

# Sustainable Biofuels for Aviation?

## Key issues and perspectives

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# The SDGs and bioenergy

**13 out of 17 SDGs** are directly or indirectly linked to **land** and **bioenergy**, especially

- 2 (food & agriculture)
- 4 (water)
- 7 (energy), and
- 15 (forests, land)

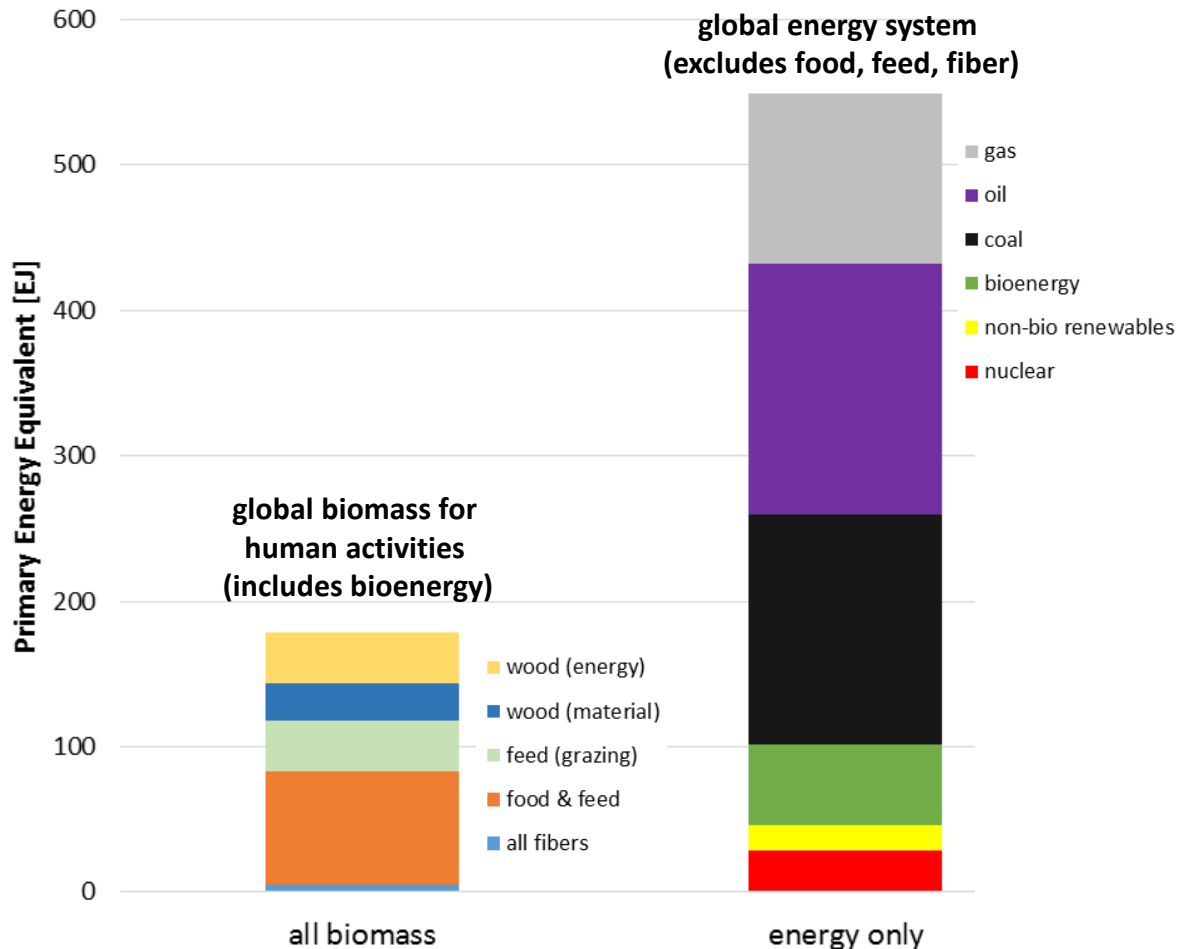
SDG indicators are being set up (until Spring 2017)

SDG	Key wording	Driver	Safeguard
 1	End poverty in all its forms everywhere	(✓)	(✓)
 2	<b>End hunger, achieve food security and improved nutrition and promote sustainable agriculture</b>	✓	✓
 3	Ensure healthy lives and promote well-being for all at all ages		(✓)
 6	Ensure availability and sustainable management of water and sanitation for all	(✓)	(✓)
 7	<b>Ensure access to affordable, reliable, sustainable and modern energy for all</b>	✓	(✓)
 8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	(✓)	(✓)
 9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	(✓)	
 11	Make cities and human settlements inclusive, safe, resilient and sustainable	(✓)	(✓)
 12	<b>Ensure sustainable consumption and production patterns</b>	✓	(✓)
 13	<b>Take urgent action to combat climate change and its impacts</b>	✓	✓
 14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	(✓)	(✓)
 15	<b>Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</b>	(✓)	✓
 17	Strengthen the means of implementation and revitalize the global partnership for sustainable development	(✓)	(✓)

Source: own elaboration based on SDKP (2015). **Bold text:** SDG related to biomass; (✓) = partially relevant

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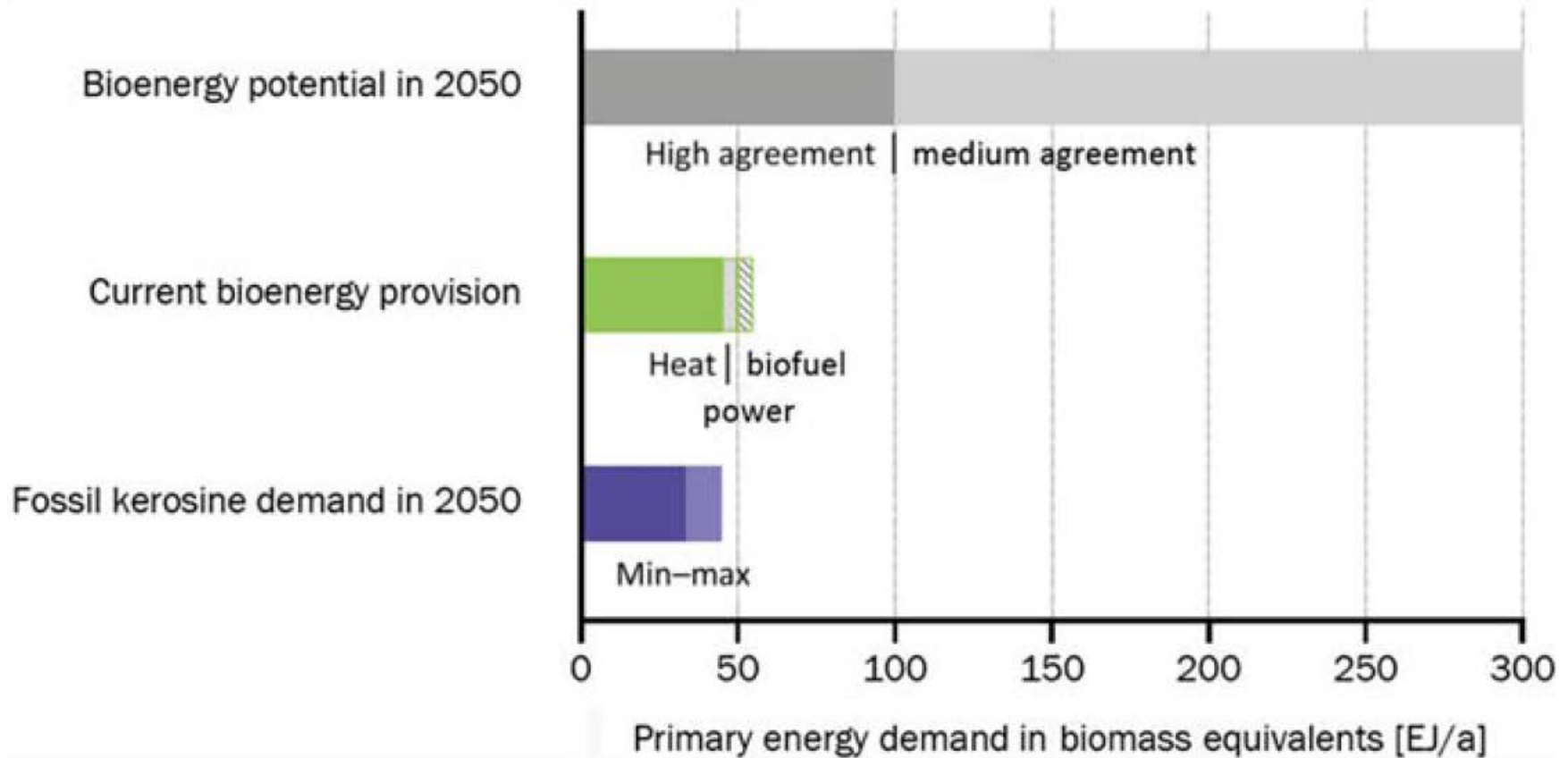
# SDGs and biomass: global context



Source: IINAS calculation for 2010 based on IEA (2014) and nova (2012)

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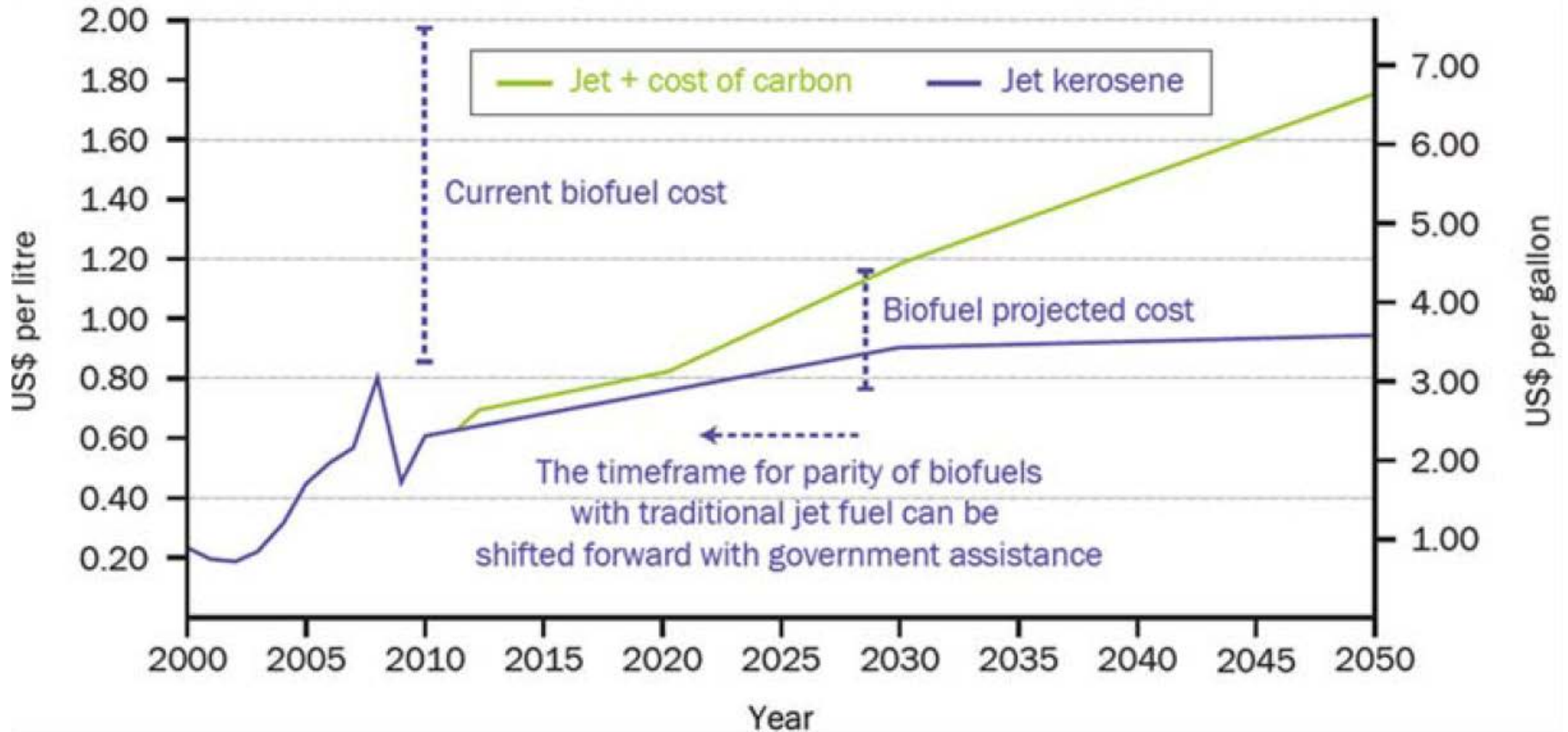
# Enough biomass for aviation?



Source: Thrän & Ponitka (2016)

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# Cost of biofuels for aviation



Source: Thrän & Ponitka (2016), based on ATAG data

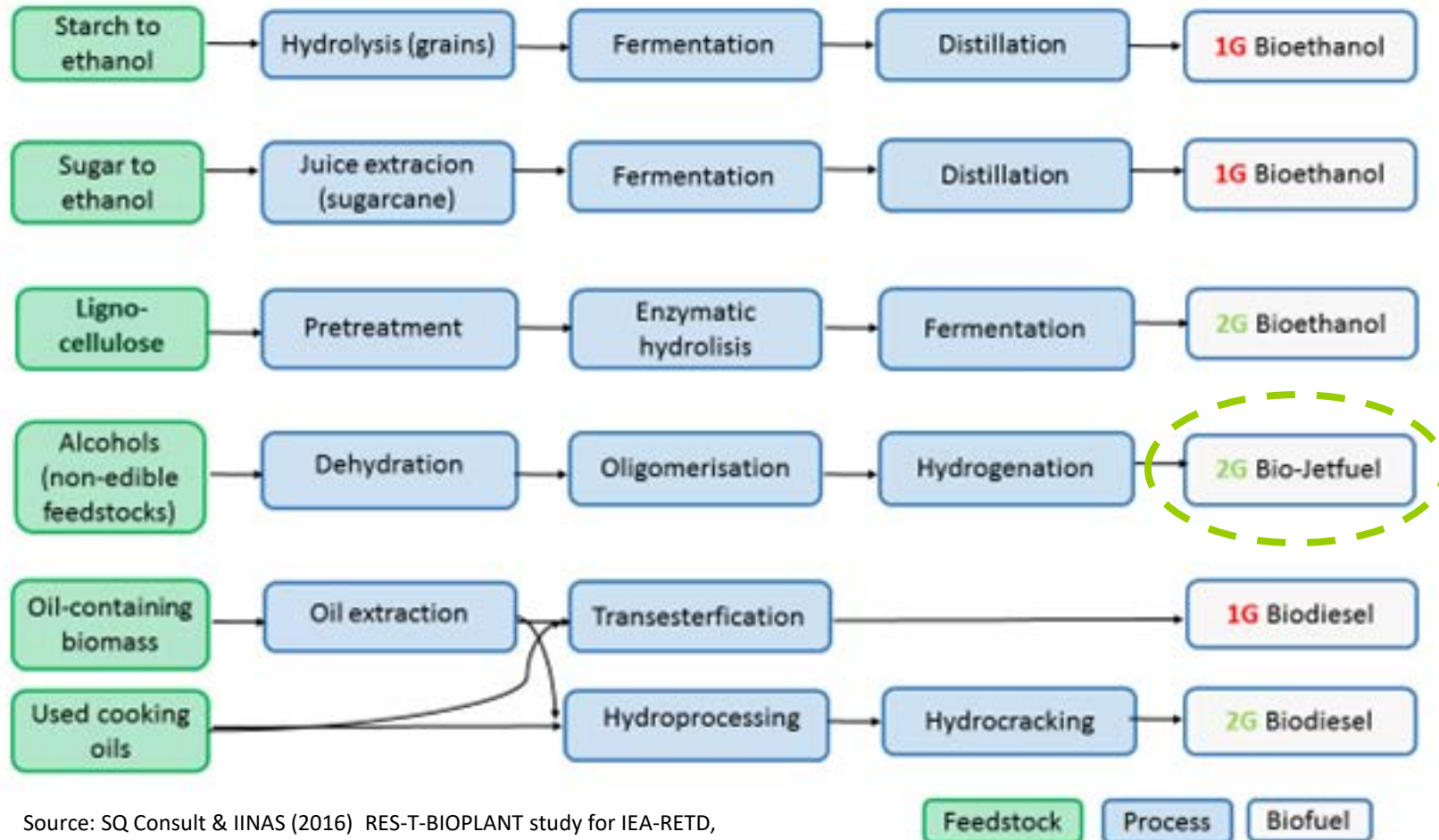
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# Feedstocks and 1G/2G biofuels...



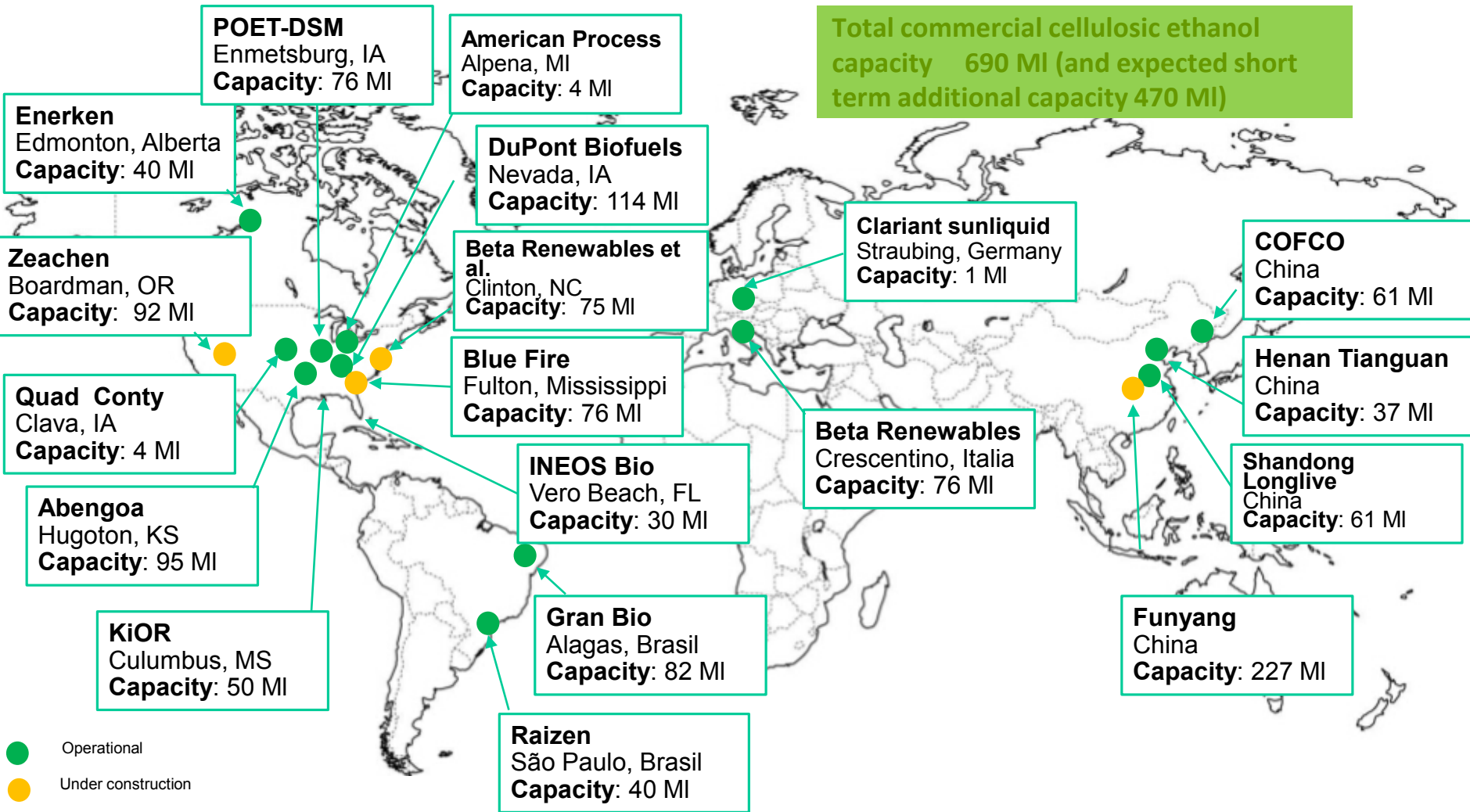
Source: SQ Consult & IINAS (2016) RES-T-BIOPLANT study for IEA-RETD,  
available at: [http://iea-retd.org/?smd\\_process\\_download=1&download\\_id=6409](http://iea-retd.org/?smd_process_download=1&download_id=6409)

Note: Fischer-Tropsch (FT) fuels not included due to early development (pilot plants)

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# 2G EtOH plants...up in the air?

Total commercial cellulosic ethanol capacity 690 MI (and expected short term additional capacity 470 MI)



● Operational  
● Under construction

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# Conclusion & perspective

- Paris (2 °C, decarbonization) requires biomass for **energy** (until 2030), but up to 2050, **shift** to advanced biofuels **for aviation/shipping** (parallel: biomaterials, and sustainable agri/forest)
- Advanced biofuel feedstocks:
  - Wastes (cascading), residues (biodiversity, soil C)
  - Perennials on marginal/degraded land: biodiversity and social safeguards → **synergies** (soil, jobs) – yet: **cost!**
- **Land** use (agro, forest...) is key – bioeconomy must be **part of sustainable food systems & landscapes**

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# More Information



[www.globalbioenergy.org](http://www.globalbioenergy.org)

**IEA Bioenergy**

Inter-task project “Measuring, governing and gaining support for sustainable bioenergy supply chains” <http://itp-sustainable.ieabioenergy.com>



Resource-efficient bioeconomy in Europe [www.s2biom.eu](http://www.s2biom.eu)



Supporting a Sustainable European Bioenergy Trade Strategy  
<http://www.biotrade2020plus.eu/>

**biomass** policies Sustainable bioenergy in EU28 [www.biomasspolicies.eu](http://www.biomasspolicies.eu)

[www.iinas.org](http://www.iinas.org)

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