Beyond Zero

Toyota Adria
9.3.2021

TOYOTA ENVIRONMENTAL CHALLENGE 2050

TOYOTA

ALWAYS A BETTER WAY

- New vehicle zero emissions
- Life cycle zero emissions (raw materials, parts & manufacturing, use, recycling)
- Plant zero emissions
- Minimizing and optimizing water usage
- Establishing a re-cycling based society
- Establishing a future society in harmony with nature 2050

BEYOND ZERO

LQ (Autonomous + BEV)

E-pallet (MaaS)

Robotics

Jaxa Lunar Cruiser (FC)

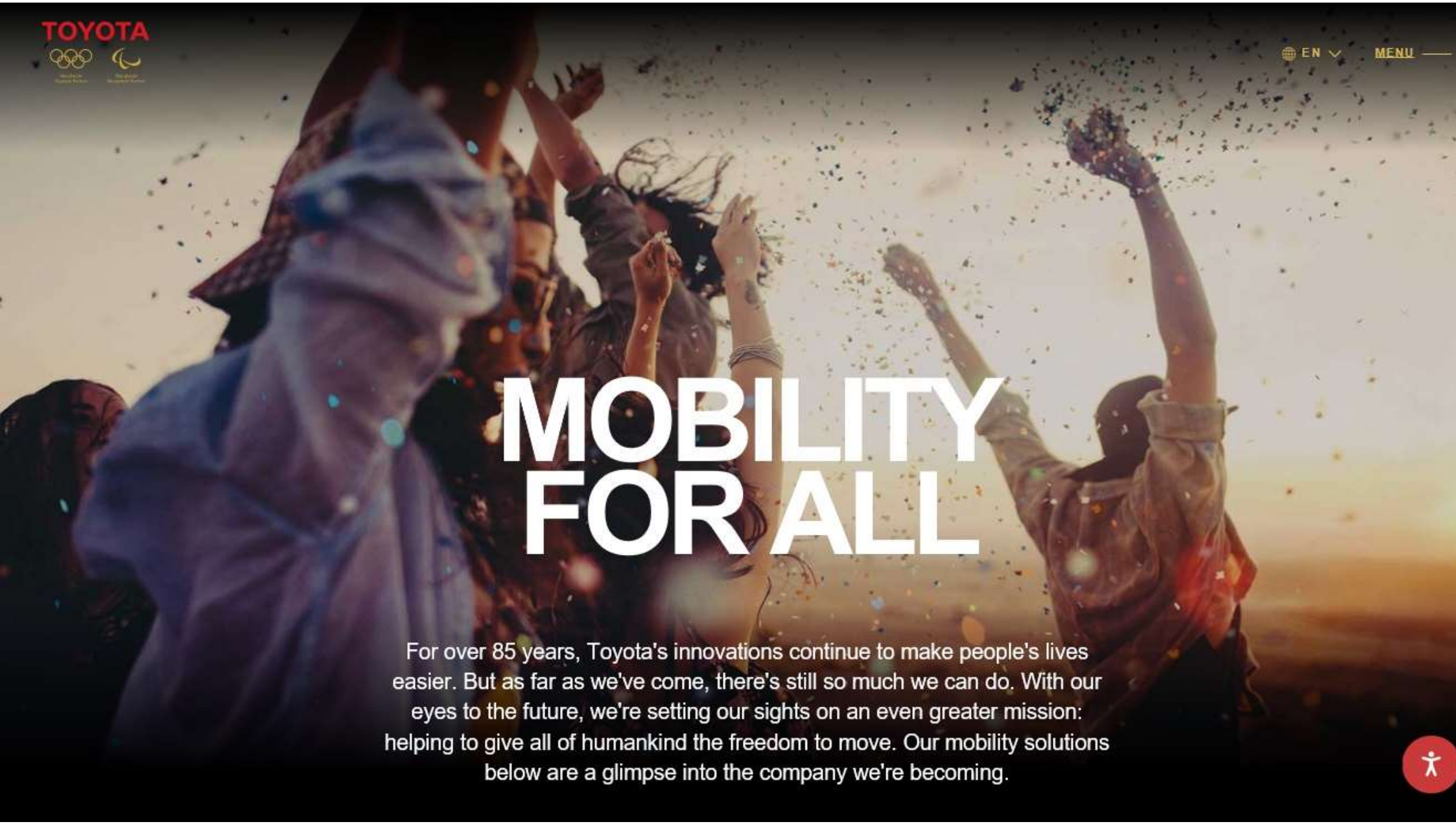
Toyota Woven city (Hydrogen society)

Energy observer (FC)

EXCITEMENT

GR TOYOTA GAZOO Racing

Toyota Olympics & Paralympics Partnership


TOYOTA
EN
MENU
MOBILITY FOR ALL
For over 85 years, Toyota's innovations continue to make people's lives easier. But as far as we've come, there's still so much we can do. With our eyes to the future, we're setting our sights on an even greater mission: helping to give all of humankind the freedom to move. Our mobility solutions below are a glimpse into the company we're becoming.

Our partner

Traffic safety
+
Mobility for
People with
Disability

To prevent accident

- TSS promotion
- Heroji Furajo v Pižamah

Rehabilitation

- Collaboration with Soča
- Provide a car to Soča for the training for patients

University Rehabilitation Institute
Republic of Slovenia

Recovery

- Supply Toyota car with BDF handle
- Provide car to AMZS for driving school

BDF. TOYOTA AMZS

Mobility
For the people
Living in
Rural area

To elderly people

- Cooperation with Sopotniki

...Sopotniki
zavod za medgeneracijsko solidarnost

Data analysis

Top 20 best-selling brands ranked by average CO_2 emissions

(Volume weighted)

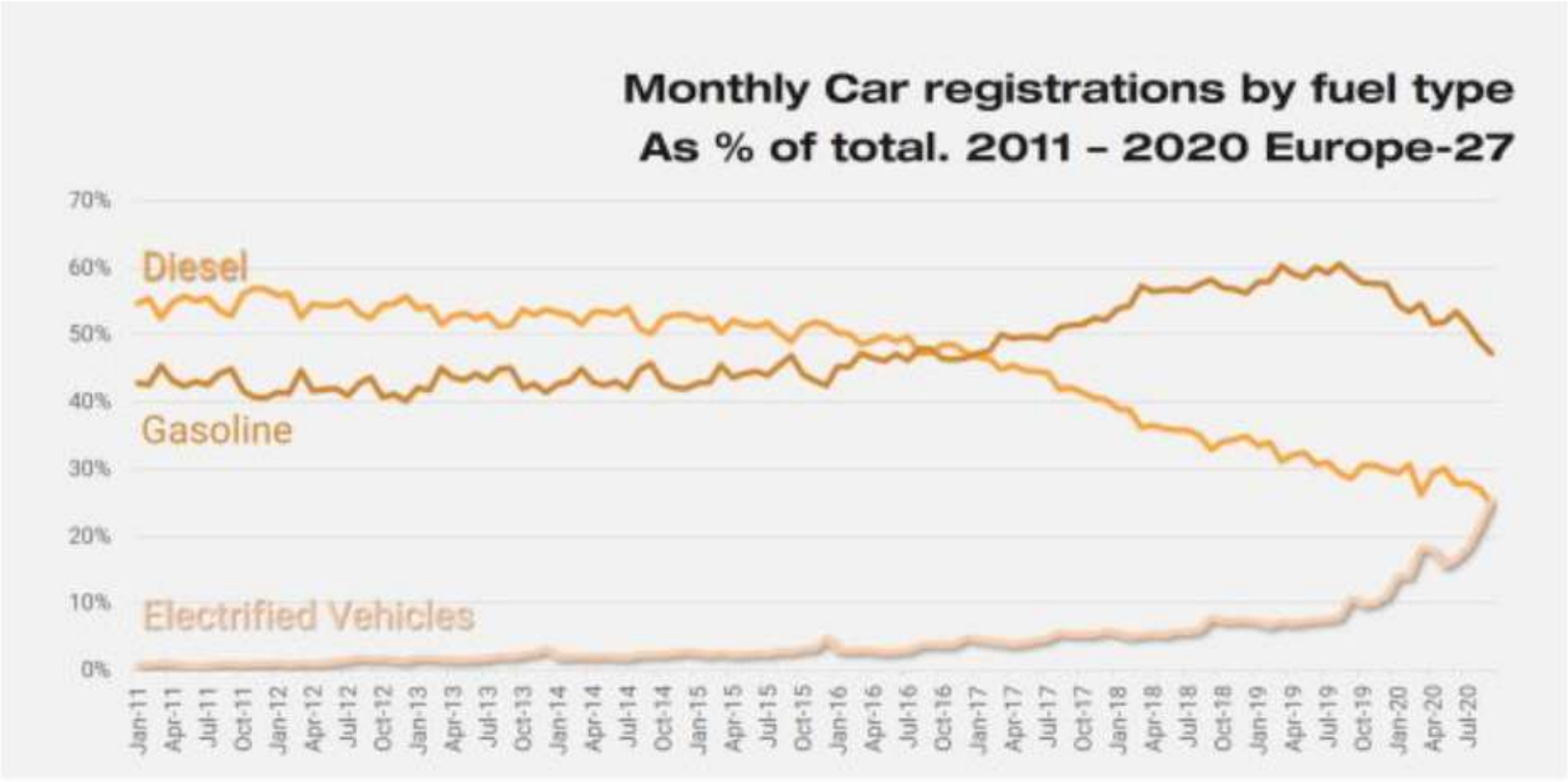
EU-18

JATO

	Make	2019 g/km	2018 g/km	Δ 19 vs 18 g/km	Position 2018
1	TOYOTA	97.5	99.8	-2.3	1
2	CITROEN	106.4	108.1	-1.7	3
3	PEUGEOT	108.2	107.9	+0.3	2
4	RENAULT	113.3	110.0	+3.4	4
5	NISSAN	115.4	114.0	+1.4	5
6	SKODA	118.1	116.2	+1.9	7
7	SEAT	118.1	116.7	+1.4	8
8	SUZUKI	120.6	114.3	+6.3	6
9	VOLKSWAGEN	121.2	119.2	+2.0	9
10	KIA	121.8	121.6	+0.2	12
11	FIAT	123.7	119.6	+4.1	10
12	OPEL/VHALL	124.9	126.0	-1.1	15
13	DACIA	125.6	120.9	+4.7	11
14	HYUNDAI	126.5	124.5	+2.0	14
15	FORD	128.5	123.6	+4.9	13
16	BMW	129.0	130.2	-1.3	17
17	AUDI	130.3	127.7	+2.6	16
18	VOLVO	133.8	132.6	+1.2	18
19	MAZDA	135.4	135.2	+0.2	19
20	MERCEDES	140.9	139.6	+1.3	20

TOYOTA

ALWAYS A BETTER WAY


Monthly Car registrations by fuel type
As % of total. 2011 – 2020 Europe-27
70%
60%
50%
40%
30%
20%
10%
0%
Diesel
Gasoline
Electrified Vehicles
Jan-11
Apr-11
Jul-11
Oct-11
Jan-12
Apr-12
Jul-12
Oct-12
Jan-13
Apr-13
Jul-13
Oct-13
Jan-14
Apr-14
Jul-14
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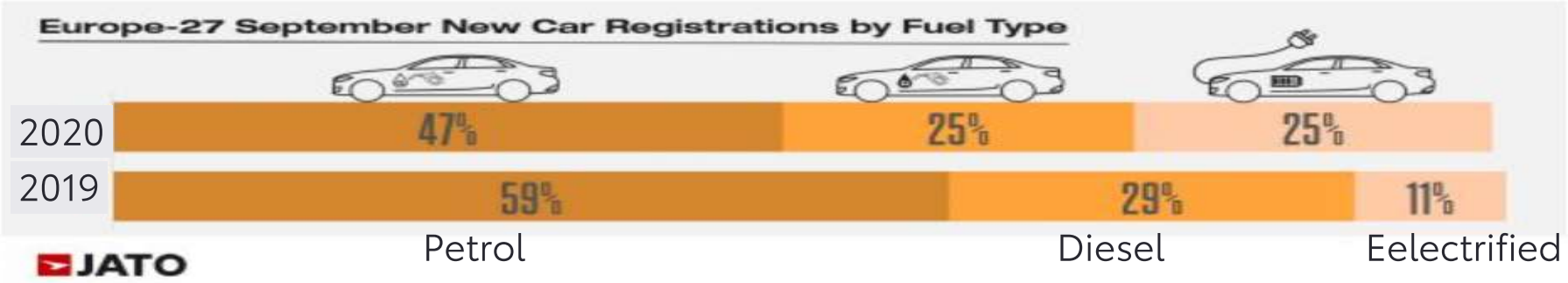
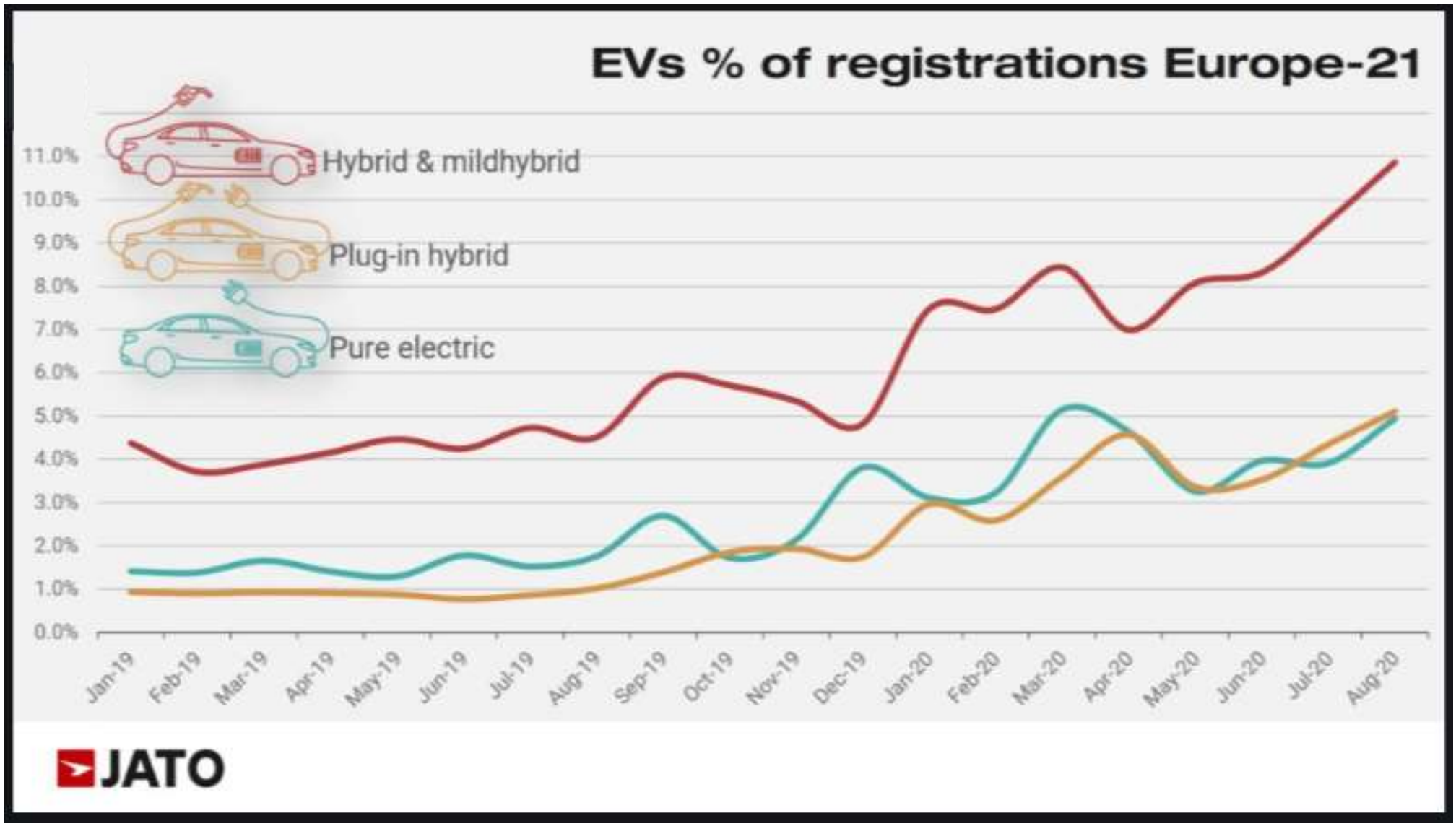
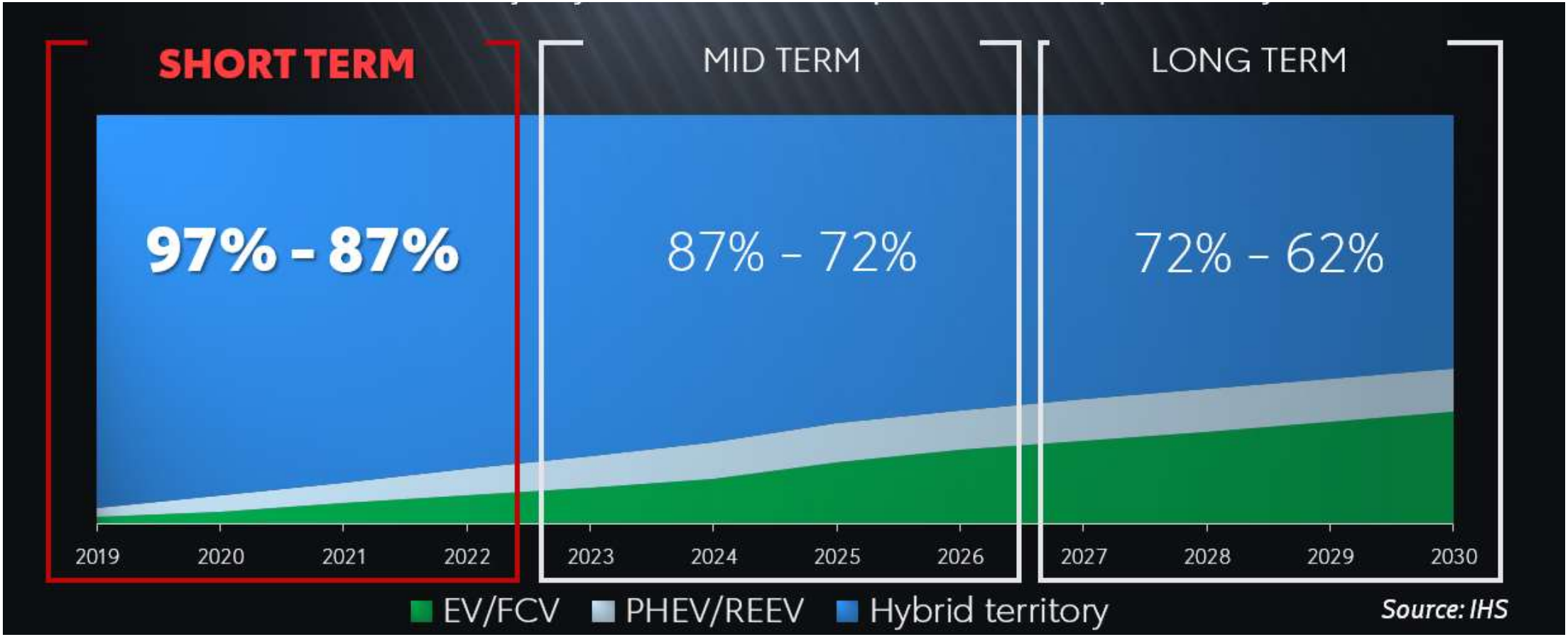
Jan-20
Apr-20
Jul-20


Europe-27 September New Car Registrations by Fuel Type
2020
47%
25%
25%
2019
59%
29%
11%
Petrol
Diesel
Eelectrified

JATO


EVs % of registrations Europe-21
Hybrid & mildhybrid
Plug-in hybrid
Pure electric
11.0%
10.0%
9.0%
8.0%
7.0%
6.0%
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
JATO

EV POWERTRAIN FORECAST BY IHS




EVs as % of registrations Europe-27 H1 2020
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
55%
60%
65%
70%
75%
80%
85%
90%
95%
100%
TESLA
SMART
LEXUS
TOYOTA
SUZUKI
SUBARU
MG
LAND ROVER
VOLVO
DS
PORSCHE
MITSUBISHI
HONDA
HYUNDAI
KIA
INFINITI
JAGUAR
BMW
MERCEDES
FORD
BENTLEY
MINI
NISSAN
RENAULT
AUDI
PEUGEOT
FIAT
VOLKSWAGEN
OPEL/VHALL
CHEVROLET
SKODA
LANCIA
SEAT
CITROEN
EV: BEV, PHEV, HEV

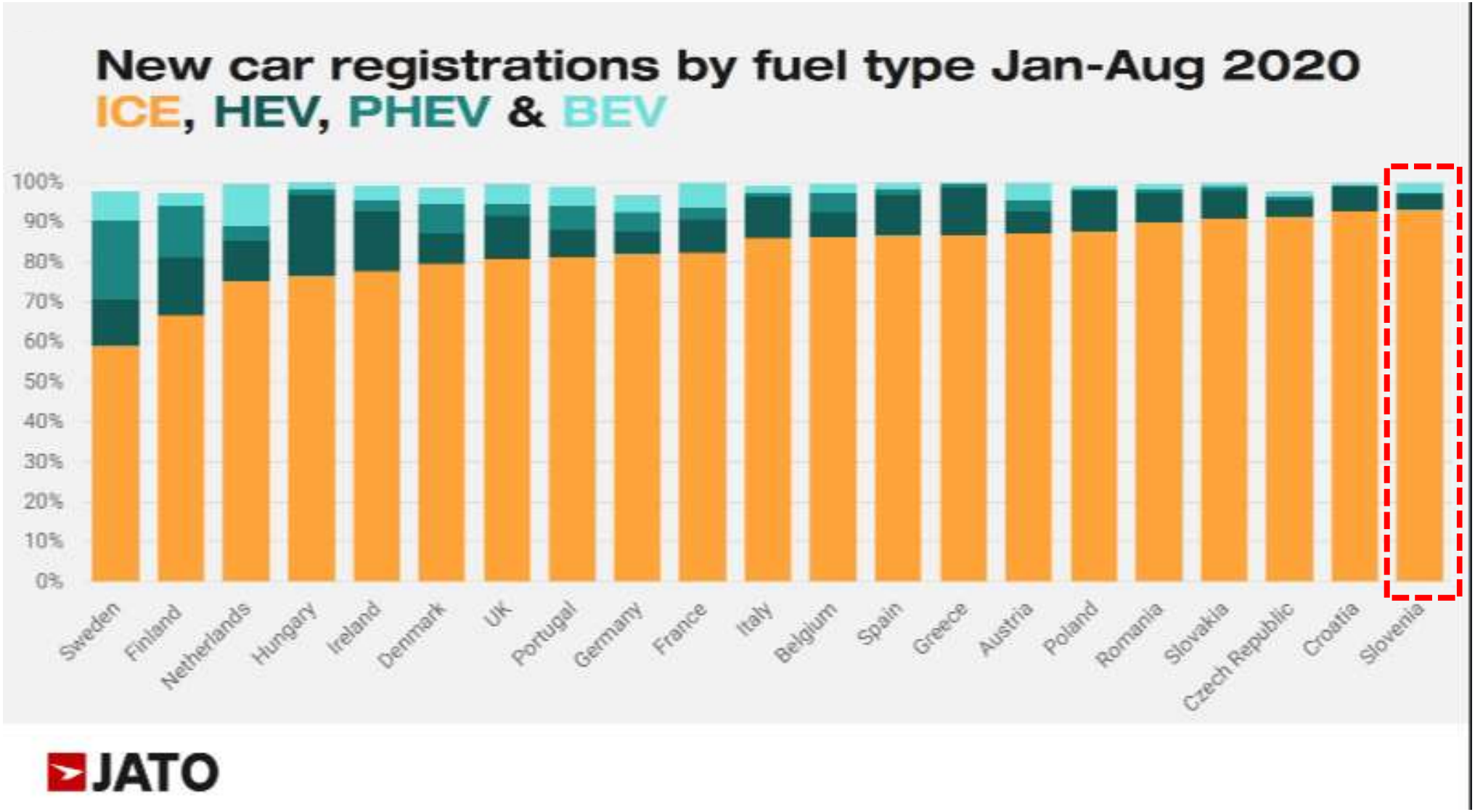
JATO

Average CO_2 emissions (g/km) under NEDC (Volume weighted)

Market	2019	2018	Δ 19 vs 18	% of regs under NEDC
Netherlands	100.1	106.0	-5.9	99%
France	111.1	112.0	-0.9	97%
Ireland	113.7	113.1	+0.6	98%
Greece	116.0	111.4	+4.6	99%
Croatia	118.3	114.7	+3.6	99%
Italy	118.4	115.3	+3.0	98%
Sweden	118.4	122.0	-3.6	97%
Spain	120.6	118.6	+2.0	100%
Belgium	121.0	119.3	+1.7	100%
Slovenia	122.6	120.0	+2.6	98%
Romania	124.0	121.3	+2.7	100%
Austria	124.8	123.4	+1.4	98%
Czech Rep.	126.9	125.6	+1.3	97%
UK	127.4	125.1	+2.3	97%
Hungary	128.7	125.9	+2.7	95%
Slovakia	129.7	127.1	+2.7	88%
Germany	129.9	129.1	+0.8	98%
Poland	131.4	128.3	+3.1	81%
EU-18	122.2	121.0	+1.1	97%
Portugal	83.2	105.4	-22.2	12%
Finland	115.6	118.4	-2.8	17%
Denmark	107.8	111.0	-3.2	30%
EU-21	122.0	120.6	+1.4	94%
Norway	60.3	72.4	-12.0	97%
Switzerland	137.7	137.3	+0.4	98%
Europe-23	121.8	120.5	+1.3	94%

Volume weighted average CO_2 emissions in g/km (NEDC correlated) by country Passenger cars Jan-Aug 2020

JATO


New car registrations by fuel type Jan-Aug 2020
ICE, HEV, PHEV & BEV
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Sweden
Finland
Netherlands
Hungary
Ireland
Denmark
UK
Portugal
Germany
France
Italy
Belgium
Spain
Greece
Austria
Poland
Romania
Slovakia
Czech Republic
Croatia
Slovenia

JATO

Toyota strategy

Cars for a new age adapted to energy diversification

HV
Hybrid Vehicles

EV
Electric Vehicles

PHV
Plug-in Hybrid Vehicles

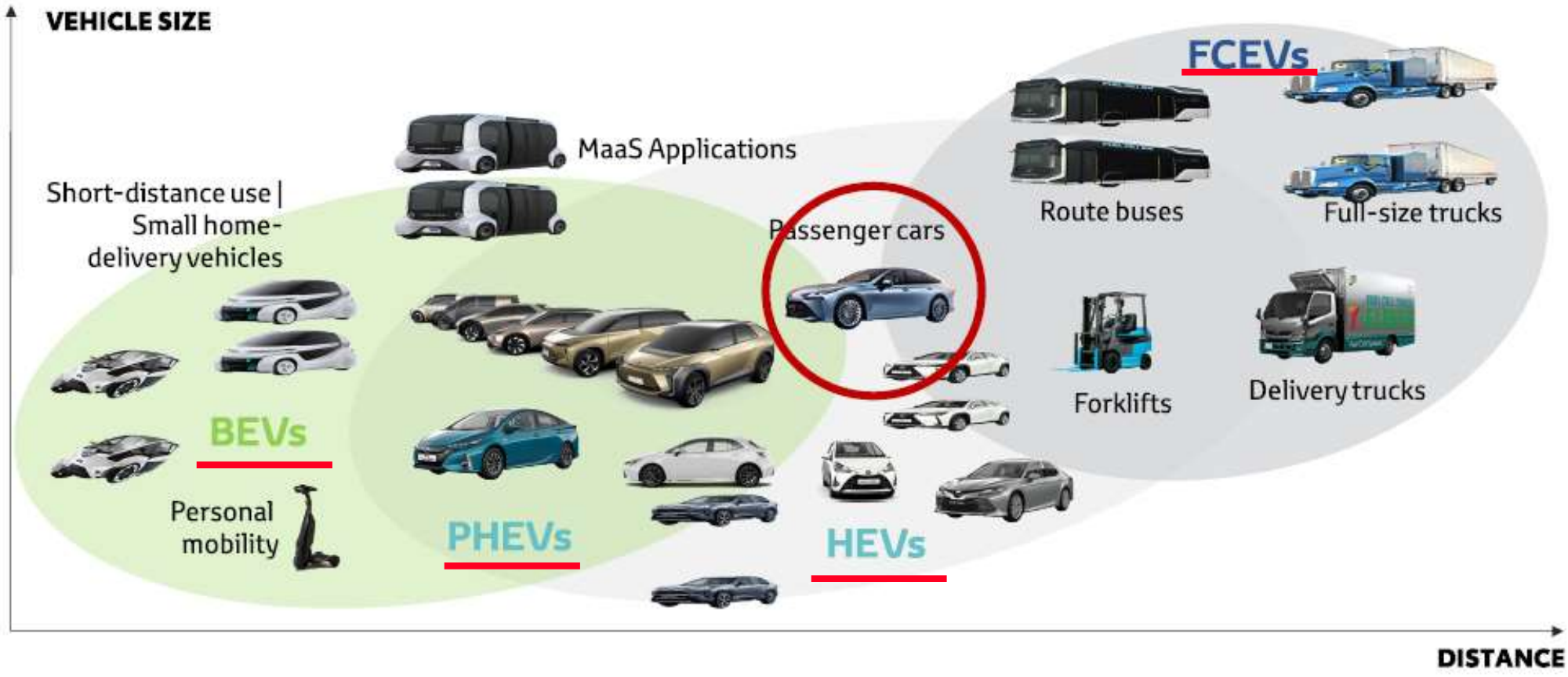
FCV
Fuel Cell Vehicles

Gasoline Vehicle / Diesel Vehicle

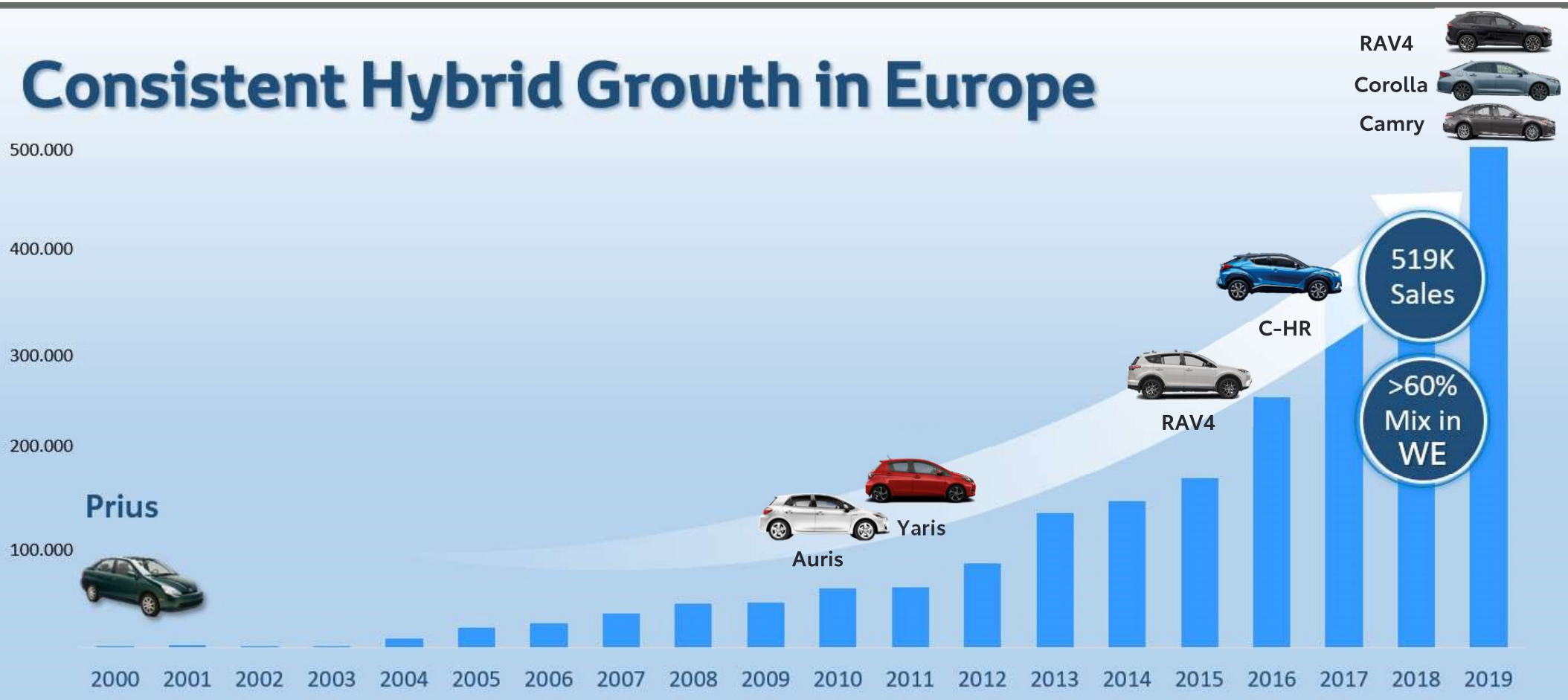
TOYOTA

ALWAYS A BETTER WAY

Different technology for different category



Consistent Hybrid Growth in Europe



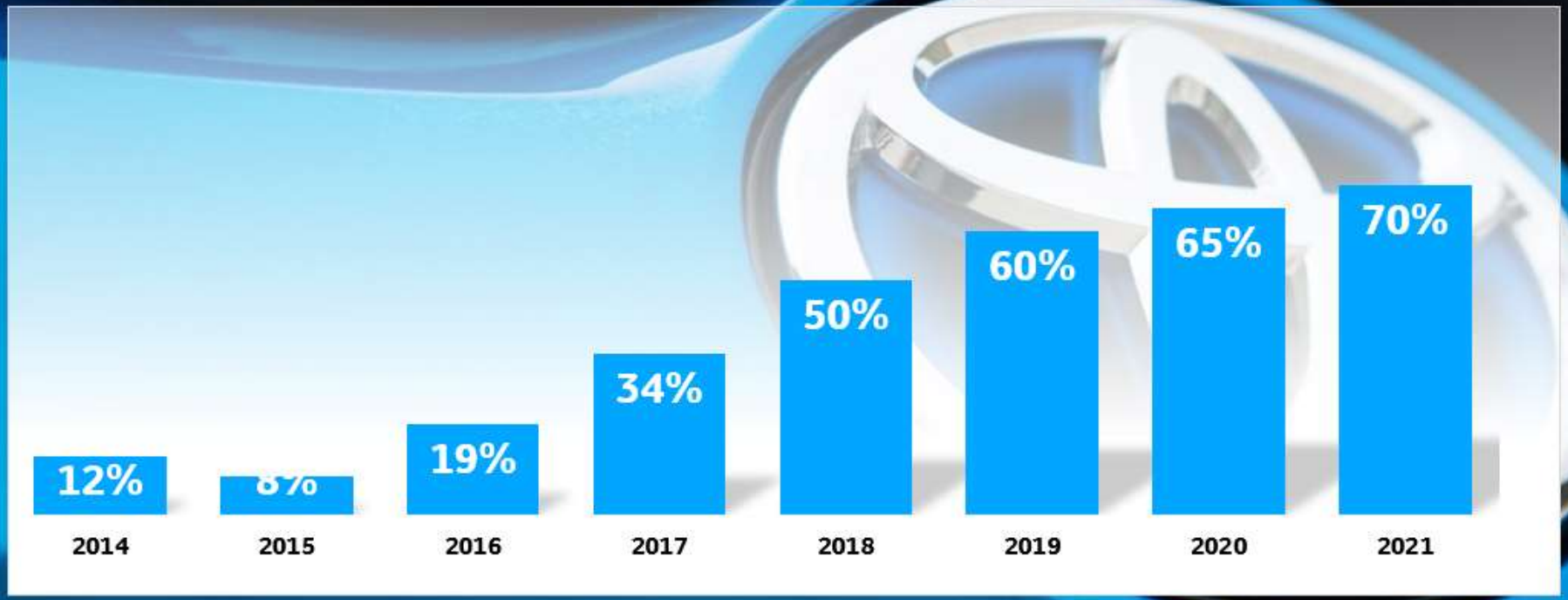
CURRENT MIX (2019):

Yaris	RAV4	Corolla H/B	C-HR	Lexus
50%	90%	85%	91%	96%

* includes RU, KZ and TRK (under TME responsibility)

TOYOTA

Hybrid mix ⟨Slovenia⟩



TOYOTA

ALWAYS A BETTER WAY

LEXUS 100% Hybrid

Toyota Hydrogen Strategy

MIRAI FIRST FUEL CELL CAR (2014)

>10,000
TOTAL SALES

>1,000
SALES EUROPE

NEW MIRAI

650 KM*
PER REFILL

3–5 MINS
100%
REFUELLING

We make and use Hydrogen Forklifts

TOYOTA

Toyota is also making FC Buses

TOYOTA

TOYOTA OPENED A PORTAL TO THE FUTURE OF ZERO EMISSION TRUCKING IN US

JR EAST, HITACHI AND TOYOTA TO DEVELOP HYBRID (FUEL CELL) RAILWAY VEHICLES POWERED BY HYDROGEN

Targeted Fuel Cell Application - Examples

CaetanoBus

Single FC module on roof
Flat layout
Launched Oct '19

Single FC module
Box layout
Installed Dec '19. Boat sailing in Caribbean

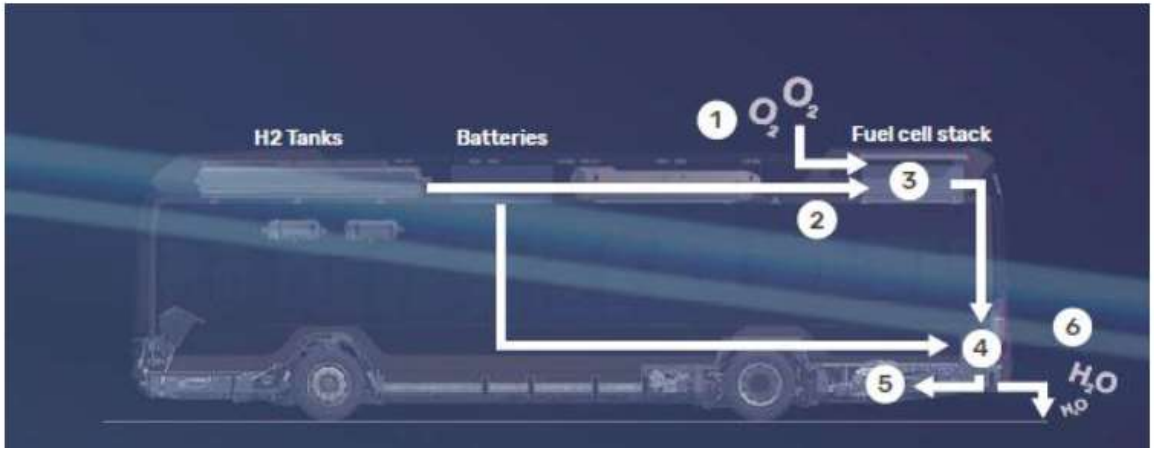
ENERGY OBSERVER
DEVELOPMENTS

H2.CityGold

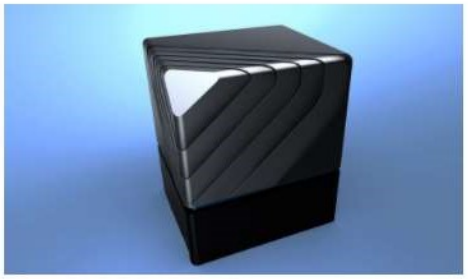
Main data

- 10.7m RHD & 12m LHD / 2 doors or 3 doors
- Range 400km
- Maximum Power 180 kW SIEMENS motor
- 60 kW Fuelcell Nominal Power (Toyota FC stuck)
- 37.5 kg (5x H2 tanks type 4)
- 29 kWh battery pack (LTO) solution
- Fuelling time < 9minutes

CaetanoBus

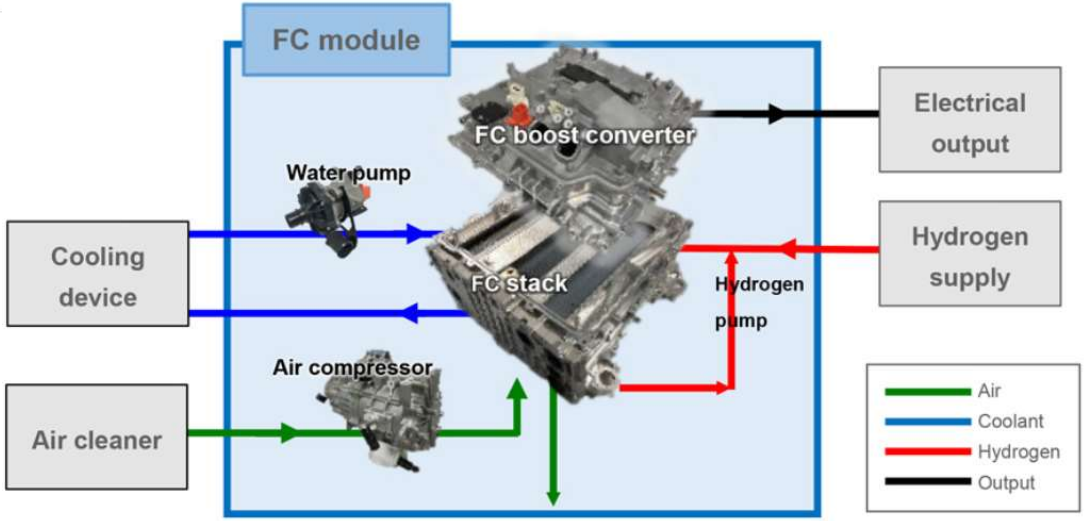


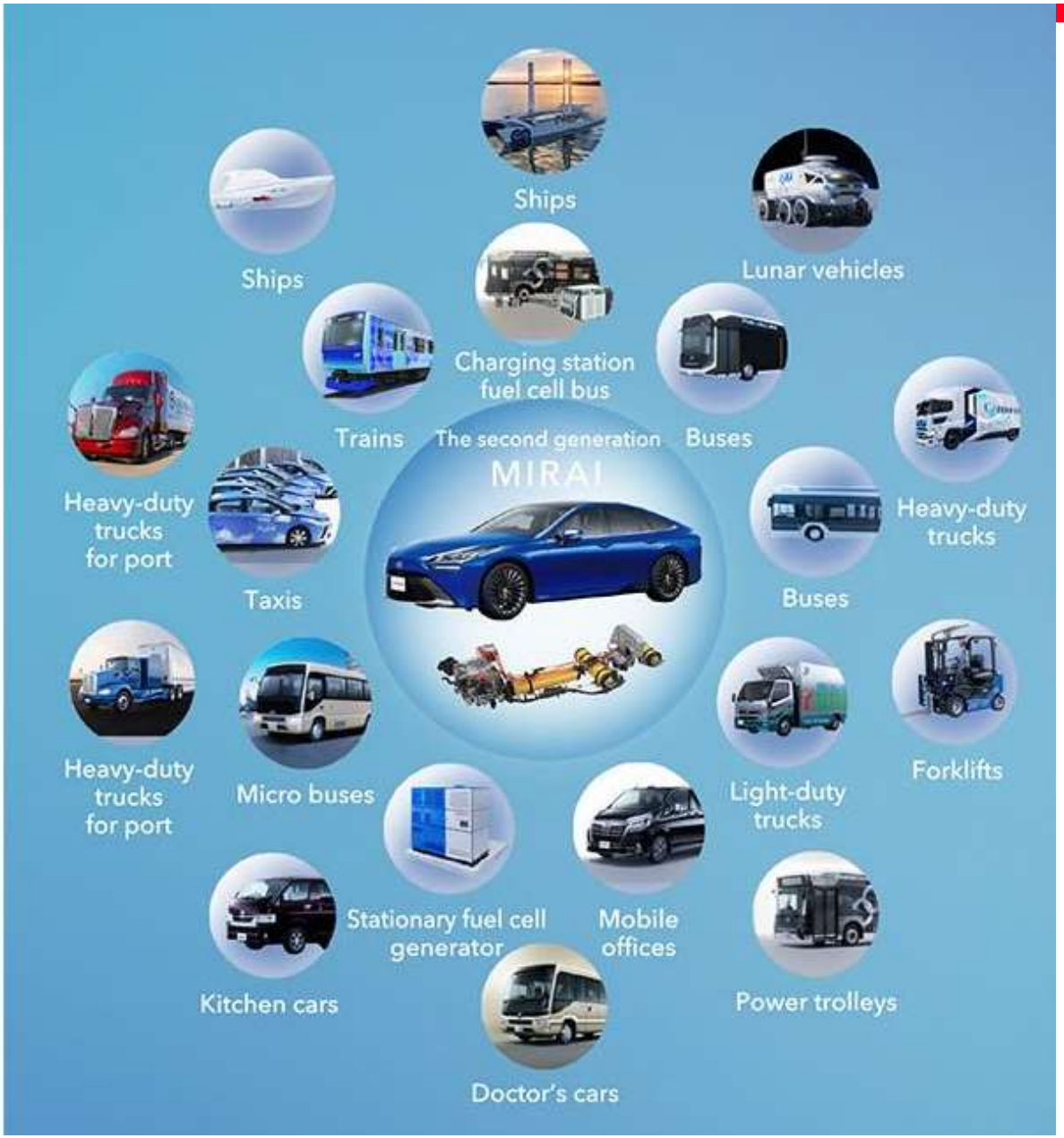
FC module overview

	Vertical type (Type I)	Horizontal type (Type II)
External appearance		
Dimensions (length x width x height)	890 x 630 x 690 mm	1,270 x 630 x 410 mm
Weight	Approx. 250 kg	Approx. 240 kg
Rated output	60 or 80 kW	60 or 80 kW
Voltage	400 - 750 V	

* Values are target values and are subject to change.

Schematic example of connecting the FC module to an external device




Ships
Ships
Lunar vehicles
Charging station
fuel cell bus
Trains
The second generation
MIRAI
Buses
Heavy-duty
trucks
for port
Heavy-duty
trucks
Taxis
Buses
Heavy-duty
trucks
for port
Micro buses
Light-duty
trucks
Forklifts
Stationary fuel cell
generator
Mobile
offices
Kitchen cars
Power trolleys
Doctor's cars

TOYOTA WOVEN CITY

- 175-acre site at the base of Mt. Fuji in Japan
- Fully connected ecosystem powered by hydrogen fuel cells.

HYDROGEN SOCIETY

RENEWABLES

SOURCES OF ENERGY

ENERGY STORAGE & CARRIER

H

HYDROGEN

ENERGY SYSTEM

END USER

END USAGE

DECARBONISED SOURCE OF POWER FOR HOUSEHOLDS & INDUSTRY

CLEAN TRANSPORTATION

Eurus Energy Holdings Corporation

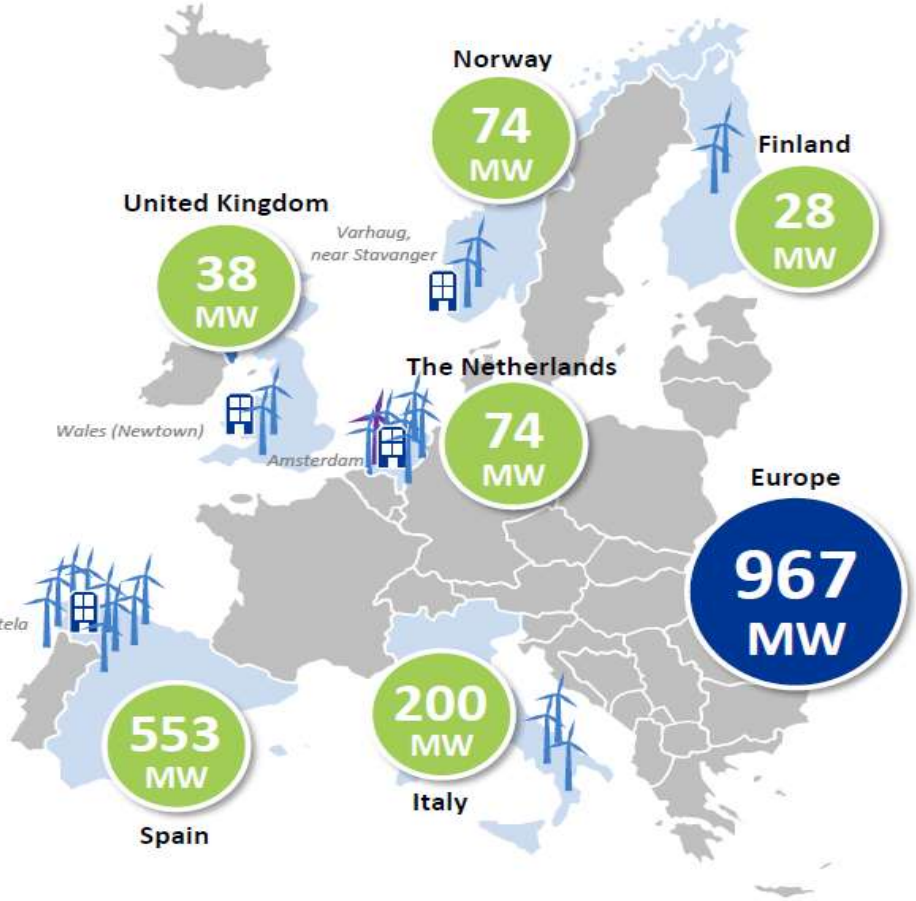
Toyota Tsusho Corporation:	60%
Tokyo Electric Power Company, Inc.:	40%

Høg-Jæren (Norway)
Capacity: 73.6MW
Start of Operation: 2011

Van Gogh (Netherlands)
Capacity: 10.0MW
Start of Operation: 2013

Llandinam (Wales, UK)
Capacity: 30.90MW
Start of Operation: 1993

Paxareiras (Galicia, Spain)
Capacity: 147.6MW
Start of Operation: 1998-2003



Eurus Energy

TOYOTA TSUSHO EUROPE

Total solution

Green energy

Electrolyser

H2 Transport

HRS

Operation

Service Maintenance

FC bus

Finance

TOYOTA FINANCIAL SERVICES

Bus operators

Hydrogen station

Stations planned in Europe

UK	Germany	Denmark	Belgium
65 by 2020	100 by 2020	15 by 2020	25 by 2020
300 by 2025	400 by 2025	185 by 2025	75 by 2025

Overview of Hydrogen station

- First Hydrogen station business as a Sogo-Shosha
  ➡ **Supporting FCV penetrating and storage know-how**

■ Operation started with Fuel cell vehicle "MIRAI" released

● Stationaly : 2 Stations (Operated as : *Toyotsu-Air liquide-Hydrogen enegy)

・Nagoya
・Toyota-sity
(each 1 place)
*Joint venture with Air Liquide

■ Nagoya-Atsuta

■ Toyota-city

● Mobile : 6 stations

(Operated as Nimohis)

・Tokyo (3 places)
・Aichi (3 placess)

*Joint venture with Iwatani, Taiyo-Nissan

■ Mobile hydrogen station

■ **Total Number of Hydrogen stations**

8 stations

Jan.2019

Be the Right ONE

National Hydrogen Strategy by country(1/2)

		FRANCE	GERMANY	NETHERLANDS	UK	SPAIN
LATEST DATA 現状	H_2 vehicles registered	400 LV 40 buses	255 PC, 507 LCV[1], **29 buses**	314 LV, 22 trucks, 7 buses	100 LV, 20 buses as of Jan, 2020	10 LV 8 buses as of 2020
	H_2 Stations (LCV[1] & HV[1])	38 as of 02/2021	**90** as of 02/2021	6 as of 12/2020	17 as of 2020	5 as of 10/2020
STRATEGIES 戦略	National hydrogen strategy	Hydrogen Plan for Energetic Transition	National Hydrogen Strategy	National Climate Agreement on hydrogen	UK Fuel Cell Dvpt & Deployment Roadmap	Renewable Hydrogen Roadmap
	When released?	June, 2018 + update Sept, 2020	June, 2020	March, 2020	2005 **New one in Q1 2021**	Oct. 2020
	Overall budgets	7.2bn€	**9bn€**	Overall budget not detailed	Overall budget not detailed	8.9bn€
	Main targets – Stations	2023: +100 2028: **+1,000**	2025: +50	2025: +50	2025: +100	2030:100-150
	Main targets – FCV	2023: 5,000 LCV 200 HV 2028: +50,000 LCV **2,000 HV**	No details on precise targets	2025: 15,000 LCV **3,000 HV** 2030: **+300,000FCV**	No details on precise targets	2030: 150-200 buses 5,000 – 7500 LV & HV, 2 commercial train lines

*LCV – Light Commercial Vehicles *PC – Passenger Car *FCV –FC Vehicle
*LV – Light Vehicles *HV – Heavy Vehicles, incl. buses, trucks, trains, and boats

Be the Right ONE

National Hydrogen Strategy by country(2/2)

SUBSIDIES 補助金

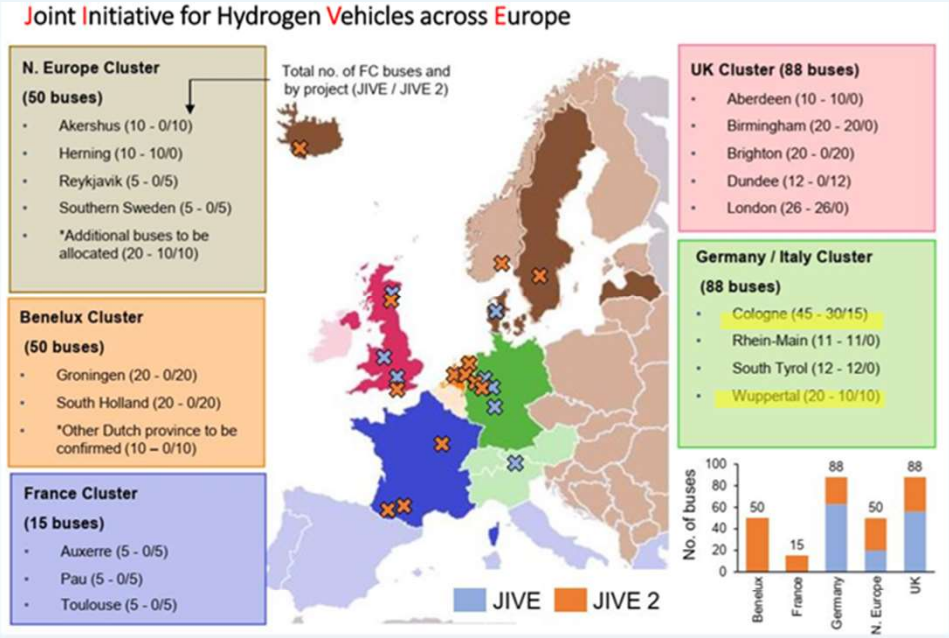
	FRANCE	GERMANY	NETHERLANDS	UK	SPAIN
Purchasing vehicles	6,000 € (PC) 3,000 € (LCV) P[1]<45k€:	0.9b€ eco-LV 0.6b€ eco-HV	Not specified	Not specified	4,400-15,000€ (HV) 4,000€ (LCV) No price limit
Production	ADEME Call for projects: Ecosystèmes territoriaux hydrogène	Not specified	300-1,000 €/avoided tonnes of CO2 for production by electrolysis	31m€ in Feb, 2020	Tax exemption 25m€ plan
Public transport system	80m€ from gov.[1] for 20 projects (2020)	Support European Infrastructure for FCVs	Subsidies for clean urban logistics & heavy-duty transport	15.5m€	Not specified
H_2 Distribution (HRS)	ADEME Call for projects: Ecosystèmes territoriaux hydrogène	2023: **3.4b€** For HRS for trucks	Not specified	Not specified	HRS included in 100m€ Plan MOVES
Development of technology	ADEME Call for projects: Briques technologiques et démonstrateurs	**1.1b€** for R&D, Facilities & production 2024: 50m€ for aviation & marine	Goal: H2 cost down 40m€- Innovative projects in the shipping industry	Not specified	2021-2023: 1.5 b€ for R&D projects

*P – Price

FC bus cluster

FCEV Infrastructure

FC Bus Project Clusters



- Cologne + Wuppertal (65 Busses) is the biggest cluster in Europe.

Demand expectation for FC Buses

	2019 TOTAL	2019	2020	2021	2022	2023	2023 TOTAL
Germany	8	55	33	111	140	100	**447**
Whole Cluster	13	55	35	158	140	100	**501**

- Results of survey among cluster members show increasing for FC buses.

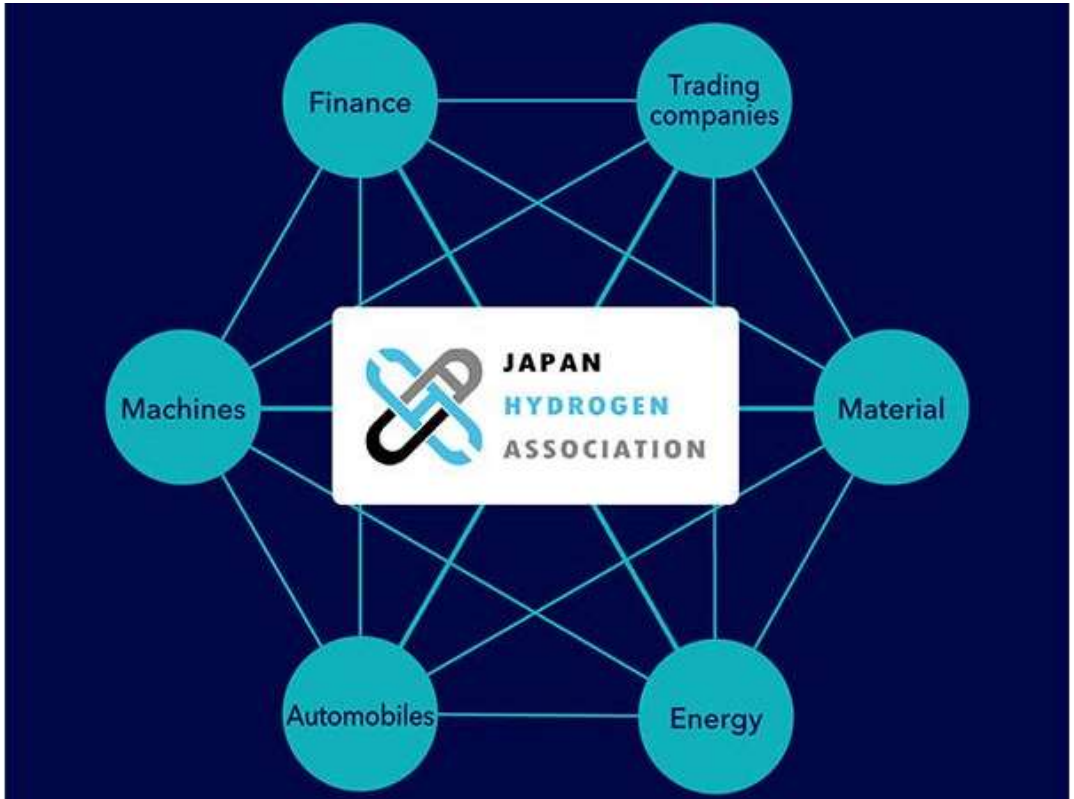
Grants for FC Buses

Latest info will be announced by government.

Federal government / 80% of gap b/w FC & Diesel buses.

North Rhein Westfalen / 80% funding of gap b/w FC & Diesel buses.
80% funding of total investment in infrastructure.
25% funding of Electrolyser.

On December 7, 2020,
the Japan Hydrogen Association
was established to realize
a hydrogen society ahead
of the rest of the world.
This is a joint effort by companies,
local governments,
and others, to work across
industries in solving problems
faced by society.



1) Creating hydrogen demand
2) Reducing cost through technological innovation
3) Providing financial support for companies
that run hydrogen businesses

About the Japan Hydrogen Association

JAPAN
HYDROGEN
ASSOCIATION

December 7, 2020

1. Background to Establishment

JAPAN HYDROGEN ASSOCIATION

(1) Global trends

Initiatives for the development of a hydrogen society are accelerating in countries around the world

Europe	European Green Deal proposed (December 2019) Target set to achieve net-zero CO2 emissions by 2050 EU hydrogen energy strategy announced (July 2020)
Germany	National hydrogen energy strategy adopted (July 2020)
Japan	Basic Hydrogen Strategy established in 2017. Since then, a Strategic Road Map for Hydrogen and Fuel Cells and Strategy for Developing Hydrogen and Fuel-Cell Technologies have been established.

1. Background to Establishment

JAPAN HYDROGEN ASSOCIATION

(2) Issues

Issues for accelerating the creation of a hydrogen society

❶ Generating hydrogen demand	Energy for transportation equipment, electric power generation, etc., non-energy for chemicals, steel, etc.
❷ Cutting costs through technological innovation	Cut manufacturing, transportation, storage, and other costs through technological innovation
❸ Providing funds to businesses	Necessary to simultaneously increase demand and reduce costs

A cross-sector organization is needed to solve these three issues

2. Overview of the Association

JAPAN HYDROGEN ASSOCIATION

Purpose	As a cross-industry and open organization with a bird's eye view of the entire supply chain, it will support the early creation of a hydrogen society by carrying out social implementation projects	
Name	Japan Hydrogen Association (abbreviated "JH2A")	
Joint Representatives	Takeshi Uchiyamada, Chairman of the Board of Directors from Toyota Motor Corporation Takeshi Kunibe, Chairman of the Board from Sumitomo Mitsui Financial Group, Inc. Akiji Makino, Chairman and CEO from Iwatani Corporation	
Organization type	Organization type: Unincorporated association (establishment of a general incorporated association will be pursued)	
Managing Board members	9 companies (in alphabetical order)	ENEOS Corporation, Iwatani Corporation, Kawasaki Heavy Industries, Ltd., Kobe Steel, Ltd., MITSUI & CO., Ltd., Sumitomo Mitsui Financial Group, Inc., The Kansai Electric Power Company, Inc., Toshiba Corporation, Toyota Motor Corporation
Members	87 companies (As of December 2, 2020)	

3. Organizational Structure

JAPAN HYDROGEN ASSOCIATION

- Made up of managing board members and general members
- Meets 1 – 2 times annually

General Assembly
(Decides important matters)

- Elected by managing board members
- Oversees accounts and operations

- Elected by managing board members
- Decides operational matters
- Meets about once per quarter

Executive Board
(Decides matters under the sole authority of the board)

Auditor

Secretariat
(Association operations)

Planning and Operations Committee
Deliberates on specific activities of the association

- Commercialization and Regulatory WG
- External Relations WG
- Research WG

4. Details of Activities (Topics)

JAPAN HYDROGEN ASSOCIATION

1. Propose and coordinate social implementation projects
2. Investigate creation of funds, and basic management and operations
3. Make policy proposals on generating demand, deregulation, etc.
4. Undertake international activities
5. Collect, analyze, and disseminate information in Japan and overseas

5. Details of Activities (Working Groups)

JAPAN HYDROGEN ASSOCIATION

1 Commercialization and Regulatory Working Group

Make proposals to the government for the creation of social implementation projects, deregulation, etc.

2 External Relations Working Group

Collaborate with other related organizations, reinforce collaboration with the Hydrogen Council, conduct public relations

3 Research Working Group

Conduct research and analysis, disseminate information, prepare research reports

6. Implementation of Projects

JAPAN HYDROGEN ASSOCIATION

Project Proposals

1. **Projects relating to local production for local consumption**
   - Use special zones in collaboration with local governments

2. **Projects relating to supply chains**
   - Solve overseas problems relating to the manufacture, transport, and storage of hydrogen

3. **Projects relating to the expansion of demand**
   - Increase demand for commercial vehicles, railways, ships, and in the chemical and steel industries

7. Future Schedule

JAPAN HYDROGEN ASSOCIATION

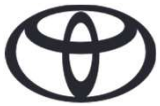
2020	December 7	Event commemorating the association's establishment
2021	Jan. – Feb.	Deliberate on details of working group activities Identify issues relating to the widespread use of hydrogen Gather information for policy proposals
	February	Make proposals to the government

TODAY'S TAKEAWAY

1. Toyota is ready to provide FC vehicle (Mirai) and FC bus (Caetano bus).

2. Toyota is looking for the partners about the POC (proof of concept) for hydrogen business.

   - Vehicle and bus : Cities, government, universities, companies, etc.
   - Hydrogen (prod.): Power companies, Chemical companies etc.



Hvala