Methanol fuel cell

Fastwater project

Webinar 5 Nov 2020

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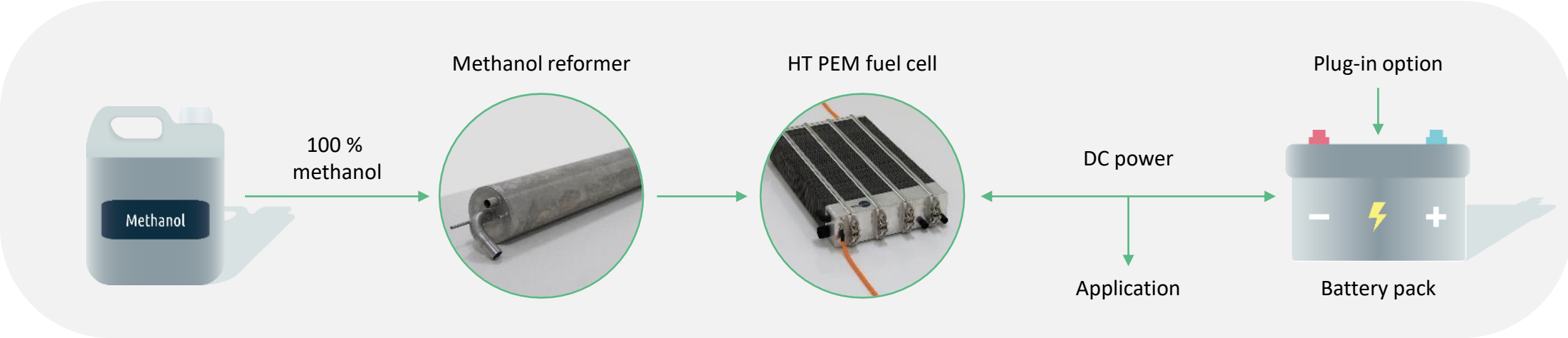
Methanol fuel cells - a **green** alternative



Markets

APU

Automotive

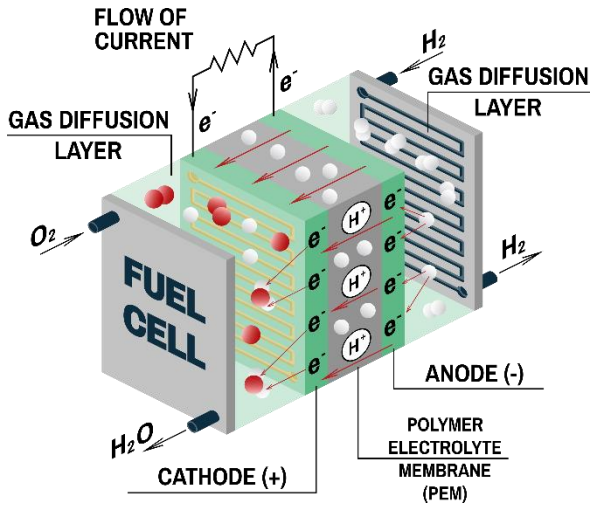
Heavy duty

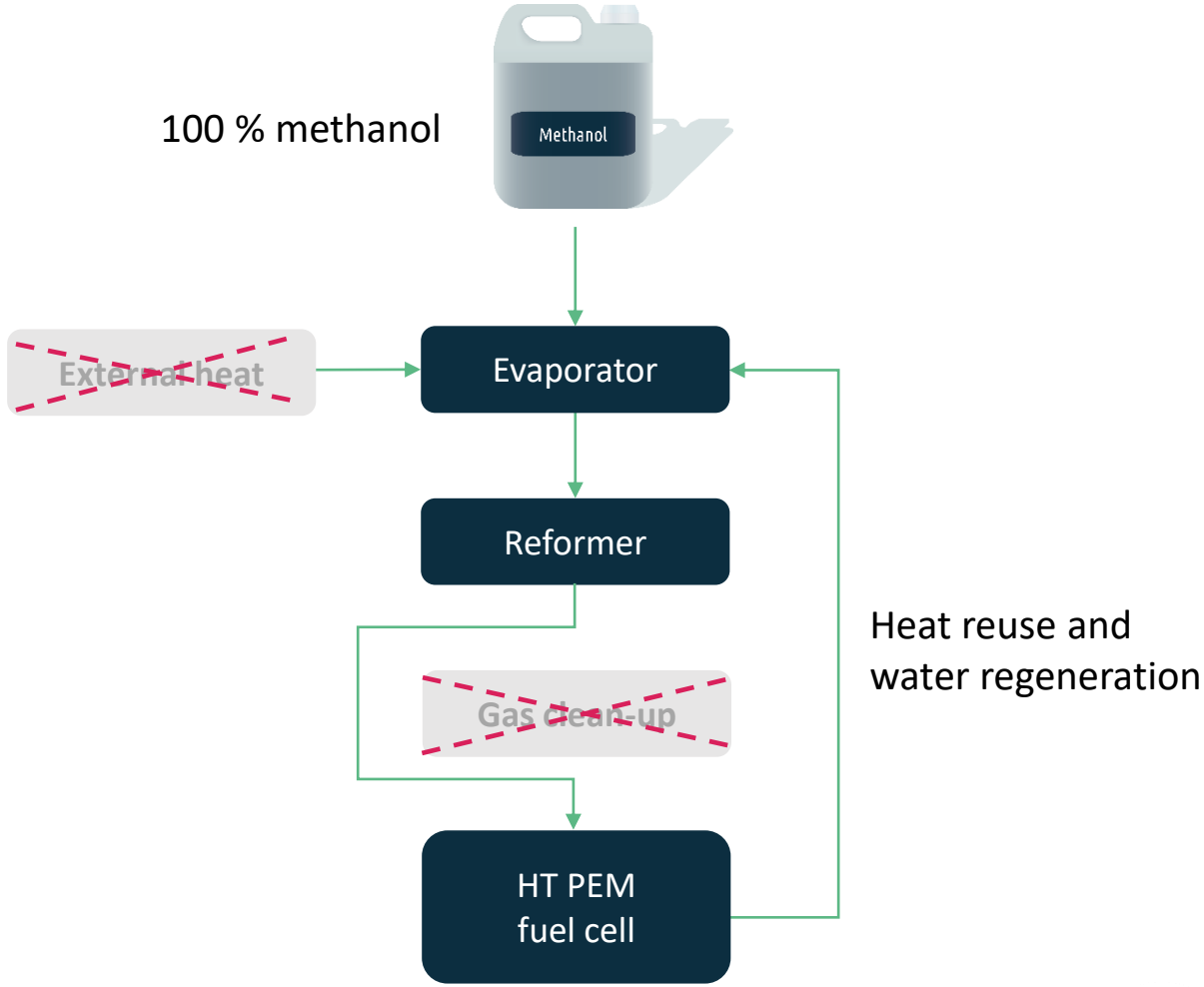
General USPs

- ✓ CO_2 reduction
- ✓ Cost savings
- ✓ Zero harmful emissions

Superior High Temperature PEM technology

- No external heat needed as waste heat drives fuel evaporation process = **higher** conversion efficiency
- No gas clean-up needed = **simple** and cost effective system
- Water regeneration = **increased** energy storage





Methanol fuel cell product platform

- Operation on pure methanol (M100)
- Output power range: 7-25 kW
- System efficiency: 40-50 %
- Fuel consumption: 0,5 L/kWh
- Start-up time: 10 minutes
- Operation temperature: 160 ºC

Methanol fuel cell vehicle – a hybrid set-up

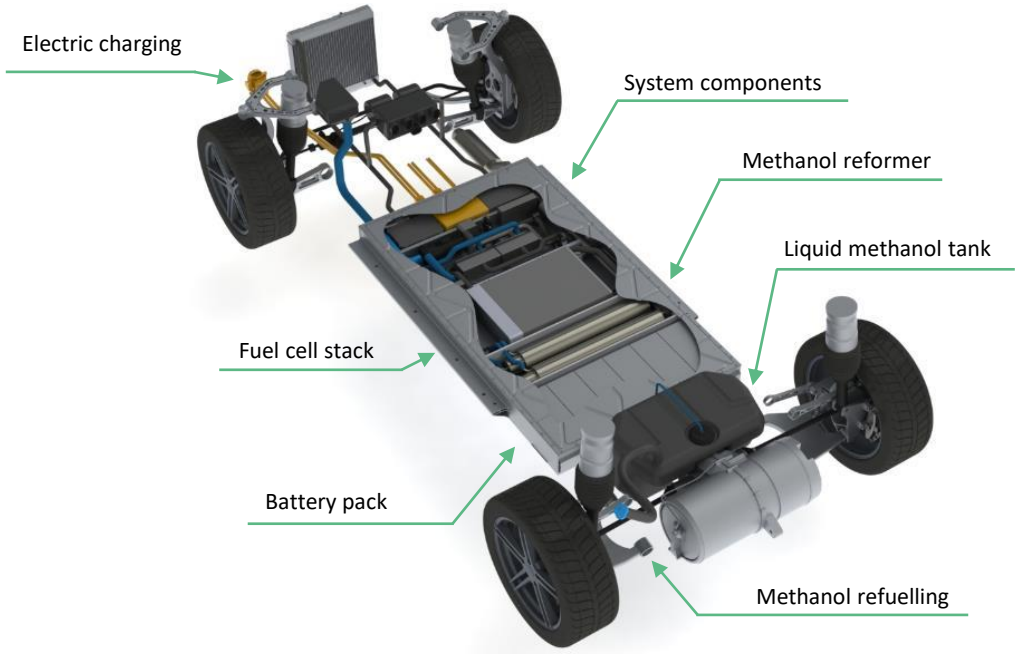
Key value proposition:

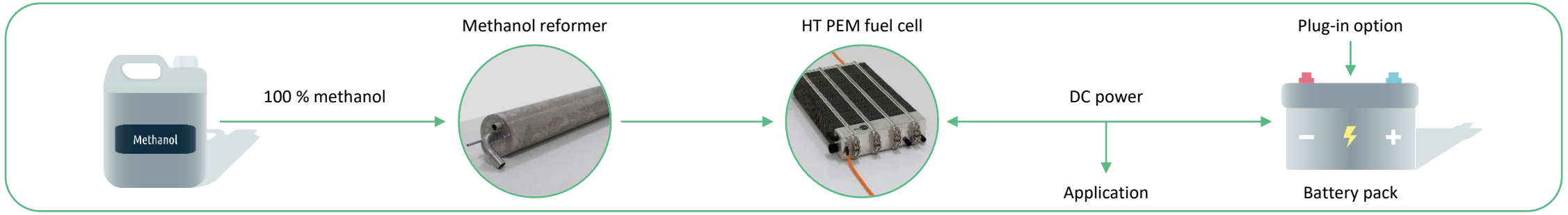
End user

- ✓ 1,000 km range
- ✓ 3 min refuelling time OR plug-in
- ✓ Significant fuel cost savings (typically 30-60%)
- ✓ Zero harmful emissions
- ✓ No noise or vibrations

OEM

- ✓ Same form factor and platform as battery pack (flatpack)
- ✓ CO_2 neutral and significant tailpipe CO_2 reduction
- ✓ Higher power density (than battery → light vehicle)





Air pollution and CO_2 emission

Blue World Technologies **makes a difference** with zero harmful emission fuel cell technology

7 million
people die every year from exposure to fine particles in polluted air

Out of the 7 million premature deaths
4.2 million
die as a result of exposure to ambient air pollution

91%
of the world's population lives in places where air quality exceeds WHO guideline limits

The transport sector
is responsible for a large proportion of urban air pollution

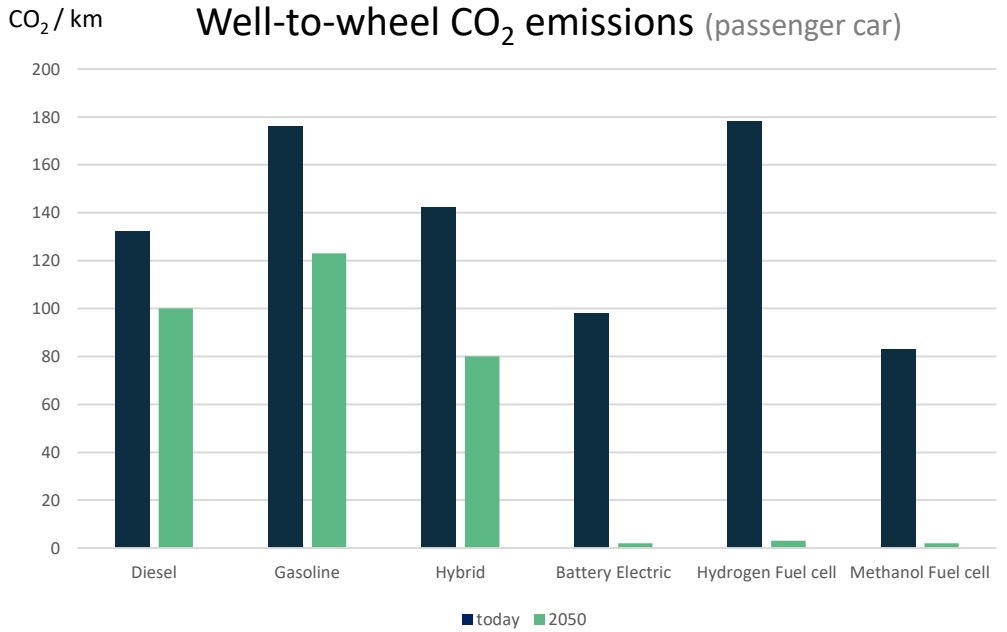
Zero harmful emission:
- No particle emission
- CO_2 tail-pipe reduced by 50-60%
- CO_2 well-to-wheel as hydrogen/electric

Neutrality = decarbonisation

Tank to wheel - methanol fuel cell:
- ~500 g CO_2/kWh
- 30-50 g CO_2/km
- **Zero harmful emissions**

Today:
- Energy mix: oil, coal, natural gas, wind, solar, biomass

2050:
- Renewable energy sources: biomass, solar, wind, biogas



Source: Danish Department of Energy – Alternative drivetrains 2014

For further information please contact

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