



TOYOTA: *The Road to Zero Carbon*

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Toyota Environmental Challenge



Toyota Environmental Challenge

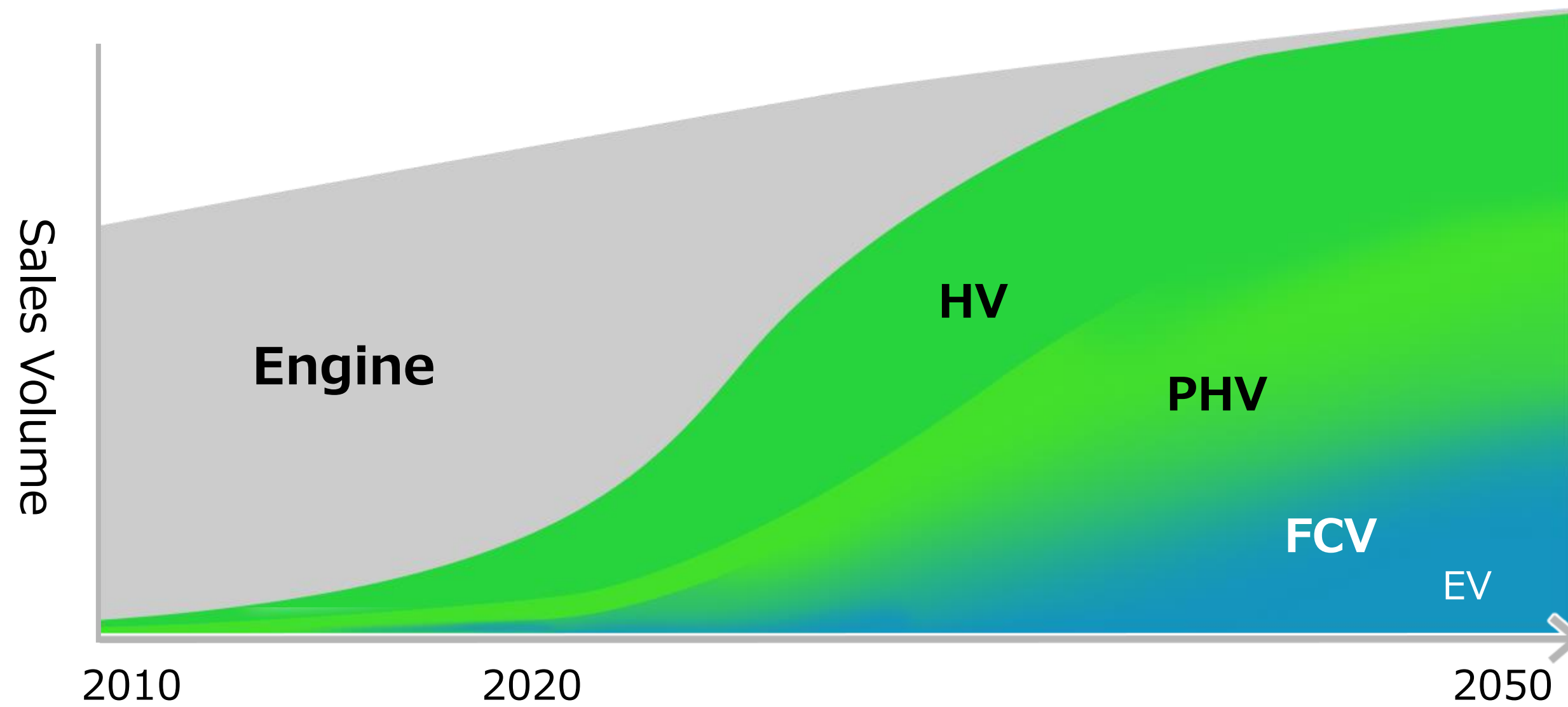




Challenge 1:

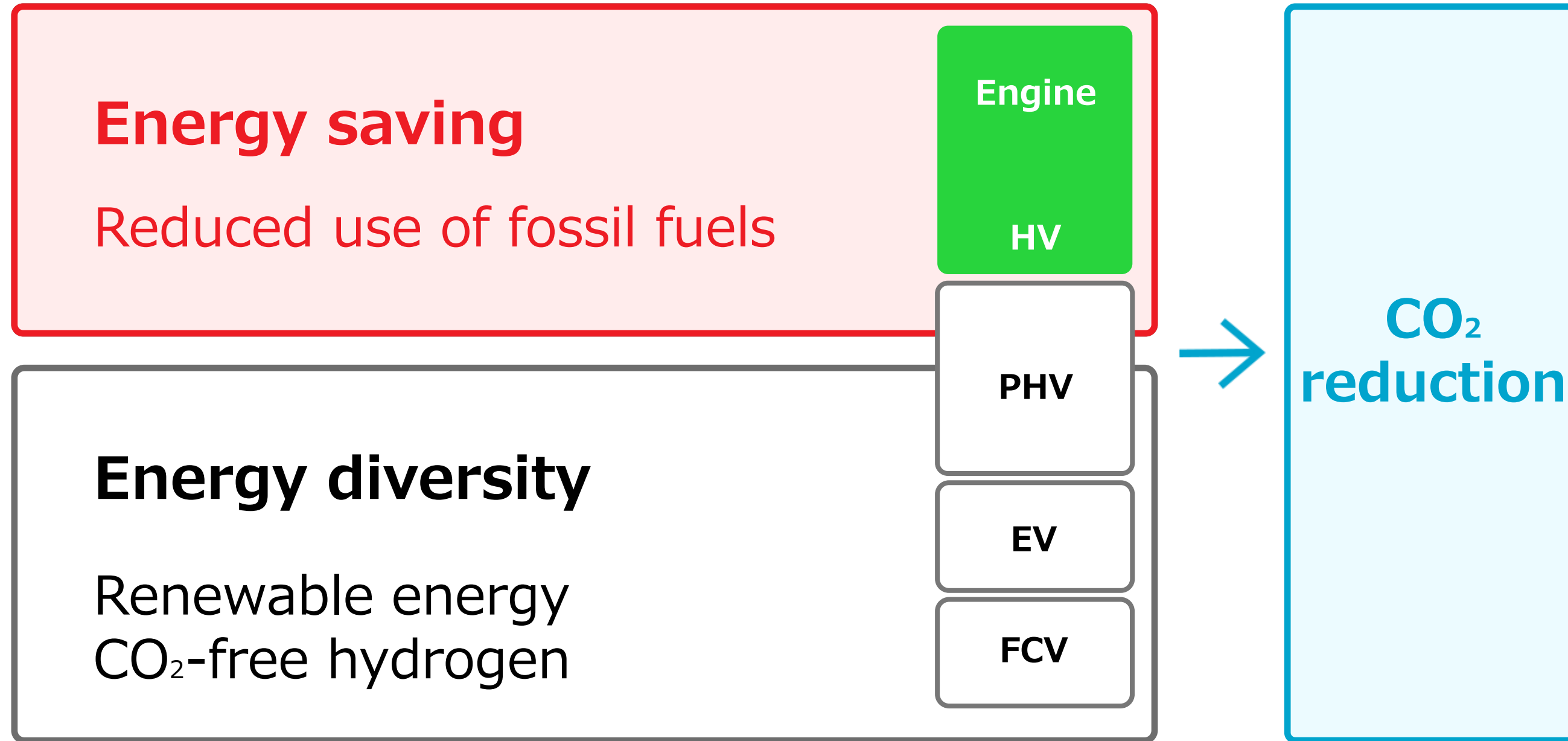
**New Vehicle Zero CO₂
Emissions Challenge**

Deployment of Next Generation Vehicles



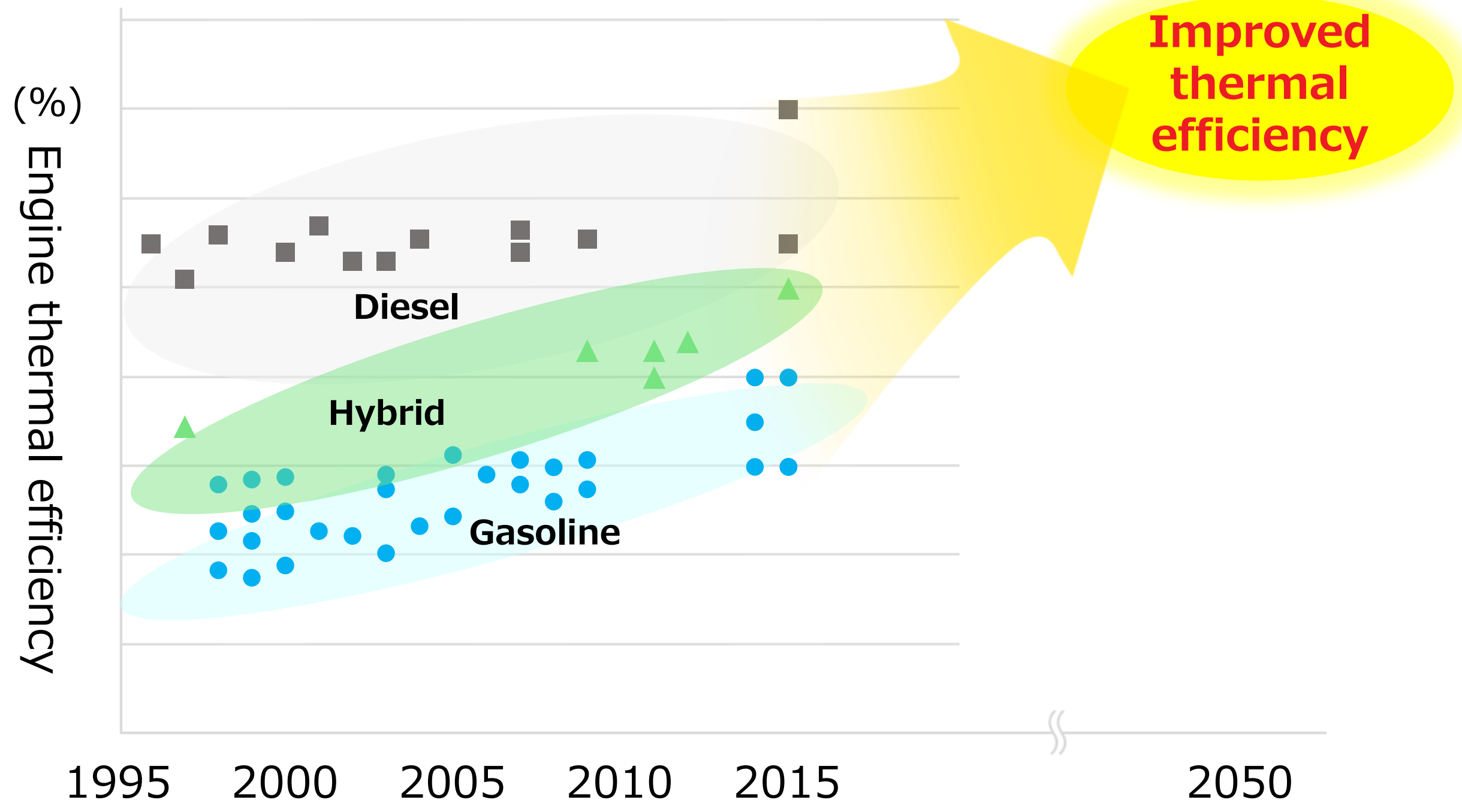
Fleet mix evolution leveraging diversified technology portfolio

CO₂ Reduction Initiatives



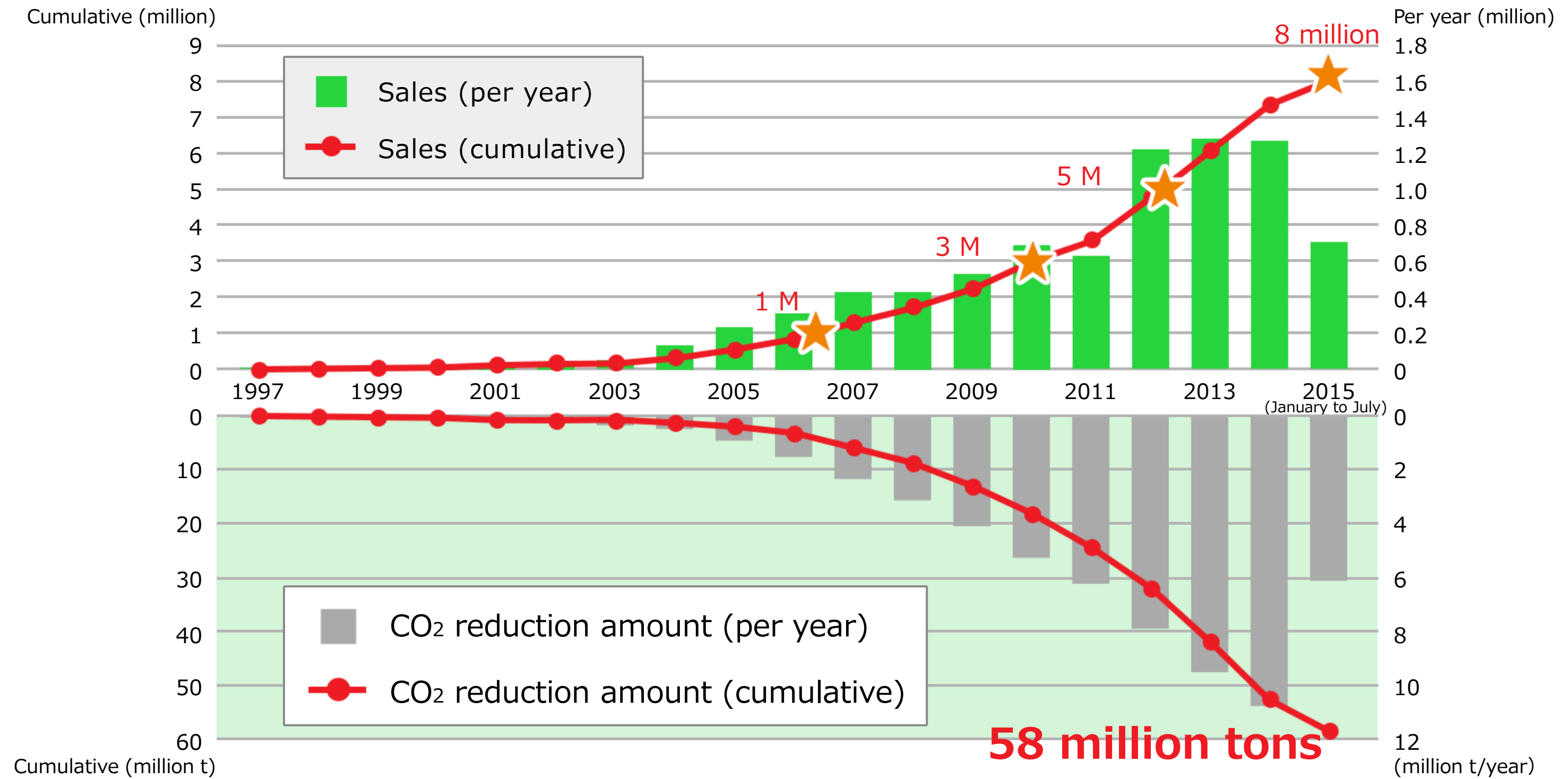
Short/mid-term promotion of energy saving solutions

Powertrains with Improved Efficiency



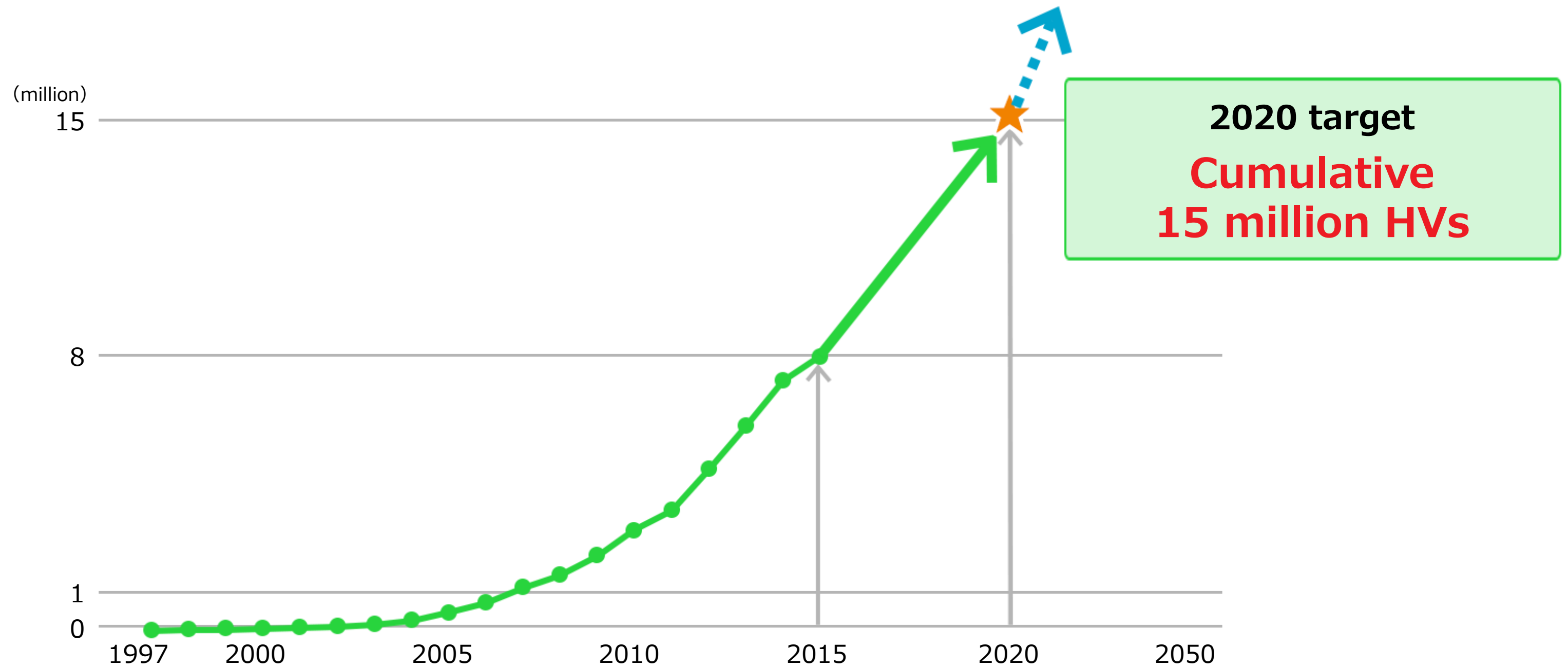
Aiming for further thermal improvement

HV: Sales



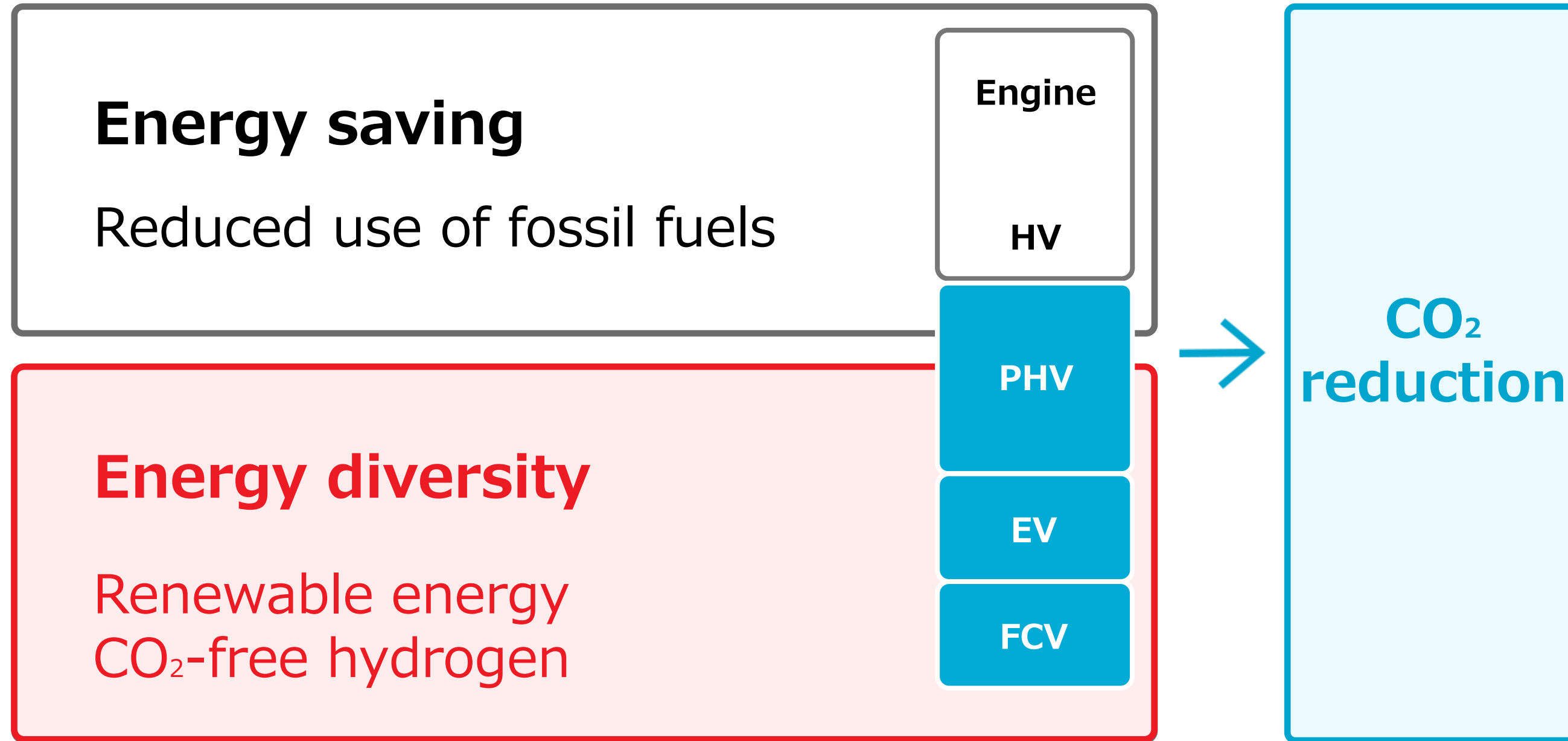
58 million tons of cumulative CO₂ reduction

Cumulative HV Sales Target



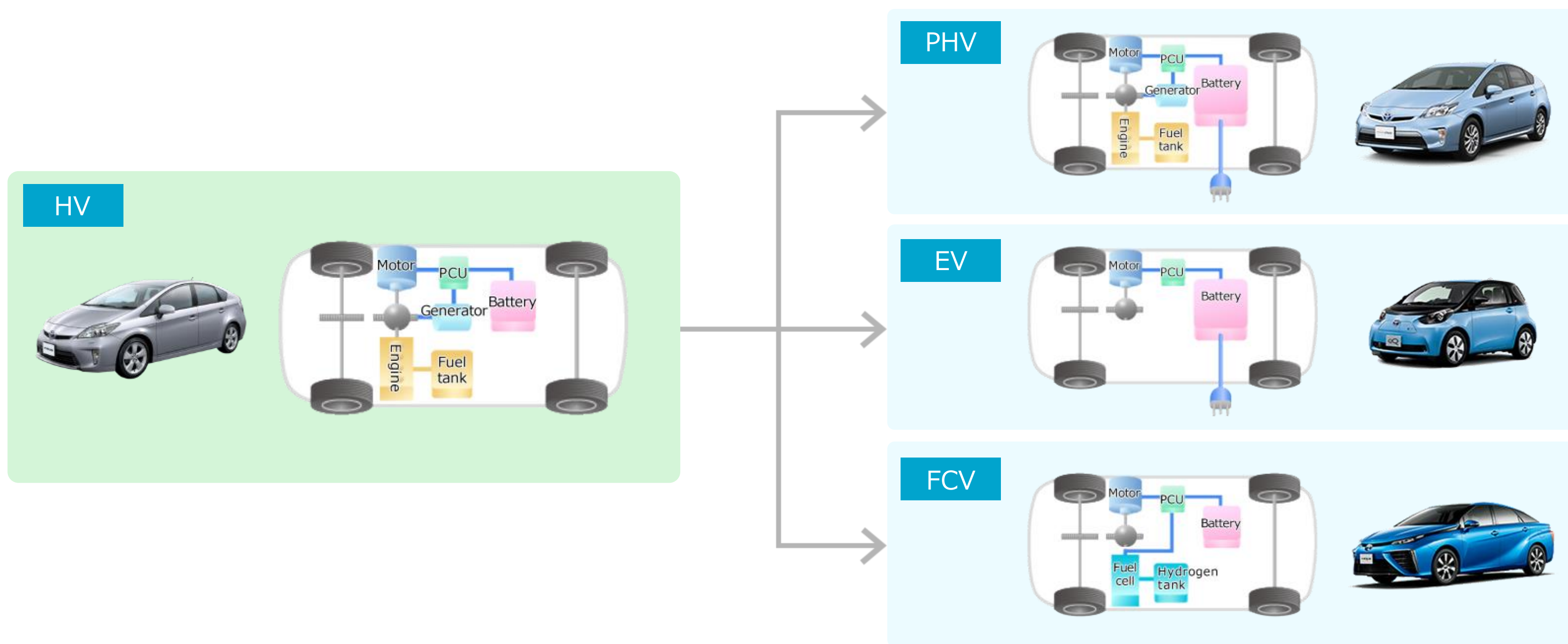
HV target: 15 million in 2020

CO₂ Reduction Initiatives



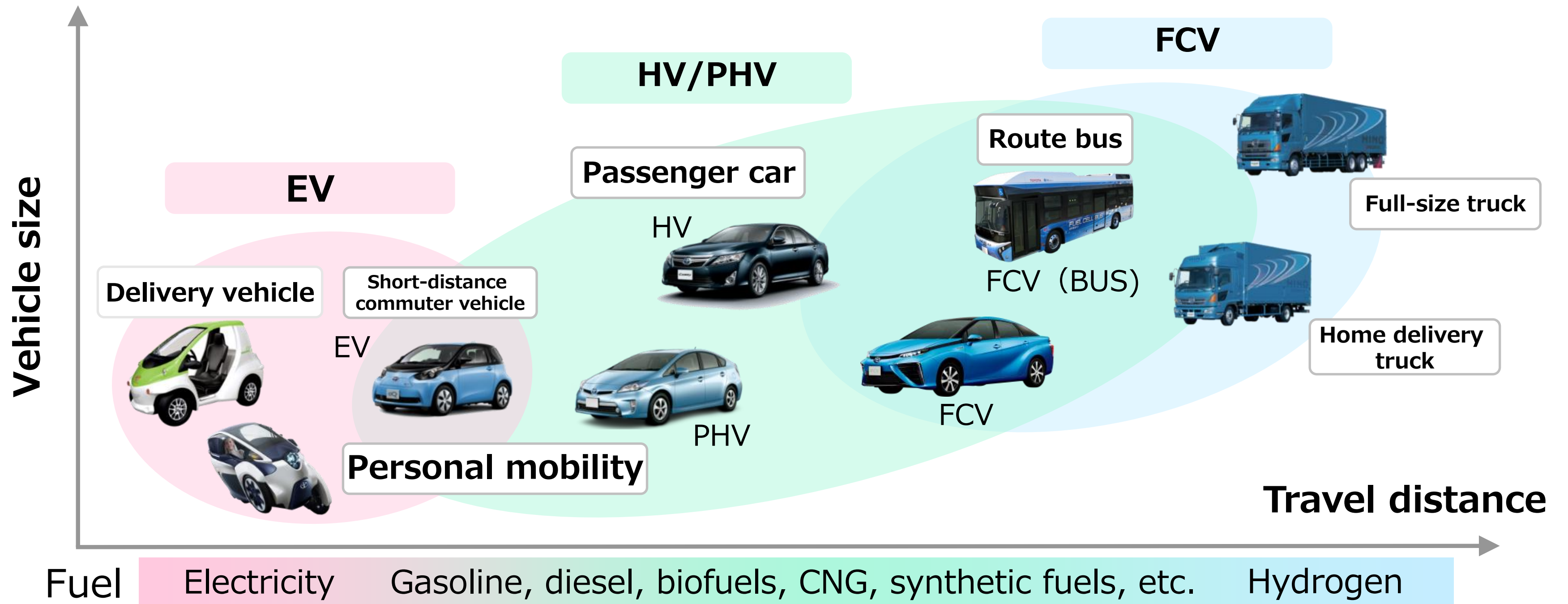
Renewable energy and CO₂-free hydrogen power

Application of Hybrid Advances



HV technology advances extend to other motor applications

Fuel Diversity and Uses



EV: Short-distance; HV & PHV: Wide-use; FCV: Medium-to-long distance

Hydrogen FCV



FCV "MIRAI": Major Market Intro – 2014/15

Advantages of FCV

Energy diversity

- Hydrogen sourced from a wide variety of primary energy

Zero emissions

- Zero tailpipe CO₂

Fun to drive

- Electric motor enables smooth, quiet driving
- Excellent acceleration at start to low/mid speed



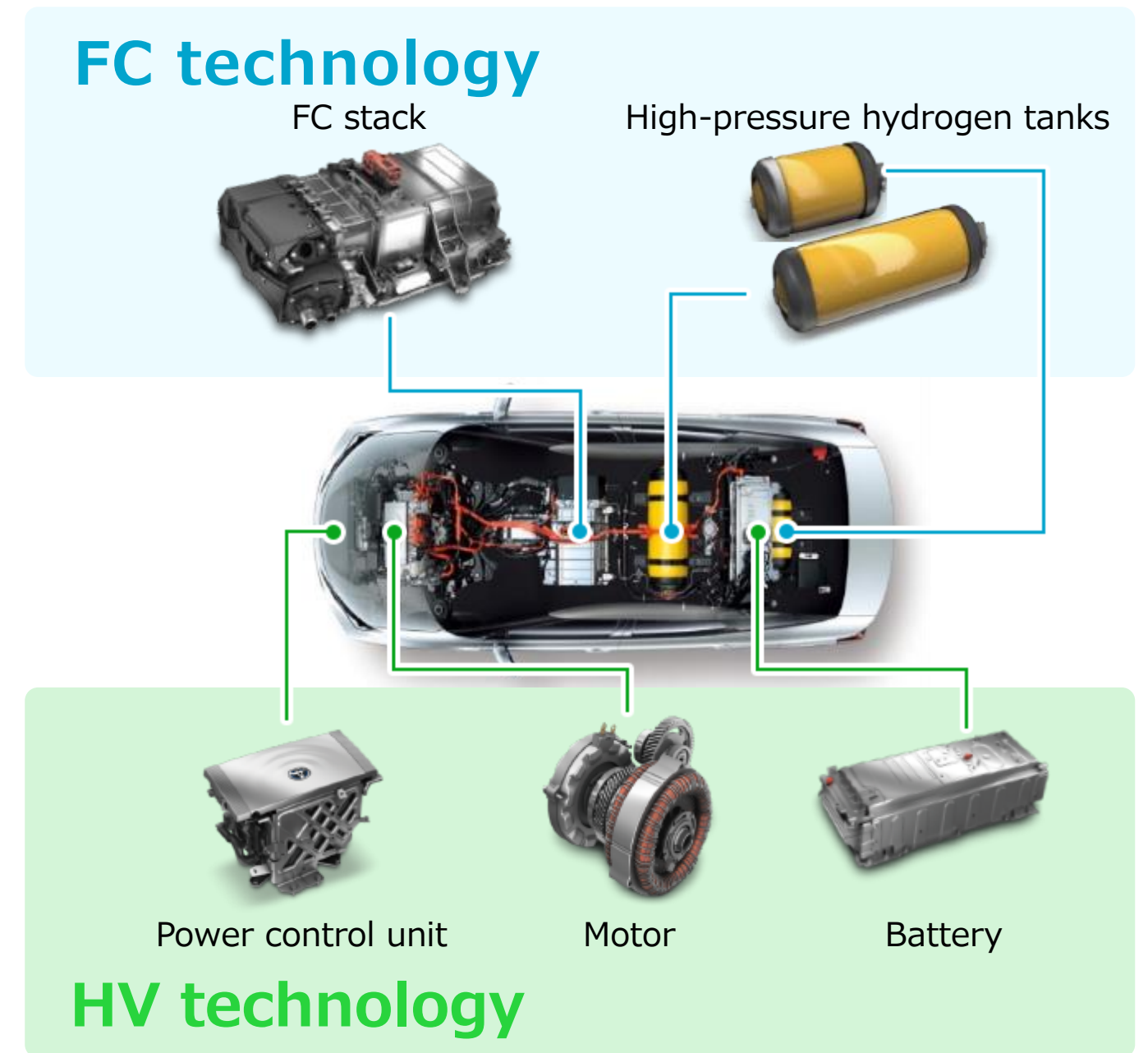
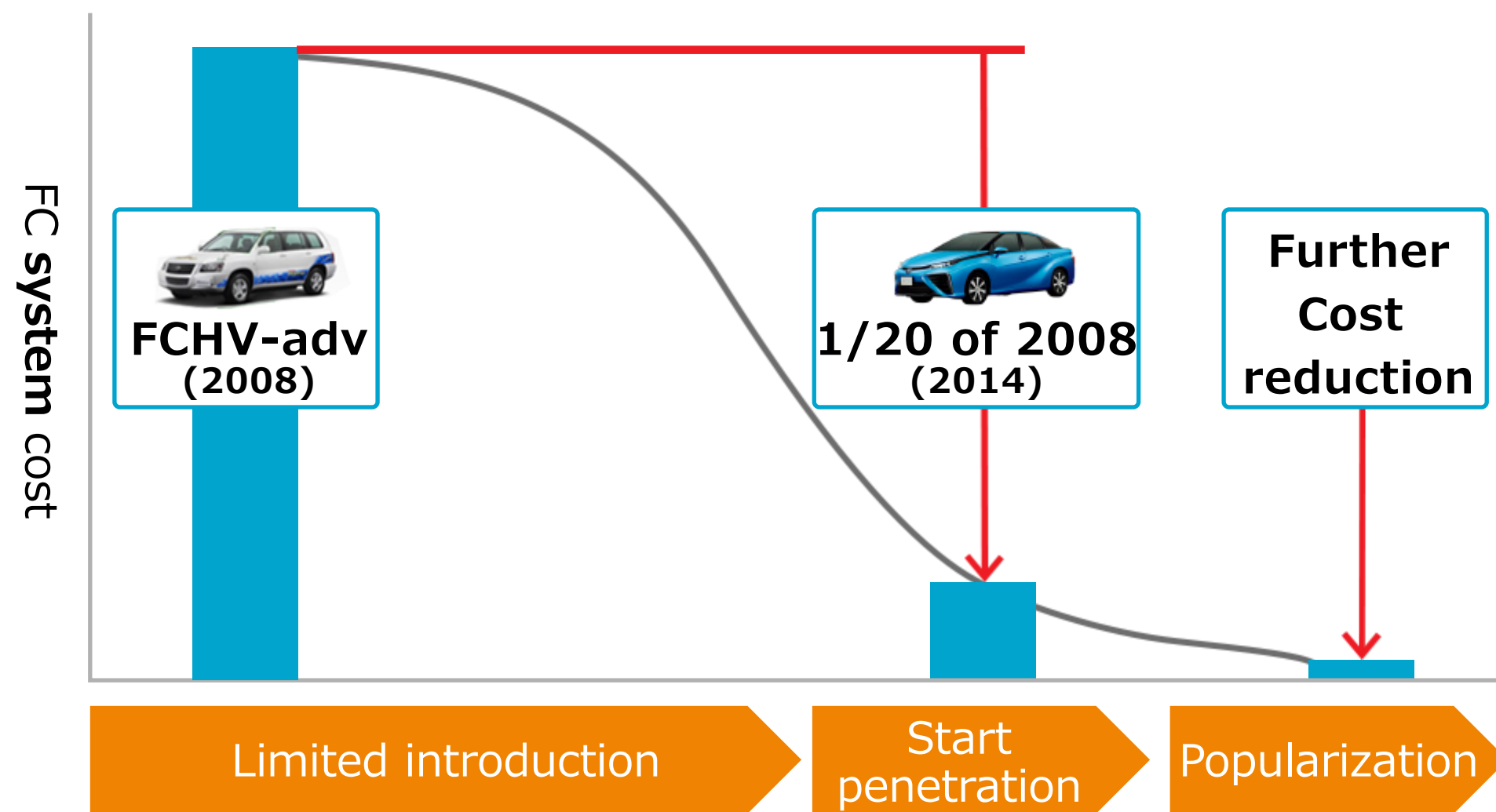
Usage

- Range (gasoline equivalent)
- Refueling (about 3 minutes)

Power supply (emergency use)

- High capacity

Cost Reduction of FCV



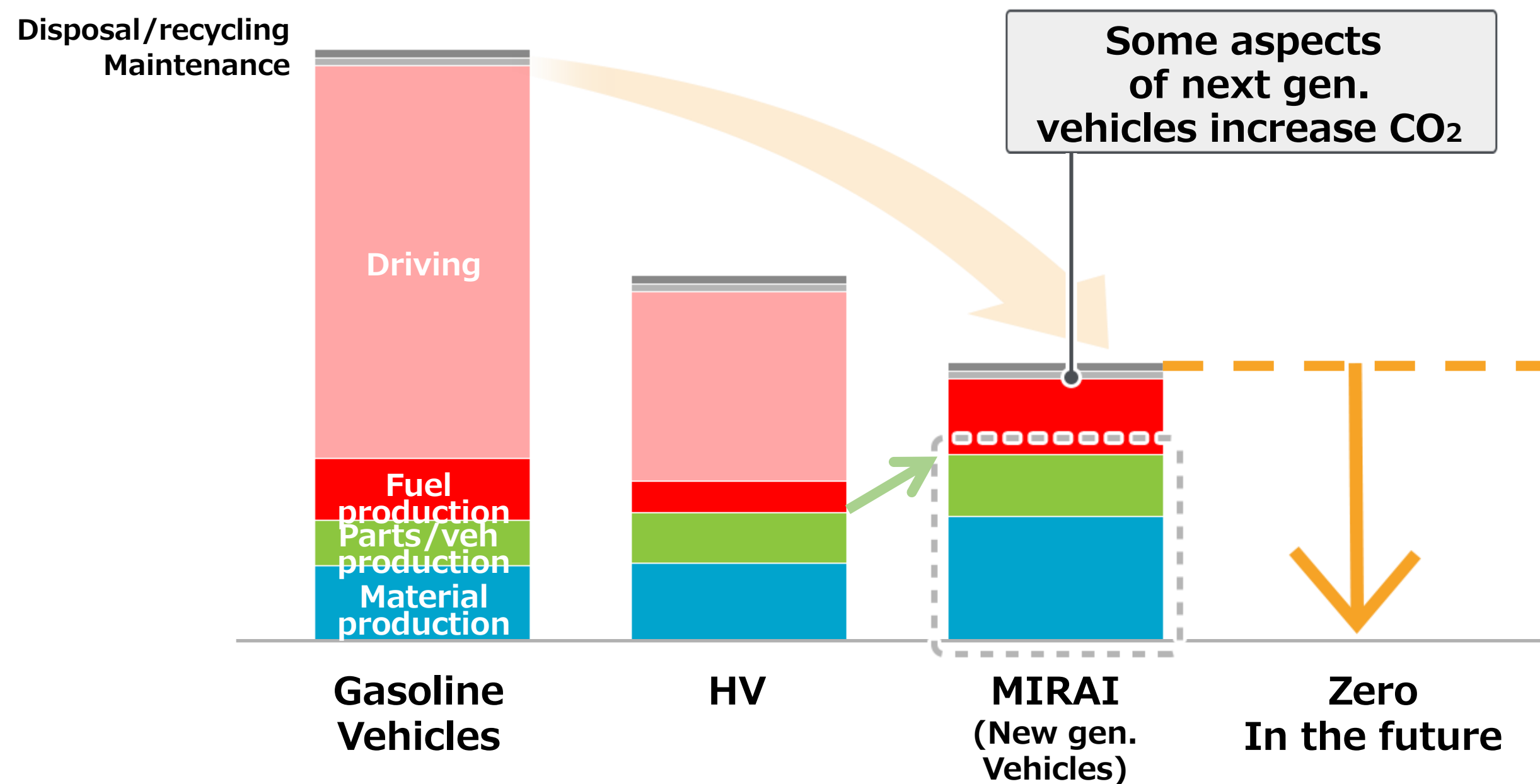
Apply HV technology to accelerate cost reduction



Challenge 2

Life Cycle Zero CO2

Challenge 2: Life Cycle Zero CO₂



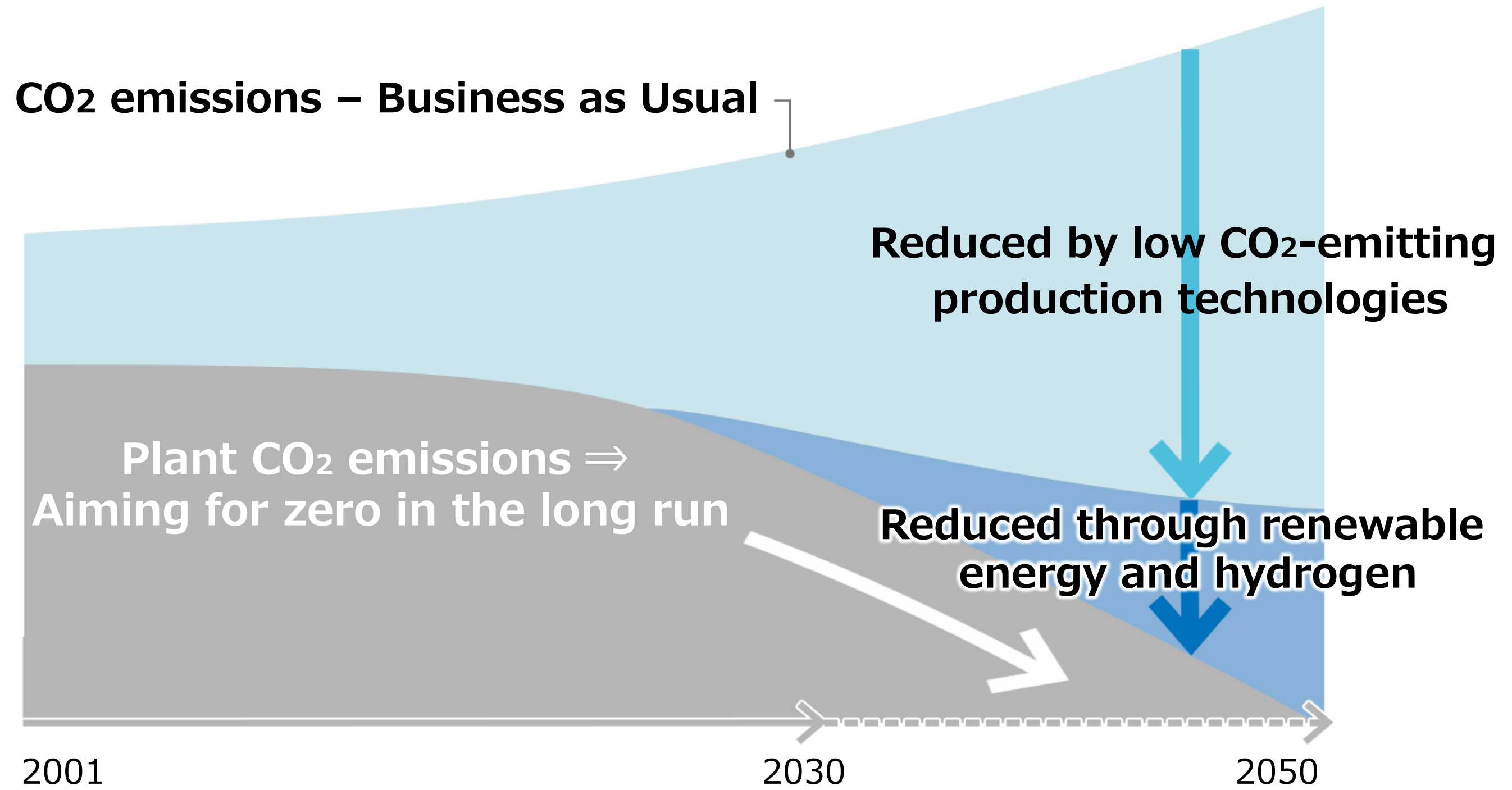
Next generation vehicle approaches zero CO₂ during driving however, steps back in material, parts/vehicle production



Challenge 3

Plant Zero CO₂ Emission Challenge

Reducing CO₂ in Production

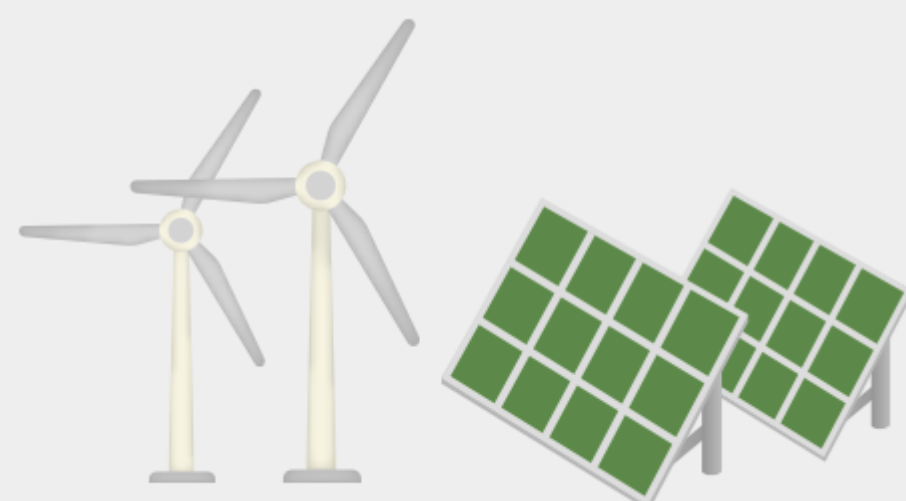


Energy sources/technology combine to offset emissions

The Role of Renewable and Hydrogen Energy

Renewable energy use

Direct use of solar and wind power generation



Renewable energy

Electricity →



Hydrogen energy use

- Power generation from CO₂-free hydrogen
- Use of liquid hydrogen evaporation heat air conditioning
- Use hydrogen combustion in the production process

CO₂-free hydrogen

Liquid hydrogen tank



Cold, Heat & Combustion

Electricity

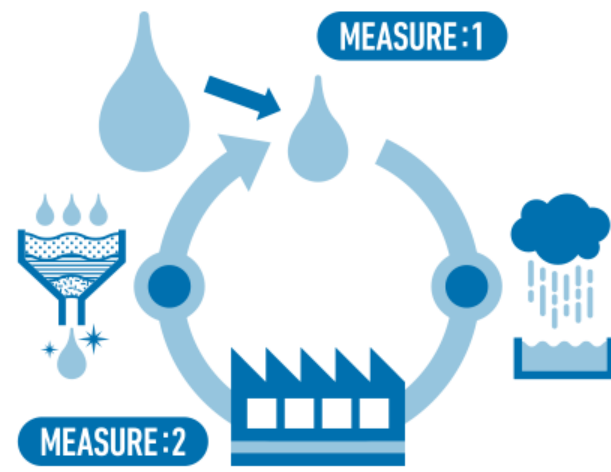
Filling

Hydrogen power generation etc.

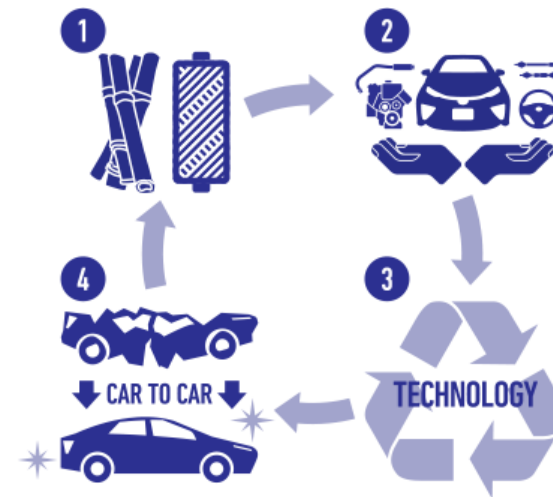


Conversion to renewable and hydrogen energy sources

Comprehensive Approach to Sustainability



CHALLENGE 4
 Challenge of Minimizing and Optimizing Water Usage



CHALLENGE 5
 Challenge of Establishing a Recycling-based Society and Systems

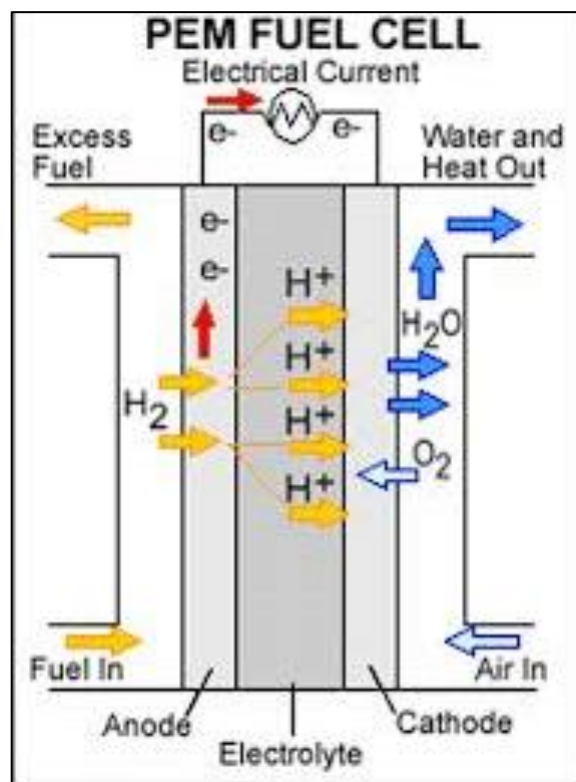


CHALLENGE 6
 Challenge of Establishing a Future Society in Harmony with Nature



Complementary efforts beyond vehicles and production

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