

# Unlocking the Potential of eFuels

## *Overcoming industrial bottlenecks in the electrification process*

**19. May 2026, Stuttgart**

THE LEADING SERVICE STATION AND CAR WASH TRADE FAIR IN EUROPE



Future Mobility Forum, 15:00 – 15:30

**Ralf Diemer**

CEO of the eFuel Alliance e.V.



# Our Members

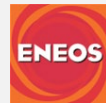
More than 170 companies, associations and consumer organizations along the eFuel value chain, including:



## Infrastructure



## Technology & Fuels



## Offtakers



# Our Mission

## Pooling shared Interests

We are a **Stakeholder-Initiative** created to foster a strong renewable fuel market within the next 2-3 years, representing the whole value chain of eFuels.

## Taking the chance

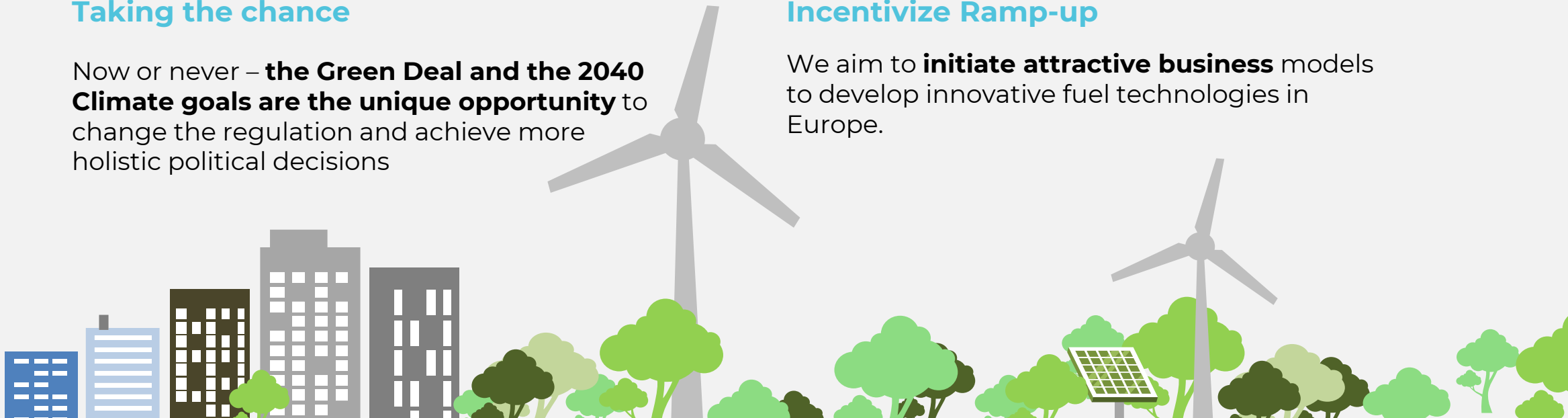
Now or never – **the Green Deal and the 2040 Climate goals are the unique opportunity** to change the regulation and achieve more holistic political decisions

## Fair competition

We stand for **fair competition** and a **level-playing field** for all relevant emission reduction solutions. We are clearly committed to more climate protection and are not fighting against any single technology.

## Incentivize Ramp-up

We aim to **initiate attractive business** models to develop innovative fuel technologies in Europe.





# Global Potential of eFuels

# Vielseitiges globales Potenzial von eFuels



## Climate-potentials



### **Decarbonisation of the hard-to-abate sectors**

Enormous potential for CO2 savings in aviation and shipping, where high demand for liquid fuels will persist beyond 2050.



### **A climate-friendly transition towards ambitious EU climate targets in road transport**

Due to industrial bottlenecks in the electrification of road transport, liquid fuels will be needed for longer



## Industry-potentials



### **Energy independence in times of geopolitical uncertainty**

Renewable fuels can be produced anywhere and offer logistical security



### **Increasing Resilience in Defence**

High fuel demand in the event of war can be met by e-fuels, thereby increasing independence from fossil fuels

# The impact assessment of the EU from 2024 for the road sector

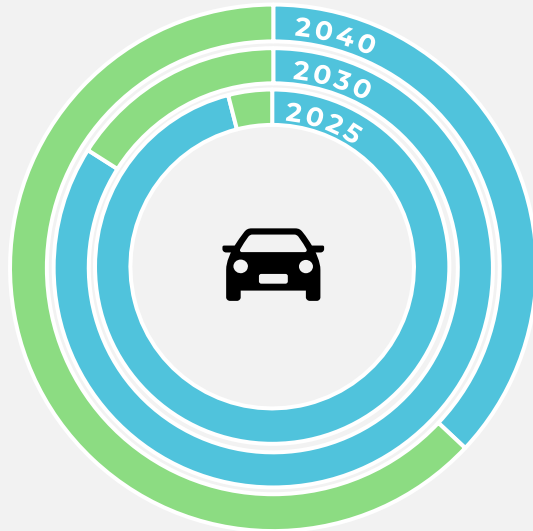
*How realistic is the promised shift towards  
alternative propulsion in the transport sector?*



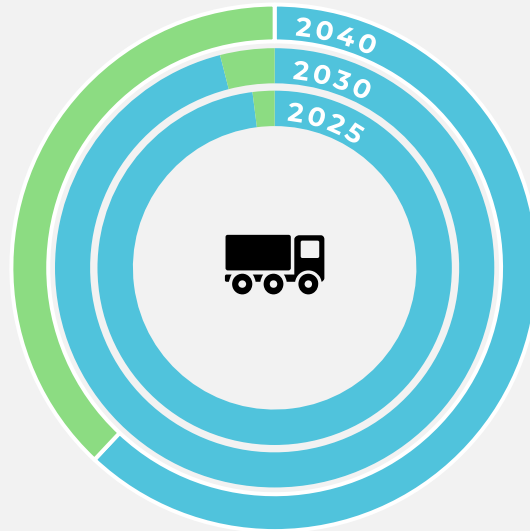


# ICE-Share of different fleets in the EU by 2040

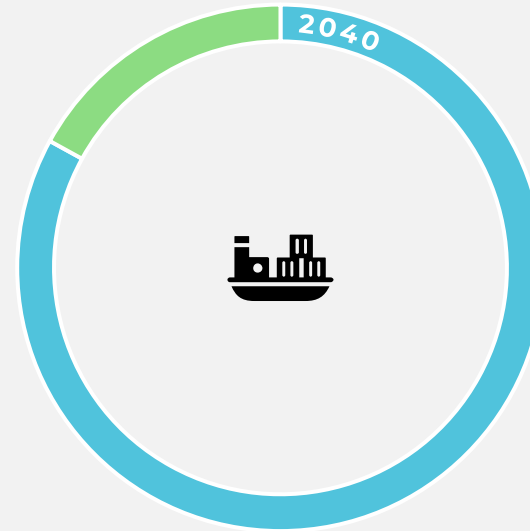
Internal combustion engine (ICE) remains relevant in all segments, efuels can drive green mobility.  
analysis derived from eu commission impact assessment 2024



**37%**



**62%**



**83%**



**99%**

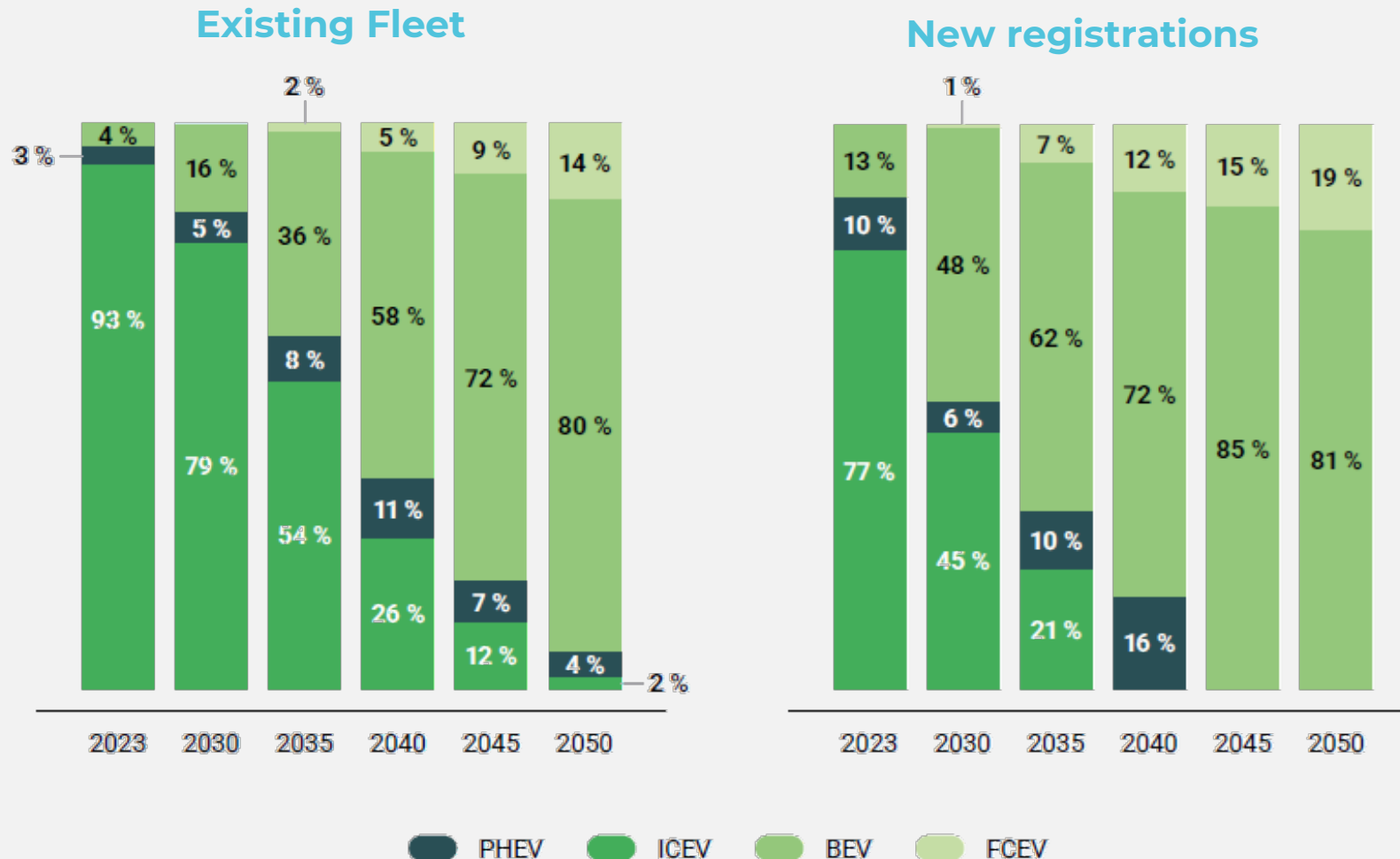
● ICE incl. PHEV ● Others (incl. BEV)

ICE includes maritime and jet engines | \* Derived from scenario 3 of European Commission's Impact Assessment Report – 2040 climate target -90% & climate neutrality 2050, Doc 3 pages 85-97

Source: Porsche Consulting fleet & CO<sub>2</sub> model; European Commission's Impact Assessment Report – 2040 climate target & climate neutrality 2050; ACEA



# Powertrain mix of passenger cars





- EU's plan: Growth in the LDV and HDV sectors to **increase five- to sevenfold** within around five years.
- By 2050, **80% and 48%** of the fleet, respectively, are to be electric vehicles.
- The expansion of BEV production is putting **pressure on the supply chain**: raw materials, battery cells, battery packs and vehicle

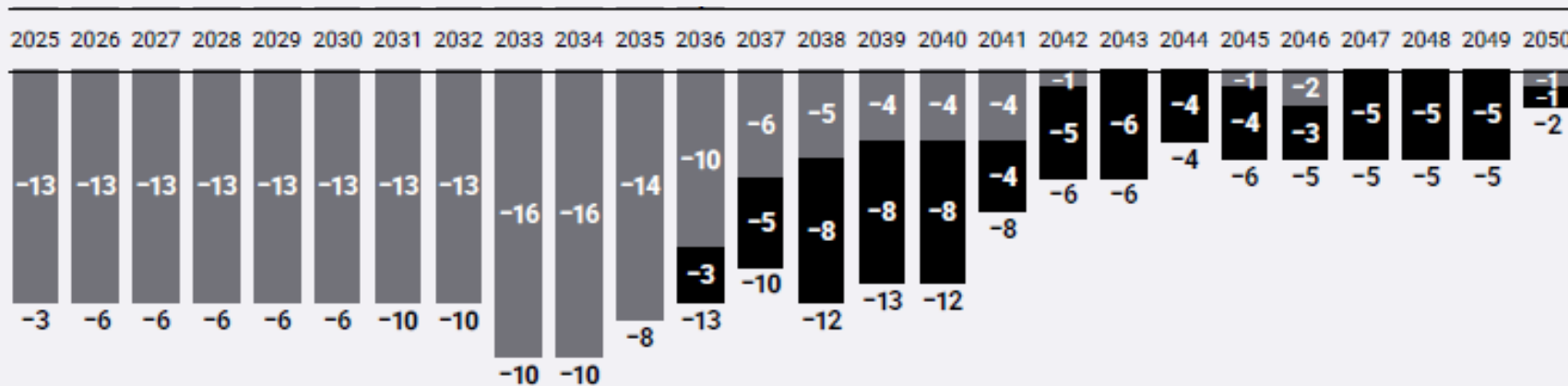




# EU scenario leady to early scrapping of vehicles



-  Natural end of life (after 16 years)
-  Premature Scrapping



## Assumptions:

- 16 Years service life for all technologies
- Constant fleet size of 209 Mio.

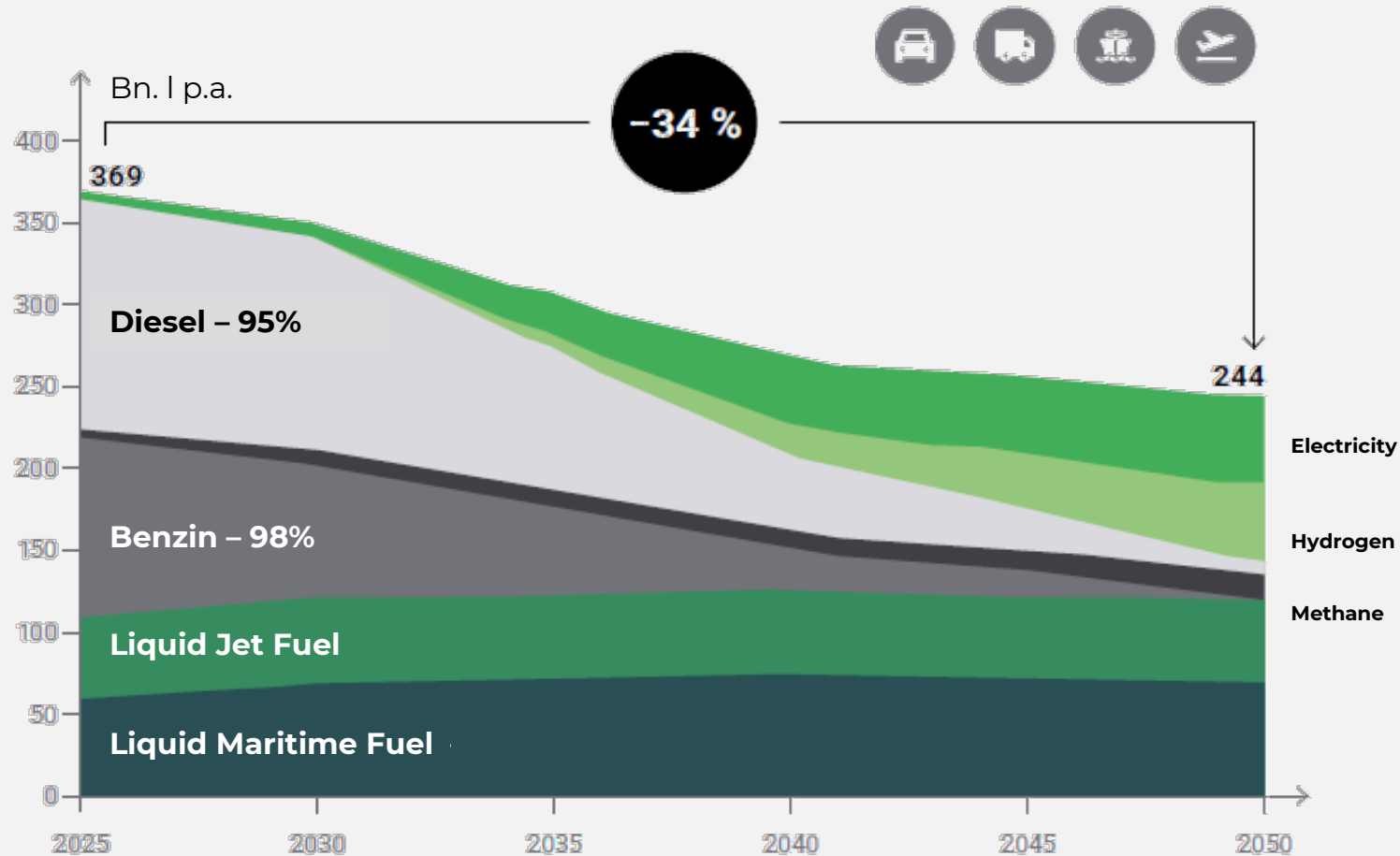
- **New ICEV registrations** remain at approximately 7 million vehicles before phasing out by 2036
- **Early scrapping from 2036** accelerates fleet turnover, requiring the scrapping of even relatively new vehicles
- **Nearly 75 million vehicles** would need to be prematurely scrapped

- Financial costs of such scrapping program would **amount to €200 bn.**

The **same investment in eFuel production** would be sufficient to finance half of the globally planned capacity for 2030 — estimated at approximately **20 billion liters of gasoline equivalent**



# Fuel demand by type according to the EU (p.a.)



Total fuel demand is projected to **decline by 34%** between 2025 and 2050 — from **369 to 244 billion liters of gasoline equivalent**

Liquid Fuels will **still account for 53%** of total energy demand across all mobility sectors in 2050

**128 billion liters of liquid fuel** must be sourced from emission-free sources such as advanced biofuels and eFuels

The background of the slide is a photograph of a lush, green landscape, possibly a valley or a hillside, with dense vegetation. The image is overlaid with a semi-transparent green filter and several large, overlapping circular shapes in various shades of green, creating a modern, abstract design.

# **An overview of expected industrial bottlenecks in electricity and battery production, H2 infrastructure and e-fuels**



# Bottleneck factors for Electrification & Hydrogen/eFuels Value Chains

## Battery production

Lithium and Nickel as short- and medium term Bottleneckfactors

## Electricity

Overload of the electricity grid as a longterm Bottleneck factor.

## Hydrogen Infrastructure

Short-term Bottleneck of facilities for producing green hydrogen.

## eFuels

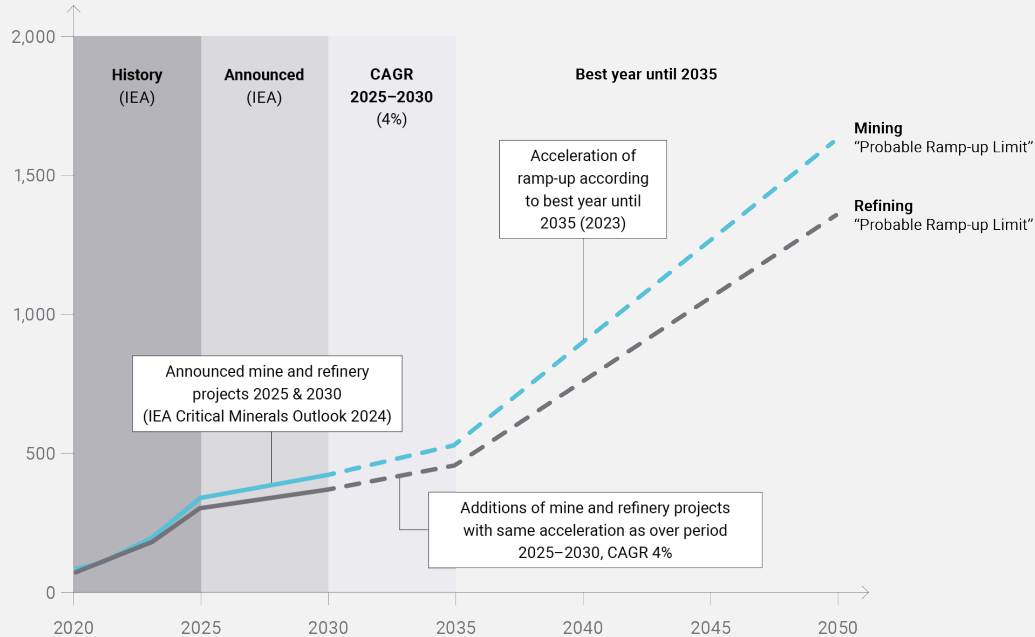
Hardly any Bottlenecks due to low demand.





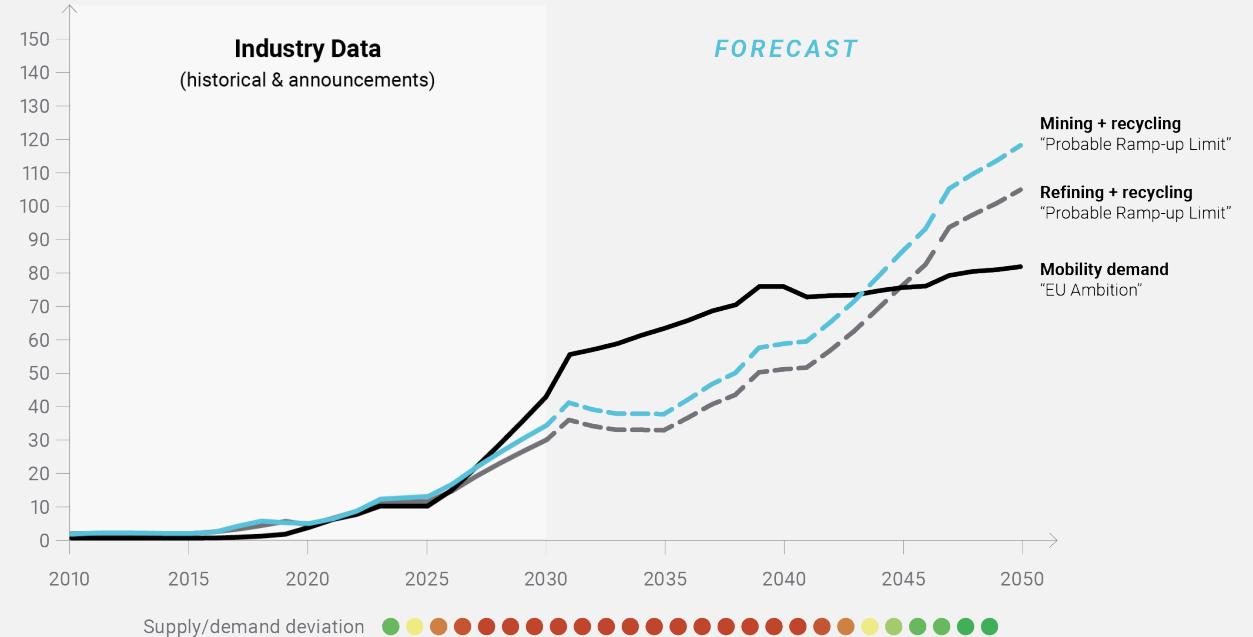
# Examples of Bottleneck Factors – Lithium

## 01 LITHIUM MINING & REFINING



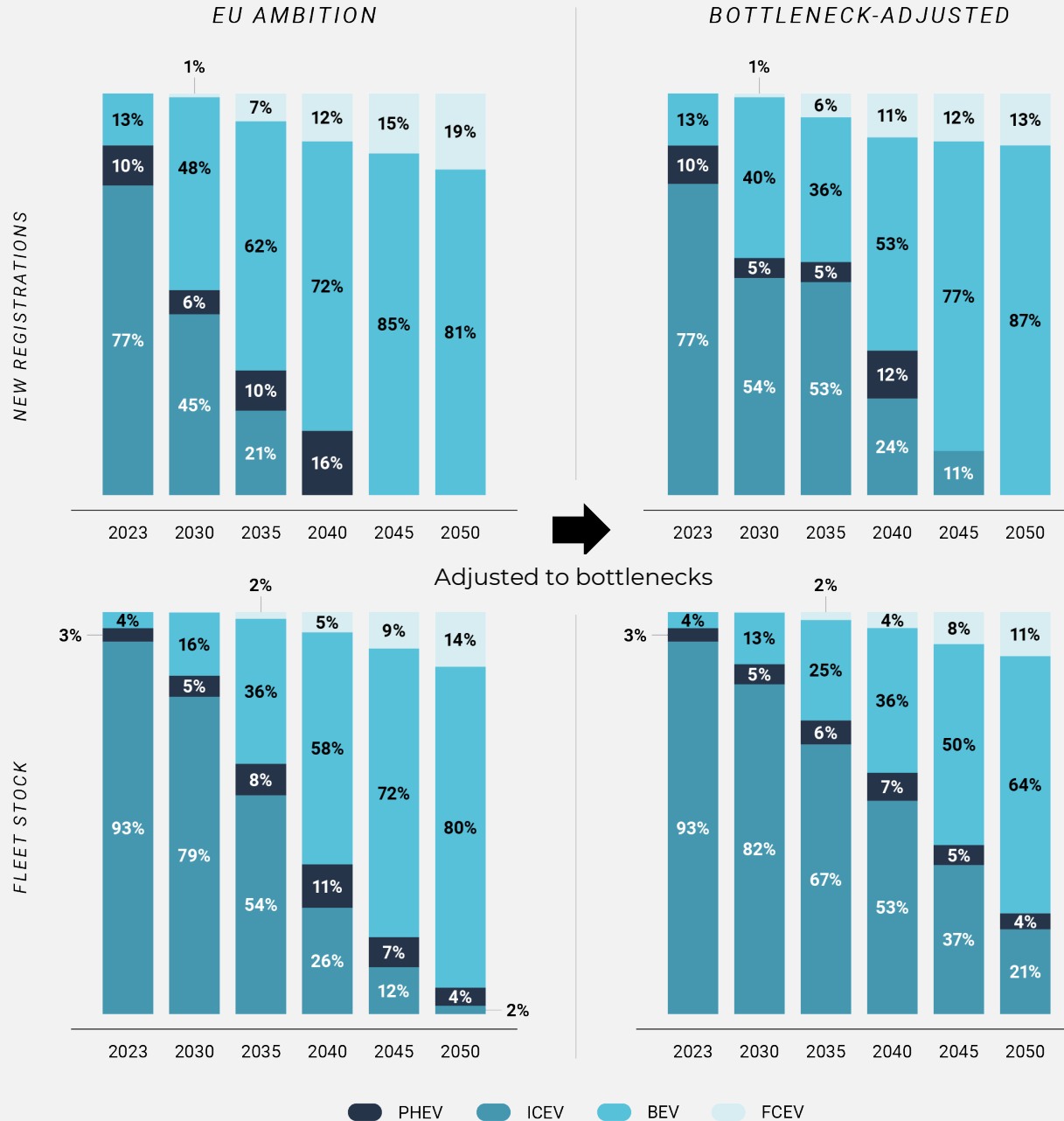
- Lithium supply (alongside nickel) was identified as the **most limiting factor** for the expansion of electric mobility
- In **2023**, IEA estimated **global lithium demand at 165 kt** (92 kt for clean technologies, 73 kt for other uses); global secondary supply estimated at **5 kt**, setting primary demand at **160 kt**
- From **2040 onwards**, recycled material will have a **significant impact**, with up to **27% secondary lithium** in new passenger cars, trucks, and buses

## 01 LITHIUM MINING & REFINING



### Bottleneck Analysis

- Lithium demand is expected to **surge between 2025 and 2032**, driven by ambitious BEV policies
- From **2027 onwards**, a supply bottleneck emerges under the "Probable Ramp-up Limit" scenario, with an average annual **supply deficit of ~30%**
- Bottlenecks are expected to **ease by 2047**, after which BEV registrations could potentially exceed the "EU Ambition" scenario targets



## Powertrain adjusted scenario

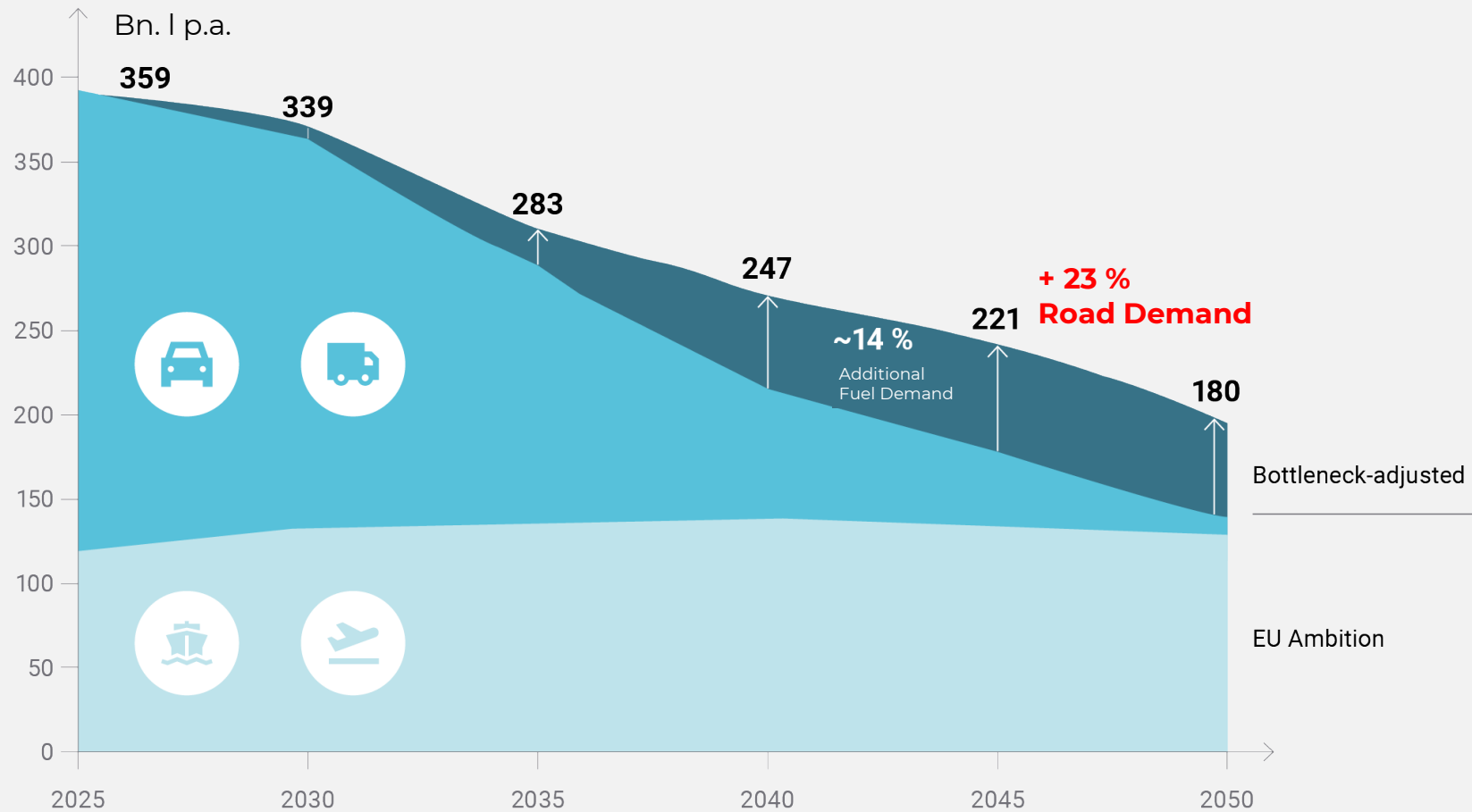
Industrial Bottlenecks will lead to a **different Powertrain mix**

The **EU ambitions meet industrial bottlenecks**. The powertrain transformation will be delayed.

According to this scenario, **around 60% of vehicles will still rely on liquid fuels** in 2040, instead of 37%.

Even after 2050, **a quarter of vehicles will still have an internal combustion engine**.

# Emerging remaining liquid fuel demand



The whole demand for fuel will be 23% higher than projected in the EU Ambition Scenario

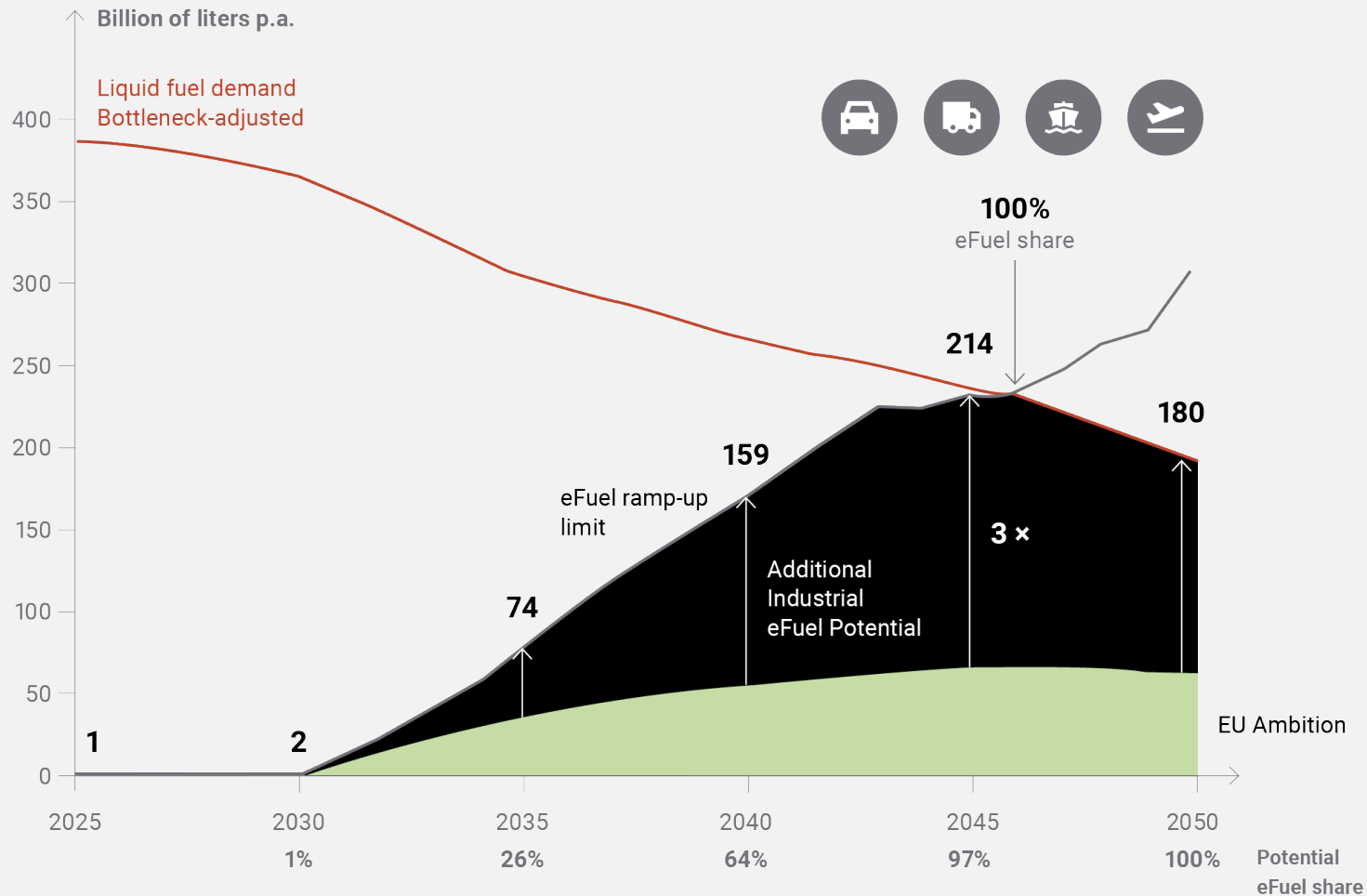
Industrial Bottlenecks will only start to relax beyond 2045

# The potential of synthetic fuels to bridge industrial bottlenecks



# Ambitious eFuels Ramp-Up

eFuels could possibly cover 100% of the liquid fuel demand by 2046



Share 2050

~69 Bn. l

eMaritime

~23 Bn. l

eGasoline

~38 Bn. l

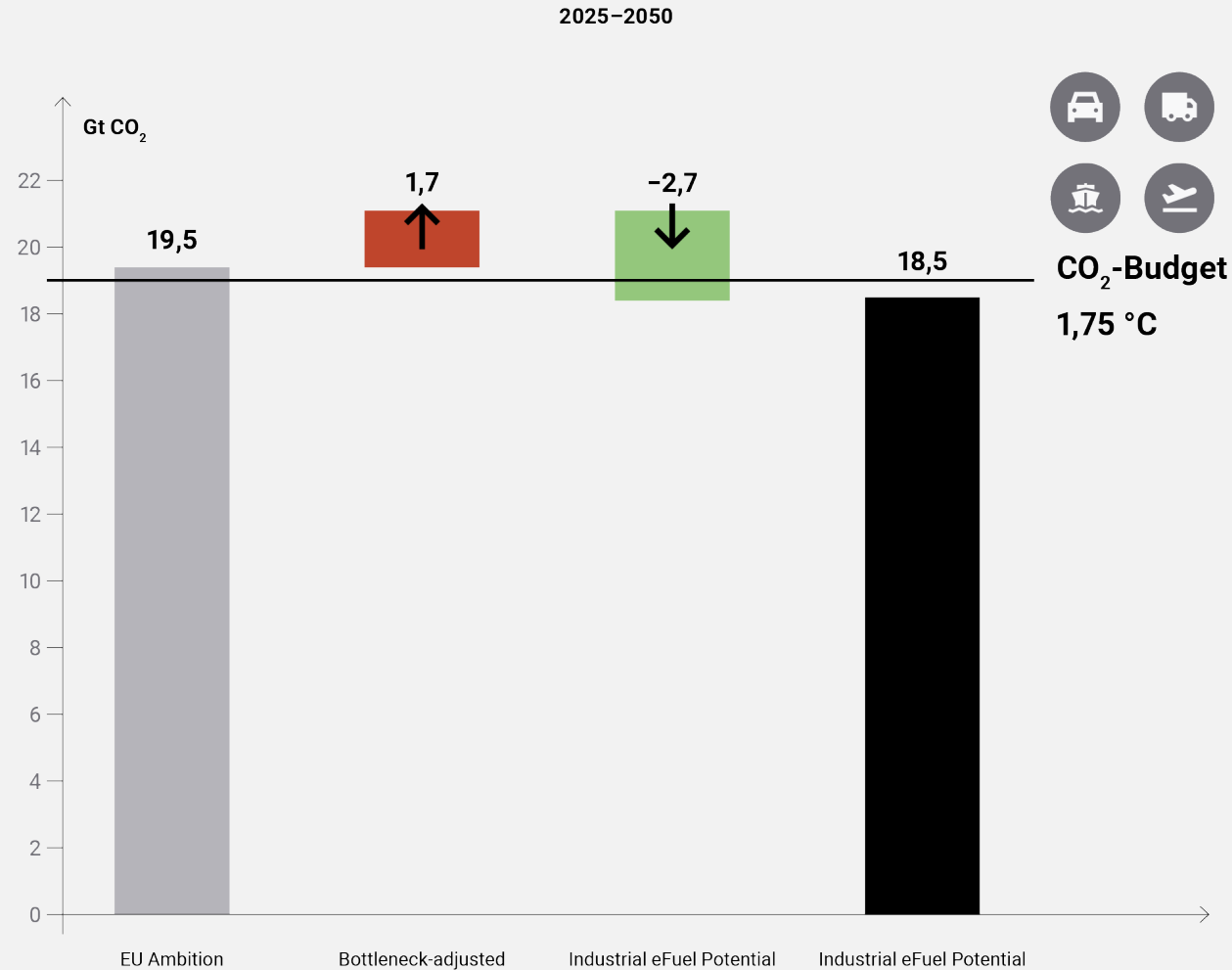
eDiesel

~49 Bn. l

eSAF



# Cumulated Emissions – EU Mobility



Adhering to the 1.75° C goal is possible

## Three Scenarios:

1. **EU-Ambition Scenario** → Failing to meet CO<sub>2</sub>-Budget
2. **Bottleneck-adjusted scenario** → Failing to meet CO<sub>2</sub>-Budget
3. **Industrial eFuel Potential Scenario** → only scenario to stay within the remaining CO<sub>2</sub> Budget to achieve 1.75° C goal

In the global database,  
we keep track of  
announced eFuels  
projects, their production  
capacities and investment  
status

**~300**

projects

**~20 bn L<sup>1</sup>**

capacity  
2030

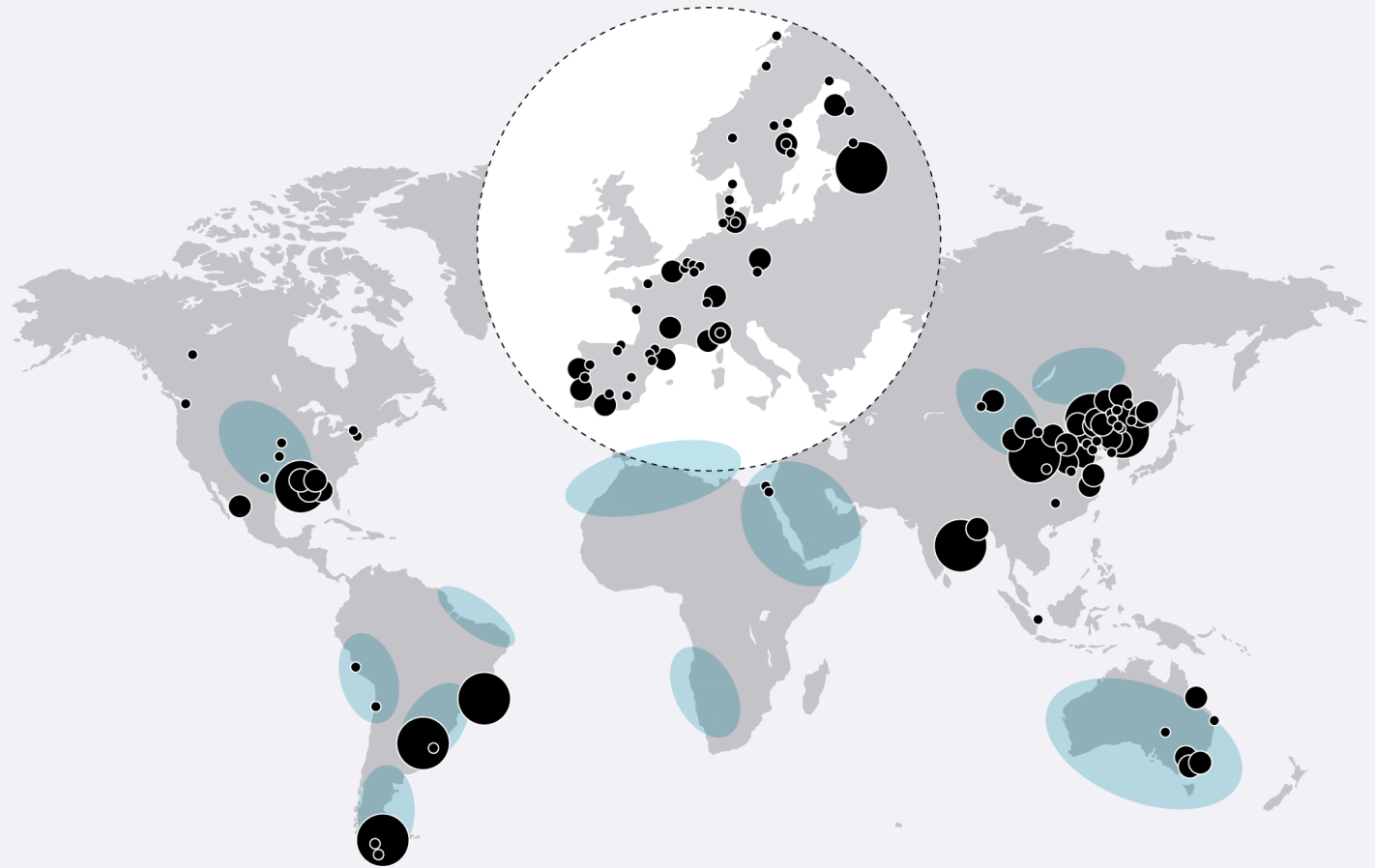
**6**

eFuels  
types

**x10**

Growth  
2025-2030

Source: Porsche Consulting synfuels project tracker; Desk research; IEA Hydrogen Database; VW Group Innovation; eFuel Alliance data; Methanol Institute Database



Region with high scaling potential

Capacity >30 million l gasoline eq./year

>120 million l gasoline eq./year

>300 million l gasoline eq./year

## 2030 eFuels projects' capacities

IC  
INERATEC

Aalborg  
Forsyning

∞ INFINIUM™

ABEL  
ENERGY

Liquid Wind

Arcadia  
energy

MADOGWA

TOKYO GAS

CRRC

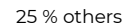
Nordic  
Electrofuel

Ørsted

SPIC

SunGas  
RENEWABLES™

Phelan  
Green



Source: Porsche Consulting synfuels project tracker; Desk research; IEA Hydrogen Database; VW Group Innovation; eFuel Alliance data





# Announced eFuel Capacities for 2030

eFuels projects for 2030 are still in early stage, key challenge is financing & regulatory uncertainty

Share of  
eFuels capacity

4 %  
Status  
unknown



76%  
Concept/Feasibility



14%  
FEED<sup>1</sup>



6%  
FID\*/Construction



<0.1 %  
Operation

Project execution  
likelihood



94%

VERY HIGH

6%

**Final Investment  
Decision**

Capacities based on official announcements, including data by Volkswagen China eFuels projects analysis; eAmmonia & eMethanol will also supply other sectors; eAmmonia excluded from deep dive as mainly used in chemical industry

Source: Porsche Consulting synfuels project tracker; Desk research; IEA Hydrogen Database; VW Group Innovation; eFuel Alliance data

**Why are synthetic fuels becoming increasingly important in the defence sector?**



# Increasing Resilience – eFuels in Defence

eFuels have great mitigation potential to overcome strong supply chain limitations, as well as facing new realities with wars becoming closer.

## Emerging Bottlenecks in fuel supply security in 2026

1. Crude Oil Import dependence
2. Refining capacity in Europe is decreasing (+ unequally distributed across Europe)
3. Inadequate network for fuel distribution, especially in Eastern Europe
4. Insufficient storage possibilities

**Challenges to maintain both fossil and sustainable fuel supply chains in the energy transition**



### Fuel Logistics in war situations

- On average, a **soldier requires 20-60 litres per day** (average of all branches of armed forces)
- Example: **60% of all killed and wounded NATO forces** in Afghanistan are concentrated around fuel logistics<sub>1</sub>



### Resilient Supply

- Independent PtX technologies have fewer contact points with **critical supply chains**
  - No need of being connected to public electrical grid
  - No need of any special feedstocks other than water and CO<sub>2</sub>
  - Free choice of location of production



### Efficient usage of excess energy

- Expected **abundance of renewable energy** in Europe (Solar/Wind)
- E.g. in Denmark; in 2020 already 1,463 GWh of electrical energy in Denmark was lost due to grid limitations → eFuels offer storage potential
- Dampen effects of supply chains limitations with eFuel supply from excess energy

<sub>1</sub>NATO Conference on Operational Energy 04-2023, Major General Wilfred Rietdisk



# Using the Potential

**Adjustment of restrictive regulations to incentivize investment**





# Regulative framework for eFuels in the EU



## CO2 standards for new cars and trucks

The Commission's proposal of December 2025 provides for a quota of just 3% for renewable fuels in 2035. This is not enough to incentivize investment.

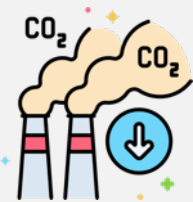
→ See here our [Position](#)



## Renewable Energy Directive (REDIII)

The current targets for 2030 are too low and do not go beyond 2030. The production criteria for e-fuels need to be revised in a pragmatic manner. RED IV is due to start in 2026

→ See here our [Position](#)



## EU Emissions Trading System

Neither the EU ETSI nor the EU ETSII should be called into question. Revenue from aviation and shipping should be used to offset incremental costs

→ See here our [Position](#)



## FuelEU Maritime

FuelEU Maritime is essential, particularly in the wake of the failed international negotiations at IMO level. However, non-binding and unambitious quotas do little to stimulate the market

→ See here our [Position](#)



## ReFuelEU Aviation

Set targets for sustainable aviation fuels by 2050. 1.2% eFuels in 2030/2031. It is very important that the eSAF targets are maintained. At the same time, airlines should be supported through the further development of SAF certificates

→ See here our [Position](#)



## Energy Taxation Directive

Energy taxation is the only 'Green Deal' regulation that has not been successfully finalised. A low tax rate on e-fuels, as proposed by the European Commission, would be a major economic lever. A review of the ETD is long overdue and urgently needed

→ See here our [Position](#)

# eFuel Alliance

A strong alliance for carbon-neutral renewable fuels to fight climate change

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