

**Boosting the contribution of bioenergy  
to the European Union Climate &  
Energy ambitions: a proposal for a  
European Industrial Bioenergy  
Initiative (EIBI):**

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Discussion document prepared by the

**European Biofuels Technology Platform  
(EBTP)**

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## Executive summary

**The European Industrial Bioenergy Initiative (EIBI) intends to accelerate the commercial deployment of advanced technologies to boost the contribution of sustainable<sup>1</sup> bioenergy to the EU 2020 targets.**

The EU climate and energy package adopted provisionally in December 2008 aims at a 20% or more reduction of greenhouse gas (GHG) emissions, 20% of renewable energy in the total EU final energy consumption, 20 % increase in energy efficiency and a 10% renewable energy share in EU transport fuel by 2020. Bioenergy is already contributing to a very significant share of EU renewables (68 %). To meet the 2020 aims will require a tripling of the current level and a ten fold increase for biofuels. The challenges for Member States to meet these targets under current business and regulatory environment are considerable, because of the magnitude of the growth rate and investment needed in a context of uncertainty on the economic and political frameworks, as well as on the sustainable availability of required biofeedstock.

The purpose of the EIBI is to boost the contribution of sustainable Bioenergy<sup>2</sup> to EU climate and energy objectives, with a focused approach leveraging public private partnership to manage risks and share financing. It implies an acceleration of ongoing research, development & demonstration efforts in order to deploy reliable and efficient technologies on the EU market by 2020. The EIBI requires a supportive, reliable and harmonized regulatory framework across the Member States to ensure sustainable and competitive supply of biofeedstocks and to target end markets that are politically relevant and economically attractive.

### EIBI scope:

- Innovative bioenergy value chains<sup>3</sup> which are not yet commercially available (thus excluding current biofuels, heat & power, biogas ...) and could be deployed at large scale (large single units or larger number of smaller units).

### Key objectives:

- Enabling commercial availability of advanced bioenergy at large scale by 2020, aiming at production costs<sup>4</sup> allowing competitiveness with fossil fuels at the prevailing economic and regulatory market conditions, and advanced biofuels<sup>5</sup> covering up to 4 % of EU transportation energy needs by 2020.
- Strengthening EU world technology leadership for renewable transport fuels for diesel and jet engines<sup>6</sup>, serving the fastest growing area of transport fuels, in the world.

### Core activity

- Selection and funding of Demonstration<sup>7</sup> and/or Reference plants<sup>8</sup> projects

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<sup>1</sup> Throughout this document, the words “sustainability” and “sustainable” are covering the three dimensions: social, environmental, economic

<sup>2</sup> Bioenergy: heat and/or electricity and/or fuels produced at industrial scale from bioresources (dedicated crops, agricultural and forestry residues, municipal and industrial wastes)

<sup>3</sup> Value Chain: specific combination of feedstock, processing technologies and marketable end products

<sup>4</sup> Production cost of biofuels depends heavily on investment intensity, on the degree of utilization of primary energy and on feedstock price, with significant differences across geographic areas and specific feedstock types.

<sup>5</sup> Sustainable biofuels with a broader raw material base and/or better end product properties than the biofuels currently on the market

<sup>6</sup> This comprises fuels for the transport needs of diesel fuelled cars, trucks & buses, off road vehicles, ships and airplanes

<sup>7</sup> Demonstration: demonstrate the performance and reliability of all critical steps of the value chain so that the first commercial unit can be designed and performance guaranteed from the outcome of the Demo unit.

<sup>8</sup> Reference Plant: first commercial scale unit.

- Budget and timeline; 6-8 Billion € over 10 years, to fund 15 to 20 demonstration and / or reference plants

Main outcome:

- Developing use in the EU of sustainable biomass resources for bioenergy applications, adjusted to local context.
- Focusing relevant EU public and private R&D capability on strategic objectives validated at EU level.
- Contributing significantly to the creation of green jobs, to locally and sustainably produced energy and to the development of a healthy bioenergy industrial base.
- Stimulating education and training in the related scientific and technological areas, raising the level of competencies and increasing the number of professionals.

Key messages on the EIBI:

- A set of innovative<sup>9</sup> industrial bioenergy value chains could be successfully deployed in Europe provided supportive framework is available to manage high cost and risk of industrial deployment.
- The focus of EIBI should be on those value chains, which could bring large volume contributions, and which are too costly to be developed and funded at national level.
- Sustainable and reliable supply of feedstocks will be a critical success factor for the long-term perspective of biomass-based technologies on a large scale. This relates to efforts in improving productivity in these sectors, in developing reliable supply chains that open up the feedstock potentials, certification issues, and prevention of excessive disturbances in agricultural and forest commodity markets. These challenges which are not specific to bioenergy use of biomass should be addressed in a coherent effort shared with the relevant stakeholders and initiatives.
- Seven such innovative bioenergy value chains, that could bring significant contributions to EU ambitious objectives, in addition to the existing bioenergy value chains, have been identified (see box below). **This list is not exhaustive.**

**7 “generic” value chains**

A) Conversion paths based on thermochemical processes:

- (1) Synthetic fuels / hydrocarbons from biomass via gasification (main markets: renewable transportation fuels for jet and diesel engines)
- (2) Bio-methane and other gaseous fuels from biomass via gasification (substituting natural gas and other gaseous fuels)
- (3) High efficiency power generation via gasification of biomass (main markets: electricity for large scale plants, CHP for smaller plants (below 20 MWel.))
- (4) Bioenergy carriers from biomass via other thermochemical processes like pyrolysis, torrefaction etc. (main markets: fuels for heating, power generation or intermediate for further upgrading into transportation fuels.)

B) Conversion paths based on biological and chemical processes:

- (5) Ethanol and higher alcohols from sugars containing biomass<sup>10</sup> (main market: renewable transportation fuels as gasoline components, E85)
- (6) Renewable hydrocarbons from sugars containing biomass via biological and/or chemical process (main markets: renewable transportation fuels for jet and diesel engines)
- (7) Production of bioenergy carriers from CO<sub>2</sub> & sunlight through micro-organism based production (algae, bacteria etc.) and further upgrading into transportation fuels and valuable bio-products (main market renewable transport fuels for jet and diesel engines)

<sup>9</sup> Innovative for the purpose of EIBI means not yet commercially available ( thus excluding current biofuels, heat & power, biogas ...)

<sup>10</sup> Biomass containing monosaccharides (e.g. glucose), disaccharides (e.g. sucrose) and polysaccharides (e.g. starch and cellulose) with the main focus on lignocellulosic biomass

- Within each of these 7 “generic” value chains, different paths based on significantly different fossil feedstocks (including fossil co-processing) technological and/or industrial options are possible. Combinations of thermochemical and biological processes are also possible. They all correspond to different types of energy-driven biorefineries<sup>11</sup>.
- The critical technologies for these value chains are at different level of maturity. Relevant scientific and technological know how is available in Europe, within industry, technology developers and universities/research institutions.
- Demonstration of the sustainable performance of these technologies over the complete value chain is critical for securing financing for commercial large scale deployment and gaining social acceptance.
- The earliest industry actors are ready to move to a demonstration and/or commercial reference plant, provided a relevant framework ensures sharing risks and financing via public/private partnership. Others will be ready in the coming years, allowing to spread EIBI project selection activity between 2010 and 2015.
- The preliminary estimated budget to build and operate 1 to 3 Demonstration and/or Reference Plants within each of the 7 “generic” value chains is 6-8 billion € over 10 years.
- These Demonstration projects and/or Reference Plants will be industry led key actors within each project should come from at least three Member States.
- The EIBI initiative will include also important R&D challenges for the existing public research capacities in Europe. Applied R&D will play a key role in directly supporting selected demonstration and reference projects; strategic R&D will be needed for the long term development of the whole sector.
- To ensure clear focus and strong partnership of critical actors within each EIBI project, several topics of relevance to overall bioenergy development will not be in the direct scope of EIBI. Such topics are:
  - Demonstration projects exclusively focused on improving yields & quality characteristics of biofeedstocks (existing and new)
  - Small niche & locally specific bioenergy value chains
  - Biorefineries that are not focused on bioenergy
  - Demonstration of new logistics end use solutions which are not bio specific
 EIBI will, however, ensure linkage and synergies with relevant initiatives dealing with these topics.
- A framework is needed to design, validate and implement such risky and costly projects leveraging on synergies across key industry actors and EU Member States. It should be flexible to adjust to the different risk profile and characteristics of each value chain.
- On the basis of this proposal, EBTP is willing to pursue an active dialogue with the European Commission and relevant stakeholders to further elaborate the EIBI around shared objectives and targets, coherent and selective criteria, clearly identified funding sources and mechanisms, transparent governance and efficient management. EBTP proposes that the EIBI programme should be rapidly established to ensure that the first call can be open as soon as 2010.

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<sup>11</sup> Biorefinery: Biorefining is the sustainable processing of biomass into a spectrum of bio-based products (food, feed, chemicals, materials) and bioenergy (biofuels, power and/or heat) [IEA Bioenergy Task 42 on Biorefineries]