



# The Use of Climate Friendly Fuels in the existing Vehicle Fleet



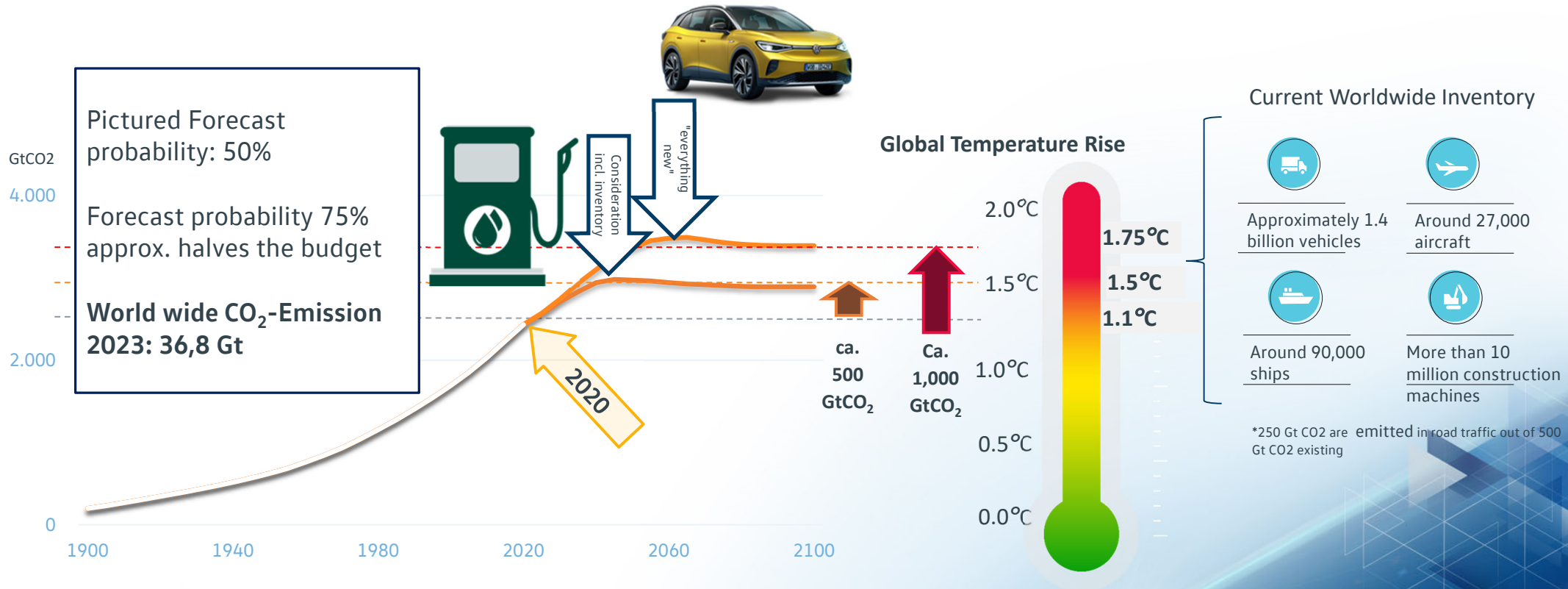
**Prof. Dr. Tom Garbe, Volkswagen AG**

11.9.2024



# Introductory System Considerations

All States and Sectors have to share the existing Carbon Budget



**A sufficient reduction in CO<sub>2</sub> emissions can only be achieved with the inclusion of the existing buildings, vehicles and industry**



# Introductory System Considerations

## Four Fields of Action



**New  
Powertrain  
Technologies**

**Carbon Neutral  
Energy Carriers**



**Behavioral  
Change**

**Cope with  
consequences  
of climate  
change**



**legislation levers:  
CO<sub>2</sub> Fleet Compliance  
Renewable Energy Directive  
Corporate Sustainable Reporting Directive**



# Volkswagen Activities

Volkswagen offers BEV for every vehicle sector

2019

2020

2021

2022

2023



ID.3



ID.4



ID.5



ID. BUZZ



ID.3 FL



ID.7



ID.2

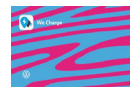
Decarbonization of electric powertrain production



IONITY  
Charger



ID. Charger



We Charge



bp/Aral  
Flexpole  
Charger

ID. Charger Travel

Increase of green electricity



# Volkswagen Activities

Actual VW Group releases for Paraffinic Diesel



**Passenger car**  
(4 Cyl)  
KW 25/2021



**Light duty vehicle**  
(4 Cyl)  
KW 30/2021



**Passenger car**  
(6 Cyl, up to 170 KW)  
KW 8/2022

Volkswagen will continue to enable upcoming cars for climate fuels  
- Diesel 4Cyl. are now released from 2019 (EA 288 evo)  
- is also working on the release of older cars from 2015

Procedure to check, if elder cars have got an actual release  
is established in Volkswagen Service



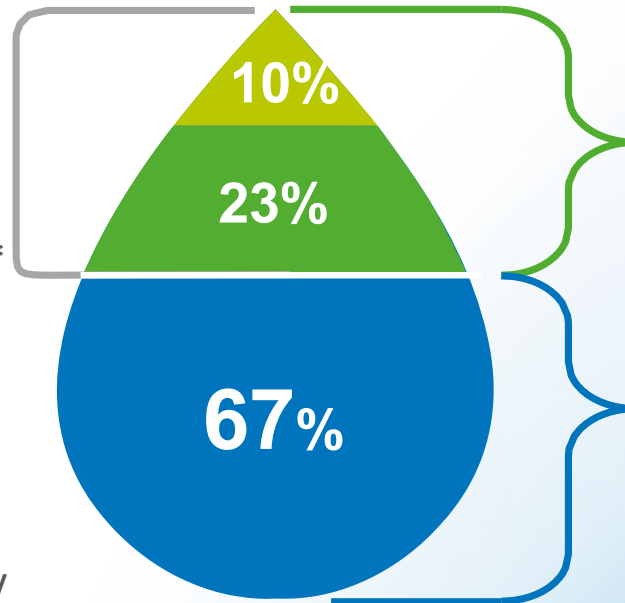


# Volkswagen Activities

Volkswagen supports the development and Market introduction of new Fuels

## Blue Gasoline

- Full compliance with EN228 RON95 E10 specification
- Increased share of renewable components to up to 33%
- Clearly defined sustainability criteria – waste and residue only\*
- At least 20% CO<sub>2</sub>\*\* reduction via biofuels and ~80% CO<sub>2</sub> compensation via NBS\*\*\*
- Each batch is approved externally



**Up to 33 % waste & residue derived renewable components**

~10 % Bio ethanol

~23 % Bio naphtha

**67 % high quality additized gasoline components**



Thomas Garbe, Volkswagen AG



# Volkswagen Activities

## E20 Rxx Development and Support

fast ramp up  
possible

visuable step  
for the customer

car range not  
significantly affected

high number  
of cars from  
the legacy fleet  
are probably compatible

production technology has  
high technology rediness level

raw material capacity  
for the EU – market  $\cong$  20%

Ethanol can be produced  
cost effective from waste and residues

high RON  
is enabler for  
regenerative  
base fuels

Future cars could be operated  
more efficient thanks to RON  
and evaporation enthalpie



# VDA Communication

## Position to RED III Implementation



Überraschender Vorstoß der Autoindustrie

### 6+ Aus für Benzin und Diesel 2045 – kann das funktionieren?

Ausgerechnet die Autoindustrie fordert, dass Deutschland mit Benzin und Diesel Schluss macht: im Jahr 2045. Millionen Verbrenner-Pkw dürften dann noch im Verkehr sein.

Von **Arvid Haitzsch**  
22.08.2024, 11.31 Uhr



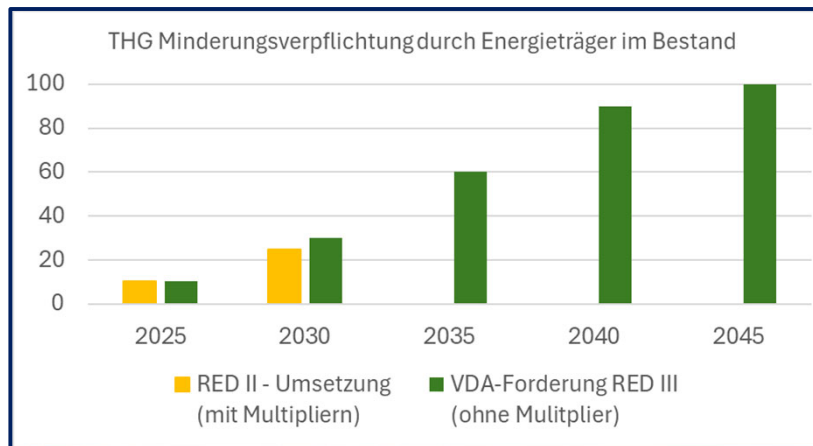
Thomas Garde, Volkswagen AD

Positionspapier

## RED III

**VDA** | Verband der Automobilindustrie

Umsetzung der Erneuerbare-Energien-Richtlinie in nationales Recht





# Scale up Scenario

## Diesel Ramp Up

Amounts will increase due to scale of technology and feedstock multiplicity

Veg. Oils

Used cooking oil

Tall oil

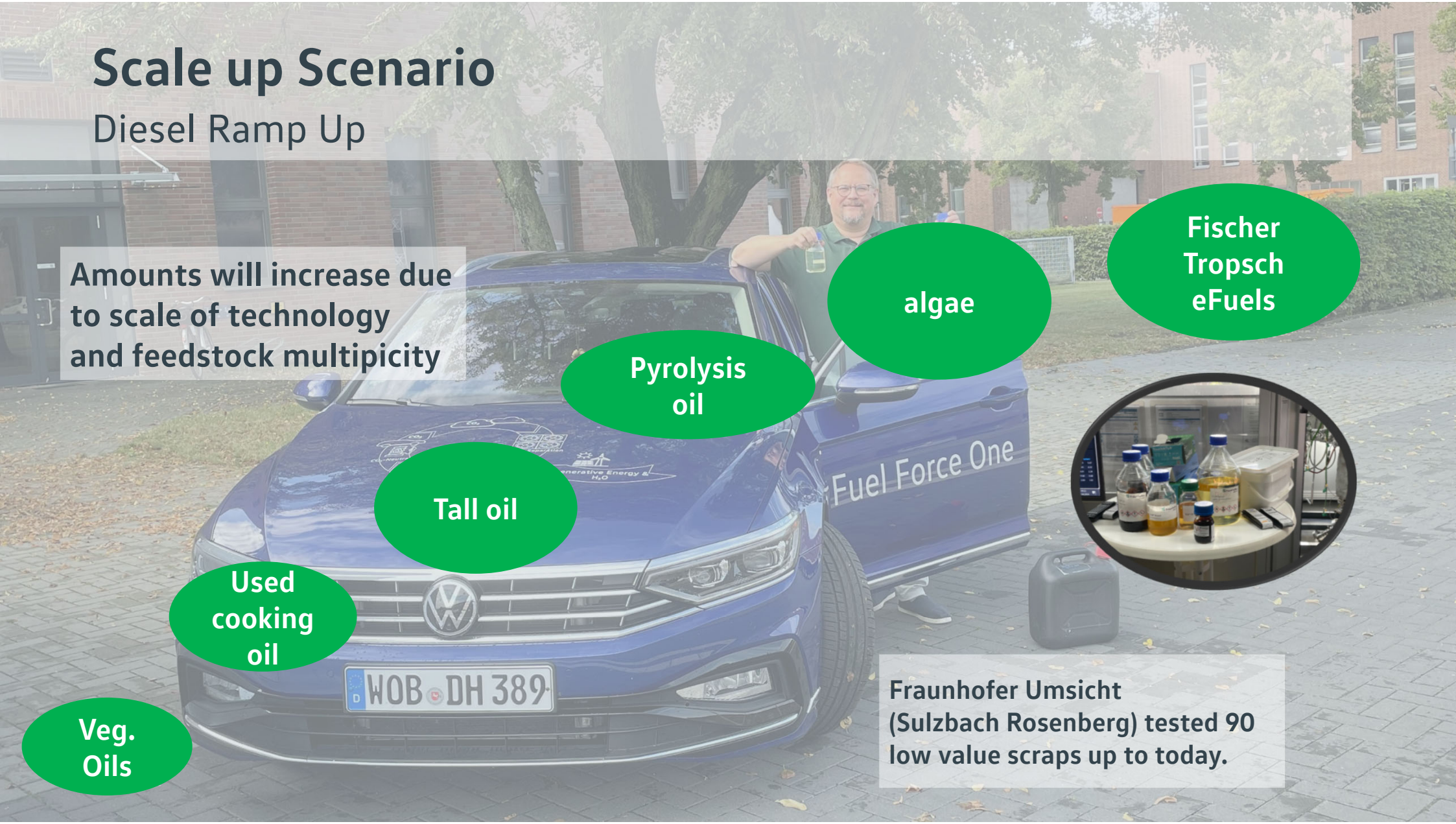
Pyrolysis oil

algae

Fischer Tropsch eFuels

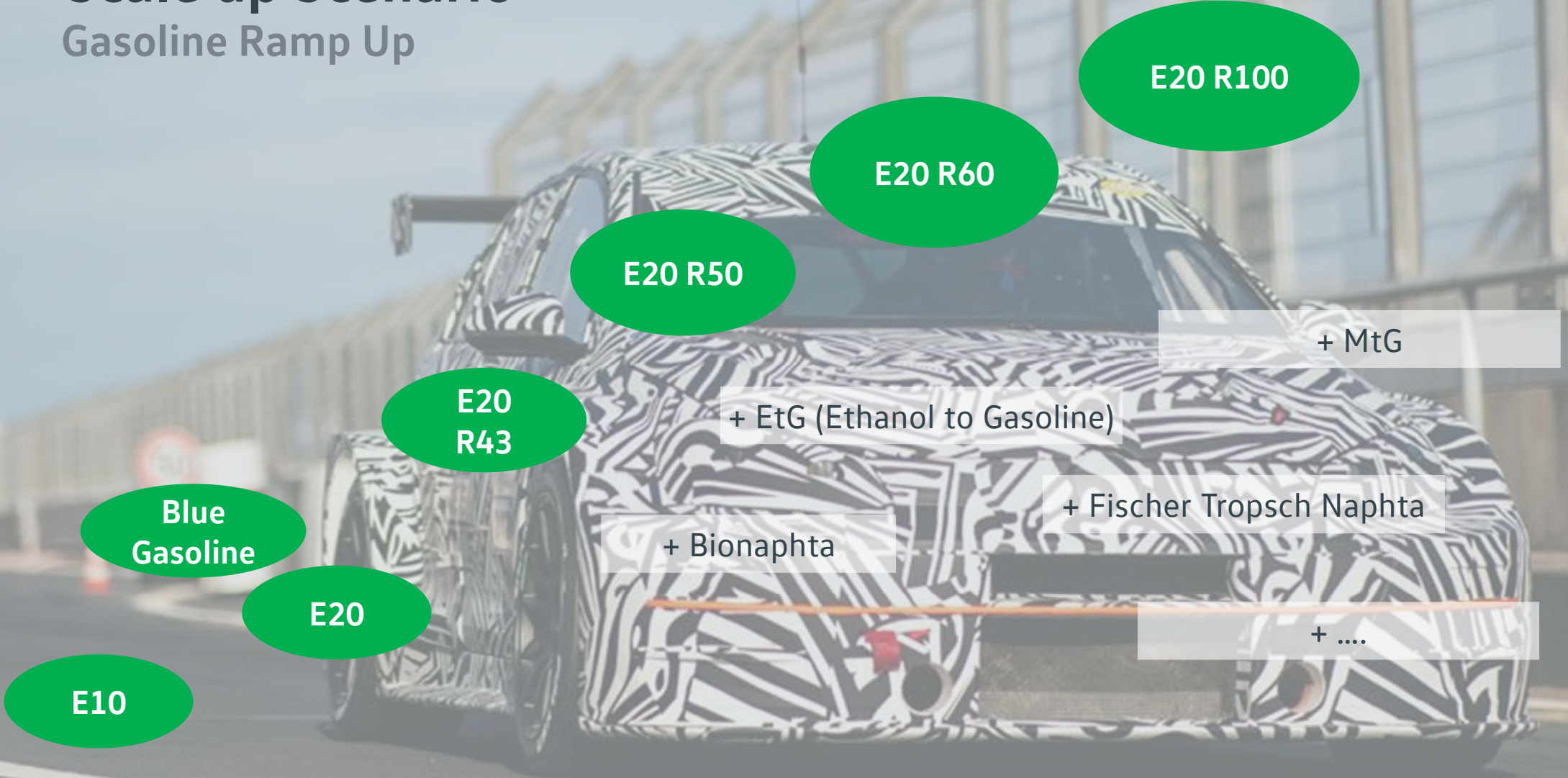


Fraunhofer Umsicht (Sulzbach Rosenberg) tested 90 low value scraps up to today.



# Scale up Scenario

## Gasoline Ramp Up





# Summary and Conclusion

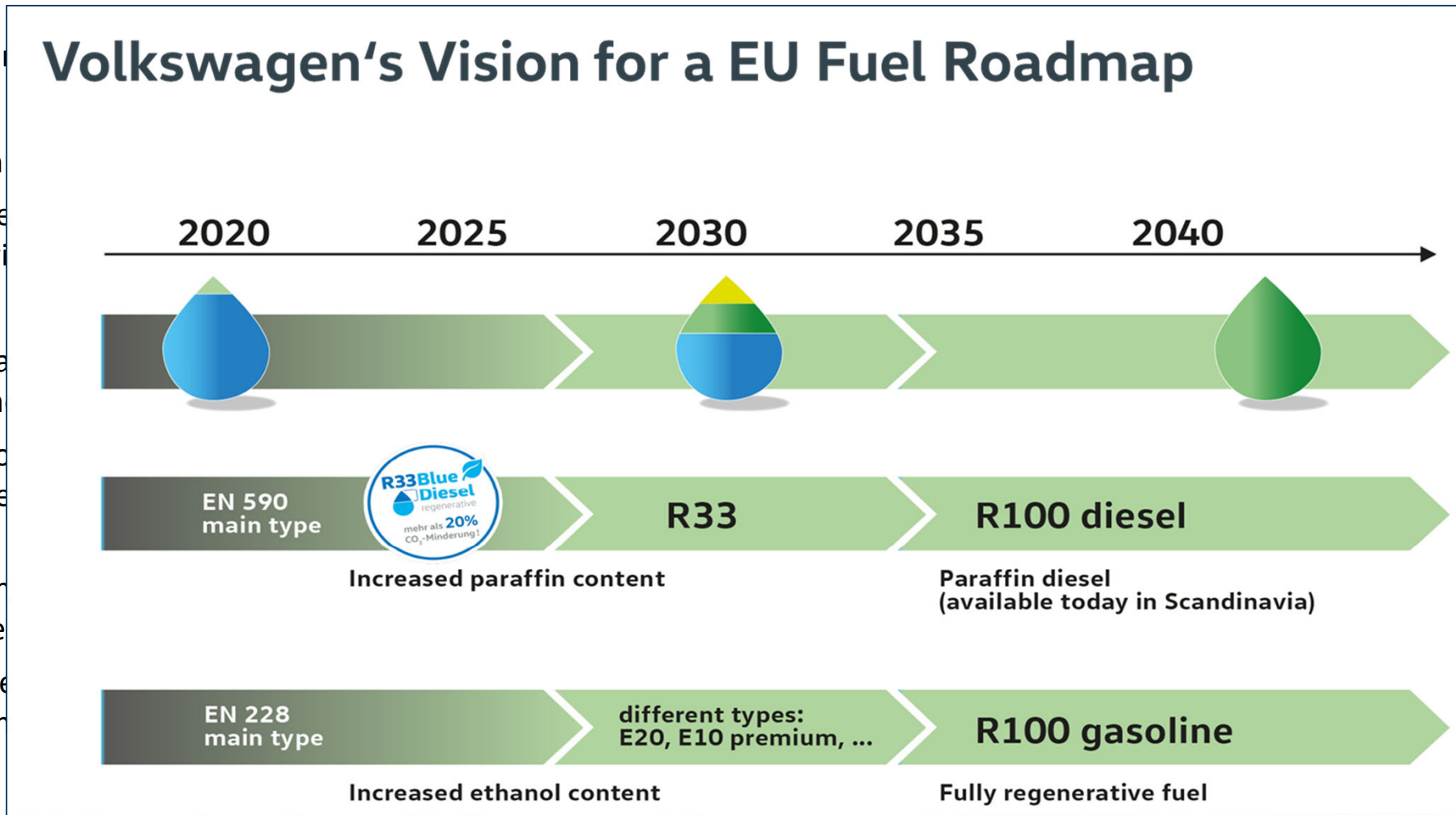
- Time is running out: Urgent need to mitigate Climate Change!
- In transport BEV technology is the most important technology for new vehicles.
- Regenerative fuels for the vehicle fleet have to be established as a supplementary technology in order to be careful with the “Carbon Budget”.
- Paraffinic Diesel and E20 with increasing share of regenerative Basefuel (Efuel and Bio) have been identified as the most promising pathways
- To be successful, high quality of Climate fuels has to be established. Specifications as well as testing programs are necessary to ensure that.
- The technology scale needs more ambitious legal framework, especially the RED has to be developed to higher renewable rates and long time reliability
- New “drivers” for the use of regenerative fuels have appeared:  
The sustainable Reporting (short term) and the LCOFV - option (mid term)





# Summary and Conclusion

- Title
- Introduction
- Requirements
- Parameters
- Technical
- The
- New

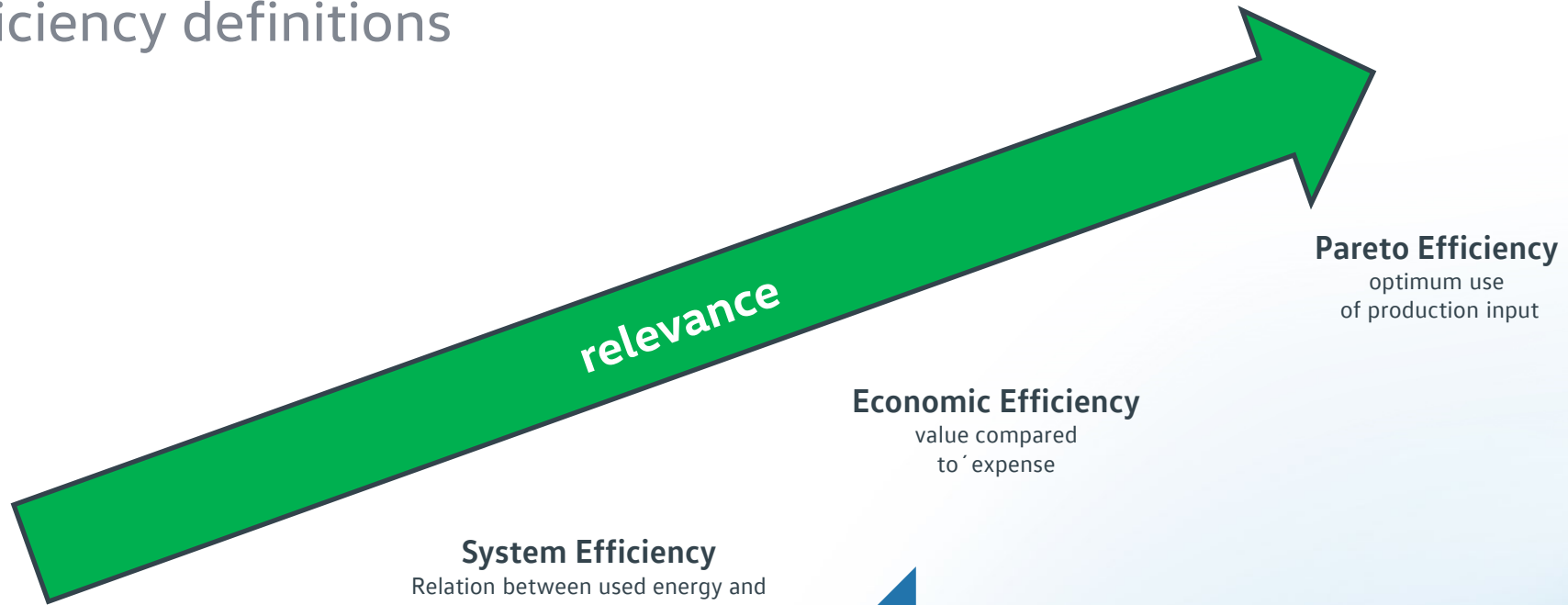


careful  
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# Introductory System Considerations

## Efficiency definitions



**Pareto Efficiency**  
optimum use  
of production input

**Economic Efficiency**  
value compared  
to 'expense

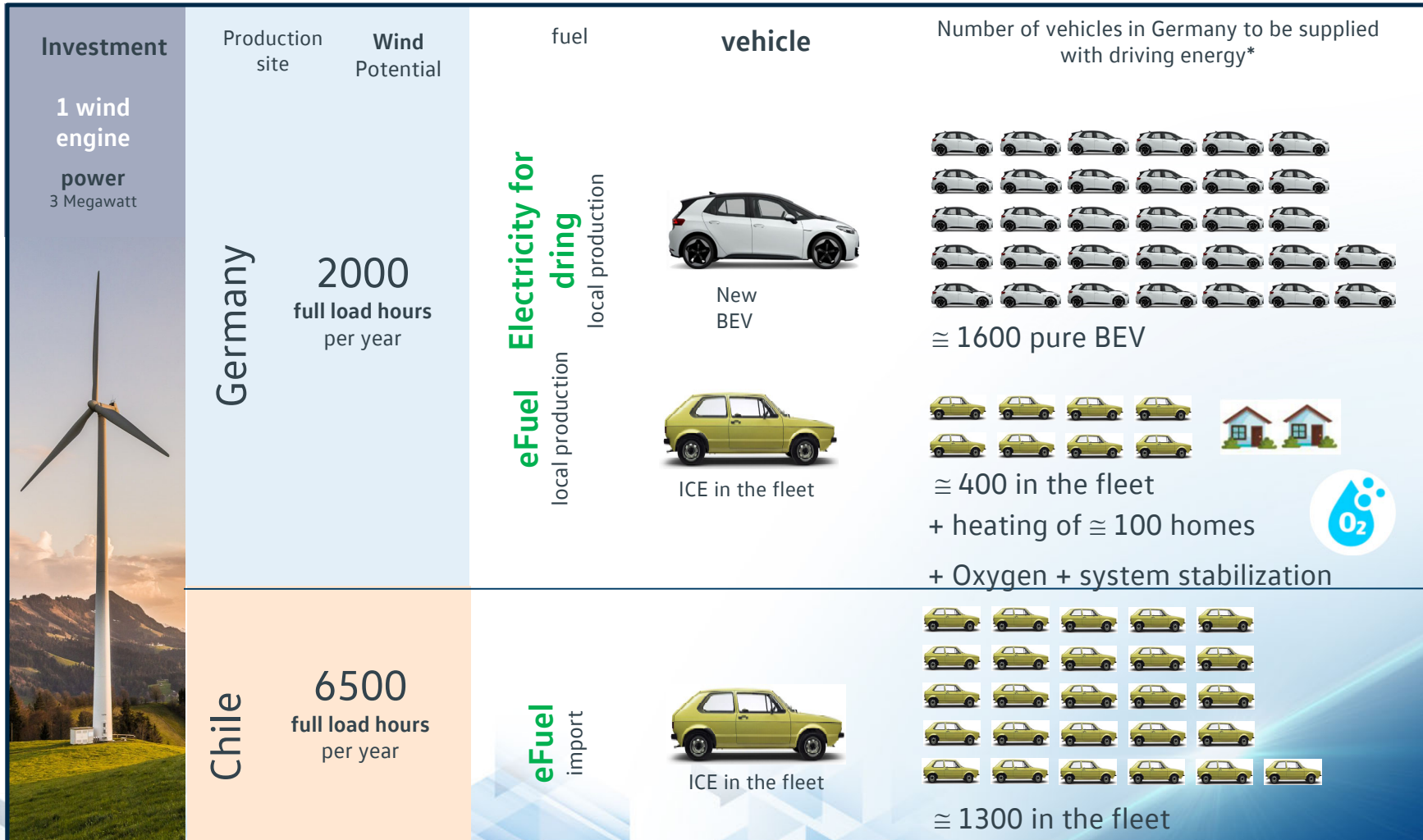
**System Efficiency**  
Relation between used energy and  
energy and installed enrgy  
production capacity

**Efficiency**  
Relation between used energy and  
energy and enrgety expense



# Introductory System Considerations

## Efficiency evaluation of eFuels



\*compact class  
typical distance





# Kraftstoffe der Zukunft

Betrachtung der Wirtschaftlichkeit in unterschiedlichen Sektoren

