Part 3 : PRESENTATIONS Day - 1 1st Session
LCS-RNet Secretariat

LCS·R Net

LCS-RNet Researchers Meeting

Secretariat of the LCS-RNet
1-2 April 2009
Trieste, Italy

LCS·R Net

Schedule

- Day 1
  - Introduction
  - Discussion on key questions
  - Introduction of activities of participating institutions
  - Drafting of Strategic Paper and Chairpersons' summary
- Day 2
  - Introduction of activities of participating institutions - continues
  - Discussion on Strategic Paper
  - Discussion on Chairpersons' summary
  - Closing

LCS·R Net

Open Discussion 1

- What do you expect from this LCS-RNet?
- What is Value Added of this LCS-RNet?

- Objectives, Nature; and Uniqueness
- LCS under LSC-RNet; Themes/Areas

LCS·R Net

Open Discussion 2

- What kind of function is necessary for LCS-RNet to be successful?

- Activities and Outputs
- Goal after 5 years
- Membership
- Decision Making
- Basic Rules of Financial Matters

LCS·R Net

Background

May 2008: G8 EMM at Kobe
- Supported **the international research network on low-carbon societies (LCS)**

Recognising;
- Necessity to transfer the socio-economic structure for LCS.
- Importance to have visions of own low-carbon societies.

July 2008: Interim Secretariat for LCS-RNet was set up in IGES.
Nomination of founding research institutes by G8 countries
→By March 2009 : 9 institutions from 5 countries registered

Dec 2008 : Announcement of setting up LCS-RNet at the COP14

March 2009 : Presentation of Background paper at Preparatory Meeting of Siracusa G8 EMM in Rome .

1 - 2 April 2009: LCS-RNet Researchers Meeting, Trieste, Italy.

5 April 2009: LCS-RNet Session in G8 Forum:
Low Carbon Technologies Development, Trieste, Italy.

LCS·R Net

Objectives of the Meeting

- To provide the first contact of core researchers involved with LCS-RNet,
- To exchange information of researches related to LCS study,
- Strategic planning for LCS-RNet activities and outputs

LCS-RNet Secretariat

LCS·R Net

Expected Outputs of the Meeting

- Strategic Paper
  - Strategic planning covers objectives, activities and outputs, future plan, management and organizational matters of the LCS-RNet
- Chairpersons' summary
  - Main points discussed and decisions in this meeting

To be reported at the LCS-RNet – Kick off meeting in the High Level Forum on 5th April 2009:
→ for official kick-off of the LCS-RNet

LCS·R Net

Strategic Paper

Zero draft prepared by the Secretariat:

- based on
  - The background paper
  - Views and opinions that the Secretariat gathered from core research institutions in March 2009
- needs to be
  - revised during the meeting; and
  - presented to the LCS-RNet Kick-off Meeting

LCS·R Net

Strategic Paper
- Outline -

- Introduction
- Background
- Objectives and the Nature of the Network
  - Objectives; Nature; and Uniqueness
- Research and Activity Planning
  - LCS under LSC-RNet; Themes/Areas; Activities and Outputs; and Goal after 5 years
- Management and Administrative Matters
  - Membership; Decision Making; and Basic Rules of Financial Matters

LCS·R Net

Objectives

from the discussions/brainstorming with research institutions in March

All agreed that:

- Information exchange and research cooperation among research institutions whose focuses cover various issues relating to LCS,
- Dialogues between participating researchers and various stakeholders including policy-makers, businesses, citizens and others to share possible visions on low carbon societies,
- Contribution to G8 process and other international political processes on climate change by providing research outcomes and recommendations.

Proposals/discussion points:

- *Scope of LCS-RNet covers research on society and human behaviour, as well as technologies,*
- *Keep direct access to policy-makers to deliver summary of research findings – taking the opportunities at G8EMM and UNFCCC COP side events,*
- *Research of / research to assist sub-national level, regions, and cities.*

LCS·R Net

Nature of LCS-RNet

from the discussions/brainstorming with research institutions in March

All agreed that:

- A platform for voluntary collaboration amongst research institutions for information exchange
- Non-binding network, and its activities and outcomes are independent from official views of any governments, and should not be policy prescriptive. Scientific integrity

Proposals/discussion points:

- *Which type of the network/platform is to be aimed,*
  - *joint programme on specific output, or building common research type?*
  - *What kind of collaboration is possible, or is collaboration too much?*

LCS·R Net

Uniqueness

from the discussions/brainstorming with research institutions in March

Proposals/discussion points:

- *Difference/uniqueness of LCS-RNet from other initiatives*
- *Direct linkage between research and international policy-making processes, including G8 Environment Ministers Meeting*

LCS-RNet Secretariat

LCS under LCS-RNet, Themes/areas, Goal after 5 years

from the discussions/brainstorming with research institutions in March

Proposals/discussion points:

- *LCS under LCS-RNet - what's the difference with sustainable development and the millennium development goal*
- *Common research questions ? Themes/areas?*
- *How to cooperate with other initiatives whose objectives are similar to the LCS-Rnet*
- *Goal after 5 years - Something to evaluate the success/achievement of the LCS-RNet*

Activities and Output

from the discussions/brainstorming with research institutions in March

Proposals/discussion points:

- *Activities include:*
  - *Annual researchers meeting*
  - *Summer school type of one-week intensive study session*
  - *Joint research on specific areas*
- *Expected outputs include:*
  - *Annual Meeting Report*
  - *Synthesis report of the scientific results for the use of policy-makers*
  - *Newsletter/policy brief, annual report (end of the year), synthesis report*

Membership

from the discussions/brainstorming with research institutions in March

Proposals/discussion points

- *Open to research institutes on LCS study, but needs certain limitation for efficient network activities*
- *(the Secretariat asks) a single research contact point per county to be designated*

Decision-making

from the discussions/brainstorming with research institutions in March

All agreed that:

- LCS-RNet should be independent
- Core steering group would be needed as a decision-making body.
- Role of governments - to limit to e.g. advisory to administrative matters

Proposals/discussion points:

- *Steering group and its mandate*
- *Establishment of Interim Steering Group*
- *Advisory board and task groups if necessary*

Basic rules of financial matters

from the discussions/brainstorming with research institutions in March

Proposals/discussion points:

- *The costs of research activities and the participation of all activities of Network are born by each participating research institutions.*
- *The administration cost of the Network including the hosting the annual meeting will be born by research institutions on the voluntary basis.*
- *Voluntary financial and other contributions from all participating countries/research institutions to the Network's activities are highly encouraged.*

Grazie!

PRESENTATIONS: Day 1 2nd Session CMCC

CMCC
Centro Euro-Mediterraneo per i Cambiamenti Climatici

CMCC Research

LCS-Rnet meeting
Trieste, 1-2 April 2009

Giulia Galluccio

1

Introduction to CMCC

- **CMCC is the Italian research centre on climate science and policy**. Financially supported by the Italian Ministry for the Environment Land and Sea, the Ministry for Education, University and Research and the Ministry for Economy, CMCC was established in 2005 as a non-profit limited company
- **CMCC was born from the experience of six Italian research institutions** (Istituto Nazionale di Geofisica e Vulcanologia, *Fondazione Eni Enrico Mattei*, Università degli Studi del Salento, Centro Italiano Ricerche Aerospaziali, Consorzio Venezia Ricerche, Università degli Studi del Sannio) internationally well known at scientific and academic levels in the field of climate change.
- **CMCC mission is to act as a unique vertically integrated research centre**, at a national scale, able to produce complete scientific studies in the climate change sector and to support the emission reduction policies, with a global approach but a **particular focus on the Mediterranean region**.
- CMCC activities focus on the **development and applications of models** of climate dynamics, impacts of climate change and adaptation and mitigation policies.

2

Main Features

- CMCC holds an innovative **Supercomputing infrastructure** which consists of two clusters, together reaching a peak of computing power of 30 TFlops.
- A high capacity and high performance storage infrastructure supports the clusters.
- Among the Centres for Weather Forecasting and Climate applications all **over the world** the CMCC computational infrastructure is **ranked 5th** and it is the third biggest centre in Europe
- **CMCC hosts the Italian Focal Point** for the Intergovernmental Panel on Climate Change (**IPCC**)

3

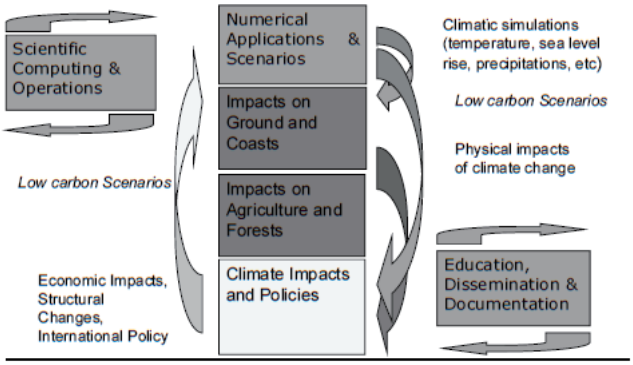
CMCC related LCS research

CMCC research focuses on:

- Development of numerical simulations of global and regional models of climate change
- Economic analysis of its impacts on terrestrial and marine ecosystems and on economic activities.
- Valuation of the global impact of climate change integrating the land use changes, deforestation and afforestation
- Valuation of climate policies, jointly with their implications on energy investments, research and development and the diffusion of climate-friendly technologies.

4

6 research Divisions: an integrated research key to LCS



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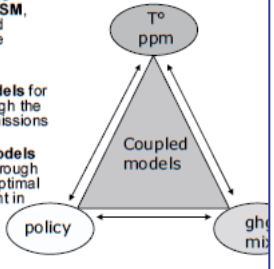
CMCC research topic key to LCS

The international policy framework and the leading position adopted by the EU in fighting climate change require an exceptional research effort on development of integrated assessment modes able to directly interact with policy makers

- **CMCC research aims at developing a fully integrated analytical framework** for climate control policies coupling in-house built economic models (**WITCH, ICES**) with environmental ones (**CC-ESM**, i.e. the CMCC Carbon earth System Model, and **LUC@CMCC**, i.e. the CMCC Land-Use Change Model)
- Two approaches will be integrated:
  - the development of **climate variability models** for the definition of low carbon scenarios, through the identification of a consistent mix of GHG emissions and external forcing
  - the development of long term **economic models** for the definition of low carbon scenarios, through the identification of mitigation policies and optimal policies of energy and technology investment in different geographical areas



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CMCC

Training activities key to LCS

Doctorate School in Global Change Science and Policy (ChangeS), based at the University of Venice and in collaboration with CMCC, University of Salento and University of Sassari:

- 4 Ph.D. programs are currently active:
  - Ph.D. in Science and Management of Climate Change - Climate change impact and management in Venice
  - Ph.D. in Science and Management of Climate Change - Dynamic Climatology in Bologna
  - Ph.D. in Environmental and Energy Systems in Lecce
  - Ph.D. in Agriculture and Forestry Systems in Sassari
- Program of Winter and Summer schools

7

Networking efforts

CMCC develops also networking activities with international outstanding research entities, sharing a common vision of developing measurement and modelling tools in order to support and carry out frontier climate change and earth science research activities.

- **NCAR** - National Center for Atmospheric Research acting on behalf of the University Corporation for Atmospheric Research, Boulder, Colorado, USA
- **PEI** - Princeton Environmental Institute, Princeton University, USA on Ordering Stabilisation Wedges
- **CGMD** - Climate and Global Modelling Division of the Indian Institute of Tropical Meteorology, Pashan, India on climate change and earth science
- **University of Adelaide**, Australia
- **Tel Aviv University**, Israel
- **8 Associate Partners** at national and international level (WHO, ICTP, CNR, IAMB, University of Tuscia, University of Sassari, SPACI, CRMPA)

8

Forthcoming Events

- Venice, 02-03 April 2009 - Workshop on "**The Economics of Adaptation to Climate Change**", organized by ICCG, CMCC in cooperation with OECD, Paris
- Venice, 15-16 June 2009 - Coalitions for Climate Cooperation. A Game-Theoretic Analysis of Post 2012 Climate Policy, organized by ICCG, CMCC and ETH Zürich
- Venice, 17-19 June 2009 - **2009 International Energy Workshop (IEW)**, organised by ICCG, CMCC and FEEM
- Venice, 13-19 July 2009 - **Scoping Meeting 5th AR-IPCC**, organized by CMCC in cooperation with IPCC and MATTM
- Venice, 19-20 October 2009 - Workshop on "**Fairness and the Commons Socio-economic Strategies and Resource Dynamics**", organized by ICCG, CMCC and PEI

9

CMCC main expectations from the LCS-RNet

- **Involvement of international** research institutes from **key players** in the design of future climate and energy agreements
- **Exchange of knowledge** and main scientific findings on research issues key to LCS
- Adopt a **common** definition of LCS, establishing **reachable targets**
- Design a common strategy to increase **awareness** on LCS among key stakeholders and the public at large. At a later stage get other **key stakeholders** outside the scientific community involved in the network.
- Foster an **integrated approach** of environmental and economic climate change modeling research

10

CMCC view on LCS definition and targets

- A LCS is **aware of the 'carbon-footprint'** generated by its socio-economic development path
- A LCS must act within a **commonly agreed GHGs stabilization targets**, involving developing regions
- Main efforts to achieve that target must address **current trends and changes in the socio-economic systems**, improvements in energy efficiency and **technological innovation** (including CO2 absorption and storage), as well as an **integrated assessment** of climate scenario and climate and energy policies on the regional and world societies and economies.

11

CMCC
Centro Euro-Mediterraneo per i Cambiamenti Climatici

www.cmcc.it
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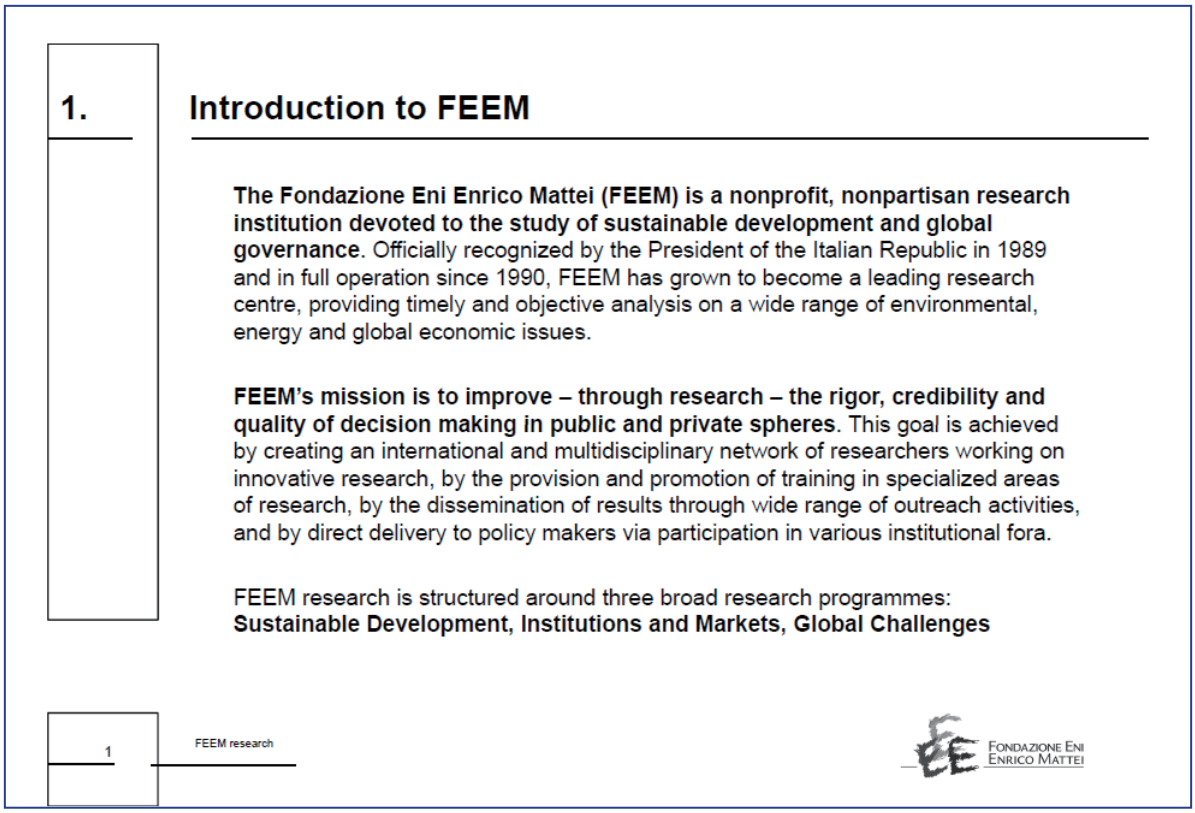
FEEM


FONDAZIONE ENI
ENRICO MATTEI
FEEM research
Alessandra Goria,
FEEM
www.feem.it
LCS-Rnet meeting
Trieste, 1-2 April 2009


1.
Introduction to FEEM
The Fondazione Eni Enrico Mattei (FEEM) is a nonprofit, nonpartisan research institution devoted to the study of sustainable development and global governance. Officially recognized by the President of the Italian Republic in 1989 and in full operation since 1990, FEEM has grown to become a leading research centre, providing timely and objective analysis on a wide range of environmental, energy and global economic issues.
FEEM's mission is to improve – through research – the rigor, credibility and quality of decision making in public and private spheres. This goal is achieved by creating an international and multidisciplinary network of researchers working on innovative research, by the provision and promotion of training in specialized areas of research, by the dissemination of results through wide range of outreach activities, and by direct delivery to policy makers via participation in various institutional fora.
FEEM research is structured around three broad research programmes:
Sustainable Development, Institutions and Markets, Global Challenges
1
FEEM research
FONDAZIONE ENI
ENRICO MATTEI

1. FEEM LCS-related research

The Sustainable Development Research programme addresses the following research topics, most of which directly relevant to LCS research:

Climate change modelling and policy
Coalitions and networks for international environmental agreements
Economics of biodiversity
Environmental evaluation
Forestry, land-use and land cover change
International carbon markets and the financing of climate policy
Sustainable energy
Sustainability indicators
Water management

2. *FEEM research topics key to LCS research* (1)

Climate change modelling & policies : FEEM researchers have developed novel modelling tools for the economic analysis of policies aimed at climate change control, addressing world-wide vulnerability, mitigation, impacts and adaptation to climate change. Within the Euro-Mediterranean Centre for Climate Change (CMCC), FEEM furthermore contributes to the development of a fully integrated analytical framework for climate control policies coupling economic and environmental models

Mitigation → FEEM is positioned at the forefront of international research through the use of the in-house developed energy-economy-climate model **WITCH, a dynamic integrated model of the world economy that provides normative information on the optimal response of the economic system to climate change damage and policy.** The model has already been applied to provide an economic assessment of specific mitigation technologies, innovation policies, and environmental externalities. Ongoing work focuses on integrating technological and education policies, and on the role of uncertainty in climate policy.

Impacts & adaptation → On the impact side FEEM is currently investigating the general equilibrium effects of climate change on the world economy, through the use of **ICES, a recursive-dynamic computable general equilibrium (CGE) model** developed by FEEM researchers. FEEM research has been able to assess a wide set of climate change impacts, including sea level rise, impacts on health, tourism, agricultural productivity, intensity and frequency of extreme events and energy demand.

FEEM

3

FEEM models

WITCH
World Induced Technical Change Hybrid model

http://www.feem-web.it/witch/

ICES
Intertemporal Computable Equilibrium System

http://www.feem-web.it/ices/

4 FEEM research

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4.

FEEM research topics key to LCS research (2)

Forestry, land-use and land cover change: modeling exercises to investigate the socio- economic and environmental effects of land-use change, development of bio-fuels, and the integration of reducing emissions from deforestation and forest degradation (REDD) in the carbon market, with the aim to provide support to policies on key issues for the design of future climate agreements.

Sustainable energy: economic analysis of externalities in the energy sector, of renewable energy sources (in particular bio-energy) and of the role of innovation in energy technologies. In synergy with climate change research, this research field addresses security of energy supply and innovation, and the relationships between energy use and technological change, including learning by doing and R&D, and international spillovers.

Sustainability indicators: attempts to provide the qualitative and quantitative assessments necessary for linking key well-being and sustainability indicators with mainstream economic indicators, providing much needed insight into the synergies and trade-offs between economic growth and environmental sustainability. Qualitative assessment includes the evaluation of key indicators and indicators efforts, as well as the evaluation of institutional needs and opportunities. Quantitative work indeed focuses on the improvement of quantitative models linking indicators, and on the assessment of costs and benefits of reaching sustainability targets.

International carbon markets and the financing of climate policy: analysis of carbon price dynamics both in the short and long term, with the use of financial modelling techniques. FEEM research addresses in particular the analysis of different carbon market features and their implications in setting up a future global international emissions trading mechanism.

5 FEEM research

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5. FEEM relevant projects

CIRCE - Climate Change and Impact Research: the Mediterranean Environment, *EC, FP6*

ClimateCost - Full Costs of Climate Change, *EC, FP7*

CMCC - Centro Euro-Mediterraneo per i Cambiamenti Climatici,

ENSEMBLES -ENSEMBLE-based Predictions of Climate Changes and their Impacts, *EC, FP6*

PESETA - Projections of Economic Impacts of Climate Change in Sectors of Europe Based on Bottom-up Analysis, *EC, DG ENV*

TOCSIN - Technology-Oriented Cooperation and Strategies in India and China: Reinforcing the EU dialogue with Developing Countries on Climate Change Mitigation, *EC, FP6*

VECTOR 2 - Vulnerability to Climate Change of Costal Areas and Marine Ecosystems, and their Role in the Mediterranean Carbon Cycle, *MUR, MEF, MATTM*

IFCG - International Forum on Climate Governance, *MATTM*

6 FEEM research

FONDAZIONE ENI ENRICO MATTEI

7. FEEM relevant events 2009

Milan, 13 March 2009- Workshop on "**Carbon Market and flexible mechanisms: legal, technical and economic issues",** organized by FEEM in cooperation with Linklaters and Amec

Venice, 2-3 April 2009 - Workshop on "**The Economics of Adaptation to Climate Change**", organized by ICCG, FEEM in cooperation with OECD, Paris

Venice, 4 April 2009 – International Conference on "**Financial Crisis and Climate Policy. A Science-Policy Debate**", organized by FEEM, ECF and ECLT

Venice, 15-16 June 2009 – "**Coalitions for Climate Cooperation. A Game-Theoretic Analysis of Post 2012 Climate Policy"**, organized by ICCG, FEEM and ETH Zürich

Venice, 17-19 June 2009 - **2009 International Energy Workshop (IEW)**, organised by ICCG, CMCC and FEEM

Venice, 5-11 July 2009- 2009 **Summer School on Economics, Transports and the Environment**, organised by EAERE, FEEM, VIU

Venice, 13-19 July 2009 - **Scoping Meeting 5th AR-IPCC**, organized by FEEM-CMCC in cooperation with IPCC and MATTM

Venice, 19-20 October 2009 - Workshop on "**Fairness and the Commons Socio-economic Strategies and Resource Dynamics**", organized by FEEM, CMCC and PEI

Venice, 9-10 November 2009 - Workshop on "**The Finance of Climate Change**", organized by FEEM, RFF and Université of Paris Dauphine

7 FEEM research

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FEEM

8. FEEM main expectations from the LCS-RNet

Involvement of international research institutes from key players in the design of future climate and energy agreements

Exchange of knowledge and main scientific findings on research issues key to LCS

Adopt a common definition of LCS, establishing reachable targets

Design a common strategy to increase awareness on LCS among key stakeholders and the public at large. At a later stage get other key stakeholders outside the scientific community involved in the network.

Foster a common vision of the main sectoral issues to be addressed in order to reach the target, and of the necessary policies to be implemented. The common vision will encompass the social, economic and technical changes needed to respond to stricter climate change and energy policies. Both quantitative and qualitative assessments of the envisaged policies on current trends in the social, economic and environmental systems will be considered, to enhance harmonization of future policies. Methodologies and results will be compared. Synergies and trade-offs between policies and across regions, including effects on welfare, competitiveness and the environment, will be identified.

8 FEEM research

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9. FEEM view on LCS definition and targets

A LCS is aware of the 'carbon-footprint' generated by its socio-economic development path

A LCS must act within a commonly agreed GHGs stabilization target, involving developing regions

Main efforts to achieve that target will encompass an integrated assessment of climate and energy policies on the regional and world societies and economies, addressing current trends and changes in the socio-economic systems, as well as improvements in energy efficiency and technological innovation (including CO2 absorption and storage).

9 FEEM research

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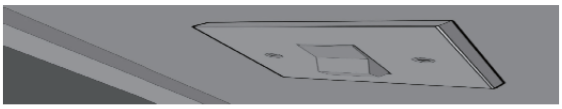
UKERC



UK Energy Research Centre

Dr Mark Winskel
Research Co-ordinator

01/04/09, LCS-RNet, Trieste

UKERC
UK Energy Research Centre

1

UK ENERGY POLICY GOALS

- 80% reduction of CO_2 emissions by 2050
- ≥26% reduction of CO_2 emissions by 2020
- Renewables to supply 15% of UK energy by 2020 (currently ≈2%)
- 5% of road transport to be biofuel by 2010
- Maintain reliability of energy supplies
- Promote competitive markets
- Ensure every home is adequately heated

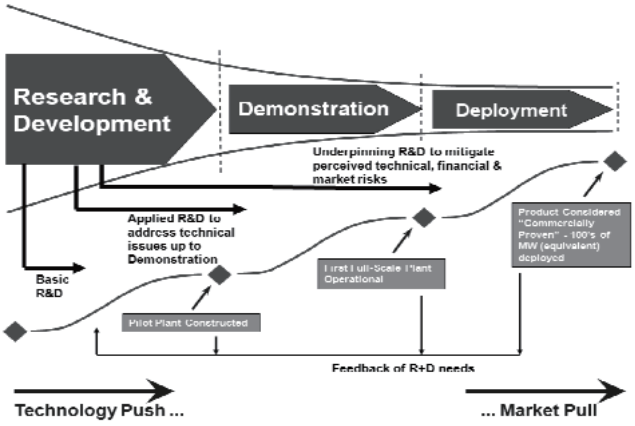
Meeting these targets will require a transformation of energy production, distribution and consumption

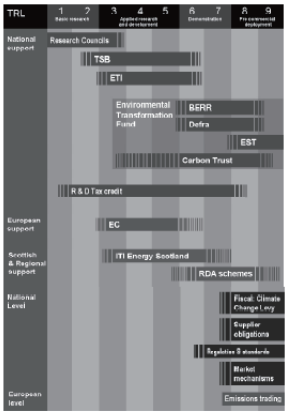
Energy Act 2008
Climate Change Act 2008

UKERC

2

The 'ideal' energy innovation process





Support for technologies in the UK

public investment on RDD&D c.£200m p.a.

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UK Research Councils' Energy Programme

- >£90m pa
- UKERC
- SUPERGEN (Sustainable Power Generation)
  - Technology-specific large research programmes
- Carbon Vision Programme (mainly buildings)
- Fusion Programme
- Research Training and Capacity Building
- Many other 'responsive mode' activities

UKERC

5

UKERC's mission

- *UKERC's role is to undertake a programme of whole systems energy research and promote cohesion within the overall UK energy research effort.*
- The centrepiece of the UK Research Councils' Energy Programme
- A world class centre for interdisciplinary whole systems energy research (70+ researchers at 18 Universities)
- A bridge between the UK energy research community and the wider world of business, policy and international energy research
  - Research Atlas (landscape, roadmaps, research register)
  - Energy Data Centre
  - National Energy Research Network (500 members)
  - Meeting Place (15-20 events per annum)
  - Technology and Policy Assessment

UKERC

6

UKERC

UKERC activities

- Interdisciplinary 'whole systems' energy research programme
  - over 150 peer-reviewed articles and reports to date
  - research presented at most major international energy conferences.
- National Energy Research Network (NERN)
  - information and collaboration opportunities to nearly 500 active national and international energy researchers
  - members include academics, industry, civil servants and policy makers and investors.
- Research Atlas
  - a series of reports on the UK energy research landscape
  - fully searchable research register containing details of all research council energy projects
  - energy data centre: deposit where key datasets are curated
  - detailed roadmaps for specific energy technology areas
- Meeting Place
  - gateway and networking hub linking UK and international energy researchers. Organised and facilitated numerous outcome-focused research events.

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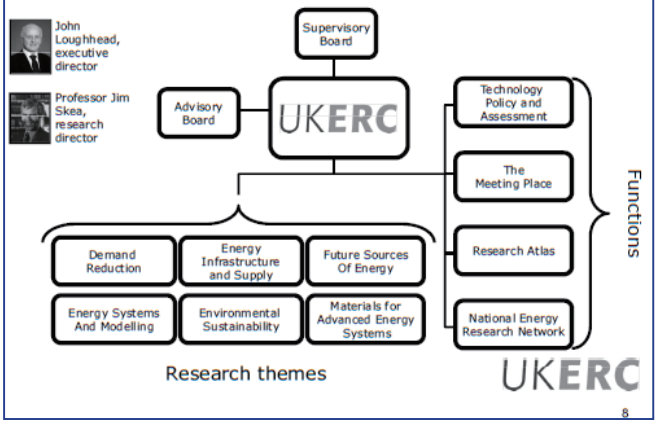
UKERC Structure, Phase I (2004-09)



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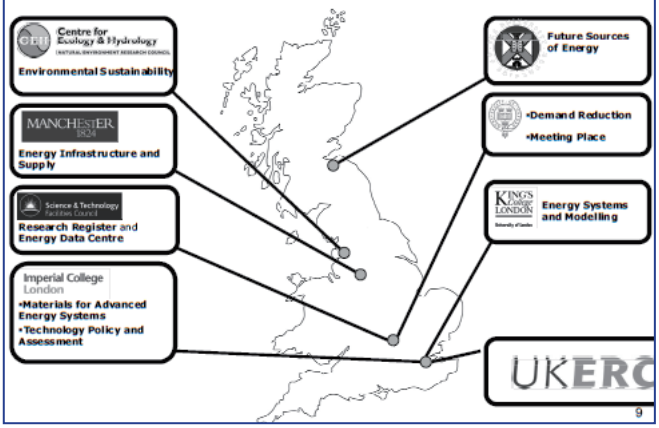
Where are we?



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UKERC Energy 2050 Project

- taking stock mid-way point in Phase I (2006)
- UKERC collectively has the capability to address (if not answer) key questions about long-term energy policy
- Create stronger links between UKERC's different research themes
- Define research problems which can be addressed *only* by collaboration within the Centre
- i.e. creating dependencies between different parts of the Centre

UKERC

10

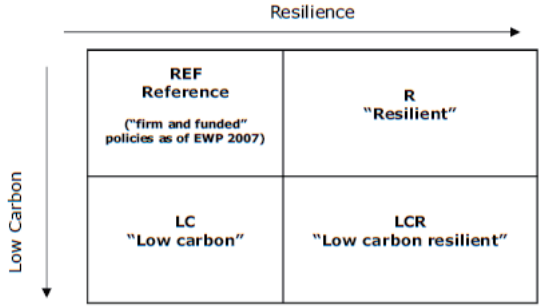
Methodology

- underpinned by high-level scenarios
- different research themes collaborate in working groups
- making use of a range of system-level, network and sectoral modelling tools (e.g. MARKAL)
- use of detailed insights from the research themes to fill in lack of detail in high-level modelling tools
- "soft-linking" different models

UKERC

11

Energy 2050 'Core Scenarios'



UKERC

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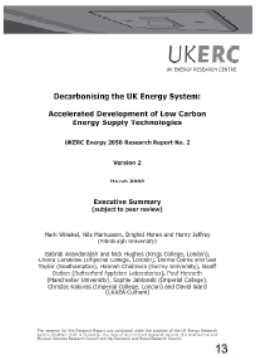
UKERC Energy 2050 workstreams

- pathways to a low carbon energy system
- energy security and resilience
- lifestyle and consumption
- socio-environmental sensitivities
- global energy markets
- de-centralised energy systems
- *technology acceleration*
  - Scenarios with accelerated development of renewable energy, CCS, nuclear and fuel cells


UKERC
AN ENERGY RESEARCH CENTRE

Decarbonising the UK Energy System:

Accelerated Development of Low Carbon Energy Supply Technologies

UKERC Energy 2050 Research Report No. 2

Version 2

Executive Summary
(subject to peer review)

13

Technology Acceleration: Key Messages

- Technology acceleration could have a major influence on energy system decarbonisation, especially in the longer term. In attempting to map out decarbonisation pathways, it is important to take this into account.
- The overall impacts of accelerated technology development are complex. Raising the decarbonisation ambition from 60% to 80% does not mean doing 'more of the same' – it introduces new technology preferences and research priorities.
- Technology acceleration could substantially reduce the overall cost of decarbonisation. Between 2010-2050, accelerated development is associated with a total saving in UK 'welfare costs' of decarbonisation of £36bn. Most of this accrues in the longer term, after 2030.

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Technology Acceleration: Key Messages

- Because RD&D costs are shared internationally, the overall benefits of accelerated development greatly outweigh the investment costs.
- For the UK, the benefits imply a much greater RD&D investment – much of this needs to be committed well before significant 'returns' start appearing after 2030.
- Accelerated development introduces alternative decarbonisation pathways in the longer term, with greater contributions from CCS, fuel cells, and renewables such as offshore wind, marine and solar PV.
- Accelerated development only changes deployment in the longer term. In the shorter term, decarbonisation will require responses from demand reduction, improved efficiency and more mature supply technologies.

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Technology Acceleration: Key Messages

- Realising the benefits of technology acceleration requires the UK to participate fully in global efforts at low-carbon technology innovation – this promises big rewards in the longer term.
- There are no simple messages in terms of 'picking winners' – the need is for sustained support of a broad portfolio of emerging low-carbon technologies.

- Energy 2050: Key Messages
  - Energy efficiency, especially in existing buildings
  - De-carbonise electricity – but don't prescribe which technology
  - Support innovation across the entire chain – from basic R&D to deployment
  - Avoid locking into specific pathways too early

UKERC

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UKERC Phase II (2009-2014)

- *To help secure the UK's energy supply, provide energy solutions for the future and dramatically reduce carbon emissions*
  Research Councils' Energy Programme award, March 2009

Climate change is the biggest challenge of our generation … one of the real strengths of the UK Energy Research Centre is that it brings together scientists from a variety of disciplines, to find solutions faster.
Lord Drayson, Minister for Science and Innovation

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UKERC Phase II: Basic Activity Areas

- Capacity Building (same as Phase I)
- Knowledge Exchange (same as Phase I)
- Research programme (revised from Phase I)
  - 40% of the Research Programme will involve a competitive research fund
  - respond to emerging developments in energy research or policy
  - draw a wider range of researchers into UKERC

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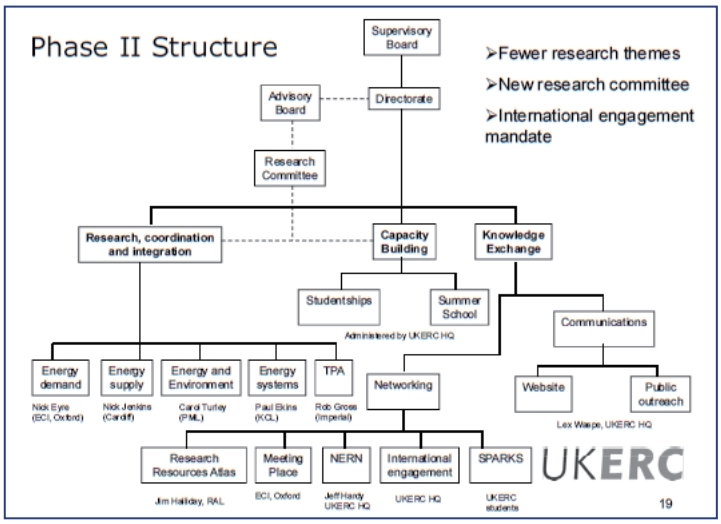

Capacity building

- UKERC Interdisciplinary PhD studentships
  - Annual competition for 5-7 PhDs
  - Must be interdisciplinary research
  - Alumni of 30 students
- UKERC Annual Energy Summer School
  - 5-day residential course
  - 100 UK and international research students
  - Now enrolling for 2009, at www.ukerc.ac.uk

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UKERC II: Research Challenges

- Driving systemic change in the energy sector
  - transforming patterns of energy demand
  - new energy vectors or the use of energy storage
  - decarbonisation of the electricity sector
  - accelerating low carbon technology deployment
- Managing environmental impacts
  - global dimensions of UK decision-making
  - consequences for environmental impacts and eco-system services
- Energy security
  - international linkages
  - UK infrastructure
- Developing tools and methods to address the challenges
- Timescale: the bridge between 2020 (short term) and 2050 (long-term)

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UKERC and LCS-RNet

- UKERC can contribute work on modelling low carbon energy systems, understanding the contribution of technological change to low carbon societies, and investigating the role of lifestyle change and behaviour.
- LSC-RNet can allow the sharing of results globally between developed and developing countries, help build capacity to understand what a low carbon society is and how it can be achieved, and provide useful evidence for policy-makers.
- The most important question is how to achieve a low carbon society, and what key steps need to be taken in the next two decades to put us on a trajectory to a low a carbon society.
- In the UK, we believe that an 80% reduction in greenhouse gas emissions by 2050, from a 1990 baseline is a fair contribution to achieving a low carbon society in the global context.

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Thank You

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UK Energy Research Centre
mark.winskel@ed.ac.uk
www.ukerc.ac.uk

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PRESENTATIONS: Day 2 1st Session

IDDRI
SciencesPo.

Institute for
Sustainable Development and International Relations

What is IDDRI?

Institute for Sustainable Development and International Relations
Paris, France

- IDDRI's origins are based on 3 beliefs:
  - Global changes resulting from human activities are unsustainable over the long-term
  - Complete transformation of development models is needed
  - The above can only be possible for coherent policies are implemented immediately at the global level, bringing about changes in lifestyle.
- IDDRI thus aims to bridge the gap between research and decision-making concerning:
  - Global Governance
  - Trade and environment
  - Climate Change
  - Natural resources / Biodiversity

  ..... and analyse these areas from a global perspective
- Strategy:
  - Inform decisions
  - Identify emerging issues
  - Coordinate dialogue among stakeholders whose interests sometimes appear to be at odds: researchers, scientists, companies and political decision-makers

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IDDRI

What is IDDRI

- A private, non profit Foundation, joint venture between public and private sectors (commercial and NGOs) and national research institutions (CNRS, CIRAD, INRA, Ecole Polytechnique) acting as core funders
- Iddri act as
  - A think tank networking at international level (Chattham House, E3G, SEI, WRI, RFF, CEPS, China Council for International Cooperation on Environment and Development (CCICED) etc.) involved in European and international Policy developments
  - A research Institution, developing collaborative research programmes with other research team (mainly french and european level –LSE, CS-Cambridge, Grantham Institute, Louvain, SWP Berlin …)
  - Since 2008, IDDRI is at Science Po Paris and support the development of teaching activities in the area of sustainable development (Master of International affairs, + co development with LSE and Columbia University)

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Modelling low-carbon futures

- A carbon policy modelling exercise aiming at :
  - Analysing the economics of the transition to low carbon economies
  - Describing possible interactions between carbon policy - energy ressources - technology development - structural choices in transportation and urban spatial design – and implications for industrial production ….
  - At the global and regional levels
- A joint venture, 4 year exercise
  - A research team gathering different modeling capacities (CIRED/LEPII/ENERDATA)
  - A steering commitee associating the researchers and private stakeholders (Industry, Public Utilities, Banking Institutions)
- Outcomes:
  - LCS Scenarios
  - New developments of the modelling tool
  - A methodology to represent the evolution of raw material demand
  - A group of people in the research team, the industry and governm common langage and further projects

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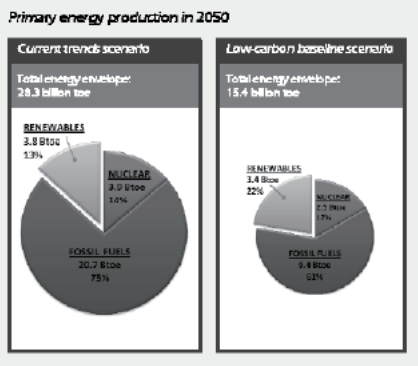
Modelling low-carbon futures

Decrease in the energy envelope in the low-carbon baseline scenario as compared with the current trends scenario

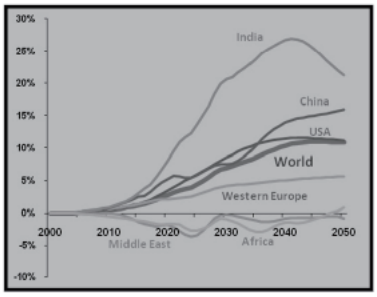
....allowing the Btoe of renewables to actually decrease in the low-carbon scenario



Economic gains from simulataneous decarbonisation efforts in developing and developed countries

(as opposed to a scenario where developing countries delay efforts)

% increase in GDP



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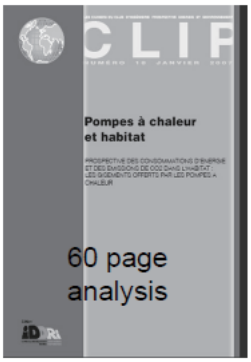

CLIP

Club for Engineering Perspectives on Energy and the Environment

A loose association of government institutions, research partners, technology centres, and industrial companies ....

- Furnish decision makers with specific images of how new technologies could be applied…
- … notably on their insertion in different social and geographical contexts, and their associated consequences on the environment

Technology / Infrastructure / Policies

New business models (who will deliver)

Co benefits / interference with other social issues and agenda (distributive impact, urban cohesion, congestion, local pollution, social housing, etc.)

- Heat pumps & energy consumption
- Hybrid, Electric or H2 vehicles
- Forestry and C sequestration
- Biofuels and water ressources
- Implementation of "grenelle" target
- Small Scale Cogeneration
- Biomass and electricity
- CCS

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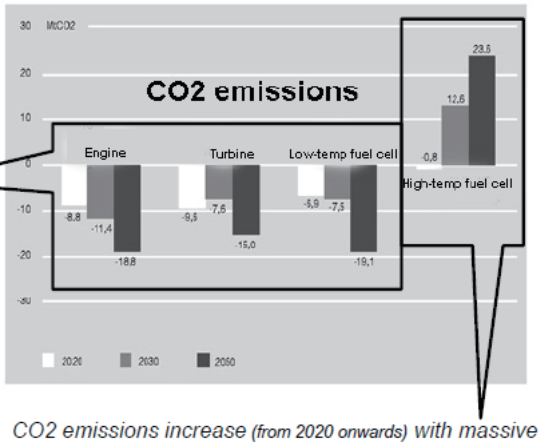
CLIP 15: Cogeneration and CO2 emissions

4 scenarios for evaluating emissions from the widespread deployment of the following cogeneration technologies:

- Engine
- Turbine
- Low-temperature fuel cells
- High-temperature fuel cells



Significant CO2 emissions reduction with widespread deployment of engine, turbine, and low-temperature fuel cell cogeneration technologies, thanks to:

- *Disappearance of coal as an electricity source*
- *Higher efficiency of low-power cogeneration systems*

with respect to:

- *Separate conventional gas turbines*
- *Domestic gas and oil heaters*

CO2 emissions increase (from 2020 onwards) with massive deployment of high-temperature fuel cell cogeneration technology:

- *CO2 reduction from energy savings < CO2 emissions rise due to replacement of nuclear power with high-temperature fuel cells*

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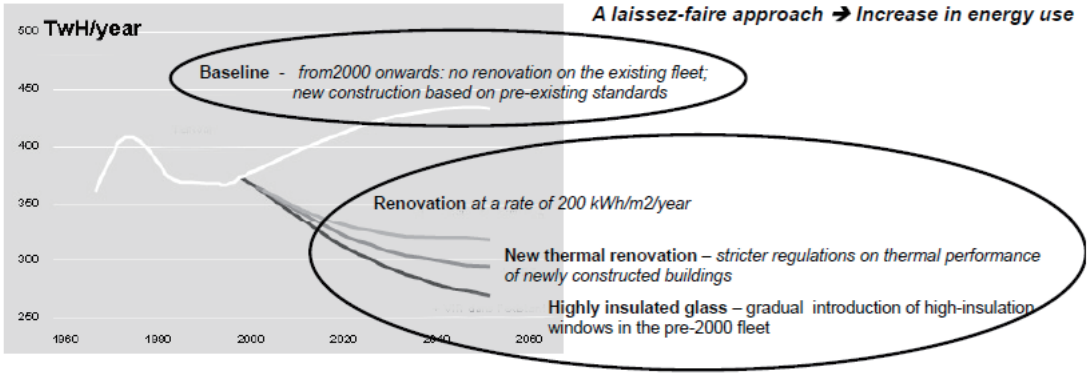
Housing and energy use: CLIP 13 & other simulations

Potential impact of renovation & new construction on the energy performance of the French housing fleet



A laissez-faire approach ➔ Increase in energy use

Proactive policies ➔ Decrease in energy use

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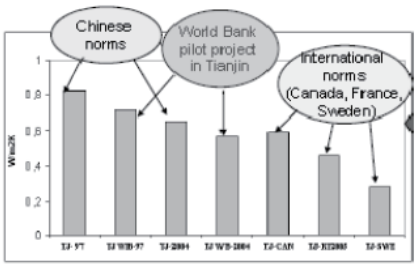
Housing and energy use: CLIP 13 & other simulations

The Chinese Housing Fleet

Potential for improving energy efficiency (W/m^2K)



Minimising carbon cost by choosing the right energy system / building energy standard mix

Average abatement cost of different scenarios ($US\$/tCO_2$)

Building standard \ Supply	CCS	Switch from coal to gas system
RT2005 (French)	32	39
A2 (Improved Chinese)	43	67
SWE (Swedish)	7	8
LC (« Low-Carbon »)	11	14

Reference: TJ 2004 +coal; discount rate: 8%

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Other remarks

- ***Other areas of possible interest to LCS-RNet:***
  - Comparative analysis of climate / energy policy instruments
  - Tools for international cooperation (C markets, sectoral approaches, finance and technology deploiement)
  - The development of new research and TT areas : adaptation (since 2006), urban fabric, agriculture and forestry
- ***IDDRI's expectations:***
  - A platform for efficiently sharing methodologies, tools, and results on LCS "visions", beyond IDDRI's current network
  - Sharing experience on how to better interface with the society in the design, the implementation and the interpretation of research activities

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Wuppertal Institute

Wuppertal Institute
for Climate, Environment
and Energy

Sustainable Low Carbon Society
Research at the Wuppertal Institute

LCS-Research Net
Researchers Meeting Triest
1/2 April 2009

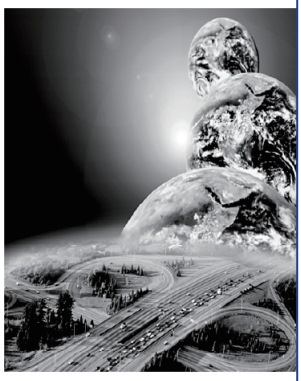
Dr. Stefan Lechtenböhmer
Co-Director
Research Group
Future Energy and Mobility
Structures

Mission
Application-oriented Sustainability Research

The WI explores and develops **models, strategies and instruments** to support a **sustainable development** at local, national and international levels.

Sustainability research at the WI **focuses on ecology** and its relation to economy and society.

Our research analyses and initiates **technological and social innovations** that **decouple** economic growth from nature use and wealth.



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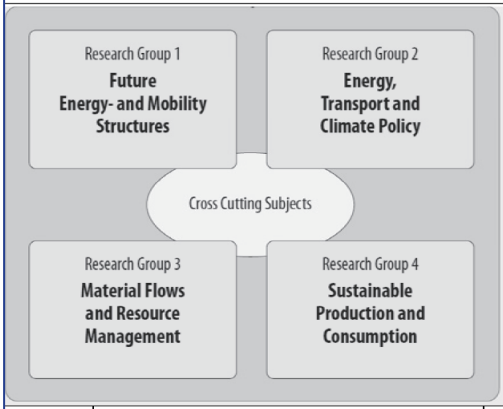
Wuppertal Institute for Climate Environment Energy



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Low Carbon, Low Risk, Low Material Society
Research topics at the WI / In Germany

- **Sustainable Society Research at Wuppertal Institute**
  - The WI has a long tradition in doing long term sustainability research
  - LCS-Vision / long term technologies and scenarios
  - Low Material Society scenarios and instruments
  - Strategies and policies towards LCS (time horizon 2020/30)
  - Sustainable Production and Consumption (WI-UNEP Centre: CSCP)
- **LCS-Research in Germany (Scenarios on sustainable energy futures)**
  - Long term energy and emission targets have been discussed since 1990
  - Several institutes have made long term energy scenarios (for 2050)
  - Mainly focused on the German energy system
  - A strong German network on LCS research is missing

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Important LCS Research by WI

- **1990: Parliamentary Enquete Commission "Protection of the Earth"**
  - Setting of a long term target: -80% GHG by 2050
  - Prof. Hennicke was member of that commission
- **1995: WI flagship study: Sustainable Germany**
  - Groundbreaking study for German sustainability discussion
  - Mainly qualitative recommendations on "basic needs"
  - First quantitative scenario analysis for 2050
- **1996: Long term integration of renewable energies (EU, 2050)**
- **2000: Long term energy scenarios for Germany (Fed. Environmental Agency)**
- **2002: Parliamentary Enquete Commission "Sustainable Energy Future"**
  - Prof. Hennicke & Dr. Lehmann were members of that commission
  - Quantitative energy scenarios for Germany: -80% GHG by 2050
  - Competing analysis WI vs. IER
- **2004: Ecologically optimised expansion of renwable energies**
  - Quantitative energy scenarios for Germany: -80% GHG by 2050, with DLR
  - Basic studies for the annual "Leitstudie 2050" of German MOE
- **2009: Pathways to a carbon free Munich 2058**
  - Commissioned by Siemens as part of their sustainable urban infrastructures project

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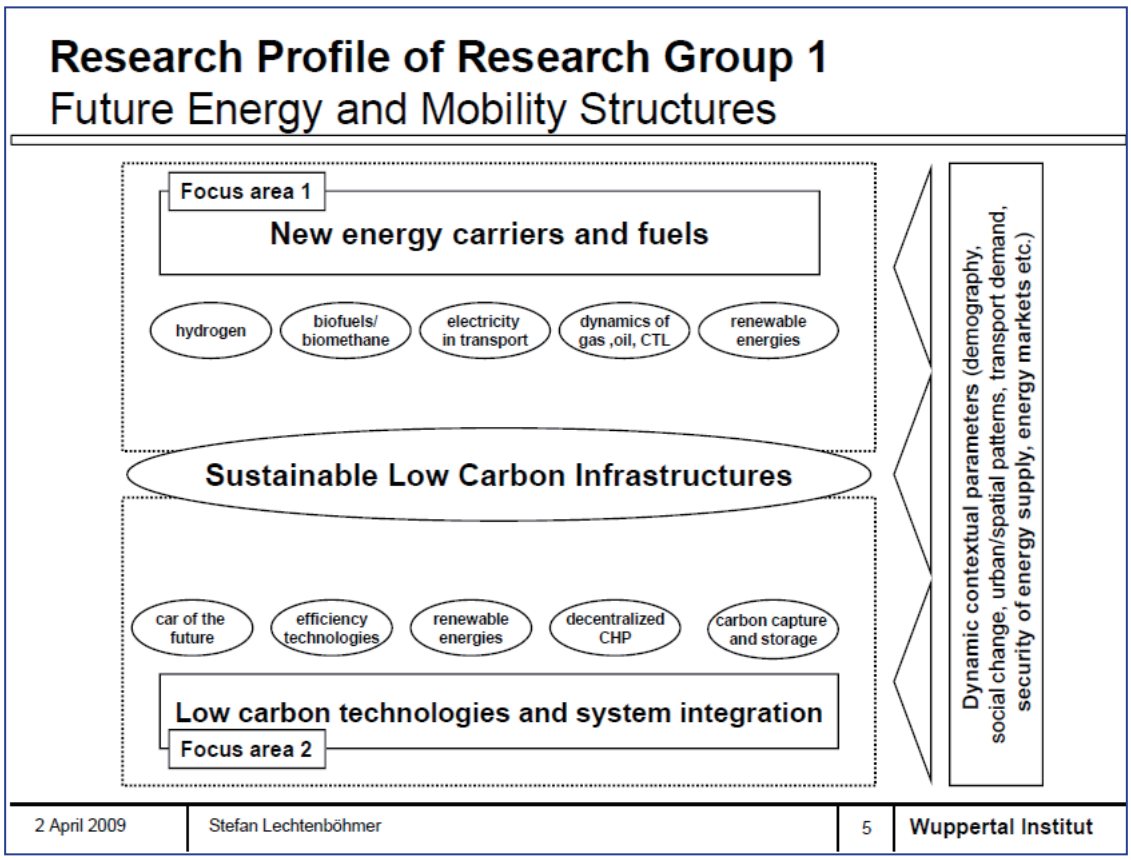

LCS scenario research (approach)

- **Energy system modelling / time horizon 2050:**
  - Various scenario analyses from municipal to global level
  - Additional: strong track of mid term scenarios
- **Methodology**
  - Bottom-up demand oriented technological energy modelling
  - Detailed technological analysis of the energy systems
  - Policy based modelling approach
  - Research developments planned
    - Stronger linking to LCA/Dynamic LCA
    - Inclusion of material system into analysis
    - Interaction / linking with economic models (GE, PE, Growth models, others) --> new Project: Long term climate

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LCS technologies research topics at WI

- **High efficient demand side systems**
  - Building structures
  - Electric appliances
- **Low Carbon infrastructures**
  - Efficient energy supply (heat, gas, electricity, CHP)
  - Transport and mobility structures
- **Renewable energies**
  - System integration of all types of renewable energies
  - Focus on biogenous energy carriers
- **Carbon Capture and Storage**
  - Potentials and pathways
  - Innovation and diffusion

- **Systems integration of new transport energy carriers**
  - Hydrogen
  - Bio fuels
  - Electricity

- **Various third party funded research projects**
  - TA/LCA for certain technology paths
  - Scenario based systems integration analysis
  - Market potential analyses for stakeholders

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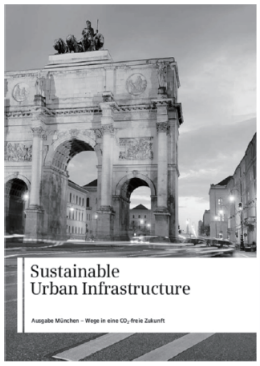
Selected project:
Munich 2058 – Pathways to a Carbon Free Future

- **Blueprint for the restructuring of cities**
  - 50% of the worlds population lives in cities, but they consume more than 70% of the energy
  - cities are determining nodes of ressource use and core to the solution
  - 50% of cities of 2050 are still to be built
  - 50% have been already built (including infrastructural backbones)
- **Project components:**
  - Technology matrix (100 local technologies for a CO_2 free future)
  - Scenario analysis „Vision Munich 2058“
    - Two scenarios (Target & Bridge) 750 / 1300 kg CO_2/cap
  - Pilot district „CO_2 free“ by 2038
  - *Economic chances of being a low carbon frontrunner*



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Our Definition of
“Low Carbon Society”

- **The term has not yet been used (rather: Sustainable Energy System)**
- **How low? – Long term target**
  - 2° C-Target of the EU
  - 60% Reduction of GHG emissions vs. 1990 worldwide (UN Foundation)
  - 80 - 95% Reduction for industrialised countries (EU Environment Ministers)
  - 80% Reduction vs. 1990 (German target, Parliamentary Enquete Commisions)
- **“Low Carbon” has to be achieved within a framework of other sustainability criteria**
  - Material flows and availability of ressources
  - Security and Risks
  - Sustainable production and consumption

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First expectations to the LCS-Rnet / Ideas for Research questions

- **Development of a “LCS” is one of the key challenges for the coming decades for all countries, for the cities, for the economy**
  - Agenda setting in order to speed up development of concepts, strategies and technologies
  - Creation of awareness for the long term perspective
- **International exchange and learning about LCS**
  - Concepts (comparison, pros and cons of approaches)
  - Methodologies
  - Policies and strategies
- **Improving LCS research and its scientific impact**
  - Exchange of methodologies
  - Joint efforts to publish LCS research results / intensify scientific discussion
- **Defining of LCS Roadmaps**
  - Specific strategies for industrilized/developing countries
- **Specific questions for research**
  - What are LCS concepts for nations / cities / companies etc.
  - What are the LCS technologies? Which is the demand for technolgy policy?

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Ideas for Research questions

- ***What are the questions to solve for achieving a global LCS by 2050?***
  - *Technical, conceptual, behavioural, political, institutional*
  - *Which time frame is appropriate for which research question?*
  - *Which approaches might be fruitful?*
- **Systems, scenarios and futures research**
  - Which methodologies are used for LCS research and are they appropriate?
  - Which time frames and which regional scope are appropriate?
  - Which concepts/visions for LCS already exist? (e.g. -80% scenarios; 2000 Watt society; solar society ...)
- **How to implement changes towards LCS?**
  - Analysis of technology needs: Are there roubust technologies? What are the needs and possible priorities for R&D policy?
  - Analysis of behavioural changes: How can behavioural changes be introduced?
  - Analysis of institutional and societal changes: Which institutions do we need and how can they be changed?
  - Analysis of policy towards LCS

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Added value of the LCS Research network

- Achieving a global LCS will be a core challenge of society
- The network will start to stronger link systematic thinking of what that is
- It cannot cover all possible facets of LCS in depth
- Its added value is in promoting the topic/issue
  - It may promote more conceptual and analytical work o the topic
  - It can thus guide more specific research e.g. in modellers communities etc.
  - Its focus should be on the systematic thinking/approach

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NIES

AIM (Asia-Pacific Integrated Assessment) project team
National Institute for Environmental Studies (NIES), Japan

Modeling Sustainable Low-Carbon Asia

Keywords: LCS Scenario, Low-carbon City, Action plans towards LCSs

Junichi Fujino, Mikiko Kainuma (NIES)

Researchers Meeting, International Research Network for Low Carbon Societies, - LCS-RNet-
1 – 2 April 2009, New Congress Center, AREA Science Park, Trieste Italy

1

LCS study in NIES, Japan

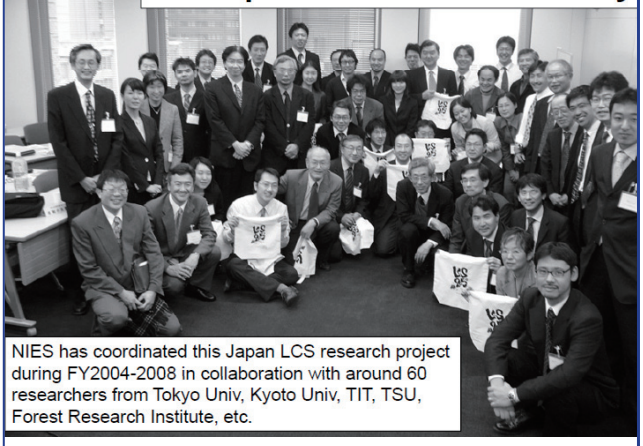
- FY1990- start AIM (Asia-Pacific Integrated Model) project
- FY1995- start AIM International Workshop
- FY2001 AIM provided SRES/A1B marker scenario

- FY2004-2008 NIES has coordinated Japan LCS research project funded by MOEJ
- FY2006-2008 Japan-UK joint LCS research project in collaboration with MOEJ, UK Defra, UKERC, Tyndall Centre for Climate Change

- FY2009-2013 NIES coordinates Asia LCS research project funded by MOEJ

2

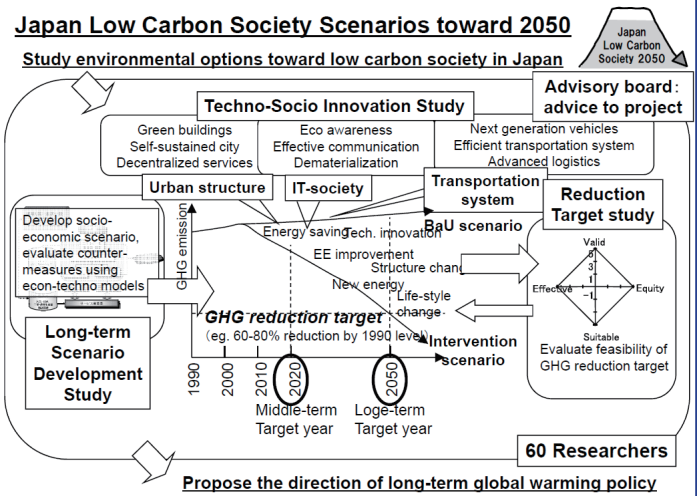
1. Japan LCS scenarios study



NIES has coordinated this Japan LCS research project during FY2004-2008 in collaboration with around 60 researchers from Tokyo Univ, Kyoto Univ, TIT, TSU, Forest Research Institute, etc.

Japan Low Carbon Society Scenarios toward 2050

Study environmental options toward low carbon society in Japan



[FY2004-2008, Global Environmental Research Program, MOEJ] http://2050.nies.go.jp

Path toward Low-Carbon Society: Japan and Asia -Results from Japan Low-Carbon Society (LCS) Scenarios Study- on February 12, 2009 in Tokyo Organized by MOEJ and NIES

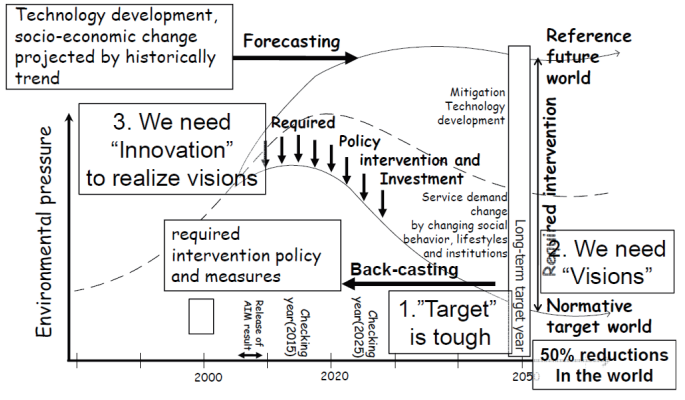
1st session "The results of 'Japan Low-Carbon Society Scenarios toward 2050' Project"

1. Necessary volume of global and Japanese CO2 reduction for 2050 (Prof. Norichika Kanie, Tokyo Institute of Technology, Japan)
2. Japan 70% CO2 emissions reduction scenarios by 2050: Roadmap and Dozen Actions toward LCSs by Backcasting Methodology (Dr. Junichi Fujino, NIES, Japan)
3. Potential of formation of low carbon cities and its analysis (Prof. Keisuke Hanaki, The University of Tokyo, Japan)
4. Transportation in Low Carbon Society (Dr. Yuichi Moriguchi, NIES, Japan)
5. Low Carbon Society Scenario: ICT and Ecodesign (Prof. Jun Fujimoto, The University of Tokyo, Japan)
6. Wrap-up: What has been done in "Japan Low-Carbon Society Scenarios toward 2050 Project" (Project leader Dr. Shuzo Nishioka, NIES, Japan)

All slides are available on Japan LCS study homepage: http://2050.nies.go.jp

Japan Low Carbon Society Scenarios toward 2050

[FY2004-2008, Global Environmental Research Program, MOEJ]



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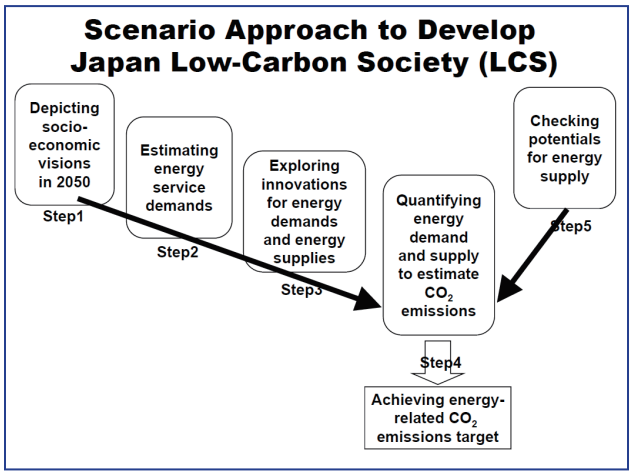
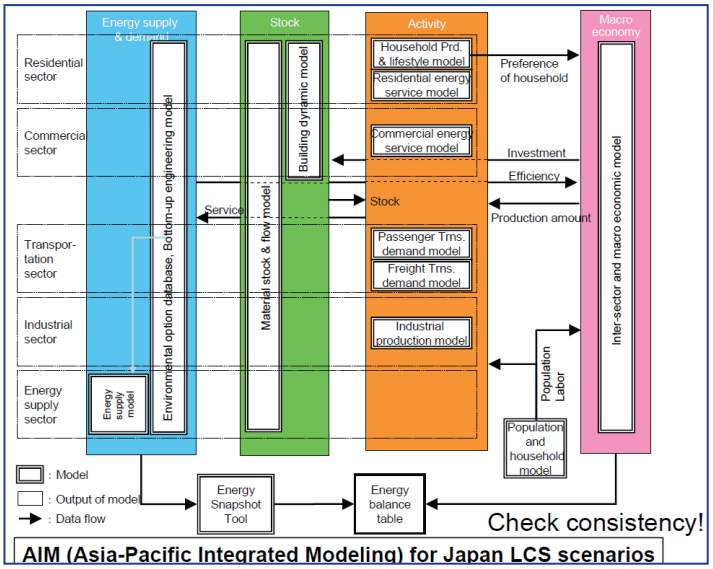
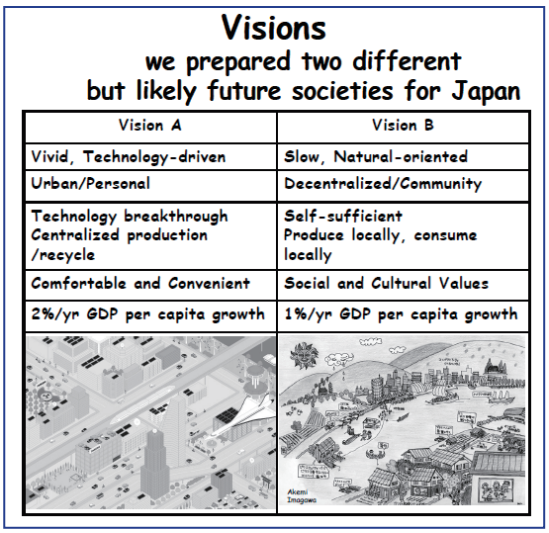
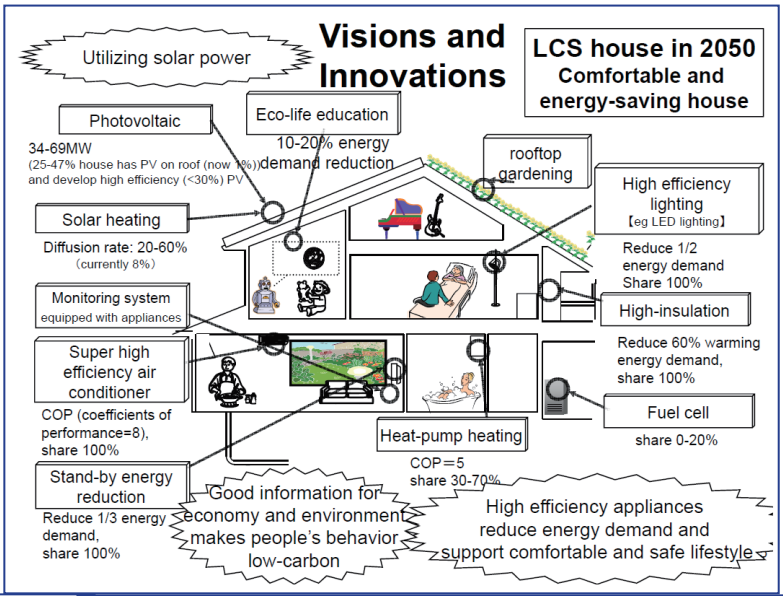
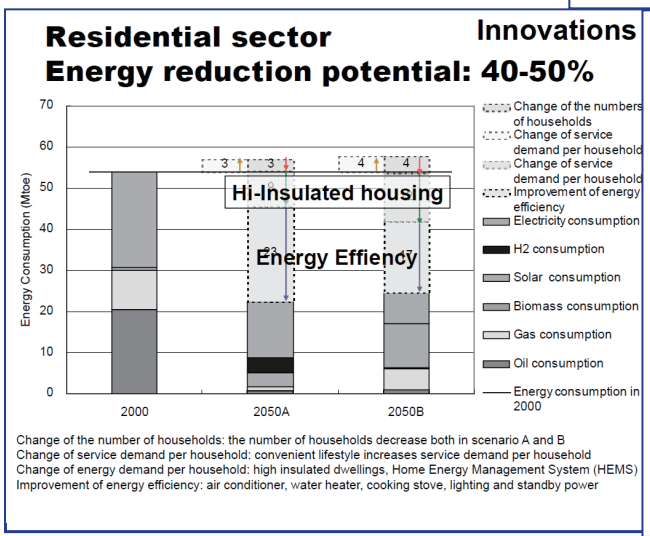
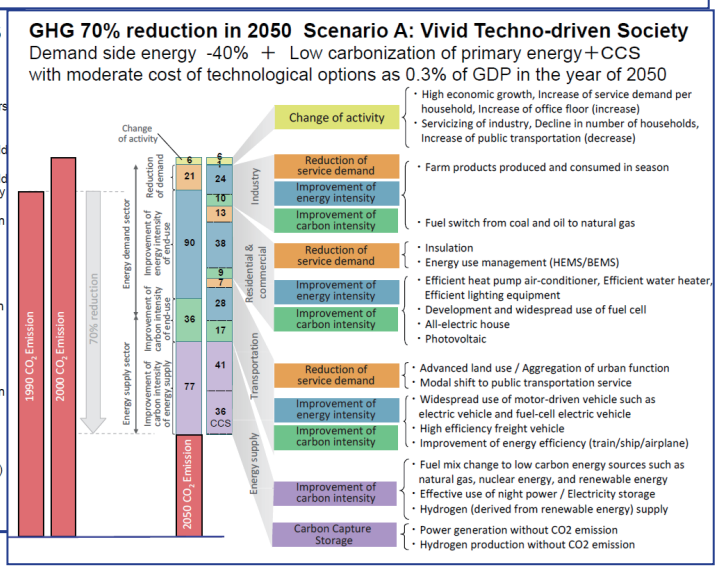

Scenario Approach to Develop Japan Low-Carbon Society (LCS)
Depicting socio-economic visions in 2050
Step1
Estimating energy service demands
Step2
Exploring innovations for energy demands and energy supplies
Step3
Quantifying energy demand and supply to estimate CO_2 emissions
Step4
Checking potentials for energy supply
Step5
Achieving energy-related CO_2 emissions target


Energy supply & demand
Stock
Activity
Macro economy
Residential sector
Commercial sector
Transpor-tation sector
Industrial sector
Energy supply sector
Household Prd. & lifestyle model
Residential energy service model
Commercial energy service model
Passenger Trns. demand model
Freight Trns. demand model
Industrial production model
Energy supply model
Environmental option database, Bottom-up engineering model
Material stock & flow model
Building dynamic model
Inter-sector and macro economic model
Population and household model
Preference of household
Investment
Efficiency
Stock
Service
Production amount
Population
Labor
: Model
: Output of model
: Data flow
Energy Snapshot Tool
Energy balance table
Check consistency!
AIM (Asia-Pacific Integrated Modeling) for Japan LCS scenarios


Visions
we prepared two different but likely future societies for Japan
Vision A
Vivid, Technology-driven
Urban/Personal
Technology breakthrough Centralized production /recycle
Comfortable and Convenient
2%/yr GDP per capita growth
Vision B
Slow, Natural-oriented
Decentralized/Community
Self-sufficient Produce locally, consume locally
Social and Cultural Values
1%/yr GDP per capita growth


Visions and Innovations
LCS house in 2050
Comfortable and energy-saving house
Utilizing solar power
Photovoltaic
34-69MW
(25-47% house has PV on roof (now 4%)) and develop high efficiency (<30%) PV
Eco-life education
10-20% energy demand reduction
rooftop gardening
High efficiency lighting
【eg LED lighting】
Reduce 1/2 energy demand
Share 100%
Solar heating
Diffusion rate: 20-60%
(currently 8%)
Monitoring system equipped with appliances
High-insulation
Reduce 60% warming energy demand, share 100%
Super high efficiency air conditioner
COP (coefficients of performance=8), share 100%
Fuel cell
share 0-20%
Heat-pump heating
COP=5
share 30-70%
Stand-by energy reduction
Reduce 1/3 energy demand, share 100%
Good information for economy and environment makes people's behavior low-carbon
High efficiency appliances reduce energy demand and support comfortable and safe lifestyle


Residential sector
Energy reduction potential: 40-50%
Innovations
Energy Consumption (Mtoe)
Hi-Insulated housing
Energy Effiency
2000
2050A
2050B
Change of the numbers of households
Change of service demand per household
Change of service demand per household
Improvement of energy efficiency
Electricity consumption
H2 consumption
Solar consumption
Biomass consumption
Gas consumption
Oil consumption
Energy consumption in 2000
Change of the number of households: the number of households decrease both in scenario A and B
Change of service demand per household: convenient lifestyle increases service demand per household
Change of energy demand per household: high insulated dwellings, Home Energy Management System (HEMS)
Improvement of energy efficiency: air conditioner, water heater, cooking stove, lighting and standby power


GHG 70% reduction in 2050 Scenario A: Vivid Techno-driven Society
Demand side energy -40% + Low carbonization of primary energy+CCS
with moderate cost of technological options as 0.3% of GDP in the year of 2050
1990 CO_2 Emission
2000 CO_2 Emission
70% reduction
2050 CO_2 Emission
Change of activity
Reduction of service demand
Improvement of energy intensity
Improvement of carbon intensity
Industry
Residential & commercial
Transportation
Energy supply
Carbon Capture Storage
・High economic growth, Increase of service demand per household, Increase of office floor (increase)
・Servicizing of industry, Decline in number of households, Increase of public transportation (decrease)
・Farm products produced and consumed in season
・Fuel switch from coal and oil to natural gas
・Insulation
・Energy use management (HEMS/BEMS)
・Efficient heat pump air-conditioner, Efficient water heater, Efficient lighting equipment
・Development and widespread use of fuel cell
・All-electric house
・Photovoltaic
・Advanced land use / Aggregation of urban function
・Modal shift to public transportation service
・Widespread use of motor-driven vehicle such as electric vehicle and fuel-cell electric vehicle
・High efficiency freight vehicle
・Improvement of energy efficiency (train/ship/airplane)
・Fuel mix change to low carbon energy sources such as natural gas, nuclear energy, and renewable energy
・Effective use of night power / Electricity storage
・Hydrogen (derived from renewable energy) supply
・Power generation without CO2 emission
・Hydrogen production without CO2 emission

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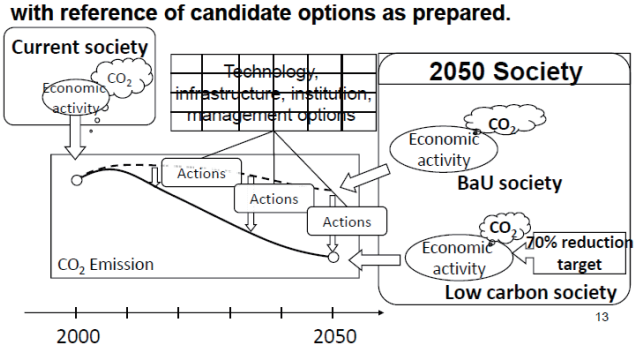
To achieve the 70% reduction goal by 2050, we investigated
- **which options should be selected,**
- **when options should be introduced,**
- **how much of each option should be introduced at each stage,**

with reference of candidate options as prepared.



A Dozen Actions towards Low-Carbon Societies

Press releas
on May 22, 200

Residential/commercial sector actions

1. Comfortable and Green Built Environment
Efficiently use of sunlight and energy efficient built environment design. Intelligent buildings.

2. Anytime, Anywhere Appropriate Appliances
Use of Top-runner and Appropriate appliances. Initial cost reduction by rent and release system resulting in improved availability.

Industrial sector actions

3. Promoting Seasonal Local Food
Supply of seasonal and safe low-carbon local foods for local cuisine

4. Sustainable Building Materials Using local and renewable buildings materials and products.

5. Environmentally Enlightened Business and Industry Businesses aiming at creating and operating in low carbon market. Supplying low carbon and high value-added goods and services through energy efficient production systems.

Transportation sector actions

6. Swift and Smooth Logistics
Networking seamless logistics systems with supply chain management, using both transportation and ICT infrastructure

7. Pedestrian Friendly City Design
City design requiring short trips and pedestrian (and bicycle) friendly transport, augmented by efficient public transport

Energy supply sector actions

8. Low-Carbon Electricity Supplying low carbon electricity by large-scale renewables, nuclear power and CCS-equipped fossil (and biomass) fired plants

9. Local Renewable Resources for Local Demand
Enhancing local renewables use, such as solar, wind, biomass and others.

10. Next Generation Fuels Development of carbon free hydrogen- and/or biomass-based energy supply system with required infrastructure

Cross-sector actions

11. Labeling to Encourage Smart and Rational Choices
Visualizing of energy use and CO2 costs information for smart choices of low carbon goods and service by consumers, and public acknowledgement of such consumers

12. Low-Carbon Society Leadership Human resource development for building "Low-Carbon Society" and recognizing extraordinary contributions.

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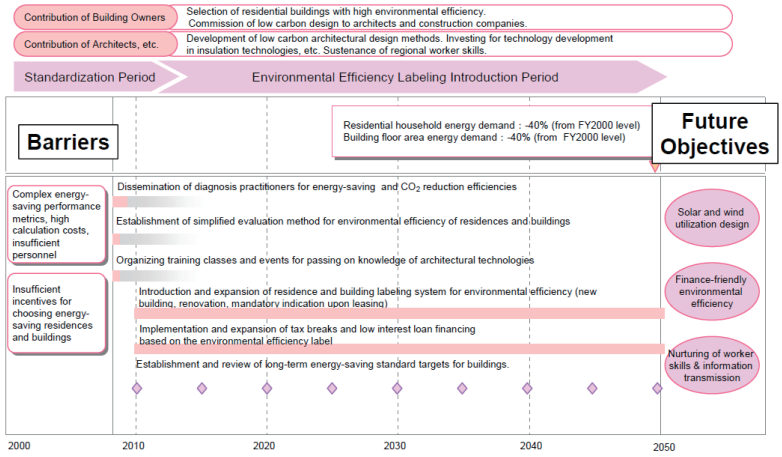
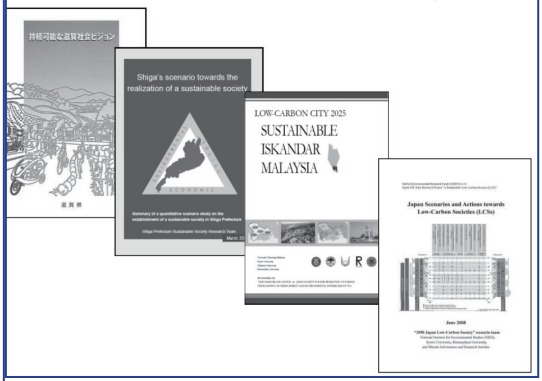
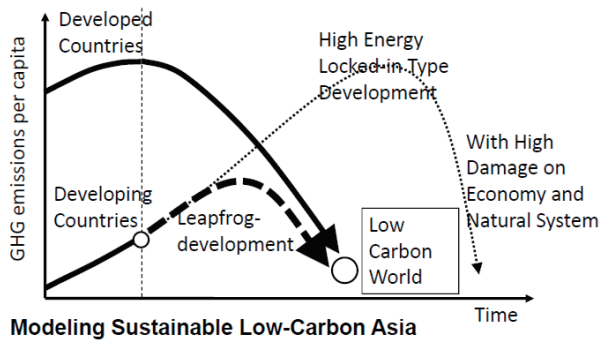
1. Comfortable and Green Built Environment



Demonstration and publicity material of our LCS study on national-level and sub-national-level analysis



2. Asian LCS scenarios study



Modeling Sustainable Low-Carbon Asia

We have just started new research project "Asian Low-Carbon Society Scenario Development Study" (project leader: Mikiko Kainuma) during FY2009-2013, funded by Global Environmental Research Program, MOEJ

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Path toward Low-Carbon Society: Japan and Asia -Results from Japan Low-Carbon Society (LCS) Scenarios Study- on February 12, 2009 in Tokyo Organized by MOEJ and NIES

2nd Session "Advancement of Low-Carbon Society Scenario Studies in Asian countries"

1. China Low Carbon Society Scenarios (Dr. Jiang Kejun, Energy Research Institute, National Development & Reform Commission, China)
2. India Low Carbon Society Scenarios (Prof. P.R. Shukla, Indian Institute of Management, India)
3. Thailand Low Carbon Society Scenarios (Prof. Ram Manohar Shrestha, Asian Institute of Technology, Thailand)
4. Implication of terrestrial carbon emissions in a LCS (Dr. Jae Edmonds, Pacific Northwest National Laboratory, USA)
5. Wrap-up "Direction of Low Carbon Asia Study (Dr. Mikiko Kainuma, NIES, Japan)

Workshop "Toward Low-Carbon Society: Japan Scenarios and Asian Challenge" on February 13, 2009 in Tsukuba

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All slides are available on Japan LCS study homepage: http://2050.nies.go.jp

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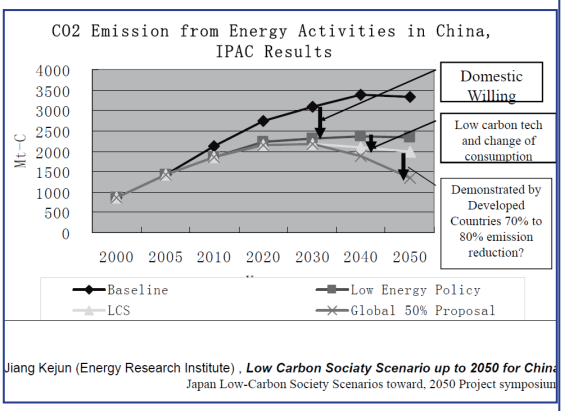

Jiang Kejun (Energy Research Institute) , ***Low Carbon Society Scenario up to 2050 for China***
Japan Low-Carbon Society Scenarios toward, 2050 Project symposium

Japan Low-Carbon Society Scenarios Toward 2050 Project Symposium, 12 February 2009 Tokyo, Japan
Ram M. Shrestha and Shreekar Pradhan (AIT)

Measures to achieve low carbon society during 2005-2050

Cleaner Fuel Use and Environment Friendly Public Transport System

Use of non-motorized transport systems
- shift to non-motorized transport

Master plan for compact cities
- Lowers travel demand

Public transport friendly design of cities and transport system
- modal shift, higher use of Mass Rapid Transits

Use of clean fuel and efficient vehicles
- improving efficiency and lowering carbon intensity of energy use in transport; promoting biofuels.

Energy Efficiency Improvements (End Use and Industrial Production)

Labeling on electrical appliances

Energy auditing – promoting use of efficient technology in industries

Carbon emission labeling of industrial products
- Promoting use of low carbon products.

Low Carbon Electricity Generation

Efficient and cleaner power generation
- Promoting natural gas based advanced combined cycle power plants

Renewable Portfolio Standard (RPS)
- Biomass based power
- Solar based power

Nuclear power generation

Natural gas use in electricity generation

Building Insulation in Residential and Commercial Sector

Building codes
- Regulatory measures to lower energy use

Financial incentives through Energy Conservation Fund

Public awareness campaign
- to promote voluntary measures

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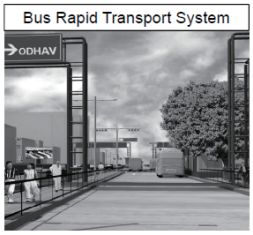
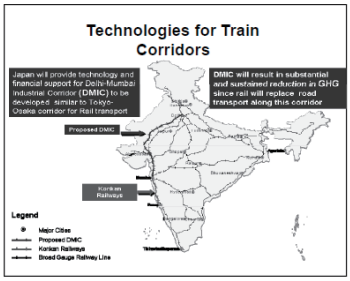
Sustainable Cities: Planning and Infrastructures

- Land-use Planning
- Building Choices
- Infrastructures
- Service Networks

Bus Rapid Transport System



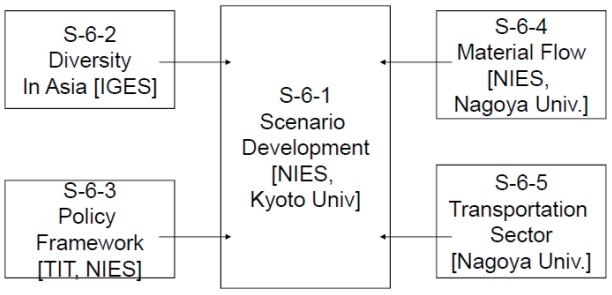
Technologies for Train Corridors



Low-Carbon Society Scenarios for India:
Aligning Sustainable Development and Climate Actions
P.R. Shukla, Indian Institute of Management*
Japan Low Carbon Society Scenarios toward 2050 Project Symposium*
Tokyo, Japan, February 12, 2009

Indian Institute of Management, Ahmedabad, India

Asian Low-Carbon Society Scenarios toward 2050 (S-6)



Qualitative Analysis

Quantitative Analysis

[FY2009-2013, Global Environmental Research Program, MOE]

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What are the Asian low carbon societies we will design in this study?

By the middle of this century (2050), the target societies will satisfy the followings;

1. Harmonized with drastically changing future Asian society and economy,
2. complying with each country's national reduction target that consists with the global low carbon target, under the global, national and regional constraints on fossil and renewal energy resources, and land resource,
3. developing/devising/promoting LCS policies based on each region's characteristics,
4. and also utilizing effectively co-benefits of LCS policies and neighboring policies.

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Japanese Former PM outlines green 'Fukuda vision' on 9th June 2008 pledged to cut of 60-80 per cent of greenhouse gas emissions based on current levels by 2050 in Japan.

Japanese government set "Action Plan for Achieving a Low-carbon Society" on 29th July 2008 (http://www.kantei.go.jp/foreign/policy/ondanka/080729.pdf).

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Japan LCS research project and Japanese CC policy

- Feb 13th 2007 Interim Report "Japan Scenarios torwards Low-Carbon Society (LCS) -Feasibility study for 70% CO2 emission reduction by 2050 below 1990 level-"
- May 24th 2007 Former Prime Minister Abe launched "Cool Earth 50" to reduce 50% GHG emissions by 2050
- March 2008 Japan-UK joint LCS research project released "Call for Action" to G20 in Chiba and G8 EMM in Kobe
- May 22nd 2008 Interim Report "Dozen Actions towards LCSs"
- June 9th 2008 Former Prime Minister Fukuda set the target of Japanese CO2 emissions reduction by 60-80% in 2050
- July 29th 2008 Japanese government set "Action Plan for Achieving a Low-carbon Society"

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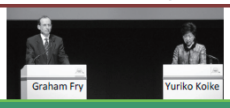
Japan-UK Joint Research Project Sustainable Low-Carbon Societies (LCSs)

(Co-chairs : Shuzo Nishioka(NIES) and Jim Skea(UKERC))

In 2006, the Governments of Japan and UK established an innovative joint research project with participation from a diverse group of some 20 countries including most G8+5 countries, Asian countries (Australia, Korea, Thailand, Nepal, Malaysia, Indonesia), African countries, and others.

■ Launch of the Project : 16th Feb 2006 (Anniversary of Kyoto Protocol)



Former Japanese Environment Minister Yuriko Koike and UK Ambassador to Japan Sir. Graham Fry announced the launch of the joint research of the Low-Carbon Society.

■ 1st Workshop: June 2006
Developing Visions for a LCS through Sustainable Development

WS: 19 countries, 54 experts
Symposium: around 500 people

Tokyo

- A long-term perspective focusing on the need for urgent action to reduce CO_2 towards 2050.
- Achievement of LCS will involve the development and deployment of low carbon technologies, changes in lifestyles and institutions, and need to align with sustainable development.

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■ 2nd Workshop: June 2007 **Achieving a Sustainable LCS**

London 30 countries,100 participants

- A wide range of stakeholders- from government, business, and civil society need to be engaged in finding solutions.
- A significant share of GHG is due to cities. Effective Action can be and is being undertaken.

■ 3rd Workshop : Feb 2008 **Roadmap to Low Carbon World**

Tokyo

WS: 18 countries, 79 experts
Symposium: 273 participants

- Creation of appropriate incentives for business using long-term policy signals to strengthen carbon pricing.
- Expanding financial flows, international cooperation in low-carbon approaches.
- Building trust between countries and stakeholders though enhancement of communication is important.

"Call for Action" and WS3 "Executive Summary" were delivered to G20 in Chiba, March 14-16 2008.

G8 Gleneagles 2005 ⇒ **G8 Environmental Ministerial Meeting, May 2008 G8 Japan, July 2008**

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Side Event at UNFCCC/COP

- COP11 (2005), "Global Challenges Toward Low-Carbon Economy -Focus on Country-Specific Scenario Analysis-"
- COP12 (2006), "Global Challenges toward Low-Carbon Society (LCS) through Sustainable Development (SD)"
- COP13 (2007), "Low-Carbon Asia: To be or not to be"
- COP14 (2008), "Sustainable Low-carbon Asia: How can it change the post-2012 climate negotiations?"
- COP15 (2009), …

COP11 (2005), Montreal

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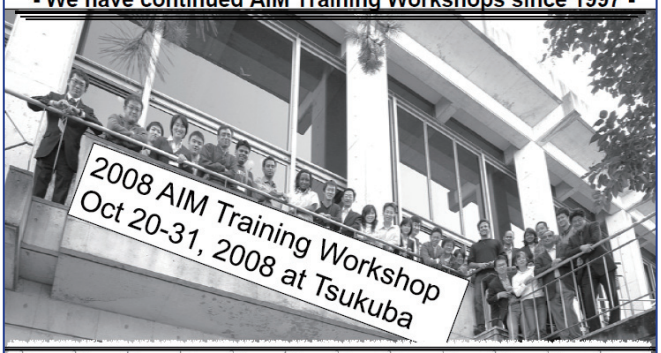
We support country-wise LCS modeling through SD for Asia-Pacific and the world
- We have continued AIM Training Workshops since 1997 -



India China Thailand Korea Malaysia Indonesia Brazil Russia South Africa Taiwan, China USA Japan

http://2050.nies.go.jp

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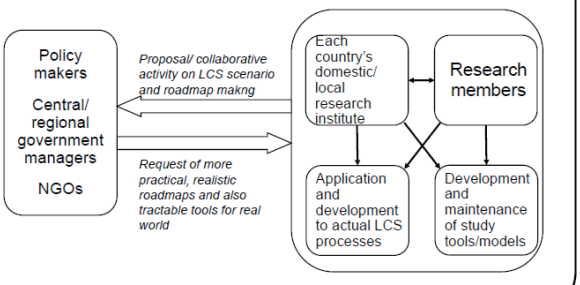
Expectations on LCS-RNet: "How to deploy our study to real world?"



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PRESENTATIONS: Day 2 2nd Session ENEA

Climate research in Enea

Vincenzo Artale

Rome, Italy

ENEA
Italian National Agency for New Technologies, Energy and the Environment

ENEA is a public agency operating in the fields of energy, the environment and new technologies

ENEA research activities are carried out by five Departments and 11 Research Centers with about 3000 scientists and technicians:

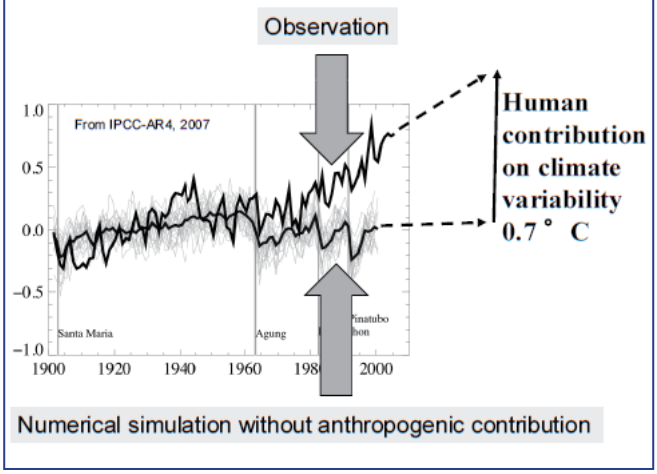
1. Advanced physical technologies and new materials
2. Biotechnologies, agro-industry and health protection
3. Energy technologies, efficiency and renewable sources
4. Environment, global change and sustainable development
5. Nuclear Fusion and Fission, and related technologies.

The climate problem in few words….

Various atmospheric gases contribute to the green house effect, whose impact in clear skies is 60% from water vapor, 25% from carbon dioxide, 8% from ozone and the rest from trace gases including methane and nitrous dioxide

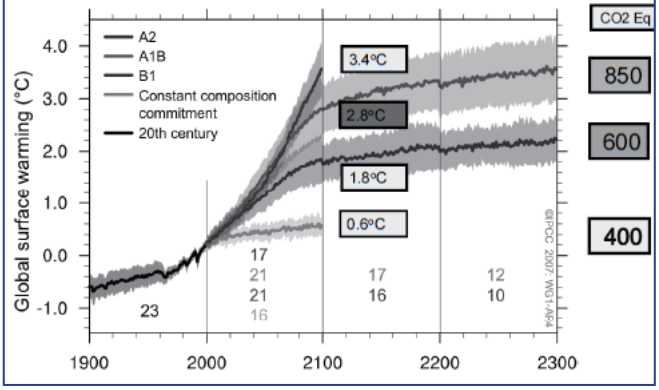
on average the energy from the sun received at the top of the Earth's atmosphere amounts to 175 petawatts of which 31% is reflected by clouds and from surface, the rest 120 PW is absorbed by the climate system and ultimately emitted back to space as infrared radiation

Total human energy use is about a factor of 9000 less than the natural flow



What's in the pipeline and what could come

Warming will increase if GHG increase. If GHG were kept fixed at current levels, a committed 0.6° C of further warming would be expected by 2100. More warming would accompany more emission.



Is the climate change only a physical problem?

We have to achieve to the following key scientific issues

improve our comprehension on the climate processes by observation, theory and modelling in order to define the assessment and vulnerability of the climate system define mitigation actions or socio-economics questions

How can a global accord for climate protection be reached that goes significantly beyond the Kyoto Protocol?

What are the costs of these strategies, how can politics and business be alerted to the economic and societal consequences if no action is taken, or if action is not taken early enough

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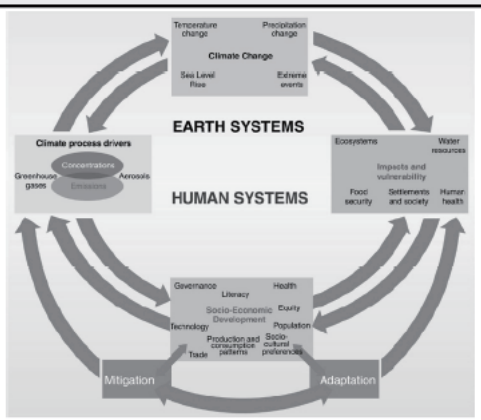
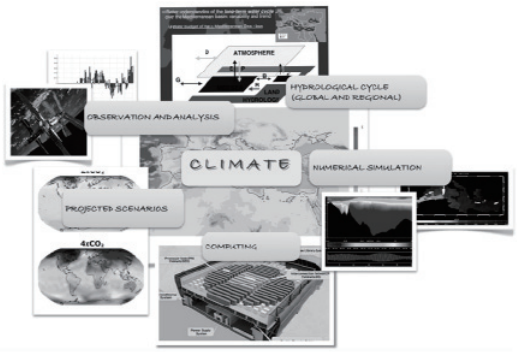
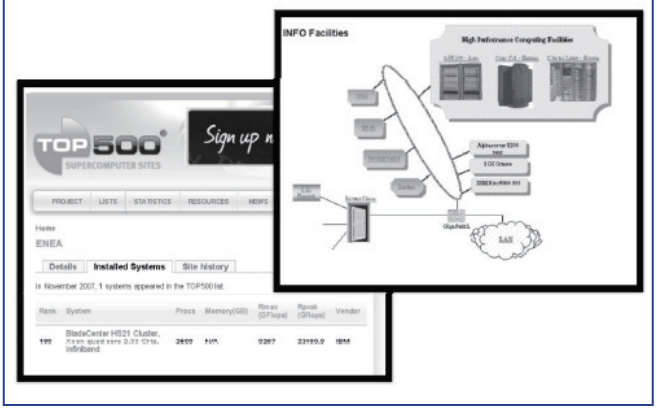
Connect the EARTH SYSTEM with the HUMAN SYSTEM



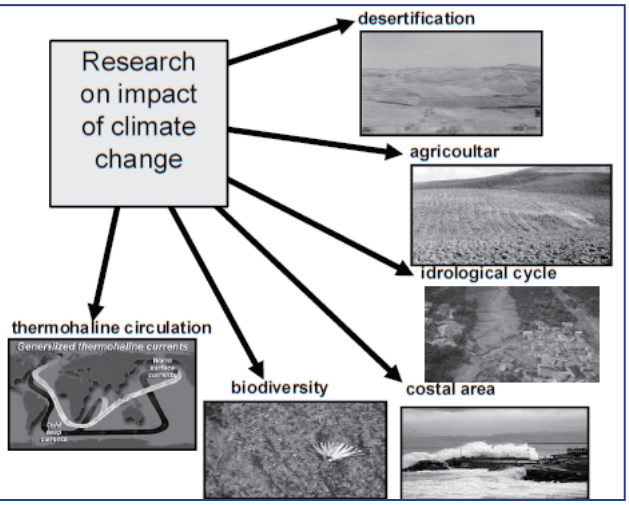
Enea contribution on climate research (Mediterranean Region)



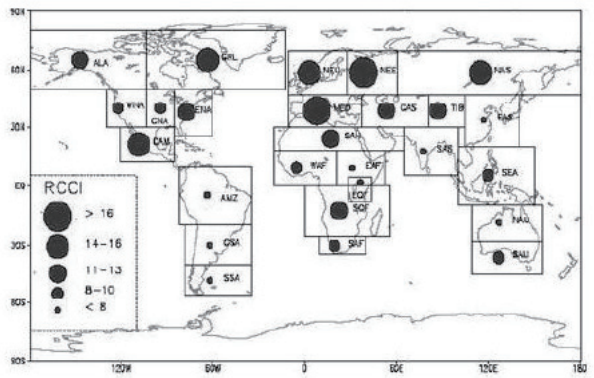
Computing resources



Research on impact of climate change



Vulnerability of the *different* region from Giorgi, 2005



Climate Change is a global problem and needs an international consensus, however important decision have to be taken at regional level therefore we have to develop an integrated regional models

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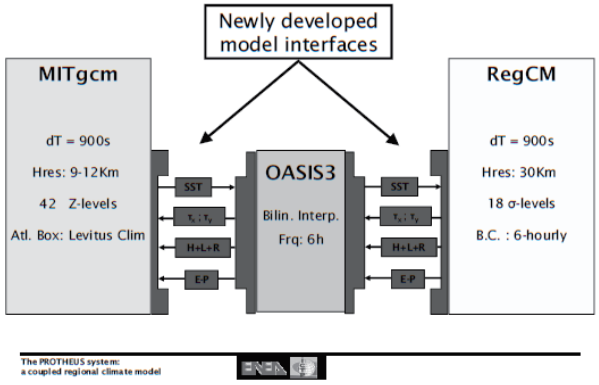
A Regional Earth System Model for climate change and impact studies

Why we need a Regional Earth System Model?

- To represent the hydrological cycle (rivers, glaciers, vegetation, ocean-atmosphere interaction)
- To represent the regional radiative forcing (different aerosols sources, complete chemistry)
- To integrate more and more complex geo-physical and human processes

The PROTHEUS system:
a coupled regional climate model

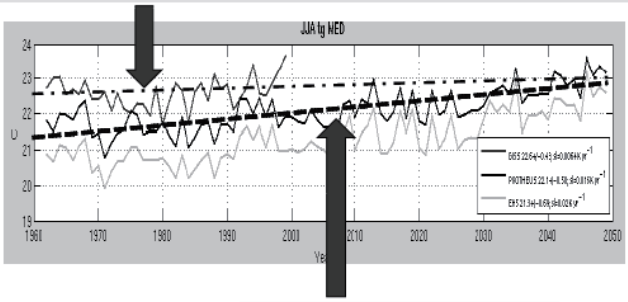
The coupling system



The PROTHEUS system:
a coupled regional climate model

SST AVERAGED OVER THE WHOLE BASIN IN SUMMER

0.02-0.03/decade from the past observation or 0.06/decade for the last 50 yrs



0.16/decade from our scenario

Some Conclusion

From a review of all available data set for the Mediterranean Sea we found an warming trend of 0.022 ° C/decade in SST over the last 150 yrs, moreover in the Gulf of Cadiz the MOW displays a trend of 0.16 ° C/decade and 0.05/decade in salinity over the last 50 yrs;

The Mediterranean isn't a isolated basin, but is a relevant component of the North Atlantic climate system

From future scenario, A1B, our couple model (Protheus System) predicts significant interannual variability and acceleration of warming in particular after the 2020 with an average value of 0.16 ° C/decade;

The Mediterranean area is one of the more vulnerable area in the world and needs a urgent policy of mitigation and adaptation

Protheus will be applied for impact studies and their economical evaluation at regional and local level not only for the Mediterranean region

ENEA
ENTE PER LE NUOVE TECNOLOGIE, L'ENERGIA E L'AMBIENTE

Department of Energy technologies, efficiency and renewable sources

Overview of activities

Agostino Iacobazzi
ENEA, Department of Energy technologies, efficiency and renewable sources
C.R. Casaccia, Via Anguillarese 301, 00123 S. Maria di Galeria (ROMA)
agostino.iacobazzi@enea.it

MR2008-1

Main fields of interest

ENEA

Low carbon energy production

- Renewable Energy Sources
  - Photovoltaic
  - Bioenergy
  - Concentrated Solar Power
- Advanced technologies
  - Clean coal
  - Carbon Capture and Sequestration
  - Nuclear (Fission and Fusion)
  - Fuel cells
  - Hydrogen

Efficient end-use technologies

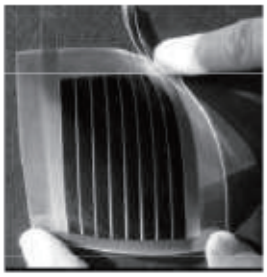
- Stationary
  - Ecobuilduing
  - Smart grids
  - Energy storage
- Transportation
  - Mobility
  - Advanced vehicles
  - Energy storage

Short term | Medium term | Long term

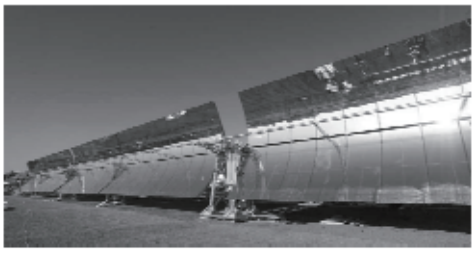
Low carbon energy production
Renewable Energy Sources

ENEA

- Photovoltaic
  - ✓ Concentrated c-Si
  - ✓ Advanced c-Si
  - ✓ Thin-film and organic



- Concentrated Solar Power
  - ✓ Electric energy production
  - ✓ Hybrid plants (Biomass+solar)
  - ✓ Dissalation
  - ✓ Solar cooling

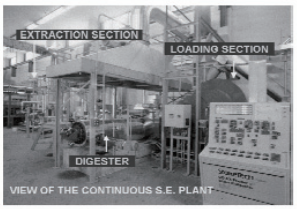


ENEA

Low carbon energy production
Renewable Energy Sources

ENEA

- Bioenergy
  - ✓ 2nd generation biofuels (biodiesel and bioethanol)
  - ✓ Biomass and waste gasification
  - ✓ Algae and bacteria



Low carbon energy production
Advanced technologies

ENEA

- Clean Coal
  - ✓ advanced coal gasification systems
  - ✓ H2 – O2 combustion
  - ✓ Carbon capture systems
- Carbon Capture and Sequestration
  - ✓ Deep saline aquifers
  - ✓ ECBM
- Nuclear
  - ✓ GEN IV fission
  - ✓ Fusion (ITER, DEMO)

Low carbon energy production
Advanced technologies

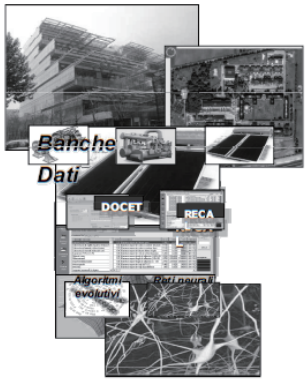
ENEA

- Fuel cells
  - ✓ Proton Exchange Membrane (PEM)
  - ✓ Molten Carbonate (MCFC)
  - ✓ Solide Oxide (SOFC)
  - ✓ Material, component and systems
- Hydrogen
  - ✓ Production (fossil fuels, RES)
  - ✓ Storage (hydrides, nanostructures)
  - ✓ Utilization (Fuel cells, ICEs, thermal cycles

Efficient end-use technologies
Stationary

ENEA

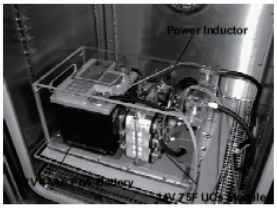
- Energy efficiency
  - ✓ Ecobuilding
  - ✓ Components and systems
- Smart grids
  - ✓ Distributed Generation
  - ✓ Power Parks and districts
  - ✓ Optimization - "ODESSE " ENEA Platform (*Optimal DESign for Smart Energy*)



Efficient end-use technologies
Transportation

ENEA

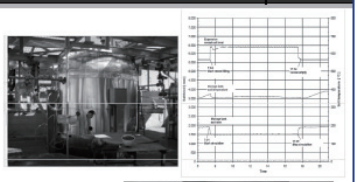
- Mobility
  - ✓ Transport modelling and optimisation
  - ✓ DSS for Transport Planning
  - ✓ Optimisation models for freight logistic and operation
- Advanced Vehicles
  - ➢ Components development
  - ➢ Power train development
  - ➢ Testing facilities

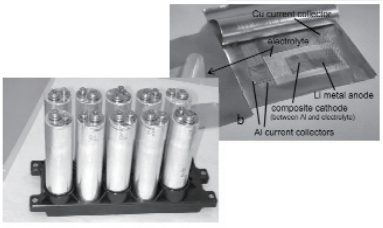


Efficient end-use technologies
Energy storage

ENEA

- Thermal
  - ✓ Motlen salt heat storage for CSP plants
- Electric
  - ➢ Advanced batteries (Li-ion, ionic liquids)
  - ➢ Supercapacitors
  - ➢ Power management
  - ➢ Testing facilities





ADEME

Towards a Low Carbon Society

ADEME's R&D activities

Daniel Clément
Research Director – ADEME
daniel.clement@ademe.fr

www.ademe.fr

Outlines

- ADEME's R&D activities and orientations ;
- An exemple : NEDO – ADEME energy R&D cooperation ;
- Trends on energy R&D international cooperation.

NB: ADEME is not a research institute (no labs) nor a research policy maker. ADEME implement the research components of environment and energy policy.

The French Agency for Environment and Energy Management (ADEME)

- A public agency under the supervision of :
  - The Ministry for Research and Higher Education (MESR) ;
  - The Ministry of Ecology, Energy and Sustainable Planning and Development (MEEDDAT).
- A public agency with four main activities contracted with the French State
  - Acquire knowledge (R&D) ;
  - Convince and mobilize ;
  - Advise ;
  - Help in decision making.

ADEME's R&D Key indicators

- A 2009 budget of €638 million (a €557-million action budget including 50 million euros for R&D and an operating budget of €81 million);
- **A demonstrator funds** in the field **of new energy technologies for 400 million euros** for the four next years (145 M€ in 2009);
- **Over 70%** of the ADEME's R&D budget dedicates **to energy related R&D projects;**
- **A staff of 820 employees including 140 "scientific officers"**.
- **30 sites (3 centers, 26 regional implantations, 1 office in Brussels)**

ADEME's R&D activities and orientations over the period 2007 – 2010

ADEME's R&D activities

- **Funding research and innovation** in the field of non nuclear energy, energy efficiency, waste treatment, soils and air pollution ;
- Funding R&D demonstration through the recent « **research demonstrator funds** » ;
- Prepare the scientific basis for the implementation of **energy and environmental regulation and standards** *(bonus – malus, ETS…)* ;
- **Build shared technological and societal vision** to drive the R&D programming process *(road maps on private vehicle and fuels combination, on CCS, on 2d generation biofuel…)*
- **Ensure strategic intelligence** regarding technological and societal initiatives than could conduct to significant breakthrough.

ADEME

Role of ADEME for R & D

- Orientation, animation, and financing research programmes
  - *"from laboratory to use, and vice versa"*
- Structuration of public and private research
  Speeding up innovation process
- Different modalities of support, depending of advancement of research and innovation
  tenders, demonstration projects, development of methods, …
- Each year ADEME finances 80 new PhD's scholarships

Objectives of ADEME

- Participate to national programmes in energy and environment :
  - *PREDIT, PREBAT, Energy efficiency, etc.*
- Contribute at the EU level to the implementation of the 7th research and development framework programme "energy, environment and sustainable development :
  - *ADEME is the National Contact Point for energy and environment*
- International cooperation

ADEME'S involvement in R&D Int'l relationships

- AIE's Implementing agreements and collaborations
  - EUWP, REWP, AGHSET, R&D priority setting…
  - Fuel Cells
  - BIO-energy
  - Buildings
  - PV system & small grids
  - …
- International Partnership for Hydrogen Economy (IPHE)
- Carbon Storage Leader Forum (CSLF) with Institut Français du Pétrole (IFP) and Bureau de Recherches Géologiques et Minières (BRGM)
- **…**

10 R&D pilot programs over 2007 - 2010

Development and experimentation of new technologies and social organizations	Clean and energy efficient transportation
	Energy efficient buildings
	Capture and storage of CO_2
	Electricity production based on renewable resources
	Bioenergy and bioproduct
	Intelligent energy network and storage
	Eco-technology
Acquire knowledge	Impact of air pollution and noise
	Impact of soils pollution and environmental waste assessment
	Foresight and socio-economics

Some technical programmes

Clean and efficient transport systems (PREDIT Programme)

- Support Clean and efficient technologies and fuels for transport
  (including efficient batteries for energy storage, performant and hydrogen engines, hybrid systems, fuel cells, biofuels)
- Systemic approach (both organisational and technological)
- Research projects with car manufacturers (to reduce emissions and unit consumptions)
- Research projects with enterprises and cities or groups of cities governments (local, district, regional level)

ADEME

Efficient buildings (PREBAT)

- Energy performance of new and existing buildings by year 2050
- A zero energy balance in buildings
- Development of new materials and new technologies for insulation, heating, air conditioning, lighting
- New conception in architecture and construction
- Promotion of high environmental quality
- Study of dwellers behaviour

Carbon capture and storage, and mineral sequestration

- Reduction of capture and transportation costs
- Testing and validation of technical and geological solutions – storage in deep aquifers or in depleted oil and gas reservoirs with the possibility of recovery of additional oil
- Extending the methodologies : exchanges of experience – exploring all options (trapping CO2 at source, concentration with combustion using 02 – transforming fossil fuels into synthesis gas...)
- **CO2 capture and storage towards a cleaner use of fossil fuels but the societal acceptance is to be experiment**...

GREEN electricity : PV solar energy

- Increase of cells and modules efficiency (today 7-8 kwp for 10 m2)
- Reduction of costs manufacturing
- Improvement of conversion efficiency of solar modules
- Integration of solar modules in buildings
- Better reliability
- Accordance with EU climate-energy package
- In 2008 : 18 MW PV in the grid
- 2020 : 5 800 MW (yearly growth 130 %)

Biofuels and bio-resources

- Enlargement of the use of different bio-resources from agriculture and forestry
- Production of biofuels from ligno-cellulose biomass conversion
- Studies on gasification of biomaterials to produce biofuels (ethanol)
- Production of synfuel (gasification of organic wastes, wood, feedstocks, etc...)
- **Socio-economic aspects**

Environmental friendly technologies

- Cogeneration
- Ecoconception
- Energy efficiency programmes
- Recycling and revalorization
- Innovative chemical and physical techniques
  - Catalysis and photocatalysis,
  - Gasification (solid wastes, sludges, sugarcane and beet wastes, tires, RDF, etc.),
  - Membrane processes,
  - Electrolysis,
  - Treatment of different kinds of sludge (industrial, sewage plants, and dredged sludge)
  - Pipeline integrity management systems (safety and security against illegal tapings) and no-digs pipe-laying
- Biochemical techniques (biofuels, composting, methanization)

Impact and prospective programmes

ADEME

Impact programmes (air, noise, soils, waste)

- To improve the knowledge on pollution
- To develop metrology and new evaluation methodologies
- To develop new tools and studies (for modelisation, characterization, etc.)
- **To study links between health and environment**

Prospective and socio-economy

- To define strategies at national, regional and local levels
- To evaluate cost and impacts of new decisions
- To convince decision-makers and suggest exchange and debates among the actors

An Exemple The NEDO – ADEME energy R&D cooperation

Why a cooperation between ADEME and NEDO ?

- **A similar energy situation :**
  - Few domestic fossil resources ;
  - High potential for renewable energy development.
- **A complementarity in R&D competences :**
  - Japan is a major player in technological development ;
  - France is a major player in system optimization.
- **Strong industrial links :**
  - Transport sector with the Renault – Nissan cooperation
  - Electricity sector with the EDF – TOYOTA Cooperation (+IERE)
  - Buildings with the links between St Gobain and AIST

Five objectives for the ADEME – NEDO R&D cooperation

- **Share** visions and roadmaps on energy R&D topics ;
- **Compare** energy R&D programs contents and objectives **;**
- **Create** new technological and industrial cooperation between the two countries **;**
- **Share and discuss** the *ex post* evaluation results of energy R&D programs **;**
- **Discuss** on institutional R&D organization in the two countries **;**

ADEME – NEDO cooperation : The major results

- **2006** : A **kick of** cooperation seminar ;
- **2007** : A seminar on **renewable energy integration in buildings** with the CSTB ;
- **2007** : A seminar on **transportation roadmap** with the IFP and the key French and Japanese cars manufacturers ;
- **2008** : A seminar on **intelligent electricity networks** with EDF R&D

ADEME

Cooperation Trends

The ADEME – NEDO R&D cooperation

- **3 keys orientations are under discussion :**
  - **Co-funding of R&D demonstrators** (especially PV and intelligent electricity networks) **;**
  - **Building common technological and societal roadmaps and visions** (ie : urban mobility and urban vehicles) **;**
  - **Pursuit of energy R&D program comparison** with a special attention on the **enrollment of industrials** from the two countries.

Focus : PV and smart networks

- **To facilitate RE integration in electric grids**
- **New tools for grids management**
- **New technologies (energy storage for instance)**
- **In France, a R&D program coordinates by ADEME to be implemented**
- **In Europe a technologic platform (Smart Grid) gathered private and public stakeholders**
- **A demonstrator with NEDO in discussion (Japanese background of Ota City – 533 houses or MEGA SOLAR Plant in Hokuto - 2MW in 2010).**

The R&D cooperation with the European and developing countries (1/2)

At the European level

- Studying the **opportunity** created by the **joint programming process** *(UE communication on Joint Programming)* **;**
- **Create a regular dialogue** with the DG research on **the R&D priorities included in the FP 7 working program** *(18th September seminar on biofuels, energy efficiciency and renewable energies)* **;**
- **Pursue** our enrollment in **the ERA-Net.**

The R&D cooperation and developing countries

The developing countries **:**

- **Today :** No specific R&D cooperation with the developing countries;
- **Tomorrow : Strategic cooperation on particular topics :**
  - **Mediterranean countries on solar energy;**
  - **Using ADEME – CNRS agreement to create a R&D cooperation with China;**
  - **Biofuels with Brazil;**
  - **…**

ADEME and LCS-RNet

- **ADEME is interested in contribute to the development of a research community dedicated to LCS.**
- **ADEME can experiment and implement the responses proposed by the LCS-RNet. Especially among the society and in collaboration with local authorities…**
- **ADEME can contribute to share and to disseminate the results in the local, national, European and international spheres.**

IGES

Institute for Global Environmental Strategies

Introduction of LCS-related Research and Activities

Takashi OTSUKA

Programme Management Office
IGES

Low Carbon Societies Research at IGES

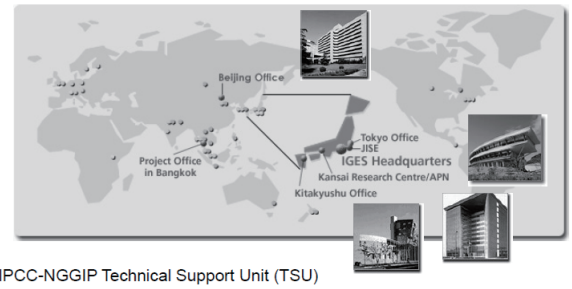
Introduction to IGES

- The Institute for Global Environmental Strategies (IGES) established in 1998 is a research institute conducts pragmatic and strategic policy research on global environmental issues.
- **Policy research**: IGES proposes policies and institutional frameworks that aim to create a new type of environmentally sound and socially equitable society.
- **Focus on Asia-Pacific**: IGES focuses on sustainable development in the Asia-Pacific, a region experiencing rapid growth in industrial activity and population, with serious implications for the future global environment.
- **Outreach to stakeholders**: IGES aims to produce outputs that can be utilised in the decision-making of various actors, including national and local governments, businesses, NGOs, citizens as well as international organisations.

Low Carbon Societies Research at IGES

Blanch Offices and Partners

A total of 48 signatory organisations as of March 2009



- IPCC-NGGIP Technical Support Unit (TSU)
- Asia-Pacific Network for Global Change Research(APN)
- Japanese Center for International Studies in Ecology (IGES-JISE)

Low Carbon Societies Research at IGES

Thematic Areas of Research

- Issue oriented research:
  - Climate Change (post-2012 regime, adaptation, sustainable development co-benefits, market/financial mechanisms , technology transfer, transportation, LCS in Asia), Biofuels, Forest Conservation, Freshwater Management, and Waste Management and Resource Efficiency.
- Stakeholder oriented research:
  - Business and the Environment, Capacity Development and Education
- Other cross-cutting issues:
  - Urban/local Initiatives for Sustainable Society/LCS.






Low Carbon Societies Research at IGES

IGES LCS-related Research and Activities (1)

IGES White Paper

- "Climate Change Policies in the Asia-Pacific: Re-uniting Climate Change and Sustainable Development" published in 2008.
- Summary of current climate change policies and recommendations.
- Key climate issues in Asia-Pacific context, namely post-2012 regime, adaptation, sustainable development co-benefits, and market mechanisms were discussed.
- Further complexities in aligning climate concerns and sustainable development were also debated in relation to forestry, freshwater, and etc.
- Recommendations focused on that integration of climate change policies and sustainable development and showed the way for new development towards the realisation of LCS.

Low Carbon Societies Research at IGES

IGES LCS-related Research and Activities (2)

LCS-Asia Study: Integrated Research on the Mid- and Long-Term Policy Options toward LCS in Asia

- Based on the experience of participating to Japan LCS Scenarios Study
- Joint research with NIES and others
- IGES covers:
  - Development Patterns: "Are countries in Asia in a good position to pursue Low Carbon Development?" "Unique context in each country?
  - Sustainable Development Co-benefits
  - Leap-frog technologies (energy, industry, transportation, agriculture, etc.)
  - Value and wisdoms to anchor Low Carbon Development

IGES

Low Carbon Societies Research at IGES

IGES LCS-related Research and Activities (3)

Facilitation of global/regional discourses/dialogues

- Regional Consultations on the Post-2012 Climate Regime since 2005
- Secretariat for Asia-Pacific Forum for Environment and Development (APFED) since 2001
- Preparation of discussion papers (climate change, 3R and biodiversity) for Kobe G8 Environment Ministers Meeting in 2008
- Providing technical inputs to CC related high level policy dialogue in Indonesia w/ JICA and AFD since 2008
- Secretariat for LCS-RNet since 2008

Takashi OTSUKA | IGES | http://www.iges.or.jp | LCS-RNet Researchers Meeting, 1-2 April 2009, Trieste, Italy

Low Carbon Societies Research at IGES

Linkage to International Organisations and Processes

- Other involvement in important policy processes and close association international/regional organisations include:
  - UNFCCC, WWF, and the 3R Initiative
  - Asia Europe Foundation (ASEF) under the framework of the Asia Europe Meeting (ASEM)
  - Asian Environmental Compliance and Enforcement Network (AECEN) by USAID
  - ADB, UNESCAP, UNEP-ROAP, ASEAN

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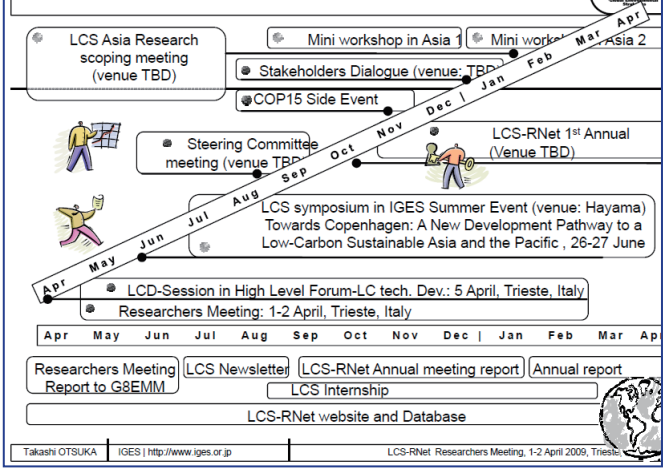


Takashi OTSUKA | IGES | http://www.iges.or.jp | LCS-RNet Researchers Meeting, 1-2 April 2009, Trieste, Italy

Low Carbon Societies Research at IGES

Envisaged contribution to / Expectation from LCS-RNet

- Collaboratively develop and disseminate timely messages to relevant stakeholders including policy makers, business, NGOs, citizens, etc., through:
- Sharing findings from LCS Asia study, Asian LCS model cities study, and other studies ongoing and being developed.
- Promotion of LCS research and stakeholder dialogues in Asia including "Towards Copenhagen: A New Development Pathway to a Low-Carbon Sustainable Asia and the Pacific" on 26-27June 2009.

Takashi OTSUKA | IGES | http://www.iges.or.jp | LCS-RNet Researchers Meeting, 1-2 April 2009, Trieste, Italy

Low Carbon Societies Research at IGES

See you all in Hayama!

Takashi OTSUKA | IGES | http://www.iges.or.jp | LCS-RNet Researchers Meeting, 1-2 April 2009, Trieste, Italy

PRESENTATIONS: Day 2 3rd Session NIER

Research Activities for Low Carbon Society in KOREA

2009. 4.

National Institute of Environmental Research KOREA

Contents

I National Institute of Environmental Research

History

July 1978	Established as the National Environmental Protection Institute (NEPI) under the Ministry of Health and Social Affairs
Jan. 1980	NEPI was incorporated into Environmental Administration
Oct. 1986	NEPI was reorganized the National Institute of Environmental Research (NIER) (3 departments, 2 divisions and 14 offices)
July 2000	Moved to Environmental Research Complex at Incheon
July 2005	Reorganized focusing on research functions covering an Environmental Media
March 2007	Created Environmental Health Research Department (6 departments, 24 divisions and 6 centers)
April 2008	Reorganized focusing on Climate Change Research

Vision

➢ Sustainable environmentally friendly country establishment

Mission

➢ Provide environmental policy supports based on sound science

Aim

➢ Develop into one of the 6 largest environmental research centers in the world in 10 years

Staff

Total	Research	Administration	Technician
297	222	31	44

※ Temporary researcher : 450, Postdoctoral researcher : 5

Budget

(Millions of USD)

Section	2007	2008
Total	36.683	43.786
Environment Research Project	10.153	12.126
Research Infrastructure	4.006	6.842
Salary	11.520	12.904
Operation Cost	11.914	11.914

※ Exchange Rate : USD 1 = KRW 1,150 as of September 2008

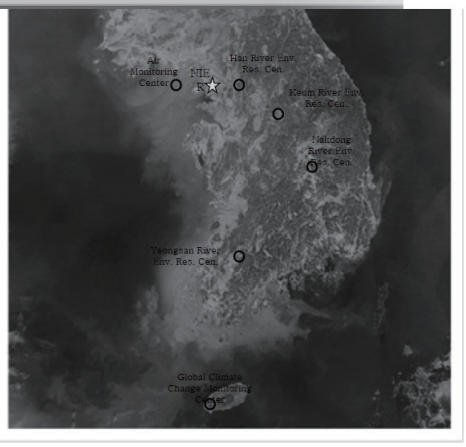
Organization

- 4 Departments, 13 Divisions and 6 Research Centers

President

- Research Strategy and Planning Office — 1 team
- Environmental Health Risk Research Department — 3 divisions 2 teams
- Climate & Air Quality Research Department — 3 divisions 1 team
- Water Environment Research Department — 3 divisions 2 teams
- Ecology Research Department — 4 divisions 3 teams
- Transportation Pollution Research Center
- Environment Research Centers of 4 Rivers
- Resource Recirculation Research Center

Location



국립환경과학원

Ⅱ Toward Low Carbon Society

Toward Low Carbon Society

Housing, Food, Clothing
- Cool Biz
- Food Mileage
- Carbon zero building

Transportation
- Carbon zero town
- Public transportation
- Distribution system improvement

LCS

Industy and Economy
- Energy efficiency
- Low energy industry
- Resource-recycling economy

Natural Energy
- Sun light
- Wind power
- Ground heat

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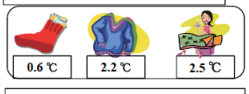
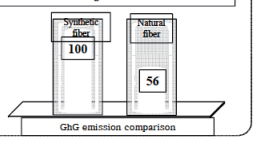
Clothing

High Carbon Society (Present)
- Fast clothing
  - CO_2 emissions : production 56%, laundry 33%
- Fully dressed up at work in summer??
- Short pants at home in winter??
  - To raise 1℃ , energy consumption increase 5%

Low Carbon Society (Future)
- Slow clothing
- Cool Biz and Warm Biz
  - without a tie : wind-chill 2℃↓
  - with a blanket : wind-chill 2.5 ℃ ↑



- Buying low CO_2 emission clothing



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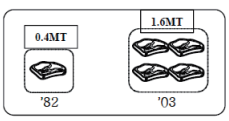
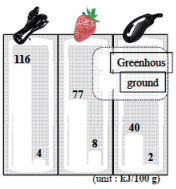
Food

High Carbon Society (Present)
- High food mileage(2nd after Japan)
  - -Japan(7,032 ton-km/yr-cap), Korea(6,620), U.S.A (1,015)
- Meat consumption in Korea : increased 4 times from '82 to '03
  - Meat emit 25 times more CO_2 than vegetable



Low Carbon Society (Future)
- Low food mileage food consumption
  - Local food
- Decrease meat consumption
  Increase vegetable consumption
- Food of the season consumption



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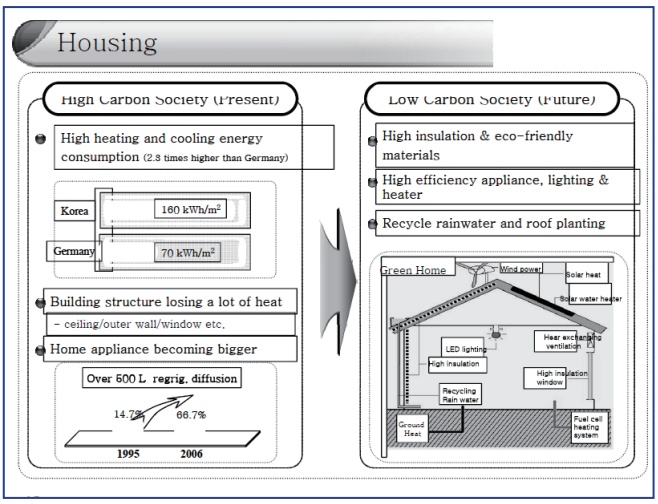
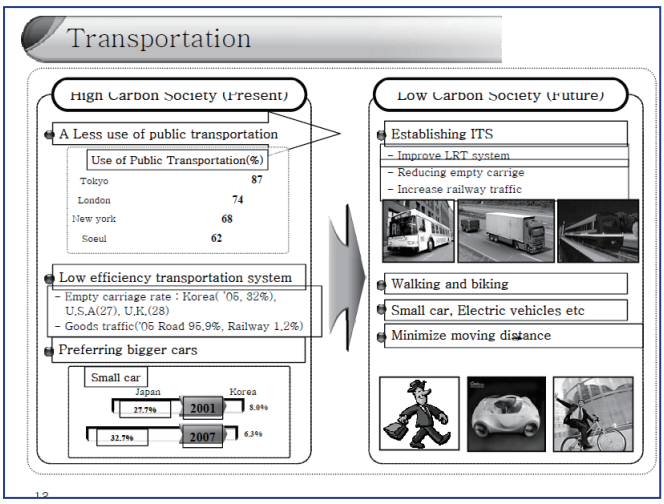
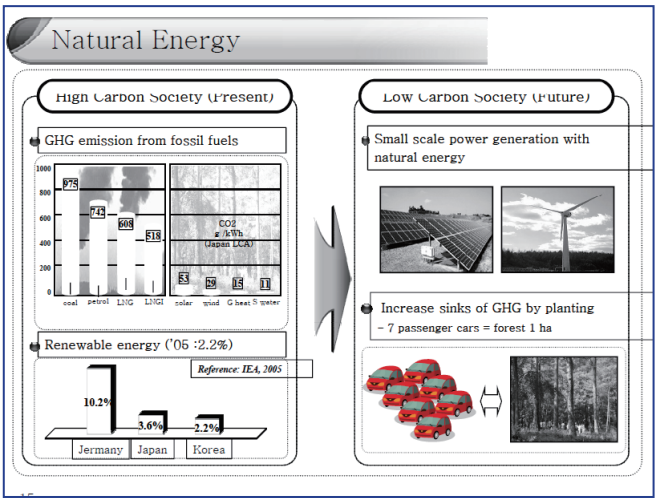
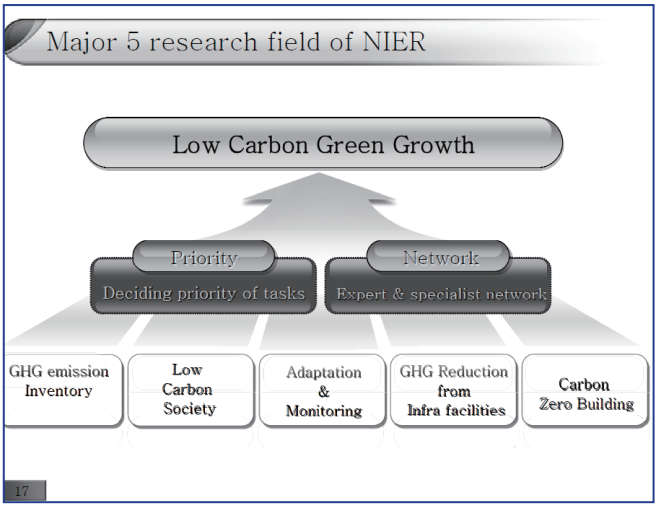
NIER

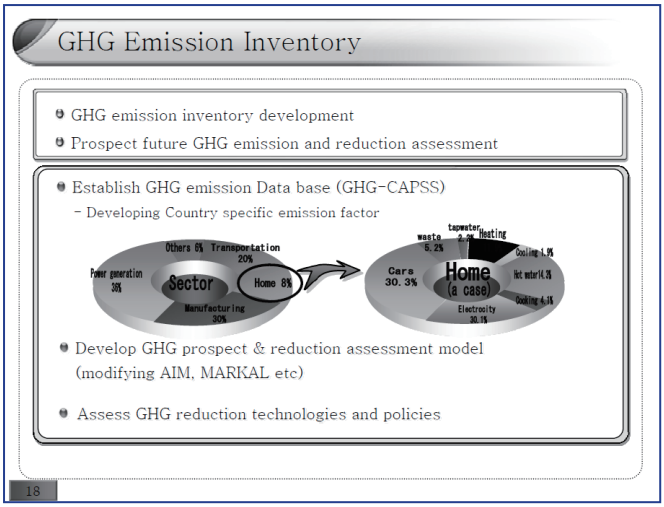

Housing
High Carbon Society (Present)
High heating and cooling energy consumption (2.3 times higher than Germany)
Korea
160 kWh/m²
Germany
70 kWh/m²
Building structure losing a lot of heat
- ceiling/outer wall/window etc.
Home appliance becoming bigger
Over 600 L regrig. diffusion
14.7%
66.7%
1995
2006
Low Carbon Society (Future)
High insulation & eco-friendly materials
High efficiency appliance, lighting & heater
Recycle rainwater and roof planting
Green Home
Wind power
Solar heat
Solar water heater
LED lighting
High insulation
Heat exchanging ventilation
High insulation window
Recycling Rain water
Ground Heat
Fuel cell heating system


Transportation
High Carbon Society (Present)
A Less use of public transportation
Use of Public Transportation(%)
Tokyo 87
London 74
New york 68
Soeul 62
Low efficiency transportation system
- Empty carriage rate : Korea('06, 32%), U.S.A(27), U.K.(28)
- Goods traffic('05 Road 95.9%, Railway 1.2%)
Preferring bigger cars
Small car
Japan
Korea
27.7%
2001
8.0%
32.7%
2007
6.3%
Low Carbon Society (Future)
Establishing ITS
- Improve LRT system
- Reducing empty carrige
- Increase railway traffic
Walking and biking
Small car, Electric vehicles etc
Minimize moving distance


Natural Energy
High Carbon Society (Present)
GHG emission from fossil fuels
978
743
608
518
CO2 g/kWh (Japan LCA)
53
29
15
11
coal
petrol
LNG
LNGI
solar
wind
G heat
S water
Renewable energy ('06 :2.2%)
Reference: IEA, 2005
10.2%
3.6%
2.2%
Jermany
Japan
Korea
Low Carbon Society (Future)
Small scale power generation with natural energy
Increase sinks of GHG by planting
- 7 passenger cars = forest 1 ha

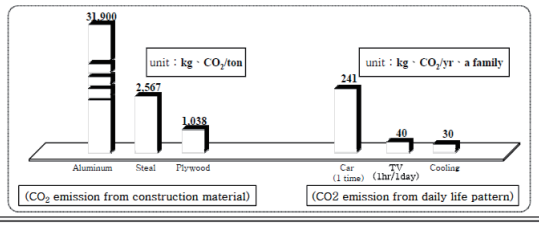

국립환경과학원
III
On going Researches and Future Plans


Major 5 research field of NIER
Low Carbon Green Growth
Priority
Deciding priority of tasks
Network
Expert & specialist network
GHG emission Inventory
Low Carbon Society
Adaptation & Monitoring
GHG Reduction from Infra facilities
Carbon Zero Building
17


GHG Emission Inventory
GHG emission inventory development
Prospect future GHG emission and reduction assessment
Establish GHG emission Data base (GHG-CAPSS)
- Developing Country specific emission factor
Others 6%
Transportation 20%
Power generation 38%
Sector
Home 8%
Manufacturing 30%
Cars 30.3%
Home (a case)
Develop GHG prospect & reduction assessment model (modifying AIM, MARKAL etc)
Assess GHG reduction technologies and policies
18

Establishing low carbon society

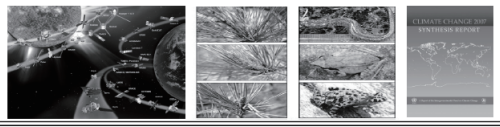
- Basic CO_2 emission factor calculation for products, daily life pattern
  To guide people to practice saving energy
- Food mileage calculation
- Life cycle assessment (LCA) for major products and establishing D/B
- Investigate CO_2 emission from daily life pattern



19

Adaptation and Monitoring

- Climate Change Risk Assessment and Long term monitoring of the impact
  Minimize the impact and risk of climate change
- Long term monitoring of climate change
  - Develop integrated modeling system
  - Monitor CO_2, Ozone, Aerosol by a satellite
- National Comprehensive Plan for Climate Change Adaptation
  - Ecosystem adaptation program



20

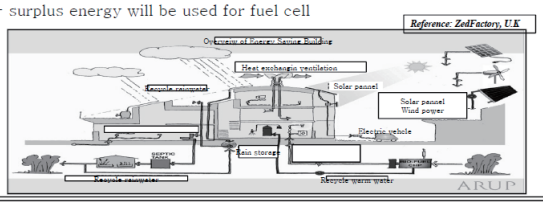
GHG reduction from infrastructure

- assessing GHG emission of environmental infrastructure
  GHG reduction form env. infrastructure
- Determin GHG emission by facilities
  - waste water treatment, waste incineration, land fill , etc
- Assessing GHG reduction and cost effectiveness
- Distribution optimized technologies t

21

Carbon zero building and eco-village

- Climate change research building will be constructed as the first carbon zero office building in Korea in '09~'10
- Minimizing energy consumption by optimizing insulation
  - High efficiency window, outer wall, roof planting
- All energy supplied by natural energy
  - Power generation by Solar light, wind, ground heat
  - surplus energy will be used for fuel cell



22

IV Expectations on LCS-RNet

V Expectations on LCS-RNet

- Promote information exchange and research cooperation among research institutions
  - Joint research on specific areas
- Promote dialogues between participanting researchers and various stakeholders
  - International symposium on LCS
- Contribute to international political processes on climate change
  - Recommendations based on research outputs under thd LCS-RNet

IEA

Low Carbon Society
Research Networks
1-2 April 2009

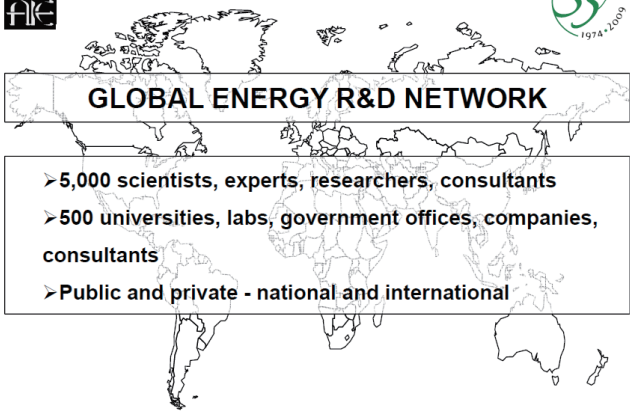
Linking Government, Research, Industry and Society

Carrie Pottinger
R&D Analysis and Coordination

- Existing Links
- Identify Gaps
- Explore Pathways

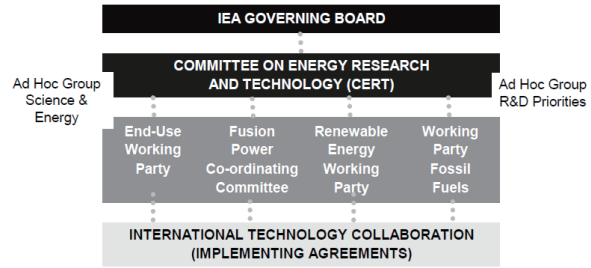
- Existing Links
- Identify Gaps
- Explore Pathways

GLOBAL ENERGY R&D NETWORK



- 5,000 scientists, experts, researchers, consultants
- 500 universities, labs, government offices, companies, consultants
- Public and private - national and international

Energy Technology R&D Network



42 Implementing Agreements

Supply

FOSSIL FUELS
Clean Coal Sciences
Enhanced Oil Recovery
Fluidized Bed Conversion
IEA Clean Coal Centre
IEA Greenhouse Gas RD
Multiphase Flow Sciences

RENEWABLE ENERGY TECHNOLOGIES
Bioenergy
Geothermal
Hydrogen
Hydropower
Ocean Energy Systems
Photovoltaic Power Systems
Renewable Technology Deployment
Solar Heating and Cooling
SolarPACES
Wind Energy Systems

FUSION POWER
ASDEX-Upgrade
Environmental, Safety, Economy
Fusion Materials
Large Tokamaks
Nuclear Technology Fusion Reactors
Plasma Wall Interaction in TEXTOR
Reversed Field Pinches
Spherical Tori
Stellarator Concept

IEA

Demand

TRANSPORT
Advanced Fuel Cells
Advanced Materials for Transportation
Advanced Motor Fuels
Hybrid and Electric Vehicles

BUILDINGS
Buildings and Community Systems
District Heating and Cooling
Energy Efficient Electrical Equipment
Energy Storage
Heat Pumping Technologies

ELECTRICITY
Demand-Side Management
Electricity Networks
High-Temperature Superconductivity

INDUSTRY
Emissions Reduction in Combustion
Industrial Energy and Technologies

Horizontal

INFORMATION AND MODELLING
Climate Technology Initiative
Energy Technology Data Exchange
Energy Technology Systems Analysis

Collaboration

- ✓ **Coordinated research**
  Specific energy technology RD&D studies
- ✓ **Joint projects**
  Design, construction and operation of pilot projects, facilities, experiments
- ✓ **Information exchange**
  Scientific and technological developments, national programs, energy policies
- ✓ **Personnel exchanges**
  Scientist, experts, technicians
- ✓ **Other**
  E.g. Modeling, databases, capacity building

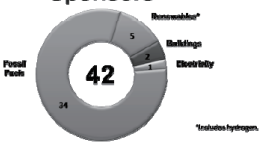
Role of the IEA

- ✓ **Co-ordinate projects between IEA-IA and IA-IA**
  Joint research, workshops, data, publications
- ✓ **Provide legal advice**
  Legal text, procedures, participation, withdrawals
- ✓ **Bring forward policy messages**
  - •Technology briefs to Governing Board
  - •Ministerial and G8 communiqués
  - •*Energy Technologies at the Cutting Edge*
- ✓ **Engage key world economies**
- ✓ **Raise public awareness**
  - *OPEN Bulletin*
  - *Website*

IEA Member Countries

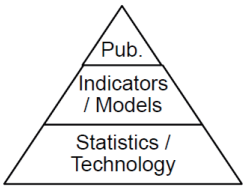
IEA Non-member Countries

Sponsors



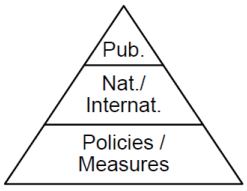
IEA Research

Numeric-based



World Energy Outlook
Energy Technology Perspectives
(Markal, MObility MOdel)
Oil Market Report

Policy-based



National Policy Reviews
Commodity
Environment/CO2

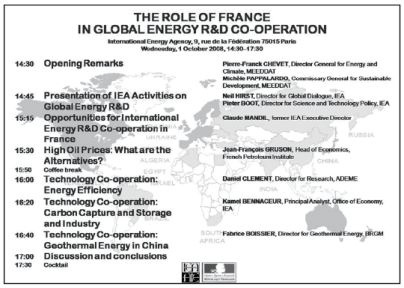
Sampling

IEA

Thematic Events

- ✓ **High-level representation and messages**
  - G8, MEM, COP, WEF
- ✓ **Global outreach**
  - G8 +5, South-east Asia
- ✓ **Emergency exercise**
- ✓ **Workshops that feed into analysis**
  - *CHP, Zero-Energy Buildings, Energy Efficiency Week*

Targeted Events



THE ROLE OF FRANCE
IN GLOBAL ENERGY R&D CO-OPERATION

International Energy Agency, 9, rue de la Fédération 75015 Paris
Wednesday, 1 October 2008, 14:30–17:30

14:30	Opening Remarks	Pierre-Franck CHEVET, Director General for Energy and Climate, MEEDDAT Michèle PAPPALARDO, Commissary General for Sustainable Development, MEEDDAT
14:45	Presentation of IEA Activities on Global Energy R&D	Neil HIRST, Director for Global Dialogue, IEA Pieter BOOT, Director for Science and Technology Policy, IEA
15:15	Opportunities for International Energy R&D Co-operation in France	Claude MANDIL, former IEA Executive Director
15:30	High Oil Prices: What are the Alternatives?	Jean-François GRUSON, Head of Economics, French Petroleum Institute
15:50	Coffee break	
16:00	Technology Co-operation: Energy Efficiency	Daniel CLEMENT, Director for Research, ADEME
16:20	Technology Co-operation: Carbon Capture and Storage and Industry	Kamel BENNACEUR, Principal Analyst, Office of Economy, IEA
16:40	Technology Co-operation: Geothermal Energy in China	Fabrice BOISSIER, Director for Geothermal Energy, BRGM
17:00	Discussion and conclusions	
17:30	Cocktail	

➢Existing Links

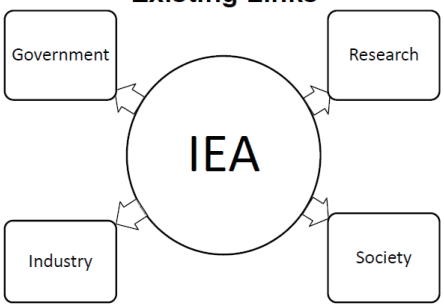
➢Identify Gaps

➢Explore Pathways

Historical IEA Focus

- ✓ **Responding to government needs**
  Oil security, energy policy, research on specific issues, conducting workshops, collecting statistics
- ✓ **Results: first for governments**
  Committees report back home
- ✓ **Results: second for general public**
  Analysts, universities, companies, consultants

Existing Links



➢Existing Links

➢Identify Gaps

➢Explore Pathways

IEA

Global Energy Changes

- ✓ **Recent trends require changes in approach**
  Climate change, oil supplies, energy security, G8, global economic crisis
- ✓ **The clock is ticking and we're running out of time**
  WEO and ETP point to tremendous efforts needed
- ✓ **Traditional avenues of communication are no longer sufficient**
  Workshops, publications, press releases important but reach limited audience

Reaching Out and Into

- ✓ **Engaging with key world economies**
  Brazil, Russia, India, China, and South Africa Asia-Pacific, Latin America,
- ✓ **Increasing involvement important stakeholders**
  Industry, finance, cities
- ✓ **Enabling policymakers**
  Energy technology roadmaps, energy efficiency recommendations

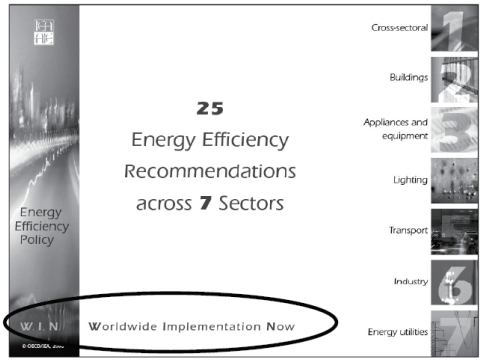
Enabling Policymakers

- ➢ **RDD&D mapping**
  Identify gaps and opportunities for international collaboration
- ➢ **Roadmap projects**
  Create consensus on key actions needed for RDD&D transition

Supply
- ✓ CCS power generation
- ✓ Coal – IGCC
- ✓ Coal – USCSC
- ✓ Nuclear III + IV
- ✓ Solar – PV
- ✓ Solar – CSP
- ✓ Wind
- ✓ Biomass – IGCC & co-combustion
- ✓ 2nd generation biofuels

Demand
- ✓ Energy efficiency in buildings
- ✓ Energy efficient motor systems
- ✓ Efficient ICEs
- ✓ Heat pumps
- ✓ Plug-ins and electric vehicles
- ✓ Fuel cell vehicles
- ✓ Industrial CCS
- ✓ Solar heating

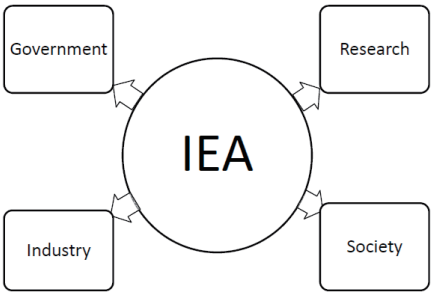
Too Little Time



New Pathways

- ✓ **Media**
- ✓ **Schools**
- ✓ **To be defined**

Making Progress



Continued Efforts Needed

OECD

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

OECD: Contributions to Low-Carbon Society Research & Understanding

Jan Corfee-Morlot
OECD Environment
jan.corfee-morlot@oecd.org

Overview: OECD work on LCS

1. OECD - structure, working models, how work gets done
2. Ongoing work on climate policy
3. Events/outreach
4. Examples of analytical results

OECD work on climate change:

- Committee for Agriculture
- Committee for Information, Computers & Communications Policy
- Committee on Fiscal Affairs
- Economic and Development Review Committee
- Economic Policy Committee
- **Environment Policy Committee**
- Development Assistance Committee
- Fisheries Committee
- Investment Committee
- Public Governance Committee
- Trade Committee

And at associated bodies:

- IEA, Nuclear Energy Agency, International Transport Forum
- Roundtable on Sustainable Development, Africa Partnership Forum, Heilgendamm Process…

⇨ *Unique opportunity for policies across government*

OECD: a variety of policy analyses & dialogue processes

- **Country peer reviews, data & indicators:**
  - *Environmental Performance Reviews* -international co-operation, including climate [2009: Gr, Fin, Lux, Ire]
  - *Economic Reviews* - selected countries with sections on climate change policies [e.g. New Zealand, EU]
  - Collection and harmonisation of climate-relevant data and statistics - including in agriculture, work on embodied carbon, etc. [energy data with IEA]
  - OECD patents database - analysis of policies and innovation, including transfer of technological know-how *
- **Roundtable on Sustainable Development:**
  - Ministerial/ CEO Roundtable discussions on sectoral approaches (March) and Border Tax Adjustments (Summer)

- **Trade :**
  - Facilitating trade in cc technologies in the electricity generation & heavy-industry sectors
  - Counting carbon in marketplace - trade & carbon footprint: trade, transport & climate change
- **Science, Technology & Industry:**
  - OECD Innovation strategy [2010] ⇒ work on eco-innovation; green innovation*
- **Investment:**
  - Public policy frameworks to support private investment in climate-friendly infrastructure (with ENV) [2009-2010]
- **Tax:**
  - Case studies on tax, innovation & environment (e.g. Turkey's fuel taxes, UK Climate Change Levy) [2009-2010]
- **Regulatory reform:**
  - work on regulatory impact assessment as tool for policy coherence, focus on climate change

- **Biodiversity & REDD**
  - 2009-2010: Will look at potential synergies between REDD and achieving biodiversity benefits, and limitations
- **Agriculture & fisheries:**
  - Policy implications of agriculture's role in mitigating GHG emissions; agricultural policies and adaptation
  - Fisheries & cc (to be a chapter in biennial Review of Fisheries)
- **Other:**
  - Global Forum on Transport (10-12 Nov 2008)
  - Waste policies & cc
  - …

OECD

Development Co-operation:

- Work on adaptation & development co-operation (with ENV)
- Rio markers development finance statistics: tracks ODA to climate mitigation [ongoing]; examining possible markers for adaptation
- Include cc in DAC peer reviews

Integrating adaptation into development co-operation – DAC Guidance

- Integrating at national level, sectoral level, project level, local level
- 28-29 May 2009 - Joint High Level Meeting of Environment Policy and Development Assistance Committees
- 2009-2010: programmatic approaches; thematic/ sectoral; harmonised frameworks for risk assessment; evaluating progress…

OECD OCDE

Cities & Climate Change

- Economics of Impacts & Policy Benefits at Local Scale:
  - Available: literature review, port cities ranking by vulnerability to sea-level rise & storm surge (now & in future), concept study, Copenhagen study, preliminary Mumbai study
  - On-going: update of port cities ranking; completion of Mumbai study; special issue of academic journal & OECD publication
- Multilevel governance and climate change (joint ENV/ GOV)
  - On-going: working paper on horizontal & vertical linkages, integrating decision-making on mitigation, adaptation into urban development planning, understanding co-benefits at city/ local scale
- Outreach activities - as part of the project:
  - OECD Roundtable on Urban Development, research networks, collaboration with World Bank, side-events UNFCCC & ICLEI

OECD OCDE

Economics of Adaptation, Impacts, Policy Benefits

- Available: Cost of Policy Inaction (OECD book); literature review on economics of impacts; co-benefits; local scale impact and benefits assessment; IA modelling of adaptation costs and benefits
- 2009-2010: Further developments with IA modelling & adaptation; work on policy instruments to incentivise adaptation; water & adaptation; further work on local scale impact & policy assessment (e.g. Mumbai case) & co-benefits

Economics of Mitigation*

- Explore economic implications of alternative mitigation pathways
  - Macro-economic modelling - ENV-Linkages model
  - Global mitigation costs and their national / regional distribution of costs
  - Structural change implications of low-carbon global mitigation goals, simple climate implications of alternative scenarios for participation & levels of effort
  - Alternative policy packages (i.e. global markets vs fragmented markets)

www.oecd.org/env/cc/econ

OECD OCDE

UPCOMING OECD EVENTS:

- **13 March** - RT SD Ministerial discussion on sectoral approaches
- **20 May** - Working Parties review phase 2 work on economics of mitigation
- **27-28 May** (DK) - Conference on the ICTs, the Environment, and CC
- **28-29 May** - Joint High Level Meeting of Development and Environment [adaptation financing; low carbon development]
- **9-10 June** - Global Forum on Trade: Trade & Climate Change
- **11 June** (SP) - Workshop on Green Cities: New Approaches to CC
- **15 June** - Conference on Corporate Responsibility [session on energy & cc]
- **June** (FR) - World Bank Symposium on Cities [OECD session]
- **24-25 June** - OECD Ministerial Council Meeting [green recovery; cc progress]
- **18 September** - OECD Conference on Economics of Climate Change
- **4-5 November** - Global Forum on Eco-Innovation

OECD OCDE

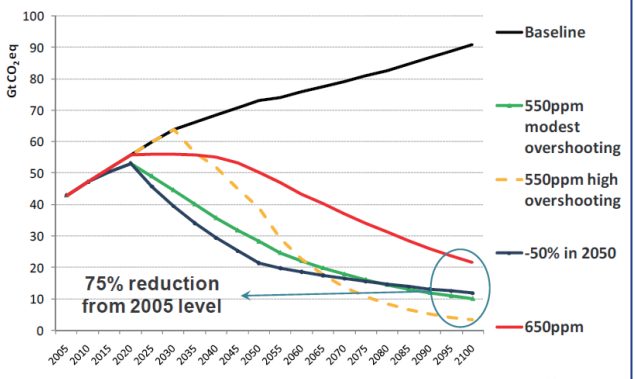
Main OECD Input to COP15

- OECD is an observer in negotiations ⟹ main input is providing analysis and a forum for discussion to support OECD country negotiators prepare for COP15.
- Main areas of analysis/ forthcoming products of relevance:
  - **Annex I Expert Group** (AIXG) **analysis of key negotiating issues** e.g. financing, MRV, sector approaches
  - **Economics of Mitigation (ECO-ENV project)**, with the September Conference and Autumn release of publication.
  - OECD Policy Guidance on **integrating adaptation into development co-operation**, and High Level Meeting of OECD Environment Policy and Development Assistance Committees in May 2009.
  - Analysis on **green recovery & climate change**
- Side-event at COP15, publications stand, participate in others' side-events, intervene in High Level Segment.

OECD OCDE

Economics of Mitigation: Policy Simulations

GHG emission paths under alternative world carbon price scenarios



Source: OECD, ENV-Linkages model.

OECD OCDE

OECD

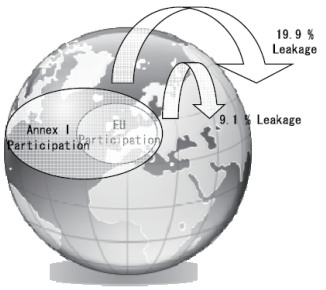
Economics of Mitigation [Phase 1]

- Costs, GHG emissions, and distributional effects of policies
  - Ambitious action to reduce emissions is economically rational
  - Distribution of costs & benefits are very uneven
- Policies to incentivise technological change
  - Pricing emissions will give incentives for technology development & deployment (550ppm scenario ⇒ 4-fold increase in R&D spending)
  - But uncertainty and market failures may discourage investors, so need specific R&D policies…. so need a policy mix.
- Incentives for action: air pollution & health co-benefits
  - Significantly offset costs of mitigation action in some areas, but not fully
  - Useful to look at mitigation & air pollution together ⇒ can be cost-effective synergies in policies

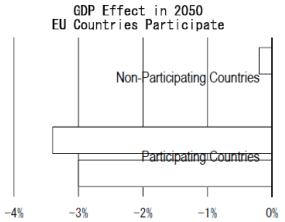
OECD OCDE

Carbon Leakage and Countervailing Import Tariffs

Participating countries achieve 50% emission reduction in 2050



Carbon Leakage Rates in 2050
Without a Countervailing Tariff



Source: OECD, ENV-Linkages model

OECD OCDE

Economics of Mitigation

Phase 2 work [mid-2009]

- Carbon leakage & competitiveness - political economy issues
- Incentives for participation (distribution of benefits & costs, financing)
- Gradual build-up of carbon markets
- Energy subsidies removal (with IEA)
- Contribution of forest sector & land use

➢ Progress report: OECD Council at Ministerial Level [June, 2009]

➢ Synthesis report of Phase 1 & 2 work [Autumn 2009]

➢ Conference on Economics of Climate Change [September, 2009]

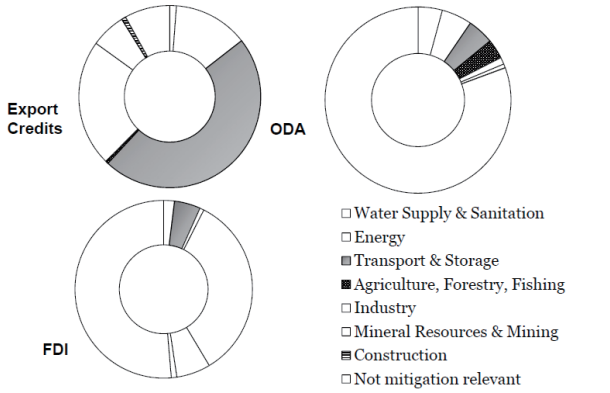
OECD OCDE

AIXG - analysis to support negotiators

- OECD & IEA provide the Secretariat to support an Annex I Expert Group on climate change (AIXG).
- The AIXG meets twice a year to allow negotiators a place off-line to discuss analysis of key issues on the negotiating agenda ⇒ critical role where misunderstandings or lack of clarity on technical issues.
- Priority work areas for AIXG analysis are :
  - Interpretation &implementation of the Bali Action Plan references to "measurable, reportable, and verifiable" actions, commitments, and support for actions.
  - Possible Registry or Register of Nationally Appropriate Mitigation Actions (NAMAs) by developing countries.
  - Financing flows to support developing country mitigation actions.
  - Sectoral approaches - how they might work in a post-2012 framework.
  - How actions and support might be differentiated amongst countries.

OECD OCDE

Mitigation relevant ODA, export credits, FDI (average 2003 - 2005)



Source: OECD compilation, drawing on OECD - CRS, UNCTAD

OECD OCDE

Different qualities and availability of finance for mitigation information - a basis for a more comprehensive framework?

Financial Data Sources	Mitigation-specific				Mitigation-relevant		
	Bilateral climate support	ODA bilateral	ODA multilateral	CDM	ODA bilateral	ODA multilateral	FDI
Data type	National communications	Rio markers – OECD CRS	MDB	UNEP-Risoe World Bank	OECD CRS	OECD CRS	UNCTAD
by source country	+	++	-	-	++	+	++
by recipient	+	++	-	+	++	+	++
by purpose	+	++	-	+	+	+	-
by endpoint	+	++	-	+	++	+	+

OECD OCDE

OECD

Innovation in Environmentally Sound Technologies : OECD Project*

- Develop indicators of EST innovation to be included in OECDSTAT - alongside indicators of nanotech, biotech and ICT
- Develop indicators of EST technology transfer and internationalisation of innovation (co-invention and knowledge spillovers)
- Analyse the determinants of EST innovation and international transfer empirically using econometric techniques

Contacts: Nick Johnstone and Ivan Hascic, Empirical Policy Analysis Unit, ENV/EEI
www.oecd.org/env/cpe/firms/innovation ; (Nick.Johnstone@oecd.org)

* Financial support from DG ENV, UK DEFRA, DE BMU, CH BUWAL, NL VROM gratefully acknowledged.

OECD OCDE

Innovation EST: Areas Covered by Project

- Air pollution control (stationary and mobile)
- Water and wastewater treatment
- Solid waste management, recycling and prevention
- Noise control
- Monitoring technologies
- Renewable energy
- 'Clean' coal (i.e. IGCC, CCS, FBC)
- Fuel cells
- Building and lighting energy efficiency
- Hybrid/electric vehicles
- Green chemistry
- etc...

OECD OCDE

Cities & Climate Change: the Inventory Challenge to Assess Performance

- National-scale IPCC / FCCC, AIP Harmonization Complete
- Range of technical and data issues complicates local measuring
- Local competing protocols, none of which officially sanctioned internationally:
  - ICLEI
  - CCAR
  - The Climate Registry
  - Bilan Carbone (ADEME)

Source: Corfee-Morlot, Cochran, Teasdale (2009) Cities and Climate Change: Harnessing the Potential for Local Action

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CD OCDE

Cities & Climate Change: Regional Science & Impact Assessment

- Local science-policy dialogue to assess impacts, understand & manage risk
- Variety of institutional delivery models
  - Examples: IRI, UK CIP, ViTeCC, Ouranos
- National/sub-national public funding, also private funding for regional science
- Build on local/regional research capacity, universities, institutes
- Suppliers and customers of information - interaction is valuable

Source: Corfee-Morlot, Cochran, Teasdale (2009) Cities and Climate Change Harnessing the Potential for Local Action

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Follow-up

- For more information see:
  www.oecd.org/env/cc & www.oecd.org
- Thank you!

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