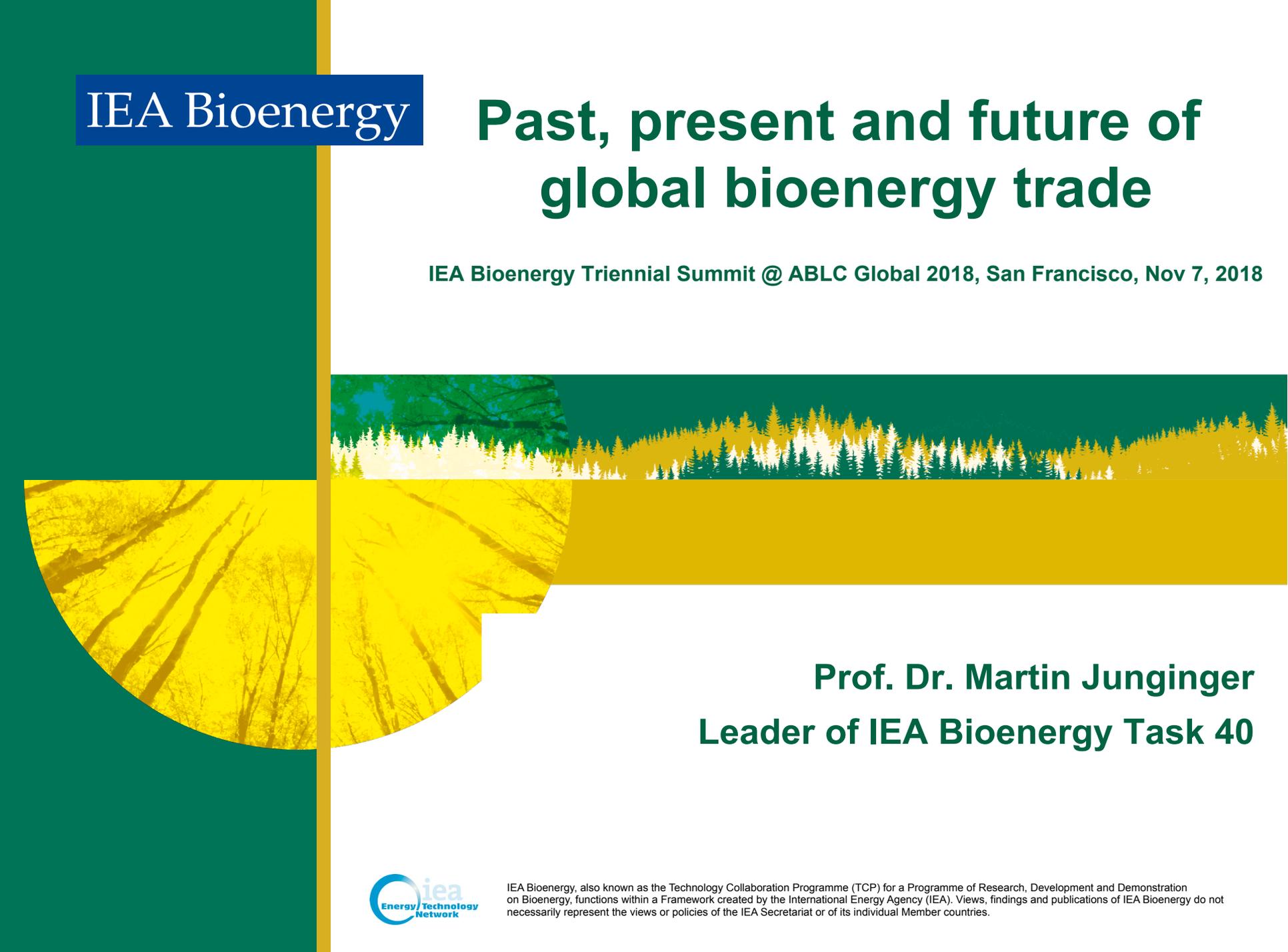


Past, present and future of global bioenergy trade

IEA Bioenergy Triennial Summit @ ABLC Global 2018, San Francisco, Nov 7, 2018



Prof. Dr. Martin Junginger
Leader of IEA Bioenergy Task 40

History of bioenergy trade

- In the last century, practically all bioenergy use was a local or regional form of energy, especially for solid biomass
- Main reasons were (sufficient) local demand, but most importantly difficulties of transporting raw biomass over longer distances (due to high moisture content, difficulties with storage, no existing supply chains, etc. etc.)
- But...

- The first load of industrial pellets was shipped on the *Mandarin Moon* from Prince Rupert, Canada to Helsingborg, Sweden in 1998



(Source: J. Swaan, WPAC)

And in 2004, the first 25 kton load of palm kernel shells arrived in Italy from Indonesia



(Source: Michael Wild, W&P)

1. Two main drivers for increase in trade

1. Increasing policy support for liquid biofuels and solid biomass (e.g. blending mandates, tax exemptions, feed in tariffs etc.)
2. Technological progress in pretreatment technologies – especially wood pellets and biodiesel

IEA Bioenergy Task 40

Sustainable biomass markets and international bioenergy trade to support the biobased economy

Core objective:

‘to support the development of sustainable, international markets and international trade of biomass, recognizing the diversity in biomass resources and applications for bioenergy and biomaterials in the biobased economy’

IEA Bioenergy **TASK 40**

Sustainable International Bioenergy Trade - Securing Supply and Demand

Triennium 2016 - 2018

Task members:



Task Leaders



Martin Junginger
(Academic)



Peter-Paul
Schouwenberg
(Industry)

Global biomass trade for energy— Part 2: Production and trade streams of wood pellets, liquid biofuels, charcoal, industrial roundwood and emerging energy biomass

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DOI: 10.1002/bbb.1858; *Biofuels, Bioprod. Bioref.* (2018)

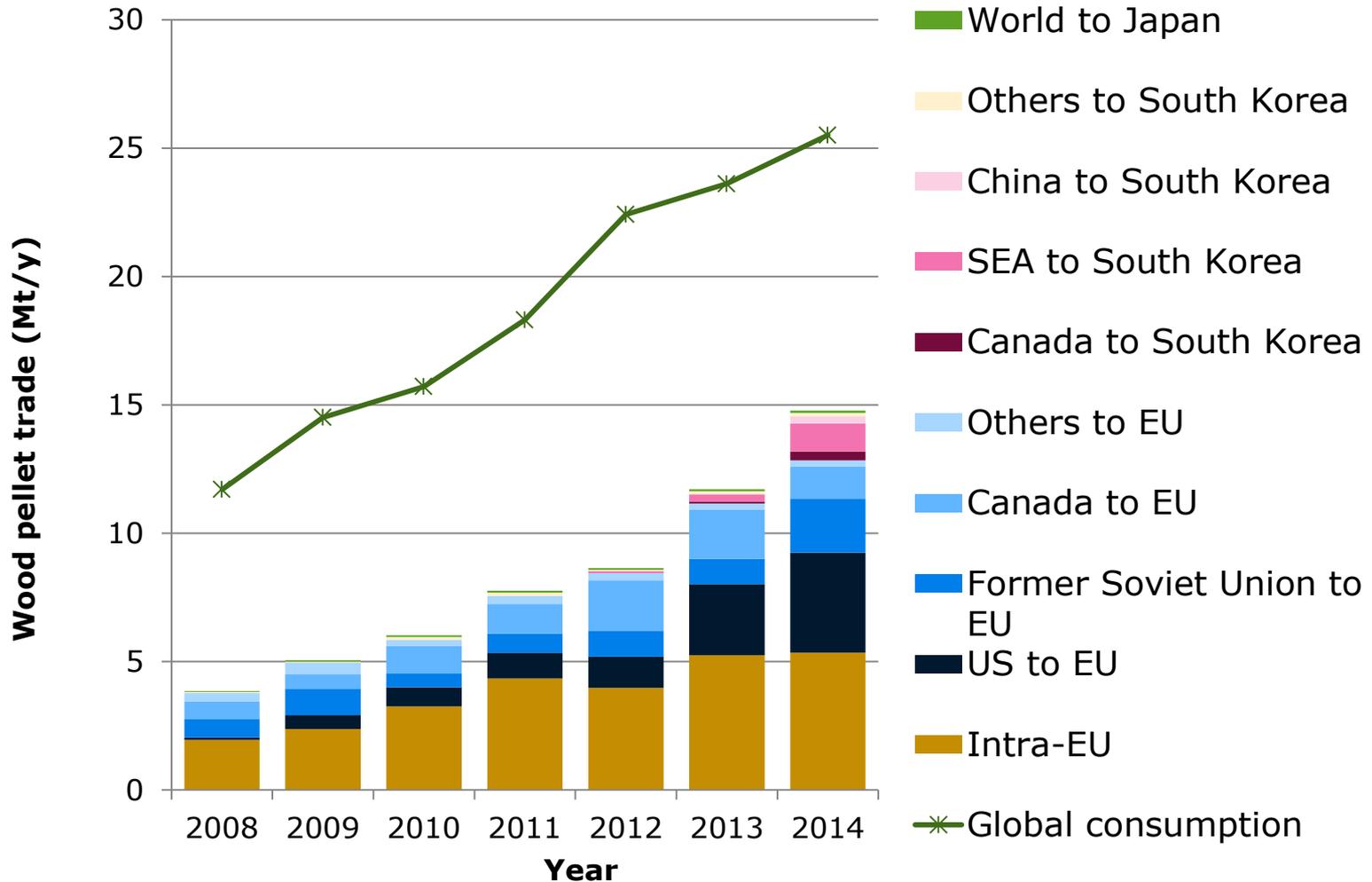
— what can the BBE learn from bioenergy?

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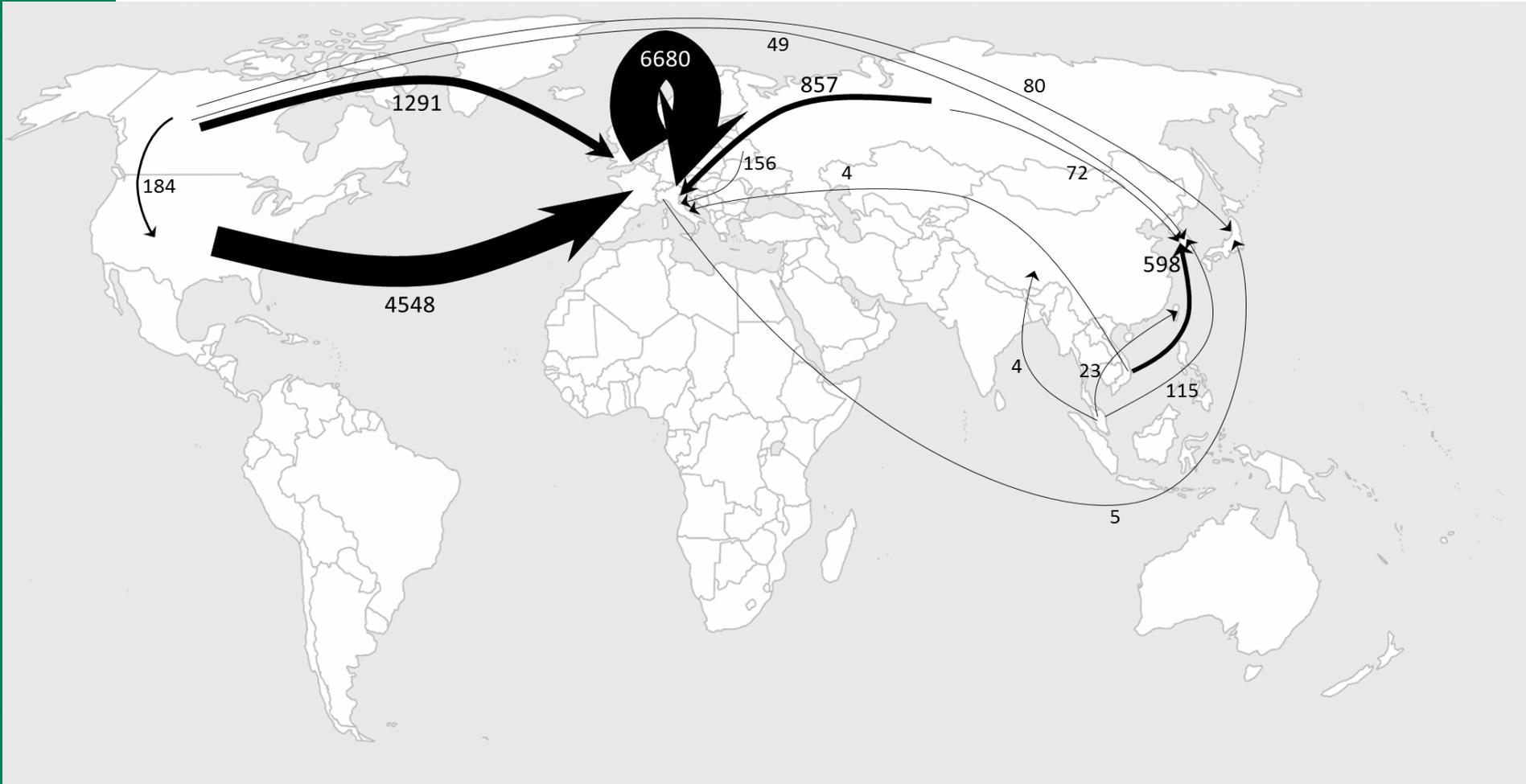
Work programme

- 3. Making things happen / stimulate (investments in) trade** – needs to increase dramatically over the next decade. Investigating the requirements for **commoditization of biomass** and biofuels will play a central role; next to the technical aspects, it also important to analyse the **necessary conditions for the development and successful market penetration of key biobased commodity**.
- 5. Need for high-quality bio-fuels/feedstocks and advanced/smart logistics (dedicated infrastructure) to achieve cost price reductions.** Logistics typically are 30-50% of final costs of bioenergy. While advanced logistics and better feedstock may even increase cost at first, they are likely to reduce cost once deployed on a larger scale, and allow for system cost reductions

The role of biomass trade, wood pellets

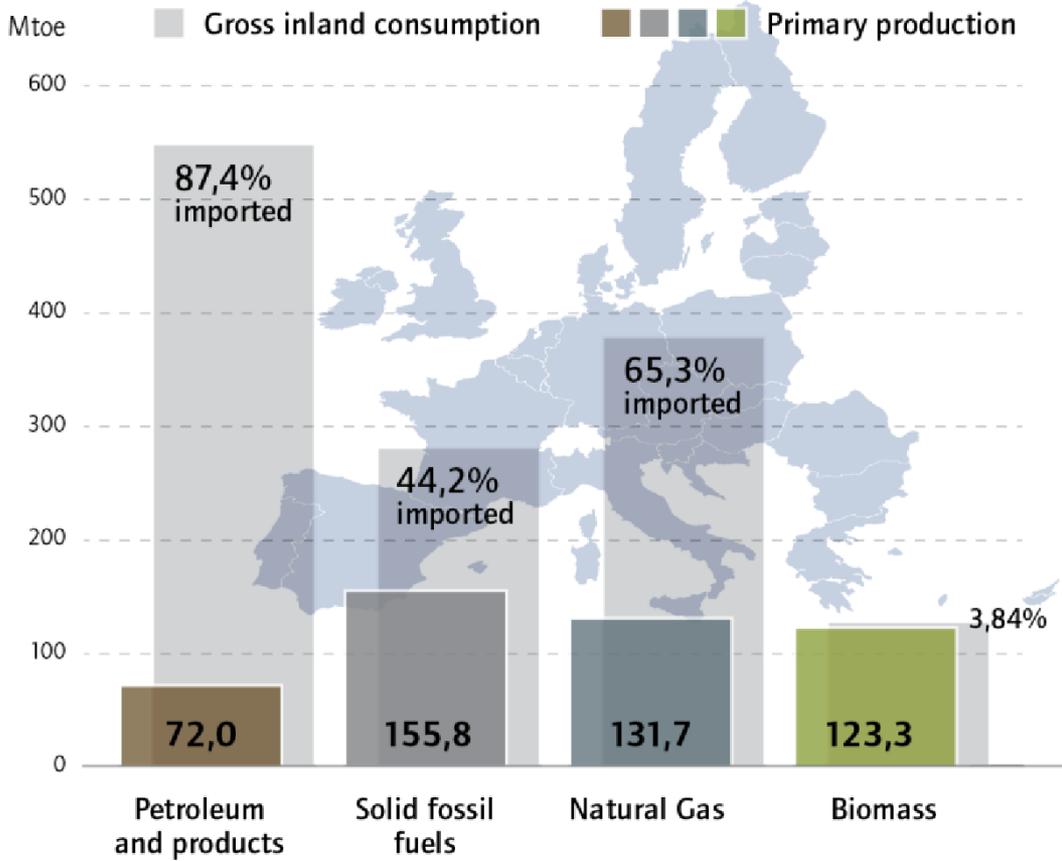


International wood pellet trade 2015

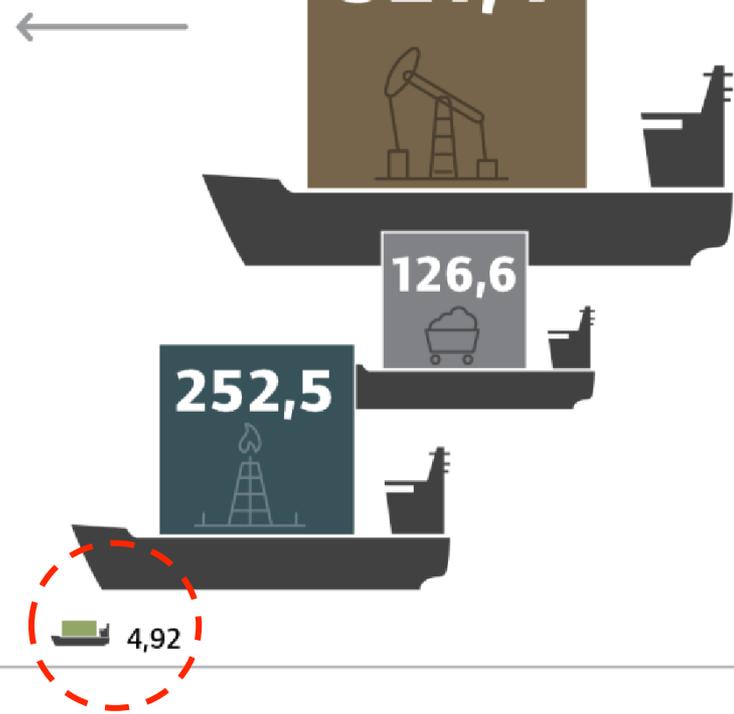


Source: Proskurina, Junginger et al. BioFPR, 2018 DOI: 10.1002/bbb.1858 All numbers in ktonnes

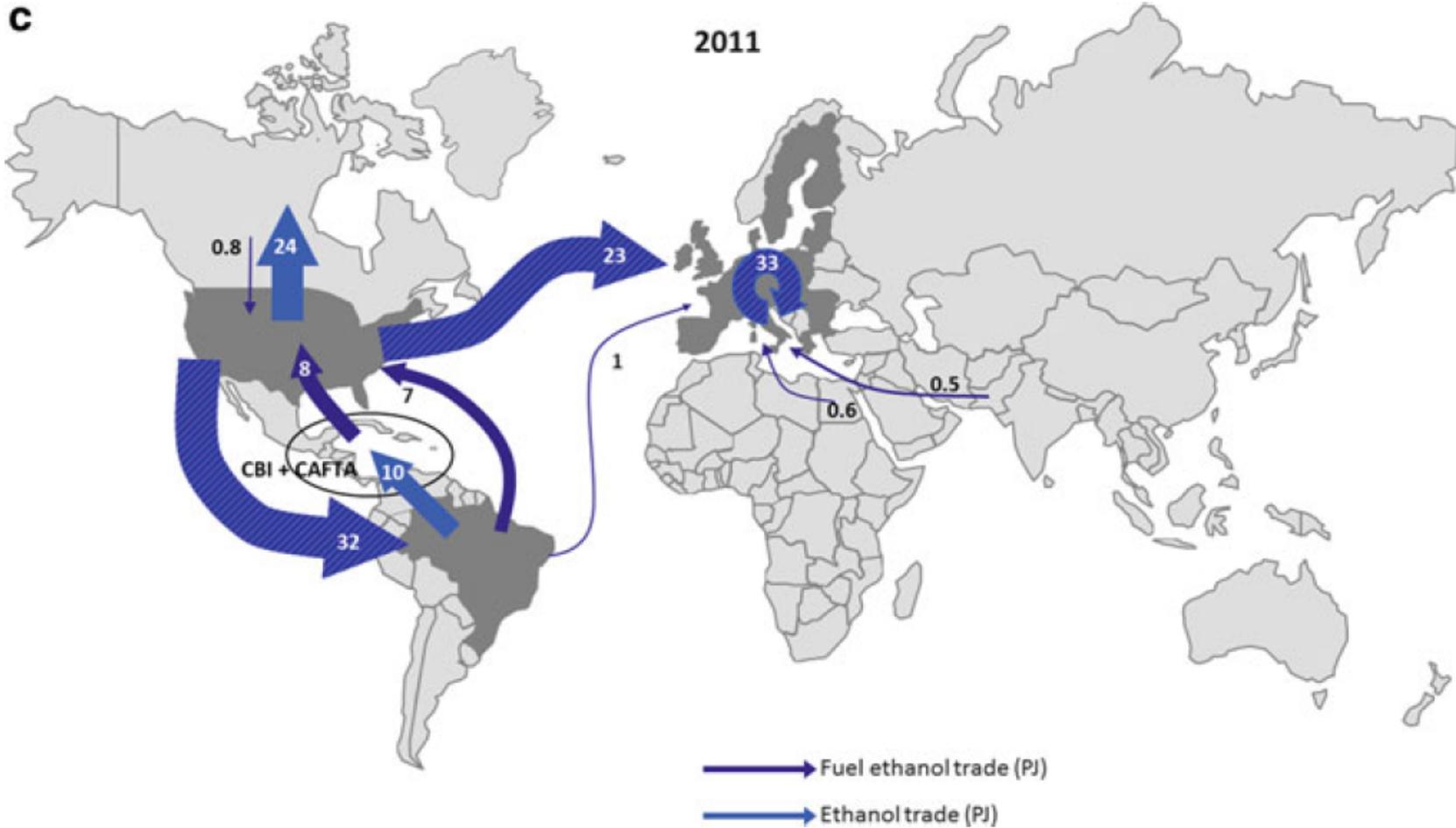
European Energy Dependency



Imports to EU28 (Mtoe)

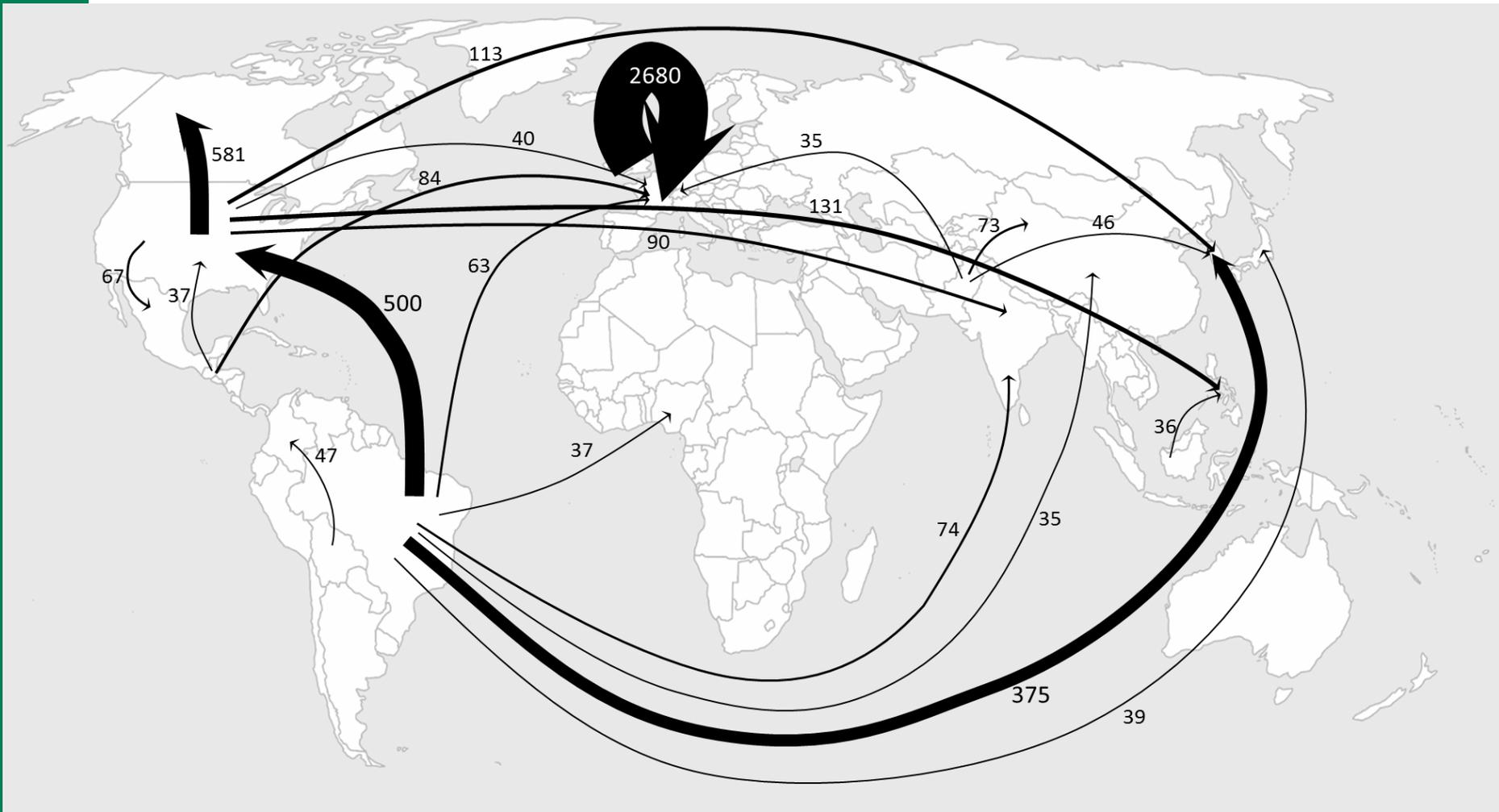


Global bioethanol trade 2011



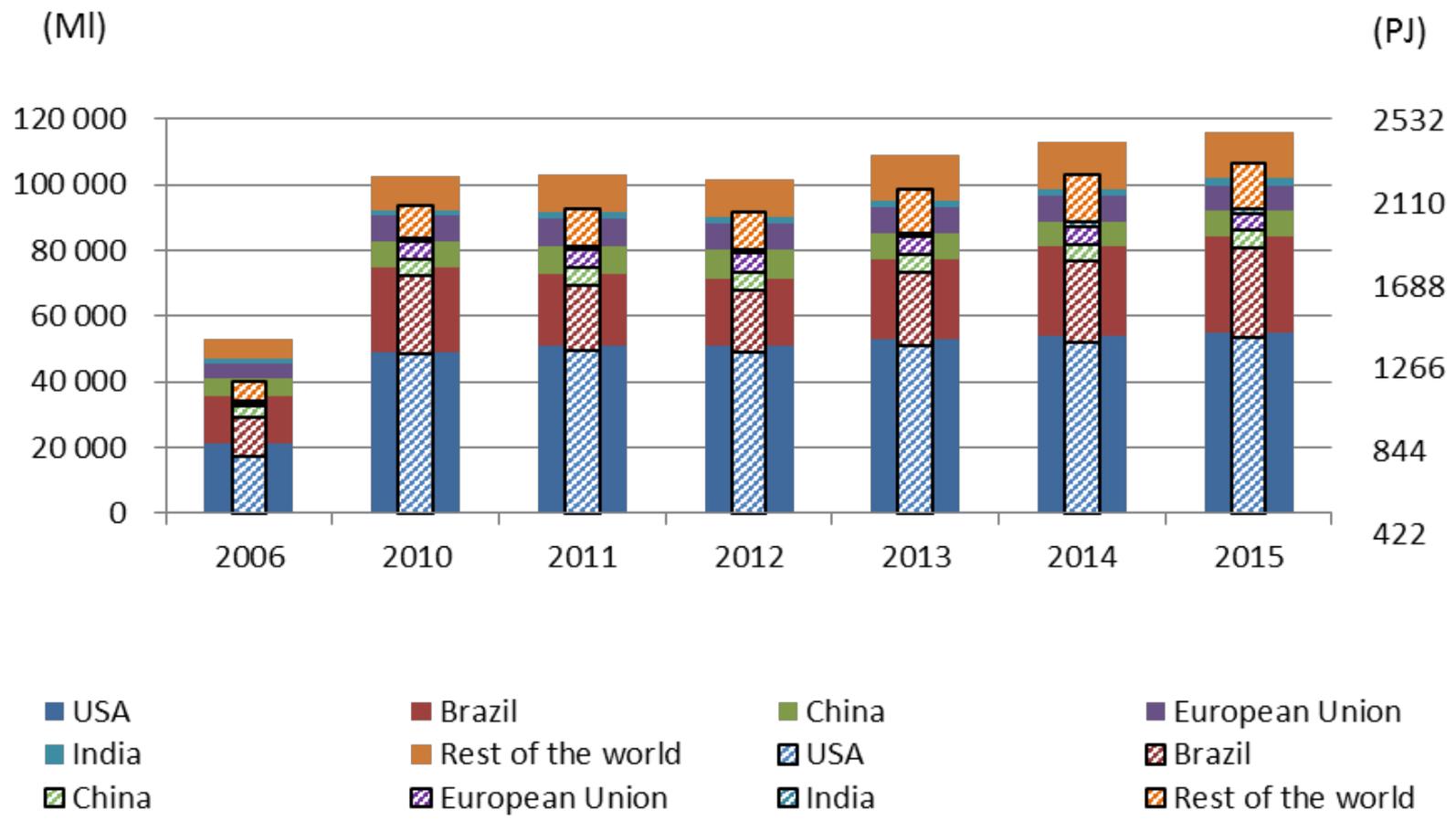
(Source: Lamers et al., Chapter 2 In Junginger et al. International Bioenergy Trade, Springer 2013)

Global ethanol trade 2015



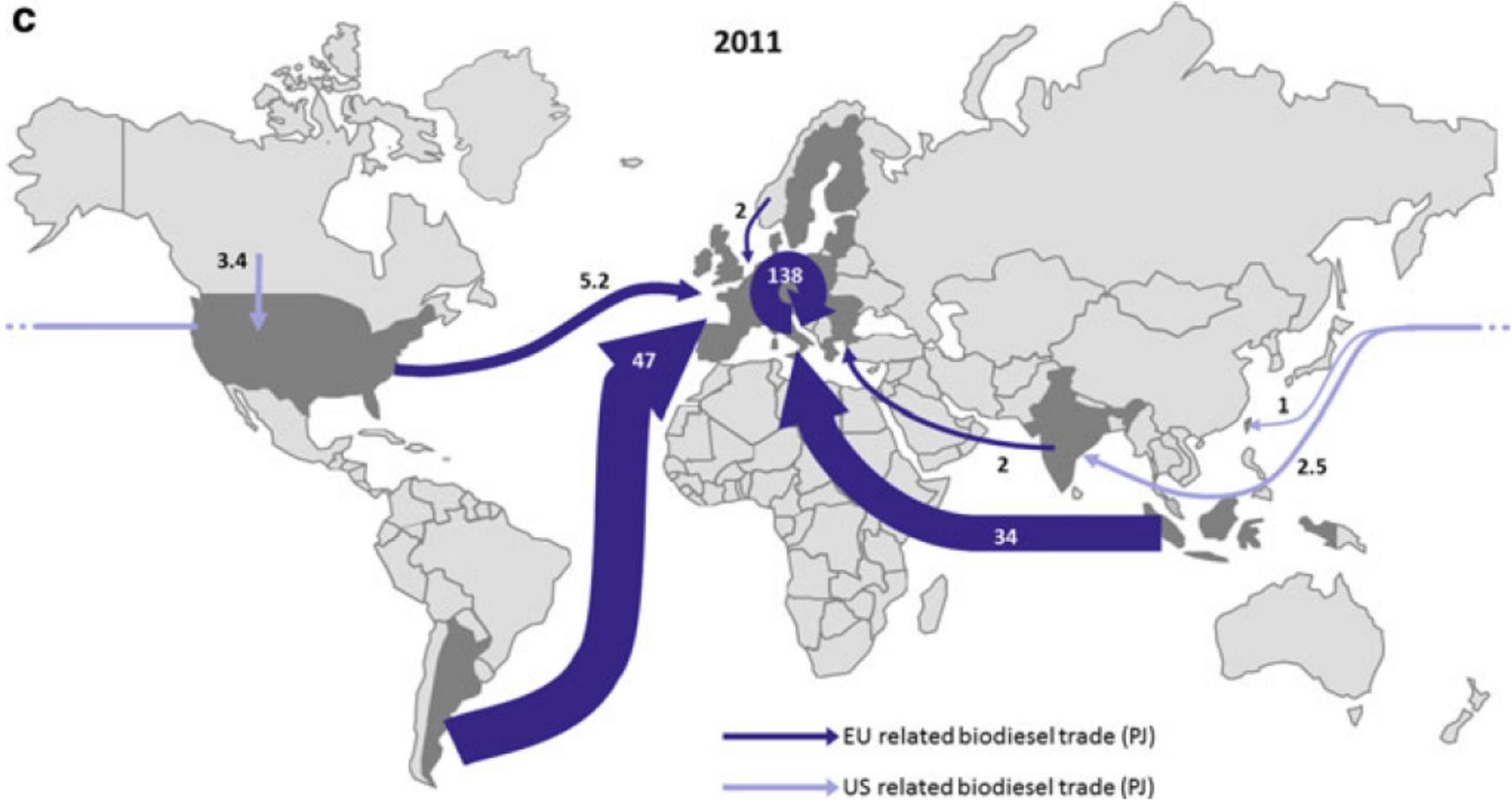
Source: Proskurina, Junginger et al. BioFPR, 2018 DOI: 10.1002/bbb.1858 All numbers in ktonnes

Total consumption of ethanol (large bars) and share used as transport fuel (small bars)



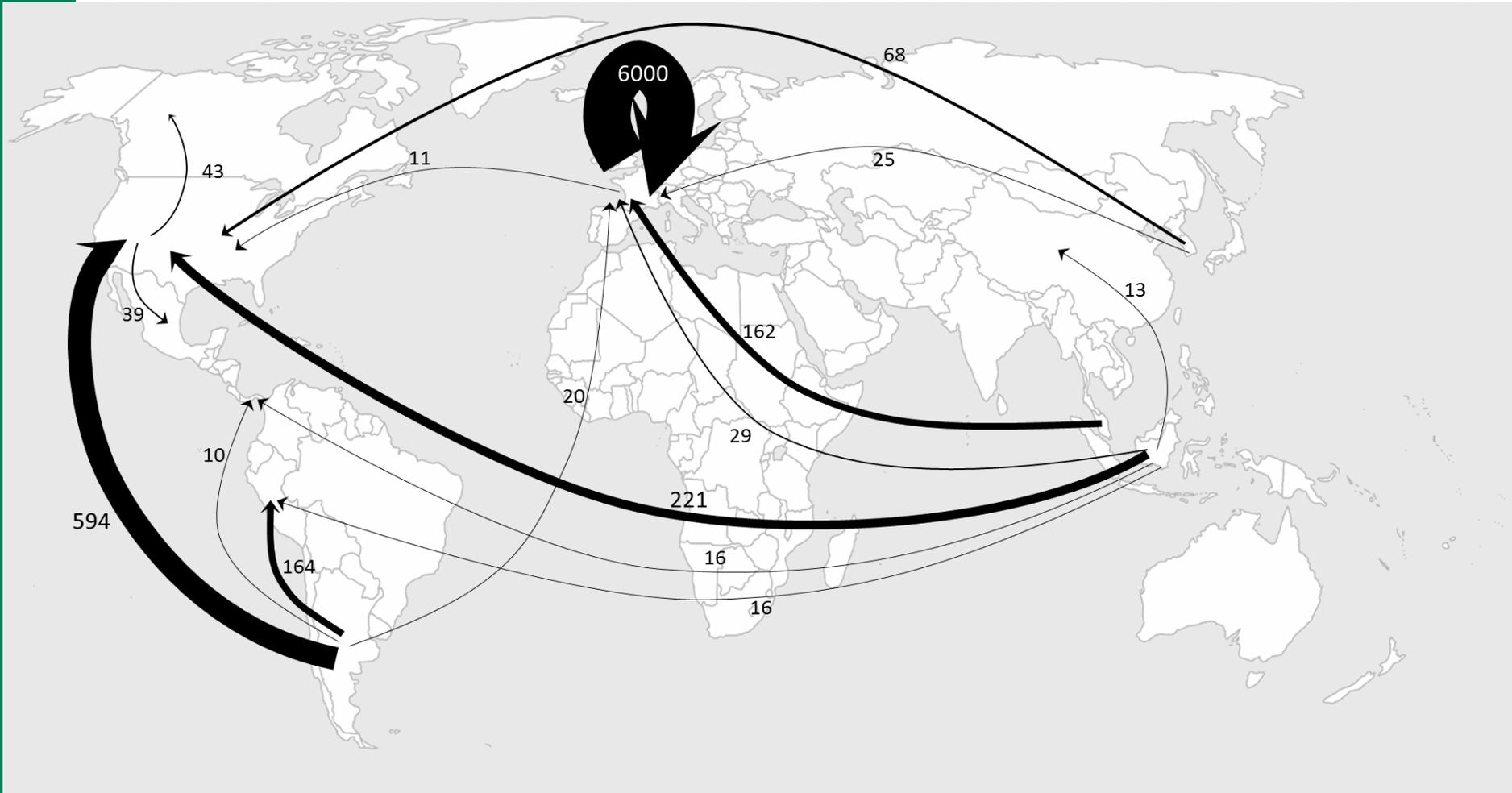
Source: Proskurina, Junginger et al. BioFPR, 2018 DOI: 10.1002/bbb.1858 All numbers in ktonnes

Global biodiesel trade 2011



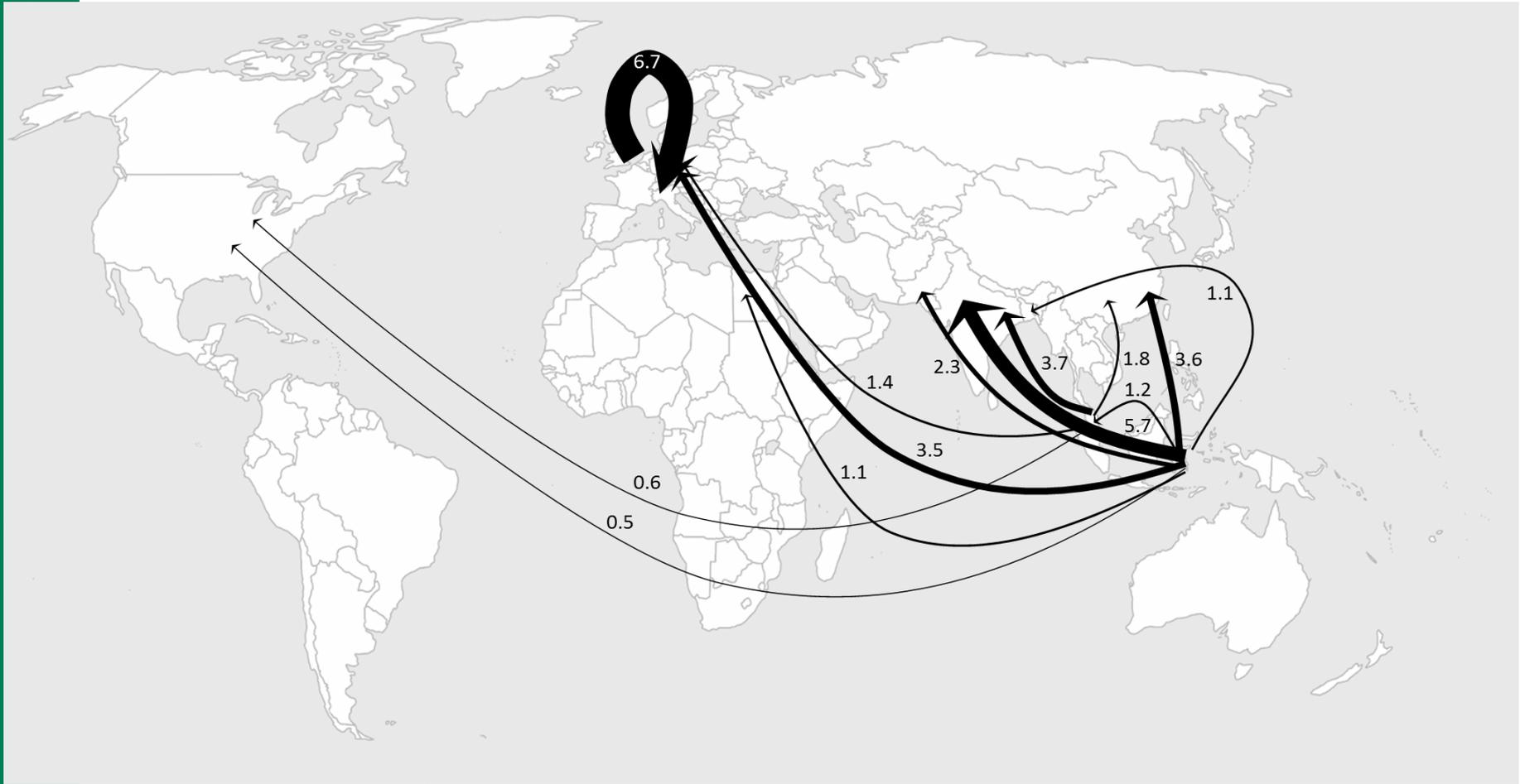
(Source: Lamers et al., Chapter 2 In Junginger et al. International Bioenergy Trade, Springer 2013)

Global biodiesel trade 2015



Source: Proskurina, Junginger et al. BioFPR, 2018 DOI: 10.1002/bbb.1858 All numbers in ktonnes

Global palm oil trade 2015 (for all end-uses)



Source: Proskurina, Junginger et al. BioFPR, 2018 DOI: 10.1002/bbb.1858 All numbers in ktonnes

Palm oil consumption / end-use in the EU

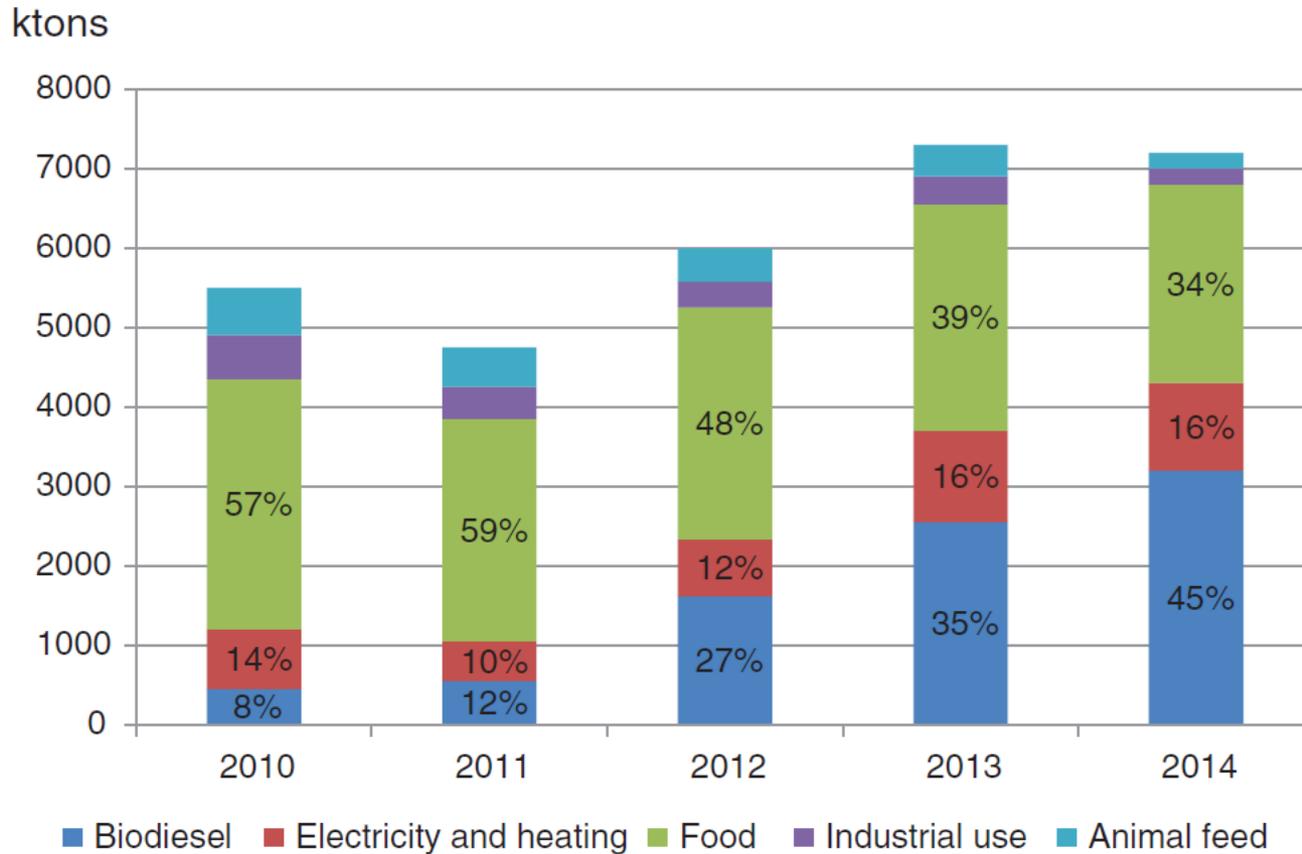
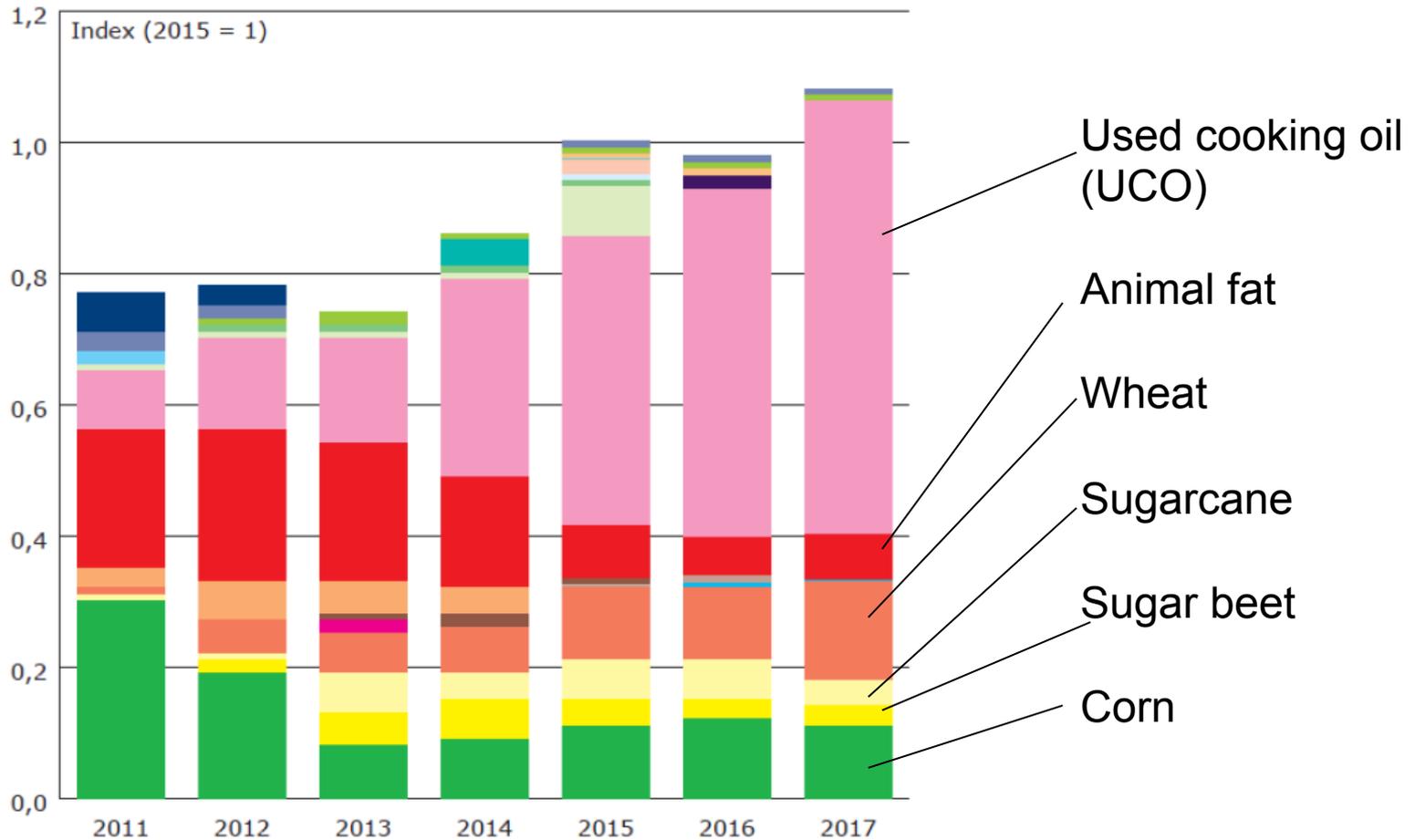


Figure 9. Palm oil consumption in the EU. Data were obtained from.^{29,43}

Liquid transport fuel use in NL

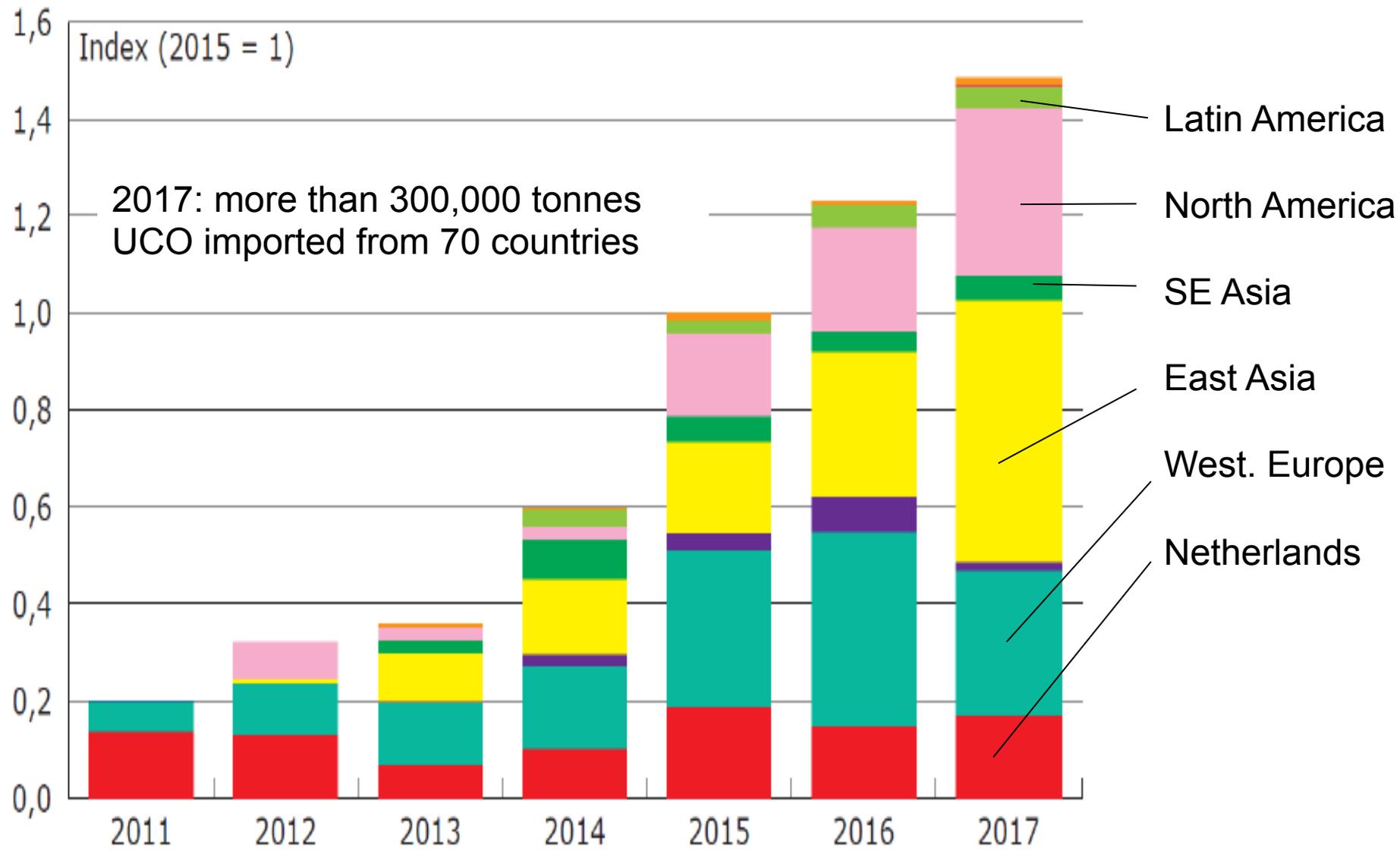
(based on physical energy content)



Source: Rapportage Energie voor Vervoer 2017, 18 juni 2018, NeA

UCO origin used in NL

(based on physical energy content)



The future of bioenergy trade

- Current trade of wood pellets mainly for replacing coal (EU & East Asia) and liquid transport biofuels (EU, US Brazil) – likely to increase, but shift feedstocks (e.g. palm oil ↓ advanced biofuels ↑) and additional pretreatment (e.g. torrefaction) and end uses (aviation, shipping)
- Future trade flows driven by increasing renewable energy and climate targets
- More uncertain: trade of lignocellulosic biomass and residues for biorefineries / production of biochemicals?
- Even more uncertain & long term: trade for BECCS?

2050 Outlook

- Current trade: 2 EJ (out of 58 current use)
- **2050:** Averaged across integrated assessment models, in 19 EJ of bioenergy consumed is expected to be traded across nine world regions, out of a global consumption of over 90 EJ
- This is **greater than current trade of coal** or natural gas, but less than that of oil
- Trade flows vary strongly between models in terms of volumes and directions wide agreement that **rapid growth in the trade of bioenergy is necessary for strict climate mitigation scenarios**
- This will require **improvements in infrastructure, logistics, financing possibilities and global sustainability standard for biomass production.**

The future of Task 40

From 2019, Task 40 will be transformed into a task on
BIOENERGY DEPLOYMENT

- Lead Germany (Uwe Fritsche) and Sweden (Olle Olsson)
- Topics for the work program will include deployment of...
 - Bioenergy Carbon, Capture & Storage (BECCS)
 - Renewable gas
 - Biomass for high temperature heat in industry
 - Biofuels for the marine and aviation sector
 - Bioenergy in upcoming markets such as East and South East Asia

Interested? Contact Uwe Fritsche, uf@iinas.org

Summary & final remarks

- Global trade of both solid and liquid biomass has been increasing strongly in the past two decades
- Nowadays, approximately 2% of all bioenergy consumed is traded internationally – but in some countries, the share of imported biomass is much higher
- Demand is almost always triggered by policy incentives – and thus subject to fluctuations
- Trade is expected to grow further with increasing demand for biomass in industrialized countries
- Sustainability is both major driver and major concern – as discussed this morning

Thank you for your attention!

Questions?

More information on www.bioenergytrade.org