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Getting to Policy Impact: Lessons from 20 Years of Bridging Science and Policy with Sustainability Knowledge

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INTRODUCTION

In order to address the increasingly complex contemporary environment and development problems and instigate a societal move towards sustainable development, knowledge which is scientifically valid, policy relevant and socially robust is required. From the policy-maker world, calls for more 'evidence-based' policy are increasingly heard not just in the field of sustainability. As a consequence, research organizations, both those within and outside academic institutions, need to not only consider how their work is received, but also increasingly the role and impact of their work for policy making, industry and society at large. Evidence of this trend is found in the explicit requirement from most research funding agencies that proposals demonstrate strategic or policy relevance. For research organizations concerned with sustainable development, such as the Stockholm Environment Institute (SEI), policy relevance is also at the core of its mission.

Such organizations, with an important audience in the public policy sphere from sub-national to global levels, should be evaluated on the basis of what types of public policy impacts the knowledge it generates is having at different levels of governance. However, such evaluations are inherently tricky. Despite its strong presence in nearly all research funding descriptions, 'policy impact' is an ambiguous term, and there is very little consensus about what it really means or how to measure it.

Several questions emerge on how to approach the topic. How and where might one observe policy impact? How might that impact be traced back to the introduction of sustainability knowledge, and the precise roles of different actors? Further, what kinds and depth of policy impact can there be and what types of factors around the process facilitate or impede policy impact? This study sets out to address these questions from an empirical angle, and then draw out what emerge as general lessons about conditions favouring policy impact from sustainability knowledge.

The study looks specifically at the role and impact that SEI has had in a number of different policy arenas in the past decade. Based on a common analytical framework, insights are built upon the analysis of six case studies where SEI has provided knowledge support to either policy formulation, policy evaluation, or policy implementation stages in various policy contexts and regions: US state-level climate policy, the use of carbon footprint for regional development and local housing policy in the UK, Estonian waste policy and tax reform, the implementation of the Montreal Protocol in developing countries and countries with economies in transition, and international agreements on tropospheric ozone pollution. The aim of these studies is to identify and characterise the policy impact, as well as explore the contributing factors and conditions under which SEI provided policy advice and knowledge support. Together, the cases form the basis for suggestions on what conditions and circumstances make sustainability knowledge support and policy advice work well. Thus, based on our empirical findings, we include discussions of and suggestions for how SEI and similar

organizations around the world could better serve its mandate to ‘bridge science and policy’ by bringing sustainability knowledge into the policy domain.

Each case study first gives a background and introduction to the case. Thereafter each briefly describes the policy context and the specific policy issues where SEI and its knowledge co-generation partners have actively provided knowledge and support. Lastly, the cases discuss the conditions that formed the output (and in some cases outcome) of the policy support in their specific case.

CONCEPTS AND FRAMEWORK

What is sustainability knowledge?

In its most generic sense, sustainability knowledge can be defined as *knowledge that facilitates the development of policies with sustainable outcomes.* Such knowledge includes different constituent elements. In this report, we include two forms of sustainability knowledge. First, it entails knowledge about the *substance* of policy problems and solutions, in other words a better understanding of environmental effects, a more comprehensive and holistic problem understanding, and better economic or technical solutions to problems. Second, and in line with the emerging field of 'sustainability science' (Kates *et al.* 2001; Clark 2007), it also entails knowledge about the *process* with which more sustainability-oriented policies needs to or can be made. Such process-oriented knowledge includes, for example, methods for effective stakeholder participation (*cf* Forrester 1999 and Kasemir *et al.* 2003) and joint learning (*cf* Forrester *et al.* 2008) while maintaining scientific[1] excellence. This integration of stakeholders and their diverse knowledge has been considered necessary in environmental and sustainable development research for over a decade (e.g. *cf* Shackley & Wynne 1995 and Bailey *et al.* 1996) and particularly the integration of such knowledge into policy (*cf* Gallopín 1999). However, measuring the impact of such knowledge has proven to be difficult, although it is widely considered to be a necessary prerequisite for sustainability (e.g. *cf* Folke *et al.* 2005 and Pahl-Wostl *et al.* 2008).

What is policy impact?

Policy impact can be defined as *an observed change in the public policy process (and/or content) as a result of the knowledge that is supplied (or co-generated)*. Debates about the impact and role of knowledge in the policy process first coalesced in policy analytic work in the 1970s, in particular that of Weiss (1979) and Wildavsky (1979). More recently, this literature and the questions it poses have re-emerged in the European setting in relation to the use of impact assessment and other decision support systems as part of enhancing European and member state government functions – so called 'better regulation' and 'evidence-based policy-making' (for a more extensive discussion see Nilsson *et al.* 2008: especially page 336). There are several different types of policy changes that may occur as a result of knowledge use. Here, the work of Weiss (1979) provides a useful starting point. Weiss identified seven different ways in which the use of research could be examined. These included the 'problem solving model' which is the direct application of knowledge to inform a decision; a 'tactical model' where evidence is used to delay action and support non-decision making; an 'interactive model' where the use of evidence is chaotic and non-linear; a 'political model' where evidence is used to support pre-determined positions; and an 'enlightenment model' where evidence affects policy slowly and indirectly via longer term processes of social

learning. SEI as an organization may in view of its mission to bridge science and policy be primarily interested in having instrumental and learning-based impacts, but efforts must be mindful of other, more political, types of knowledge use. These can include using knowledge for the purpose of post-hoc legitimating of action and positions or as ammunition in 'turf wars' between parts of government, and may lead to regulatory capture situation for the knowledge provider (Shulock 1999).

A sequence of learning elements can provide a means for categorizing the depth of impact in terms of learning. In this study, the following degrees of depth are used:

- knowledge **acquired**: an assimilation of experience, as well as new ideas and concepts from other actors;

- knowledge **interpreted**: gaining new understandings of cause-effect relations of policy problems and how to resolve them, as well as incorporating understanding into the organization's own goals, strategies, and activities;

- knowledge **institutionalized**: incorporation into procedures, rules, policies, and other tangible outputs for implementation (Nilsson 2006, adapted from Huber 1991).

Policy impact and the policy cycle

Understanding any impact upon policy making requires understanding how policy decisions are made. According to traditional approaches within policy analysis and public administration (*cf* Hogwood & Gunn 1984), a simplified policy cycle can be broadly described in terms of four stages: the first stage is strategic policy *formulation* or the decision on what broad course of action to take. Sustainability knowledge may feed into this stage with supporting information on the problem definition underlying the course of action and criteria for why this course is the correct one to take. The next stage is the *translation* of this strategic policy into policy measures or packages of measures that will enable meeting the strategic aim. These measures are often referred to as the policy 'output'. Sustainability knowledge can and should feed into this stage by identifying and evaluating likely successful measures. However, at this policy stage many decision premises, interest group positions, and other mechanisms are 'competing' with sustainability knowledge. Such premises may include public opinion but also cost-benefit and other economic analyses. Policy measures then need to be implemented: *implementation* of the policy measures needs a further raft of decisions and communication. The final stage is that of *evaluation* of the policy and its 'outcomes'. This latter stage has two facets: the policy output evaluation (i.e. was the policy successful: did people accept the measure, was it politically successful?) and the policy outcome evaluation (i.e. did it have the desired consequence?). In reality, things are rarely that simple. Despite its continued use in some policy circles, the sequenced policy cycle model has been convincingly overthrown in empirical and

theoretical policy science over the last few decades, especially the idea that there is a starting point and a finishing point (*cf* Hudson & Lowe 2004; page 223*ff*). Alternative perspectives include, for instance, theory constructions such as the garbage can model of decision making or the advocacy coalition framework (Cohen *et al.* 1972, Sabatier 1988, Sabatier & Jenkins-Smith 1993, and Schlager & Blomquist 1996).

One alternative perspective might be called a 'multi-level' approach which draws upon the stages of the policy cycle but not necessarily as a clearly linearly connected sequence. According to this approach, policy processes occur within and across geographical and functional layers of governance. Strategic policy may be formulated at a relatively high level of governance (regional or international). This strategic policy is then translated into policy measures, usually at the national or state level, and then implemented at the local level. It is useful when identifying and assessing where pivotal decisions are made, to think of each stage in the policy cycle as actually having its own cycle of decision making with strategic elements (albeit, at lower levels and constrained within certain limits) as well as choice over actual policy measures. Thus it is necessary, when looking at a 'big' issue such as ecological and sustainable development issues to track power and influence of different actors at different stages in the policy cycle(s) and to use insights from a range of models and theoretical approaches. Each of the levels of decision making in this multi-level model – regional strategic, national measures and local implementation schemes – has embedded within it decision windows in which important decisions are taken: these windows are where the sustainability knowledge must be targeted in order to have the desired effect. This perspective appears particularly useful as a backdrop for assessing impact within a research organization that operate from the global policy level all the way through national processes to local on-the-ground implementation issues.

How does one achieve policy impact?

A small literature on this topic helps us to identify *a priori* expectations concerning what qualities of the science-policy interface are required (Cash *et al.* 2003). The first is the quality and *validity* of the scientific and technical knowledge. However, being recognized for scientific excellence, will not deliver a policy impact on its own. The second critical quality is having good stakeholder engagement processes, ensuring *legitimacy* of the knowledge produced. Indeed, such criteria are inherent in the emerging concept of sustainability science (see above). However, neither are straightforward or simple to achieve. SEI's experience working with stakeholder processes, as well as in other arenas, highlight how the policy impact of sustainability knowledge can be influenced by several factors including who has power and influence within engagement processes and the relationship between engagement and the participation of actors (see also Forrester *et al.* 2008). The challenge becomes how, under these influencing factors, it can be ensured that scientific excellence and the democratic basis both get prioritized. A third issue is the question of *relevance*, that is to couple the knowledge to processes where it is to be making a positive contribution. For example,

political context can shift the significance of science in decision making (Pielke 2007: page 40*ff*). Cases where there is 'a commitment to a specific course of action' through shared values and limited uncertainty 'can be resolved primarily through the systematic pursuit of knowledge' (what Pielke calls 'tornado politics') and, conversely, there are cases Pielke calls 'abortion politics' where 'there are conflicting commitments based on differing values' where science cannot contribute very effectively (*ibid*: page 41, 42*ff*).

Whatever the contexts, effective *communication* is critical. Sustainability knowledge needs to be communicated well via stakeholder engagement in an iterative process (i.e. knowledge-producing organisations need to listen to stakeholders as well as talk to them) and learning needs to occur as a result of that communication: 'what we need then is a new understanding of sustainable … resource management as a societal search and learning process' (Pahl-Wostl *et al.* 2008). In any analysis of learning and/or communication it is important to understand the actors involved. These are primarily the sender and the receiver, which, in this paper, are categorized as *supply-side actors* and *demand-side actors*. Also important is the medium, and of course the packaging or framing of the message and the context within which it is delivered.

Analytical framework, methods, and case study questions

We selected six cases of science-policy interaction across SEI where it was generally acknowledged (by supply-side and demand-side) that the introduction of new knowledge had had an impact. These case studies were chosen to offer a variety, in terms of the research programmes, geographical regions and governance levels (local, national, international) of SEI's work. There are advantages and disadvantages to using a case study design. Crabbe and Leroy (2008) note that case study research offers a number of advantages, for example as it yields added value in situations where it is unclear where a policy ends and policy context begins and where there is a situation of 'many variables, small *n*' (*cf* Ragin 1987, Yin 1994). The main disadvantage relates to the potential lack of robustness and generalisability of the results. This should be considered especially in this study where positive cases were intentionally selected, that is where a policy impact perceived as positive was manifest (in contrast to no or negative impact). However, generalisation is not the main purpose of this study, but rather to explore types of and conditions for effective impact and using illustrative cases for that purpose.

In order to understand the process of how policy impact occurred, a series of standardized, semi-structured interviews were carried out in each case with a number of key actors from both the supply side and the demand side. Around six actors per case were interviewed with a balanced representation of supply and demand side. In each interview it was emphasised that SEI wanted to learn from this process and improve its service to the demand side and this could only occur if demand-side actors

were honest and truthful about successes (and about failures). Where successes were claimed, actors were encouraged to provide supporting evidence.

There are questions about the policy impact and potential learning – what could be termed 'dependent variables' – that can be asked of the cases. These include identifying where, that is at what stage of the policy process and through what actors, the impact occurred and what 'kind' of impact can be observed. For each case, the following questions were posed:

- can we detect changed decisions (an instrumental or problem-solving impact);
- can we detect new knowledge being used to delay or deflect attention (a tactical impact);
- can we detect increased interaction and engagement between actors (an interactive impact);
- can we detect an actor positioning, underpinning or undermining new knowledge based upon pre-conceived notions (a political impact); or,
- can we detect new awareness leading to learning and new ways of seeing things and new ways of doing things (an enlightenment impact).

Further, we explored how deep any resultant policy impact was by analyzing whether the new knowledge was simply *acquired* (as you would expect to see in instrumental, tactical or political above); whether it was *interpreted* (any of the above) or whether it was *institutionalized*.

There are also several possible 'independent variables' linked to the principal aspects mentioned above, or factors that may contribute positively or negatively to the observed pattern of impact. *Validity*, *legitimacy*, *relevance* and *communication* are key qualities of impact potential, but what concrete factors on the demand side as well as the supply side contribute to these qualities?

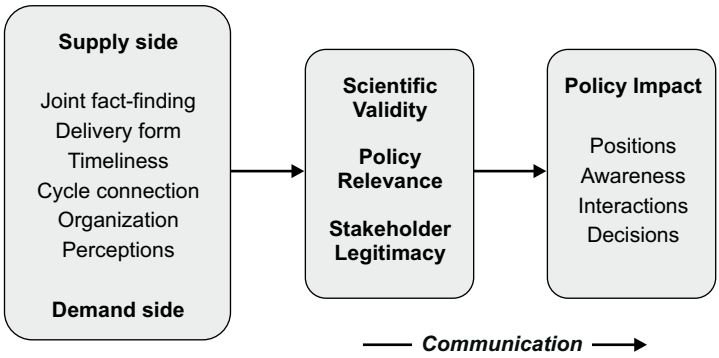

Figure 1: Schematic overview of the analytical framework

These independent variables may be related to actor capacities, interests, incentives and roles, which may differ between supply-side senders and demand-side receivers. To address these factors, demand-side actors were asked to specify their request, purpose, need, format and timeline for information and evaluate how supply-side met these expectations.

Both demand- and supply-side actors were asked to provide their perceptions and recollections on the *communication* and message presented. Several types of questions were asked to address this topic, including:

- whether the message was timely;
- the (dis)connect between the policy and research cycles;
- perceptions of the precision, quality and/or format of the knowledge and whether they (or the decision makers they were advising) perceived the new knowledge as useful evidence;
- whether it was delivered in a useful manner;
- what were the organizational arrangements for the knowledge transfer; and,
- whether there were collaboration arrangements in the provision of knowledge.

Supplementing these questions were a series of questions concerning contextual issues such as media attention, political interest, risks and perceptions of risk, uncertainties, visibility of the issue and public opinion.

The case studies are to a large extent based on interviews. The interviews were semi-structured and followed an interview guide.[2]

The cases span a range of time-scales. Some actors interviewed are still actively involved in the processes evaluated, while others reflect on completed processes. In some recent and ongoing cases the process is fresh in people's minds and we can assess the aims of the actors, the process, and the policy output. In the most recent cases the policy output not yet in place (although in most cases we know what form it will likely take). While many analyses of sustainability policy making focus on the process and policy output, by considering cases with a longer timescale, we are able, in the longer timeframe case studies, to examine the actual outcome and consider how (or not) the process and output met the goals established. This variety strengthens the analysis by allowing us to learn from past success and failure, and improve upon ongoing and future processes.

CASE STUDIES

Policy analysis for state-level climate action in the US

Case study by Carrie Lee

Introduction

SEI has supported and advised in many of the leading US state climate action efforts, as well as emerging regional ones. With support from the Energy Foundation and in collaboration with researchers from the Center for Climate Strategies (CCS) and other organizations, SEI has provided a framework for knowledge generation and transfer, including technical and facilitation assistance for stakeholder groups and supporting analyses of emission reduction potential and cost effectiveness of policy options considered.

This case study specifically examines SEI's involvement in the 2007 Washington State Climate Advisory Team (CAT) process. Climate action in Washington State has taken place within the policy context of evolving regional, state and local action in the US: the absence of federal action being the main driver. This case study aims to identify the policy impacts of SEI's contribution to the 2007 CAT process, as well as to discuss potential motivations, mechanisms and drivers for the observed policy outcomes. Throughout the 2007 CAT process, SEI researchers served roles as both the lead technical coordinator and technical working group advisors in partnership with CCS. In this case study, this joint-collaboration is illustrated by reference to SEI researchers as SEI/CCS team members. Our analysis is based on examination of policy outputs and interviews with three supply- and four demand-side participants, including an SEI, CCS, and CAT facilitator, as well as state agency staff and CAT stakeholder members.

Policy Context

In the absence of federal action on climate change policy development, US state governments have taken the lead to establish greenhouse gas (GHG) reduction targets and action plans for reducing emissions. These plans have led to tangible outcomes, ranging from binding and enforceable emissions commitments and cap-and-trade systems to the adoption of efficiency and renewable energy standards. The evolution of state action on climate change has been attributed to multiple drivers and benefits including economic development and policy entrepreneurship opportunities. Future climate change policy at the federal level in the US is likely to be very influenced by the actions already taken at the local, state, and regional level (Peterson 2004). States have often served as 'policy laboratories' for environmental policy and climate policy is no exception (Pew Center on Global Climate Change 2006). To date, 19 US states have established GHG emission reduction targets and 38 have developed climate action plans to reduce their contribution to climate change – CCS provided support for

22 out of the 38 state action plans prepared from 2001 to 2008, and SEI has played an advisory role in over a dozen of these states.

SEI has had a 'long history' of working with US states on renewable energy and energy efficiency that stretches back to the 1980s. It did so mainly through working with the Tellus Institute. SEI participated in the first state climate action process in Rhode Island in 2001 and continued on to provide support the West Coast Governor's Global Warming Initiative in 2003-2004, the California Climate Action Team in 2004-2005, and in the 2004 Puget Sound Clean Air Agency's Climate Protection Advisory Committee in Washington State.

By 2004, SEI along with a team of other researchers working on state level climate action came together under the leadership of Tom Peterson, who established CCS. For SEI, participation in state level climate action and collaboration with CCS, have been based on the objective that with limited action at the federal level we, 'want to be where change is happening, if states are the laboratory, where else would researchers want to be?' As a research institution, 'we had experience analyzing mitigation options when few people did. We want to be where our own experience and knowledge base can bring value added to a public policy dialogue.' Based on the collective experience of staff and tested process elements from prior state work, a systematic state climate action process has evolved providing a toolkit for state efforts. General objectives in supporting state action on climate change, as described by Peterson, are to, 'help the nation tackle climate change, to support state's in their own self determination to find solutions, not to propose solutions, but enable states and stakeholders to find their own way forward to tackle the problem'.

Washington State 2007 CAT process

The Washington State 2007 CAT process was initiated to meet orders tasked in the Climate Change Challenge issued by Governor Gregoire through Executive Order 07-02 in February 2007. The Executive Order, citing the scientific consensus on climate change and projected climate impacts to the state, declared the state's commitment to address climate change by establishing GHG emission reduction and clean energy economy goals for Washington to reduce GHG emissions to 1990 levels by 2020, to 25 percent below 1990 levels by 2035, and to 50 percent below 1990 levels by 2050 (Gregoire 2007). To achieve these goals, the Executive Order tasked the directors of the Community, Trade and Economic Development (CTED) and Ecology (DOE) state agencies to develop a climate change initiative to achieve the 2020 goal beyond the 60 percent of emission reductions projected to be achieved by recent actions in the state (Gregoire 2007; WA DOE and WA CTED 2008). The agency directors were also tasked to develop recommendations for achieving this goal based on consultation with representatives from business, agriculture, forestry, energy suppliers, labour, tribes, faith and environmental communities, and all levels of government (*ibid*).

However, the impetus for the 2007 CAT process began much earlier. In 2003, following the urging of Board of Director members including King County Executive Ron Sims and City of Seattle Mayor Greg Nickels, the Puget Sound Clean Air Agency assembled

stakeholders to form the Climate Protection Advisory Committee (CPAC) to develop a comprehensive planning approach to climate mitigation in the four western counties of Washington state. The CPAC process, for which SEI researchers served as the lead technical facilitator, received significant attention and interest from the then Governor, Governor Locke, and helped generate support for early climate legislation including the adoption of the California Clean Car Standard. Following the CPAC process, leaders in the climate community recognized the need for a Washington state level stakeholder process. Thus, they 'took it upon [them]selves to approach directors of state …agencies to say that the Governor really needs to take on climate change as an initiative'. The issue gained support from the newly elected Governor, Governor Gregoire. State agency directors noted that there 'became a growing sense of the linkage between the state's climate strategy and energy and economic development… what brought her around was getting the conversation out of the sense of a trade-off between the environmental and economic objectives.' The new Governor's support for taking action on climate in Washington was demonstrated by her issuing the Climate Change Challenge Executive Order 07-02.

Immediately following the Governor's Executive Order, the directors of the DOE and CTED state agencies engaged a broad coalition of leaders to design the Washington State 2007 CAT process (WA DOE and WA CTED 2008). Early on, SEI and CCS were brought in to build on state agency experience with stakeholder processes, and develop a CCS-style process in Washington. The 2007 CAT process held its first of eight meetings in March of 2007 over a period of 11 months with 27 CAT stakeholder members. The CAT was supported by five technical working groups (TWG), each made up of a group of 10-15 stakeholders, structured around different segments of the state's economy[3] to develop policy recommendations to achieve emission reductions in each sector. SEI and CCS staff provided technical facilitation and analytical support for each TWG. Clear and explicit ground rules for stakeholder participation were established at the onset of the process, including stating that participants will: provide leadership and a vision for how Washington will meet the Climate Change Challenge; not debate either the science of climate change, the goals established in the Executive Order, or the timeline; support the process and its concept fully; and act as equals during the process (WA DOE 2007). The interim 2007 CAT report *Leading the Way on Climate Change* was submitted to the Governor and subsequently presented to the Washington State Legislature in February of 2008 with 12 recommendations and 31 strategies developed and supported by the CAT to achieve the goals of the Governor's Executive Order (WA DOE and WA CTED 2008).

Policy Impact

Our aim in this case study is to identify the policy impact of SEI's participation, as part of the CCS team, in the 2007 CAT process. Our challenge is distinguishing the policy impact of the value added by SEI/CCS's participation from outcomes specific to the process itself. This case study addressed this challenge by focusing questions to interviewees on three specific contributions of the SEI/CCS team, reflecting both 'substance'- and 'process'-oriented sustainability knowledge:

- analytical support provided to quantify the GHG emission reduction potential and cost effectiveness of recommended policy options included in the 2007 CAT report;

- role of having third party experts, such as SEI provide technical facilitation; and,

- value added of building on the experience, tools, and track record of SEI and CCS staff and the CCS process from other states in developing a Washington specific process.

Interviews with select participants identified three specific policy impacts, outlined below, from SEI/CCS's contribution to the 2007 CAT process. Policy impacts were observed at several stages in the policy process including both policy development and implementation, as well as by several actors including state legislators, stakeholders, and state agency staff. Factors, which contributed and in some cases limited the scope of the policy impact of SEI/CCS's contribution, are considered in the next section of this case study.

Quantification of potential GHG emission reductions of policy options

In the 2008 legislative session, subsequent to the 2007 CAT process, the Washington State legislature passed ESSHB 2815[4], which established GHG emissions limits, mandatory reporting and monitoring of emissions, and plans to implement a regional cap and trade system. Additionally ESSHB 2815 directed the state DOE and CTED agencies to submit the final recommendations of the CAT to the legislature by December 1st, 2008. This directive initiated a second stakeholder process, the 2008 CAT process, to transform the comprehensive recommendations developed in the 2007 CAT process into a set of refined, focused, and effective actions that could be implemented by the Governor and state legislature to achieve the state's GHG reduction targets (WA DOE 2008).

Each of the state agency staff and CAT members interviewed cited the impact quantification of policy options by SEI and CCS staff had in developing legislative support for ESSHB 2815: 'quantification of policy options built key needed confidence in the legislature that achieving the GHG emission reduction targets was feasible', 'the credibility allowing [the legislature] to move forward … was based on … having good analysis of strategies … people felt comfortable moving forward'. SEI staff described that 'our role has been on the analytical side... to provide a foundation to say "yes we can"'. State legislators in Washington had 'very little previous exposure to climate change' before the 2007 CAT process, yet the four legislators who served as 2007 CAT members became, 'some of the key leaders to move [ESSHB] 2815 through the legislature'. The value of the quantification of policy options is also illustrated by one CAT member's assertion that in his organization's advocacy and legislative work he finds the quantification 'very useful in terms of bringing together a sense … [that the] problem and challenge become finite and tractable … in ways climate often is not'.

However, while the 2007 CAT process was a 'clear contributor, it isn't necessarily the case that it [ESSHB 21815] would not have happened without it. The NGO community had done a lot of legwork in years prior' and since 'the CAT hadn't been able to organize itself [around] … two or three things that the state ought to move on right away … [we] didn't see the impact on legislature [that] you might have'.

These assertions suggest that the policy impact of the quantification of policy options provided by SEI/CCS can be described as, ultimately, enlightenment and instrumental impact, where new awareness of the feasibility of achieving the Governor's GHG emission reduction goals contributed to legislative support for ESSHB 2815 to establish the GHG reduction goals and further climate action measures in the state and region. The depth of the policy impact may be best described as knowledge *interpreted* contributing to institutionalization, new understanding and legitimization of how to achieve the GHG emission reduction targets, by presenting a plausible path forward contributed to the implementation of climate policy legislation.

Active collaboration and participation in the process

The CCS process aims to promote capacity building. 'We very much push for transparency in what we do … and aim for ownership in the analysis process, we engage stakeholders in developing, not just approving the analysis'. Unlike US states in the northeast or California, Washington state agencies do not have 'the professional and legal infrastructure developed around air quality' to build upon when approaching climate issues. At the state level, SEI and CCS staff has found that the CCS process 'builds momentum and expectations for state staff from the public and stakeholders… to deliver on this'. A state agency staff member described that, 'climate issues are now the major focus for the agency, previously … not a big focus at all. Once it was just my group – now it is for the whole agency'. A CAT member emphasized that the 2007 CAT process provided an 'infusion and assistance of … analytic and technical resources, which allowed our state officials to get educated, come up to speed and up the learning curve … to have the confidence with pushing forward with a stronger climate agenda … and now be leading the WCI process'. Following the 2007 CAT process, SEI staff has witnessed that 'the things we [SEI] were doing are now the things that they [state staff] are doing. The templates, concepts, and analyses are now within their capacity'.

This policy impact, the increased capacity of state agency staff through the collaboration and participation in the 2007 CAT process with SEI staff, can best be categorized as an interactive impact where interviewees detect increased interaction and engagement of state agency staff on climate change mitigation. Regarding the depth of policy impact, this is best described as an example of *knowledge acquired* and *institutionalized*, where state staff are now incorporating analytical procedures in to their own work to implement climate mitigation policies in Washington.

A proven track record and expertise

SEI researchers describe that in Washington the 'collected CCS experience provided a framework that you could implement quickly … [and] shows people that they are

… taking part in a process that will lead to a product that will have impact' based upon previous implementation expertise: 'Nothing speaks more forcibly than saying look at what worked in Arizona, New Mexico, Montana…' Further, the importance of participation and support from key stakeholders, especially those from the business community, was emphasized by all interviewed: 'Probably the most important outcome of the 2007 CAT was just getting the right people in the room especially on the business side … to publicly state that it was important for Washington State to engage … on climate'. The challenge is that although key stakeholders were participating 'there are always stakeholders who don't want much to happen'. The CCS framework helped to reduce this potential resistance, by, as stated by a CAT member 'the CCS structure … provided a clear pace … for the process… without which it would have been hard for the CAT process to find the rhythm and … it can get bogged down'.

Additionally the proven experience of the SEI and CCS staff, in addition to the CCS framework itself, strengthened stakeholder confidence in the 2007 CAT process. CCS Director Peterson has found participation of SEI and CCS staff provide added value by facilitating 'acceptance by stakeholders': in some states he has found that stakeholders are more comfortable having 'an independent team. It gives them more assurance that there is no predetermined outcome and that everyone has a voice.' This perspective was confirmed by a state agency staff member that highlighted that the value of 'having outside expertise available to the legislature so that they can hear things not from the agencies, but from some other third party whom they view to have credibility. No one has ever questioned that he knows what he is talking about'.

Not all committee processes induce learning. It depends on organizational arrangements that build up sufficient trust to enable key actors to develop joint problem perceptions and deliberations on broad sets of considerations and perspectives (Nilsson 2006). However, by building confidence in key stakeholders, the CCS framework and expertise of SEI and CCS staff contributed to generating trust among CAT participants. This policy impact can be best described as an interactive impact, where the CCS framework and participation of SEI and CCS staff as third party experts facilitated increased confidence and trust of key stakeholders in the 2007 CAT process enhancing interaction and engagement.

Evaluating the Conditions of Policy Impact

While interviewees identified several contributions that SEI and CCS knowledge and the CCS structure had on observed policy impacts, they also highlighted several independent and contextual factors that influenced the 2007 CAT process. In this next section, factors that contributed and help to explain the policy impacts outlined in the above section are reviewed, as well as consideration of factors that limited the policy impact of the 2007 CAT process.

Plurality of Stakeholders

All individuals interviewed cited the critical importance of stakeholder participation in the 2007 CAT process. Stakeholder involvement in the development of policy

recommendations to achieve the state's GHG emission reduction goals was a specific directive of the Governor's Executive Order. The CCS director found the impact of stakeholder participation to be 'dramatic [and] … able to tap into the best resident expertise in the state and open up the consideration of options'. Policy makers are also, more willing and able to consider a 'wider and broader set of options with more comfort and confidence if they are built out of stakeholder and technical work groups'. State agency staff stated this is true in Washington: 'the legislature doesn't take on tough issues; it will defer to the initiatives process and let people decide [via]… a stakeholder process.' Despite the policy impact of having SEI and CCS staff provide third party expertise in the analysis, state agency staff clarified that the legislature 'are not going to take the word of a third party' alone: so stakeholder participation in the process not only built legislative confidence but also generated advocates of the process among key constituencies that had developed 'a sense of buy in' through participation in the process. The role of stakeholder involvement identified by 2007 CAT participants echoes the importance of the interactive model and insights from policy network theory that 'it is unlikely, if not impossible, that public policy of any significance could result from the choice process of any single unified actor. Policy formation and policy implementation are inevitably the result of interactions among a plurality of separate actors with separate interest, goals, and strategies' (Sharpf 1978).

Key Participants and Role of Leadership

As critical as the stakeholder process itself, interviewees cited that participation of 'the right business folks inside the room' was a key factor in the observed policy impacts of the 2007 CAT process. The Governor's Executive Order played a key role in getting participation of key stakeholders and clearly establishing a mandate for the process, CAT members emphasized that stakeholders 'don't say "no" when you've got the Governor asking'. Having the Governor sponsor the process made it clear that something was going to happen with the recommendations and it 'made it imperative that the business community come to the table'. Thus, 'nothing happens because a stakeholder group makes a plan it only really works when they have some sense of mandate'. Furthermore, as described by the CAT facilitator, CAT members recognized that 'we have to figure out how to work together if we are going to do anything real on this' and the 'magic of the group was realization it could get done its charge without compromising individual interests.' Subsequent to the 2007 CAT process, several key stakeholders through membership in the Washington Association of Businesses formed a climate team to help inform and support legislative discussions.

Political context for optimal knowledge transfer

The Governor's Executive Order further facilitated policy learning and knowledge transfer by establishing a mandate for the CAT process that climate change is happening and Washington will take action, as well as clearly identifying the course of action – specific policies, actions, and recommendations to reduce Washington's GHG emissions. The CAT facilitator highlighted that 'so much coverage' in the media on the issue 'as well as [the] receptive public … wanting some response' at the time generated further supported the objective and approach outlined by the Governor. These

conditions are described by what Pielke refers to as 'tornado politics' cases where 'science can compel action' when there are 'particular circumstances characterized by shared values and low uncertainties about the relationship of alternative courses of action' (2007). The Ground Rules for the CAT process ensured that these shared values and clear direction given by the Executive Order were carried through from the start of the CAT process, thereby showing the importance of an initial strategic policy impact influencing the political context within which policy decisions is made. Under these conditions, Pielke suggests that scientific information can be 'critical for decision makers to evaluate and compare decision alternatives' (2007: page 42*ff*). The CAT process was not stalled or bogged down in debate about whether climate change is happening or what we should do about it; it was given a clear and effective mandate from the Governor, and ground rules included 'no debating the science'.

Barriers to policy impact

Interviewees cited the timing of the release of the 2007 CAT report and the lack of micro-economic analysis as limitations to the policy impact in the 2008 legislative session. State agency staff cited that 'there was enough time for the legislature to digest the CAT report', however 'to have had the most impact it should have come out a little earlier' in the legislative session, thus noting a disjoint between the knowledge production (science) cycle and the policy cycle it is trying to influence. Further, while SEI and CCS staff provided analysis of cost-effectiveness of recommended policy options, state agency staff noted that in the end 'people really wanted micro level analysis … to know what is the impact going to be on my electric bill, and what's the impact on my company'. In response to this issue, in the subsequent 2008 CAT process the state department of revenue has provided more in depth evaluation of the fiscal impacts of recommended policy actions.

Nevertheless, those interviewed also identified other remaining challenges to implementation of policies to achieve the state's GHG emission reduction targets developed through this process. CAT members expressed concern that 'you can lose the forest through the trees' by focusing on the 2020 goal and as a result the 'creative transformative … high leverage and catalytic kind of thinking processes aren't encouraged'. Perhaps broadening the charge of the CAT to devote more attention toward how stakeholders can 'communicate this challenge could lead to better assimilation and use of the knowledge'. While the 2007 CAT process has done a good job of identifying what needs to be done, a CAT member expressed his 'key frustration that there is not yet an understanding of the kind of resources needed at state government level [for]… implementation of CAT recommendations'.

Conclusions and Lessons Learned

Interviews with 2007 CAT participants including state agency staff, CAT stakeholder members, CAT facilitator and SEI/CCS researchers identified that SEI/CCS participation provided three primary contributions to the 2007 CAT process, bulleted below, leading to the observed policy impacts (in italics):

- Quantification of potential GHG emission reductions of CAT policy options by the SEI/CCS team *generated legislative support* for ESSHB 2815 by demonstrating that GHG emission reduction targets were achievable.

- Active collaboration with SEI and CCS staff and participation in the CCS structured 2007 CAT process *enhanced state agency capacity* on climate change mitigation.

- The proven track record of the CCS framework and expertise of the SEI/CCS team *facilitated support and involvement of key stakeholders*.

Additionally, several independent factors influenced the observed policy impacts including stakeholder participation, a clear and definitive mandate for the process, the timing of the release of the 2007 CAT report, and the *relevance* of economic analysis provided.

Interviewees also provided a valuable assessment of several lessons learned from the 2007 CAT process. As evidenced in the discussion of patterns of policy impact above, SEI and CCS staff have identified that for these processes to be successful there 'has to be a leadership commitment from the very top … in order to create a process [and] there has to be a willing group of high level stakeholders and experts to commit to the process'. In order for the state to effectively address climate 'you need to have the skills and the will' a CAT member emphasized. The Governor's Executive order provided the 'will' and the collaboration with SEI and CCS staff helped facilitate state agencies to develop the 'skills' to address the climate issue.

State agency staff emphasized in their efforts useful knowledge is 'knowledge that is applicable to the situation and understandable'. While knowledge itself cannot decide what policy to pursue, state agency staff highlighted that 'the better the information that you have to help people understand the choices the less likely the politics are going to stick you with some less than desirable approach'.

Formulating policy advice on reducing the carbon footprint of housing

Case study by John Forrester

Introduction

SEI has developed a scenario tool known as REAP (resources and energy analysis programme). With this tool, SEI creates scenarios that can be used to help compare the ecological (or carbon) footprint of various policy interventions at the local and

regional level. The scenarios can be applied at the strategic level because they look at the potential impact of changes in consumption patterns of a population of an area as a whole. Thus, REAP can be used to help answer questions such as:

- How will existing policy influence the carbon footprint of an area over any given time period?
- Where should efforts be focused in order to ensure the greatest reduction in carbon emissions by a given date?
- What scale of intervention is necessary to stabilize CO_2 emissions at a given level?
- What combination of interventions would bring about a given circumstance (e.g. a specific reduction) by a given date?

This case study looks at one application of REAP in one specific instance; the environmental assessment of the Leeds city region (LCR) housing policy within the Yorkshire & Humber Regional Spatial Strategy (RSS) and the impact and resulting spin-offs from the initial report. That first report was a rapid review (Frey *et al.* 2006) which was used by the UK Environment Agency (EA) as evidence at a review of the Yorkshire & Humber Assembly's (YHA – an arm of regional government) RSS. The data from this initial report – resource accounting on, for example, direct and indirect emissions from housing sector, policy options for retrofit to existing housing stock and for new build housing, and options for energy supply to housing stock – fed into a wider regional report on climate change (YHA 2007). However, the Environment Agency felt that better use could have been made of the original case study data, and in 2008 SEI published another report on the original case study targeted at UK local authorities and policy makers (Barrett & Dawkins 2008). The EA have also published a summary report based on this latest report and this has been sent to all UK local authorities (EA 2008).

In this way, the findings from the original analysis – that even with forecasted increased in housing needs, carbon reduction is possible through a range of policy measures and behavioural change – have been applied at regional review level (by the EA), regional policy formulation level (by the YHA), and at local level (by the EA). Further, they have contributed to Environment Agency policy at the highest levels by keeping low- and zero-carbon technologies (LZCs) on the agency agenda. Lord Smith, the agency's new chairperson, speaking at the EA's annual conference in London in November 2008, noted the importance of bringing in a coherent and comprehensive national strategy to invest in energy efficiency in homes as well as LZC energy supply.

Initiative

SEI produced an initial report (Frey *et al.* 2006) on the carbon impact of housing and other sectors that tried to get some initial results but it was, SEI acknowledged, 'very

basic'. SEI had worked with the Worldwide Fund for Nature (WWF) in Yorkshire on this and some of the work had also been funded by the YHA. That early study 'gave a bit of a catalyst of interest until the more significant study happened'.

The initiative to carry out an extended review of housing (leading to Barrett & Dawkins 2008 and EA 2008) was taken jointly between the SEI and the EA North East region Regional Strategy Unit (RSU). SEI acknowledged that 'it was the fact that *they* thought it was important that the project happened'. The fact that the work was commissioned by the EA has led to a difference in its presentation, its utility and – it can be argued – the reception of the resultant report(s). The EA have suggested that had they not commissioned the report, and if SEI had produced a similar report as an 'academic' report, it might just have been 'vaguely referred to' – and only if they knew and trusted the source which produced it.

The EA initially wanted a 'rapid review' report so that they could use as evidence at a review in public of the YHA's RSS: in other words, to implement a *problem solving* use of knowledge. It should be said from the outset that the EA only commissioned this study because they felt that SEI was (at that time) in a unique position to deliver the evidence required. Thus, it could be fairly argued that the policy initiative came from the EA, while the academic initiative came from SEI. This contention is supported by comments from users that SEI can be 'a bit researchey'. One resulting problem is that 'often SEI delivers more than asked for' which actually leads to delays. Nonetheless, SEI and the EA developed a successful working relationship, building on a longstanding informal agreement at the local and regional level that they share common interests and goals. The EA recognized that the research institute needed 'a certain amount of chivvying' to deliver according to timing required by the policy cycle, but they also recognise that there was no in-house capacity to produce anything approaching this standard of report.

The Leeds housing study became part of a larger study carried out in tandem with the consultants Arup (YHA 2007) where an environmental impact study was carried out in the Yorkshire and Humber region on all policies. The original initiative has also recently led to the more recent Tees Valley report also with the EA (Paul 2007). This can be seen in the context – from SEI's point of view – of a whole series of studies resulting in reports, the initiative for which came from having built up a relationship with the EA which is both political and enlightenment.

Policy context

The fulcrum of the policy impact of this specific piece of work could be located with the EA; in particular with the Principal Officers of the EA's RSU. The RSU is a generic strategy planning team operating at the regional level and dealing with climate change and sustainability in so far as the EA has a remit, albeit the institutional resources which the EA devotes towards things like climate change and sustainable development have a particular focus which does not generally include housing.

However, the EA is a national organisation which is trying to drive national policy. The EA is itself split into regions, each of which has a RSU dealing with the regional partners such as the regional [economic] development agencies (RDAs), regional assemblies, and regional government offices and so on. The EA regions are subdivided into areas (e.g. Yorkshire) and those areas are the operational units. Each area also has an influential external relations team that is doing the influencing at that local level. At the local authority level, influencing and engagement also works through the local strategic partnerships (LSPs) and the local area agreements (LAAs). Thus, there is a lot of institutional focus on LAAs, particularly those that relate to climate change adaptation and to a lesser extend those that address climate change mitigation.

In our case discussed here, after the initial rapid review commissioned by the EA (Frey *et al.* 2006), the regional assembly decided to carry out a review of all the main strategies and their contribution to climate change (YHA 2007). The consultants Arup carried out that review with Cambridge Econometrics and SEI performing the technical analysis. The EA perceived that report as 'an important document' because it gave the consumption-side view of emissions. The EA also put a funding contribution towards that report. The idea was that there would also be a case study of Leeds city region, taking the rapid review of housing 'a bit further'. Arup were supposed to have been responsible for publishing the report from that study, but it was only afterwards 'when it was really too late' to have a policy impact on the RSS that the full report came out. Even then, it came without the Leeds housing case study. Thus, the EA re-commissioned that case study to be published (Barrett & Dawkins 2008).

However, the real target audience for this latest report is the local authority level rather than the regional level. The report clearly related to the housing policy area, which is delivered at the local level of governance by local authorities. Thus, the subsequent utility of the analysis – after it had been used instrumentally at the RSS review in public – was and still is largely to local authorities. The evidence for their need was also supported by the fact that Leeds City Council (LCC) was also represented on the project steering group at the highest level (by their Head of Sustainable Development). The Sustainable Development Unit at LCC, covers a multitude of activities including managing of services such as the council's work on climate change and environmental management; parts of planning such as advice on design, landscape, conservation, contaminated land, minerals and waste planning; and 'championing sustainability thinking across the organisation' (the latter being a 'less well defined' role).

Leeds was invited to join the steering group by the EA after early workshops were attended by several local authorities. The EA had an agenda and Leeds was 'surprised and encouraged' that the EA was taking a stance on housing. However, this was unexpected as the EA does not have a statutory remit on housing. Leeds was encouraged that the EA took this on from the perspective of being the national (and regional) regulator and a source of environmental evidence and data. However, there is a perception that the EA RSU was 'slipping this under the radar as this is not the sort of report which the EA

would normally commission: all policy actors involved in this study agreed that 'there are a lot of us working on sustainability that are constantly ducking RADAR…'

However, the LCC's sustainable development unit was interested in the REAP study as it perceived it as another piece of research that could be 'marshalled to make a case to support [their] argument.' It supported particularly the need for robust policies on sustainable design and construction and, more widely, to inculcate sustainability thinking across the organization.

Policy Impact

SEI felt that the report was focused, there was a need for it, it was timely, and the level of analysis was about right (i.e. 'we didn't spend three years working out the figures to get a ridiculous level of accuracy but we got a level of accuracy that we were confident enough to know the rough "policy wedges"'). The leader of the SEI footprinting group said that he 'personally enjoyed it because I had a steering group who wanted it to happen – it wasn't forced upon anyone this. I felt very comfortable being very honest with them and engaging them saying I really don't know what we're going to do in this bit, let's sit down and discuss it…' Further, SEI claims there was a waiting audience for the report(s) it and the fact that end users participated in the process helped in its dissemination. So does all of this add up to successful policy impact?

The initial 'purpose' of the rapid review report was to be evidence in the 2006 examination in public of the Yorkshire & Humber RSS. This was something that the EA RSU had put a lot of effort into trying to influence, as they were felt that there should be standards with respect to renewable energy for housing, particularly for new build housing. There had been 'limited success' influencing previous such examinations of regional strategies. However, prior to when the Yorkshire & Humber RSS was examined, an officer from the RSU spoke to a regional policy colleague from WWF who had been active in funding the development of REAP. They had a conversation about how they could get some evidence together prior to the public examination to 'put some figures around housing growth and emissions'.

At this stage, it was still thought possible to tackle both housing and transport as the key issues. With the ambitious economic growth agenda for the Yorkshire & Humber region (as part of a central government plan for the North of England to 'catch up' with the South), it became apparent that more infrastructure development such as housing and roads would be built. Thus, the EA officer and the WWF officer discussed options to 'get some evidence together to try and influence' the examination in public. It was at this stage that both organisations started talking to SEI about whether or not REAP would be a suitable tool to provide that evidence. The EA knew about REAP because a principal officer had attended a presentation in advance of REAP being initially launched.

The choice to focus on housing was made and the EA commissioned SEI to carry out the rapid review. This happened 'very quickly, a month to six weeks and was very

useful and well received at that time, particularly for the examination in public – to give a few figures.'

The EA cited that 'the thing that's in REAP is numbers'. There was a perception that because 'lot of strategy comes down to accountancy,' numbers are needed to make a successful argument. 'The housing sector and the economic sector always seemed to have all these numbers that they could just throw at these sorts of examinations'. It seemed that 'if you've got numbers then they're just accepted as being good evidence'. The use of the REAP model 'set down a marker that there was information that allowed us to provide information about the carbon impact of growth'. Although the Arup/SEI study on all sectors of the RSS (YHA 2007) was considered 'seminal' by the EA because it showed the bigger picture for the first time: it 'got buried because it came up with the answers that people didn't want to see'. Nonetheless, REAP provided a way to 'do the maths' around accounting for the indirect emissions to end users and it gave 'a more sensible answer'.

The idea of accounting for indirect emissions goes back to a UK Office of National Statistics (ONS) which the EA dated to 'about 2004/5'. It was recognized that if the indirect emissions from all goods and services are accounted for, then 'we are going in completely the wrong direction' and this would need to influence high-level strategic decisions. As REAP produced numbers which 'looked like the numbers that come out of econometric models… this provided so much weight to the economic arguments,' and influenced policy makers. However, 'SEI was looking at the bigger picture and not just direct emissions'. Although the direct emissions are a relatively minor part of the carbon footprint of anything we do, it can be said that SEI was answering a policy question that wasn't being asked at that time.

Policy moves on national and international scales, as well as regional. The influence of the ecological footprint approach quickly became popular and SEI is acknowledged to have 'made inroads' to the way Yorkshire Forward (the RDA) accounts for the environment. Ecological footprint is now a headline indicator in the Region alongside GVA [gross value added: a measure in the estimation of GDP] and a quality of life index. This is largely down to the EA and the work carried out by SEI which supported it. Jointly, SEI and the EA have pushed to have the ecological footprint concept to be included in monitoring reports. The UK North East region also uses the ecological footprint, although not as a headline indicator: thus we can see more significant knowledge institutionalization in these latter stages even after the relatively poor initial instrumental impact of the analysis.

For the rapid review analysis (Frey *et al.* 2006) and the Arup report (YHA 2007), the main target audience for the EA and SEI included 'the economic and spatial planners within the regional assembly and the RDA' and, indirectly, 'national government policy'. It is those people – 'the Director of Strategy at Yorkshire Forward (the RDA) and their equivalent in the North East' – who are the significant actors. Further, the message (of indirect emissions that goes hand-in-hand with the ecological footprint

concept) is 'a big shock to the system' as even consideration of the environment is a relatively new process to some policy advisors and policymakers. The extent to which 'the environment' is championed by individual actors within organisations (e.g. Alice Owen when she was at YF: Ms Owen is now a UK Sustainable Development Commissioner) was noted.

However, while the strategic level for housing policy may be regional, the operational delivery of housing strategy is at the local authority level. Thus, the EA took the SEI report (Barrett & Dawkins 2008), summarized it and disseminated it to local authorities in the region (EA 2008). The EA felt that this summary 'definitely was needed compared to the main report'. For reasons outside the scope of this case study (to do with whether the EA corporate steer should concentrate on adaptation to climate change rather than mitigation), there have been some delays with the publishing of this latter summary report. Interestingly, when the EA first conceived of their summary, it was to be corporately branded as an EA publication –acknowledging SEI – whereas now they would prefer it branded as an SEI report. There is an interesting sideline commentary here on the branding of reports and policy briefs, the independence of the SEI name can be a useful adjunct to the policy clout of a big institutional or agency name, sometimes one of the other may be considered 'better' for political reasons. Nonetheless, these EA summary reports have been popular with local authority officers and when one EA officer took some to a meeting recently they were 'snapped up'.

Local authorities are, thus, still in the process of using the SEI analysis and its spin-off reports (YHA 2007, Barrett & Dawkins 2008) and summaries (EA 2008). In Leeds 'it [Barrett & Dawkins 2008] is being cited as part of the evidence base' that they are using to move planning policies towards insisting on tougher standards for new-build housing. Thus, in addition to having a political effect strategically, it is having an instrumental effect practically, albeit indirectly from the original purpose of the initial analysis (Frey *et al.* 2006) at the RSS examination.

For local authorities, policies need to be grounded in very thorough research and clear evidence: policy advice has to be empirical. Thus, the SEI 2008 report and previous analysis provides the empirics to support the EA summary. What the SEI study clearly shows is the scale of the problem for local authorities. The SEI report (and the EA summary) argues that a package of retrofit to existing properties and new building to higher standards go hand in hand with other policy measures such as behavioural change and a range of other engineering solutions such as district heating.

Importantly, the SEI analysis helps to 'show that Leeds needs to move towards higher standards faster than maybe the national timetable would suggest' but 'it is still going to be a battle to get that policy properly bedded in, particularly in the current housing market. Nevertheless, Leeds can point to the SEI research and say this is why we are insisting on this'. Leeds is also using the SEI 2008 report as 'an evidence base' in preparing their climate change strategy 'which will talk about more than just the planning response'.

The report was intended to reach decision makers: everyone recognized that that is 'where it had got to hit': so that is why the summary was prepared, designed to reach the leaders, chief executives, and senior persons and bring the scale of the issue to their attention. The body of the report remains the evidence base which 'policy people can use in day to day work'.

Evaluating the Conditions of Policy Impact

One reason for the pattern described above lies in the close working relationship between all those involved in the study. All the institutional actors shared a common interest in seeing the analysis have an impact. Thus, the initial report (Frey *et al.* 2006) when it had been used was superseded by the regional study (YHA 2007) and the more detailed 2008 SEI report and then the EA summary. The fact that multiple users were targeted allowed the various report and publications to impact at different levels. SEI saw some of its most significant end user as being the local authorities which comprise the Leeds city region area, particularly 'people in a position who have a responsibility for housing policy' and 'those who were acting as champions for sustainability within their organisations who needed evidence for members' so the bi-level report and summary with best-practice examples were appropriate for that whereas the EA could and did also use the analysis at more strategic (at regional and national) levels as well and so needed the reports but also needed the fact that the analysis had been carried out independently and the fact that the data existed publicly and could be cited.

The close working relationship was engendered by a small steering group composed of individual officers and researchers who saw eye-to-eye. According to SEI, the group members were 'able to input data, ideas, give excellent ideas about the level of detail which was required and the context for the report'. An example of this relates to the issue of demolition: SEI had noted 'early on' that demolition and rebuild would be 'an important factor' and the steering group framed this in a way so as to avoid negative media messages. Getting this balance of the message right was 'through having the right people on the steering group.'

Timing was also a major factor. The fact that carbon is 'out there' as an issue in the policy arena by 2008 meant that there was an audience for the SEI report. This is also the reason for the ongoing impact of the work. The Boardman report (ECI 2007) had already said that it was theoretically feasible to reduce emissions by 80 per cent by 2050 in the housing sector. However, it did this 'without any kind of numbers' to back it up. The steering group decided to 'go with that 80 per cent target which turned out to be the right thing to do.' Also from Boardman (ECI 2007), SEI had picked up on the 'total emissions' idea; the idea that in addition to the target itself, it matters how you get to your target. Further, the UK may soon have regional CO_2 targets. The EA claims that 'if the climate change bill goes through, if we get carbon budgets, devolved down to a regional level, we will start to see that this work has paid huge dividends'. Furthermore, the focus on a city region may also be indicative of future trends: SEI felt that the 2008 report 'was representative of where things are going in the future rather

than framing it by institutions and structures which we have now.' This is an important factor in its continuing impact.

The SEI analysis and resultant output was also good, extended peer-reviewed science. In addition to the EA, local authorities were invited to workshops to policy-peer review the study. SEI also invited external experts, such as Nick Eyre at the ECI, to review the study. Furthermore, SEI internally reviewed its figures. SEI's lead researcher noted that this approach is 'very helpful as if I had done it completely in isolation it wouldn't have been good'. Obviously the steering group also provided input to the review process.

The next stage was to ensure that the final (2008) report made a maximum impact. At first it was unclear as how to get the report to those who needed to hear the message in local authorities and city-region management. A decision was made to seek the expertise of the EA Corporate Affairs (external relations dept) in disseminating this 'important bit of [EA funded] work' which ties in with EA priorities of climate change, resource management, and sustainable communities. EA Corporate Affairs acknowledged that it was 'great, easy to understand, relevant to the hot issues outside the EA', thus the summary report was produced by the EA and is framed as the EA providing (i.e. commissioning) sound science to back up policy with evidence.

However, in a fast moving policy landscape, it can come down to individuals taking a view on whether they feel that work that is in some ways a bit 'under the radar or on the periphery of an institution's core remit' should go ahead and whether managers can 'take a punt on this sort of thing and think yes, we should be pushing the boundaries'. However, it gives the managerial and officer-level 'boundary pushers' or champions more confidence if they know that there's a full scientific report behind their actions. For example, if people ask about the science behind it, they know that they can refer to the main SEI report (2008). 'You know that you can depend on John and the SEI reputation' that it is 'sound science' was one user comment. Further, the EA said that 'we don't have to know everything that's gone into it to be confident to say that the science behind it is sound'.

From the EA's point of view, the great strength of partnerships with organisations like SEI is to be able to tailor the research work, such as the development of tools like REAP, toward policy priorities. That is the remit of the RSU. The EA can thus help SEI understand what is happening with regard to what can be a very fluid policy landscape and to try and anticipate where things are going in the future. Conversely the EA can use SEI's work to develop a model like REAP to influence policy. For example, within the EA Region, the Tees Valley work (Paul 2007 – carried out subsequent to the Leeds work discussed here) has been 'very useful in getting the region to accept ecological footprint as something useful' in developing an interpreted model of knowledge uptake. This was due to a manager and senior manager picking up on the 'value' of the ecological footprint approach. It is also interesting that the Tees Valley work and the linkage between the EA and SEI can trace its origins back to the same root link where

a then Area Manager 'knew about SEI and trusted and felt confident that this was work the EA could use'.

Benefits of using REAP to produce policy-specific and policy-targeted reports include that it gives a real policy message. The fact that the message is seen to be in line with that coming from senior economists (Stern, Turner, *et al.*)[5] also 'makes a huge difference because they're seen as business economists and they've giving clear messages that it's going to be more expensive if you leave it. This makes it easier to build on it.'

Having an end user (Leeds City Council) on the steering group also helped in terms of having useful discussions and comments on drafts. For the end user, it was important to show not only the output but also the 'methodology behind the model of understanding total carbon emissions' and making this clear to readers so that they could understand the urgency and why emissions reductions cannot be left to 2020 or 2050 and done in the last year. They were keen to get across that it must be a cumulative issue. In their opinion the 2008 report 'succeeded extremely well in getting these sorts of issues across – which is not an easy task'. Further, they felt that 'the two section report with a clear bulleted summary [a format that had been used in the 2006 report as well], also backed up with precise, detailed quantitative evidence is useful and both sections are needed.'

A problem is that the message is inherently unpopular politically. Action costs money. Thus the message needs to be reiterated. Repackaging and republishing the analysis helps to keep the message alive: so too does the fact that the report is independent (SEI) and also 'official' (EA).

Conclusions and Lessons Learned

There is a strong message of building trust between supply side and demand side actors as necessary for successful targeted output from this type of project and the steering group meetings have been described as having been 'highly co-operative and productive'.

From SEI, good practice is illustrated by involvement of the end-user in the process of developing the Report. One SEI interviewee noted that 'we have very few reports that are not [produced with the end users]' and this also allows a clearer policy message output. For most of the work the footprint group does, there has been a steering group with an active partnership that can help with dissemination and presentation as well as content. Having practitioners involved means that 'real policy messages' can be given. Having this sort of supply-side/demand-side partnership over the long run also allows SEI to produce time series data which allows trending and comparison which are very influential in having indirect instrumental impacts.

The EA note that 'the parallel with ecological footprint is that it's looking at the region's resource and carbon impact beyond national boundaries'. In the wider context of the

EA/SEI relationship this has been 'very very influential.' The power of the REAP tool is also echoed by the local authority: 'the REAP tool is immensely powerful and Leeds has used it on other pieces of work within the council. As a research and modelling tool it is very helpful.' One important caveat is that however powerful the tool, or however well written the report, 'you still end up with the tough policy choice' although using good research in this way gives the policy actors 'greater certainty that the choice that you're recommending is the correct one' although it 'doesn't make then more palatable or easier to implement'. REAP, or any piece of analysis or report by itself will not 'provide the levels of leadership that we need at a higher level to really bring about change but it's all part of the story.' Finally, success comes down to individual actors sometimes: you've got someone in a certain position who can act as a catalyst, or not. Thus, building personal relationships between supply-side actors and demand side actors at all levels remains important and actors working in concert – as we also saw in the previous case, and as we shall see in subsequent cases – is an important factor.

Advancing waste policy in Estonia

Case study by Harri Moora and Heidi Tuhkanen.

Introduction

This case study provides a concise summary of the policy advice and main lessons learned from SEI's involvement in advancing Estonian waste policy. It examines SEI's influence on the process of developing the legal basis and economic instruments for waste management in Estonia between 2000 and 2008. It analyses SEI's multi-faceted role in the development and implementation of the legislation regarding packaging and packaging waste, the development of the National Waste Plan (2007), as well as the policy proposal for waste taxation (new landfill charges/taxes for the period of 2010-2015). The case study aims to assess the lessons learned from the analysis of the development process and SEI's contribution in order to identify effective methods of policy impact within the Estonian context. Thus, SEI's input can be characterized not only as providing substantive knowledge in the form of life cycle assessment (LCA – comparable to the use of REAP in the previous case study) but also what could be described as 'process knowledge' through the facilitation of the steering group, *communication* with public and roundtable discussions. In this way it also parallels what we saw in the US climate case.

As with the other cases, SEI's role in the process is assessed through internal and external stakeholder evaluation and backed up by document review. SEI's role in the development processes is evaluated through interviews with the key actors of the process. Four people were interviewed, including people from the Ministry of Environment (waste department and development department).

Policy Context

In order to examine SEI's influence on process of developing the legal basis and economic instruments for waste management in Estonia, one must understand how the legislative process works, as well as be familiar with the brief history of waste legislation in Estonia since the EU accession process.

The Estonian Ministry of Environment is one of the main institutions preparing environmentally related policy documents and applying the laws to harmonise and implement EU environmental directives. The administering and preparation for the adoption of the laws takes place in the Environment Committee of the Parliament. Prior to submission to the Parliament, it passes through a round of consultation with the state authorities and a public hearing.

Estonian waste policy is based on EU waste legislation. However, prior to Estonia's accession to the EU in 2004, a large number of new and amended legal acts had to be adopted in a short period. This included drafting legislation, defining and delegating responsibilities for meeting the new requirements, and implementation to meet the high recovery targets and shift from landfill to recovery. The harmonization with and implementation of EU waste policy has been on one of the most challenging and debated areas in environmental policy since it involves a wide range of different actors, including households, companies, municipalities, producers, as well as several Ministries. Also, the costs for implementing the EU waste directive and packaging directive in Estonia are high. For both of these reasons, the process was of considerable interest to the public.

Some of the challenges faced by the process include:

- A coherent legal basis and waste management strategy was missing (including management plans at different levels) and these had to be set up and implemented.

- Separate collection and sorting systems for many different waste streams needed to be established (specific challenges to the Packaging Directive and to the Landfill Directive).

- New adequate treatment and disposal facilities needed to be established, as most of the waste was previously sent to landfill.

- Financing and a financial instruments were needed to establish and upgrade to support a sustainable waste management system, which was costly.

- Effective enforcement and control was lacking.

- There was a lack of administrative capacity and cooperation at the regional and local level; the lack of finances, information, and technical expertise had to be overcome.

- Waste statistics and data availability was an issue.

Setting up and implementing a successful waste management strategy requires intensive and effective horizontal and vertical co-operation. It requires cooperation both between local authorities and between different levels of administration (local – regional – national – international). This is due to the fact that the legal competence and the physical responsibility for tasks of waste management within a country are delegated to the different levels of administration (national and local) and to other actors (industry and private companies). This, in turn, requires the development of strong financial, technical, and *communication* capacities within the state institutions (Ministry of Environment) and the local authorities that are responsible for implementation and enforcement. A robust financing strategy needs to be included into the planning process and is crucial to the implementation of the process. Another key factor for successful implementation and acceptance of the policy is public participation. The policy process, therefore, needs to be transparent and organized in a way that the public and stakeholders are supported by information, consultation, and educational activities.

Development of Legislation and economic instruments in Packaging Waste

Estonia became an EU member state in 2004. As mentioned, it had a very short period of time (2000-2004) in which to harmonise its waste legislation with that of the EU. Estonia was the only new member state among 10, which did not receive an extended transition period to meet the EU packaging recovery targets. This meant that the system had to be implemented prior to accession. Since the late 1990s, three main legislative acts had provided the framework for Estonian packaging and packaging waste: the Packaging Excise Duty Act, the Packaging Act, and the Waste Act.

Shortly before accession (2004), a new Packaging Act and new Waste Act were adopted, while the Packaging Excise Duty Act was amended. In order to meet the recovery and recycling targets set in the Directive, a new system for managing packaging waste had to be developed. This system organised the separate collection and/or sorting of used packaging and packaging wastes. Both the development and management of the infrastructure was a challenge in terms of organisational, technical, and financial aspects. For example, in order to implement the *Polluter Pays Principle* and *Producer Responsibility Principle*, which are central to EU waste legislation, financial mechanisms (e.g. subsidies, taxes, charges) had to be developed and employed at different levels and for the different users of the system, that is householders, industry, and retailers.

During the development process, SEI was the main local expert assisting the Ministry of Environment. The Ministry of Environment contracted SEI to carry out several

studies, along with a comparative assessment of EU packaging legislation and old EU member states' experiences in this field (Moora 2003). The surveys covered packaging and packaging waste amount and composition studies, and the environmental and economic assessments of planned regulatory and economic instruments.

Based on economic and environmental analysis, SEI proposed new packaging excise duty[6] levels. In addition, SEI prepared an economic and environmental evaluation of the possible introduction of the packaging deposit system. This work was carried out with the cooperation of Estonian, Norwegian and Swedish experts.

Based on its analyses, SEI was commissioned to participate in drafting the new packaging legislation and preparing necessary guidelines for the implementation. SEI also supported the Ministry of Environment in communicating the proposal to the decision makers, namely the members of Parliament's Environmental Committee as well as the Ministry of Economy and the Ministry of Finance, who would need to modify the tax legislation in place at that time. The Ministry of Environment then successfully defended this proposal in front of the Estonian parliament's Environmental Committee, which made the further adoption of the legislation in the parliament easy.

In a 2004 report on the implementation of the Packaging Directive, it was stated that the implementation of the new acts was surrounded by debate around the differing interests of the stakeholder groups. The stakeholder groups identified were *economic operators* (manufacturers, waste management operators, etc.), *competent authorities* at all levels, and *consumers and environmental organisations* (NGOs, etc) (Saarniit 2004). In the beginning of the process, in order to increase transparency and foster cooperation among stakeholders in the development process, a steering committee was created. SEI was asked by the Ministry of Environment to develop and facilitate this forum. Such stakeholder participation was crucial to legal preparation and implementation, not just due to different interests, but also to prepare local authorities for implementation. The lack of expert and infrastructural capacities at the local level such as local municipalities, if not addressed, could pose problems in the implementation phase.

Due to SEI's expertise and established relations with many of the stakeholders involved in the development phase, SEI was contracted by the Ministry of Environment to further assist during the implementation phase after the legislation was adopted. SEI supported awareness raising activities by facilitating seminars and publishing several manuals and guidance materials about the subject. The Estonian packaging deposit system, modelled after the Nordic systems, was soon recognised in Europe as a success story. Additionally, Estonia is the only new EU member state that has fulfilled the recovery targets for packaging waste.

SEI has assisted the Ministry of Environment to promote the packaging deposit system by providing economic and environmental information and increasing awareness among relevant stakeholders (mainly large waste producers such as the association of food processors, as well as the association of retailers). Further, in 2007 and 2008,

SEI was invited by the Estonian Ministry of Environment to share the best practice of the system functioning to the Ministries of Environment in the other Baltic States and Poland.

Development of National Waste Plan in Estonia

In 2007, SEI participated in the development process of the National Waste Plan, which was adopted in 2008. As a part of the strategic environmental assessment (SEA) of the waste plan, SEI carried out the life cycle assessment (LCA) study to evaluate the alternative municipal waste management options in terms of their environmental impact, environmental/external costs and economic costs. This was the first time that the LCA methodology was used in the Baltic States in national level waste management policy making to compare possible options.

Involvement in this process, however originated from previous SEI and Ministry of Environment cooperation in an EU INTERREG IIIB funded project 'Regional cooperation in waste management' (RECO). One of the aims of the RECO project was to develop and test a user-friendly LCA model that can be used by authorities within their waste management planning process. This model (WAMPS) enables authorities to identify the environmental and economic effects of current waste management systems and effects that may accrue from changes to those systems (e.g. redistributing the flow of identified waste material between the options of recycling, composting, energy recovery and landfill) by examining the main materials in the municipal waste streams. The advantage of WAMPS is that it calculates the total costs of various treatment methods, including externalities and environmental costs. Thus, it allows for various alternative scenarios for waste planning to be comprehensively compared. Though the WAMPS model was first tested on the City of Tallinn, SEI involved the Ministry of Environment to provide them with first-hand experience with the model. As a result of the Ministry of Environment's positive experience with the Tallinn case, the Ministry of Environment was interested in also using this actor based decision-making process to integrate the scientific analysis into the National Waste Plan development. Since the choice between different waste management options in the waste hierarchy must be based on life cycle based evidence, the results of the study also helped the Ministry of Environment to communicate and support its decisions to the European Commission.

Development of proposals for new tax/charge for waste disposal

Robust financing instruments are crucial for the establishment and maintenance of a sustainable waste management. In addition to packaging excise duty (tax) and deposit system development, SEI has recently also contributed to the development of system of charges for waste disposal. Estonia is still the only new EU member state that has implemented a charge for waste disposal (landfill tax). It did so in the 1990s. This introduction of an environmental dimension into taxation is considered in the next case study on environmental tax reform.

SEI was contracted to carry out two studies for the Ministry of Environment and to play a role in communicating the proposal to the public. The objectives of these

studies were to provide financial incentives for businesses to improve their resource efficiency and waste recovery, to provide a source of revenue for the State in terms of environmental investments, and to evaluate the potential environmental and economic impacts of proposed fees for waste disposal. The aim of the initial study was to review EU member states' environmental fee systems for waste disposal and evaluate possible amendments in the system (including the environmental and economic cost assessment of possible tax levels). The calculation of external costs of landfill of municipal waste was carried out together with British experts. This resulted in the proposal of new fees for 2010-2015. The Ministry of Environment ordered an additional survey to evaluate the impact of economic instruments to the recycling of oil shale residue and the evaluation of possibilities and practical implementation of the country-wide waste tax.

SEI also assisted the Ministry of Environment in communicating the results to the public. Stakeholders included waste producers, waste management companies, municipalities, the associations representing all three of these groups, NGOs, as well as individuals (including researchers). The results were presented to all relevant stakeholders at two roundtables, where SEI, together with the Ministry of Environment, facilitated and presented the results.

Policy Impact

In general, SEI's contribution to the process of developing the legal basis and economic instruments for waste management in Estonia is seen as significant. SEI's overall impact in this case can be described as *knowledge acquired*, knowledge *interpreted*, as well as knowledge institutionalised. The knowledge provided by SEI led to increased awareness and supported the decision making process at the national level, as well as the *communication* of the decisions to other stakeholders in both the policymaking and policy implementation stages. SEI's work supported mainly the demand side actors in the Ministry of Environment and increased the interaction and engagement between stakeholders during the development of packaging legislation, national waste plan and also landfill tax.

Evaluating the Conditions of Policy Impact

The Ministry of Environment was the main initiator for all the different studies carried out: Landfill Charges proposal, Packaging Legislation and National Waste Plan development. However, it was noted by Peeter Eek, the Head of the Waste Department, that all the government Ministries receive the results of the work. Also, in the landfill tax work, both the Ministry of Economy and Ministry of Financial Affairs were directly involved. The results of different studies conducted by SEI have been taken into account, mainly by the Ministry of Environment, and have been the basis for policy and decision making in the Ministry of Environment. Since the reports are publicly available, they have also been used by other stakeholders (companies, municipalities, universities, etc). SEI studies have also been used in planning of waste management infrastructure at local and regional level.

In terms of SEI involvement in the landfill tax proposal, Eva Kraav, a Senior Specialist at the Development Department of the Ministry of the Environment, felt that SEI's work was valuable and relevant. The results and proposals of the studies were clear, science-based and easy to communicate to different stakeholders. The studies struck a good balance, in that they were not too detailed or complex, but were at the relevant level and offered concrete policy proposals. They were used by the Ministry of the Environment as a basis for developing the new charge levels and also for the public *communication*. Most of the proposals made by SEI are now integrated into the new proposal for amendments of environmental charges law. The Ministry also felt that SEI provides them with an external and holistic view of the topic and supplements the Ministry's own expertise.

In each case, SEI was directly involved in the *communication* of the results to the public and stakeholders. The forum in which the study results were communicated performed their function well. In policy advice related to packaging and landfill tax study, SEI and the Ministry of Environment facilitated the *communication* in a roundtable format. To ensure that the proposals were understood, the results were separately communicated to the main stakeholders (e.g. main industry associations and companies), including high-level politicians.

In terms of conflicts, it was mentioned that there had been general conflict between the Ministry of Environment, the industry and local communities. However, there is still a low level of awareness, lack of a tradition of cooperation between companies and local municipalities, and lack of political will. These and the strong lobby of industry are identified as barriers to sustainability knowledge being more influential. Both interviewees at the Ministry also mentioned the lack of time as a barrier to making even more use of the study. The processes like EU accession and the national processes in the ministry come with very tight schedules. For example, the National Waste Plan and Landfill tax proposal took less than a year.

Conclusion and Lessons Learned

SEI has been actively and consistently involved in developing the legal basis and economic instruments for waste management in Estonia throughout the entire policy cycle. It has been involved in the data collection and analysis, drafting legislation and preparing recommendations, and *communication* and implementation. SEI is seen as one of the few (maybe even the only) institution in Estonia with the capacity to provide holistic or multidisciplinary (environmental, economic, social) assessment and policy support in the field of waste management and apply various assessment tools such as life cycle analysis and cost-benefit analysis. This has been done in close cooperation with international experts and involving local stakeholders.

SEI's work has provided a strong base for long-term cooperation with authorities. The involvement has consistently been at the request of the Ministry of Environment. In terms of waste related issues, SEI has conducted integrated scientific background and feasibility studies and further proposed recommendations based on the results of

the studies. These studies and recommendations are seen as meeting the needs of the Ministry of Environment and successfully bridging science and policy. Furthermore, SEI has had an additional role in communicating the results to the public and stakeholders, which has further ensured successful implementation of science based policy decisions. For *communication*, SEI has produced awareness raising materials and manuals that support policy implementation.

Lessons learned include:

- SEI is one of the few domestic organisations able to provide a balanced and scientifically based analysis with recommendations that are appropriate for the Estonian context. Its analysis meets the demand of policy makers in terms of being clear, at the relevant level and offering concrete policy proposals. As it is science-based, but multi-disciplinary, it allows for policy makers to defend their decisions to various groups of stakeholders.

- Stakeholder participation has decreased the conflicts during the legislative and implementation process. In terms of the Estonian waste management, SEI is familiar with all the stakeholders and their positions, is seen as an appropriate 'middleman' and can act as a partner to the Ministry of Environment. This case represents the first time that such stakeholder participation was used in the waste area.

- SEI's network is multilevel. SEI's contacts locally and internationally have enabled it to respond to research needs and build its own capacities.

- Involvement of the decision makers in a waste management planning process: using actor-based assessment tools increases awareness and understanding of decision makers. Personal involvement of the Ministry of Environment in a local level study led to the Ministry initiating studies using the same tools at the national level.

- Sharing the initiative: although the Ministry of Environment is usually the initiator of studies, policy advice, and so on, inviting the Ministry to participate or follow and learn about research results can lead to future follow up projects. In this way, SEI also initiates contacts with the Ministry and fosters further policy-relevant studies.

Introduction of environmental tax reform in Estonia

Case study by Kaja Peterson

Introduction

The process of introduction of environmental tax reform (ETR) into the Estonian economy and fiscal policy could be divided into three phases, initiation, adoption and implementation (and review). Compared to the other European countries, especially those closest to Estonia – the neighbouring countries of Finland, Sweden and Denmark who have the longest tradition of applying environmental fees and taxes – Estonia 'joined the club' very late. The official launch of the ETR was only in 2003.

However, the spectrum of types of environmental taxes is rather wide with many different economic instruments and environmentally related taxes, fees and charges applied in different countries. The process of determining a course for Estonia is in focus here: in this case the main 'sustainability knowledge' provided was the role of SEI in the policy formulation and in engaging stakeholders and the general public. This can be seen as an extension of the process knowledge part of the previous case study.

However, SEI was also involved in providing substantive knowledge at various stages in the process, some of which has been dealt with in the previous case study but further economic analysis and analyses of good practice was also provided here. Over the past decade, most OECD countries have integrated environmentally related taxes into environmental policy, for several reasons. They are relatively easy to administer and may help tackle environmental issues such global warming because they can provide incentives for both technological innovation and further reductions in polluting emissions. They also provide revenue. Most countries, including Estonia, need to introduce more flexibility and efficiency in their economic structures. This implies, among other things, adjusting tax systems in order to reduce distortions, increase market flexibility, and making environmental policies more effective. Most EU and OECD countries have undertaken significant tax reforms since the end of the 1980s, chiefly in two ways: first by reducing tax rates in the higher income tax brackets and lowering corporate tax rates; secondly, by broadening the tax base, especially for indirect taxes (VAT and consumption taxes). This revision of tax systems has provided a good opportunity to introduce an environmental dimension into taxation, a policy, which is now referred to as 'green tax reform' or, as here, 'environmental tax reform'.

Policy Context

ETR usually consists of three complementary policies: eliminating market distortions, restructuring existing taxes, and introducing new environmental taxes. Increase of environmental taxes is usually complemented with reduction of the income taxes and, or, social taxes directly or through compensation mechanisms where collected environmental taxes are redistributed to socially vulnerable societal groups or industry sectors whose market positions are vulnerable. Several fiscal measures currently used,

such as direct or indirect subsidies to resource intensive industries, are causing market distortion and negative environmental impact. For example, many governments support farmers by propping up domestic prices, behind tariff barriers and through export subsidies, but also through public expenditure going directly to farmers. Reductions in these forms of support have been accompanied by increases in payments based on area or animal numbers or on historical entitlements that have limited the impact on farm receipts, with some payments having compliance conditions. However, payments that are weakly dependant on environmental compliance – such direct subsidies that are paid to farmers and other agricultural producers – can also exacerbate environmental degradation.

In addition, applying such subsidies may also prevent restructuring of resource intensive industries and may encourage application of outdated inefficient technologies that lead to waste of energy and resources. Reduced fees on the use of natural resources, like lower tariffs on the water used in irrigation or groundwater removed during mining activities, have similar negative impact on the environment. Progress has been made in moving away from the most production- and trade-distorting policy measures, although these still continue to dominate producer support in most OECD countries (OECD 2008). Subsidies are also introduced mostly due to social reasons. In Estonia such reduced fees have been introduced to water use and waste land-filling for oil-shale based energy sector, with the result that energy production is contributing lion's share to waste generation, water use and air emissions. However, while some businesses may become less competitive with a burden of green taxes, others, more benign businesses could be made more competitive. Ecological accountability can eventually be made profitable, so that industry is less taxing on the environment. That process started (publicly) in Estonia in 2003.

Phase I. 2003-2005: initiation of ETR

ETR was first mentioned in official documents in 2003. The coalition agreement between the *Res Publica*-Party, the Reform Party and the People's Party signed on 10 April 2003 included an objective under the chapter of environmental policy and strategies for 2003-2007 to '…prepare the concept of ecological tax reform for public debate. The concept shall foresee the reorientation of taxation from income taxation to the taxation of the use of natural resources and pollution of the environment'[7]. Today, the civil servants of the Ministry of the Environment and Ministry of Financial Affairs recall the origin of these lines in the Coalition Agreement as being Villu Reiljan, the Chairman of the People's Party at that time and the environment minister-to-be. Some interviewees associated the introduction of the ETR into the agreement with Olavi Tammemäe, the former director of SEI Tallinn Centre and the then to-be-Deputy Minister of the Environment from 1 January 2004. However, it should be noted that Estonia joined the European Union on 1 May 2004 and the need for economic incentives in environmental protection comparable to those applied in other EU member states became more urgent.

Phase II. 2005-2006: ETR concept adopted

The Coalition Government was dissolved by 13 April 2005 and a new Government was formed. The new coalition agreement was signed between the Reform Party, the Central Party and the People's Party and it comprised a chapter on taxes, where the ETR was mentioned among five other points that the Government was committed to target in the following years. It reads in the agreement that 'The Coalition Government approves of the taxation that considers the environmental effects. The Coalition Government shall prepare the concept of ecological tax reform, that foresees the partial reorientation from taxation of income to taxation of use of natural resources and pollution of the environment'[8]. Thus, while in 2003 the Government gave a strong statement on the need of reorientation of taxation from income taxation to environmental taxation, in 2005 such a statement became weaker, by saying that only 'partial' reorientation is sought.

Phase III. 2007 fwd: Implementation and review of ETR

After the parliamentary elections in March 2007, the People's Party, the initiator of ETR, lost their seats in the new Riigikogu[9]. A new Government was formed on 5 April 2007. The coalition of the Reform Party, Union of Pro Patria and Res Publica-Party, and Estonian Social Democratic Party declared in their common programme (Estonian Government 2007a) that the Government shall continue the implementation of the ecological tax reform, which enforces the polluter-pays principle and control system of the regulation on the reuse of waste. It was also stated that the Government shall increase the tariffs of emissions and resource, among others also on oil shale[10]. Since 2007, the sitting Government has adopted two Governmental (action) programmes: the initial programme was valid until 20 December 2007 (Estonian Government 2007a) and the amended Governmental Programme is valid since that date (Estonian Government 2007b). The initial programme requested the Minister of Finance 'to submit to the Government the concept of implementation of ETR by fourth quarter of 2007'. This objective is restated in the amended Governmental programme, but with a deadline of first quarter of 2008. The programme also foresees the development of a new environmental taxes concept for 2010-2020 by the third quarter of 2008 under the supervision of the Minister of the Environment.

Following by the revised Governmental programme adopted on 20 December 2007, both ministries responsible for ETR – Ministry of the Environment and Ministry of the Financial Affairs – were assigned to specific actions. The programme affirms that the Government has the will to continue the implementation of ETR and to enhance it. The Government also stated that it would take steps to increase the tariffs of emissions and use of natural resources, including oil shale. According to the programme, the Minister of the Environment became responsible for the revision of the Waste Law and the Law on Environmental Fees, and the development of the long-term concept of environmental fees for the period of 2010-2020 by the first quarter of 2009. The Minister of the Finances was assigned the task of analysing the effectiveness and impact of introducing resource bonds on environmental taxation system. The Chairman of the Estonian Green Party, Marek Strandberg, has already proposed some means to

introduce such stocks, referring to the similarities of the system to the EVP-system[11] exercised in early 1990s (Strandberg 2008). To date (end 2008), neither of the requested reports have been made available publicly yet.

The list of draft laws and regulations to be prepared by the Ministry of the Environment in the coming few years is rather long. Current laws on waste management, earth crust and ambient air are to be updated. In addition, several new policies and development plans are on the list, for example the Development Plan of the Natural Resources for Building, a new concept of environmental tariffs of natural resources, waste disposal and water consumption. The much debated Development Plan of Oil Shale Utilisation until 2015 was adopted by the Parliament in October 2008.

Policy Impact

SEI's Tallinn Centre was involved in the introduction of the environmental tax reform in Estonia from the very start of the process. SEI Tallinn's Director, Olavi Tammemäe, was asked by the Chairman of the People's Party, Villu Reiljan, to give advice for the drafting of the coalition agreement of the government-to-be in 2003. According to interviewees, the concept of ETR was not discussed within the Ministry of Environment, among other ministries nor at the governmental level. Thus, the term 'ETR' appeared rather accidentally in the public arena without any prior public debate or clearly formulated governmental policy document. The adopted Coalition Agreement, a *de facto* Governmental Commitment for the next four years, was a strong document to launch the ETR concept to the country.

In June 2004 the Minister of the Environment again asked advice from the then director of SEI Tallinn Centre, Valdur Lahtvee, on the best *communication* strategy of the concept and principles of ETR to the stakeholders and wider public. A common press conference was convened in the same month.

Evaluating the Conditions of Policy Impact

SEI took its own initiative to collect and provide overview of the application of ETR in Europe, especially in the EU. In a relatively short time, a team of SEI experts drafted a review of the applied environmental taxes, fees and charges in EU member states. (Lahtvee *et al*. 2005). This report, published in a series of SEI publications in June 2005, was the first comprehensive overview of the concept and implementation of ETR in the Estonian language. SEI also initiated discussions on ETR at the expert level. Seminars on the effective measures for implementation of ETR at national level were organized, the network of international experts was utilized, and acknowledged expert speakers were invited to attend and share their views and experience. SEI, and its director, Valdur Lahtvee, thus became a reference point of expertise on ETR for rapid comments for media.

In the second phase of the ETR process, an inter-ministerial working group was established, comprising experts from three key ministries – Ministry of the Finance, Ministry of the Environment and Ministry of the Economy and Communication. SEI

drafted the outline of the ETR concept paper that was used as the first input to the discussions in the working group. Valdur Lahtvee, being a member of the group, had the opportunity to frame the discussions and eventually the official document itself. He continued to be a source person for the media. He was contacted to get short or more in-depth comment on the meaning and impact of ETR on Estonian economy, environment and people's wellbeing.

The Minister of the Economy and Communication commissioned an independent study to test the effects of ETR on national economy. The study concluded that ETR would have only minor effects. After this last barrier was removed, the ETR was adopted by the Government in July 2005. SEI backed the governmental decision with newspaper articles explaining the ETR and its effects on ordinary citizens.

The third phase of the ETR process could be marked as a revision of ETR aiming to review and update the economic instruments and improve their impact. The current government, which started in April 2007, reaffirmed the Governmental Action Programme for the period of 2007-2011 to continue and upgrade the ETR (Estonian Government 2007a and 2007b). The programme(s) foresee(s), among other activities, to increase the resource fees and explore the possibility of introducing other economic instruments, such as the resource stocks. In order to justify changes to an environmental tax system, background studies were launched by the Ministry of the Environment. SEI was commissioned to analyse the current status and effectiveness of resources fees and waste fees. The current Director of SEI Tallinn Centre, Tea Nõmmann, leads the team of experts to collect and analyse the data on the resource fees collected from companies and the share of such fees. SEI's Harri Moora and his team analysed the status of waste fees (see the previous case study in this report). Both studies, taken together, reveal among other things, the urgent need to upgrade the procedures of data collection on fees and taxes, as well as to increase effectiveness of management and cross utilisation of state databases. These improvements will much facilitate the execution of studies and analyses. For example, the current data on natural resource fees appeared to be patchy and responsibility is spread between different agencies and reporting structures, which may result in contradictory or even false conclusions. The Ministry of the Environment has made the review process of ETR open and transparent via establishing stakeholder forums and media coverage to explain the reasons for changes more widely and effectively.

Once the revised Act on Environmental Fees with new upgraded fees on emissions and natural resources is adopted, and the decision on the introduction of a car tax is finally taken – as proposed in the initial ETR document – the third phase of ETR could be deemed closed. A fourth phase might be characterised by the further development and expansion of the spectrum of economic instruments to safeguard the environment for the next generations. The typical policy cycle reflects a simple quality control loop: starting with problem identification, target setting, proceeding with implementation and monitoring and evaluation of implementation and as well as evaluation of the *relevance* of results to policy or strategy, and finally correction. However, in policy-

making this loop is re-iterated and the same process is anticipated about the ETR but acknowledging that the cycle may be non-sequential, thus the effect of environmental taxation needs to be monitored and evaluated and the policy adjusted accordingly.

Conclusions and Lessons Learned

The experience of SEI showed that having competence and being acknowledged by politicians and experts plays a key role in promoting a process. Further, the pieces of substantive advice provided by the directors of SEI Tallinn Centre, Olavi Tammemäe and Valdur Lahtvee, were planted on fertile ground due, in no small way, to their personal initiatives based on expertise. In this case, a comprehensive sequence of learning is in evidence; of *knowledge acquired* through analyses carried out by SEI, transferred into the political process and *interpreted* therein, and then *institutionalized* by the policy system. The case of Estonian ETR also shows the crucial role of external expertise and independent studies that provided credibility to the argumentation made by politicians. As shown in the study, much of the initial, background work and corresponding funding was sought by SEI's own initiative, thus the further work on environmental taxation should be based on a much firmer basis. However, this case is important as it shows how knowledge-supplying research institutions can take the lead but there is still a need for a governmental programme with clear objectives, actions, mandate and deadlines that is complemented by a long-term plan of applied studies and means of stakeholder engagement.

Providing knowledge for the Swedish Ozone Layer Protection Programme

Case study by Linn Persson and Åsa Persson

Introduction

This case study looks at the knowledge support provided by SEI to the Swedish Ministry of Foreign Affairs (MoFA) in relation to the implementation of the Montreal Protocol. First, a background to the Montreal Protocol, the Swedish bilateral programme under the Multilateral Fund and the SEI involvement in the process are given. Thereafter the policy context and the specific policy issues where SEI has been active in providing knowledge and support are described. Lastly, the conditions that formed the outcome of the policy support in this specific case are discussed.

The case is to a large extent based on semi-structured interviews. Five people were selected for interviews among the staff at SEI and at the MoFA that had been working with the board of the Multilateral Fund (The Executive Committee - the ExCom) in the period of 1999-2006. three were SEI staff or former SEI staff, and two staff or former staff of the MoFA.

The Montreal Protocol and its Multilateral Fund

The Montreal Protocol entered into force on January 1st 1989 with the aim to phase out ozone depleting substances (ODS). It was amended several times up to 1999, strengthening the phase-out requirements and adding new ODS to be controlled. The substances controlled by the protocol include among others; chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), methyl bromide, carbon tetrachloride and halons.

The Montreal Protocol set a time table with phase-out dates for each type of ODS. These are more stringent for developed countries than for the roughly 140 developing countries (Article 5 countries). Today most of the remaining CFC imports are used as refrigerants for the servicing of installed refrigeration and air-conditioning equipment[12]. It should be noted that although the Montreal Protocol is generally considered to have been successful, the developing countries have just recently reached the final stages of the phase-out of the primary ODS such as halons and CFCs. Initially, the developing countries consumed approximately 10 per cent of the amounts of ODS used in developed countries and their contribution to the problem was thus relatively small. In 1991, the Parties to the Montreal Protocol agreed to assist the Article 5 countries in meeting their commitments under the Protocol and set up a Multilateral Fund (MLF), based on annual contributions from the developed countries.

The MLF is governed by an Executive Committee (ExCom) with 14 members from both developed and developing countries. Sweden is part of the so called EFTA constituency including the EU countries and Switzerland, Norway and Iceland. Within the constituency, the countries rotate the membership of the ExCom, but the country holding the chair has the right to co-opt representatives from other countries of the constituency in its delegation. There was a close cooperation between Sweden and Switzerland, in particular during the 1990s when Switzerland, followed by Sweden, held the chair. SEI also assisted Austria and Finland when they were chair holders.

The assistance of the Fund is delivered primarily through four implementing agencies: United Nation Environment Programme (UNEP); United Nations Development Programme (UNDP); United Nations Industrial Development Organization (UNIDO); and the World Bank (WB), but also through bilateral agencies such as Sweden's Sida in case the donor country is using the option to have a bilateral programme.

The Swedish bilateral programme and the role of SEI

The Swedish government decided in 1997 to provide direct bilateral assistance to developing countries through the Swedish Ozone Layer Protection programme (OLP) using the bilateral window of the MLF. The OLP built on the experiences among authorities and enterprises during the Swedish phase-out process. Between 1997 and 1999 the Swedish International Development Co-operation Agency, Sida, coordinated the OLP. In 1999, the Stockholm Environment Institute (SEI) was contracted by Sida to take over the coordination. The approved projects in the programme were funded from the Swedish contribution to the MLF, within the 20 per cent bilateral window that

comprised around US$360,000 to 450,000 per year. The work of SEI was funded from the development cooperation budget outside the Swedish contribution to the MLF. The overall objective of the OLP was to 'support the process in developing countries in areas of critical importance for a sustainable and cost-efficient phase-out of ozone depleting substances'.

A key aim of the program was also to strengthen country capacity to manage the phase-out, as well as the wider implementation process of a multilateral environmental agreement (Sida 1997). During the period 1997-2006, the OLP encompassed 15 projects approved by the ExCom for funding from the Swedish bilateral window. These projects included preparation and implementation of terminal phase-out management plans and national phase-out plans as well as regional projects, workshops and a handbook on CFC phase-out strategies for the refrigeration servicing sector[13].

Starting in 1997, SEI was also contracted by the Swedish Ministry of Foreign Affairs (MoFA) to give policy advice to Sweden or the EFTA constituency in the ExCom. From 1999, the policy advice was instead included in the contract with Sida. The support consisted of SEI participation in the three annual meetings of the ExCom, including preparation, review of all pre-session documents, giving suggestions on a Swedish position as well as writing reports of the meetings. Prior to each meeting, the suggested positions were sent to the designated official with responsibility for the Montreal Protocol at the MoFA. The MoFA then shared it with other ministries and agencies, in particular the Ministry of Environment (one designated official), the Swedish EPA (two officials dealing with the MP) and Sida (one official, also responsible for the OLP). The MoFA also coordinated with the other countries of the Constituency.

As part of preparing for the ExCom, preparatory meetings were sometimes held, either only with the Swedish participants or with other members of the constituency. SEI would also participate at these meetings as well as in the ExCom negotiations. During the first years of the policy support, SEI was at times the only Swedish representative at the ExCom.

Policy context

The policy activities in relation to the Montreal Protocol can be divided into three policy levels; the international negotiations on the convention itself and the subsequent Meetings of the Parties, the ExCom meetings where decisions on funding the implementation of the Protocol in developing countries are made and, lastly, the national level for national policy formulation and implementation.

The OLP addressed the international level through the work in the ExCom, and the national level through the projects with national ODS phase-out activities. The focus of this case is on the first of these two levels, that is the ExCom and the resulting ExCom decisions. However, there are close links between the two policy levels and many of the insights gained in the projects under the bilateral programme formed the basis for the policy advice given for the Swedish position in the ExCom. Furthermore,

the experience from the national level phase-out in Sweden was also important for the formation of the Swedish ExCom positions.

Policy Impact

The ExCom deals with all matters concerning the implementation of the Montreal Protocol and has the responsibility of assisting developing countries in meeting their obligations. The ExCom decisions govern for instance which type of projects are eligible for funding and at what level of funding. The interviewees were asked to list the most important ExCom policy issues that they took part in negotiating or preparing. The issues mentioned are listed below and the SEI input for each issue briefly described. The interviewees all described the interaction between SEI and the MoFA as a dialogue, characterised by joint learning. Therefore it is not always clear whether a proposed position originated from SEI or from the Ministry. In the text below, the 'Swedish position' is referred to when this is less clear. In cases where the interviewees have pointed out that SEI was suggesting a certain position, this is referred to as a 'SEI position' (which does not imply that the MoFA disagreed). Note that when we discuss policy impact in this case, we refer both to the influence of SEI on the Swedish position and to the influence of the Swedish position on ExCom decisions.

The policy influence of Sweden – considering that the Swedish position was developed in dialogue between SEI and the MoFA – in the ExCom was limited at the outset and in the short term. Sweden was often alone or with a few other parties arguing for its position and met strong opposition from other ExCom members. This meant that opposing views to those advocated by Sweden were often reflected in the ExCom decisions. However, as described below, with time, many of the Swedish positions gained more support and were increasingly reflected in the direction of the ExCom policies.

Adopting a programmatic approach

SEI was very active in discussing the project approach originally taken in the MLF, that is funding of individual projects on a case-by-case basis. The position of Sweden has been to promote coordinated national phase-out plans instead of support to individual projects. The rationale of this position was that it is only by incorporating the funded activities in a more coordinated policy at the national level that the phase-out will be cost-effective and involve as few disruptions to societal functions as possible. This demands national ownership with involvement of several different authorities in the country. The Swedish phase-out experience showed that a success factor for the phase-out was the national coordination with different authorities and the trade organisations, and this in turn is only possible if there is an overall plan to come together around.

The first visible policy impact of this position was the creation of the so-called Refrigeration Management Plans. These are coordinated overall plans for the complete phase-out of all use of controlled substances in the refrigeration and air-conditioning sector. At first only very limited funds were made available for these management plans. Sweden strongly argued for increased funding, as it was a requirement for the

management plans to succeed. This was later accomplished (ExCom decision 31/48 from July 2000). Later, the coordination of projects increased with the creation of National CFC Phase-out Plans and Terminal CFCs Phase-out Plans, a development that Sweden had actively advocated for. The policy impact in relation to this issue was thus instrumental and considerable. The new programmatic working format can be seen as the effect of institutionalised knowledge.

Promoting strong country ownership

Several of the interviewees pointed out country ownership of the implementation process as one of the most important policy issues they were involved in. Sweden argued for increased support for countries to enable them to be in charge of their own phase-out activities and that it is instrumental to place responsibility for the MP commitments with the relevant authorities in each country. The rationale behind promoting country ownership was that implementation would be more effective since incentives as well as overall responsibility for the implementation of the Montreal Protocol lie with national authorities. This would also gradually build up the capacity for implementing other multilateral environmental agreements.

The advocacy of country ownership by Sweden had a bearing on the 'Institutional Strengthening' projects, which provide for countries to employ a National Ozone Unit at the ministry concerned, covering salaries and basic office support for staff to work with the national implementation of the Montreal Protocol. Initially these units were small with few staff, high staff turn-over, and low status in the ministry hierarchy. Sweden was actively involved in strengthening the position of these National Ozone Units and contributed to a long series of decisions to that end. One MoFA official said that Sweden played a very important role in constantly defending the National Ozone Units in ExCom.

Another component of the efforts to strengthen the country ownership was the initiative to start networks between National Ozone Units (NOU). Sweden had pioneered the creation of such a network in Asia in 1993, funded by Sida and implemented by UNEP. As a staff member of UNEP, the champion of the network idea also initiated the creation of two networks in South and Central America, funded by ExCom. She later became SEI staff and programme manager for the OLP.

The benefit of creating networks was that it offered the National Ozone Units an additional tool in their work. The staff working at the NOU did often not have many colleagues to discuss the work with at the national level but by sharing working methods and information with their colleagues on a regional basis the effectiveness of the implementation could be improved. The networks were seen with great scepticism by leading ExCom members. Based on the positive experience of the Asian network (still funded by Sida), Sweden managed to convince ExCom of the benefits of the networking idea. The networks of ozone officers are now widely considered one of the success factors of the Montreal Protocol[14] and six more such networks have been initiated in other regions, funded by the MLF.

Recognising that illegal trade with ODS was a fast growing problem and based on the positive experience of the Asian network, Sweden managed to reach agreement in ExCom (only after long negotiations) on expanding the networking idea to include also customs officers to meet and work for the improvement of the monitoring of trade of ODS. The success of this network has now also led to the establishment of a similar network for the Latin American region.

To conclude, the policy impact related to this issue was delayed but eventually substantial. The strengthening of the National Ozone Units and regional networks are examples of deep impact and institutionalised knowledge.

Extending funding eligibility to the servicing sector

When the MLF was set up in 1991, there was a strong focus on giving priority to investment projects, such as providing new equipment for industries and converting industrial processes from CFC use to alternative substances. The leading position within ExCom was to postpone the phase-out of all other uses of ODS, such as the usage in the refrigeration and air-conditioning sector. SEI argued that this sector was, in fact, crucial to successful phase-out since this sector would be the most time-consuming. Therefore, it was fundamental not to delay addressing this problem.

Eventually, funding for the refrigeration and air-conditioning sector was made available from the MLF. The first non-investment projects to phase out the use of CFCs in the refrigeration servicing sector included training of service technicians on the recovery and recycling of CFC. Later these types of projects were coordinated under the Refrigeration Management Plans (see above), but originally only for small countries where the whole CFC consumption was used for servicing. Using a Swedish bilateral project in the Philippines as an example, SEI eventually managed to convince the ExCom majority not to postpone the challenging work ahead in the servicing sector of large countries. The policy impact was delayed, but eventually the ExCom started to provide funding also for the servicing sector in all countries.

Choice of CFC substitutes and the HCFCs

When CFCs started to be phased-out, there were different options for replacements chemicals. One option was to use HCFCs, also known as ‘soft freons’, which are also controlled substances under the Montreal Protocol, but with a lower impact than that of the CFCs. In the developed countries the CFCs were mostly replaced by other options than HCFCs. The initial investment for these other alternatives is usually higher, but on longer term, cheaper than the HCFC alternative. On the other hand, in the projects carried out under the MLF large volumes of HCFCs were phased-in when converting from CFCs. In other words, long-term sustainability was not ensured in these cases.

From the start, the Swiss/Swedish position was that existing ExCom rules actually forced developing countries to introduce HCFCs and that this should be avoided. One of the interviewed SEI staff gives this as the most important policy issue during her active time. Most of the interviewees brought it up as an important issue. Switzerland

had managed to drive through a decision stating that, when considering conversion to HCFCs, the cost of the subsequent conversion from HCFC to another alternative should also be included in the cost calculation. The implementation of this decision was watered down by the ExCom and turned into a note to countries and industries going for HCFC conversions that ExCom would not pay for the future conversion from HCFC (as indicated above, support to an HCFC investment was cheaper for the MLF than conversion to other alternatives). In the absence of support from the ExCom majority, Sweden and Switzerland argued for an in-depth analysis of the HCFC use to be carried out by ExCom. This evaluation was later carried out, but with much delay. At that point, the step to phase in HCFC at large scale was already taken.

In the Meetings of the Parties of the MP, the EU was arguing for a faster phase-out and a production ban for HCFC for a long time before this happened. However, in the ExCom the large EU countries were not so active on the HCFC issue according to one of the SEI staff. In ExCom it was instead Sweden and Switzerland that were most strongly opposing funding conversion to HCFCs. Thus, the policy impact on this particular issue was less than desirable, with hindsight, and it came too late. There was partial policy impact, but not full acceptance by the ExCom. Overall the large scale introduction of HCFCs in the ExCom projects is to be considered a failure from the perspective of Swedish policy impact on the ExCom. A break through in the efforts to phase-out HCFCs came finally at the 2007 Meeting of the Parties, when the phase-out timetable for the HCFCs was substantially accelerated and new directives to ExCom were approved.

Evaluating the conditions for policy impact

All of the interviewees claimed that SEI has had large influence on the policy formulation in the ExCom. This can be observed through the policy impact in a number of strategic ExCom decisions as described above. In general, the policy impact of the knowledge provided by SEI in this case can be characterised as fairly strong and direct, in the longer term. The overall impact can also be described as instrumental when the Swedish position directly influenced new approaches taken by the ExCom to the funding of projects. To some extent, this instrumental use of knowledge also led to institutionalisation of the new knowledge and ideas promoted by Sweden.

Regarding the depth of the impact, it may to a large extent best be described as acquisition of the new knowledge, rather than interpretation or institutionalisation. However, for some issues it may be argued that the *knowledge acquired* also led to institutionalisation of the knowledge such as the establishment of the new work forms, as with the creation of the Networks and with the establishment of a more programmatic approach of the funded projects.

What factors can explain the relatively successful level of influence? Which were the conditions that facilitated the high policy impact during the contract period? Based on the interviews the following factors could be identified. Some relate to the demand side and some to the supply side of the particular knowledge provided. The factors

identified include both conditions that augmented the policy impact and those that hindered a more full impact.

Optimal organizational arrangements of the knowledge transfer

All interviewees expressed that the set-up for the policy advice of SEI to the MoFA was ideal for what the situation demanded. SEI could prepare and then share views on different proposals from the ExCom in the appropriate setting at the Ministry and within the EFTA constituency. Since the key staff of SEI in the programme all had earlier work experience from Swedish authorities they were trusted to align with the general Swedish position in the work with MEAs and to act on behalf of Sweden in giving policy advice for the ExCom. The high level of trust between the MoFA and SEI is thus an important factor explaining the policy impact of SEI on the Swedish position. Regarding the policy impact of Sweden in the ExCom, some interviewees also expressed that in their opinion, the existence of the Swedish bilateral programme gave Sweden extra credibility in ExCom, which increased the policy impact of the Swedish position.

Experience-based knowledge highly valued

Whereas the knowledge support needed for the creation of the Montreal Protocol was science based, the knowledge perceived as important for the policy formulation in the ExCom was based on practical phase-out experience. Conclusions drawn from earlier phase-out activities were fundamental to guide the further work with the implementation. SEI was well positioned to offer such experience-based knowledge since the staff had participated actively in the Swedish phase-out, and later also had the experience from the projects in the bilateral programme to relate to.

For the ExCom negotiations, reading the proposals from the secretariat before each meeting was a key task. One interviewee pointed out that 'the devil is in the details', and that seemingly small decisions could have large impact for the implementation. The knowledge receiver considered the role of SEI in reading all proposals carefully and valuing them based on their own phase-out experience highly valuable. The desired format of the knowledge support was in concrete suggestions on changes to the proposals of the secretariat.

Timely response to a specific demand

The timing was ideal for SEI knowledge support in the case of ExCom and the Swedish bilateral programme. At the point when a political interest was formed for a strong Swedish presence in the ExCom and active involvement in the MP implementation, SEI already had the staff capacity to answer to that interest. The former SEI staff Ingrid Kökeritz had at that point (1995) both experience from the Swedish national phase-out, as well as insights into the difficulties ahead for national MP implementation in developing countries through earlier work for UNEP in Bangkok. She thus had the actor capacity that was suitable for being able to deliver policy advice in this context. Several interviewees mentioned that the personal capacity of Kökeritz was pivotal for the decision of the MoFA to hire SEI for the policy support. When she retired, two new

SEI staff were recruited who both had earlier experience of working with the MP at Swedish authorities and thus the continuity was assured.

Lack of staff resources at the government authorities

One official at the MoFA stated that the reason for contracting SEI for policy advice was that there was a lack of staff resources at the Ministry and at Sida. He also commented that this was not an ideal situation because it forced the official at the Ministry to become 'some kind of a project leader', which he/she is not supposed to be, and it puts SEI in the position of being some kind of semi-country representative, which SEI probably does not want to be. Therefore he saw this type of external knowledge support to the Ministry as a problem.

The other MoFA official interviewed said to the contrary that hiring a consultant or external expertise in a case like this is exactly what the MoFA should do. However, he also recognised that a precondition for this set-up is that the responsible MoFA staff member has enough time to allow interaction with the consultant and to keep track of the policy issues at stake. He also explained that he sometimes had had to defend the solution of hiring SEI because it was considered expensive by some. He had argued that it does cost money to carry out innovative institutional support projects in developing countries but that it is the only way ahead. Without the constant vigilance in the ExCom by Sweden, supported by the on the ground work by SEI, many important decisions for the implementation would in his opinion not have been taken. He added that it is all about achieving change on the ground and to do this you have to be involved in the concrete phase-out activities.

One of the SEI staff explained that the MoFA would have preferred to give the task of policy support to the EPA, but that the EPA did not have the staff resources either and then the option to use SEI was chosen. It can also be noted that looking back at the period investigated, the SEI staff has been offering the continuity whereas the staff at the MoFA has changed more frequently.

Changes in priority of policy issues at the MoFA

The timely response of SEI and a lack of resources at the Ministry as described above formed the basis for SEI to be hired to give policy advice, and to coordinate the Bilateral Programme. However, it is clear that the priority given to the Montreal Protocol by the MoFA also played an important role both in the start up of the policy advice as well as in the decision to end the bilateral programme in 2006, and to delegate the responsibility for the ExCom to the EPA, which was done in 2005. Over time, the political interest seems to have been reduced for the MP and the attention moved over to other conventions and issues, such as climate change.

One MoFA official noted that from 1999-2006 there has also been a change in political interest in the development cooperation carried out by Sweden. Earlier a lot of emphasis was put on what to do, which issues to 'solve', for example, sustainable development, gender, environment and so on. Now there is more interest in how to transfer funds

effectively and how to enable developing countries to develop. From this perspective, the interest in the Montreal Protocol implementation decreased.

Absorption capacity of the knowledge support receiver

When asked, all interviewees said that the possibilities of the MoFA officials to take in the knowledge support given have varied from person to person. It also seemed like the time available to spend on each convention has been reduced for the officials during the period investigated, which may partly be a response to the changes in priority over time described above.

One MoFA official said that the dialogue with SEI worked perfectly fine, but that he experienced a lack of time to take in the information offered, 'from the outside I believe that it is not understood how poor the resources are for other issues than foreign policy at the MoFA'. This is also why, he said, that the most useful form of information are the broad reviews like the ones from the International Panel on Climate Change or the Millennium Ecosystem Assessment, where large quantities of research and knowledge is being synthesised and made available in a condensed format.

Another MoFA official argued from his experience with other MEAs that the Secretariats of the conventions often have their own agendas and that it is necessary for the governments to set aside staff resources to be able to reflect and make own judgements on the steps ahead for the conventions and their implementation. His impression was that there is less time for each convention today compared to ten years ago for the officials in the Ministry, which means that they only have time to react, and not to be proactive in the policy formulation in the Meetings of the Parties and in ExCom. However, if Sweden and other donor countries are serious in their intentions, they have to assure adequate resources at their own Ministries, enough time for the officials and possibilities for them to hire external expertise when needed, but also time enough to engage the developing countries in the work with the conventions, he argued.

Others involved in the policy formulation in the Swedish arena

The Swedish EPA has been closely involved in the ExCom work, following all the pre-meetings. They also participated in the ExCom meetings and from 2005 the EPA took over the responsibility for the ExCom from the MoFA. The MoE has been involved foremost in the Meetings of the Parties of the convention, and Sida has to a very little extent been involved in formulation of the policy issues.

One of the SEI staff pointed out that the development of the SEI position and the project set-up taken in the bilateral programme was also influenced by a Swedish technical consultant involved in the majority of the Swedish projects. His technical expertise has been channelled by SEI as part of the policy advice to the MoFA.

Conclusions and Lessons Learned

In light of the above it can be concluded that this case shows an example of a setting where SEI had a substantial input to policy formulation, sometimes with institutionalised impact, over a period of several years. Crucial conditions for this policy impact were identified as follows:

- The organisational set-up for the knowledge transfer was considered optimal by the interviewees and was thus an important factor allowing for an effective policy impact.

- Lack of actor capacity in the form of personal resources at the Ministry, Sida and the EPA, together with the fact that SEI had staff with adequate earlier experiences was decisive in giving SEI the contract for the policy advice and for the coordination of the bilateral programme.

- The experience based knowledge that SEI could deliver was considered highly appropriate by the knowledge receiver and thus had a high impact.

- The high trust built up between the MoFA and SEI was fundamental to the policy impact of SEI.

- The receiver of the policy advice was initially very eager to take onboard the advice from SEI. Later the interest of the MoFA turned from the MP implementation to other issues, resulting in the MoFA officials having less time to spend on MP issues and eventually to the close down of the bilateral program as well as delegating responsibility for the ExCom to the EPA.

Providing knowledge for international agreements on tropospheric ozone

Case study by Julie Simon

Introduction

This case study is two-fold. On one hand, specific scientific knowledge integration into the LRTAP policy context is looked at (sub-case 1). On the other hand, a broader intervention of SEI is described (sub-case 2). Their common characteristic is to address tropospheric ozone issues and they also both took place on a time scale of around ten years. One major difference is that in one case SEI delivered natural science results to a well established policy arena, whereas in the other one it delivered policy advice in order to build up policy instruments and an institutional framework. Thus, in the former

SEI is clearly providing substantive knowledge while in the latter SEI is engaged in process-knowledge motivated activity as well as knowledge provision.

SEI and tropospheric ozone issues

Tropospheric ozone in SEI is a long-standing research theme. Over the last twenty years SEI has participated in the Task Forces that have provided the United Nations Economic Commission for Europe (UN/ECE) Convention on LRTAP (Long Range Transboundary Air Pollution) with some of the scientific and technical information that has supported the development of the Gothenburg and Oslo Protocols in Europe. SEI's participation has included the development of Europe-wide sensitivity maps of ecosystems to acidification and eutrophication and of ozone impacts on crops and forests.[15]

Work in SEI's Atmospheric Environment (AE) programme has played a central role in developing new risk assessment methods for the impacts of ozone in Europe, which are applied both by the EU and within the UN/ECE. This has involved the development and application of models of the flux of ozone into vegetation, which is closely related to effects. This model has also been used to assess the economic impacts of ozone through lost crop production, and the benefits of different emission control strategies. There is increasing evidence of the impacts of ozone worldwide, and work in the AE programme provided the first global synthesis of this evidence. A major focus for development of this area of the programme is the consequences for local and global food security of continued increases in air emissions.[16]

This case study embraces several years of research around tropospheric ozone, so it is a set of actions – rather than one specific study – that led to policy changes. It shows how the overall capacity and legitimacy of the AE Group within SEI allowed its studies to be taken into account in policy arenas.

LRTAP, RAPIDC, Malé, APINA

The LRTAP Convention was created in 1979 and addresses some of the major environmental problems of the UNECE region through scientific collaboration and policy negotiation. At this stage, the Convention has been signed by a significant number of countries in the Northern Hemisphere (51 Parties). Following the Convention, eight Protocols have been agreed, one of them being the multi-pollutant multi-effect Gothenburg Protocol in 1999, addressing among others the problems of high concentrations of tropospheric ozone. The way science is input in the process of policy making is primarily through working groups (a.k.a. International Cooperative Programmes or ICPs) set up for different issues, such as ICP forests and ICP crops. Those working groups meet on a regular basis and discuss the science behind the policies (e.g. flux method approach). This is where SEI's impact is most evident, as will be described below. For our case study, when a consensus emerges on the specific topic, then this scientific information is provided to the IAM (Integrated Assessment Modelling) team. At that stage, modellers assess the method and decide whether to include or not the specific piece of work into the wider IAM. Then, this IAM constitutes one part of an eventual piece of policy advice.

The RAPIDC (Regional Air Pollution in Developing Countries) Programme is aimed at promoting action at political level on air pollution in developing countries. It is funded by Sida, the Swedish International Development Cooperation Agency, and is coordinated by SEI. The Programme has two main focal regions: South Asia (from Iran to Bangladesh and from Bhutan into the Maldives) and Southern Africa (seven of the 14 SADC countries are currently engaged in RAPIDC activities), the sub-programme here is called APINA (Air Pollution Information Network for Africa). Tropospheric ozone issues are here part of a much broader policy building process. This focus on developing countries also led to the creation of the GAP Forum in 2004. The overall orientation of SEI towards air pollution in Southern Africa and South Asia is subject of the second sub-case.

Policy Context

LRTAP produced a general Convention which the signing Parties agreed to follow. LRTAP Protocols are hence the type of policy which is ultimately targeted in sub-case 1. However, in the first instance, IAM can be understood here as a 'piece of policy', and is the one which has directly been influenced by SEI in the sub-case 1. LRTAP Protocols are revised every couple of years, to ensure their accuracy with the evolution of the environment and of the science. Between two revisions, regular scientific meetings keep going on, bringing together up-to-date knowledge.

LRTAP and its Convention are mainly seen as a model to refer to in sub-case 2. The policy context regarding RAPIDC is quite different, however. Instead of inputting data in a well established structure (LRTAP), the point was and is here to genuinely create a structure for the purpose, as well as to create a specific policy. The overall goal of the project was to trigger other regions (Southern Africa and South Asia[17]) to take part in a policy making process, addressing air pollution issues of which tropospheric ozone is only one.

Both sub-cases occur at a high level of policy making, as they remain at a regional level, being Europe and North America on the one hand, or Southern Africa and South Asia on the other.

From SEI's perspective, sub-case 1 can be seen as a 'bottom-up' approach, scientists providing data to other scientists, which then will feed into a specific policy. Sub-case 2 is mainly characterised as a 'top-down' approach, where the overall policy is still at a definition stage, and will mainly result from discussions between scientists and policy makers. This should not hide the fact that local knowledge and capacities are active components of the process. Both sub-cases have been effective in achieving their objectives, although some lack of feedback from the demand side (policy makers) to the supply side (scientists) was underlined in sub-case 1.

Policy Impact

Several policy issues contributed to SEI's policy impact. The first issue was the inclusion in the IAM of the flux approach – versus the concentration approach – for assessing the

impacts of ozone in vegetation. The *validity* and feasibility of this approach needed to be acknowledged. Discussions occurring at meetings would contain disagreements on approaches. In Southern Africa and South Asia, the primary setting up of a policy was and is the issue. This shows the difference of scale where the processes occur: specific point within a specific policy on the one hand, broad policy making on the other one.

Adopting the flux-based approach

Started by SEI in 1992, the research about the flux-based approach to assess concentration of ozone in vegetation has resulted in two very tangible substantive-knowledge policy impacts; one in 2004 (the integration of the flux approach for crops risk assessment) and the other one very recently in 2008 (same integration but for forests). The scientific aim was to 'develop a new risk assessment method, a flux based approach to assess the risk of ozone on crops and forests across Europe, as a method of trying to identify what emission reductions should occur across Europe'.

The first time the flux method was mentioned in an international meeting was in 1996. Then the first LRTAP scientific meeting dedicated for fluxes approach was in 1998-99, and 'so we had all the scientific community talking about it'. It took another five years for the flux approach for crops to be eventually included in the IAM. This is the first major visible policy impact and is both problem solving and also enlightenment. The impact in relation to this issue was instrumental in LRTAP, as well as enlightening towards the UK Department of Environment, Food, and Rural Affairs (new knowledge acquisition, but no direct instrumental impact) through a cascade-down effect.

The process of including the flux approach for forests in the IAM is still ongoing.

Triggering the adoption of a regional air pollution policy

Southern Africa and South Asia face major air pollution problems, which are growing dramatically given problems such as the rural exodus and the development of cities, and the high increase in private and commercial motor transport.

Because of the transboundary aspect of air pollution, consensus and policy solutions are to be reached at the regional level, together with national or local levels. Within the RAPIDC Programme, and on SEI initiative, a series of policy dialogues was held in 1998 to facilitate the development of agreements to implement measures which prevent and control air pollution, one in Harare (Zimbabwe), one in Bangkok (Thailand) and one in Cañuelas (Costa Rica). At the same time, a partnership was built with UNEP (United Nations Environment Programme), allowing to complement and strengthen SEI's input. Those dialogues resulted in the Harare Resolution, the Malé Declaration and the Cañuelas Declaration.

At the beginning, stakeholders involved in those dialogues were different. In Asia, the process took part, from the outset, at the ministerial level through the SACEP (South Asia Cooperative Environment Programme) Governing Council. According to an interviewee, the dramatic and transboundary Indonesian which haze occurred in

1997 as a result of forest fires could partly explain why Ministers were concerned and quickly got involved in the process. In Africa, no ministerial level was part of the Programme at the beginning, they slowly came into it in 2003 (when two Ministers participated in the Maputo meeting) and in 2008 (four Ministers involved in the Lusaka Policy Framework). The South American policy building process stopped because of the Argentinean economic crisis which, for this case, caused the loss of key contact people.

Currently, the Malé Declaration is in its implementation phase, and the Lusaka Policy Framework is brought back to national countries, at the ministerial level.

From the policy output context, the impact was (and is) hence clearly instrumental as new texts (Declaration, Resolution) were produced and agreed. Perhaps even more than instrumental, it seems like a 'triggering impact', as those regions started from scratch on the issue of transboundary air pollution problems.

Setting up the Global Air Pollution Forum

In 2004, based on the experience and *knowledge acquired* through the running of the RAPIDC Programme, the GAP (Global Air Pollution) Forum started, jointly established by SEI and IUAPPA (International Union of Air Pollution Prevention and Environmental Protection Associations) on an impetus of the latter. Its aim is to flexibly synthesize solutions to air pollution-related problems by promoting effective cooperation among nations at regional, hemispheric and global scales. Its role is to be a facilitator in bringing together regional organisations which were previously working independently from one another.

Evaluating the Conditions of Policy Impact

A quite important and positive policy impact from SEI is observed and highlighted by both the demand and supply side. Impacts have been instrumental and allowed changing policies and policy building, and thus demonstrate an *institutionalized* depth of impact. It took some years to become apparent, but 'Yes, it's been quite a long process. When you start you think things can go quickly, but then you realise doing something in five years is impressive. The long time gives you the time to make sure about what you say, so it is positive in that sense'. Both projects are still ongoing, and further deep impacts are expected.

Based on the interviews, several conditions beneficial for impacting on the policy process can be identified:

Going to the right people

SEI staff underlined the high importance of talking to the right people so your message is heard at the right place. One interviewee declared: 'Then we initiated a connection with EMEP, through Mr X which was a very important thing to make, probably the most important thing we ever did'.

But it was also mentioned that it is 'surprising how in some ways personality can be so important', referring to this as a barrier to make a step forward in the adoption of new element. Up to a certain extent, personality of both the receiver and the sender of information really matters.

Integrating the right actors

Being able to define who to work with, and being persuasive enough to bring along those people was in one case a very important step. This is especially true when working with policy makers at a ministerial level, as learnt from the APINA process.

Being the right person: scientific credibility and legitimacy

From an institutional point of view ('science' understood as an institution), being a recognised strong figure helps the message to be heard. Interviewees were either already recognised either in their own right or through working together with better known persons or research groups. Regarding the personal skills, being gifted with both cleverness and good *communication* skills seems to be an invaluable element too. Coming from SEI, which enjoys a reputation of sound science, also formed a positive *a priori* factor for success. Demand side interview reveals how SEI built up its credibility in acting within LRTAP, as it delivered efficiently and independently on many occasions.

Concerning tropospheric ozone, some key people are clearly identified within SEI, and the fact that there has been continuity is perceived as a facilitator for them having an impact.

Being with the right person: complementarity and mutual trust

Building good relationships as well as good partnerships is a facilitating element. Being able to build up trust in those relationships and partnerships is crucial. This aspect was repeatedly underlined by one interviewee. A demand side interviewee emphasised that 'both sides benefited to being exposed to one another', the interaction between science and policy hence resulting in joint learning (i.e. enlightenment).

The will to be policy-relevant

Science does not spontaneously turn into policy-relevant science. Further, science is unlikely to have an impact on policy if that science, and the scientists who carried it out, originally had no policy objectives. Not every scientist has a drive to produce policy-relevant science.

It is worth saying all interviewees in this case did share this concern about their work being relevant for policy. One interviewee happily endorses a boundary role, acting between science and policy, being a scientific adviser as well as a policy facilitator. This is actually a step towards producing policy relevant science, which is the way followed by another interviewee who described their role as 'providing a synthesis of scientific evidence, providing information for other people to do something with'. A policy actor interviewed clearly stressed that the way science is communicated is crucial, as policy

makers require 'something that is very simple and easy to understand, something that can be interpreted into policy, and that can be implemented'. SEI seems in these cases to have been efficient both regarding its technical level and its *communication* patterns: both are needed

Acting at the right time

In one example, a completely outside element (the transboundary forest fire haze episode) may have allowed the process to start quickly and to include key actors. This timing, although unplanned, was actually perfect for the air pollution issues to be addressed. Being open to such opportunities is important. Further, science can have an impact at different stages of the policy cycle, but intervening at all points of the policy cycle works particularly well.

Defining SEI's impact, a demand side actor characterised it as 'very timely', SEI being already working on the subject, or ready to work on it, and hence being able to deliver advice precisely when needed is critical. Its capacity to secure necessary resources to deliver was also mentioned.

Openness of the receiver

In both sub-cases, the field was open to new ideas or innovative science. LRTAP structure intrinsically allowed scientific meetings to occur regularly and new results or methods to be fed into the IAM. The structure of the policy arena, with scientific debates at its basis, was fundamental. Regarding South Asia and Southern Africa, the field was empty, and there was a niche to occupy concerning transboundary air pollution issues.

Conclusions and Lessons Learned

Several examples of SEI's policy impact from providing knowledge for international agreements on tropospheric ozone emerged in this case study:

- adoption of the flux-based approach in the IAM, built on SEI's research in this area;
- triggering of adoption of regional air pollution policy in Southern Africa and South Asia, based on SEI initiative of policy dialogues; and,
- facilitation of regional collaboration through the Global Air Pollution Forum, jointly established by SEI.

Several independent factors contributed to the policy impacts noted above.

- Interviewees highlighted the importance of relationships and partnerships. Going to the right people and integrating the right actors played a key role to ensure that their message was heard at the right place and supported by the needed staff. Furthermore, SEI staff identified the need for both being – and being with

– the right person. The scientific credibility and legitimacy it provided were crucial for SEI to have its message heard. This credibility was also built across time and through repeated interaction, building trust and creating opportunities for joint learning between demand- and supply-side actors.

- The form, time and reception of the message all played important roles in the observed policy impacts. SEI produced scientific material that was useful, it was both understandable to policy makers and relevant to the timing of policy decisions. The LRTAP structure allowed frequent input via scientific meetings thus further facilitating the use of SEI's policy-relevant materials.

DISCUSSION

The cases show how institutes like SEI can have a range of policy impacts ranging from supplying new substantive knowledge into the policy milieu, for instance – with tools such as REAP, WAMPS, and the ozone flux method – through to more process-related impacts where the institute follows through the use of that knowledge within the realm of policy making – such as was seen in most of the cases but most evidentially in the US, the Estonian, the Montreal Protocol and the Malé and APINA cases.

In the introduction, we raised the point that policy impact is often difficult to see, to measure, and we also acknowledged that in these six cases we deliberately selected cases where SEI was acknowledged to have had some sort of impact. Thus we have tracked that impact, and we have found that there is no one path to success. We suggested that SEI might be most interested in having instrumental and learning-based impacts, that is where there is a clear link between what we do and a policy output or outcome; but we have also seen successful interactive and political impacts leading to – or likely to lead to – sought-for outputs and, or, outcomes.

Importantly, our investigations show that these high-impact cases in the United States, in the United Kingdom, in Estonia, in Sweden and at the international levels, have been ones where the research institute(s) or knowledge suppliers have, over time, made a position of influence for themselves within the policy sphere and thus gained the power to bring about change. This does ***not*** mean a policy impact may be had without the scientific credibility. It is precisely because SEI has the ability to operate legitimately as both a substantive knowledge supplier and as an agent in the process that it has been able to have this impact.

In addition to the specific points made in the six case study discussions above, a number of generic points come up across cases and these will be discussed here. The discussion then concludes with a ten point set of factors that should be considered by those involved in the generation of sustainability knowledge, to enhance the policy impact of their endeavours.

Acquisition, interpretation and institutionalization

The selection of cases in this study suggests that SEI can have an impact throughout what we shall for simplicity, call the policy cycle (acknowledging that policy making is multi-level and we may simply not be working at each and every level). Some cases show impact more at the stage of strategic policy formulation (top-down), some at the translation of strategic policy into measures, and some at implementation. Further, some cases show SEI at work to impact at several 'stages' of the multi-level process; top-down and bottom up. What is seen in the cases is that *knowledge acquired* at one stage of the policy 'cycle' may not be *institutionalized* until another stage. In several of

the cases presented, the story has been cut short, but significant policy impacts are yet to be expected from these efforts.

In some cases, there were also examples of failures in having the desired policy impact due to various barriers. One aspect of this is that researchers are usually communicating knowledge to the policy advisors – not the actual policy makers. Thus we see an instrumental effect in terms of acquisition and interpretation of knowledge by policy advisers, but this is not always followed through to a corresponding institutionalization at the stage of policy output. This is difficult to address: knowledge suppliers have very little influence on the institutional arrangements within the policy-making system which makes for coordination and *communication* problems. Ultimately, political decisions are often taken behind closed doors and often do not involve those that have gathered and *interpreted* the knowledge base for the decision. Furthermore, these decisions typically involve a range of parameters, concerns and evidence, of which the sustainability knowledge is only one.

Collaboration among partners and with users

In the cases presented, SEI is not always the initiator. Because SEI works closely with partner organizations it is sometimes difficult to determine where and when initiatives really began. However, on weight of evidence, most SEI researchers identify initiative from 'the ministry' or user institution as important factor driving the observed impact. Often officers from that policy organisation have approached SEI to perform a task that the policy organisation believes it needs additional technical and/or staff capacity to complete. The fact that SEI is an independent research organisation – that understands the science and can provide evidence-informed advice as well as serve as non-partisan third party – is important to policy organisations.

Knowledge producing organisations succeed best when they collaborate with and account for the needs of end users. Our analysis, as expected, finds the same to be true in the case studies examined. For example, the REAP tool 'largely came out of a perceived need for such a tool' both by SEI and by its users such as the UK Environment Agency. Similarly, the Ozone Layer Protection case also shows this joint learning at play where Sweden's policy position was 'developed in dialogue' with the Swedish MoFA. In this example, the continuous process to strengthen the position of the National Ozone Units, thus improved the national ownership of the implementation of the Montreal Protocol requirements; in this respect the OLP case parallels that of APINA where SEI, through the RAPIDC programme, is involved in strengthening the ability of national governments to respond to air pollution. Close collaboration between SEI and CCS researchers and state agency staff in the US state-level climate action has enhanced state agency staff capacity on climate change mitigation on current and future initiatives.

In the Estonian waste case, SEI's ability to produce integrated (socio-economic and environmental) knowledge tailored to the Ministry of Environment's needs was crucial to its continued collaboration with the Ministry and impact on several policy issues. The knowledge has not only been used by the Ministry as a base for decision making, but also for defending its decisions to others. The RAPIDC/Malé/APINA case – adding to the evidence already from the OLP case – shows clearly where SEI has not only delivered policy advice, but has co-created with local stakeholders the structure within which that policy advice can be heard and, eventually, acted upon. In some ways, thus, SEI is acting as the operational arm of development agencies, such as Sida as well as of local, national and regional governance institutions. Similarly, in RAPIDC we see SEI and UNEP complementing and strengthening each other's activity.

A lesson here is also that it is important to promote early engagement with end users in order to have effective policy impact. However, this should of course be seen in the light of the need to conduct research on topics which may not always be demanded or prioritised by potential users. The benefits of user-led research must be balanced with the need for independence and integrity in defining research questions and time to build up a knowledge base. In other words, to have effective policy impact over the long term seems to necessitate a certain degree of freedom. Thus, not all research may be demonstrably directly applicable to existing policy structures from the outset.

Role of facilitation

The cases also suggest that SEI is a provider of 'process-oriented' sustainability knowledge, by playing a facilitation role locally, nationally, regionally and globally. The Estonian waste case shows especially how SEI and the MoE worked together and fulfilled not only a research role, but also acted as both a 'boundary actor' with foreign research organisations and in a facilitation role internally to Estonia. A similar facilitation role was seen in the Estonian ETR case as well, and stakeholder engagement and facilitation of working groups was an integral part of several case studies.[18] In the Estonian waste case 'stakeholder participation decreased the conflicts during the legislative and implementation process' and having SEI in this role enhances others' trust in our processes as well as in our outputs. In the US state climate action case participants interviewed emphasized that policy makers are often more willing and able to consider a 'wider and broader set of options with more comfort and confidence if they are built out of stakeholder and technical work groups'.

Presentation of research outputs

Appropriate targeting of written materials and reports is crucial for supporting policy development. In the US case study, state agency staff emphasized that for them useful knowledge is 'knowledge that is applicable to the situation and understandable' and

'the better the information that you have to help people understand the choices the less likely the politics are going to stick you with some less than desirable approach'.

The academic ethos in some SEI research may tend to encourage longer reports more closely resembling peer-reviewed journal articles. While these reports are critical for contributing to the scientific literature as well as policy impact, the more targeted and shortened policy briefs or summary reports also help to maximize policy impact. One Estonian government actor put it that 'SEI's work was valuable and relevant. The results and proposals of the studies were clear, science-based and easy to communicate. The studies struck a good balance, in that they were not too detailed or complex, but at the relevant level and offered concrete policy proposals'. Providing hard numbers is vital, as it helps to build up the argument in the political setting. The combination of a technical report and an easily understandable summary allows for a wide impact designed for multiple levels of user. As in the UK carbon footprint case, a demand-side actor said of the SEI Technical Report that it 'is being cited as part of the evidence base that [the city region] are using to move some of their planning policies towards insisting on tougher standards' while at the same time they can more generally point to the summary report to explain why they are insisting on this. A similar principle can be seen in the CLRTAP/RAPIDC case where the substantive scientific excellence in one sub-case is translated into clear policy advice and process-knowledge support in the other. The two go hand-in-hand but a level of translation is required so that *knowledge acquired* and *interpreted* at one stage of the policy cycle may be similarly acquired, interpreted and institutionalized at another. These examples emphasize that policy advice needs to be empirical, but also clear.

In several cases SEI has worked with partners to produce guides or manuals that aim to raise awareness and generate publicity in the form of guides and manuals. This is useful publicity as these materials are often widely or publicly available and can be used by other stakeholders (users) as well as by other researchers.

Developing 'user friendly' tools and models have in several cases successfully enhanced the policy decision making. The WAMPS model used in Estonia and the REAP model in the UK are both examples of tools that calculate total environmental and external costs to allow for various scenarios to be compared. These models emphasize how SEI brings together quantitative research with user needs to support policy making.

Trust, independence and continuity

One fundamental factor seen in the cases is the need to develop trust between knowledge suppliers and knowledge users. Different cases demonstrate different ways this is achieved. In some cases it is through longstanding relationships developed over decades, while in others it is addressed through sharing staff to develop understanding. The 'trusting relationship' developed in these case studies helped to deal successfully with contentious policy issues. Long-standing cooperation has proved to develop

productive collaborations. This is certainly the case with the tropospheric ozone case where it took at least three years to get flux modelling on the scientific agenda and then 'another five years for the flux approach for crops to be eventually included in the I[ntegrated] A[sessment] M[odel]'. However, the fact that this approach was not adopted immediately and that it was developed outside of the main policy framework also demonstrates the need for research institutes like SEI to conduct independent research, which may not be mainstream or initially demanded by policy makers.

Continuity and long-lasting professional relationships foster trust building and productive research efforts. Following the release of the REAP report (UK housing case) for the Yorkshire & Humber Regional Spatial Strategy review the work went on to have a utility to the commissioning agency and other local UK local authorities continue to turn to it. This influence is not just at 'point of contact' but has, according to the Environment Agency, made a difference to the way the Regional Development Agency 'accounts for the environment'. Thus, building long-term relationships can lead to an enlightenment impact as well as an instrumental one. Interestingly, one thing which came out of the Swedish OLP case in particular is that SEI can provide a level of continuity in the fast-changing arena of policy institutions where staff may have a high turnover rate or be transferred regularly. SEI's work on tropospheric ozone demonstrated how over a long time period efforts can eventually have a policy effect despite political changes along the way. Thus, SEI's strategic planning may be over a longer timeframe than that of the political arena and we should be prepared for the long haul (*cf*. 'sharing the initiative' and 'the realities of politics').

The use of an independent research institute to provide a process-knowledge intervention gives the policy advisors and makers 'assurance that there is no predetermined outcome and everyone has a voice'. In the US case study, State agency staff also highlighted the value of 'having outside expertise available to the legislature so that they can hear things not from the agencies, but from some other third party whom they view to have credibility. No one has ever questioned that he knows what he is talking about' (i.e. SEI is acknowledged to have significant substantive knowledge as well).

However, there is a fine line between using independent research to 'genuinely' raise the quality and *legitimacy* of a policy decision, and using it in a political or tactical way to pursue other, hidden objectives. For this reason, an organisation like SEI must recognise the need to balance trust and close cooperation with policy-makers, with the need to avoid situations of 'regulatory capture'. The latter would harm SEI's credibility in the long term. An important way to ensure independence over time is to have an internally defined research agenda, in parallel with more user-led or collaborative research and science-policy *communication* work.

Basis for learning

There is a strong undercurrent running throughout the cases that instrumental use of knowledge can lead both directly and indirectly to learning and resultant enlightenment impact. The US case tells us that action taken at federal level is likely to be influenced by strategic and scheme-level decisions taken at local and state level and the same message comes out of the UK city-region level case where the actions taken there are hoped to create an effect at national level. This change may not necessarily be direct but is likely to be more political-tactical or institutionalised rather than simply instrumental; influencing the way in which national level politicians and organisations position themselves over critical issues such as climate change mitigation and adaptation.

From the US study we also note that 'climate issues are now the major focus for the agency, previously … not a big focus at all. Once it was just my group, now it is for the whole agency'. It is important to recognise that SEI provides a service to policy advisers: ministries and agencies often simply do not have the time (and often not the expertise) to research issues in depth. SEI is seen as having the capacity to provide holistic or multidisciplinary (environmental, economic, and social) assessment and policy support.

Timeliness

All the cases show that knowledge can only have an impact if its introduction is timely. This is no less true for an enlightenment model than it is for a problem solving model, although in the former, there is a disjunction between the point of entry of the new knowledge and its effect. This was seen to impact several projects: in the Swedish case the political interest for the practical implementation of the Montreal Protocol diminished during the period studied but momentum was maintained through SEI's intervention, and in the UK case although EA the corporate strategy changed from climate change mitigation to climate change adaptation the timeliness of carbon as 'an issue' has been sufficient to make the work apposite.

Working over a long time period with information user organizations also allows SEI to maintain continuity of purpose despite shifting priorities and interest. The Estonian environmental tax reform case also shows us that by introducing new knowledge and syntheses of knowledge at apposite moments, SEI can be a catalyst to policy action.

Timeliness is of essence, but also has a random, unpredictable dimension in that focusing events that are fully external to the process may put items on the agenda. One example is the Indonesian forest fire haze problem, in relation to which SEI's processes were well-timed.

Role of the political context

Personalities are important in politics: probably even more important than they are in science. Where SEI seeks to work within the policy arena we need to play by the rules of that arena and we cannot expect the norms of science to serve us well there. This does not mean that we do not still adhere to scientific knowledge excellence. Building good relationships with policy actors and agencies is important, but we must preserve our independent research status. However, we also need to note that the cases tell us that personalities – and 'champions' – are important. Knowledge suppliers need to work within the policy sphere in order to have a policy impact and that entails understanding, and working within, the rules and norms of the policy sphere(s). This is particularly evident in the Estonian environmental tax reform case where former directors of SEI Tallinn centre played a key role in the policy formulation and evaluation. The Estonian waste case shows us where the ability of SEI to respond to the policy needs within the short time frame available allowed SEI to make an impact. This can also be seen in the REAP-based work in the UK housing study where, initially, a rapid assessment was required. In politics the timing is related to electoral cycles as well as policy cycles, but SEI can continue to have a role by getting the balance right between the necessary academic rigour and responding to policy needs, and continuing to provide a dual facilitation and technical support role to policy agencies.

Finally, we must recognise that however powerful the tool, or however well written the report, as in the REAP case study 'you still end up with the tough policy choice.' Although using good research in this way gives the policy actors 'greater certainty that the choice that you're recommending is the correct one', it 'doesn't make them more palatable or easier to implement'. No report by itself will 'provide the levels of leadership that we need at a higher level to really bring about change, but it's all part of the story'.

The US case tells us that the State Governor's executive order further facilitated policy learning and knowledge transfer by establishing conditions which Pielke (2007) refers to as 'tornado politics' where 'science can compel action' when there are 'particular circumstances characterized by shared values and low uncertainties about the relationship of alternative courses of action'. Where individuals are willing to 'champion' the environment in this way, SEI can provide that champion with the evidence needed to, as in the UK case study, 'take a punt on this sort of thing and think yes, we should be pushing the boundaries'. It gives the managerial and officer-level champions more confidence if they know that there is a full report behind their actions.

TEN SUGGESTIONS TO ENHANCE POLICY IMPACT OF SUSTAINABILITY KNOWLEDGE

Based on the SEI case studies presented in this report, and the collective lessons learned from them, we have extracted what we consider to be generalisable suggestions that will be useful in many other organizational contexts. However, the list is not meant to be prescriptive, knowledge supply actors should feel free to use or adapt factors if their individual circumstance makes the factor impossible to implement:

1 **Recognise differences in timing between research and policy making.** While early engagement with end users or end user-defined research can ensure effective policy impact in the short term, an effective policy impact over the long term may also require a body of research and action to be defined by the knowledge provider independently, and built up over a longer period of time.

2 **Acknowledge the realities of the political and policy-making context.** Proper use of steering groups and technical working groups can be used to anchor the knowledge acquisition in a broader institutional setting and also clarify the needs and expectations of the information users and providers and helps knowledge providers to understand the norms and context of the knowledge users.

3 **Maintain the balance of collaborative and independent research**. In order to ensure that emerging sustainability problems are being subject to research, and that the credibility of the knowledge providing institution is upheld, it is imperative to pursue parallel tracks of more co-produced or collaboratively defined research and of independently defined research.

4 **Make use of strong champions** (i.e. search out where knowledge is wanted). Knowledge can make the greatest contribution where it is demanded. It is critical to work with actors on the demand side that have a capacity to engage with new knowledge as well as to take ownership and responsibility for the decision making processes. It is important to seek out opportunities to provide knowledge where there is cognitive capacity as well as agency, and where new approaches can result in direct as well as indirect learning.

5 **Facilitate joint learning processes**. Involving the demand side in the knowledge-generation process profoundly enhanced the learning impact. Such processes are also more likely to foster ownership and action based on new knowledge co-created. In other words, the implementation and institutionalization of sustainability knowledge is far more likely to succeed.

6 **Facilitate trust building and continuity among partners**. Long-lasting professional relationships, close integration of staff working relationships, and

acceptance of the research role as an independent third party can all help build trusting relationships to help deal successfully with contentious policy issues.

7 **Consider implications of other policy spheres.** The timing of non-environmental policy concerns, as well as political and other cultural and social factors, will inevitably be critically important to the ultimate decision making process. The extent to which the sustainability knowledge takes these into account will influence the ultimate impact.

8 **Acknowledge the progressive nature of policy impact.** Not all impacts are evident at once. Knowledge interpretation, enlightenment and organizational learning is a slow and gradual process often extending over several years. Also, the level of 'intervention' in terms of knowledge provision may be far removed from the actual decision level and point, sometimes with a time span of several years.

9 **Deploy user friendly analyses, models and scenarios.** Interpretation and use of knowledge relies on the ability of demand-side actors to trust and understand what lies underneath the results presented. Complex pieces of analysis often limit the possibility to use the knowledge in policy making processes. More general research findings should be translated into something that is directly relevant for and applicable to the particular policy geographical scale, level of precision, existing institutions and level of process (e.g. whether it is strategic, implementation or evaluation).

10 **Speak the right language.** Sustainability knowledge cannot bring about enlightenment if it is not fully understood. Speaking the right language and making concepts and ideas interpretable is critical – as is the importance of iterative communication. It is important to clarify in which formats the sustainability knowledge will be most effective in instilling new knowledge and in influencing policy. A baseline tip is to provide short, concise, and clear summaries, but the information within them should be backed up by full reports.

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ENDNOTES

1 Following John Ziman's (2000) Real Science: what it is, and what it means (Cambridge University Press), we take the word 'science' here to describe a 'naturalistic approach via intersubjectivity' that encompasses both the human sciences and the natural science (see page 109).
2 Although the interview guide was prepared in English, the interviews were carried out in Swedish, Estonian or English. For the most part, specific names and titles of interviewees have not been included, some are listed in the acknowledgements above and instead reference is made to their position and/or connection to the project.
3 The five technical working groups included: Residential, Commercial & Industrial; Transportation; Forestry; Agriculture; and Energy Supply.
4 An ESSHB (engrossed second substitute house bill) is an act passed by the state legislature. ESSHB 2815 is an act relating to creating a framework for reducing greenhouse gases emissions in the Washington State economy.
5 Sir Nicholas Stern wrote a UK report (2008) into the economic impact of climate change. Adair Turner is head of the UK Climate Change Committee: in late 2008 the committee gave its advice to government that the UK should set a target of cutting all greenhouse gas emissions by 2050 by at least 80 per cent. Importantly, this reduction is to include emissions from aviation and transport which had been previously excluded.
6 An excise duty is a charge (tax), which has to be paid by the waste producer if the recovery targets are not fulfilled.
7 Translated from Estonian.
8 Translated from Estonian, italics added.
9 Riigikogu – The Estonian Parliament
10 Translated from Estonian.
11 EVP – privatisation stocks or 'ErastamisVäärtPaberid' in Estonian. Compensation to the people for their past work during the Soviet time paid in EVP-s. The EVPs were used in the privation process.
12 Refrigerants are chemicals used in fridges and in air-conditioning systems. With time these systems may leak some of the refrigerants, or the refrigerants may become contaminated and need replacement. Adding more refrigerant is then necessary for the functioning of the system. This is part of what is referred to as 'servicing' of equipment.
13 For a more comprehensive description of the OLP, see SEI (2006). The Swedish Bilateral Programme under the Montreal Protocol. Report available at www.sei.se.
14 Networking counts, UNEP DTIE, 2002. Can be downloaded from www.unep.org.
15 See http://www.sei.se/index.php?section=atmospheric&page=policy for more details.
16 Data taken from http://www.sei.se/index.php?section=atmospheric&page=issues
17 Although the interviewee adequately reminded that South America was part of RAPIDC at the outset, but went out of the process when an economic crisis struck Argentina. South America has since re-entered the process through the Global Air Pollution Forum.
18 For an in-depth discussion of stakeholder engagement, readers may also wish to consult Forrester *et al.* (2008).

In order to address increasingly complex environment and development problems, knowledge which is scientifically valid, policy relevant and socially robust is required. This study looks at SEI's experience in producing such 'sustainability knowledge'. Six cases are examined where SEI is acknowledged to have provided knowledge support to policy formulation, policy evaluation, or policy implementation in various national and international policy contexts and regions. They show how institutes like SEI can have a range of policy impacts ranging from supplying new substantive knowledge into the policy milieu through to more process-related impacts. The report includes a generic discussion of points raised from this collective study of SEI's experience, and concludes with ten factors that sustainability science researchers may wish to consider in order to enhance their policy impact.

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