

Alternative Fuels: Key to Sustainable Aviation

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COMSYN Workshop
18-19 April 2018
Stuttgart and Karlsruhe, Germany



Knowledge for Tomorrow



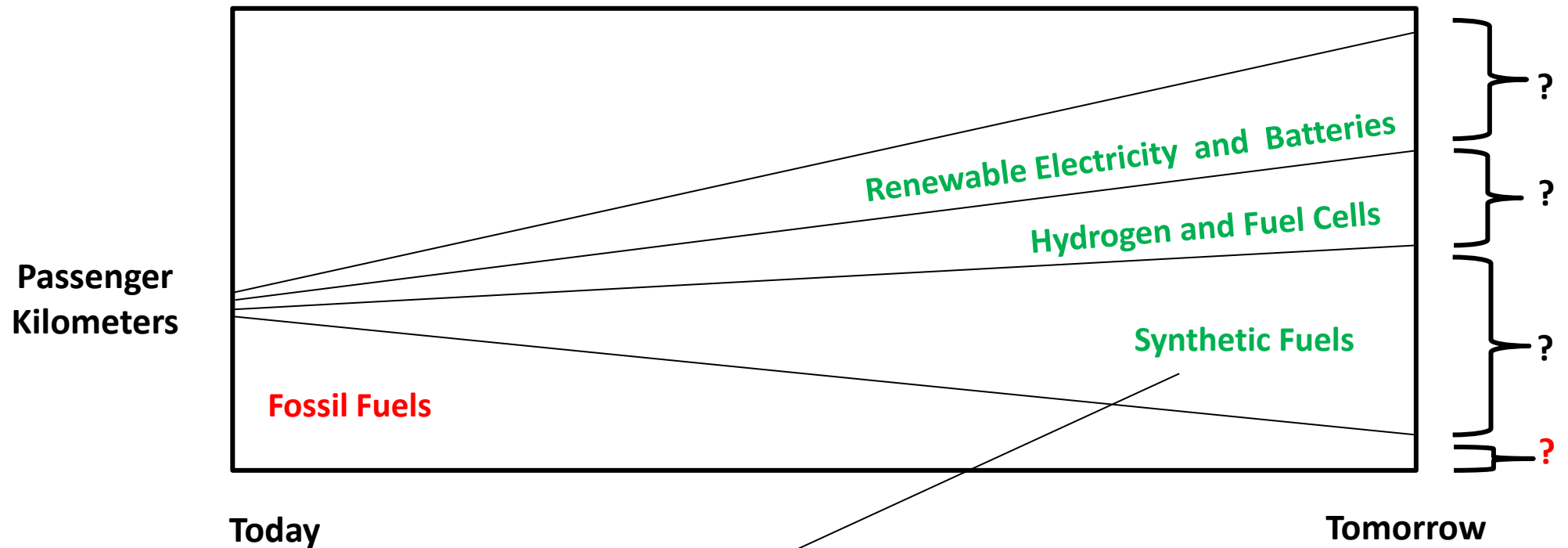
IATA goals for sustainable aviation ^[1] are challenging

- Cap on CO₂ emission from 2020 on
- Reduction in CO₂ emissions of 50 % by 2050 (reference 2005)

➤ ***Alternative fuels required!***



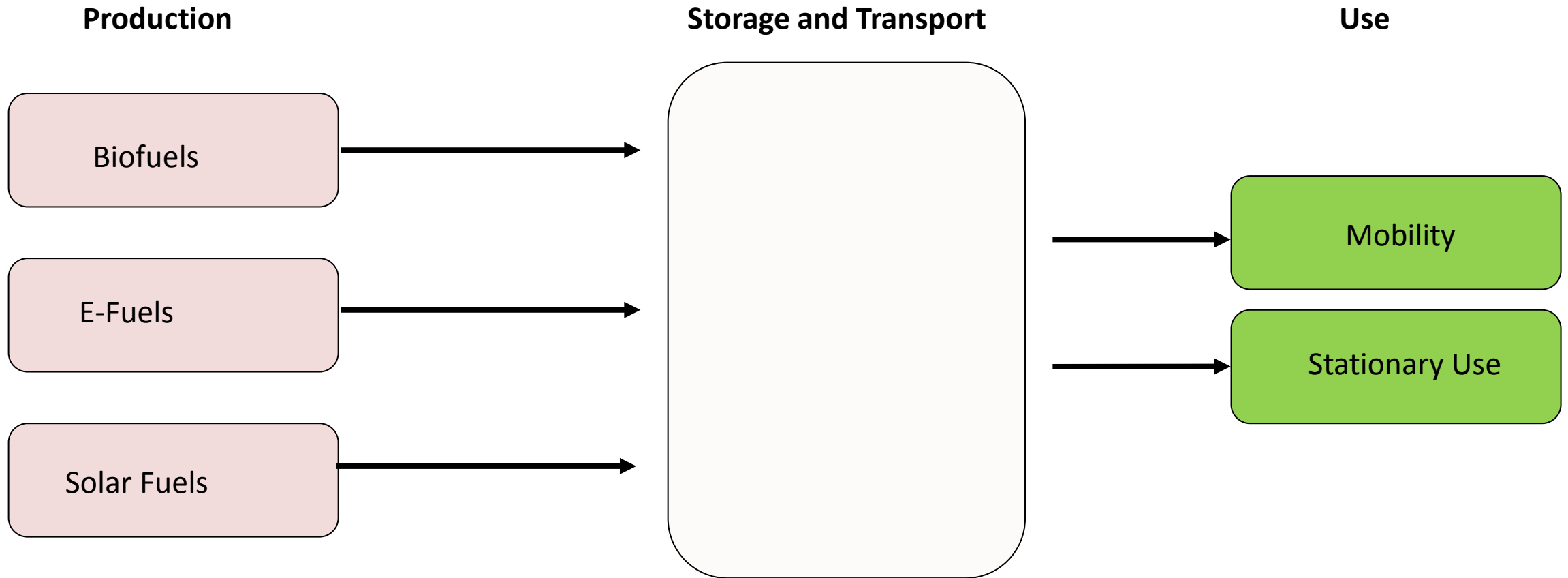
The Global View on Future Mobility



How much and which alternative fuels
are required/available/affordable for CO₂ reduction?



DLR Contributions to Fuel Research



DLR global approach: Future Fuels – liquid fuels for power, heat and transport

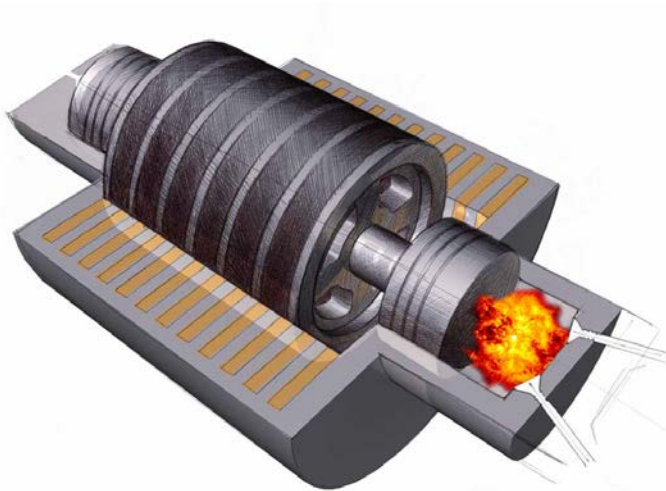
Rocket Engine



Jet Engine



New Engine Concepts

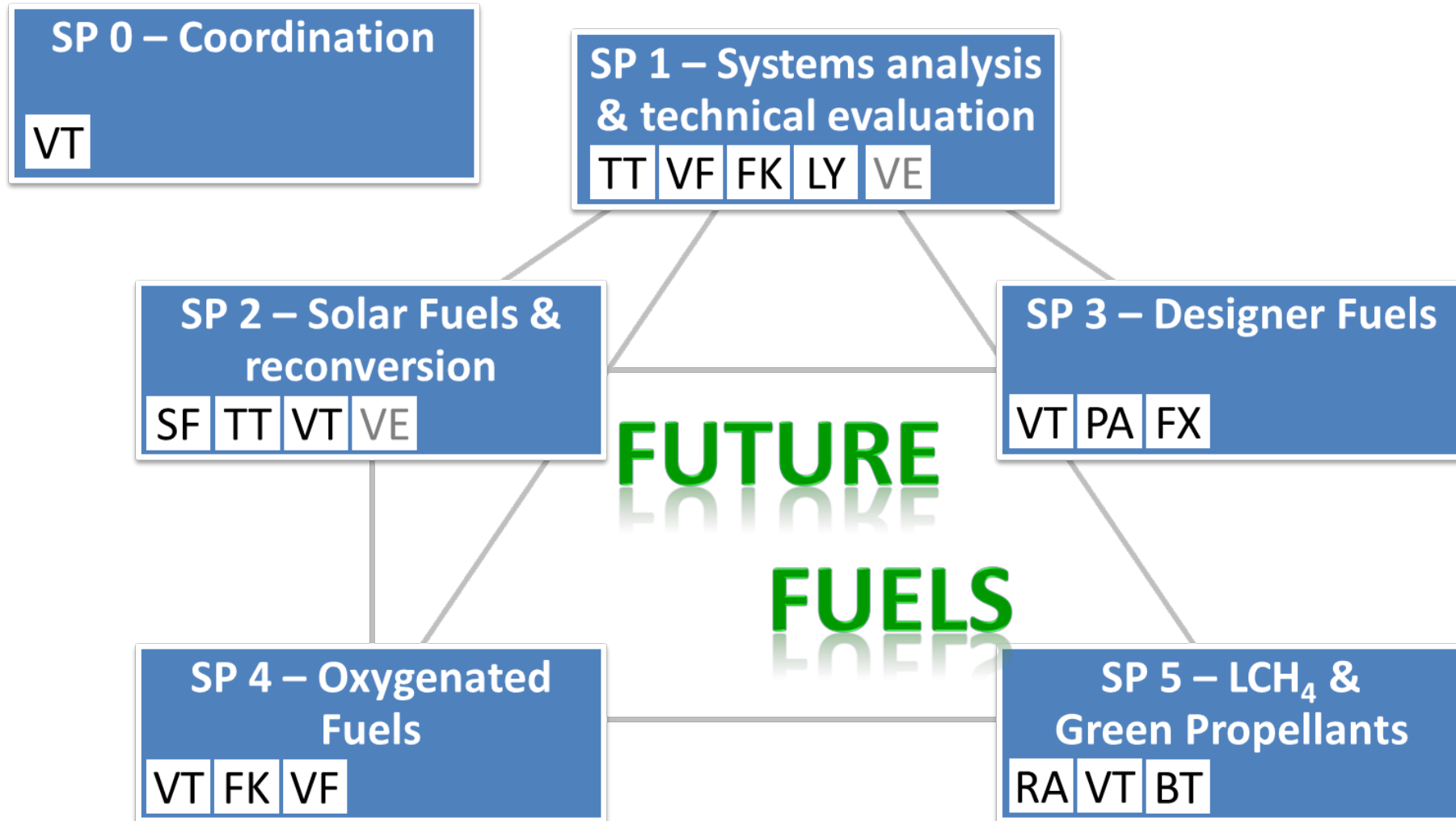


Micro Gas Turbine

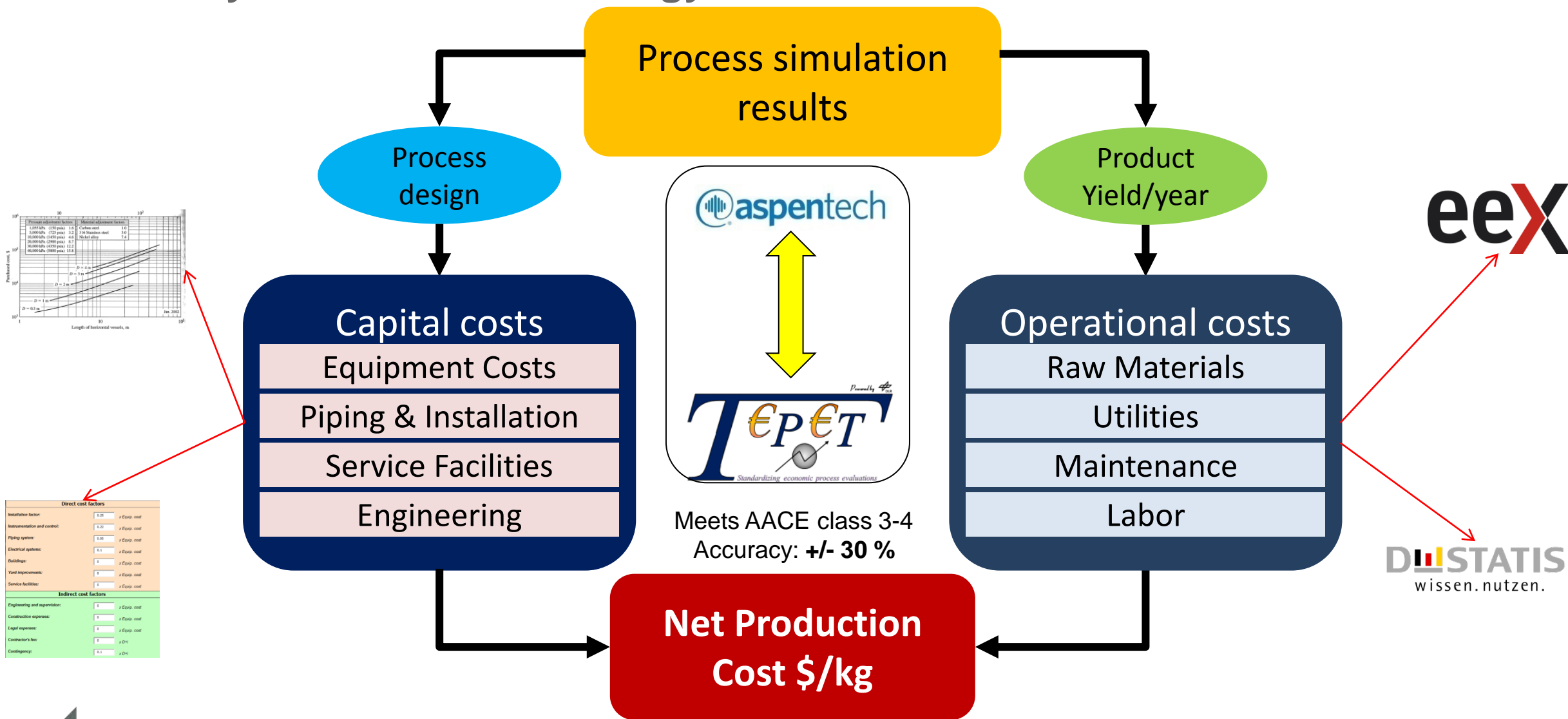


Future Fuels - Cross Cutting DLR Research Program

11 DLR Institutes, 13 Mio.€, 2018-2011

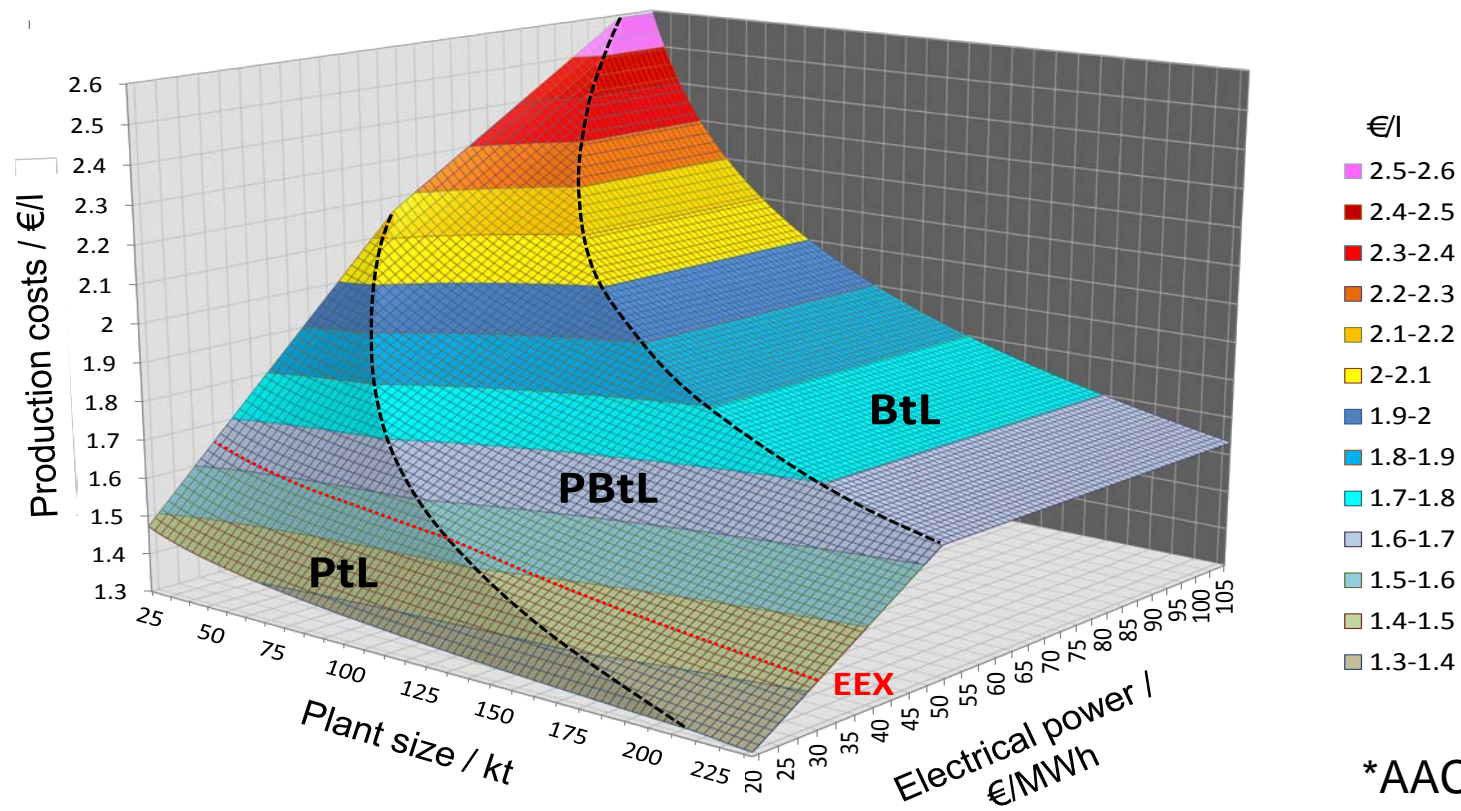


Cost Analysis – DLR methodology



Techno-economic assessment (TEA) of alternative production routes at DLR

- standardized cost estimation based on chemical engineering standards (ACEE*)
- year-specific, site-specific, plant-specific (ACEE class II+IV: Accuracy: +/- 30 %)



*AACE International
view: <https://web.aacei.org/>

Conclusion

- **GHG emission reduction from growing air transport impossible without renewable fuels**
- **Power-to-Liquid technology is available and aviation certified – but currently not competitive**
- **Significant cost reduction options for synthetic kerosene from renewable power**
- **Insufficient research activity and lack of political support implies:**
 - No massive development of renewable power generation
 - No technology development of electrolyser, Fischer-Tropsch synthesis, CO₂ separation etc.
 - No investment in production, processing and distribution of Power-to-Liquid
 - No market launch of synthetic kerosene from renewable power (oil price versus power price?)
 - No substantial GHG emission reduction in aviation

