

# Hydrogen Society - towards Sustainable Mobility



**World Materials Forum**  
Session “Fuels Cells: Making it affordable”

**Gerald Killmann**  
Vice President R&D  
Toyota Motor Europe



# Toyota's challenging environmental targets



## CHALLENGE 1

New vehicle  
Zero CO<sub>2</sub>  
Emissions Challenge



## CHALLENGE 4

Challenge of  
Minimizing and  
Optimizing  
Water Usage



## CHALLENGE 2

Life Cycle  
Zero CO<sub>2</sub>  
Emissions Challenge



## CHALLENGE 5

Challenge of  
Establishing a  
Recycling-based  
Society and Systems



## CHALLENGE 3

Plant Zero CO<sub>2</sub>  
Emissions Challenge

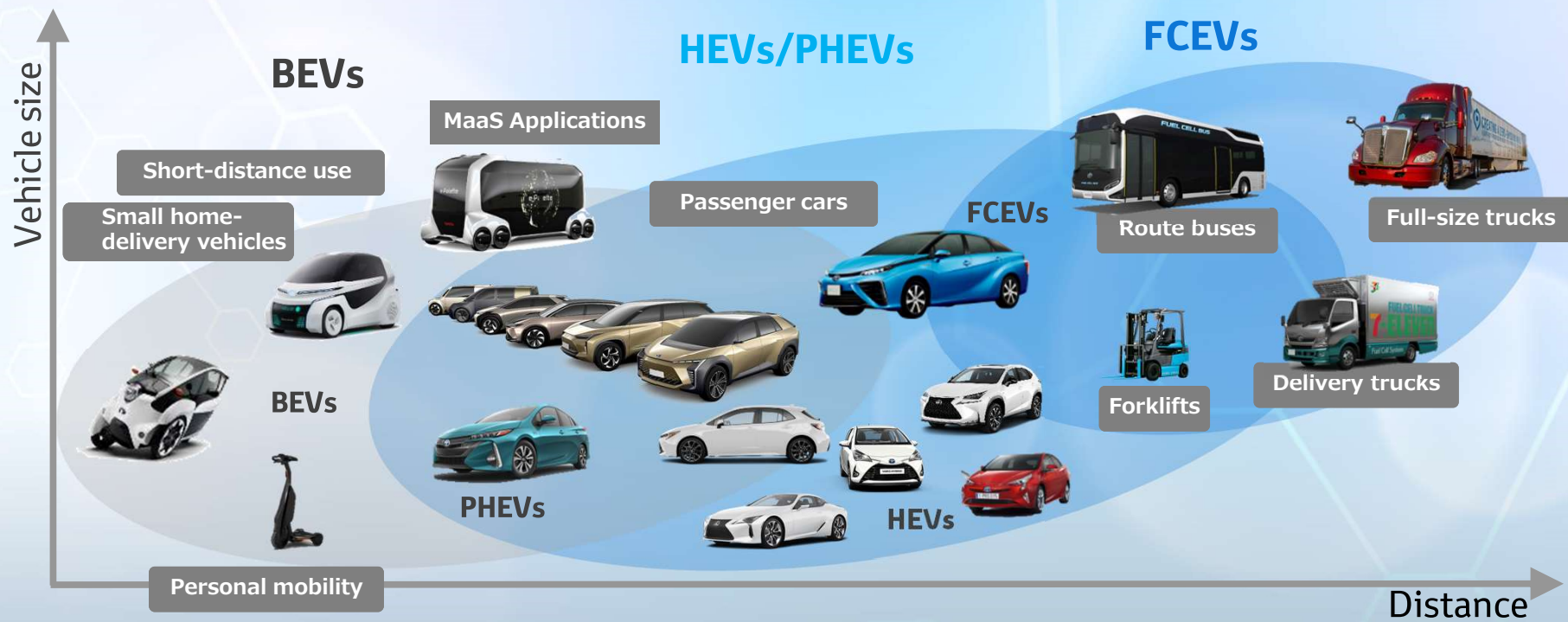


## CHALLENGE 6

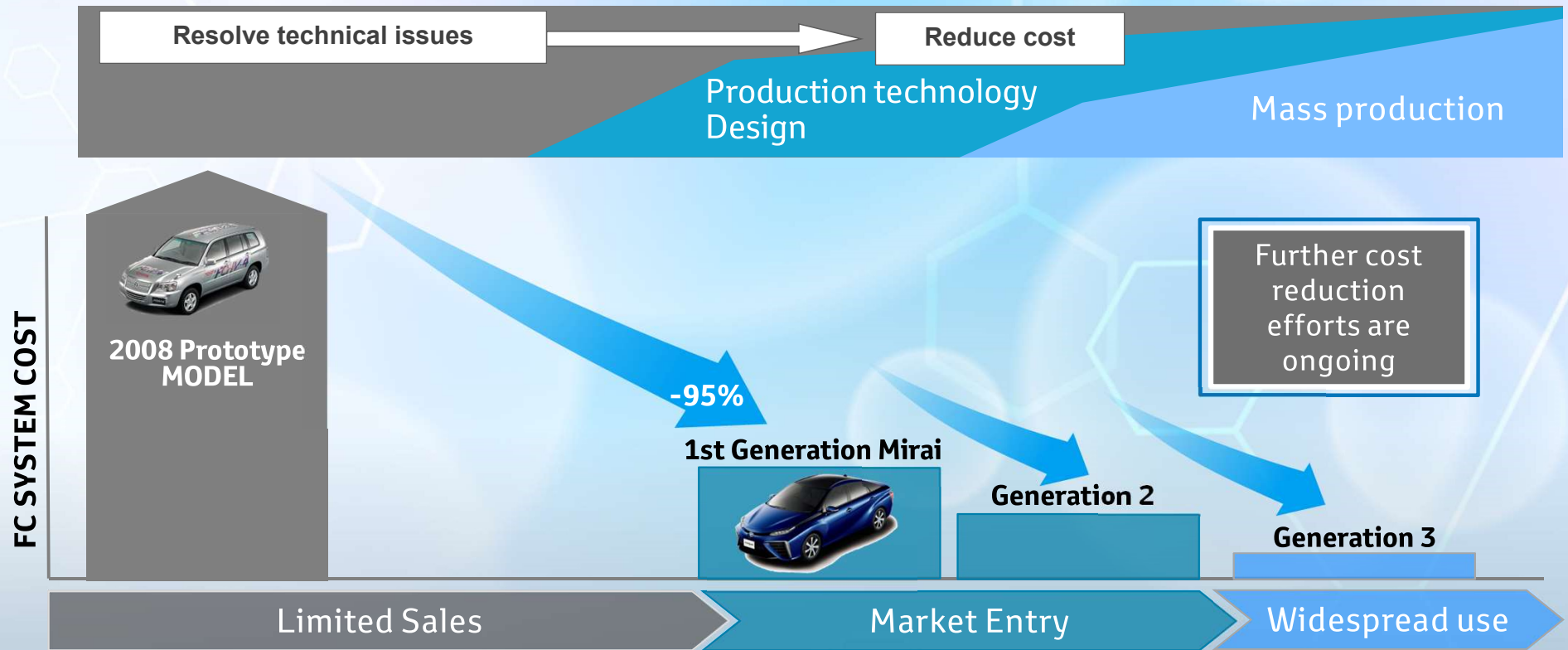
Challenge of  
Establishing a  
Future Society in  
Harmony with Nature



# Diversification of HEV, PHEV, BEV and FCEV

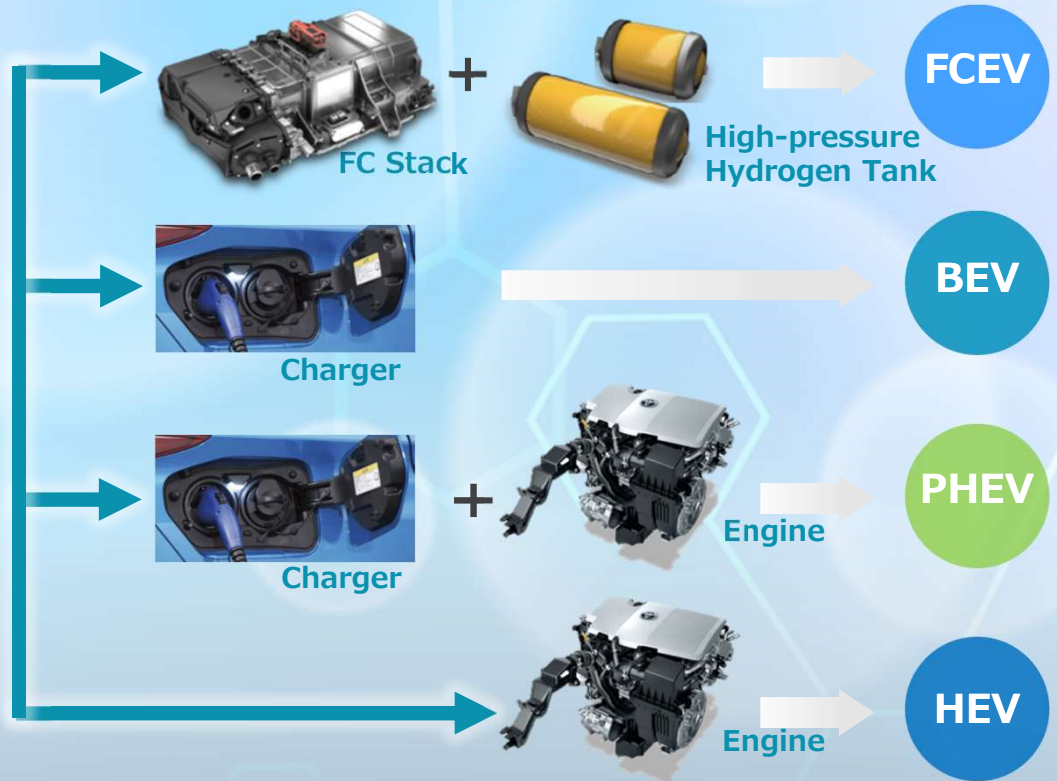
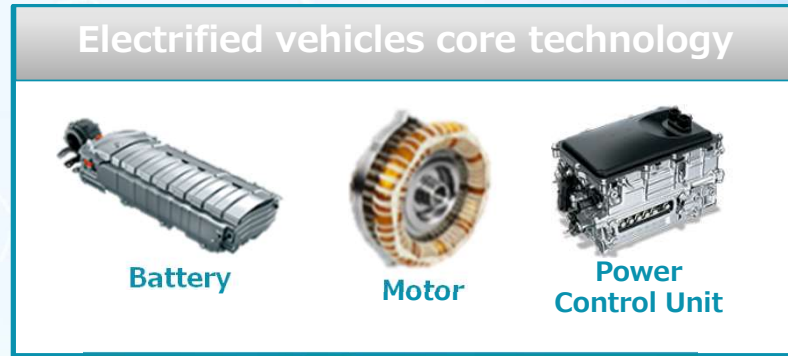


# FC system: Cost reduction roadmap

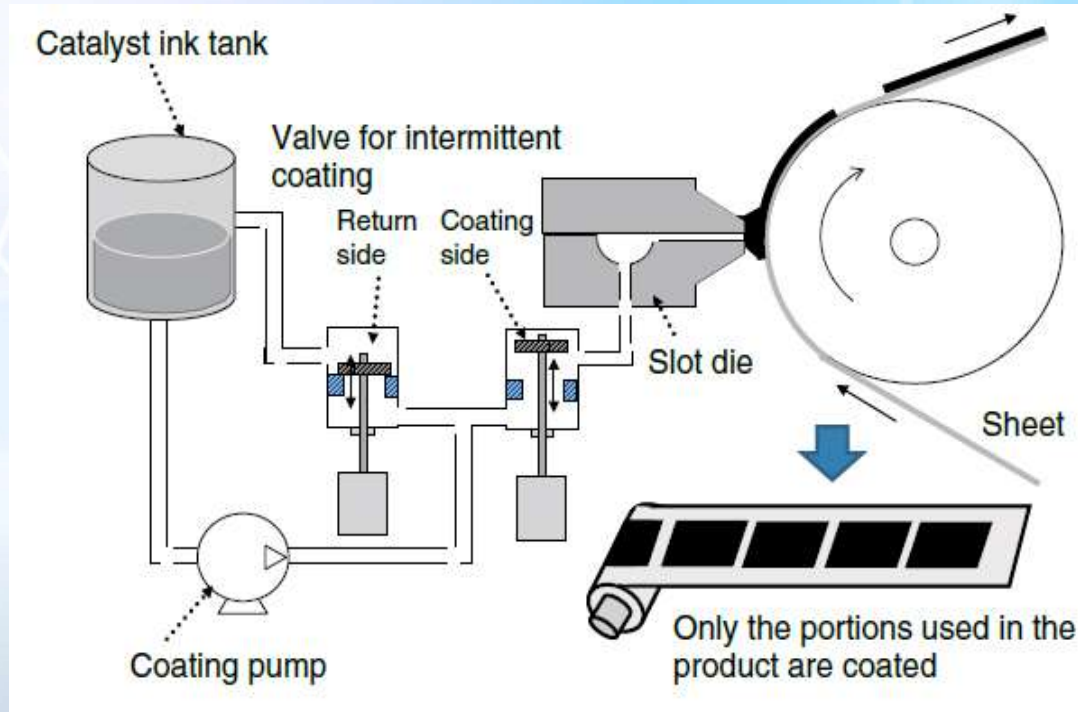




# Toyota's core technology for electrified vehicles

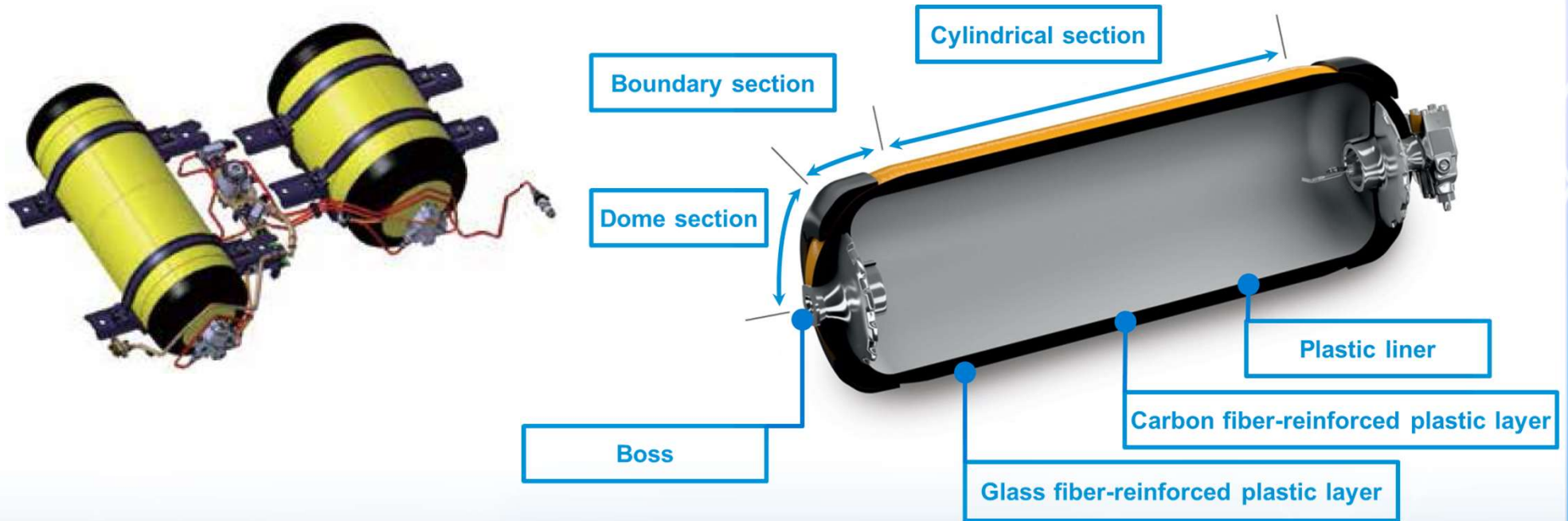


# Production technology: Fuel Cell



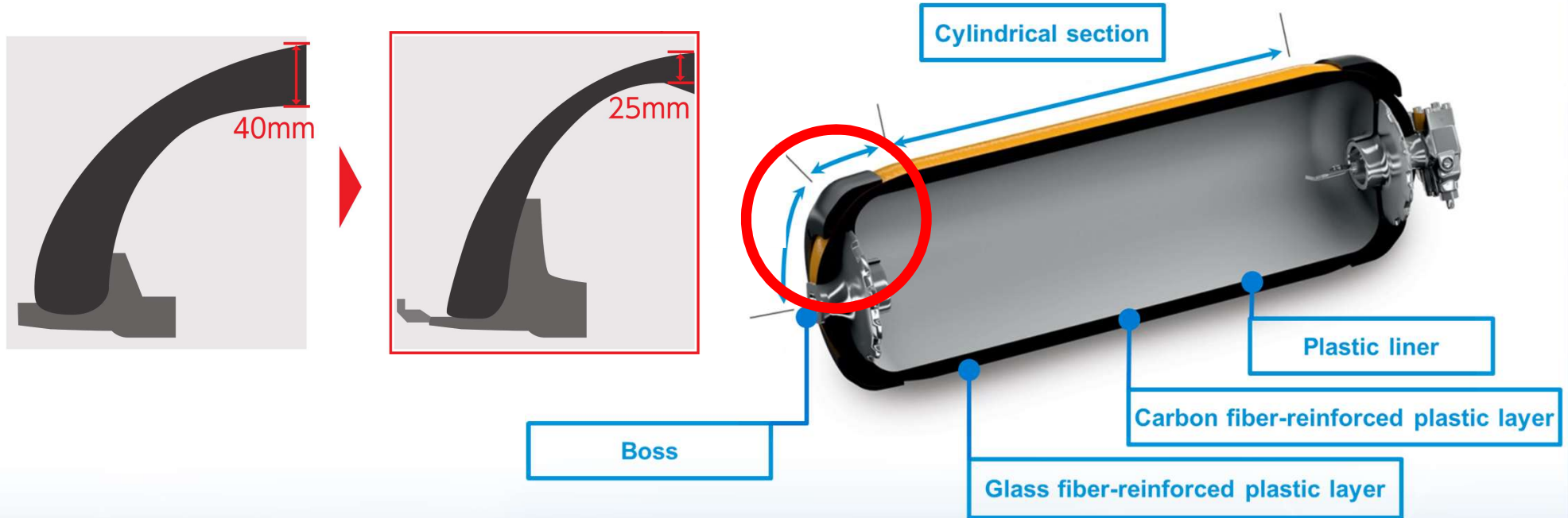
Intermittent slot die coating technology for catalytic layers reducing the amount of Pt used

# Production technology: H<sub>2</sub> tank



CFRP tank developed for Mirai

# Production technology: H<sub>2</sub> tank



CFRP tank developed for Mirai

Lamination method reduces required CFRP by about 20%



# FCEV growth through diversification

## Passenger Vehicles



Performance improvement  
and cost reduction

## FC technologies



Increase  
demand



Contribution to  
infrastructure development

## Commercial Vehicles



Substantial hydrogen  
consumption

## Industrial use



# FC volume ↑: Second generation Mirai



Pictures: Mirai Concept

Production volume x10  
30000 stacks / year

New factory building to include stack production



# H2 demand ↑: Commercial, industrial applications



**Industrial &  
Residential Use**

**Small trucks**



**CaetanoBus**

First FC stack buyer in Europe



**Zero Emission Truck prototype**

Feasibility Study: Toyota Project Portal  
Hydrogen Fuel Cell Truck





# A society of diverse energy sources, combining electricity and hydrogen

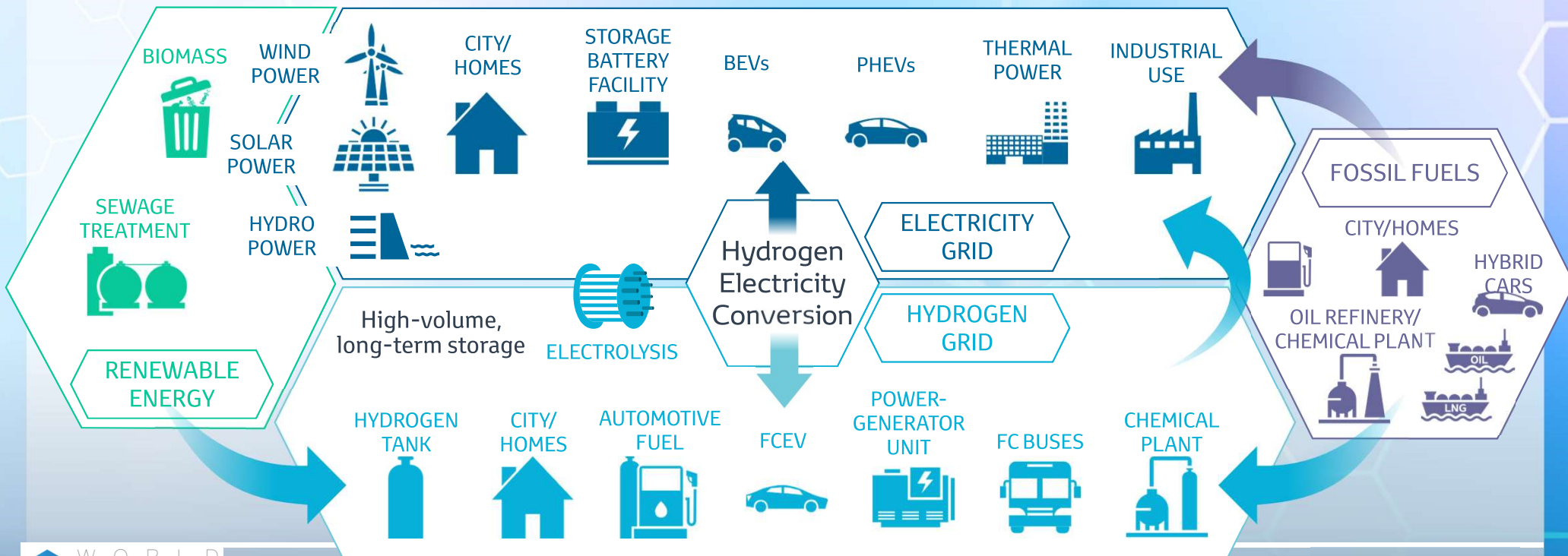
Sustainable mobility in a society where BEV and FCEV coexist

ENERGY FLOW

ELECTRICITY

HYDROGEN

FOSSIL FUELS







Thank you for your kind attention !

