IEA Bioenergy
Technology Collaboration Programme

Task 32 Biomass Combustion

Overview of Activities

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27. Fachgespräch Arbeitskreis Holzfeuerung

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IEA Bioenergy in brief

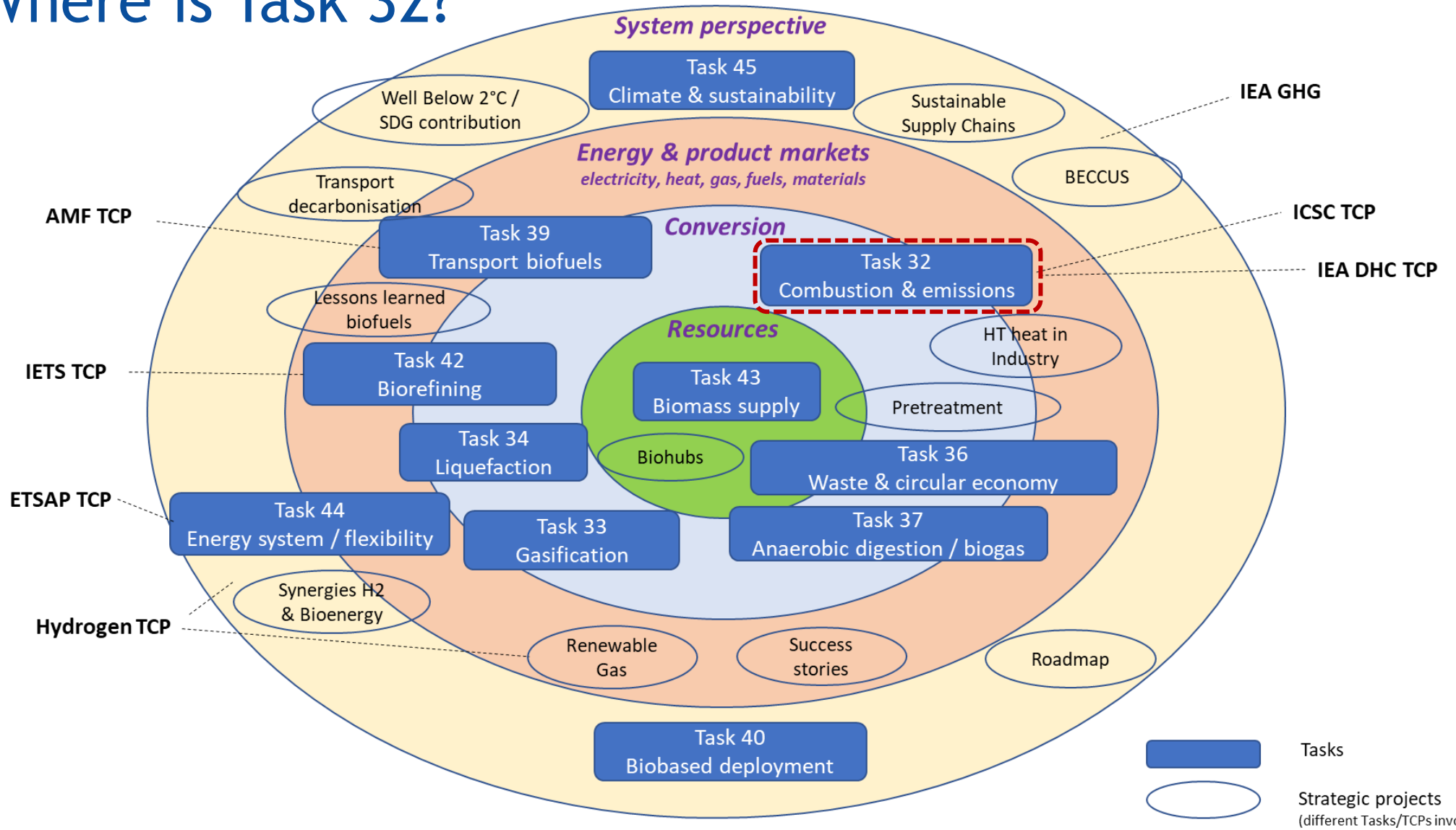
Technology Collaboration Programme (TCP), functioning within a framework created by the **International Energy Agency** (IEA)

Goal:

- International **collaboration** and **info exchange** on bioenergy research, technology development, demonstration, and policy analysis
- Facilitate the commercialization and market deployment of sustainable bioenergy systems = **climate positive, environmentally sound**, **socially acceptable** and **cost-competitive** (incl. external costs)

Work programme carried out through **Tasks** and **Strategic Projects**, covering the full value chain from feedstock to final energy product

Where is Task 32?



What is Task 32?

- Task 32 focuses on biomass combustion
  - Design, operation, efficiency, emissions etc.
  - From wood stoves to large power plants
- Task 32 members are experts from
  - Austria - Canada - Denmark - Germany - Japan - Netherlands – New Zealand - Norway - Switzerland
- Objectives
  - Collect and disseminate expert knowledge to target group
  - Exchange experiences between member countries and beyond
  - Resolve barriers to support deployment of biomass combustion
- More information
  - Task 32 website
  - IEA Bioenergy website

Task 32 work programme

Clear challenges for biomass combustion:

- Conversion of industries from fossil fuels
- Emissions (PM + NOx) - from smaller plants
- Sustainability discussion
- Integration of biomass combustion in future energy in energy systems
  - Especially with capture, sequestration and use of carbon from the flue gases (BECCUS)
  - Reduced fuel intensity – hybrid solutions

Residential heating - past

Comprehensive work within residential heating technology and emissions

- Status report on methods for PM emission measurement and new developments (report)
- Testing methods and real-life performance for pellet stoves (report) and firewood stoves (report)
- Design guideline for low-emission woodstoves (guide)
- Inventory of national strategies to reduce impact on air quality from residential wood combustion (report)
- Workshops and webinars on wood stoves and boilers (events)

Residential heating - present

- Round table expert meeting on emissions from small scale combustion, targeted at policy makers (event)
- Task 32 session at the Alaska-Canada Wood Energy Conference 2023 (conference)
- Workshop: Sustainable low emission wood stoves - recent developments and proper operation at Progetto Fuoco 2024 (events)
- Report on state-of-the-art residential biomass boilers (to be published very soon)
- Highlighting benefits for carbon balances and sustainability when using wood stoves (now part of fact sheet action)

Residential heating - future

- Impact assessment of reduction measures found in inventory
- Share experiences of market surveillance initiatives
- Keep technology innovation focus
- Take up user training - give recommendations
- Present policy brief based on findings

Innovative low emission biomass combustion

- Report on how heat storage and boilers in cascade provide low emissions
- Study of the nitrogen cycle in biomass combustion plants
- State-of-the-art biomass combustion heating plants with low NO_x emission - recent development and cases (report in Q3 2024)
- Hybridisation of biomass heating plants with heat pumps and/or solar energy is a proposed new focus

Biomass combustion with negative CO_2 emissions

- Workshop on biomass combustion and BECCUS held 21 September 2023 (website)
- Modeling the consequences of BECCUS on an existing Danish biomass-fired CHP plant (report/fact sheet in Q2 2024)
- Opportunities for BECCUS on small biomass combustion (fact sheet progressing)
- Overview of technical options for post combustion CO_2 capture

To be studied in future projects:

- Real, implemented, full scale BECCS cases
- Options for biochar from biomass combustion

Task 32 projects - industry

- Biomass for HT Heat in Industry intertask project
  - Case studies with good examples of transitions
  - Policy report
- Four new case studies coming up in 2024
  - Sluggish dialogue with case hosts create delays
- Assist decision makers with database
  - Case studies and references into existing IEAB database
- Proposing continued work on industry heat
  - Fuel options - broadening feedstock base
  - Flexibility for industry and for energy system
  - Cases with higher temperature demand

Thank you for your attention!

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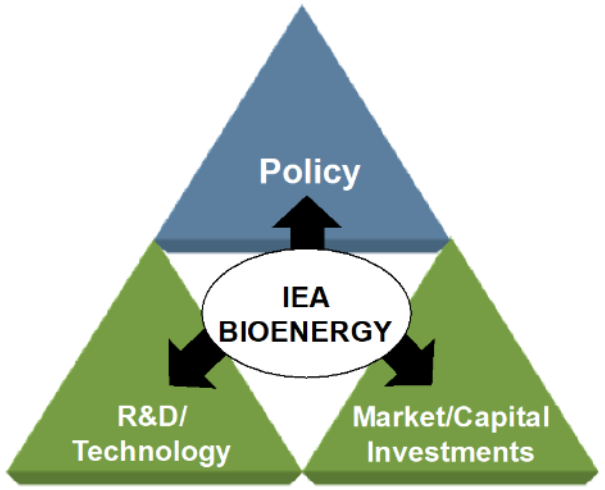
Extra slides: About IEA Bioenergy

IEA Bioenergy TCP Overview



25 Contracting Parties

Budget in 2022: 2 Million US$
Tasks: 11 + Strategic Projects
Participation: 111
Direct participation: > 200 persons

Turkey is in the process of joining IEA Bioenergy
US Grains Council recently joined Task 39 as a Limited Sponsor

Unique role for sustainable bioenergy in the transition away from fossil energy

- **Available now** to phase out fossil fuels in existing energy infrastructure
- **Versatile:** role in different sectors – heat, power, transport fuels
- **Storable/dispatchable:** complements intermittent/seasonal renewables in power systems
- Next to producing energy, it can **remove atmospheric CO_2** ("negative emissions") via deployment of Carbon Capture & Storage (CCS) : BECCS / Bio-CCS
- Provide **atmospheric CO_2** for carbon-containing e-products/e-fuels via Carbon Capture & Utilisation (Bio-CCU)
- **Enable biomass supply chains & sustainability governance systems** for the biobased economy

Bioenergy contributes to climate change mitigation when:

- Biomass is grown **sustainably** or based on waste/residues
- **Converted** to energy products **efficiently** (often together with other biobased products)
- Used to **displace fossil fuels**

Current strategic action areas

A sustainable system for energy and materials supply with biomass

- Demonstrating the key role of bioenergy in a decarbonising world, the complementary role with other renewables, and the potential to provide negative emissions (BECCUS)
- Contribution to Sustainable Development
- Embedding bioenergy into the broader bio-economy
- Incorporating the security, flexibility and stability provided by bioenergy in the fuels, electricity, gas and heating systems

Innovative Technologies

- Enabling the development and application of innovative technologies (collaboration & best practices)
- Developing advanced biofuels from lignocellulose and waste & consider their role in hard-to-abate transport sectors (aviation, marine, long-distance transport)

Current strategic actions areas

Sustainable Supply Chains

- Mobilize biomass resources through landscape management, reuse of abandoned agricultural lands; sustainable sourcing in agriculture and forestry; logistics to mobilize underutilized residues
- Support sustainability governance & certification
- Promote market deployment of efficient biobased value chains

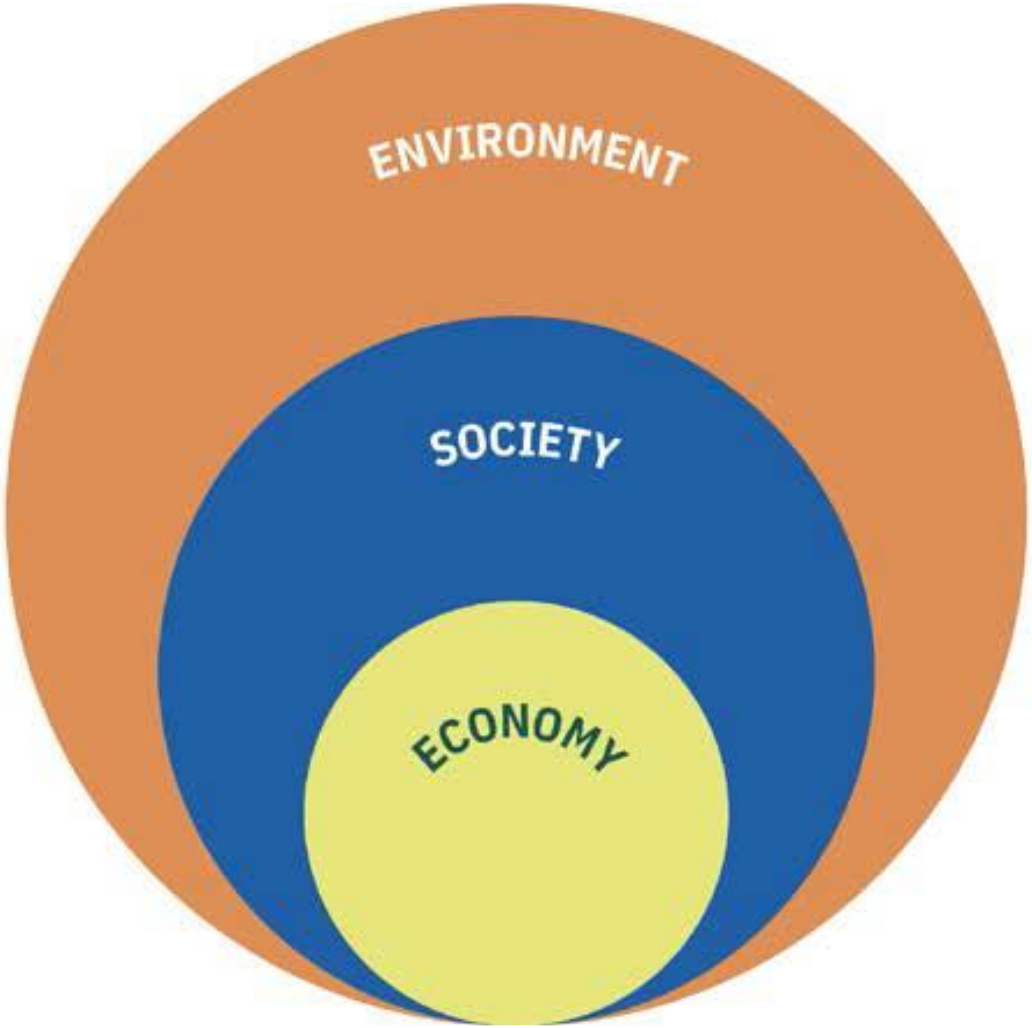
Operational Optimisation

- Engaging relevant stakeholders in a dialogue & science based analysis to inform political/public debates
- Expanding collaboration with emerging and developing countries
- Ensuring the optimal use of communication channels

Extra slides: Why biomass is such a good idea

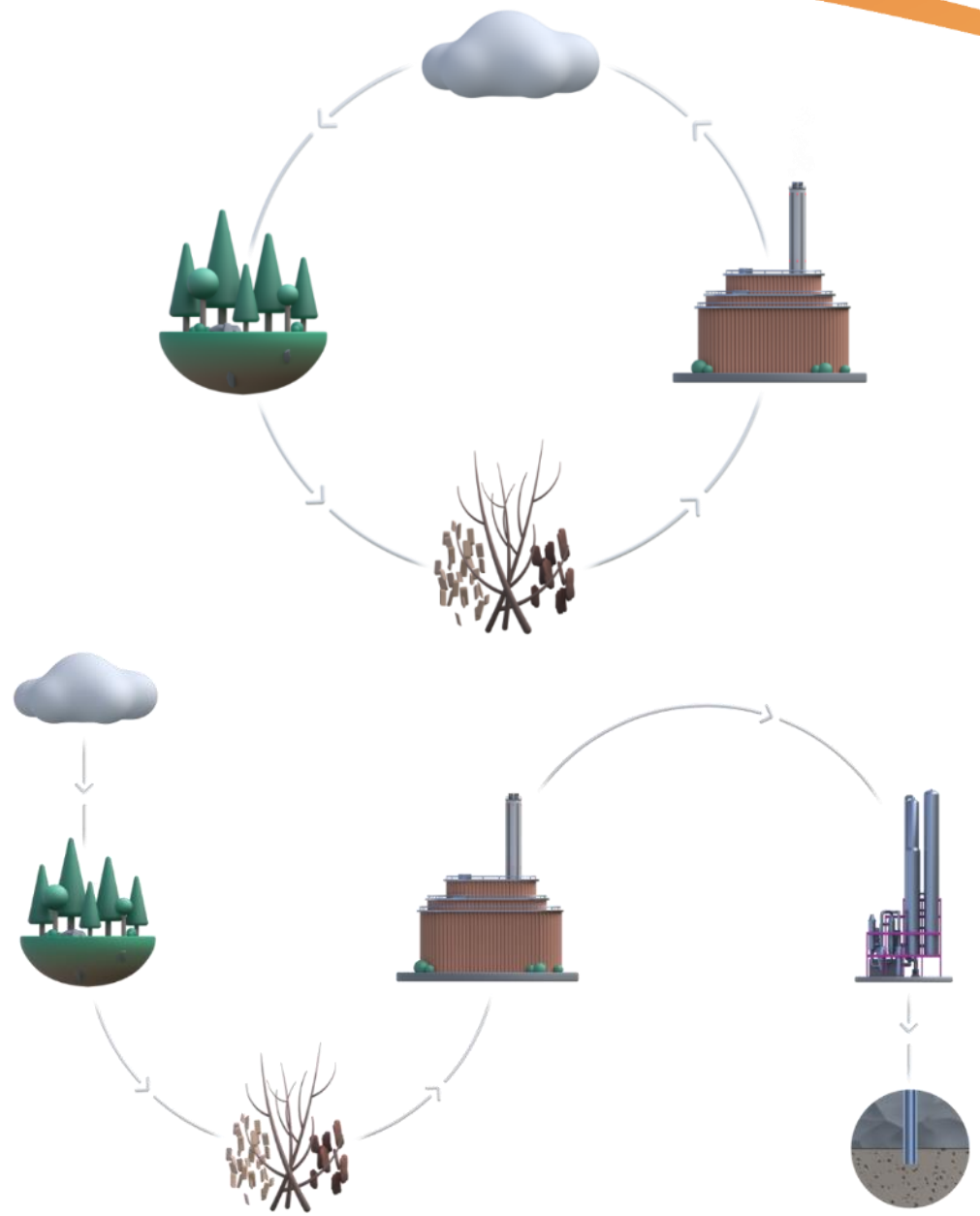
Why we think biomass is such a good idea

- Transition to sustainability is the main focus
- ”Meeting current needs without compromising future generations”
- Biomass is a renewable source of energy that can deliver on all three sustatainability pillars
  - Economic
  - Social
  - Environmental



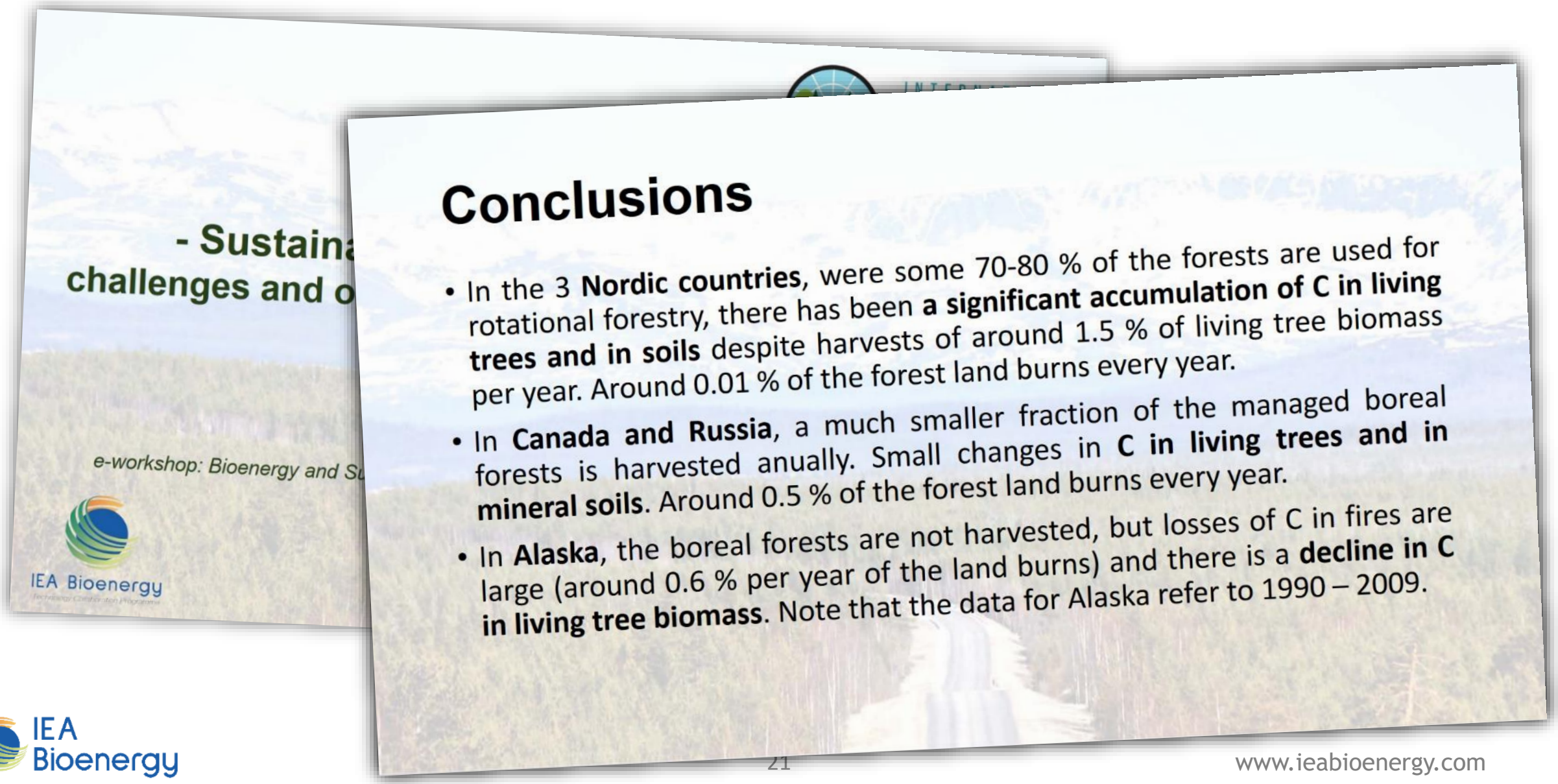
Biomass to mitigate GHG emissions

- By using biomass to generate bioenergy you can replace fossil fuels
- Thereby you put an end to adding fossil carbon to the atmosphere
- If you add carbon capture and storage, bioenergy becomes a way to remove carbon dioxide from the atmosphere



Illustrations by Stockholm Exergi AB

Managed boreal forests store more carbon



Social benefits from biomass

- Creating local/regional jobs
- Keeping economy local
- Equalizing access to energy
- Support resilience of forests, reducing risks of losses due to
  - Storms
  - Insects
  - Wildfires

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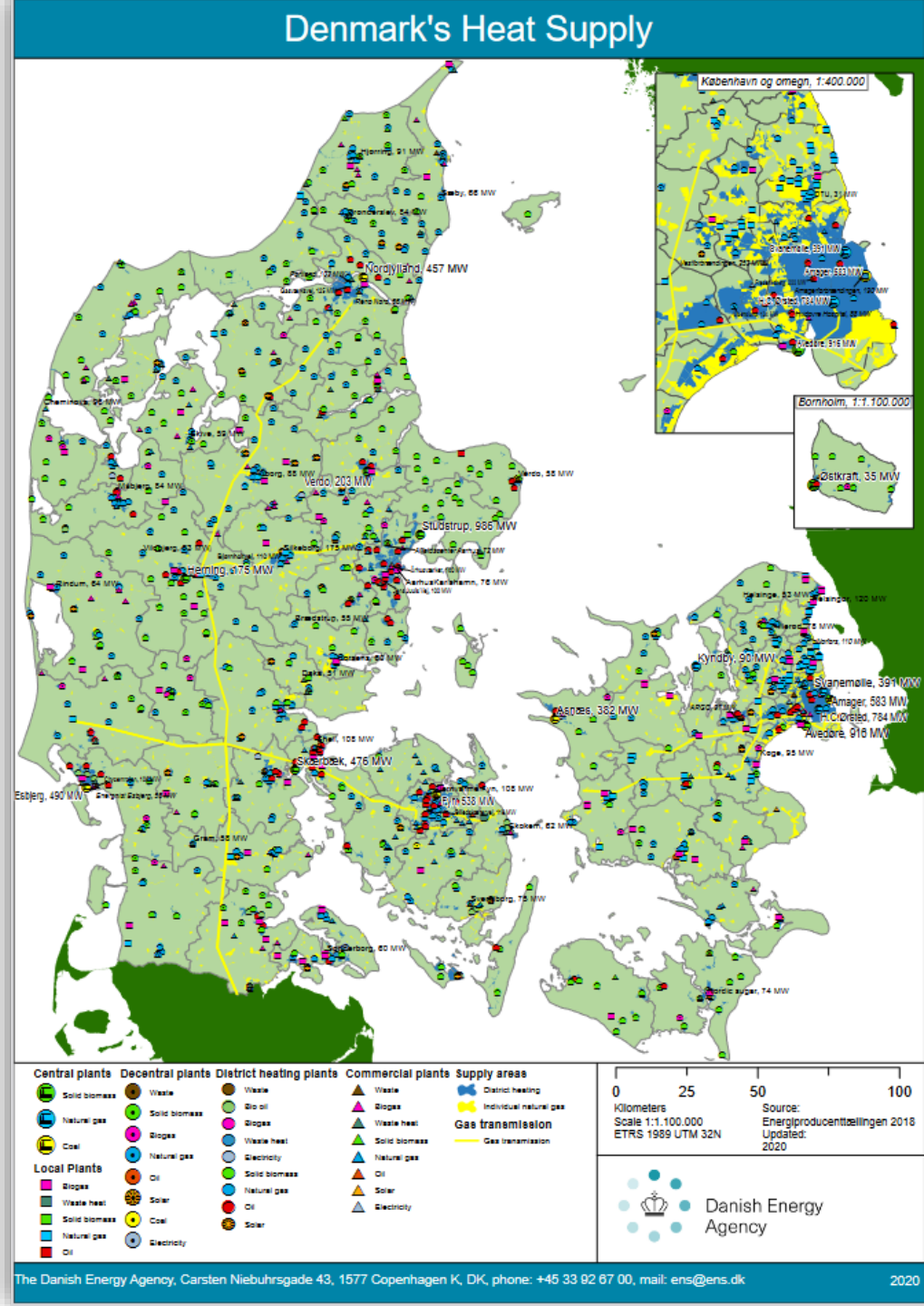
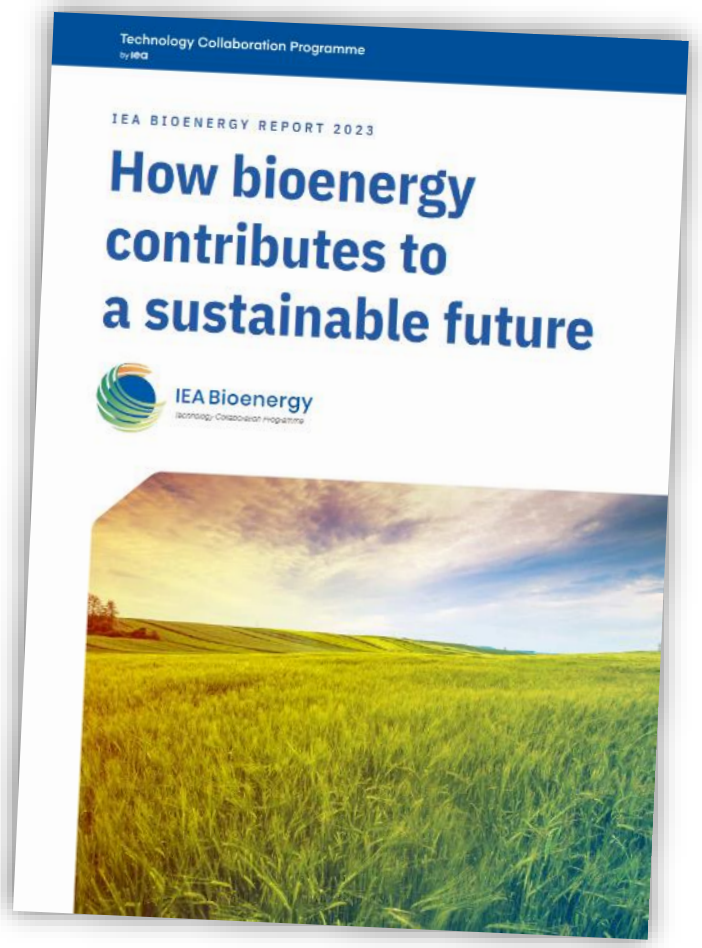
Economic perspectives

- Biomass may be economic due to cheap sourcing or expensive fossil alternatives
- Involving negative externalities of fossil fuels in the equation, e.g., the environmental costs, may be necessary in some cases to develop a market
- Two good examples of this
  - Sweden; CO_2 tax on fuels for many years
  - Denmark; biomass excempted from energy tax



Read more



www.ieabioenergyreview.org

Extra slides: About Ea Energy Analyses

Ea Energy Analyses

- Consulting company operating in the field of **energy and decarbonization**
- Established in **2005**
- Based in **Copenhagen**, Denmark
- Founding partners were managers in the TSO of Eastern Denmark

50 people

Projects in 20+ countries

3.5 m$ annual turnover

19 years of experience within the energy sector

For any inquiry, contact:
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