

26 November 2018

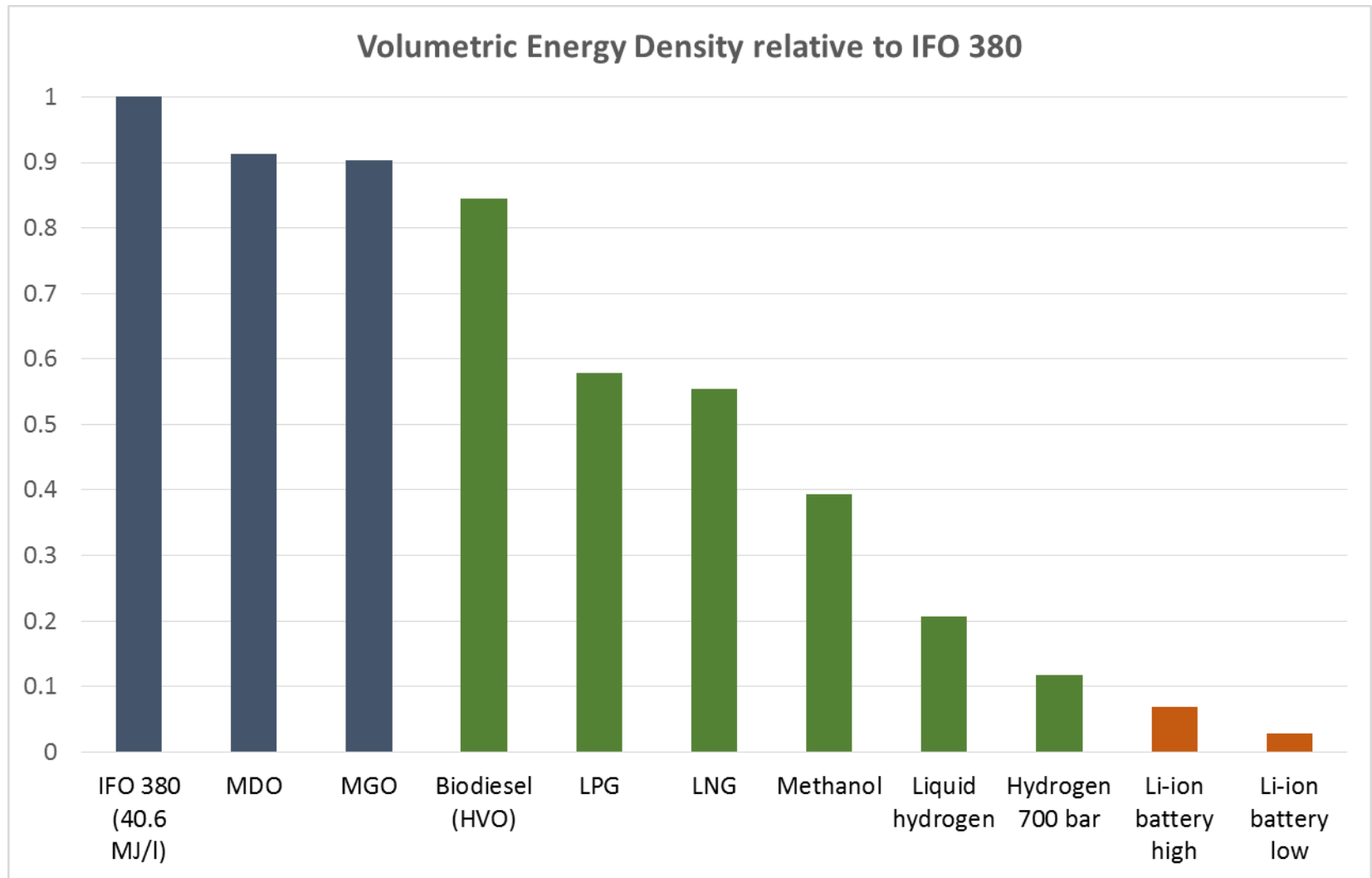
Considerations for uptake of alternative marine fuels

Energy lives here™

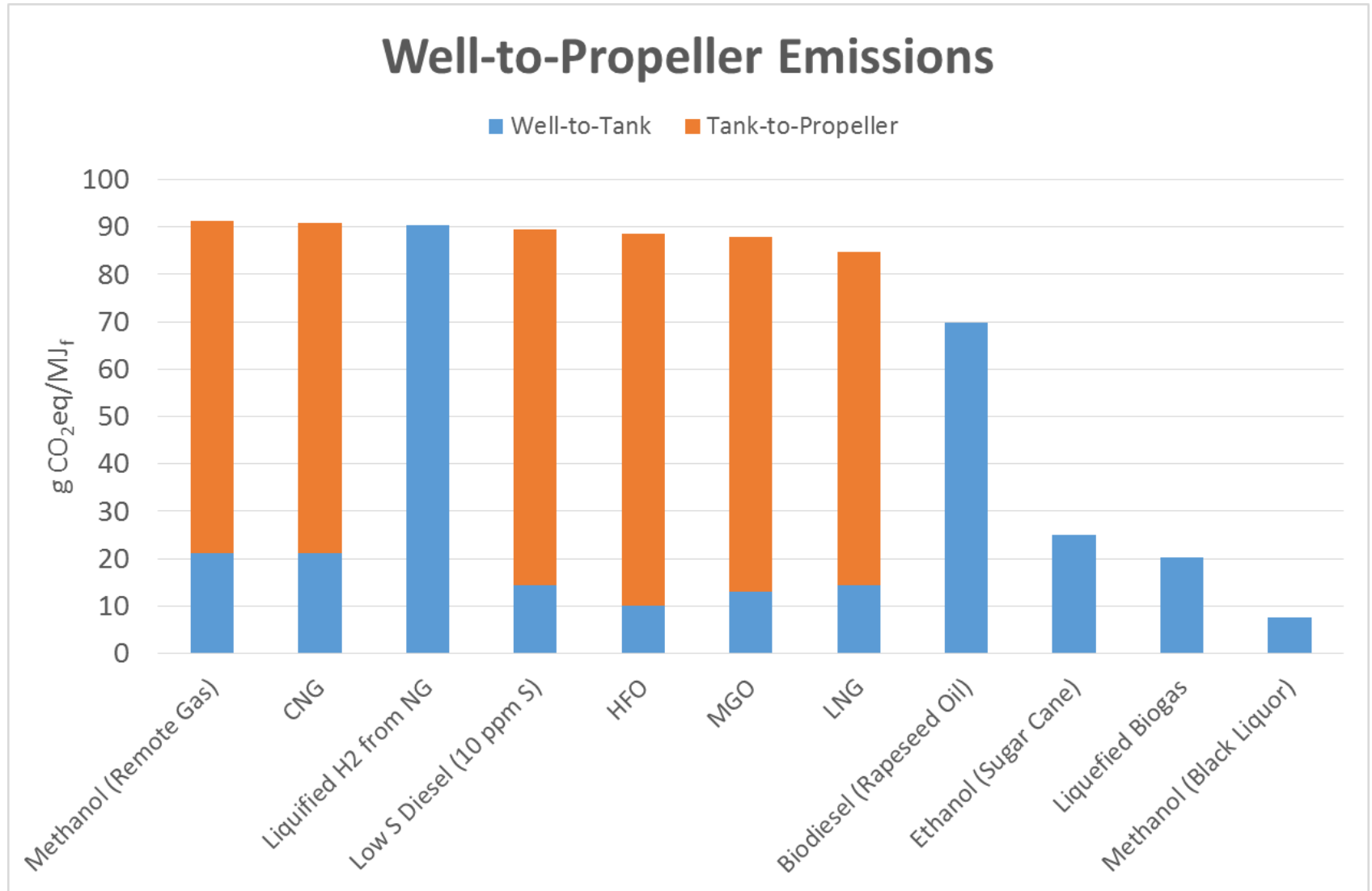
Outline

- Technical Considerations
 - Energy density
 - Holistic approach: fuel-ship system life cycle considerations
 - Drop-in solution or fleet turnover
 - Scalability
 - Energy and emissions intensity
- Policy Considerations
 - Predictable stable regulatory framework
 - Research and development framework
 - Cost/benefit
 - Different technology options to compete
 - Consistent cost of carbon across the economy

Energy Density Varies Widely

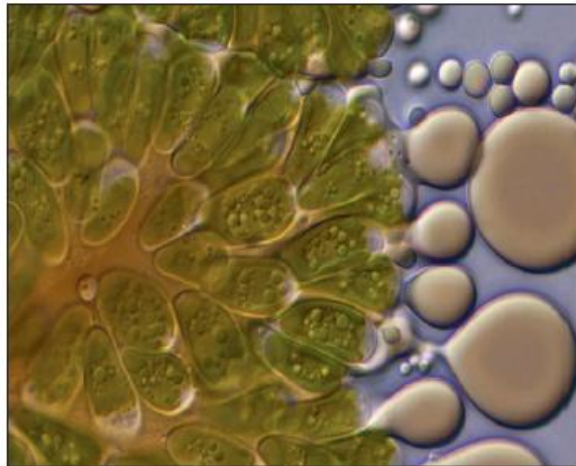


Holistic approach



Scalability

- Low-GHG emissions energy technologies need to deliver economy, scale and reliability
 - *Fundamental research aimed at developing energy solutions that have the potential to be economically feasible and scalable*

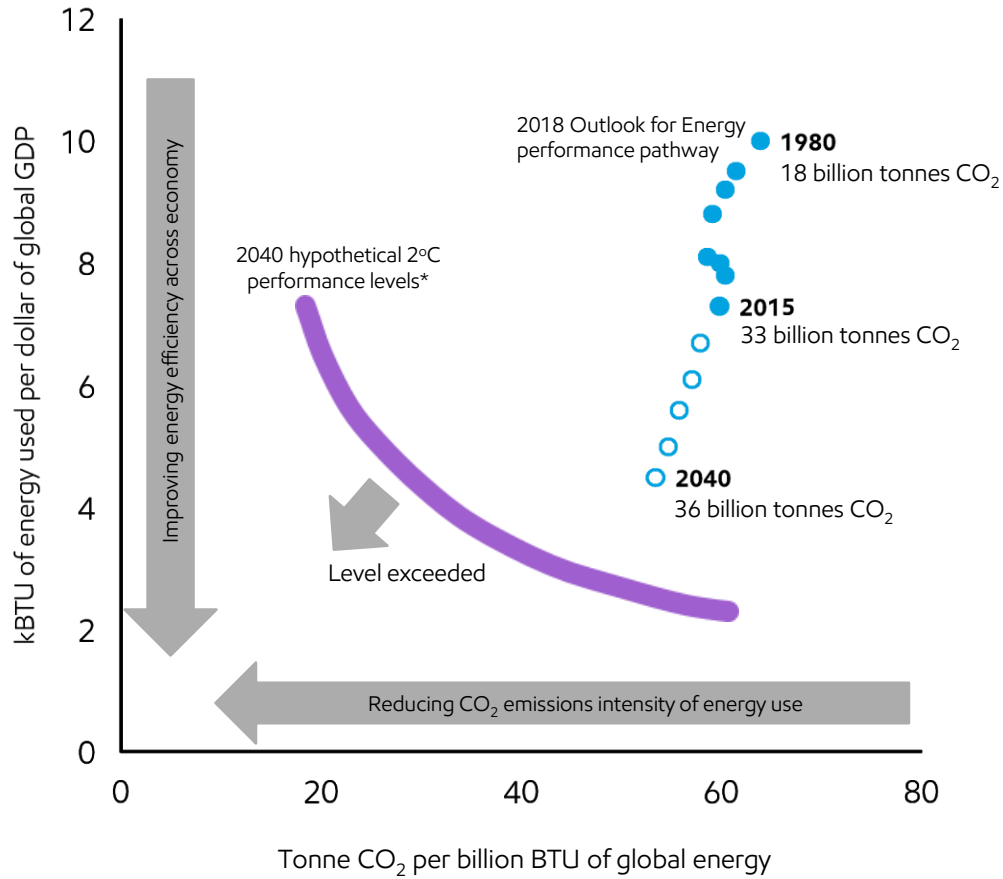


Up close: Advanced biofuels

ExxonMobil and Synthetic Genomics recently announced a breakthrough in joint research into advanced biofuels involving the modification of an algae strain that doubled its oil content without significantly inhibiting the strain's growth.

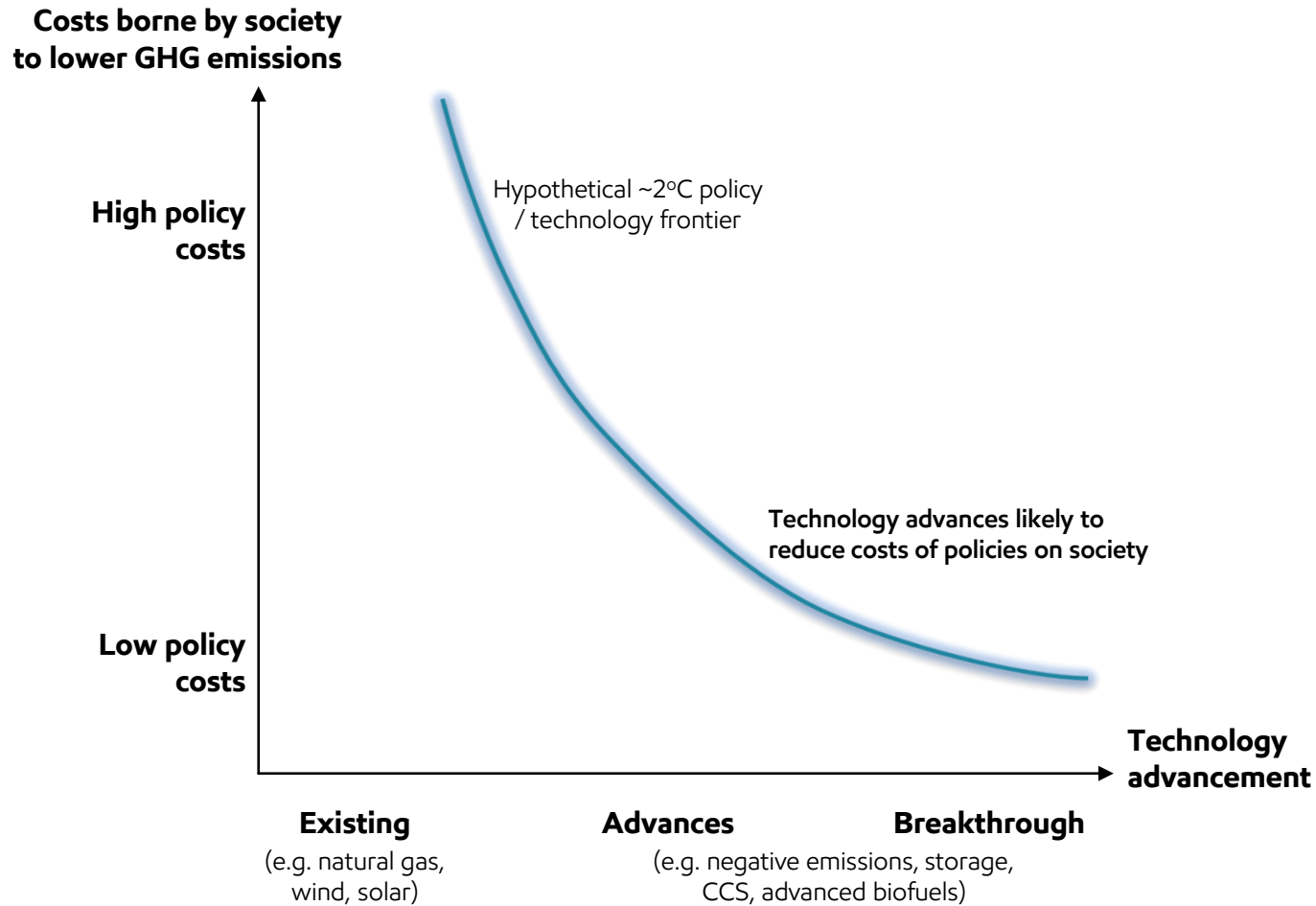
Two factors paramount to limiting emissions

World energy-related CO₂ emissions relative to energy intensity and CO₂ emissions intensity



*Based on average Stanford EMF27 full technology / 450ppm scenarios' CO₂ emissions (~20 billion tonnes including energy and industrial processes), ExxonMobil GDP assumptions consistent with 2018 Outlook

Technology key to reducing societal costs of 2°C pathway



Policy / Technology matrix is illustrative only

Policy Considerations

Attributes of sound policy

- Promote global participation
- Let market prices drive the selection of solutions
- Ensure a uniform and predictable cost of greenhouse gas emissions across the economy
- Minimize complexity and administrative costs
- Maximize transparency
- Provide flexibility for future adjustments to react to developments in technology, climate science, and policy



2050 Policy Considerations

- Development of disruptive technologies to reduce shipping GHG emissions will require huge financial and other resources
- It cannot be assumed that public funds alone will be able to support such developments
- Private investors will only commit resources if there is a reasonable expectation of a business case and prospect of a profitable market
 - *Short-term – pragmatic approach within existing regulatory framework*
 - *Measures to stimulate R&D and unlock investment in low-carbon technologies*
 - *Comprehensive holistic approach to GHG emissions*
 - *Economy-wide carbon price applied to all sectors*

Adapted from FuelsEurope, Vision 2050 –
Specific Policy proposals, 2018
<https://www.fuelsEurope.eu/vision-2050/>



*Thank you for
your attention*