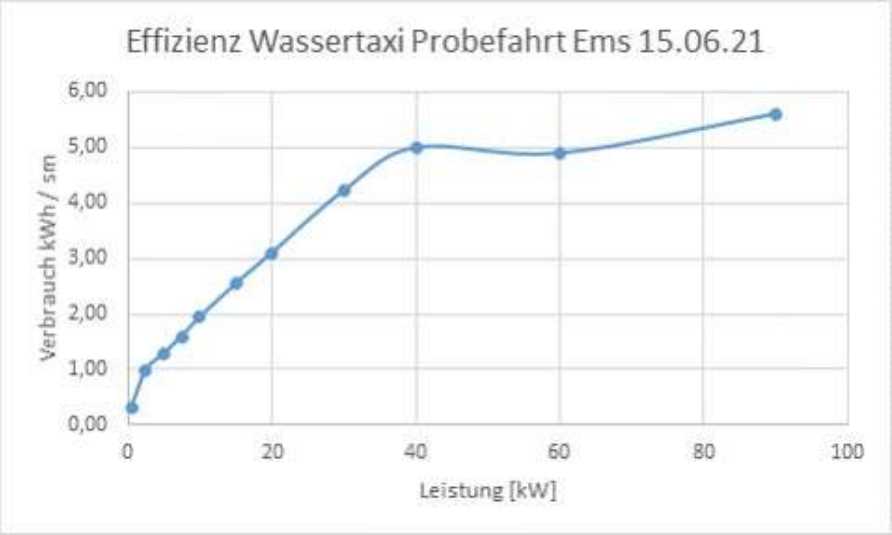
Green Energy for small Watercraft

“Zero Emission Island Ferry”

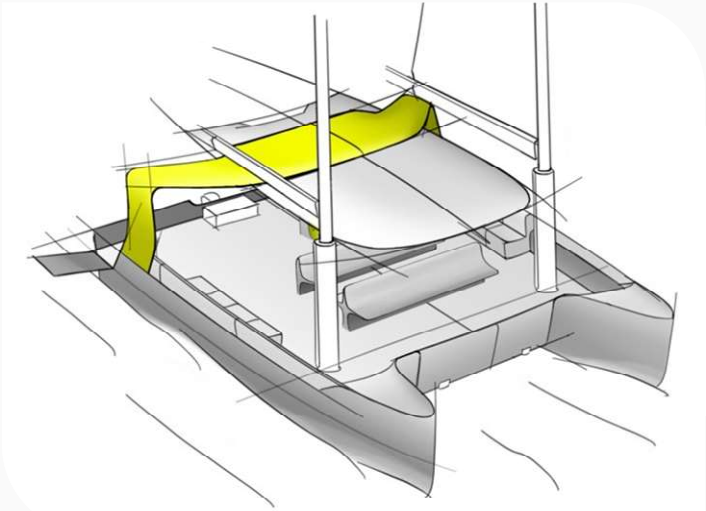
Overview

- “Green Water Taxi” Project
  - Concept
  - Trial results
- Considerations for Alternative Fuels
- Decisions Making (here)
- Conclusions

Concept



- Parametric Fast Hull (PFH from DWSC)
  - Low energy consumption
  - High speed capability
  - Shallow draft
- Hybrid drive – modular – zero emission
  - Electric – battery
  - Range Extender – FC or ICE Generator (green fuel)
  - Wind propulsion (rotor or carbon rig)
  - Solar roof
- Wide beam catamaran (L: 8m, B: 6m) – scalable
  - Spacious platform for various applications:
  - Water Taxi, Tourist Cruise, Ferry

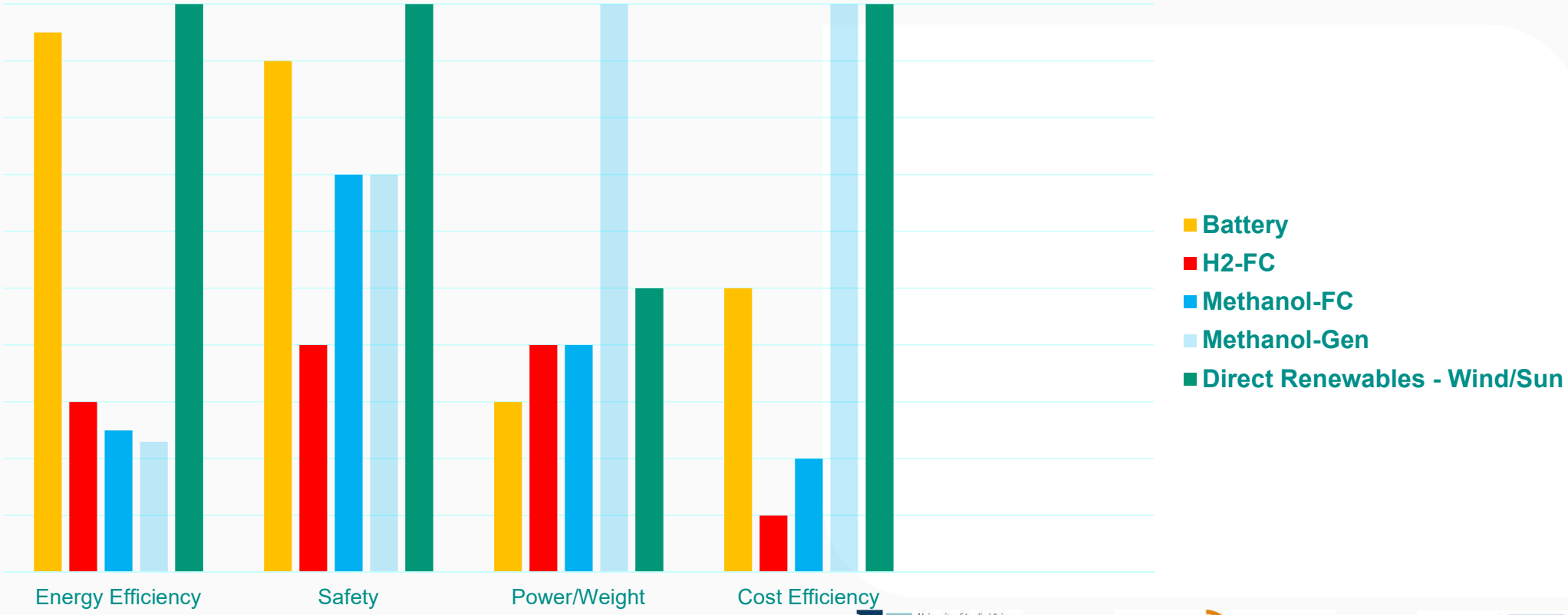


Trial from Emden to Norddeich

- 40 nm distance
  - abt. 60 kWh consumption (slow speed)
  - 82 kWh battery capacity
- Proof of shallow water capability
  - Draft 0.30m
- Proof of speed capability
  - > 16 kn (calm water)
- Proof of high comfort
  - space, motion, noise

Considerations for Energy/Fuel Options

Rating of different configurations (approximation of scale)



Decision Making (here)

- Battery-electric drive (only) could be suitable, if…
  - Reasonable battery capacity (weight, cost)
  - Operation profile? Fast Charging?

- Range extender for high flexibility
  - H2-FC: too many open questions, safety, regulations etc.
  - Methanol-FC: suitable, but power/weight ratio and cost critical
  - Methanol-Gen: suitable, significant better rating than FC (market?)

- Other fuels (LNG, Ammonia etc.)
  - Safety?!
  - Fuel Logistics and Handling?
  - Cost Efficiency?

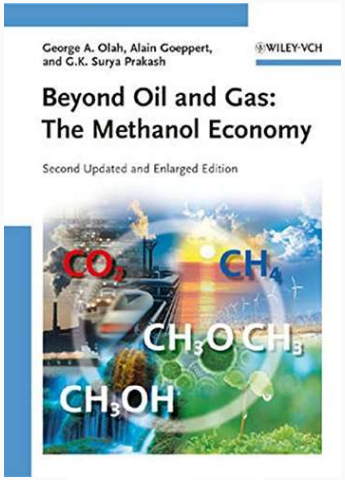
Conclusions

- For a quick change over to green fuels a combination of battery-electric drives with a Methanol fuelled range extender seems to be reasonable for small craft – technology/rules available now

- In general: It has to be considered, that a simpler solutions on board could significantly overweigh the effort of processing H2 to a more convenient derivate (Methanol, perhaps other options)

- In general:
  - Use of direct renewables (wind/sun) wherever senseful from operation perspective - high cost efficiency when energy prices are high (to be expected for all fuels)
  - Use of other options to save fuel (high cost efficiency)

- Literature: For the bigger picture on Methanol…
  - Olah, G. et al., The Methanol Economy



Thanks for your Attention

Further information on h2watt.eu

Hochschule Emden-Leer
Faculty of Maritime Sciences
Prof. Capt. Michael Vahs
Bergmannstraße 36
26789 Leer
www.hs-emden-leer.de

FME
Leo van der Burg
Laan Corpus den Hoorn 101
9728 JR Gronigen
www.fme.nl

Unterstützt durch: / Mede mogelijk gemaakt door:

www.deutschland-nederland.eu