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THE EUROPEAN ENVIRONMENT AGENCY FOCUSES ON EU-POLICY IN ITS APPROACH TO SUSTAINABLE DEVELOPMENT INDICATORS

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Summary: The European Environment Agency (EEA) produces assessments based on (environmental) indicators to support policy. With the publication of the Sustainable Development Strategy for the European Union, and the European Commissions' intention to publish a progress report on sustainable development for the prime ministers each year in spring, the EEA becomes involved in regular assessments of progress in the environment within the context of sustainable development. The selection of the indicators for the EU progress report will be done by the policy makers, which is a good starting point to increase the accountability for their actions or lack of action and which eventually may lead to "sustainability". The EEA has developed a number of tools, frameworks and typologies which will be applied to provide an integrated assessment of progress around the limited selection of sustainable development indicators.

1. The European Environment Agency

The European Environment Agency (EEA) is a European Community body with the aim of serving the Community and the Member States with information to support policy making for environmental protection in the perspective of sustainable development. The main activities of the EEA are compiling and assessing data and information on the current and foreseeable state of the environment.

The EEA was founded by a regulation of the European Union (Council regulation EEC/12120/90), and it started its activities in 1993. The EEA has a membership of the fifteen European Union countries, plus Norway, Island, Liechtenstein. The Accession Countries to the EU are expected to become member of the EEA soon. Although the EEA office in

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Copenhagen houses only 80 people, many more experts in many institutions in all European countries are involved in its work. Simultaneous with the foundation of the EEA, also the EIONET (the European Environmental Information and Observation Network) was created, a huge network of 600 institutions in Europe to help the EEA with bringing together, harmonising, and reporting on environmental data and information in Europe. The EEA works closely together with other international organisations for different tasks. Our co-operation with statistical institutions or institutions collecting statistics like Eurostat, OECD, FAO, secretariats of international conventions, is very much focused on improving the efficiency of international reporting, so that our member countries report (statistical data) to one international organisation only, applying the most efficient data collection mechanism. The EEA tries to avoid setting up additional data collection exercises, and depends on other organisations for the majority of its data needs.

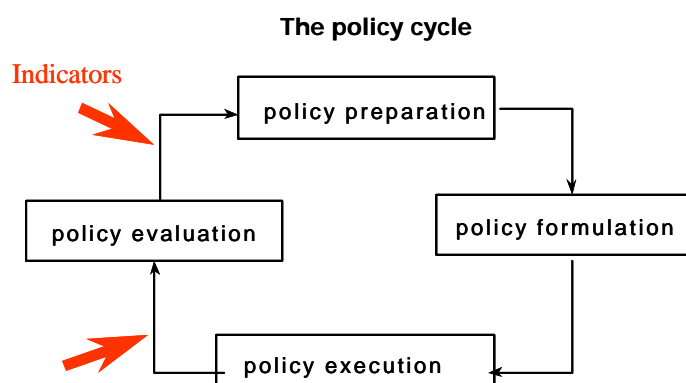
EEA reports and databases are increasingly made available to everyone in Europe via the Internet (<http://www.eea.eu.int>).

With the development in attention going from ‘environment’, to ‘the environmental pillar in sustainable development’ to ‘environmentally sustainable development’ the EEA is in a constant process of creating clear lines for our clients focusing on the essentials in the overload of environmental and sustainability information.

The primary clients of the European Environment Agency are policy-making agents and politicians at EU level in the European Commission, in the European Parliament, in the Council and in the Member states. These clients are increasingly aware of the use of and usefulness of indicators in their processes.

Indicators can play an important role within the policy preparation and the evaluation stages of the policy cycle (figure 1). It is also in these stages that the two major reports that the EEA produces regularly, aim to support policy: a State of the Environment/Environmental Outlook report of which the last edition (EEA, 1999) served the preparation of the 6th Environmental Action Programme of the European Commission, and the regular Environmental signals indicators report series (EEA, 2000, 2001), serving the regular evaluation of the policies set out in the Action programme.

Figure 1: Indicators and the policy cycle



However, our primary clients are not the only actors driving policies and able to bring along changes. Informed citizens, NGOs, companies, lower levels of governments are the EEA’s secondary target groups.

2. Indicators and support to the policy process

As an institution founded to support policy, the European Environment Agency pays a lot of attention to the proper link of indicators and the policy processes they serve.

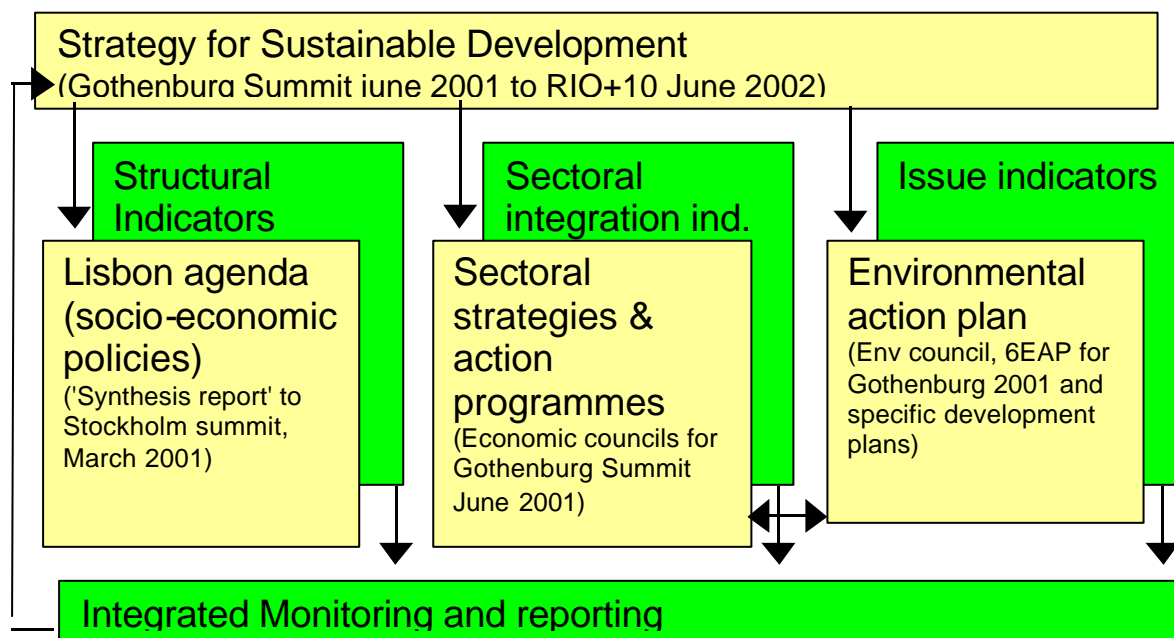
Since the European Council in Gothenburg in June 2001, the EU sustainable development strategy (CEC, 2001a) provides an umbrella for a number of interlinked and mutually supporting policies on the EU level, such as the 6th Environmental Action Programme and the so called Cardiff process for the integration of environment in sector and other policies.

The 6th Environmental Action Programme (CEC, 2001b) is the next ten-year programme of actions of the European Community to promote the integration of environmental concerns in all Community policies and to contribute to the achievement of sustainable development. The programme sets out key environmental objectives for the period.

The Cardiff process for the integration of environment and other policies (Council, 2001) started as a European Council initiative in 1998. Councils with a sector focus, such as the energy Council and the transport Council were asked to prepare strategic documents on how they would integrate environment in their policy making. Through a number of Council meetings in the past years this programme is being carried out, bringing together environmental and sector interests in a generally fruitful process.

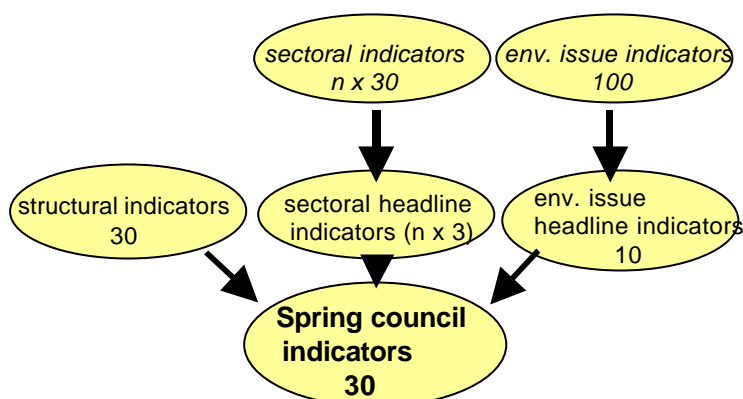
The Strategy for Sustainable Development also aims to add the environmental angle to the so-called Lisbon process on employment, economic reform and social cohesion (“a Europe based on innovation and knowledge” (CEC, 2001c)). Figure 2 summarises the three main policy lines or ‘corridors’ under the chapeau of the Sustainable development strategy.

Figure 2: The 'three corridors model' to follow progress in sustainable development



To report on progress and assess the effects and effectiveness of these policies an accompanying set of interlinked indicators is needed. Furthermore, there should be a clear structure to communicate to policy makers how each part of the information is related to the various policy processes. To achieve this clarity clusters of environmental indicators and assessment and reporting mechanisms are being developed (Figure 3).

Figure 3. Indicator architecture with tentative number of indicators per group



Behind the 6th Environmental action Programme, and the envisaged more detailed action programmes for environmental issues, indicator-based reporting is necessary on the state of the environment for the various issues and the driving forces and responses influencing it. The EEA will support the 6th AEP and its associated action programs or issue strategies by providing sets of indicators for each of the issues (see Table 1; the paper by Jens Brodersen on 'Challenges in the development of indicators for hazardous waste' for this session is an example of this), and by developing the Environmental signals indicator report into a multi-purpose tool for overall progress reporting on issues and sectors. Thematic indicator reports will serve to maintain a high level of knowledge and attention for environmental issue policies.

Table 1. State of affairs in the development of indicators to support the 6th EAP, including the thematic strategies

6 th EAP themes	status	remarks
Climate change	emission indicators: final	
	climate indicators: planned under 2001 work programme	
Nature and biodiversity	under development in co-operation with DG Env.	
Accidents and disasters	no activities planned	
Soil protection	list under development	
Marine ecosystems	list under development in co-operation with the Marine Conventions	
Environment and health and the quality of life		Co-operation with WHO on definition and development of indicators on human health and environment
Air pollution	list under development	
Water quality	list under development	
Chemicals and pesticides	headline indicator development by Eurostat	
Noise	no activities planned	
Urban environment		support to indicator initiatives in co-operation with DG env.
Natural resources and waste	list under development	See paper Jens Brodersen

For use in reports to high-level policy makers, a selection has been made of the hundreds of indicators for environmental issues, resulting in eleven EU Environmental Headline Indicators (Table 2) (EEA, 2001). A first report is expected to be published by the Commission together with the EEA and Eurostat in the autumn of 2001.

Table 2: EU headline indicators

Environmental headline indicators for the EU (status January 2001)		
ISSUE	CURRENT INDICATORS	PROPOSALS FOR IDEAL INDICATORS
6th Environmental Action Programme theme: Climate change		
1. Climate Change	aggregated emissions of 3 main greenhouse gases	aggregated emissions of 6 greenhouse gases of the Kyoto Protocol
6th Environmental Action Programme theme: Nature & biodiversity		
2. Nature & Biodiversity	designated "Special Protection Areas" (Birds Directive)	biodiversity index, or conservation status of key species and habitats
3. Air Quality: acidification	aggregated emissions of acidifying substances	same
6th Environmental Action Programme theme: Environment & human health		
4. Air Quality: summersmog	aggregated emissions of ozone precursor substances	same, and: number of days of pollution exceeding standards
5. Urban Air Quality	number of days of exceedance (several pollutants)	urban air quality indicators or index; urban transport indicators
6. Water Quality	phosphate and nitrate concentration in large rivers	European index for the status of water bodies
7. Chemicals	production of hazardous chemicals	production of hazardous chemicals, weighted
6th Environmental Action Programme theme: Waste & resources		
8. Waste	municipal and hazardous waste generated & landfilled	resource use in line with the waste strategy
9. Resource Use	gross Inland Energy Consumption	material balance indicator
10. Water Quant.	total fresh water abstraction	intensity of water use
11. Land Use	land use by selected categories	land use change matrix

Behind the sector integration strategies, there should be regular reporting mechanisms based on indicators, as requested by the various Councils since Cardiff.

Following on the example of the successful Transport and Environment Reporting Mechanism (TERM, see box 1), the EEA is developing with its partners similar indicator based reporting on Environment and Energy, Environment and Agriculture and, if resources are made available, will develop it for tourism and fisheries. Similar to the 'environmental headline indicators' (see above) a limited set of main indicators can be selected from the currently around 30 available integration indicators per sector.

Box 1. The TERM process and concept: a model to be followed by other sectors?

The European Council, at its Summit in Cardiff in 1998, requested the Commission and the transport ministers to focus their efforts on developing integrated transport and environment strategies. At the same time, and following initial work by the European Environment Agency on transport and environment indicators, the joint Transport and Environment Council invited the Commission and the EEA to set up a Transport and Environment Reporting Mechanism (TERM), which should enable policy-makers to gauge the progress of their integration policies.

The main output of TERM is a regular indicator-based report through which the effectiveness of transport and environment integration strategies can be monitored. The first indicator report was published in 2000. TERM-2001 is currently under preparation (publication expected in September 2001).

The 30 TERM indicators were selected and grouped to address the seven key questions:

1. Is the environmental performance of the transport sector improving?
2. Are we getting better at managing transport demand and at improving the modal split?
3. Are spatial and transport planning becoming better coordinated so as to match transport demand to the needs of access?
4. Are we optimising the use of existing transport infrastructure capacity and moving towards a better-balanced intermodal transport system?
5. Are we moving towards a fairer and more efficient pricing system, which ensures that external costs are internalised?
6. How rapidly are improved technologies being implemented and how efficiently are vehicles being used?
7. How effectively are environmental management and monitoring tools being used to support policy and decision-making?

The indicators cover all the most important aspects of the transport and environment system (**D**iving forces, **P**ressures, **S**tate of the environment, **I**mpacts, and societal **R**esponses – the so-called DPSIR framework) and include eco-efficiency indicators.

Finally, the Gothenburg summit requested the European Commission to report each year at the Spring European Council on progress under the sustainable development strategy, based on indicators (the so-called Synthesis report). For the EEA the process of regular reporting to spring European Councils is a unique opportunity to deliver key indicators and assessments on environmental aspects of sustainable development, including progress towards integration of environment in sectoral activities. The EEA will re-orient its Environmental signals indicator report to support this reporting process, while retaining the reports own structure and logic to serve multiple clients. A first impression of the indicators package for the Spring Synthesis report is given in Table 3.

Table 3: Possible indicators for Spring European Council reporting on sustainable development (Indicative, no formal status)

<p>For the indicators for economy and society the following have been suggested in a Council document (this list is under discussion within the Commission):</p> <p>General Economic background:</p> <p>1. GPP (per capita and as growth rate)</p> <p>Employment</p> <p>2. employment rate by gender</p> <p>3. employment rate of older (55-64) workers</p> <p>Innovation and research</p> <p>4. R&D expenditure as % of GDP</p> <p>5. % of citizens with internet access</p> <p>6. ICT (Information and Communication Technology) expenditures</p> <p>Economic reform</p> <p>7. consumer price of telecommunications and electricity</p> <p>8. business investment as % of GDP</p> <p>9. capital raised on stock markets as % of GDP</p> <p>Social Cohesion</p> <p>10. long term (> 12 months) unemployment rate</p> <p>11. regional cohesion, expressed as coefficient of variation of unemployment rate at NUTS 3 regional level</p> <p>12. share of population aged 18-24 with only lower secondary education.</p> <p>The latest DG Environment proposal for the environmental dimension, including the Cardiff process:</p> <p>Environment</p> <p>13. greenhouse gas emissions</p> <p>14. share of renewables in electricity production</p> <p>15. volume of transport (veh.km) versus GDP</p> <p>16. modal split transport (a. passengers, b. freight)</p> <p>17. urban air quality (index)</p> <p>18. waste: municipal waste quantities, amounts generated and landfilled (to be extended with hazardous waste)</p> <p>19. exposure to chemicals (in development)</p> <p>20. biodiversity index</p>

The strength of the indicators selected for the Synthesis report is that policy makers have proposed them, and one may assume that each of them will get an important role in monitoring and following up on policy actions. As a list of indicators on major EU sustainability issues, the current selection seems not yet fully balanced, however. Themes like poverty, social exclusion, the ageing society, migration are not yet (fully) included in the current list.

3. Indicator frameworks and typologies

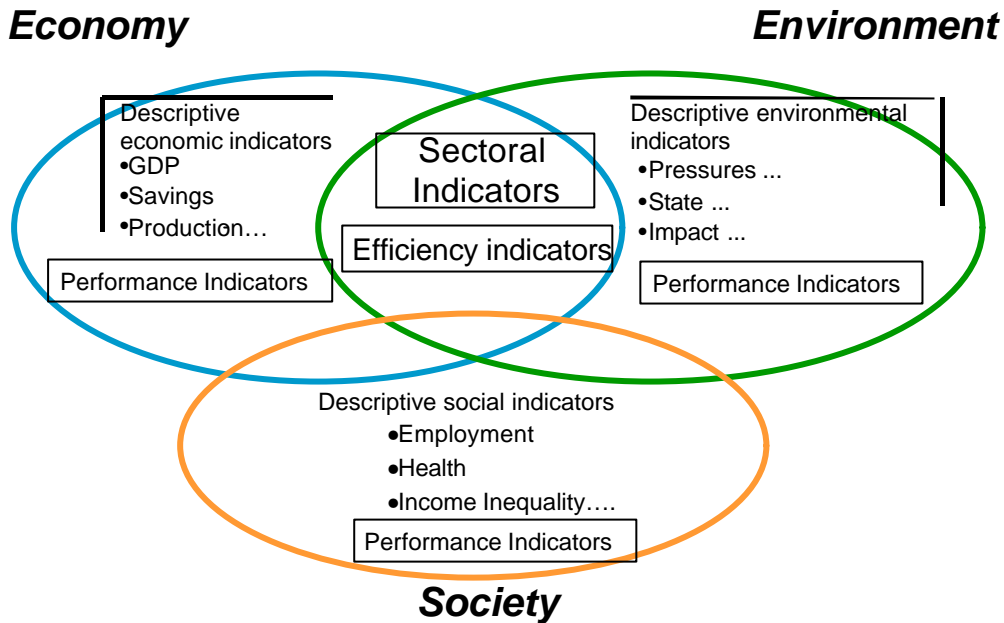
3.1 A typology of questions and indicators.

With sustainable development now a main line in EU policy making, the EEA sees environmental indicators placed within a system aiming to describe developments towards sustainable development, which makes clear where trade-offs are to be made and where win-win situations may occur (Figure 4).

There is a clear parallel between this conventional three-circle diagram and Figures 2 and 3. Each of the indicator packages resulting from the policy process finds a place in or in between the circles: the 6th Environmental Action Programme and its associated issue strategies fall in the environment circle, the sectoral reporting fits in between the economic and the

environment circle, with a few links with the social circle. The Lisbon indicators cover the economic and the social circle. Within each of these groups tools and frameworks are needed for selecting and assessing the indicators.

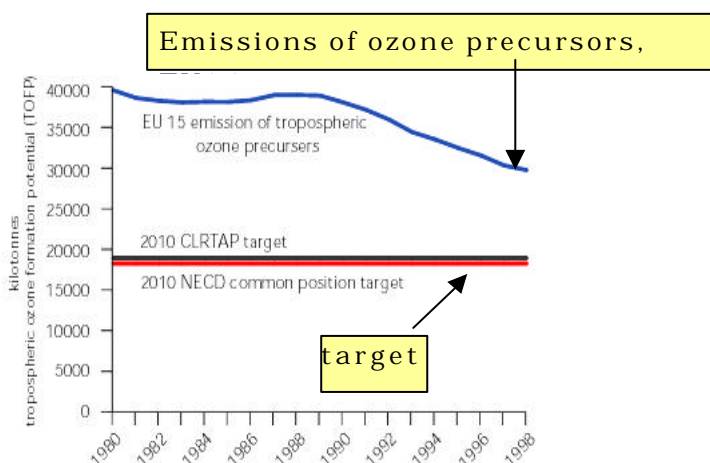
Figure 4. General model sustainability indicators



The descriptions in the boxes in Figure 4 refer to a typology of indicators. A first category of indicators answers the question: “how are pressures on the environment and how is the quality of the environment developing?”. These are called *Descriptive indicators*, and are usually presented as a line diagram showing the development of a variable over time, for example ‘cadmium contents in blue mussels’, or ‘number of indigenous species in biogeographical

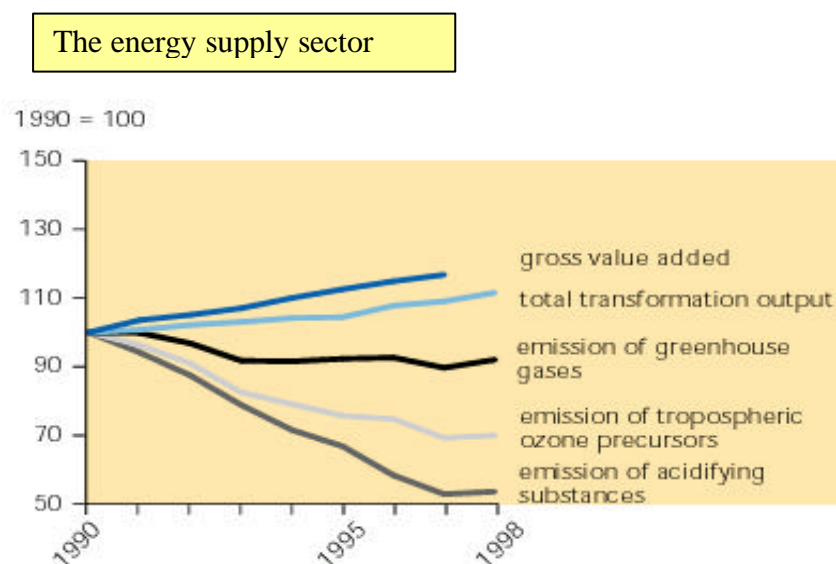
A second category of indicators answers the follow-up question “and is that relevant?” *Performance indicators* use generally the same variables as descriptive indicators but are connected with target values. ‘The number of days in which ozone levels are exceeding WHO standards’ is clearly an example of a performance indicator. The ‘designation of Natura 2000 sites compared with an estimate of important natural areas or an area target per country’ is also a performance indicator, as are the indicators linked to targets of international conventions or national action plans (see Figure 5).

Figure 5. Example of a performance indicator: emissions of ozone precursors, EU15



The third category, which can be found in between the environment and the economy circle are *Eco-efficiency indicators*. These answer the question “have we become more efficient in our economic processes?” (Figure 6). It is our experience that a presentation of eco-efficiency indicators with separate lines for the development of an (economic) activity and for environmental pressures, instead of a ratio, is the most understandable. In the ideal case the lines will after a period of parallel development go in a different direction: a (absolute) decoupling of environmental pressure from economic development is necessary for sustainable development. The example in Figure 6 shows this development clearly for all gases, although in 1998 there seems to be a tendency to follow economic development again. Eco-efficiency indicators have proven to be useful communication tools: a ‘2% eco-efficiency improvement in a given year’ is a common language, whatever the economic structure of a country or whatever business sector we are considering. They give a clear incentive to continually improve performance.

Figure 6. Example of an eco-efficiency indicator: the energy supply sector, EU15

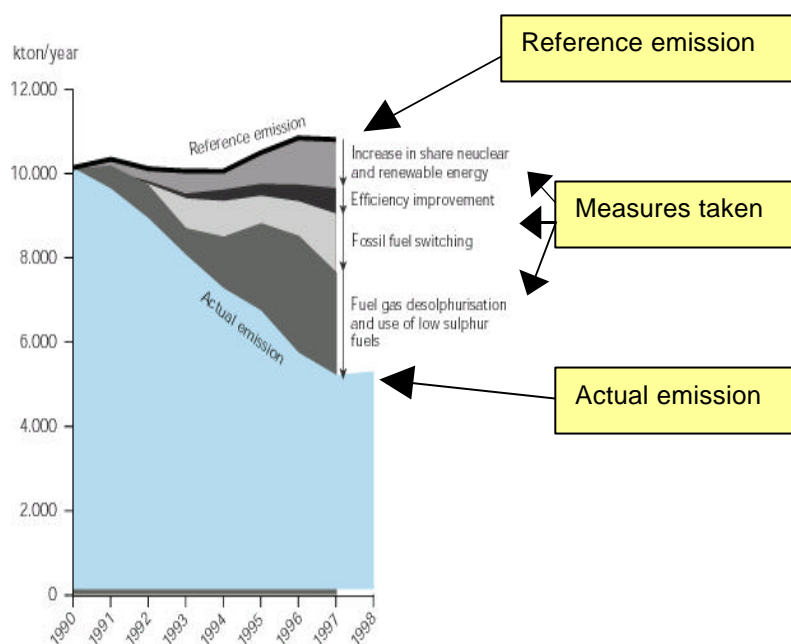


To answer the question “what has been the effect of policy?” a new and fourth category of indicators has been developed: *policy-effectiveness* indicators (Figure 7). Policy effectiveness indicators show the reasons behind the development of a variable. This kind of indicators makes clear what have been the influence of structural changes in the economy or in production processes, and of (environmental) decision-making. The Dutch yearly environmental indicator report (RIVM, 2000) contains several examples of this type of indicator. First examples for the EU have been published in Eea’s Environmental signals report (EEA, 2001).

Finally a fifth category of indicators is connected with the question: “and are we on the whole better off?”, which asks for a balance between economic, social and environmental progress. Indicators like Genuine Savings, an adjusted GDP try to answer this question.

Thinking in terms of questions to be answered, and trying to identify the proper questions for solving problems helps in identifying the most suited indicators. Systematising these questions helps in getting a balance in indicator sets.

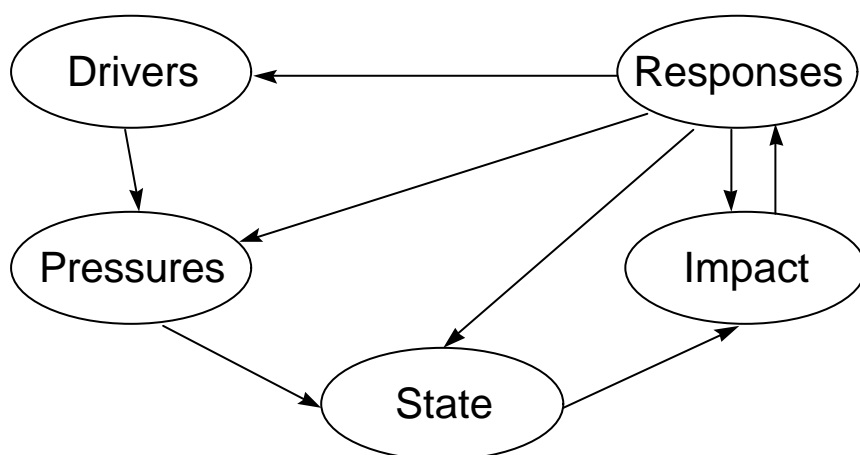
Figure 7. Example of a policy effectiveness indicator: sulphur dioxide emissions by conventional power plants, EU15



3.2 The assessment framework and the role of indicators in the policy life cycle.

Another important element to structure a collection of indicators and to communicate their application is the analytical framework for the assessment. The EEA uses a slightly extended model of the well known OECD-model, which is called the **Driving forces - Pressures - State - Impact - Responses (DPSIR)** framework (Figure 8).

Fig 8. The DPSIR Framework for Reporting on Environmental Issues



This extended framework is used because it makes clear what the difference is between the *driving force*, like development of industry or number of vehicle kilometres of passenger cars, and the *pressures*, for example the emission of carbon dioxide by passenger cars. The *state* of the environment is expressed in quality parameters for air, water and soil. *Impact* is a more

difficult concept: it stands for the effects of a changed environment on the health of human beings and other organisms and on the effects on nature and biodiversity. All those impacts give rise to *responses* of society.

Sometimes indicators can be placed in between the DPSIR elements or consist of combinations of the boxes. Eco-efficiency indicators like 'emission coefficients' and 'energy productivity' (or its inverse 'energy intensity') show what happens in between the driving forces and pressures. This kind of information is being able to answer the question: Are we making technological progress? The combination in one diagram of the pressure: 'release of nutrients from agriculture' and the state: 'development of nitrate concentration in surface water' tells a story of time delay in natural processes and the 'time bombs' created in the environment. Policy effectiveness indicators summarise the relations between the response and the driving force or pressure .

When designing indicator lists a conscious use should be made of the frameworks mentioned here. For problems that are in the beginning of their policy life cycle (Winsemius, 1986), that is, in the stage of problem identification, indicators on the *state* of the environment and on *impacts* play a major role. They will be mainly descriptive indicators, which identify alarming developments in the state of the environment. The most well known cases of 'state'-indicators that gave rise to policy reactions are those on the sudden decline of selected species (fish in acidified Scandinavian lakes, seals in the Dutch Waddensea, for instance), surface water quality (salt in the river Rhine which was used for irrigation in horticulture, for example) and on air quality in cities (summersmog in Paris, Athens). This function of 'state'-indicators is thus limited in time: as soon as a problem is politically accepted and measures are being designed, the attention shifts to '*pressure*' and '*driving force*' indicators.

There is, however, a long period in which 'state'-indicators support the process of getting political acceptance of policy responses. Greenhouse gas policies provide clear examples where indicators on climate change and its impacts in terms of average temperatures, movement of the tree line, or species distribution are being used to gather political support for signing the Kyoto protocol.

In the next and longer stages of the policy cycle (formulation of policy responses, implementation of measures and control) policymakers focus on what they can influence, the driving forces through volume measures, the pressures with technical measures and educational projects. Performance indicators on changes in driving forces and pressures are the most used. The state of the environment is only a derived result of activities in society and policy reactions and hence 'state'-indicators are of a lesser importance.

The exception is, of course, management of biodiversity as such or when organisms play a role in the solution of environmental problems. In these situations indicators such as biomass production, forests as carbon dioxide sinks and forest composition are important measures of progress.

Eco-efficiency and *policy effectiveness* indicators, as well as '*response*'- indicators are used to get a wide acceptance of measures and as tools to reach the objectives with the support of all stakeholders.

In the last, the control phase of the policy cycle, 'state'-indicators become important again to watch the recovery of the environment and a limited number of these indicators will be used to continuously monitor the state of the environment. They will be accompanied by an equally limited number of indicators on 'driving forces', 'pressures' and 'responses' to monitor the behaviour of the whole system.

4. Linking indicators to the policy process

4.1 Experiences

In the past years many countries have produced environmental indicator reports in print and on the Internet. It is now possible to evaluate the use that has been made of the information and to reflect on the reasons why an indicator has or has not been given attention by policy makers. According to the apparent role in the policy process environmental indicators can be classified in four classes:

1. Indicators that are important for showing how the environmental system works, but which were not designed to be particularly policy relevant. For instance, as long as we are not able to entangle the complex of factors including weather conditions that influence the occurrence of wetland birds on national or even EU level (thus not for a specific area) the resulting indicator functions as a background to other indicators with more action perspective. With increased knowledge or a redirection of environmental policies, some of the background indicators may turn into a policy relevant indicator in the future.
2. Those indicators that are fully integrated in the policy process in the sense that a change in the indicator leads to a reaction from the policy side. The emission of greenhouse gases and the distance to the targets of the Kyoto protocol has in many countries led to a redirection of current policies, a reformulation of national targets and it is regularly published in the newspapers. There are a number of similar examples on European and national scale, such as the recycling of packaging waste, the amount of animal manure in areas with severe eutrophication problems, and fish stocks.
3. Those indicators that are clearly relevant to a policy process, but lack the precise link to policies to lead to an immediate reaction from the side of policy makers. Concentrations of nitrogen and phosphorus in surface waters have a role to maintain the attention for the eutrophication problem, but as the parameters are not immediately linked with certain policy actions, the publication of the indicator will not immediately give rise to a lot of policy attention.
4. Those indicators that have only a limited relevancy to policy makers due to their definition in units not relevant for the policy makers actions, or because the indicators describe processes that cannot or can only to a very limited extent be influenced by policy measures. The percentage of the population linked to waste water treatment facilities does not appeal to policy makers when they are working in a political process that does not aim at 100% connection, but at the provision of waste water treatment to agglomerations with more than 2000 inhabitants.

The EEA and many national institutions tend to maintain a number of indicators from the third category, with the motivation that they are the best available proxy indicators. In some cases that maybe true, but in other cases the use of these indicators distracts us from giving better and more relevant signals on progress.

It has also been possible to give some success factors for the use of indicators, such as:

- Indicators should report progress over time and must go with an assessment of the reasons for their development.
- They should be few in number, and users should get used to their presentation.
- They become more powerful when linked with formal targets or informal or indicative (sustainable) reference values. Linked with targets, indicators become tools for management and to make policy makers accountable;

- With or without targets, using indicators to compare or benchmark individual sectors or countries or companies with each other is another way to make decision makers accountable and to foster progress as both failure and success stories become evident. The question why one sector/country/company is doing better than another is a good entrance to explore still unknown opportunities to do better. At the same time exposing this kind of information to the outside world could lead to ‘peer pressure’ to do better (the so-called “name and fame or shame” exercise).

4.2 Making indicators more relevant

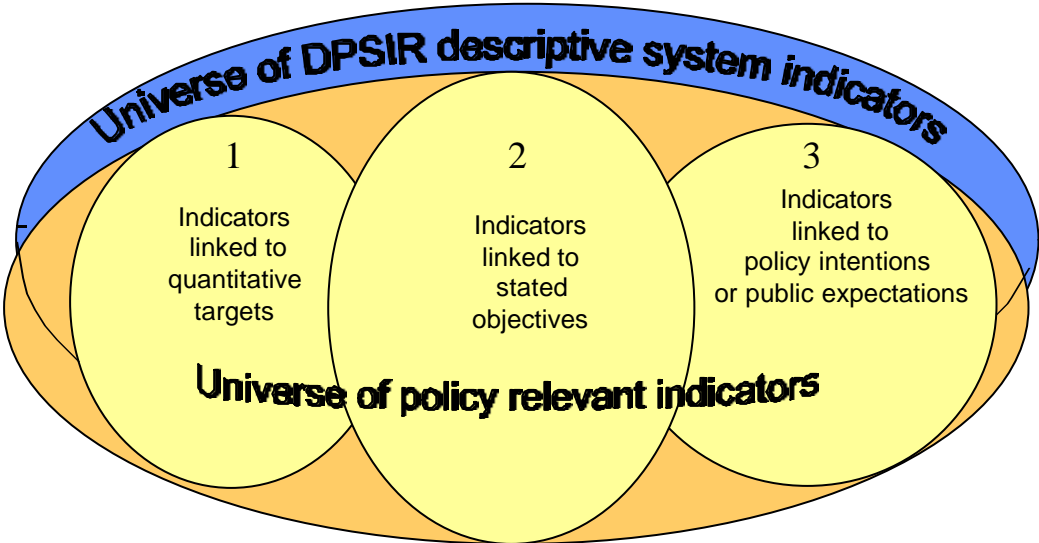
With the increased experience in producing and publishing indicators it is now possible to classify indicators according to their use as done above, and to redesign indicator lists to become more relevant. An important requirement is to link policy issues and policy questions to the best extent with indicators.

The general idea for this redesign process is given in Figure 9, which shows that within the family of policy relevant indicators, a first group is connected with the *quantitative targets* policy makers have set themselves. The Kyoto target for the reduction of greenhouse gas emissions is the most well known example.

Policy documents contain also not quantified, but equally clear *objectives*, however. An example is a statement like: “to reduce the discharge of pollution from agricultural sources into ground and surface water”. Linking the indicators on nutrient surpluses and use of pesticides to this objective makes these indicators operational with regard to certain policies. A third group of *intentions* in policy documents is much more vague, but they can also be used to link with indicators. A statement like “to make rail freight transport more attractive”, cannot be connected with one progress indicator. However, the success of policy makers actions to make rail more attractive can be expressed by an indicator on the modal split of freight transport.

An example of the conscious linking between policy questions or policy intentions and the indicators that come close to answering these, is provided in the boxes on top of each chapter in the EEA Environmental signals series (EEA, 2000; EEA, 2001). Another good example is DETR, 2001.

Figure 9. The link of indicators to the policy process



5. A few thoughts on sustainability indicators

The development of the “Synthesis report” on progress in sustainability in the EU (see section 2) points into a direction of policy development where targets and indicators play a main role to keep continuous attention for a certain process and to deliver the expected results. In the EU a similar process happened around the introduction of the Euro, the new European Monetary Unit (EMU). Countries needed to reach a limited number of targets (in terms of e.g. budget deficit, inflation rate) to join the group of countries who would introduce the Euro. These targets were called ‘convergence criteria’ and they were based on the management principles, *that you can only*:

- manage what you measure (*indicators*)
- respond and be rewarded/penalised for those things which you can be held accountable (*benchmarking*), and
- achieve what has been agreed (*targets*).

The use of a limited number of indicators (and targets) in the EU sustainable development strategy reporting, could be a first sign of the use of “sustainability convergence criteria”, for which targets and indicators are very intimately linked and the selection of indicators is deliberately kept very strict.

But even if the sustainable development indicators do not get as much attention as the EMU criteria, there is a need for linking closely sustainability indicators with policy questions, to give them a role in the process. Asking the “right” questions at the “right” moment” is key. Typologies and frameworks may help to achieve this. For example, during the development of the Transport and Environment indicators, the main new aspect was the shift from the question: ‘how many roads are we building’ to the question ‘do we give people access to basic services like shops, schools, work and recreation?’ This shift resulted from applying the DPSIR framework to the transport problems and especially asking the question regarding the drivers of transport and environment problems. Similarly a new analysis of the connections between the social, the economic and the environment sphere in sustainable development issues could clarify what are the main issues to go after.

Of the many links between environment and social issues, mainly the human health/environment aspect has been developed. This resulted, of course, from an analysis of the system, showing the effect of poor environmental quality on human health. The relative attention it has been given is, however, probably rooted in the fact that the Environment Ministers and the Health Ministers needed the support of each other in (budget) discussions with their colleagues. The effect of environment on the economy and employment seems to be studied far less intensively, which might have to do with the fact that a Minister of Social affairs has a stronger position in governments. It might be well possible that an analysis of the link environment/employment provides a much stronger argument for change than the environment/health interface. A further look into ‘environment and social exclusion’ for instance, might give rise to new ideas on directions for sustainable development looking for win-win situations.

Looking at the list of sustainable development indicators produced so far, it is obvious that indicators on the interfaces between environment, society and economy are scarce. It is easier to describe straightforward developments in each of the spheres than to develop indicators on effects on other spheres. Multi-causality is difficult to catch in indicators. But, as a policy makers’ answer to a complex problem is often to look for a simple solution influencing the

main causing factors, possible indicators for multi-causal problems should also look upstream. What is causing the problem, what can a policy maker reasonably and cost-effectively influence?

Instead of the thousands of indicators on the effect of chemicals on ecosystems and human beings (too numerous), instead of the hundreds of indicators on emissions of many hazardous substances (not available), the indicator for the aggregated production of substances considered hazardous for the environment is now being proposed as the headline indicator for the chemicals issue (see Table 2).

Focusing on the relevant policy questions thus may help to identify indicators that refer especially to the interfaces in the three-circle model of sustainable development.

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