



German eFuel One

Shaping the future of mobility.



Christian Hanke
CEO



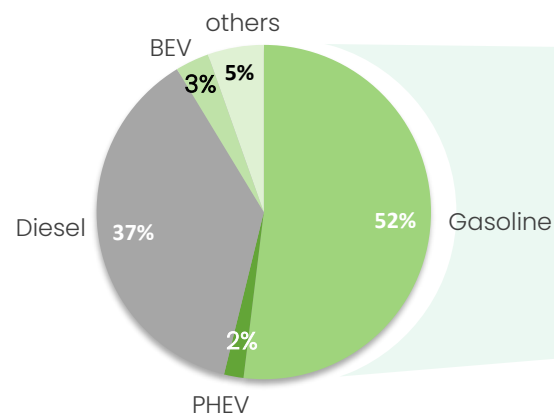
www.gef1.de

Decarbonising Mobility: The Vital Role of e-Fuels

The future of mobility: Why e-Fuels matter for a net-zero world

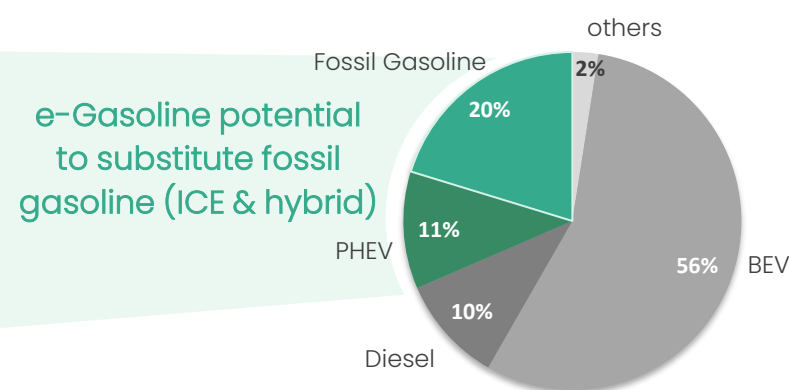
The Challenge

Current fuel mix of the German passenger car fleet in %



The Opportunity

2050: European fleet mix forecast by powertrain in %



e-Gasoline potential
to substitute fossil
gasoline (ICE & hybrid)

Electric mobility

- BEVs are an efficient way to decarbonise road transport
- Market adoption takes time and requires buildup of charging infrastructure
- The increasing prevalence of hybrid vehicles still requires a significant amount of gasoline, highlighting the need to shift towards non-fossil fuel alternatives
- Certain geographies cannot be electrified efficiently in the mid-term

There will be a large demand for liquid fuels for decades to come, which must be defossilised to meet essential net zero targets

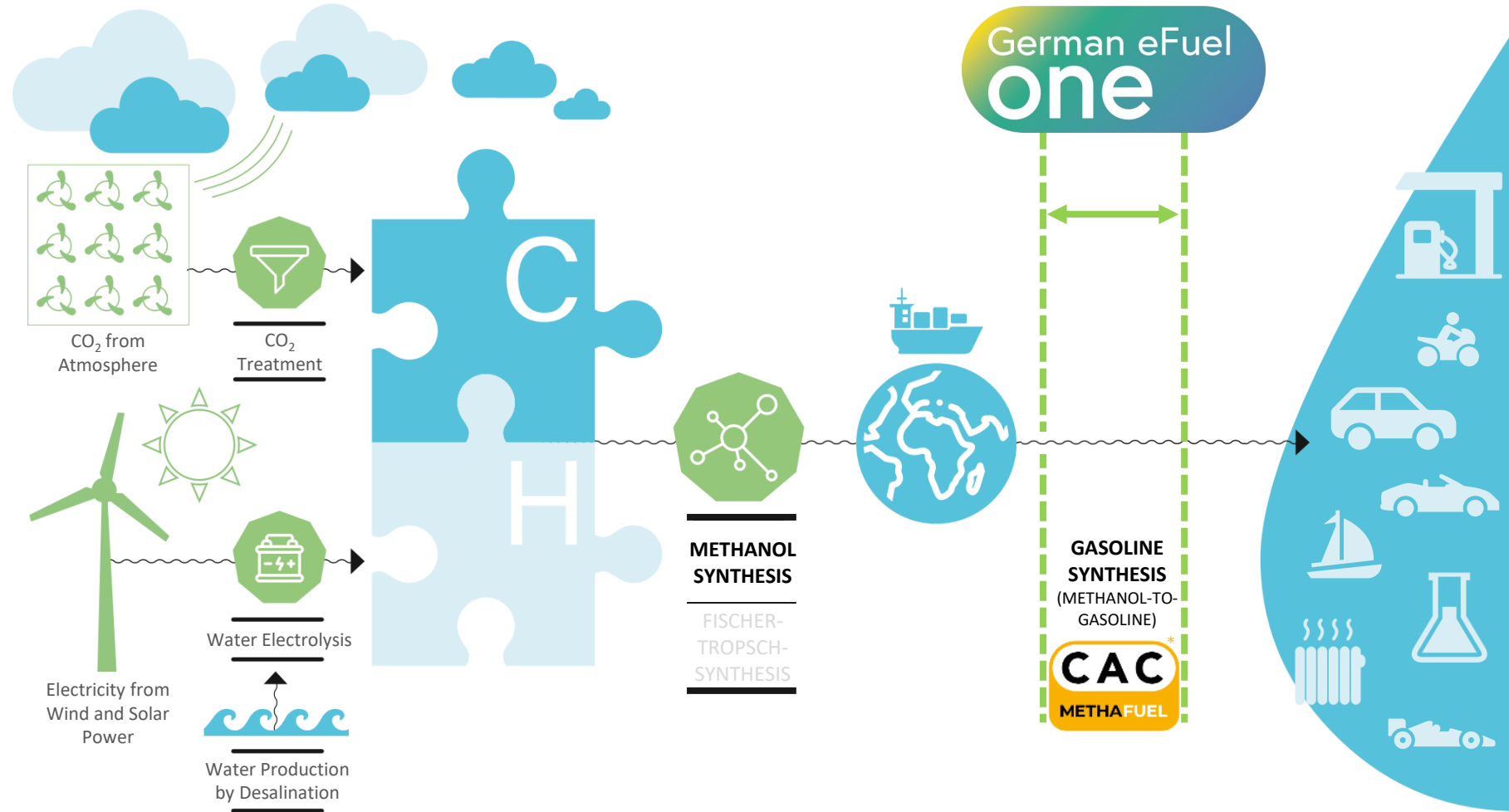
Bridging the gap to decarbonisation

- The fuel demand in 2050 for PHEV, HEV as well as remaining ICE fleet is still expected to be significant
- The gasoline demand of hybrid and ICE fleet (31%) in 2050 is estimated at 45 billion liters in the European Union
- The path to net zero requires additional low carbon solutions next to bio-Fuels & HVO

The market potential for hydrogen-based synthetic fuels to substitute fossil gasoline is substantial

Sources: Project GEF One – Vendor CDD

From Green Power to eFuels

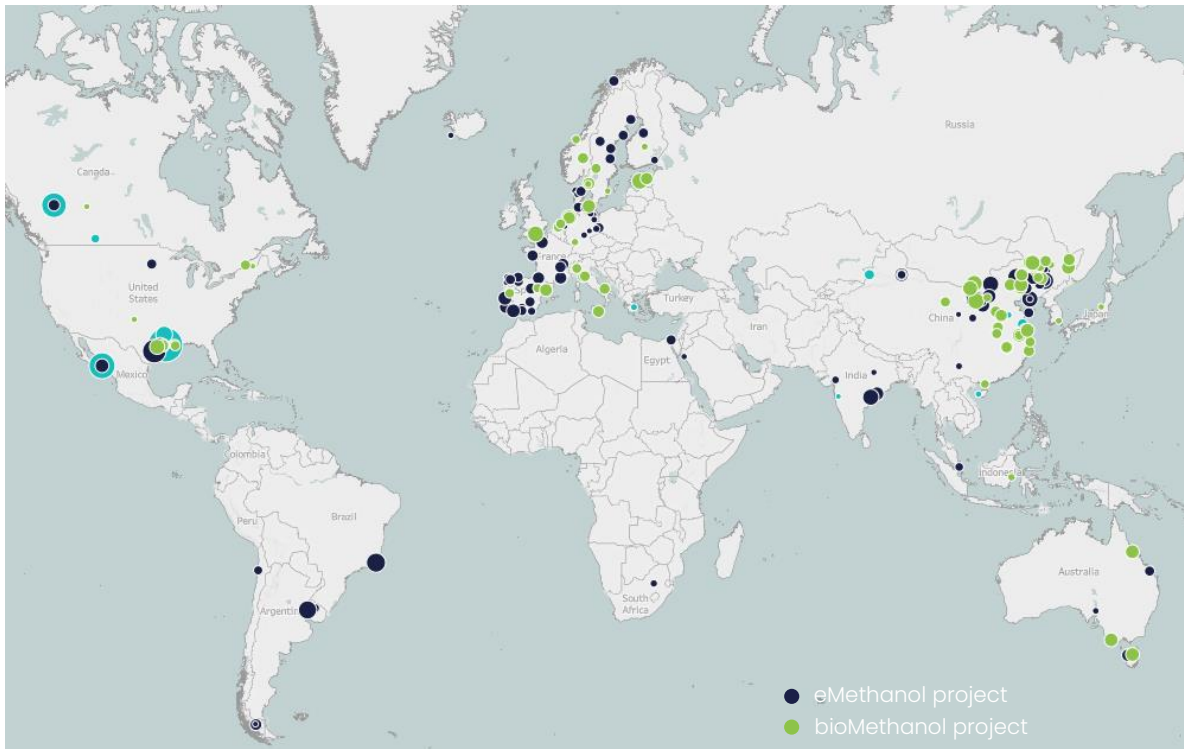


eFuels

- ✓ Climate-friendly synthetic fuels made from renewable energy sources
- ✓ Drop-in capable due to same fuel properties
- ✓ Compatible with existing infrastructure
- ✓ Produicable worldwide at favorable locations
- ✓ Unlocking the huge international potential of renewable energies
- ✓ Important key to secure Germany's energy demands

* German technology development from Saxony with worldwide patents

Renewable Methanol Market – Turning to Green Molecules



Methanol as versatile building block for chemicals and fuels



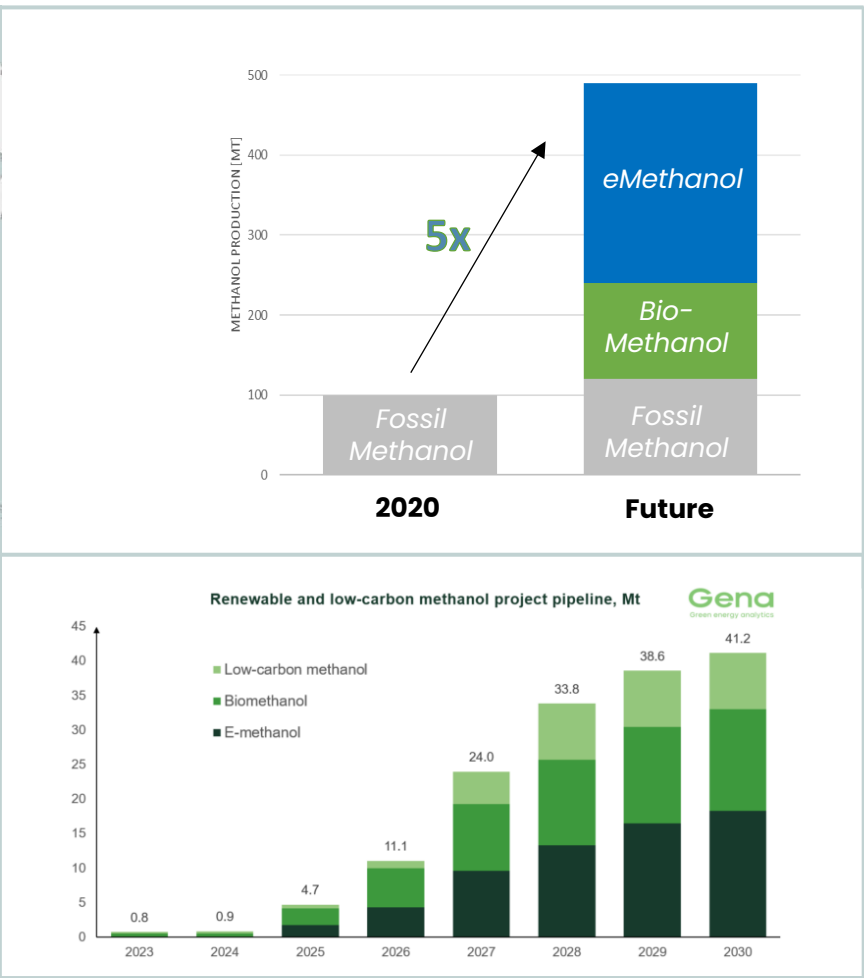
Worldwide >200 projects on renewable methanol



Fossil dominated methanol market develops to green molecules

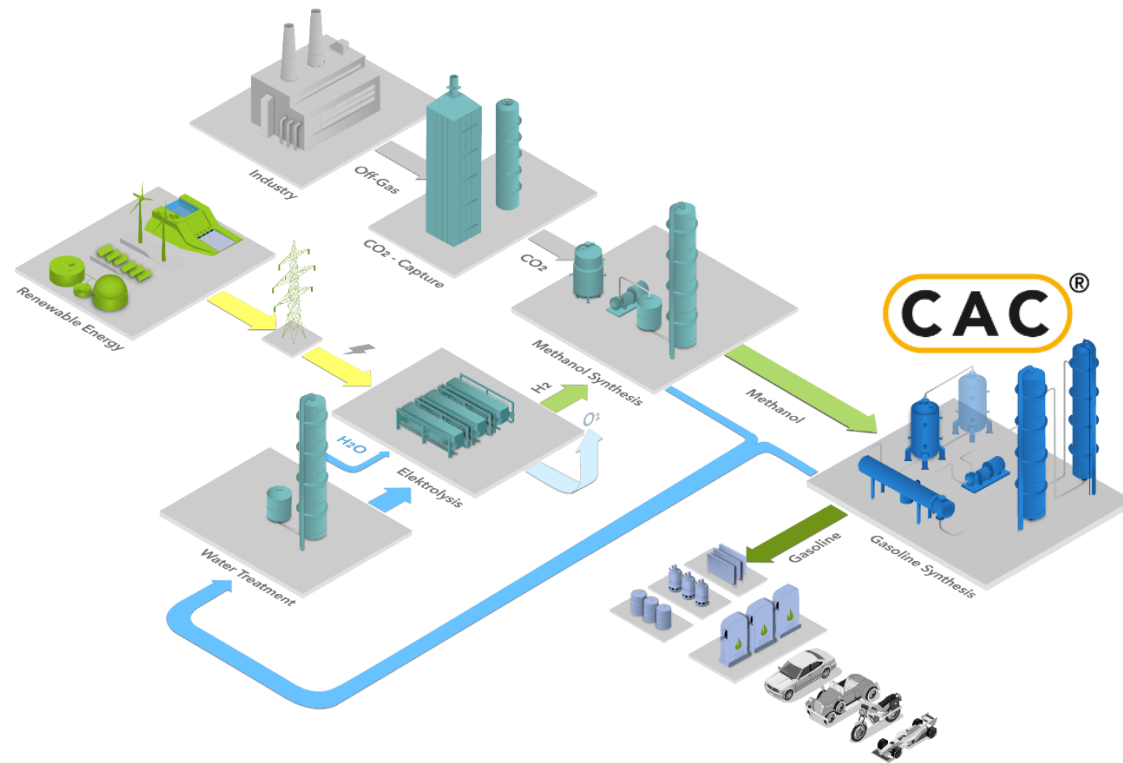


Total production capacity of >40 billion l/a (until 2030)

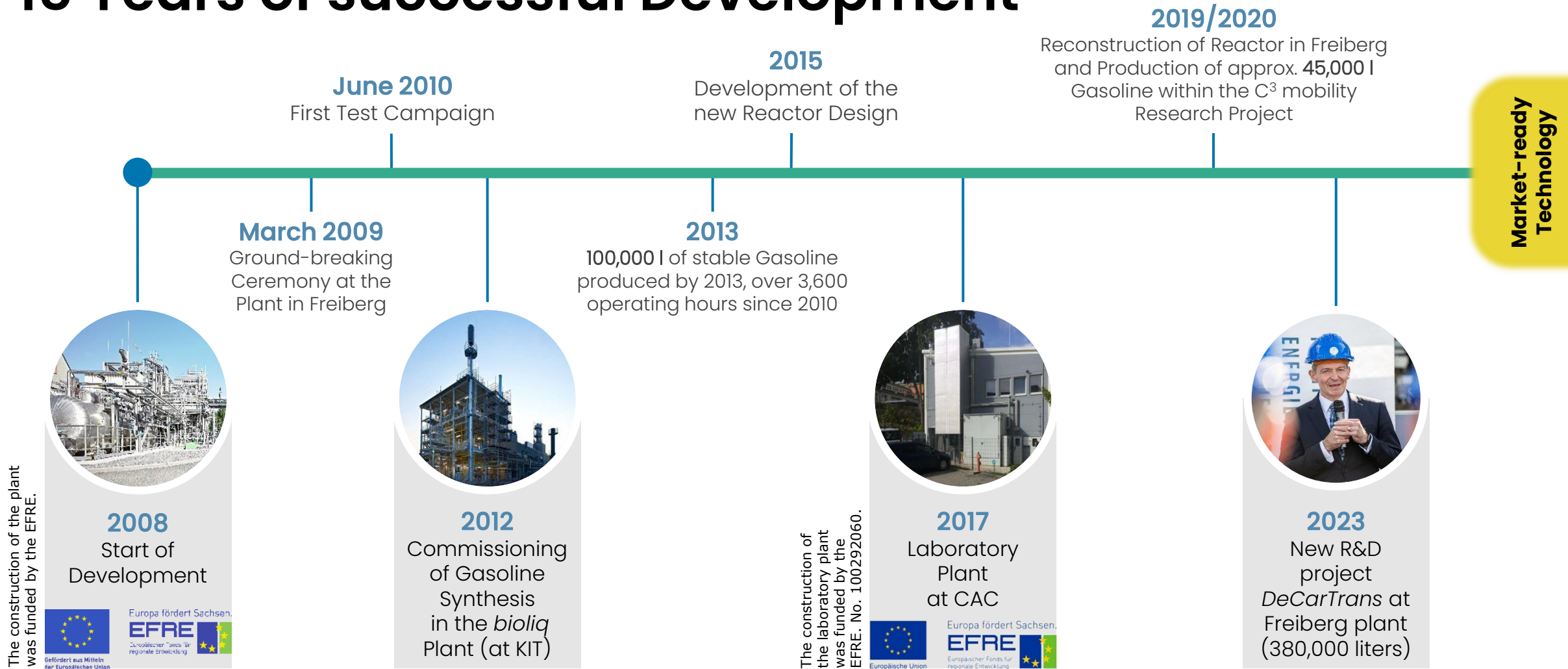


CAC METHAFUEL®

Gasoline Synthesis Technology



15 Years of successful Development



Process demonstrated in Large Scale Facility in Freiberg



Perfect Product Quality:

Synthetic Gasoline meets
European Standard **DIN EN 228**

Certified Product ready
for the market:

- registered by ECHA and thus
REACH certified



ALWAYS AN IDEA AHEAD

CAC METHAFUEL®

Gasoline Synthesis Technology by CAC

- **German Cutting-Edge Technology**
- **Innovative Reactor Design** for effective One-Step Conversion
- **Simple Upscaling** by numbering up of Reaction Tubes
- **Isothermal Operation** for continuous Production and stable Product Quality
- **Lower CAPEX due to lower Equipment Costs** compared to other MTG technologies
- **Best Gasoline Quality available on the market** among MTG processes

Proven Technology with proven Product



Summary

- MtG fuel classified as drop-in-capable by all project partners involved (conformity EN standard)
- By using MtG fuel in the entire vehicle fleet, an enormous reduction in greenhouse gas potential can be realized

Supported by:
Federal Ministry
for Economic Affairs
and Energy

on the basis of a decision
by the German Bundestag



Certified

- The synthetic Gasoline produced in DIN EN 228 Quality has been REACH¹⁾ certified.



¹⁾ REACH regulation (EG) 1907/2006 represents European chemicals regulation on the Registration, Evaluation, Authorization and restriction of Chemicals.

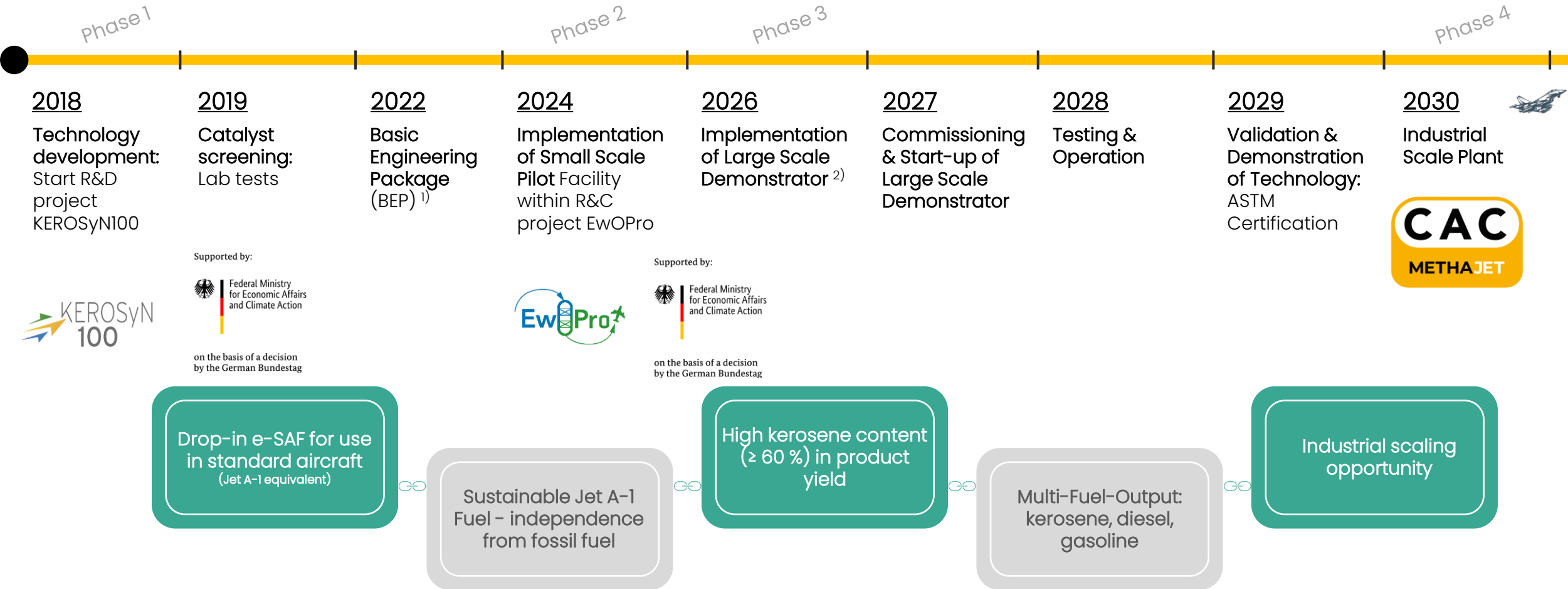
Gasoline quality fulfills Standard

Property	MTF Gasoline	DIN EN 228	
Density (at 15°C)	720-760	720-775	kg/m ³
Paraffins	50-65		Vol. %
Olefines	<7	max. 18	Vol. %
Naphthenes	6-10		Vol. %
Aromatics	26-35	max. 35	Vol. %
Benzene	0.1-0.5	max. 1	Vol. %
Durene	<0.1		Vol. %
Oxygen content	0.02-0.3	max. 2.7	Wt. %
RON	92-95*	min. 95	
MON	82-85	min. 85	
Vapor pressure	50-60	40-60	kPa
Boiling range	40-210	FBP 210	°C
Oxidation stability	1,000	min. 360	

* As blend with Ethanol (E10) min. RON 95 will be achieved!

MtX – from Gasoline to Kerosene and Diesel

Building directly on the industrial-scale know-how of CAC's methanol-to-gasoline process, transferring key reactor and process design insights into the CAC METHAJET® technology for next generation of sustainable fuels



German eFuel one

Christian Hanke

CEO German eFuel One GmbH



Lange Str. 100 - 106, 27318 Hoya



+49 (0) 1522 738 5524



chanke@gef1.de



www.gef1.de

