Bio4Fuels Days

Bio4Fuels from Biomass to Biofuels: Resource and Cost efficient

October 12. 2018

Summary from Day 1

- There is a need for a different Key Performance Indicator
  - Leave feedstock and technology
  - Use GHG-emission reduction or Carbon Effiency
- It seems that there is enough biomass for (most) of intended applications BUT not one feedstock -> one product
  - Renewables are key to a low carbon future
  - Need higher efficiency of production/logistics chain
  - Need for new feedstocks (running up: MSW and MacroAlgae)
  - Consider sustainability of the feedstocks
- Drop-in fuels are most "popular" for de(fossil)carbonization
  - Aviation Long Haul/Heavy Transport, Marine applications Construction machinery
  - Biogas where applicable
- The conversion efficiencies must be higher – avoid loosing the renewable carbon to CO_2
  - Mass and Energy Integration of Biochemcial and Thermochemcial pathways
  - Feed-in renewable hydrogen from intermittent sources to improve C-balance
- More ambitious regulations/support mechanisms are needed for advanced biofuels

Technology development, time scale 15 years

- TRL 1 to 5/6 not much to do with research time
- From TRL 6/7 onwards, embarking on parallel activities is possible, though
  - It increases costs
  - Changes on the fly are complicated
  - Higher Risk

} "Risk money"

Year				2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
The save way	TRL 1			TRL4	TRL5			TRL9	Financing. Location Regulations		Building permit		Detailed engineering		Building		Commis-sioning	Operation
						Find a partner to commercialize it								Operation permit				
The short track	TRL 1			TRL4	TRL5			TRL9	Financing. Location Regulations					Commis-sioning	Operation			
						Find a partner to commercialize it				Building permit		Operation permit						
											Detailed engineering							
												Building						

Bio4Fuels is also an advanced "consultant" for industries!

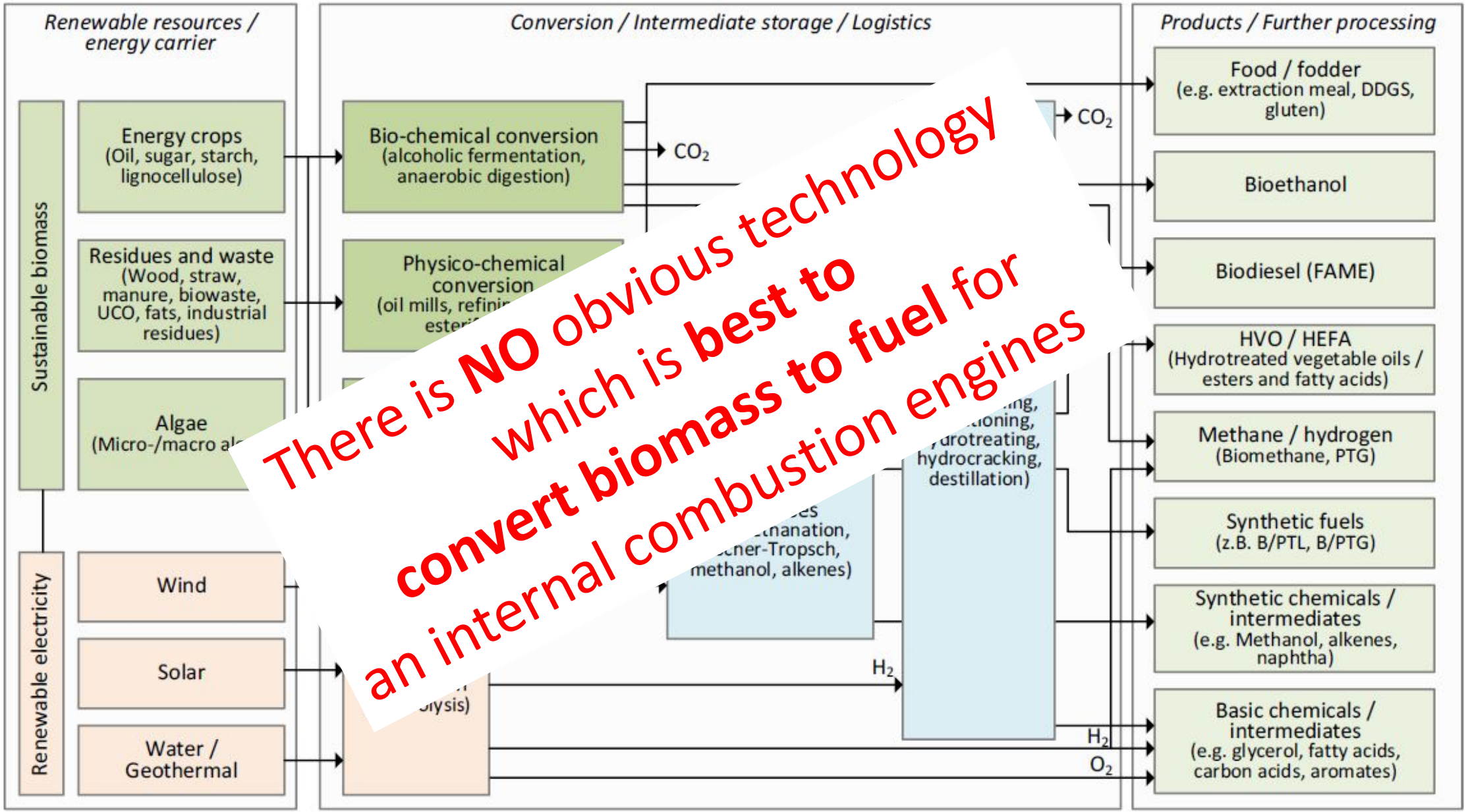
The Scene (mostly from a Scandinavian Perspective)

Electro Mobility has taken the Scene of a future transport system:

- Dramatic cost reduction for solar and wind power and battery technology since 2010
- Reduce of taxes, road toll etc on electric cars; converted private transport
- Perception: this solves de(fossil)carbonization of transport
- Limitations:
  - Range
  - Heavy and long haul transport
  - Offshore shipping
  - Aviation

} Liquid biofuels from biomass are needed

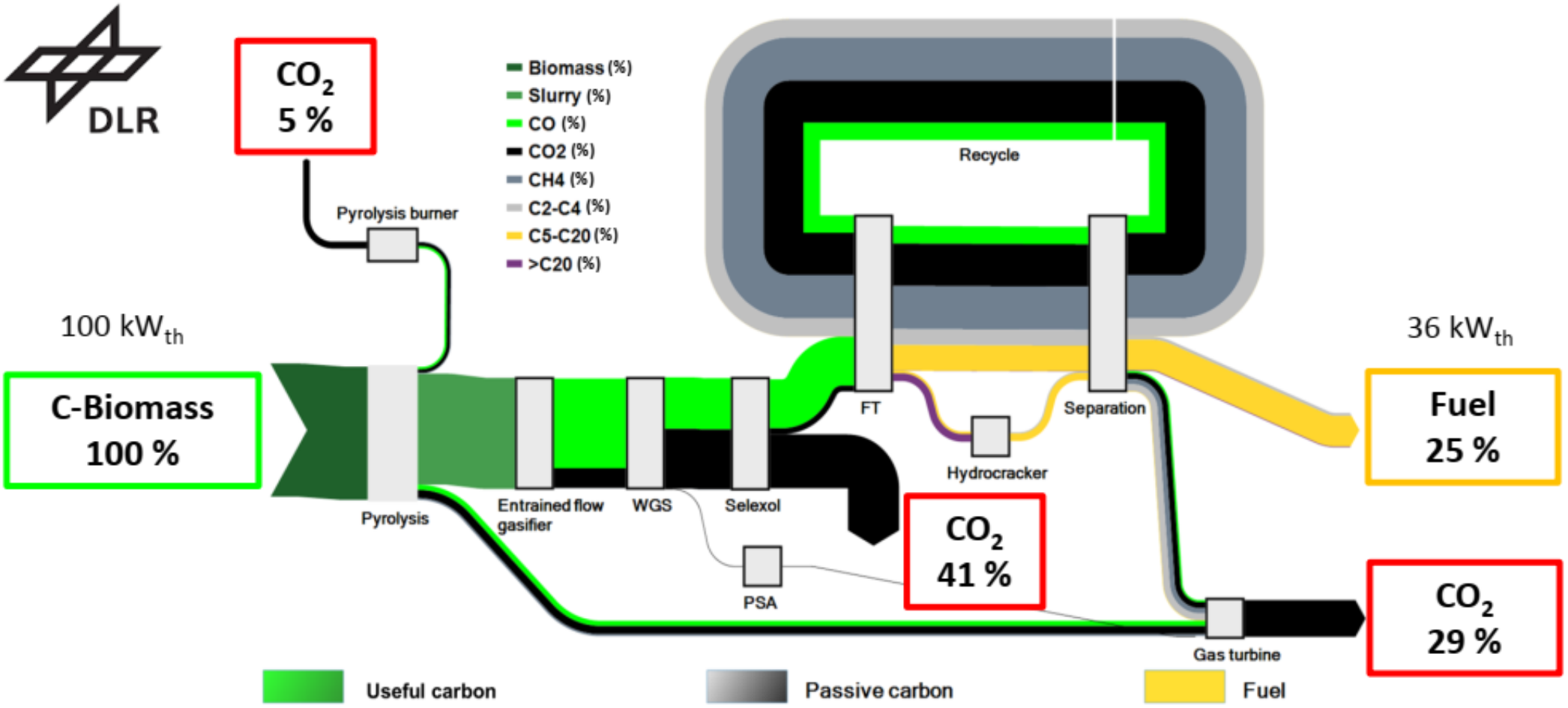
Technologies solution: de(fossil)carbonize transport



There is **NO** obvious technology which is **best to convert biomass to fuel** for an internal combustion engines

SynBioPTx © DBFZ 08/2016 (w/o entitlement of completeness)
B/PTG – Biomass-/Power-to-Gas, B/PTL – Biomass-/Power-to-Liquids, DDGS - Dried Distillers Grains with Solubles, FAME – Fatty acid methy ester

75 % of biomass carbon lost as CO_2



Moritz Raab, DLR
Ambition Workshop
Sept. 2018

König et. al – 2016 - Power and Biomass-to-Liquid (PBtL): a Promising Approach to Produce Biofuels using Electricity

The deliverables of Bio4Fuels

- Improve "older" technologies and convert to new feedstock
- Find the right combination of feedstock and product
- Maximize utilization of feedstock
- Minimize energy consumption
  - Improve conversion and separation
  - Reduce water amount in the system
  - Increase dry matter content in processes
- Integration of biochemical, thermochemical and catalytic processes
- Process Simplification and Intensification
- Prepare technology for piloting
- Assist industries in commercialization

Picture: www.theentrepreneurafrica.com/key-difference-innovation-vs-entrepreneurship/

Thanks for your attention!

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