METHANOL INSTITUTE

RENEWABLE METHANOL REPORT -WEBINAR

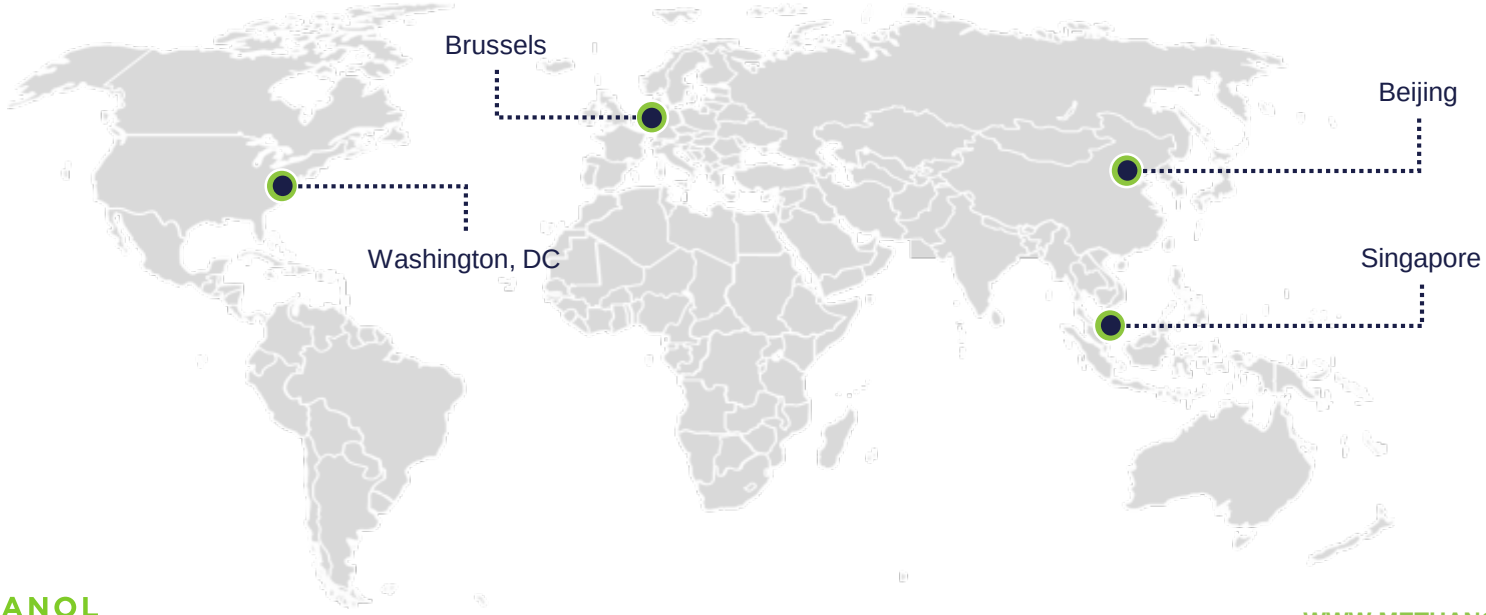
Larry Navin, Director of Government & Public Affairs – Methanol Institute

5 March 2019

01 WHO WE ARE

MI History

- The Methanol Institute (MI) was established in 1989
- 30 years later, MI recognized as the trade association for the global methanol industry
- Facilitating methanol's expansion from our Singapore headquarters and regional offices in Washington DC, Brussels, and Beijing



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METHANOL INSTITUTE

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MHTL · methanex the power of agility · سابك sabic · OCI

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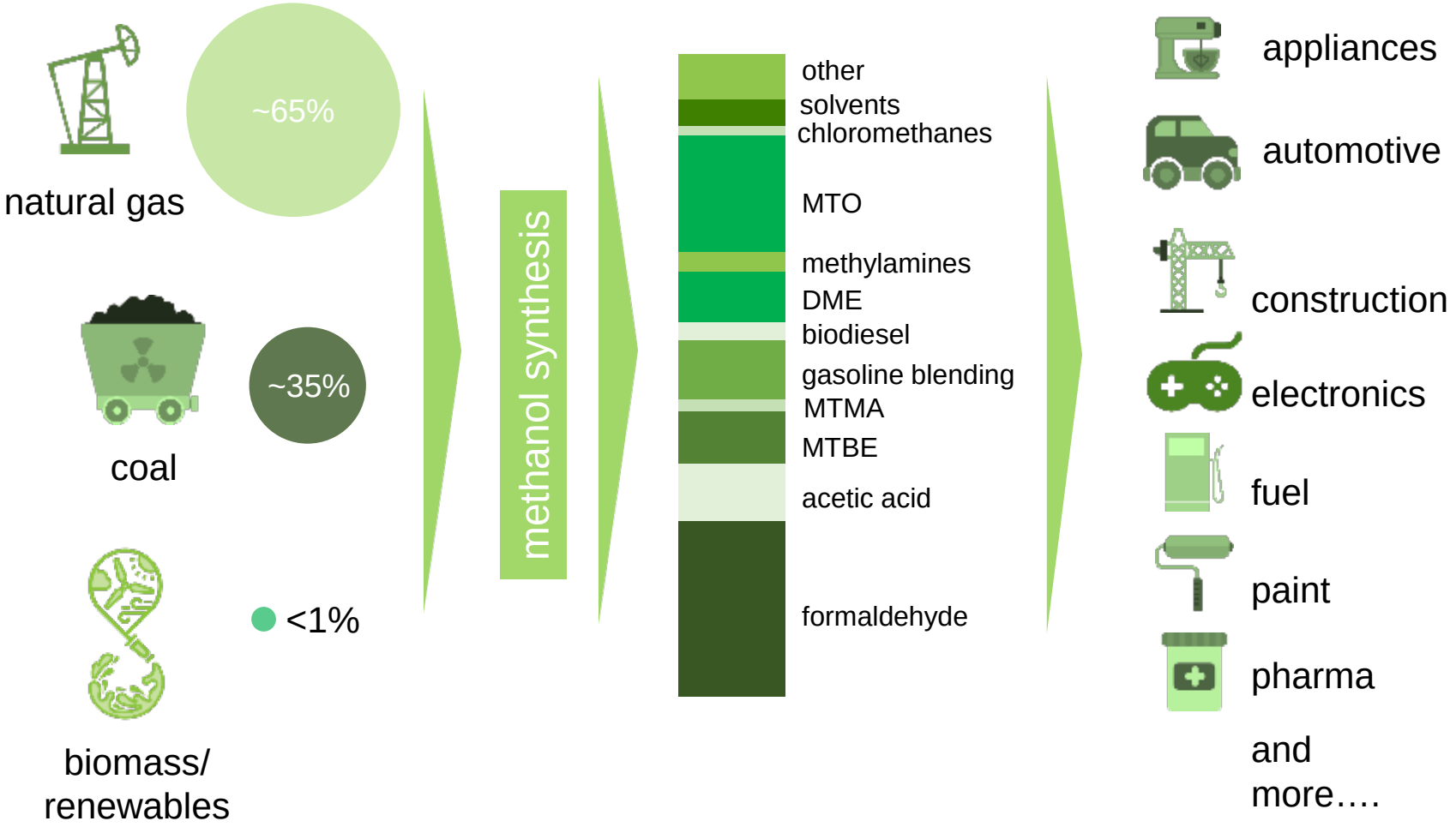
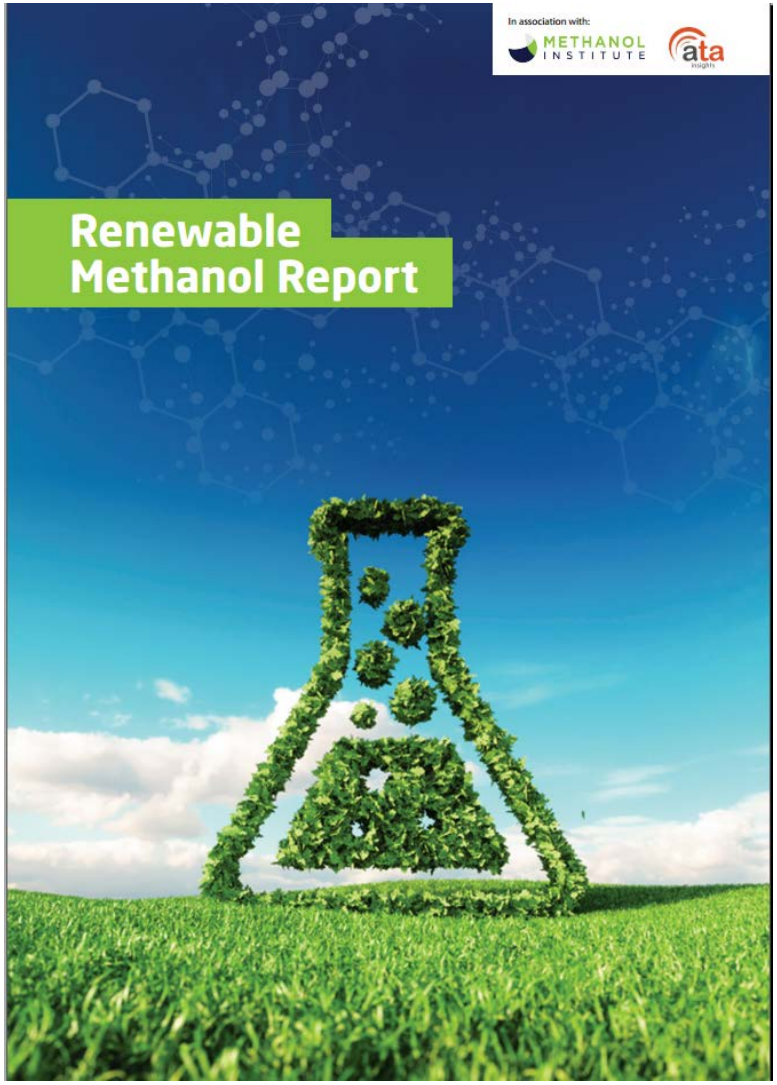
https://www.methanol.org/join-us/

Methanol: Broad Feedstocks and Markets



Renewable Methanol Report



- February 2019: MI releases ***Renewable Methanol Report*** prepared by ATA Insights
- Contents:
  - Executive summary
  - Why consider renewable methanol?
  - Renewable methanol production
  - Case Studies: CRI, Enerkem, BioMCN
  - Applications and uses of renewable methanol
  - Conclusions and how to find out more
- Free download here: http://bit.ly/2UeJpJp

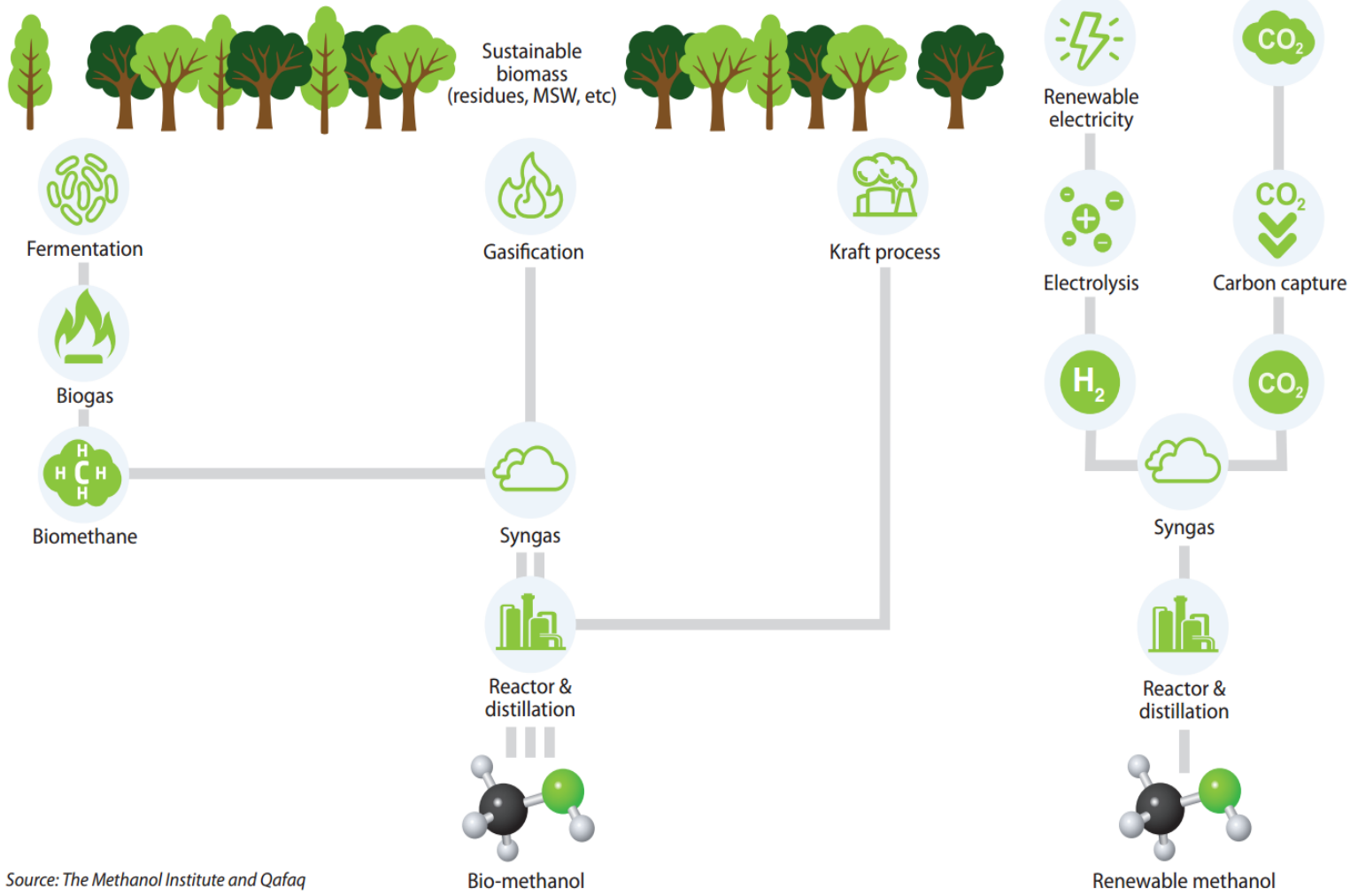
Pathways to Renewable Methanol

FEEDSTOCKS

- Agricultural Waste
- Forestry Residues
- Municipal Solid Waste (MSW)
- Carbon Dioxide (CO2)
- Renewable Hydrogen

Renewable Methanol Report

Figure 1. Renewable methanol production processes from different feedstocks



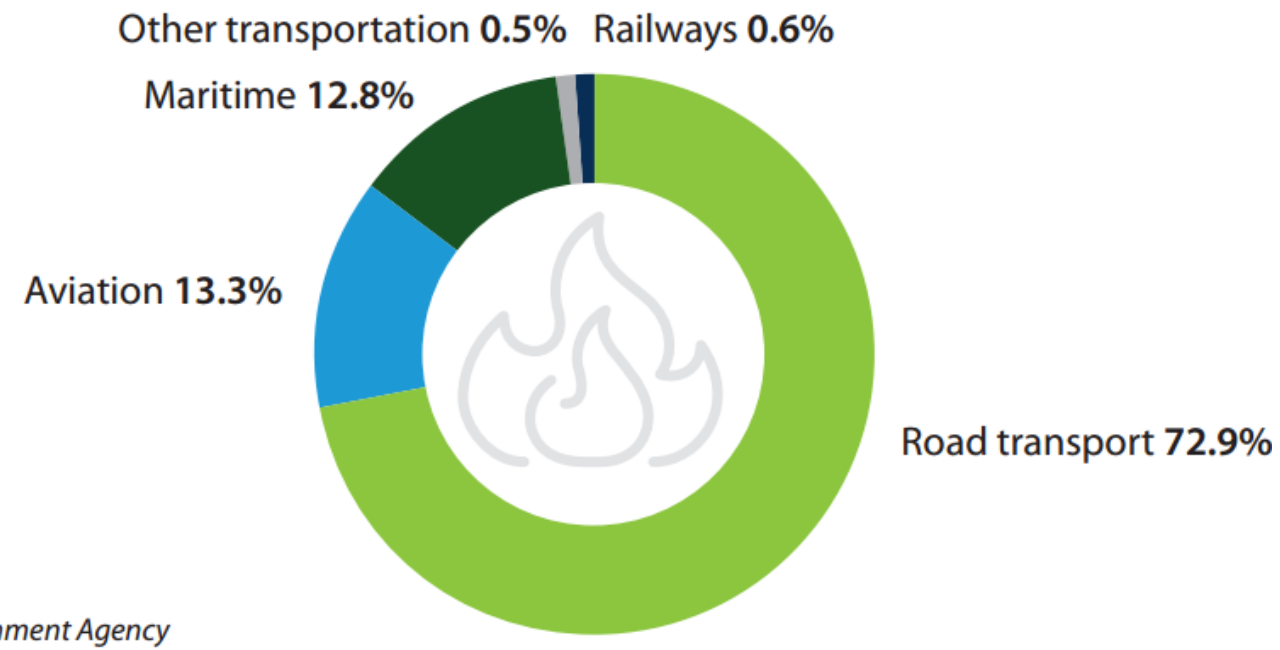
Source: The Methanol Institute and Qafaq

Renewable Methanol Report

Methanol category	Commercial	Feasibility and R&D
Bio-methanol	■ BASF (GER) ■ BioMCN (NL) ■ Enerkem (CAN) ■ New Fuel (DEN)	■ Biogo (GER) ■ Enerkem (NL) ■ LowLands Methanol Heveskes Energy (NL) ■ NREL (USA) ■ Origin Materials (USA) ■ Södra (SE)
Renewable methanol	■ CRI (IC) ■ Innogy (GER)	■ Advanced Chemical Technologies (CAN) ■ Asahi Kasei (JPN) ■ Blue Fuel Energy (CAN) ■ bse Engineering (GER) ■ Catalytic Innovations (USA) ■ CRI (CN/GER) ■ Gensoric (GER) ■ Infraserv (GER) ■ Liquid Wind (SE) ■ MefCO2 (GER) ■ Neo-H2 (USA) ■ Port of Antwerp (BE) ■ Quantiam Technologies (CAN) ■ STEAG (GER) ■ Swiss Liquid Future (CH) ■ thyssenkrupp (GER) ■ USC (USA) ■ ZASt (GER)
Low carbon methanol	■ GPIC (BAH) ■ Methanex (CAN) ■ QAFAC (QAT) ■ SABIC (KSA)	■ Carbon2Chem (GER) ■ FRESME (SE) ■ GasTechno (USA) ■ Haldor Topsoe (DEN) ■ Maverick Synfuels (USA) ■ NCF (CN) ■ OPTIMeoH (GER)

Renewable Methanol Report

Figure 6. Share of transport greenhouse gas emissions 2015*



*European Environment Agency

Methanol is a versatile fuel source

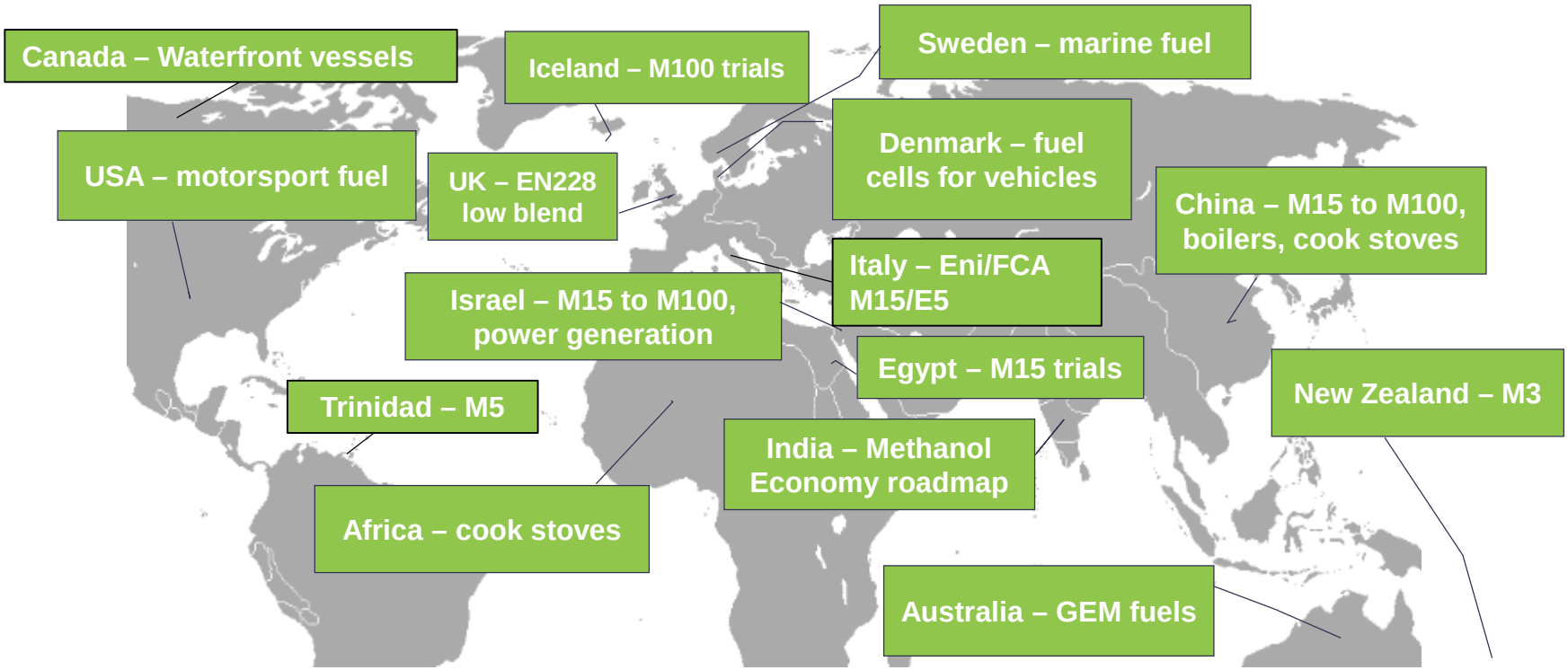
Out of the ~80 million metric tons of methanol sold globally in 2018, energy and fuel uses represent 40% of total demand

FUELS
- Neat fuel
- Low blends
- High blends
- GEM
- MTBE
- Biodiesel
- DME & OME
- MTG

TECHNOLOGIES
- SI & CI engines
- Turbines
- Fuel cells

SEGMENTS
- Road & non-road transportation
- Power & heat generation
- Marine

Global Methanol Fuel Examples



https://www.methanol.org/energy/

Renewable Methanol Report

Figure 7. Well-to-wheel CO_2 emission - from Danish Department of Energy, Alternative Drivetrains 2014*

Type	Current status	Green scenario
Diesel	132g/km	100g/km
Gasoline	176g/km	123g/km
Hybrid	142g/km	80g/km
Battery electric	98g/km	2g/km
Hydrogen	178g/km	3g/km
Methanol	**83g/km**	**2g/km**

**JENSEN, Mads Friis*

Variable Renewables and Renewable Methanol

- Renewable Electricity Used to Obtain Hydrogen from Water by Electrolysis
- Solar PV, Hydro, Wind peak yield may not match peak demand leading to curtailments
- TSO's may have to disconnect from the grid
- Excess Variable Renewable yield can be used to generate Renewable Methanol
- That Renewable Methanol can be used to generate clean power, or as a renewable fuel for cars and ships

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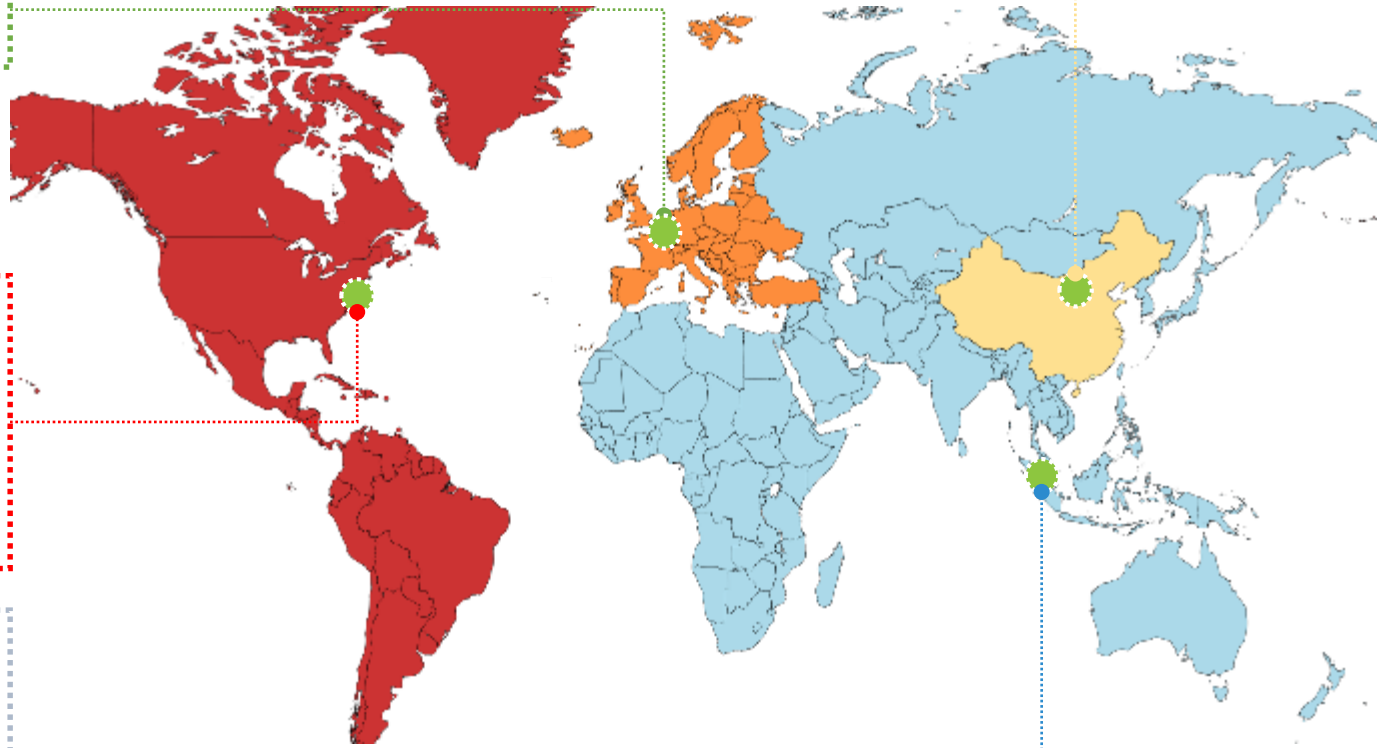

www.methanol.org www.methanolfuels.org