In-Stream

# Sustainability Indicators for Policy Making: Green Growth and Green innovation

## Report on the IN-STREAM Workshop of 7 July 2011

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## Report on the IN-STREAM Workshop of 7 July 2011

**7 JULY 2011**

**IN-STREAM minutes - Leonardo Mazza, Samuela Bassi (IEEP, London/Brussels), Thibaut Henin (Ecologic Institute, Berlin) and Elisa Portale (FEEM, Venice/Milan)**

# IN-STREAM Workshop

# Sustainability Indicators for Policy Making

This workshop organised in the context of the FP7 project IN-STREAM (Integrating Mainstream Economic Indicators with Sustainable Development Objectives) had the aim of gathering experts' and policy makers' feedback on a number of innovative sustainability indicators and to provide a platform for the sharing of experiences and best practices in the use of these tools.

The workshop focused on providing key insights and preliminary outcomes of the qualitative and quantitative analyses conducted in IN-STREAM, linking economic indicators with measures of sustainability and well-being. This was the third of a series of workshops dedicated to specific policy areas and that took place in different European cities. This event focused in particular on the use of indicators for green growth and green innovation policy.

The presentations summarised below, as well as the presentations and minutes of other IN-STREAM workshops and the reports mentioned therein are available in the project's website.

**IN-STREAM** is a collaborative research project to better integrate mainstream economic indicators with sustainable development objectives. It is funded through the European Commission Directorate General for Research under Grant Agreement No. 2111759. Further information is available online at http://in-stream.eu. The INSTREAM team involves: Ecologic Institute (Germany; Project Co-ordinator), Fondazione Eni Enrico Mattei (Italy), University of Bath, Department of Economics and International Development (United Kingdom), Charles University Environment Center (Czech Republic), Institute for European Environmental Policy (United Kingdom and Belgium), Universität Stuttgart: Institut für Energiewirtschaft und Rationell Energieanwendung (Germany), International Institute for Applied Systems Analysis (Austria), and Zentrum für Europäische Wirtschaftsforschung (Germany).

**Andreas Kraemer (Ecologic Institute) – Opening speech**

Andreas Kraemer welcomed the participants to the workshop. He stressed the importance of sustainability indicators, emphasising the role of IN-STREAM in the context of other related initiatives, like the German Enquete-Commission 'Growth, Wealth, Quality of Life – Paths to sustainable economic management and societal progress in the social market economy[1]', the European Commission's 'Beyond GDP' and the OECD's Istanbul Declaration. In this context, he emphasized the added value of national processes such as the German Enquete-Commission which can have a significant impact on the policy and business communities. In addition, the publication of all the research carried out allows the general public to partake in the debate and can stimulate further harmonisation of sustainability indicators in the EU and beyond.

**Samuela Bassi (Institute for European Environmental Policy, IEEP) - Overview and objectives of the day: the storylines and the outline of the day.**

Samuela Bassi presented the workshops aims and structure. Among its objectives, the workshop intended to show some preliminary findings of the IN-STREAM project and share views and experiences on the use of sustainability indicators with the participants. The three storylines covered by the project, i.e. biodiversity, green growth and resource efficiency, were outlined. This workshop was dedicated to the 'green growth' storyline, focusing on sustainable economic growth and its link to different EU policies, especially on climate, energy and cohesion funds. The upcoming IN-STREAM publications were announced, together with the final project conference, which will take place in Brussels on 27-28 September 2011.

The full presentation is available here.

**Lucas Porsch (Ecologic Institute) – Presentation and Introduction to the IN-STREAM Project**

Lucas Porsch's opening presentation provided an overview of the In-Stream projects. The main objectives of the project were outlined, including the evaluation of different indicators and how they can contribute to the *Beyond GDP* process, the further identification of institutional needs and opportunities - especially for composite indicators - and an investigation of the impacts of reaching sustainability targets on a range of indicators.

He also stressed the project's added value in attempting to bridge the gap between sustainability indicators and mainstream economic indicators, for example by its investigation of the economic impacts of sustainability targets. Lucas clarified that the project would come up with recommendations on how to work with indicators and introduced the project's different focal points (qualitative assessment, quantitative assessment, qualitative/quantitative linking, and integrated assessment) and presented the project team and responsibilities. He explained how data are used in the different stages of the policy-cycle, such as objective definition, problem identification, modelling of impacts or measuring success. He finally emphasised that the project should result in producing policy-relevant and timely results. Lucas invited the workshop participants to remain involved in the project, either by participating in the upcoming IN-STREAM final conference in Brussels or registering to the newsletter and visiting the website.

[1] Enquete-Kommission "Wachstum, Wohlstand, Lebensqualität - Wege zu nachhaltigem Wirtschaften und gesellschaftlichem Fortschritt in der Sozialen Marktwirtschaft",
URL: www.bundestag.de/bundestag/ausschuesse17/gremien/enquete/wachstum/index.jsp

The full presentation is available here.

**Francesco Bosello (Fondazione Eni Enrico Mattei, FEEM) Constructing a robust indicator set for sustainable growth? The quantitative analysis of IN-STREAM**

Francesco Bosello highlighted that the quantitative analysis carried out under IN-STREAM was vast, and covered by various Work Packages. Its key aims were to identify links between mainstream and sustainability indicators, analyse the EU path towards sustainability, and propose new ways to use sustainability indicators. In particular, the project developed quantitative tools to analyse sustainability. It was stressed that, despite their limitations, economic models are useful as they can help assess the sustainability of policies *ex-ante* (instead of the more widespread *ex-post* approach), they are internally consistent and allow to conduct analysis in a controlled environment. Furthermore, under IN-STREAM, a composite indicator for sustainability was built and its properties tested.

A general equilibrium model (ICES) was used, including several countries and industrial sectors, and representing inter-linkages across markets. The model allowed the comparison of a business as usual scenario (BAU) with a mitigation policy scenario, where a 20 per cent CO2 emission reduction was achieved by 2020. A list of 21 economic, environmental and social indicators selected by the project partners and compatible with the model was used to assess the effect of the policy. The indicators were also aggregated to obtain a composite indicator. The weights of each of them were chosen on the basis of experts' judgements. These can also be updated by accessing an online survey.

The composite indicator allowed researchers to rank countries according to their level of sustainability before and after policy implementation. Overall, the composite indicator showed a low correlation with GDP, and could therefore be considered as 'alternative' to mainstream economic indicators. In the BAU scenario, the top most sustainable countries included only developed countries (the best being Sweden), while the bottom of the list included mostly developing countries, but also Bulgaria and Portugal. It was noted that, by changing the weighting of the single indicators, the ranking would change. In the mitigation policy scenario, the overall level of sustainability of EU countries increased. In particular, the economic and environmental dimensions of the indicator improved, while the social dimension slightly decreased. Interestingly, in the countries outside the EU, the level of environmental sustainability improved, while the economic and social dimension decreased, revealing some negative feedback of EU policy.

Overall, it could be concluded that mathematical tools are useful for the analysis of sustainability, that composite indicators can add additional information, but that criteria for aggregation and weighting needs to be very transparent. The models are typically weakened by a certain level of subjectivity and uncertainty.

The full presentation is available here.

**Dr. Klaus Rennings (Zentrum für Europäische Wirtschaftsforschung, ZEW) - Eco-Innovation Policies: Concepts, Best Practices and Monitoring**

Klaus Renning's presentation focused on eco-innovation best practices and ways to monitor innovations uptake. The example of the German master plan on eco-innovation was described in more detail. Its aim was to strengthen Germany leadership position and develop innovation markets. Target setting, it was noted, is particularly important for effective eco-innovation strategies, as they provide investors with a reliable framework.

Three theoretical concepts of eco-innovation were illustrated. The first, building on neo-classical economics, stresses the importance of eco-innovation to correct for market failures. The second, building on evolutionary economics, focuses on the role of eco-innovation in the transformation from unsustainable to sustainable systems. The third relies on industrial ecology theory, life cycle approaches and material flows accounting, and focuses on the problems of industrial metabolism, like the need to make material flows sustainable.

Monitoring of eco-innovation can be done by using surveys, patent analysis and other tools. No formal monitoring was carried out at EU level before 2010. Lately a EU eco-innovation observatory has been set up, aiming to provide yearly data and carry out thematic and sectoral studies. Research in this area revealed that, in the EU, eco-innovation is largely regulation driven. However, market expansion, cost reduction and improving brand image are also drivers of eco-innovation. The impact of innovation on employment at firm level was considered small, although slightly positive. The level of technology diffusion varies greatly across countries, depending on national/regional regulation.

Among its key conclusions, the INSTREAM study revealed that eco-innovation is very segmented across the EU, is strongly driven by regulation and can be complementary to environmental policy.

The full presentation is available here.

**Discussion**

Asked how quickly the proposed mathematical tools can deliver policy forecasts, Francesco noted that information feeding into a model is often readily available. There is, however, a need to get policy makers and scientists more acquainted to the tools. He further stressed that indicators can be powerful communication devices.

Francesco also clarified that a general equilibrium model was used in IN-STREAM since this appears to be the approach most used by policy makers.

Regarding the links between the IN-STREAM composite indicators and the Yale Environmental Performance Indicator (EPI), it was clarified that the two have some similarities, but the main difference consists in the use of a model in the IN-STREAM approach, which allows forecasting. It was also noted that one of the aim of IN-STREAM is to find innovative ways of using sustainability indicators, rather than create new ones.

Regarding the binary relationship among the indicators selected for the composite indicator, Francesco clarified that this was reflected in the weighting process. When there was no interaction among indicators, they were aggregated as a simple weighted sum. When interaction was significant, interaction terms were added.

A participant noted that, frequently, statistical offices apply backward analysis, and recognised the value of the IN-STREAM approach in allowing for forecasting. It was also noted that there is an increasing tendency in moving away from single indicators towards dashboards of indicators. Synthetic indexes, however, can have a stronger communication power (e.g. the OECD recently launched its 'Better Life Index'). If composite indicators are used, it is crucial to make their construction clear and transparent.

**Victoria Alexeeva-Talebi (Zentrum für Europäische Wirtschaftsforschung, ZEW) - Unilateral climate policy and competitiveness: Differential emission pricing from a sectoral, regional and global perspective**

Victoria presented the results of ZEW's research, which investigated potential tensions between the EU's climate change targets (the '20-20-20' package) and the targets set out in the Lisbon Strategy. More specifically, the question is whether achieving the climate change targets may come at the expense of competitiveness.

She explained that the first stage in the research was to clarify the concept of competitiveness, in order to identify appropriate indicators. The analysis focused on two dimensions which are key to competitiveness: the 'ability to sell' and the 'ability to earn'. She stressed the importance of distinguishing between competitiveness determinants and competitiveness indicators. Competitiveness indicators were selected at the sectoral level. These could be measured alongside two dimensions: international trade performance, and profitability performance.

She pointed out that, using the Computable General Equilibrium (CGE) model, they calculated a competitiveness indicator for each sector and each region using the data on bilateral trade (exports and imports). While the initial intention was to link a competitiveness indicator to a welfare measure, it was soon realised that this is possible only to a limited extent.

One of the key findings from their policy simulation was that, if tax differentiation is applied, possible trade-offs in the economy needs to be accounted for. Differentiation can in fact come at the expense of certain industries, and can result in non-negligible welfare losses in the EU. This does not mean, however, that it should not be applied, as it can for instance help addressing carbon leakage concerns. Overall, it can be considered a 'second best' option..

The full presentation is available here.

**Discussion**

Asked about the novelty of this exercise, Victoria noted that it was the first time sustainability indicators were used within this framework. While past research had frequently a narrower sector focus, the IN-STREAM work on competitiveness looked at the whole economy. The methodology also offered a sound theoretical background, and provided a link to welfare measurements.

Regarding whether the estimates on energy intensive industries took into account potential technological improvements and energy efficiency, Victoria clarified that technological changes were exogenous in the model, while the focus was rather on how trade flows react to different tax levels. Should technological innovation be internalised, the impacts on these industries' competitiveness could be lower.

Victoria also clarified that indicators were considered consistent (i.e. resulting in comparable results) when they reflected the same (positive or negative) effect on competitiveness, although some had different orders of magnitude. Part of the reason is that some of them used different reference points for the relative dimension on competitiveness (i.e. competitive relative to whom?). She further noted that competitiveness is not an absolute measure, but it is relative to other firms' performance.

A participant also observed that the message that tax differentiation could lead to non negligible welfare losses could discourage policy makers to apply them. It was hence clarified that this was the case only in a 'first best' scenario. In the real world, the presence of a number of inefficiencies – like carbon leakage- makes second best options preferable – such as the introduction of tax differentials.

A participant highlighted the issue of bargaining in international negotiations, where economic analysis has an important role to play. He stressed the importance of distributional differences across sectors and income groups (distributive impacts) when considering the consequences of a carbon tax. Victoria clarified that the model only looked at unilateral emission reductions, but that it allowed for further disaggregation across income groups.

Francesco highlighted that the workshop's presentations only allowed for illustrating part of the IN-STREAM results, and that further work on a range of other issues was also carried out, such as on the implications of sustainability policies on health, food prices and production. He pointed out that one of the main messages is that one needs a multicriteria analysis: economic tools are important but there are also other investigation methods.

**Veronika Wille (University of Stuttgart) - Assessment of greenhouse gas emissions**

Veronika Wille presented an overview of indicators on greenhouse gas emissions, distance to target, costs distance to target and climate change damage costs, while highlighting the methodological challenges, future developments and advantages and disadvantages of the different approaches.

In the overview of gases with global warming potential (GWP), Veronika noted that work on measuring all processes leading to a change in radiative forcing is in planning stages and that GWP measurements for non-GHG substances (i.e. OC, SO2) were based on preliminary estimates. Despite the higher GWP of other gases, $CO_2$ remains the most relevant due to the significantly higher quantity of emissions. Veronika showed the different scenarios possible, based on the HEIMTSA Common Case Study, comparing business as usual to the 2°C 450 ppm goals in terms of million ton $CO_2$ equivalent, for the years 2005, 2020, 2030 and 2050. Another indicator used was the 'distance to target' which compares actual emissions with a 'sustainable emission pathway', that is a path for European GHG emissions leading to a reduction of ca. 71 per cent of EU GHG emissions in 2050 compared to a 1990 baseline. This indicator was calculated by comparing the emissions of the sustainable emission path with actual emissions. Alternatively one can add the differences to the accumulated differences of past years and then compare cumulated emissions. Here the point of time of emissions is not considered.

The 'costs distance to target' indicator was based on the indicator distance (of emissions) to target, where the annual costs for reducing the emissions values to the target value is estimated. This is calculated using partial equilibrium models (energy, agriculture). The final indicator presented was 'total damage costs', which shows the monetized damage caused by the greenhouse gases emitted in a year. It was created by calculating total damage costs of emissions by multiplying marginal damage costs with emissions (e.g. EU29) from all sectors in $CO_2$ equivalents. The inclusion of equity weighting can significantly affect the distribution.

Veronika presented some of the advantages and disadvantages of each indicators: 1. The Greenhouse gas emissions indicator is easy to calculate and well understood, but has limited comparability; 2. The distance to target indicator provides a visible distance to sustainable path, however is based on models and cannot be aggregated; 3. The costs distance to target indicator has good compatibility and can be aggregated, however, costs are based on assumptions; 4. The damage costs indicator provides compatibility, and is an aggregated measure for damages which is able to provide a worldwide emission

path. However, uncertainty remains if all damages are included. There is need for further development of the indicators in this field.

The full presentation is available here.

**Discussion**

A participant commented that the damage costs indicator should use an equity weighted procedure in order to justify mitigation costs. He noted that 2°C is a precautionary target, not based on cost benefit analysis, and that it includes high uncertainty. Asked whether there were any ideas on what the costs will lead to, and who would have to pay, Veronika answered that this was not the purpose of the indicators – these only show the amount of external costs. How to internalise them is a policy decision. A discussion on the methodological aspects of the indicator ensued, focusing on the comparability between countries and on whether innovation was factored in. An example of avoidance costs in solar production changing drastically over the past five years was given. Another participant stated that costs for energy conversion and development have been analysed, through trends and technical examination in order to better predict changes in costs.

Furthermore, it was commented that the value of exploring historical data may be limited as there has been an increase in volatility, making it difficult to extrapolate climate trends – damages have been increasing and become harder to predict. Veronika clarified that the models include measures for storms and extreme weather events. The discussion then shifted towards uncertainty in the models, the difficulty in calculating probability, and the rationale for using a precautionary principle when setting targets.

It was further noted that climate change targets and have changed significantly over the past ten years, adding some uncertainty to the model. The results of the model are also highly dependent on economic variables such as discount rates and on whether equity concerns are taken into account.

**Leonardo Mazza and Samuela Bassi (Institute for European Environmental Policy, IEEP) - The use of indicators in the policy cycle and introduction to the brainstorming session**

Leonardo Mazza presented an overview of the qualitative analysis carried out by IEEP in the IN-STREAM project. He explained that the aim was to analyse a set of indicators, identify the policy implications for their use, draw lessons from some case studies, investigate the issue of the uptake of sustainable indicators in the press, discuss results with stakeholders and draw some useful conclusions and recommendations. The work focused on a set of environmental, social and economic indicators selected by the team.
Leonardo first introduced the policy cycle, outlining the characterised each one of the ten distinct phases in the cycle, and explaining how indicators may typically provide information relevant for decision-makers at the different stages of the decision-making process. Leonardo provided an overview of the policy cycle analysis undertaken, and its relevance in the context of green growth. He briefly introduced the policy areas investigated (climate change, energy efficiency, cohesion policy) and illustrated how the policy cycle had been adapted to better reflect the specificities of policy areas such as energy efficiency and cohesion policy.
Leonardo concluded his presentation providing a few insights of the findings of the qualitative work for green growth relevant policy areas. He highlighted, for example, that GDP, employment and competitiveness are the top three most influential indicators used in Cohesion Policy, according to experts in the field, and that there has so far been a heavy focus on 'output' indicators rather than outcome indicators. With regard to energy efficiency, there appears to be a need to improve the explanatory power of energy intensity indicators by increasing the sectoral detail. In the area of climate change, it was

recommended to use data on GHG emissions by different sectors for targeting priority industries.
Samuela Bassi introduced the brainstorming session. The participants were requested to join one of three groups focusing on three different policy areas related to green growth: emission trading, cohesion policy and energy efficiency in buildings. Each group were to identify key sustainability indicators and position them in the policy cycle. For each indicators selected, they had to indicate why it was chosen, at which stage(s) of the cycle it should be adopted, how it should be used and how suitable it is to be taken up by media. Furthermore, the participants were requested to discuss the obstacles/limitations/gaps for using sustainability (green growth) indicators in the group's policy area, and which sustainability (green growth) indicators are not currently available for use/did not reach their full potential.

The full presentation is available here.

**Discussion**

Leonardo was asked whether the number of indicators varied over time and if there was information on changes of availability and methodology. He replied that the indicators examined were all currently available, though some are not robust and face criticisms. The historical non-availability was not investigated, however it was noted that progression in indicator design reflect stages. In some cases, the indicators have been tested by comparing previous predictions made to actual levels. Some indicators are trendy and "come and go", it is difficult to foresee future needs.

A participant questioned the choice of policy cycle used in the presentation, who decided the stages and whether policy makers were purposefully considering the stages while formulating policy. Leonardo explained that the policy cycle is a framework for analysis, rather than a fixed model, and that even unconsciously, policy makers follow a similar path. The purpose of the task was to respond to policy maker's needs, and the policy cycle has been used in order to highlight where demand is and where gaps exist. Samuela explained that the stages of the policy cycle and indicators were chosen based on stakeholder consultation – through the IN STREAM network and workshops. The focus has not been on promoting policy maker's use of the policy cycle, but on using indicators. The policy cycle is a tool, an instrument for discussion, as recommended by the TEEB report. Another participant pointed out that different cultures and contexts lead to different policy cycles – that as a footnote it should be indicated that it is flexible. It is a tool for analysis, not a checklist.

**Brainstorming session: the use of sustainability indicators in green growth related policies - Presentation of key outcomes**

During the breakout session, the participants were divided in three groups, each discussing the use of sustainability indicators in three green-growth related policies: emission trading, cohesion policy and energy efficiency in buildings.

The participants were asked to select between 5 and 10 indicators (including but not only from a list provided) which were considered particularly useful, and associate them with the most relevant step(s) in the policy cycle of the policy under discussion. Furthermore, for each indicator the groups had to briefly justify: why the indicator was particularly valuable, why it was placed at the specific stage(s) of the cycle, how the indicator should/could be used, and if the indicator was easy to communicate – i.e. if suitable to be taken up by media.

The groups were also asked to discuss what the main obstacles/limitations/gaps for using sustainability indicators in the policy area of their focus were, and if they knew of any indicator currently not readily available for use in these areas.

**Holger Gerdes (Ecologic Institute) – Report from the Emission Trading group**

The group identified a broad range of indicators that could potentially be useful in the context of the EU emissions trading scheme (EU-ETS). The focus was on indicators that could help to address problems that emerged in the first two phases of the ETS, e.g. its limited effectiveness due to the low market price of $CO_2$ credits, and the relatively high administrative burden with the associated transaction costs.

The large majority of the identified indicators was placed in the policy monitoring and evaluation stages of the policy cycle, while less indicators were associated with the policy determination and implementation stages and only a few were associated with the policy description and dissemination stages. The indicator that was considered to be most useful in various stages of the policy cycle was $CO_2$ emissions. By means of this indicator – which the group defined as a headline indicator in the context of the EU-ETS – the fulfilment of $CO_2$ emissions targets can be monitored.

In addition, the group identified a dashboard of seven other indicators that could be useful in the context of the EU-ETS:

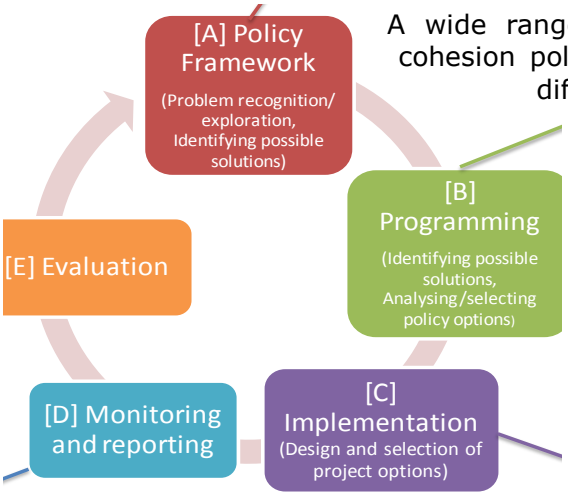
- $CO_2$ price – to monitor how the instrument is performing
- effects on energy demand – to monitor a potential shift towards alternative energy sources
- reduction in fossil fuel consumption in the transport sector – to monitor environmental improvements in the transport sector
- effects on land-use and natural resources (natural capital, adjusted net savings) – to monitor potential implications of an increased cultivation of energy crops
- innovation at the company level – to monitor the effects of higher carbon prices on production patterns
- stakeholder acceptance of the policy instrument – to monitor the social discourse related to the instrument
- distribution of revenues – to increase transparency of the instrument

**Samuela Bassi (Institute for European Environmental Policy, IEEP) – Report from the Cohesion Policy group**

The group's discussion focused on the Cohesion funds' strategic policy (e.g. the decisions related to the eligibility of EU regions to funding) and programme framework (e.g. the setting of objectives, targets, priorities at national and regional level) rather than on the use of indicators at project level. This reflected the approach followed in the IN-STREAM analysis.

The policy cycle adapted to cohesion policies is show in the figure below.

*Fig. 1 Cohesion policy cycle*




A wide range of suggestions of sustainability indicators for cohesion policy was put forward by the group for the use at different stages of the policy cycle, revealing how multifaceted the issue is. It was noted that the list provided for the brainstorm lacked business indicators. These were considered particularly important to portray competitiveness, eco-innovation, job-creation related to cohesion policy, and were therefore included at several stages of the cycle.

Only few environmental indicators were selected. These were considered less 'appealing' for financial decisions, but it was recognised that they could be more useful for high-level national policy than at regional/local level. It was also suggested that environmental indicators could be most relevant at the implementation stage, e.g. to select implementation options (projects) with the least environmental impacts. An overview of the indicators proposed by the group for each policy stage is shown in the table below.

*Table 1. Indicators for cohesion policy*

| **Delivery instrument** | **Indicators considered relevant** |
|---|---|
| Policy framework (Problem recognition; identification of possible solutions) | Genuine savings; Diversity of land use and economic structure; Share of 'innovative' enterprises in a region; Inequality of income Education; Adjusted GDP per capita; Human Development Index (HDI); Energy intensity per unit of GDP; Depopulation |
| Programming (Identifying solutions; selecting policy options) | Social Capital; Resilience networks; Number of 'knowledge; partnerships' ; HDI; Sectoral unemployment |
| Implementation (Design and selection of project options) | Social capital; Most potential for environmental indicators is the implementation phase; Share of 'innovative' enterprises in a region |
| Monitoring and reporting | Adjusted net savings; All resource use indicators; Job creation Entrepreneurship and spin-off; Talent and skills; Number of accepted patents; Execution (use of funds); Share of 'innovative' enterprises in a region |
| Evaluation | Inequality Index/Evaluation, GINI Coefficient; Net payments; DALY/PDF; R&D/Entrepreneurial initiatives; Share of 'innovative' enterprises in a region |

Among the limitations and gaps in the use of sustainability indicators for cohesion policy, the group highlighted the need to explore opinions at local levels. It was also noted how the allocation of funds is often a highly political decision. The importance of using indicators that are understandable by the finance and business sector was emphasised. The group observed that these stakeholders often see the environment as a burden, and the use of appropriate indicators should enable showing the opportunities related to sustainability (e.g. job creation). It was also suggested that a 'package' of indicators – i.e. a mix of economic/social/environment dimensions – should be provided to decision makers.

With regard to communicability, it was noted that indicators should be easily quotable. Climate change indicators appeared to convey a potentially powerful message (e.g. the economic implications of natural hazards induced by climate change). Job creation was also seen as a very topical indicator. It was observed that the message is stronger when

indicators are well known and understood (e.g. ecological footprint). Overall, the clarity of indicators was considered very important for effective communication.

Finally, the group concluded that most of the indicators discussed are not yet fully used/understood in cohesion policy. Social indicators (e.g. well-being) were considered important, but were perceived as currently still lacking robustness and being prone to subjective assessment. Their use could increase in the future once methodologies are further developed. The issue of comparability across countries was also raised: different countries may use different indicators and definitions, and benchmarking may not yet be possible. The group agreed that the use of sustainability indicators and the awareness of their importance should increase. There are signs of increased interest in sustainability measures by EU funding institutions (e.g. DG Regio), and therefore there may be potential for further indicators adoption.

**Lucas Porsch (Ecologic Institute) – Report from the Energy Efficiency in Building group**

The group's discussion focused on the Energy efficiency in building policy. The building sector is a significant contributor to climate change as it consumes approximately 37 per cent of global energy supply and it is responsible for 32 per cent of all $CO_2$ emissions in 2004 (IPCC 2004). Energy efficiency in buildings is relevant for the three sustainability dimensions, and particularly the social one.

The EU commission's new Energy Efficiency Directive[2] establishes a legal obligation to achieve energy efficiency in the public building through renovation of existing buildings with the clear aim to save energy. Policies are most implemented for public building in the environmental dimension in order to reduce the GHG emissions coming from the inefficient use of energy. In the Directive there is no target for social and economic aspects explicitly related to the building sector.

Beside this, the group emphasised the importance of the household side and of the social aspects connected to energy efficiency in building and in particular in view of relevant issues such as energy poverty, the rise of fuel prices and the housing market. Furthermore, the group highlighted the problems connected to the enormous amount of new buildings needed in the world and the consequences on sustainability. It was noticed that energy efficiency is a long term problem with long term investment cycle and therefore not very attractive for policy makers. Moreover, energy efficiency standards are higher in new buildings while in old buildings energy improvements are less significant.

Several indicators were considered for the policy cycle. Most of them were related to social and economic aspects, but just because the environmental indicators were considered already the most explicative and most common used in the policy assessment. The following table presents the key indicators which were considered in the cycle, covering all dimensions. Most of those indicators are applicable to all phases of the cycle and the group found a very high level of overlap in most of them.

*Table 2. Indicators for energy efficiency in buildings*

| Delivery instrument | Indicators considered relevant per phase of the policy cycle |
|---|---|
| Policy framework (Problem recognition; identification of possible solutions) | Fuel poverty by area and district; Numbers of new building needed; Share of emissions from building over total emissions; Energy leakage indicators; Changes in comfort – rebound effect; Net present value of investment in different building;Distribution of costs; Housing cost; Price of fuel; energy security connected to energy import; Change in health, biodiversity and GHG |

[2] "EU Energy Efficiency Directive MEMO/11/440, 22 June 2011" http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/11/440&format=HTML&aged=0&language=EN&guiLanguage=en

| | |
|---|---|
| | emission |
| Programming (Identifying solutions; selecting policy options) | Energy consumed in building operation of existing building (gov, school, army, shops etc); Geographical location of building to reduce the need of consumption; Activity indicators (investment, appliances); Fossil fuel vs. renewable use connected to well being of person; Green Job creation |
| Implementation (Design and selection of project options) | Number of civil engineers registered as low carbon efficiency skills; Certification for best material; Investment in energy efficiency in building % of expenses and government intervention – evaluation effort; % of housing investment in energy efficiency per capita; Impact on housing cost; Investment in RD in material and energy efficiency design |
| Monitoring and reporting | GHG emission originated in a $m^2$; Average performance in terms of energy used for $m^2$; stock of energy saved every year per $m^2$; amount of energy produced with renewable sources; Monitoring housing market; Share of housing cost on GDP; Monitoring investment in RD |
| Evaluation | Number building rated as energy efficient |

Among the limitations and gaps in the use of sustainability indicators for energy efficiency in building policy, the group highlighted the need to enhance transparency in the evaluation aspects. It was noted that a building rated as 'efficient' does not always take into account the technology has been used, the amount of renewable energy produced and the impact on overall dimension of sustainability including social aspect as, for example, the cost of housing and the energy poverty measurement. Another limitation regards social indicators and in particular social targets that should be provided.

It was also noted how all those indicators can give very important direction to policy makers in order to establish environmental and technological requirements to guarantee a comfortable surrounding condition and limited energy consumption.

Finally, it was observed that the list of potential sustainability indicators is vast, and all those connected to sustainability and social aspects should be more enclosed in the energy efficiency building policy.

**Discussion**

The participants observed that the list of potential sustainability indicators is vast, and the choice of the most suitable ones depends on the questions they need to address.

As some processes are highly political, it is important that the indicators chosen are quotable. In some cases they may not be driven by information but by rhetorical strength.

It was suggested that the project should look also at how useful indicators have been in the past, and in what cases they were not used for political reasons. It was also noted that the choice of weak versus strong sustainability may be difficult to capture though the use of indicators

**Benjamin Görlach (Ecologic Institute) - Wrap-up**

Benjamin Görlach underlined that the IN-STREAM key objective has been to find linkages across indicators and to better understand where indicators can be used to illustrate trade-offs between the different dimensions of sustainable development. This responds to an inherent characteristic of decision-making: policy decisions are full of such trade-offs and a number of multiple objectives need to be achieved at the same time. While there is more agreement on the use of sustainability indicators on climate/carbon policies, given the existence of clear environmental targets, other policy areas remain more controversial, and several types of indicators may be needed.

In its attempt to identify the links between indicators and trade-offs, IN-STREAM explored the link between social and environmental dimensions. In some cases the relation appeared to be positive (win-win effects, such as the creation of green jobs), but in some cases the relation can be negative (e.g. carbon leakages can lead to de-industrialization and job losses). The study revealed that both relations are not very strong, as the social dimension appears to be relatively neutral to environmental policy.

The ability of the IN-STREAM models to provide forward looking analysis can be considered particularly innovative. This can counter-balance the limitations of stastistical approaches which tend to look backwards and cannot tell much about where we are going. The use of models opens up a whole new dimension. Mathematical models are therefore important for simulations and forecasting. However, their limits should be taken into account, such as scope limitations and misspecifications – built on data and assumptions, a model can only give the answer that it is designed to give.

Overall, it was noted that this type of analysis is increasingly on demand, reflecting an increasing interest in sustainability indicators and in their application to policy making. Today's environmental challenges are so broad that they require economy-wide solutions. Furthermore, environmental policy is increasingly mainstreamed into other policy areas, contributing to the transformation of society and the economy. There is a rising need for orientation and macro-aggregate level analysis on demand. Green growth is clearly a key element in this cross cutting process, and the type of analysis carried out in the IN-STREAM project will make an increasing contribution to the elaboration of useful answers.

For further information on the project or additional comments, please visit the IN-STREAM website http://www.in-stream.eu/ or contact the project coordinator Lucas Porsch or workshop and policy analysis coordinator Samuela Bassi:


Lucas Porsch
Ecologic Institute
Pfalzburger Straße 43/44
10717 Berlin, Germany
**Tel:** +49 (30) 86880-0
**Email:** Lucas.Porsch@ecologic.eu
**Web:** http://ecologic.eu/

Samuela Bassi
Institute for European Environmental Policy (IEEP)
15 Queen Anne's Gate
SW1H 9BU London, UK
**Tel:** +44-(0)20-7340 2685
**Email:** sbassi@ieep.eu
**Web:** www.ieep.eu



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