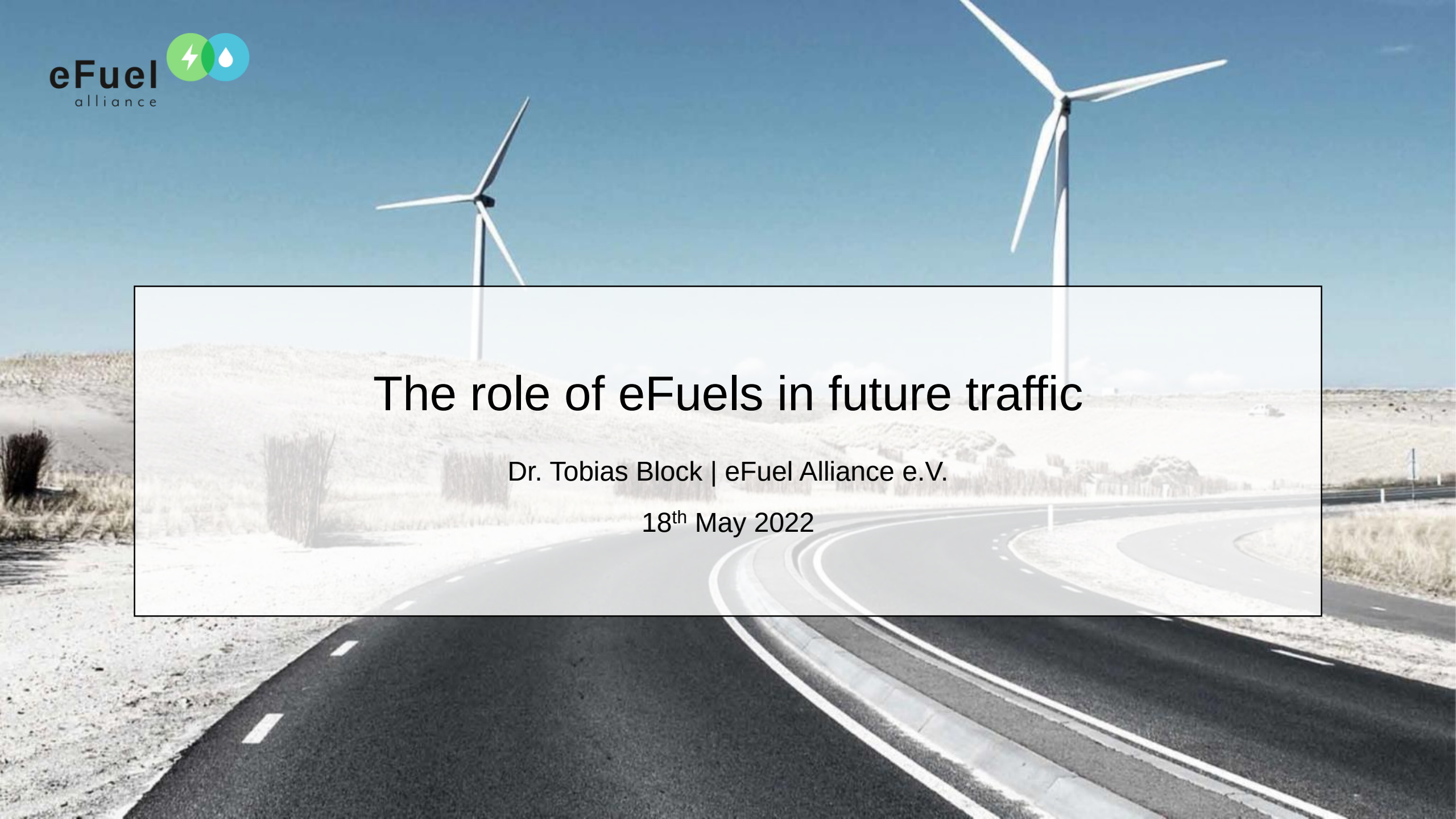


The role of eFuels in future traffic

Dr. Tobias Block | eFuel Alliance e.V.

18th May 2022

Who we are

eFuel Alliance – Who we are and what we stand for

- We are a **stakeholder initiative established** to foster a strong renewable fuel market within the next 2-3 years. We currently represent companies and associations **along the whole value chain of eFuels**. We are clearly committed to greater climate protection and a strong advocate of a **multi-solution approach**.
- Now or never – the **Green Deal is the unique opportunity** to change the regulation and achieve more holistic political decisions.

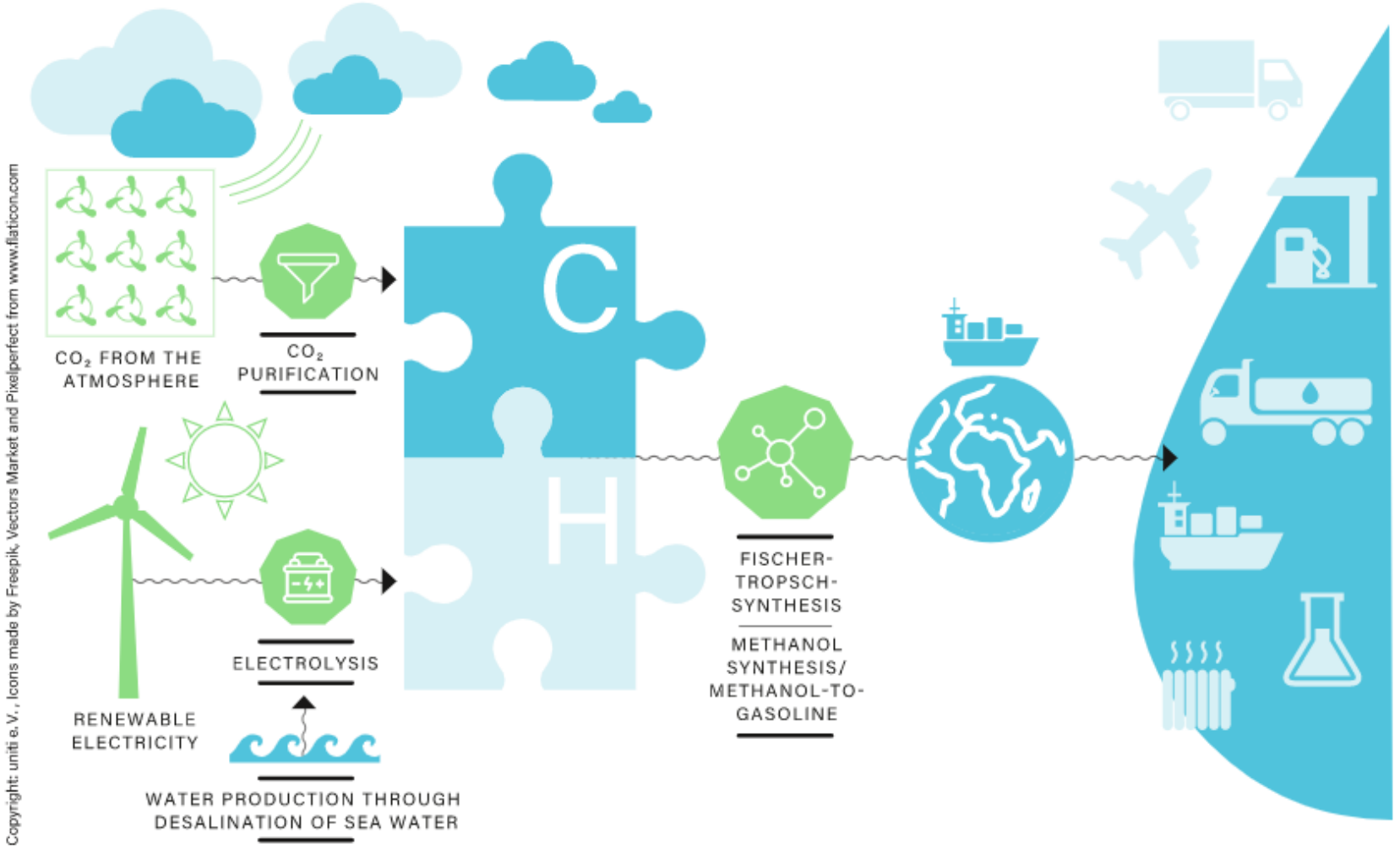
OUR MEMBERS – MORE THAN 150 COMPANIES, INCLUDING:

OUR POLITICAL MISSION:

1. Account for renewable fuels in the **revision of the CO2 standards of new cars, vans and trucks**
2. Reflect the climate benefit of renewable fuels in the **revision of the European energy taxation**
3. Press for a more ambitious **revision of the renewable energy directive / Fuel Quality Directive**

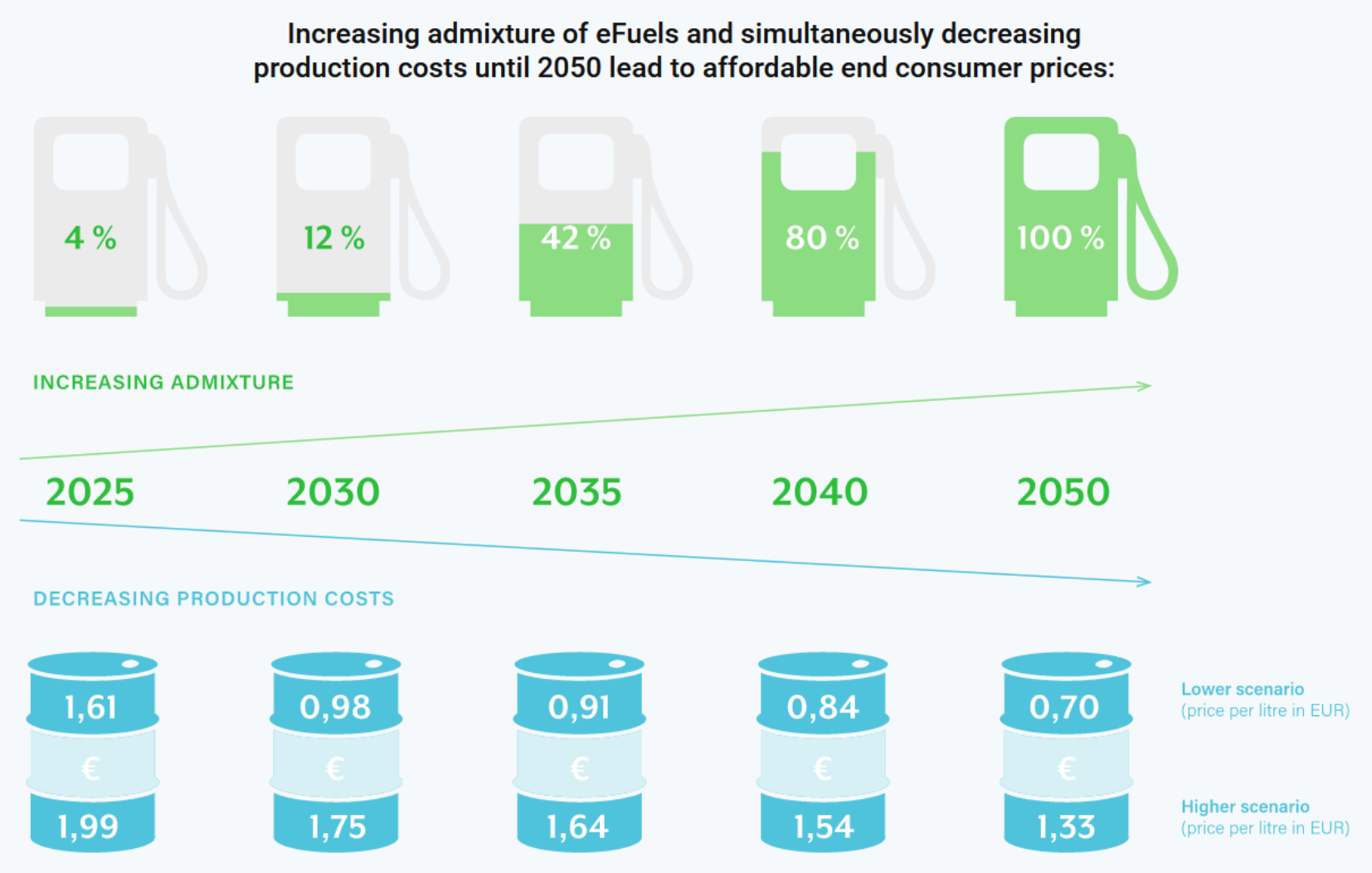
What are eFuels?

How are eFuels produced?



- Extraction of hydrogen from water by electrolysis using renewable electricity
- Hydrogen and CO2, directly captured from the atmosphere, are converted into a liquid energy carrier, by using e.g. Fischer-Tropsch synthesis.
- Power-to-X (PtX): Renewable electricity is converted into a synthetic, multi-purpose fuel with drop-in ability
- Climate-neutral process, no additional greenhouse gases are produced

Affordable mobility must be maintained



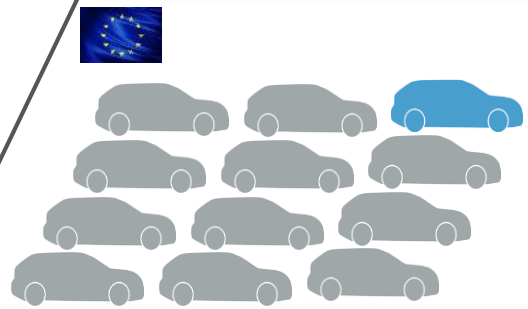
- Economies of scale will reduce the production cost of eFuels …
- … while in the meantime the share of blending is steadily increased.
- According to a study by Prognos AG, the Fraunhofer Institute UMSICHT and DBFZ, the production costs are assumed to be be less than EUR 1 per litre in 2050.
- Climate neutrality thus remains affordable for everyone

eFuels as an optimal complement to electric mobility

FORECASTED DIVISION ALONG THE ENERGY DEMAND IN EU-27 IN 2030:

Electrification. Needs: Charging infrastructure

Necessity of gaseous or liquid renewable fuel. Needs: Technology ramp-up



Total fleet: ~ 240 Mio. cars
New registered cars: ~. 12 Mio. cars p.a

Optimistic calculation:

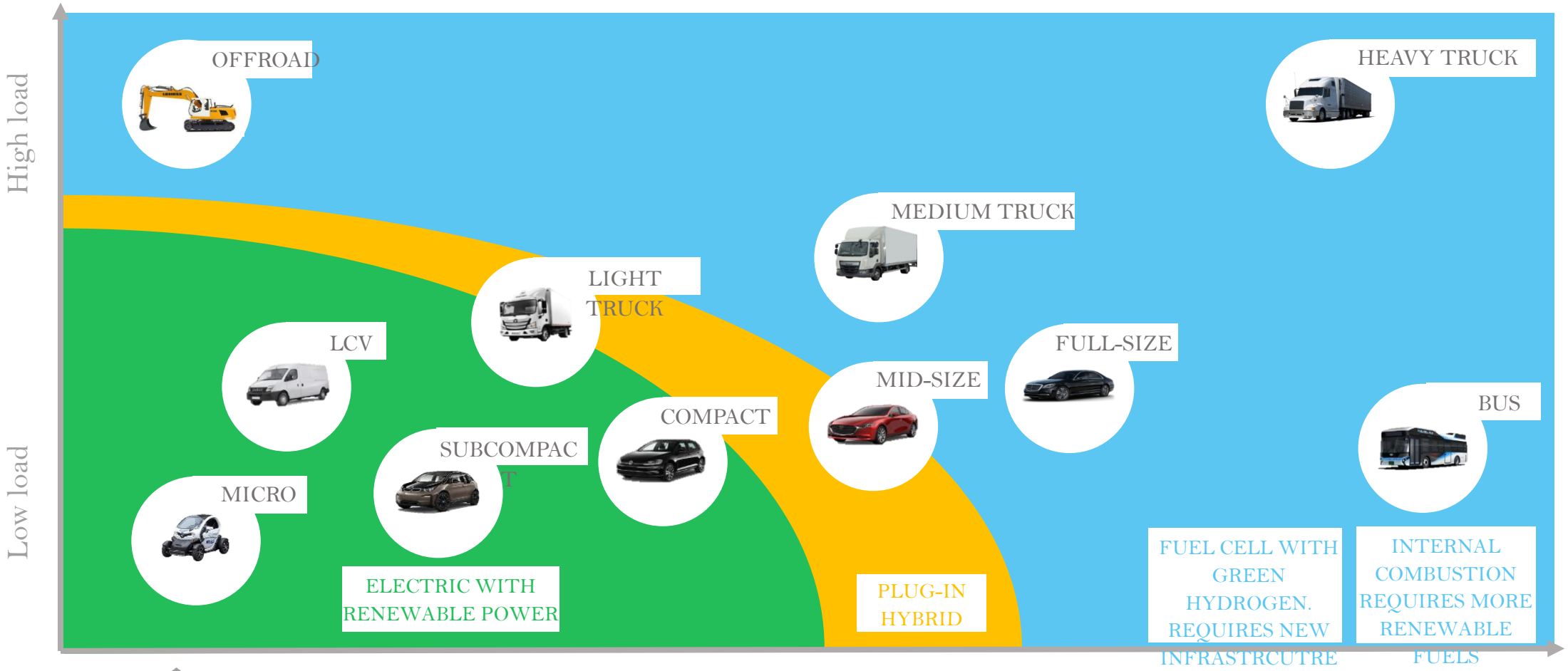
Upon now: **Every second** new registered vehicle and from 2035 every vehicle is a **BEV** in the EU

- **Max. 2.5 %** of the total fleet stock are replaced per year
- Only after 2050 the entire fleet stock consists of BEVs

A complete and timely transition of the transport sector requires the use of renewable fuels in addition to electrification

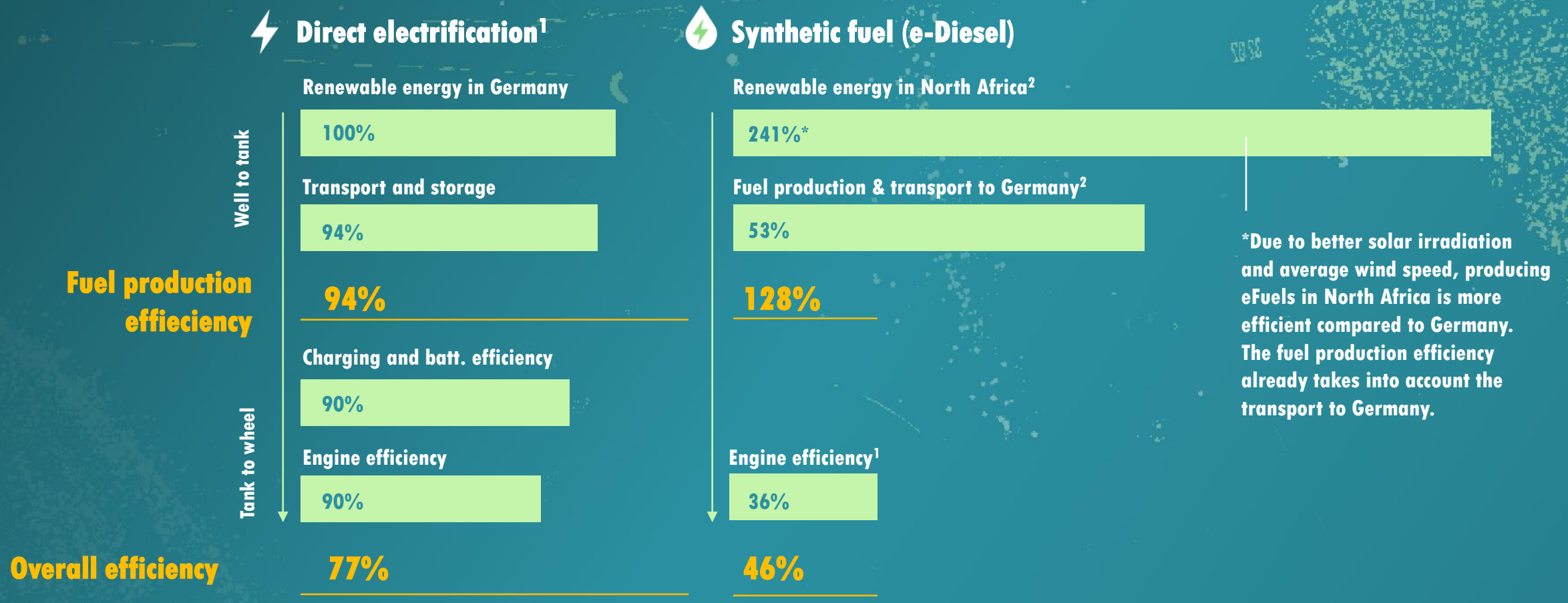
In principle different use cases require a powertrain mix

THE GREATER THE REQUIRED PAYLOAD AND RANGE – THE LARGER THE BATTERY SIZE – THE GREATER THE BATTERY COSTS – THE GREATER THE INFRASTRUCTURE EXPANSION – THE GREATER THE ECOLOGICAL FOOTPRINT.



Efficiency of direct electrification and imported eFuels compared

eFuel alliance



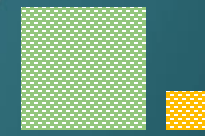
*Due to better solar irradiation and average wind speed, producing eFuels in North Africa is more efficient compared to Germany. The fuel production efficiency already takes into account the transport to Germany.

The difference in the overall efficiency is a factor of 1.7 and not a factor of 5-7 as claimed by other publications.

Sources: (1) transportenvironment.org; (2) Frontier Economics

Is there enough renewable energy to produce eFuels?

Theoretically, in countries with ideal conditions for solar and wind power, enough renewable energy could be generated to meet the entire energy demand of Europe and the world. Let's solve global warming together with global solutions.



Area required to meet primary energy demand worldwide in 2018: 800 x 800 km

Area required to meet primary energy demand in the EU in 2018: 250 x 250 km

Global fuels for global challenges

Source: Own calculations based on DLR

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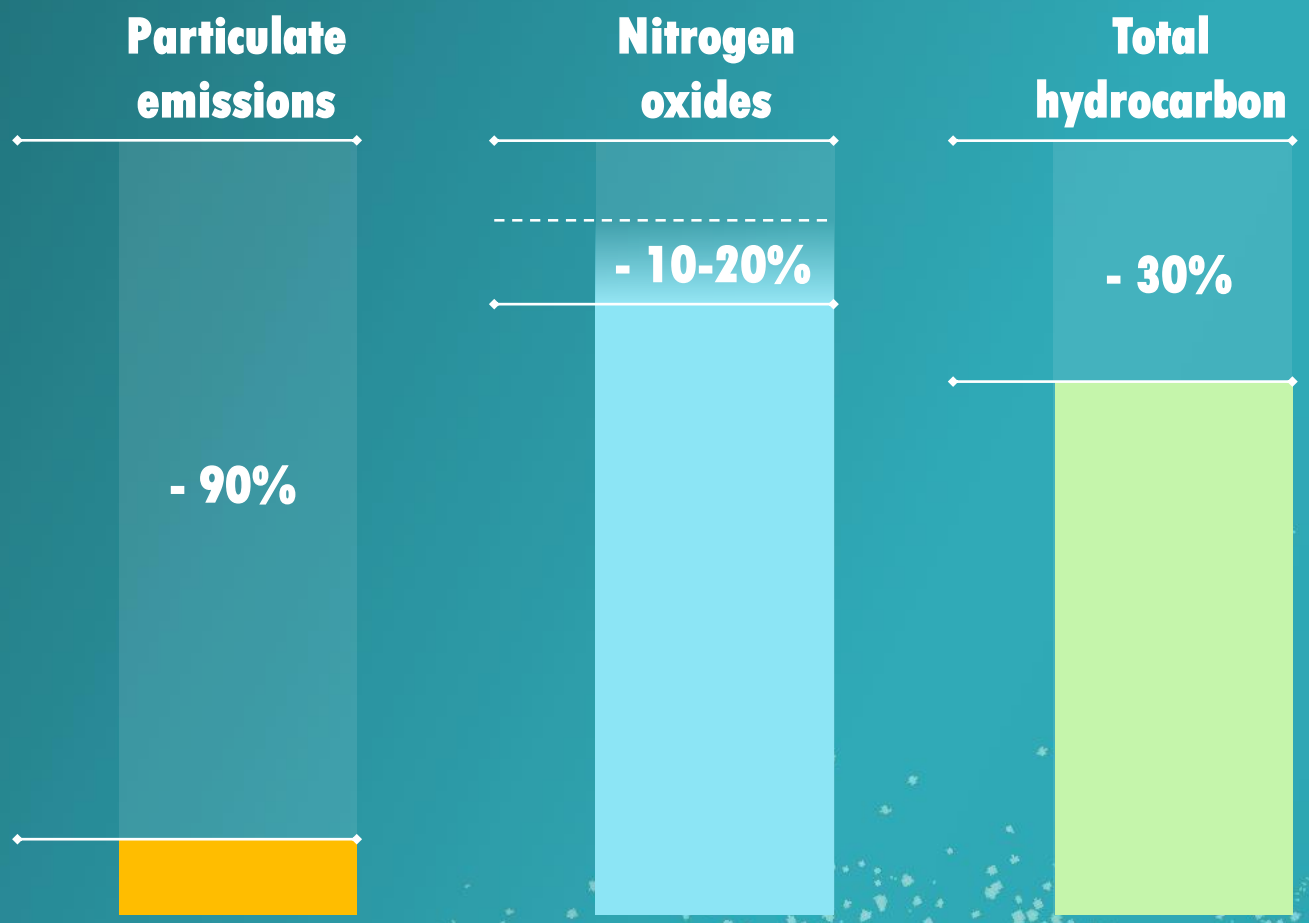
Less emissions with synthetic fuels

Tests compared engine powered by eFuels to fossil fuel



Significant reductions to criteria emissions were obtained with synthetic fuel formulations, when compared to an existing European market fuel.

Reductions of more than 90% in particulate emissions, 10 to 20% in nitrogen oxides emissions, and up to 30% in total hydrocarbon emissions were achieved.

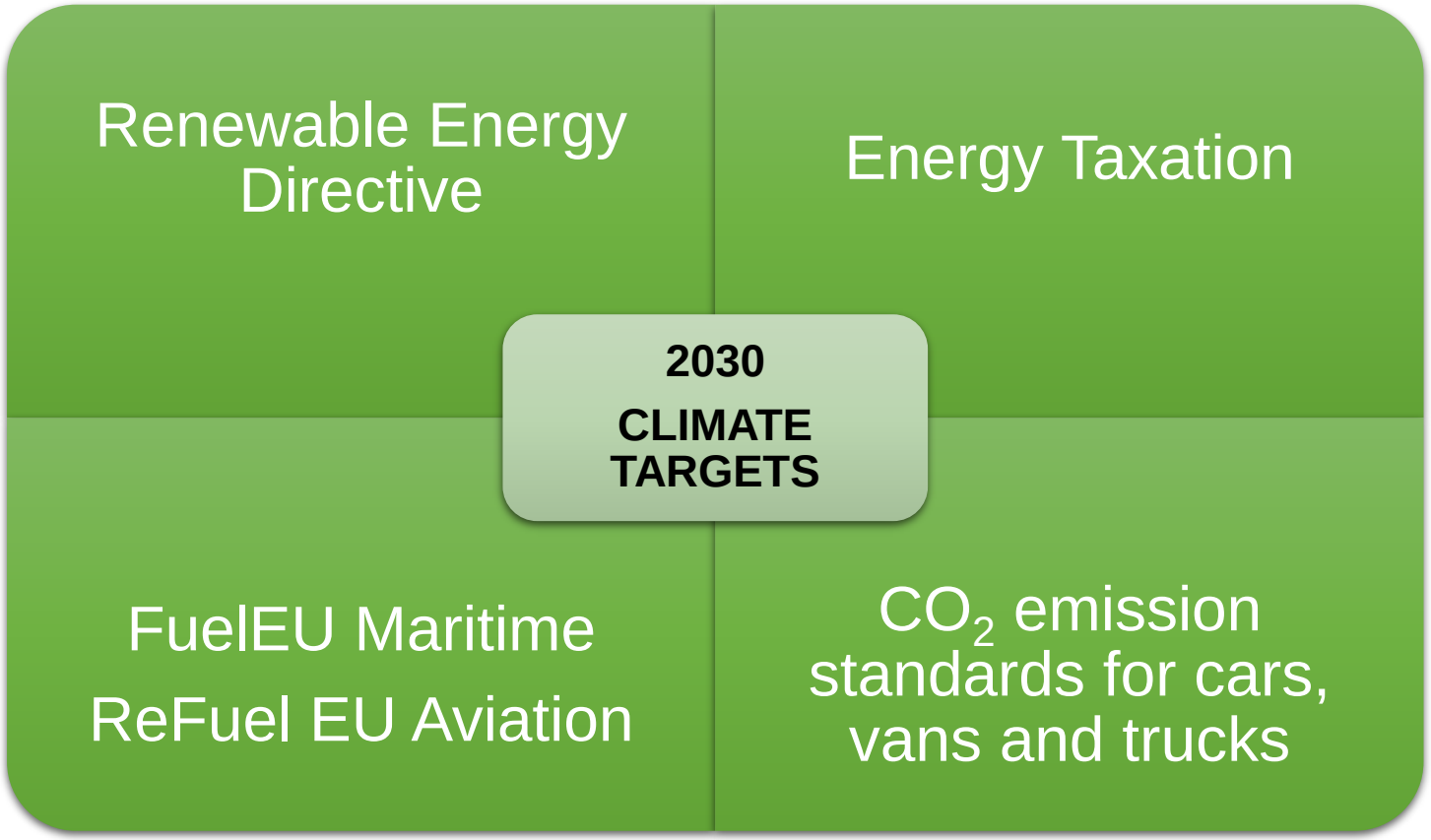
Quelle: saemobilus.sae.org

What kind of political framework is needed?

What are the most important legislations for eFuels?

EUROPEAN GREEN DEAL

Reduction of GHG emissions by at least 55% by 2030



What are the most important legislations for eFuels?

EUROPEAN GREEN DEAL

Reduction of GHG emissions by at least 55% by 2030

2030 CLIMATE TARGETS

RED

At least 20 % GHG quota in the transport sector

Sub-target of 5 % for eFuels for all sectors by 2030

ETD

Fiscal consideration of the contribution to climate protection

Based on the CO2 footprint

Maritim/Aviation

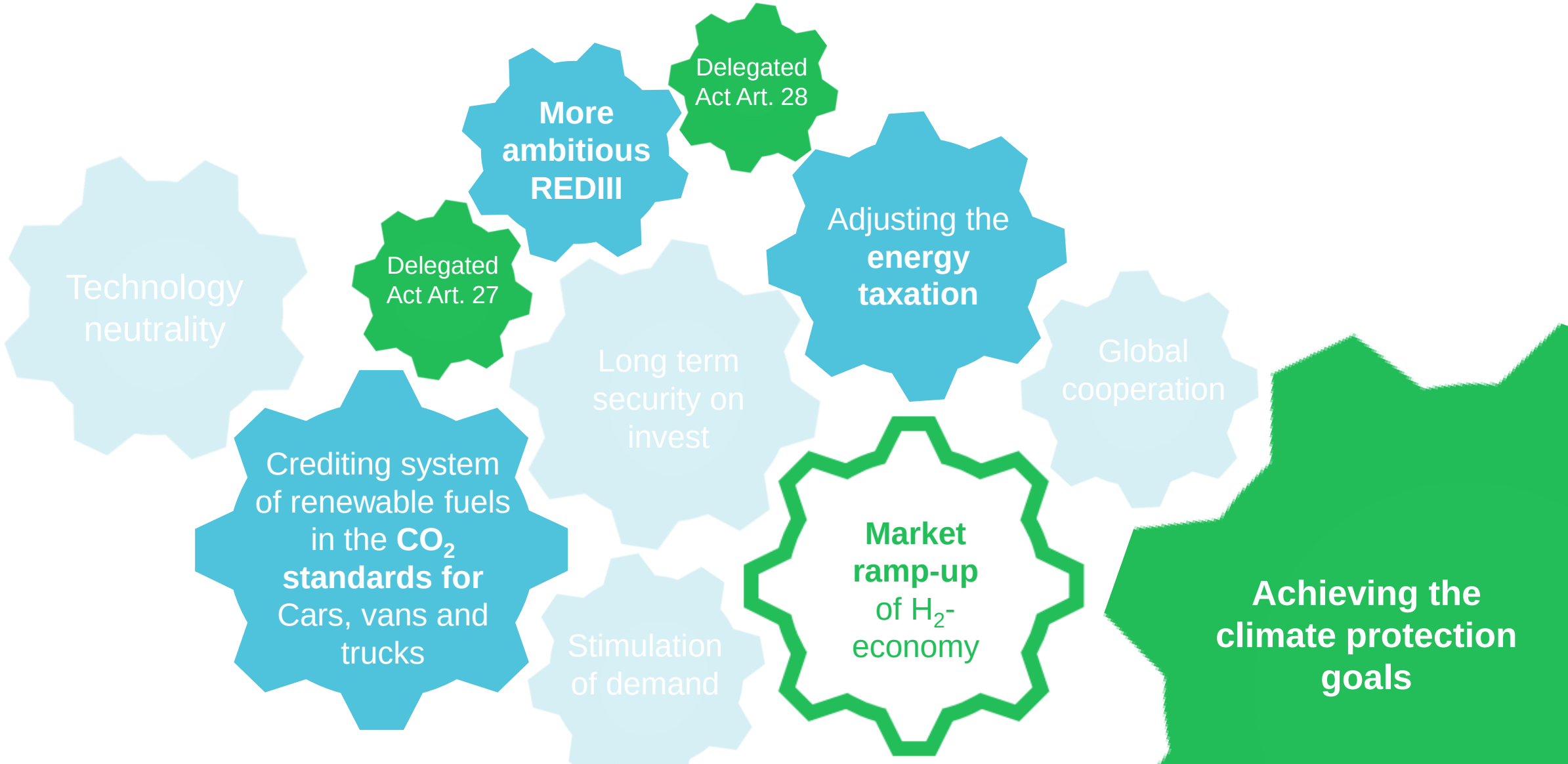
Additional proportions of fuels required beyond the percentages specified in the RED.

CO2 Standards

Introduce a voluntary crediting system

Climate-neutral fuels should be credited in a complementary manner

The moving parts policymakers need to turn



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