

## Conclusions of the workshop “The role of industrial biorefineries in a low-carbon economy”, Gothenburg, 16 May 2017

Input to the meeting “Bioenergy and biorefining in a circular (bio)economy”, Brussels, 27 Sept 2017



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# ExCo Workshop

- The role of industrial biorefineries in a low-carbon economy”, Gothenburg, 16 May 2017
- Organized by IEA Bioenergy (Task 42) & IEA IETS, in connection to their May 2017 ExCo meetings
- 4 sessions:
  1. plenary session on biorefinery developments,
  2. interactive workshop on strategic biorefinery developments,
  3. plenary session on how to overcome deployment barriers for biorefineries,
  4. interactive workshop on deployment barriers and actions
- Workshop summary ready in draft, will be published in October

<http://www.ieabioenergy.com/publications/ws22-the-role-of-industrial-biorefineries-in-a-low-carbon-economy>

# Promising concepts & business opportunities

- *Pulp and paper mills:*
  - ideal platform for the demonstration of the biorefinery concept because of their scale, existing infrastructure, proximity to biomass sources, and experience in biomass-handling logistics
- *Chemical industries:*
  - can shift to biobased resources, e.g. sugars, lignocellulose
  - focus on materials with specific functionalities (not only replacing fossil chemicals)
  - consider CO<sub>2</sub> and hydrogen as building blocks
  - experience from developing advanced biofuels is important stepping stone towards biochemicals

# Promising concepts & business opportunities

- *Food and feed industries:*

- already base their production on biobased feedstocks,
- more can be done with residues and waste, or non-conventional crops (e.g. proteins from grass or insects).
- Some existing biofuel production plants already include food/feed as co-products, and they can also move more towards the production of higher value-added components.

- *Petroleum refineries:*

- Co-processing of biobased intermediates such as pyrolysis oil in petroleum refineries => efficient way to build on existing infrastructure and attain a smooth transition.
- Renewable hydrogen as component in refinery processes (could be produced from biomass).

# Promising concepts & business opportunities

- *Energy utilities:*
  - integrate more with other industries, exchanging residues, heat and potentially CO<sub>2</sub>.
  - Flexibility in feedstocks (seasonal biomass & residues) and outputs (electricity, heat, biofuels) will be important to reduce investment risks.
  - Where concentrated CO<sub>2</sub> is available, carbon capture and utilisation (CCU) can be considered.

# Main deployment barriers

## *Social:*

- image/acceptance/public perception on sustainability of biomass
- lack of knowledge related to opportunities of the biobased economy
- food habits, throw-away society
- resistance to change for new products

# Main deployment barriers

## *Technological:*

- technology readiness; need further developments in separation and purification (e.g. proteins) and harvesting
- technical knowledge gaps and too many choices; complexity and rapid innovations
- lack of qualified staff
- product quality (certification needs), health & safety

# Main deployment barriers

## *Economic:*

- uncertainty about profitability; large investments with high risk level
- lack of new biorefinery business models along the whole value chain
- difficult access to capital and financing, even for viable projects; shortening timing of business cycle: investors need faster guaranteed return of investment
- relatively high cost of biomass
- knowledge and risk perception



# Main deployment barriers

## *Markets:*

- need for sector cooperation, but conservative industries (both in traditional biobased and in energy)
- opposition of existing infrastructure and stakeholders
- competition from other markets with mature technologies, including oil derivatives
- strength/lobby power of the fossil industry and existing subsidies for fossil products
- competition for sustainable feedstocks
- fragmented and volatile markets; lack of market development, e.g. for lignin products

# Main deployment barriers

## *Policy:*

- unstable policies & policy uncertainty
- lack of long term vision and policy consistency
- uncertainty about sustainability requirements, risk of revisiting decisions
- legislation related to waste & feedstocks (incl. definition of waste), food safety and GMOs
- local definitions for a global problem (carbon, renewables)

# Recommendations

## *Policy*

- stable, coherent, consistent and predictable policies
- elaborate a long term vision with concrete actions and long term perspectives for industry; evolution towards this vision should be tracked and monitored
- consider agriculture as an integrated supplier of feedstock and a service for carbon storage; build capacities to sustainably raise food yields on farms and yields from forests
- Apply real external cost and CO<sub>2</sub> price mechanisms for fossil based products, and remove (hidden) fossil subsidies
- sustainability criteria is a basis for funding; should be aligned at international level
- Facilitate cooperation between different sectors

# Recommendations

## *Policy*

- Other measures to support deployment of biorefineries:
  - provide government guarantees to reduce investment risks;
  - subsidies for innovation and R&D towards resource efficient biorefining;
  - support for demonstration and first-of-a-kind plants to bridge the valley of death; cost-sharing funding for early to late technology readiness level (TRL);
  - encourage innovation deployment through purchase mandates, long term binding targets for renewable products, tax credits for biobased products, RIN systems, etc.
  - permitting to require recycling and use of renewables (circular economy).

# Recommendations

## *Business*

- Long term commitments of sectors.
- Fossil based industries should be encouraged to go for a transition towards renewable and biobased resources.
- Set up business-to-business approaches, e.g. Carbon Pricing Leadership Coalition. Apply internal value of CO<sub>2</sub> for investment decisions, without waiting for government decisions on this.
- Take advantage of green credentials.
- Long-term multi-party agreements (national and international) & set up new biorefinery business models.
- Share cross-sector information => involvement and transparent commitment of industry, academics and NGOs.

# Recommendations

## *Research/education/information*

- the scientific community needs to raise its voice: communicate with industries, the public and policy makers, create awareness of the benefits of the biobased economy, showcase the benefits of cooperation to industry and promote success stories in biobased products
- Develop education on the circular economy/biobased economy + solid scientific data and transparent knowledge base on the benefits and status of biobased products => making the value of biobased products clear to markets, the public and politicians
- good balance between academic and industrial research; multidisciplinary RD&D; better management of technological innovation & improved international cooperation.
- continuous verification of the progress in R&D, certification and standards implementation; develop common language in terms of definitions, measurements, assessments and calculation methods for biofuels/biobased products

*Thanks for your  
attention*

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