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Policy Report 2

**Setting and Using Targets for Sustainable Materials
Management: Opportunities and Challenges**

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NOTE FROM THE SECRETARIAT

Sustainable Materials Management (SMM) and the concept of addressing waste issues by looking at the value chain are well accepted components of sustainable consumption and production (SCP) and waste policy. However, both face a number of challenges in implementation, including the establishment of effective targets. As such, the purpose of this report is to explore the opportunities, challenges and important considerations faced by policy makers when setting and implementing SMM-related targets.

It has been prepared for the OECD Global Forum on Sustainable Materials Management to be held in Belgium from 25 to 27 October 2010.

Together with the two other policy reports (*Policy Principles for SMM* and *An overview of available instruments for SMM*), this report on *Setting and Using Targets for SMM* will serve to fuel the discussion of Session 4 of the Global Forum related to policies for implementing SMM.

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This report is work in progress. The opinions expressed in this paper are the sole responsibility of the author(s) and do not necessarily reflect those of the OECD or the governments of its member countries.

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EXECUTIVE SUMMARY

Background

This report is one of three thematic reports commissioned by the OECD Working Group on Waste Prevention and Recycling (WGWPR) to inform its work on “policy instruments for SMM”. It was partly motivated by the challenges negotiators experienced recently around this issue at the OECD (2008 Council Recommendations on Resource Productivity), the G8 (Kobe 3R Action Plan) and the EU (Waste Framework Directive). One challenge at these negotiations was the different interpretations and understandings of what a ‘target’ encompasses and how they are used.

Objectives

Sustainable Materials Management (SMM) and the concept of addressing waste issues by looking at the value chain are well accepted components of sustainable consumption and production (SCP) and waste policy. However, both face a number of challenges in implementation including the establishment of effective targets. As such, the purpose of this report is to explore the opportunities, challenges and important considerations faced by policy makers when setting and implementing SMM-related targets.

It should also be mentioned that this report is explicitly focused on the underlying opportunities, challenges and considerations related to targets – not at promoting their wider use *per se* – as this is a policy question that ultimately needs to be decided upon by individual governments.¹

Terminology

The need for a clear definition of targets and the variety of possible targets were identified as key issues. The following definitions and concepts were used in this report.

- The working definition of SMM:

*Sustainable Materials Management is an approach to promote sustainable materials use, integrating actions targeted at reducing negative environmental impacts and preserving natural capital throughout the life-cycle of materials, taking into account economic efficiency and social equity.*²

- A spectrum of targets from hard to soft:

¹ Source OECD.

² OECD (2007), *Outcome of the First OECD Workshop on Sustainable Materials Management*, ENV/EPOC/WGWPR/RD(2005)5/FINAL, OECD, Paris ([http://www.oilis.oecd.org/olis/2005doc.nsf/Linkto/env-epoc-wgwpr-rd\(2005\)5-final](http://www.oilis.oecd.org/olis/2005doc.nsf/Linkto/env-epoc-wgwpr-rd(2005)5-final)).

Type of Target	Characteristics	Example
Hard	Short timeline Narrow scope Clear accountability Typically quantifiable Clear monitoring process	Fixed recycling rates for a specific material or type of packaging (<i>e.g.</i> In Flanders, Belgium, waste policy states that each municipality attains a maximum of 180kg residual waste per inhabitant by 2010 and is responsible for achieving this target)
Soft	Longer timeline Broader in scope Accountability with a level of flexibility	Improved energy performance of new buildings (<i>e.g.</i> Aspects of the Japanese Basic Law for Establishing a Sound Material-Cycle Society)
Voluntary	Similar to soft targets but entered into voluntarily	Voluntary industry initiatives (<i>e.g.</i> Dutch Chain-Oriented Policy Pilot Projects)

- Strategic objectives (goals):
 - Which are broader still than soft targets in that they incorporate a wider set of considerations and/or have even longer timeframes. Often there is limited direct accountability for the targets. These are typically used as tools to coordinate action at the more specific level and provide a vision for a future state. An example of this is the Netherlands where a long-term vision for waste policy, up to the year 2050, was formulated together with the market.³
- Strategic levers:
 - This refers to the available methods and extent of influence a target-setting authority may have to change a system. For example, in Flanders, Belgium, a target is set for the number of compost masters per inhabitant to encourage and increase residential composting. This is a target which can be tracked easily and is within the control of Flanders to influence.

Findings

In seeking to determine the drivers for establishing targets for environmentally-related SMM, our research suggests that the reasons fall into one or more of the following broad categories:

- Providing a future vision/inspiration for action (*e.g.* the Netherland's long-term waste policy vision);
- Coordinating actions among various actors (*e.g.* Japan's Basic Law for Establishing a Sound Material-Cycle Society);
- Providing a mid-term constraint as a bridge or means to encourage society to be prepared for a future expected reality (*e.g.* recycling rates in the EU which among other things encourage the establishment of recycling infrastructure);

³ Source OECD

- Providing a metric of success against which progress can be measured (*e.g.* waste targets within Finland's National Waste Plan); and
- As a signal of action on an issue (*e.g.* Chinese Taipei's target of reusing 85% of collected waste by 2020).

A few examples of current and emerging practices related to the adoption and implementation of target-based approaches for SMM-related instruments were also reviewed. The report provides insight in response to three main questions, including:

- What factors led to the acceptance of SMM-related targets in different policy landscapes?
 - This was found to be related to environmental reasons, a culture of target setting, a clear justification for action and a desire to coordinate a variety of activities.
- What are the parameters embodied in these existing target-based policies?
 - Given the scope of SMM there were a wide variety of parameters or policy instruments used to achieve the aims established by the targets.
- What are the experiences with these approaches to date?
 - A number of factors in the effectiveness of targets were identified, namely: government commitment; setting the targets at the appropriate level; a regular review process; an effective monitoring system; and adapting target based approaches to suit cultural differences or priorities.

A number of key considerations for policy makers in setting and implementing targets were also identified. These were grouped into three areas:

- Determining the objective of the target:
 - This refers to the outcome desired and is influenced by a number of factors including one's understanding of the system in question, the time dimension, the influence of other programmes, and which aspects of the system one is trying to influence.
- Understanding the capacity within the system to affect change:
 - This was found to be controlled by aspects such as authority, ability to engage the actors required to set targets and cultural differences.
 - An important consideration here is the current environmental, economic and social situations of a given place. Furthermore, governmental structures, geography and the distribution of infrastructure will also influence the ability to set targets and the process by which targets are set and monitored.
- Additional considerations when implementing targets:
 - When implementing targets the following aspects were identified as playing a particularly important role in their success: an effective monitoring system, an appropriate instrument mix, a regular review process, and awareness of the targets.

Conclusions

The research suggests that ‘good’ targets (*i.e.* those which are credible, are supported by government and society, are based on sound research and set at an appropriate level) can be effective in supporting SMM practices. The main challenge for policy makers is to understand the attributes of effective target setting and incorporate these attributes into their target-setting process.

Acknowledgements

This report was made possible by the contributions of numerous individuals who provided valuable insight into this emerging topic. Experts consulted for this work included: Yuichi Moriguchi, Ron Nielsen, Ester van der Voet, Guido Sonnemann, Sonia Valdivia, Stefan Bringezu, Raimund Bleischwitz and Joseph Fiksel. Those at the sub-national level who generously shared their experiences with targets were Christof Delatter, Mark McDermid, David Lawes, Teresa Conner, Ichiro Nagase and Tetsuya Doi. From the private sector, the following individuals shared their perspective and experience with establishing and using targets to drive their activities within their individual companies: Michiharu Yamamoto (Nippon Mining & Metals Co., Ltd.), Guy Boucher (Domtar), Michael Deane (Turner Construction), Edward Madzy and David DiMarcello (BASF), Karl Edsjö (Electrolux), and Markus Terho and Tarja Österberg (Nokia). Additionally, Angie Leith, Duncan Bury, Jay Illingworth and Derry Allen provided unique insights from their national and industry positions.

Contributions to the OECD Front Runner’s Experience on Sustainable Materials Management (SMM), 2nd SMM Workshop, held in Tel-Aviv, 2008, provided a substantial amount of background information which dramatically assisted with the research for this report.

RÉSUMÉ

Contexte

Ce rapport est l'un des trois rapports thématiques commandés par le Sous-groupe sur la prévention de la production de déchets et le recyclage (SGPDR) pour éclairer sa réflexion sur les « instruments d'action pour la gestion durable des matières ». Il a été en partie motivé par les difficultés que les négociateurs ont récemment rencontrées autour de cette question dans le cadre de l'OCDE (Recommandation du Conseil sur la productivité des ressources adoptée en 2008), du G8 (Plan d'action 3R de Kobe) et de l'UE (Directive-cadre sur les déchets). L'un des problèmes auxquels se sont heurtées ces négociations concernait les acceptions et interprétations différentes du terme « objectif », de ce qu'il recouvre et de la façon dont il est utilisé.

Objectif

La gestion durable des matières (GDM) et l'application aux déchets de l'analyse de la chaîne de valeur sont des composantes reconnues des politiques de consommation et de production durables (CPD) et de gestion des déchets. Toutefois, l'une comme l'autre rencontre des difficultés de mise en œuvre notamment pour établir des objectifs efficaces. L'objet du présent rapport est donc d'étudier les opportunités, les défis et les principales questions auxquels les décideurs sont confrontés pour fixer et mettre en œuvre les objectifs associés à la GDM.

Il convient de préciser que ce rapport vise expressément à analyser les opportunités, les défis et les principales questions concernant les objectifs, et non à en promouvoir la généralisation car celle-ci relève de décisions politiques qui, en dernier ressort, appartiennent aux gouvernements nationaux⁴.

Terminologie

Il est apparu essentiel d'établir une définition claire des différents types d'objectifs et d'en identifier les principales caractéristiques. Le rapport utilise les définitions et les concepts suivants.

- Définition pratique de la GDM :

La gestion durable des matières est une approche destinée à promouvoir une utilisation durable des matières, qui comprend des mesures visant à en réduire les incidences négatives sur l'environnement et à préserver le capital naturel tout au long du cycle de vie des matières, sans perdre de vue l'efficacité économique et l'équité sociale⁵.

- éventail d'objectifs allant du contraignant au non contraignant :

⁴ Source OCDE.

⁵ OCDE (2007), *Outcome of the First OECD Workshop on Sustainable Materials Management*, ENV/EPOC/WGWPR/RD(2005)5/FINAL, OCDE, Paris ([http://www.oilis.oecd.org/olis/2005doc.nsf/Linkto/env-epoc-wgwpr-rd\(2005\)5-final](http://www.oilis.oecd.org/olis/2005doc.nsf/Linkto/env-epoc-wgwpr-rd(2005)5-final)).

Type d'objectif	Caractéristiques	Exemple
Contraignant	Délai de réalisation court Portée réduite Responsabilité rigoureusement définie Généralement quantifiable Processus de suivi bien défini	Taux de recyclage fixe pour telle matière ou tel type d'emballage. (par exemple, en Flandre (Belgique), la politique des déchets stipule qu'il incombe à chaque commune de faire en sorte que le volume de déchets résiduels ne dépasse pas 180 kg par habitant en 2010)
Non contraignant	Délai plus long Portée plus large Responsabilité plus souple	Amélioration de la performance énergétique des nouveaux bâtiments (par exemple, éléments de la loi fondamentale japonaise pour l'édification d'une société fondée sur un cycle rationnel des matières)
Volontaire	Analogue aux objectifs non contraignants mais faisant l'objet d'un engagement volontaire	Initiatives volontaires de l'industrie (par exemple, projets pilotes néerlandais pour une politique des déchets axée sur la chaîne des matières)

- Objectifs stratégiques (finalités) :
 - Plus larges que les objectifs non contraignants en ce qu'ils prennent en compte un plus vaste éventail d'éléments et/ou en ce qu'ils ont des délais de réalisation plus longs. La responsabilité directe de ces objectifs est souvent limitée. En règle générale, ils servent à coordonner l'action à un niveau spécifique et proposent une vision pour l'avenir. Aux Pays-Bas, par exemple, une vision à long terme de la politique des déchets à l'horizon 2010 a été élaborée en y associant le marché⁶.
- Leviers stratégiques :
 - Il s'agit des moyens d'action et du degré d'influence dont l'autorité qui fixe les objectifs dispose pour changer un système. En Flandre, par exemple, un objectif est fixé pour le nombre d'agents de formation au compostage par habitant afin d'encourager et d'accroître le compostage domestique. C'est un objectif dont il est facile de suivre la réalisation et sur lequel la Région flamande a les moyens d'exercer une influence.

Résultats

En cherchant à déterminer les motifs qui conduisent à fixer des objectifs de GDM à des fins environnementales, cette étude a montré que ces motifs relèvent d'une ou de plusieurs des grandes catégories suivantes :

- Fournir une vision/source d'inspiration future pour l'action (vision néerlandaise à long terme pour la politique des déchets, par exemple) ;
- Coordonner les actions des différents acteurs (loi fondamentale japonaise pour l'édification d'une société fondée sur un cycle rationnel des matières, par exemple) ;

⁶ Source OCDE

- Instaurer une contrainte à moyen terme qui serve à la société de passerelle ou d'incitation à se préparer à une réalité future (taux de recyclage qui encouragent notamment la mise en place d'infrastructures de recyclage dans l'UE, par exemple) ;
- Fournir un outil de mesure du succès permettant d'évaluer les progrès réalisés (objectifs visant les déchets dans le Plan national de gestion des déchets de la Finlande, par exemple) ; et
- Manifester une intention d'agir concernant tel ou tel problème (objectif de réutiliser 85 % des déchets collectés d'ici à 2020 au Taïpei chinois, par exemple).

On a aussi examiné quelques exemples de pratiques existantes et nouvelles concernant l'adoption et l'application d'une approche par objectifs en vue de l'utilisation d'instruments pour la GDM. Le rapport fournit des éléments de réflexion en réponse à trois grandes questions :

- Quels facteurs ont conduit à accepter de définir des objectifs de GDM dans différents contextes de l'action publique ?
 - On constate que ces objectifs s'expliquent par des motifs environnementaux, une culture de la fixation d'objectifs, une justification claire de l'action, et un désir de coordonner des activités diversifiées.
- Quels sont les paramètres pris en compte dans les politiques par objectifs existantes ?
 - Compte tenu de l'ampleur du champ couvert par la GDM, un large éventail de paramètres ou d'instruments d'action publique sont utilisés pour atteindre les objectifs fixés.
- Quels enseignements ces approches ont-elles déjà permis de tirer à ce jour ?
 - Plusieurs facteurs d'efficacité des objectifs ont été dégagés, à savoir : l'engagement des pouvoirs publics ; la fixation des objectifs à un niveau adéquat ; un processus régulier d'examen ; un système de suivi efficace ; et l'adaptation des approches par objectifs en fonction des différences culturelles ou des priorités.

Cette étude a aussi dégagé plusieurs éléments clés à l'intention des décideurs désireux de fixer et de mettre en œuvre des objectifs. Ces éléments s'articulent autour de trois grands axes :

- Déterminer la finalité de l'objectif :
 - La finalité renvoie au résultat attendu et elle est fonction de plusieurs facteurs dont la conception que l'on a du système en question, le facteur temps, l'incidence d'autres programmes, et les éléments du système sur lesquels on entend agir.
- Bien cerner ce qui, au sein du système, est de nature à avoir une incidence sur le changement :
 - Il ressort que ce sont des facteurs comme l'autorité, la capacité à mobiliser les acteurs nécessaires à la fixation des objectifs, ainsi que les différences culturelles.
 - Un aspect important est la situation environnementale, économique et sociale d'un territoire donné. En outre, les structures gouvernementales, la géographie et la répartition des infrastructures ont aussi une incidence sur la capacité à fixer des objectifs et sur les processus de fixation et de suivi des objectifs.

- Autres éléments à prendre en considération pour la mise en œuvre des objectifs :
 - Les aspects suivants ont été identifiés comme jouant un rôle particulièrement important dans le succès de la mise en œuvre des objectifs : un système efficace de suivi, une panoplie appropriée d'instruments, un processus d'examen régulier, et une sensibilisation aux objectifs.

Conclusions

Cette étude suggère que de « bons » objectifs (à savoir crédibles, appuyés par les pouvoirs publics et par la société, fondés sur de solides recherches, et fixés à un niveau approprié) peuvent être mis efficacement au service des pratiques de GDM. Le principal défi pour les décideurs est de bien cerner les caractéristiques des objectifs efficaces et de prendre en compte ces caractéristiques dans le processus de fixation des objectifs.

Remerciements

Ce rapport n'aurait pas été possible sans le concours de nombreuses personnes et leurs précieux apports concernant cette nouvelle thématique. Parmi les experts consultés pour la présente étude figurent Yuichi Moriguchi, Ron Nielsen, Ester van der Voet, Guido Sonnemann, Sonia Valdivia, Stefan Bringezu, Raimund Bleischwitz et Joseph Fiksel. Au niveau infranational, ont généreusement partagé leur expérience en matière d'objectifs : Christof Delatter, Mark McDermid, David Lawes, Teresa Conner, Ichiro Nagase et Tetsuya Doi. Dans le secteur privé, ont fait part de leurs points de vue et de leurs expériences en matière d'établissement et d'utilisation d'objectifs pour conduire leurs activités au sein de leurs entreprises : Michiharu Yamamoto (Nippon Mining & Metals Co., Ltd.), Guy Boucher (Domtar), Michael Deane (Turner Construction), Edward Madzy et David DiMarcello (BASF), Karl Edsjö (Electrolux), et Markus Terho et Tarja Österberg (Nokia). En outre, Angie Leith, Duncan Bury, Jay Illingworth et Derry Allen ont apporté l'éclairage particulier d'acteurs de l'administration publique et de l'industrie de leurs pays respectifs.

Les contributions au deuxième atelier sur la GDM, intitulé « Front Runners' Experience on Sustainable Materials Management (SMM) », organisé par l'OCDE à Tel-Aviv en 2008, ont apporté un volume important d'informations de base qui ont grandement facilité les recherches menées pour le présent rapport.

1. INTRODUCTION

1. Sustainable Materials Management (SMM) and the concept of addressing waste issues by looking at the value chain are well accepted components of sustainable consumption and production (SCP) and waste policy. However, both face a number of challenges in implementation including the establishment of effective targets. As such, the purpose of this report is to explore the opportunities, challenges and important considerations faced by policy makers when setting and implementing SMM-related targets.

2. There are three major learning objectives related to this topic: why and how countries generate targets; how these targets are used; and the key considerations for policy makers when considering setting and implementing targets. Although these objectives deviate slightly from the original outline by the Working Group on Waste Prevention and Recycling, comments received on the draft version of this report indicate that this presentation of the information is preferable.

3. It should also be mentioned that this report is explicitly focused on the underlying opportunities, challenges and considerations related to targets – not at promoting their wider use *per se* – as this is a policy question that ultimately needs to be decided upon by individual governments.⁷

4. The research for this report consisted of five general inputs:

- Existing OECD research related to SMM, particularly case studies completed for the OECD Front-Runners Experience on SMM, 2nd SMM Workshop, held in Tel-Aviv;
- Literature from academia and think tanks looking at SMM-related policy topics and the use of targets in environmental policy;
- Interviews with both national and sub-national representatives;
- Interviews with experts in the field of SMM policy development; and
- Interviews with companies from a variety of sectors that are demonstrating leadership in the area of target setting.

5. A complete list of the individuals interviewed and sources reviewed for this report are available in Annex 3. In addition, specific concepts or comments attributable to a single source have been captured in the footnotes. It should be noted that it was not the purpose of this report to conduct a robust analysis of any one approach to SMM but rather to draw lessons from a variety of sources including individual programmes at various national and sub-national levels, as well as specific lessons from the private sector, to illustrate concepts in the report rather than direct or inform collaboration.

6. This report is part of the GWPR's new work on "policy instruments for SMM". It is one of three thematic reports that will inform and support future activities in this area. It was partly motivated by

⁷ Source OECD.

the recent experience and negotiations around this issue at the OECD (2008 Council Recommendations on Resource Productivity), the G8 (Kobe 3R Action Plan) and the EU (Waste Framework Directive). One challenge at these negotiations was the different interpretations and understandings of what a ‘target’ encompasses and how they are used.

7. The report, therefore, begins by presenting a clear definition of targets and their various forms which – informed by practice – cover a spectrum from ‘hard’ to ‘soft’ targets. It then provides a summary of the drivers for setting targets related to SMM. Based on available information, it documents the current and emerging practices of OECD member states in setting and using SMM-related targets. And it provides insight into the key considerations policy makers will want to address when setting and implementing targets. The report concludes by summarising the key findings/conclusions from all of the research conducted. Within the appendices, readers will find summary tables of the SMM programmes reviewed, a number of case studies on the private-sector experience in setting and implementing targets, and a list of data input sources.

2. DEFINITIONS

2.1 Sustainable Materials Management

8. The OECD's working definition of SMM was developed at the first OECD workshop on SMM held in Seoul, Korea in 2005. That definition, used throughout this report, is as follows: *Sustainable Materials Management is an approach to promote sustainable materials use, integrating actions targeted at reducing negative environmental impacts and preserving natural capital throughout the life-cycle of materials, taking into account economic efficiency and social equity.*⁸

2.2 Targets

9. The standard definition of a target, 'a goal to be achieved,'⁹ is insufficient to convey the variety of approaches used in SMM target setting. These cover the spectrum from vague qualitative targets with a great deal of flexibility (soft targets) to quantifiable targets with clear baselines, measures, accountability and dates for achievements (hard targets). We also observed the use of 'strategic objectives' that act as overarching concepts to coordinate activities at a more specific level. Policy makers have used a variety of targets from across this spectrum in order to achieve their objectives. The following provides an explanation of the various terms used to define this spectrum and its elements:

2.2.1 Hard Targets

10. These targets tend to have a short timeline (*e.g.* 1 to 5 years), a narrow scope (*i.e.* looking at a single product or material type), and have clear accountability. They are typically quantifiable in nature and include – as part of the target – descriptions of the measurement approach, a review process to ensure achievement and, in many cases, a clear articulation of the consequences of failing to achieve the target. Further, given the need to measure performance, hard targets are often focused on a single attribute and can be very specific in regards to which products, industries or segments of society are included in the target. Example: fixed recycling rates for a specific material supported by financial penalties for not achieving them.

2.2.2 Soft Targets

11. Usually broader in nature (*e.g.* looking at building performance rather than insulation values), soft targets typically have a variety of timelines and no specific accountability. Where there is clear accountability, soft targets have a level of flexibility which hard targets do not; the level of expected performance (*e.g.* a 25% reduction) or timeline (*e.g.* by 2015) can change as new information and experience become available. Example: the Japanese Basic Law for Establishing a Sound Material-Cycle Society sets specific targets for various industrial sectors but, as part of both annual and five-year review cycles, allows for adjustments to these targets as new information becomes available.¹⁰

⁸ OECD, (2007) *Outcome of the First OECD Workshop on Sustainable Materials Management*, ENV/EPOC/WGWPR/RD(2005)5/FINAL, OECD, Paris
([http://www.oilis.oecd.org/olis/2005doc.nsf/Linkto/env-epoc-wgwpr-rd\(2005\)5-final](http://www.oilis.oecd.org/olis/2005doc.nsf/Linkto/env-epoc-wgwpr-rd(2005)5-final)).

⁹ Merriam-Webster Online Dictionary, accessed from <http://www.merriam-webster.com/dictionary/target>.

¹⁰ Interview with Yuichi Moriguchi, Director, Research Centre for Material Cycles and Waste Management, June 2009.

2.2.3 Voluntary Targets

12. Related to soft targets, voluntary targets are those entered into by choice with the option of opting out. These targets are often related to some incentive (*e.g.* financial, training, reputation building) which makes meeting the voluntary target worth the effort. Example: the “Dutch chain-oriented policy pilot projects” involved companies from six pilot project categories (gypsum, zinc, carpet, food, expanded polystyrene, textile) that developed voluntary quantitative SMM targets, goals and plans which were then supported by the government.

2.2.4 Strategic Objectives (Goals)

13. In contrast to hard and soft targets, strategic objectives tend to be based on a broader set of considerations, more general concepts or longer timelines. They are primarily qualitative in nature, and lack a clear description of either the measurement mechanism or consequences for failing to meet the objective or goal.

2.3 Strategic Levers

14. This refers to the available methods and extent of influence a target-setting authority may have. As demonstrated throughout this report, this is an important concept given that the available strategic levers that exist for governments vary widely. For example, a jurisdiction may not represent a significant market for a specific product and therefore may have limited ability to influence its design, but it may be able to affect the recycling rate for that product.

3. CONTEXT AND OBJECTIVES OF SMM POLICY AND TARGET SETTING

15. Much has been written about the need for SMM, including the OECD's "Report of the 2nd Survey on SMM-Related Activities in OECD Countries".¹¹ In general, underlying environmental issues are the key drivers for the justification by policy makers for establishing SMM policies and related targets. For example, one author stated that: *Increasing material flows contribute to many of the world's environmental and social problems. In the near term, sustainable development is threatened not so much by the depletion of non-renewable resources such as minerals or fossil fuels, but rather by over-exploitation of renewable resources and the life cycle impacts or 'externalities' associated with material extraction, transport and utilization. These externalities include potential climate change due to global warming emissions; degradation of air, waste, land, and wildlife habitats in industrialized areas; and depletion of natural resources including fresh water, biomass, and topsoil. Hence, there is a need to explore the potential for achieving sustainable materials management (SMM).*¹²

16. The primary environmental drivers for national policies are domestically based and include reducing the life cycle impacts of materials. End-of-life issues such as access to landfill sites and impacts on land, water and wildlife tend to dominate. Global issues such as climate change and concerns regarding continued access to critical materials provide additional motivation in shaping environmental policy. Non-environmental drivers tend to be related to future economic considerations particularly related to the competitiveness of domestic firms.

17. Within the context of SMM, the rationales provided for public or private target setting seems to fall into the following broad categories:

- Providing a future vision/inspiration for action;
- Coordinating actions among various actors;
- Providing a mid-term constraint as a bridge or means to encourage society to be prepared for a future expected reality;
- Providing a metric of success against which progress can be measured; and
- As a signal of action on an issue.

3.1 Providing a future Vision/Inspiration for Action

18. Targets and, more specifically, strategic objectives can be used to provide a long-term future vision/inspiration for action, often driven by both a desire to motivate action and then to coordinate that action, as just mentioned. In many cases, setting targets at this broad and encompassing level – either in

¹¹ OECD (2009), *Report of the 2nd Survey on SMM-Related Activities in OECD Countries*, OECD, Paris (<http://www.oecd.org/env/waste>).

¹² Fiksel, J. (2006), "A Framework for Sustainable Materials Management," *Journal of Materials*, August, 2006. p. 15.

terms of inspiration (*e.g.* zero waste) or timeline (*e.g.* by 2050...) – requires an accepted level of flexibility. This is primarily due to the fact that a strategic objective can be set without a clear understanding of how it can or will be achieved. By allowing flexibility in the achievement of the targets, involved parties can move beyond discussions of how to achieve the target based on available information to a more direct conversation of the future state they would all like to work towards. In the private sector this is most clearly seen in bold statements such as ‘achieving zero waste’ where it is not clear how they will be achieved in the foreseeable future. In the public realm, it is employed by governments when striving to provide some coherence to a wide number of activities, programmes and targets. For instance, in Japan there is an awareness of material security, or access to the materials required for the functioning of the economy, and a clear need to improve the country’s ability to capture existing materials within its economy. Establishing longer-term objectives for material flows and material productivity has helped to create a future vision for the country and provided a springboard from which to act.¹³

19. There is also a clear difference between “what should be done” and “what can be done”. In the climate change debate a clear “what should be done” goal is to keep the global temperature rise below 2°C, but it seems very difficult to agree on “what can be done”. In the SMM such a “what should be done” goal does not yet exist and may even be very difficult to agree on, given the wide variety of materials. In the SMM it may even be easier to agree on the “what can be done” when implementing the targets reflected in the working definition of the SMM. On the other hand, it would perhaps be advisable to agree at the OECD level only on the “framework conditions or principles” for the SMM and let countries agree on the specific targets or approaches which would fit to their national circumstances.

3.2 Coordinating Actions among various Actors

20. In the case of national targets, the drivers for establishing SMM-related targets appear to be first and foremost a coordinating mechanism. In the case of Flanders in Belgium, for example, there are a wide number of instruments being applied by a number of different actors (*e.g.* public authorities, industry groups) in different departments and levels within the government. Targets are used as an effective way to ensure that these individual parts (*i.e.* actors, departments and levels) are working in a coordinated manner towards a future vision.¹⁴ The use of a target to coordinate activities can also be seen in the private sector where, depending on the objective and flexibility of the target, it may be set via a top-down process or bottom-up approach. The bottom-up approach involves looking at the information available and setting a target based on what is essentially known to be possible and is more common when establishing hard targets (*e.g.* reduce waste by 10%). The top-down approach entails establishing a vision for the future – often with limited understanding of how that will be achieved – and is more commonly used when establishing either a soft target or strategic objective (*e.g.* to be a leader).

3.3 Providing a mid-term Constraint as a Bridge or Means to Encourage Society to be prepared for a future expected Reality

21. SMM requires a long-term perspective. In both the Japanese and Dutch examples provided in this report, there are strategic objectives being set with a timeframe of between 5 and 40 years. However, given the length of these timelines, it can be difficult to spark activity in the near or mid-term. To address this, a number of governments and private-sector firms set mid-range targets in order to motivate more immediate action. In many cases these mid-term targets provide accountability that does not exist with long-term/future vision-type strategic objectives due to an expected lack of control over strategic levers for the duration of the target process. An example of this would be establishing an initial target for resource

¹³ Interview with Guido Sonnemann, UNEP’s Division of Technology Industry and Economics (DTIE), Sustainable Consumption and Production Branch, July 2009.

¹⁴ Interview with Christof Delatter, Director INTERAFVAL (Association of Flemish Cities and Municipalities), July 2009.

efficiency improvements within 5-10 years although resource constraints are not expected to affect an economy for 15-20 years. This might be done to allow sufficient time for adjustments in production processes, education, etc. which would be needed to respond to this future state.

3.4 Providing a Metric of Success against which Progress can be measured

22. A consistent motivator for establishing targets is to provide a mechanism for measurement, most often with the help of indicators. A number of individuals interviewed for this report commented that targets provide a way to monitor the success (or lack thereof) of a programme, instrument or effort. In other words, they provide a marker of what success 'looks like'. With a set target in place, individuals are motivated to track and measure the impact of their activities and can readily establish whether or not they have achieved this mark.

3.5 A signal of Action on an Issue

23. An interesting take on targets was that they can also be used as a means of demonstrating action on a particular issue (*e.g.* reducing waste).¹⁵ In both public and private scenarios, targets have been used to demonstrate that policy makers or companies are concerned about an issue and – through the process of setting a target – are then expected to take action towards it. If target setting is not followed by action, policy makers and companies can quickly lose credibility with stakeholders.

¹⁵ Interview with Christof Delatter, Director INTERAFVAL (Association of Flemish Cities and Municipalities), July 2009.

4. AN INVENTORY OF CURRENT AND EMERGING PRACTICE

24. Most OECD countries have some form of SMM policies, practices or targets in place. In some cases, long-standing policies are now elements of national programmes, in name or in practice, focused on SMM (e.g. incorporating waste policies and targets into more broad SMM policies). For the purposes of this report, we have distinguished between formal SMM policies – those with a clear framework, name and objectives – and informal SMM policies which lack this overarching structure but that may share many of the same implicit objectives (e.g. *integrating actions targeted at reducing negative environmental impacts and preserving natural capital throughout the life cycle of materials*¹⁶). We have done the same for programmes and activities. This approach aligns with the findings of the OECD’s Report of the 2nd Survey on SMM-Related Activities in OECD Countries.

25. In that survey, all 16 respondents indicated that they have “policies or programmes that explicitly address, or are relevant to, sustainable materials management”.¹⁷ Examples of these types of policies include regulating the management of problematic waste streams, increasing material/product efficiency and promoting their reuse and recycling, green procurement, and reducing energy use across the life cycle of products and services.

26. The clearest examples of formal SMM policies include Japan’s *Basic Law for Establishing a Sound Material-Cycle Society* and the Netherlands’ *National Waste Management Plan – Towards a Material Chain Policy*. Both programmes involve certain key elements in their target setting, including:

- A clear and strong government commitment to sustaining the use of materials in both an environmentally and economically efficient way, thereby providing credibility to the targets;
- A broad strategic objective/vision for where the programme should aim to bring society, through government action;
- Flexible or softer targets at higher and longer-term levels supported by harder targets for clearly definable activities; and
- Application of a variety of policy instruments to address specific obstacles to improving the material use and recovery within their national borders (including a variety of target approaches).

27. Detailed descriptions of the targets within each programme reviewed can be found in Appendix 1. Additional information on the policies themselves is available in the OECD Report “Policy Instruments for Sustainable Materials Management Interim Report 2 for the OECD”.¹⁸ Table 1 provides a sample of the types of targets being implemented at various stages of the life cycle. This is followed by discussions of the key questions posed in regards to the motivation for, implementation of and experiences with SMM-related targets.

¹⁶ OECD, (2007) *Outcome of the First OECD Workshop on Sustainable Materials Management*, ENV/EPOC/WGWPR/RD(2005)5/FINAL, OECD, Paris ([http://www.oilis.oecd.org/olis/2005doc.nsf/Linkto/env-epoc-wgwpr-rd\(2005\)5-final](http://www.oilis.oecd.org/olis/2005doc.nsf/Linkto/env-epoc-wgwpr-rd(2005)5-final)).

¹⁷ OECD (2009), *Report of the 2nd Survey on SMM-Related Activities in OECD Countries*, OECD, Paris (<http://www.oecd.org/env/waste>).

¹⁸ Forthcoming.

Table 1. Sample SMM Targets in Select OECD and Non-OECD Countries and Regions¹⁹

	Japan	Netherlands	Belgium (Flanders)	Finland	EU	Chinese Taipei	Mexico
Resource Extraction	Target for resource productivity with respect to earth and rock material	Programme looking at impact on land use (goals due out late 2009)	General objective to minimise use of finite resources	Target looking at gravel and crushed stone used in earthworks			General objective to minimise use of finite resources
Production		Programme looking at pollution, GHG reduction and land use (goals due out late 2009)	General objective to increase number of Flemish companies producing in an eco-efficient way by 2009 (based on 2003 eco-efficiency rates)	Material efficiency criteria and related programmes in development under the new waste management programme (targets due out in 2010)		No specific targets, but there are restrictions on manufacturing, import and sales of zinc-manganese batteries and alkaline manganese batteries that contain over 5 ppm of mercury	No specific targets, but producers of special management wastes and hazardous end-of-life products must develop specific waste management plans
Resource productivity	Targets set in the Fundamental Plan for Establishing a Sound Material-Cycle Society		General objective to optimise use of renewable resources		Increase resource productivity at the same or greater rate than the 2.2% productivity improvement seen over the last 10 years. Programme is looking at developing more targets to promote resource productivity		General objective to increase use of recyclable and reusable materials in production

¹⁹ Note: this table is based on available data, however, there are likely to be additional targets and programmes addressing the various stages defined, as well as similar practices in other OECD countries. See additional detail and source information in the Annex 1 National SMM-Related Target Summary Tables.

	Japan	Netherlands	Belgium (Flanders)	Finland	EU	Chinese Taipei	Mexico
Consumption	Top Runner Programme provides incentives for reduced energy use from non-industrial sources through a label indicating energy performance ²⁰		Increase sustainable consumption in retail and government sectors by 2015, based on 2008 levels	Material efficiency criteria and related programmes in development under the new waste management programme (targets due out in 2010)			
End of Life	Targets set in the Fundamental Plan for Establishing a Sound Material-Cycle Society Programme looking at waste-related GHG emissions	Goals due out late 2009	Extensive, quantifiable targets for household and industrial waste, building projects, end-of-life vehicles, tires, WEEE, batteries and oil	Extensive, quantifiable targets for municipal waste, manure and building projects	Extensive, quantifiable targets for household waste, end-of-life vehicles, WEEE, batteries and packaging	Quantifiable targets for household and industrial waste	General goal to increase alternative end-of-life waste treatment (thermal/ caloric or composting) and reduce waste to landfill by 2012

4.1 How did the Idea of Using SMM-related Targets come to be accepted in the Policy Landscape?

28. As documented by the OECD's second survey, environmental reasons are the leading driver for action on SMM followed closely by economic drivers. Specific drivers cited include shortages of landfill sites, reduction of hazardous substances, resource conservation, cost savings from the efficient use of resources and increasing competitiveness of small and medium-sized enterprises (SMEs).²¹ In regards to establishing national SMM-related targets, two items appeared to be key differentiators – an existing culture of target setting, and broad acceptance of the need for action.

29. The culture of target setting was seen as important in both Japan's and the Netherlands' description of why targets were established in relation to their programme. Specifically, in this context, there is an expectation that targets are explicit parts of various programmes. In other countries/contexts this expectation is not as strong and many programmes may be established without the similar need for targets to be explicitly stated within them. There may also be differences in the way in which the flexibility of targets are perceived, but demonstrating this was beyond the scope of the research of this paper.

30. As with other environmental policies (*e.g.* climate change policies, toxicity concerns) it was recognised that establishing both policies and targets was easier in cases where there was a clear and accepted need to do so. For Japan, this included the country's limited available space for landfilling and in the Netherlands it was the existence of sufficient data to demonstrate the need for action. The EU Waste

²⁰ British Columbia Ministry of Environment (2009), Design for Environment (DfE) Best Practices Lessons for British Columbia's Ministry of Environment, p. 11

²¹ OECD (2009), *Report of the 2nd Survey on SMM-Related Activities in OECD Countries*, OECD, Paris (<http://www.oecd.org/env/waste>).

from Electrical and Electronics Equipment (WEEE) Directive provides a further example, as it was driven by a clear need to address the implications of mismanaged WEEE. Once this need was broadly established, targets were part of political efforts to signal action on the issue.

31. In the case of Belgium (see “Coordinating actions among various actors” on page 10), targets were also seen as a coordinating mechanism for the wide variety of programmes which were being pursued at different levels of government involving a variety of actors, including regulatory bodies, state agencies, the public and the private sector.²² This was also echoed by Japan, which stated that although “it regards voluntary targets taken by industry to be important, [the] Government decided to have rather firm quantitative [national rather than industry-based] targets and take a variety of measures in an integrated manner to achieve set targets”.²³ As previously described, these targets provided a consistent direction towards which all of the efforts within these jurisdictions were working, regardless of their specific focus and level of resource support (*i.e.* both specific small-budget programmes and cross-sectoral large-budget efforts).

32. Finally, targets were used to provide a logical consistent vision for society in the long term. A clear example of this is the “zero waste” concept in Chinese Taipei. This is a long-term goal with a variety of specific focus areas and intermediate goals, such as a 75% reduction in waste generation by 2020.²⁴

4.2 What are the Parameters Embodied in these existing Target-based Policies?

33. In the countries reviewed for this report there is a wide variety of parameters or policy instruments used to achieve a policy’s strategic objectives and more specific hard targets. The breadth of policy instruments used is extensive and beyond the scope of this report; however, examples of this approach are:

- When the region of Flanders in Belgium established waste separation targets, the government offered support to those municipalities which initiated waste prevention programmes. For example, initiatives such as home composting were supported through subsidies for the purchase of containers and by educating the public. The government also used ‘smart-taxes’ in order to make landfilling more expensive than incineration and incineration more expensive than recycling.²⁵
- The Swiss waste management system does not rely on targets. Their approach is clearly a results-based approach where the targets have been “replaced” with mandatory bring-in and take-back systems which are free of charge for consumers, complemented with a convenient collection infrastructure (over 10,000 collection points for WEEE) and a pay-per-bag system for the disposable waste fraction (all separate collection systems are free of charge for consumers).²⁶

²² Interview with Christof Delatter, Director INTERAFVAL (Association of Flemish Cities and Municipalities), July 2009.

²³ Source: Ministry of the Environment, Japan.

²⁴ Source: Taiwanese Ministry of Environment.

²⁵ Source: Flemish Public Waste Agency, OVAM, Belgium.

²⁶ Please see *e.g.*: WEEE Ordinance, <http://www.bafu.admin.ch/abfall/01472/01478/index.html?lang=en>.

4.3 What are the Experiences with these Approaches to date?

34. Although the experience to date with setting targets related to SMM are generally qualitative due to the relative newness of the concept's application there are a few factors which appear to contribute to a target's effectiveness:

- Government commitment;
- Setting the targets at an appropriate level;
 - This is complicated by limited information on strategic levers and the complexity of the systems in question;
- A regular review process;
- An effective monitoring system to understand their impact; and
- Adapting target based approaches to suit cultural differences or priorities.

4.4 Government Commitment

35. The importance of government commitment can be seen in a variety of current and past experiences. Many of those interviewed for this report commented on the failure of early environmental policies looking at similar issues and longer-term concepts to achieve their stated targets or objectives. In part, this was related to a relative lack of government commitment to those targets and objectives when compared to other policy priorities (*e.g.* education, health, economy). In current programmes, this commitment is demonstrated by:

- Dedicating resources to the activities within the programme;
- Linking performance to economic activity (*e.g.* meeting standards to acquire the CE mark certifying that a product meets health, safety and environmental requirements for EU market access);
- Working collaboratively with a variety of stakeholders to clearly identify and address the obstacles to SMM in the most effective way (*e.g.* education, R&D investments, internalisation of environmental costs); and
- Establishing and refining targets based on the best available objective information.

4.5 Setting Targets at an appropriate Level

36. The research indicated that targets can be very effective motivators and can drive changes in behaviour when they are set at the right level (*i.e.* that the required strategic levers are available and that policymakers can achieve the right balance between motivating action and what is possible). A challenge in achieving this is having the appropriate information. It is important to have a clear understanding of the strategic levers available to drive change. In the case of products, this may be related to emerging technologies or alignment with product specifications in other jurisdictions (*e.g.* RoHS, EPEAT). One example of this is the development and adoption of lead-free solder in electronics, which has been driven by both technological advances and emerging regulations in the EU. The concept of control emerged numerous times in the recounting of private-sector experiences, with interviewees emphasising the importance of focusing their hard targets on those areas where they had control over the outcome versus

those where they only had influence. Domtar's experience with setting standards for forestry practices is a good example. The company set targets for their owned and leased properties prior to working with suppliers due to the relative levels of control which it held (see the Domtar case study in Appendix 2). Also, there is a clear difference between setting "minimum standards" (e.g. EU eco-design directive²⁷) and "performance standards" (e.g. recycling target in the EU Framework Directive²⁸). The Eco-design Directive establishes a framework for the setting of the EU eco-design requirements for energy-related products with the aim of ensuring the free movement of such products within the internal market, while the waste Framework Directive lays down a clear "hard target" of 50% by 2020 for reuse and recycling of at least paper, metal, plastic and glass from households and comparable sources.

37. Another challenge is in having insufficient data or experience to establish the appropriate scale for targets. Given the complexity of the systems being discussed (i.e. material flows through an economy) all interviewees pointed to life cycle concepts as the only way to really understand the opportunities for improvement and thus establish effective targets. This is further complicated by the non-linear rates of progress that tend to be S-shaped rather than straight.²⁹ For example, Flanders in Belgium saw limited growth in their recycling rates throughout the early 1990s (close to 20%). Then, between 1994 and 2001, rapid growth in this rate was experienced as it climbed close to 70% where it has more or less remained.³⁰ This adds another layer of complexity to setting targets, as it is difficult to know where on this innovation curve one finds themselves or what the ultimate impact of a new technology may be on the environmental performance of an industry or system. To overcome this, policy makers have selected different targets from along the spectrum depending on the information available (e.g. hard targets where the system and opportunities for change are clear; soft targets where information is vague and impacts are uncertain).

38. It was noted by a number of interviewees that the establishment of targets can often lead to an improvement in data availability. This was most clearly demonstrated by the Kyoto targets, which have led to a substantial increase in the amount of climate-related data around the world.³¹ This challenge of targets before data or data before targets is often addressed through incremental programme implementation. In the case of the Netherlands' Chain Policy approach, they have focused on applying the concepts to a few select industries so they can learn from the experience, such as the industrial response, before establishing clear targets.

39. In all of the policy frameworks reviewed there was variety in the types of targets used. In the case of Japan's Basic Law, there are hard national targets for the government to achieve and, in part, they reflect the vision for a sustainable Japanese society. However, these are not translated down to the level of individual activities.³² Rather, individual activities and programmes are informed by the general direction provided by the government's strategic objectives and are based on a deeper knowledge of the specific industry or system under consideration and the options available to improve performance. This level of detail is simply not possible at a national level, or for longer-term targets, given the variety of inputs and variables that would need to be understood. (See Table 2 below for a summary of target types and their key advantages and disadvantages.)

²⁷ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:285:0010:0035:EN:PDF>.

²⁸ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:312:0003:0030:EN:PDF>.

²⁹ Rotmans, J., R. Kemp and M. van Asselt (2001), *More evolution than revolution: transition management in public policy*.

³⁰ Source: Flemish Public Waste Agency, OVAM, Belgium.

³¹ Interview with Yuichi Moriguchi, Director, Research Centre for Material Cycles and Waste Management, June 2009.

³² Source: Ministry of the Environment, Japan.

Table 2. Summary of Target Types and Key Advantages and Disadvantages

Type of Target	Timeline	Focus	Accountability	Key Advantages	Key Disadvantages
Hard	Short (1-5 yrs)	Product or Material	Clear and enforced	Set a baseline Measurable Enforceable	Difficult to achieve agreement Information requirements Typically based on known opportunities
Soft	Short to Medium	Product System	Somewhat clear but flexible	Easier to achieve agreement Adaptable to new information Less stringent information requirements	Harder to enforce Less accountability Information requirements
Voluntary	Short to Medium	Product, Material or Product System	Various, generally clear but flexible	Easier to achieve agreement Adaptable to new information Less stringent information requirements Inspires action Flexible	Harder to enforce Less accountability Typically based on known opportunities
Strategic Objective	Long (10+ years)	Country or Market	Limited	Easier to achieve agreement Coordinate multiple programmes Inspires action Flexible Can be ambitious	Limited accountability Difficult to measure success

4.6 A regular Review Process

40. Acknowledging the evolving nature of the information required to set appropriate targets also implies the need for a review mechanism to incorporate new information as it becomes available – something which the Japanese and Dutch programmes have. In both cases, there is a review process for their broader objective targets as well as individual activities and programmes. Further, in cases where targets are not met they strive to understand the reasons for this failure and readjust targets when needed, incorporating lessons learned into future versions of the target. This flexibility was seen by interviewees as an important part of these programmes. In cases where flexibility is not possible due to a greater likelihood

of actors being held accountable for achieving the targets – even if they were set at the wrong level (e.g. expected technological solutions did not emerge) – setting hard targets becomes exceptionally difficult.³³

4.6.1 An effective Monitoring System to understand their Impact

41. Targets on their own are not sufficient to change behaviour; they require a clear support mechanism for their achievement and a monitoring mechanism to track and understand performance. In this way, targets provide a framework and measure of success for the activities and results being undertaken within a national or regional SMM strategy. This creates a challenge in its own right, as in certain circumstances data is simply not available to measure performance. In these cases policy makers have had to be careful not to use metrics or measurements that lead to unintended negative consequences. Corn-based ethanol is a good example. It has been supported as a means of reducing use-phase CO₂ emissions; however, over the life cycle it may lead to an increase in CO₂ emissions and may have negative social implications through increased food prices.³⁴ Therefore, in terms of monitoring the effects of targets and the ability to adjust them, the measurement mechanism or the policy instruments selected is critical. Interestingly, when speaking to sub-national representatives in Canada and Belgium, it was made clear that in these countries the government has punitive measures it can apply to industry or other actors but that these are rarely if ever applied. Rather, in most cases, issues of poor performance are addressed by developing an understanding of the obstacles to achievement and working collaboratively to overcome them.³⁵

4.6.2 Adapting Target-based Approaches to suit Cultural Differences or Priorities

42. Although national targets can be an effective way of driving changes in behaviour they are not the only means of creating change and effective programmes tend to respond proactively to opportunities wherever they may arise. As demonstrated in both the United States and Canada, there are sub-national programmes which have encouraged improved performance in a variety of areas without national targets (see the case study *Target Setting for Extended Producer Responsibility - Electronics in Canada* in Appendix 2). When considering these programmes, it appears that leveraging industry's preference for results-based management over regulation (i.e. allowing them greater say in the creation of programmes, activities and so on) has led to partnerships achieving what would have traditionally been stipulated in national targets. Sub-national representatives for both countries commented that, although there are specific areas where national targets would be effective, the focus provided at the sub-national level is required to understand the strategic levers which are available to drive change. As noted by one expert, an effective means of facilitating change is to achieve improvements in a sufficient number of companies so that you get to a “tipping point” or level of acceptance in the industry, where the behaviour switches from being considered leading practice to being common practice.³⁶

³³ Interview with Mark McDermid, Sector Specialist, Wisconsin Department of Natural Resources, Cooperative Environmental Assistance Bureau, July 2009.

³⁴ C.D. Howe Institute (2008), C.D. Howe Institute Commentary - The Ethanol Trap: Why Policies To Promote Ethanol as a Fuel Need Rethinking.

³⁵ Interviews with David Lawes and Teresa Conner, Ministry of Environment, British Columbia, Canada; and Christof Delatter, Director INTERAFVAL (Association of Flemish Cities and Municipalities), July 2009.

³⁶ Interview with Mark McDermid, Sector Specialist, Wisconsin Department of Natural Resources, Cooperative Environmental Assistance Bureau, July 2009.

5. KEY CONSIDERATIONS IN SETTING AND IMPLEMENTING TARGETS

5.1 Setting Targets

43. In conducting the research for this report there was near universal agreement among the interviewees with the idea that good targets are desirable. The main challenge for policy makers is to set 'good targets' (*i.e.* those which are credible, are supported by government and society, are based on sound research and set at an appropriate level). What defines a good target is its ability to engage the group responsible for its achievement to enthusiastically pursue it and achieve all possible improvements. The process of setting good targets has been described as more of 'an art than a science' due to the numerous variables involved and the inability to accurately predict future events. Because of this, target setting must incorporate as much information as possible. In most situations, a number of unknown variables will exist and require judgement to determine their likely influence. In this section of the report, the key issues which should be considered when striving to establish good targets and lessons learned from both private- and public-sector experience are reviewed.

5.2 Determining the Objective of the Target

44. The first consideration is the desired outcome that the target is trying to achieve. As described in previous sections, different types of targets are used to achieve different outcomes. For instance, if the objective is to provide coordination among a variety of actors, policy makers should likely consider setting strategic objectives. In contrast, if there is a specific activity that policy makers are trying to avoid or reduce (*e.g.* disposal of gypsum in landfills), hard targets are likely more appropriate.

45. The level of understanding policy makers possess in regards to the system they are trying to influence is an important factor when establishing targets, in particular when considering what types of targets to employ. It is also a critical factor in the credibility of targets (see Box 1 for the EU's approach to developing an understanding of systems).

46. This is particularly true when considering hard targets; the greater the hardness or lack of flexibility or greater accountability a target will have, the higher the expectation that policy makers can justify this additional level of constraint. In practice, policy makers have addressed this complexity in four ways:

- First, effective targets are based on a thorough review process with input from a wide number of informed sources;
- Second, where information is not available or is limited, targets tend to be soft or strategic objective are used;
- Third, policy makers focus on specific systems or actions within the whole, where information is relatively prevalent and credible targets can be set and will engage those responsible for their achievement; and,
- Finally, policy makers address this challenge through the use of pilot programmes to develop a deeper understanding of specific systems and the inherent challenges and opportunities which they face in the application of strategic levers to achieve a specific target.

Box 1. Methodology for Completing Preparatory Studies

The following is the process used in the EU to complete the preparatory studies for energy-using products. It was designed to provide a complete picture of the issues, challenges and opportunities related to a product category.

Task 1 – PRODUCT DEFINITION

- within a product group, what types of this product should be included and excluded?

Task 2 – ECONOMIC ANALYSIS

- market investigation and quantification of current stock of product in EU market and expected growth

Task 3 – CONSUMER PERSPECTIVE

- actual usage and local infrastructure

Task 4 – TECHNICAL ANALYSIS OF EXISTING PRODUCTS

- investigate whether existing standards/regulations for this product group can be used

Task 5 – BASE CASE AND ENVIRONMENTAL ASSESSMENT

- look at the product in all stages of its life cycle to quantify environmental impacts for each sub-group of products using the MEEuP tool (life cycle tool)

Task 6 – TECHNICAL ANALYSIS OF BEST AVAILABLE TECHNOLOGY (BAT)

Task 7 – IMPROVEMENT POTENTIAL

- BAT, options, impacts, long-term targets

Task 8 – SCENARIO ANALYSIS

- create an impact assessment/sensitivity analysis reflecting impacts on environment, market, and policy

Sources: Personal Communication, Dr. Constantin Hermann, PE International, 23 Sept 2008;
http://ec.europa.eu/energy/demand/legislation/doc/2006_11_21_workshop_meeup_en.pdf

47. Areas that policy makers need to consider when establishing good targets include:

- The time dimension – for example, setting a target for improved design is different for a product which is redesigned on a regular basis (*e.g.* a personal computer) versus one that is redesigned less frequently or stays on the market longer (*e.g.* an oil tanker).
- The interrelationship between targets and other aspects of the current system being addressed by other programmes, policies or targets, and how establishing new targets can support the overall strategic objectives of the government – for instance, SMM programmes and targets likely want

to incorporate or align themselves, wherever appropriate, with other economic or social targets (*e.g.* job creation through recycling infrastructure).

- Which aspects (*e.g.* design, waste, recycling) should be covered by the policy or target? Targets have been applied to different objectives and stages of the life cycle. Examples include:
 - Resource productivity:
 - In Japan, the government has established a target for economic activity per material of Yen 420,000 per tonne of material (excluding the input of rock and earth) by fiscal year (FY) 2015.
 - Specific material streams (*e.g.* paper, e-waste, building materials):
 - In the Netherlands, the government is piloting a series of programmes looking at six specific material streams. In this pilot phase, companies from these material chains established voluntary quantitative targets, goals and plans – many of which were supported by the government.
 - Materials Reuse:
 - In Flanders, Belgium they have established a series of household waste targets, including the collection of 5kg per inhabitant of re-usable products by recognised re-use centres for the purpose of reselling.
 - Waste Generation:
 - To encourage domestic composting in Flanders they have established a target of six active ‘compost masters’ (*i.e.* compost promoters/advisors) per 10,000 inhabitants.
 - 3Rs:
 - In the EU, there are a number of policies which work together to address resource efficiency. For example, the Directive 2000/53/EC on end-of-life vehicles sets out a target of 85% reuse and recycling of vehicles by weight by 2015.
 - Waste management:
 - Given that a number of SMM-type policies and targets have either grown out of or incorporate existing waste management programmes; it is not surprising that there are a wide number of targets (*e.g.* hard targets for waste disposal per capita in Belgium).
 - Product specific EPR programmes:
 - Where product capture rates are difficult to determine, other performance indicators can be used at the outset such as programme access, consumer awareness surveys, waste audits, web site traffic, etc.
- The level of difficulty in achieving the target (*e.g.* easy versus inspirational) is a difficult and complex issue. Ultimately, it is hoped that targets will encourage an improvement in a particular activity or area. The challenge is that targets which are too easy do not capture the extent of

improvement possible, while those perceived as being too difficult will discourage actors and fail to engage them. Ideally, good targets strike a balance between these extremes, pushing the limits of improvement while maintaining the engagement of individual actors in the system that control the strategic levers of change. Achieving this balance was recognised by all those interviewed for this report as a substantial challenge which is dependent on a number of variables. However, by incorporating the considerations provided here, policy makers can improve their likelihood of finding balance between the extremes.

48. These areas of consideration are also critical in achieving a sufficient level of understanding of the system in question. Although it is somewhat easier at a more specific level, it is practically impossible to have all the data and information one would want to establish a good target. Therefore, policy makers and their stakeholders will have to make decisions regarding how much information is sufficient prior to establishing a target. Examples of barriers to a complete picture of the system include:

- A lack of life cycle data, although this is starting to be addressed through an increased number of life cycle studies and efforts by a variety of sources to dramatically increase the amount of life cycle data available (*e.g.* Wal-Mart, the European Commission's European Life Cycle Database³⁷);
- A lack of data on other life cycle considerations (*e.g.* life cycle costing, social implications, toxicity, technical hurdles, environmental consequences of expanding, changing or improving technologies);
- The costs associated with data collection, which can be substantial;
- A lack of programme experience (*e.g.* recovery of end-of-life compact fluorescent lamps);
- The requirement for a variety of perspectives, which may have contradictory priorities;
- A lack of clarity on how markets and individuals will react to various policy instruments implemented to achieve the target; and
- Difficulty in understanding the practicality of various technological options.

49. While these are applicable to all targets, the challenges faced in developing SMM-related targets are particularly pronounced. This is the result of the sheer complexity of the system in question, which theoretically encompasses the ways in which all materials flow through a country and region. Therefore, it is not surprising that governments tend to select specific areas for action and progress in a step-wise fashion rather than attempting to set policies and targets which are all encompassing. (See Box 2 for a description of the Dutch pilot programmes).

³⁷ For more information on the EC's ELCD please visit <http://lca.jrc.ec.europa.eu/lcainfohub/datasetArea.vm>.

Box 2. Application of the Chain Approach in Waste Policy in the Netherlands

The following is a brief description of the process used in the Netherlands in piloting their Chain-Oriented Waste Policy and how they have used that process to understand the issues, challenges and opportunities available to inform their policy.

Initial Step – In 2007, they selected six waste streams in which to carry out pilots.

Pilots – Within each of these waste streams, they worked with highly motivated companies to achieve a substantial reduction of waste-related environmental pressure across the chain.

Reporting Progress – In May 2008, the companies presented their action plans and initial results.

Next Steps – The lessons learned from these pilots have provided the government with valuable insights into the operation of a chain approach in practice and into the preconditions which the government needs to create in order to enable companies to apply this approach successfully. These lessons have been incorporated into the Chain-Oriented Waste Policy Programme 2009-2012.

Source: OECD

5.3 Understanding the Capacity within the System to affect Change

50. A final broad consideration when setting targets is the capacity of policy makers in areas such as authority, effect on strategic levers and technological solutions. This is an important consideration as there is a direct link between the credibility of accountability under a target and control over the strategic levers to achieve the desired outcome.

51. The case study for Turner Construction (see Appendix 2) provides a good example. It chronicles the company's selection of targets focused on improving the management of materials at their construction projects rather than setting goals for building a certain percentage of environmentally preferable buildings. This was a conscious decision on their part based on the acknowledgement that they controlled their construction practices and, therefore, could create accountability for executing on this aspect but could not control whether or not their clients requested the construction of environmentally preferable buildings – even though they encouraged this practice.

52. Similarly, policy makers are constrained by a number of factors which should be considered and incorporated into the setting of targets. Examples of these include:

- Authority in regards to jurisdictional control over the system in question:
 - As with many waste policies, jurisdictional control may involve a number of actors (*e.g.* landfill policies at the municipal level, recycling rates set at the regional level). When considering setting targets which cross these boundaries, it is important to understand where authoritative control for the areas in question lies and incorporate this into the design process;
- Authority to monitor or enforce the targets:
 - In researching this report a number of monitoring systems were identified, including strict reporting systems (*e.g.* EPR in Canada) and voluntary practices where stakeholder pressure enforces the targets (*e.g.* voluntary private-sector initiatives). When setting targets, it is

important to consider where the authority to monitor and enforce the targets rests and what information will be required by the monitoring party to ensure accountability.

- Authority to set targets or engage the actors required to set the targets (*i.e.* those controlling the strategic levers required for action).
 - As demonstrated by the Turner Construction example, it is important to understand who controls the strategic levers required to affect the change desired and whether one has the authority or influence to engage them. Another example would be small jurisdictions that may not have the influence to engage multi-national companies on adjusting the design specifications of their products (*e.g.* a municipality trying to convince electronics manufacturers to remove brominated flame retardants from their product).
- Cultural factors
 - Differences in cultural considerations are likely best illustrated by experiences at different private-sector firms. In engineering-type firms, for example, it is common to see clear targets that provide a measure of success. In others, actions can be driven by the specific target and by competition among individuals or business units. In these cases, the target is more about being a top achiever within a specific metric or combination of metrics, making a non-ambitious target somewhat irrelevant if there is a sufficient level of competition. For example, Turner Construction set a target for the number of Green Building trained professionals (*i.e.* Leadership in Energy & Environmental Design Accredited Professionals [LEED APs]) within the company, but this target was quickly surpassed as different departments competed with one another to have higher numbers of trained professionals.³⁸ While this scenario is difficult to generate in public policy, the EPEAT programme in the US followed this trend by generating a level of competition amongst producers to exceed minimum government procurement standards and strive for higher EPEAT ratings.³⁹ It has also been a factor in Wisconsin, where active engagement of forerunner companies has created a draw for improved performance across industries.⁴⁰

5.4 Considerations when Implementing Targets

53. Once targets are set, the ease with which they are implemented is determined by four key items: i) An effective monitoring system; ii) An appropriate instrument mix; iii) A regular review process which incorporates lessons learned and new information; and iv) Awareness of the targets themselves.

- An effective monitoring system:
 - An important part of target setting is reaching agreement on how progress will be measured. This is necessary guidance for the parties responsible for achieving the target and those responsible for monitoring and reporting on progress (*e.g.* government bodies). This is also linked to the concept of accountability, as it is an important element in ensuring, as much as

³⁸ Interview with Michael Deane, Vice President and Chief Sustainability Officer, Turner Construction Company, July 2009.

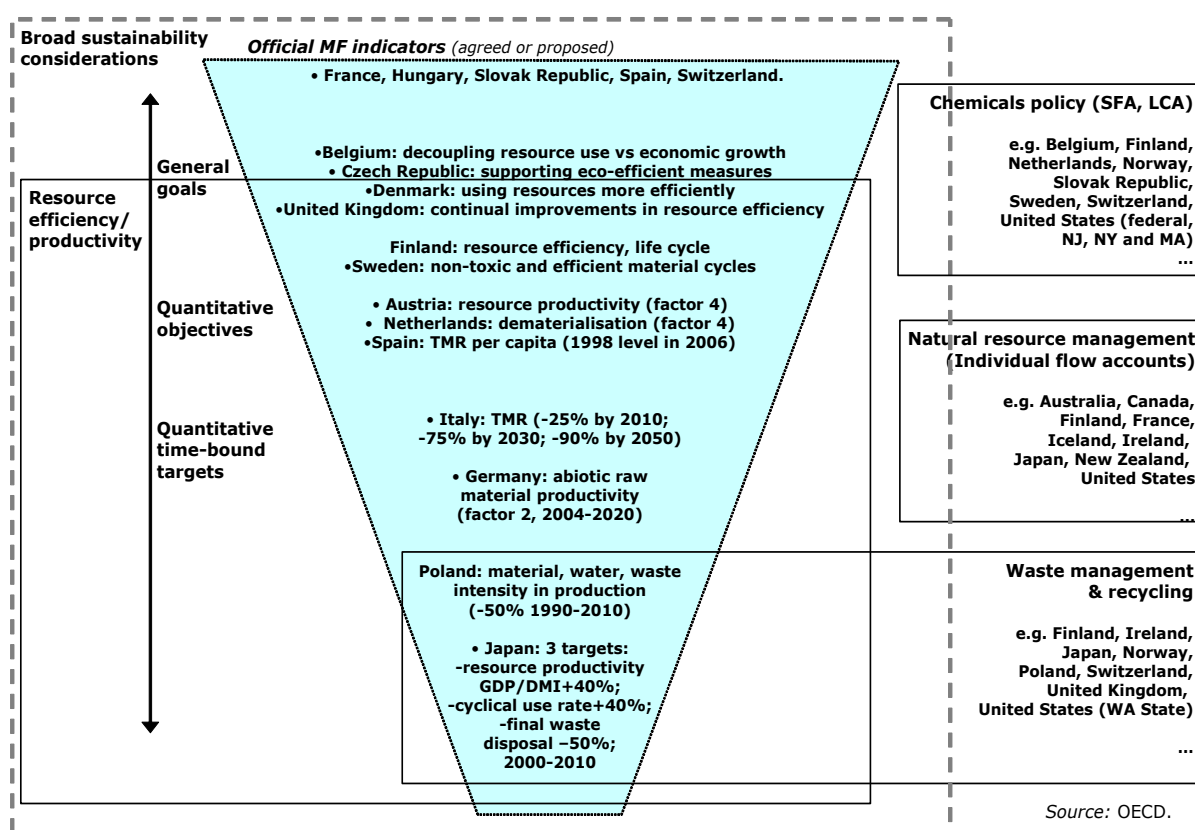
³⁹ For more information on EPEAT or "Electronic Product Environmental Assessment Tool" please visit www.epeat.net.

⁴⁰ Interview with Mark McDermid, Sector Specialist, Wisconsin Department of Natural Resources, Cooperative Environmental Assistance Bureau, July 2009.

possible, that parties are held to the same standard. Further, monitoring progress is used in practice to ensure that the objective the target is striving to achieve (e.g. reduced waste in landfills from recycling programmes) is being met and that there are no unintended negative consequences (e.g. illegal dumping).

- In many OECD countries, goals and objectives concerning the efficient management and sustainable use of natural resources and materials have been embodied in national sustainable development strategies (NSDS) or environmental action plans. In a few countries, time-bound quantitative targets have been defined. In general, these targets are not mandatory but are rather an expression of desired policy directions.⁴¹ Examples of material flow information linkages to policy goals are presented in Figure 1.

Figure 1. Examples of Material Flow information linkages to policy goals



- Monitoring of waste separation targets in Flanders, Belgium demonstrates some of the best practice in this area. In this case, approximately 90% of municipalities established voluntary environmental agreements with the regional government. These agreements defined the approach to measurement and the efforts of the municipalities were monitored. Where targets are not met, the government has a legal right to take over waste handling within the jurisdiction and charge the municipality for it, although this has never been used in practice.

⁴¹ OECD (2008), *Measuring Material Flows and Resource Productivity, Part III, Inventory of Country Activities*, <http://www.oecd.org/dataoecd/47/28/40486068.pdf>.

Where targets are not met but have been pursued in good faith, they are reviewed and adjusted as appropriate. Further, as part of this monitoring, the government looks for anomalies and the impact of the programmes. In one case, in an effort to discourage household waste generation, a municipality raised the price of disposal substantially which led to an increase in illegal dumping. Through effective monitoring, this was caught and the policy mix was adjusted to address the issue.⁴²

- In the European Union (EU), the Parliament, the Council and the Commission have set in place a comprehensive system of around 60 legal acts aimed at ensuring that all waste in the EU is managed so as to prevent harm to human health or the environment. However, in many parts of the EU, implementation of the EU legislation and targets falls significantly short of obligations. These gaps of implementation have given rise to significant problems in many parts of the EU, most notably to illegal waste dumping and illegal waste shipments. In this situation, the protection of human health and the environment, which is the overarching goal of the EU waste legislation, is not achieved.⁴³
- An appropriate instrument mix:
 - As demonstrated throughout this report, governments apply a wide range of policy instruments to achieve the desired target. A consistent trait among the policies reviewed was a willingness to apply the most appropriate instrument to achieve the target. In certain circumstances this implies a results-based approach with little involvement in the process of achieving targets.⁴⁴ In others, it involves providing a framework for measurement (*e.g.* EPEAT in the United States) or supporting specific costs associated with adaptation (*e.g.* subsidising the cost of compost bins in Belgium). In the policies reviewed, government bodies were not dogmatic in regards to which policy instrument to apply to which challenge; rather, they drew from those available and sought input from a variety of stakeholders in order to apply the most appropriate mix.
- A regular review process:
 - The review process has proven to be a critical aspect of target implementation, as it assists policy makers with overcoming a number of the challenges, including: i) Dealing with the reality of imperfect information; ii) Achieving agreement on targets; iii) Gaining credibility for the target; and iv) Applying an appropriate instrument mix. In Japan, the Basic Law for Establishing a Sound Material-Cycle Society has a number of review mechanisms that are seen as critical to the effectiveness of the programme. For example, progress against specific targets is regularly measured with indicators and documented in annual progress reports by companies and sub-national governments. Further, and perhaps more importantly, the entire programme – including the instrument mix, micro targets and strategic objectives – is reviewed every five years. In practice, this provides a formal mechanism to incorporate lessons learned over the previous implementation period; new research and better understanding of technological advances can be taken into consideration, and adjustments can be made to ensure progress towards the long-term objectives. Further, having a review

⁴² Interview with Christof Delatter, Director INTERAFVAL (Association of Flemish Cities and Municipalities), July 2009.

⁴³ Study on the Feasibility of the Establishment of a Waste Implementation Agency, Revised Final Report, 7 December 2009, http://ec.europa.eu/environment/waste/pdf/report_waste_dec09.pdf.

⁴⁴ See Appendix 2, EPR in Canada Case Study, for an example of this approach.

process that incorporates a great deal of flexibility in adjusting targets based on available information has its advantages. Specifically, this allows greater freedom to those responsible for its achievement. They can commit to action based on the best information available today and know that there is an opportunity for greater refinement in the future as they learn from experience.

- Awareness of targets:
 - Awareness of the targets, including a clear understanding of the need to achieve them and who is ultimately accountable, is a critical aspect of target implementation. This can be achieved by active engagement in the setting of targets, maintaining transparency in the monitoring process and ensuring ongoing communication of progress among all stakeholders.

6. LESSONS LEARNED AND CONCLUSIONS

54. The key lesson of this report is that ‘good’ targets can be effective in supporting SMM practices. The main challenge for policy makers who have decided to set targets is to ensure targets are ‘good’ by making certain that they are credible, are supported by the government and society, are based on sound research and that they are set at an appropriate level. To do this, it is critical that policy makers understand the attributes of effective target setting and incorporate them into their target-setting process, particularly in regards to the target’s appropriateness (based on the information available), flexibility and level. Given the complexities involved in the consideration of SMM policies, most policy makers who have established SMM-related targets have addressed these attributes by using hard targets in those areas supported by substantial information and where strategic levers to achieve the target are clear.

55. Additional findings of the report are centred on the justification for and practice of setting and implementing public and private sector SMM-related targets. These include:

- Underlying environmental issues, which are driving the justification for establishing SMM policies and related targets. This relates to both the environmental issues (*e.g.* increasing waste generation, limited space available for landfilling), as well as future economic considerations (*e.g.* availability of, raw materials and resources). In the private sector, similar concepts are driving behaviour but are translated into the business case for action and described in terms of cost savings (*e.g.* eco-efficiency), risk avoidance (*e.g.* social licence to operate) or emerging opportunities (*e.g.* technology for urban mining or recycling).
- Dynamics within a jurisdiction that can affect the ability to set and implement a target effectively at the national level (*e.g.* legal authority, resources and public support to act on an issue). In certain jurisdictions targets implicitly have a level of flexibility with actions being more important than specific results while in others this level of flexibility is not present and specific results are critically important.
- Available strategic levers to drive changes in behaviour. For example, smaller jurisdictions are more likely to generate action if they align efforts with those of larger actors or work with domestic producers to train and share best practices. In larger jurisdictions, more policy options are available as they have a greater influence on behaviour (*e.g.* the requirement to meet basic environmental criteria prior to receiving the CE mark for market access to EU). In many countries a mix of policy instruments are used to address a variety of strategic levers (*e.g.* educational programmes, government procurement programmes that favour environmentally preferable products and targeted recycling programmes).
- The implications of adding pressure to a system through economic or other policy measures, as these may lead to unintended consequences (*e.g.* a substantial increase in disposal fees in one municipality in Belgium led to a dramatic increase in illegal dumping of waste).
- The use of a detailed engagement process to develop better understanding of a system and what is possible within it. This is often done at a micro or specific level (*e.g.* through a product system,

sub-national body or industrial sector) rather than national level, and relates to the idea of understanding strategic levers.

- The ability to access information on the full product system. This is likely why most programmes focus specific target setting at the micro level. An example of the challenges and technical hurdles faced can be demonstrated by comparing different materials. The quality of wood-based materials (forest products) can degrade over recycling cycles, whereas many metals can be recycled almost infinitely. It is, therefore, important to consider what the key sustainability issues are for each material stream – in this case, resource extraction for forestry versus recovery and recycling for metals.
- The cultural context of policies. For example, in the Netherlands and Japan there is greater opportunity for establishing national targets due to their culture of consensus-based decision-making, government structure, and resource and population base.
- The ability to measure progress towards the target. This was identified as a key challenge in the successful implementation of targets. Defining clear indicators of progress was seen as important both for establishing credibility of, and ensuring accountability for, the target.
- Other elements critical to implementation of the target – the credibility of the target; an effective monitoring system; an appropriate instrument mix; a regular, robust, review process; and awareness of the target itself.
- Governmental structures, geography and the distribution of infrastructure will influence the ability to set targets and the process by which targets are set and monitored. In federal jurisdictions with shared responsibilities for some environmental issues and discrete responsibilities for others setting targets can be complex process of consultation and negotiation.

56. In conclusion, this report demonstrates that targets can be an effective part of SMM policy when set at the appropriate level. The challenge for policy makers is in achieving this ‘appropriate level’ given the complexity of the systems in question and the lack of complete information. The report identified a number of considerations for policy makers within the areas of understanding the objectives of the target, capacity for change in the system, and additional considerations when implementing targets. Developing an understanding of these within the system in question is seen as important in determining the potential effectiveness and appropriateness of different types of targets. Further it was found that a single definition of targets is not sufficient to address the variety of the characteristics which targets embody across the hard to soft spectrum.

7. APPENDIX 1: NATIONAL SMM-RELATED TARGET SUMMARY TABLES

Programme: Japan's Basic Law for Establishing a Sound Material-Cycle Society (SMCS) ⁴⁵
<p>Description: Japan has created its Law for Establishing a SMCS outlining clear quantifiable national targets for resource productivity, as outlined in its Fundamental Plan. This structure provides the overall vision for SMCS-related activities that are carried out through joint efforts of the government and other concerned parties.</p>
<p>Overall Objective: To establish a SMCS or a society in which the consumption of natural resources is minimised and the environmental load is reduced to the extent possible by: preventing or reducing the generation of waste; promoting proper recovery/recycling of products and materials when they have become recoverable/recyclable resources; and ensuring proper disposal of recoverable material resources that were not recovered or recycled.</p>
<p>Summary of Policy Instruments: The Basic Law falls under the Fundamental Plan, which sets longer term targets. While there are quantifiable targets at the national level, a variety of policy instruments – including voluntary targets, as well as programmes related to waste management, recycling and green procurement – are used to encourage action at the micro level. The types of targets set at the national level include: resource productivity; use of specific material streams (<i>e.g.</i> paper, e-waste, building materials); reuse of materials; generation of waste (<i>e.g.</i> industrial, hazardous, municipal); 3Rs (reduce, reuse, recycle); and waste management targets for incineration and landfill. Targets also include several household/individual activities like reduction of municipal solid waste. National targets are kept consistent with public/private targets, such as National Waste Management Plan 2008 and Keidanren Targets for Voluntary Activities for Waste Reduction. Moreover, in addition to tracking national indicators, the government is also tracking industry-specific resource productivity and has set quantitative, industry-specific waste reduction targets. The thinking is that estimates from each industry sector will allow for a more accurate analysis of factors affecting change. The hope is to track resource productivity internationally in the future so cross-country comparisons can be made. Japan is also expanding its efforts to the international level in order to work with its neighbours on improving regional materials management. Targets are primarily established around two main dates: 2050 is the “Sustainable Year” around which long-term targets are based; 2015 is the “Milestone Year” and is the year regarded as the target in the Second Fundamental Plan for Establishing a Sound Material-Cycle Society. Extensive quantitative targets exist under this Plan, including those for reducing wastes, changing attitudes and awareness, and shifting business practices.</p>

⁴⁵ Source: Ministry of the Environment, Japan

Specific Parameters Being Used	
<p>Resource Extraction: Limited information found. Data is collected on earth and rock resources with respect to resource productivity.</p> <p>Target of 87% effective use rate for reuse of construction-generated soil by 2012</p>	<p>Resource Productivity: (Gross Domestic Product [GDP] divided by the input of natural resources and others) ~Yen 420,000 per tonne in FY 2015 (The Yen-per-tonne target increases over time, based on the idea that the annual GDP should remain adequate when using smaller inputs of resources).</p> <p>Resource productivity, excluding the input of earth and rock resources, is ~ Yen 770,000 per tonne in FY 2015.</p>
<p>Production: A target has been set to increase the utilization ratio of cullet in the manufacturing of glass containers to 90% before fiscal 2010 based on the “Law on Promotion of the Effective Utilization of Resources”.</p>	<p>Consumption: Japan Top Runner Programme provides incentives for reduced energy use from non-industrial sources through a label indicating energy performance.⁴⁶</p>
<p>End of Life: Final disposal amount (the amount of landfilling of waste from municipal solid waste and industrial waste) is ~ 23 million tonnes in FY 2015.</p> <p>Sample industry-specific final disposal volume targets include:</p> <ul style="list-style-type: none"> • Iron and Steel Industry - 75% waste reduction by 2010 based on 1990 disposal levels. • Construction Industry - 87% reduction by 2010 based on 1990 levels. • Electrical power industry - 79% reduction by 2010 based on 1990 levels. <p>Cyclical-use rate (Volume of cyclical use divided by Volume of cyclical use + Natural resources input) is ~ 14-15% in FY 2015. The idea is that, over time, this indicator should increase when cyclical use is lengthened and the amount of final disposal is reduced.</p> <p>Reduce waste-related greenhouse gas (GHG) emissions by 7.8 million tonnes, to be achieved by 2010</p> <p>Recycle rate are 60% or over for nickel-cadmium batteries, 55% or over for nickel-hydride batteries, 30% or over for lithium batteries and 50% or over for sealed lead-acid batteries.</p>	<p>Other: Second Fundamental Plan defined targets directly concerning the reduction of waste generation. These indices are related to the “Reduce” component of the 3Rs, and the restriction of waste generation.</p> <p>Cool Earth Partnership (2008) sets a 60-80% carbon-reduction target by 2050 based on current levels. Reducing waste through resource extraction, production, distribution and consumption are all components of achieving this target.</p> <p>A target has been set to raise the recycling rate of paper manufactured in Japan to at least 62% by fiscal 2010, in accordance with the Law for Promotion of Effective Utilization of Resources.</p> <p>A recycling rate of 95% of concrete mass and asphalt concrete mass by 2010 had already been reached.</p>

⁴⁶ British Columbia Ministry of Environment (2009), Design for Environment (DfE) Best Practices Lessons for British Columbia’s Ministry of Environment, p. 11.

<p>Key Drivers for Target Setting: The Basic Law for Establishing a Sound Material-Cycle Society (2000) generated recognition that quantitative targets in waste management and recycling were important. Another key driver was the OECD’s request in 2002 for Japan to develop these types of targets. As a result, quantitative targets were included in the Fundamental Plan for Establishing a Sound Material-Cycle Society (2003). Other key drivers include a limited domestic resource base, limited land available for landfill, and a tradition of target setting in other environmental policy areas leading to successful outcomes.</p>	
<p>Target Setting and Review Process: Stakeholders play an important role in the target-setting process by debating the rational, appropriateness and instruments for implementing targets – a process that is led by the government. The entire plan is reviewed every five years. In addition to government setting firm quantitative targets, industry is encouraged to set voluntary targets. Although a sanction programme (fines) does not exist for national targets, the government treats them as firm objectives rather than guidelines. Quantitative indicators are often used to set targets. For example, a 10% reduction in the 2000 levels of municipal solid waste (MSW) was used to set the current reduction target. Other target-setting indicators include the rate of shoppers’ refusal of free plastic bags. Competition between municipalities is also employed, with the national government monitoring local governments who are charging for waste disposal and identifying those municipalities most active in promoting waste reduction and recycling. In the Second Fundamental Plan for Establishing a Sound Material-Cycle Society, progress toward quantitative targets is reviewed every year, with the target year of the plan being Year 2015.</p>	
<p>Starting Year:2000</p>	<p>Review Cycle: Varies. Annual targets have been established under the Second Fundamental Plan.</p>
<p>Scope of Initiative: The single overarching programme provides a clear framework and direction to all national efforts in this regard.</p>	
<p>Life Cycle Stages: All</p>	<p>Specific Waste Streams: Packaging, home appliances, batteries, industrial wastes, WEEE, dioxins emitted from incineration of construction materials, food recycling and end-of-life vehicle recycling.</p>
<p>Materials Included: All</p>	
<p>Experience: Targets on resource productivity have clearly helped to shift industrial activities from unsustainable ones to more sustainable ones. In cases where targets have not been met, the government works to understand what the obstacles to achievement have been and how best to address them. Finally, targets give good guidance for annual policy review as they clearly demonstrate “where we are at the moment”.</p>	

Programme: Chain-Oriented Policy in the Netherlands⁴⁷

Description: The Netherlands instituted a new Chain-Oriented Waste Policy in response to limitations to environmental improvement gains under its traditional waste management programme. The Policy sets national-level quantifiable targets and identifies priority waste streams based on areas of high environmental pressure (e.g. air and soil pollution, waste generation). General quantifiable targets are set for priority waste streams. Targets will become more specific and measurable as further data is uncovered. Companies involved in the pilot project set voluntary quantifiable targets, goals and objectives. As the plan moves forward, both quantifiable targets set by the government and voluntary agreements between the government and companies will be used.

Overall Objective: The subtitle of the new National Waste Management Plan (LAP), ‘Towards a material chain policy’ indicates the direction in which waste policy is moving. The general objective of waste policy is to restrict, as much as possible, the total environmental pressure of a chain (from obtaining raw materials to production and use and eventually waste, including reuse), with waste policy providing an optimum contribution to achieving this objective. The policy’s aim is to realise actual reductions in environmental pressure in the most efficient and cost-effective manners. The ultimate goal is an integrated policy framework for the whole material chain.

Summary of Policy Instruments: The policy uses the chain-oriented approach, which sheds a more comprehensive light on waste choices and provides additional consideration of potential impacts. It establishes quantifiable, national targets around three main areas of focus: GHG emissions; diffusion of dangerous substances; and biodiversity loss. These targets are covered by a broader long-term vision: *“that, by 2050, the market will have found useful, eco-efficient applications for virtually all waste, detailed waste legislation and regulation will no longer be necessary, and European and other frameworks will ensure that waste policy has become part of industry, product and energy policy set.”* Various planning periods are scheduled, with individual objectives steered towards reaching the overarching vision above. In late 2007, a concrete chain approach was launched with the project “Towards A Chain Approach in Waste Policy”. Upon this launch, six pilot projects were started within individual product chains (gypsum, zinc, carpet, food, expanded polystyrene (EPS) and textile) to test out the chain approach. In this pilot phase, companies from the six material chains established voluntary quantitative targets, goals and plans, many of which were supported by the government. After the pilot phase, the government identified seven priority waste streams to focus on for the National Waste Management Plan. Some quantifiable national-level reduction targets have been set for these seven streams within defined time periods. The policy aims to offer additional quantifiable targets when the environmental pressure in the chain is calculated. Current efforts are underway to weave sustainable procurement criteria into the chain approach policy. The goal is to encourage suppliers toward sustainable procurement. The policy also acknowledges eco-design standards and is seeking to expand the scope of eco-design to include energy-related products. Pilot programmes to simulate the application of this eco-design instrument were launched among small to medium-sized businesses.

Specific Parameters Being Used

Resource Extraction:

Production:

The paper and cardboard industry has set targets for energy savings. Additional concrete goals for all 7 waste streams are forthcoming (late 2009).

Resource Productivity:

Consumption:

⁴⁷ Source OECD.

Programme: Chain-Oriented Policy in the Netherlands⁴⁷

<p>End of Life: The process of collecting data on environmental pressure related to end of life for each of the seven waste streams is underway (<i>e.g.</i> the pilot project for gypsum seeks to double the recycling of gypsum from construction and demolition waste from 20% in 2008 to 40% in 2010, and ensure that the Netherlands becomes the European leader in gypsum recycling by 2015). Waste policy must contribute to the national goal of reducing CO₂ emissions by 30% by 2020 compared with 1990.</p> <p>Additional concrete goals are forthcoming (late 2009).</p>	<p>Other: Waste policy must contribute to the national goal of eliminating the threat to people and the environment caused by the diffusion of dangerous substances by 2020 and halting the loss of biodiversity by 2010.</p> <p>Seven priority streams within the framework of the chain approach, over the LAP planning period, are to achieve a reduction of the environmental pressure generated in each of the streams by at least 20%.</p>
<p>Key Drivers for Target Setting: Key drivers include sufficient data to demonstrate large environmental pressure (LCAs conducted); a culture of targets leading to action by both politicians and other actors; targets that provide a sense of action without being overly prescriptive with regard to specific actions; priority waste streams identified by an outside consultancy; and the sentiment of moving beyond traditional waste management programmes to a chain approach. A desire to reduce environmental pressure in the waste stage by measures taken earlier in the chain and to deal with waste aspects and other environmental aspects much earlier in the material chain are also a consideration. A final key driver is the long-term vision that, by 2050, the market will have found useful, eco-efficient applications for virtually all waste.</p>	
<p>Target Setting and Review Process: National policy ambitions, around which quantifiable national targets are set, were informed by the significance of environmental pressure in the whole chain and the potential for achieving environmental gains. Additionally, voluntary quantitative and qualitative targets and goals are set within industrial sectors. Data is being collected and compiled on the environmental pressure that each waste stream contributes to end-of-life waste, greenhouse effect, pollution and land use. The overall objective is to reduce environmental pressure by 20%. Various programmes, as well as quantitative and qualitative goals, exist and are forming to facilitate this overarching goal. Target dates and the review process are being developed. Formulation of concrete goals will take place by late 2009 and implementation will be complete by late 2012. Monitoring will be conducted annually from 2009 to 2012, followed by an evaluation report produced in 2012 that will include decisions on project follow-up and next steps. Target setting and progress is a process that is informed by and employs the collaboration of companies, industries and other stakeholders from the chains in question.</p>	
<p>Starting Year: Chain approach started in 2007.</p>	<p>Review Cycle: In development.</p>
<p>Target Year: Various (overall vision- 2050).</p>	
<p>Scope of Initiative: National level with particular focus on seven priority waste streams.</p>	
<p>Life Cycle Stages: All</p>	<p>Specific Waste Streams: Paper and cardboard, textile, construction and demolition waste, organic waste, aluminium, PVC and bulky domestic waste. (Priority streams were identified by an outside consultancy.)</p>
<p>Materials Included: All</p>	

Programme: Chain-Oriented Policy in the Netherlands⁴⁷

Experience: In late 2007, six chain pilot projects were started with the twin aims of gaining experience with a chain approach as the mode of operation and achieving a substantial reduction of waste-related environmental pressure in the chains involved. Companies from six material or product chains took on the task of reducing the environmental pressure in their chain. These highly motivated companies examined how they could close or further close the material cycle in an innovative way. In May 2008, the companies involved in the pilot projects presented their action plans and the first inspiring results. Many plans will be implemented in the coming period, with some of them supported by the government.

Programme: Mix of Policies and Programmes Related to SMM in Flanders, Belgium⁴⁸

Description: In Flanders, Belgium there is no single overarching SMM policy but rather a variety of policies related to various life cycle stages including: production; consumption; waste collection, separation and recycling; as well as efforts to decouple consumption and environmental impact and a focus on specific waste streams. Within each of these, a variety of target approaches have been used – from vague voluntary targets without clear accountability in the area of sustainable consumption to hard targets for separation of waste. These are being drawn into a rather new initiative “transition towards sustainable material” which is working to develop a long-term vision for SMM within Flanders and to understand how best to achieve it.

Overall Objective: The aim is that, by 2010, Flanders will have achieved far-reaching decoupling between economic growth, on the one hand, and impact on the environment and use of materials and energy on the other hand. Flanders wants to substantially improve its position compared to the best-scoring neighbouring countries (Pact of Vilvoorde).⁴⁹

Summary of Policy Instruments: Flanders has implemented a variety of programmes to address various life cycle stages and impacts. These are generally set at the regional level and in the case of waste and materials management are implemented at the municipal level where waste collection is undertaken. Where data and understanding allow, targets are quantified, while in other cases they are stated in general terms and seen as strategic objectives for government policy rather than hard targets to be pursued. Where appropriate, implementation is backed up by clear accountability if targets are not met, however, the approach is generally to work with implementers to find solutions and overcome obstacles to achievement of the targets.

Targets can be found in legislation or in policy planning documents and, in most cases, are stricter than targets in European and international legislation or conventions. Generally, targets and objectives relate to traditional waste management issues (recovery, recycling and incineration with energy recovery) and there is a movement towards a life cycle approach in these areas. As such, targets are set to increase sustainable consumption in retail and government sectors by 2015 based on 2008 levels. The government is scheduled to adopt a sustainable public procurement action plan in 2009 with the aim of increasing sustainable public procurement. Areas that generate rapid results are the focus of this initiative (e.g. the purchase of vehicles for government use). Additionally, an eco-efficiency target has been set with the objective of increasing production efficiency within a set time period. However, the outcome will be difficult to evaluate because the target is rather broad and general. The government also set general objectives around the substitution of hazardous materials and the use of waste as a secondary resource. In contrast to these examples of general targets, extensive, specific, quantifiable and easy-to-evaluate targets are set for household and industrial waste, building, end-of-life vehicles, tires, WEEE, batteries and oil.

Specific Parameters Being Used

Resource Extraction: General objective is minimum use of finite resources.

Resource Productivity: General objective is optimal use of renewable resources.

Production:
General objective is to increase the number of Flemish companies producing in an eco-efficient

Consumption:
Increase sustainable consumption in retail and government sectors by 2015, based on 2008

⁴⁸ Source: Flemish Public Waste Agency, OVAM, Belgium.

⁴⁹ Ibid.

Programme: Mix of Policies and Programmes Related to SMM in Flanders, Belgium⁴⁸

<p>way by 2009 (based on 2003 eco-efficiency rates).</p>	<p>levels. General objective is to increase energy efficiency in the industry and service sectors by 2010, based on 2004 levels.</p>
<p>End of Life: A minimum of 95% of the weight of all the end-of-life vehicles has to be re-used or recovered by 2015.</p> <p>A minimum of 85% of the weight of end-of-life vehicles has to be re-used or recycled by 2015.</p> <p>Waste tires have to be collected separately. Re-usable tires have to be sorted out. Of at least 25 % of the collected tires, the tire tread has to be renewed. Of the collected tires where the tread cannot be renewed, 20% have to be recycled. The remaining part of the collected tires is incinerated with energy recuperation.</p> <p>Industrial The amount of industrial waste for final disposal must decrease by at least 20% by 2010 based on 2000 levels.</p> <p>The production of industrial waste must take place at a slower pace than economic growth compared to 2002.</p> <p>Household The total amount of household waste generated is decoupled from consumption and is to remain at the same level or decrease compared to 2000 levels.</p> <ul style="list-style-type: none"> - 75% of the household waste is collected separately for recycling from 2010 onwards. - 2% of prevention/year for the dry waste fraction (e.g. packaging, diapers, WEEE, batteries) to compensate for the economic growth; - 6 active compost masters (1 per 10,000 inhabitants); - 25% of households to do home composting in a qualitative way and keep more than 50% of their organic and biological waste out of the larger waste treatment process via home composting and low-waste gardening; - 5 kg of re-usable products is to be collected per inhabitant by recognised re-use centres and sold again; - the number of people participating in selective 	<p>Other: General objectives include: maximum prevention of the generation of waste; maximum use of waste as secondary resource; and minimum environmental impact when treating waste.</p>

Programme: Mix of Policies and Programmes Related to SMM in Flanders, Belgium⁴⁸

<p>collection schemes remains, at minimum, at the same level as in 2005; the number of companies participating in selective collection initiatives increases.</p> <p>- each municipality attains a maximum of 180 kg residual waste per inhabitant by 2010 and is responsible for achieving this target.</p>	
<p>Key Drivers for Target Setting: Key drivers include: sufficient data to demonstrate a need; a culture of targets leading to action by both politicians and other actors; indication of a sense of action (politically); and all of the above without being prescriptive in regards to specific actions. An overarching goal to decouple economic growth and impact on the environment and use of materials and energy by 2010 is also a driver, as is the long-standing tradition of separate collection, recycling and composting.</p>	
<p>Target Setting and Review Process: Targets are generally set by experts in the Flemish administration in collaboration with the industrial sector and other stakeholders. However, in certain circumstances – such as when the public demands action on an issue – targets can be set by politicians. In some cases, municipalities are held directly accountable for reaching a target (<i>e.g.</i> residual waste generated per inhabitant).</p>	
<p>Starting Year: Various</p>	<p>Review Cycle: Various (<i>e.g.</i> five years for Waste Management Plan).</p>
<p>Target Year: Various</p>	
<p>Scope of Initiative: No overarching policy framework, but programmes address decoupling, sustainable consumption, sustainable production, waste prevention, waste separation and recycling, and sustainable building and living.</p>	
<p>Life Cycle Stages: All</p>	<p>Specific Waste Streams: End-of-life vehicles, tires, WEEE, batteries, and oils.</p>
<p>Materials Included: All</p>	
<p>Experience: Within the individual programmes, these targets have been effective in driving society towards more sustainable use of materials. This is based on the fact that the targets implemented were realistic, measurable, and based on both ecological and economic considerations. Further, it was stated that targets have to be supported by the public, supported by a mix of policy instruments to ensure their achievement, and need to be communicated and monitored. A final lesson is that focusing too much on achieving targets involves a risk of negative unintended consequences.</p>	

Programme: Mix of Policies and Programmes Related to SMM in the EU⁵⁰

Description: In the EU, there is no single overarching SMM policy but rather a variety of policies related to various life cycle stages, including: production; consumption; waste collection, separation and recycling; and a focus on specific waste streams. An emphasis is placed on recycling through the policies and associated targets. Targets are both quantitative and qualitative, particularly where policies are still developing. A central future goal is to understand the interrelationship of policies and targets in order to build synergies across existing policies and provide insights for future target development.

Overall Objective: The long-term goal is for the EU to become a recycling society that seeks to avoid waste and uses waste as a resource. EU waste and recycling legislation, including the new framework for waste prevention adopted in 2008, is designed to reduce negative environmental impacts (notably reducing waste going to landfill), and encourage recycling. Increasing resource efficiency is also a main objective. The various policies around which targets are set have individual objectives (*e.g.* Directive 94/62/EC on packaging and packaging waste aims to prevent or reduce the impact of packaging and packaging waste on the environment and to ensure the functioning of the Internal Market).

Summary of Policy Instruments: The Framework for Waste Prevention was recently updated and adopted by Parliament in October 2008. It replaces the previous version which was established in 1975 and has set out the framework upon which specific waste policies have been built over time. The EU implemented a variety of policies that address various life cycle stages through quantitative and qualitative targets. Targets are set by the Commission. For Member States, reaching the targets is a legally binding commitment between the Member States and the Commission. Targets are primarily quantified and address particular waste streams (household waste, end-of-life vehicles, WEEE, batteries, packaging), life cycles stages and resource efficiency objectives. When not quantified, general qualitative language is used and benchmarks are encouraged. To date, targets relevant to resource efficiency have mainly been set at the latter stages of the life cycle (*e.g.* by 2020 Member States must recycle 50% of their household and similar waste), and this has generally been done through legislation.⁵¹ Targets primarily emphasise material reuse and recycling as end objectives, but targets around packaging and eco-design bring in waste reduction and design considerations. Regarding eco-design, the Directive 2005/32/EC on the eco-design of Energy-using Products (EuP) defines criteria for eco-design products. The Sustainable Consumption and Production (SCP) Action Plan proposes the expansion of the eco-design directive by focusing not only on “energy-using” products but also on all “energy-related” products, which includes products that impact energy consumption during use. Under the SCP Action Plan, benchmarks and requirements will be set based on leading products. Continuous improvement through updating these benchmarks is also a component of the programme.⁵²

Eco-innovation benchmarks and targets under the SCP Action Plan are currently being discussed with an objective of developing tools and targets that will boost eco-innovation in the EU.

⁵⁰ Source: European Union.

⁵¹ Council of the European Union, (October 20, 2008), “A new framework for waste management in the EU” Available from:
http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/misc/103477.pdf.

⁵² Commission of the European Communities, (July 16, 2008) COM(2008)397 final, “Communication From the Commission to the European Parliament, the Council, The European Economic and Social Committee and the Committee of the Regions – On the Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan” Available from:
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52008DC0397:EN:NOT>.

Programme: Mix of Policies and Programmes Related to SMM in the EU⁵⁰

Specific Parameters Being Used	
<p>Resource Extraction: No information found.</p>	<p>Resource Productivity: No targets set but plans to develop them are in place. The general objective is to increase resource productivity at the same or greater rate than the 2.2% productivity improvement seen over the last 10 years. They have an understanding of how recycling targets have contributed to resource productivity improvements</p>
<p>Production: Data collected on amount of CO₂ emissions avoided due to recycling of metals, glass, paper and plastics.</p>	<p>Consumption: No information found.</p>
<p>End of Life: Vehicles -85% reuse and recycling of vehicles by weight by 2015.</p> <p>WEEE component, material reuse and recycling - 75% (for categories of products 1,10) (e.g. large household appliances, refrigerators, freezers) - 65% (for categories of products 3,4) (e.g. ICT equipment) -50% (for categories 2,5,6,7,9) (e.g. small household appliances, lighting equipment)</p> <p>Battery collection rates -25% by 26 September 2012 -45% by 26 September 2016</p> <p>Recycling rates, by average weight -65% recycling of lead-acid batteries and accumulators -75% recycling of nickel-cadmium batteries and accumulators -50% recycling of waste batteries and accumulators</p> <p>Household waste -50% target for preparing for reuse and recycling of items such as paper, metal, plastic and glass from household waste by 2020</p> <p>Construction and Demolition -70% target for preparing for reuse and recycling and material recovery, including “backfilling” of non-hazardous construction and demolition waste by 2020</p>	<p>Other:</p>

Programme: Mix of Policies and Programmes Related to SMM in the EU ⁵⁰	
<p>Key Drivers for Target Setting: The key drivers are: sufficient data to demonstrate environmental significance; increasing resource efficiency; boosting recycling; an indication on a political level of a commitment to improvement through targets without being prescriptive in regards to specific actions. A focus on recycling and the objective of becoming a “recycling society” are also main drivers.</p>	
<p>Target Setting and Review Process: Targets are generally set by the Commission and acted on by Member States. Performance is monitored by the Commission and, if targets are not met, it can launch infringement procedures against Member States.</p>	
Starting Year: Various	Review Cycle: Various
Target Year: Various	
<p>Scope of Initiative: No overarching policy framework, but policies address recycling, sustainable consumption, sustainable production, waste prevention, boosting overall resource efficiency, and eco-design and innovation.</p>	
<p>Life Cycle Stages: All, with a focus on the latter.</p>	<p>Specific Waste Streams: End-of-life vehicles, WEEE, batteries and packaging</p>
<p>Materials Included: All</p>	
<p>Experience: Overall resource productivity of the EU has been increasing over the last ten years and specific recycling targets have contributed to this improvement. Despite the fact that recycling has been increasing, there are still indications that overall waste generation has grown due to growth in consumption. This is a matter that is likely to receive attention in the future, in particular as part of the implementation of the Waste Framework Directive. Some concern exists over whether targets were initially set too low because many Member States were quickly able to reach them. (The policies and targets are at different stages of implementation. Some correspond to targets set in legislation that have evolved over a number of years [<i>e.g.</i> the packaging directive]. Other targets have yet to be implemented, such as those recently set in the Waste Framework Directive.)</p>	

Programme: Mix of Policies and Programmes Related to SMM in Chinese Taipei⁵³

Description: In China, the Chinese Taipei's Environmental Protection Administration (TEPA) manages waste policy and has promoted various programmes. Within these programmes there are a variety of both hard, quantifiable targets and general guidelines. The Zero Waste Programme is one of their main endeavours. Source minimisation, resource recovery and recycling are the major principles for waste disposal under this programme. Future objectives are to formulate product policies that integrate extended producer responsibility and eco-design principles in an effort to lower the impact of products on the environment. TEPA works with local government and industries to meet targets and objectives.

Overall Objective: To meet the goals of sustainable society and to respond to a growing concern over the environmental impacts of MSW incinerators, TEPA initiated a Zero Waste Policy for MSW in 2003. The policy reflects the shifting philosophy of waste management from end-of-pipe treatment to source reduction and resource reutilisation. The policy lays out four major strategies: source reduction, reuse, recycling and green consumption.

Summary of Policy Instruments: China has set national targets for waste reduction for various life cycle stages and waste streams. Some initiatives include quantifiable targets. Direct mandates are also frequently used (*e.g.* starting in 2007, untreated raw waste can no longer be disposed of in landfills except in certain specific rural areas), as are general objectives. Initiatives are implemented at both national and local levels. Where appropriate, implementation is backed up by clear accountability if targets are not met. Under the Zero Waste Programme, focus is on the elevation of: waste minimisation; resource recovery; resource recycling; waste collecting; waste disposal technologies; and final disposal. According to these seven measures, TEPA formulated the Programmes for General Waste Recycling and Resource Recovery, which include seven tasks: mandatory garbage sorting; all purpose kitchen waste recycling; reuse and recycling of bulky waste; reuse of the waste from household re-modelling; upgrading waste treatment facilities; sewage treatment; and replacement of unusable waste-collecting vehicles.

Waste management programmes have evolved in terms of focus and scope. The Resource Recycling Four-in-One Programme, established in 1997, helped increase the recycling rate of resources. From 2001-2003, programmes focused on promoting the recycling of kitchen and bulky waste. In an effort to align with trends of sustainable resources and zero waste, the Zero Waste Programme was launched in 2003. TEPA made waste sorting nationally mandatory in 2006. In 2006, they also issued Excessive Packaging Restrictions to regulate packaging amounts on a number of items. Additionally, TEPA restricted the manufacturing, import and sale of zinc-manganese batteries and alkaline-manganese batteries that contain over 5 ppm of mercury.

TEPA helps local governments meet targets by providing subsidies to cover education, promotion and recycling equipment. Local governments also provide bulky waste collection services and organise auctions of refurbished furniture to encourage the reuse of bulky waste. Eco-design and extended producer responsibility policies are expected to be developed in the future.

Specific Parameters Being Used

Resource Extraction: No information found.

Resource Productivity: No information found.

⁵³ Source: Environmental Protection Agency, Chinese Taipei.

Programme: Mix of Policies and Programmes Related to SMM in Chinese Taipei ⁵³	
Production: Restrictions on the manufacturing, import and sale of zinc-manganese batteries and alkaline-manganese batteries that contain over 5 ppm of mercury.	Consumption: No information found.
<p>End of Life: Waste minimisation targets: decreased waste by 25% in 2007; 40% in 2011; and 75% in 2020.</p> <p>List of 15 mandatory items for recycling.</p> <p>As of 2007, untreated raw waste can no longer be disposed of in landfills, except in certain specific rural areas.</p> <p>Increase reuse rate of incineration ash from 20% in 2006 to 80% in 2009.</p> <p>Reduce industrial waste by 10% and reuse 85% of the collected waste by 2020.</p>	Other: Industrial waste-collecting vehicles must have Global Positioning Systems (GPS) to ensure proper disposal of waste.
Key Drivers for Target Setting: Key drivers include: demonstrated need; lack of prior waste management programmes or regulations; necessity of waste management programmes for global standing and public health; current trends in sustainability (<i>i.e.</i> zero waste); and concern over impacts of MSW incinerators.	
Target Setting and Review Process: Targets are generally set and reviewed by TEPA. Collaboration with industrial sectors occurs for the purposes of innovation and participation. TEPA developed the first online industrial waste registration and inspections system in the world. The system assists local governments in inspecting and controlling industrial waste. They mandate the use of industrial waste-collecting vehicles with GPS to ensure proper disposal of industrial waste. Moreover, they use a photo database to manage illegal dumping of industrial waste. Finally, environmental protection inspectors work with the police to inspect businesses and prevent illegal dumping.	
Starting Year: Various; 2003 for Zero Waste Programme.	Review Cycle: Various
Target Year: Various	
Scope of Initiative: No overarching policy framework, but programme address waste prevention, resource recovery and recycling, and waste disposal techniques including separation, eco-design and innovation.	
Life Cycle Stages: All	Specific Waste Streams: Batteries, industrial waste, kitchen waste.
Materials Included: All	
Experience: Within the individual programmes, these targets have been effective at driving compliance and better waste management practices. In 2007, the daily non-recyclable garbage collected approached a 45% reduction rate compared to 1997. Incineration has replaced landfill as the principal means of waste disposal.	

Programme: National Waste Plan in Finland⁵⁴

Description: In April 2008, the Finnish Government approved a new national waste plan to the year 2016. The plan describes how waste management in Finland should look in 2016 and how the goal will be achieved. The plan also contains a separate action plan for preventing the generation of waste. The 13 regional environment centres have each drafted their own regional waste plan.⁵⁵ Targets are due out in 2010. In general, Finnish waste discourse is shifting from waste prevention to material efficiency. As such, they have a national programme to promote sustainable consumption and production. The programme consists of a variety of policies related to material efficiency and sustainable purchasing. Targets are used within these policies, but many are still in draft form and have yet to be released.

Overall Objective: The central objective of waste policy is to reduce the harmful health and environmental impacts of waste. In order to meet this objective, it is particularly important to:

- prevent the generation of waste;
- promote reuse of waste;
- promote biological recovery of waste and recycling of materials;
- promote energy use of waste not suited for recycling; and
- ensure that the treatment and disposal of waste does not cause any harmful impacts.⁵⁶

Summary of Policy Instruments: Finland's waste policies are based in large part on EU legislation. Finland has implemented a variety of regional-level programmes to address life cycle stages, including waste collection, separation and recycling, and is in the process of developing programmes to address sustainable consumption and production. Targets are set at both national and regional levels. Where data allows, targets are quantitative; in other cases, targets are qualitative and put forth as broad goals and objectives at both national and regional levels. Where targets are specified, so are parties responsible for implementing them. Many of the targets for the new waste policy are in development and are due out in 2010.

General programmes exist around material efficiency, recovering methane from landfills, recycling, hazardous wastes, reducing negative health and environmental impacts associated with waste, increasing technical expertise in the waste sector and combating illegal waste shipments. With respect to increasing technical expertise, funding is being invested into measures and programmes to improve waste statistics, classification and monitoring.

The Service Centre for Material Efficiency was established in 2007. Material efficiency programmes at the product level have been proposed and are waiting for funding. Both government and non-governmental organisations will take part in writing material efficiency criteria. Programmes will include efforts to set minimum requirements for product durability, updatability, and reparability, and other material-efficiency features, and to promote repairable and updateable products. Many programmes are in the R&D stage under the new waste policy. For example, TEKES, a research and development (R&D) funding organisation in Finland, is also looking into launching a technology programme on material efficiency including public and private partnerships. Other programmes, like the producer responsibility system, are in development and waiting on more complete data to dictate direction, goals and targets.

⁵⁴ Based on Finnish Ministry of the Environment (2009), Towards a Recycling Society – the National Waste Plan for 2016.

⁵⁵ Ministry of the Environment – Finland – Waste Policies Website, accessed from: <http://www.ymparisto.fi/default.asp?node=17719&lan=en>.

⁵⁶ Finnish Ministry of the Environment (2009), Towards a Recycling Society – the National Waste Plan for 2016, p. 9.

Programme: National Waste Plan in Finland⁵⁴

Specific Parameters Being Used

<p>Resource Extraction: By 2016, 5 % (3 to 4 million tonnes) of the gravel and crushed stone used in earthworks will be replaced by waste generated by industry and mineral extraction.</p>	<p>Resource Productivity: No information found.</p>
<p>Production: Material efficiency criteria are being created, which will take life cycle efficiencies into account, including energy used in production.</p>	<p>Consumption: Material efficiency criteria are being created, which will take life cycle efficiencies into account, including consumption of natural resources during the products' life cycle.</p>
<p>End of Life: Stabilise the amount of municipal waste to 2.3-2.5 million tonnes annually (the level of the early years of this century) and then ensure that the trend will be downward by the year 2016.</p> <p>By 2016, 50% of all municipal waste should be recycled as material and 30% used as energy. Not more than 20% of the total should be landfilled</p> <p>All manure generated in connection with rural businesses would be recovered; 10% of this amount, or about 2.1 million tonnes, would be treated in biogas plants at farms. At least 10% of all sludge generated in rural areas and collected using septic tanks and cesspools would also be treated in these plants. By 2016, some 90% of all sludge generated in rural areas would be treated in wastewater treatment plants and the remaining 10% in biogas plants at farms.</p> <p>By 2016, at least 70% of all construction waste will be used as material and energy.</p> <p>By 2016, 100% of all municipal sludge will be recovered, either to be used as energy or for soil conditioning.</p> <p>By 2016, a maximum of between 460,000 and 500,000 tonnes of municipal waste would end up at landfills and that, in 2016, landfills would number between 30 and 40.</p>	<p>Other:</p>
<p>Key Drivers for Target Setting: Key drivers include: sufficient data and understanding of the issue; culture of targets leading to action; national and sector-specific targets providing motivation for action without being overly prescriptive in regards to specific actions. The general programme objective to reduce negative impacts associated with waste across the life cycle is also a main driver.</p>	

Programme: National Waste Plan in Finland⁵⁴

<p>Target Setting and Review Process: Targets are set and reviewed by national and regional offices. Additionally, in their material-efficiency agreements, industrial sectors set and commit to waste reduction and recycling targets. With regard to the review process, the monitoring will mostly be on the basis of the waste-sector statistics compiled by Statistics Finland. If necessary, separate surveys will be carried out in connection with the monitoring. The implementation of the Plan will also be monitored as part of the monitoring reports drawn up in accordance with the environmental and quality systems maintained by the individual sectors.⁵⁷</p>	
<p>Starting Year: Various. A new National Waste Plan was approved in 2008.</p>	<p>Review Cycle: Various</p>
<p>Target Year: Various. A new National Waste Plan runs to 2016.</p>	
<p>Scope of Initiative: National level, with particular focus on waste prevention and increasing material recycling and reuse.</p>	
<p>Life Cycle Stages: All</p>	<p>Specific Waste Streams: Biodegradable wastes, industrial waste, batteries and hazardous wastes.</p>
<p>Materials Included: All</p>	
<p>Experience: Past waste legislation and targets have been an effective way of driving society towards more sustainable use of materials. Finland attributes waste management improvements to changes in EU legislation, specifically stricter waste management standards and requirements. Additionally, they attribute success to greater cooperation between municipalities within Finland. Targets implemented in Finland were measurable and achievable and results by industry sector were publicly reported, encouraging competition and good performance. Under the new waste management programme, targets are expanding into new areas including waste prevention and sustainable consumption. How they will be received and operate in practice remains to be seen, but the outlook is optimistic due to past experience and result from the generation recovery and treatment of waste in 2005.</p>	

⁵⁷ Finnish Ministry of the Environment (2009), Towards a Recycling Society – the National Waste Plan for 2016, p. 31.

Programme: Mix of Policies and Programmes Related to SMM in Mexico⁵⁸

Description: In 2009, the Mexican Ministry of the Environment (SEMARNAT) launched the National Programme for Waste Prevention and Comprehensive Management. The programme consists of a variety of waste management strategies. Overall, the programme's emphasis and strategies focus on the 3Rs initiative (reduction, reuse and recycling) with the central goal of changing consumption and production patterns and traditional practices of waste management throughout the country.

Overall Objective: Mexico's waste and recycling legislation is designed to improve life conditions of people, create jobs and reduce negative environmental impacts by reducing waste going to landfills and encouraging reuse and recycling. Changing consumption and production patterns and traditional practices of waste management throughout the country is a central objective.

Summary of Policy Instruments: The National Programme for Waste Prevention and Comprehensive Management, established in 2009, sets out the framework for a shift in waste management policy across Mexico. This shift focuses on moving from a waste collection and final disposal model to a more comprehensive prevention and waste management approach incorporating legal and administrative frameworks, environmental education, technological development and training. The policy instrument planning phase was strengthened by the input of the corporate sector, namely mining and oil sectors. In addition to the National Programme for Waste Prevention and Comprehensive Management (2009), the National Waste Prevention and Comprehensive Management Law (2003) outlines guidelines, objectives and waste management targets. All targets of the Waste Prevention and Management Programme are aligned to, and are consistent with, the national objectives for the National Development Plan and the National Environment and Resources Management Programme, and they are all derived from the Waste Law. Indicators included in the National Environment and Resources Management Programme were developed by SEMARNAT staff, together with Japanese international cooperation agency (JICA) experts, and were aimed at assessing the effects of implementation of the programme. Waste management targets are generally qualitative in nature, although quantitative targets exist in other environmental management areas such as energy and water policies. Waste targets primarily emphasise material reuse and recycling as end objectives. Timelines are set for reaching targets. If the goals and targets are not achieved at the end of the set time period, a recommendation is made, and an analysis has to be produced in order to explain why targets were not met. Thereafter, new targets or re-organisation takes place (including consideration of the creation of new programmes). The programme has to be updated when the new administration begins. Generally, policy instruments are designed with the intent of diverting waste from landfills and creating more jobs in processing plants through commercial activities related to the recycling and reuse of materials and the alternative disposal of end-of-life products (composting thermal or caloric waste treatment).

Specific Parameters Being Used

Resource Extraction: No information found.

Resource Productivity: No information found.

Production: General objective to increase the production of goods made of recyclable and reusable materials.

Consumption: No information found.

End of Life:
General goal is to increase alternative end-of-life waste treatment to include thermal/caloric or composting.

Other: Generators, producers, distributors, importers and exporters must develop management plans for special wastes and

⁵⁸ Based on email exchange with César Rafael Chávez, Secretary of Development and Environmental Regulations, SEMARNAT México, September 2009.

Programme: Mix of Policies and Programmes Related to SMM in Mexico ⁵⁸	
	hazardous end-of-life products.
<p>Key Drivers for Target Setting: Key drivers include: sufficient data to demonstrate environmental significance delivered through the national diagnosis; limited landfill and other final disposal site space; and limited technical and financial resources for managing sanitary landfill at the municipal level.</p>	
<p>Target Setting and Review Process: Targets and programmes are generally set by the federal government and acted on by state and municipal governments within their respective action fields. Targets are reviewed by teams of national and international experts in waste management. Current socio-economic regional conditions and current trends in waste management are taken into consideration in target setting. Evaluations consist of yearly, semester and three-month reviews to measure target achievements.</p>	
Starting Year: 2009	Review Cycle: Various
Target Year: 2012	
<p>Scope of Initiative: Policies address recycling, sustainable consumption, sustainable production, waste prevention and boosting of overall resource efficiency.</p>	
Life Cycle Stages: All	<p>Specific Waste Streams: Special management wastes, WEEE, tires and oils.</p>
Materials Included: All	
<p>Experience: Mexico is experiencing an urbanisation process such that 70% of the population is located in ten large cities. This concentration has shifted consumption and waste-generation patterns so that solid waste is generated at a higher rate and is more heterogeneous in composition than in past years. Concern with regard to waste management generally exists around enforcement issues. With regard to the National Programme for Waste Prevention and Comprehensive Management, overall stakeholder feedback has been positive. This comprehensive waste management programme is the first of its kind in Mexico. It has created heightened expectations and strong, focused work on the side of local authorities and some recycling sectors. Stronger participation of the private sector is also expected in most projects in mid-size and major cities, as is major involvement of local authorities in the observance of environmental laws and regulations.</p>	

8. APPENDIX 2: PRIVATE-SECTOR CASE STUDIES

8.1 Nippon Mining & Metals Co., Ltd.⁵⁹

57. The Nippon Mining & Metals Group offers comprehensive products and services in the non-ferrous metals field, from resource development, smelting and refining to manufacturing and marketing of electronic materials, and recycling and environmental services.⁶⁰ According to their President and CEO, Masanori Okada, “Given that the earth’s resources are directly used as our raw materials, in fulfilling our social mission we need to take aggressive measures to reduce our environmental impact and to encourage the formation of a recycling-oriented society.”⁶¹

8.1.1 Key Issues:

58. To achieve this broad vision, the company has gone through a review process identifying their key material issues. The review involved identifying a broad list of challenges and these were then narrowed down by a combination of their importance to Nippon’s business strategies and the level of stakeholder interest. This effort reduced the key priority issues from 28 to 7 and a final effort consolidated them into 3 key material issues: establishing a recycling-oriented society; development of environment-friendly technologies; and implementation of initiatives regarding climate change problems.

8.1.2 Framework:

59. These material issues are addressed under a broad Corporate Social Responsibility Action Policy, which looks at the entire life cycle of their products. Policy objectives (e.g. recovering rare and precious metals and other similar materials from recycled materials, and further developing ‘urban mines’) are supported by detailed annual activity plans which follow the Plan, Do, Check, Act cycle. Further, Nippon Mining & Metals Group sets medium-term targets which, where appropriate, provide quantitative targets regarding energy savings, reductions in CO₂ emissions and final disposal of waste. These targets are evaluated on a yearly basis and revised periodically.

8.1.3 Experience:

60. Looking specifically at the first material issue – establishing a recycling-oriented society – Nippon Mining & Metals Group has become active in the area of urban mines. They identified certain key obstacles, including: technological capability to extract materials from used products; collection infrastructure; and coordination across borders in terms of the movement of disposed articles out of Japan and achieving broad acceptance of its importance. One step in this direction has been the Hitachi Metal Recycling Complex, which will apply leading technology to the recovery of various metals such as gold, silver, copper, tin, zinc, bismuth, nickel and indium. Further, they have provided input and collaborated

⁵⁹ Based primarily on comments from Michiharu Yamamoto, General Manager, CSR Department, Nippon Mining & Metals Co., Ltd. via email June 2009 and Nippon Mining & Metals Co. 2008 Sustainability Report available from <http://www.nikko-metal.co.jp/e/sustainability/index.html>.

⁶⁰ Nippon Mining and Metals Co., Ltd. (2008), 2008 Sustainability Report, p. 3.

⁶¹ Ibid. p. 2.

with other industry players in the value chain (like those in the IT industry) to address the above challenges.⁶² Through these activities and public reporting of their progress by way of annual sustainability reports, they are making inroads towards addressing their key material issues.

8.2 Domtar⁶³

61. Domtar is the largest integrated manufacturer and marketer of uncoated freesheet paper in North America and the second largest in the world based on production capacity.⁶⁴ The company has 15 pulp and paper mills in operation, and 16 converting and distribution operations including a network of seven sawmills located off site of their paper-making operations.⁶⁵ In terms of managing their resource (wood fibre) responsibly, Domtar seeks to maximise the use of recycled fibre, while striving to source all required virgin fibre from sustainable forests – even when they are not directly managed by Domtar.⁶⁶ Through these efforts, Domtar is establishing a leadership position in the forest products industry with respect to its sustainability efforts.

8.2.1 Key Issues:

62. Domtar recognised several years ago that there were many misconceptions around fibre management by the forest products industry. To get a better understanding of the impacts related to the industry, Domtar conducted a life cycle assessment on fibre management. For the company, this was seen as part of their risk management process and provided them with insights into the key impacts for their processes. For example, the key sustainability issue that emerged was proper management of the forests themselves to ensure the long-term viability of the wood fibre source. One of the main challenges for Domtar (related to managing their material in a sustainable manner) comes from the fact that approximately 80% of fibre comes from third-party suppliers.

8.2.2 Framework:

63. Many of the company's sustainability issues fall under two key management areas – cost reduction and risk management. Targets and a focused effort on improving the eco-efficiency of their operations have been successful in reducing costs along with reducing emissions, water usage and other environmental impacts. On the business risk side, they saw consumers moving away from, or complaining about, forest products as they believed the sector was depleting resources too fast – a clear risk for a forest product-based company.

64. Domtar chose to focus on the Forest Stewardship Council's (FSC's) approach to sustainably managing forests. They started out by setting targets for areas they had direct control over, setting out to have all their lands and lands licensed under them FSC-certified within two years. They then encouraged their suppliers to do the same. However, when dealing with suppliers that do not fall under their direct control, Domtar chose to use more qualitative targets. Working to see what type of certifications were appropriate, this process became more about engagement and being involved in the process, rather than forcing certification standards and targets on their suppliers. Domtar believes that once a better understanding of the key issues has been achieved through supplier education and better data becomes available, it will become easier to set the quantitative targets for areas not under their direct control.

⁶² Comments from Michiharu Yamamoto, General Manager, CSR Department, Nippon Mining & Metals Co., Ltd. via email June 2009.

⁶³ Primarily based on interview with Guy Boucher, VP Sustainable Development, Domtar, August 2009.

⁶⁴ <http://www.domtar.com/en/corporate/overview/index.asp?location=SecondaryNav>.

⁶⁵ Ibid.

⁶⁶ <http://www.domtar.com/en/sustainability/environmental/3185.asp>.

Beyond being a good corporate citizen, Domtar understands this is about managing risks and meeting customer demand for preferable products.

8.2.3 Experience

65. Setting targets to become FSC certified pushed Domtar to move in the right direction and created momentum from their own foresters to be further engaged. When they first committed to becoming certified, the standards were not fully established yet so they directly participated in the development of standards and committed to move on practical standards once they were defined. Now, Domtar continues to work to support the development of more certification standards that can be more broadly applied in their supply chain, specifically so that it is less cost prohibitive for smaller landowners and suppliers to achieve certification. Pushing targets related to the sustainable management of their material was made easier by a strong commitment from the senior management of the company to improve their sustainability performance. Also, previous experience with having many of their forests ISO 14000 certified provided something for the company to build upon.

8.3 Turner Construction Company⁶⁷

66. Turner Construction Company is the largest 'green building' construction company in the United States, completing over \$3 billion in green building projects in 2008.⁶⁸ The company also offers a wide array of building services, from preconstruction consulting to design and build services through to building maintenance.

8.3.1 Key Issues:

67. In 2003, led by senior management, the company thoroughly explored the importance of the green building market. This review process included interviewing over 700 'market barometers' or key people in the market. The respondents indicated the positive performance of green buildings and said they were becoming increasingly involved with them, confirming Turner's focus on this market segment. With this validation of opportunity, Turner committed itself to the green building market and undertook a series of activities that included target setting.⁶⁹

8.3.2 Framework:

68. Green building as a key opportunity for the company was addressed under a broad-based approach to sustainability, which was announced in 2004. In addition to green building, Turner Construction Company's sustainability approach also includes waste tracking initiatives, utilisation of Building Information Modelling (BIM) and recycling, GHG reduction and green purchasing initiatives.⁷⁰ The company referenced the United States Green Building Council (USGBC) and LEED rating system to set initial targets for many of the aforementioned initiatives.⁷¹ Additionally, targets and initiatives are

⁶⁷ Based primarily on comments from Michael Deane, Vice President and Chief Sustainability Officer, Turner Construction Company, via telephone, July 2009, and the Turner Construction Company Website accessed via www.turnerconstruction.com.

⁶⁸ Turner Construction (2009), Turner's Portfolio of Green Buildings Reaches All Time High, www.turnerconstruction.com/corporate/content.asp?d=6627& .

⁶⁹ Comments from Michael Deane, Vice President and Chief Sustainability Officer, Turner Construction Company, via telephone, July 2009.

⁷⁰ Turner Construction, Turner Reaffirms Commitment to Wide Range of Sustainability Efforts, <http://www.turnerconstruction.com/greenbuildings/content.asp?d=6692>.

⁷¹ Comments from Michael Deane, Vice President and Chief Sustainability Officer, Turner Construction Company, via telephone, July 2009.

informed by annual Green Building surveys that identify key market issues and findings. Turner Construction Company sets concrete targets in areas where they have direct control, such as on-site waste management. In areas where they have less control (e.g. clients' requests for LEED buildings), the company sets more flexible targets with the objective of influencing, rather than mandating, desired behaviours.

8.3.3 Experience:

69. In practice, Turner Construction Company's internal targets are set as 'stretch goals' rather than mandatory objectives. The company's philosophy is to encourage reaching for targets but not to punitively punish not meeting them. They feel the real value lies in encouraging the right behaviour and learning. Behaviour is encouraged with both incentives and competition. For example, the company offers an incentive bonus for employees to become LEED AP-certified. Internal employee drive to achieve certification has surpassed this incentive, reflecting both an imbedded sustainability culture and the result of positive competition between departments to have the most LEED AP professionals. Turner Construction also produces a biannual report, showing performance and level of compliance with internal targets across business units in order to encourage best practice. In setting targets, the company uses LEED measurements as a benchmark.⁷²

8.4 BASF The Chemical Company⁷³

70. BASF is the world's leading chemical company with business segments in chemicals, plastics, performance products, functional solutions, agricultural solutions, and oil and gas. BASF has approximately 97,000 employees and serves customers in nearly all countries worldwide. In 2008, they generated €62.3 billion in sales and income.⁷⁴

8.4.1 Key Issues:

71. Every five years BASF conducts a global review, charting the future path of the company and industry. The review considers global macro trends but also considers local issues, including specific customer and product lines, and projects what needs to be done in order to be a viable company in the target year 10 to 15 years in the future. In the previous global review process (2003), with a target year of 2015, four strategic initiatives surfaced:

- earning a premium on BASF's cost of capital;
- forming the best team in the industry;
- helping customers be successful by creating solutions rather than just selling chemicals; and
- ensuring sustainable development; broadening an original focus on safety to problem solving for society.⁷⁵

⁷² Ibid.

⁷³ Based primarily on interview with Edward Madzy, Director, EHS Product Regulations/Product Stewardship, and David DiMarcello, Manager, Environmental Center of Expertise, BASF, August 2009.

⁷⁴ BASF at a glance: <http://www.basf.com/group/corporate/en/about-basf/profile/index>.

⁷⁵ Comments from interview with Edward Madzy and David Dimarcello, BASF, August 2009.

8.4.2 Framework:

72. The four strategic initiatives arise out of a foundational framework of BASF's commitment to serve the global community, not only as a chemical company but as a company working to address larger global issues including health and nutrition, mobility and climate change.⁷⁶

73. These four strategic initiatives ground practically all of BASF's activities. Specifically, every individual at BASF has personal goals related to each of these four initiatives and there is a corporate scorecard to track performance. Additionally financial targets are established by individual plants. BASF feels that a framework including personal goals encourages focus, accountability and progress.⁷⁷

8.4.3 Experience:

74. In practice, BASF sets and encourages firm targets both at the global corporate and individual levels. In 2005, they set fairly aggressive goals for 2012. By 2008, they had already reached many of these goals. They re-evaluated and set their 2020 goals based on this experience. Due to their size and global span, BASF sets goals globally but allows their regional entities to define the specific projects and targets to achieve the global goals. There is flexibility in local implementation that allows consideration for local market, environmental and social drivers.

75. BASF realises the utility in target setting for both inspiring innovation and showing leadership. For instance, setting targets and collecting data for their CO₂ emissions led them to track the CO₂ saved through use of their products by customers across the value chain. This measure highlighted the net-positive impact of their product portfolio which, in turn, provides solutions to problems in society dealing with energy savings, emissions controls and overall climate protection.

8.5 Nokia⁷⁸

76. Nokia is the world leader in mobility, driving the transformation and growth of the converging internet and communications industries. Nokia produces a wide range of mobile devices with services and software.⁷⁹

77. In 2007, Nokia's net sales were €51.1 billion and operating profit was €8.0 billion. At the end of 2007, the company employed more than 112,000 people and had production facilities for mobile devices and network infrastructure around the world, sales in more than 150 countries, and a global network of sales, customer service and other operational units.⁸⁰

8.5.1 Key Issues:

78. As is the case with many electronics companies, Nokia has acknowledged the challenge of knowing all the substances in their products, as many components are sourced from lengthy or complex supply chains. Many electronics companies deal with this issue by creating a list of restricted substances and ensuring that none of these are in their products. However, this does not necessarily mean that all substances are known, rather that specific substances simply are not included in the products. Several years ago, Nokia made the ambitious objective to identify all the substances in their products, not just those that

⁷⁶ BASF at a glance <http://www.basf.com/group/about-basf/index>.

⁷⁷ Comments from interview with Edward Madzy and David Dimarcello, BASF, August 2009.

⁷⁸ Based primarily on comments from telephone interview with by Markus Terho, Environmental Affairs Director, and Tarja Österberg, Communications Manager, Nokia, August 2009.

⁷⁹ Nokia (2007), Corporate Responsibility Report 2007.

⁸⁰ Ibid.

raise concerns.⁸¹ It saw this as both a responsible approach as a company and as a potential cost-savings activity. Although the task took several years and extensive resources, it has allowed Nokia to respond quickly to stakeholders who raise issues related to specific substances as new concerns arise.⁸² This provides them with a competitive advantage, as other companies responding to similar concerns would be forced to try and determine if their products contained these substances on a case-by-case basis.

8.5.2 Framework:

79. To achieve their ambitious objective, Nokia successfully set and achieved a series of targets related to the collection of information on the numerous substances in their products. After initial research into the area, they determined that they could almost immediately obtain the necessary data for 50% of their products.⁸³ For the first phase of this effort they set this as their target. Once this was achieved, they increased this target by 10% every half year. Targets were set in consultation with their material experts who would analyse products one by one (some containing up to 200 components and 15 materials each).⁸⁴ Nokia also consulted with their suppliers throughout this process, acknowledging that these companies are often the experts on their respective products and substances.⁸⁵ Every six months throughout the process, the suppliers would meet with Nokia to agree on a suitable target. Often the supplier positions were quite similar and Nokia would then suggest a target and work to get agreement from them.⁸⁶ The company also engaged with non-governmental organisations (NGOs) throughout the effort. Although the NGOs were not involved in the supplier meetings, Nokia worked with them to understand their concerns and communicate these to suppliers.

80. Through this extensive process, Nokia became the first mobile phone manufacturer to have full material declaration for all their mobile devices. The process also led to the development of the Nokia Substance List, which is made available on their website. Nokia describes this list as one which:

“... identifies substances that we have banned, restricted, or targeted for reduction with the aim of phasing out their use in our products. The list is divided into two sections, Restriction in Force and Monitored Substances. We work together with our suppliers in investigating alternative materials and solutions that will help us fully eliminate restricted or monitored substances from our total product line. The Nokia Substance List will be updated annually. In addition, we will give interim updates on individual substance phase outs as needed...”⁸⁷

8.5.3 Experience

81. Although a lengthy and extensive process, the effort by Nokia has positioned them as a leader in their industry for material and substance management. Target setting in this process played a key role in achieving success, which Nokia attributes to the fact that material experts, suppliers, NGOs and other stakeholders were included in the process. Some suppliers were concerned over their intellectual property rights related to their material usage, however, Nokia worked to address this through a variety of

⁸¹ Nokia, Managing our Materials and Substances, accessed August 2009 at

<http://www.nokia.com/environment/our-responsibility/substance-and-material-management>.

⁸² Comments from telephone interview with by Markus Terho, Environmental Affairs Director and Tarja Österberg, Communications Manager, Nokia, August 2009.

⁸³ Ibid.

⁸⁴ Ibid.

⁸⁵ Comments from telephone interview with by Markus Terho, Environmental Affairs Director and Tarja Österberg, Communications Manager, Nokia, August 2009.

⁸⁶ Ibid.

⁸⁷ Nokia, Managing our Materials and Substances. Accessed August 2009 at

<http://www.nokia.com/environment/our-responsibility/substance-and-material-management>.

approaches. For example, it used incentives to motivate suppliers to comply with their efforts. Specifically, Nokia created a preferred supplier designation that it awarded to those suppliers able to meet their targets in a timely fashion.⁸⁸ Although these targets were not shared externally during the process, Nokia is currently working to determine the best way to set and make public similar targets wherever possible.⁸⁹

8.6 Target Setting for Extended Producer Responsibility - Electronics in Canada

82. Managing waste from electronics (e-waste) is a global issue, due in part to the volumes of materials in question. Various jurisdictions and electronics companies have established approaches to better manage these products and the numerous associated materials. In Canada, the concept of Extended Producer Responsibility (EPR) has come to the forefront of these approaches.

83. The Canadian response resulted in the electronic industry's establishment of Electronics Product Stewardship Canada (EPSC). The EPSC was founded by 16 leading manufacturers that decided to collaborate when they saw the potential for provincial regulations to move in the direction of those in the EU. Through negotiations with provincial authorities EPSC was engaged in the initial development of these industry-led programmes. Currently, the Atlantic Canada Electronics Stewardship (ACES), the Saskatchewan Waste Electronic Equipment Programme (SWEEP) and the Electronics Stewardship Association of British Columbia (ESABC) have staffed an office of Harmonization Coordination as of January 1, 2009. A similar EPR programme was launched in Ontario in April 2009 through Ontario Electronics Stewardship (OES) although it is not formally part of the harmonization initiative.

84. The harmonization office's focus is on working to harmonise the operational, industry-led and regulated environmental stewardship programmes for end-of-life electronics to ensure their efforts are aligned.⁹⁰ ACES, SWEEP, and ESABC operate as non-profit organisations and were formed by manufacturers, retailers, and other stakeholders to focus efforts around the collection and recycling of electronic waste. Each programme has tracked data related to a few key performance indicators, as shown in Figure 2. A key focus of the effort is conducting research on appropriate performance measures that regulated and industry-led electronics stewardship programmes should be looking to include in order to encourage continuous programme improvement, to allow for comparative analysis on programme impacts and to satisfy regulatory requirements.

85. From a regulation perspective, waste in Canada is dealt with at a provincial rather than national level. However, there is a harmonised effort led by the Canadian Council of Ministers of the Environment (CCME). The CCME is comprised of the environment ministers from the federal, provincial and territorial governments. The Council seeks to achieve positive environmental results, focusing on issues that are national in scope and that require collective attention by a number of governments.⁹¹ In June of 2007, the CCME endorsed the Canada-wide Principles for Extended Producer Responsibility.⁹² The objective of the Canada-Wide Principles for EPR is to assist and support jurisdictions in the development of EPR programmes. The overarching goals of the principles are to minimise environmental impacts, maximise environmental benefits, promote the transfer of end-of-life responsibility for the product and/or material to the producer, and encourage design for environment (DfE). While recognizing differences in the legislative/regulatory framework and existing programmes among jurisdictions, CCME encourages regional or national cooperation in the development of EPR programmes. Specific measures undertaken by

⁸⁸ Comments from telephone interview with by Markus Terho, Environmental Affairs Director and Tarja Österberg, Communications Manager, Nokia, August 2009.

⁸⁹ Ibid.




⁹⁰ <http://www.estewardship.ca/>.

⁹¹ <http://www.ccme.ca/about/>.

⁹² http://www.ccme.ca/assets/pdf/epr_principles_e.pdf.

each jurisdiction are at their discretion, with the goal of effective, efficient, and harmonised implementation.⁹³

Figure 2. Performance of selected EPR Programmes for Electronic Waste

Program Stats since program inception and as of March 31, 2009	 SWEEP	 ESABC	 ACES	TOTALS
Program Launch Date	February 2007	August 2007	February 2008	***
Tonnes of regulated products collected & sent for responsible recycling and diverted from landfill or illegal export	3,778	16,826	2,632	23,236
# of obligated members registered (POPS & Remitters)	619	1,442	480	2,541*
Total Collection Depots Province-wide	71	97	35	203

** Includes duplicate members*

Source: <http://www.estewardship.ca/docs/programme-metrics.pdf>.

86. CCME has also created an EPR Task Group which provides guidance on the development and implementation of EPR and product stewardship programmes. The Task Force is also engaged in the preparation of a Canada-wide Action Plan on EPR which has as its primary focus the development of harmonious EPR programmes for specific identified products with implementation on an agreed timetable.⁹⁴ The EPR Task Group's mandate is to:

- Identify opportunities to harmonise, make consistent where appropriate, expand and improve EPR programmes;
- Develop general guidance on EPR issues;
- Identify and explore opportunities to forge strategies for new EPR initiatives; and

⁹³ Canada Wide Principles for Extended Producer Responsibility
http://www.ccme.ca/assets/pdf/epr_principles_e.pdf.

⁹⁴ http://www.ccme.ca/ourwork/waste.html?category_id=128.

- Facilitate EPR communications and information exchange among jurisdictions.

87. Various stewardship programmes at the provincial level have been established in response to the CCME's initiatives, as well as the provinces' and industry's acknowledgement that consumers are increasingly concerned with the environmental and social impacts of the products they use. In the province of British Columbia, the government has responded to this through the setting of specific targets for waste recovery rates of 75% across all sectors. However, in the case of electronics, it is more difficult to figure out recovery rates (due to their long lifespan), hence government and industry focus on public awareness instead. Recognising that the industry has the knowledge on how to best reduce their environmental impacts, the province supports their effort in setting their own targets, but require that they submit an annual publicly available report on how they are performing relative to their own targets.⁹⁵ The provincial government of British Columbia also acknowledges that target setting is a key step to increasing industry performance but points out that these are likely most effective at a provincial, industry-specific level, rather than at a national level as waste management issues are typically not under national jurisdiction. British Columbia also notes that having the CCME play a harmonisation role by providing provinces with overall guidance is helpful to ensure a common approach throughout the country.⁹⁶

⁹⁵ Interview with David Lawes and Teresa Conner, Ministry of Environment, British Columbia, Canada, July 2009.

⁹⁶ Ibid.

9. APPENDIX 3: DATA INPUT SOURCES

9.1 Expert Interviews completed:

- **Yuichi Moriguchi** – Director, Research Centre for Material Cycles and Waste Management
- **Ron Nielsen** – Eco-Efficiency Centre – Dalhousie- Resource & Environmental Studies
- **Ester van der Voet** – Institute of Environmental Sciences (CML), Leiden University
- **Guido Sonnemann** – UNEP’s Division of Technology Industry and Economics (DTIE), Sustainable Consumption and Production Branch
- **Sonia Valdivia** – UNEP’s Division of Technology Industry and Economics (DTIE), Sustainable Consumption and Production Branch
- **Stefan Bringezu** – Director, Material Flows and Resource Management, Wuppertal Institute
- **Raimund Bleischwitz** – Co-Director, Material Flows and Resource Management, Wuppertal Institute
- **Joseph Fiksel** – Executive Director, Center for Resilience, Ohio State University

9.2 Sub-National Interviews Completed:

- **Christof Delatter** – Director, INTERAFVAL (Association of Flemish Cities and Municipalities)
- **Mark McDermid** – Sector Specialist, Wisconsin Department of Natural Resources, Cooperative Environmental Assistance Bureau
- **David Lawes and Teresa Conner** – Ministry of Environment, British Columbia, Canada
- **Ichiro Nagase** – Manager, Global Environment & Sustainability Office Environment Bureau, Kawasaki City, Japan
- **Tetsuya Doi** – Waste Disposal Policy Division, Niigata City, Japan

9.3 Other:

- **Angie Leith** – U.S. Environmental Protection Agency, Office of Resource Conservation and Recovery
- **Duncan Bury** – Head, International Waste Policy, Waste Reduction and Management Division, Environment Canada

- **Jay Illingworth** – Interim Executive Director, ACES & Harmonization Coordinator for ACES, ESABC & SWEEP (Canadian Electronic Stewardship Programmes)
- **Derry Allen** – U.S. Environmental Protection Agency, Counselor, National Center for Environmental Innovation, Office of Policy, Economics and Innovation
- **Karl Edsjö** - Environmental & European Affairs, Electrolux Major Appliances Europe
- **César Rafael Chávez** - Secretary of Development and Environmental Regulations, SEMARNAT México

9.4 Private-Sector Case Studies:

- Nippon Mining and Metals Co., Ltd., Japan
- Email exchange with Michiharu Yamamoto, General Manager, CSR Department, Nippon Mining & Metals Co., Ltd., June 2009
- **Domtar**, Canada
- Interview with Guy Boucher, VP Sustainable Development, Domtar, August 2009
- Turner Construction, United States
- Interview with Michael Deane, Vice President and Chief Sustainability Officer, Turner Construction Company, July 2009
- **BASF**, Global (Head office Germany)
- Interview with Edward Madzy, Director, EHS Product Regulations/Product Stewardship, and David DiMarcello, Manager, Environmental Center of Expertise, BASF, August 2009
- **Nokia**, Global (Head office Finland)
- Interview with Markus Terho, Environmental Affairs Director, and Tarja Österberg, Communications Manager, Nokia Corporation, August 2009

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