

Evolution to a Mobility-Centered Society

DENSO will broaden its approach to solving societal issues.

Overview

- Growth

Evolution from a “Tier 1 supplier that supports the auto industry” to a “Tier 1 supplier that supports a mobility-centered society” by leveraging strengths cultivated through the manufacture of automotive components.

- Path

Expand the scope of value offered by DENSO based on automotive technologies to contribute to a mobility centered society.

- Initiatives

Creation of New Value: Energy, Food and Agriculture, Factory Automation

Evolution of Mobility: Electrification, ADAS

Strengthening Fundamental Technologies: Semiconductors, Software



Expand the scope of value offered by DENSO based on automotive technologies to contribute to a mobility-centered society.

For New Values

- Through these three initiatives and under the new management structure, we will advance our business in the fields of “Green” and “Peace of mind” and aim to achieve 7.5 trillion yen in sales by 2030.

DENSO's European Research Network

Regional Network and Contributions to Europe

- DENSO has a global technological network that encompasses seven engineering hubs across Europe:

Network



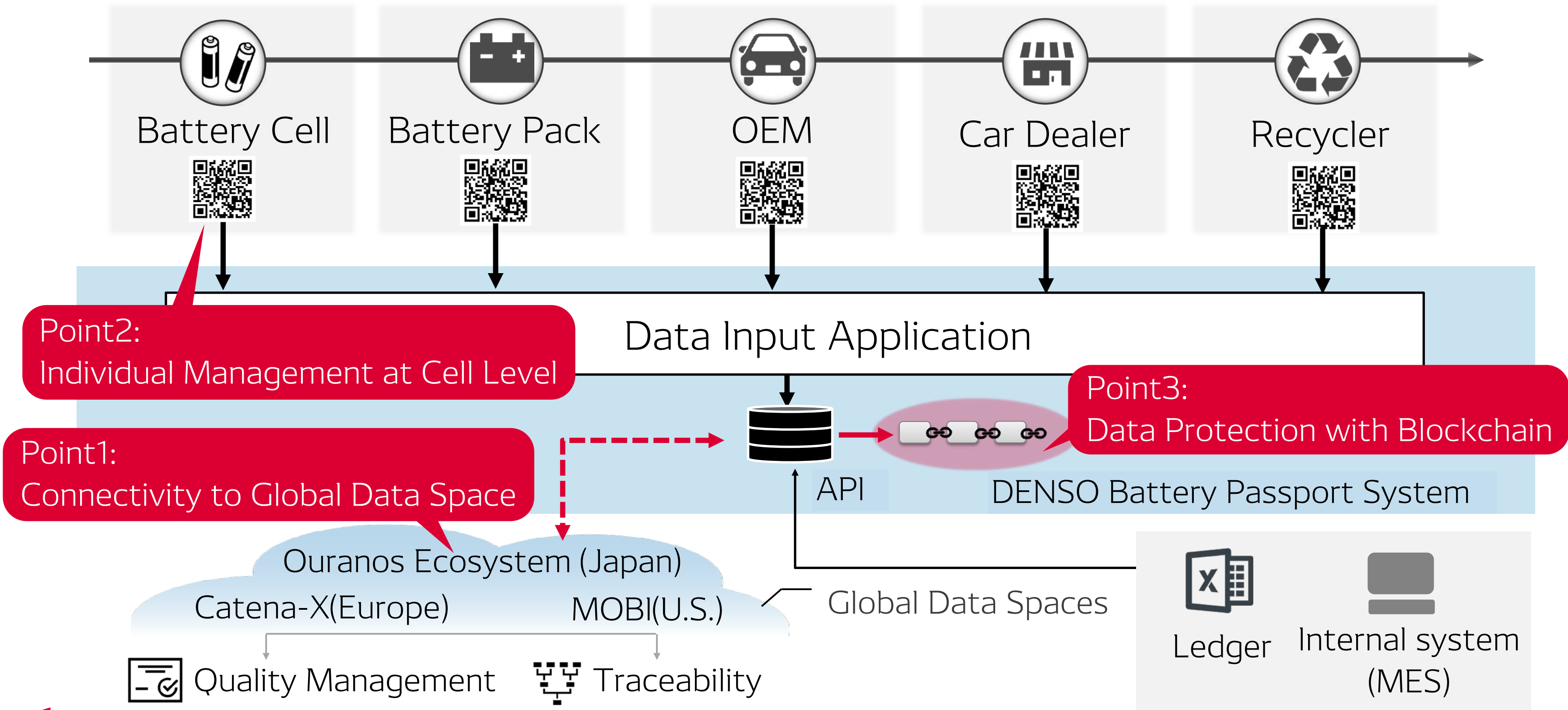
- Active Participation as a Board and Committee Member in ERTICO
- Involvement as a Member in European Standardization Committee Activities
- Developing Eco-friendly Solutions for Both Passenger and Logistic Transportation in Europe

Traceability for Battery Passport

Battery Passport System for Battery Regulation

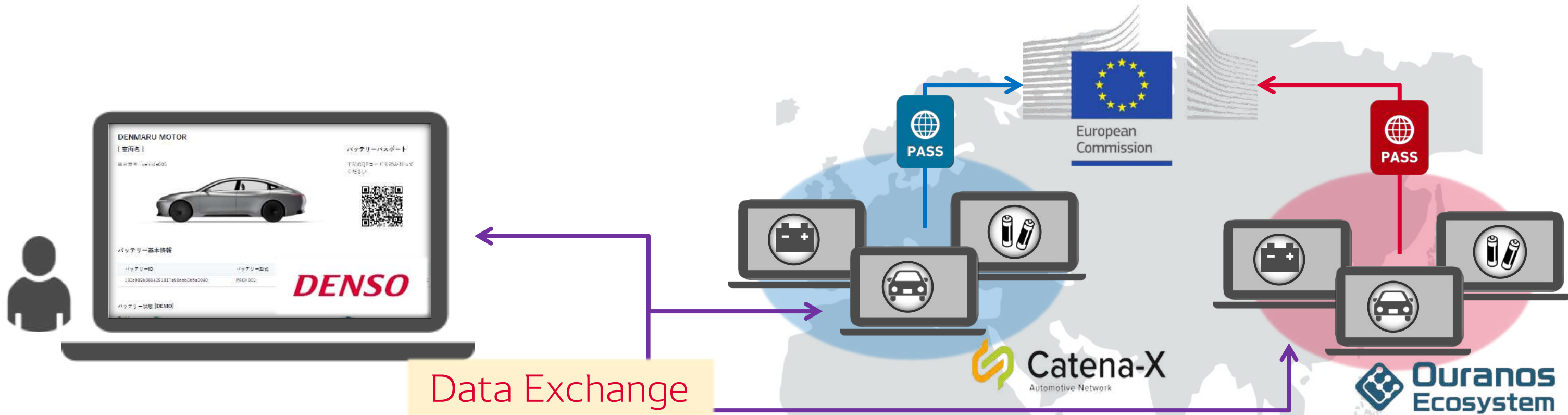
Overview

The Battery Passport application enables seamless compliance with battery regulations by leveraging QR codes and secure blockchain technology.



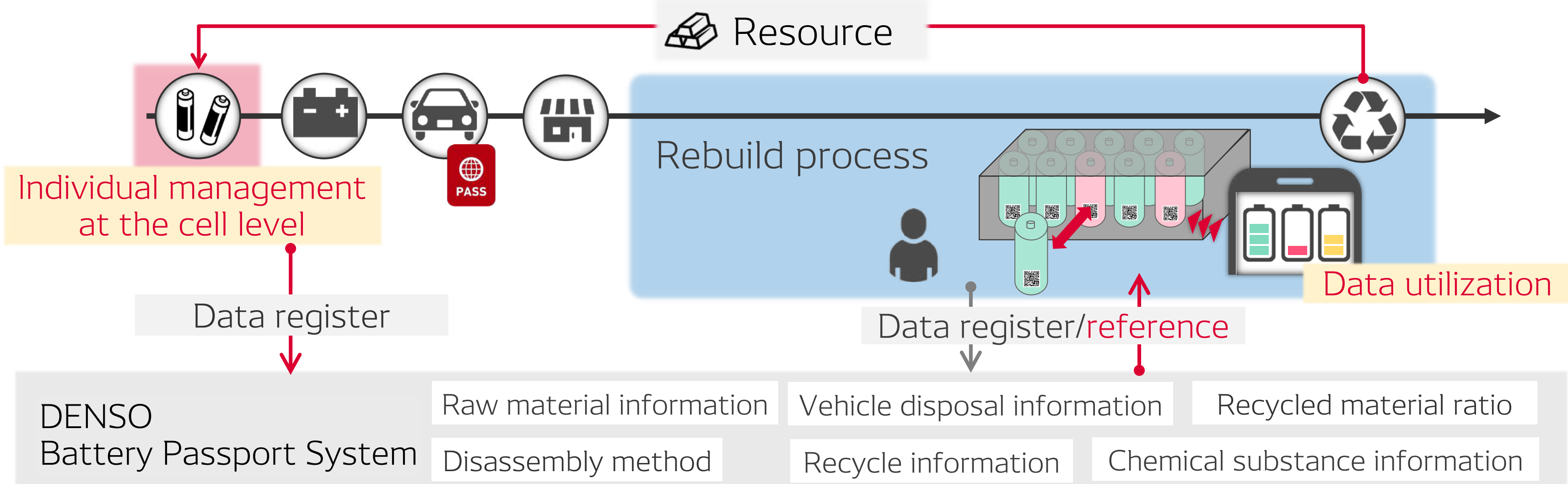
Feature

- Offers seamless connectivity across multiple Data Spaces.



Enabling data exchange across global supply chains in a single application.

- Individual management at the cell level for using data during the rebuild/recycling process.

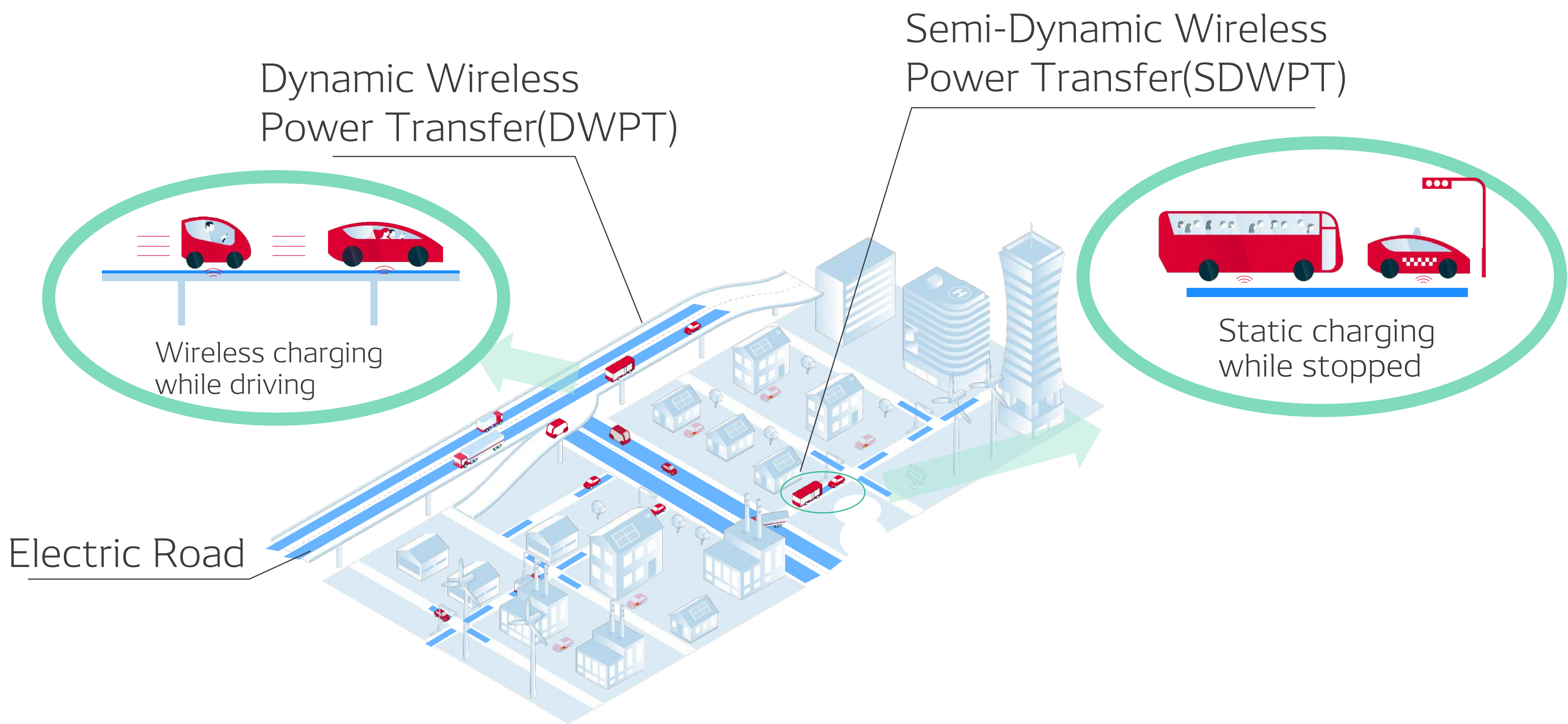


Improve resource circularity using cell data in the rebuilding and recycling processes.

Dynamic Wireless Power Transfer System

Overview

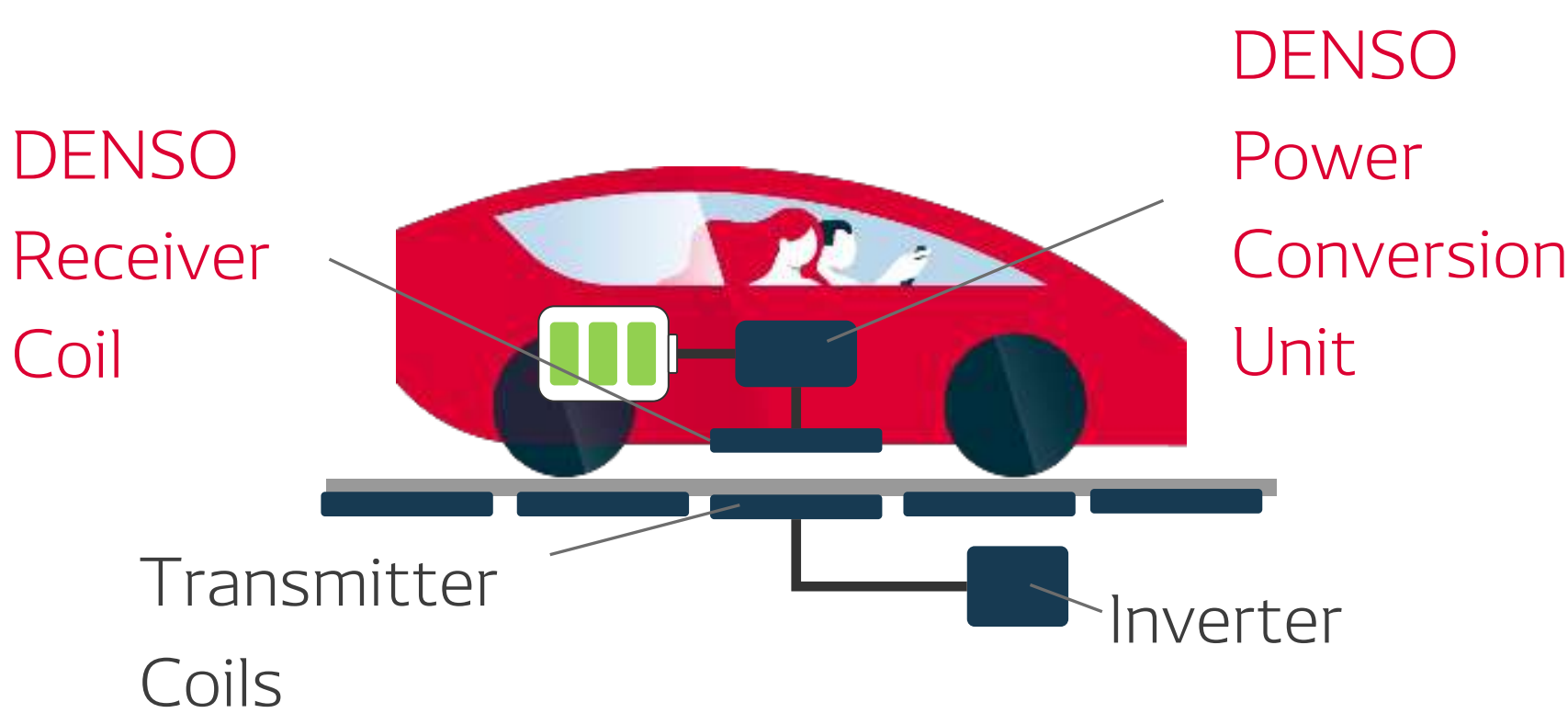
- Achieve an “Infinite Drive Range Even With a Small Battery” and contribute to the widespread use of convenient, low-cost electric vehicles, while reducing CO2 emissions generated by battery manufacturing.



Activity

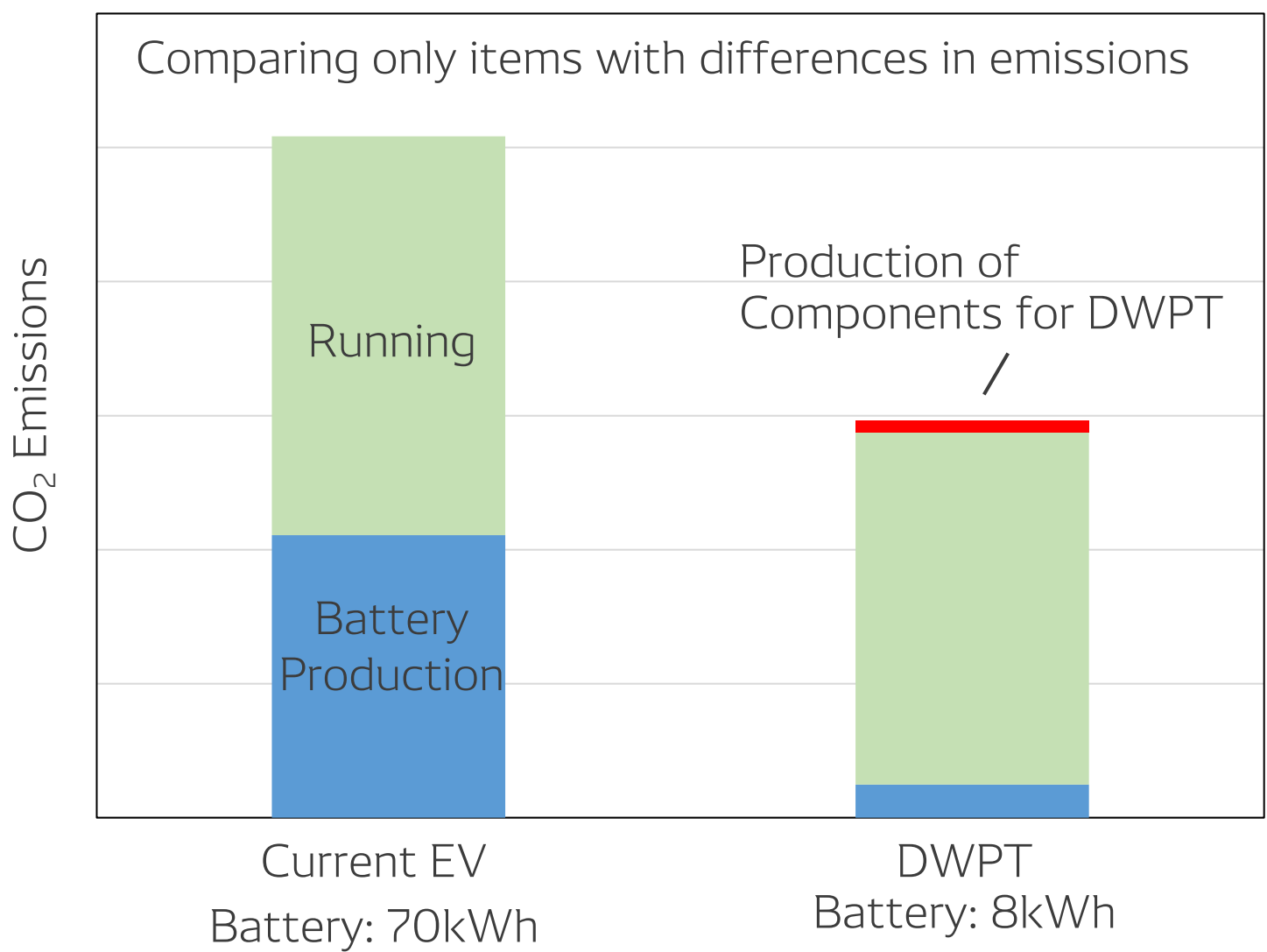
- To support a carbon neutral society, DENSO is developing onboard components and systems for a Dynamic Wireless Transfer System.

■ System Overview



High-Efficiency Wireless Power Transfer(85%) by Magnetic Resonant Technology.

■ Comparison of CO₂ emissions in LCA



DENSO estimates that 50% of 35 EVs will have DWPT. CO2 emissions from battery manufacturing are assumed to be 80 g CO₂/kWh.

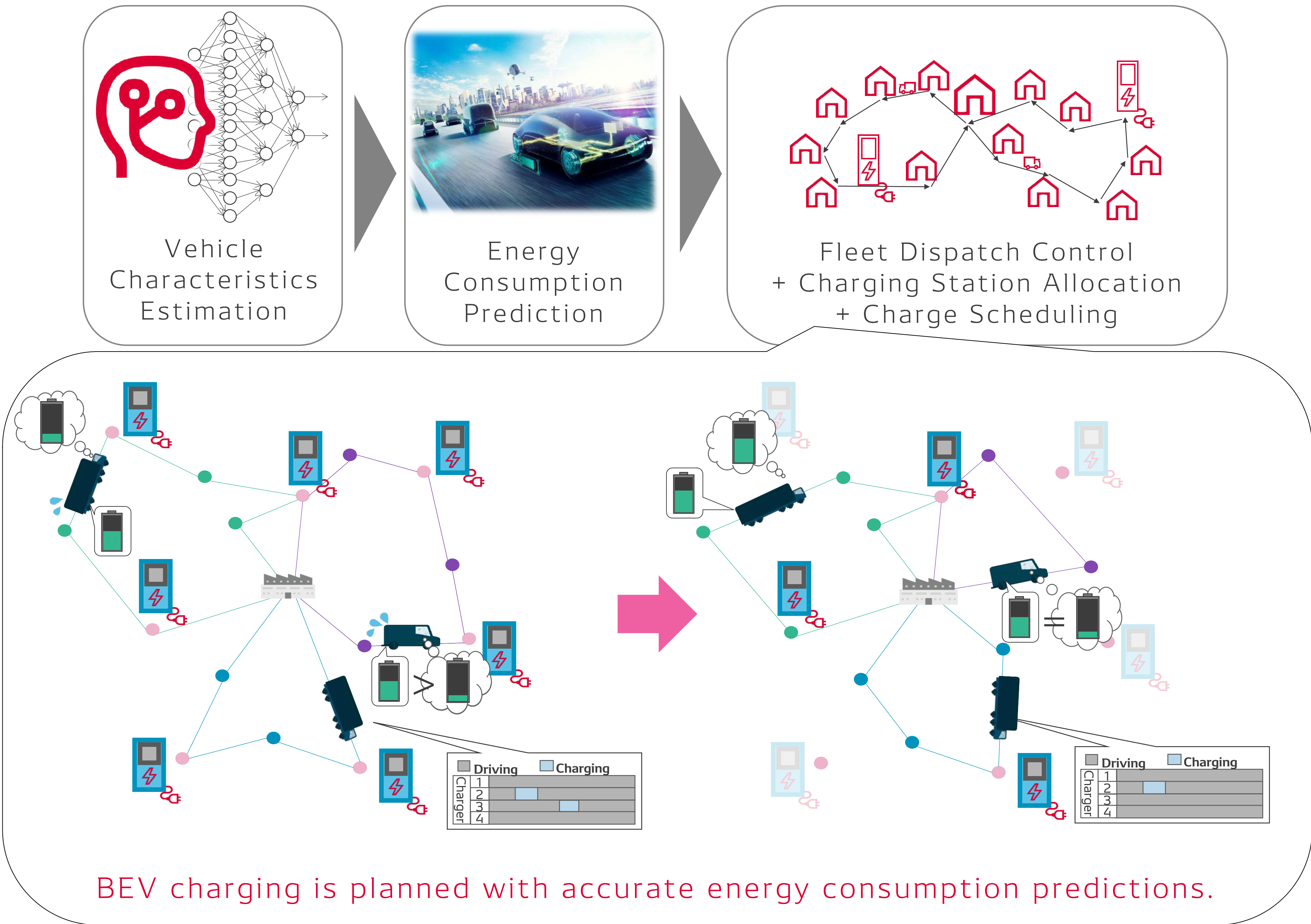
Fleet Dispatch Control for Reducing CO2 Emissions

Software-based Technology to Contribute to C/N

Highlights

- Dispatch vehicles and plan charging with highly accurate energy consumption predictions.
- Optimize utilization based on different vehicle characteristics.
- Allocate charging stations for BEVs by predicting energy consumption.

Solution Overview



Result

Area:100(km) * 100(km), Locations:12, Drivers:3, Charging Capacity:70(kWh)

	Charges when it drops below 60%	Optimal Charging Time Schedule	Effect
Charge Time	120min	30min	74.2% Down
Total Time (Transit Time + Charge Time)	852min	762min	8.5% Down

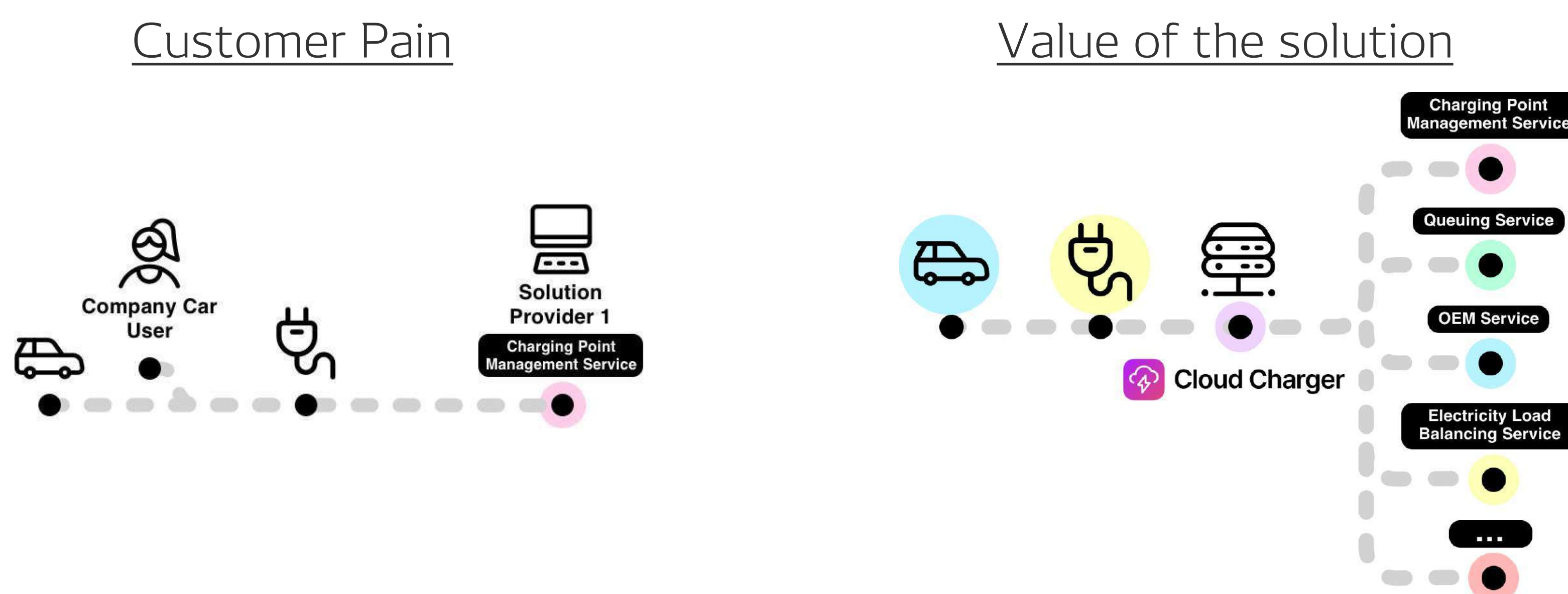
Cloud Charger

Software Gateway for Optimizing EV Charging UX

Highlights

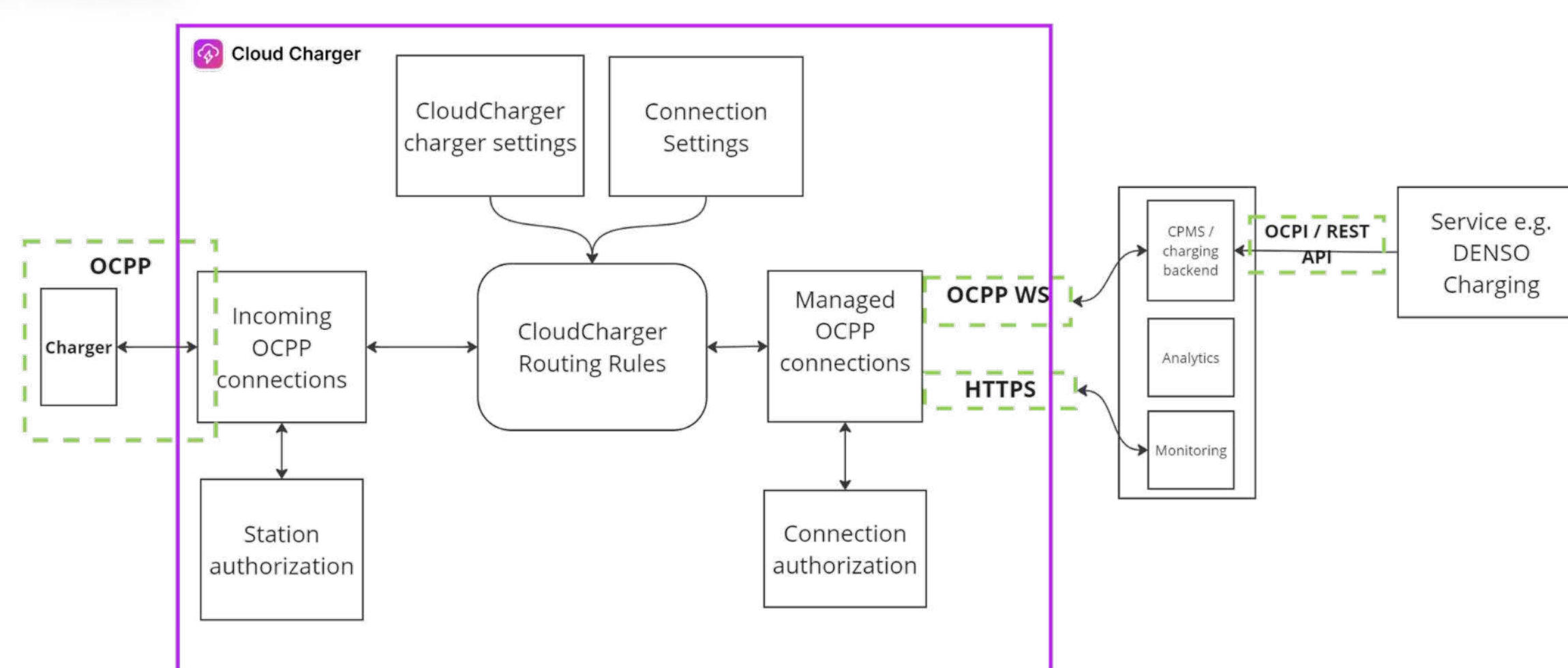
- A software solution that unlocks the full potential of charging points with multiple services and better data utilization.
- A cloud software gateway facilitating communication between EV chargers and multiple backends using OCPP and REST protocols.

Configuration



Chargers are connected to one solution provider and are locked in. They depend on the solution provider to add desired services.

Cloud Charger enables customers to connect charging points with multiple services and applications.



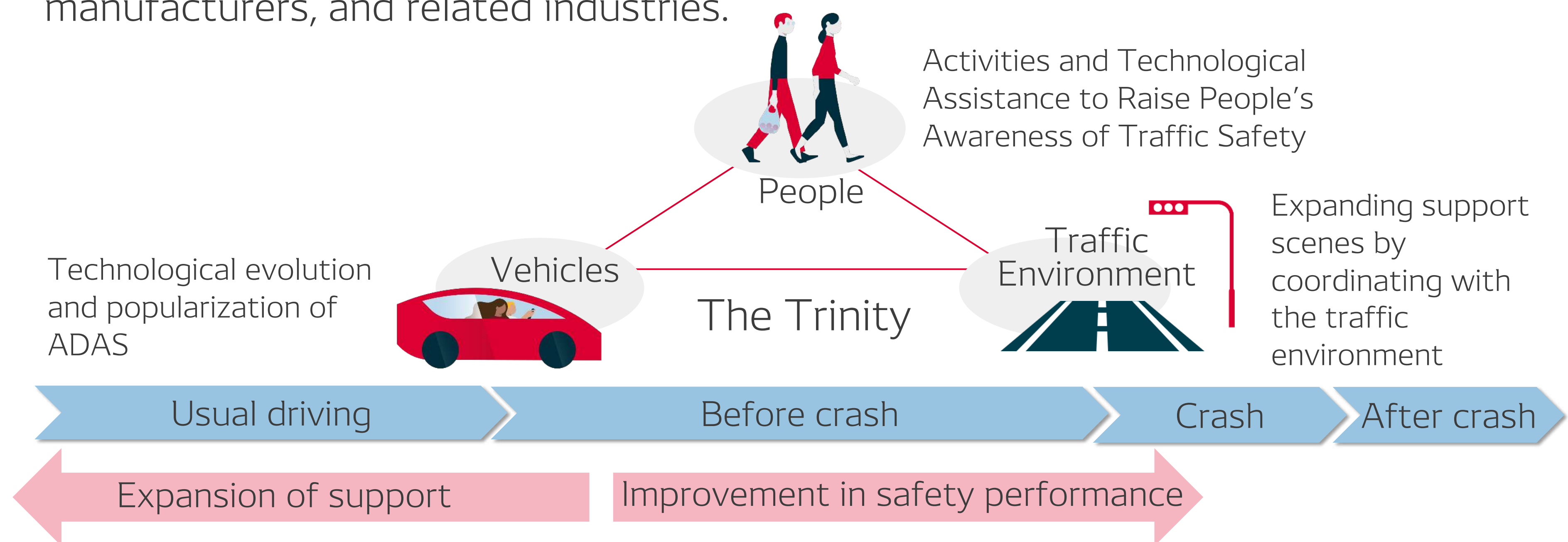
Differentiation Philosophy

- No Code: No coding efforts required for operators. No more technical integrations. Everything is done via a user-friendly interface.
- Service Hub: An open space to select desired services based on customer needs.
- 1-Click Activation: All connections are done in one click without changing backends.

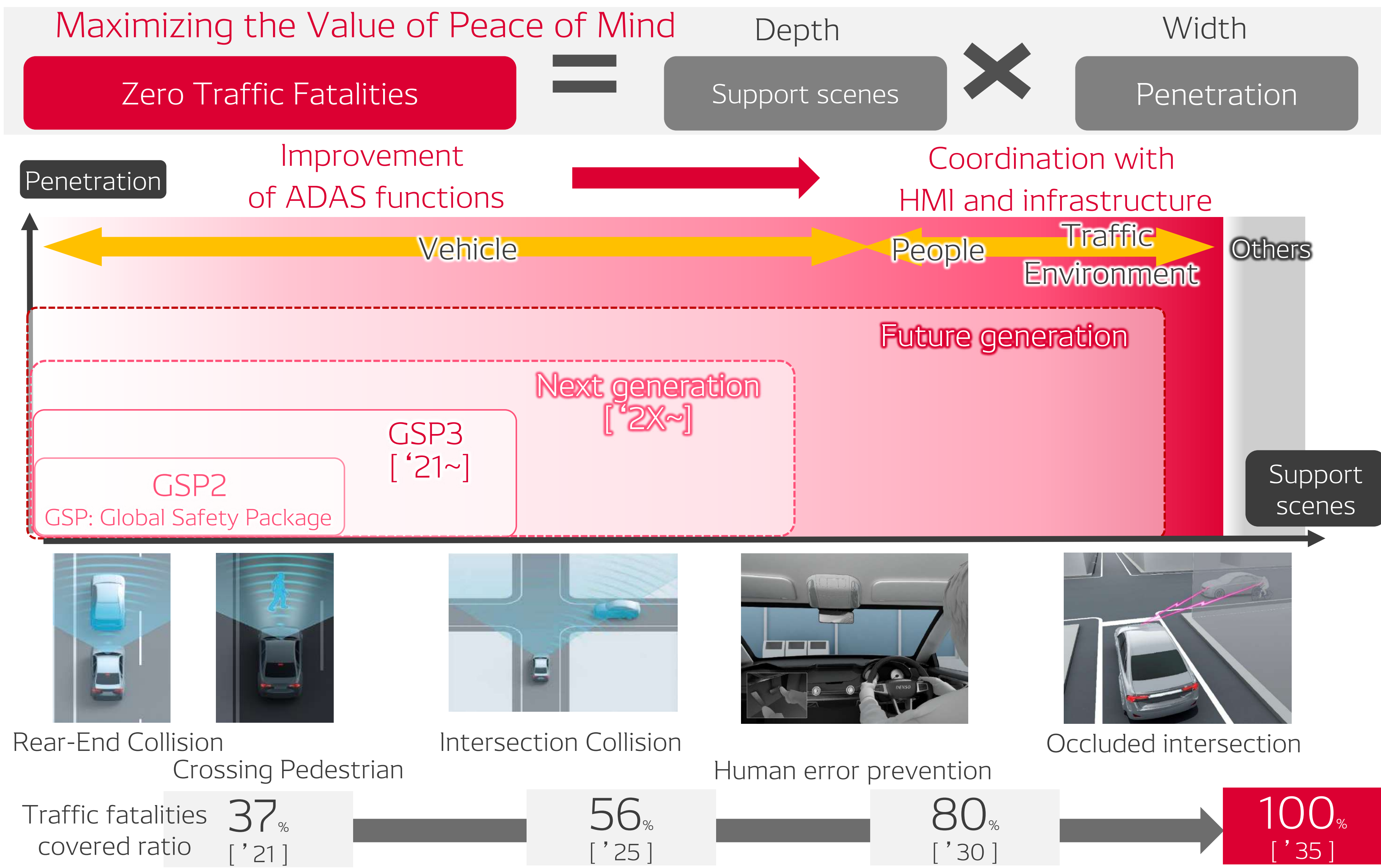
Towards Zero Traffic Fatalities

Highlights

- Aiming for zero traffic fatalities, we strive to realize free movement without traffic accidents.
- Aiming for zero traffic fatalities, we contribute to a society where everyone can move freely with peace of mind by promoting measures for the trinity of “people,” “vehicles,” and “traffic environment” in cooperation with related authorities, manufacturers, and related industries.



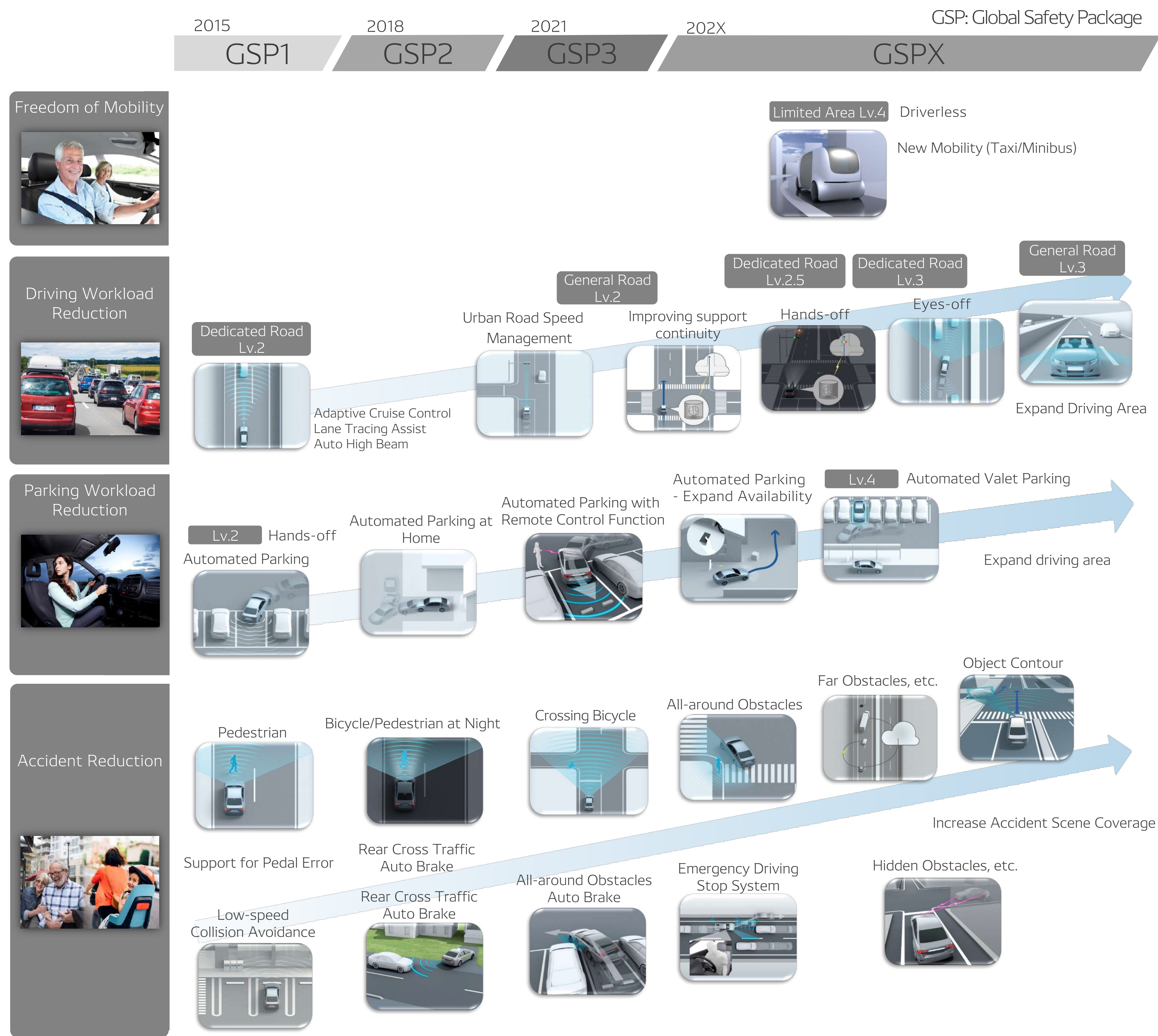
Approach



AD&ADAS Roadmap

Overview

- DENSO aims to create a mobility society without fatalities from traffic accidents, where all people can move safely and with peace of mind.
- By enhancing our long-cultivated sensing and HMI technologies, we will further contribute to the development of automated driving.



The DENSO Parking Assistance System

Future Parking Support Concept

Highlights

- [VR] Smart Parking Support: Provides suitable proposals by an AI agent that detects various parking situations.
 - Intuitive Interaction: Informs the driver of risks with 3D View and 3D audio.
 - Scene Understanding: Understands the surrounding environment and sets a suitable parking position.
- [Movie] Remote Operated Valet Parking: Relieves the stress of parking jams by handing over parking to the service operator.

Functions

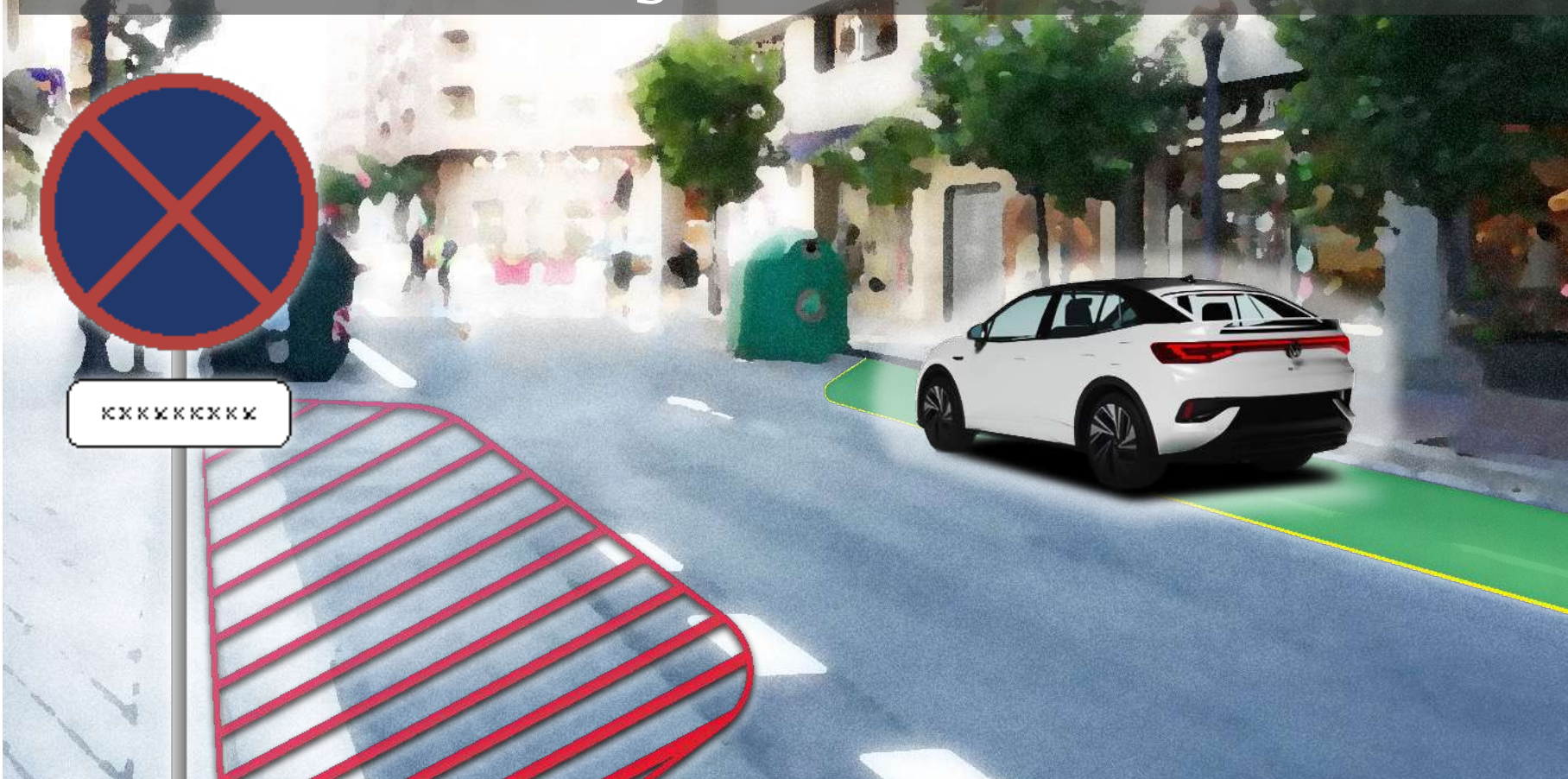
[VR] Smart parking support by AI agent



[VR] Intuitive Interaction by 360-Degree Perception



[VR] Scene Understanding to Enhance Automated Parking



[Movie] Remote Operated Valet Parking by Collaborating Vehicle and Operator



Result

- Safety: Ensures safe driving and parking with a smart support system.
- Stress-Free: Relieves the stress of parking jams by handing over parking to the service operator.

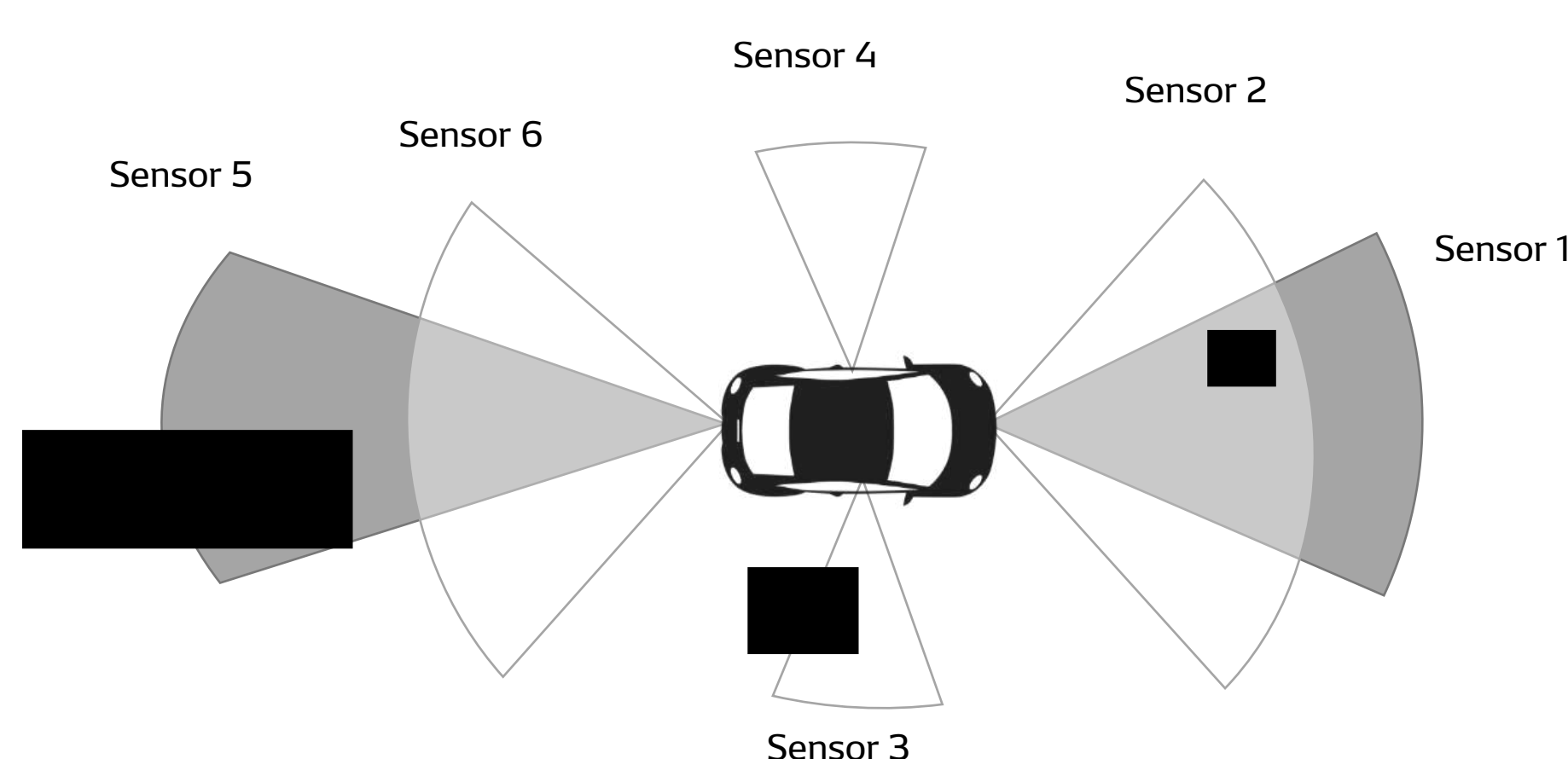
CPM Significance Index for Redundancy Mitigation

Avoiding loss of safety-relevant information

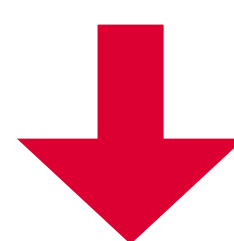
Highlights

- Improving Collective Perception to avoid communication channel overload
- Distributed and collaborative approach for prioritizing sharing of sensor-detected objects to avoid loss of safety-relevant information

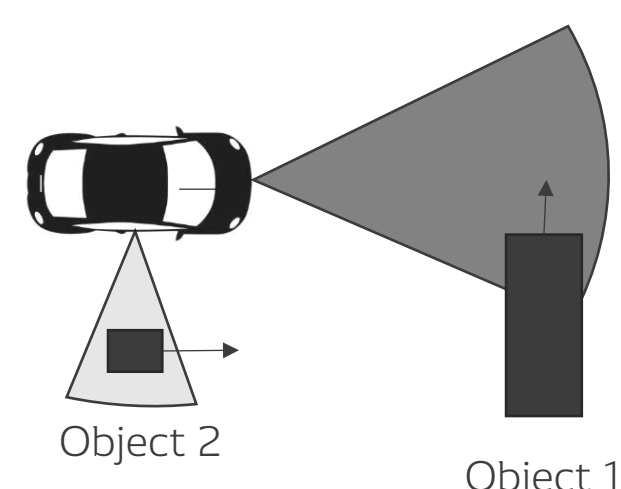
Configuration



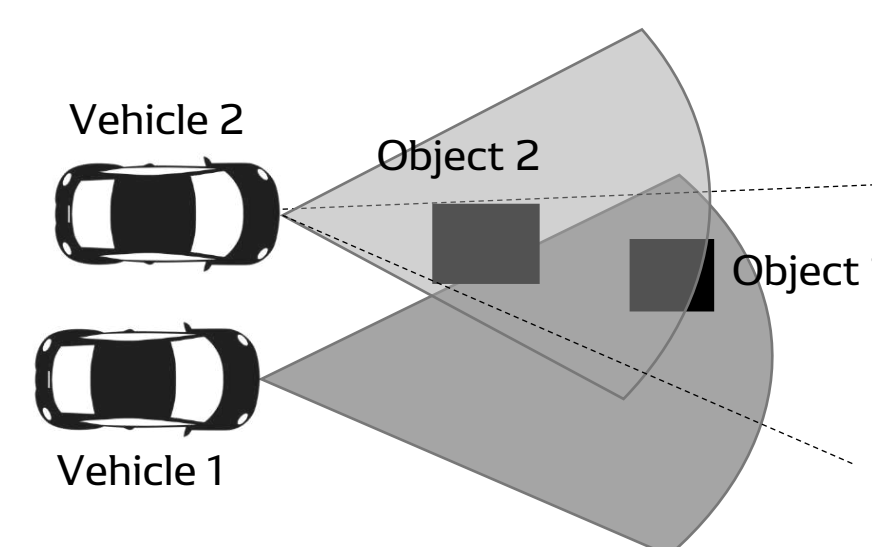
- Collective Perception Messages (CPMs) might contain a large number of detected objects
- Repetitive transmission of large CPMs would result in channel overload
- Channel overload is avoided by dropping packets indiscriminately, i.e. without any intelligence about their content or the significance of the information within
- As a result, CPMs with significant information (e.g. objects with high relevance to the safety of another vehicle) might be dropped



- Idea: adapting the Collective Perception Service (CPS) to include only the most significant objects (from a safety point of view) within a CPM
- Solution: basing the significance of a CPM on the 'significance index (SI)' of the object information within
- Object significance determination examples:



a) Kinematics based:
Object 1 is more significant than Object 2 due to a potential collision path with the vehicle



b) Occlusion based:
Object 1 is more significant than Object 2 for vehicle 2 due to occlusion by Object 1

Result

- The CPM Significance Index (CSI) addresses the issue of potential loss (i.e. non-transmission) of safety relevant objects in Collective Perception Messages (CPMs), especially in situations with high communication channel load