

Global Bioenergy Partnership

***Working together to promote bioenergy
for sustainable development***

**Transportation biofuels for greenhouse gas mitigation, energy
security or other reasons?**

IEA Bioenergy - task 38

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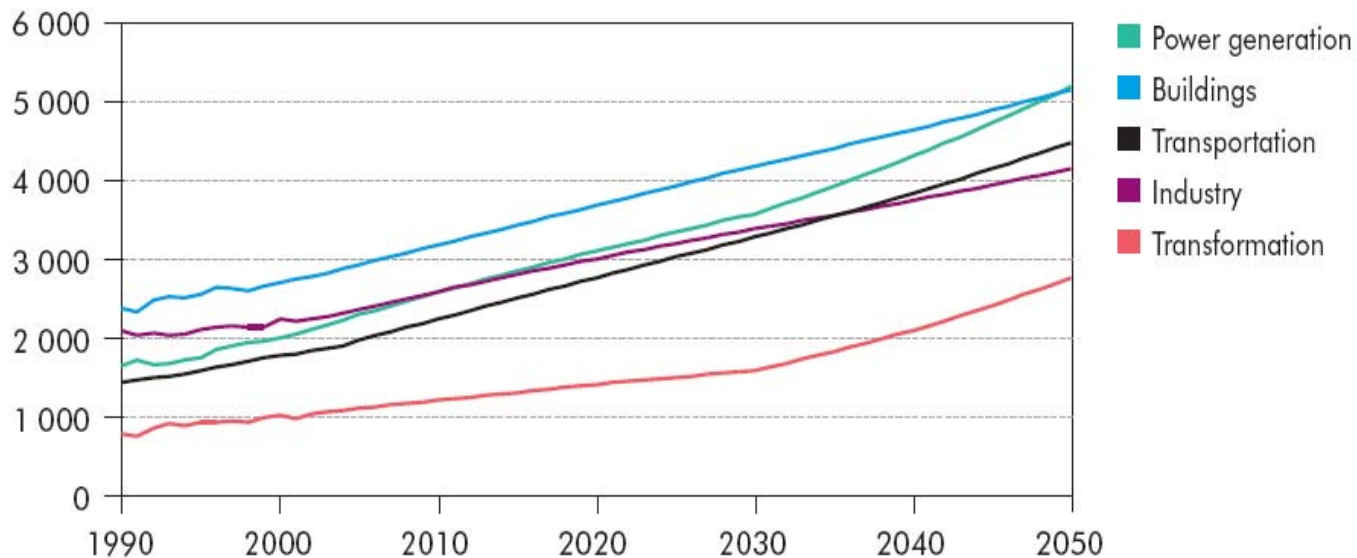


KEY POINTS

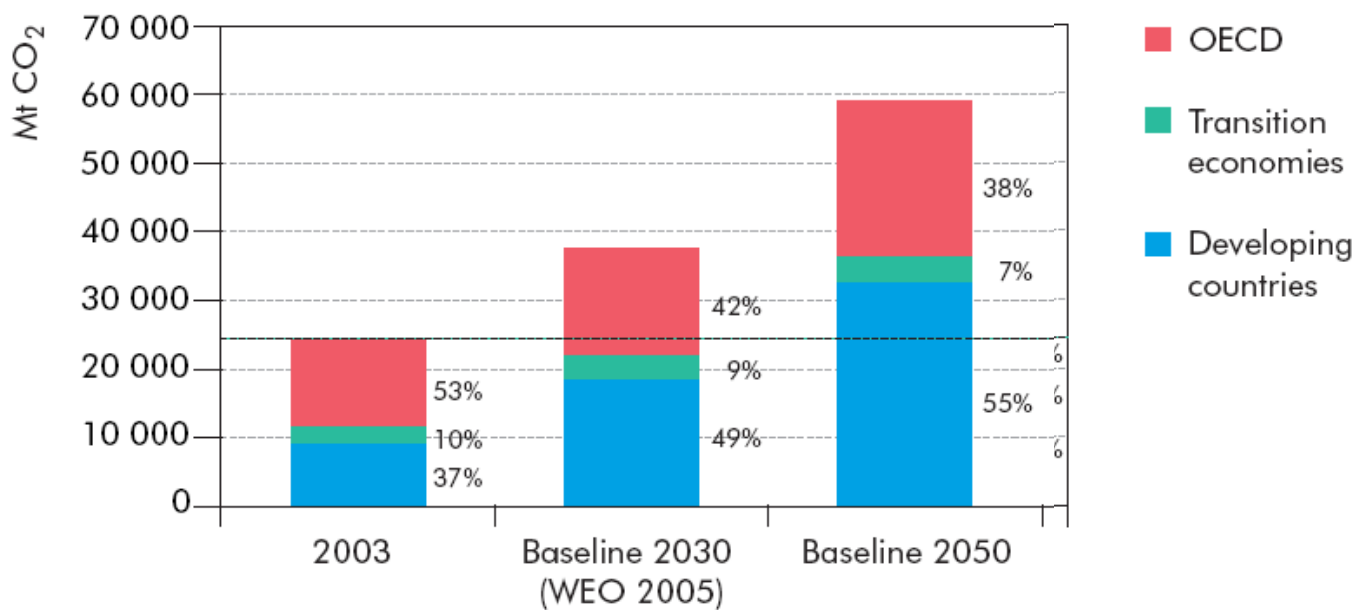
1. **Energy and Climate Change**
2. **International Partnerships for GHG mitigation**
3. **GBEP update**
 - **Biofuels in G8 +5 countries today**
 - **Biofuels development and perspectives**
 - **CO2 balance**
 - **Sustainability criteria**
 - **Economics**
 - **Projects**

Key messages

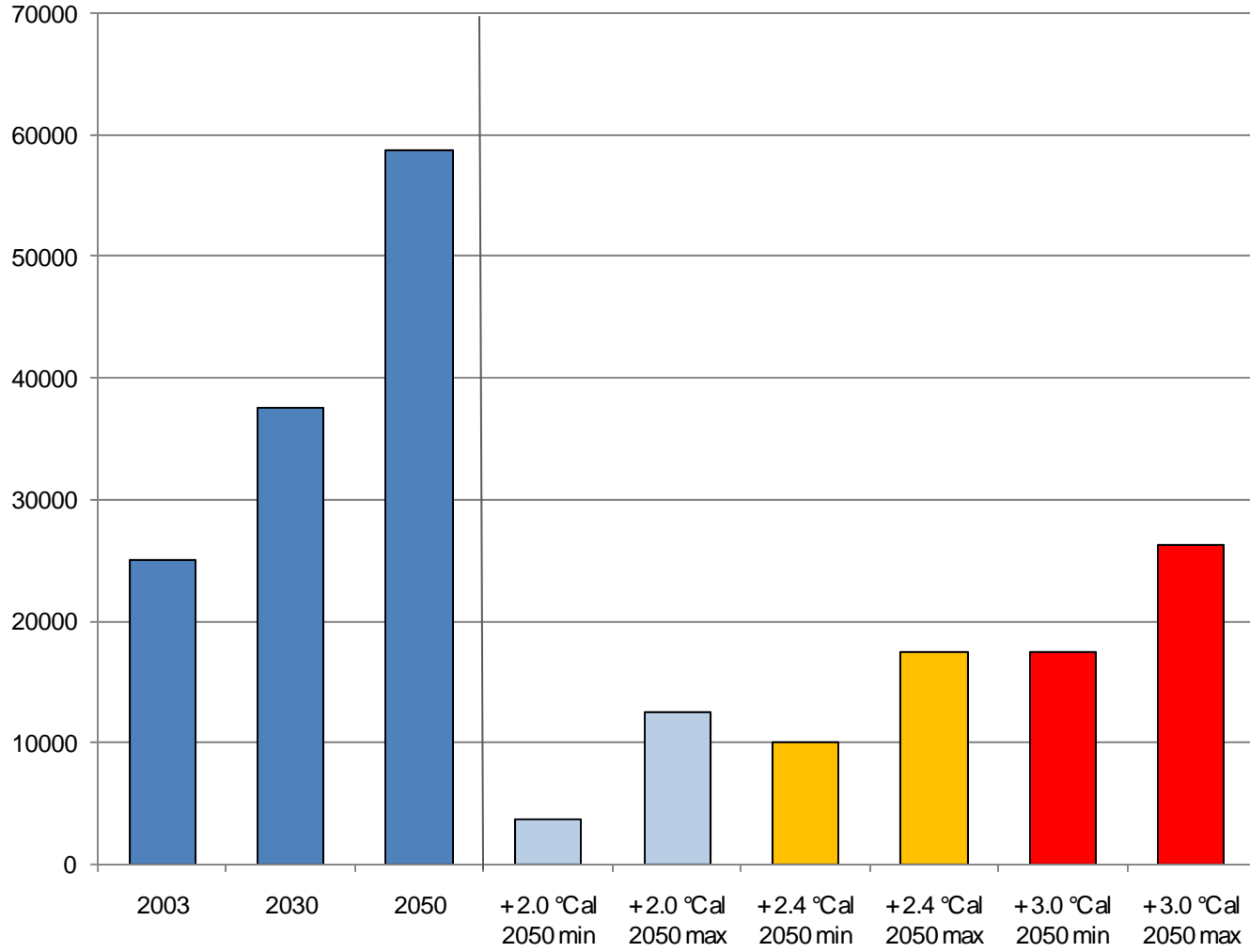
Energy use by sector in the Baseline Scenario



	Baseline Scenario	
	2003 (Mtoe)	2050 (Mtoe)
Electricity and heat plants	2 180	5 177
Other fuel transformation	1 003	2 761
Industry	2 326	4 138
Transport	1 895	4 472
Buildings and appliances	2 733	5 142



CO2 (Mt/year)



WHAT'S A GIGATON OF CO2 ?

Coal fired plant	273 zero emission 500 MW
CCS	1000 sequestration sites like Sleipner (only 3 in operation today)
Nuclear	135 nuclear sites 1GW
Efficiency	Deploy 273 million new car at 40 mpg instead of 20 mpg
Wind	4 times the current global gen capacity of 74 GW
Solar PV	273 times the current global solar PV
Biofuels	Convert a barren area of about 4800.000 km² (2 times UK)
CO2 stor new forest	Convert a barren area of about 900.000 km² (Germany + France)

ENERGY AND CLIMATE CHANGE

A POSSIBLE SCENARIO FOR 2050

BALI

194 countries agreed:

**2 year negotiation to define the road map
with the target of 25-40 % reduction of
CO2 emission based on 1990 to be
met within 2020**

**It is an enormous amount of CO2 to be
avoided in a short while**

GLOBAL WARMING- CLIMATE CHANGE

It is an ethic issue that needs gov actions

- **Commitment of all countries on the planet**
- **Definition of sustainability criteria for any options**
- **Definition of costs and values**
- **Definition of new market regulations**
- **Involvement of all stakeholders since the very beginning**

Governmental Partnerships are political organizations crucial to define proposals for decision makers

INTERNATIONAL PARTNERSHIPS FOR THE GHG MITIGATION

4 partnerships have already been set up:

- IPHE hydrogen set up in 2003
- CSLF carbon capture and storage set up in 2003
- M2M methane to markets set up in 2004
- GBEP bioenergy set up in 2006

All 4 very young, but very active: results achieved so far very promising

A new partnership in preparation EEP (Energy Efficiency Partn)

IPHE: INTERNATIONAL PARTNERSHIP ON HYDROGEN ECONOMY

- **16 Country Members + EU**
- **Chair CANADA**
- **Vice-chairs: Italy, USA, China, Japan**
- **Members: Australia, Brazil, Canada, China, France, Germany, Iceland, India, Italy, Japan, Republic of Korea, New Zealand, Norway, Russian Federation, United Kingdom, United States**

- **Secretariat: Canada**

www.iphe.net

CSLF: CARBON SEQUESTRATION LEADERSHIP FORUM

- **21 Country Members + EU**
- **Chair: USA**
- **Vice Chairs: Italy, Australia**
- **Members: Australia, Brazil, Canada, China, Colombia, Denmark, France, Germany, Greece, India, Italy, Japan, Korea, Mexico, The Netherlands, Norway, Russian Federation, Saudi Arabia, South Africa, United Kingdom, United States**
- **Secretariat: DOE**

www.cslforum.org

M2M - 19 Partners

Argentina

Australia

Brazil

Canada

China

Colombia

Ecuador

Germany

India

Italy

Japan

Mexico

Nigeria

Poland

Republic of
Korea

Russia

Ukraine

United Kingdom

United States

Project Network

Currently more than 480 organizations, including the Asian Development Bank, World Bank, UNECE, Consultants and Project Developers

GBEP - 21 Partners

BRAZIL	INTERNATIONAL ENERGY AGENCY	IEA
CANADA	UN FOOD AND AGRICULTURE	FAO
CHINA	UN CONF ON TRADE AND DEVL P	UNCTAD
FRANCE	UN DEPT OF ECONOMIC & SOCIAL	UN/DESA
GERMANY	UN DEVELOPMENT PROGRAM	UNEP
ITALY Chair	UN INDUSTRIAL DEV ORGANIZATION	UNIDO
JAPAN	UN FOUNDATION	UNF
MEXICO Vice- chair	WORLD COUNCIL RENEW ENERGY	WCRE
NETHERLANDS	EUROPEAN BIOMASS IND ASSOC	EUBIA
RUSSIAN FED		
UNITED KINGDOM	SECRETARIAT	FAO
UNITED STATES		

GBEP – 9 OBSERVERS

AUSTRIA

INDONESIA

ISRAEL

KENIA

MOZAMBIQUE

SOUTH AFRICA

SWEDEN

TANZANIA

EU

FIRST GENERATION BIOFUELS

- **Bioethanol** from crops as an alternative to food market (sugar cane, corn)
- **Biodiesel** from oil seeds (soybean, rapeseed, palm, sunflower) with trans-esterification with methanol (ethanol eventually) as an alternative to food market

SECOND GENERATION BIOFUELS

- Bioethanol from optimized sugar crops (sweet sorghum) in set aside area, in arid area or in poor soil
- Bioethanol from agriculture cellulose waste (corn stalks, straw) – Integrated agriculture-energy
- Biodiesel from optimized crops (Jatropha, Honge) - no food competition **(tropical and subtropical area)**
- Bio-oil **(SVO)** for adapted diesel engines for generators and tractors (when alcohol is not available or infrastructures inexistent) **(developing countries)**
- Biodiesel from hydro-refining of raw bio-oil (no more glycerin by-product)

THIRD GENERATION BIOFUELS

- Bioethanol from rotating wood plantations through cellulose hydrolysis
- Bio-oil or biodiesel from algae cultivation with CO₂ from power gen
- **Bio FT diesel** from waste bio-mass gasification
- Bio n-butanol from biomass fermentation (as co-solvent for ethanol/methanol-gasoline blends, or as chemical)
- Bio-hydrogen from selected biomass fermentation

FOURTH GENERATION BIOFUELS

- **Bio-H₂ from LT water photolysis through micro-organisms as catalyst**
- CO₂ reduction to CO through photosynthesis

BIOFUELS IN G8+5 countries

Bioenergy in the global energy contest

- Bioenergy overview
- Bioenergy contribution to the world energy supply
- Bioenergy consumption in G8+5

Policy overview

- Policies across countries
- Regional policies
- Sustainability and trade consideration

Country profile and bioenergy data per G 8+5

Regional profiles

- (EU, NAFTA, ASEAN, MERCOSUR, CBI, CAFTA)

POLICY OVERVIEW G8+5 countries

Principal policy mechanisms being deployed

- Feed-in tariff
- Taxes
- Guaranteed market
- Compulsory grid connections
- Other direct supports on R&D&D

National targets and public incentives systems

Government's current move towards performance focused policies

- GHG reduction required rather than mandate on amount of fuels to be consumed

Recognition that not all biofuels are “green”

Sustainability criteria need to be agreed upon internationally

WTO does not currently have a trade regime specific to biofuels. The current move towards technical standards regionally and internationally is addressed

GBEP: Harmonization of GHG methodologies

US is the GBEP leading Partner on biofuels for transportation

Germany is the GBEP leading Partner on solid biomass

Main Objectives:

- Develop a harmonized methodology to be used by policy makers in all countries**
- Develop a template or best practice guidance in the harmonized methodology for conducting GHG lifecycle assessments**

GBEP: GHG for transportation

US hosted first GBEP Task Force meeting Oct 2007

Participants from Canada, France, Germany, Italy, Japan, UK, US, ENEP, UNF, Int Council Clean Transportation, Univ Cal Berkeley, Iowa State Univ

Background

- GHG methodologies taskforce established by GBEP steering committee in May 2007
- Goal of taskforce is to focus global efforts on the harmonisation of methodologies for measuring the GHG benefits of transport biofuels.
- End result is to have flexible methodology to be used by policy makers in all countries (both developed and developing) and be applicable to any type of transport biofuel.
- First taskforce meeting October 2007
- Second meeting March 2008

Taskforce Work Plan

- Review existing methodologies for measuring exclusively the GHG impacts of transport biofuels.
- Develop a harmonised approach by which the results of GHG lifecycle assessments can be compared on an equivalent and consistent basis.
- Encompass the full well-to-wheel lifecycle of transport biofuels and address all significant sources of GHG emissions
- Not indicate a preference for any particular existing methodology or feedstock, or to place limits on the parameters that may be included in biofuel GHG life cycle assessment tools.
- Define a minimum set of recommended parameters and inputs to be considered when conducting a GHG analysis for potentially any type of transport biofuel and to set these out in a good practice guidance document for policy makers.

Results of October 07 Meeting

- Review of existing efforts in defining methodologies
- Broad agreement that it is possible to develop common methodology
- Development of preliminary list of parameters and inputs needed for a common methodology
- Recognition of issues needing further discussion

List of Parameters

- The GHGs to be covered
- The effects of direct land use change, both in terms of above and below ground carbon inventories;
- The effects of the production cycle, including fertilizer production, agricultural inputs and processing energy;
- Combustion of the finished biofuel and tailpipe emissions
- Corresponding factors to facilitate comparison with the petroleum fuel replaced.

Issues Needing Further Discussion

- The possible need for common definitions of terms
- Accounting for co-product emissions
- Ensuring transparency in default values and parameters used, and assumptions made, in conducting a GHG lifecycle assessment
- Whether to include consideration of pollutants, such as particulate matter
- Whether and how to take account of the effects of indirect land use change
- How to take account of future technologies (e.g. cellulosic) in the design of the methodology

Second Taskforce meeting

- Scheduled for March 7 in Washington DC
- Agenda still not defined but will likely focus on issues still needing further discussion and next steps

Next Steps

- Continue meeting and define timeline for finishing final methodology by 2009.
 - First draft completed (hopefully) by late 2008
 - Draft will be made available for comment
 - Comments incorporated and submitted to GBEP Steering Committee for approval

Farm/forest gate to tank (example)

This aspect is crucial:

Production of bio-diesel in a tropical country needs to bring methanol there from Venezuela and back bio-diesel from such tropical country to the international market (CO₂ emission for logistic of both methanol in and bio-diesel out)

Production of bio-oil in the tropical country and use it as SVO for domestic demand and avoiding oil import (CO₂ emission saved in comparison with the above)

Import of bio-oil from tropical countries to Europe and refine it in refinery

Production of bio-oil in Europe and use it as fuel for large low speed diesel engines in substitution of diesel)

Sustainability criteria

- **Competition with food**
- **Protection of biodiversity**
- **Management of land**
- **Management of water**
- **Control of air, soil, waters pollution**
- **Social impact on urbanization**
- **Keeping people on rural area**

ECONOMICS

- Global warming- climate change means a new global commitment for the GHG mitigation
- Biofuels should compete in the fuel market, but the fuel market regulations should be drastically modified in order to meet the target
- Biofuel business should not be based on the oil price only
- A shared CO₂ value should be defined to cover the extra cost of biofuels compared with fossil fuels

MARKET DEVELOPMENT

- First gen biofuels: increase sustainable production worldwide competing in a new fuel market
- Second gen biofuels: demo units –cost sharing industry and govts
- Third gen biofuels: pilot units with prevalent public funds
- Forth gen: basic research- mainly public funded

GBEP could help in the harmonization of all these activities through an integrated **WORLD BIOFUELS PROJECT**

KEY MESSAGES

- **Growth in bioenergy needs to be carefully managed if we are to make the most of its benefits on resolve its challenges**
- **Sustainability is a key objective and it is wise to ensure sustainability management of the entire chain**
- **Methodologies to measure GHG emission reduction from the use of biofuels are essential for the climate change mitigation**
- **Next generation biofuels are likely to provide large amount of biofuels in a short while**
- **Bio-fuels development is already in progress**
- **Capturing the full potential of biofuels means overcoming environmental and social constrains and removing trade barriers.**
- **Economics and competition need a change in the market regulations**

For further information

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