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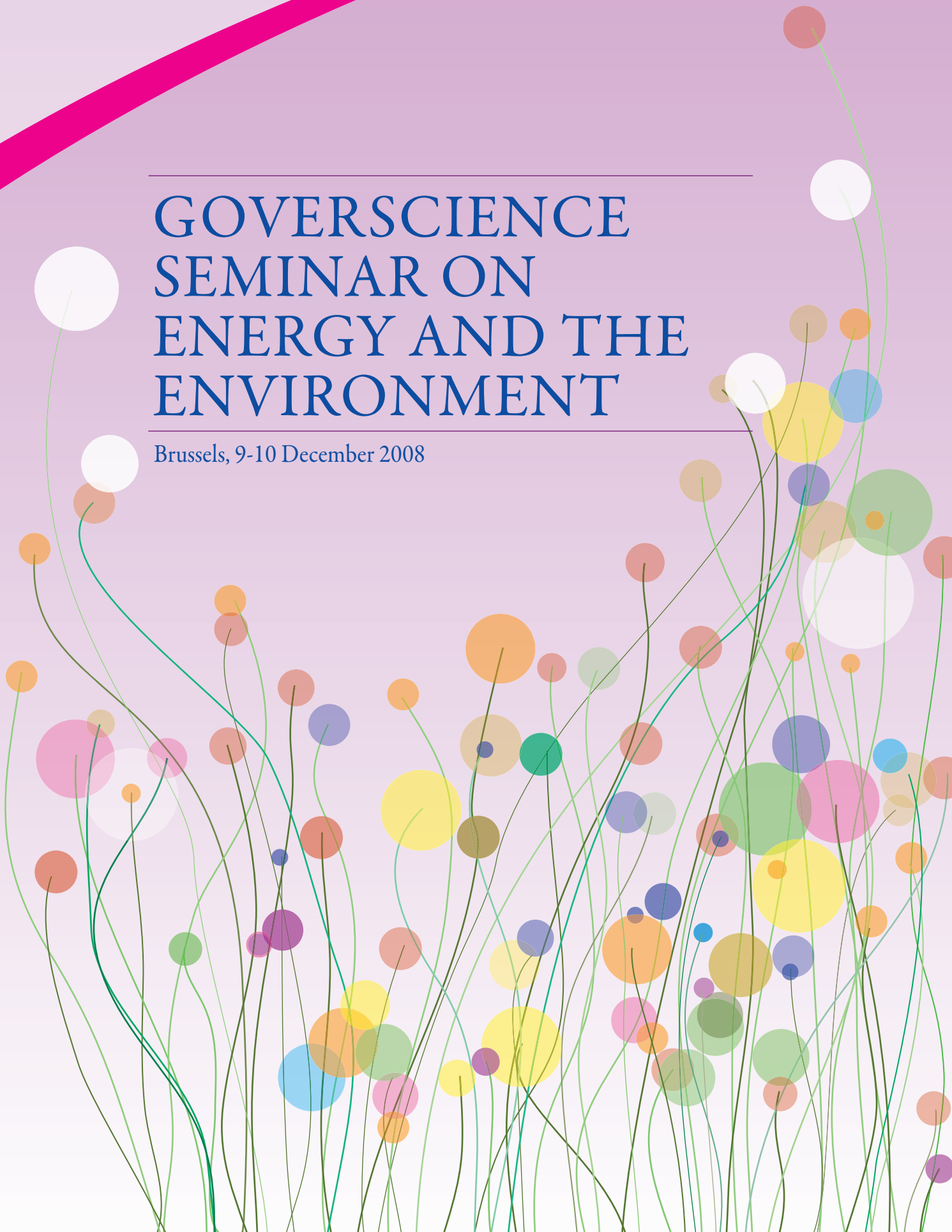
GOVERSCIENCE SEMINAR ON ENERGY AND THE ENVIRONMENT

Brussels, 9-10 December 2008



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Foreword

When launching the Ljubljana process in 2008 the European Council called for an improved governance of the European research area (ERA), where 'stakeholders such as universities and research organisations, civil society and business should be actively engaged in ERA ... '. Indeed, the Commission's 'Science and society' initiatives in the sixth framework programme and 'Science in society' ones in the seventh demonstrated that citizens and civil society organisations show a growing interest in getting involved in research policy, be it at the level of rendering research findings meaningful, contributing to setting the research agenda or even participating in research projects.

This inclusiveness of research governance processes is becoming an essential feature of the strategy to overcome the big societal challenges Europe is facing, such as according energy needs and production in a sustainable way.

The Goverscience seminar on energy and the environment held on 9 and 10 December 2008 took stock of previously funded Community projects under the sixth and seventh framework programmes on energy, environment and governance and of the main Community strategic documents relating to the field. It gathered during two days 10 experts and Commission civil servants in an open and structured discussion on the status quo and perspectives ahead of us in sustainable consumption and production of energy.

As the findings make clear, good knowledge is already available but, as yet, insufficiently disseminated and not yet translated into action. In front of this backdrop recommendations focused on how research can contribute to the communication and implementation of existing knowledge, including how it might address the need to learn from each stakeholder and build upon existing experiences.

As far as 'Science in society' is concerned, one of the recommendations particularly drew my attention, as it may raise the ambition of our actions to the level of the challenge: '**Ways in which to bring actors together to make change happen must also be further tested and developed on a broader scale**'. This recommendation is particularly challenging for us at European level and I am indeed convinced that we need to act together now – scientists, civil society, industry and policymakers – in order to make the difference for generations to come.

Jean-Michel Baer
Director 'Science, Economy and Society' Directorate,
Directorate-General for Research

I – Introduction

Addressing the 'energy and environment' issue under a governance heading and at European level is indeed a challenge because it combines all its scientific, technological, political and societal dimensions (including the environmental, social and ethical ones) in all their complexity. Fortunately enough we could rely on the experience acquired through the European governance debate in the early 2000s as well as that from the ongoing debate on the European research area, led by the Commission since the start of the millennium.

This report is a contribution to a debate which focuses on the way citizens consume energy, be it directly or through choices they make through lifestyles and consumption habits. It aims to explore and suggest a few lines of thoughts and research actions on how the Commission can use its political and regulatory prerogatives in order to tackle the energy transition ahead, while improving the environment, social and economical situation.

Science and governance in the EU-context of the seminar

When launching the Ljubljana process in 2008 the Council called for an improved governance of ERA, where 'stakeholders such as universities and research organisations, civil society and business should be actively engaged in ERA … '. Indeed, the Commission's 'Science and society' initiatives in the sixth framework programme (FP6) and 'Science in society' ones in the seventh one (FP7) demonstrated that citizens and civil society organisations show a growing interest in getting involved in research policy be it at the level of rendering research findings meaningful, contributing to setting the research agenda or even participating in research projects. This inclusiveness of research governance processes is becoming an essential feature of the strategy to overcome big societal challenges Europe is facing, such as solving the energy challenge in a sustainable way. The Goverscience seminar held on 9 and 10 December 2008 is a focal point of previous activities in this field.

Organised by the 'Science, Economy and Society' Directorate of the Directorate-General for Research, Goverscience seminars gather generally a 'reasonable' number of people from various horizons (Research, industry, policy making, civil society…) and invite them to reflect on a topic at the crossroads between science and governance. They rely on 'open space technology', giving a large freedom to participants to shape and feed the agenda, before and during the seminar. The preparation of the seminar is therefore an essential part of it as, apart from the knowledge of their own field of expertise and activities, participants must arrive at the seminar with a good knowledge of its rationale, background and main results of past and ongoing FP projects.

The 'energy and environment' Goverscience seminar took stock of previously funded FP6 and FP7 Community projects on energy, environment and governance and enabled the exchange of experiences through plenary and parallel sessions (Appendix I). It also took into account the main Community documents ([1]) relating to the field such as the 'Sustainable consumption and production and sustainable industrial policy' action plan ([2]), the strategic energy technology plan ([3]) and the activities developed by the EU's competitiveness and innovation framework programme ([4]) (CIP 2007-13) (notably the 'Intelligent energy – Europe' ([5]) operational programme).

([1]) See references in Appendix K.
([2]) COM(2008) 397, 16.7.2008.
([3]) COM(2007) 723, 22.11.2007.
([4]) http://ec.europa.eu/cip/index_en.htm
([5]) http://ec.europa.eu/energy/intelligent/index_en.html

Objectives of the seminar on 'energy and environment'

Human activities have an impact on climate that translates already, and increasingly, into global warming, resulting in more severe weather conditions (drought and floods), extreme meteorological events (hurricanes) and sea level rises. One of the main causes is to be found in our energy consumption, served by an energy production system which has grown in most industrialised (and industrialising) countries well beyond the limits of sustainability.

It is also commonly acknowledged by experts in the field that mitigation of and adaptation to present and future climate changes cannot be achieved through science and technology alone. Individual and collective behaviour – that of citizens, industries and policymakers – will be a key determinant of taking a path towards sustainable energy production and consumption.

There is, therefore, a need to reflect upon initiatives of the European Commission from this perspective in order to foster more inclusive governance, leading to actions and advocacy from citizens and civil society organisations. Such initiatives include the 2007 European Commission conference 'Towards a post-carbon society' ([6]) and the current DelibProcessSCP ([7]) project, as well as other past and on-going projects.

The dual objectives of the Goverscience energy and environment seminar, held in Brussels on the 9 and 10 of December 2008, were:

- to produce a better understanding of the notion of 'sustainable energy production and consumption', bringing together perspectives from research, industry, civil society and policymakers; and
- to propose European research-related initiatives for sustainable energy production and consumption which involve citizens and civil society.

The desired impact of the Goverscience energy and environment seminar was to facilitate an exchange of experiences between participants, enabling the dissemination of the project results so that these might be used by other Commission services and in other relevant European activities and policies.

The seminar brought together 16 experts from different sectors ensuring a plurality of backgrounds and perspectives.

About the report

The aim of the report is to:
- document and summarise the outcomes of the seminar;
- draw further conclusions and recommendations, based on the outcomes of the seminar.

The report is structured in line with that of the seminar, and included three central chapters:
(1) firstly, the introductory presentation and the outcomes of the discussion on stock-taking are documented and discussed (Chapter 2);
(2) next, the outcomes of the discussion on future perspectives are presented (Chapter 3); and
(3) finally the closing discussion and recommendations of the seminar are reflected upon (Chapter 4).

The Appendix comprises two parts, one encompassing the documentation of the group results as was visualised using flipchart and posters (Annexes A, B, C, D and E), and one consists of the seminar materials and additional background information (Annexes F, G, H, I, J and K).

([6]) *http://ec.europa.eu/research/social-sciences/pdf/towards_post_carbon_society_en.pdf*
([7]) *Launched in April 2008 for 18 months: 'Identifying research needs and designing elements of deliberative processes on sustainable consumption and production in the demand areas food, housing and mobility' (http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/08/4&format=HTML&aged=0&language=EN&guiLanguage=en).*

II – Background and status quo

The 'background and status quo' session of the seminar opened with an introductory presentation on 'Energy and environment – Sustainable consumption and production' (see Appendix F), given by Satu Lähteenoja of the UNEP/Wuppertal Institute Collaborating Centre on Sustainable Consumption and Production (CSCP).

This was followed by a parallel group discussion, which intended to take stock of energy and environmental issues from two perspectives: the national and regional settings of the EU in Group 1 (see Appendix A) and, in Group 2, the global perspectives (see Appendix B). The facts and figures on energy and the environment were also discussed as an overarching and cross-cutting issue.

Sustainable consumption and production

The introductory presentation (Appendix F) focused on three key areas: the consumption perspective of the energy and climate change challenge, the major impact areas for sustainable consumption and production, and finally the role of civil society organisations (CSOs) herein.

The consumption perspective reveals two central challenges. One is the highly skewed global pattern of energy consumption and CO_2 emissions, i.e. that industrialised states, including the USA and Europe, have per capita emissions well beyond the estimated maximum level of emissions per capita for sustainable life on earth. This maximum level is currently estimated at approximately 2 metric tones of CO_2 equivalent per capita and per year.

The second challenge is the tremendous rise in total global CO_2 emissions seen over the course of the last decades. It was highlighted that there is a **mismatch along the value chain** between the area in which management effort is expended, and actual environmental impact. Current management efforts for reducing emissions are predominantly focused on the production phase in the value chain, and, to a lesser extent, on the transport and distribution phases or the end-use of the product. It is, however, at the beginning (raw materials and supply chain) and at the end (product usage/end-of-life) of a value chain that the greatest impact for reducing emissions can be observed – but where much less effort is made. Hence a holistic approach is lacking for the complete value chain.

The areas which currently have the greatest impact on energy consumption and environment are food, housing and mobility. It is here, too that the **operational costs**, the usage and energy consumption during the product's lifetime (e.g. during the use of a car or habitation of a house) are highly relevant for the environment. These are, however, seldom given as much consideration – or communication – as the environmental impacts of their production/construction. It is here, too, that the **rebound effects** are stronger than technical innovations and improvements.

In light of this situation, change will require a joint and concerted effort by government, business and civil society actors. While government has to create a supportive framework and policy instruments, business has to provide sustainable products and services. Civil society, however, is important for the introduction of creative **instruments for behavioural change**. Here the role of CSOs is vital, given their potential to work at the interface of all relevant actors, ranging

from academia, policymakers, consumers and business. They can join forces and develop sustainable solutions for sustainable production and consumption.

For this reason, the DelibProcessSCP project aims to involve CSOs in a process where research needs for housing, mobility and food are identified. (For further information see Annexes F–H).

The discussion following the presentation highlighted the existence of opposing strategies for addressing consumers' behaviour: one is to persuade them to go for improved products, the other is to persuade them to consume less. Both strategies require different types of action.

Another important issue discussed was the issue of consumer choice i.e. that sustainable products are only offered at (prohibitively) high(er) costs. It was stated that public incentives are necessary for the market introduction of sustainable products. One example of **overcoming market barriers** to the introduction of sustainable products was that of low energy fridges in Denmark. These used to be too expensive due to low demand (with demand kept low because the product was too expensive) until the State took action to incentivise and support market introduction. Following this action, prices fell thanks to the increased feasibility and attractiveness for consumers and producers.

National and regional settings in the EU

The first parallel group discussion (Appendix A) on the status quo looked into the national and regional settings in the EU, and first explored the question: 'How far are knowledge and communication of the facts satisfactory in the EU?' The second area of discussion focused on questions such as 'How to deal with different levels in the EU', 'What, in this setting, is the role of CSOs', 'What of the European Commission?' and 'How do we compare with other regions in the world?'

Do we know and communicate enough about the scientific facts?

The discussion gave rise to a differentiated picture. On the one hand, comprehensive figures regarding energy and environment are available and from various sources. However, the assumptions and selections underlying the presentation of the figures are often not very clear and seem to be influenced by the (vested) interests of the communication. With a view towards society, **trustworthy information** is, therefore, a pivotal issue and closely linked to public trust in institutions. Here again CSOs play an important role. In addition, a **meaningful 'translation'** of existing facts is necessary for communicating with society. One example of this is the plethora of units and equivalents for energy and CO_2 emissions that are used in literature – a plethora which is difficult to understand without expert knowledge. The information available to date is often meaningless without such expert knowledge.

On the other hand, there is a lack of information and figures that would be relevant for making decisions that move towards sustainable consumption – or this information is not disseminated. An example of this is the lack of data and information, as well as **communication, on external costs** – for example of coal exploration and use, or for any other product and energy source. The real costs, including societal costs, are not transparent. Furthermore, information on the existing barriers to improved technologies (be they

legal, social or economic) are often not communicated. A significant information and communication shortfall can be observed regarding the **benefits individuals might enjoy** by using sustainable products and services, for example savings they could make by living in energy efficient houses etc.

Where do we stand in the EU?

The findings of the group were, that at the individual level, an awareness of sustainable consumption exists, but this is often combined with a 'Nimby' attitude and a willingness to accept personal constraints seems to be limited. At a political level the **sense of urgency** regarding the energy and environment issue is notable in its absence. No immediate threat is perceived, and so short term political priorities often inhibit engagement for more long-term oriented action on climate change.

On the issue of **convergence in the EU** it was highlighted that shared goals are required (and exist), but that different roadmaps to achieve these goals are necessary. This is relevant given the **diversity within the EU**. This diversity – which is not only cultural but also relates to historical, technical, economic patterns and trends – should be respected. However the harmonisation of 'the rules of the game' was also considered to be important.

From an Eastern Europe perspective, the European Commission plays an important role in enhancing sustainability as politicians' and businesses' levels of general awareness are rather low and the EC is, in some cases, the sole **driving force for change** towards more sustainable consumption and production.

Global perspectives

The group discussion (for detailed results see Appendix B) that looked into the global perspective began with a brainstorming of relevant global issues, before exploring the strengths and weaknesses when it comes to sustainable consumption and production, and the role of the EU compared with the non-EU World. Finally the group identified needs for action for research, behavioural change and economic frameworks.

What are the key issues with regard to sustainable consumption and production?

Firstly, the general **environmental impacts** such as climate, air, biodiversity, water etc. are relevant issues which need to be addressed. Secondly, the **direct and indirect economic effects** need to be considered, including issues such as economic growth, free trade, internalisation of externalities ([8]) and the price impacts of choosing sustainable products and services. With regard to **social impacts** it was highlighted that a number of often confusing messages are communicated to citizens (e.g. consuming more will save the economy versus consumption is destroying the world). Further issues within the societal dimension range from information and education, health, safety and security to conflicts of regional interests and outright conflicts/war.

What are the strengths and weaknesses of sustainable consumption and production?

An important **strength** is the existing political will and public awareness, economic performance and knowledge about what action to take, as well as the feeling of responsibility towards future generations. In addition, practical success stories and examples are

([8]) Costs related to the production and consumption of energy or goods (e.g. loss of natural resources, deterioration of health and environment, climate change etc.) are not included in the price of energy or goods and therefore 'externalised' to society. With respect to a market-driven approach for demand, this is not working as long as there are 'failures' on the market, and the externalities are an important measure for market failures.

available of how to implement sustainability in production and consumption and these could be replicated.

Weaknesses include the EU's dependency on often imported energy and products – which, in essence, constitutes an 'exporting of our problems' (resource exploitation, environmental pollution, social exploitation etc.) to oversee countries. Another weakness is that fiscal regulation and public incentives often do not proactively encourage sustainable behaviour.

The **threat** the EU has to face is that if only the EU is willing to take action, but the rest of the world is not, then climate change and unsustainable production and consumption will increase. Another threat is the current economic crisis which might limit the economic capacity for further sustainable development. There also exists the risk that the public is becoming confused by the mixed – and contradictory – messages being sent, as well as by the lack of appropriate communication on the environmental impacts and benefits of sustainable consumption and production. This shortfall threatens to lower the public's willingness to change its behaviour.

Having said this, the current economic crisis also represents an unprecedented **opportunity** for a new beginning. The increasing impact of new media and globalisation can contribute to rising global awareness. There is also opportunity for a cultural change, with trendsetters and affluent groups pioneering sustainable lifestyles and thus becoming role models for the public – as well as mobilising a critical mass. Comprehensive – and comprehendible – environmental standards for goods also represent an opportunity for increasing the sustainability of production and consumption. Finally, a decreasing dependence on politically sensitive imports opens up the opportunity for new frameworks of cooperation for sustainable energies with other countries.

What is needed in the fields of technology, public behaviour and economic frameworks?

In the field of **research and technology**, networks of knowledge transfer should be expanded upon, 'smart' devices that communicate with and inform the user of their energy use/consumption should be developed, and – in general – affordable and robust technologies for products and energy sources should be brought to market.

In the field of **behaviour** a very real need exists to enhance high-impact education in society and to address both supply and demand side issues – choosing better technology and using it less wastefully, thus helping avoid rebound effects. In addition it is necessary to understand the impact of regulated change, including unintended impacts at the individual, corporate and societal levels. Finally standards should be developed by which sustainability can be judged consistently (i.e. including life cycle issues).

With regard to **economic frameworks** more research is needed into how externalities and ethical conduct can be implemented within these frameworks. Greater understanding between industry, research, policymakers and economists is also needed. These groups still need to mix with each other, cross-pollinating ideas and engaging in a conversation. Here knowledge from collaborative research should be sustained and used. Better understanding is needed on how a political framework for international energy collaboration might be constructed (namely between Africa and Europe on solar energy).

Finally, conflicts of motivation – including long-term versus short-term interests, growth versus sustainability – need to be identified and resolved.

III – Future perspectives

One working group looked into campaigning for behavioural change as a perspective for the future, focussing thereby on consumers and citizens (see Appendix C). The second group discussed the issue of virtuous economic frameworks, focussing more on business and policy (see Appendix D). The issue of cooperative research processes was included as a cross-cutting issue for both groups.

Campaigning for behavioural change

Questions explored by the group included: 'Who has to be involved and how?', 'How far is this possible?' and 'To which extent is more research needed?', 'What are the best instruments?', 'What are priority areas for societal change in contrast to technical change?'

Who has to be involved?

The most relevant actors that need to be involved in campaigning for behavioural change include individuals, communities, religious persons, artists/VIPs and the media, CSOs, business, policymakers/government and international organisations.

What are the most relevant shortcomings for initiating behavioural change?

A worrying shortfall between knowledge and action can be observed, and this is combined with a lack of easily accessible and affordable sustainable products and services. At the political level, the different interests within sectors and between different policies represent a significant barrier to finding a common strategy in response to the problems and to enhancing behavioural change. This, amongst other things, also leads to competing messages being conveyed to the public and to confusion arising from non-agreement on proposed solutions.

As was previously mentioned, building trust represents a notable challenge and, together with understandable information and a common language, is necessary for not only securing trust, but also for ensuring understanding. One example mentioned was the multitude of often not very clear labels – one comprehensive label for sustainable products is still missing. More education on sustainable production and consumption is also still needed.

For personal motivation it was observed that a 'lack of ownership' of the problem – or rather: of the origin of the problem and of the solution for the problem – results in inaction. Individuals tend to perceive climate change and sustainability as a general problem but not as a problem that is relevant for them as individuals or which can be impacted upon by their behaviour and choices. Even if individuals, in general, adhere to sustainability, they consider themselves powerless when it comes to acting. These issues are compounded by the fact that the benefits of sustainable behaviour, especially for individuals, are not clear, nor are there sufficient incentives for changes in behaviour.

Which instruments are available?

A suite of instruments to further behavioural change are available (including the media, education, local participation) but common approaches and communication strategies are needed among the different actors if behavioural change is to be advanced. The strategies and instruments of different sectors – for example economic and political sectors – need to be coordinated and systematically linked up. One such example is long-term infrastructure planning which needs to be done at different levels and offers the chance to identify and implement new solutions.

Research is needed for tracking the effect of projects and implementation of labels ([9]). Another focus area of research could be communication with a view towards better integrating the rational and the emotional in communications on sustainable production and consumption. A third area of research should focus on smart appliances. Here is important to consider not only appliances that optimize the use of energy, but also appliances that inform the users about energy consumption, environmental impacts and eventually savings by behavioral change.

A central practical instrument identified is the enhancement of sustainable public procurement. This instrument has many benefits, ranging from supporting the market entry of sustainable products and services, to serving as a role model for other organisations and individual citizens.

What are the priority areas?

In total four key areas relevant for enhancing behavioural change were highlighted (see Graph in Appendix C):

- regulation – to step in where a solution is economically not feasible, but socio-economically useful; leadership from the government;
- economy – for sustainable leadership and delivering sustainable products and services;
- research – for tracking the effective impact of projects;
- communication – a common communication language and labelling are needed as well as a common communication strategy from all actors, including researchers, politicians and CSOs.

Developing virtuous economic framework conditions

This topic explored behavioural change in businesses, with the group looking into questions such as 'What are the emerging topics?', 'How can the behaviour of companies be influenced (tools)?', 'What gaps exist?' and 'What is needed e.g. from research?'

Emerging topics

An important topic for enhancing sustainable products is the experience curve, which gives rise to new technologies requiring high sales volumes to be competitive, whilst incumbent technologies are relatively cheaper due to experience efficiencies. To overcome this, regulation or support from the state is needed, taking action when a solution is not economically feasible but socioeconomically beneficial.

A second topic relates to the **empowerment of customers**. There are doubts that businesses actually know what customers want (to what extent is the 'customer always right'?). Customers are willing to trust the green credentials of a product or business, but this trust needs to be protected and not misused. Robust information on environmental credentials must be provided and the customer must be empowered to make real environmental choices. In any case, cultural differences, including those as they exist in the EU, should be considered – the awareness and orientation of customers towards sustainable products and consumption differs among EU countries and among social-economic groups.

With regard to businesses it should be acknowledged that their motivation is quite

([9]) There are interesting projects with labels and life-cycle assessment databases, where users – by sending an SMS with a product code, or taking a picture to a label (2D barcode) (e.g. http://mobilecodes.nokia.com, http://code.google.com/p/zxing) and accessing the internet – may receive information about the product (and environmental impact) through an SMS, MMS or webpage. (SMS projects are FishMS (http://www.wwfsassi.co.za/home.asp?m=1) or Healthytoys (http://www.healthytoys.org).

simple – profit maximisation. Overall, the speed of **change is slow** and there is reluctance among companies, politicians and individuals to think and act with a long-term perspective. Changing the rules of the game in favour of greater sustainability is theoretically possible, but must be addressed globally so as to ensure a **level playing field**.

How can virtuous economic framework conditions be enhanced?

Public procurement that also takes externalities into account could be an innovation and engine for change. Best practices are available and benchmarking between countries could help to increase interest in the topic.

In any case, a 'best of' approach across the EU could also apply to any move towards greater sustainability with an EU-wide '**name and shame**' campaign lending potentially powerful support to such a change.

Research has an important role to play in this context, identifying **barriers to implementation** including with the help of applied, oriented or action research and the need to ensure dissemination of results ([10]). **Monitoring** changing behaviours, facts and figures remains a constant task for research.

Assessing externalities and creating consensus in academia and society needs to be achieved in order to increase acceptance of and market share for sustainable products. Research should also increase joint programming and build on good examples from the past. A dialogue between disciplines and which cuts across issues still needs to be initiated and to take place.

Education and **lifelong learning**, as it takes place in science centres for professionals, has an important role to play to ensure that professionals keep apace with the development and distribution of sustainable products and services.

What are priority areas for research?

Building on the previous discussion, the following points for research were identified.

- Research on **externalities** – to identify and measure externalities and to build consensus within academia on these findings. In this context research for public procurement is needed that furthers innovative sustainable solutions.
- Research on the **impact of information and regulation** on business and customers. Success factors should be identified and analysed.
- Research to **monitor changes in attitude** (including cultural differences), the 'common customer wish list', e.g. on green energy, products and corporate behaviour.
- Research to create and disseminate **case studies on green changes** which highlight success factors for replication (including the dissemination and the role of politics).

One cross-cutting issue is the **role of CSO and the inclusiveness** of research and action.

([10]) This is already supported in the 'Intelligent energy – Europe' programme (http://ec.europa.eu/energy/intelligent).

IV – Conclusions and recommendations

In general it was found that there already exists extensive, **good knowledge** on technologies as well as on behaviour related to the energy and the environment. A good body of knowledge is also available on **existing experiences** in the field of sustainable consumption and production. It was observed that a large proportion of the results from previous research are not sufficiently disseminated. All in all, it was found that communication and interaction with the public and with the economic framework remain the key issues, with predominantly these acting as barriers to achieving sustainability, rather than the availability of new technology.

At an individual level – be it that of consumers or of businesses – the **importance of behavioural** issues was underlined. The greatest hurdle identified is the existing gap between awareness and actions, combined as it is with no real sense of urgency and ownership of the problem. In combination these prohibit citizens, politicians and business from acting immediately – and consequentially on the issues of energy and the environment. Additionally, the confusing communication regarding what constitutes appropriate behaviour sent by different actors makes clear orientation for action difficult. The rebound effects of new technologies have not been systematically traced and communicated, and so represent yet another challenge to be faced. In all this, the differences between EU Member States need to be born in mind, differences such as those that exist between northern and eastern Europe.

With regard to the framework for individual action – in this case markets and government regulation – it was concluded that the existing legal framework is not satisfactory. It was also observed that although the **importance of externalities** is now more broadly acknowledged, significant action is still needed so as to incorporate external costs into prices and products. In addition the impact of prices on consumer behaviour remains unclear and needs to be investigated further.

Recommendations

As the findings make clear, **good knowledge is already available** but, as yet, **insufficiently disseminated and not yet translated into action**. In front of this backdrop recommendations focus on how research can contribute to the **communication and implementation of existing knowledge**, including how it might address the need to **learn from each stakeholder and build upon existing experiences.**

The following recommendations seek to meet this goal of implementing existing knowledge and overcoming the gap between knowledge and action at various levels.

- At EU level, a research-backed initiative is proposed which would take a **'name and shame' approach** to EU States that are (un)successful in implementing concrete, actionable changes towards sustainable production and consumption. Research has the role of identifying case studies and analysing success factors, as well as barriers to the implementation of knowledge.

- Beyond this, it will be important to move forward supporting **projects that implement knowledge developed previously** (e.g. ICTs, etc.) i.e. effective dissemination and transfer of knowledge through practice and enhancing human resources. This would contribute to the distribution of services through Europe.

- In **eastern Europe**, where sustainability remains low on the public and political agenda, the **need for awareness raising and dissemination of results/information** is notably strong. It is recommended that the European Commission should initiate common initiatives on consumer behaviour, common legislation etc. to help overcome this barrier.

- The issue of **public procurement** was seen as an activity of high priority and identified as one where Member States can take action. Research needs to **identify externalities** and **monitor the impact of innovative public procurement**. Furthermore, organisations and businesses showing good practices in sustainable procurement should act as role models and beacons of best practice for others.

- **Research on internalising – or at least depicting – currently externalised costs** remains a central task, with direct relevance not only for public procurement, but also for the impact that the price mechanism may have upon (changing) consumer behaviour.

  In any case, it is necessary that this issue be considered more closely and in greater depth, that transparency be increased, and that the time frame within which costs are calculated also be taken into account. In the long-term, costs can become benefits.

- **Research on the impact of communication and transparent information** is also a key to empowering consumers and have them acting as responsible investors able to make genuine, informed environmental choices, thus helping to **unlock the potential of society for change**.

- Ways in which to **bring actors together to make change happen** must also be **further tested** and **developed on a broader scale.** In this context research on new information and communication technology as platforms to communicate and change behaviours (mobile phones, WEB 2.0, etc.) should be considered.

- In any case, **monitoring** behavioural changes, impacts of innovations, communications and regulation, individual and institutional choices, and resulting facts and figures regarding energy and environment, is also needed.

Annexes

- Outcomes of seminar discussions
  Annex A to E

- Seminar and background material
  Annex F to K

1. OUTCOMES OF SEMINAR DISCUSSIONS

Annex A: Group results – Status quo national and regional settings in the EU

Scientific facts and figures (re energy and its consumption)

- Figures are available (Shell, BP, IEA, USDoE, IPPC...), but should be interpreted carefully because of:
  - assumptions;
  - interest of communicator (→ interpretation depends on interests);
  - value of communicator (validation → trustful information needed for society);
  - 'jargon' of communicator (→ meaningful 'translation' for society) e.g. what is a CO_2 equivalent, what is a tonne etc.;
  - lack of access/meaning for non-experts (→ orientation in the information jungle) to make a choice.
- Figures are missing or they are not disseminated (e.g. externalities and real costs, e.g. impact of coal in Bulgaria and the real costs):
  - equivalence between energy sources (→ comparative data on potentials of different energy sources), no (true) benchmark between energy sources;
  - track records on energies (→ exclusion of information);
  - productivity of energy use;
  - targets (quantitative and qualitative).
- Target monitoring:
  - not yet enforced;
  - no corrective regulation.
- Facts not disseminated:
  - many barriers to technologies (legal, social, economical);
  - (benefits for individual are not made clear) → prices. i.e. energy efficiency of buildings.

National and regional settings in the EU

General issues:

- diversity to be respected (culture, available resources for energy/past choices on energy sources e.g. nuclear power, coal etc. → legal settings, economic development/economics);
- public deliberation – not the rule;
- inclusion of externalities? – Not the rule (healthcare etc.);
- awareness of people? – Yes, but... 'nimby' effect;
- need for convergence? – Shared goals (conversion) but different roadmaps (diversity) scenarios can differ;
- sense of urgency? – Motor for change. Not the priority, lack of (immediate) threat;
- EC coordination – harmonisation;
- international – grey perspectives! Sustainability, security.

Annex B: Group results – Status quo global issues

Global issues

- 'Sustainable energy, production and consumption':
- environmental impacts 'in general':
  - climate
  - air quality
  - biodiversity
  - water
  - energy
  - traffic/mobility
  - safety

- economic effects (direct and indirect effects):
  - growth
  - free trade
  - internalising 'externalities' ⟶ Legislation
  - wealth distribution
  - price impacts (e.g. bio fuel)

- social effects:
  - inclusivity
  - safety and security
  - health
  - conflict/war
  - conflicts of regional interest
  - education of the public ⟶ Information
  - consumer behaviour
  - confusing messages

⟶ Consumption = growth = ☺
⟶ Consumption = unsustainable

SWOT – EU vs R.O.W. – Global issues

S

- Political will
- Science and technology
- Public awareness
- Economic strength
- 'success stories' for renewables – can be copied – wind, wave, solar, efficiency

W

- High consumer expectation
- Dependence on imported energy and raw materials
- High cost of renewables
- Inconsistent uptake
- Inconsistent feed-in tariffs
- Renewable energy buffering
- Lack of distributed grid policy

unregulated free trade

O

- Economic crisis
- New beginnings
- Incentive to economise and opportunity for economic tech
- Sustainable energy from Europe
  - Less imports needed
  - Secure supply
  - Much wider use possible
- Cooperation with sunny countries – import energy, alleviate poverty, stabilise Africa
- Consumer/voter action

T

- Moving-alone economic crisis
  - Pressure to save on investment esp. long term
  - Erosion of economic strength
- Oil exhaustion/high price
- Public non-acceptance
  - Wind farms, etc.
  - Higher costs
  - Having to economise

Sustainable production and products

S

- Carbon trading (for domestic manufacture)
- Small energy products and free market
- Know-how
- Recycling

W

- Sustainable products 'not sexy'
- Energy storage
- Distribution (EG electicity/H2 for vehicles)
- Cheap, throw-away products, easier to replace than to repair
- Public lack info to make informed choices
- No standard for LCA

O

- Marketing sustainable products -› value to buyer
- Improved design/style
- Quality standards for durable products and recyclability, end-of-life directives
- Smart energy management in products -› user awareness
- Labelling of products for E.E. and lifecycle energy
- Research best label formats!

T

- Weakness in recycling infrastructure
- Unstable economics in recycling
- Replacing impacts of fossil extraction with impacts of renewables

Sustainable consumption

S

- Growing awareness
- IT literacy
- Some growth in action by consumers
- Responsibility for future generations
- Complementary advantages, health, cost savings

W

- Low action
- Lack of info on life-cycle
  – Public and expert
- Governments need revenue from taxes on energy
- Fiscal incentives often do not encourage change
- Lack of trust in government
- Ghost consumption e.g. standby

Media

Some inconsistencies

O

- Use of new IT-tools to raise awareness
  - Internet, mobile phone
- Globalisation
  - Opportunity for new infrastructures to be sustainable
- Cultural change
  - E.g. organic food cycling
  - Bolivian example

T

- Confusing message consuming = good for economy and bad for environment
- Globalisation -> cheap goods
- Rebound effect
- Increasing 'living standards'
- Exporting consumer culture

Too much contradictory info?

Educative!

Barriers to progress

	Research (Technology)	Behaviour (Society)	Economics
Ideal Solutions	• Total sustainability over social life • Information openly available on life-cycle impacts • Least-cost approaches developed	• Sustainable solutions always preferred • Society values less materialistic • Population well educated and aware	• Sustainable solutions always favoured • Energy supply secure and peaceful/respectful
Routes	• Research delivers sustainable technologies • Regulatory framework developed • Communication between research disciplines and with economists • Technology to ease user decisions • Knowledge transfer from EU towards third countries	• Regulation-driven behaviour change • Education, information, dissemination • CSOs – info and services • Informed users with smart devices	• Research gets needed funding • Regulatory frameworks applied - Minimising waste - International carbon trading/price and environmental codes of conduct
Barriers	• Long roll-out times • High capital costs • Some technology's immature-poor performance and reliability • Research funding limited	• Misinformation on new technology • National/cultural boundaries • Fashionability of sustainability • Lack of international collaboration	• Short-term thinking • Self-interest • High investment costs • Non-economic values not valued

Conclusions

Research (technology)

- Building networks of knowledge transfer – in the broadest sense (technological, economist, outside EU etc.).
- Smart energy using devices – that communicate and inform the user.
- Delivering affordable and robust technology into the market (products, energy sources).

Behaviour

- High-impact education of society – what works best? → choosing better technology and using them less wastefully.
- Impact of regulated change – understanding impacts including unintended ones, at individual, corporate and societal levels.
- Develop standards by which sustainability can be judged consistently – life cycle etc.

Economic frameworks research

- How to implement 'externalities' and ethical conduct in economic frameworks (good and bad examples are available).
- Creation of understanding between industry, research, policymakers/and economists – mix the groups... talk together.
- Sustaining and using knowledge from collaborative research.
- Political framework for international energy collaboration – better understanding is needed about economics, politics etc., for example between Africa and Europe on solar energy.
- Identifying and solving conflicts of 'motivator' i.e. long term versus short term, growth versus sustainability.

Annex C: Group results – Campaigning for behavioural change

Most relevant actors

- Religion, individuals, media, society, community, scientist, NGOs, policymakers/ government, artists/VIPs, economy, international organisations e.g. UNEP.

Most relevant gaps

- Different interests in the sectors, between different policies, to find a common strategy to solve the problems
- Understandable information and a common language → challenge for building trust
- Facts
- Missing label
- Ownership of the problem (cc is as problem, but not my problem...)
- Values are not sustainable/not oriented
- Benefits of sustainable behaviour are not clear, esp. for individuals
- Lack of incentives to behaviour...
- No agreement on solutions → confusion
- Lack of education in schools
- Gap between knowledge and action
- Price/no economic incentive
- Lack of sustainable products and services – must be made easier to access and use etc.
- Trust in information (source/facts)

Solutions

- Media/VIP, creative community – make image, sustainability more cool
- Education
- Sustainable public procurement
- Local production and consumption to be more emphasised
- Common communication strategy between the actors
- More local participation (give chance to participate in sustainable investment locally, i.e for choosing windmill locations)
- Less dependence on energy
- Research: effects of projects
- Rules and regulation to enforce sustainable consumption of energy
- Link between different instruments (economic and political)
- Research and communication – integrate ration and emotional aspects
- Infrastructure planning (on different levels, reduce energy losses) → long-term planning and looking for new solutions
- Energy planning studies including infrastructure – aim: come to an optimal use

- Clear view on the energy circle
- More research on smart appliances
- Indicators to show used energy (energy label for products)
- More research on effects of labels
- More labels with EU standards

Summary of key areas

Annex D: Group results – Developing virtuous economic framework conditions

Emerging topics

- 'Learning curve' of costs
  - Incumbent technologies cheap
  - New technologies need high sales to compete
- 'Customer is king'
  - Are customers informed?
  - Do businesses know what customer wants?
  - Customer trust in green credentials
  - Cultural differences
  - Availability of choices
  - Robust information on environmental credentials
- Business motivation is quite simple!
  - Change of rules theoretically possible, but must be addressed globally
- Motors for change – business assoc., training
  - CSOs
  - Customers
  - Information
  - Choice
  - Price
- Benchmarking between countries (name to shame)
- Slow speed of change and reluctance of companies, politicians and individuals, to think long term
- 'Public purse', public procurement
  - Externalities not yet taken into account
  - Best practice available: DG Environment and TREN

Tools

- 'Best of' approach in EU -> information
- Joint programming for research -> make it work and built on good exp. from past
- Research

  - Including applied/oriented research and dissemination of results ->

  - Identify barriers to implementation ->

  - Action research

  - Assessing externalities and create consensus in academia and society

- Education and lifelong learning, role of science centres? -> for professionals
- Monitoring -> facts, figures, behaviours -> (changing role of CSOs)

Crosscutting dialogue

Research issues/questions

Cross-cutting issue: CSO/inclusiveness

(1) Externalities: identify, measure, consensus.

(2) Impact of information and regulation on business and customers -> success factors!

(3) Monitoring changes of attitude (including cultural difference), 'common customer wish list', e.g. on green energy, products and corporal behaviour.

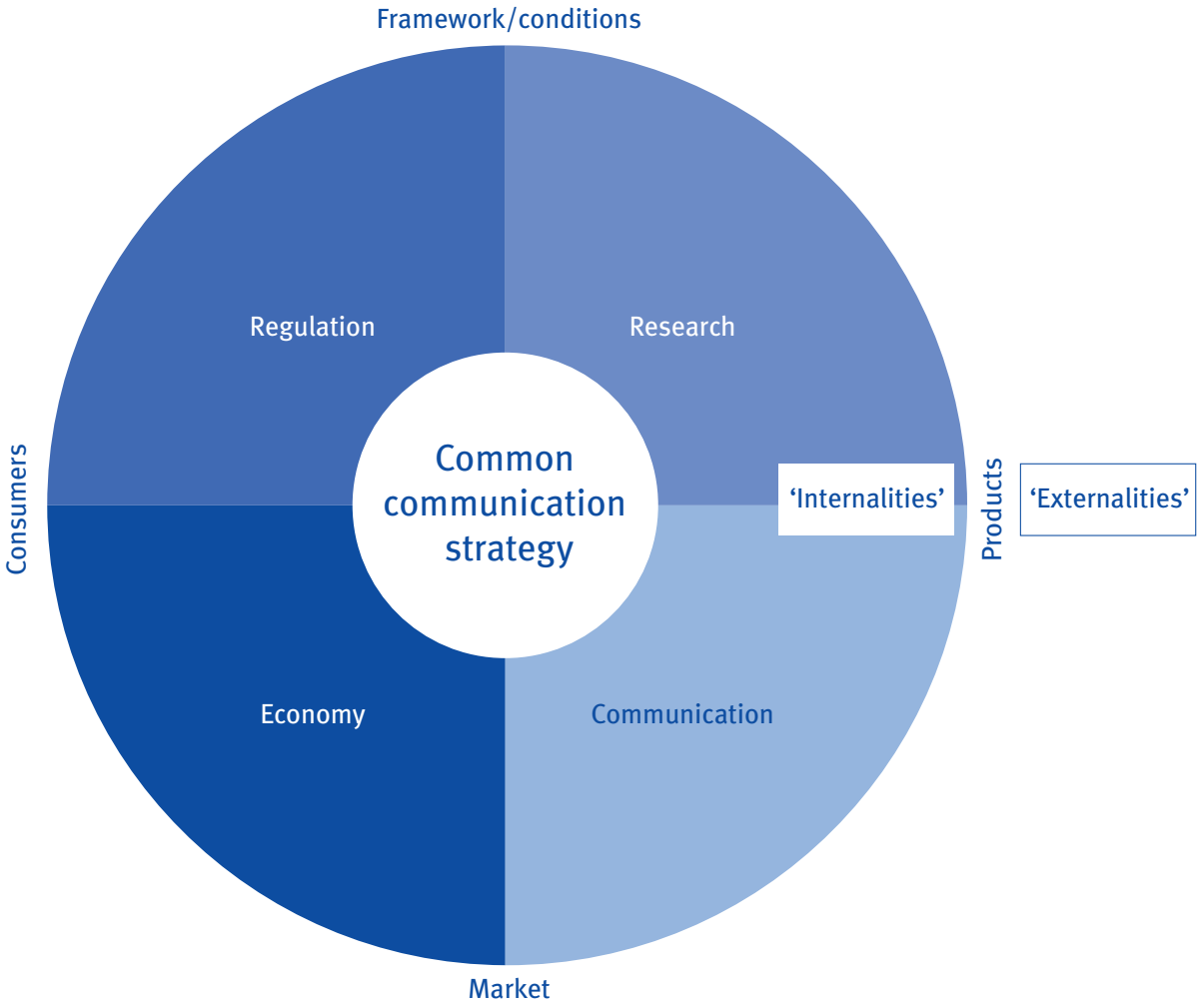
(4) Create and disseminate case studies on green changes -> success factors for multiplication, link to/involve dissemination, implementation, including politics.

(5) Public procurement and external -> increase learning curve effect.

- RND/brain
- 'Green' extern

Annex E: Summary discussion

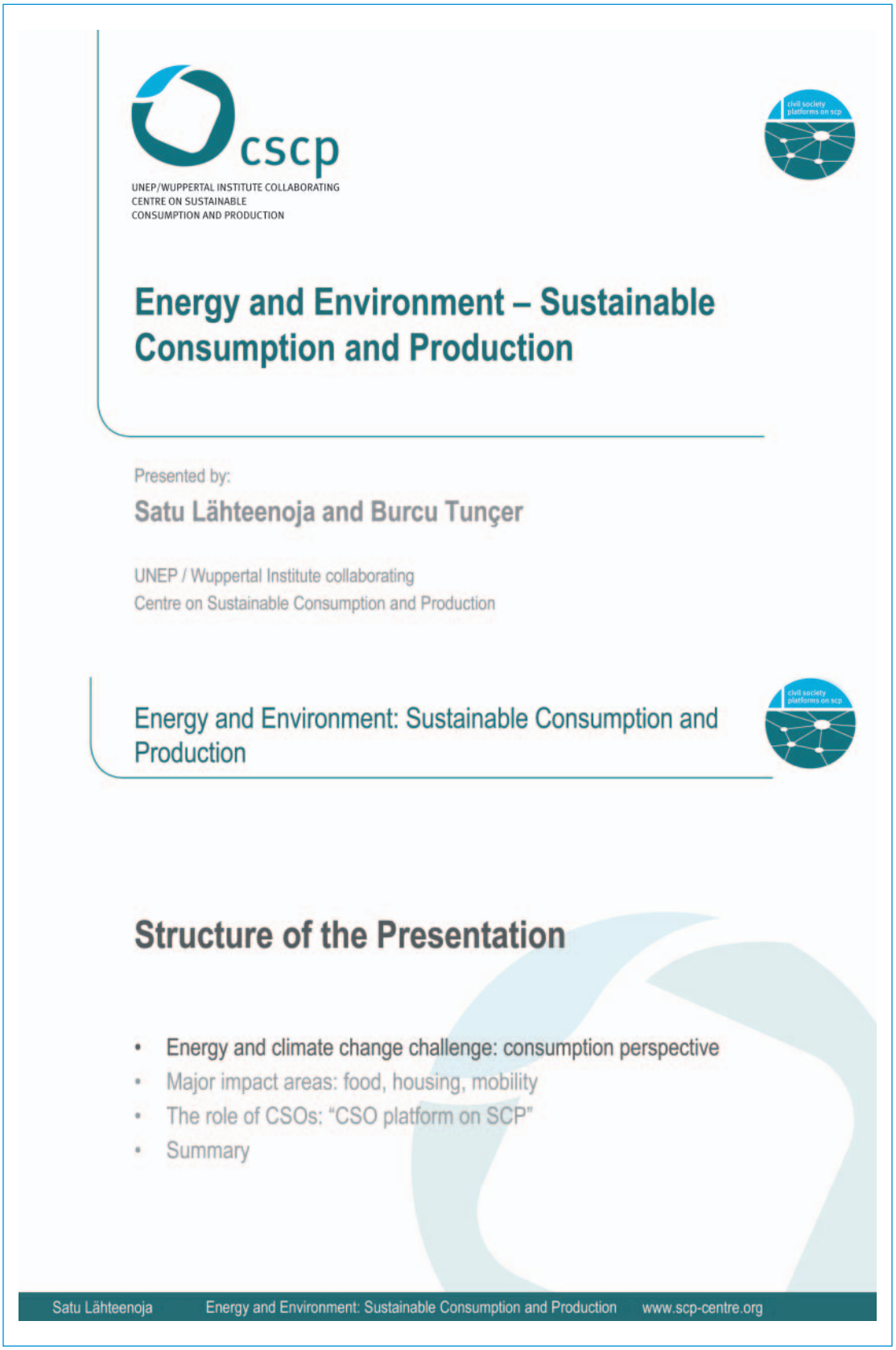
The following graph is based on results presented in Appendix C and was developed as an input for the summary discussion.



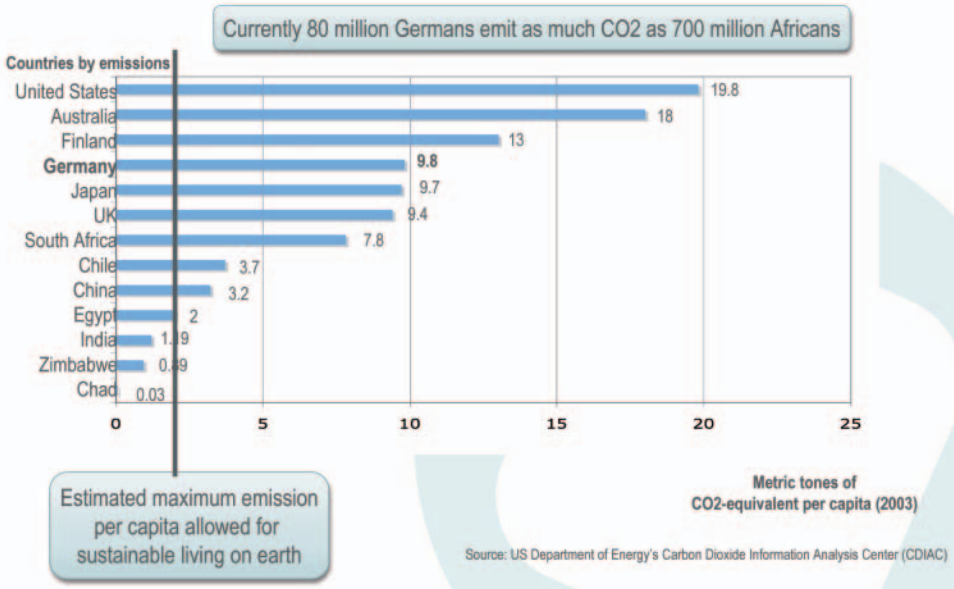
2. SEMINAR AND BACKGROUND MATERIAL

Annex F: Introductory presentation

by Satu Lähteenoja, UNEP/Wuppertal Institute collaborating Centre on Sustainable Consumption and Production



To achieve a fair share of carbon emissions per capita, change of consumption and production patterns is needed



Source: US Department of Energy's Carbon Dioxide Information Analysis Center (CDIAC)

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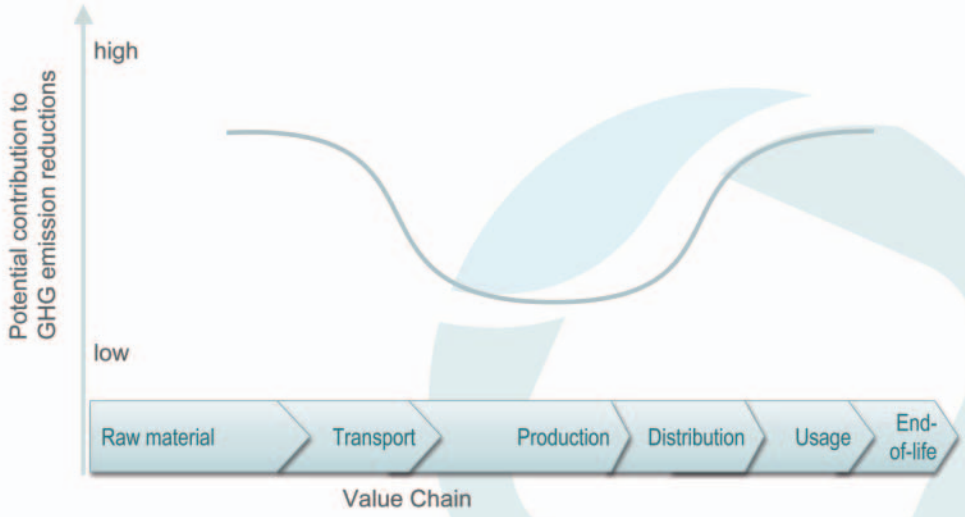
GHG emissions in the value chain

Opportunities in global value chains

Impacts and Opportunities among consumer products



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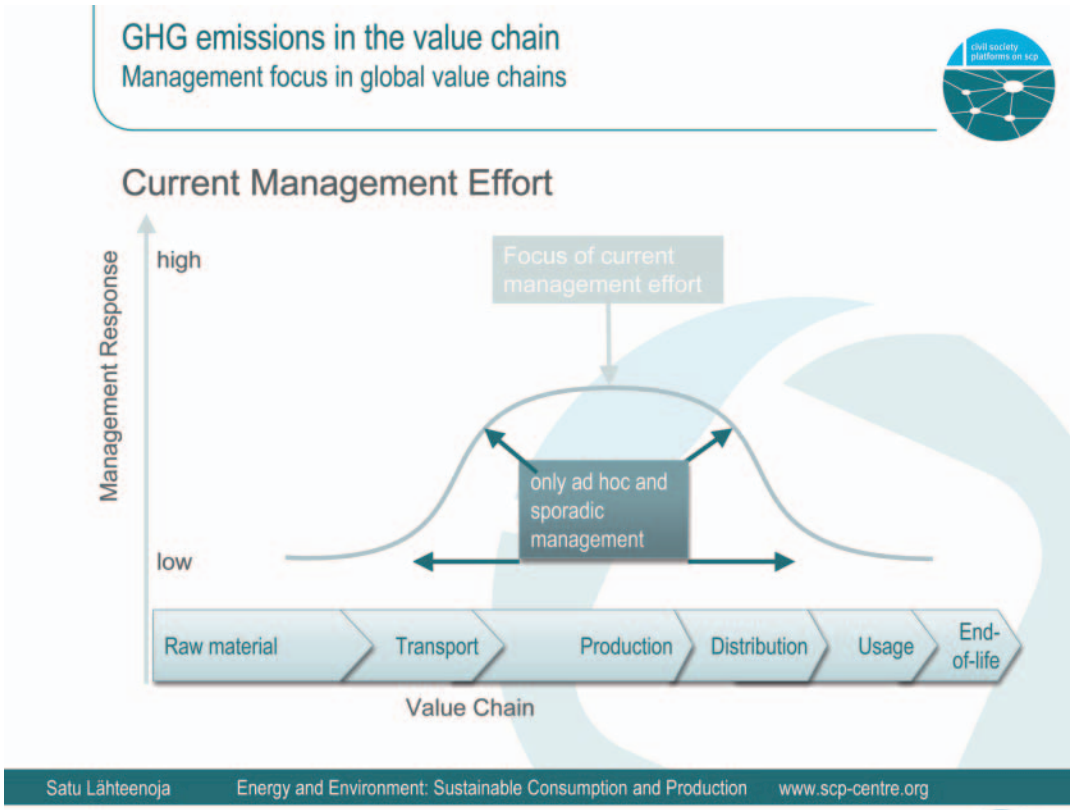
GHG emissions in the value chain
Management focus in global value chains
Current Management Effort
Management Response
high
low
Focus of current management effort
only ad hoc and sporadic management
Raw material
Transport
Production
Distribution
Usage
End-of-life
Value Chain
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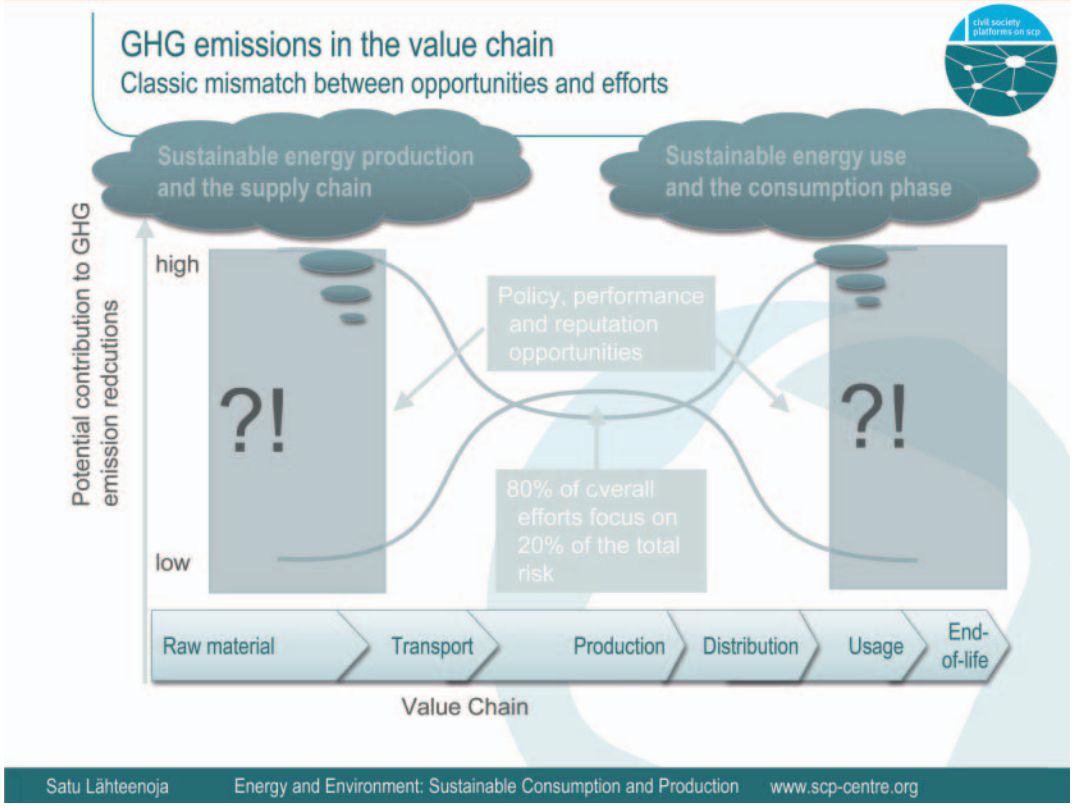
GHG emissions in the value chain
Classic mismatch between opportunities and efforts
Sustainable energy production and the supply chain
Sustainable energy use and the consumption phase
Potential contribution to GHG emission reductions
high
low
?!
?!
Policy, performance and reputation opportunities
80% of overall efforts focus on 20% of the total risk
Raw material
Transport
Production
Distribution
Usage
End-of-life
Value Chain
Satu Lähteenoja
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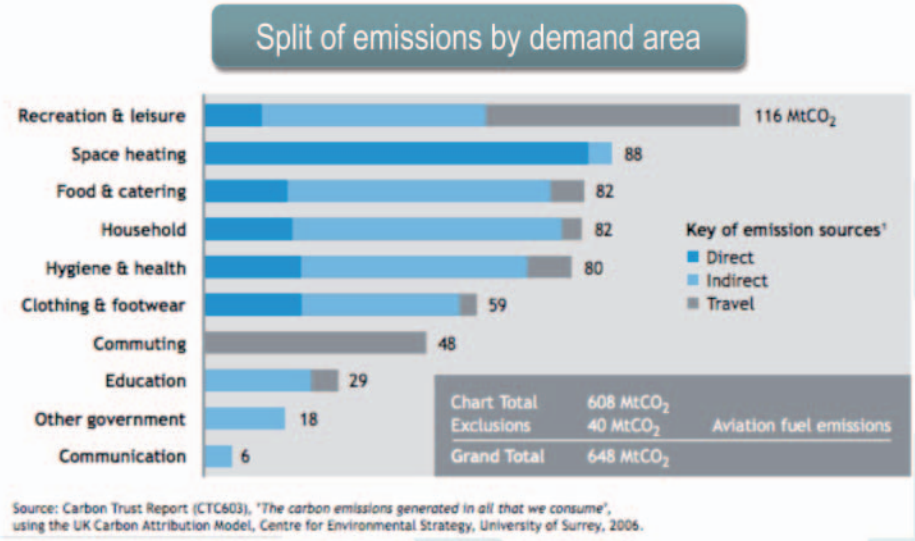
Energy and Environment: Sustainable Consumption and Production

Structure of the Presentation

- Energy and climate change challenge: consumption perspective
- Major impact areas: food, housing, mobility
- The role of CSOs: "CSO platform on SCP"
- Summary

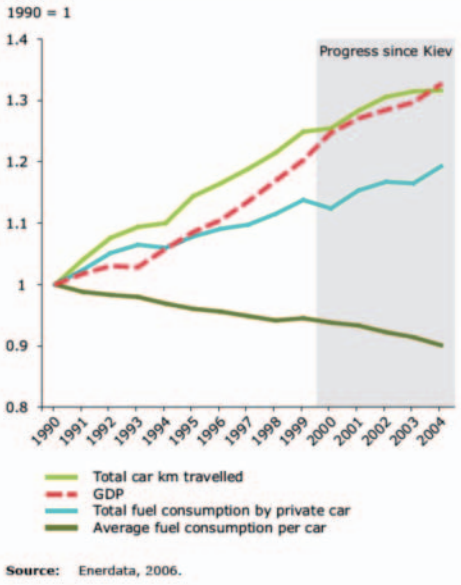
Energy and Environment: Sustainable Consumption and Production

From consumption perspective, some demand areas have priority for climate change mitigation



Source: Carbon Trust Report (CTC603), *'The carbon emissions generated in all that we consume'*, using the UK Carbon Attribution Model, Centre for Environmental Strategy, University of Surrey, 2006.

Rebound Effect in Mobility



Source: Enerdata, 2006.

Three-quarters of journeys travelled in EU-25 are made by cars, while **80% of the world population** has **no access** to motor vehicles yet. (EC, 2006; EU-UNEP, 2005).

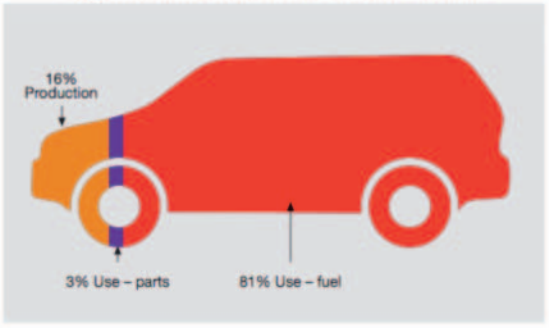
Increase in car travel outweighs efficiency gain!

Sustainable consumption and production is closely linked to climate change mitigation challenge in private transport area

Energy efficiency potential during use of private transport vehicles

Use phase is the most important lever for change in private road transport !

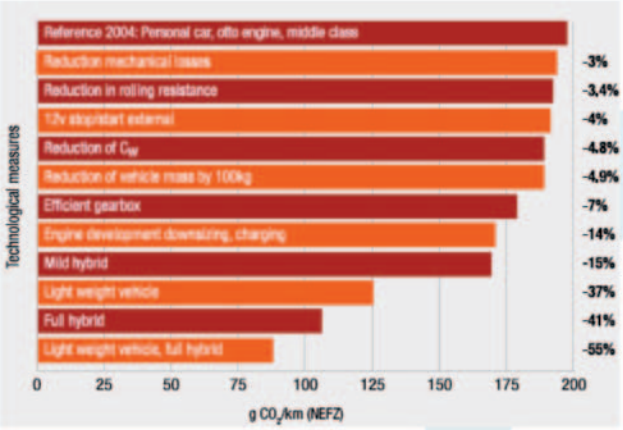
CO_2 emissions over the life-cycle of a vehicle



Source: WWF-UK Evidence Base 2006

Low-carbon technologies and design for environment strategies to tackle climate change impacts

Energy efficiency potential concerning private transport vehicles



Source: S. Schmidt, 2005

- Technological innovations and improvements have a lot of potential, but not enough to tackle the rebound effect
- Need to look at the consumption phase: how to improve the energy efficiency with more sustainable lifestyles?

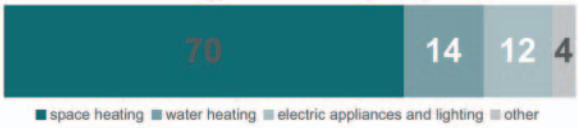
Sustainable consumption and production is closely linked to climate change mitigation challenge in housing area

Huge opportunity for more energy efficient housing

- In countries of temperate and cold climates, **typically 80-90% of total life cycle energy use in housing** is consumed **during the use phase** of a building's life.
- Potential energy efficiency lies in the heating systems and electric appliances as well as in the consumer behaviour

Energy use in the use phase of housing is typically 80-90% !

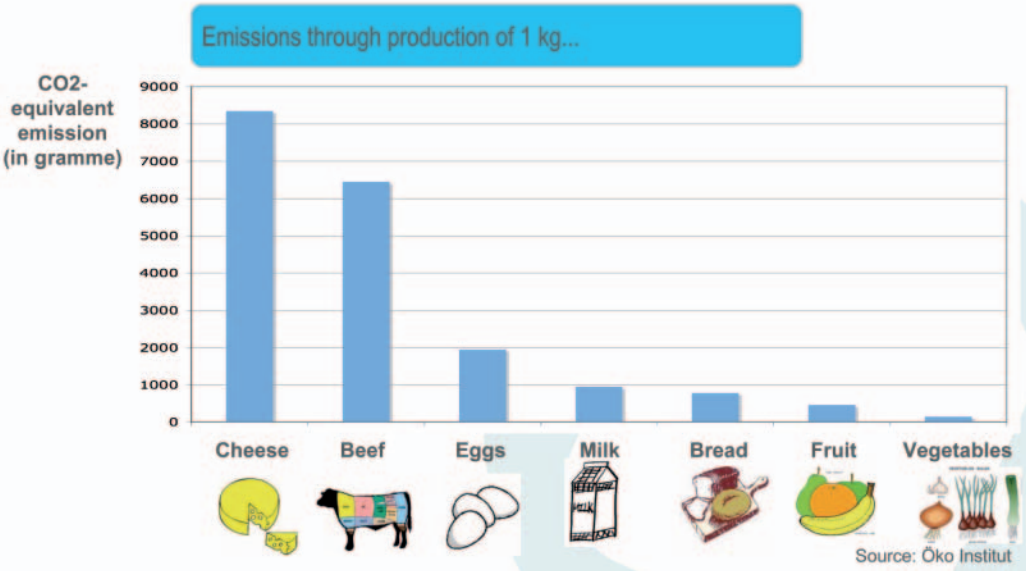
Distribution of energy use in housing use phase in %



Source: Enerdata (2004) in EEA (2006)

Sustainable consumption and production is closely linked to climate change mitigation challenge in food & drink area

Need to make consumers aware of high climate impact of meat and cheese products



Energy and Environment: Sustainable Consumption and Production

Structure of the Presentation

- Energy and climate change challenge: consumption perspective
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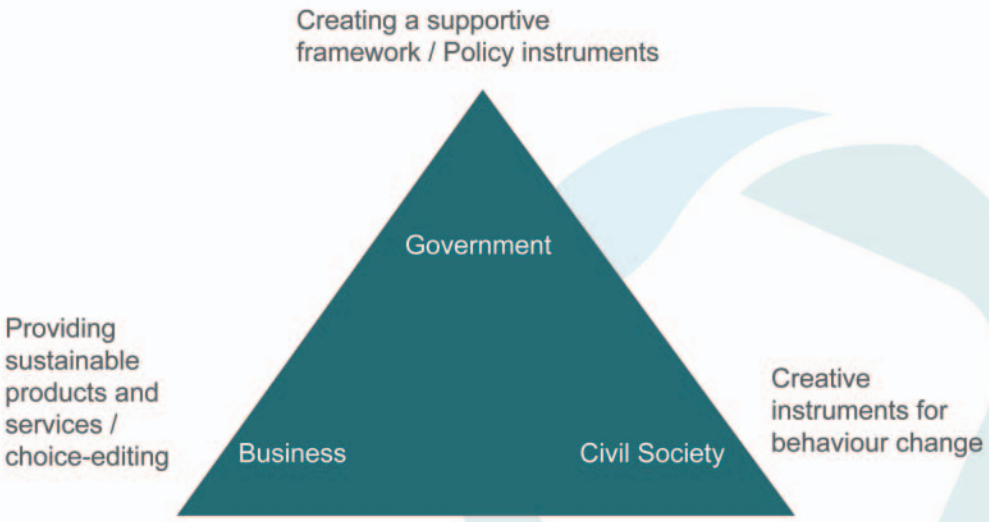
The Triangle of Change



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The role of CSOs

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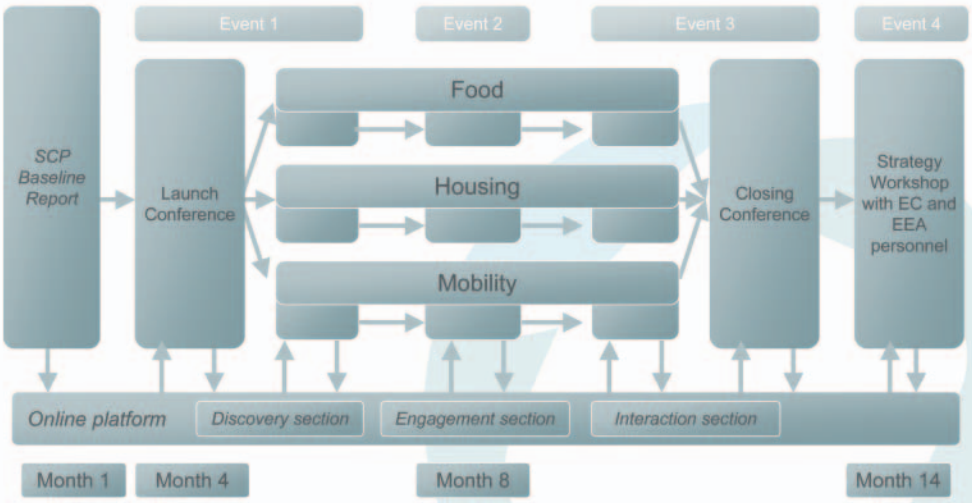
DelibProcessSCP: Identifying research needs and designing elements of deliberative processes on SCP in the demand areas food, housing and mobility (CSO Platform on SCP)

Objective	To provide a dialogue platform that can give CSOs a space for identifying research needs and influencing political decisions on SCP.
Scope	It will focus on major impact areas of food and drink, housing and mobility that are responsible for 70% of environmental damage in the EU.
Activities	• Base line report (overview of trends, drivers, impacts within high impat consumption areas, as well as an overview of current CSO activities backed up by interviews, innovative and creative action areas towards SCP) • Launch conference (13-14 October 2008), Impact area workshops (March 2009), Closing Conference, Strategic Summary Workshop for Policy Feedback • Online dialogue platform
Partners	• UNEP/Wuppertal Institute Centre on SCP (CSCP) • Regional Environmental Centre (REC) • Centre for Sustainable Design (CfSD)

CSO Platform on SCP Project timeline



Join The Dialogue Platform!

http://www.scp-dialogue.net

http://csoplatform.ning.com/

Energy and Environment: Sustainable Consumption and Production

Structure of the Presentation

- Energy and climate change challenge: consumption perspective
- Major impact areas: food, housing, mobility
- The role of CSOs: "CSO platform on SCP"
- Summary

Summary

- Energy and climate change are part of the SCP challenge
- Global value chains: The consumption phase is important
- High-impact demand areas: food and drink, housing and mobility
- Multi-stakeholder approach: All actors of society are needed, role of civil society is crucial
- Technological improvements are part of the solution, but not enough. There is a huge potential in the consumption side, and more research and funding is needed for that.

UNEP/WUPPERTAL INSTITUTE COLLABORATING CENTRE ON SUSTAINABLE CONSUMPTION AND PRODUCTION

Thank you for your attention!

For more information, please contact:

Satu Lähteenoja

Researcher, satu.lahteenoja@scp-centre.org

UNEP / Wuppertal Institute Collaborating Centre on Sustainable Consumption and Production

Annex G: Project websites

Participants projects' websites:

Ceecec	http://www.Ceecec.net
CO2Remove	http://www.co2remove.eu
Create Acceptance	http://www.esteem-tool.eu
DelibProcessSCP	http://www.sustainability.at
INRE	http://www.inre-project.eu
POPP	http://www.eupopp.net
Roads2hycom	http://www.roads2hy.com
Solhyco	http://www.greth.fr/solhyco
Wave Dragon	http://www.wavedragon.net

A few other related projects' websites:

Alistore	http://www.u-picardie.fr/alistore
Argona	http://www.argonaproject.eu
BEST	http://www.best-europe.org
BiGPower	http://www.biomatnet.org/secure/FP6/S1922.htm
BIPV-CIS	http://www.ist-world.org/ProjectDetails.aspx?ProjectId=93b553d045b34012a144536dc96262d7
CIP	http://www.cowam.com
Cipast	http://www.cipast.org
Cowam	http://www.cowam.com
CREPE	http://crepeweb.net
ECD-MoM	http://www.meetingmindseurope.org
ESHA	http://www.esha.be
EU-Consent	http://www.eu-consent.net
EU-DEEP	http://www.eudeep.com
FENIX	http://www.eudeep.com/index.php?id=204
Mengtech	http://www.erasme.ecp.fr/index_html/recherche/mengtech
Night Wind	http://tno-refrigeration.com/pageID_4054349.html
NILE	http://www.nile-bioethanol.org/doc/NILE_newsletter_no2_Oct2007.pdf
OBRA	http://www.obraproject.eu/reports/OBRA_project_presentation.pdf
Paganini	http://www.paganini-project.net
Refgov	http://refgov.cpdr.ucl.ac.be
STARC	http://mahbsrv4.jrc.it/starc/index.html
World Wide Views	http://www.wwviews.org

Annex H: Summary documentation of projects

Project	Abstract	Inclusiveness	Energy and environment rationale
Ceecec (Civil society engagement with ecological economics)	The aim of the project is to increase the interaction between ecological economics (EE) academics and Civil Society Organisations (CSOs). Ceecec aims to enable civil society organisations (CSOs) to engage in and lead collaborative research with ecological economists. The overall focus is not on theory but on case-study learning, whereby CSOs and academics identify and explore key issues for research in areas such as water management, mining, energy, forestry and agriculture, based on CSO needs and interests.	The notion of inclusiveness is tackled through the case-study approach adopted by the Ceecec project in order to achieve its capacity-building goals. The case studies bring CSOs and ecological economists together to identify environmental and social consequences of economic development. In addition the project will also provide an assessment of CSO/ecological economics collaboration specifically in the Balkan region, and with the assessment and mapping of previous ecological economics research used by CSOs internationally.	The explicit energy and environment rationale is that CSOs could profit from increased capacity in EE to give analytical foundations to activism and policy making. Meanwhile, CSOs have large stocks of environmental knowledge gained from their grassroots experience and activism. This could be of benefit to EE academics.
ESHA	The European Small Hydropower Association (ESHA) is a non-profit international association representing the sector of small hydropower. ESHA is a founding member of EREC (European Renewable Energy Council), which groups together all main European renewable energy industry and research associations. ESHA serves to create a platform for actors in the field of SHP (from national associations to research institutions and industry) to represent their interests at the European level.	ESHA is structured as a federation of EU national hydropower associations and is open to members from all sectors involved in small hydropower, i.e. equipment manufacturers, public utilities, independent producers, consultants, etc. The issue of inclusiveness is tackled in the sense that ESHA seeks to unite all these different actors to form a strong platform for the interests of SHP. Through the diversity of its members, and the inclusiveness of the approach, ESHA is at the forefront of information on ongoing research and market trends in small hydropower.	The project is based on the assumption that the benefits at both economic and environmental levels that can be achieved by developing SHP are enormous. These benefits can however only be achieved if use is made of synergies at the European, national and local levels.
Solhyco	The project is aiming at the development of solar hybrid power and cogeneration plants, based on a gas turbine cycle. Concentrated solar radiation is the main energy source of this system, which additionally can use either fossil or biofuels as back-up in periods without sunshine. Thus no additional energy storage or back-up power plants are needed. When biofuels are used a 100 % sustainable operation at zero net emissions is possible.	The consortium consists of 9 partners and includes industrial members that will be future suppliers of components and systems. At the project end, industry will be ready for a first cogeneration demonstration plant. The project tackles the issue of exclusiveness by involving both industry and research associations in its consortium. The extent of the involvement and cooperation between these different organisations is however unclear.	The main objective of Solhyco is to develop a highly efficient solar-hybrid micro turbine (SHM) system for power and heat generation with dual solar power and fuel input. The explicit energy and environment rationale includes developing new and advanced concepts in renewable energy technologies.

Project	Abstract	Inclusiveness	Energy and environment rationale
World Wide Views	The main objective of the project is to give citizens around the world the possibility to contribute with their views on some of the key issues addressed at the United Nations climate summit COP15 in Copenhagen in 2009, in order to influence the negotiations and the future of global climate policy. Around 100 citizens from each of the participating countries will meet in their own countries to engage in a structured dialogue aimed at answering an identical set of questions. The face-to-face consultations with citizens will be carried out in the participating countries almost simultaneously and a few months before the COP15. The results will be gathered and presented continuously for comparison on a public homepage.	The issue of inclusiveness is tackled to the extent that citizen participation is very much encouraged. The project indeed makes use of methods engaging citizens in political decision-making processes. The project also enables a qualitative inclusion of citizens' views. Thus, the questions asked at the WWViews will make a statistical comparison of the answers in different countries possible, but – contrary to the usual questionnaires – the method will also allow citizens to motivate and qualify their answers, thus making a qualitative enquiry possible into the reasons and arguments that has lead to a specific answer.	The energy and environment rationale behind the project is underpinned by the wish to engage citizens in debates about important, but often complex, issues – often with the aim of giving advice to politicians. The project considers that as non-specialists, citizens are in a unique position to weigh the pros and cons of different technological and political initiatives and to evaluate scientific progress from moral, social and cultural perspectives. Common to the methods is also the emphasis on deliberation and dialogue with citizens informed by input from various experts.
CIP	The objectives of 'Cowam in practice' (CIP – 2007/2009) are to: - contribute to make actual progress in the governance of radioactive waste management (RWM); - follow up and analyse 5 national processes of RWM governance: Spain, United Kingdom, Romania, Slovenia and France Support stakeholders, particularly local communities, directly in their engagement; - capture the learning from that experience for the EU 27.	The organisation set-up of the project tackles the issue of inclusiveness and seeks to bring various stakeholders together. Indeed, the originality of this project lies in a cooperative research approach, successfully experimented in the COWAM 2 project: with a direct participation of stakeholders in the research groups and in the Steering Committee. The architecture of the project is purposely designed for the stakeholders to effectively influence and feed the project throughout its progress.	The energy and environment rationale is based on essential questions raised by institutional decision-makers as well as by local communities concerning the implementation of good practices and principles of decision-making. There is a need for a continuous and enlarged support to these efforts in Europe. The question is all the more relevant and pressing that having reviewed their past difficulties, many countries are now attempting to implement innovative and inclusive governance approaches.
DelibProcess SCP	The DelibProcessSCP project aims at addressing civil society participation in the EU Sustainable Development Strategy by actively involving Civil Society Organisations in identifying research needs and designing elements of deliberative processes on sustainable consumption and production in the areas of food, housing and mobility, which have been found to be responsible for 70 % of environmental damage in the EU. The project is conducted by UNEP/Wuppertal Institute Collaboration Centre on Sustainable Consumption and Production (CSCP), Regional Environmental Centre (REC) and Centre for Sustainable Design (CfSD).	The structure of the project will lead to the inclusion of a number of stakeholders. The project consists of an opening and a closing seminar and a three-part workshop series. The workshop series brings civil society organisations (CSOs) together with research organisations and governments to explore the state of the art of SCP. A wide range of CSOs from all European countries are invited to participate in the platform. In addition to these face-to-face meetings CSOs can interact with other CSOs and stakeholders, give continuous feedback and influence the seminar and workshop outlines via the (upcoming) internet-based discussion forum on this website.	The assumption behind the project is that in order to reach the goal of shifting towards less environmentally damaging consumption patterns, the involvement of all societal actors – government, business, academia and civil society – is needed. A consistent involvement of civil society stakeholders is a prerequisite since civil society organisations can motivate consumers to rethink their consumption behaviour, encourage business to produce sustainable products, ask academia to assess the sustainability of current consumption and production patterns and negotiate with governments on measures to make our current patterns more sustainable.

Project	Abstract	Inclusiveness	Energy and environment rationale
ECD-MoM	Meeting of Minds – European Citizens' Deliberation on Brain Science is a two-year pilot project led by a European panel of 126 citizens. A partner consortium of technology assessment bodies, science museums, academic institutions and public foundations from nine European countries launched this initiative in 2004 with the support of the European Commission. The initiative gave European citizens a unique opportunity to learn more about the impact of brain research on their daily lives and society as a whole, as well as to discuss their questions and ideas with leading European researchers, experts and policy-makers.	The project aims at including citizens in deliberation on the issue of brain science. This inclusive method was successful in the sense that it lead to the creation of a European report with a common framework and a common set of questions, setting out those aspects of brain science that need to be examined further and discussed in greater depth. The conclusions and recommendations were handed over to high-level European officials and representatives of the European scientific and research community at a public ceremony emphasising the existence of a dialogue at European level between the general public and policymakers on science-related matters.	The overall objective of the Meeting of Minds initiative was to involve European citizens in assessing and publicly discussing the issue of brain science with relevant research, policy and ethics experts, various stakeholders as well as representatives of European decision-making organisations. As such, the initiative aimed at give relevant inputs into European policy-making and wider public debate on brain science. It also helps the issue of brain science on the policy and wider political agenda. An assessment of the energy/environment rationale is not possible.
INRE	The project supports the collaboration of NGOs and research institutions from Bulgaria, Romania, Serbia, and FYR Macedonia in the renewable energy field, with a special emphasis on the involvement of NGOs in the seventh framework programme (FP7) for research technological development and demonstration. The project's objectives are: to identify and assess the NGOs research needs in the field of renewable energy, to identify the research areas in the field of renewable energy of a common interest for NGOs and research institutions and to promote FP7 to the researchers and NGOs.	The inclusion of civil society stakeholders is implemented through different means: identification and collection of information about all NGOs engaged with the promotion of renewable energy;, identification and systemisation of the information/research needs of these organisations and assessment of the research needs; collection of information about all relevant research institutions; assessment of the relevance of the priorities of the research institutions to NGO needs; etc.	The assumptions behind the project are that it is necessary to improve the collaboration between civil society stakeholders and research institutions in the renewable energy field. This is achieved through different means: review of the NGOs engaged with promotion of renewable energies; identification of areas of common interest for research institutions and NGOs; training on the seventh framework programme
Cipast	For about twenty years the controversies relating to questions with strong scientific and technological contents have increased. They have given rise to new democratic expectations, both a need to know and a need to decide. Especially questions about the participation of civil society in the decision-making process are increasing, as well as about guidelines on basic research and dissemination of innovations, according to the social impact of science and technology. The aim of the Cipast network ('Citizen participation in science and technology') is to support – by the exchange of good practices and transfer of expertise – the emergence of a European culture of citizens' participation in these fields.	Past or ongoing participatory experiences show a big variety in types and in their main thematic issue. In order to better meet citizens' expectations and needs, Cipast therefore focuses on a process of active and participative learning with case studies at the core of the training. As a result of the project, a case study-based training programme is now available. All case studies presented in this training package were developed by involving actors and users and were tested in training sessions in two international workshops: with 70 participants from 23 countries in Dresden, Germany, in 2006, and (in a revised version) with 80 participants from 20 countries in Procida (Naples), Italy, in 2007.	The involvement of civil society and citizens in policy deliberation and decision-making processes relating to scientific and technical issues has undergone significant and also highly heterogeneous changes in European countries. Cipast has brought together actors, pooled their various capacities, and integrated their various contextual perspectives through a common platform. It fosters the performance of a social assessment of the technological innovation processes that continuously transform our lives, involving risks benefits.

Project	Abstract	Inclusiveness	Energy and environment rationale
Roads2HyCom	Roads2HyCom (R2H) is an Integrated Project supported by the sixth framework programme (priority 6.1). The project is supporting the European Commission, HFP/JTI, HyRaMP and other stakeholders in planning future fuel cell and hydrogen activities through a growing portfolio of resources that include web-based tools, handbooks, training workshops and reports. Roads2HyCom has mapped the state of the art of hydrogen related technologies, hydrogen infrastructure and the needs of early adopters (called 'hydrogen communities'). Currently the project is working on developing technology pathways, analysing the gaps and opportunities for fuel cell and hydrogen technologies and developing a strategy for future RTD activities.	Roads2HyCom is a consortium of twenty-nine key stakeholders from a broad cross-section of areas including energy and hydrogen supply, transport industries (surface and air), stationary power (buildings, industry), engineering and socioeconomic research and community expertise. The dialogue necessary to include the different stakeholders takes place via workshops, presentations, reports or special trainings. As a result of the project, a handbook on hydrogen and fuel cell technologies has been produced in order to inform communities about these technologies and to stimulate stakeholder interest. In parallel to the publication of the handbook, Roads2HyCom organised a series of workshops for community stakeholders to exchange views and to gain feedback on the handbook.	Hydrogen and fuel cells will be important research objectives in the future and can help saving the climate and the independence of energy supply. Still, research needs to be continued in order to achieve the goal of a 'hydrogen economy'. New, innovative research will have to solve problems in the area of hydrogen production and distribution as well as increase efficiency and durability of units. In order to choose the most promising research projects for granting subsidies, objective and reliable information is needed on the state of the art of technology. Roads2HyCom therefore develops a methodology based on eleven categories of 'metric', which are used to profile each technology.
CO2ReMoVe	Europe has invested large research efforts in CO_2 geological storage monitoring in several storage types. Two new industrial-scale geological storage projects (In Salah and Snohvit) now provide the opportunity to build on this work. For CO_2 storage to qualify in emission trading schemes, R & D efforts are required to develop a sound basis for monitoring and verification. This will provide assurance of long-term storage security and establish standardised site certification guidelines for policymakers, regulators and industry. In order to spread the application of CO_2 geological storage in Europe and neighbouring countries, CO2ReMoVe proposes a range of monitoring techniques, applied over an integrated portfolio of storage sites, which will develop: (1) methods for baseline site evaluation; (2) new tools to monitor storage and possible well and surface leakage; (3) new tools to predict and model long term storage behaviour and risks; (4) a rigorous risk assessment methodology for a variety of sites and timescales; (5) guidelines for best practices for industry, policymakers and regulators.	Apart from the scientific goal, the project aims at engaging a wider group of stakeholders by involving key stakeholders throughout the planning process at local, national and European levels. By sharing best practices, the project aims at contributing to bridge the gap between the assurance that state-of-the-art monitoring technology and verification can provide, and the assurance of technological performance required by CCS stakeholders. The process is organised iteratively in order to allow both users and stakeholders to benefit from a better understanding of the assurance requirements and technology-based limitation. To assist future EU and national regulatory efforts, the project aims at developing a catalogue of pragmatic proposals for performance standards. Partners of the project organise workshops and seminars for technology transfer and information dissemination to industry, policymakers and other stakeholders. The project explicitly aims at helping policymakers in this field — thus, special workshops or seminars will be provided for this target group.	The geological storage of CO_2 provides a significant option to mitigate CO_2 emissions, contributing to the achievement of Kyoto (and successor) targets in a world where economic growth will depend on fossil fuels for the next several decades. The first step towards Europe's goal of becoming a hydrogen economy requires the manufacture of hydrogen from fossil fuels. This can be done cost-effectively on a large scale without GHG emissions, if the resultant CO_2 can be securely geologically stored.

Project	Abstract	Inclusiveness	Energy and environment rationale
Eupopp	Consumption is a key lever to attain a more sustainable development. Leading research institutions from across Europe are taking part in a ground-breaking project analysing the impacts of policy strategies and instruments on consumption patterns in order to examine how sustainable consumption (SC) policies can successfully tackle this problem. A focus is on policies in the need areas of housing and food. In the analysis, all European regions will be covered, with a special emphasis on Spain, Finland, Germany, and the Baltic area. The project 'European policies to promote sustainable consumption patterns' (Eupopp) is funded under the seventh framework programme and is running from August 2008 to July 2011.	The project will deliver products of different shape and scope. Besides the elaboration of policy papers, several stakeholder workshops, regional procurer workshops, focus groups and a final conference will be held. The project results will promote sustainable consumption in the three main arenas of sustainable consumption and production. Furthermore, an early well-grounded dissemination strategy will address policymakers, consumer organisations, academia and other stakeholder groups.	Unsustainable consumption patterns are major causes of global environmental deterioration, including the overexploitation of renewable resources and the use of non-renewable resources with their associated environmental impacts. Therefore, the project develops an overall conceptual framework as a starting point, which will portray the relationships between sustainable consumption policies, consumption patterns and sustainability.
Wave Dragon	Wave Dragon aims at finalising and realising a full-size composite built multi-MW wave energy converter (WEC). The project will produce the Wave Dragon technology, developing it from an all-steel built scale 1:4.5 prototype tested since 2003. This first single unit is the first step towards Europe's largest wave farm. Developers of wave energy converters face major challenges: Machinery needs to be able to operate and survive in this very rough environment, operation and maintenance systems have to be optimised, and the technology is in competition with other renewable energy technologies. The project will finalise the development, develop an operation and maintenance strategy, operate a wave energy device of MW size, develop an operation and maintenance strategy, run an advanced test programme, and assess the socioeconomic impact of Wave Dragon.		The need for the development of renewable energy generation arises from the requirement to generate electricity, reduce emissions of greenhouse and acid rain gases, and to move towards a more sustainable future. The development of renewable energy from this pre-commercial demonstration project will offset the emission of greenhouse gases, in line with the UK's commitments under the Kyoto Protocol. Wave energy is a means of generating electricity that does not produce emissions of greenhouse or acid rain gases, does not produce toxic waste products, and is not dependent on finite reserves of fossil fuels. It is inherently sustainable. Thus, the exploitation of wave power is seen as a complementary technology to the more mature technologies such as wind power.

Project	Abstract	Inclusiveness	Energy and environment rationale
Alistore	Rechargeable lithium batteries are the most importance advance in energy storage in the last century. Still, it has fallen short in meeting technological demands, and further breakthroughs are sorely needed. In Europe, a number of internationally leading research groups working on lithium-ion batteries exist. These have shown that nano-materials have the potential to revolutionise battery design. However, if a substantial leap forward is to be made in performance, research into these complex systems requires that a range of skills and expertise must work together in an integrated network. Eighteen top research groups are keen to merge their efforts within a virtual centre to reduce redundancy, ensure complementarily, optimise collaboration to achieve vital research objectives, and share expensive facilities and resources.	Within the virtual centre, eighteen research groups from seven Member States and three candidates or associated members take part, accounting for about 60 % of European Lithium battery research. The network can take advantage of the synergies it creates and better secure the sustainability of research results. Furthermore, by publicising Alistore advances, European companies can be supported in positioning themselves. For this purpose, industrial workshops were planned and a European economic interest group (EEIG) was established. The EEIG was set up to connect Alistore to the industry, to improve the network management, to facilitate the economic activities of the members, and to improve services to the industry. The work published by the network members has demonstrated that the nano-materials have a huge potential to increase battery performance.	Global warming, the finite nature of fossil fuels and pollution in our cities have conspired to make renewable energy a European imperative. It is clear that electrical energy storage is a critical issue for the new energy economy and one for which rechargeable lithium batteries, alongside other technologies, has an important potential impact. Research is needed to meet the demands of technology towards rechargeable lithium batteries. Success in meeting these challenges will both generate income to fund future networks, and foster Europe's potential at the international forefront of energy storage technology.

Annex I: Agenda

Tuesday, 9 December 2008

08.30–09.00 *Welcome with coffee/tea (and administrative requirements)*

09.00–09.15 *Opening session*

- **Mr Jean-Michel Baer**, Director 'Science, Economy and Society', Research DG, European Commission
- **Mr Pēteris Zilgalvis**, Head of 'Governance and Ethics' Unit (L3), Research DG, European Commission

09.15–9.30 *'Practical details regarding the seminar'*

- **Mr Philippe Galiay**, Administrator, Unit L3, Research DG, European Commission
- **Ms Hannah Büttner**, IFOK GmbH (Rapporteur of the seminar)

09.30–9.45 *'Energy and environment: Sustainable consumption and production'*

- **Ms Satu Lähteenoja**, UNEP/Wuppertal Institute Collaborating Centre on SCP (CSCP) (AT) – DelibProcessSCP ([11]) project

9.45–10.00 *Structured comments from 'generalist' governance projects and Q & A*

10.00–10.30 *Coffee break*

10.30–12.00 *First breakout session (three parallel sessions A 1, B 1 and C 1) on status quo*

12.00–14.30 *Lunch*

14.30–16.15 *First breakout session (three parallel sessions A 1, B 1 and C 1) on status quo (continued)*

16.15–16.45 *Coffee break*

16.45–17.15 *Sharing conclusions*

17.15–17.30 *Recommendations for the second day*

([11]) 'Identifying research needs and designing elements of deliberative processes on sustainable consumption and production in the demand areas food, housing and mobility', launched in April 2008 for 18 months, available online (http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/08/4&format=HTML&aged=0&language=EN&guiLanguage=en).

Wednesday, 10 December 2008

08.30–09.00 *Welcome with coffee/tea (and administrative requirements)*

09.00–10.45 *Second breakout session (three parallel sessions A 2, B 2 and C 2) on future perspectives*

10.45–11.00 *Coffee break*

11.00–12.00 *Second breakout session (three parallel sessions A 2, B 2 and C 2) on future perspectives (continued)*

12.00–12.30 *Sharing conclusions*

12.30–14.00 *Lunch*

14.00–14.30 *Analysis and first synthesis by the rapporteur*

14.30–15.30 *Comments, Q & A*

15.30 *End of the seminar*

Parallel Sessions

Status quo:

A 1 *Technical background*

B 1 *National and regional settings in the EU*

C 1 *Global issues*

Future perspectives:

A 2 *Co-generating solutions*

B 2 *Campaigning for behavioural change*

C 2 *Developing virtuous economic framework conditions*

Annex J: Participants

Mr Jean-Michel Baer	European Commission, Research DG, Directorate L
Ms Hannah Büttner	IFOK GmbH (DE)
Mr Tiago de Sousa Brilhante Pedrosa	European Commission, Joint Research Centre, Unit G 9
Mr Philippe Galiay	European Commission, Research DG, Unit L 3
Ms Lucie Greyl	ASUD-Ecologia e cooperazione ONLUS (IT)
Mr Peter Heller	Deutsches Zentrum für Luft und Raumfahrt E.V. (DE)
Ms Satu Lähteenoja	UNEP/Wuppertal Institute Collaborating Centre on SCP (CSCP) (DE)
Ms Lucinda Maclagan	European Commission, Energy and Transport DG, Unit D 4
Mr Angel Nikolaev	BSREC (BG)
Mr Nick Owen	Ricardo UK Limited (UK)
Mr Henk Pagnier	Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek–TNO (NL)
Ms Bettina Schaefer	Ecoinstitut Barcelona (ES)
Ms Viola Schetula	Dialogik-expert (DE)
Mr Hans Christian Sørensen	Wave Dragon Ltd (DK)
Ms Brigitte Weiss	European Commission, Research DG, Unit B 3
Mr Pēteris Zilgalvis	European Commission, Research DG, Unit L 3

Annex K: References

European Commission:

- 'Communication on the sustainable consumption and production and sustainable industrial policy action plan', COM(2008) 397, 16.7.2008;
- 'Towards a European strategic energy technology plan', COM(2006) 847, 10.1.2007;
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Facts and figures used during the seminar were drawn from:

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BP statistical review of world energy 2008:
http://www.bp.com/productlanding.do?categoryId=6929&contentId=7044622;

Energy use in the new millennium – Trends in IEA countries:
http://www.oecdbookshop.org/oecd/display.asp?k=5L4P6RRF08JL&lang=en;

Civil society platform on SCP:
www.scp-dialogue.net

European Commission

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Addressing the 'energy and environment' issue under a governance heading and at European level is indeed a challenge because it combines all its scientific, technological, political and societal dimensions (including the environmental, social and ethical ones) in all their complexity. Fortunately enough we could rely on the experience acquired through the European governance debate in the early 2000s as well as that from the ongoing debate on the European research area, led by the Commission since the start of the millennium.

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