies by reflecting upon these policies from a multi-actor perspective*." (Excerpt from internal memo, May 2012)

On the other hand, the multiplicity of messages was also appreciated by user groups – including politicians. In their view, evaluative knowledge based on facts and figures, supplemented with policy analysis of networked governance, offered a more complete picture of the system under study. They appreciated the action perspectives for their rich suggestions and their attention to a wide range of actors and issues. The external evaluation with user groups reflected three types of functions: a knowledge function, a communication function and a political function, each of which is illustrated with a fragment from the evaluation report of the 2012 study (final evaluation report, September 2013):

Knowledge: "In policy the numbers are often forgotten; this [study] allows us to demonstrate how policy is performing (policy-maker)". For example, the Balance study points to *overall national-level improvement of air quality, while it simultaneously decreases in local urban settings*.

Communication: The Balance study allows for a shared understanding of the numbers, for example about emissions, as it *discusses their meaning and how to interpret them*.

Political: A member of the Dutch Parliament makes use of the Balance study in budgetary negotiations to convey political pressure: "The Balance study identifies how nature develops in our country and *whether this development runs into the right direction*." (Italics added)

Users tend to indicate the added value of the Balance study in learning terms, while they principally refer to modernist evaluation outcomes. In the first excerpt, a policy trade-off is being addressed. In the second excerpt, the user refers to the added value of the meaning of numbers. In the last excerpt, the study enables reflection on the direction of nature policy. These findings provide empirical evidence of the suggestion made by previous scholars that modernist evaluation approaches can also facilitate learning and reflexivity (Owens et al., 2004).

The evaluation report mentioned how the role of the study seemed to be increasingly shifting towards an agenda-setting function (see also Maas et al.,2012) and it suggested further developing skills and capacities for reflexive evaluation approaches within the organisation.

As for the next project – the 'Assessment of the Human Environment 2014' (PBL, 2014a) – it was decided that the learning aspirations had to remain intact using the systems approach as a guidance for the thematic assessments. At the same time, the legitimate role of the Assessment of the Human Environment was acknowledged to be grounded in its 'facts and figures' and accordingly the PBL management board decided to stress the

traditional assessment function with a 'back-to-basics' motto, conforming to the modernist evaluation imaginary.

In summary, this case illustrated the interplay between *policy and political dynamics*, *innovative aspirations* and legitimacy concerns in view of the *formal mandate and position* of the study. Nonetheless, the team managed to develop an additional role in line with a more agenda-setting orientation, represented by the 'facts that matter' and the action perspectives. Thus, both imaginaries were mobilised interchangeably.

7.5 Discussion and conclusions

In this article we explored how evaluation practitioners attempted to innovate a prominent Dutch evaluation study, while they also attempted to remain faithful to traditional attributes of preceding editions. We now return to our research question: How in their everyday work do evaluation practitioners address the multitude of evaluation approaches, given diverse societal expectations of evaluation?

Our case analysis revealed that at times, practitioners, and their internal and external peers alike mobilised modernist and reflexive evaluation imaginaries interchangeably, when justifying their work. We identified the following interplay between institutions and local dynamics in our empirical section:

1. institutionalised rules (regulatory pillar), beliefs (normative pillar) and practices (cognitive pillar) ensure connectivity to modernist evaluation traditions;
2. innovative aspirations to improve the usability and quality of the study bring reflexive ideals (normative change) into the evaluation process; and
3. the characteristics of policy issues and the political situation trigger modernist or reflexive activities depending on the case.

In the first phase, due to dominant institutionalised views and practices, the initially explored reflexive approaches were partly discarded, as users and practitioners questioned the need for change. Yet, in the individual chapters' phase, reflexive evaluation approaches were pragmatically aligned with characteristics of the policy field, disciplinary preferences, sectorial interests, policy needs, personal motivations and capacities and practical considerations such as the availability of data. In the integration phase we showed how the resignation of the Dutch government and the temporary political coalition triggered policy-makers, involved as external peer-reviewers, to demand more explicit acknowledgement of both facts and visions in environmental policy evaluation, thus combining elements of both modernist and reflexive logics. The evaluation phase triggered discussions over the legitimate role of the study, revealing the search for ways of combining modernist (back-to-basics) and reflexive (governance analysis; action perspectives) elements.

The reconstruction of this local practice reveals inconsistencies. Tensions emerged from the co-existence of modernist and reflexive imaginaries, which had been articulated as different perceptions about the study's mandate, internal aspirations and capacities for innovation in view of external conditions and user expectations. The innovative ambitions conflicted with the ritual of evaluation in an institutionalised setting. This is consistent with the observation that "evaluation processes in organisations are sometimes inconsistent, disconnected, ritualistic, and hypocritical" (Dahler-Larsen, 2012: 226). Institutionalised expectations and appeals for innovation were aligned with particular policy characteristics and to the political situation, creating space for different

evaluation approaches to be used interchangeably. We found that there is no single, coherent 'evaluation approach', but instead, a multitude of approaches and practices became apparent in the different subprojects. We illustrated how innovation in assessment approaches was triggered by practitioners themselves. As a consequence, practitioners experienced more freedom to tailor evaluation approaches to particular policy questions.

The ad hoc and patchwork evaluation style of our case illustrates how inconsistencies experienced due to the co-existence of the evaluation imaginaries were accommodated: a decoupling among intentions, approaches and outcomes allowed innovation to occur locally, while at the same time conforming to traditional values. Illustrative hereof in our case are the emergence of the 'facts that matter' approach or the inclination of users indicating the added value of the 'Balance study' in learning terms, while they principally refer to modernist evaluation outcomes.

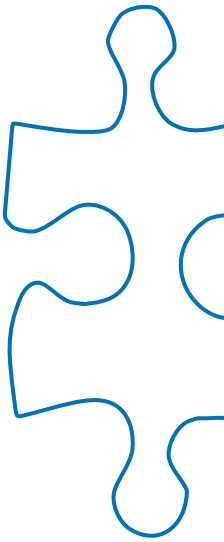
What does this example of co-production in evaluation praxis has to offer for policy evaluation practitioners? We showed how practitioners, and their peers, consciously or unconsciously, draw upon diverse societal views on what evaluation 'is' and 'should be'. Such views may not be coherent, consistent, or even articulated. Awareness and articulation of societal expectations is indispensable considering the complex, multi-actor character of present-day governance processes, which policy evaluations have to accommodate and contribute to. Evaluation practitioners need to attend to organisational dynamics by means of balancing internal perspectives on evaluation, institutionalised interests and political and cultural values in the environment (Stirling, 2006), and consider how they mutually affect the nature and direction of their evaluation study.

Finally, in terms of the theoretical debate in policy evaluation, we have suggested that the current co-existence of evaluation imaginaries has contributed to inconsistencies in the evaluation process. Resulting in tensions and more freedom for evaluation practitioners. There is need for further insight into the potential inconsistencies that result from the hybridisation of methods and approaches, and ways for accommodating these inconsistencies in practice. Our suggestion for evaluation theory is, therefore, to further explore how decoupling of approaches, methods, intentions and outcomes enables practitioners to deal with experienced inconsistencies. A focus on the political and strategic act that decoupling involves seems a fruitful way to explore how modernist and reflexive understandings of 'what evaluation is' and 'what evaluation should do' can be combined.

8.

PBL's identity in transition?

Framing PBL's roles at the science-policy interface



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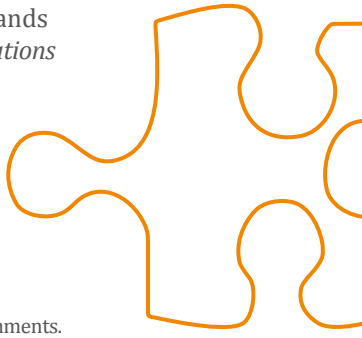


This article is part of a thematic collection on scientific advice to governments.

The previous chapters were largely oriented to reflection on participatory assessment practices in the PBL organisation. This chapter triggers deeper reflection at the level of PBL's identity as well, in view of expressions of uncertainty and doubt about the future roles and position of PBL as government expert organisation.

Four actors – the PBL management team, clients, PBL practitioners and external peers – shared their views on PBL's legitimate roles in interviews, strategic events or strategic documents. They make sense of the transition process within the PBL by structuring their views on what they think is the core business of PBL, now and in the future.

8.1 Introduction

Within a relatively short time span of approximately 50 years, we have witnessed the establishment of scientific advice to governments on a large scale and, at the same time, a fundamental change in the concepts of science and governance going hand in hand with the democratic and deliberative turns in science and politics. The 'self-evident' authority of scientific advisers has come under scrutiny by public scepticism towards the wisdom and honesty of experts and the massive reliance on expert knowledge as a foundation for policy (Bijker et al., 2009; Lentsch and Weingart, 2011). In spite of the loss of authority on the part of experts, and, thus, of their legitimating value, somewhat paradoxically, the modernist arrangements for scientific advice to governments remain steadily in place. Modernist beliefs in objective science and scientific autonomy assure the impression of demarcation between the worlds of science and politics, this way (ideally) avoiding the scientization of politics or politicization of science to occur (Weingart, 1999). Highly institutionalised forms of expertise construction such as the IPCC (Intergovernmental Panel on Climate Change) and IPBES (Intergovernmental Platform on Biodiversity and Ecosystem Services) are cases in point. At the same time, the growing intertwining of science and society (Hajer and Wagenaar, 2003; Irwin and Michael, 2003; Maasen and Weingart, 2005) bring about shifts in the conception of what scientific advice 'is' and 'should do', triggered by ever more knowledge controversies over objects of governance (Hajer, 2009) and growing difficulties of containing 'scientific' issues within established institutional boundaries (Gottweis and Braun, 2007).

We witness the emergence of a range of new ideas and approaches for how to shape and institutionalise science–society interactions in a more interactive and reflexive way in many countries, inspired by notions of 'citizen science' and 'co-creation' defining and redefining roles of citizens, politics and science in resolving societal problems in interaction with the social and political context under study (Irwin, 1995; Fischer, 2000; Maasen and Weingart, 2005; Fischer, 2009). It is assumed that the reorganisation of government science advising along the lines proposed by reflexive scholars will increase the accountability, quality, effectiveness and legitimacy of scientific expertise in society (Funtowicz and Ravetz 1993; Nowotny et al. 2001; Jasanoff 2003).

Attempts to replace modernist logic with a reflexive one are not just difficult, but seen as subversive for the knowledge–power nexus implicated in institutionalised forms of scientific advice to governments (Foucault, 1995). Governments in the modern era have sought to exercise their powers of regulation and control through knowledge regimes (Scott, 1999) that use 'value-free' scientific knowledge to "constitute what in effect become truth regimes just as much as governance regimes" (Turnhout et al., 2016: 69). This is not the place to explore the question of why or exactly how the knowledge–power nexus is constituted in scientific advice to governments. Yet, this situation is telling of the paradox government scientific advisers are confronted with: while they attempt to innovate their practices to become more reflexive and interactive, they cannot 'escape' modernist fundaments that constitute their practices.

This article explores how actors involved in government science advising make sense of this paradoxical situation. Using the transition process within the PBL Netherlands Environmental Assessment Agency as a paradigmatic case (Flyvbjerg, 2006a), I shed light on the dynamics of institutional redesign. In so doing, I address a broader topic of relevance to this thematic collection on scientific advice to governments: What can an

empirical study of a single expert organisation in transition tell us about the future for scientific advice to governments?

8.2 Background

The science systems and knowledge infrastructures in many countries are modelled to modernist ideals of science speaking 'value-free' truth to political power that gained institutional currency in the nineteenth century. The notion of value-free science itself was based on the expectation that the impartiality and objectivity of scientists could help overcome political conflict (Proctor, 1991). While, on the one hand, these modernist beliefs and arrangements are problematised or considered unacceptable after the deliberative and democratic turns in science and politics, on the other hand, they are strongly institutionalised in knowledge–power nexuses (Stirling, 2006; Wesselink and Hoppe, 2011) that help determine who is responsible, who has authority over whom and what sort of accountability is to be expected (Gottweis and Braun, 2007). It is through the mutual reinforcement of modernist beliefs, arrangements and approaches that the hegemony of modernist logic in scientific advice to governments can be explained. Modernist logic is reflected in the institutional design of government expert agencies, which is marked by: an independent performance of 'unbiased experts' who are free from external influences, particularly from their clients; a scientific approach supported with elaborated scientific working procedures to assure 'good science' and a mandate in advising the legislative or the executive (or both) on science-related policy issues (Jasanoff, 2005b; Lentsch and Weingart, 2011).

The paradox that accompanies efforts of institutional redesign towards a reflexive mode of scientific advice to governments all along is that it occurs partially. Reflexive approaches may emerge while modernist beliefs, for example, in an objective and independent advice, remain uncontested as part of the knowledge–power nexus constituting modernist arrangements in scientific advice to governments. Exemplary are the reform attempts at IPCC: "the negotiations over IPCC reform have thus far focused on improving scientific quality by reviewing specific procedures (from the selection of authors and review procedures to the way errors are dealt with in published assessment reports) … [while] … So far, no debate has ever taken place about the IPCC's relationship to public policy and to its various global 'publics' or about its normative commitments in terms of accountability, political representation, and legitimacy" (Beck et al., 2014: 82). When reflexive principles are mobilised, they seem not to replace but to 'add on' to modernist ideals. A prime example is that leading practitioners of scientific advice signalled the need for embedding principles of humility, transparency and honest brokerage in the practice of scientific advice to governments. They drafted principles for a twenty-first century science advisory practice that is legitimate and accountable (Gluckman, 2014; ICSU, 2014); yet the simultaneous inclusion of autonomy and scientific privilege in the set of principles illustrates that the 'traditional' modernist ideal of science speaking 'value-free' truth to political power is still very much alive.

At the same time, these examples illustrate how practitioners seek room for manoeuvre and options available for reforming scientific advice to governments. A review of literature on expert roles reveals that scholars emphasise on transparency in methods and assumptions, a professional attitude of humility, public participation and explication of different points of view (Spruijt et al., 2014), this way endorsing reflexive logic of what scientific advice 'is' and 'should do'. In recognising the limits of prediction and

control, scientific advisers come to grips with different meanings and functions of knowledges in different contexts. Experts are compelled to open up to wider review and make 'engaged publics' integral to their practices. They essentially need, using a phrase of Jasanoff (2003), to institutionalise 'technologies of humility', involving participation, reflexivity, framing and transparency to address the partiality of scientific knowledge and the inevitable uncertainty and ambiguity it holds. New roles of science in society, such as honest brokering (Pielke Jr., 2007), enable experts to facilitate interaction with civil society actors to address societal problems marked by uncertainty and ambiguity. The spectrum of possibilities in which new roles for science emerge characterises the dynamic character of reform attempts, but also leads to a lack of understanding of those new roles and a lack of distinction between them (Turnhout et al., 2013; Reinecke, 2015). New roles for science may even end up reinforcing a traditional modernist logic of scientific advising, "while terms like knowledge brokerage may hide this reality by fashioning these with an attractive label and a new-found legitimacy" (Turnhout et al., 2013: 10). Illustrative hereof is an example pertaining to the context of PBL, my case setting. In February 2010, PBL was assigned the task by the Dutch cabinet and parliament to review the IPCC fourth assessment report (AR4) in response to political and media debate about mistakes in the regional assessment part. PBL's former Director (from 2008 to 2015) Maarten Hajer, a renowned scholar in deliberative governance, initiated a deliberative repertoire (Hajer, 2012) by inviting critical peers and publics to contribute to the review of potential mistakes (PBL, 2010a). While this deliberative approach restored the credibility and legitimacy of PBL and climate science in general (Hajer, 2012; Tuinstra and Hajer, 2014), the deliberative repertoire was also perceived to undermine the epistemic authority of climate science. Some found it risky since PBL positioned itself in political debate by engaging with climate sceptics and lay people (Tuinstra and Hajer, 2014). This case example clearly reveals the paradox PBL finds itself in: steps in the direction of a reflexive mode of advising are not undisputedly accepted.

8.3 Case introduction and research approach

This article zooms in on the transition process in one of the government-funded Dutch planning bureaus[38]: the PBL Netherlands Environmental Assessment Agency (in Dutch: *Planbureau voor de Leefomgeving*; further abbreviated to PBL). I use this setting as a paradigmatic case (Flyvbjerg, 2006a) in the hope of learning something about the belief systems of actors who acknowledge the need for institutional redesign of scientific advice to governments. Given that the debate over the roles and identities of expert bodies in the science–policy interface is as lively in the Netherlands as anywhere else (Halffman, 2005; Halffman and Hoppe, 2005) and given PBL's active attempts to move into the direction of a reflexive mode of advising, an empirical study of the transition process within the PBL may illustratively unmask how processes of institutional

[38] There are two more planning bureaus: SCP – Social and Cultural Planning Office of the Netherlands, and CPB – Netherlands Bureau for Economic Policy Analysis. Planning bureaus are governmental policy-analysis agencies. The term 'planning bureau' is a typical Dutch invention. The first planning bureau, CPB, was established in the aftermath of WWII. The name is somewhat misleading; these institutes are not involved in planning the economy, or else, but in the provision of policy-relevant knowledge. For these reasons, they prefer to use terms like assessment agency, as in their English names, although their Dutch names are anchored in law and have become commonplace in Dutch political parlance (Halffman and Hoppe, 2005).

redesign take shape. The PBL dates back to the mid-1990s and in its present form was established in 2008 out of a merger of the MNP Netherlands Environmental Assessment Agency and the RPB Netherlands Institute for Spatial Research. The PBL advises the Dutch government in policy areas of nature, spatial planning and the environment with independent[39] policy analysis studies.

Triggered by a credibility scandal in 1999, the PBL unwittingly embarked on a transition from a technocratic mode to a more reflexive mode of advising (Petersen et al., 2011); yet in so doing it was confronted with the paradoxical situation described above. The PBL has attempted to innovate its practices to become more reflexive and interactive, yet cannot 'escape' modernist fundaments constituting its practices: ".. given the institutionalized role of the Netherlands Environmental Assessment Agency at the Dutch science–policy interface and regular reorganizations (the latest due to a merger), the modest progress made in the direction of a PNS [post-normal science[40]] strategy should be considered a substantial result. It is not clear how much further the agency could go even, without losing some of its credibility in the policy domain (based on the image of 'normal science')" (Petersen et al., 2011: 381). PBL researchers acknowledge the added value of stakeholder participation, for instance, but are in doubt about the quality impact this may have (Kunseler et al., 2015). They pragmatically pursue a strategy of decoupling innovative ambitions from institutionalised ways of working; and in this way attempt to work effectively under the coexistence of modernist and reflexive ideals within the organisation (Kunseler and Vasileiadou, 2016).

While offering rich insight into the paradoxical situation at PBL, previous case work remains short of insight into the belief systems of actors involved in PBL's transition process. This article explores how four crucial actor groups—the management team, practitioners, clients and external peers—make sense of the paradoxical situation, and while doing that express their beliefs on what they think scientific advice 'is' and 'should do'. I approach this task using frame analysis, which serves as an analytical tool that gives insight into sense-making[41] processes in organisations that face challenges and surprises (Termeer and van den Brink, 2013). Weick (1995) considers sense-making as the root activity of people who have to deal with an unpredictable and unknowable world. Frame analysis is a language-focused method that identifies how groups of actors structure their views through active processes of problem structuring and interpretation to make their world logical and meaningful, sometimes pointing to the implications for action of their ways of thinking (Yanow, 2003). Different actors may problematise different situations, tell different stories and suggest different solutions. These processes may lead to frame differences, which represent a rich variety of

[39] Independence is secured in legislative within the Regulation for Policy-Analysis Agencies, Article 4, which states that the three Dutch policy-analysis agencies (planbureaus) are solely responsible for the content and quality of their work and that policymakers should refrain from interference with research contents and methods (Government Gazette, 2012).
[40] Funtowicz and Ravetz (1993) introduced the term 'post-normal science' for issue-driven knowledge production in a context of hard political pressure, values in dispute, high decision stakes, and high epistemological and ethical systems uncertainties. In context of this article, post-normal science can be positioned as a strategy under the reflexive mode of advising.
[41] In my definition of frame and framing, I relate to its use in the school of interpretive policy analysis (Yanow, 2003). This school builds on a social constructionist use of the concepts of frame and framing, which can be traced back to the work of the sociologist Goffman (1974), who argued that individuals perceive events in terms of certain frameworks of understanding or 'frames', which provide them with a way of describing and interpreting the event.

perspectives, interpretations and ways of understanding what is going on (Laws and Rein, 2003). An analysis of frames among four actor groups, as I pursue with the PBL case in the next sections, is therefore potentially illustrative of the plurality of and interrelations between their beliefs on what they think scientific advice 'is' and 'should do'. These four actor groups are situated within the knowledge–power nexus constituting the PBL organisation. For the purpose of frame analysis, I draw on documented material of strategic events in the period from 2008 to 2015 in which actor groups reflected on PBL's (future) identity and role. Table 8.1 summarises my data sources for frame analysis for each of the four actor groups. Actors draw on own experiences or refer to exemplary studies of PBL to mark their point of view. Although I separate the actor groups for the purpose of identifying frame differences, in practice they interact more or less frequently in daily work implying that their views on the identity and roles of PBL have been dynamically shaped within these interaction processes as well.

Table 8.1 *Data resources for qualitative content analysis*

PBL research staff	PBL management	Clients PBL	External peers
Nine session reports and a summary report of a PBL seminar on expert roles (18 January 2011).	PBL's strategic plan: the charcoal sketch (November 2011), implementation plans of PBL's departments (June 2012) and progress reports (2013 to 2015).	16 interview reports and a summary report of a client satisfaction survey conducted in Autumn 2012. For details see de Wit and Merkx (2014).	Scientific audit report (PBL Audit Committee, 2013) and PBL's response to the audit committee (PBL, 2013).
PBL researchers reflected upon dilemmas they encountered in their daily practices during a seminar on expert roles. The seminar was organised under the heading of PBL's strategic programme on open assessment methodology.	PBL's strategic plan was drafted in autumn 2011 by the PBL management team. It describes ambitions and goals for PBL's role and position in 2015. Activities needed to achieve them in the period from 2011-2015 are formulated in implementation plans. The progress reports summarise PBL's achievement towards its self-defined ambitions and goals.	The client satisfaction survey was conducted by PBL's confidential advisor in 16 semi-structured interviews with policy clients at various government departments, collaboration partners at universities and knowledge institutes, media and a civil society organisation.	An international scientific audit committee evaluated the scientific quality and societal relevance of research that is conducted by PBL. The audit covers the period from May 2008 to May 2012; with a focus on research conducted in 2011 and 2012. The committee made recommendations with regard to research improvements, relevance, PBL management and PBL's positioning in the future.

Using qualitative analysis software I systematically coded the data reflecting actor expressions on three attributes: (1) the crucial drivers for the transition process within PBL; (2) the desirable role/identity of PBL; and (3) the methodological, cultural and regulatory challenges accompanying the transition process. In conducting qualitative content analysis of these sources, first-order coding served to identify patterns across actor expressions about 1, 2 and 3, resulting in three 'frames' that are summarized in

table 8.2 and described in the next section. Second-order coding served to identify beliefs within these frames on what actors think scientific advice 'is' and 'should do'; findings are discussed in the subsequent section. As I am involved in producing the very objects under study, being a practitioner at PBL myself, I am accordingly engaged in the transition process, and there is a blurred distinction between my analysis of the transition process and the practising of the transition itself. Coding, however, serves as a systematic method to develop a nuanced view and generate a comprehensive picture of the situation under study (Weiss, 1995), whereas experience and proximity to the studied reality are at the very heart of case study research (Flyvbjerg, 2006a) and help to gain insight into the contingent and partial processes of organisational change and innovation (Pallett and Chilvers, 2015).

Table 8.*2* *Overview of frames and frame attributes derived from qualitative content analysis*

Frame attributes	Frame 1: PBL as integrated assessment specialist	Frame 2: PBL as think-tank	Frame 3: PBL as trustworthy expert
1. Crucial driver for transition	Increasing complexity of policy problems: multi-scale/multi-actor	Mediatised society politicizes policy problems and expert knowledge	Public trust in experts decreases
2. Role/ identity of PBL	PBL assesses problems across scales, levels, themes and sectors	PBL puts perspective in debates on unstructured policy problems	PBL ensures trustworthiness and transparency of its assessment processes
3a. Regulatory challenge	Working for multiple clients at various policy levels	Ensuring policy relevance and credibility of think-tank role	Standardised review procedures required
3b. Cultural challenge	Interdisciplinary collaboration needs improvement	Need for reflection upon own/organisational assumptions as to account for normative bias	Acknowledgment of the importance of critical review needed
3c. Methodological challenge	Assuring quality of expertise for integrated assessment; need for governance expertise in addition to modelling expertise	Assuring quality of expertise for perspective analysis; need for improving facilitation and communication skills	Developing a systematic approach for extended peer review processes

8.4 Three coexisting frames

The findings of frame analysis can best be summarized as an experience of uncertainty and doubt about the future roles and position of PBL as government-funded expert agency. The four actor groups tell multiple stories; presented as three frames in the following paragraphs. They highlight regulatory, cultural and methodological challenges when they structure and define the transition within PBL in view of what they recognise as the crucial driver for changing or strengthening a desirable role or identity. An overview of the three frames and their attributes is given in Table 8.2.

8.4.1 Frame 1: PBL as integrated assessment specialist

To provide relevant policy advice in today's society where all problems are interlinked, PBL's strength resides in its integrating approach: "Such an approach aims to inform policymakers about all the relevant aspects and trade-offs and provides some warrant against suboptimal decision making" (excerpt from PBL's Strategic Plan). The frame of PBL as specialist in integrated studies is promoted by the management team in view of PBL's reputation; the long-standing national and international reputation of—in particular—the environmental section of the agency for its renowned integrated modelling studies on air pollution and climate change. Clients appreciate the facts and figures within PBL's assessment studies, as "we can use them to underline towards governance and politics that much work is still needed" (excerpt from interview with civil society organisation). The biannual statutory PBL study titled "Assessment of the Human Environment"[42] (or "Balance study" in short referencing) is frequently mentioned as key product. One policy client remarks, for example, that she brings the Balance studies to political debates, "for example about particulate matter, as it contains a surprising state of the art overview. Politicians cite these numbers as well" (excerpt from interview with policy client).

Due to increasing interrelatedness across themes, sectors, geographical scales and policy levels, actors across the four groups argue that PBL has to strengthen its ability to produce integrated studies. A collaboration partner highlights that PBL publications offer much information but sometimes lack profound analysis "which you require to understand how you get from one situation to another" (excerpt from interview with collaboration partner). The desirable identity that emerges within this frame is reflected in actor expressions that highlight the need for PBL to rethink problems as multi-scale problems. Although PBL already carries out studies on all scale levels, for example, with respect to climate change, energy or quality of living, actors point out that interrelatedness of these studies needs attention as well as inclusion of other domains like mobility, water, housing.

The methodological challenge, accordingly highlighted by the management team and external peers is to strengthen the availability of expertise that enables PBL to conduct integrated analyses. In the past, work has focused on environmental impact assessments to identify physical impacts, for example, emission reductions, or synergies and trade-offs across themes and sectors such as transport, energy, land use and so on. Yet, to improve the policy relevance of this work under increasing complexity of governance systems, additional attention to policy implementation processes is a must: "Sustainability issues can only be tackled when we understand the roles of different institutes (including markets) and their changing behaviour" (excerpt from PBL's Strategic Plan). Other methodological issues associated with this task are the availability of resources (governance expertise and capacity in particular), the validity of regional data and the knowledge integration challenge of linking quantitative model-based assessments at multiple scales with qualitative case studies explaining regional or local impacts.

[42] PBL's Assessment of the Human Environment reports cover the policy domains of spatial planning, physical environment and nature, and are produced biannually since 2010 and, before that, 15 times on an annual basis in the environment and nature domain, following statutory regulations. Its original objective is to offer the Dutch government and parliament support for policy prioritization and budget allocation based on insights in the (expected) policy performance.

To accommodate the integrated assessment frame within the organisation, the cultural challenge highlighted by external peers is to encourage more vigorous cross-fertilization among staff working on similar issues at international, national, regional and local levels. Several policy clients and collaboration partners underscore this challenge as they experience different voices across PBL and lack of contacts throughout the agency.

A regulatory challenge, highlighted under this frame, is to be aware of potential conflicts that may arise when doing studies involving different or multiple policy levels. Conflicts might arise, for instance, in relation to confidentiality of research results; or if analyses of related issues for different clients arrive at different conclusions; or if a conclusion meets ready acceptance at one level and resistance at another. The management team seeks options for establishing client relationships with European, regional and local levels, without neglecting the national policy level as to avoid these conflicts. External peers suggest conflicts are to be avoided by ensuring consistency in recommendations across policy levels. PBL researchers bring forward knowledge-sharing as an alternative to vertical client–supplier relationships, especially at lower policy levels, involving policymakers as stakeholders to coproduce the assessment. Policy clients remark that PBL should anyhow strengthen its institutional position in topic areas of spatial planning, housing—topics that are typically of decentralised nature. Collaboration partners point out that PBL has to consciously position itself to other research institutes in these areas as 'stage manager' to ensure its legitimacy as a specialist in integrated assessment studies.

8.4.2 Frame 2: PBL as think-tank

Another frame identifies PBL's strength in its role of think-tank where PBL not only produces policy analyses, but also aims to identify new policy perspectives expressed into politically relevant messages. Clients emphasise the visionary value of PBL's trend studies and foresight studies. They highlight the "energetic society"[43] and the "nature outlook"[44] as key examples. In reflecting upon PBL's role and identity, they point to agenda-setting as PBL's core business and future development direction. Policy clients particularly appreciate this kind of analysis for its ability to make them think in new and productive ways: "In the energetic society study, PBL challenges policy-makers to think in a more strategic way about government-society relations" (excerpt from interview with policy client). This role would, for example, imply, they suggest, that PBL's work programme has to centre on "big" transition questions and its implications for policy, rather than being inclusive of policy issues and departmental requests as it tends to be.

This frame is justified in perspective of today's mediatized society, where PBL's role would be to reveal new action perspectives underpinned by scientifically sound and independent (that is, not partisan to a specific normative or political position) analysis. PBL management embeds this frame within its mandate, arguing that stopping the analysis at "what" questions—as PBL used to focus on—leave policymakers with an

[43] PBL's Energetic Society report was published in 2011; former Director Maarten Hajer authored this publication (Hajer, 2011). During the process clients were involved to discuss preliminary findings in deliberative policy sessions. Employees were asked to comment on the essay and internal discussion simultaneously served to get PBL researchers acquainted to governance analysis.
[44] PBL's Nature Outlook 2010–2040 was published in 2012 (PBL, 2012). During political turmoil on budgetary constraints on nature development, this report depoliticized the debate by presenting four different perspectives on nature and nature policy.

important gap regarding "how" to achieve policy objectives. Collaboration partners bring in another argument when they remark that PBL in its think-tank role most clearly distinguishes itself from other research institutes and universities. One partner remarks that "a profile as exclusive think-tank would strengthen PBL's position in the science–policy interface as it gives PBL a clear identity among other expert organisations" (excerpt from interview with collaboration partner).

There is doubt among researchers regarding the appropriateness of this role; some argue that PBL conveys an opinion with essay-like products and see this role as a normative positioning. They raise regulatory concerns with respect to the policy relevance of this role: "we may complicate policy matters by exploring policy problems in width instead of offering a clear yes/no response to a policy question" (excerpt from role seminar notes). Moreover, they feel that the credibility of PBL may be challenged if it advises policymakers and evaluates the same policy process later on. Can PBL still conduct an independent policy evaluation? For example, during the role seminar it is discussed how "performing different roles than expected as 'standard' may result in lack of clarity about the mission of PBL as a consequence of which PBL may run the risk of being perceived as 'a chameleon who is mistrusted' " (excerpt from role seminar notes). Hence, there are many concerns about the regulatory status of this frame; Is PBL allowed to act as think-tank? Another regulatory concern is that PBL in this role would increasingly depend on other research institutes for supply of research findings, while budgetary constraints in the research world do not ensure future supply is possible.

Another feeling of doubt among some researchers is of methodological nature and relates to the way to conduct this role: "we may not exactly know what this role is about" (excerpt from role seminar notes). Prioritising unstructured[45] issues means addressing potentially controversial issues: "This requires two-way communication about the basis of competing viewpoints" (excerpt from audit report). Accordingly, PBL researchers feel that they should address value orientations and action-oriented motivations, and affiliate themselves with a role of "post-normal researcher"[46] (excerpt from role seminar notes). Knowing how best to factor interactive engagement with stakeholders and the public is crucial. External peers remark, however, that PBL still lacks the resources and means to engage consistently in stakeholder participation. It should invest particularly in a deliberative set-up of the assessment process, using innovative interactive techniques such as playing with models in a context of decision-making. Also facilitation skills and expertise in governance analysis need attention.

A cultural challenge in this respect, identified by external peers, is that despite broad openness to the idea of stakeholder participation across PBL, there is a lack of basic understanding of the latest scholarship on science–policy–society interactions: "many of which [i.e. core beliefs of PBL researchers] are still subscribed to the notion of 'speaking truth to power' without them seeming to realise that policy framings are always normative, and that independence in the case of PBL may involve taking into account the beliefs of different stakeholders – even those regarded as marginal by some scientists" (excerpt from audit report). Following the latest body of thought, they argue, PBL has to re-examine its own assumptions on ways for ensuring independence and policy relevance in interactions. To legitimately add perspective to political debates in a role as

[45] The term 'unstructured issues' is used by actors groups to refer to issues that are characterised by complexity on both cognitive and normative dimensions. For a definition, see the work of (Hisschemöller and Hoppe, 1995; Hoppe, 2009).
[46] The concept of post-normal science was introduced by Funtowicz and Ravetz, 1993.

think-tank, PBL's commitment to its independence has to ensure that PBL is not partisan to a specific normative or political position.

8.4.3 Frame 3: PBL as trustworthy expert

Even though the number of contested PBL studies is low[47], it is essential for PBL to avoid contestation and assure public trust in PBL's expertise. This motivation underpins the third frame, which identifies PBL's strength in its qualified and trustworthy expertise organisation. In view of this frame, PBL has to accommodate potential risks of contestation in a society that is marked by lower trust and higher scrutiny towards experts.

A regulatory challenge highlighted by external peers under this frame is the lack of standardisation of review processes within the PBL organisation. Responsibilities for scientific quality control are distributed among a number of people. Because review procedures are not standardised between PBL's departments, serious review is not guaranteed in all circumstances. Moreover, reviewers are generally selected by the project leader and accordingly not anonymous, nor can they expect to be the most critical readers.

Policy clients note that the cultural challenge for PBL is to assure objectivity as ideologically minded researchers and reports sometimes build upon particular assumptions that are not always so well scientifically underpinned. They warn for this normative attitude, as it puts the credibility of PBL at risk. Researchers acknowledge the ideological bias in their work; and how this may sometimes influence their choice of topics and methods. They acknowledge that transparency about viewpoints and definitions is essential. External peers suggest that review by experts with alternative views and assumptions would enable critical discussion about the values underpinning assumptions used in PBL studies. They remark that the task of reviewing needs higher priority within the PBL organisation.

Methodological challenges under this frame are the set-up of criteria and approaches for organising reviews. Issues that deserve attention are: anonymity of reviewers to the project leader, number of reviewers asked, what counts as a scientific review (as opposed to feedback from policymakers), timing of review. Under circumstances where PBL captures a limited level of knowledge on a particular topic (for example, development cooperation), early review may 'prevent' knowledge gaps. A well-organised review system could eventually avoid perceptions among clients that messages are not always scientifically underpinned and sometimes reflect mere opinions.

8.5 Conceptions of what scientific advice is and should do

The three frames are not necessarily competitive, nor contradictory, yet the coexistence of three frames shows that various actor groups envision multiple meanings, roles and

[47] Within the period from 2011 to 2015, covered in this study, three PBL studies were subjected to (public) credibility contestations. PBL acted upon the criticism by organising deliberation with extended peers on the epistemological and normative assumptions within the assessment studies. See PBL's review of the IPCC fourth assessment report (PBL, 2010), a PBL publication on food consumption and production (PBL, 2013a) and a PBL publication on biodiversity indicators (PBL, 2014a).

identities. Through their deliberations they are 'opening up'[48] a space to consider and evaluate a range of alternative institutional design options. The coexistence of the first and second frames marks the differentiated importance that actors allocate to particular types of study – integrated assessments (Frame 1), trend and foresight studies (Frame 2) – in view of crucial drivers for transition. A strong identity as integrated assessment specialist is crucial, knowing that PBL increasingly has to operate in dispersed multi-actor and multi-level governance settings. However, an identity as think-tank allows PBL to put perspective in politicised problems. Pursuing both frames, as all actor groups do, raise alternative, though not necessarily mutually exclusive design options. The highlights of regulatory, cultural and methodological challenges under each frame signpost the potential directions for redesign. While reconciliation of both frames at methodological level (interdisciplinary capacity building under Frame 1 and deliberative capacity building under Frame 2) may be feasible if resources are available, tackling the cultural and regulatory design implications of both frames might ask for different foci in future profiling and positioning of the PBL in the science–policy interface. Whereas Frame 1 conceives of PBL as the knowledgeable specialist who works across scales, levels and domains, under Frame 2 PBL is the visionary facilitator in societal debate. The coexisting third frame seems to offer a way out though, as PBL's trademark of trustworthy expert safeguards PBL's independent image regardless of type of study or setting, which all actor groups consider to be of paramount importance. With a reputation grounded in the role of trustworthy expert, PBL can accordingly appropriate the role of specialist or think-tank to the type of setting and study.

Within and across frames, frame differences are notable. The four actor groups reflect a variety of interpretations of how PBL is (expected) to play its roles; revealing different conceptions of what scientific advice 'is' and 'should do'. Under Frame 1 the four actor groups convey different ideas on how to relate to policy levels other than national government, ranging from vertical client-supplier relationships to interactive knowledge-sharing or co-production. Under Frame 2 the appropriateness of the think-tank role is a point of concern among practitioners as they perceive a risk of too close engagement with policy and political processes. External peers recognise this response as a 'speaking truth to power' attitude in the PBL organisation and stress that a cultural transition is needed to enact this role properly. Frame differences in Frame 3 become explicit in the motivations underneath the shared concern for normative bias. The actor groups display alternative interpretations of trustworthiness, including a focus on scientific underpinning, on transparency and on critical positioning towards alternative perspectives. What we can learn from these frame differences is that modernist and reflexive logic coexist in the knowledge–power nexus constituting the PBL organisation. Moreover, analysing frame differences across the frames reveals that all actor groups convey elements of both logics when expressing their views on PBL's (future) identity and role, although external peers are more inclined to promote reflexivity and policy clients tend to adhere to modernist assumptions, whereas practitioners and management team remain in-between to suit both.

[48] Stirling introduces the conception of 'opening' up to point out the greater need for the appreciation of plural, socially situated understandings of epistemological and normative commitments in innovation processes (Stirling, 2008; Stirling, 2010).

On the one hand, this leads me to conclude that several reflexive principles endorsed by scholars discussing expert roles (for an overview, see Spruijt et al., 2014) are notable in PBL context:

A certain amount of humility is noticeable: Normative bias and ideological views are problematised in view of PBL's credibility, and critical review and transparency are considered necessary (Frame 3). Acknowledgement of one's own and organisational assumptions is also perceived as conditional to the performance of the think-tank role that addresses the basis of competing viewpoints (Frame 2).

Deliberation and participation become accepted strategies: They allow for embedding local knowledges in integrated assessment studies (Frame 1) and assure inclusiveness of perspectives to address unstructured societal problems (Frame 2). This is seen to benefit both the scientific quality and societal impact of PBL's assessment processes.

On the other hand, when it comes to institutionalisation, reflexive ideals still need a way to go. My analysis of frame differences reveals how most actors remain uncritical of several modernist beliefs (see Weingart, 1999 for clarification):

The preservation of boundaries between 'science' and 'politics': The assumption that knowledge is generated in a process isolated from politics is still very much alive. The think-tank role is perceived as a technical–rational endeavour that demarcates the stakeholder values from the politics in the policy system (Frame 2). A focus on advancing integration between various scientific methods (for example, modelling and governance analysis) in interdisciplinary work settings tends to demarcate integrated assessment as a scientific approach from the politics that interdisciplinary collaboration inevitably involves across various normative and epistemological commitments that originate in these disciplines (Frame 1).

The reinvention of objectivity: While a belief in value neutrality is abandoned, the assumption that inherent biases and limitations can be solved by peer review and transparency reveals a belief in objectivity as scientific endeavour (Frame 3). Also the think-tank role advocates a search for objectivity as it enables PBL to take distance from politicised problems, rather than engage with the broader societal values that influence policy. In other words, PBL researchers seek to identify the evidence-based implications of perspective plurality "out there". They tend to decontextualize these perspectives from the normative debates in which they are shaped.

Scientific privilege through peer review: The notion of critical review inclines to be captured within the scientific discourse of peer reviewing. PBL's strategy for assuring its trustworthy expert status resides in the 'virtue' of rigour, represented by the review process. The purpose of review is to assure the integrity of scientific methods and the soundness of the assessment process (Frame 3). A post-normal science role (Frame 2) and extended peer review strategy (Frame 3) are advocated to account for normative bias in PBL assessments and value diversity in the policy problem under study for the purpose of scientific quality assurance, rather than for reasons of social robustness or public accountability per se.

Similar to various scholars (Turnhout et al., 2013; Beck et al., 2014; Reinecke, 2015; Turnhout et al., 2016), yet giving more profound insight into actors' belief systems, this analysis reveals how newly found reflexive principles of humility, transparency and deliberation may unwittingly become encapsulated within modernist logics. Using frame

analysis, I *unmasked* the performativity of persistent ideals of demarcation, objectivity and scientific privilege in scientific advice to governments.

8.6 Conclusion: towards a future for scientific advice to governments

Actors make sense of the paradoxical situation accompanying the transition process in government scientific advising by seeking and structuring their views about necessary reforms in logical chains of drivers, motivations, dilemmas, challenges, actions and so on. A set of strategic documents of PBL's transition process expressed those views and this article identified three frames reflecting PBL's future identity and role: PBL as integrated assessment specialist, PBL as think-tank and PBL as trustworthy expert. What we can learn from this case is that actors struggle with the coexistence of modernist and reflexive logics in processes of institutional redesign, as is reflected in their beliefs of what scientific advice 'is' and 'should do'. On the one hand, there is awareness and willingness to act in more humble, transparent and deliberative manners – actors acknowledge uncertainties, biases of their own, a broad range of societal values and views implicated in policy problems and knowledge production – while at the same time they pertain to modernist beliefs in science–politics demarcations, objectivity and scientific privilege.

This article has illustrated how the advance of the institutionalisation of a reflexive model for government science advising depends on a successful dialogue between various actor groups. Different actors tend to emphasise on different situations, different stories and different solutions leading to frame differences, which represent a rich variety of perspectives, interpretations and understandings of what is going on (Laws and Rein, 2003). Institutional redesign involves, therefore, reconfigurations of social relationships and accompanying shifts in the knowledge–power nexus (Friedland and Alford, 1991). This requires flexibility of the knowledge/advisory infrastructure at large. Much depends on the steering relationship between the government and its scientific advisory bodies and the opportunities for rearranging this relationship. The Dutch government (as well as other governments in Europe) is redefining its position, seeking its role as facilitator of policy initiatives arising in an 'energetic society'. This would imply that governments inevitably have to participate in the co-production of governance initiatives and thus collaborate with other policy and civil society actors. As knowledge and expertise are mobilised along the way, the shift from government to governance may bring forward different conceptions of what scientific advice is and should do, appropriating new roles to scientific advisers that allow them to participate in governance networks and advise to crucial policy and social actors, instead of government alone.

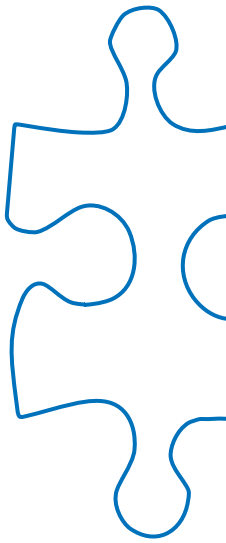
The challenge for government scientific advisers is to 'translate' processes of institutional redesign into concrete social and cultural changes. Institutional reflexivity can uncover the underlying conditions and power relations affecting an individual's or institution's frame of reference (Stirling, 2006). Identities become multiple and standard rules and structures are called in question and become subject of debate (illustrated by the frame differences). Via diffusion of standard rules and structures, reflexive logic may gradually gain influence in government scientific advising and may eventually become an institutionalised habit of thought (Jasanoff, 2003). Yet, the simple acknowledgement of assumptions, ideologies and power structures does not offer by itself an orientation for change. It also needs a transformational dimension based on a reasoned, jointly

agreed normative orientation (Popa et al., 2015). This article has illustrated how questioning and deliberating about the role and identity of one's own organisation is the first step. Yet, critical awareness needs to combine with critical action to generate dynamic processes of change and innovation in scientific advice to governments.

9.

Understanding the complexity of the objectivity norm

Making sense of objectivity in participatory knowledge production



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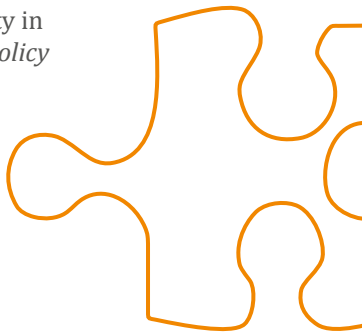


For a government expert organisation to properly perform its role, it is vital that its authority, which is grounded in claims of objectivity, is publicly recognised. A major question that is triggering reflection among PBL practitioners is whether participatory modes of knowledge production may result in new ways of generating authority.

In this chapter we discuss how internalised notions of objectivity, shared in interviews and discussion sessions, were challenged by the very initiative of merely discussing the (potential) merit and difficulties of deliberative assessment approaches. We show that objectivity is not a fixed category, but that practitioners reconstruct what it means to be objective in participatory settings, so that they can validly say that they conform to the norm of objectivity.

9.1 Introduction

For government expert agencies to properly perform their role as credible and influential science-policy interfaces, it is vital that their authority is publicly recognised. Do government expert agencies generate new ways of demonstrating their authority, given that in present-day society their public legitimacy – grounded in claims of objectivity – is often publicly challenged? Drawing on empirical work, particularly in the field of climate science and politics, we can say that this hardly seems to be the case (van der Sluijs et al., 2010; Beck et al., 2014); on the contrary, the norm of objectivity seems to be reinforced by the media, as well as by scientists and the expert agencies themselves.

Experts typically seek to conform to identity norms, like objectivity, when approaching their task (Hilgartner, 2000). Tracing the historical and cultural origins of objectivity reveals that over time the word 'objective' has acquired different meanings and associated scientific practices (Daston and Galison, 2007). There is no single definition that captures the meaning of objectivity and new meanings are added as practices change over time, giving objectivity its irreducible complexity (Douglas, 2004). In science–policy interfaces objectivity plays a dual role in distinguishing valid policy-relevant knowledge from mere politics. Objectivity in the sense of what counts as proper scientific representation of nature, and objectivity in the sense of the role of public interests and values in the reasoning process. This double objectivity, scientific and political, is achieved through institutional projections of credibility and truth to policy-makers and other audiences (Jasanoff, 2011). Institutionalised forms of scientific advice to governments, therefore, routinely commit to objectivity as a central identity norm to ensure that the advice has credibility and influence in society, thus assuring their authority (Bijker et al., 2009; Hilgartner, 2000; Jasanoff, 2005b).

Institutional responses to credibility crises in scientific advice to governments, e.g. the Climategate affair, signal that expert agencies like the Intergovernmental Panel on Climate Change (IPCC) wish to restore public faith in their autonomy, openness and disinterest. They employ 'repair' strategies by increasing the transparency of their scientific procedures and extending peer review to include non-scientific peers in the assessment process. The IPCC's relationship to public policy and its various global 'public' audiences is hardly subjected to critical debate (Beck et al., 2014; van der Sluijs et al., 2010). Accordingly, the epistemic power of the IPCC remains unchallenged and unreflexively guides a global and science-based understanding of climate change, subordinating plural and local understandings of climate change to a singular technocratic framework (Turnhout et al., 2016).

We have conceptualised this situation as an 'authority paradox'[49]: large uncertainties and value conflicts reinforce the need for authorities who can speak in the name of an objective science at a time when the objectivity of experts and expert agencies is subjected to public scrutiny. Public challenges of the objectivity of expertise are undermining the authority of scientific experts. The paradox here is that while there is a

[49] Bijker et al. (2009) introduce the paradox of scientific authority to investigate how the Health Council of the Netherlands manages to maintain its position of scientific authority, while that authority seems to be deteriorating in the rest of Dutch society. Hajer (2009) introduced the authority paradox to explain how "the phenomenon of media 24/7 multiplies the attention for the classical-modernist political centre at a time at which crucial problems often spill over jurisdictions, disempowering the political centre" (p.176). Both Bijker et al. and Hajer showed how the paradox expresses itself in institutional settings whose classical-modernist roots are challenged by appeals for democratisation.

need for objective scientific advice, such advice can only be acquired from experts and expert agencies whose objectivity and, hence, authority are contested (Bijker et al., 2009; Gluckman and Wilsdon, 2016). Institutionalised forms of scientific advice to governments are faced with this paradox. Government expert agencies increasingly have to operate in disparate multi-actor and multi-level settings where policy issues – especially in the environmental field – are marked by severe political pressure, disputed values, high stakes in decision-making and very large epistemological and ethical system uncertainties (Funtowicz and Ravetz, 1993).

How do the experts themselves navigate the authority paradox? This question is best examined in situations where experts start actively questioning, challenging and innovating their practices, while they aim to safeguard their credibility and influence as an authority.

In this paper we present an empirical study to show how practitioners in a Dutch government expert agency, the PBL Netherlands Environmental Assessment Agency (*Planbureau voor de Leefomgeving* – PBL), interpret the objectivity norm when considering their role as credible and influential experts in today's constantly changing governance settings and issue configurations.

Taking the PBL as a paradigmatic case (Flyvbjerg, 2006a), this paper sheds light on the wider problem of persistent technocratic and science-based environmental knowledge production systems (Turnhout et al., 2016). Participatory or transdisciplinary modes of knowledge production have proven hard to establish due to disciplinary traditions and expert-driven research cultures in the home institutions of experts (Mattor et al., 2014; Sternlieb et al., 2013). There is a tendency in environmental science-policy interfaces to institutionalise new modes of knowledge production in accordance with prevailing values of scientific independence and autonomy (Lövbrand, 2011; Van der Hel, 2016). In practice, therefore, these attempts appear to deviate little from, and can even reinforce, a technocratic style of working (Reinecke, 2015; Turnhout et al., 2013). Experts tend to "do […] more of the same under a different name" (Van der Hel, 2016: 173). The lens of practice, in this paper adds a new perspective to institutional tensions in science–policy interfaces by illustrating the complexity of the objectivity norm (Douglas, 2004). In the next section, we will introduce the PBL as a paradigmatic case for government expert agencies seeking to navigate the authority paradox. We then explain our methods of data collection and analysis. The empirical section of the paper shows how practitioners start questioning, challenging and innovating their practices and develop new meanings of objectivity at the same time. The paper concludes by pointing out how the authority paradox may be successfully navigated by experts in environmental science–policy interfaces.

9.2 The PBL as a paradigmatic case

The PBL Netherlands Environmental Assessment Agency can serve as a paradigmatic case (Flyvbjerg, 2006a) for government expert agencies seeking to navigate the authority paradox. Using this case, we can learn something about the way practitioners conform to the identity norm of objective science, while they start to consider and evaluate their assessment approaches and expert roles in today's advisory setting of constantly changing governance and issue configurations. This section introduces PBL' position at the Dutch science-policy interface and illustrates its responses to credibility crisis in the past.

The PBL is the Dutch national institute for strategic policy analysis in the fields of the environment, nature and spatial planning. It is a government-funded expert agency that aims to "contribute to improving the quality of political and administrative decision-making by conducting outlook studies, analyses and evaluations in which an integrated approach is considered paramount." PBL holds the legal status of a policy assessment agency with "a prime concern to generate policy-relevant studies in an independent[50] and scientifically sound manner" (PBL, 2017).

PBL's activities fulfil a traditionally-determined authoritative role for a small group of professional representatives and government. First and foremost, PBL works closely with government departments that oversee its operation and research capacity. PBL is presented in the public debate as a powerful institute that disciplines policy-makers into rational policy making; using impartial calculation methods to assess policy goals and options in a way which is neutral and non-partisan (Halffman and Hoppe, 2005). The rhetoric of objectivity is deployed not only by the agency itself (Kunseler, 2016), but also by politicians and policy-makers who seek to correct one another with claims of expertise. They accept PBL's knowledge as 'best guess' statements to create the playing field in which they operate and bargain, because "questioning this would lead to a swamp of policy unpredictability" (de Vries, 2008).

While the authority of the PBL is firmly grounded in its legal (de jure) position as an independent government expert agency, in practice PBL researchers tend to perform their expert roles flexibly when dealing with different clients and public audiences, by means of skilful boundary work (Hoppe, 2009b; Huitema and Turnhout, 2009; Pesch et al., 2012). In this way they can ensure that there is an organisational fit with a policy field or issue based on PBL's mandate to produce science-based policy-relevant studies. Authority in such dynamic boundary processes comes from playing a credible role in a succession of concrete situations. This creates a de facto (real) authority alongside PBL's de jure (legal) authority (Hajer, 2009, 2012), which then leads to the accumulation of epistemic authority over time.

Nonetheless, PBL's credibility has been called into question on several occasions e.g. when errors became evident or when PBL was accused of an ideological or political bias. Against the background of today's complex governance settings and issue configurations, PBL can expect to increasingly face potential credibility issues, especially as uncertainties and value controversy surrounding knowledge claims continue to grow in constantly changing constellations of actors. Besides working with govern- ment departments and parliament, PBL has to relate to civil society stakeholders, as well as supra-national and regional levels of government, each of which bring their own claims, stakes and values to the assessment process (Halffman, 2009a).

When credibility has been contested in the past, this has led PBL to formulate new strategies and procedures to deal with uncertainties and perspective plurality. This is illustrated by PBL's methodology guidelines for uncertainty assessment and communication, stakeholder participation, scenario building and peer review (Dammers et al., 2013; Hage and Leroy, 2008; Kunseler et al., 2014; Petersen et al., 2013). Despite the mandatory status of these guidelines as part of quality assurance procedures, a

[50] This independence is laid down by law in the Regulation for Policy-Analysis Agencies, article 4, which states that Dutch policy-analysis agencies (planbureaus) are solely responsible for the content and quality of their work and that policy-makers should refrain from interfering with research content and methods (Government Gazette, 2012).

methodological support unit and training in the use of these guidelines, they are not always fully utilised in PBL projects. There still seems to be insufficient understanding in the organisation concerning the basic values and beliefs underlying these guidelines, and limited room to accommodate them given PBL's institutionalised interface position (Petersen et al., 2011). It appears paradoxical that PBL researchers learn to reflect upon organisational routines in order to detect unnoticed biases and unbalanced framing (in line with reflexive logic[51]), but remain committed to institutionalised beliefs in science–politics demarcations, objective science and scientific privilege (in line with a modernist logic) (Kunseler, 2016).

Illustrative of this paradox in the PBL context is an example described by PBL's former director (from 2008 to 2015), Maarten Hajer, a renowned scholar in public policy and political sciences. A deliberative assessment process had to restore public trust in climate science[52] but – in his view – nearly split PBL in two: "Between February and July 2010 some 35 researchers at the PBL contributed to an investigation of the IPCC's fourth assessment report, checking the text for more errors. This assignment nearly split the institute (in total some 250 full-time equivalent [personnel] (FTE), of which approximately 200 FTE researchers) in two. About half the academic staff were convinced this was an assignment that could only do damage to the IPCC and would lead to the demise of the PBL as an internationally respected research institute; the other half argued there was no choice and we should act on a parliamentary request in a responsible way. A small subsection of the latter half saw it as a challenge and regarded it as an important experiment in an attempt to find a new form of scientific governance." (Hajer, 2012: 455)

Without going into further detail, this example strikingly illustrates how the use of a deliberative approach to generate and restore PBL's authority appeared to invoke practical concerns among the majority of the PBL population and experimental enthusiasm among a few. In the remainder of this article we will focus on these practical concerns and explore how they reflect interpretations of the objectivity norm.

9.3 Research design

Seen through the lens of practice, organisational practices are always open to contestation and this keeps them continuously in a state of tension and change. This view is broadly placed in what has been termed 'the practice turn' in social theory (Nicolini, 2012). It was inspired by developments in sociology as well as in science and technology studies. This practice approach is suitable for the study of science-policy interfaces as a social practice (van den Hove, 2007), because it takes social structures and institutions, like the objectivity norm, not simply as given but considers how they are interpreted and re-interpreted in the day-to-day work of social actors. Thus, from the practice perspective, changes in scientific advice to government arise from processes

[51] Under reflexive logic practitioners reflect upon frames of reference including disciplinary, institutional and cultural routines, norms and beliefs. They acknowledge the limits of scientific prediction and control prevalent under modernist logic, and come to grips with a socially contingent understanding of the nature and role of knowledge in society (Kunseler, 2016).

[52] PBL was tasked by the Minister of Infrastructure and the Environment with reviewing the IPCC Fourth Assessment Report in response to media debate about mistakes in the regional assessment part. For this purpose PBL organised an extended peer review process in which critical peers and public parties were invited to contribute to the review of potential mistakes.

that are rather difficult to steer or predict (Arts et al., 2014). Zooming in on practical concerns directs attention towards the dynamic between invention and improvisation and the limits imposed by institutionalised norms and conditions. A focus on practical concerns enables us to appreciate PBL's practices as acts of 'bounded creativity': "the variety of ways in which [practitioners] can creatively engage with the practical concerns set up by a practice is bounded by the limits imposed by external conditions and criteria of accountability" (Nicolini, 2012: 226).

To surface the practical concerns which govern and affect practitioners, and to appreciate them from their perspective the design of our research is informed by an interpretive, naturalistic approach which enables us to "study things in their natural setting, attempting to make sense of, or interpret, phenomena in terms of the meaning that people attribute to them" (Denzin and Lincoln, 2013: 3). We identified the varied and multiple meanings that practitioners attribute to objectivity as they emerge from the practices carried out in the PBL organisation. Their interpretations and the interaction between them provided the basis for our study (Creswell, 2003). We made use of participant observation and document analysis of informal discussions in PBL. We also conducted interviews with practitioners about the challenges they face in their daily work. Our material was derived from three in-house activities that PBL researchers could take part in on voluntary basis. Although the activities were not necessarily restricted to a discussion of PBL's roles and the design and quality of deliberative assessment approaches in today's critical society, as it turned out, concerns related to these matters attracted considerable attention. These three in-house activities were:

1. A seminar on expert roles, organised on 18 January 2011, with the aim of developing a more sophisticated understanding by some 40 participating PBL practitioners of their own expert roles. The session reports and final meeting report served as material for our research. We further drew on ten interviews which we and others conducted with ten project leaders prior to the seminar, asking for their own experience of science-policy-society interactions. More details are available in a PBL working paper (de Wit et al., 2014).
2. An internal strategy project conducted from spring 2014 to spring 2015 with the aim of reflecting upon the implementation of open assessment methods and tools in PBL activities (in the PBL context this term refers to methods and tools that increase transparency concerning uncertainties and perspective plurality). The research was conducted by an external consultant who interviewed 13 PBL practitioners (mainly methodology and modelling experts) about their experience of and reflections on open assessment in the PBL context, and two external methodology experts about the theory of open assessment methodology.
3. A PBL course with eight PBL practitioners (mainly project leaders) who discussed their experiences on interacting with policy actors and stakeholders. The aim of the course was to enable PBL practitioners to gain a clearer understanding of recent insights in science-policy literature. The course consisted of reading of science–policy literature, three working sessions and individual assignments and was conducted from autumn 2014 to early spring 2015.

Our involvement in these activities as co-organisers (EK and WT activity 1), coordinators (EK activity 2; WT activity 3) and participants (EK, all activities; WT, activity 2) enabled us to observe and experience the practical concerns of PBL practitioners. Experience and proximity to the reality studied lie at the very heart of case study research (Flyvbjerg, 2006) and help to provide insight into the contingent and

partial processes of organisational change and innovation (Pallett and Chilvers, 2014). Intersubjectivity is an important asset in interpretive inquiry, given that the interpretation of meanings and relationships can have different connotations depending on one's own points of reference (Burawoy, 1998). We ensured intersubjectivity in dialogue among ourselves, by member checking quotes with participants, and with qualitative content analysis to guide our search for patterns across the data (Weiss, 1995). Firstly, we selected excerpts that point to dilemmas on how to sustain PBL's authority as a credible and influential science–policy interface in a critical society. Secondly, we identified how practitioners discussed these dilemmas, and we analysed how their practical concerns reflected their interpretations of objectivity.

9.4 The complexity of the objectivity norm

We identified three types of dilemmas: how to engage with policy actors, how to work with extended peers and stakeholders and how to justify new role interpretations. These three dilemmas are presented as questions in column 1 of table 9.1. In discussing these dilemmas, we see how PBL practitioners seek to assure objectivity, which reveals the various interpretations of objectivity within the PBL organisation (column 2).

Table 9.1 *Overview of practitioners' interpretations of objectivity reflected in dilemmas*

Dilemmas raised by PBL practitioners	Interpretations of objectivity reflected within dilemmas
How to appropriately balance distance from and engagement with policy actors?	Addressing the role of values in deliberative assessment processes
Do extended peers and stakeholders contribute to or rather limit the scientific quality of PBL assessments?	Addressing the rigour of the knowledge that is generated in deliberative assessment processes
Do different role interpretations than those traditionally expected put the legitimacy of the PBL at risk?	Addressing the legitimate design and implementation of deliberative assessment processes

9.4.1 How to appropriately balance distance from and engagement with policy actors?

Questions raised during the role seminar illustrated that practitioners seek to strike the right balance between maintaining a distance from and engaging with policy actors other than government departments, to guide their role in changing governance configurations: "to what extent are regional and local governments allowed to request advice from PBL, now that policy tasks in the field of nature, spatial planning and the environment are largely decentralised?" And "can PBL act as a direct adviser to the European Commission?" And "how to position ourselves in relation to non-government actors, such as businesses, who are involved in policy processes?" (quote derived from activity 1)

On the one hand they recognise the advantages of deliberation with these policy actors to facilitate policy learning and to ensure the balance with respect to a spectrum of values (value-neutrality). The following quote illustrates that a focus on policy learning and value-neutrality is seen to match PBL's mission as an independent intermediary at the science-policy interface: "The strength [of PBL] lies in discussing issues outside frameworks. Its strength is to set the agenda. This is what I am often told [by policy-makers]. PBL employees are judged on the basis of those four studies that add more

perspective to what policy-makers are concerned with on a daily basis. PBL therefore has to be able to act as an independent intermediary." (1)

Engagement with policy actors facilitates policy learning, but it requires an independent position in order to make judgements (i.e. recommendations) that are balanced towards the various stakes and values represented by the parties involved: "The width of the programme, the various government levels involved and the independent role of PBL allow room for us, as an independent party, to make critical recommendations to the various parties." (2) And she adds: "As we do have some 'weight' now, this is going well." (2)

Conversely deliberative approaches are also considered risky given the importance of sustaining PBL's independent position: "You see what happens from less of a distance; the mirror of independence is less evident. You become a part of the whole. You have to be highly alert in such processes. On the one hand you want to conduct participatory research in order to invoke learning. But on the other hand this implies that you become dependent on others for this to happen. And you become part of it, at least a bit. Researchers do not like it if you move too far in this direction." (2)

Thus, engagement calls into question PBL's detachment from politics and the particular beliefs advocated in these processes: "The external world perceives our engagement with the actors involved in policy preparation as different from what would be expected [i.e. a more distant stance] . . . while external parties essentially should see PBL as an independent broker." (2) In order to safeguard an independent position, PBL should therefore refrain from political interference: "We cannot become part of the process [i.e. of policy negotiation and formulation]" (1). Ensuring the objectivity of PBL seems to require clear demarcations between PBL's role as a provider of independent knowledge and the political processes in the policy network or system.

This leads us to conclude that the dilemma of how to strike a balance between distance from and engagement with policy actors, reflects practical concerns on how to ensure the independence of the knowledge generated in deliberative assessment processes. The usage of the term independence reveals interpretations of objectivity related to the role of values in the assessment process. On the one hand, independence is assumed to be necessary in order to create distance from points of view advocated in political and governance processes. Detachment assures that deliberative assessment processes generate objective outcomes. While engagement with these same policy actors is perceived as necessary to generate objective – in the sense of value-neutral – scientific advice that facilitates policy learning, since it balances the various views and accordingly adds (critical) perspectives to political debates.

9.4.2 Do extended peers and stakeholders contribute to or rather limit the quality of PBL assessments?

The core business of the PBL is to produce science-based assessments. In so doing, PBL practitioners carefully manage the quality of their assessment processes. However, they recognise that they are inevitably subject to bias themselves. Extended peer review is therefore considered a crucial quality assurance strategy: "Does our environmental idealism influence our work? Inevitably there is a bias, but the question is how you deal with it? The idea would be to organise your own criticism in all phases of your project and involve different stakeholders in doing so. This way, you can neutralise the bias." (1)

While supporting extended peer review, the dilemma practitioners experience is how to organise extended peer review in such way that it enhances quality without limiting the rigour of the assessment process, as the following quote illustrates: "I am a proponent of extended peer review, but you have to channel it and actively manage it: what is it you want a response to and from whom? Otherwise you won't receive a response but only trigger 'conflict'. In an ideal world, a research project is like architecture designed in a public space where everyone can respond to inspire the architect." (3)

There is a tendency among PBL practitioners to place extended peers in a subordinate position, where they may be 'invited', but not 'steer' or 'co-produce' the assessment process: "Co-production brings opportunities and risks: do we have enough distance? Can we maintain our line of argument? In unstructured[53] [i.e. value laden and highly uncertain] situations you need to adopt a position to be able to present a clear line of argument." (3) PBL practitioners aim to ensure control over deliberative assessment processes which they justify in terms of the need for 'a clear line of argument', the rigour of which they believe may be put at risk when extended peers play a more prominent role.

Even when stakeholders are given a more prominent role during the framing of assessments, PBL practitioners apply scientific procedures to exclude speculations from the process: "In the stakeholder dialogues on urban sustainability we asked them [i.e. stakeholders] to underpin their views[54] with reference to evidential relationships, such as the health effects of environmental problems. Themes raised during the dialogue underpinned with less clear evidence, such as flexibility, freedom of choice and social cohesion were scientifically processed [i.e. using expert consultation and scientific literature review] after the meeting." (2)

Based on our analysis we may conclude that deliberation with extended peers and stakeholders raises quality concerns. Practitioners' interpretations of objectivity are reflected in their views on how to sustain the rigour of the knowledge that is generated in these processes. Extended peers and stakeholders are seen to contribute to the rigour of the assessment outcomes on the one hand. Deliberations trigger reflection upon institutionalised frames of reference, and prevent bias or normative framings to go unnoticed. On the other hand PBL practitioners want to control the quality of stakeholders' contributions and tend to impose scientific standards and procedures to generate reliable knowledge.

9.4.3 Does adopting different roles than those traditionally expected put the legitimacy of the PBL at risk?

Adopting different roles than those traditionally expected is perceived as putting the legitimacy of the PBL at risk, as certain roles may contradict one another. Several questions raised during the role seminar illustrated these practical concerns: "How to remain independent assessors while actively assisting in policy and public debates as

[53] When using the notion of unstructured problems, PBL practitioners refer to Hisschemöller and Hoppe (1996) who define four types of problems along two axes, reflecting the level of agreement about values and certainty about knowledge. Unstructured problems are deemed to be far from certain and far from agreement.

[54] It is important to note here that it was not possible on the basis of our material to distinguish between PBL practitioners' valuation of input from stakeholders with regard to their arguments and their world views.

well?" and "How to act both as an independent assessor and strategic adviser in the same policy field?" (1).

For example, when involved in policy development and then evaluating the same policy later, PBL might be seen as a "butcher judging his own meat" (1). The outside world may accordingly consider the mission of the institute ambiguous: "the untrustworthy chameleon" (1).

PBL practitioners want to safeguard their legitimacy, while new roles may challenge this position: "The outside world perceives our closer involvement with policy preparation as a 'special role', which is seen as a change in which you need to maintain your independent role." (1)

As they see it, new roles are nevertheless useful in unstructured problem settings. In these settings, PBL practitioners perceive the need for deliberation across knowledge perspectives and for convergence towards a convincing result: "If you deal with unstructured problems you have to interact with politics and policy and with people offering knowledgeable contributions in order to get to an action perspective." (2)

When practitioners practice such new roles they experience considerable implications for their work process. They need to make use of novel methods and organise the assessment process differently than they are used to, as the following two quotes illustrate: "During the workshop this was noticeable; the experts [i.e. the PBL practitioners] did not adopt their old roles. Which was difficult once we [i.e. the PBL practitioners] experienced the implications on our work. For example, how should I design my presentation now that it will not be the focus of the workshop? We do not 'determine', but 'follow'. You are put outside your comfort zone, which we are not used to. As a presenter in such a workshop you are no longer sure of what to present, since someone else may have said it already." (3)

"Reflexive monitoring[55] allows you to discover why something works well or not in the process. These are also your research findings. It is a different methodology that gives different types of results. If it turns out during the process that there is no support for the concept [i.e. the issue framing] from the actors involved, then this is your research finding; which is somewhat awkward for the researchers at PBL." (2)

These quotes illustrated how practising new roles raises legitimacy issues that relate to the design of the assessment process (e.g. the use of reflexive methods and 'open' presentations) and the conditions for deliberative assessment processes (e.g. the power dynamics between PBL and participating actors).

Thus, new roles seem to be justified when PBL practitioners can contain and define these new roles in a legitimate manner. New roles were highlighted to give more prominence to interaction and discussion among participants in order to generate objectivity interactively. In this way, deliberation was considered a legitimate approach for eliminating predetermined framings from the assessment process. New roles were also considered risky given the importance of PBL's independent stance (in the sense of detachment, see dilemma 1). A certain degree of distance (from points of view advocated in political and governance processes) had to be maintained in deliberative assessment processes to assure the legitimacy of the outcomes it produced. Ensuring the

[55] Reflexive monitoring (van Mierlo et al., 2010) was recently introduced as a new mode of assessment in the PBL context. It is a method that supports systems innovation in transdisciplinary research settings by means of monitoring the learning processes.

objectivity of PBL is thus considered to be a matter of seeking to adopt new roles in a legitimate manner.

Overall, we may conclude that the complexity of the objectivity norm provides for both stability and flexibility in practices of government science advising. Practitioners' interpretations of objectivity seem to be guided by external conditions, on the one hand: "The PBL mission is defined and informs our practices, but we can see that things change and that questions change. In principle this would allow us to work differently."(2) While on the other hand they act as agents of change for themselves in creating and inventing novel approaches, which adds new meanings of objectivity to their repertoire: "Would it perhaps be possible to include special practices, for example, the advisory practice of 'knowledge at the table[56] as part our advisory repertoire? Could PBL develop new products relating to these special roles and which are recognisable to the outside world?" (1)

9.5 Navigating the authority paradox?

We have shown that PBL practitioners hold a deep and complex understanding of the objectivity norm, which supports their position as a credible and influential government expert agency operating at the Dutch environmental science-policy interface. By emphasising on independence, rigour and legitimacy they seek to ensure that their advice has credibility and influence in society, thus assuring their authority. Seen through the lens of practice, we showed how the objectivity norm of what is deemed as independent, rigorous and legitimate knowledge was situationally interpreted, in view of particular practical concerns. New meanings of objectivity were added in circumstances where this served to increase relevance and credibility. Engagement with policy actors became necessary to generate independent – in the sense of value-neutral – scientific advice that could facilitate policy learning. Extended peer review became necessary to improve the rigour of the assessment outcomes as it prevented bias or normative framings to go unnoticed. New roles became necessary to give prominence to interaction and discussion among participants which improved the legitimacy and quality of the assessment process. Conversely, practitioners still often interpreted objectivity conform the prominent 19th century representation of 'objectivity as scientific truth' (Daston and Galison, 2007). Practitioners emphasised on independence to distance themselves from points of view advocated in political and governance processes; and on scientific rigour to control the quality of stakeholders' contributions in order to generate reliable knowledge.

The practice view in this article, in effect, explains, in our view, why experts tend to do more of the same under a different name (Turnhout et al., 2016; Turnhout et al., 2013; Van der Hel, 2016). Institutional representations of the objectivity norm cannot be changed overnight. At the same time, when experts 'improvise', they tend to stretch the boundaries of what is 'appropriate'. PBL practitioners creatively engaged with the dilemmas they raised within the limits imposed by the institutional setting. A sense of 'fit' intuitively brings new modes of knowledge production to fruition (Regeer, 2009). This leads to diversification of approaches, identities and roles in government science advising. In our case, PBL practitioners acknowledged that serving the Dutch

[56] The advisory practice of 'knowledge at the table' involves participation in policy deliberations as an independent knowledge resource.

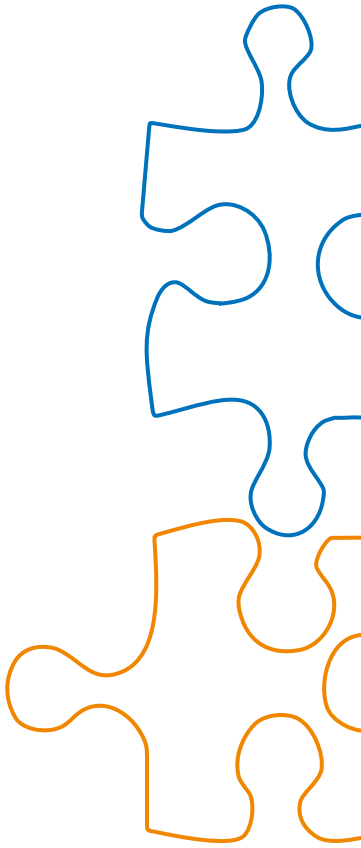
government with appropriate knowledge in a 21st century critical society inevitably requires them to explore the added value of deliberative modes of assessment. The practical concerns that accompanied this process of change reflect how internalised notions of objectivity became flexible in usage.

Practitioners in this case highlighted both scientific and political accounts of objectivity (Jasanoff, 2011); their interpretations related to the quality of knowledge, the role of values and the design of assessment processes. They loosely connected these different meanings of objectivity. Loose connections such as these tend to provide coherence to organisational practices (Douglas, 2004).

To navigate the authority paradox successfully is related, thus, to skilfully representing, elaborating and correcting meanings of objectivity that have been brought to the fore (Hajer, 2009). Experts should be well aware of their own usage of the term, but also of the meanings invoked by others. Interpretations of objectivity in practices of government science advising not necessarily interconnect with the ways other practices – such as governance or media practices – invoke the term. The complexity of objectivity allows room for its flexible usage, but may as well lead to strong normative debates on the (lack of) trustworthiness of expertise (Douglas, 2004). This is exactly what happens during credibility crises. Once objectivity of expertise is called into question, the basis for trust is gone. In order to restore a sense of trustworthiness, experts need to be able to relate to many different publics and work together different meanings under a shared idea of objectivity (Douglas, 2009; Hajer, 2009). Training in reflexive skills may help experts in recognising which meanings of objectivity they ascribe to and which ones are invoked in the debate. Environmental experts who are able to loosely connect diverse objectivity conceptions are more likely considered as trustworthy and authoritative partners in environmental science–policy interfaces.

10.

General conclusions



10.1 Brief recapitulation

This thesis examined how scientific advisers in a Dutch government expert organisation attempted to connect participatory forms of knowledge production to their traditional assessment repertoires. I started this thesis by illustrating how practitioners at the PBL Netherlands Environmental Assessment Agency found themselves in-between logics: they are inclined to adopt reflexive ways of working, while they are bounded by the limits imposed by modernist structures, norms and ways of working. Based on previous studies on the uptake of participatory knowledge production in expert settings at science–policy interfaces, I posited the assumption that the tendency to encapsulate reflexive aspirations within modernist knowledge cultures is typically not understood in terms of the practical concerns which govern and affect practitioners employed in government expert organisations.

This is problematic against the background of credibility contestations and intensive debates about the legitimacy and authority of government-funded expert agencies in environmental science–policy interfaces, such as the IPCC in the field of climate change, since different and conflicting meanings of what is 'good' knowledge and how it should be produced lead to a paradoxical situation (i.e. the paradox of scientific authority). It may lead to a lack of trustworthiness, and eventually to the demise of the authority of expertise. Using the lens of practice, I have analysed how practitioners experience the meaning and orientation performed by their practices. This thesis asked, therefore, how in practices of scientific advice to government, environmental experts at the PBL mobilised modernist and reflexive logics interchangeably, which effects (i.e. challenges and dilemmas) this produced and how these effects were being anticipated.

In chapter 1 to 3, I introduced the focus of this thesis, formulated the research questions and explained how the PBL organisation may serve as a paradigmatic case for the paradoxical situation confronting today's bodies of expertise. I introduced the socio-historical foundations of modernist and reflexive logics of science for policy, and identified the basic principles they imply for scientific advice to governments. I pointed out the added value of practice research to come to grips with the tensions in participatory assessment settings. Being a researcher-practitioner in the PBL setting enabled me to conduct a dialogical approach to interpretive inquiry in the practice context of the PBL organisation.

The findings of my practice study in the PBL organisation have been reported in chapters 5 to 9. This final chapter will provide a further reflection on the material presented in the previous chapters. The main research question of this dissertation will be answered:

How do environmental experts at the PBL work under co-existing modernist and reflexive logics?

In Chapter 1 I also specified two sub-questions:

1. *Which practical concerns arise when PBL practitioners attempt to connect participatory forms of knowledge production to their traditional assessment repertoires?*
2. *How do PBL practitioners cope with co-existing logics in their day-to-day work?*

These sub-questions will be subsequently addressed in the following two sections. In section 10.4 I will provide an answer to the main research question.

10.2 Practical concerns: quality of knowledge and legitimacy of role

This section answers the first sub-question:

Which practical concerns arise when PBL practitioners attempt to connect participatory forms of knowledge production to their traditional assessment repertoires?

The findings in Chapters 5 to 9 lead me to conclude, on the one hand, that PBL practitioners are concerned about the *quality* of knowledge produced in participatory assessment: is it improving the relevance and impact of the study? Will participation generate reliable knowledge? On the other hand, they are concerned about their *role* performance. Can we safeguard our independence in participatory processes? Does participation suit our identity as objective expert?

When PBL practitioners attempt to connect participatory forms of knowledge production to their traditional assessment repertoires, they essentially wonder how participatory activities may contribute to the production of independent, scientifically sound and policy-relevant knowledge. These three core values are reflected in deliberations about the *quality* of their work and the *role* they can perform in a participatory assessment setting. I witnessed how practitioners and their peers adhered to both modernist and reflexive logics simultaneously, and mobilised the one or the other (unwittingly) according to the occasion. This resulted in quite a messy situation, which caused confusion, but at the same time appeared to be seemingly productive.

The two logics of scientific advice are essentially incommensurable: their representations of the nature and role of scientific advice to governments are in conflict (see tables 2.1 and 2.2 in chapter 2). Fundamental differences between them are related to different societal and political understandings of the role of science in society, as well as to different ontological and epistemological conceptions of the nature of science. While modernist logic understands reality as singular and objectively knowable, reflexive logic understands reality as pluralistic and socially constructed (see table 2.1 in chapter 2). The findings in chapters 5 to 9 illustrate how the incommensurability of logics produces inconsistencies in practice. These inconsistencies become explicit in: positive versus negative perceptions of the impact of stakeholder participation (chapter 6); contradictory evaluation styles and approaches (chapter 7); frame differences (chapter 8) and a complex understanding of the objectivity norm (chapter 9).

These findings are explained in the following two subsections.

10.2.1 In pursuit of quality

I derived my first grasp of practical concerns concerning the quality of participatory assessments from a reflection on the analytical-deliberative process of the Sustainable City project, presented in Chapter 5. We (i.e. the project team, including myself) concluded that:

- the *relevance* of the study could have been strengthened if we had ensured a better fit between our model-based narratives and the policy agendas on sustainable urban development;
- the *credibility* of the assessment could have been improved if we would had more systematically integrated the analytical and deliberative activities throughout the assessment process;
- the *legitimacy* of the study could have been benefited from a more inclusive approach to worldviews and values on sustainable urban development, as to reflect the normative loadings of the participating stakeholders.

Issues regarding these three attributes – relevance, credibility and legitimacy – in this particular case are illustrative for the *type of* quality issues that are generally raised by the PBL researchers, regardless of the type of study or policy context. They relate to the core values of the PBL, which are embedded in its mission statement. As stated on PBL's website: "Policy relevance is the prime concern in all of our studies. We conduct solicited and unsolicited research that is always independent and scientifically sound" (PBL 2017). The three core values of policy relevance, independence and scientific soundness guide the daily operations of PBL researchers. I noted how the *interpretations and perceptions attributed to* the credibility, relevance and legitimacy of a study highly differentiated across and within policy assessment settings. For example, in chapter 6, I identified the different positive and negative perceptions attributed to e.g. the credibility of the participatory foresight study by practitioners and their peers. In this study I found that practitioners and peers mobilised reflexive logic when pointing out positive credibility implications of stakeholder participation, such as knowledge quality improvement, while they were inclined to mobilise modernist logic when highlighting negative credibility impacts. They posed for example practical concerns about the rigour of impact calculations, or the lack of a systematic approach to integrate the various analytical and deliberative activities. This finding indicates how practitioners struggle to fruitfully implement their participatory assessments in a reflexive manner. They aimed for the production of integrative and socially robust knowledge, but encountered concerns on the scientific validity of the impact calculations, which is a principal quality criterion imposed by institutionalised modernist logic.

Moreover, I have identified how modernist and reflexive logic were mobilised interchangeably during assessment processes under influence of internal dynamics (including path-dependent choices, functional choices, disciplinary understandings), and informed by external trends and developments.

Path-dependency: Which quality attribute gains prominent attention and how this attribute is balanced against other attributes, is guided by experiences in the past. For example, in the Sustainable City project improving legitimacy (in terms of: inclusiveness of perspective plurality) for the purpose of generating integrative and socially robust knowledge was actively pursued with a co-framing strategy. The teams' legitimacy orientation can be explained as a path-dependent choice, since the largely technical-analytical approaches of previous sustainability assessments had been criticised for their lack of responsiveness to, and interaction with, society. The team explicitly moved away from a technical assessment approach to an analytical-deliberative approach for the purpose of producing socially robust knowledge on sustainability issues. In comparison, the team of the Nature Outlook project had actively pursued its usability with an anticipatory strategy to ensure a sense of fit to political dynamics and real-time nature policy processes. This strategy had been motivated by lessons learned from

previous Nature Outlook studies, pointing to the studies' lack of policy relevance. Thus, my reading of these cases illustrates how reflexive aspirations appear to have been motivated by limits encountered with modernist ways of working in the past.

Functional choices: The balancing act between the various quality attributes, and the perceptions attributed to them relate to choices about the purpose and policy function of the project. For example, in the case of PBL's Assessment of the Human Environment project, analysed in chapter 7, ideas of how to set the boundaries between the work of the PBL practitioners and the policy-makers (i.e. responsibilities, tasks) shifted during the process in relation to the presumed policy purpose of the study. Initially, the project team searched for manners to organise productive interactions, by means of participatory activities with policy-makers throughout the assessment process. This was initially seen to improve the quality of the study. While later on in the process, after deliberations about the process design within the project team and with the PBL management board and a supervisory board of policy-makers, participation was rejected. Participation of policy-makers in the assessment process was considered risky in view of the study's traditional legitimate role as policy accountability mechanism for environmental policy target achievement. Participation was seen to breach the essential divisions of responsibilities between the PBL practitioners responsible for the assessment process and the policy-makers responsible for the policy processes. Hence, initial reflexive aspirations were sidelined in this case setting during the assessment process in view of modernist expectations and demands from internal peers and principal clients as on how to assure the legitimacy and policy relevance of this assessment study.

Disciplinary understandings: Stakeholder participation triggers interdisciplinary confusion within the PBL organisation about the standards for quality control. Different quality perceptions, e.g. of how to control the validity of stakeholder knowledge, originate from different disciplinary quality standards (e.g. triangulation in the social sciences and causal inference in the natural sciences). Such disciplinary discrepancies remained largely unattended to and implicit in PBL assessment practices, as is for example illustrated in chapter 6. Traditional quantitative foresight approaches were mixed with qualitative discursive approaches, while the inherently different quality perceptions adhered to these foresight cultures remained largely unreflected. This finding indicates that both modernist and reflexive logics are being mobilised without fundamental awareness of the differences between them in terms of epistemological underpinning. How the different quality perceptions attributed to the impact of stakeholder participation, whether positive or negative, related to a particular type of knowledge or way of producing this knowledge and assuring the quality hereof, appeared not to be subjected to debate. Yet, knowing that these different epistemic cultures co-exist is crucial to understand and bridge, eventually, differing quality conceptions in an effective manner.

Trends and developments: The PBL practitioners appear to be well aware of intellectual developments in the field of science-policy studies and seek to adopt them in their practice. They, for example, use the strategy of post-normal science to design an analytical-deliberative process in the case of the Sustainable City project (chapter 5). They connect to policy learning, a core concept in interactive governance theory, as an alternative to the traditional technical policy performance orientation of the Assessment of the Human Environment study (chapter 7).

My analysis of identity frames in the PBL organisation (chapter 8) demonstrates how four actor groups – practitioners, management board, external peers and clients & collaborating partners – acknowledge the need to respond to external dynamics. They refer to an increasing complexity of policy problems, the shift towards multi-scale/ multi-actor governance in many of PBL's issue domains, the mediatisation of society and publics' increasing lack of trust in scientific expertise. Hence PBL practitioners and their peers and clients appeared to acknowledge the changing conditions under which they need to operate. Their awareness is indicative of their 'formal' acknowledgement of the need to adopt reflexive logic. Yet, the findings listed in the previous paragraphs have clearly demonstrated that in practice the practitioners' quality interpretations and perceptions represent not reflexive logic alone, but also include elements of modernist logic.

10.2.2 In pursuit of a legitimate role

Safeguarding PBL's role as independent expert at the science–policy interface is of primary concern to the practitioners, yet their interpretations of what this role entails are multiple. Similar to their differing quality conceptions, practitioners also hold differing role conceptions in practice. Also in this respect, modernist and reflexive logics are being mobilised interchangeably, according to the occasion.

In chapter 7, I demonstrated how practitioners reconciled different purposes for evaluation within the case setting of the Assessment of the Human Environment study: on the one hand they adhered to a modernist conception of evaluation as a mechanism for policy accountability assurance that is to be technically conducted along a set of rationalistic principles of efficiency and effectiveness. On the other hand, a reflexive conception of evaluation emerged as a mechanism for policy learning in which deliberative engagement with the various actors involved in policy-making served to obtain understanding of policy complexity along a set of good governance principles, including e.g principles of transparency and fairness alongside the principles of effectiveness and efficiency. In my reading of this case, the practitioners were left with a sense of different, co-existing, ideas of the presumed legitimate role of this particular evaluation study.

A similar adherence to both modernist and reflexive logics emerged both within and across the identify frames of the four actor groups – PBL as integrated assessment specialist, PBL as think-tank and PBL as trustworthy expert (chapter 8) – when they tried to make sense of socio-political trends in governance and expertise confronting the PBL organisation. In their interpretations of the 'integrated assessment specialist' role, for example, they mobilised modernist principles to assure their autonomy in new principal–client relationships with local governance actors to effectively perform this role in multi-scale/ multi-actor settings. Their expressions thus, reflected the 'bridging the gap' conception of the role of expertise under modernist logic. Yet, they simultaneously mobilised reflexive logic when considering how to perform their integrated assessment role differently, in knowledge-sharing platforms or in processes of knowledge co-creation for example. They, hence, mobilised the brokerage conception of the role of expertise under reflexive logic. Also in practitioners' different understandings of the objectivity norm, listed in table 9.1 of chapter 9, the role conceptions of both logics are clearly represented. For example, the findings of practitioners' interpretations of the role of values in assessment processes revealed

how, on the one hand, they assumed that to remain objective – in the sense of value-free – required them to keep a distance from value-laden political and governance processes, which is indicative of the 'bridging the gap' conception of their role under a modernist logic. On the other hand, they considered engagement with policy actors necessary to generate objective – in the sense of value-neutral – scientific advice that could facilitate policy learning and add critical perspectives to political debates, illustrating the knowledge brokerage role of expertise under reflexive logic.

In addition to the conditions identified under 10.2.1, practitioners seemed to be inclined to adhere more to a modernist or a reflexive role conception informed by the particularities of the *policy context*, such as the characteristics of policy issues, the stage of policy formation and political commotion. For example, in chapter 7 it is illustrated how practitioners adhered to a reflexive approach when they had to evaluate unstructured policy topics in agenda-setting stages, while they were inclined to adhere to a modernist approach when starting from structured policy topics in their implementation stages. Hence, in this example, the complexity of policy issues and the characteristics of the policy setting 'guided' practitioners in understanding which role 'made sense' in a particular setting. Their understandings of what evaluation is and should do, thus, tended to shift according to the occasion. This anticipation of a legitimate role to the dynamics of the policy setting also showed in the foresight studies (chapter 6). Practitioners in the Nature Outlook project anticipated on political turmoil regarding the public demise by the State Secretary of the hegemonic ecological discourse. They designed four normative policy scenarios to broaden understandings of nature and nature policy, in line with a think-tank role that illustrates reflexive logic in use. Simultaneously they informed policy-makers on an 'ad hoc' basis about the impact of their policy options, to instrumentally support decision-making processes, in line with a role of an integrated assessment specialist operating under modernist logic.

10.3 Coping with concerns: alignment strategies

In this section I respond to the second sub-question:

How do PBL practitioners cope with co-existing logics in their day-to-day work?

The preceding section set out in detail what is at stake in bringing participatory assessment into being in the PBL organisation, by illustrating how modernist and reflexive logics are being mobilised interchangeably under influence of internal (path-dependency, functional choices, disciplinary understandings) and external (socio-political, intellectual and policy) dynamics. I have demonstrated how co-existing logics produced inconsistencies between differing quality and role conceptions, resulting in challenges of e.g. methodological, cultural or managerial nature for individual practitioners and project teams. Yet, it appears that these challenges have hardly resulted in tensions or frictions. Inconsistencies were eventually being resolved, or at least rendered unthreatening by bringing modernist and reflexive logics into alignment. As a consequence, the practitioners in the PBL organisation have been able to cope with

the practical concerns they encountered. The alignment strategies[57] they have demonstrated are:

- Encapsulation: reflexive aspirations and principles were encapsulated within institutionalised structures, norms and ways of working established under a modernist paradigm.
- Decoupling: by switching between schools or styles of policy analysis, both logics were mobilised interchangeably according to the occasion, bringing about freedom for practitioners to tailor their assessment approaches to particular policy questions.
- Loose connections: different assessment approaches, identity frames and understandings of objectivity were interconnected under a shared idea of what independent, scientifically sound and policy-relevant advising entails.

10.3.1 Encapsulation

Encapsulation has been identified in the literature on participatory knowledge production as a typical expert response to accomodate the call for a more reflexive science (see section 2.3). On the outside it appears that experts open up their activities to broader public involvement. But on a closer look, the experts remain committed to scientific quality standards and maintain a distanced position towards political and governance processes. What actually happens here is that the inclination to retain to institutional systems of reference *tends to be 'masked'*. Attractive narratives of public involvement, transparency and responsiveness give practices of scientific advice to government a new image, e.g. on what it entails and how it plays a role in society. Yet, in reality, these newly found reflexive principles become encapsulated within persistent structures, norms and ways of working. In line with these scholarly findings, I have demonstrated how, in practices of scientific advice to government at the PBL, this process of encapsulation takes shape. Encapsulation comes strikingly to the fore within the case setting of the Assessment of the Human Environment study (chapter 7). Reflexive evaluation approaches that were initially explored were partly discarded during the assessment process, as clients, peers and project team members started questioning the presumed quality improvement of the participatory process and the legitimacy of the expert role this process would entail. The actors expressed and exchanged their views on the risks and de-legitimating effects a participatory evaluation approach would bring to the preconceived division of boundaries between the policy-makers and the PBL practitioners. Thus, while the reflexive aspiration of policy learning remained on top of the agenda, the optimal conditions to facilitate this learning process had been abandoned, as this reflexive ambition had become encapsulated within traditional boundary work commitments that had been legally installed for its modernist predecessors.

At a more general level, my analysis of frame differences (chapter 8) and my analysis of the complexity of the objectivity norm (chapter 9) reveal the influence of predominant modernist principles of autonomy, political distance and neutrality in the PBL organisation. This is illustrated for example, with respect to the issue of normative biases and predetermined policy frames. The general belief among PBL practitioners is

[57] Whilst I use the term 'strategy', there is nothing strategic about it. Instead, practitioners often apply the strategy unwittingly, as an automated response. I use the term strategy because it illustrates a pattern of behaviour that practitioners intend to apply in order to work effectively under co-existing logics.

that biases and unreflective framings have to be avoided. Reflexive principles of participation and humility were mobilised by practitioners when they deliberated upon the added value of participatory activities, such as extended peer review or stakeholder dialogues, as a means for organising critical review. Thus, these activities appeared to have been informed by reflexive logic. Practitioners expressed a sense of humility towards their own assumptions and knowledge claims. At the same time, they mobilised a scientific discourse of peer reviewing. The purpose of extended peer review, as I retrieved from their interpretations, primarily was to assure the integrity of the scientific methods and the rigour of the assessment process. Their emphasis on scientific rationale is illustrative of their belief in truth claims, which is representative of modernist logic. When inclusiveness of perspective plurality was mentioned as a driver for participation, for example as part of the narrative of the think-tank frame, it appeared from the analysis that PBL practitioners believed that they could assess these perspectives while keeping at a distance from the political controversies and conflicts surrounding them. Hence, they sought to identify the rationalistic elements and evidence-based implications of perspective plurality without getting involved into the normative debates that accompanied these pluralistic knowledge claims. In this way, they isolated their assessment activities from the political and governance processes in which these perspectives were actively being shaped, and presumed they could make participatory assessment a technical-rational endeavour. Thus in practice, it appeared that practitioners hardly deliberated upon the wider societal and political contingencies that guided the frames of reference of stakeholders or those of their own interdisciplinary project team members. The level of reflexivity is apparently shortsighted, while at first sight it appeared that they were seriously reconditioning the epistemic and social nature of their practice.

10.3.2 Decoupling

Whilst the strategy of encapsulation offers an identifiable account of the alignment process within the PBL organisation, I believe an alternative reading of these same findings is possible. In this section I will demonstrate a different picture of the alignment process. Such a reading acknowledges the challenges faced by government expert organisations with reflexive aspirations but modernist constituents, in the light of the dynamics they are confronted with during the assessment process.

I argue that PBL practitioners have been able to effectively bring the two logics in alignment with a strategy of decoupling. I have demonstrated how they accommodated both modernist expectations of instrumental and technical knowledge and reflexive appeals to knowledge co-creation by separating project intentions from the approaches in use and the outcomes generated. They framed and re-framed their ambitions, methods and outcomes to suit the expectations of peers and principals, and in so doing seemed to pick and choose elements of modernist and reflexive logic throughout the process. In this way, various parts of the assessment became different in nature (both epistemically and socially), tailored to disciplinary preferences, sectoral policy needs and issue characteristics.

Indicative of this strategy of decoupling is the *ad hoc and patchwork evaluation style* developed by the project team of the Assessment of the Human Environment study (chapter 7). Practitioners adapted their reflexive aspirations to the ritual that evaluation is in an institutionalised setting, by designing a systems approach (building on the

tradition of systems modelling in the physical and ecological domains, supplemented with governance analysis to add a 'social systems' perspective to it). They thus bridged the intention of policy learning with the traditional idea of a policy performance assessment. In this way, they were able to produce 'facts that matter'. They 'opened up' predetermined policy framings without discarding the modernist tradition of a provision of facts and figures for policy-makers. They embedded the familiar representation of 'facts and figures' in a more deliberative and systemic approach, so that policy-makers were informed about the pluralistic and constructivist character of these numbers. Another example of decoupling is that policy-makers indicated the added value of the evaluation study in learning terms – that is, the study triggered reflection upon policy frames in view of societal concerns and developments – but referred to modernist outcomes – facts and numbers – to support the argument. Moreover, I have demonstrated that the strategy of decoupling enabled for innovation to occur locally within the different issue domains included in various chapters of the assessment study. Choice of evaluand, evaluation methods and evaluation criteria were principally guided by the characteristics of the policy field such as the level of consensus on policy goals and availability of (quantitative) policy targets, but also by disciplinary preferences, sectorial interests, policy needs, personal motivations and capacities and practical considerations such as the availability of data. While several chapters principally adhered to a technical-causal model for the assessment of target achievement (addressing 'what' questions), other chapters – completely or partially – conducted governance analyses to identify tensions and windows of opportunities for collaboration across networks of policy actors (addressing 'how' questions). Thus, in this way practitioners productively accommodated inconsistencies arising from the co-existing logics (so-called 'evaluation imaginaries' in chapter 7).

10.3.3 Loose connections

Practices of government scientific advice in the PBL organisation appear not to be guided by a single quality standard or role conception. Instead, practitioners have demonstrated their ability to loosely connect different quality assurance standards (e.g. causal inference and triangulation), assessment approaches (e.g. systems analysis and governance analysis) and roles of expertise (e.g. analyst and facilitator) by ensuring connectivity to their core values of generating policy-relevant, independent and scientifically sound advice. In this subsection I bring forward the strategy of 'loose connections' to comprehend how PBL practitioners seemed to have picked and chosen the (combination of) assessment approaches they considered appropriate for the occasion. In effect, this strategy explains why the apparently random process of decoupling was not random at all. Decoupling enabled practitioners to adapt to the needs of their audiences and the particularities of problem situations. By creating loose connections between various perceptions of what credible, relevant and legitimate advising entails, they provided coherence to their organisational practice. Coherence, paradoxically, comes with a diversification of assessment approaches, norms and identities for environmental expertise in policy and society.

I witnessed for example that there is no single entity that could be labelled as the evaluation approach, but instead, *a multitude of assessment constellations* became visible, tailored to the characteristics of the different topic areas covered in the assessment study (chapter 7). PBL practitioners mobilised reflexive logic where it seemed to align well with e.g. agenda-setting stages with policy-makers in need of

scoping and framing unstructured policy issues. Whereas in other topic areas, the PBL practitioners hardly reflected upon the existing policy frames and conducted impact assessments in a rather modernist manner to identify trade-offs emerging during policy implementation processes. By creating loose connections across the various chapters in terms of overarching messages, the two logics have been brought into alignment and the study was accordingly perceived as scientifically sound and highly policy-relevant.

Another example of the strategy of loose connections is represented at the level of *PBL's identity frames* (chapter 8). PBL practitioners situationally appropriated their interpretations of PBL's role and position to particular socio-political trends. PBL's identity frame of integrated assessment specialist has been framed in view of increasingly dispersed multi-actor and multi-level governance settings. In these settings PBL should be acting as the knowledgeable specialist who works across scales, levels and domains. At the same time an identity frame of think-tank was mobilised based on the notion that PBL could and should act as visionary facilitator in societal debate to bring in perspective on contested politicised problems. I identified from the stories of practitioners how, by means of generating loose connections between these identity frames, both positions could be pursued simultaneously. Loose connections between these two identity frames appeared to be established by ensuring connectivity to a third frame of 'trustworthy expert'. By so doing, modernist ideals of control, detachment and neutrality were aligned with reflexive notions of humility, participation and perspective plurality under a convincing rhetoric of trustworthiness. Similar processes of loose connections to create alignment between logics were displayed in practitioners' *interpretations of the objectivity norm* (chapter 9). Practitioners shared their experiences with deliberative assessment processes, and discursively expressed their views on the objectivity norm by stressing the importance of independence, rigour and legitimacy. On the one hand new roles were, for example, considered risky given the importance of PBL's detached position, whereas on the other hand new roles were considered necessary to give prominence to interaction and discussion among participants for the sake of knowledge quality improvement. In this way, loose connections were created between modernist and reflexive logics under a shared, but diversified, notion of objectivity.

10.4 Practical reasoning in-between logics

Combining the answers to the two sub-questions, the following answer to the general research question of this thesis can be formulated.

How do environmental experts at the PBL work under co-existing modernist and reflexive logics?

Looking back at the various strands of this research, this thesis has essentially been about the way practitioners employ practical reason when they attempt to connect participatory forms of knowledge production to their traditional assessment repertoires. It is through practical reason that modernist and reflexive logics are being brought in alignment. I demonstrated that practitioners conduct an assessment of a particular policy issue, in its particular context, by selecting approaches that are most relevant to the inquiry at hand. During assessment processes they bring differing conceptions of the nature and role of scientific advice to government – characteristic of

both logics – into alignment. We can understand this process in terms of 'encapsulation' (see image on the left side in figure 10.1). Also in my case setting I have identified how practitioners endorsed reflexive principles such as humility, transparency and participation, but enacted them in a rather instrumental and technical (instead of interactive and social) manner.

Alternatively, I have shown how the alignment process can be understood from strategies of decoupling and loose connections (see image on the right side in figure 10.1). The lens of practice in this thesis adds the strategies of 'decoupling' and 'loose connections' as ways to go beyond the notion of tensions between logics, towards the notion of acting 'in-between logics'. I have demonstrated how practitioners creatively engaged with practical concerns on the quality of their work and their roles at the science–policy interface when they attempted to connect participatory modes of knowledge production to their traditional assessment repertoires. They mobilised deliberative approaches such as extended peer review and new roles as facilitator and knowledge broker, while they also invoked institutionalised representations of a 'speaking truth to power' image. Essentially what PBL practitioners did was to creatively give meaning to a more reflexive practice of scientific advice by decoupling deliberative approaches and novel expert roles from more traditional elements of their assessment practices, such as systems analysis and modelling activities. They loosely connected the different representations of the epistemic and social nature of science for policy throughout their assessment processes by ensuring alignment with their institute's core values. In this way, PBL practitioners have been able to organise the interplay between modernist and reflexive logics in a contingent and unpredictable manner, and while so doing, they stretched the boundaries of what is 'appropriate' advice-giving. Practitioners slowly transform the institutions, identities and approaches of government scientific advice, while they simultaneously ensure the durability of their practice.

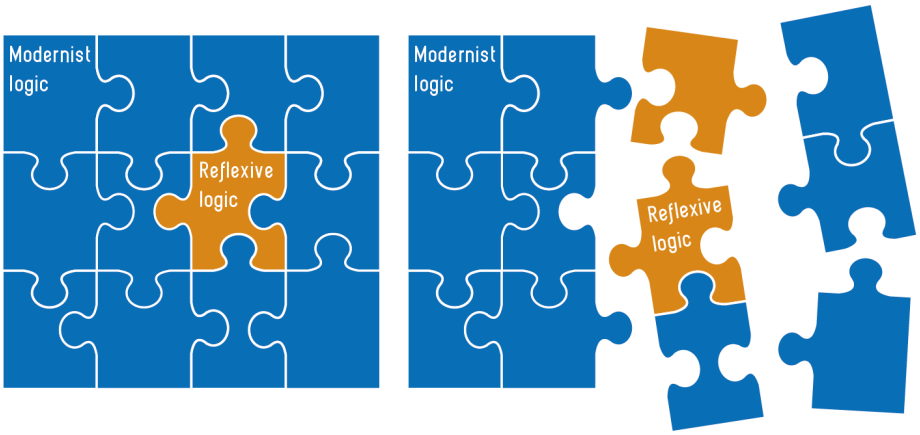


Figure 10.1 *Alignment strategies in use: encapsulation (left) and decoupling and loose connections (right)*

Hence, the shift in government expert organisations is complex and is less like the replacement of one logic by another and more like an ongoing recombination of assessment approaches, roles and principles in day-to-day practices. The difference is

that – under changing social order – reflexive logic tends to become the more encompassing notion. Principles of participation, humility and reflexivity may increasingly guide practitioners in organising their assessments in a policy-relevant, scientifically sound and independent manner.

11.

General discussion

11.1 Zooming out: Environmental expertise in a post-truth society

This thesis has been 'zooming in' on the way practitioners in a government expert organisation attribute situated meaning to the nature of their assessment practices and their role as experts by shifting interchangeably between modernist and reflexive logics guiding their daily work. In this section I 'zoom out' on the practices surrounding a government expert organisation. Practices become connected through a shared *object of concern* (Nicolini, 2012). In the context of this thesis, the shared object of concern among experts, policy-makers and civil society groups are today's 'wicked' environmental problems. Citizens, experts, politicians and industry defend, develop or challenge environmental problems in passionate ways. They frame facts and uncertainties in accordance with their subject positions, values and beliefs. This tendency to reject facts has been popularised under the heading of the 'post-truth'[58] society, meaning that evidence and critical thinking in our contemporary society are easily pushed aside in favour of intuition and emotion as bases for action and judgment. Think, for example, about the Trump presidency's neglect of human-induced climate change; an example that is widely marked as a striking case of post-truth politics.

Wicked environmental problems in a post-truth society challenge techno-bureaucratic systems of knowledge and action. A typical response for environmental experts within such systems is to maintain the integrity of facts by informing policy-makers and the public about the technical aspects of these wicked issues and by effectively communicating them across the science–policy interface. This 'automated' response of experts corresponds to a 'bridging the gap' strategy, which is representative of modernist logic. However, this strategy often seems to lead to the opposite response: citizens challenge both experts and facts. Policy-makers are caught in a dilemma: they are in need of experts, but also in need of a trusting citizenry. The strong reliance of governments on expertise has placed experts in close relationship to government with budgetary and legal arrangements. At this knowledge–power nexus, non-scientific knowledge, such as of experiential or local kind, is often marginalised and set aside as irrational and ignorant. It is in this context that the paradox of scientific authority pops up: expertise is needed more and more, while it is trusted less and less (Bijker et al., 2009; Stilgoe, 2016). Given the post-truth movement as an extreme 'sign' of distrust, we can tell that the techno-bureaucratic system in its current shape is unprepared to respond to the paradoxical situation.

Zooming out on what is going on in policy practice may offer one way of obtaining insight into the (potential for) reconfiguration of social relationships between policy, science and society. The Dutch government (as well as other governments in Europe) is seeking to redefine its tasks and responsibilities. It seeks a role as facilitator of civil society initiatives arising in an 'energetic society' (NSOB/PBL 2015). The decentralisation and socialization of traditional government policies have to make policy processes more effective, efficient (managerial drive) and/or more legitimate and participatory (democratic drive). Governments re-allocate the responsibilities and tasks for policy formulation and implementation to local government, market and civil society, for example in areas of nature protection and development, health care, child care and culture and arts. Ongoing globalisation, for example in areas of climate change, energy,

[58] 'Post-truth' is an adjective defined as "relating to or denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief" (Oxford dictionary, 2016)

biodiversity and migration, points to a similar trend of re-allocation in the opposite direction. Regardless of the exact motivations or drivers for re-allocation, governments nowadays tend to increasingly leave responsibilities to decide and take action on wicked environmental issues with other policy actors, market and civil society. Governments become partner and participant in the co-production of multi-actor and multi-level governance initiatives. At the same time, there remains a need for a classical-modernist centre which provides inspirational guidance, establishes legal reference-frameworks and assures the monitoring and control of overall developments within the policy system (Hajer, 2009).

Under these different policy circumstances, government expert organisations may increasingly recognise the benefits of generating knowledge for policy in productive interactions with key actors in the governance network instead of government alone. Conventional knowledge–policy arrangements may be sustained, whereas decentralisation and socialization trends may give way to the creation of new arrangements with less-conventional actors such as provinces, businesses and NGOs. The blurring of these old and new boundaries unavoidably has an effect on experts serving government as well. Such reconfigurations may encourage new knowledge traditions to emerge and to be accepted as 'normal' (Metze, 2011). In return, practical experiences with such emergent knowledge traditions (such as with participatory assessments in this thesis) may as well give way to structural changes in the interplay between policy, science and society.

11.2 Navigating the paradox of scientific authority

Ultimately, as various scholars imply, public trust in expertise may be restored when experts become aware of the social and moral implications imposed by their scientific framings (Fischer, 2009). Experts may learn to transparently and responsibly indicate the limitations of their own knowledges, to explicate the social and emotional aspects involved with wicked issues and to 'stage' their work differently to different audiences (Bijker, 2009; Fischer, 2009; Hajer, 2009). Will this be enough to help resolve the paradox? Probably not. It is likely, after all, that a certain chance of public contestation about authoritative knowledge claims remains. While apparently, even in a post-truth society, there remains a need for specialised knowledge to inform action as well, especially about wicked problems. And this will always lead to the establishment of counter-expertise, either to preserve established interests or to address values less represented within expert claims. Moreover, experts can never assure their knowledge production processes to be attentive to the full and diverse range of societal opinions, views and knowledges. And even if they were able to, their framings will not satisfy, nor reflect or resemble every possible alternative expression of 'public truths' (Chilvers and Kearnes, 2016).

The question remaining, therefore, is of a more practical nature: how to organise a productive navigation of the paradox?

Apparently, as this thesis has demonstrated, practitioners in government science advising create authority in a situated manner by employing alignment strategies of decoupling and loose connections. This thesis has demonstrated how a decoupling of intentions, approaches and outcomes enabled practitioners to switch between styles of policy analysis over the course of an assessment study. They mobilised both logics interchangeably according to the occasion, in this way bringing about freedom to tailor

their assessment study to particular policy questions. At the same time, different assessment approaches, identity frames and conceptions of objectivity were 'loosely' interconnected to produce a convincing idea of what it means to conduct independent, scientifically sound and policy-relevant advice.

This conclusion clearly brings out the relational aspect of expertise. In line with other scholars I argue, therefore, for a reorientation from government scientific advice as a mere resource (either as input to policy or as a collective resource for the public) to its potential for organising productive collaborations and interaction between systems of knowledge and action (Fischer, 2009; Chilvers and Kearnes, 2016; Grundmann, 2017). This does not mean, however, that experts all the time need to engage in deliberative inquiry. Yet, it would mean that researchers in government expert organisations have to be capable of reflection on the various problem framings of wicked issues. They need to be aware of the larger political and societal controversies, discussions and temporal developments even though they cannot immediately align them with what they normally consider the boundaries of their framing, activities and roles. An expert cannot legitimately claim to be an expert based on theoretical understanding or technical know-how, but only on how well-prepared he/she is to reflect in action (Schön, 1983; Flyvbjerg, 2006b). Experts are reflective practitioners who actively seek out adversarial stances towards their own points of view and make them productive by striving to understand them. They explore the way in which they are inclined to act, conditioned by their institutional systems of reference. Moreover, their reflections on their own institutional systems of reference may lead them to explore novel representations of government scientific advice. Which may, eventually, help to recondition the terms of political debate or the governance of wicked environmental issues. The PBL practitioners in this thesis, have demonstrated to be reflexive towards their institutional systems of reference, which has for example been displayed in their reflections upon the (future) profiling and positioning of the PBL organisation (chapter 8) and in their multiple meanings attributed to the objectivity norm (chapter 9). Yet, I have also noted how practitioners' reflexive efforts had to 'compete with' institutional routines established under modernist paradigm, as for example strikingly came to the fore in the Assessment of the Human Environment study (chapter 7).

As a suggested direction for future research it makes sense, therefore, to further study the production of environmental expertise by asking how 'reflexive' experts really are about the paradoxical situation they find themselves in.

11.3 Reflections on my role as researcher-practitioner

My study of practices of government scientific advice in the PBL organisation has been a very exciting learning experience. My dual role as researcher and practitioner enabled me to conduct engaged research, which in this case meant collaborating with and participating in projects and working sessions with the PBL experts and other participants involved. Using the hermeneutic circle as reflective instrument, I could channel my interpretations of these moments to gain deeper understanding of the way practitioners at PBL conduct their daily operations in-between logics. The challenges of conducting engaged research, as I have experienced them, are two-fold. I discuss them in relation to the strengths and limitations of the study.

First, a potential risk of engaged research is to become too involved in the practical activities, and identifying too much with the practitioners, which may threaten the

independence of the researcher (Schön, 1983; Burawoy, 1998). In terms of data collection, I have been dependent on the projects and activities that I could and chose to participate in. A limitation of this approach is that I only observed these selective situations and talked with the practitioners and other actors present in those settings. I have not actively selected 'critical' situations (e.g. strategy sessions about the future profiling of PBL) or interviewees that assumingly could be (e.g. based on their position or experience) particularly reflective of PBL's operation in-between logics. Rather, I followed the practitioners that I encountered on my way through their time and space to unpack their situational experience and practical knowledge. Rightly due to this engaged approach I was able to fully capture the mundane practice stories that reveal the contingent and partial processes of organisational change and experimentation (Pallett & Chilvers, 2015). I am fully aware that a selection of different case settings would have led to different practice stories, but I dare to speculate here – and I feel supported by other stories and experiences in the PBL organisation that I have come across in the meantime (Kunseler & Verwoerd, in progress) – that they would have revealed similar patterns of concerns and alignment strategies of practitioners' operations in-between logics. The (selective and engaged form of) data collection is therefore a (natural) limitation of this thesis, but it appears to have sufficiently and validly surfaced the practical concerns which govern and affect the practitioners in everyday government scientific advice.

In terms of data analysis, I have tried to be transparent about my own position in the PBL practice, and to combine involvement with intellectual independence. Hereto I created an analytical distance between my active involvement in PBL studies and knowledge exchange activities in the period of 2008 to 2015 and my reflections on practice, which is illustrated with the practice loop in figure 11.1. The practice loop illustrates the recursive relationship between my theoretical stances and insights emerging from my engagement with my research subjects. Four types of reflective research (Schön, 1983) guided this process: *repertoire-building research* served to identify the patterns in quality debates under co-existing logics by way of a balancing act between credibility, salience and legitimacy (chapter 6), *interpreting the process of reflection-in-action* enabled me to understand how practitioners reflected upon their roles and activities in response to (changing) expectations of the function, approach and outcomes of their evaluation study (chapter 7), *frame analysis* enabled me to reflect upon the agency's identities in view of perceived (future) developments and challenges confronting the agency (chapter 8), and *studying practitioners' fundamental action orientation* served to reveal the complex understanding of the objectivity norm in the PBL organisation (chapter 9).

Theoretical concepts such as logics, frames or quality attributes served as mere heuristics or 'sensitizing concepts' to guide my practice research. I hardly touch upon the rich sociological and philosophical content, history and differentiation of and across these concepts. In this sense, I have focused on the pragmatic value and less so on the theoretical content that these concepts have to offer to a practice study of situated dynamics in government scientific advice.

The second challenge is in bridging the analytical distance this thesis has created from common language: how to make the findings practical, that is, for use in the PBL organisation? The strength of my engaged research orientation is that I took "dialogue as its defining principle, and intersubjectivity between participant and observer as its premise" (Burawoy, 2008: 14). In discussing draft versions of chapters I have, I think,

contributed to reflection among the PBL researchers involved in the particular case settings. These conversations, vice versa, have enabled me to better situate the challenges and dilemmas that I had identified within my case analyses. The next step of engagement is perhaps the most challenging: to move beyond the intractable debates about the benefits and risks of participatory assessment, towards the promotion of a culture of 'learning by doing' among practitioners. I was and still am deeply involved in the practices of the PBL. I have a full-time employment in the department of Information Data and Methodology and assist in the design, implementation and review of participatory assessment studies. I may, therefore, be able to continue talking and deliberating about the choices they have made in particular participatory assessment cases. With a learning by doing approach, practitioners may, as I will further explain in the next section, learn to engage further in reflective practice. Exchanging practical knowledge of what it means to conduct participatory assessments in a policy-relevant, scientifically sound and independent manner may eventually challenge their institutional structures and dominant ways of thinking and acting.

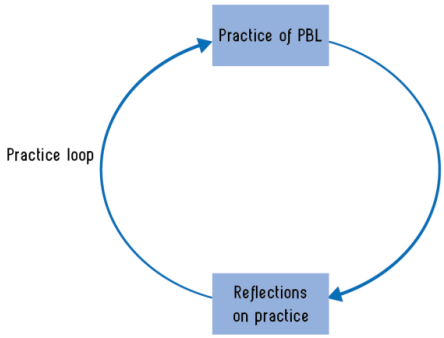


Figure 11.1 *The practice loop in this thesis*

11.4 Practical implications for (practitioners in) government expert organisations

What is the proper course of action for government expert organisations like the PBL? To answer this question from a practice perspective it is essential to recognise that organisational change is an inherent part of the plurality, diversity and messiness of everyday life within government expert organisations. The insight for government expert organisations offered by the lens of practice in this thesis is that innovation rarely results from altering the rules of game or introducing new ones, or by introducing incentives or new instruments[59]. In light of this recognition it seems hardly surprising that the use of instruments such as the guidance documents for uncertainty assessment and communication and stakeholder participation is limited in PBL practice, and that rules to apply them as part of procedures for project design are hardly followed. A practice view tempers overly optimistic, instrumental beliefs about what plans, interventions and new rules can do (Behagel et al. 2012). But it does not mean that

[59] Altering rules of the game is the proper course of action from an institutional view on organisational change, whereas instrumental solutions are the proper course of action from a rational view on organisational change (Arts et al., 2014)

methodological interventions do not have any impact in practice: they do work, they affect change, and they produce intended and unintended consequences based on the way they are mobilised in particular situations.

The lens of practice theory has been useful in deepening the understanding of the daily operations in government expert organisations. I have illustrated how participatory forms of knowledge production have been integrated in and influenced the ordinary practice, its change and stability. Hence, by examining the practices and the practitioners carrying the practices, I have accessed the processes of social learning in organisations (Lave and Wenger 1991). My suggestion for practitioners in government expert organisations is, accordingly, to actively engage in processes of 'learning by doing' on the job. A 'learning by doing' attitude may stimulate practitioners to 'problematise' what is taken for granted. They may open up to new interpretive possibilities (e.g. via trainings, inspirational lectures, life-world experiences, experiments), while they assure a sense of continuity with institutional remits by taking on the lessons 'on the job' in their regular work. In this way, practitioners learn to appreciate their acts of 'bounded creativity' which "produce sameness [in line with routines and rituals] with what is, by definition, different and changeable" (Nicolini, 2012: 226).

Learning by doing involves probing and improvisation on how best to fit and adapt innovative aspirations to the complex situations faced in everyday practice (Forester, 1999). By organising 'learning by doing' as a social and interactive activity, stories are generated that open up new directions for and possibilities of learning about practical problems. In this thesis, I have shared a few stories about practitioners' practical concerns on participatory knowledge production in the PBL Netherlands Environmental Assessment Agency. These stories have illustratively unmasked how dilemmas and challenges have emerged from the co-existence of logics, and how they have been tackled in a situated manner in alignment with the values and interests at stake under particular research and policy circumstances. These practice stories can guide and function in alternate practices of government scientific advice as inspirational resources. Moreover, these practice stories can generate capacity for reflexivity. It is in relation to "a shared concern or passion for something they do, [that practitioners may] learn from their mutual engagement about how to improve their practice" (Wenger, 1998: 58). Inspired by each other's reflections practitioners may go beyond persistent institutional and cultural frames of reference to rethink internalised notions of what government scientific advice entails (Pallett and Chilvers, 2013; 2015).

What can be practical, though, about these stories that have not simply and directly told us 'how to navigate the paradox of scientific authority'? Precisely this: these stories provide a complexity and specificity that enrich perception and heighten sensitivity (Forester 1999). These practice stories call attention to the details of the kinds of considerations – e.g. concerning socio-political dynamics, issue characteristics and path-dependencies – that practitioners in government expert organisations need to take into account to create authoritative scientific advice in contemporary society.

11.5 Concluding remarks

The PBL is in the process of producing its vision document for 2025. Under the lead of executive director Professor Hans Mommaas (since November 2015; assigned for a period of seven years), the PBL continues its reflexive programme. Several topics that are highlighted – normativity, multi-level/multi-actor, contested knowledge and method

innovation – illustrate how reflexivity is on the top of the agenda. The narratives produced by this vision can become performative in their own right as they may enhance support for experimentation with participatory and deliberative modes of knowledge production and create learning mechanisms within the PBL organisation.

This thesis has attempted to contribute insight into the practice of government scientific advice by offering new and fresh perspectives on the functioning of government expert organisations at science–policy interfaces in our contemporary society. The messiness of everyday practice has much too offer, even despite, and probably exactly because of, the richness of practical knowledge of practitioners who skilfully bring modernist and reflexive logics in alignment.

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Summary

Introduction and background

Against the background of wicked environmental problems, governance dynamics and post-truth politics, scientific advice to governments is increasingly needed, but also becomes unavoidably exposed to public scrutiny and distrust. Scientific advice is still crucially important as one element in the governance of environmental problems and policy-makers do not abandon their reliance on expert bodies, but the detached and objective status of these bodies is increasingly called into question. This situation in scientific advice to governments is identified as the 'paradox of scientific authority': expertise is needed more and more, while it is trusted less and less.

Reflexive science is promoted by scholars in science–policy studies as one way for navigating the paradox, but its implementation in government scientific advice is identified as a huge challenge. Reflexive science appreciates the limits of science in providing unquestionable authoritative understanding of wicked environmental problems in society. Experts may learn to transparently and responsibly indicate the limitations of their own knowledges, to explicate the social and normative aspects involved with wicked issues and to 'stage' their work differently to differed audiences. At the same time, the techno-bureaucratic system is firmly institutionalised in the everyday practice of government expert organisations and not likely to change fundamentally or disappear. When novel, more reflexive ways of working are introduced in these settings, they tend to become encapsulated within expert-driven technocratic ways of working. Reflexive attempts appear to deviate little from, and can even reinforce, a technocratic style of working.

What we see happening in practice is that experts find themselves in-between logics: they are inclined to adopt reflexive ways of working, but are bounded by the limits imposed by modernist structures, norms and ways of working. Two logics of scientific advice – titled 'reflexive' and 'modernist' in the context of this thesis – are essentially incommensurable: their representations of the role and nature of science are in conflict. Chapter 2 illustrates how these logics have emerged and have informed the principles that are today guiding the practice of scientific advice to governments.

Research focus

This thesis sets out to explore how environmental experts operate in-between logics within the everyday practice of acting out or merely discussing the (potential) use of participatory assessment methods (including participatory backcasting, normative foresight, extended peer review and reflexive evaluation). The study has been conducted in a Dutch government expert organisation, the PBL Netherlands Environmental Assessment Agency. The overall research question of this PhD thesis is:

RQ. How do environmental experts at the PBL work under co-existing modernist and reflexive logics?

The PBL Netherlands Environmental Assessment Agency serves as a paradigmatic case for the situation in government-funded expert agencies. The narratives that have been developed in this thesis about this case can pertain more widely to organisations which seek to (re)orient their identity and role under influence of governance dynamics, wicked problem conditions and post-truth politics, but are simultaneously bounded by

institutionalised expectations and ways of working. Chapter 4 introduces the PBL organisation at the nexus of its past and present.

Research design and findings

By adopting a practice view of organisational life, this study examines the emergence and accommodation of practical concerns which govern and affect PBL practitioners in their day-to-day work under co-existing logics. Two research questions have guided the empirical study:

1. *Which practical concerns arise when PBL practitioners attempt to connect participatory forms of knowledge production to their traditional assessment repertoires?*
2. *How do PBL practitioners cope with co-existing logics in their day-to-day work?*

Chapter 3 introduces the research design and methodology. In my role as engaged researcher in the practice context under study, I made use of various data collection techniques, including participant observation, interviewing and document analysis. In the period from 2008 to 2015 I participated in three assessment studies with participatory aspirations: the Sustainable City study, the Nature Outlook study and the Assessment of the Environment study. I also coordinated and participated in knowledge exchange activities organised by the Department of Information, Data and Methodology about expert roles, open assessment methodology and boundary work, and I derived material from the strategy-formation process. During my research, I iterated four reflective research angles to gain deeper insight the way practitioners at PBL conduct their daily operations in-between logics. The orientation of my reflective research and my practitioner role as full-time employee at PBL were closely entwined, as the various chapters illustrate in the following ways:

Chapter 5 – A 'first grasp' serves as the starting point for reflection on what is going on in practice. Chapter 5 provides a detailed account of PBL's Sustainable City project to illustrate how this first grasp originated in my early experience (in the period from 2008 to 2010) as project team member within the PBL organisation. The chapter describes how the advancement of participatory assessment in this project was both scrutinised for its limited social robustness (indicative of quality concerns informed by reflexive logic) and its limited scientific rigour (indicative of quality concerns informed by modernist logic). Thus the chapter illustrates, without going into analytical depth and reflection, how quality issues emerge in participatory assessment processes under the co-existence of modernist and reflexive logic.

Chapter 6 – I subsequently started exploring in detail why concerns about the scientific quality and policy relevance of participatory assessments had been left largely unattended – in my perception at least – during the assessment process. This direction for further inspection was motivated by my engagement from spring to autumn 2012 in a project evaluation of the Nature Outlook project, a (four-yearly) national foresight study on nature perspectives. Chapter 6 reports on the perceived quality impacts of stakeholder participation in PBL's Sustainable City project and PBL's Nature Outlook project. My reflective research centred on the repertoire in use for quality assurance. I analysed how the building of a repertoire took shape in these two projects as a balancing act between three quality attributes of salience, credibility and legitimacy. The chapter reveals how the construction of the (balance between) salience, credibility and

legitimacy was informed by path-dependency, functional choices, disciplinary preferences and socio-political dynamics.

Chapter 7 – I observed, but also intervened in (the design of), reflexive evaluation in the period from 2011 to 2012 as project team member responsible for the participatory design of the Assessment of the Human Environment project. A reconstruction of this project provided insightful material for analysing how practitioners reflect-in-action upon their role and activities in response to (changing) expectations about the policy function of the study. I identified how modernist expectations about the purpose of policy evaluation study were in tension with appeals for innovation towards a more reflexive orientation. The chapter illustrates how practitioners aligned these differing expectations by decoupling the intentions, approaches and outcomes of the various parts of this study. In this way, they created space for different evaluation approaches to be used interchangeably. The strategy of decoupling allowed for innovation to occur locally, while it ensured connectivity to the traditional roots of policy evaluation at PBL.

Chapter 8 – Three frames of PBL's identity as a Dutch expert agency appear to co-exist: PBL as integrated assessment specialist, PBL as think tank and PBL as trustworthy expert. I analysed actors' perceptions of PBL's core task and activities in view of the (future) developments and challenges confronting the agency. The resulting three frames contain contradictory ideas (marked by frame differences) of what is needed to properly enact these identities in the future. On the one hand, it appears that actors promote acts of participation and humility to prevent normative bias from going unnoticed. On the other hand, they still appear to believe in a detached and objective idea of scientific advice. Apparently the PBL organisation is opening up towards a more reflexive mode of advising, while its institutions still remains firmly rooted within its modernist constituents.

Chapter 9 – The norm of objectivity provides orientation to practitioners who experiment with participatory methods and techniques. In deliberating about the merits and challenges of participatory knowledge production practitioners restructure what objectivity means so that they can validly say that they conform to the norm of objectivity. The chapter illustrates how modernist representations of the objectivity norm (i.e. as value-free and detached) are loosely connected with reflexive understandings of objectivity (i.e. as value-neutral and interactive) whenever practitioners consider that of help in increasing the relevance and credibility of their participatory attempts. Apparently the practitioners create loose connections between the different meanings of objectivity employed within the organisation.

Conclusions

The answer this thesis provides to the first research question – *which practical concerns arise?* – is that PBL researchers are concerned about (1) the quality of participatory assessment processes and outcomes, and (2) their legitimate expert role in participatory assessment settings. The practitioners wonder how participatory activities may contribute to, without putting at risk, the independence, credibility and policy relevance of their scientific advice. This thesis explicates how dynamics in the research context inform their everyday working under co-existing logics. The way in which they mobilise modernist or reflexive logic is influenced internally by path-dependency, functional choices and disciplinary understandings, and externally by the particularities of the policy context, such as the characteristics of policy issues, the stage of policy formation

and political commotion, as well as trends and developments in science and society. Reflexive logic offers direction in case of wicked problems, lack of coherent policy direction, or when multiple responsible parties hold different opinions about the nature of and solutions for the problem, yet are open (enough) to listen and learn from one another. Modernist logic provides the basis for action in case of (assumingly) structured issues with limited societal urgency for discussion. By highlighting the dynamics 'at work' in the specific project settings of the Sustainable City, Nature Outlook and Assessment of the Human Environment studies, this thesis points out the contingent and partial manner of the ways in which modernist and reflexive elements are mobilised in everyday practice.

The answer to the second research question – *how are concerns coped with?* – is that practitioners apply alignment strategies to reconcile both logics. I distinguished three strategies: (i) encapsulation, (ii) decoupling and (iii) loose connections. Encapsulation is most commonly known in science–policy literature, whereas the other two alternative interpretations of alignment resulted from this thesis and offer a more nuanced picture of the ways in which co-existing logics are coped with in everyday practice.

i. Encapsulation means that reflexive aspirations become unavoidably embedded within institutionalised structures, norms and routine ways of working, established under a modernist paradigm. The strategy of 'alignment through encapsulation' implies, in fact, that practitioners start to reflect upon their practice (i.e. upon normative bias in their models or upon dominant policy frames), but remain within the confines of possibilities offered by the persistent modernist knowledge system.

The other two alignment strategies illustrate how practitioners affiliate to elements of modernist or reflexive logic in a pragmatic manner, which allows them to justify their actions in accordance with diverse expectations and circumstances. In so doing, they start challenging their routine ways of working, norms and identities. Modernist logic provides no longer the 'normal' grounds on which they derive legitimacy, but reflexive logic neither is the new default.

ii. This thesis coined the term 'decoupling' to explain why contradictory quality perceptions identified in chapter 6 and the patchworked evaluation style in chapter 7 did not result in frictions, but appeared to be quite productive in reconciling the different logics. I understand 'alignment through decoupling' as a tailor-made strategy in which practitioners differentiate the various parts of their work to diverse situationally-informed preferences for purpose, approaches and outcomes of the study, without essentially losing track of the idea of a coherent practice.
iii. The third strategy of loose connections further explains how coherence is created. I particularly derived this strategy from my analysis of frame differences in chapter 8 and my reflection upon the complexity of the objectivity norm in chapter 9. I understand 'alignment through loose connections' as a pragmatic strategy in which practitioners bring the two logics together under a convincing rhetoric of how to create scientifically sound, policy-relevant and independent knowledge.

Returning to the main research question, this thesis concludes that a shift in the epistemic and social nature of scientific advice to governments is complex and is less like the replacement of one logic by another. An ongoing recombination of assessment approaches, roles and principles takes shape in day-to-day practices of government expert organisations. In so doing, the practice of government scientific advice is slowly transformed, while its durability is assured.

Contribution to research and practice

This thesis aims to contribute to ongoing academic debate in science–policy studies about the identity and authority of government expert organisations under wicked problem conditions, multi-level and multi-actor governance dynamics and post-truth politics. The paradox of scientific authority challenges the practitioners employed within these organisations: they need to firmly uphold the image of neutral and detached advisers, while they also need to be increasingly transparent about the political nature of their work. A practice view on organisational life in a Dutch government agency has been useful in deepening the understanding of the daily operations of government expert organisations in-between logics. This thesis has demonstrated how zooming in on the practical knowledge employed by 'reflective practitioners' can be a fruitful way forward in science–policy studies for exploring how novel representations of scientific advice emerge and how these representations are conditioned by, but also challenge, the institutional systems of knowledge production. My detailed accounts of the ways in which practical knowledge is employed in participatory assessment settings are illustrative of the 'messiness' of transformation within government expert organisations.

It makes sense, therefore, to further study the production of environmental expertise by asking how 'reflexive' experts really are or can be about the paradoxical situation they find themselves in.

Most of all, this thesis has benefited from the rich 'practice stories', which I derived from the reflections of and exchanges among the PBL practitioners. These stories are not only of interest to academics in science–policy studies, who want to understand how participatory forms of knowledge production work out in scientific advisory practice, and affect its change and stability. I also hope that these practice stories inspire practitioners in government expert organisations to actively generate, share and learn from practice stories themselves. A 'learning by doing' attitude may stimulate practitioners to problematise taken-for-granted assumptions, appreciate new insights and creatively engage with them in a situated manner. In this way, practitioners may learn to improve their everyday practice, and may go beyond persistent institutional frames of reference in order to advance the practice of government scientific advice in a changing society.

Samenvatting

Om het hoofd te bieden aan urgente milieuvraagstukken, zoals klimaatverandering, is behoefte aan objectieve kennis en wordt meer dan ooit een beroep gedaan op publieke kennisorganisaties. Tegelijkertijd hebben deze organisaties steeds vaker te maken met 'wicked problems', een complex bestuurlijk speelveld en wantrouwen ten aanzien van de (invloed van) deskundigen. Indien een boodschap buiten de bekende 'bubble' valt, zal die als onwelgevallig en/of onjuist worden weggezet. Wanneer er dan ook nog enige indicatie is van een bias, belang of ideologische opvatting van de deskundigen, dan wordt de objectiviteit van een kennisorganisatie onoverkomelijk in twijfel getrokken. Deze gezagscrisis illustreert dat het vak van wetenschapsadvisering in een ambivalente situatie verkeert; enerzijds wordt van deskundigen verwacht dat zij transparant zijn over aannames en onzekerheden in hun kennisclaims, anderzijds eisen we van deskundigen eenduidige bewijslast over ingewikkelde vraagstukken om te weten wat we moeten doen. Onderzoekers in publieke kennisorganisaties kunnen met deze ambivalente situatie leren omgaan, zo is de veronderstelling, door zich reflexief en bescheiden op te stellen. Dit blijkt echter lastig in praktijk te brengen, omdat publieke kennisorganisaties gewend zijn, en geacht worden, om feiten te produceren.

Publieke kennisorganisaties zijn veelal opgericht vanuit het moderne paradigma. Deze zienswijze op kennisproductie stelt dat kennis waardenvrij tot stand komt en resulteert in 'evidence-based' beleid. Deze zienswijze vormt de basis van publieke kennisorganisaties als brug tussen wetenschap en beleid. Het reflexieve paradigma stelt daarentegen dat de totstandkoming van kennis verweven is met de sociale en politieke context waarin het wordt toegepast. Kennisorganisaties leveren niet alleen kennis aan over onze wereld, maar hun kennis geeft ook mede vorm aan de wereld. Dit houdt in dat kennis altijd gekleurd is en niet los staat van de tijdsgeest. In het reflexieve paradigma zijn publieke kennisorganisaties kennismakelaar; zij hebben de waarheid niet in pacht en geven daarom rekenschap aan diverse kennisclaims en opvattingen van belanghebbenden in de kwestie, om te komen tot sociaalrobuuste kennis.

In dit proefschrift staat de volgende vraag centraal: hoe gaan wetenschapsadviseurs om met uiteenlopende zienswijzen op de aard van hun vak en hun rol in beleid en maatschappij? Het praktijkonderzoek bij het Planbureau voor de Leefomgeving (PBL), beschreven in dit proefschrift, laat zien dat de onderzoekers worden beïnvloed door moderne en reflexieve denkbeelden over wetenschapsadvisering. Ik heb praktijken bij het PBL in detail bestudeerd door als lid van het onderzoeksteam actief deel te nemen aan drie onderzoeksprojecten. Daarnaast heb ik deelgenomen aan organisatie-brede discussies in de periode van 2008 tot 2015, waarin opvattingen over de (veranderende) rollen en activiteiten van PBL ter sprake kwamen. Vanuit vier verschillende analytische invalshoeken heb ik vervolgens gereflecteerd op de gebeurtenissen in de projecten en in de organisatie.

De planbureaumedewerkers komen in aanraking met moderne en reflexieve zienswijzen tijdens het toepassen van participatief onderzoek. Ik concludeer dat onderzoekers bij het PBL hier pragmatisch mee omgaan. Dit doen ze door in te spelen op beleidsdynamiek, nieuwe (politieke) ontwikkelingen en door rekening te houden met interne omstandigheden, zoals de voorgeschiedenis, de functie van het onderzoek en de beschikbare kennis en expertise in het team. Een reflexieve zienswijze krijgt ruimte wanneer beleidsdoelen niet gegeven zijn of wanneer partijen andere opvattingen hebben over de aard van het probleem, maar bereid zijn om naar elkaar te luisteren en

van elkaar te leren. Een moderne zienwijze overheerst doorgaans in studies naar (verondersteld) eenduidige vraagstukken die weinig discussie oproepen.

In de praktijk lopen deze zienswijzen echter nogal eens onbewust door elkaar heen. Tijdens het proces van kennisproductie komt dit tot uiting in verschillende opvattingen over doel, aanpak en (beoogde) uitkomsten van een studie, of in een verschillend begrip van wat men onder 'goede' kennis of een 'legitieme' rol verstaat. Onderzoekers gaan hiermee om door verschillende onderdelen van een studie te ontkoppelen, middels differentiatie in doel en insteek hiervan. Zo kunnen zij hun werk rechtvaardigen in het licht van zowel moderne als reflexieve zienswijzen. Er is ruimte voor meervoudigheid, zonder dat dit resulteert in fricties. Onder de noemer van beleidsrelevant, wetenschappelijk en onafhankelijk onderzoek worden de verschillen losjes met elkaar verbonden. Onderzoekers verbreden hierdoor hun onderzoekspalet en rolopvattingen, wat hen in staat stelt om beter in te spelen op verschillende vragen en omstandigheden.

De vervolgvraag die dit onderzoek oproept is of onderzoekers zich bewust zijn van de wijze waarop zij in specifieke situaties ontkoppelingen en losse verbindingen tussen beide zienswijzen tot stand brengen. Het produceren van gezaghebbende studies is gebaat bij continue reflectie op de (diverse) verwachtingen over doel, rol en aanpak van een onderzoek in het licht van sociale, politieke en beleidsontwikkelingen. Hiermee kan worden voorkomen dat een publieke kennisorganisatie de plank misslaat of belandt in een gezagscrisis. Het management kan hierop inspelen door een 'leren door doen' houding onder de medewerkers te promoten. Dit houdt in dat er in de dagelijkse praktijk ruimte komt om vanzelfsprekendheden ter discussie te stellen en nieuwe mogelijkheden te verkennen. Zo staat realiteitszin voorop, terwijl reflectie en vernieuwing continue plaatsvinden. Publieke kennisorganisaties die zich blijven vernieuwen zijn ook in staat gezaghebbend te blijven opereren in een veranderende maatschappij.

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About the author

Eva-Maria Kunseler was born on the 24th of August 1982 in Delft, the Netherlands. After graduating high school in 2000, she obtained her propaedeutic degree in Health sciences at Maastricht University. She continued her studies in the specialization track on Environmental Health sciences. During her studies she gained an increasing interest in environmental policy and science communication. Her bachelor thesis focused on the governance organisation of the firework incident in Enschede. She followed additional courses on sustainable development in the Environmental social sciences programme at the Radboud University in Nijmegen. For her master thesis she conducted a research internship at the Health Council of the Netherlands. She studied the role of advisory bodies in environmental health policy-making under supervision of Prof. Wim Passchier en Prof. Pieter Leroy. She conducted a survey among scientific advisory bodies across Europe and interviewed scientific advisers in Germany, France and Poland about the internal organisation of their advisory processes. During her studies she worked as a student assistant for the Communication department of the faculty of Health sciences and was active in coordinating cultural activities at her student association.

In 2005 Eva worked as an intern at the WHO European Centre for Environment and Health in Bonn, Germany. After graduation in Environmental Health sciences she started in 2006 as a researcher in the Environment and Health department of the Finnish National Institute for Health and Welfare in Kuopio, Finland. She coordinated the policy track of the WHO EU-funded ENHIS project on the establishment of a European environment and health information system and participated in the EU-funded INTARESE project on integrated environmental health assessment.

Since 2008 she works as a researcher at the PBL Netherlands Environmental Assessment Agency. She started in 2011 as an external PhD candidate at the Environmental Policy Analysis group of the Institute for Environmental Studies (IVM) at VU University Amsterdam. In her current position at the PBL department of Information Data and Methodology, Eva is coordinating strategic research on participatory evaluation and open assessment methodology.

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- Participatory knowledge production in environmental expertise: Beyond institutional fixes towards co-production. Nordic Environmental Social Sciences Conference, 6-8 June 2017, Tampere, Finland
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- Challenges of dealing with plurality. A process evaluation of the Nature Outlook of the PBL Netherlands Environmental Assessment Agency. 2012 Berlin Conference on the Human Dimensions of Global Environmental Change, 5-6 October 2012, Berlin, Germany

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"Men in the plural, that is, men in so far as they live and move and act in this world can experience meaningfulness only because they can talk with and make sense to each other and to themselves"

Hannah Arendt – The Human Condition