Highlights of the Conference

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EUBCE
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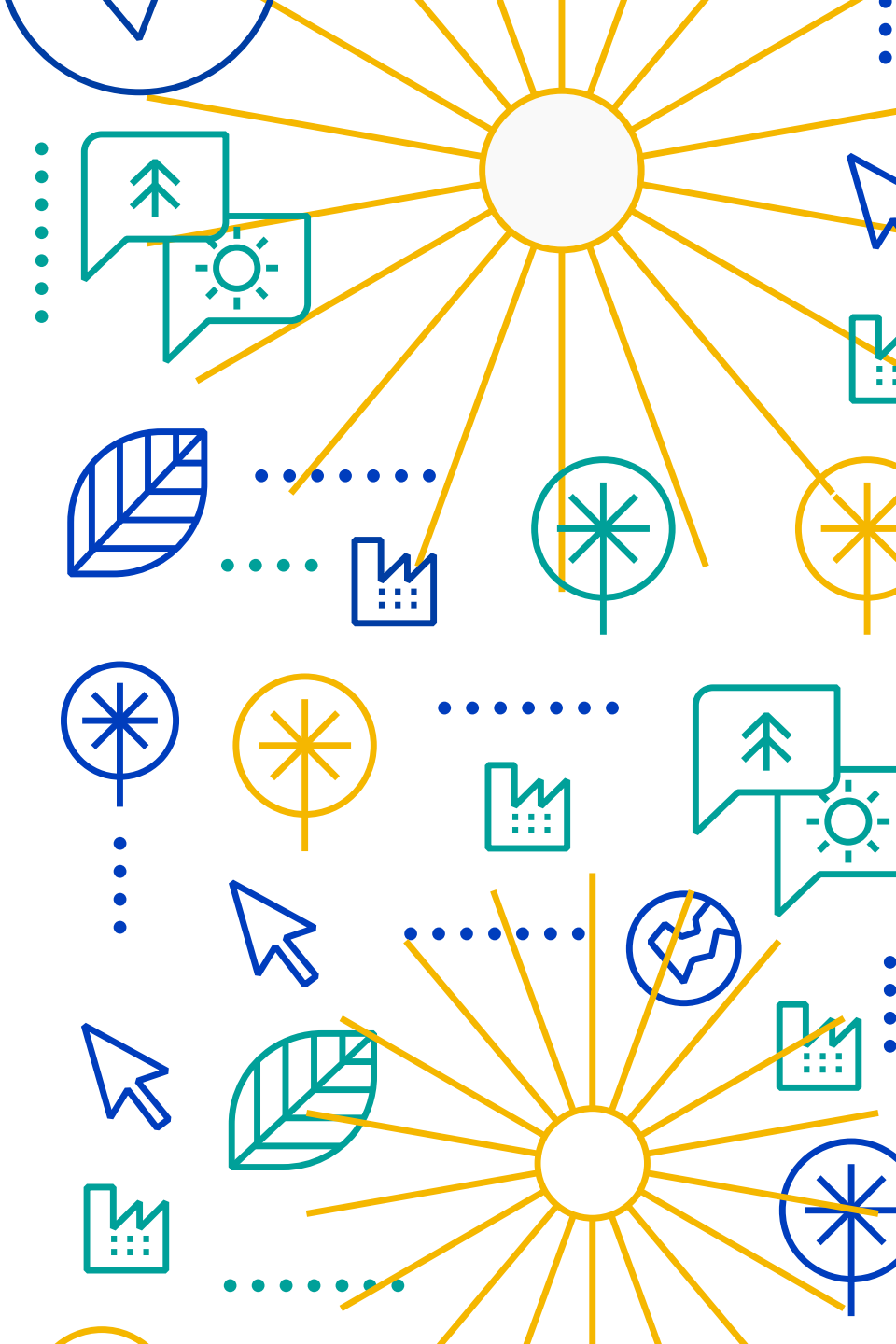

Sustainable Bioenergy for the Global Clean Energy Transition

The Need for Consensus, Innovation and International Collaboration

Global commitment toward decarbonisation

- a great momentum for renewable energy expansion
- all sectors need to contribute

Sustainability remain a main concern

- multiple benefits often overlooked in discussions
- reinforced sustainability criteria for biomass use in the EU

Bioenergy and biofuels are indispensable

– infrastructure is not there - recharging infrastructure, impacts on electricity grids underestimated
- ICE will play a large role in the global transportation sector

A variety of resources are needed

- waste and residues are the first choice
- waste are residues are limited, dedicated energy crops are needed
- intensification of sustainable biomass production

We need consensus on sustainability

1. Sustainable resources for decarbonising the economy

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Sustainable biomass potentials

- biomass carbon sink potential of forests, soil carbon sequestration potentials and implications for soil carbon storage of bioenergy crops
- scenarios for biomass supply in the EU 2050
- web-based applications to determine marginal areas and suitable crops; tool quantifying global biophysical potentials of land-based negative emissions through soil organic carbon sequestration

Biomass production systems

- biomass production options integrated into traditional agri-forestry systems, opportunities to integrate biomass production into managed landscapes
- improved knowledge on new biomass crops, intercropping, relay cropping, double cropping
- precision forest harvesting and planning through GIS for sustainable forest management

Biomass production enhancing land

- more efficient use of land and improving water availability and quality of agricultural soils in the context of intensifying agriculture
- conversion pathways involving a partial carbon return to soils and impact on soil carbon

Waste and residues

- evaluation of harvesting residues systems for alternative bioenergy
- valorization of wastewater for materials and energy, recent developments in the use of digestate as irrigation fluid at small scale
- activities on algae and aquatic biomass production systems increasingly focused on valorizing and treating polluted waters

2. Biomass Conversion for Bioenergy

Biomass combustion

- small scale biomass combustion technologies, combustion behaviour and technological approaches to reduce emissions
- emissions and operational performance from agrobiomass combustion in residential boilers
- experimental and numerical investigations of biomass combustion, alkali release and ash behaviour at large scale

Biomass gasification systems and syngas production

- advances in biomass gasification - **process analysis, modelling and optimization and syngas production**
- wood residues gasification and on syngas conditioning strategies
- synthetic fuel production from biomass gasification and Fischer-Tropsch synthesis at large scale
- investigations of autothermal catalytic reforming of pyrolysis oil for syngas production

Biogas processes and biogas cleaning

- biogas and biomethane - a solution to green transport, industry and gas grid
- novel process developments and pre-treatment of biogas feedstocks, biomethanation of syngas, biochar and hydrochar applications in biogas processes
- algae-based bio-methane purification and carbon sequestration

3. Biomass conversion to bioenergy, biofuels and bio-based products (1/2)

Bio-alcohols and chemicals from lignocellulosic biomass

- analysis of pretreatment strategies including hydrothermal pretreatment
- analysis of the influence of hydrothermal pretreatment to increase the enzymatic conversion of lignocellulosic biomass
- production of alcohols and chemicals using microbes, enzymes and process intensification

Renewable hydrocarbon biofuels and alternative fuels

- biological, thermo-chemical processes for renewable hydrocarbon biofuels
- integrated process (Thermo-Catalytic Reforming, hydro-deoxygenation and pressure swing adsorption) to synthetic fuels from sewage sludge
- co-processing Fast Pyrolysis Bio-Oil in a Fluid Catalytic Cracking (FCC)

Advances in pyrolysis processes

- fundamental and analytical aspects of biomass pyrolysis and catalytic pyrolysis; 3CO.6 catalytic, kinetic and micro pyrolytic investigations
– pyrolysis advances and biochar production and use as soil amendment and carbon sink
- advances in renewable fuels production through the hydrogenation of the crude Thermo-Catalytic Reforming oil
- new aspects of treatment of pyrolysis water

3. Biomass conversion to bioenergy, biofuels and bio-based products (2/2)

Hydrothermal processing

- hydrothermal conversion process modeling and data analysis
- advances in hydroprocessing of hydrothermal liquefaction bio-crudes
- hydrothermal carbonisation of sewage sludge and industrial residues
- innovative pathway for supercritical water gasification of wet biomass to biofuels and bio-methane

Bio-based chemicals and materials

- a range of processes for converting biomass feedstocks to bio-based products, well-defined chemicals like ethane to complex materials
- recent studies on biomass pretreatment and conversion into new materials and value-added chemicals
- bio-based production of chemicals by enzymatic/fermentation routes
- biochemical and thermochemical routes from waste and biogenic residues to biobased materials

Biorefineries for biofuels and bioproducts

- concepts for biorefineries from agri-, wood, biogenic and municipal wastes
- small scale biorefineries can also bring forward the bioeconomy in rural areas.
- advances in microalgae biofuels bioprocessing, 3BO.3.4 innovative bioconversion of syngas and CO2 with bacteria into fuels/chemicals

4. Sustainability Impacts and Policies

Socioeconomic impacts

- social impacts, behavioral analysis and change management and socio-cultural conditions
- socio-economic impacts and public perception to better understand social acceptance of biomass use for bioenergy and products

Environmental impacts

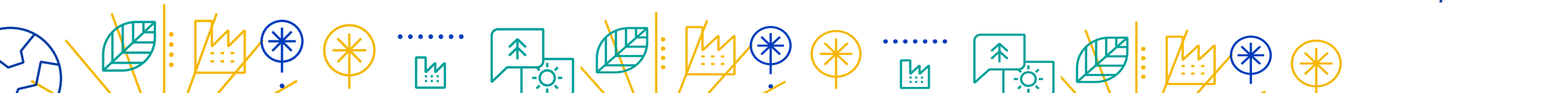
- environmental impacts of biomass production on ecosystem services, water availability
- Life Cycle environmental impacts of bio-based materials
- LCA of bioenergy and bio-based products from agri and marginal land, addressing environmental impacts on biodiversity and water

Climate impacts and GHG performance

- potential, feasibility and challenges for different climate mitigation strategies with bioenergy and carbon capture
- opportunities and challenges for BECCS systems supporting net-zero emission targets
- attributional Land use and land use change approach

Resource efficient and circular economy

- possible development paths towards a resource-efficient and carbon neutral economy
- assessment framework for the cascading and circular use of biomass in bioeconomy
- integrating biochar into value chains in sugarcane biorefineries and carbon sequestration in soil



5. Bioenergy Integration

Development and integration of bioenergy in energy systems

- decision-support tools for analysis of processes integrated in biorefineries and biomass integration of into the energy system
- novel supply chains for district heating in energy transition regions

Market implementation

- analysis and optimization of flexible solutions including biogas photovoltaic hybrid system; heat pump integrated biomass district heating plants; and concentrated solar and biomass hybrid power plants
- Innovative net zero route for biogas fast pyrolysis for hydrogen production and carbon rich material

Sustainable Aviation Fuels

- perspectives, opportunities and challenges for SAF deployment and aviation decarbonisation; promising conversion pathways from various fedsctock
- aviation fuels from hydrothermal liquefaction (HTL) (e.g. algae, sewage sludge, waste) and catalytic hydrotreating (HyFlexFuel)
- emission performances of algae to aviation fuels

Green hydrogen

- role of hydrogen to decarbonize industry, transport and grids in different scenarios
- technological review and GHG emissions assessment of hydrogen from biomass
- hydrogen production options from aquatic or land biomasses by fermentation

6. Industry Sessions

Non-food crops cultivation

- sequential cropping to develop new sustainable feedstock for lipid biofuels
- sustainable feedstocks (hemp crop and camelina catch crop) bringing agronomic and environmental benefits
- marginal/unutilized lands - important opportunities for bioenergy expansion

Small scale thermochemical conversion

- new small-scale residential biomass combustion technologies with high efficiency and low emissions
- cost-efficient and fuel flexible updraft gasifier systems at small scale for combined heat and power - Kombi Power System®
- a new kind of biorefinery by combining biochar production and CHP a valuable carbon storing material in soils as well in the chemical industry

Industrial biomass gasification

- SunGas gasification process for the production of gaseous and liquid biofuels and biochemicals
- commercial demonstration of MSW gasification at Fulcrum's Sierra biorefinery to jet fuel

Fast pyrolysis

- overview on developments and future aspects of fast pyrolysis, IBO.4.4 Progress in commercial applications of advanced bio-oil production
- co-processing pyrolysis oil biocrude in an FCC to produce renewable fuels

6. Industry Sessions

Biogas/biomethane production

- production of synthetic methane through biological methanisation of biogas
- operation of industrial size SOFC plant from a biogas wastewater treatment plant (DEMOSOFC)
- green hydrogen production from biogas with a novel catalytic membrane reactor

Low carbon fuels

- integration of hydrogen and ammonia into combined cycles
- a zero-crude Grandpuits refinery complex for biofuels, sustainable jet fuels and bionaphtha (TOTAL)
- Sunliquid® Plant - cellulosic ethanol production at commercial scale (Clariant)

Advanced biofuels

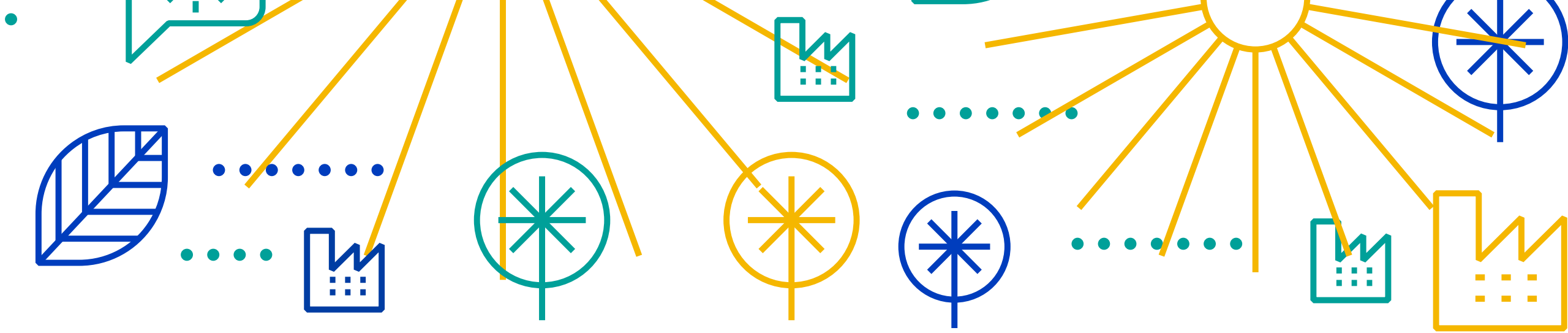
- innovative biofuel production by bacterial conversion of CO_2 and renewable hydrogen from photocatalytic water splitting
- ethanol from recycling carbon from residual gases (Lanzatech)
- bio-ethanol production (Futurol™) 2G ethanol through enzymatic hydrolysis of biomass and fermentation

Biobased products

- insights into sustainable solutions for plastic and chemical industries using bio-based feedstock
- algae platform for biofuels, food and materials
- biochemicals and biofuels from lignocellulosic material via levulinic acid chemical platform

Key messages

- low carbon and sustainable economy: a new industrial revolution
- bioenergy and biofuels: a crucial role in the green energy transition
- sustainability is key



Thank you

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PLEASE REMEMBNER THAT

EUBCE will continue after the “CLOSING” SESSION with Workshop and Panel Discussion: Expert Opinions on the ReFuel EU Aviaton Initiative