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Summary Paper 3:

Policies for Implementing SMM

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This summary report has been prepared by Chris Peterson from Five Winds International. It is based upon three policy reports, which this paper is summarising. Specifically these are: *Policy Principles for Sustainable Materials Management* by Dr. Lauren Heine and Mr. Marc Major, *Policy Instruments for Sustainable Materials Management* by Eunomia, and *Setting* and *Using Targets for Sustainable Materials Management* by Five Winds International.

The comments received from OECD's Working Group on Waste Prevention and Recycling, and in particular those of Belgium, the United States, and Canada helped to shape this draft. We are very grateful for the time, consideration and insight provided by all individuals who contributed to the completion of this work.

NOTE FROM THE SECRETARIAT

The purpose of this summary paper is to identify broad policy principles – based on the need for efficiency, cost-effectiveness, and social acceptability – that can help OECD countries move forward in developing and implementing SMM policies and instruments specific to their own policy contexts.

It has been prepared to support the discussion of session 4 of the Global Forum on "Policies for implementing SMM".

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

INTRODUCTION AND SUMMARY OF CONCLUSIONS

1. Sustainable Materials Management (SMM) is a relatively new policy approach that represents a shift from waste management to materials management in support of sustainable development. Historically, governments have focused on managing wastes as a means of managing the impact of materials on the environment. While much success has been achieved with waste management policies, research has shown that waste management is often not the key process, nor is it the most efficient and effective process, for controlling material flows in the industrial and economic systems. SMM elevates the focus of governments, industry and consumers from individual material, product or process attributes, to the entire system of material flows and associated life-cycle impacts.

2. This summary report brings together the key lessons from three reports completed for the OECD's Working Group on Waste Prevention and Recycling (WGWPR) – *Policy Principles for Sustainable Materials Management, Policy Instruments for Sustainable Materials Management, and Setting* and *Using Targets for Sustainable Materials Management.*[1] The purpose of this body of work was to identify broad policy principles – based on the need for efficiency, cost-effectiveness, and social acceptability – that can help OECD countries move forward in developing and implementing SMM policies and instruments specific to their own policy contexts.

3. This body of work draws from a number of sources including OECD member country input, lessons from leading practice, experience in the private sector and thorough literature reviews. This summary provides a description of the three key conclusions of the research efforts outlined above:

- SMM Policy should strive to achieve four key principles: preserve natural capital; design and manage materials, products and processes for safety and sustainability from a life-cycle perspective; use the full suite of policy instruments to stimulate and reinforce sustainable economic, environmental and social outcomes; and engage all parts of society to take active, ethically-based responsibility for achieving sustainable outcomes.

- Policy makers should consider the full range of existing policy instruments and tools which contribute to the broader, life cycle based and triple bottom line (*i.e,*. environmental, social and economic), scope of SMM. These may offer applicable insights; act as a suite of tools or instruments to draw from; and be adjusted to address specific objectives under SMM.

- There are some key considerations unique to developing SMM policy approaches.

4. Additional material, examples and guidance are available in each of those reports and should be drawn upon as appropriate. Readers will also find a list of key definitions and concepts outlined in Appendix 2 of this summary report.

[1] These reports are available by request from the Secretariat once approved using the following codes/numbers "Setting and using targets for Sustainable Materials Management - Opportunities and Challenges." ENV/EPOC/WGWPR(2009)11/REV1; "Policy principles for Sustainable Materials Management." ENV/EPOC/WGWPR(2009)12/REV1; and "Policy instruments for Sustainable Materials Management." ENV/EPOC/WGWPR(2009)13/REV1.

KEY CONCLUSIONS OF THE POLICY RESEARCH ON SMM IMPLEMENTATION

5. Below, based on the findings of the three policy research reports, there are three key conclusions which will provide guidance and support for the development of SMM-related policies.

<u>Conclusion 1</u>: SMM Policy should strive to achieve four key principles

6. Four broad SMM Policy Principles should be used as guidance for the development of SMM policies wherever possible.

Principle 1 - Preserve natural capital

7. SMM can contribute to the preservation of natural capital, on which humans depend, and which is needed to foster long-term sustainability. Policy Principle 1 envisions leveraging the best available science, engineering, business and management practices to encourage the preservation of natural capital. By modelling human use of materials as a system of material flows, and environmental impacts it is possible to outline broad strategies that would lead to the preservation of natural capital. Based on these strategies, policies and policy instruments specific to each country's unique circumstances can be developed. Strategies for SMM Policy Principle 1 include:

- Improving information about material flows and environmental impacts;
- Increasing resource productivity and resource efficiency;
- Reducing material throughput, particularly of high impact materials;
- Increasing reuse/recycling of materials to preserve natural capital; and
- Advancing technologies for obtaining materials from natural resources that eliminate waste and toxics and support long-term ecosystem health (Eco-innovation).

Principle 2 - Design and manage materials, products and processes for safety and sustainability from a life cycle perspective

8. It is at the design stage that decisions are made that determine impacts throughout the life cycle. SMM Policy Principle 2 calls for maximising positive (and minimising negative) impacts to the environment and human health and well-being through design. By managing for safety and sustainability at each life-cycle stage, efforts are made to ensure that risks are not shifted from one stage in the value chain, or from one geographical region, to another. Economic and social outcomes are optimised while natural capital is preserved and materials are sustainably managed.

9. SMM Policy Principle 2 also calls for increased cooperation between actors across the life-cycle so that all actors are aware of the impacts of their actions and decisions on other phases of the life-cycle and can act accordingly.

10. Three overarching material, product and process design strategies support SMM. Specifically these are detoxification, dematerialisation, and design for value recovery.

Principle 3 - Use the full suite of policy instruments to stimulate and reinforce sustainable economic, environmental and social outcomes.

11. To shift societies toward more sustainable materials management, governments can leverage a variety of policies and policy instruments including: regulations; economic incentives and disincentives; trade and innovation policies; information sharing; and, partnerships. (This Principle and its application are described further in Conclusion 2 below.)

Principle 4 - Engage all parts of society to take active, ethically-based responsibility for achieving sustainable outcomes.

12. Material flows involve and affect many stakeholders throughout the supply chain and often across vast geographical areas. Because of the complexity of SMM, outcomes can be improved by inclusion and engagement of many players in collaborative efforts to create collective solutions. Stakeholder engagement can also facilitate socially-acceptable and equitable solutions by engaging those affected and allowing them to participate in designing of systemic solutions. SMM outcomes can be improved by systematic cultivation of:

- Multilateral stakeholder engagement, responsibility and collaboration;
- Open information flows; and
- An ethical perspective.

<u>Conclusion 2</u>: Consider the full range of existing policy instruments and tools which contribute to SMM's broad life-cycle and triple bottom line approach.

13. In principle, a coherent approach to SMM policy might, indeed, be expected to look at the management of materials across their life-cycle. However, it is recognized that current policies usually focus on one particular part of a material's life cycle because of the complications associated with "*expanding the policy approach to cover the whole life-cycle of materials*".[2] Furthermore, there are good reasons to believe that there are few cases where one specific policy instrument could achieve all that might be desired of SMM policy, and that therefore, even a coherent 'policy approach' to SMM will require a range of policy instruments.

[2] OECD (2009) *Report of the 2nd Survey on SMM-Related Activities in OECD Countries*, Report for the Working Group on Waste Prevention and Recycling, Available: http://www.olis.oecd.org/olis/2008doc.nsf/LinkTo/NT00007ECE/$FILE/JT03258740.PDF

14. SMM is a relatively new approach. Policies, plans and programmes which have been introduced specifically to address SMM, or under the SMM policy framework, have not been in place for many years (and so, there is little by way of demonstrable track record to show whether they have been a success).[3] However, what is clear is that there are a wide number of policies which contribute to SMM, whether they are labelled as such or not, and that they provide lessons on the effective application of a suite of instruments to achieve the objective of SMM policy. Examples of SMM related policies from which lessons can be drawn for various life-cycle stages and the initial suite of instruments to be drawn from to develop a SMM 'policy approach' include:

- Japan's Sound Material-Cycle Society
- UK Climate Change Act
- California's Green Chemistry Programme
- Electronic Product Environmental Assessment Tool (EPEAT)
- EU Sustainable Consumption & Production
- Green Public Procurement (GPP)
- Dutch Chain-Oriented Waste Policy
- UK's Clothing Product Roadmap

15. Specific instruments used within each of these include: taxes, penalties, incentives such as access to government procurement, targets, education, investment in research and innovation, etc.[4]

16. The research conducted on policy instruments indicated that at a general level there appears to have been a recent shift from policy instruments that exert an impact across one or two stages of the material life-cycle, towards policy packages that adopt an approach which considers the whole life-cycle, shifting emphasis away from 'end of life' policies, and giving a greater emphasis to upstream interventions. Increasingly, the intention seems to be that policies should, in future, become more cross-cutting, integrated and life-cycle focused in their nature (*e.g.*, integrated product policies, sustainable consumption and production, etc.). Focusing on earlier stages in the material life-cycle is an approach which addresses the cause rather than the symptom, potentially leading to more efficient use of resources throughout the life-cycle.[5]

17. One policy instrument which was reviewed in detail was that of SMM related targets. That research suggested that 'good' targets (*i.e.*, those which are credible, supported by government and society, based on sound research and set at an appropriate level) have the potential to be effective in supporting SMM practices. The main challenge for policy makers is to understand the attributes of effective target setting, which is complicated by the multi-national aspect and complexity created by the scope of SMM, and to incorporate these attributes into their target-setting process. Additional insights on this challenge are illustrated through the key considerations in conclusion 3 below.

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[3] OECD (2009) *Report of the 2nd Survey on SMM-Related Activities in OECD Countries*, Report for the Working Group on Waste Prevention and Recycling, Available: http://www.olis.oecd.org/olis/2008doc.nsf/LinkTo/NT00007ECE/$FILE/JT03258740.PDF

[4] These policy approaches and programs are all described in greater detail within the report "Policy Instruments for Sustainable Materials Management". In particular Figure 1 "Summary of SMM Policy Instruments" provides a valuable resource for policy makers of the suite of instruments across the life-cycle stages.

[5] See Geiser, K. (2001) *Materials Matter: Toward a Sustainable Materials Policy*, Massachusetts Institute of Technology

<u>Conclusion 3</u>: Key considerations when establishing and implementing SMM policy approaches

18. Based on the research findings a number of considerations were identified for policy makers to review prior to developing and implementing SMM policy. These included: requiring a variety of aligned programs, policies, and initiatives, as stated in Conclusion 2 above; understanding the system in question; understanding the capacity within the system to affect change; availability and use of indicators; and facilitating adoption.

SMM may require a variety of aligned programs, policies, initiatives to be successful

19. As described above in Conclusion 2, it is important for policy makers to consider the objectives of both a comprehensive SMM Policy as well as objectives of specific elements within that. As demonstrated by the Dutch Chain Oriented Policy, SMM policy may require a variety of objectives at different levels (*e.g.* national, industrial, material), using different timelines (*e.g.* short, medium and long term); and various instruments to achieve each one. In the Dutch case, each element is designed to contribute to the broadly stated 2050 objectives, quoted above, with a multitude of sub-policies with individual objectives which are driving towards this end.

20. Given SMM's scope it will affect numerous ministries (*e.g.*, environment, finance, labour), industries, environmental media (*e.g.*, air, water, land), etc. which will likely require new partnerships and communication channels between previously independent groups.

Understanding of the system in question

21. The level of understanding policy makers possess in regards to the system they are trying to influence is an important factor when establishing policy, selecting instruments or setting targets. In particular this has been a key consideration when deciding whether to implement, hard or soft policy instruments and targets, when appropriate. The lessons from target setting are informative here. In the case of SMM policy, understanding of the system in question includes such factors as: the time dimension (*e.g.*, differences in product design cycles); the interrelationship and opportunities between SMM targets and other activities and objectives (*e.g.*, job creation linked to recycling infrastructure); as well as, which aspects (*e.g.*, design, waste, recycling) or impacts should be addressed by the policy.

22. Examples of barriers to a complete picture of the system include:

- A lack of life cycle data, on environmental impacts as well as 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, management and updating, which can be substantial;
- A lack of programme experience (*e.g.* recovery of end-of-life compact fluorescent lamps); and
- The complexity of the system under question which is affected by such items as: a variety of perspectives and opinions; uncertainty around individual and market reactions to policy changes; rapidly evolving technological solutions; and the global nature of material flows which often cross national borders.

23. In the case of target based approaches, policy makers have addressed the complexity and inability to fully understand the system in question by: basing policy on what is currently understood; allowing flexibility to adapt to new information; focusing on areas where data and information are available; and using pilot programmes to deepen their understanding.

Potential for Systemic Change

24. An important constraint on policy makers, when establishing policy is their capacity to 'change the rules' which is affected by items such as their authority and control over strategic levers including the availability of technological solutions.

25. Authority includes both jurisdictional control over the policy implementation, which may include numerous government levels; as well as, the ability to monitor and enforce the policy, which can be complicated by market influence and material flows which often cross national borders. It is also 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.[6] Finally, the ability of policy makers to establish desired policy may also be constrained by cultural factors such as the public or stakeholder acceptance of their authority in this area.

Availability and use of indicators

26. Indicators play an important role in the development and monitoring of any policy or program and for SMM a lack of quantitative data and time series trends by which to assess SMM policy effectiveness reflects the relatively recent nature of some policies and the current target development which is taking place. As an example of the challenge with SMM indicators GDP captures economic performance but fails to differentiate that performance based on its impact on natural or social capital.

Facilitating Policy Implementation

27. Once policy is set, authorities still face a number of challenges in ensuring its successful implementation. As with policy principles these are not unique to SMM and there are a number of lessons to be learnt from previous and current implementation efforts. Examples of success factors include: effective monitoring systems; an appropriate instrument mix; and a regular review process which incorporates lessons learned and new information.

[6] See Appendix 2 for an example of applying 'Strategic Levers'

CONCLUDING SUMMARY

28. SMM supports a life-cycle view of impacts associated with material use which can help policymakers to better predict and manage upstream, downstream and long-term consequences of actions, to avoid shifting problems from one stage of the value chain to another, and to avoid shifting impacts from the present to future generations. In this summary we have identified three key conclusions from research on SMM policy principles, instruments and targets which will support policy makers in developing and implementing their SMM policy approaches.

29. Despite the complexity of the systems in question (*e.g.*, global material flows and impacts) and challenges faced by policy makers (*e.g.*, limited comprehensive models to draw from) there are clear opportunities to remain true to the WGWPR's working definition of SMM and to *"promote sustainable materials use"* and *" 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".*[7] The research described in this summary report is a starting point for policy makers in identifying lessons from previous efforts and strategies to develop their own SMM policy approaches.

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

APPENDIX 1: GLOBAL FORUM PANEL QUESTIONS:

30. Session 4 of the Global Forum on "Policies for implementing SMM", where this paper will be presented, aims at bringing out the key policy lessons that we have learned so far.

31. The following questions might be addressed under this session:

Key issues:

- For your country or region, what types of SMM-related policies have been most effective and why? What stages of the life cycle do these policies address (e.g., extraction, manufacturing, product use, waste) and what types of SMM targets have proven to be most useful in different circumstances?

- Many national governments are set up to manage energy and water rather than product and material value chains. Given that SMM policy is aligned with a value chain approach how can governments adapt to that reality and overcome the inherent obstacles in the existing system? How can governments enhance the uptake of an SMM approach by all relevant actors in the material value chain?

- Beside their role as a regulator, what other roles can governments play when implementing an SMM approach? Do they have to play a stronger role in facilitating more collaboration between different actors in a life cycle? Do they have to play a stronger role in setting the right example, creating markets for innovative products and business models?

Back-up questions:

- Under what circumstances are (1) mandatory actions and (2) voluntary collaborations most effective and appropriate? When is it most necessary to use policies that influence price signals?

- What opportunities and challenges do the several product approaches (e.g., eco-labels, procurement policy, product standards, extended producer responsibility) offer to SMM?

- Can SMM be built upon existing policy regimes, or does real progress in SMM require the formulation of new, more integrated, innovative policies? In this context, should a traditional approach based on waste minimization remain the cornerstone of SMM, with supplementary efforts at resource conservation, or is a fundamentally different approach needed?

APPENDIX 2: KEY DEFINITIONS AND CONCEPTS

Sustainable Materials Management (SMM):

32. 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]

Policy

33. A policy, in the context of this research, is considered to be an action taken by a government which changes 'the rules' in some way, thereby affecting the way in which all actors targeted by the policy behave.

Policy Instruments

34. Policy instruments are the actions or strategies applied in order to affect the behaviour of the targeted actors. Examples of policy instruments include: taxes, penalties, incentives such as access to government procurement, targets, education, investment in research and innovation, etc.

Targets

35. Targets cover the spectrum from vague qualitative approaches with a great deal of flexibility (soft targets) to quantifiable with clear baselines, measures, accountability and dates for achievements (hard targets). The use of 'strategic objectives' that act as overarching concepts to coordinate activities at a more specific level, was also observed.

Hard Targets and Policies

36. Hard targets tend to have a short timeline (*e.g.*, 1 to 5 years), a narrow scope (*i.e.*, looking at a single, attribute, industry, 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. For example, fixed recycling rates for a specific material supported by financial penalties for not achieving them.

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

37. Hard policy fits with the definition of policy above, in that it 'changes the rules' thereby affecting the way in which all actors targeted by the policy behave. Typically this is backed-up by some form of clearly defined consequence for failure to meet the policy such as a fine or restricted access to a market.

Soft Targets and Policies

38. Usually broader in nature (*e.g., addressing a number of materials in a market segment)* 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.
For 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.[9]

39. Similarly, at their extreme, soft policies are flexible in their application, typically have no associated threat of a sanction, and rely on the voluntary actions of the specific actors targeted by the policy.

40. Related to soft targets and policies are voluntary initiatives, or those activities entered into by choice with the option of opting out. These targets and policies are often related to some incentive (*e.g.*, financial, training, reputation building) which makes meeting the voluntary target or policy worth the effort.
For 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.

Strategic Objectives (Goals)

41. An important concept in target setting, in contrast to hard and soft targets, is that of strategic objectives. These 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. The clearest example of this is the Dutch Chain Oriented Policy where the broadly stated objective of the policy is *"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."* **[10]**

Strategic Levers

42. Strategic levers refer to the available methods and extent of influence an authority may have. As demonstrated throughout these reports, this is an important concept given that the available strategic levers that exist for governments vary widely due to structure, allocation of responsibility, population and geography. For example, a jurisdiction may not represent a significant market for a specific product and therefore may have limited ability to influence companies to change their designs (*e.g.*, enforce design for

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

[10] Source OECD.

disassembly requirements), but it may be able to affect the recycling rate for that product within its jurisdiction (*e.g.*, through fines for improper disposal, etc.).

Detoxification

43. Detoxification supports SMM by eliminating the progressive build-up of chemicals and compounds produced by society that have harmful impacts on human health and environment, that cannot be properly or safely managed, or that are costly to manage from an economic or environmental standpoint. Detoxification is addressed through the application of green/sustainable chemistry and the process of chemical substitution.

Dematerialisation

44. Dematerialisation supports SMM by reducing the throughput of materials, particularly those with high negative life-cycle impacts. Dematerialisation means doing more with less and refers to more efficient use of raw materials (resource efficiency) without decreasing the quality of the service they provide. In addition to resource efficiency, dematerialisation strategies also include material substitution and replacing products with services.

Design for value recovery

45. Design for value recovery supports SMM by ensuring that products and materials are designed for reuse and recycling and that an effective model for recovery is in place (*i.e.*, reverse logistics). Design for value recovery may be driven by policies that promote extended producer responsibility (EPR) and "cradle-to-cradle" design. Cradle-to-cradle design strives to restore continuous cycles of materials with long-term positive effects on profitability, the environment and human health.