

Agenda



01 Maximize range: Right way?

02 How to reduce CO₂ in life cycle?

03 The right sized battery capacity?

04 What have we achieved (CO₂)?

05 What's next?

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Maximize range: Right way?



01

Maximize range: Right way?

How to reduce CO₂ in life cycle?

The right sized battery capacity?

What have we achieved (CO₂)?

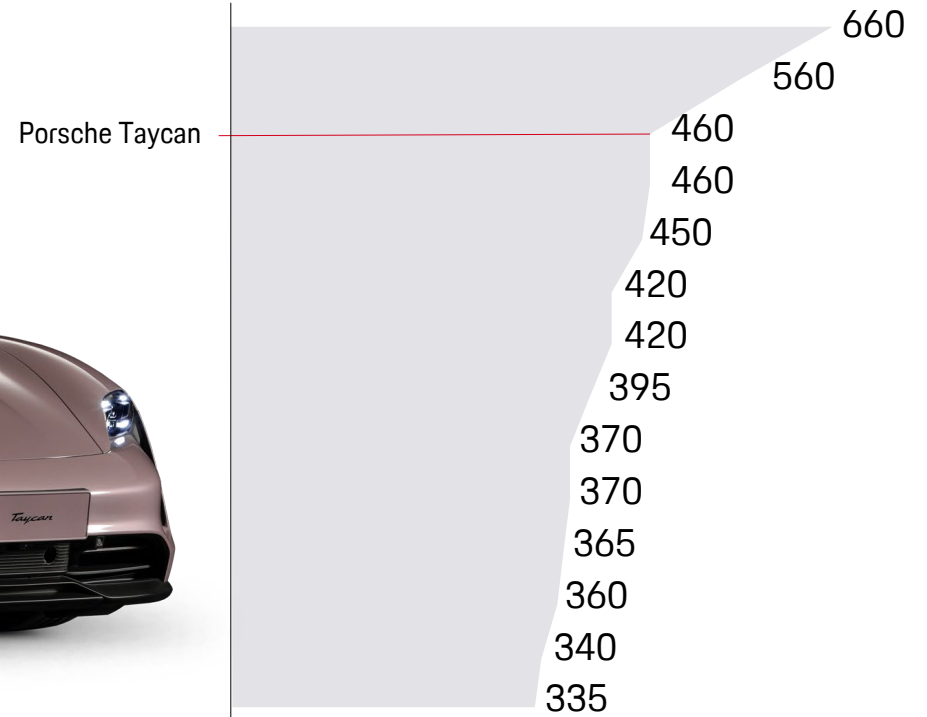
What's next?

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Market perspective on electric range: Range is increasing in all vehicle segments



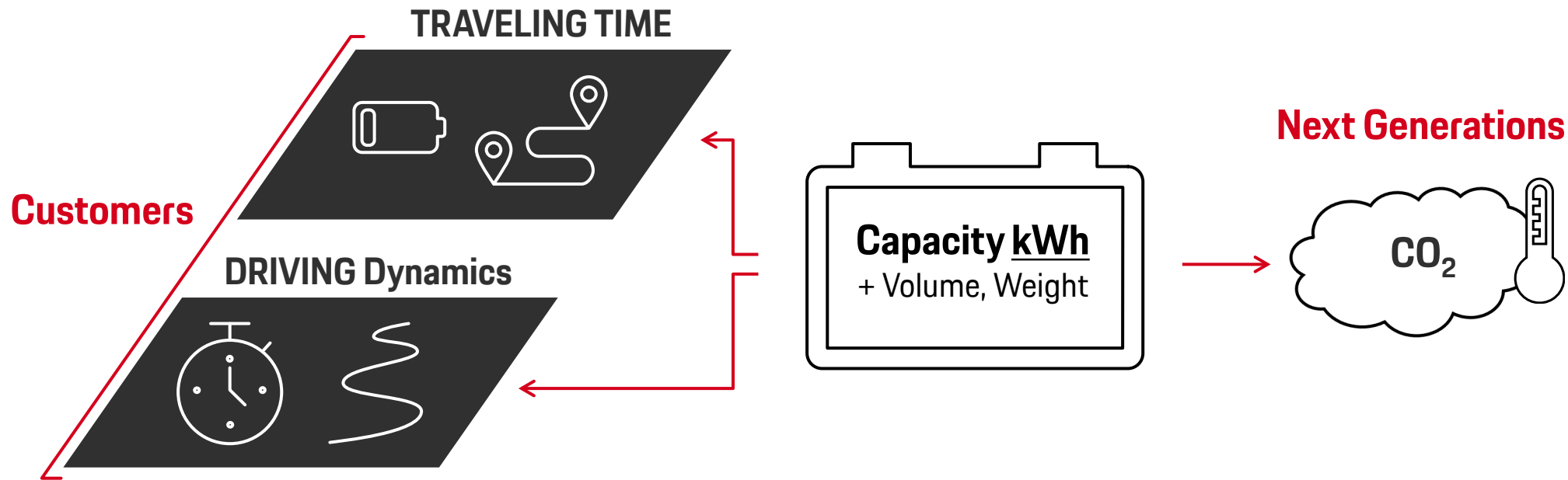
Electric Range [km]



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The vehicle range is only one aspect

Stakeholders: Customers and next generations



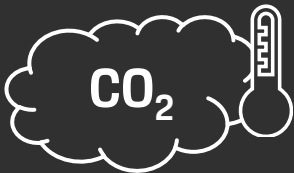
Vision Net-Zero

Porsche aims for balance sheet
CO₂ neutrality in 2030



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How to reduce CO₂ in life cycle?



02

How to reduce CO₂ in life cycle?

Maximize range: Right way?

The right sized battery capacity?

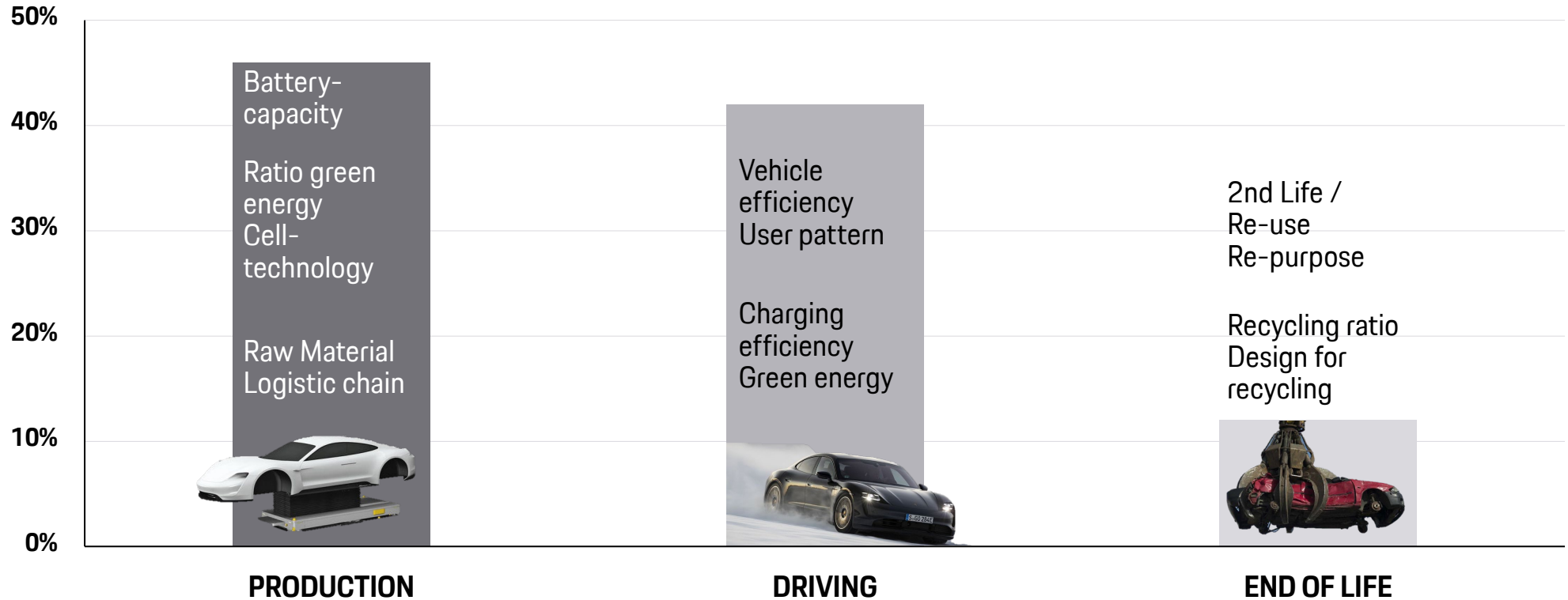
What have we achieved (CO₂)?

What's next?

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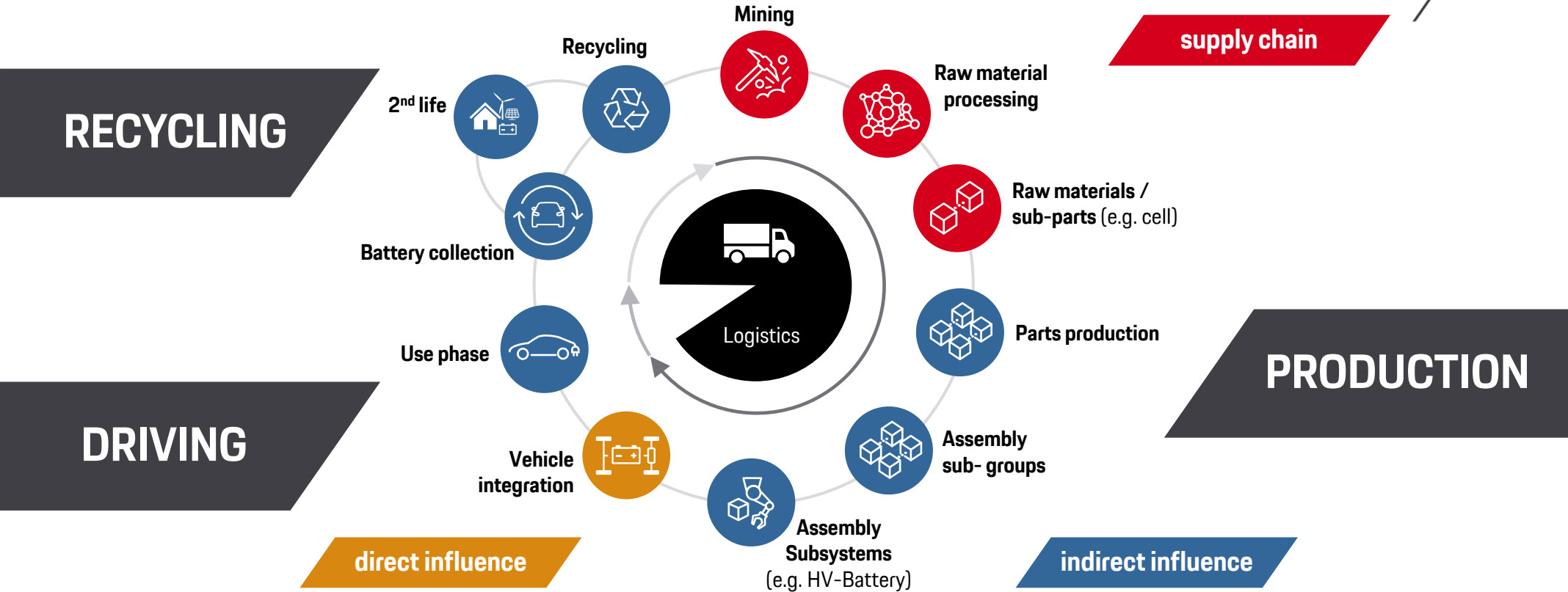
Initial situation of CO₂ emissions

share of CO₂ emissions

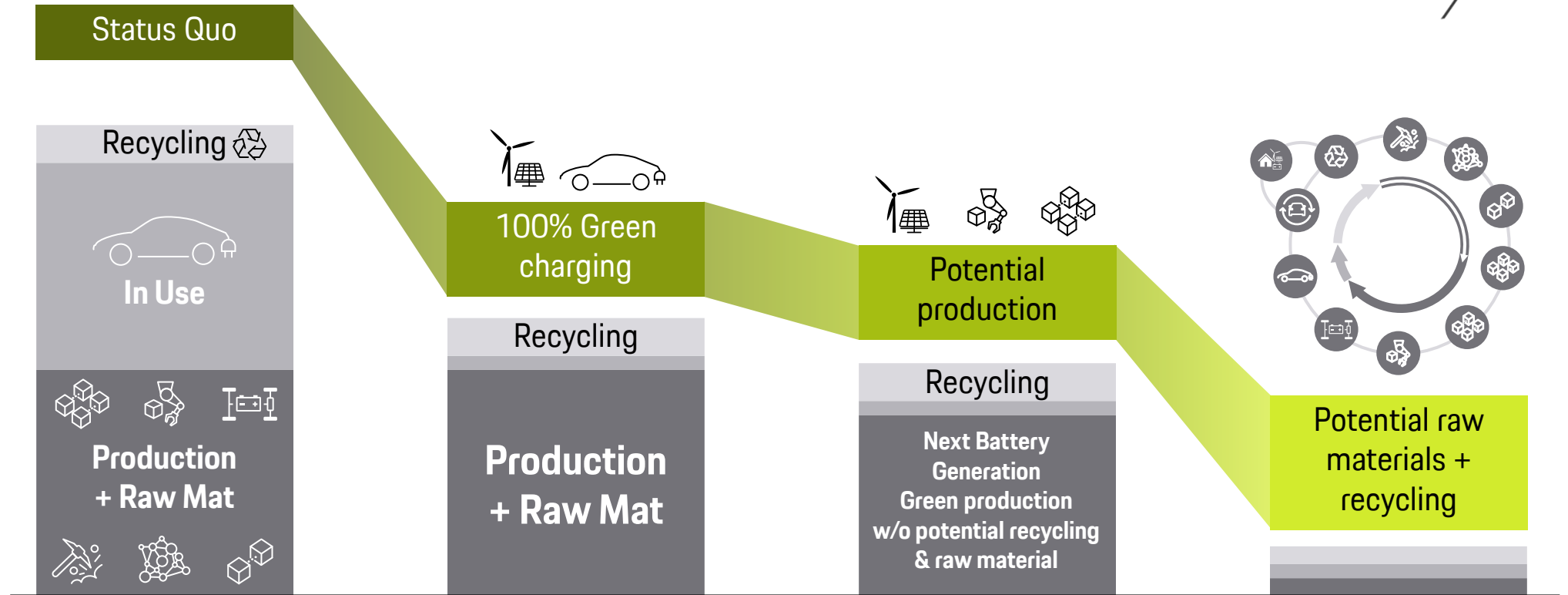


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CO₂-Impact in the vehicle life cycle – initial situation



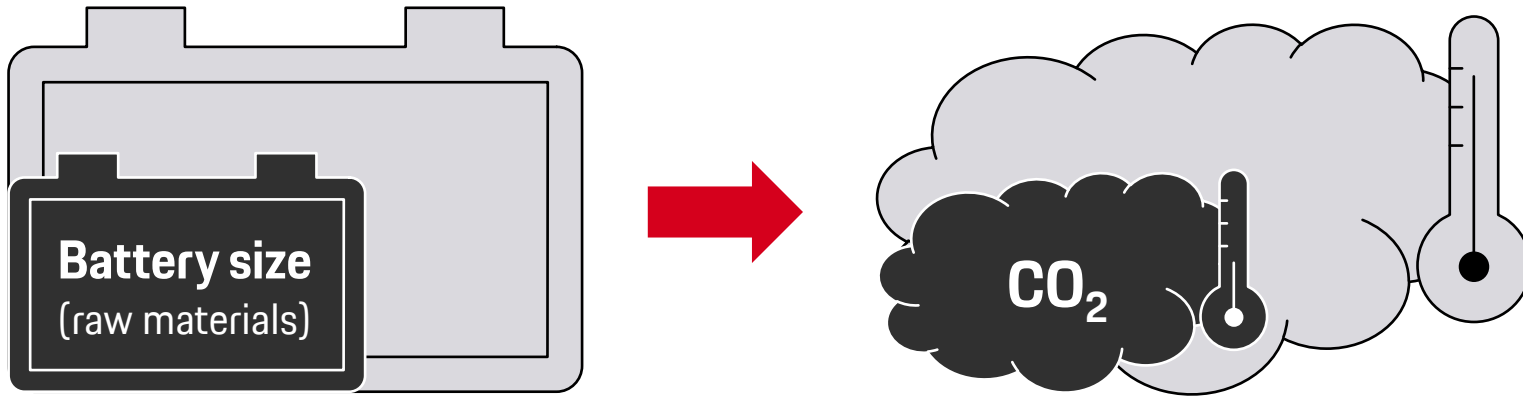
CO₂-Potentials to be achieved



Recycling rate scales back required raw material

Direct impact: kWh – CO₂ footprint

HV-Battery is the key contributor of CO₂



» ... to be considered for rightsizing the battery

The right sized battery capacity?



How to deal this trade off?

03

The right sized battery capacity?

Maximize range: Right way?

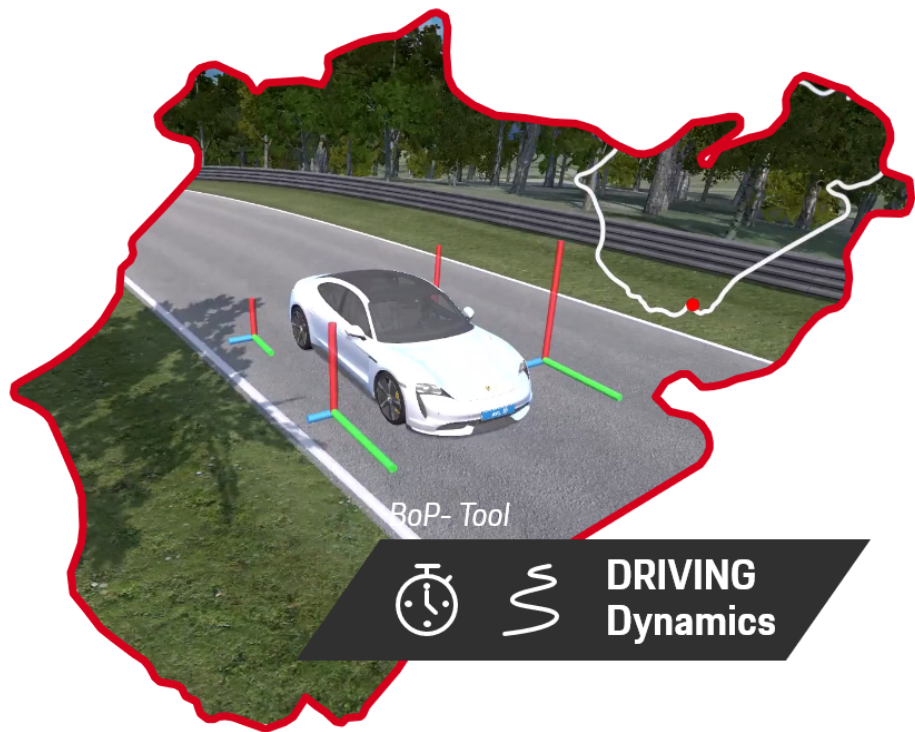
How to reduce CO₂ in life cycle?

What have we achieved (CO₂)?

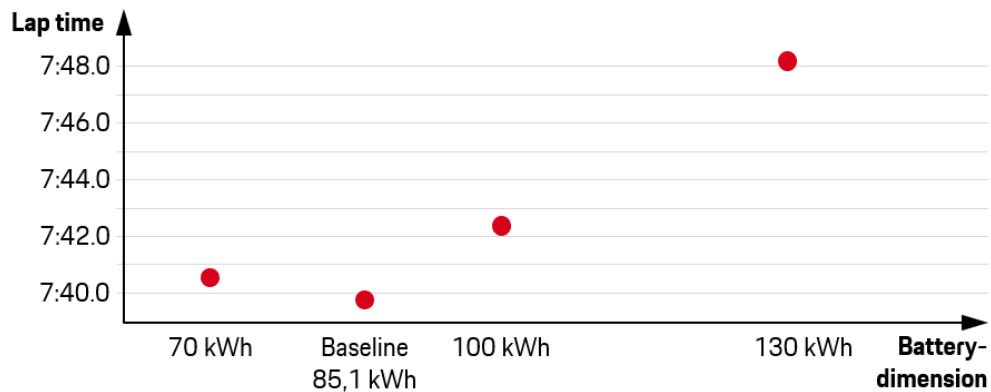
What's next?

Simulation @ Nordschleife/Nürburgring

Lap time vs. dimension of battery



	Vehicle weight [kg]	Lap time Nürburgring [min : sec]	0-100 / 200 kph Acc. Time [s/s]	Max. Long. Acceleration [m/s ²]	Max. Lateral Acceleration [m/s ²]
70kWh	2310.1	07:40.2	2.90/9.51	12.02	10.35
Baseline (85,1kWh)	2419.0	07:39.5	2.92/9.43	11.18	10.24
100kWh	2526.3	07:42.4	3.04/9.71	10.87	10.18
130kWh	2742.8	07:48.2	3.28/10.48	10.06	10.01

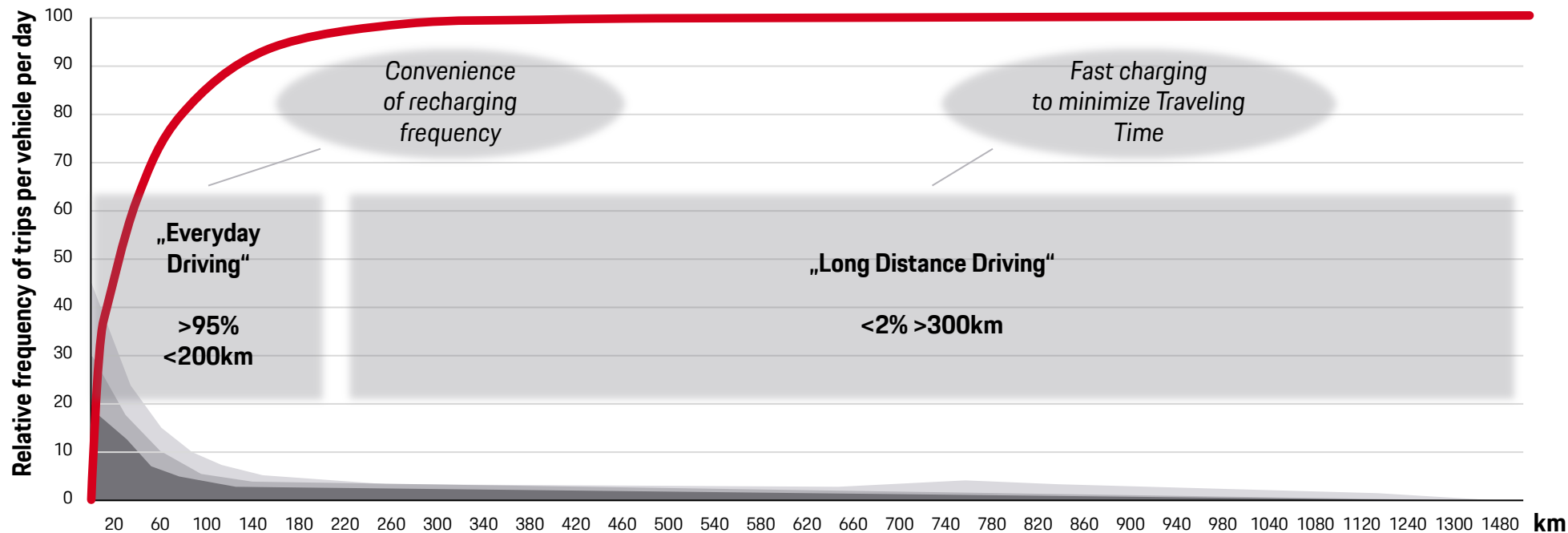


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Driving Pattern BEV



TRAVELING TIME



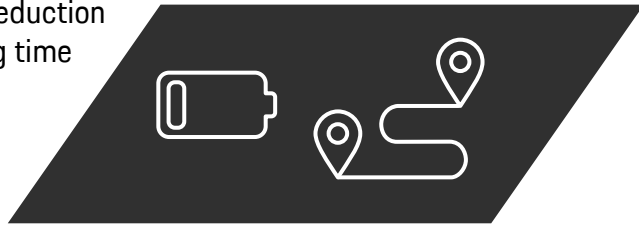
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Porsche's answer: ~100kWh is the right capacity

500 km

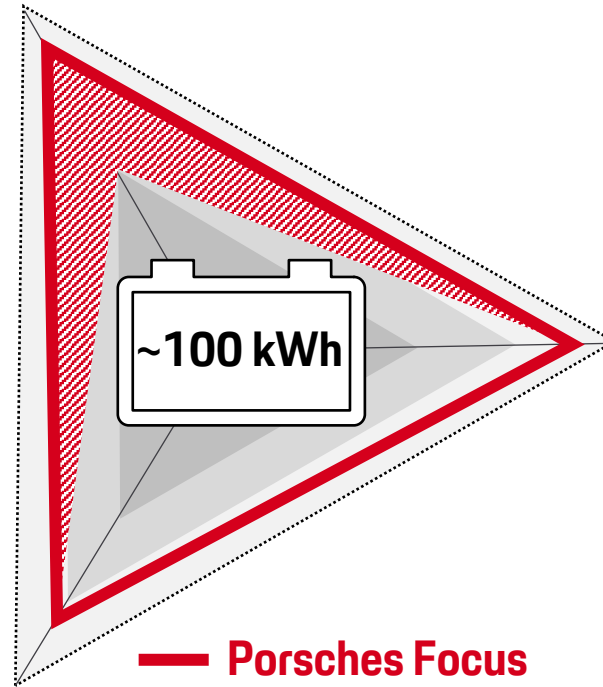
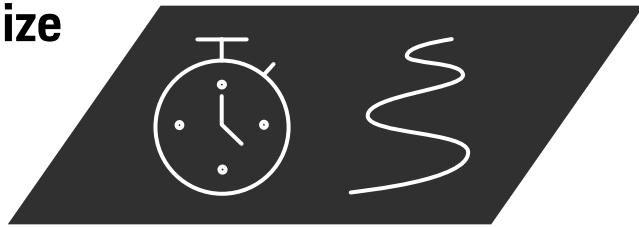
+ further reduction
of charging time

TRAVELING TIME

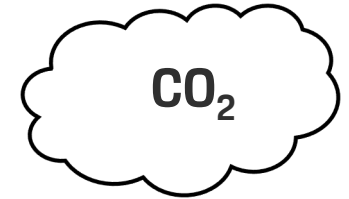


Optimize

DRIVING Dynamics

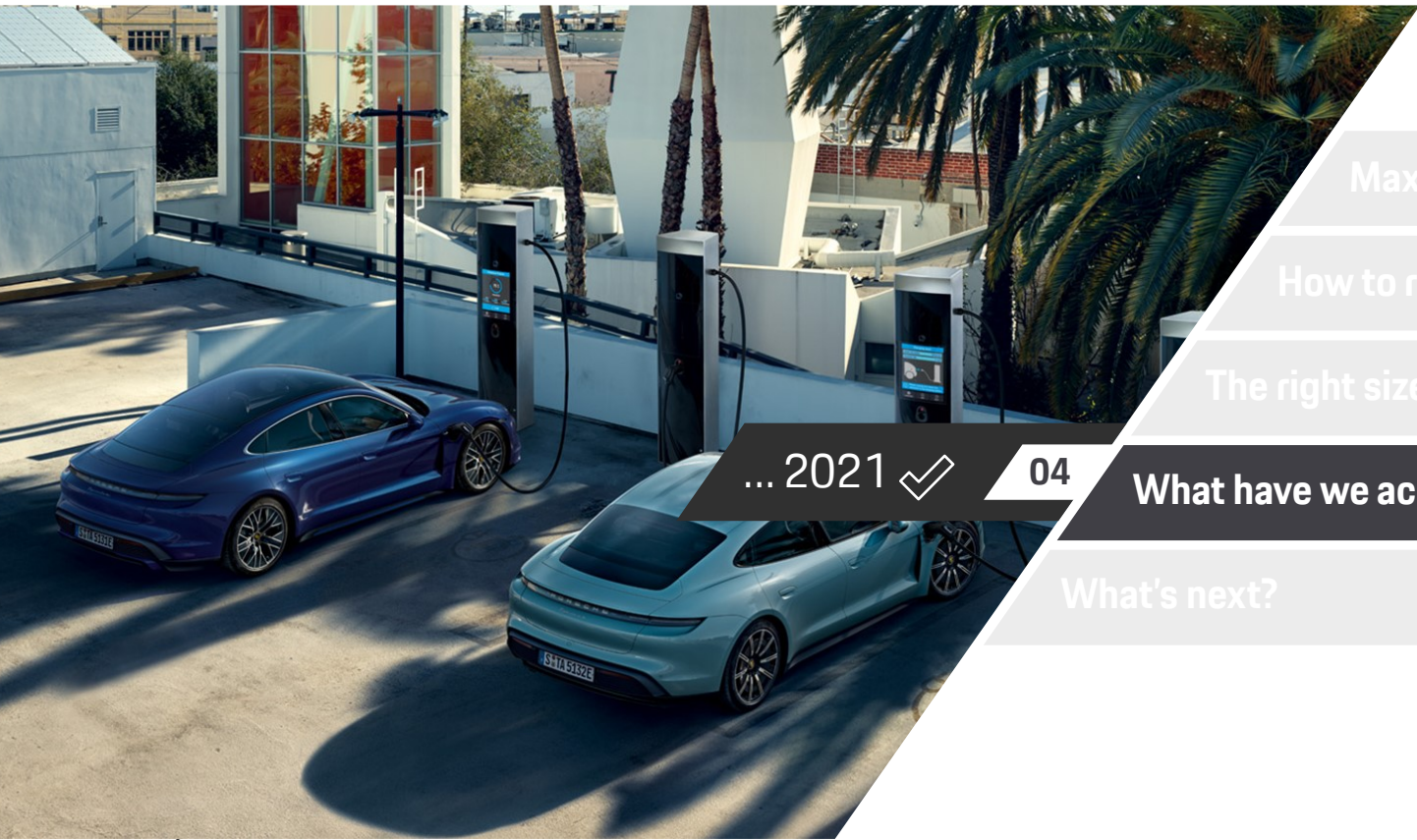


**Minimize
Vision: Net Zero**



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What have we achieved (CO₂)?



... 2021 ✓

04

What have we achieved (CO₂)?

What's next?

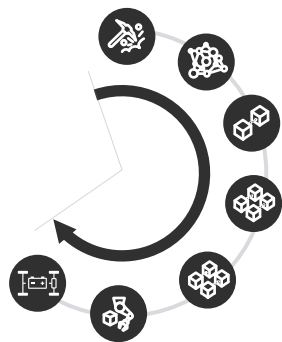
Maximize range: Right way?

How to reduce CO₂ in life cycle?






The right sized battery capacity?

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The achievements in production of Batteries (CO₂ / kWh)



Example-Measures

-  Design optimization
-  Reduction of required material
-  Optimization in material selection
-  Requirement specification Tier 1-3
-  Supply chain optimization

First
Generation

-26 %

Next
Generation



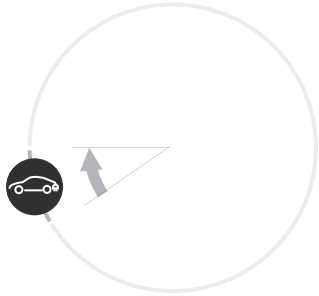
Production
+ Raw Mat







Production
+ Raw Mat

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The Achievements „In Use“



-  Most Porsche customer use green charging solutions
-  Porsche actively works on reduction of axillary loads
-  Benefits in charging efficiency with 22kW On Board Charger
-  Porsche increases charging station green charging station network

What's next?



2021 ... 2030 ... 05

What's next?

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Our steps to a circular economy



Recycling

- Massive recycling investments creates a change of the Life Cycle
- Market penetration of BEV / HV-Batteries for scalable recycling benefits (fleet)
- Technology advances only via strong partnerships



Technology

- New cell technology reducing the energy use
- Higher charging power increases efficiency
- New cooling concepts and thermo management



Carbon neutrality

- Products achieve CO₂ neutrality in a future circular economy



← Balance of usability and CO₂ reduction →