AJUSA HYDROGEN TECHNOLOGIES

We create a sustainable future

Ajusa Hydrogen Technologies

April 2025

Ajusa: Fuel cell applications in heavy-duty transport: Hybrid trucks, CRIPICOM project, and naval applications.

1. History of hydrogen technologies at Ajusa: The PEM fuel cell
2. Global fuel cell market: Heavy-duty transport / buses
3. Ajusa Technology demonstration projects
   a) Range extender module of 20 kW. Hybrid trucks Project
   b) CRIPICOM Project: demonstrator module of 50 kW
   c) Development of a 50 kW stack for submarines. S80 program

History of hydrogen technologies at Ajusa

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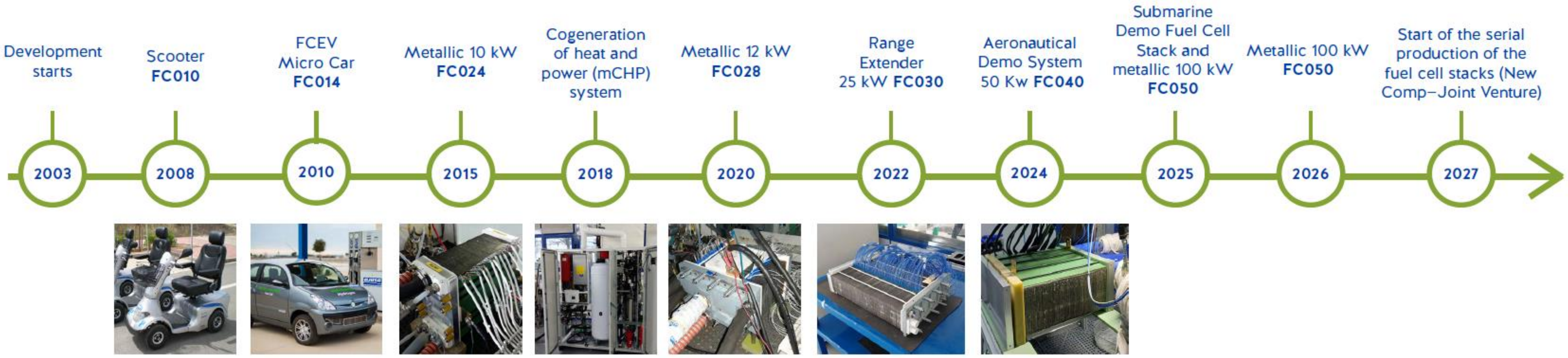
Development timeline

Ajusa TH has been developing fuel cell technologies since 2003 with the goal to design, develop and manufacture fuel cell systems and units.



Global fuel cell market: Heavy-duty transport / buses

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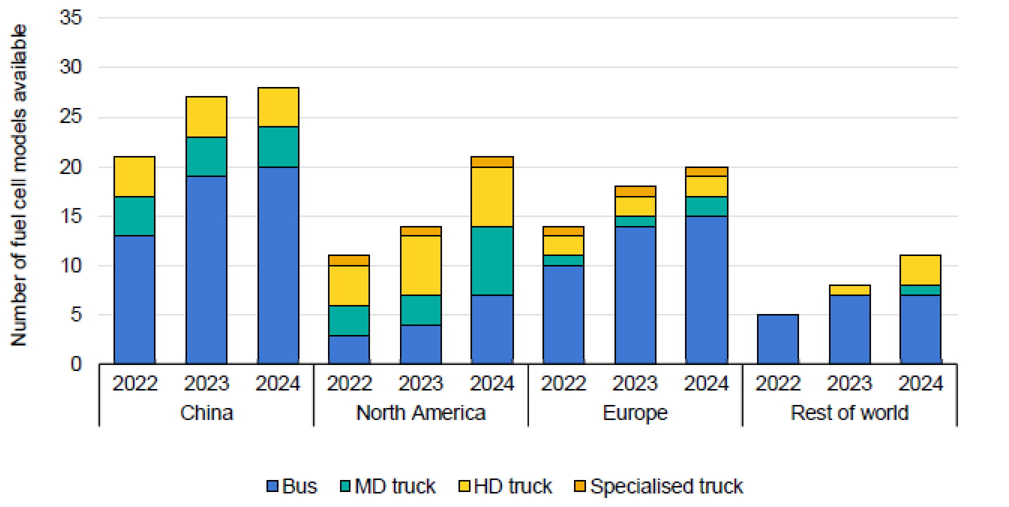
Fuel cell vehicles on the market

- Intercity Bus Irizar i6S
- City Bus Caetano H2 City Gold
- City Bus Solaris Urbino 12
- Car Toyota Mirai
- Car Hyundai Nexo
- Truck Hyundai XCIENT Fuel Cell

Figure 2.10 Fuel cell electric vehicle models by original equipment manufacturer headquarters, type of vehicle, and release date, 2022-2024



Global fuel cell market: Heavy-duty transport / buses

Urban buses in Spain: Hydrogen refueling stations and fleets

- Barcelona Metropolitan Transport (TMB) has 46 hydrogen/fuel cell buses in operation..
- EMT Madrid operates ten hydrogen/fuel cell-powered buses.
- Ajusa has been operating a hydrogen refueling station for 13 years, since 2012, one of the pioneers in Spain..

Ajusa Technology demonstration projects

Financiado por la Unión Europea
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Range extender module of 20 kW. Hybrid trucks Project

Features of the 20 kW range extender module
Dimensions: 1200 x 700 x 660 mm | Weight: 175 kg
H2 tank at 350 bar: 14.7 kg H2
Battery 600 Vdc – 139 Ah

Descripción	Valor
Voltaje / corriente nominal	163 V / 140 A
Potencia bruta eléctrica módulo (Max.)	24 kW
Consumos auxiliares (Max.)	4 kW
Potencia Térmica (Max)	30 kW
Alimentación eléctrica HV	450 – 700 Vdc
Alimentación eléctrica LV	24 Vdc
Comunicación VCU	CAN J1939
Consumo H2 (140 A)	1,37 kg/h
Calidad H2	ISO 14687-2 / SAE J2719
Presión de suministro de H2	10 ± 2 bar
Líquido Refrigerante	BASF GLYSANTIN®FC G20
Temperatura In / Caudal refrigeración	65ºC / 100 lpm
Grado de protección IP	54
Fuga externa de H2	< 108 cc/hora

Ajusa Technology demonstration projects

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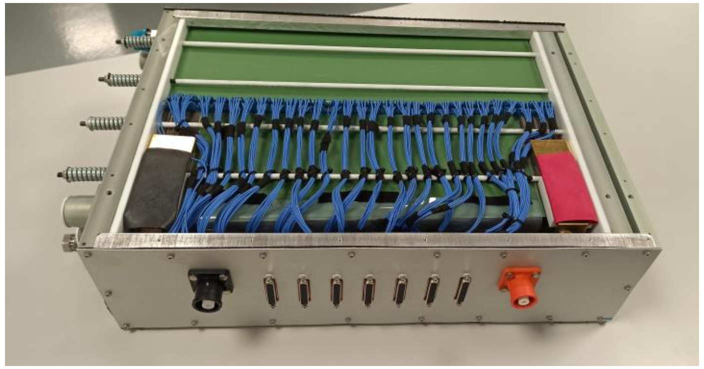
MINISTERIO DE CIENCIA E INNOVACIÓN

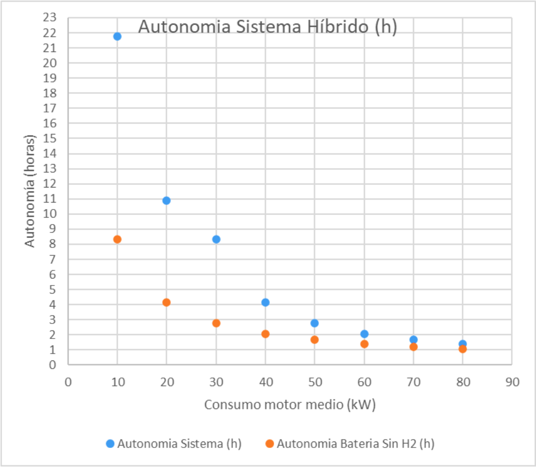
Plan de Recuperación, Transformación y Resiliencia

CDTI INNOVACIÓN

Range extender module of 20 kW. Hybrid trucks Project



Stack FC03020-250



Range Extender On/Off:

- **Start: Truck HV Battery SOC 85%**
- **Stop: Truck HV Battery SOC 95%**

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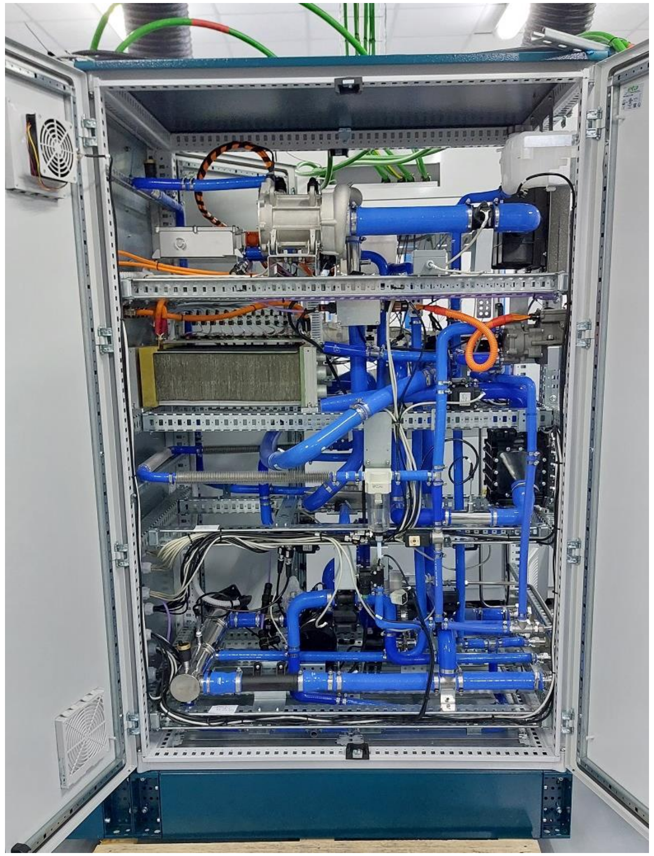
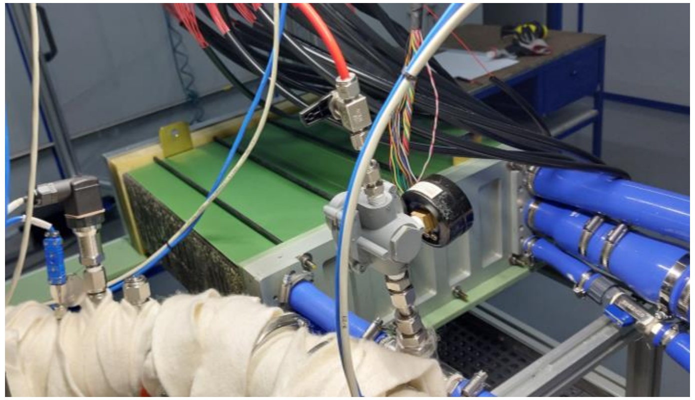
CRIPICOM Project: demonstrator module of 50 kW



Internally developed control system

Stack FC04020-250 / 50 kW



Ajusa Technology demonstration projects

Development of a 50 kW stack for submarines. S80 program

Fuel cell-based Air Independent Propulsion System (AIP). 300 kW system (6 x 50 kW)

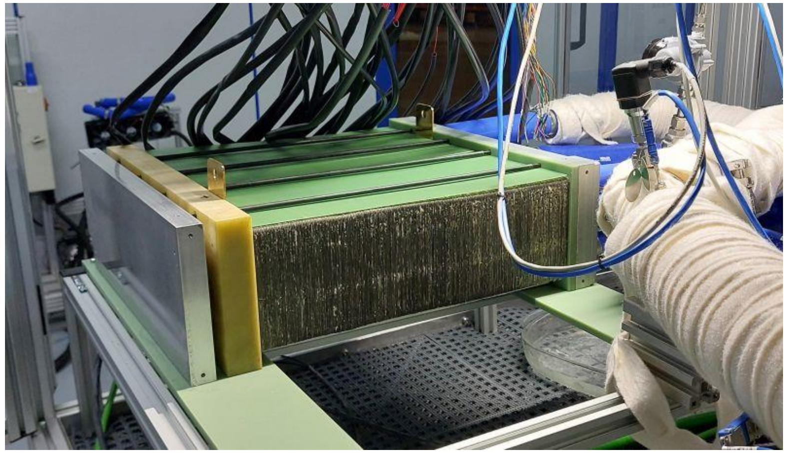
Development of a 50 kW fuel cell. FC04020 s80.
Requirements:

- Bioethanol hydrogen reformed fuel
- Pure oxygen
- Naval/military requirements

Fuel composition

	KG/H	% molar /volumen
H_2	3,56	72,4%
H_2O	1,19	2,7%
CH_4	0,132	0,3%
CO	0,0017	0,0%
CO_2	26,6	24,6%

Stack FC04020-250 / 50 kW for reformed Fuel



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Tecnologías del Hidrógeno

GRACIAS

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