



Elektrofuels – The missing link mellem vindmøller og tung transport?

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Complexity of the sector

- ▶ Many different modes and needs
- ▶ Electrification of transport sector has the first priority

BUT not everything can be electrified...





Transport in 100% renewable energy systems

Biofuels – silver bullet solution

Controversies and problems:

- Biomass is restricted
- Can be depleted
- Land use issues
- Sustainability
- Food supply



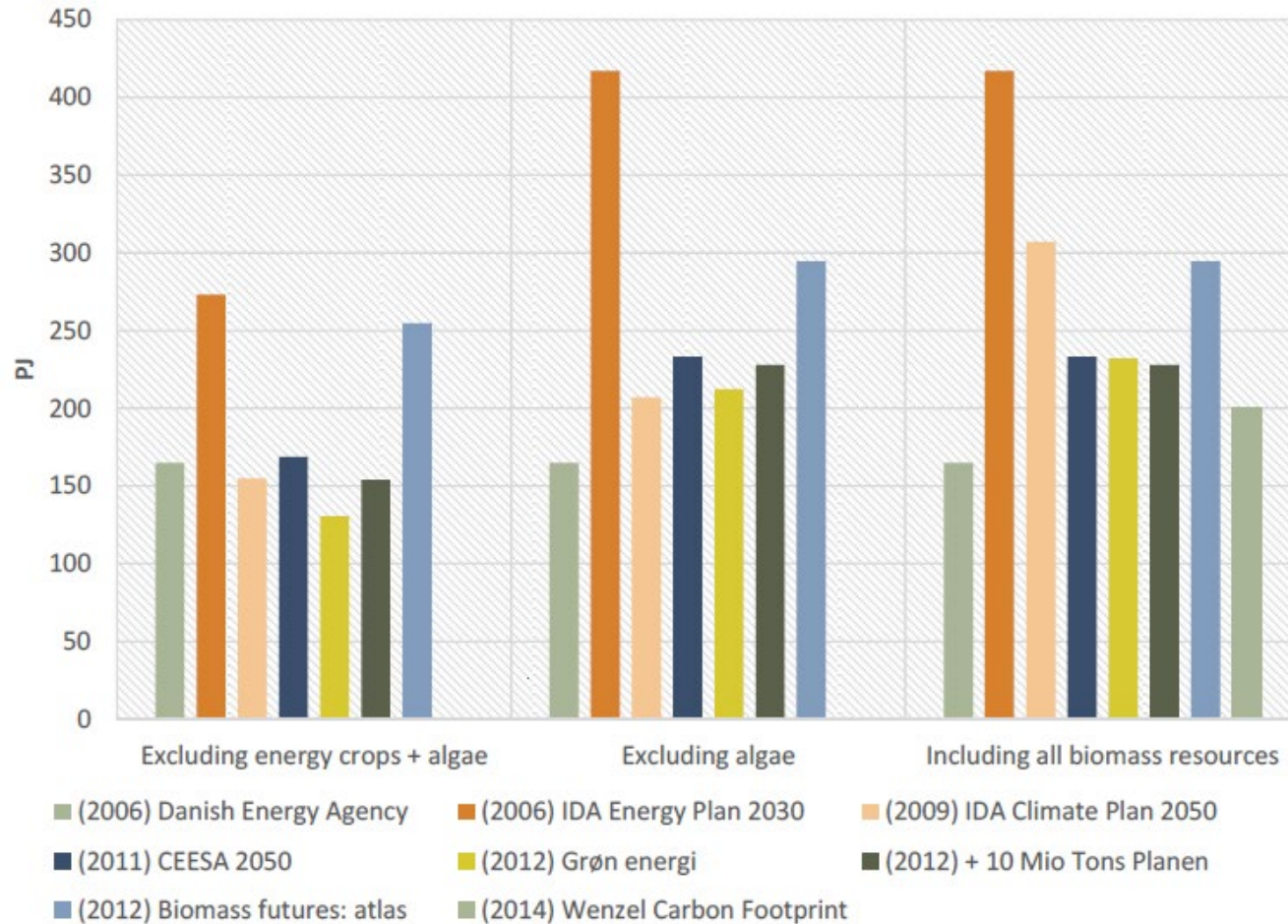
BIOMASS
POTENTIAL IS NOT
HIGH ENOUGH FOR
ALL NEEDS



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Biomass potential



BIOMASS POTENTIAL
OPTIMISTIC: CA. 300 PJ
PESIMISTIC: 165 PJ
REALISTIC: 200 PJ
40 GJ BIO PR. CAPITA HIGH GLOBALLY



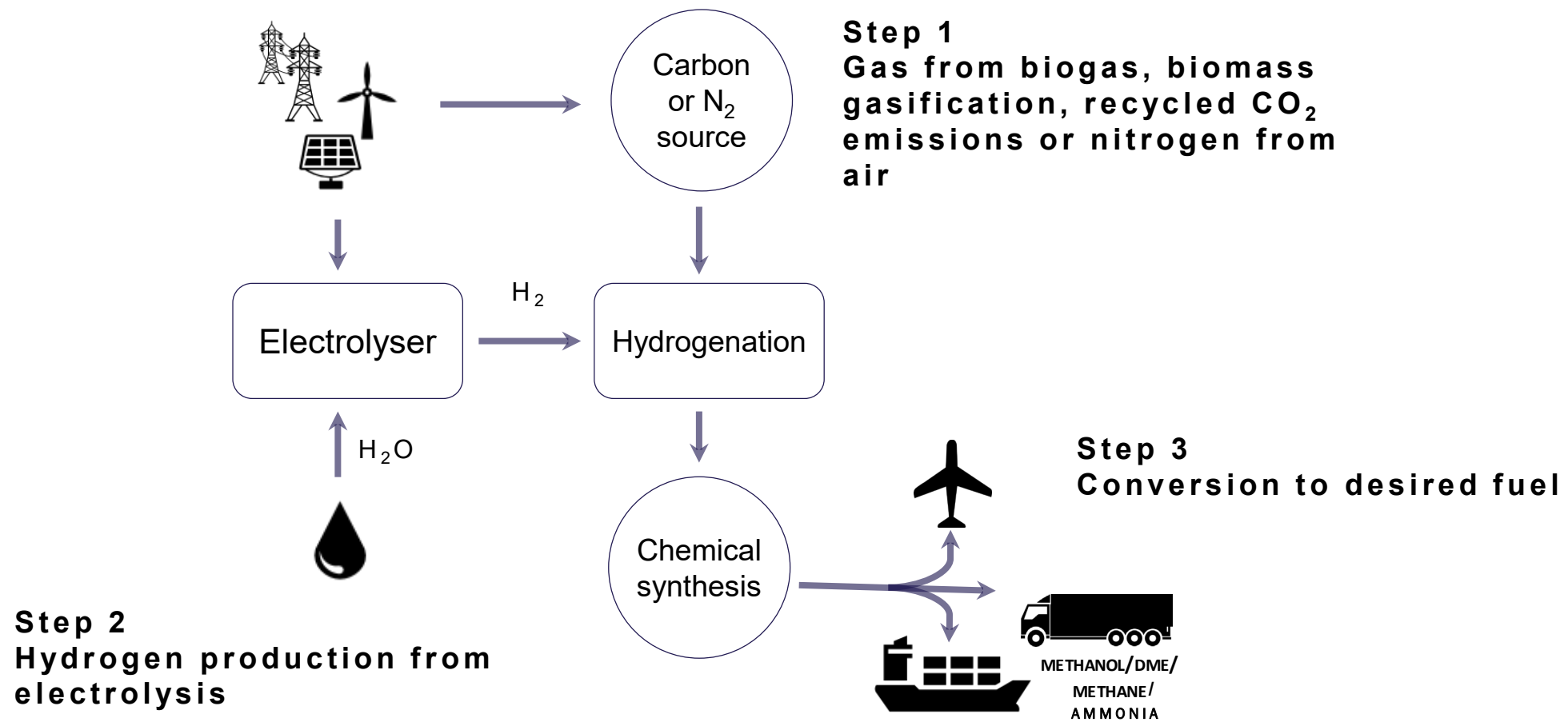


What are electrofuels?

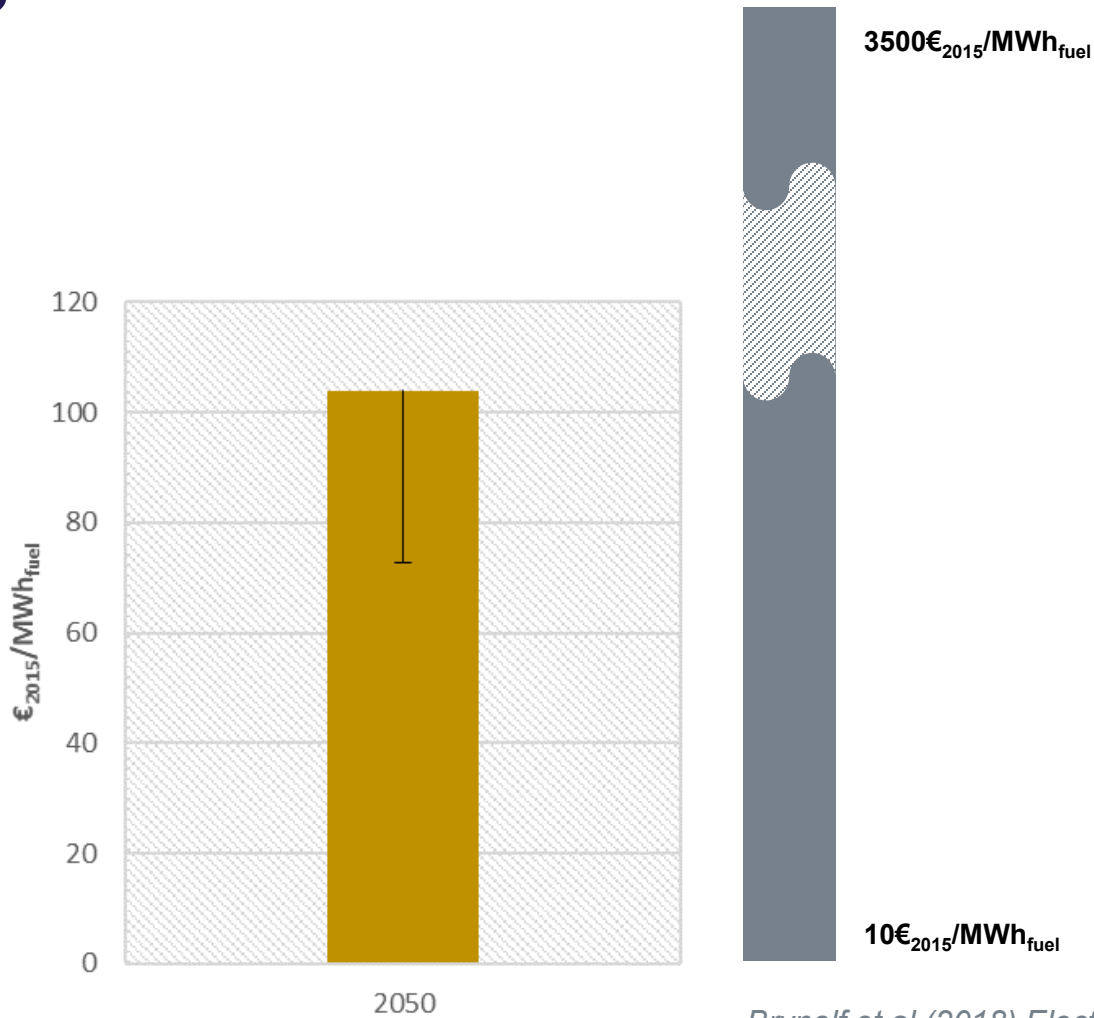
ELECTROFUELS

- ▶ Redirecting electricity to transport sector
- ▶ High share of electricity in production process
- ▶ New way of producing hydrocarbons/ammonia
- ▶ Merging hydrogen with carbon or nitrogen
- ▶ Open a door to fuel storage
- ▶ Flexible end-fuel choice





Costs?



HUGE COST DIFFERENCES DUE TO DIFFERENT ASSUMPTIONS

Brynnolf et al (2018) Electrofuels for the transport sector: A review of production costs



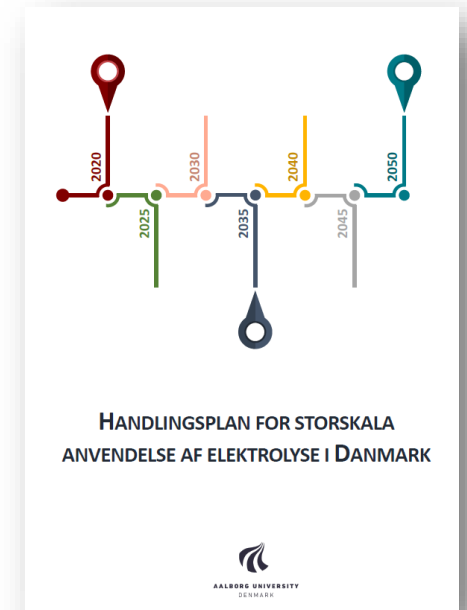
What is the role of electrolysis in the future?

	kW to few MW scale	MW scale	GW scale
Niche markets	Specialized gas markets (H ₂ , CO)	Unlikely to emerge on larger scales	
Energy storage	Demonstration of Power-to-methane for grid injection and transport	Demonstration and commercialization of Power-to-Liquid for transport	Cross-sectorial integration and seasonal storage
Hydrogen	Hydrogen refuelling stations Hydrogen for ancillary service		No further expansion of hydrogen refuelling station is expected

2017-2020

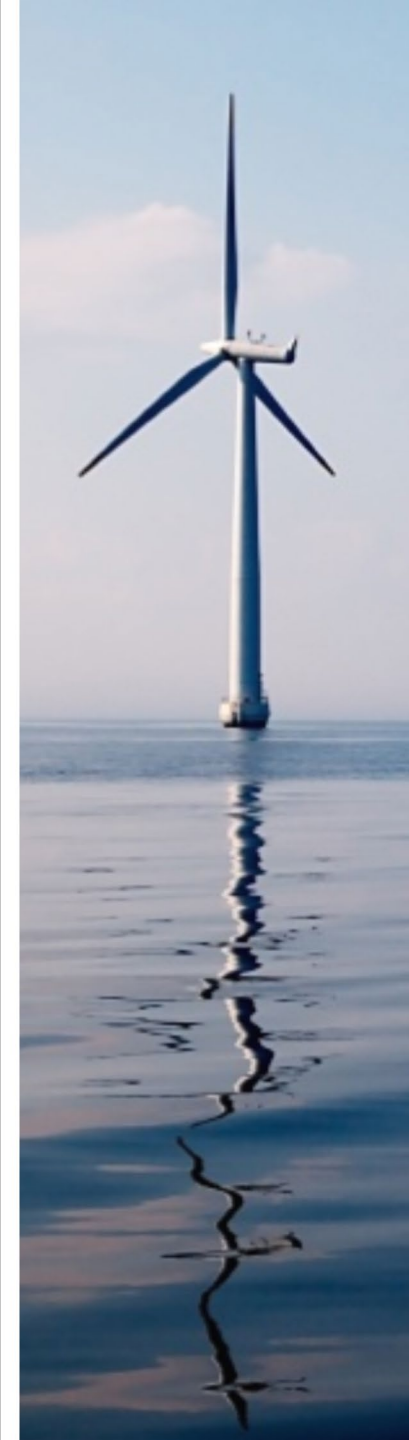
2020-2030

Beyond 2030



Advantages of electrofuels

- ▶ Cross-sector integration
- ▶ Conversion of electricity into form of liquid or gaseous fuels
- ▶ Improved flexibility of the system
- ▶ Flexibility of fuel choice
- ▶ Reduction of CO₂ emissions in case of CO₂ recycling pathways
- ▶ Reduction of biomass usage for fuel production in case of biomass hydrogenation
- ▶ No big infrastructure adaptations





Any questions?
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