

# The International Partnership on Bioenergy

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Preparatory meeting

*Part II – Barriers to bioenergy and possible roles of an IPBE*

Rome, 6<sup>th</sup> September 200

Barriers to the deployment of bioenergy

Actions to overcome the barriers and possible Partnership roles

Conclusions and way forward

# Barriers to the development and deployment of bioenergy - process

Bioenergy fuel chain stages considered:



Bioenergy chains considered:

- Biofuels for transport
- Domestic and small commercial heat and CHP / developed countries
- Domestic and small commercial heat and CHP / developing countries
- Large scale power, heat and CHP
- Hydrogen

# Barriers to the development and deployment of bioenergy - process

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The barriers have been identified based on five main categories :

- **Technical barriers**, related to biomass science and technology development
- **Financial barriers**, linked to the availability of capital for biomass deployment, as well access to it
- **Policy and regulatory barriers**, related to lack or inadequacy of policy and regulations in the area of biomass
- **Social barriers**, deriving from concerns on the environmental and social acceptability of biomass use
- **Market barriers**, resulting from inadequacy of energy market structures for the introduction of bioenergy



The analysis led to the identification of:

- A set of barriers common to the upstream steps of the different bioenergy chains:
  - feedstock production
  - transportation, pre-processing and trading
- Different sets of barriers specific to each individual bioenergy chain

## Barriers to feedstock production

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- Limited understanding of land resource availability and competition between energy and food crops
- Need for improvement in energy crops yields
- Limited experience worldwide on growing of energy crops
- Farmers' reluctance to switch crop
- Little experience in the systematic use of other types of biomass such as animal, agricultural and forestry residues
- Limited energy-recovery focus in municipal solid waste collection and landfill sites management

# Barriers to biomass collection, transportation, pre-processing and trading

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- Relatively small number of intermediaries trading non-food biomass feedstocks
- Limited awareness of intermediaries being vital to the whole chain
- Dispersed geographical distribution of feedstock producers and conversion plants
- Potential significant cost for biomass transport, especially if bulky and not pre-processed
- Financial barriers to collection and processing infrastructure

# Barriers to use of biomass for domestic and small-scale heat and CHP

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## Developing countries :

- Low income and difficult access to financing
- Subsidies for competing fossil fuels, such as kerosene, in some regions
- Few policy incentives for bioenergy deployment
- Lack of links between different policy areas (e.g. rural electrification and land use)
- Limited awareness of the benefits of bioenergy, sometimes perceived as a “fuel of the past”

## Developed countries :

- Initial replacement cost for biomass boilers: often more expensive than conventional ones
- Limited policy incentives to renewable heat: policy support often to renewable electricity only
- Limited awareness of the benefits of bioenergy, sometimes perceived as inconvenient
- Some environmental aspects not fully solved yet (e.g. air quality regulation for boilers)

# Barriers to the use of biomass for large-scale power and heat generation

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- Insufficient policy support for biomass electricity and heat, or for renewable energy in general
- Early stages of market development, resulting in higher perceived business risk
- Further improvements possible in combustion plant efficiency and costs
- Technology improvements needed in areas such as gasification, multi-fuel plants, polygeneration, co-firing
- Lack of standardisation of feedstocks and technologies
- Difficulties in the planning process for plants in developed countries



# Barriers to the use of biofuels

## Feedstock **production** and **transport**:

- Feedstock transport and logistics barriers, generally for larger scale plants
- Familiarity and technology development barriers for new crops

## Feedstock-to-biofuel **conversion**:

- Process efficiency and greenhouse gas balance requiring improvement
- Significant RD&D efforts required to bring advanced conversion technologies to market
- Significant level of capex required for conversion plants
- Uncertainty on both fuel market and availability of biomass supply

## For **fuel distribution and use**, lack of market pull in most countries is a barrier:

- Biofuels blending ratio limited by current vehicle standards and warranties
- Limited availability of flexi-fuel and biogas vehicles
- Limited systematic experience in biofuel infrastructure development, due to regional patterns
- Lack of international technical standards, including environmental and social traceability
- Limited competitiveness of biofuels against fossil fuels, when not supported by policy

# Barriers to hydrogen from biomass

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- Lack of institutional framework for hydrogen, which falls between policy areas
- Limited adoption of policy support for hydrogen production from biomass
- Hydrogen opportunities overlooked in biomass planning due to lack of knowledge about hydrogen
- Lack of information on hydrogen benefits and safety, resulting in concerns over infrastructure
- Further development required in biomass gasification to hydrogen and novel production routes (bacterial photosynthesis, algal processes and dark fermentation)
- Difficult access to finance for large gasification plants, due to the early stage of development
- In most regions, lack of experience and skills in hydrogen handling and transport
- High capital costs for hydrogen supply infrastructure
- Technology improvement and significant cost reductions required in hydrogen fuelled vehicles
- Likely consumer uncertainty over purchase of a new fuel and vehicle

Barriers to the deployment of bioenergy

Actions to overcome the barriers and role for the partnership

Conclusions and way forward

Barriers can be addressed by specific actions in five main areas...

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- **National and regional policy**
- **International standards and information flows**
- **Functioning projects and markets**
- **Biomass resources**
- **Developing and transferring technologies**

.. and the Partnership can play an important role in:

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- National and regional policy
- International standards and information flows
- Functioning projects and markets
- Biomass resources
- Developing and transferring technologies



- 1. Supporting national and regional bioenergy policymaking**
- 2. Facilitating international cooperation in bioenergy**
- 3. Promoting development of bioenergy projects and markets**
- 4. Supporting biomass feedstock supply through information and research**
- 5. Encouraging development and transfer of biomass conversion technologies**

# Possible partnership roles in supporting national and regional bioenergy policymaking

Roles for the partnership	Synergies
<ul style="list-style-type: none"><li>• Help governments understand:<ul style="list-style-type: none"><li>- how bioenergy could contribute to address national policy priorities</li><li>- how bioenergy could help developing countries with wider development objectives, including the MDG</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Link with bioenergy resource assessments; e.g. those developed by FAO and LAMNET</li></ul>
<ul style="list-style-type: none"><li>• Support governments in developing national bioenergy policies</li></ul>	<ul style="list-style-type: none"><li>• World Bank, UNDP, ESMAP, UNEP-GNESD</li></ul>
<ul style="list-style-type: none"><li>• Help developing countries build policymaking capacity</li></ul>	<ul style="list-style-type: none"><li>• World Bank, UNDP, ESMAP, UNEP-GNESD</li></ul>
<ul style="list-style-type: none"><li>• Assist the development of conversion and end use strategies to link with bioenergy resource plans</li></ul>	<ul style="list-style-type: none"><li>• FAO, IEA</li></ul>

## 2. Possible partnership roles in facilitating international cooperation in bioenergy

<b>Roles for the partnership</b>	<b>Synergies</b>
<ul style="list-style-type: none"><li>• Gather or integrate existing information on resources and technologies</li></ul>	<ul style="list-style-type: none"><li>• FAO, EIA</li></ul>
<ul style="list-style-type: none"><li>• Keep G8 countries engaged and bring other key bioenergy players in</li></ul>	<ul style="list-style-type: none"><li>• UNDP</li></ul>
<ul style="list-style-type: none"><li>• Work to improve coordination between government and donors</li></ul>	
<ul style="list-style-type: none"><li>• Work with international organisations and industry to develop technical, environmental and social standards</li></ul>	<ul style="list-style-type: none"><li>• IEA, ISO</li></ul>
<ul style="list-style-type: none"><li>• Work with international organisations and existing voluntary certification schemes in food and forestry to develop schemes for bioen. products</li></ul>	<ul style="list-style-type: none"><li>• ISO</li></ul>
<ul style="list-style-type: none"><li>• Work with international hydrogen initiatives to ensure that biomass-derived hydrogen is covered</li></ul>	<ul style="list-style-type: none"><li>• IPHE</li></ul>
<ul style="list-style-type: none"><li>• Engage in international activities on the effect of trade barriers</li></ul>	<ul style="list-style-type: none"><li>• WTO, UNCTAD</li></ul>
<ul style="list-style-type: none"><li>• Develop links and common plans with other institutions on complementary energy resources</li></ul>	<ul style="list-style-type: none"><li>• IEA, World Bank, UNDP, WEC</li></ul>
<ul style="list-style-type: none"><li>• Raise awareness of bioenergy in other organisations in related areas</li></ul>	<ul style="list-style-type: none"><li>• UNFCCC, OECD TFs, APEC</li></ul>

### 3. Possible partnership roles in promoting development of bioenergy projects and markets

Roles for the partnership	Synergies
<ul style="list-style-type: none"> <li>Identify promising market-building opportunities and initiate discussion between stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>World Bank, A,B,C-REED</li> </ul>
<ul style="list-style-type: none"> <li>Promote local market stability</li> </ul>	<ul style="list-style-type: none"> <li>World Bank, A,B,C-REED</li> </ul>
<ul style="list-style-type: none"> <li>Support policies that promote diverse bioenergy routes in each region</li> </ul>	
<ul style="list-style-type: none"> <li>Emphasise the importance of intermediaries to policymakers and funding bodies</li> </ul>	
<ul style="list-style-type: none"> <li>Disseminate information to the financial community about bioenergy, and promote bioenergy in funding institutions</li> </ul>	<ul style="list-style-type: none"> <li>WB, UNDP, GFSE, GVEP, REEEP, EU</li> </ul>
<ul style="list-style-type: none"> <li>Encourage policymakers and donors to establish training and skill sharing schemes</li> </ul>	
<ul style="list-style-type: none"> <li>Establish networks of government, non-government and private stakeholders</li> </ul>	
<ul style="list-style-type: none"> <li>Raise profile of bioenergy infrastructure planning at government level</li> </ul>	<ul style="list-style-type: none"> <li>World Bank</li> </ul>
<ul style="list-style-type: none"> <li>Promote information sharing for community involvement methods in project design and implementation</li> </ul>	<ul style="list-style-type: none"> <li>NGOs</li> </ul>



## 4. Possible partnership roles in supporting biomass feedstock supply through information and research

Roles for the partnership	Synergies
<ul style="list-style-type: none"><li>• Assist with coordination of existing activities on resource information provision</li></ul>	<ul style="list-style-type: none"><li>• FAO, LAMNET, US DoE, EUBIONET</li></ul>
<ul style="list-style-type: none"><li>• Identify gaps in RD&amp;D on crops suitable for developing countries, and promote establishment of international activities in this area</li></ul>	<ul style="list-style-type: none"><li>• IEA task 30</li></ul>
<ul style="list-style-type: none"><li>• Instigate activities aimed at providing information and support to farmers</li></ul>	
<ul style="list-style-type: none"><li>• Encourage information sharing between national forestry associations on bioenergy</li></ul>	<ul style="list-style-type: none"><li>• IEA task 31</li></ul>
<ul style="list-style-type: none"><li>• Provide centralised information on the benefits of waste-to-energy and relevant technologies, to the waste industry and policy makers</li></ul>	<ul style="list-style-type: none"><li>• IEA tasks 36 and 37</li></ul>
<ul style="list-style-type: none"><li>• Develop guidelines on sustainable biomass production in collaboration with organisations involved in resource production</li></ul>	

## 5. Possible partnership roles to encourage development and transfer of biomass conversion technologies

Roles for the partnership	Synergies
<ul style="list-style-type: none"><li>• Exchange with other international activities to provide more integrated and effective knowledge on bioenergy, e.g. web-based information systems on resources and end-uses</li></ul>	<ul style="list-style-type: none"><li>• IEA, FAO</li></ul>
<ul style="list-style-type: none"><li>• Raise awareness within national governments of bioenergy R&amp;D needs</li></ul>	
<ul style="list-style-type: none"><li>• Support IEA Bioenergy activities, and encourage further participation from developing countries</li></ul>	<ul style="list-style-type: none"><li>• IEA</li></ul>
<ul style="list-style-type: none"><li>• Ensure strong links between biomass and hydrogen R&amp;D activities</li></ul>	<ul style="list-style-type: none"><li>• IEA, IPHE, national R&amp;D</li></ul>
<ul style="list-style-type: none"><li>• Promote technology transfer between geographical regions, both N-S and S-S, for example through technology development partnerships</li></ul>	<ul style="list-style-type: none"><li>• UNDP, UNEP-GNESD, GVEP, GFSE</li></ul>
<ul style="list-style-type: none"><li>• Encourage cooperation between regional and local technology end users and technology developers to ensure that the development and deployment of bioenergy technologies are based on consideration of local conditions</li></ul>	<ul style="list-style-type: none"><li>• UNDP, UNEP-GNESD, GVEP, GFSE</li></ul>

Barriers to the deployment of bioenergy

Actions to overcome the barriers and role for the partnership

Conclusions and way forward

Some high-level considerations can be made...

If a Partnership is to have an impact in accelerating the development and deployment of bioenergy globally to contribute to cleaner and more secure energy provision and improved quality of life, it needs to:

- have a wide and balanced participation from developed and developing countries
- develop a global understanding of bioenergy opportunities and issues
- raise awareness on the barriers and how to overcome them
- establish close links with existing international activities and provide leverage to these activities, though avoiding duplications and overlaps
- have political weight to promote bioenergy effectively

Based on today's suggestions, the **activities** and **scope** of the Partnership will be finalized.