




Task 40: Sustainable Biomass Markets and International Trade to support the Bioeconomy

July 12, 2017

Dr. Patrick Lamers

Research Scientist

Idaho National Laboratory

Task 40

- **Core objective:** support the development of sustainable, global bioenergy markets and trade, recognizing the diversity in resources and biomass applications

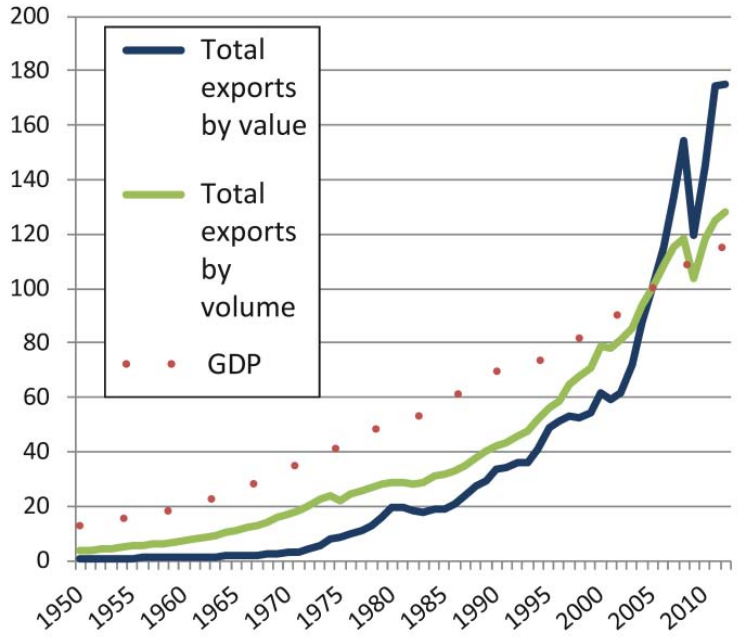
- **Industry involvement:** energy companies, technology providers, and traders (Drax, Hofor, Inray, RWE, Wild & Partner)

- **10 member countries** (2016-2018)

Relevance of Markets & Trade

- Trade accelerates **economic development** (ancient phenomenon)
- Recent developments unprecedented in **scale, speed, complexity**

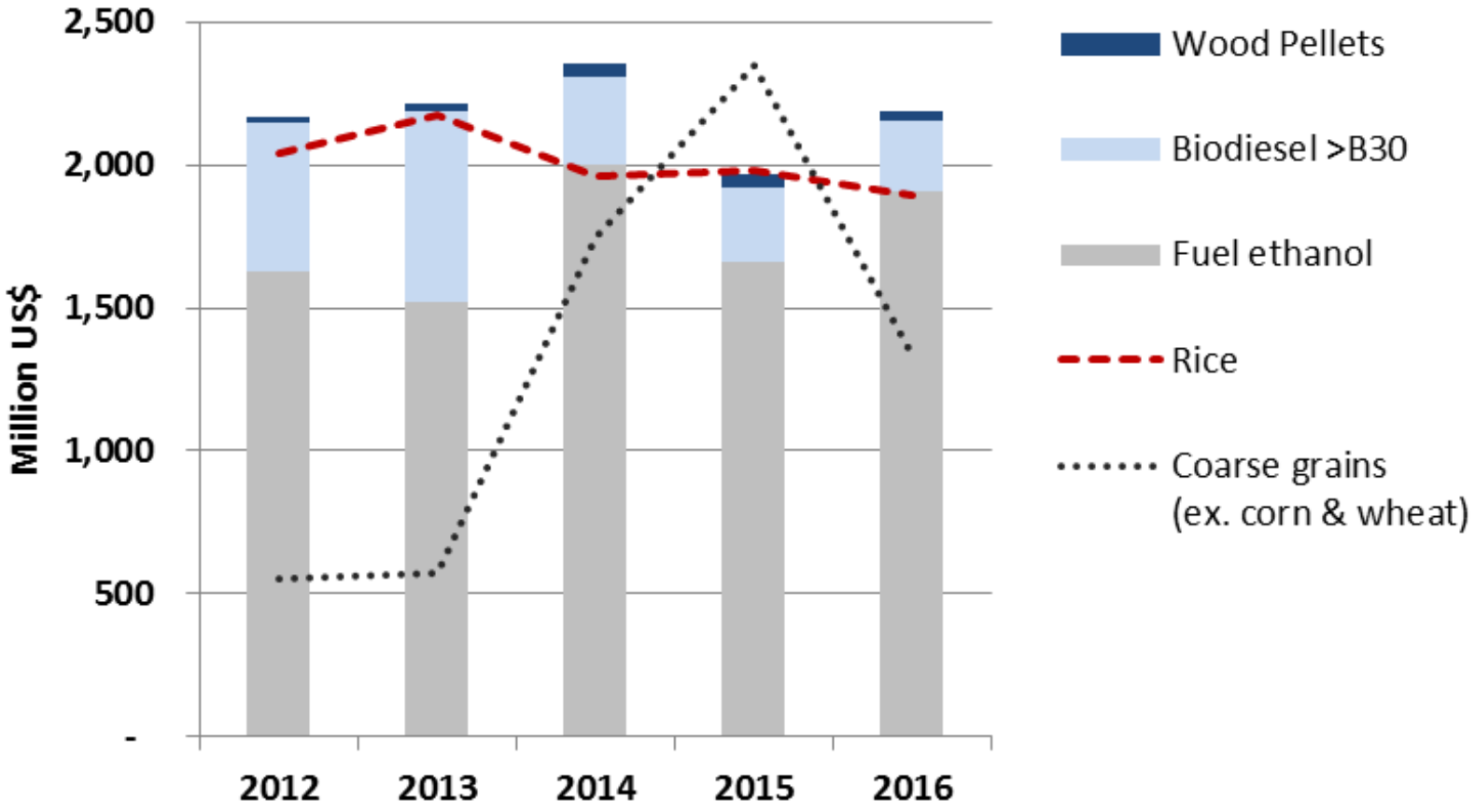
- Global trade **grew faster than GDP** (value of G&S 300x > than 1950)
- Exports average **30% of country's GDP**
- Complexity: longer and more **fragmented** supply chains



Sources: U.S. Census Bureau; Wiedmann; World Bank; WTO

U.S. bioenergy export value

- U.S. energy related biomass exports*: **multi-billion $ value**
- **Trade is reality**: U.S. domestic bioeconomy in global context

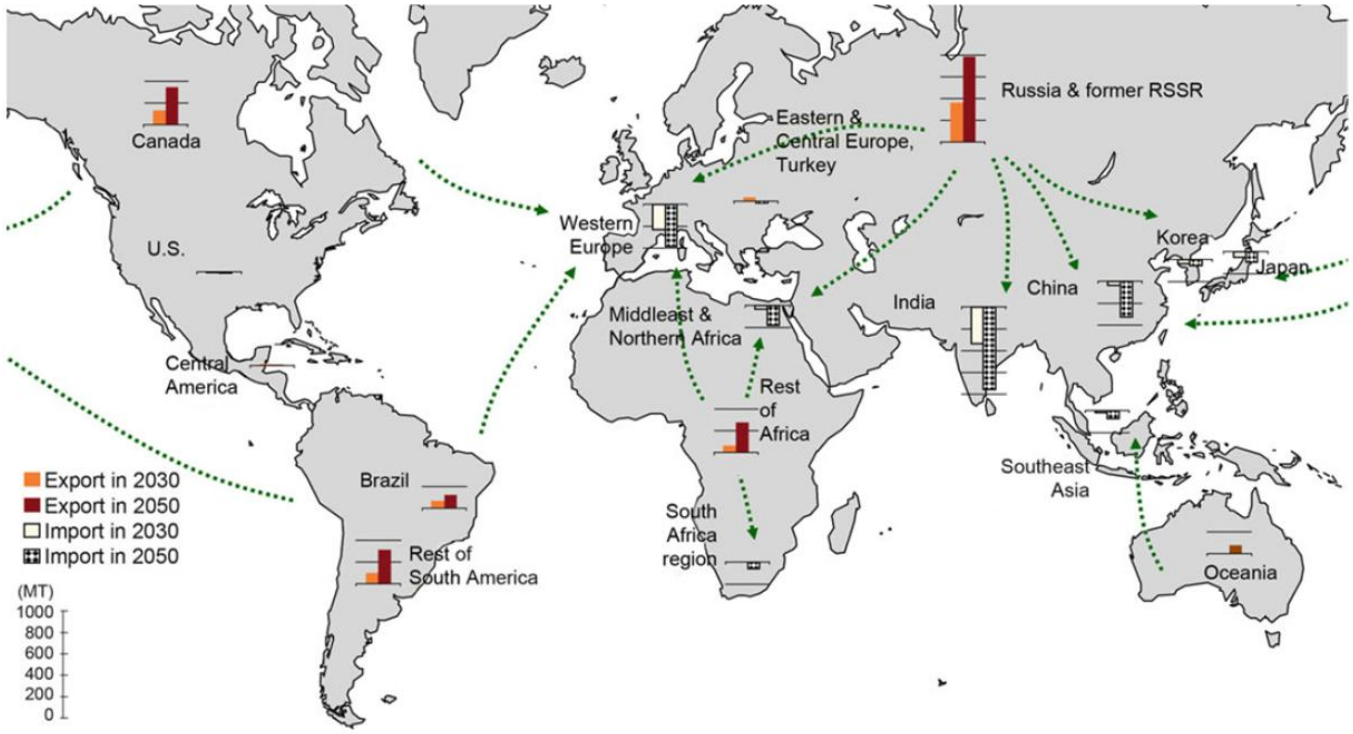


* HS3824904030; 382600; 2207106010; 2207200010; 440131

Sources: U.S. Census Bureau

Task 40 – four key areas

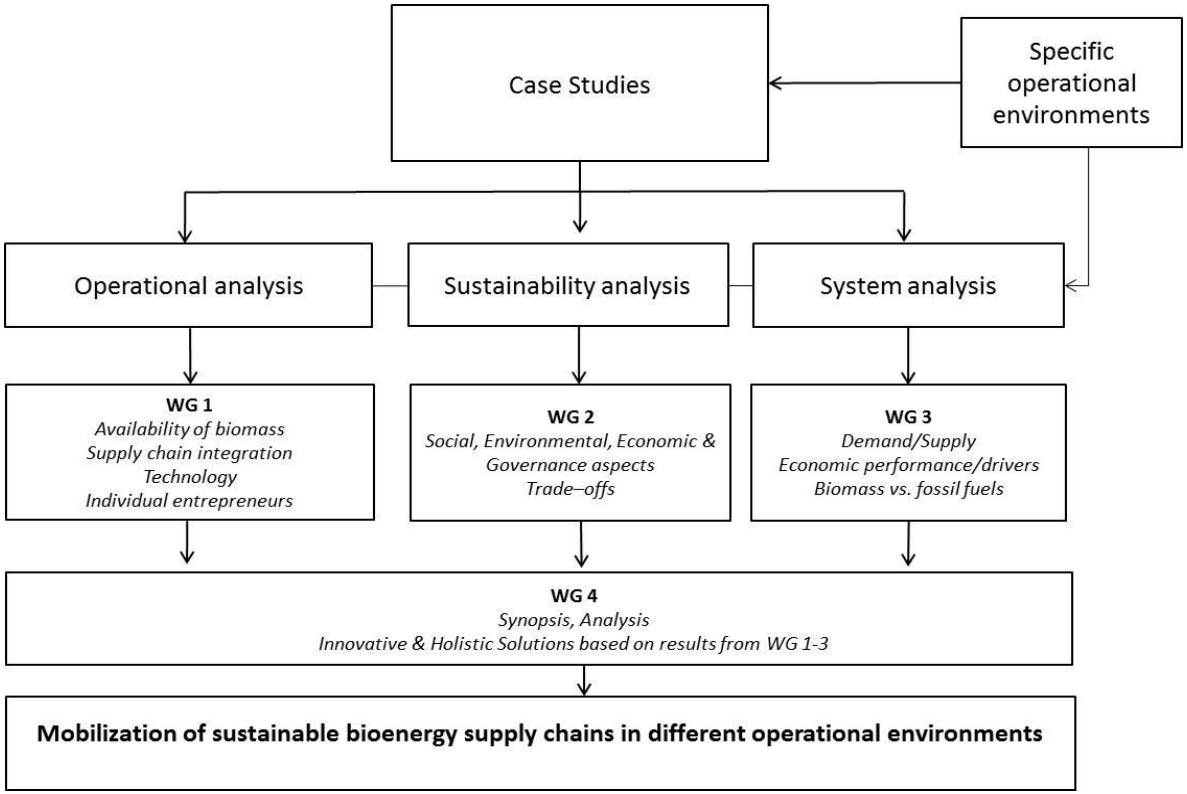
1. **Mobilization** of sustainable biomass resources
2. Analysis of biomass demand from the **broader bioeconomy**
3. **Sustainability** and certification
4. Assisting the development of **advanced analysis tools**

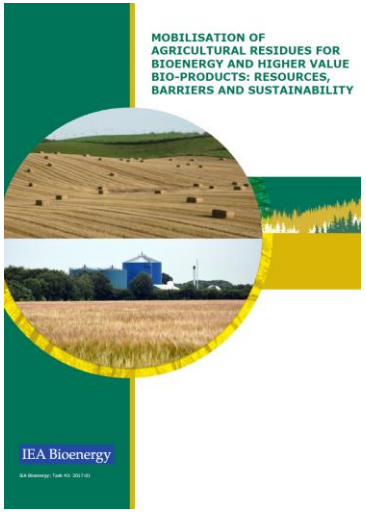


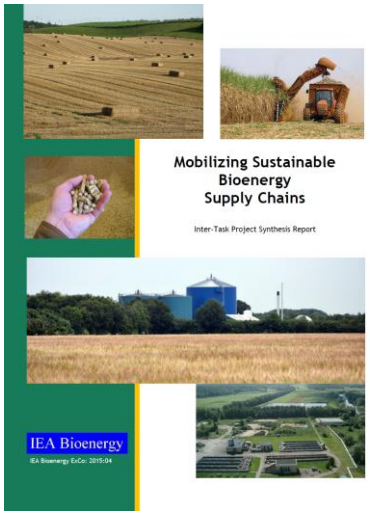
Source: Kranzl et al., Chapter 8 In Junginger et al. International Bioenergy Trade, Springer 2013

1. Mobilization

- **Intertask** between Tasks 37, 38, 39, 40, 42, 43
- **68 contributors** from academia, private sector
- **5 Cases** (two with Task 40 involvement)





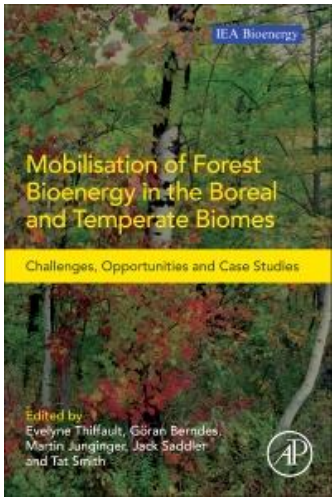


1. Temporal and boreal forest biomass

- **Theory & practice:** surveys & case studies

- **Challenges**
  - **Variability of supply chains:** diversity in structure and markets
  - **Logistics:** characterization & management of feedstock heterogeneity
  - **Management:** different practices & BMP perceptions (e.g., EU vs. US or CA)
  - **Definitions/Regulatory:** "continuously forested", "pristine", "harvest has to reflect natural occurrences" (e.g., wild fires)

- **Opportunities**
  - **Technological learning** across industries
  - **Cooperative organization structures:** supply cooperatives
  - **Integration of energy and forest systems:** integrated planning, multi-purpose forests, integrated forest management
  - **Stakeholder engagement**: public inclusion, perception management



https://www.elsevier.com/books/mobilisation-of-forest-bioenergy-in-the-boreal-and-temperate-biomes/thiffault/978-0-12-804514-5

2. Bioeconomy

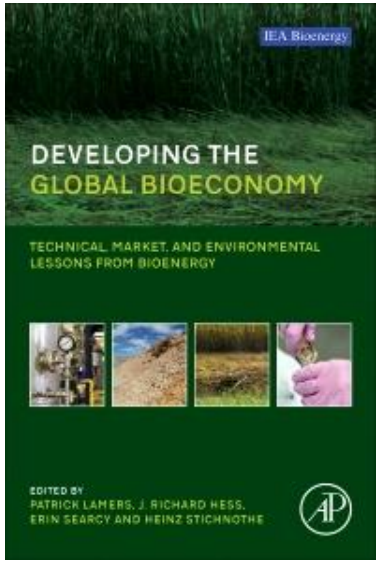
- **Lessons from the bioenergy industry**
  - How can they be applied to the development of the bioeconomy?
  - How is the current fossil-based and future bio-based economy intertwined?
- Task **34** (Pyrolysis), **40** (Trade), **42** (Biorefineries)
- **Synergy:** feedstock logistics, conversion pathways, and biorefineries
- Analysis of the **whole supply chain**
- Data collection and exchange through stakeholder **workshops**

2. Transition strategies

- **24 contributors** from 11 institutions in 8 countries
- Techno-economic review of **conversion pathways**
- **Historical analysis** of biopower and biofuel markets
- Case studies on **infrastructure integration** opportunities
- Conditions for **feedstock commoditization** (global trade system)

- **Conclusions**
  1. Need for value-add
  2. Need for risk mitigation
  3. Need for a performance metric

  - Value proposition to create incentives
  - Risk mitigation to enable & safeguard investments
  - Sustainability is the key performance metric



https://www.elsevier.com/books/developing-the-global-bioeconomy/lamers/978-0-12-805165-8

Impacts & Relevance

- **Impacts**
  - Science-Policy interface (e.g., Chatham House Report rebuttal)
  - Scientific discussion (e.g., NatClimChange 6(9)805)
  - Improvement of methodologies (e.g., LCA), trade standards (e.g., ISO)

- **DOE benefits** of engaging with the international community
  - Access to the **international stage:** U.S. ideas, tools, know-how, and concepts
  - Benefits U.S. industrial partners: **technologies** are weaved into our work

- **Programmatic relevance**
  - Market development: Trade needs to work at each **transaction** point (e.g., policy)
  - **Existing global** biomass supply chain and trading system
  - Analyzing and engaging enables **learning and adapting** for domestic strategies
    - *Biorefinery logistics concept:* driven by interaction with international experts
    - *Resource mobilization analysis:* significant input from T40 partners, resulted in ongoing effort to validate feedstock supply chain assumptions in important BETO strategy tools (e.g., Biomass Scenario Model)

Stakeholder engagement 2016-2017

- **Stakeholders**: policy makers, industry, NGOs, and academia

- **Workshops**
  - Sustainability of bioenergy supply chains – Gothenburg, Sweden (May 2017)
  - Technical Requirements for Torrefied Biomass – Rotterdam, Netherlands (Jan 2016)

- **Webinars**
  - Economic evaluation wood pellet markets (March 2017)
  - Torrefaction (Oct 2016) – joint with Task 32
  - Cascading (Sept 2016)

- **Conference sessions* & presentations****
  - European Biomass Conference & Exhibition – Stockholm, Sweden (June 2017)**
  - U.S. Industrial Pellets Association (USIPA) – Miami, FL (Nov 2016)*
  - International Wood Biorefining Week – Stockholm, Sweden (May 2016)**

INTERNATIONAL BIOMASS TORREFACTION COUNCIL

USIPA's EXPORTING PELLETS CONFERENCE

EUBCE 2017
25TH EDITION
European Biomass Conference & Exhibition

Comments & Questions, Newsletter

patrick.lamers@inl.gov

http://task40.ieabioenergy.com/

IEA Bioenergy TASK 40

Sustainable International Bioenergy Trade - Securing Supply and Demand

IEA Bioenergy Task 40 Newsletter | Issue 1, September 2014 | Website | Unsubscribe

ABOUT US

Task 40 is an international working group under the IEA Bioenergy Implementing agreement. We conduct studies and organize events on various topics related to sustainable international bioenergy trade. Follow us on:

http://www.bioenergytrade.org

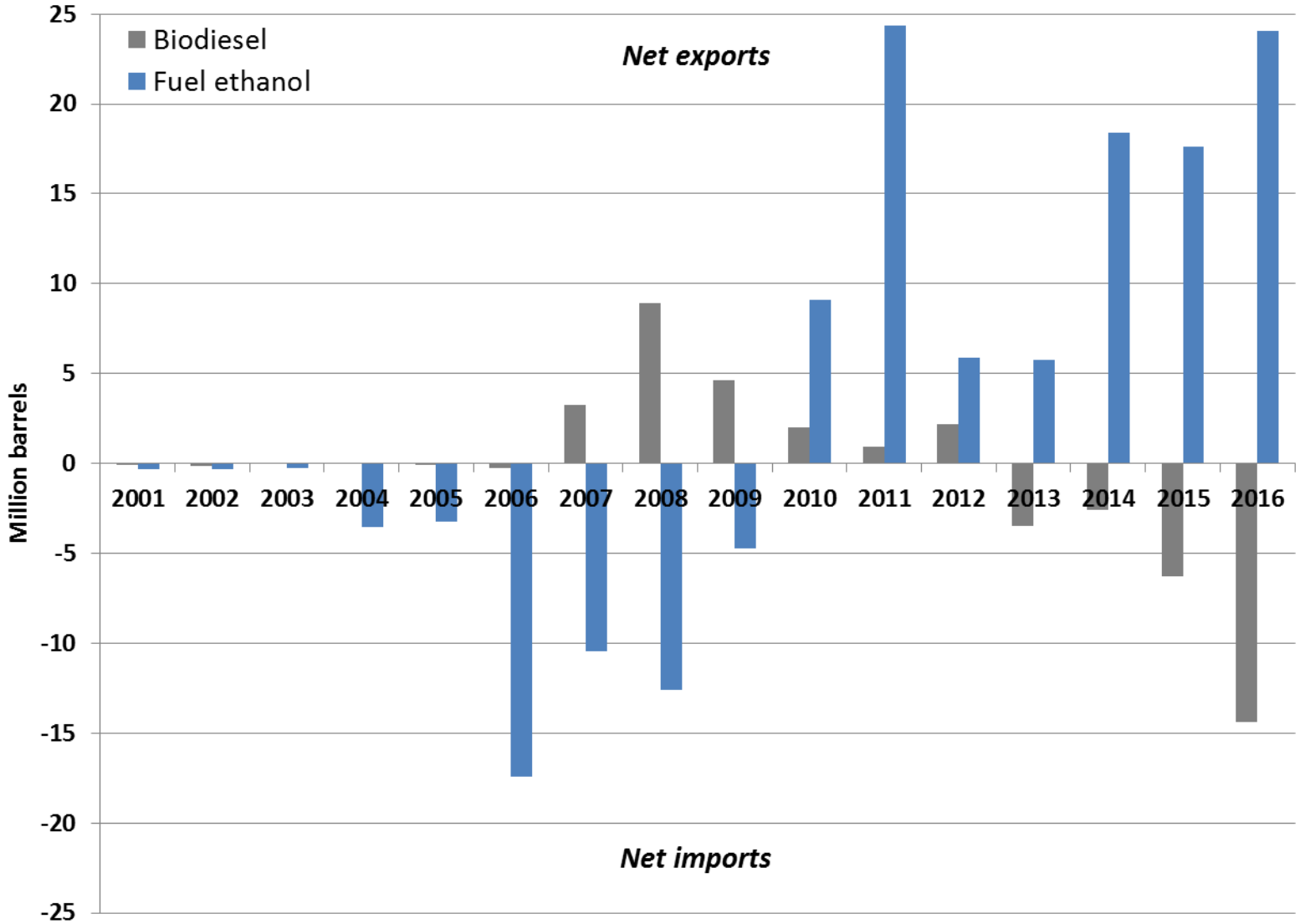
The Task is jointly led and coordinated by Martin Junginger (Copernicus Institute, Utrecht University) and Peter-Paul Schouwenberg (RWE Essent) Kees Kwant

Upcoming events

International workshop: Towards sustainable international biomass trade strategies, Brussels - 24 October 2014

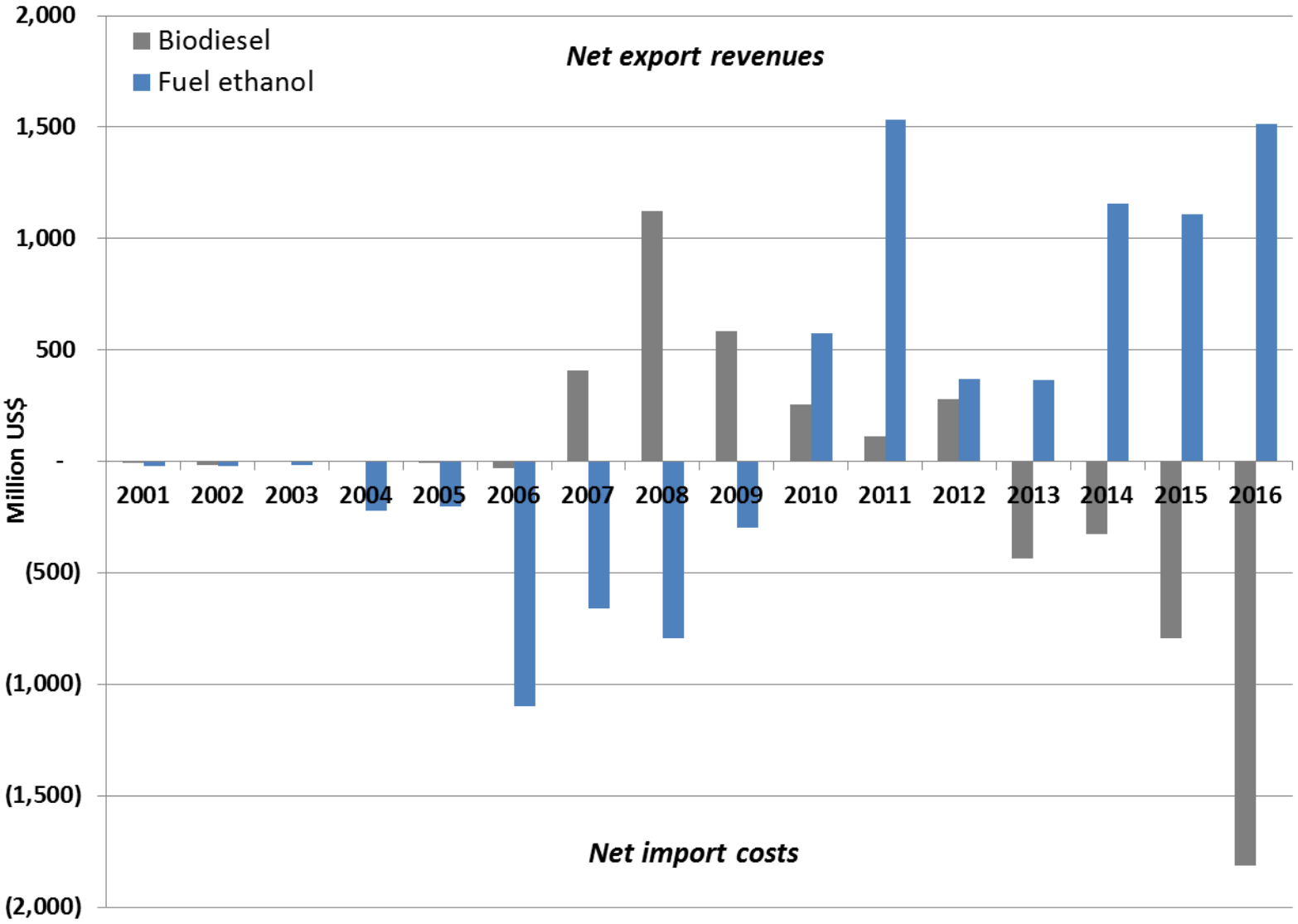
Today in the European Union, the cost-effective achievement of existing and future bioenergy targets set in the legislation implies that in addition to using domestic sustainable and cost-competitive biomass potentials, European markets will also (partly) rely on sustainable and cheap(er) imports of biomass. Some well-positioned regions of the world are already playing a role in supplying biomass to the European markets and could become

Appendix



Data sources: EIA, AFDC

Appendix



Data sources: EIA, AFDC

Mobilization matrix

Material/ Economic

Poor governance

High forest biomass mobilisation

- Biomass produced and used in large scale operations.
- Production emphasis is on higher quality land, converted pastures, etc. Competition for feedstocks with standard wood products is high, increasing pressure on forest resources.
- GHG benefits overall but sub-optimal due to significant LUC and iLUC effects.

Poor governance

Low forest biomass mobilisation

- Biomass feedstocks sourced from residue streams and roundwood.
- Additional biomass demand leads to significant LUC effects and negative impacts on ecosystem services
- Limited net GHG benefits.

Forest bioenergy storylines

Regionally oriented

Good governance

High forest biomass mobilisation

- Biomass feedstocks from residue streams are fully utilized; other feedstocks also include tree and tree parts from sustainable forest management .
- Land use conflicts largely avoided due to strong land-use planning and integrated forest management and alignment of bioenergy production capacity with silvicultural practices to increase productivity.
- Ecosystem services are preserved at the site and landscape levels due to science-based sustainable forest management regulations.

Good governance

Low forest biomass mobilisation

- Biomass feedstocks sourced exclusively from residue streams.
- Smaller scale bioenergy application used locally.
- Land use conflicts largely avoided, and ecosystem services are protected
- Significant GHG mitigation benefits are constrained by limited bioenergy deployment.
- Global energy systems still dependent on fossil fuels.

Environmental /Social