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Resource productivity and policies

A Dutch perspective

Discussion paper

Commissioned by Ministry of VROM, the Netherlands (Henk Strietman)

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With contribution by relevant Dutch stakeholders

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Covering note:
Purpose and necessity of a response from the Netherlands

This short note serves to introduce a discussion paper on recent developments in the field of e*conomy-wide material flow policy*. This kind of policy is concerned with managing the flows of resources and materials through the economy, formulating appropriate policies in terms of quantitative or qualitative targets and so on. It is beyond the scope of this paper to explore the origins of the concept, which was first brought forward by Ernst von Weizsäcker and the Lovins family in their book *Factor 4: Doubling wealth, halving resource use* [Earthscan, 1997]. This book demonstrates, with reference to a wealth of practical examples, how reduced consumption of energy and materials can go hand in hand with improved functionality of products and services and greater human prosperity.

These and allied ideas have been embraced by scientists and politics alike. As a result, *dematerialisation* – the use of less materials per 'functional unit' of a product or service – has shot up the political agenda in the last few years (though this has largely escaped the media). Thus:

- In the Netherlands, the 4th National Environmental Policy Plan states (p. 126) that, in response to a parliamentary motion to that effect, the government is to pursue a material flow policy with an indicative target of a Factor 2 to 4 reduction by the year 2030.
- The European Commission, in 2003, published a Communication entitled 'Towards a Thematic Strategy on the Sustainable Use of Natural Resources' which focuses specifically on economy-wide material flow policy. Preparatory work on this theme is currently underway in two working groups in which stakeholders are also participating.
- The OECD published a set of Recommendations this year that includes the specific recommendation that member states develop a material flow policy with indicators to back it up.
- The G8 agreed in Evian, in June 2003, to elaborate the concept of material flows in greater detail, including operational indicators to measure such flows.
- Eurostat published a quantitative review of material flows for the first time in 2002, complete with indicators.

Despite these various initiatives, policymakers still have no clear idea how a material flow policy is to be *shaped*, nor *what problems* it is to address precisely. This state of affairs is all the more curious because the indicators for such a policy already seem to have been developed by Eurostat, amongst others. This brings with it the very real risk of policy being developed on the basis of (these) indicators, rather than indicators being developed as tools to guide us towards reasoned targets. A poorly though-out policy in the field of materials, including any policy based on the Eurostat indicators, has a number of serious implications, which we would like to discuss in this paper. What they boil down to, though, is a risk that 'dematerialisation' is seen ultimately as an end in itself,

while to our mind it is far more a means towards a cleaner and greener environment.
The aim of this paper, then, is to provide some background to international policy developments in this area and present several good reasons to have emerged in discussions with others for adopting a course in which dematerialisation is seen as *a means to an end*. We hope that we have succeeded in writing a paper that enjoys broad support, at least in the Netherlands, and one that can be used by all the players involved in developing policy on material flows – government departments, industry, scientists and NGOs – to influence that process in the international arena.

1 Introduction

Within the EU and a number of European countries there is a debate in progress about the environmental impact associated with the use of resources and materials, and more particularly about 'dematerialisation' and 'material flow policy'. This debate was given a new impulse when the European Commission published its Communication 'Towards a Thematic Strategy on the Sustainable Use of Natural Resources' (see text box)[1] in October 2003. The Commission has organised stakeholder consultations on this thematic strategy with a view to drawing up a policy strategy by mid-2005. For a status report, including downloadable discussion papers and reactions, we refer the reader to: *http://europa.eu.int/comm/environment/natres/titles3_6.htm#stakeholder*.

Thematic Strategy on Natural Resources

In the European Commission's Communication on a Thematic Strategy on the Sustainable Use of Natural Resources, one of the key notions is that it is the *environmental burden* due to resource consumption that needs to be reduced and not necessarily the actual of use of materials or resources. The Commission also noted that there is no direct and simple relationship between materials consumption and environmental burden, the latter depending on a range of specifics such as the technologies used in the various stages of the life cycle, material and product lifetimes, recycling levels and so on.

The Commission has not yet proposed any specific policy measures, these being elaborated as part of the work towards a final strategy. What the Communication has already stated, though, is that the environmental impact of resource use is of greater concern than the risk of resource depletion.

The Netherlands, too, has had its debate on natural resources, materials and materials flow policy. The issue first came on the agenda in the 4th National Environmental Policy Plan and a number of studies have subsequently been carried out, partly in response to a parliamentary motion on the topic. According to good Dutch practice these studies were discussed with a wide range of stakeholders in a series of working meetings, from which there emerged a reasonable consensus as to how a materials flow policy might best be shaped. We felt it would be worthwhile to commit this emerging 'Dutch perspective' to paper and feed it into the Brussels debate, while at the same time by no means claiming that all parties are agreed on each and every detail.

This document is to be seen as a discussion paper. It has been put together with input from a variety of Dutch organisations (government departments, industry, scientific institutes, NGOs) and in the view of the authors broadly represents what might be termed 'the Dutch perspective' on these issues. The paper dovetails well with the Commission's Thematic Strategy and, indeed, most parties in the Netherlands seem to be in basic agreement with the ideas brought forward there. What this paper seeks to do is bring forward some additional considerations and highlight a few specific issues.

[1] European Commission (EC), Towards a Thematic Strategy on the Sustainable Use of Natural Resources, COM(2003) 572 final.

In this paper we shall speak consistently of ‘materials’ (and ‘material flow policy’), taking these to include the (natural) resources and raw materials extracted in the initial phase of a product lifecycle.

2 Identifying the key issues

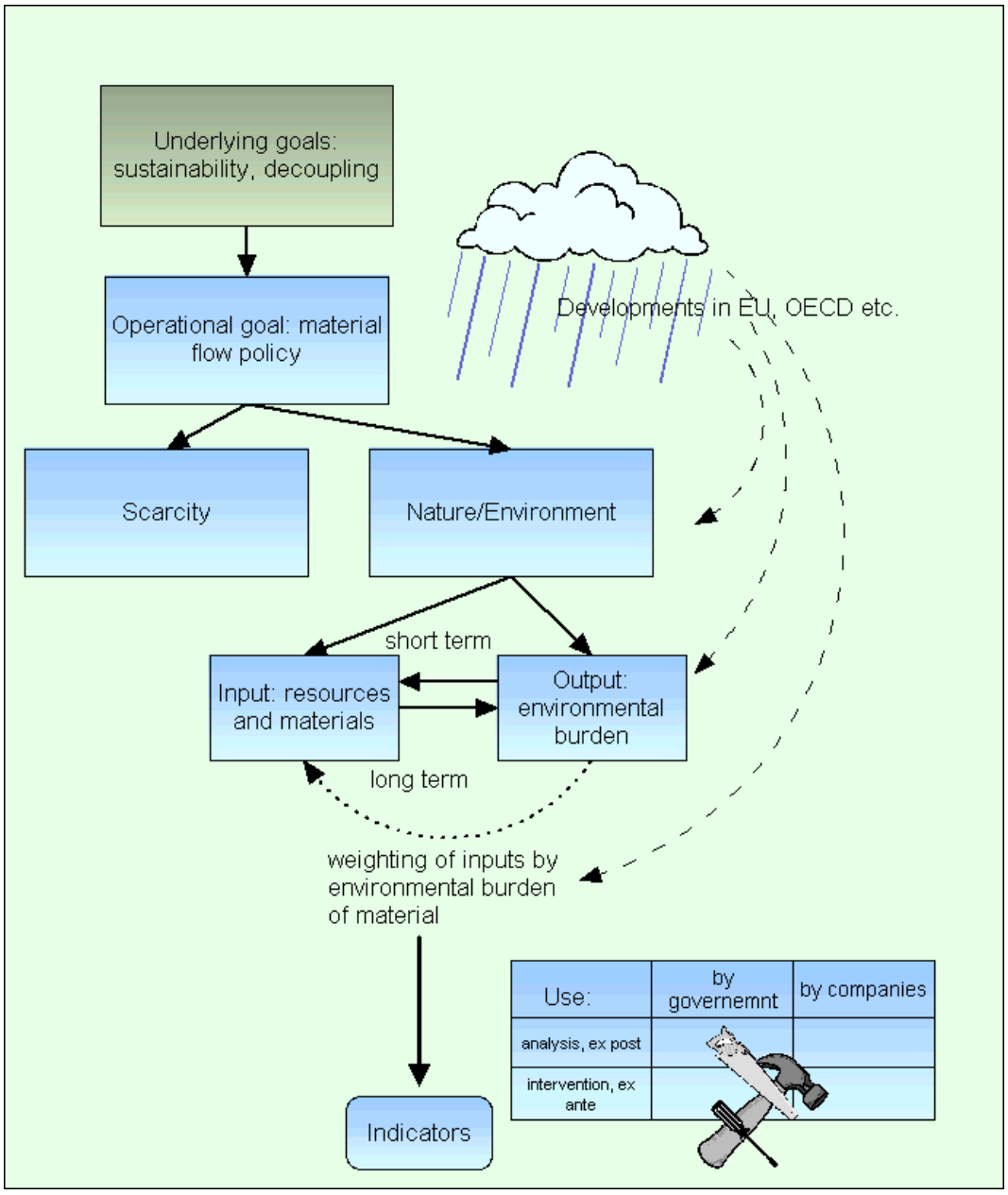
The (international) debate on material flow policy is a complex one, touching on just about every aspect of environmental policy. After all, material flows are the physical ‘lifeblood’ of an economy and there is already a raft of policies in place exerting leverage on a multitude of points in these flows. These policies are judged differently by different parties, depending on their vantage point and philosophy, and assessments diverge when it comes to the need to extend the remit of these policies or review their substance.

On closer inspection, these differences prove to relate to five basic areas:

- The *goal* of a material flow policy.
- The *leverage points* of such a policy and, in tandem with this, how policy progress is to be measured.
- *Assessment of the direction* international policy and indicator development are moving.
- The design of *indicators* for use as ‘monitoring instruments’.
- The potential and actual *use* of such indicators in the design and implementation of a materials-based policy.

These issues are unravelled schematically in Figure 1.

Figure 1 Material flow policy: the key debating issues



Everyone is agreed on the underlying goal, that material flow policy should contribute to sustainable economic development ('People, Planet, Profit'). When it comes to the *specific* contribution of this kind of policy, though, arguments shoot off in all directions. On the one hand are those whose key concern is *scarcity*, but at once there are those who argue that this should be seen as an *economic* rather than an *environmental* problem. This certainly holds true for mineral resources like metals and fossil fuels. For biotic resources like fish and timber, however, scarcity is very much an environmental and biodiversity issue. Other problems associated with resource use relate to (the wide range of) environmental impacts arising along the full chain of supply and production, from resource extraction through to final waste. Although many of these environmental impacts are already addressed by standing policy, there are those

who hold that approaching the issues from a material-flow perspective would be helpful, or possibly even essential, for more comprehensive and effective environmental policy.

At the operational level the key issue is what kind of indicators are best suited for monitoring the effectiveness of any material flow policy. This depends very much on one's assessment as to where policy leverage can best be exerted: on the environmental impacts of materials use (with policy therefore geared mainly to *outputs*, reducing emissions, waste products, damage and so on) or, alternatively, on *inputs* of (raw) materials to the economy? On one side stands a school of thought that holds that everything that goes into the economy eventually comes out as an environmental burden. Indicators monitoring material inputs to the economy are then perfectly adequate for any material flow policy, they say, as these indicators provide a *signal* as to what is happening on the output side. The second school of thought holds that the transformations occurring in the economy are so complex that the ultimate *environmental burden* on the output side has little if any direct relationship with the tonnage of matter going in on the input side. From this perspective an indicator geared to material flow policy should, more than anything else, provide information on the environmental consequences of materials use.

There are also differences when it comes to *assessment* of the direction in which international policy-makers as well as the international 'indicator industry' are moving. On the one hand are those who argue that material flow indicators have already been developed, amongst others by Eurostat (see Appendix), and that similar developments are in progress elsewhere, within the OECD, for example. As they see it, there is little sense in opposing these developments and bringing forward all kinds of improvements or innovations. On the other hand stand those who caution that these input-side indicators could all too easily be used inappropriately. Before anyone realises, they warn, policymakers could be recommending tonnage cut-backs on the input side without this necessarily benefiting the environment at all, or possibly even worsening matters. From this angle, there is no escaping the development of rather more sophisticated indicators, and ditto materials flow policy.

People's ideas on this point are also bound up with their assessment of how the indicators will be *used* to actually flesh out policy. On one side of the spectrum are those who hold indicators to have only signal value, a 'thermometer' registering events, but with no policy implications necessarily ensuing. On the other side stand those who object that, although this may be true in a formal sense, the real world of policymaking and politics shows that once a indicator appears on the policy stage, it is often used for deriving concrete policy targets and interventions without much further thought or analysis. A dubious indicator may then easily spawn dubious policy.

This leads us to the final issue: who will be actually be using the indicators to take action. Although little has been said on this point in the debate until now, it is well feasible that it will be not so much government that will be taking action

when it comes to ‘materials policy’, but business and industry. In that case government responsibility will be limited to the compiling of statistics, with these data being provided as a *service* to business, which in the absence of any further government policy is then free to take action, or not. Although on the face of it this is in line with what many companies want, they are also worried that policymakers will go beyond the notions of *self-regulation* and *corporate social responsibility* and impose compulsory measures, which in their view are methodologically unsound.

In light of the range of opinion on all these issues, in the following pages we shall try and formulate a perspective within which a policy on materials and material flow might effectively be shaped.

3 Preliminary considerations for a material flow policy

The European Commission has stated that the main objectives of a material flow policy should be to reduce environmental impact and prevent depletion of renewable resources (fish, wood, etc.) rather than reduce the consumption of materials as such. In the Netherlands this is very much in line with standing practice in most areas of environmental policy. With respect to product policy, for example, it is the environmental impact of products that is assessed and regulated, not reductions in consumption as such. In the field of manure policy, the impact of manure spreading is limited in terms of mineral inputs and not (primarily) manure tonnage. When it comes to production processes, the emphasis is on emissions not on production volumes. Likewise, it is not the number of cars the government seeks to reduce, but emissions of pollutants and noise. The only exception in this respect seems to be packaging policy, where one of the aims is indeed to reduce the overall amount of packaging on the market. However, precisely this policy is now hotly contested in the Netherlands, on the grounds that the approach is not commensurate with the actual environmental impact of packaging use.

The first preliminary consideration, then, is that ideas on material flows policy should connect to the design of existing environmental policies. Secondly, that such a material flow policy can support existing environmental policies as materials form an important part of the environmental burden of our economic systems. A study by the Institute of Environmental Sciences at Leiden University (CML) has shown that materials usage is a major contributor to a wide range of environmental problems, accounting for anything between 20 and 95% of overall impacts.

The question here, though, is whether a material flow policy can create a *new* angle on the issues in question. After all, the depletion of fish stocks can be far more effectively addressed by means of dedicated policy to promote sustainable fishing practices than with an across-the-board policy covering all ‘materials’. To our mind, new policy on material flows only has a role to play *in cases where current policy is ineffective or economically inefficient*. In the first case, if current policy is ineffective, then material flow policy may be able to provide additional

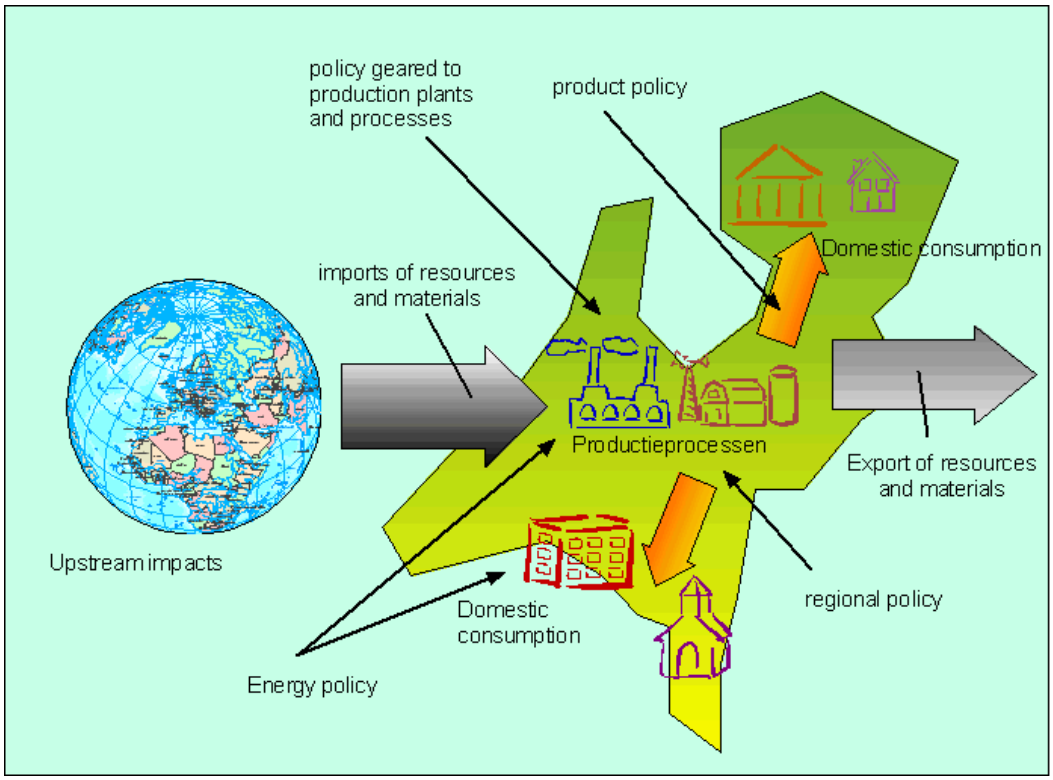
leverage for meeting targets, thus *augmenting* the existing raft of measures. If standing policy is economically inefficient, secondly, then measures scoring particularly poorly in this respect could well be replaced by measures stemming from material flow policy if these are indeed more cost-efficient.

If the goal of a material flow policy is to improve the (cost-)effectiveness of environmental abatement policy, however, it is essential that the new policy be elaborated on the basis of a comparative analysis of the effectiveness of various policy instruments. We note that such an analysis is missing so far.

A second perspective on material flow policy is that it should be used above all to address 'gaps' in existing environmental policy. In that case, such policy should be specifically elaborated to *augment* current policy instruments.

In most European countries and in the EU context there is already a broad raft of environmental policies exerting leverage in many different areas. There therefore seems to be relatively little scope for devising additional measures at the national level. Importantly, however, the picture changes if the goalposts are moved to include the *global* impact of European materials consumption.

Figure 2 Material flow policy can serve to augment standing policy by regulating upstream impacts of resource and material use



Apart from 'communicative' actions like quality certificates (FSC for wood and wood products, MSC for fish and fish products, for example) and codes of conduct and similar voluntary agreements, *there are currently few if any policies addressing the upstream negative impacts of materials use on nature and the environment, at the back end of production chains*, beyond national or European borders. For this category of impacts, then, a material flow policy might well serve a useful supplementary purpose. The philosophy here is that resource-consuming countries have a certain responsibility for impacts occurring upstream in the producer countries if environmental policies are less well developed there.

Generally speaking, most environmental policies of the EU as well as individual member states exert their leverage on emissions within national borders, generally using a licensing system to enforce 'state of the art' technology and/or ALARA (As Low As Reasonably Achievable) emissions. The aim is thus to control emissions to the extent that these arise within the borders of the EU or member states. Similar policies are also in force for domestic (i.e. EU) mining activities. As many raw materials are imported from outside the EU, however, by no means all the emissions occurring further upstream are covered by standing policy and a material flow policy might therefore well have a supplementary role to play here.

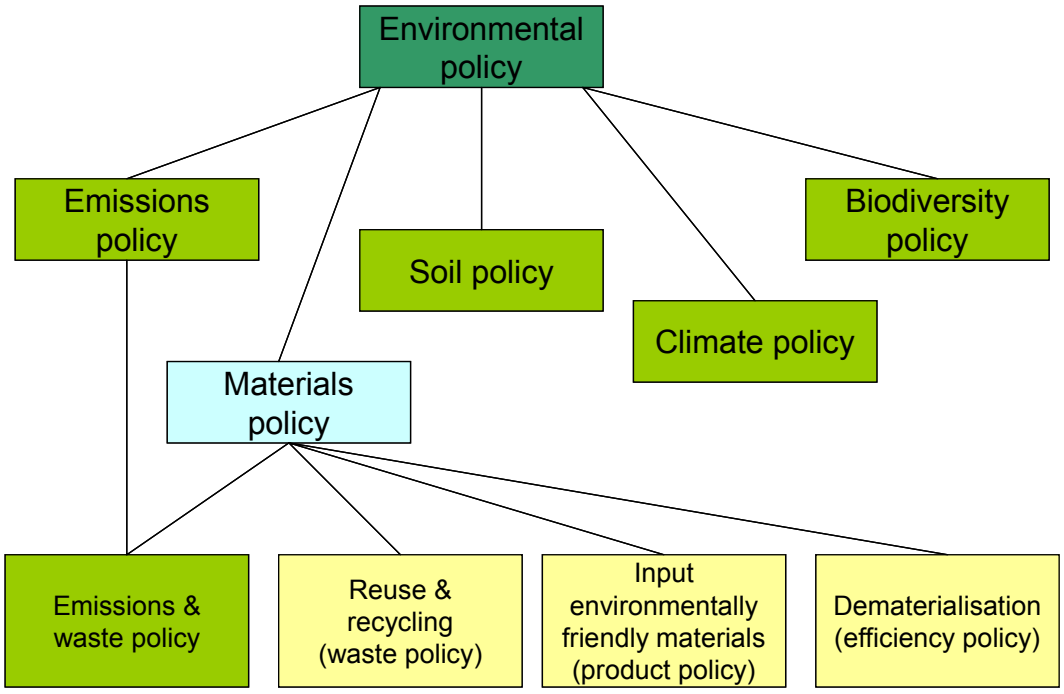
In that case, though, careful consideration must be given to the impact this would have on other types of policy that also relate to material flows and in some cases even already address upstream impacts, as in the case of product policy, for example.

This leads us to a third possible motive for initiating a specific policy on material flows: as a means of coordinating existing policies. Although there are already a great many policies in place addressing materials and material flows, these are still largely uncoordinated. In many European countries product policy, resource policy and waste policy are separate realms, for instance, with little 'joined up' thinking involved. The Thematic Strategy on Natural Resources might therefore be elaborated to culminate in framework legislation aimed precisely at integrating these policy areas.

This is illustrated in figure 3, in which material flow policy, shown in blue, serves as an 'umbrella' for waste policy, product policy and 'dematerialisation' policy (i.e. resource efficiency policy)[2]. Emissions policy and waste policy regulating landfills and pollutant dissipation lie beyond the remit of material flow policy, which in this case is already subsumed under emissions policy.

[2] Not all European countries have a resource efficiency policy at present. In the Netherlands an indicative target for 'dematerialisation' was set in the government's 4th National Environmental Policy Plan (see Appendix).

Figure 3 Articulation of material flow policy with other policy areas



A material flow policy articulated in this kind of way could have benefits for the environment as well as for trade and industry, for it would mean a standard approach being taken to all decisions regarding the use of particular materials in products or processes, all the way from the cradle to the grave.

In conclusion, we see several different areas in which a material flow policy could be usefully employed, under the proviso in each case that such policy is appropriately framed and dovetailed with standing policies. The more material flow policy is seen as a panacea for a broad range of environmental problems, the greater the risk of overlap with existing policies. If that is the approach being adopted, to our mind it must first be demonstrated that a material flow policy really has something new to offer, by being more cost-efficient or tangibly effective than the policies currently in place. The environment impact of our materials consumption in upstream supplier countries certainly represents a policy 'gap' at the moment, and one that resonates well with the growing enthusiasm for 'corporate social responsibility'. Here, then, we might have an interesting policy perspective. Another option would be to elaborate a material flow policy in such a way that it serves to coordinate what may broadly be termed lifecycle policy (geared to products, raw materials and waste), ensure transparency of trade-offs between these policy areas and, above all, steer policymaking on the compass of maximum environmental benefit.

4 Indicators and policy leverage

Once the motives for initiating a material flow policy have been clearly established, and not before, we can start thinking about specific indicators to support our policy goals. Although in general terms the primary objective of the Commission, in its Communication, seems to be to decouple economic growth from environmental damage, the wording is not precise enough for any conclusions to be drawn as to appropriate indicators.

In our vision, indicators to support a material flow policy should take due cognisance of the following four key insights.

1 Environmental impacts pivotal, tonnage as such irrelevant

The basic point of departure of environmental policy in its broadest sense is to prevent or reduce any form of environmental burden that has an undesirable or unacceptable impact, whether directly or indirectly. Policy analysis therefore generally reasons 'back' from these impacts: what environmental burdens (emissions, wastes) are responsible for these impacts, and in what processes do these burdens arise? It is therefore usually at the site of these emissions and waste outputs that policymakers seek to apply leverage. In many cases this means focusing policy efforts on production processes (industrial plant, etc.) on the one hand and consumption processes (cars, domestic heating, etc.) on the other.

Any material flow policy should accord with this basic thinking. From this perspective it is not materials themselves that are having an impact, but the emissions, wastes or direct damage to nature occurring at discrete locations along the supply chain, all the way from material production through to consumption and waste disposal. These vary enormously from material to material, and even for a single material, depending on the production process, energy requirements and modes of transportation associated with the flow in question (extraction, processing, etc., etc.)[3].

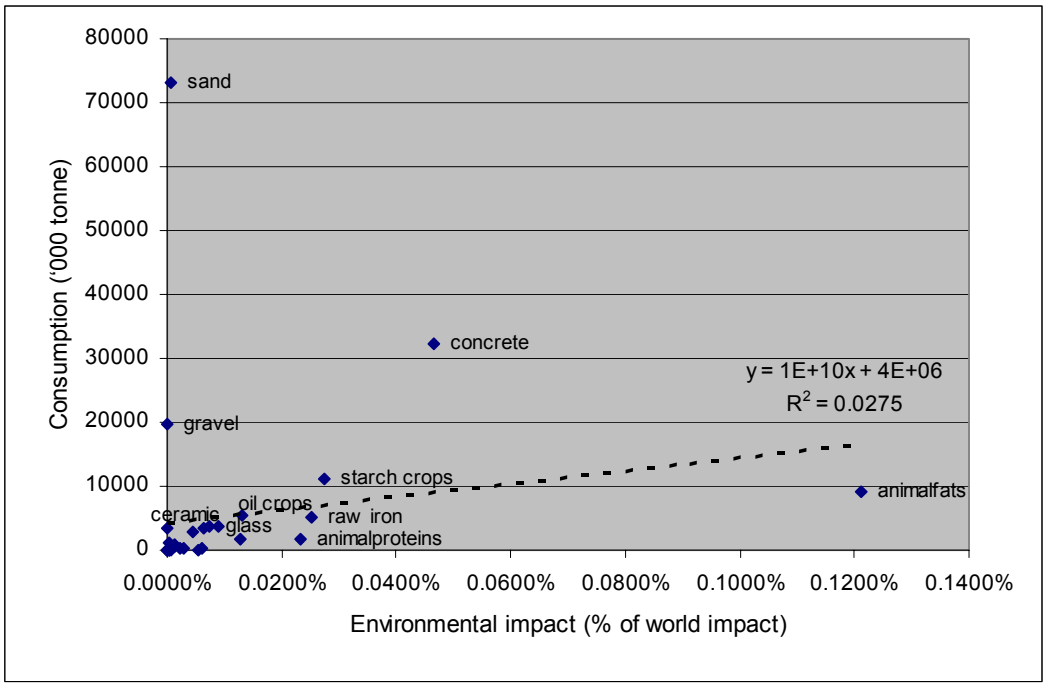
This is all the more true if materials input is analysed per 'functional unit' or 'unit added value'. After all, materials are not circulating through the economy for their own sake, but because of a specific functionality they possess. It is mainly a material's properties that determine whether it is suitable for a given purpose (double-sided printing of a newspaper on plastic film is a no-goer, for example) and if so, how many kilograms of it are required per functional unit. Thus, reduced materials consumption (in kilos) may mean *greater* environmental impact, if the functionality of the substitute material is inferior to that of the original, or if the per-kilo environmental impact of the substitute lighter material is (possibly far) greater.

It is for this fundamental reason that gearing policy to tonnage rather than environmental impact is such an ill-advised undertaking. How much a material

[3] For example, see Vroonhof, J.T.W. *et al*, Life Cycle Assessment (LCA): a useful tool, but to handle with care, CE, Delft, 2002.

weighs is a poor yardstick for its environmental impact and focusing on weight can all too easily have an effect opposite to that intended. The pivotal focus of material flow policy should therefore be the environmental burden associated with materials and their use – and this should then likewise be manifest in the indicators developed to underpin that policy. This is why the weight indicators developed by Eurostat (see appendix) are unsuitable for monitoring the progress of a material flow policy, for in adopting these indicators, policy would still be implicitly steered according to kilogram usage. As a recent analysis [CML, CE, 2004] shows, the correlation between kilogram consumption and environmental impact, in the appropriate units, is no more than about 3%, and therefore hardly significant in statistical terms.

Figure 4 Relationship between kilogram consumption and cradle-to-grave environmental impact for 29 materials (Dutch data for the year 2000)



2 Materials consumption is a better yardstick than production or input

Every economy has its imports and exports and, to varying degrees, its raw materials. International division of labour and economic specialisation play a major part in each country's prosperity, with national comparative advantages going a long way to determining their role and status in international trade. It would be a curious move indeed to counteract these trends by means of some form of material flow policy. But that is precisely what would happen if proposals are adopted to take the total *input* of materials to an economy as a yardstick and steer policy by that compass. An indicator like Direct Material Input (DMI), as discussed in the appendix, is geared precisely to input and a decrease in DMI would imply progress in terms of 'dematerialisation'. This line of reasoning obviously cannot be upheld. If a country is specialised in the processing of natural resources, for example, and does so more efficiently than most others in

terms of energy and the environment, and it exports some of its materials, semi-manufactures and products, then a reduction in DMI may in fact mean an overall increase in environmental impact, if former materials importers set up less eco-efficient production facilities of their own.

Advocates of a materials-oriented environmental policy would therefore be well-advised to take domestic *consumption* as their measuring rod and not input. This also accords well with the vision of a material flow policy that *augments* existing policy, using it above all to shape responsibilities for negative impacts on nature and the environment occurring upstream in the production chain. It is then logical for these responsibilities to be shouldered by the *consumers* of the materials in question.

3 Indicators must accord with the underlying policy vision

There is a saying among managers: 'Management gets what it inspects, not what it expects' and it may be just as true of environmental indicators. Once developed, index numbers and indicators designed to measure and record a state of affairs, a change over time or some sort of performance compared with other players can easily come to lead a life of their own. What sometimes starts out as an indicator lacking a policy can gradually evolve into a policy in pursuit of that indicator. One must be absolutely sure, then, that new indicators will indeed record the quantities one wants recorded, for sailing by the wrong compass inevitably takes one to an unintended destination.

In this respect, the entire debate on material flow policy and dematerialisation is in part a curious one, because already there are various proposals for indicators circulating without the necessarily *prior* discussion on the purpose and goals of a material flow policy having been properly attended to.

4 Wise choice of materials to be covered by the policy

Finally, the indicator developed should also embody wise choices vis-à-vis the materials to be covered by a material flow policy. We would submit that there is little point in including fossil fuels in the remit of such a policy, given the plethora of policies already in place to address the volume consumed and emissions associated with use of fossil fuels (keywords: energy saving programmes, renewable energy programmes, greenhouse effect policies and policies oriented towards acidification, fine particles, toxic emissions, etc.). Generally speaking, all these policies have been duly assessed as to cost-efficiency and effectiveness. There would therefore seem to be little point including fossil fuels in a material flow policy. Where fossil fuels are used as a production feedstock, however, there might be good reason for capturing such consumption in a material flow policy. Another way in which standing policy on fossil fuels might be fruitfully augmented, as stated earlier, would be for a material flow policy to focus on upstream impacts in the production chain (generally, exploration and extraction) occurring outside EU or national borders (domestic exploration and extraction are already regulated, e.g. by the Mining Act in the Netherlands).

5 Resource and materials policy are not necessarily government policy

There is still no clear idea as to the form a materials flow policy will eventually take, and the same therefore holds when it comes to where responsibility will lie for giving flesh and bones to such a policy. This obviously also depends in no small part on the ultimate aim of a material flow policy (see section 3) and the international leeway available to government and industry for taking appropriate action. A case in point are the WTO rules of trade, which may set limits on government efforts to address upstream environmental impacts of materials usage, in the country of extraction, for example.

Consequently, there may also be an important role for market players, i.e. business and consumers. In their efforts to shape corporate social responsibility, companies, for their part, are seeking ways to articulate their responsibilities with respect to the 'three P's': People, Planet and Profit. Data on upstream impacts of materials consumption is indispensable in this regard, for it allows companies to elaborate standards for the raw materials and semi-manufactures they are willing to use, or opt not to use certain materials at all. Such action may be taken on a voluntary basis, because it is what the market wants, or because of the potential damage to a company's reputation if it fails to demonstrate its responsibility on all three P's.

As an illustration, a number of computer and cellphone manufacturers are becoming increasingly critical of the use of columbite-tantalite, or coltan, a mineral mined mainly in Congo. In the process of extraction, tropical rainforests are being destroyed, workers subjected to appalling conditions and profits used to help fund the civil war. Companies like Siemens and Nokia are seeking alternatives, to relieve them of responsibility for the impacts of coltan extracted and marketed in Congo. This is a form of resource or materials policy in which government plays only a minor part, with initiatives being taken mainly by industry itself. In such cases it is sufficient for government to set up a robust information system, incorporating not only the environmental impacts occurring upstream but also the wider, socio-cultural impacts of resource extraction and use, making this data available to consumers and producers and their respective organisations.

This would then also allow governments to monitor the extent to which such initiatives are indeed leading to the sought-after 'decoupling' between economic growth and the environmental impact associated with resource and materials consumption.

6 Conclusions and recommendations

As we have endeavoured to show, development of a material flow policy with accompanying indicators is paved with pitfalls. At the same time though, this kind of policy can create new opportunities, provided, that is, a number of 'design specifications' are adhered to:

- Material flow policy opens up interesting perspectives as a means of *augmenting* standing policy, in cases where that policy:
  - Has obvious gaps.
  - Falls short in terms of cost-efficiency.
  - Falls short in terms of effectiveness.
- These gaps relate mainly to upstream environmental (and other) impacts, over which the EU and individual member states currently have no say, even though by consuming these materials they are partly responsible for those impacts.
- For addressing these gaps, robust and comprehensive lifecycle analyses are indispensable.
- To assess the extent to which government material flow policy can help improve the cost-efficiency and/or effectiveness of existing policies requires rigorous *ex ante* analysis of that policy.
- To make any effective contribution to environmental policy, material flow policy must focus on the overall impact of materials usage on nature and the environment; a policy based purely on tonnage serves no purpose at all.
- There may be little point in addressing fossil fuel use by means of a material flow policy.
- Material consumption should be the pivotal issue, not gross inputs.
- Indicators for a material flow policy should measure the quantities one indeed seeks to control. It is therefore essential that the latter be weighted in proportion to environmental impact.
- Only then can priorities be set for those materials with the greatest lifecycle environmental impact and an analysis made of whether some form of steering is in order, and if so, what.
- Robust information on the environmental as well as socio-cultural impacts of resource and materials use is itself an important 'resource' enabling business to get to grips with their corporate social responsibilities.

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Appendices

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Commissioned by Ministry of VROM, the Netherlands (Henk Strietman)

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With contribution by relevant Dutch stakeholders

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A The Eurostat indicators in context

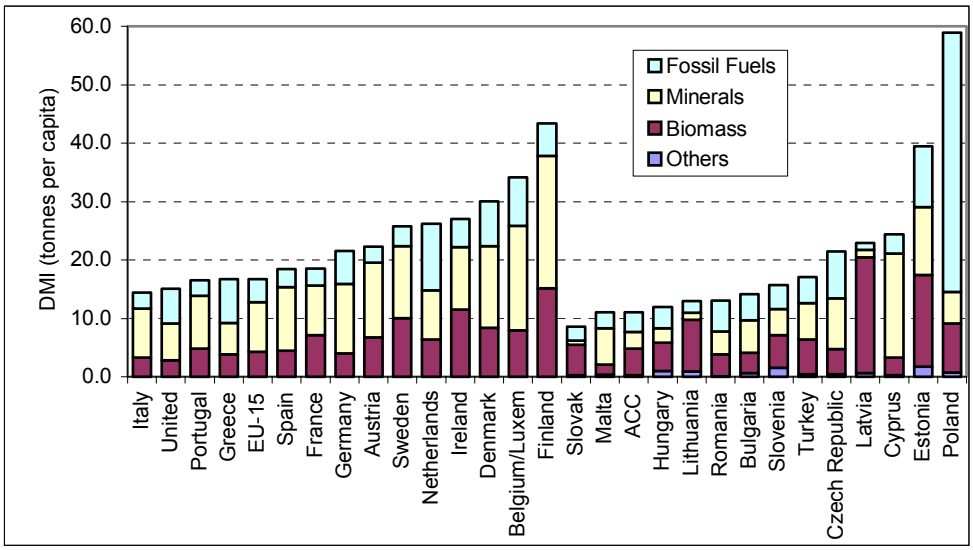
Eurostat has already developed two indicators for measuring material flows, brought forward as being suitable for setting 'material flow' targets for the Thematic Strategy on Natural Resources (see textbox below), both of which are measured in kilograms or tonnes. These indicators were also recently endorsed by the OECD in a Recommendation stating (still provisionally) that national material flows should be reported in accordance with Eurostat guidelines[4].

Indicators developed by Eurostat

Two indicators have been proposed by Eurostat: Direct Material Consumption (DMC) and Direct Material Input (DMI). Although it is beyond the scope of this paper to give a comprehensive description of these indicators, their system limits and the calculations behind them, in brief they can be defined as follows:

DMC is the consumption of new materials by an economy (extracted raw materials plus all material imports, whether raw materials or products, minus all material exports, whether raw materials or products).
DMI is the input of new materials to an economy (extracted raw materials plus imports of extracted raw materials).

While DMC, as an indicator of consumption, indeed tells us something about actual materials throughput and may therefore have some economic significance, quantifying the indicator is far harder, because for each product traded an estimate will have to be made of the total kilograms involved (i.e. kilograms of radios, vacuum cleaners, etc.).
DMI therefore seems to be a more reliable alternative. The obvious problem with DMI, however, is that it tells us nothing about actual materials consumption, because countries with a high proportion of basic industries will have a high DMI, which includes imports of iron ore, for example, but not steel exports. The figure below shows the DMI for European countries as calculated by Eurostat for 1999/2000.



[4] These indicators are also cited on the EU's 'Thematic Strategy' website, for example.

Our concern is that sooner or later such indicators will be used as a basis for setting policy targets; it would not be the first time that the cart is put before the horse. It still remains to be seen, then, whether the 'thematic strategy' will be elaborated in line with the original overarching aim of reducing environmental impacts. Because much will depend on the indicators adopted for monitoring progress in this policy area, it is also essential to query, early on in the process of indicator development, whether the quantities being measured and recorded are in fact meaningful. This should be accompanied by rigorous analysis of the precise problem being addressed by means of a material flow or resource policy.

B OECD-Council Recommendations on Material Flows

Endorsed by Environment Ministers on 20 April 2004
Adopted by the OECD Council on 21 April 2004

THE COUNCIL,
Having regard to Article 5 b) of the Convention on the Organisation for Economic Co-operation and Development of 14th December 1960;

Having regard to the Recommendation of the Council of 8th May 1979 on Reporting on the State of the Environment [C(79)114)];

Having regard to the Recommendation of the Council of 31st January 1991 on Environmental Indicators and Information [C(90)165/FINAL];

Having regard to the Recommendation of the Council of 20th February 1996 on Implementing Pollutant Release and Transfer Registers [C(96)41/FINAL] amended on 28th May 2003 [C(2003)87];

Having regard to the Recommendation of the Council of 3rd April 1998 on Environmental Information [C(98)67/FINAL];

Having regard to the Communiqué of the OECD Council meeting at Ministerial level of 17th May 2001 which stated that 'that OECD countries bear a special responsibility for leadership on sustainable development worldwide, historically and because of the weight they continue to have in the global economy and environment' and which asked the OECD to 'continue to assist governments by: developing agreed indicators that measure progress across all three dimensions of sustainable development, including decoupling of economic growth from environmental degradation';

Having regard to the OECD's Environmental Strategy for the First Decade of the 21st Century endorsed by MCM in May 2001;

Having taken note of international work on Integrated Environmental and Economic Accounting (commonly referred to as SEEA);

Considering the need for better information designed to integrate more fully environmental and economic decision-making;

Convinced of the need for intensified efforts by OECD member countries to establish and use indicators of progress concerning the implementation of national and subnational policies on the environment, eco-efficiency and sustainable development; and to systematically compare achieved results with relevant objectives of environmental policies and, where appropriate, related international commitments;

Taking into account the close co-operation on environmental matters between OECD and other international organisations;

On the proposal of the Environment Policy Committee (EPOC):

I. Recommends that member countries:

(i) take steps to improve information on material flows, including its quality and relevance for environmental management, in particular:
   - develop methodologies to enhance knowledge of material flows within and among countries;
   - consolidate and improve data collection concerning material flows within and among countries;
   - develop tools to measure resource productivity and economy-wide material flows, including appropriate estimation methods, accounts and indicators;

(ii) further develop and use indicators to better integrate environmental and economic decisionmaking, and to measure environmental performance with respect to the sustainability of material resource use;

(iii) promote the development and use of material flow analysis and derived indicators at macro and micro levels;

(iv) link environmental and economic related information through work on material flows, stocks and flows of natural resources, environmental expenditure, and macro-economic aspects of environmental policies;

(v) co-operate to develop common methodologies and measurement systems of material flows, with emphasis on areas in which comparable and practicable indicators can be defined, drawing on work already done at national and at international level.

II. Instructs the Environmental Policy Committee:

(i) to support and facilitate member countries' efforts to improve information on material flows and related indicators, including through exchange of information on national and international innovative experiences;

(ii) to continue efforts to improve methods and indicators for the assessment of the efficiency of material resource use in important areas;

(iii) to develop a guidance document to assist member countries in implementing and using common material flow accounts;

(iv) to carry out these tasks in co-operation with other appropriate OECD bodies and other international organisations to prevent duplication and reduce costs;

(v) to report to the Council on progress achieved by Member countries in implementing this Recommendation, within three years of its adoption.

C Summary of the Resources Strategy (EC)

Brussel, 1.10.2003
COM(2003) 572 final – Executive Summary

This Communication is a first step towards the Thematic Strategy on the Sustainable Use of Natural Resources (Resources Strategy), called for in the EU's Sixth Environment Action Programme. It aims to launch a debate on a framework for using resources which supports the objectives of the Lisbon strategy and the EU's sustainable development strategy. After analyzing the environmental issues associated with the use of natural resources, it outlines the main features that a future strategy should comprise, building on existing policies. Although it sets out basic ideas on how the EU should target its efforts to reduce the environmental impacts of resource use, it does not actually propose specific measures to this end. This will be done in the final strategy to be presented in 2004.

Natural resources provide the basis for the three pillars of sustainable development, economic, social and environmental. However, physical reserves can become depleted and scarce, and this can then undermine future economic and social development. Moreover, the way in which resources are used can reduce the quality of the environment to an extent that can threaten ecosystems and the quality of human life. At present the environmental impacts of using non-renewable resources like metals, minerals and fossil fuels are of greater concern than their possible scarcity. With fossil fuels for example, it is the greenhouse gases from their use that are a pressing problem today rather than the risk of reserves running out. With renewable resources like fish, clean water and land the picture is different because of loss of biodiversity and habitats. The Resources Strategy should therefore focus on reducing environmental impacts, thus enabling growing economies to use resources efficiently, from both an economic and an environmental point of view. This de-linking –commonly called decoupling - of impacts from growth is the overarching goal to which this strategy will contribute. It will be necessary to ensure that policies that influence directly or indirectly the use of resources strike a balance between the economic, environmental and social pillars of sustainable development.

Implementing new policies and adapting existing ones in order to achieve the necessary decoupling of resource-related environmental impacts from economic growth will be a longterm process. Businesses, consumers and institutions need time to develop and adopt production and consumption patterns with lower impacts. They will also need public policies with clear long-term objectives in order to plan investment and innovate. For this reason the time scale for the strategy is 25 years.

The relations between resource use and environmental impact are only partially known at present. Furthermore they change with time, for example, as a result of technical or social developments. Differences in regional conditions and use patterns need also to be considered. In addition, environmental impacts related to the use of different resources vary widely. So, initially the strategy has to determine which resources at any given time are of biggest concern, e.g. the resources with the greatest potential for environmental improvement, taking into account technological possibilities and socio-economic aspects. To perform the functions described above, and to take account of continuously evolving patterns of environmental impacts of resource use, the strategy will comprise three strategic elements that will apply continuously throughout its life.

Knowledge gathering
The entire life-cycle of resources, from their extraction, through their use in the production of goods and services and the subsequent use phase, to the waste phase, gives rise to environmental impacts. Any given raw material can take numerous different pathways through the economy. Aluminium, for example, can be transformed into goods as diverse as window-frames, aircraft bodies and beverage cans, and these all interact in very different ways with the environment. Knowledge about these pathways and impacts is presently dispersed between many actors, and significant gaps exist. The Resources Strategy has to ensure that knowledge is readily available to decision-makers and that gaps are being filled.

Policy assessment
The use of natural resources is influenced by numerous environmental policies, including for example strategies on the marine environment, soil protection, biodiversity and the urban environment, as well as climate change policy, the water framework directive and many others.
In addition, many non-environmental policies strongly influence resource use – sometimes unintentionally. Examples include fiscal, transport, agricultural and energy policies. However, there is currently no mechanism for assessing how far policy-choices in these different areas are compatible with the overall aim of decoupling economic growth from the impacts of resource use. The Resources Strategy will make these assessments, raise awareness of potential tradeoffs, and suggest alternatives wherever possible.

Policy integration
To bring the strategy to life, concrete actions will need to be taken on the basis of the information generated by the previous two strategic elements. This will involve political judgments on the relative importance of different impacts and environmental targets, taking into account wider sustainable development considerations and identifying measures with the greatest potential for environmental improvement of resource use. The Resources Strategy will therefore work towards increasing the integration of resource-related environmental issues into other policies that influence the environmental impacts of the use of natural resources, in particular under the Cardiff Process.

Following publication of this document, the Commission will, in an open and collaborative process involving the Community institutions and stakeholders, develop a comprehensive strategy to be proposed in 2004.

D SCIENCE AND TECHNOLOGY FOR SUSTAINABLE DEVELOPMENT A G8 ACTION PLAN (Evian Summit, 2004)

We recognise the need, as acknowledged in the World Summit on Sustainable Development (WSSD) Plan of Implementation, to support the development of cleaner, sustainable and more efficient technologies. Co-operative scientific research on transformational technologies offers potential to improve public health by cutting pollution and reduce greenhouse emissions to address the challenge of global climate change. Our countries must optimise the use of natural resources including through recycling.

We will focus our efforts on three areas that present great opportunities for progress: co-ordination of global observation strategies; cleaner, sustainable and more efficient energy use; agricultural sustainability, productivity and biodiversity conservation.

In undertaking these activities, we are committed to working co-operatively with other developed countries. We are conscious that, to meet the objectives of the WSSD, developing countries and countries with economies in transition need to build and strengthen their capacity to assimilate and generate knowledge for sustainable development. We reaffirm our commitment made at the WSSD to assist them through international co-operation in enhancing their research capacities.

1 Strengthen international co-operation on global observation

We will:

1.1 Develop close co-ordination of our respective global observation strategies for the next ten years; identify new observations to minimise data gaps;

1.2 Build on existing work to produce reliable data products on atmosphere, land, fresh water, oceans and ecosystems;

1.3 Improve the world-wide reporting and archiving of these data and fill observational gaps of coverage in existing systems;

1.4 Favour interoperability with reciprocal data-sharing;

1.5 Develop an implementation plan to achieve these objectives by next spring's Tokyo ministerial conference.

2 Accelerate the research, development and diffusion of energy technologies

We will:

2.1 Promote energy efficiency of all sources and encourage the diffusion and uptake of advanced energy efficient technologies, taking pollution reduction into account. Possible measures include standards, public procurement, economic incentives and instruments, information and labelling;

2.2 Promote rapid innovation and market introduction of clean technologies, in both developed and developing countries, including at the Milan Conference of the Parties of the United Nations Framework Convention on Climate Change and beyond, at the International Energy Agency (IEA) and other international fora such as the UN Economic Commission for Europe, the Expert Group on Technology Transfer, etc, finding appropriate methodologies to involve the private sector;

2.3 Support efforts aimed at substantially increasing the share of renewable energy sources in global energy use:
- stimulate fundamental research in renewable energies, such as solar photovoltaics, off-shore wind energy, next generation wind turbines, wave/tidal and geothermal, biomass;
- collaborate on sharing research results, development and deployment of emerging technologies in this area;
- work towards making renewable energy technologies more price competitive;
- participate in the International Conference on Renewable Energies, spring 2004 in Bonn;

2.4 Accelerate the development of fuel cell and hydrogen technologies (power generation, transportation, hydrogen production, storage, distribution, end-use and safety):
- increase international co-operation and exchange of information in pre-competitive research based on the principle of full reciprocity through the IEA and other existing organisations;
- work with industry to remove obstacles to making fuel cell vehicles price competitive, striving to achieve this goal within two decades;
- accelerate developing internationally agreed codes and standards in appropriate existing organisations;
- work together to facilitate the use of hydrogen technologies in our and other markets, including through development of infrastructures;

2.5 Expand significantly the availability of and access to cleaner, more efficient fossil fuel technologies and carbon sequestration systems and pursue joint research and development and expanded international co-operation, including demonstration projects;

2.6 Encourage the Global Environment Fund to include energy efficiency, renewables, cleaner fossil fuel technologies, and sustainable use of energy when setting up its programme;

2.7 Develop codes and standards for next generation vehicles, cleaner diesel and biodiesel, recognising that social needs for fuel quality are diverse among G8 countries;

2.8 In accordance with our national procedures, promote clean and efficient motor vehicles including next generation vehicles;

2.9 Work in consultation with industry to raise energy efficiency of electrical and electronic equipment;

2.10 We take note of the efforts of those G8 members who will continue to use nuclear energy, to develop more advanced technologies that would be safer, more reliable, and more resistant to diversion and proliferation.

3 Agriculture and biodiversity

We will:

3.1 Promote the conservation and sustainable use of genetic resources for food and agriculture:
- support the International Treaty of Plant Genetic Resources for Food and Agriculture by concluding negotiations over a standard material transfer agreement that facilitates access to plant genetic resources for agricultural research and development and equitable sharing of benefits arising from their use;
- support efforts to ensure funding for genetic resources conservation in the framework of the priorities set up by the Food and Agriculture Organisation Commission on Genetic Resources;

3.2 Help developing countries improve their agricultural productivity in a sustainable manner:
- support the Consultative Group for International Agricultural Research's vital role in disseminating agricultural research, as well as the Global Forum for Agricultural Research and other regional and national agronomic research organisations and North-South and South-South research partnerships;
- support actions to provide technology suited to local economic social and environmental conditions to the rural poor in developing countries particularly in Africa, including public-private partnerships;

3.3 Promote sustainable agricultural technologies and practices, including the safe use of biotechnologies among interested countries, that contribute to preventing famine, enhancing nutrition, improving productivity, conserving water and other natural resources, reducing the application of chemicals, improving human health and preserving biodiversity;
- participate in the 22-25 June 2003 Agricultural Science and Technology ministerial conference in Sacramento, to implement the commitment from the Rome World Food Summit;

3.4 Use modern technologies such as satellite imaging technologies to help us:
- combat illegal logging;
- promote sustainable forest management;
- promote agricultural biodiversity and conservation.

We will enhance our understanding of resource material flows and continue work on resources productivity indices, notably in the Organisation for Economic Co-operation and Development.

We will discuss various aspects of the global climate change problem at the World Conference on Climate Change (Moscow, September 2003).

We will work in partnership with developing countries and relevant multilateral organisations to facilitate utilisation in developing countries of the results of relevant research and development in these technologies, and so contribute to sustainable development. Trade liberalisation of environmentally friendly products will contribute to this as well.

We will convene senior G8 policy and research officials and their research institutions to compare and to link programmes and priorities, to involve and assist in more effective planning and potential linkage of future programmes

addressing research on global observation, cleaner energy, agriculture and biodiversity. This group should also consider ways to assist developing countries that have their own research programmes in these three areas, inter alia by examining the possibility of opening our research programmes to third countries.