Co-funded by
the European Union

TOYOTA HYBRID EXCELLENCE

NOVEMBRIS 2023, RVT

WHY HYBRID?

TOYOTA GLOBAL VISION

VIENMĒR LABĀKAIS VEIDS/CEĻŠ/RISINĀJUMS

“Toyota rādīs ceļu uz mobilitātes nākotni, bagātinot dzīvi visā pasaulē ar visdrošākajiem un atbildīgākajiem cilvēku pārvietošanas veidiem.”

TOYOTA: ELEKTRIFIKĀCIJAS EKSPERTS

WE LAUNCHED ELECTRIFIED VEHICLES DECADES BEFORE COMPETITORS

24
gadu pieredze hibrīda jomā

20
miljons hibrīdu pārdoti visā pasaulē

44
Toyota un Lexus Hybrid modeļi visā pasaulē

120
million tons of CO_2 saved

TOYOTA VIDES IZAICINĀJUMS 2050

6 DROSMĪGI IZAICINĀJUMI ILGTSPĒJĪGAI SABIEDRĪBAI

CHALLENGE 1

Reduce the average CO_2 emissions of new vehicles by 90% vs. 2010 levels.

2030
At least 35% CO_2 emissions reduction compared to 2010

CHALLENGE 2

Eliminate CO_2 emissions at every stage of the vehicle's life cycle.

2030
At least 25% CO_2 emissions reduction compared to 2013

CHALLENGE 3

Eliminate CO2 emissions from production plants in the operating cycle

2030
35% CO_2 emissions reduction from global plants compared to 2013

CHALLENGE 4

Reduce the quantity of water used in vehicle production plants

2030
Full assessment of water quality at 22 plants around the world

CHALLENGE 5

Contribute to the creation of a recycling-based society

2030
At least 25% CO_2 emissions reduction compared to 2013

CHALLENGE 6

Contribute to the creation of a society in harmony with nature

2030
35% CO_2 emissions reduction from global plants compared to 2013

TOYOTA ELEKTRIFIKĀCIJAS STRATĒĢIJA

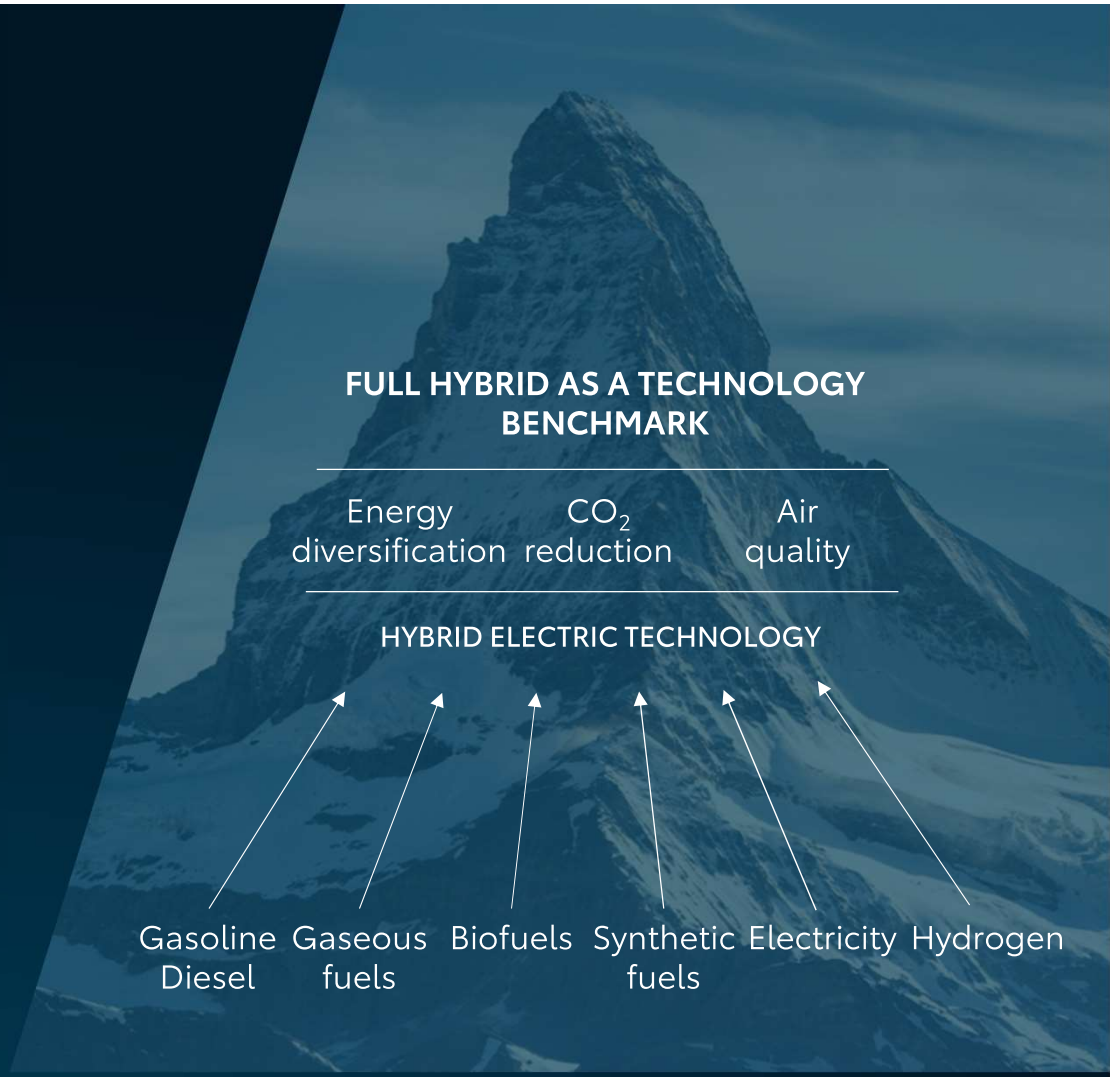
ILGTSPĒJĪGAS MOBILITĀTES VĪZIJA

HIBRĪDS PAMATĀ

Dažādām elektrificētām tehnoloģijām un degvielām būs nozīme ilgtspējīgas mobilitātes nodrošināšanā.

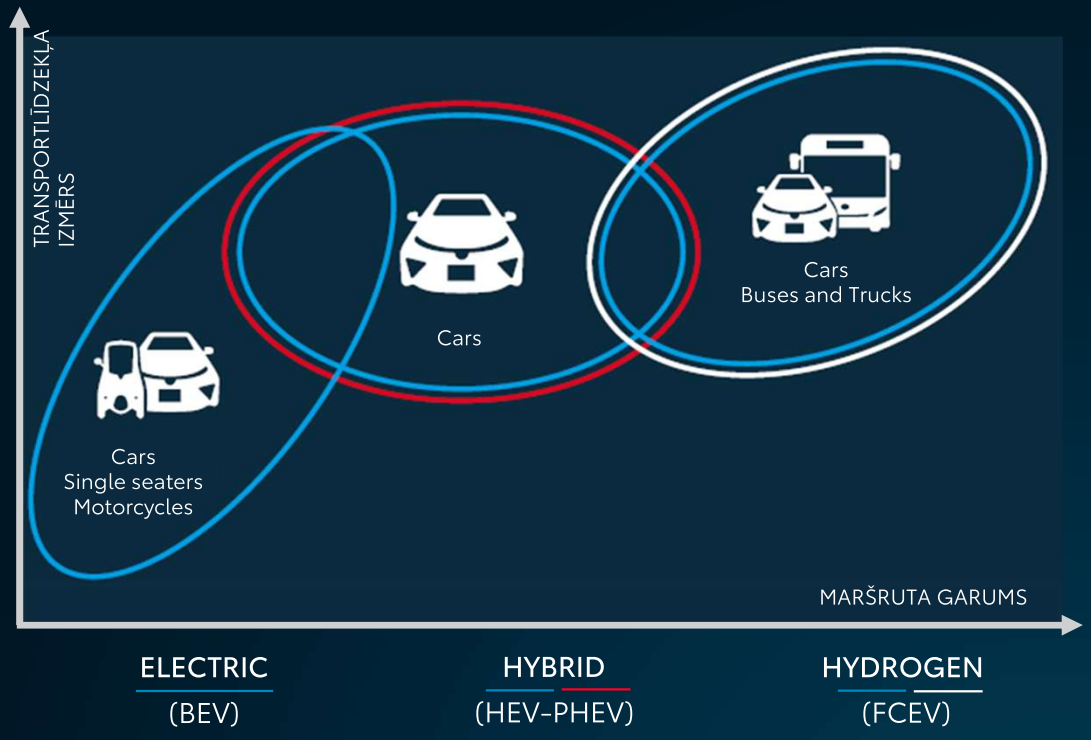
Toyota Hybrid Electric arhitektūra būs galvenā.

Visus elektrifikācijas veidus (BEV, PHEV un FCEV) var atvasināt no Toyota hibrīda sistēmas pamata arhitektūras.



TOYOTA'S ELECTRIFICATION SOLUTIONS

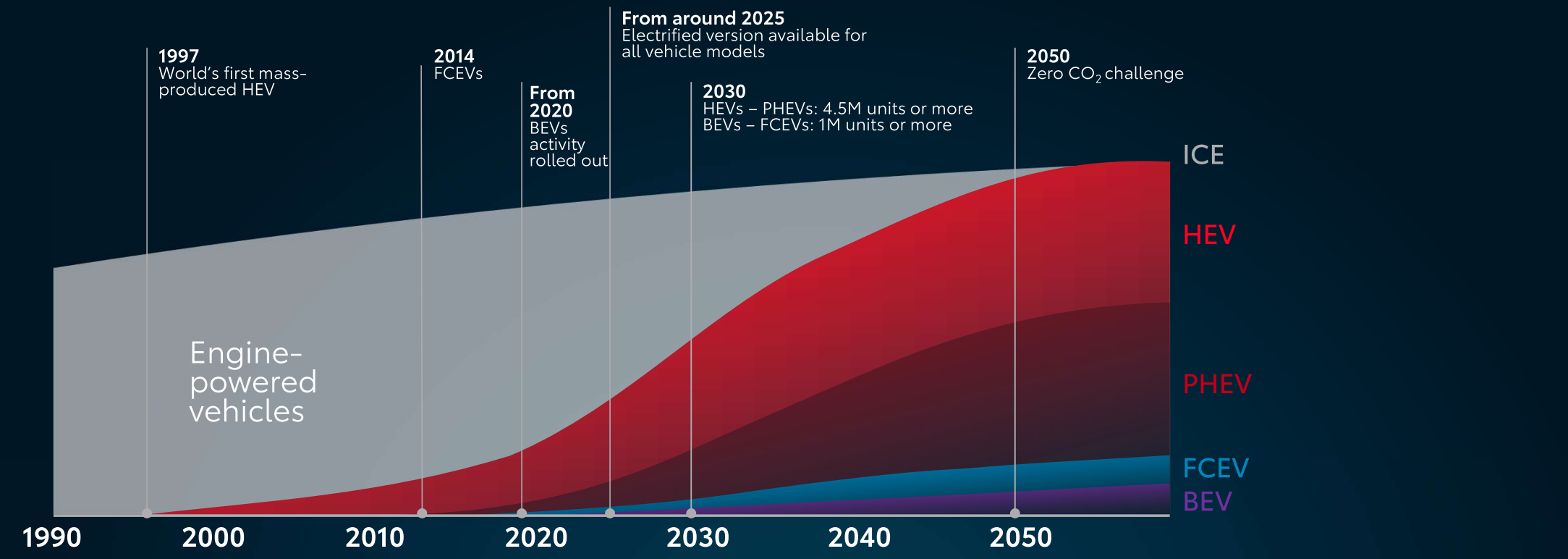
DAŽĀDU TEHNOLOĢISKO ARHITEKTŪRU LĪDZĀSPASTĀVĒŠANA



Mērķis ir piedāvāt piemērotākos pārvietošanās veidus,
īstajā laikā un par pareizo cenu

GLOBĀLA SPĒKA AGREGĀTA EVOLŪCIJAS PROGNOZE

POPULARIZING ELECTRIFIED VEHICLES



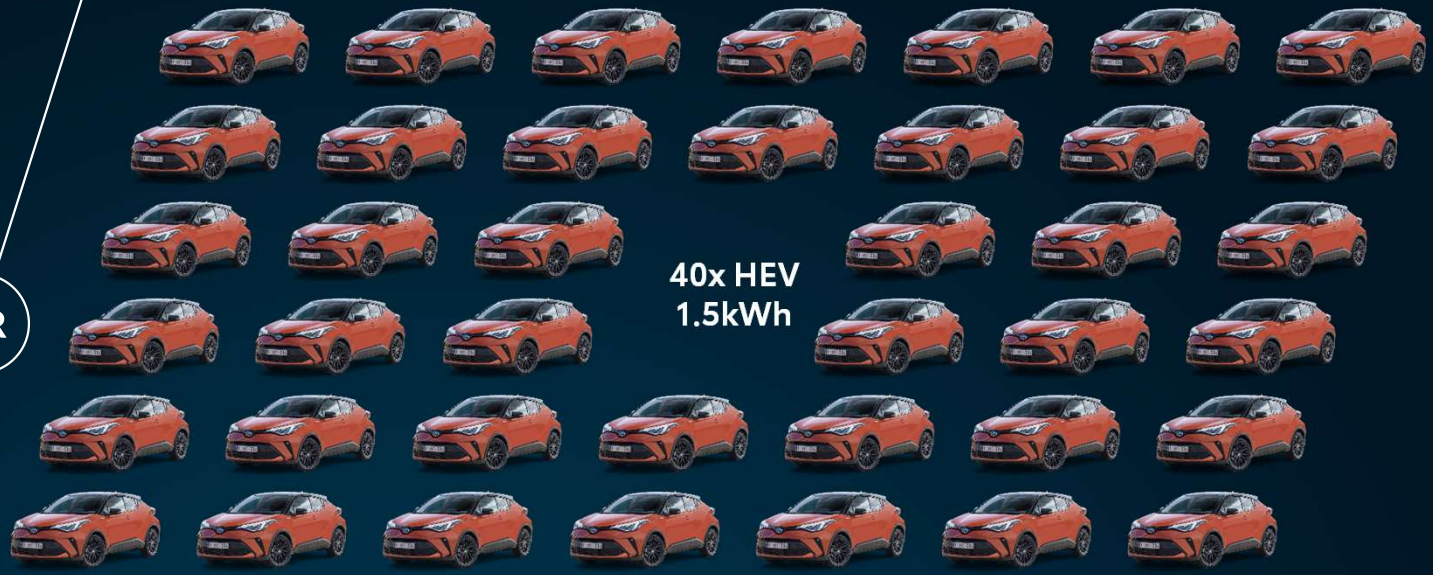
HIBRĪDS KĀ CEĻŠ UZ CO2 UN NOX SAMAZINĀŠANU

1x BEV
60kWh

-125g / km

Stratēģisks lēmums izstrādāt hibrīdu masveida, pamatojoties uz akumulatora izmaksām, uzlādes infrastruktūras prasībām un elektroenerģijas ražošanas reģionālajām atšķirībām

OR



40x HEV
1.5kWh

-(0.3 x 125) x 40 = -1,500 g/km

TOYOTA ELEKTRIFICĒTI MOBILITĀTES RISINĀJUMI

3 ELEMENTI VISU ELEKTRIFICĒTO RISINĀJUMU PAMATĀ

ELECTRIC MOTOR

pilnībā vai daļēji veicina transportlīdzekļa piedziņu

BATTERY

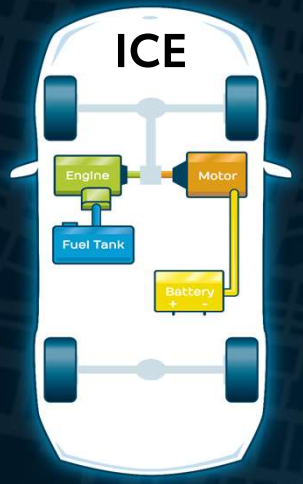
uzglabā enerģiju elektromotoram

POWER CONTROL UNIT

kontrolē jaudas plūsmu hibrīda sistēmā

ELEKTRIFICĒTIE TRANSPORTLĪDZEKĻI: GALVENĀS SASTĀVDAĻAS

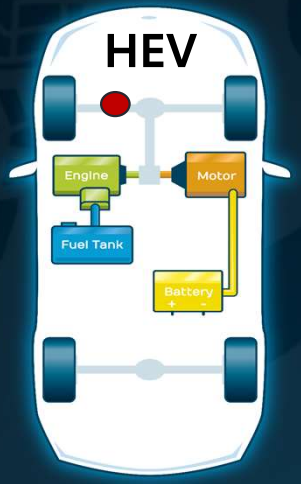
ICE



Benzīna dzinējs
Degvielas tvertne
Mehāniskā transmisija
[Ietver "vieglu" hibrīdu]

ICE VEHICLE & MILD HYBRID

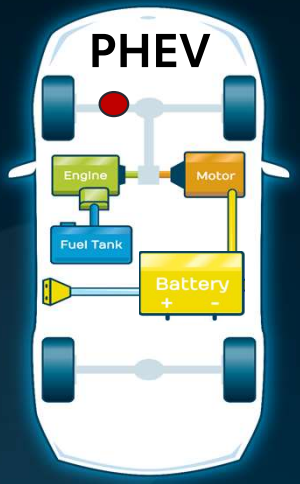
HEV



+ Akumulators (1-2 kWh)
+ elektromotors
+ Strāvas vadības bloks
+ Jaudas sadalīšanas ierīce

HYBRID ELECTRIC VEHICLE

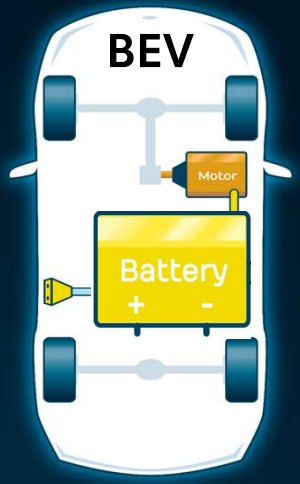
PHEV



+ Lielāks akumulators (8-18kWh)
+ Lielāks elektromotors
+ Iebūvēts 220V lādētājs
+ Ārējā ladēšana

PLUG-IN HEV

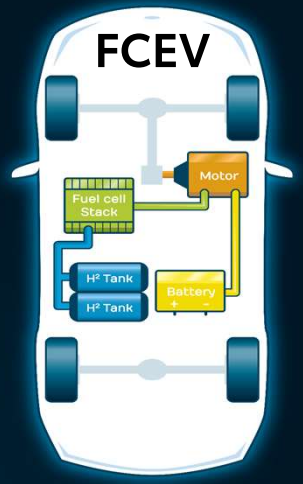
BEV



- Benzīna dzinējs/degviela
- Mehāniskā transmisija
- Jaudas sadalīšanas ierīce
+ Liels akumulators (>60 kWh)
+ Līdzstrāvas ātra uzlāde

BATTERY ELECTRIC VEHICLE

FCEV



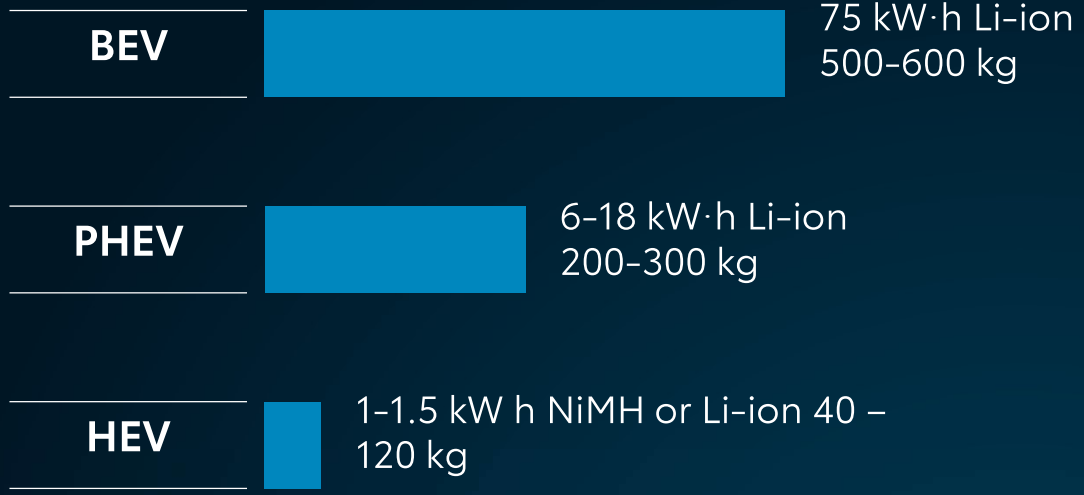
- Mazāks akumulators (1-2 kWh)
- Ārējā maksa
+ Degvielas elementi
+ Ūdeņraža tvertne (700 MPa)

FUEL CELL ELECTRIC VEHICLE

BATERIJU VEIDI

KATRAI SISTĒMAI ATBILSTOŠĀ AKUMULATORA IZVĒLE

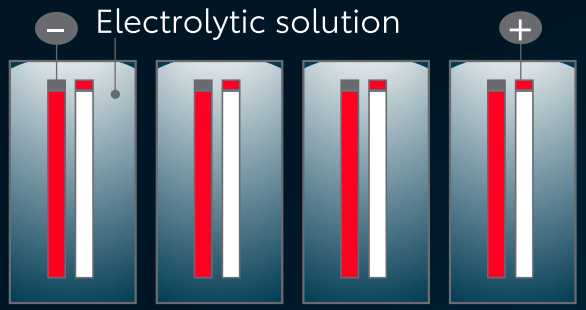
BATTERY WEIGHT



N.B. The weight can differ depending on model and EV range

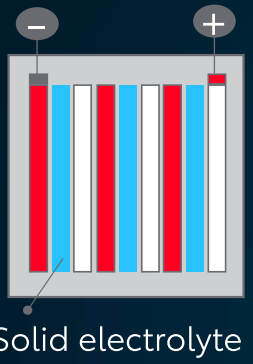
TOYOTA – PANASONIC PARTNERSHIP

DEVELOPING NEW GENERATION OF HIGH-PERFORMANCE BATTERIES



LITHIUM-ION BATTERY

SOLID-STATE BATTERY



» Better performance
» Smaller and safer
» Faster charging times

TOYOTA HYBRID TECHNOLOGY

WHAT IS HYBRID?

Two power sources

WHAT IS HYBRID?

Hybrid technology is simple and offers an optimal balance of performance and economy

PETROL ENGINE

For high speed driving

\+

ELECTRIC MOTOR

Powers the car at low speed

\+

BATTERY

Recharges itself during driving

= HYBRID

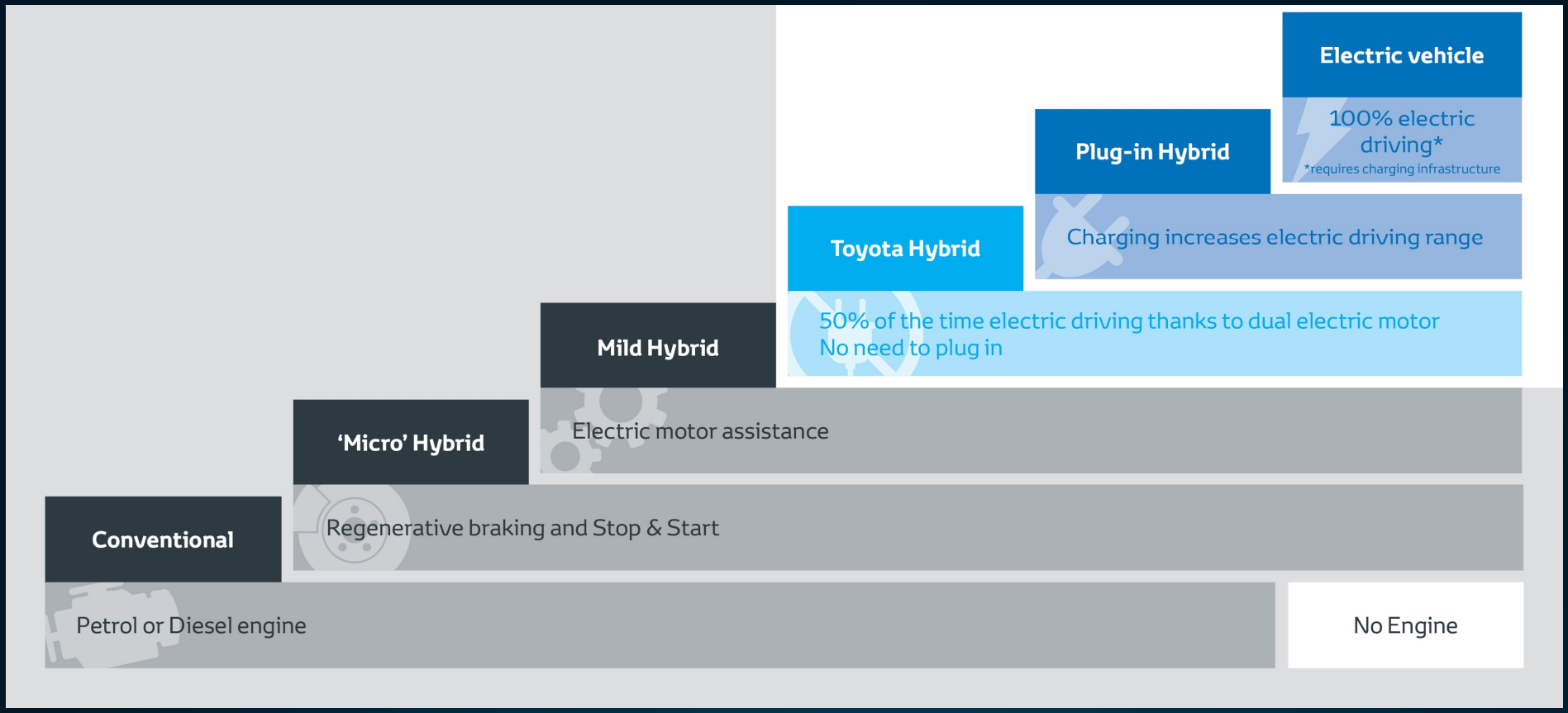
Efficient at high speed

Efficient at low speed and acceleration

For maximum power

To store and reuse otherwise wasted braking energy and energy leftovers

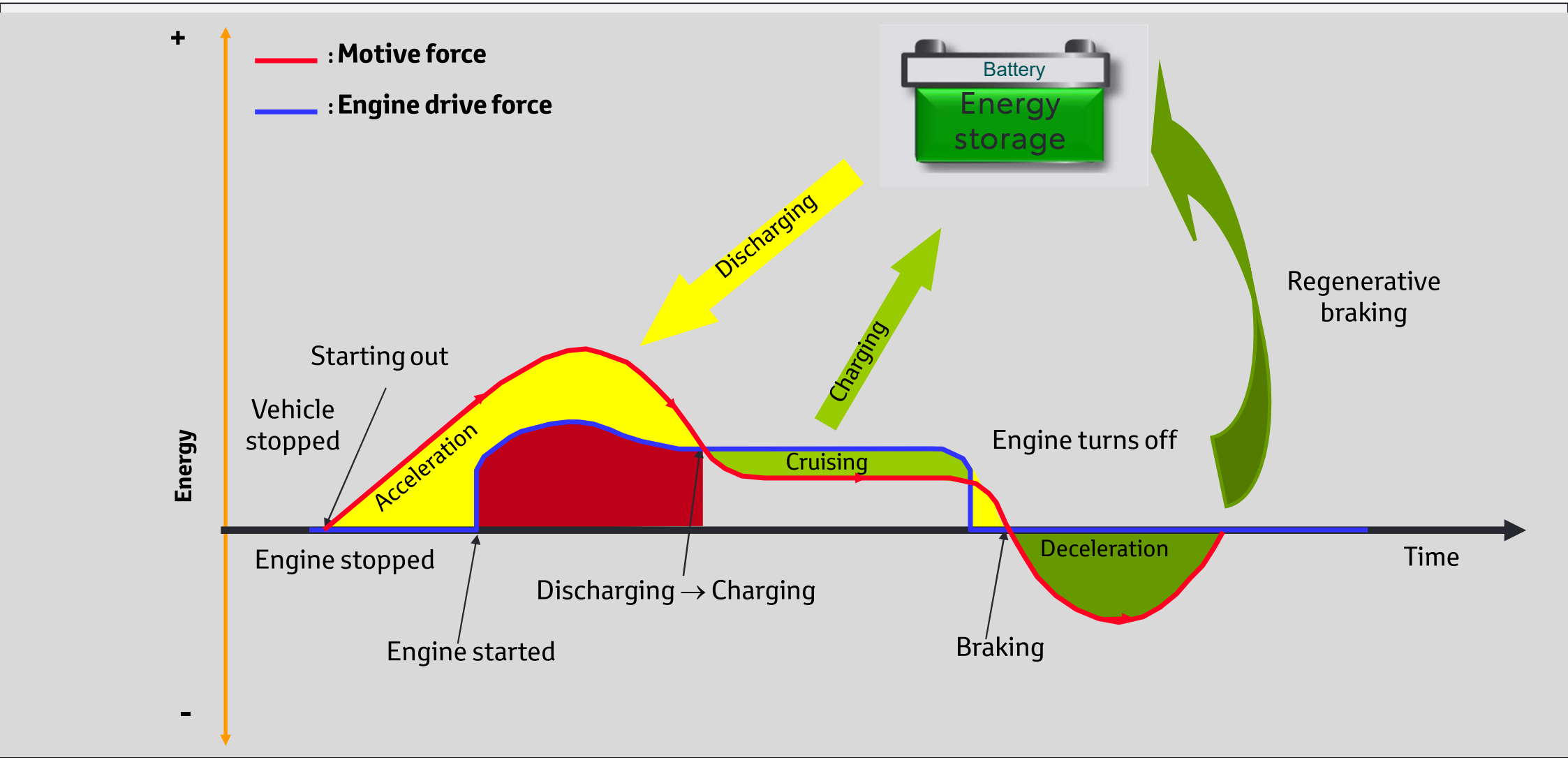
CLASSIFICATION OF HYBRID / ELECTRIC VEHICLES



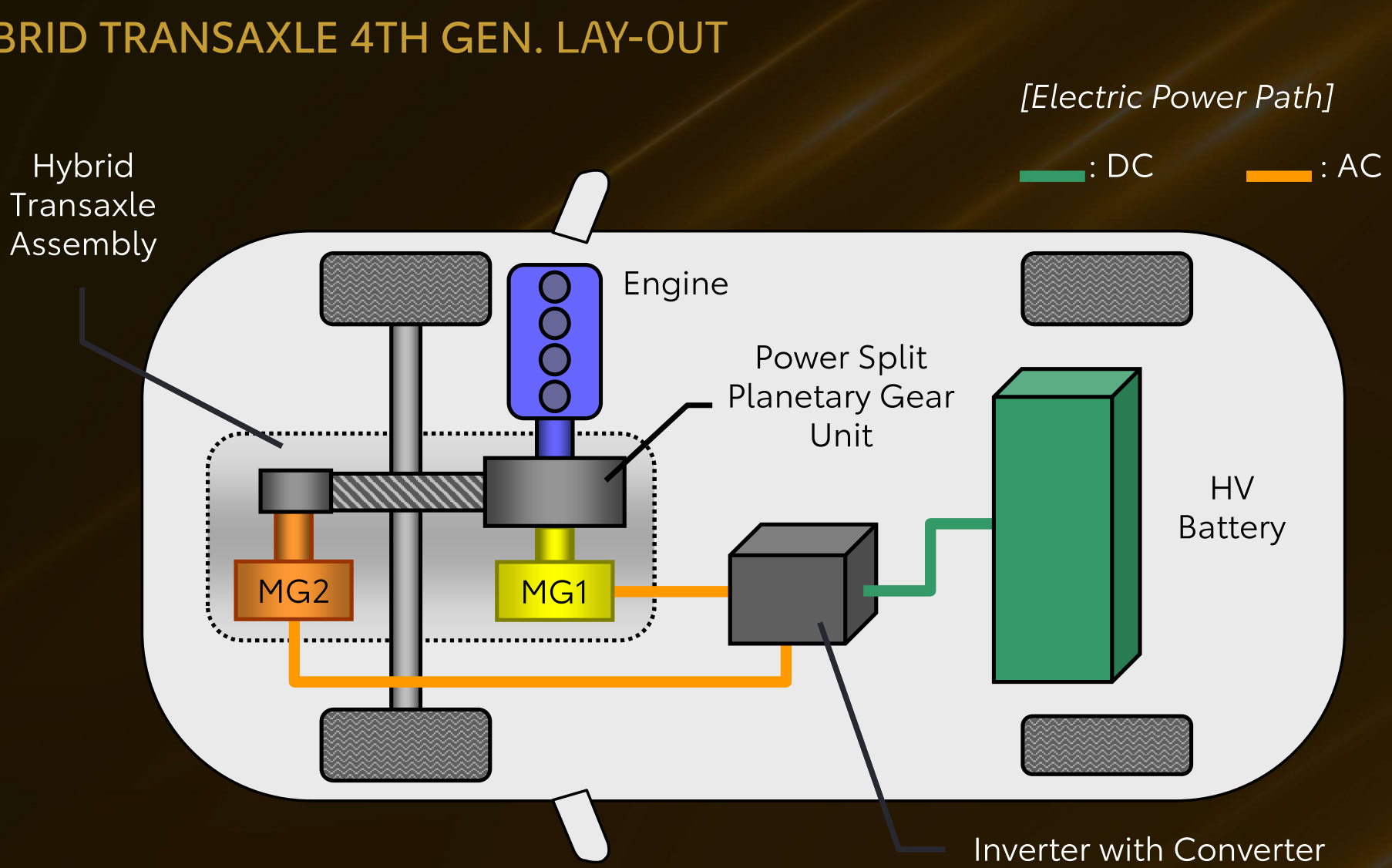
HOW TOYOTA HYBRID WORKS

TOYOTA HYBRID SYNERGY DRIVE®

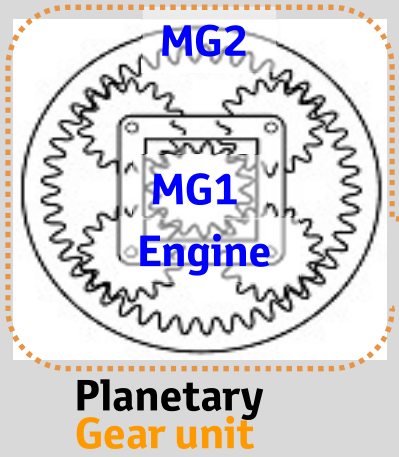
Energy management

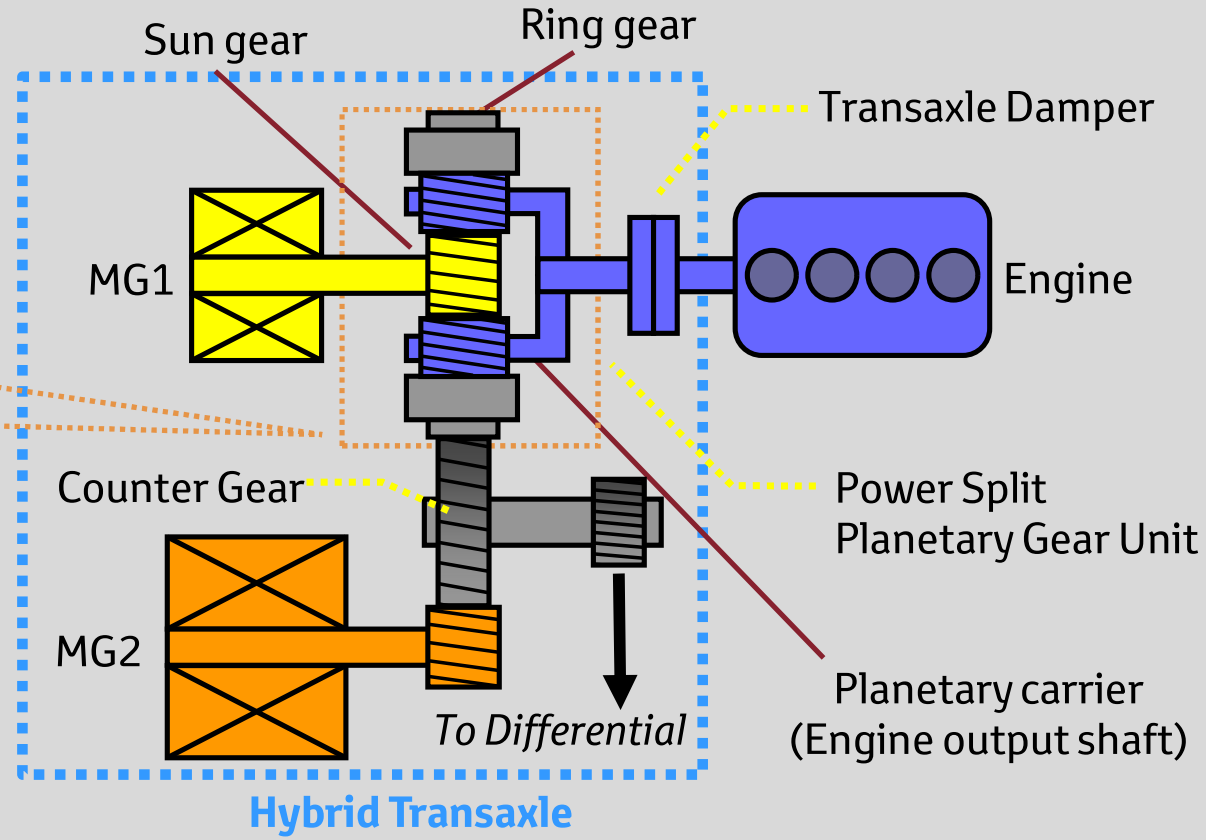


HYBRID TRANSAXLE 4TH GEN. LAY-OUT



Power split device

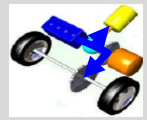




Sun Gear: MG1 (Generator)

Ring Gear: MG2 (Motor)

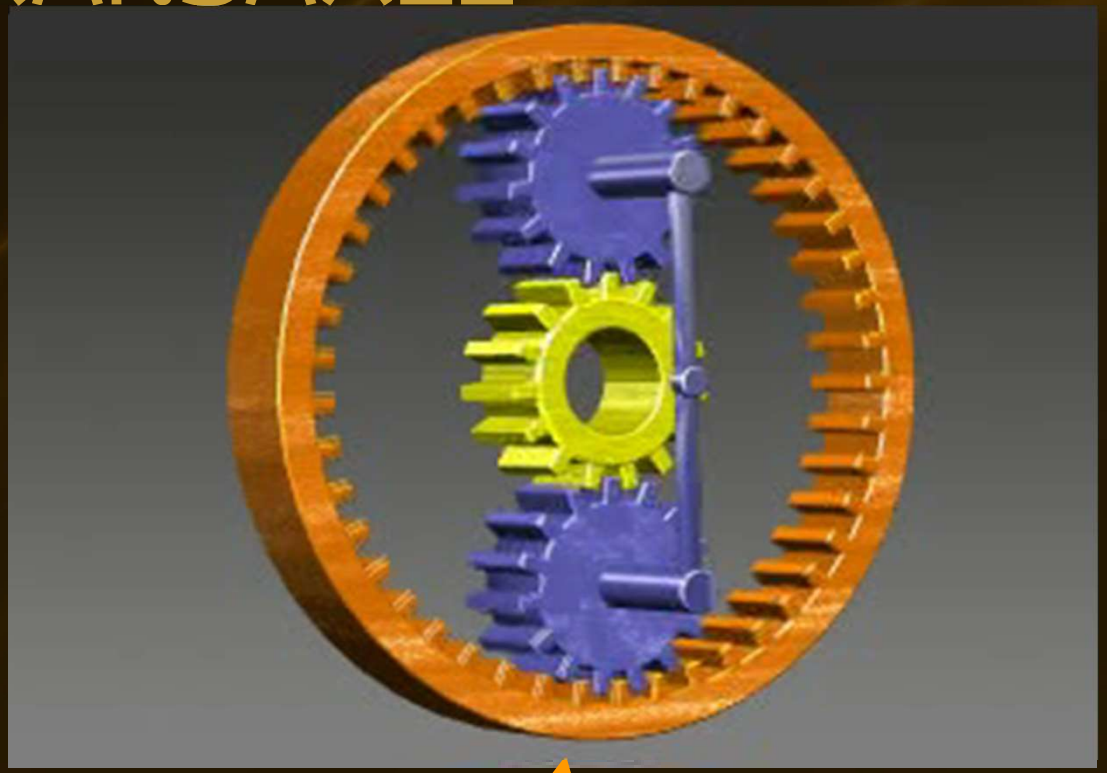
Carrier: Engine output shaft

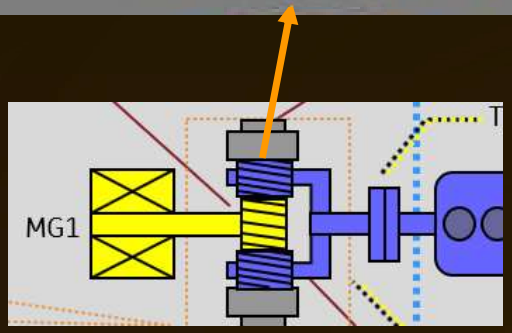


HYBRID TRANSAXLE

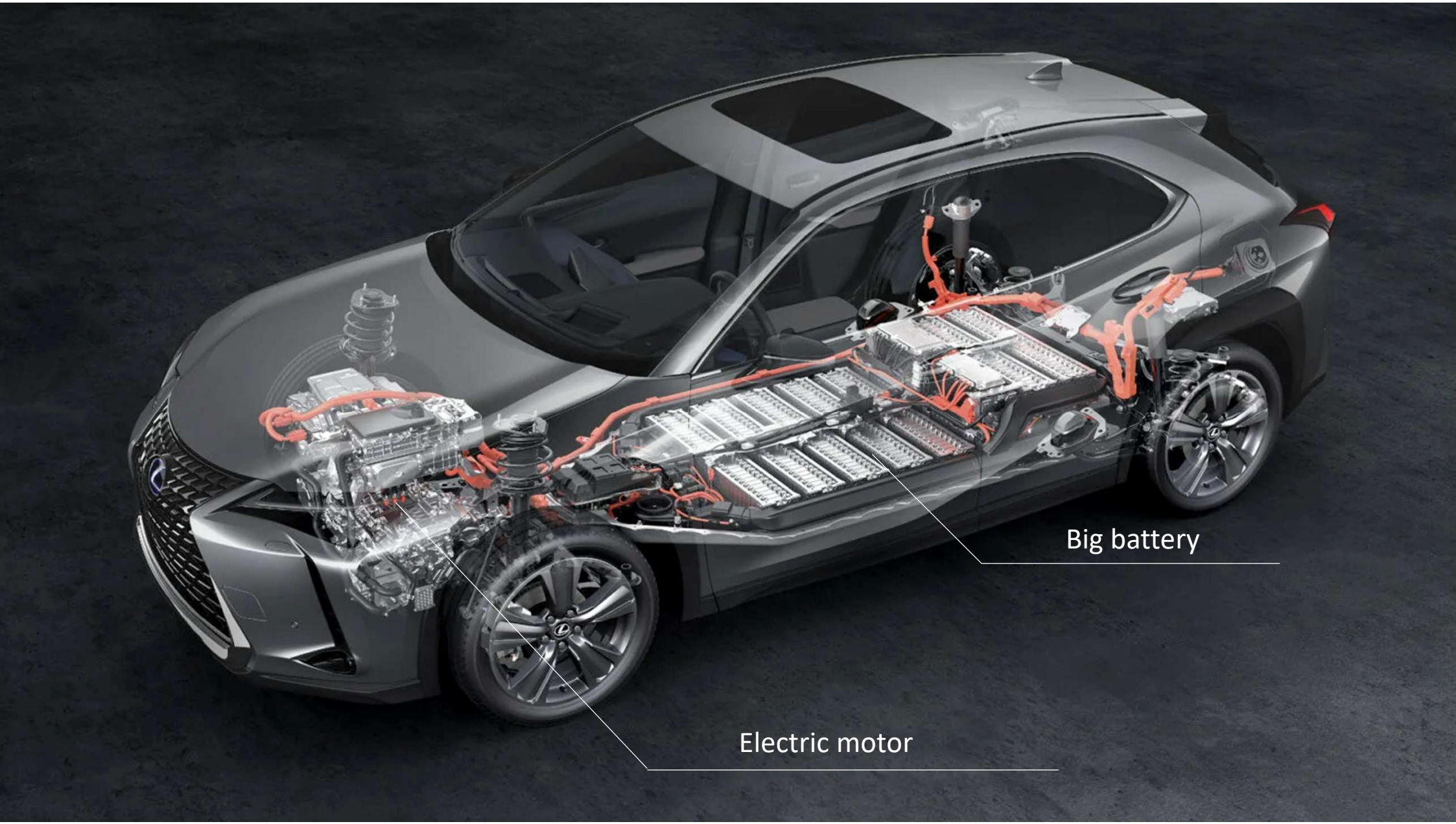
Power Split device

1. Sun gear BLOCKED
   - Carrier is driving force
   - High rpm ring gear
   - = High wheel speed
2. Sun gear spinning
   - Reduction rpm ring gear
   - = lower wheel speed





BEV


Big battery
Electric motor

BATTERY GENERAL KNOWLEDGE:

- TEMPERATURE DEFINES RANGE

	WLTP combined	Winter combined (-15C)	Winter combined (+1C)	Summer Combined, Warm (+15C)	Summer City slow driving speeds, Warm (+15C)	Highway only (100 km/h +), Warm (+15C)
Range	350	200	230	350	400	200
Vs. WLTP		-40%	-30%	0%	+14%	-43%

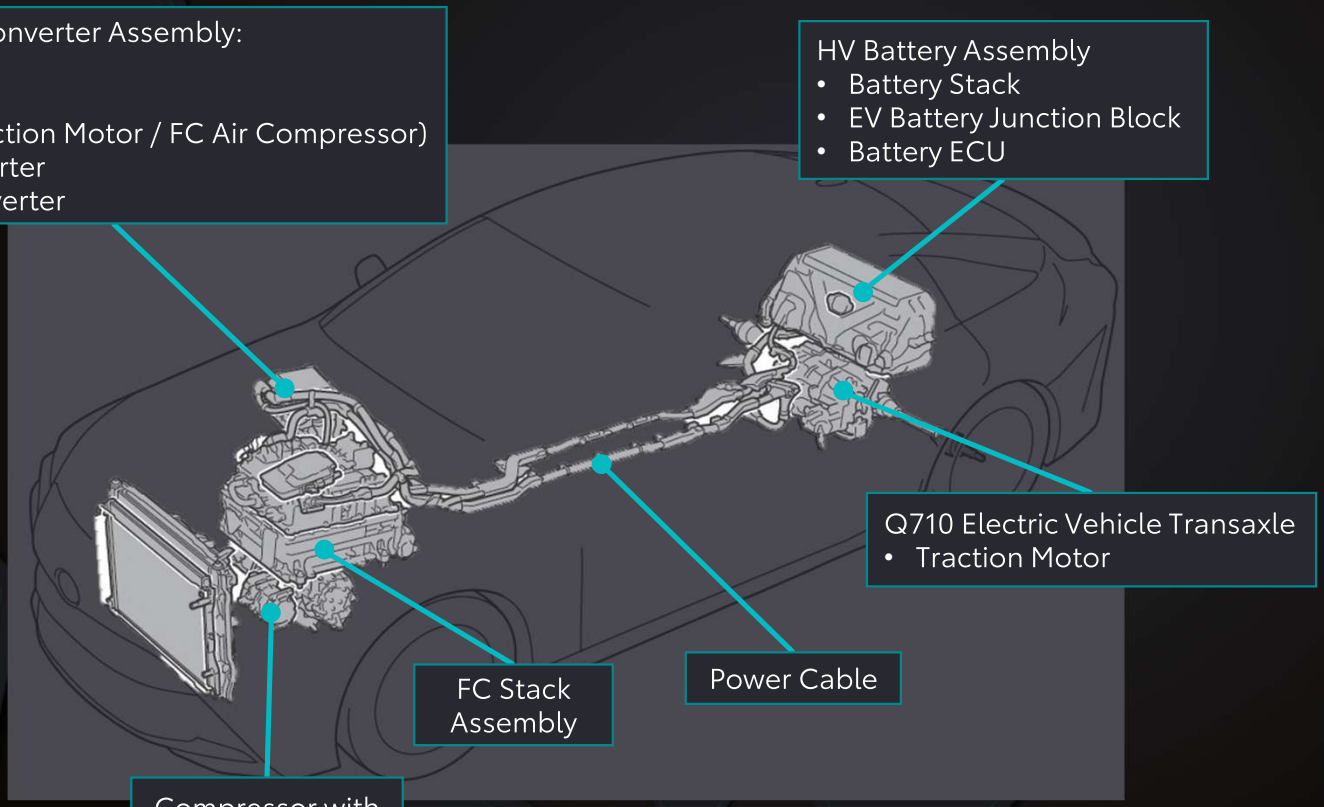
DATA TO BE CONFIRMED FOR
Table with example data to illustrate impact

FCEV


MIRAI
MIRAI

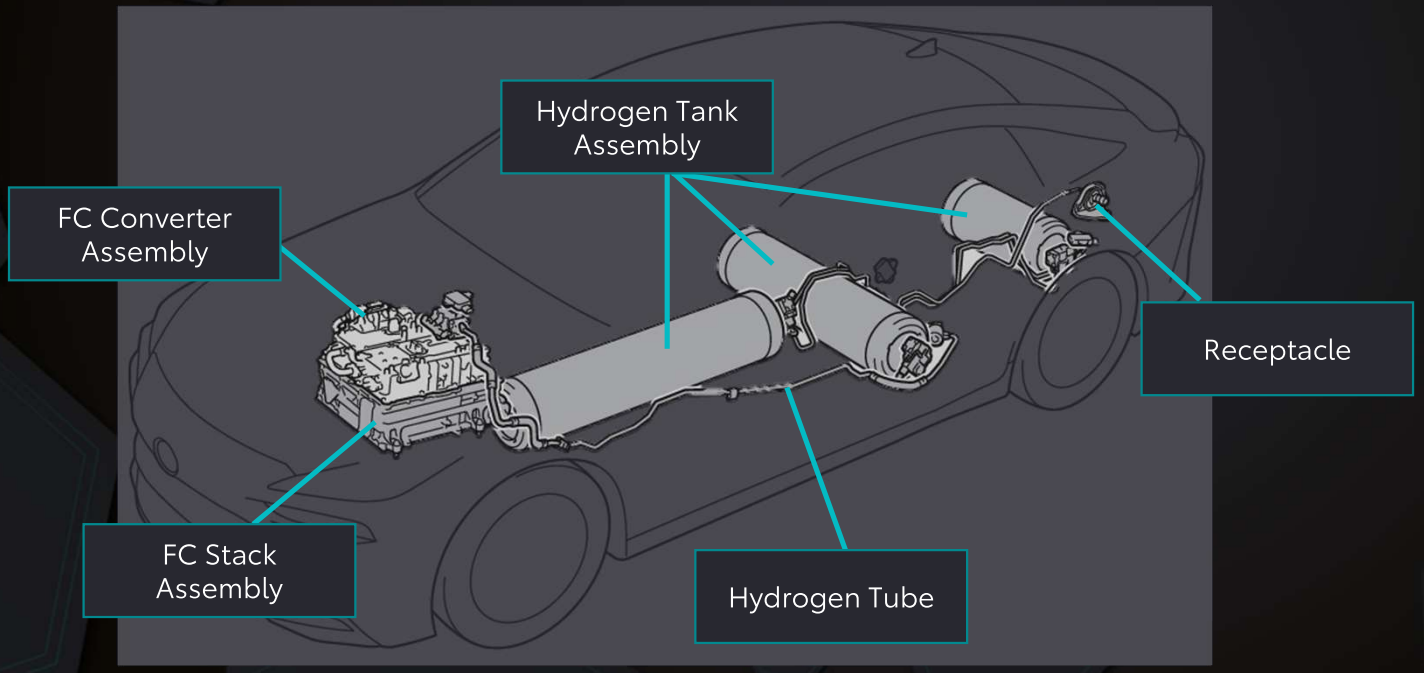
FCEV System Overview

- Hybrid system



FCEV System Overview

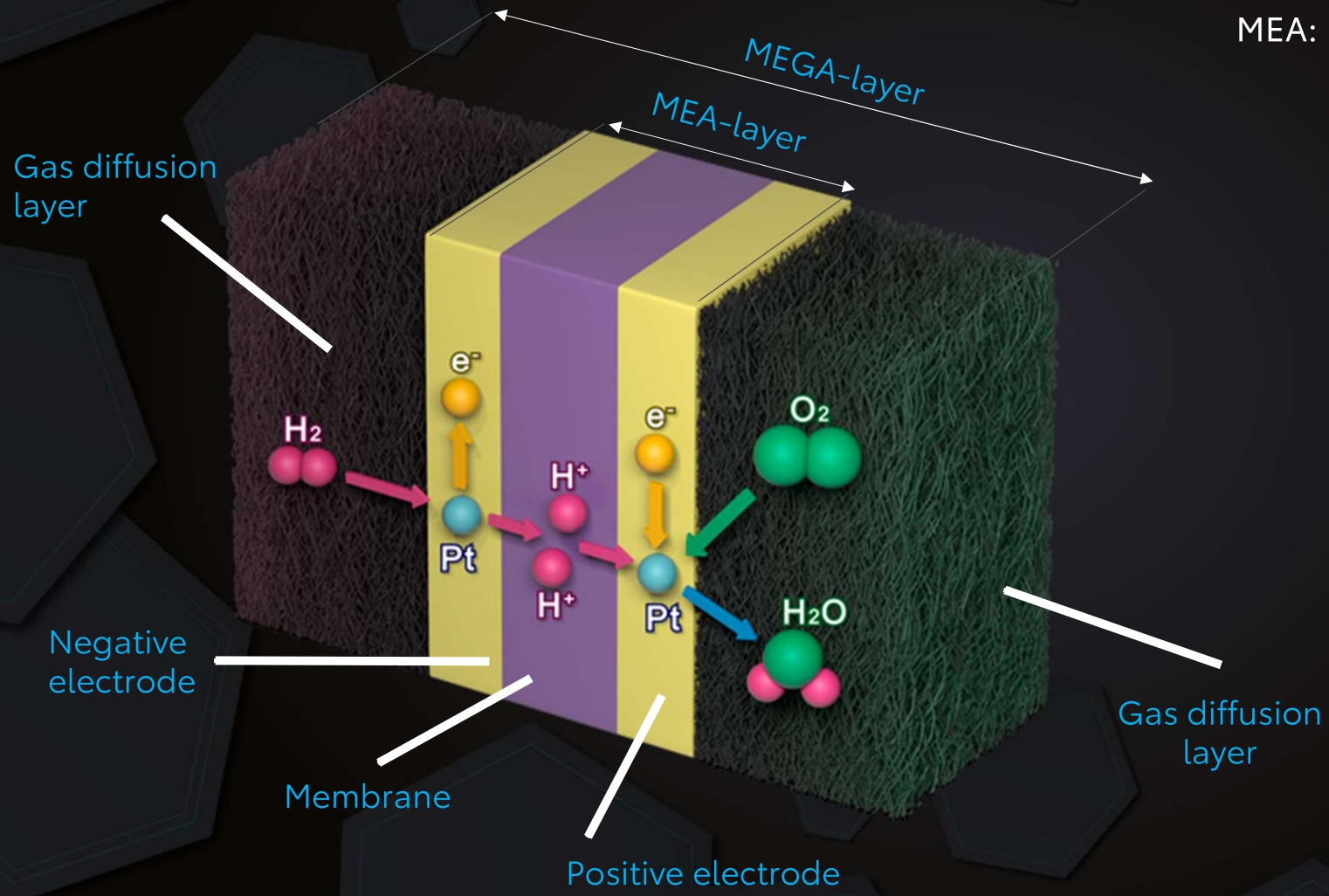
- FC system

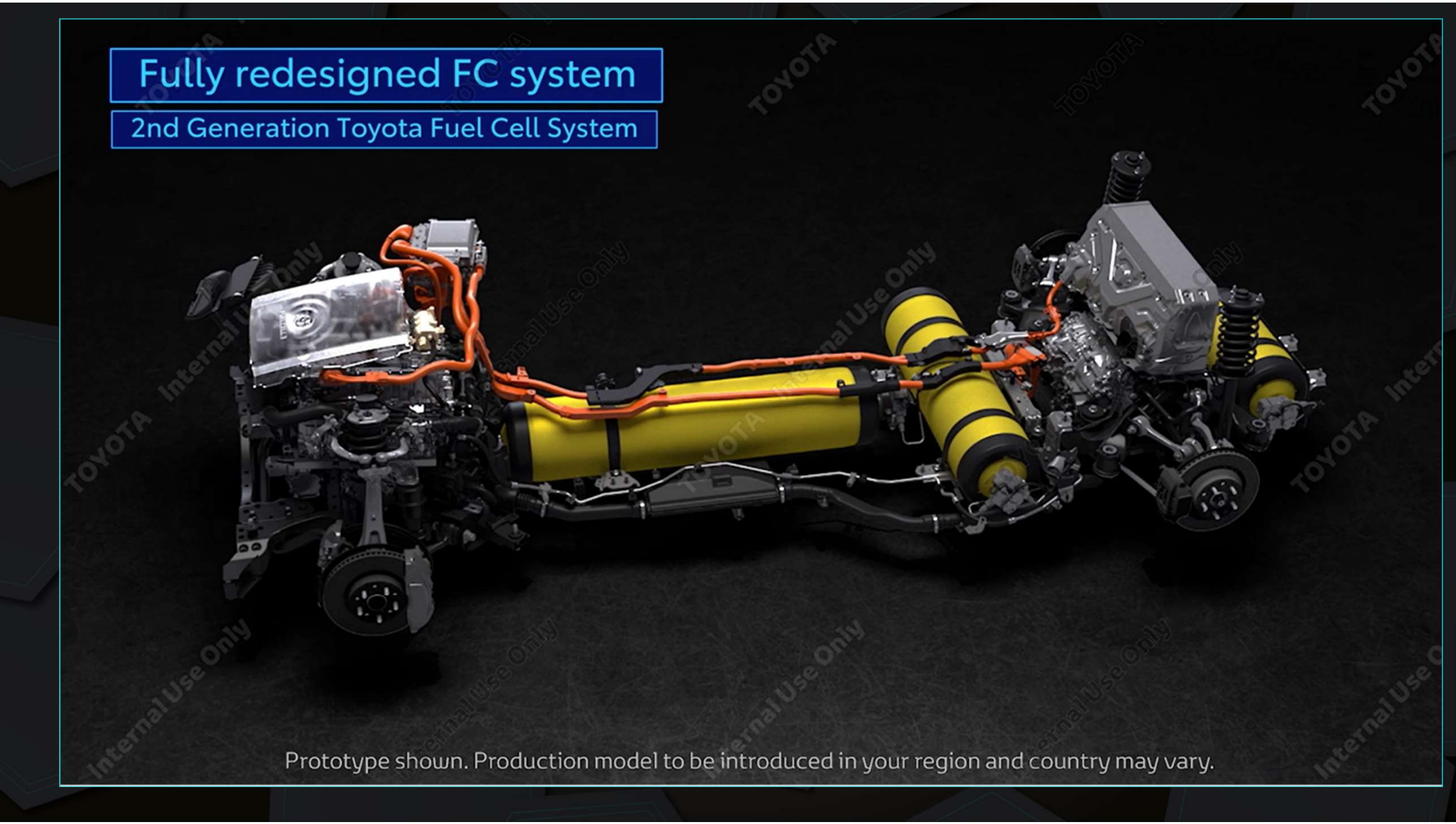


Fuel Cell Design

MEGA: Membrane Electrode Gas Diffusion Assembly

MEA: Membrane Electrode Assembly with Catalyst




Fully redesigned FC system
2nd Generation Toyota Fuel Cell System
Prototype shown. Production model to be introduced in your region and country may vary.

TOYOTA OFFICIAL PARTNER OF ENERGY OBSERVER

*Picture from: global.Toyota/en/newsroom

TOYOTA

Company Newsroom Mobility Sustainability IR | Downloadable Assets Lineup JPN

Toyota Times, LUNAR CRUISER

Jul. 21, 2023

Development Status Toyota's Manned Pressurized Rover and...

Beyond Zero, Presentation, LUN...

Sep. 18, 2020

Tackling challenges is in the "DNA of Toyota people"

Toyota Times, LUNAR CRUISER

Sep. 11, 2020

"Toyota should be involved in space" The catalyst to joint...

Toyota Times, LUNAR CRUISER

Sep. 04, 2020

Why Toyota is targeting space: An interview with Executive Mr. Terashi &...

Toyota Times, LUNAR CRUISER

*Picture from: global.Toyota/en/newsroom

LIQUID HYDROGEN-POWERED COROLLA AND GR86 (CARBON-NEUTRAL FUEL) TO PARTICIPATE IN SUPER TAIKYU AT AUTOPOLIS

Hydrogen-powered Corolla

GR86 (carbon-neutral fuel)

*Picture from: global.Toyota/en/newsroom

Toyota Motor Corporation

HySE-X1 * Mockup image for illustration purposes only

The HySE (Hydrogen Small mobility & Engine technology) research association will enter our hydrogen engine vehicle, the HySE-X1, in the "Mission 1000" Challenge of the "Dakar 2024" (Dakar Rally*1) set to be held in Saudi Arabia from January 5 to 19, 2024.

*Picture from: global.Toyota/en/newsroom


Beyond Zero, News Release,


Jul. 31, 2023
Toyota Accelerates Lo
Development of
Intelligence and...
Beyond Zero, News Release,

Jun. 26, 2023
Toyota, Toyota Tsusho
and Mitsubishi Kakok
Introduce Thailand's F
Beyond Zero, News Release,


May 30, 2023
Joint Press Conferenc
Daimler Truck, Mitsub
Fuso, Hino, and Toyot
Beyond Zero, Presentation, I


May 30, 2023
Daimler Truck, Mitsub
Fuso, Hino and Toyota

THANK YOU!