

Overview of key electrolysis and fuel cell manufacturers globally

**WEBINAR SERIES – Promoting Green Hydrogen Economy in South Africa –
Expert and Knowledge Exchange**

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Electrolysers

- General observations
- manufacturers
- products by type
- manufacturers by country
- Number of products by type
- manufacturing capacities

Fuel Cells

- General observations
- manufacturers
- manufacturers by FC type
- manufacturers by country

- 97 electrolyser manufacturers identified so far (update in 2025)
- Larger number of PEMEL products (173 PEMEL vs. 133 AEL), many from fuel cell business side and several smaller units and possibly more flexible scalability
- General trend to larger unit power sizes (20 MW for both AEL and PEMEL)
- Three countries dominate in number of manufacturers: China (16), Germany (14) and USA (14)
- German manufacturers of smaller power output (only 3 manufacturers of large power units: ThyssenKrupp Nucera, Siemens Energy, Sunfire)
- Several PEMEL manufacturers based on FC development (except Cummins, since Hydrogenics has traditionally produced both, electrolysers & fuel cells)
- China and USA/Canada have manufacturers with units of higher power output

Electrolyser manufacturers (alphabetically)

Project team
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AdvaitInfraTech Ltd.	IN
Asahi Kasei Corp.	JP
AUYAN New Energy Technology Co., Ltd.	CN
AVL	AT
Bloom Energy	US
Bramble	UK
CERES	UK
Cipher Neutron	CA
Clean Power Plc.	UK
CONVION	FI
CPU H2Power	CN
CRRC Zhuzhou Institute	CN
Cummins	US
Denso	JP
Elchemtech	KR
Elcogen AS	EE
Electric Hydrogen	US
ELOGEN (former ArevaH2Gen)	FR
EM Korea Co., Ltd	KR
Enapter	DE
ErreDue	IT
EvoLOH, Inc.	US
FEST GmbH	DE
Fortescue Future Industry	AU
FuelCell Energy	US

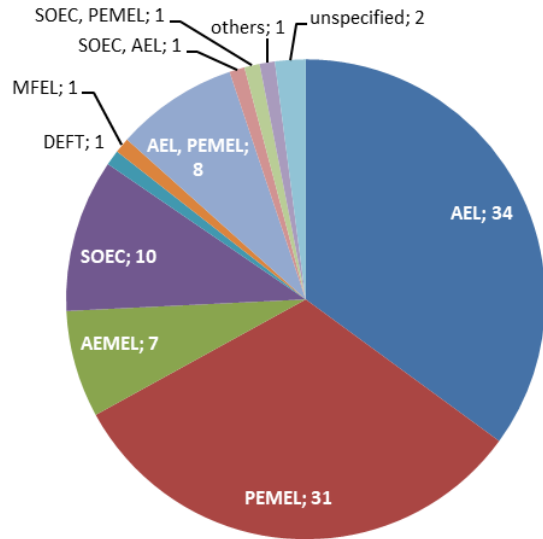
FUSION-FUEL Green Plc.	IR
Gen-Hy	FR
GENVIA (Schlumberger)	FR
GraForce	DE
Green Hydrogen Systems (GHS)	DK
H2B2 ElectrolysisTechnologies	ES
H2Energy	IT
H2U Technologies	US
Haldor Topsoe A/S	DK
HET Hydrogen	SG
Himenergo (former Uralhimmash)	RU
Hitachi-Zosen Corp.	JP
Hoeller Electrolyzers GmbH	DE
H-TEC Systems GmbH	DE
HyAxiom	US
Hydrogen Innovation GmbH	DE
Hydrogen Optimized	CA
HydrogenPro ASA (Tianjin Mainland Hydrogen Equipment Co., Ltd. (THE))	CN
Hydrox Holding	ZA
HyGear	NL
Hygreen Energy	CN
Hymeth	DK
Hysata	AU
Hystar	NO
Hyter	IT

Hyundai Engineering & Construction	KR
Iberlyzer	ES
iGas	DE
IMI Critical Engineering	UK
iph Hähn GmbH	DE
ITM Power	UK
Jiangsu Guofu Hydrogen Energy Equipment Co., Ltd. (GUOFUHEE)	CN
John Cockerill (applying Chinese Jingli electrolyzers)	BE
Kohodo	CN
kylin-tech	CN
Kyros Hydrogen Solutions GmbH	DE
Larsen & Toubro Limited	IN
LONGi Hydrogen Technology Co., Ltd.	CN
LightBridge Inc.	KR
Loop Energy	CA
McPhy Energy S.A.	FR
Metacon	SE
Mitsubishi Heavy Industries	JP
MVS Engineering	IN
NEA Hytron (Neuman&Esser)	DE
NEL ASA	NO
NextHydrogen	CA
Nordex Electrolyzer S.L.	ES
Ohmium	US
PERIC Hydrogen Technologies Co., Ltd	CN

Phoenix Motorcars Inc. , EdisonFuture	US
Plug Inc. (previous Plug Power)	US
Robert Bosch GmbH	DE
Shandong Saikesaisi Hydrogen Energy Co. Ltd.	CN
Shanghai Electric	CN
Shuangliang Green Hydrogen	CN
Siemens Energy	DE
Splitwaters	US
Stargate Hydrogen	EE
Stiesdal Hydrogen A/S	DK
Sunfire GmbH	DE
Sungrow Hydrogen Energy	CN
Syfen	FR
SynoSynergy	CN
thyssenkrupp nucera AG & Co. KGaA	DE
Toshiba	JP
Toyota/Chiyoda	JP
Trina Hydrogen	CN
Verdagy	US
Verde Hydrogen	US
Versogen	US
XiNTC Electrolyzers	NL

Electrolyser products by type

Manufacturers per EL type

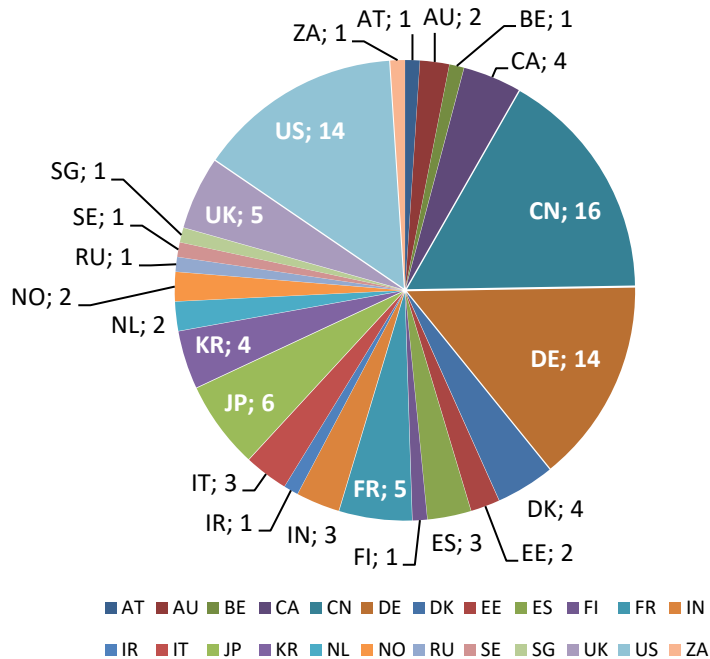


Electrolyser type	Number of	%
AEL	34	35
PEMEL	31	32
AEMEL	7	7
SOEC	10	10
DEFT	1	1
MFEL	1	1
AEL, PEMEL	8	8
SOEC, AEL	1	1
SOEC, PEMEL	1	1
others	1	1

■ AEL
 ■ PEMEL
 ■ AEMEL
 ■ SOEC
 ■ DEFT
 ■ MFEL
■ AEL, PEMEL
 ■ SOEC, AEL
 ■ SOEC, PEMEL
■ others
■ unspecified

Approach – EL-Manufacturers by country

Number of electrolyser manufacturers by country



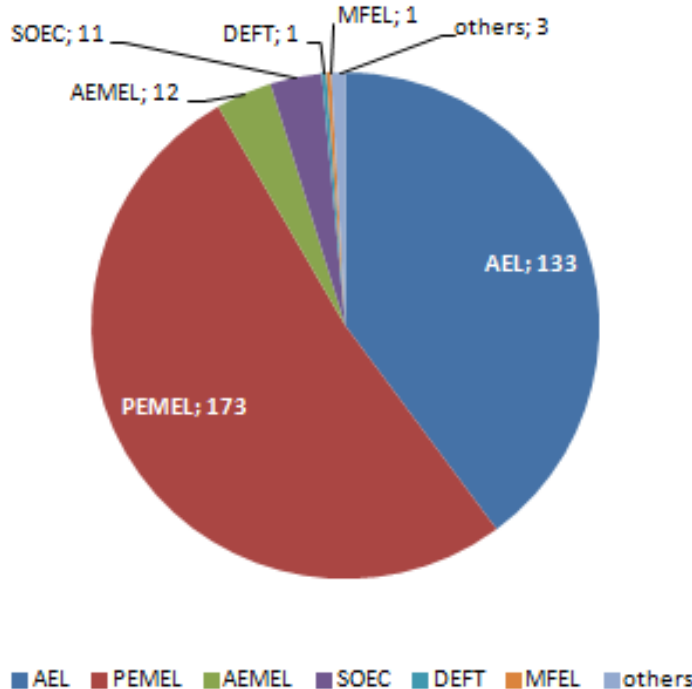
■ Distribution of 97 manufacturers to 24 countries

- China (16)
- Germany and USA (each 14)
- Japan (6)
- France, UK (each 5)
- Canada, Denmark and South Korea (each 4)
- India, Italy and Spain (each 3)
- Australia, Estonia, Netherlands and Norway (each 2)
- Austria, Belgium, Finland, Ireland, Russia, Sweden, Singapore and South Africa (each 1)

Approach – Number of EL-products by type

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Number of electrolyser products by type



- 90.6% of all electrolyser products either PEMEL (51.8%) or AEL (39.8%)
- Remainder equally distributed among AEMEL (3.6%) or SOEC (3.3%), only 5 exotic electrolysers

	Electrolyser manufacturers	
	old	new
# companies listed	54	97
# single products listed	177	334
Also manufacturing fuel cells		11

- Numbers not available for all manufacturers listed
- Manufacturer production capacities:
 - 14 @ 2 ... 5 GW/a (focus: USA)
 - 23 @ 0.5 ... 1.5 GW/a (focus: China)
 - 8 @ 0.05 ... 0.4 GW/a (focus: Europe)
- All electrolyser types AEL, PEMEL, AEM and SOEL represented

- 68 fuel cell manufacturers identified so far
- About 11 out of 68 FC manufacturers also offer electrolyzers (now): manufacturers understand potential for improving opportunities by better utilising manufacturing know how and capabilities of technically similar products
- Majority of FC manufacturers emerged from the automotive sector (from cars earlier to HD applications now) or large-scale stationary power applications
- Some start-up FC manufacturers emerged from specific application areas such as SFC energy (leisure applications), HyPoint – now acquired by ZeroAvia – (aircraft), Honeywell Aerospace (UAVs) and Genevos (small maritime applications), partially applying FCs from large FC manufacturers
- Large-scale power product portfolio has apparently grown
- Scaling up manufacturing capacity aspect has grown in relevance compared to 2022/2023
- Fewer mergers but many partner cooperation agreements as compared to 2022/2023

Approach – FC manufacturers (alphabetically)

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Advait Infratech Ltd.	IN	GenCell	IL	Plug Inc.	US
Advent Technologies Holdings, Inc.	US	Genevos SAS	FR	PowerCell Sweden AB	SE
AFC Energy, Ltd.	UK	H2X Global	AU	Proton Motor Fuel Cell GmbH	DE
AVL List GmbH	AT	Hanwha Aerospace	KR	REFIRE	CN
Axane	FR	HDF Energy	FR	Robert Bosch GmbH, Geschäftsentwicklung	DE
Ballard Power Systems Inc.	CA	Helion ALSTOM Hydrogen SAS	FR	SFC Energy AG	DE
balticFuelCells GmbH	DE	Hitachi Energy Ltd	JP	SHPT (Shanghai Hydrogen Propulsion)	CN
Bambili Energy Fuel Cells	ZA	Honda / GM Fuel Cells	JP	SinoSynergy	CN
Bloom Energy	US	Honeywell Aerospace	US	SinoHytec Co.,Ltd.	CN
Blue World Technologies ApS	DK	Hopium SA	FR	SOLIDpower SpA	IT
Bramble Energy	UK	Horizon Singapore HQ	SG	SolydEra SpA / GmbH	IT
cellcentric GmbH & Co. KG	DE	HyAxiom Inc.	KR	Sustainable Energy Group Inc.	US
CERES	UK	HyMove	NL	Symbio Fuel Cells	FR
Convion Ltd.	FI	Hyundai Fuel Cells	KR	TECO2030	NO
Corvus Energy	NO	Hyzon	US	Toshiba	JP
Cummins Accelera	US	INOCEL	FR	Toyota Fuel Cells	JP
Denso Corporation	JP	Intelligent Energy	UK	Troowin	CN
Doosan Fuel Cells	KR	Kyocera Energy Conversion Devices (Fuel	JP	Yanmar Energy Systems Co., Ltd.	JP
EH Group Engineering AG	CH	Loop Energy Inc.	CA	Vinssen Co., Ltd.	KR
EODev Fuel Cells	FR	Mitsubishi Heavy Industries	JP	WATT Fuel Cells	US
EKPO Fuel Cell Technologies GmbH (former Elring Klinger AG and Plastic Omnium)	DE	Nedstack Fuel Cell Technology BV	NL	ZEPP Solutions B.V.	NL
FTXT Energy Technology Co., Ltd.	CN	Nuvera Fuel Cells, LLC	US	ZeroAvia	US
Fuel Cell Energy, Inc.	US	Panasonic Fuel Cells	JP		

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2022/23



2024 (1st stage)

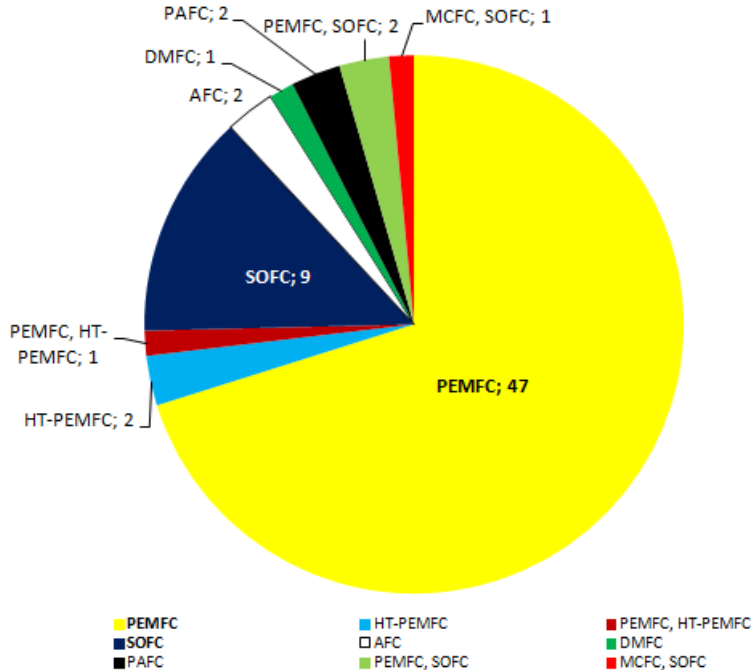


2024 (2nd stage)

Approach – Fuel cell manufacturers by FC type

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Number of manufacturers by FC type

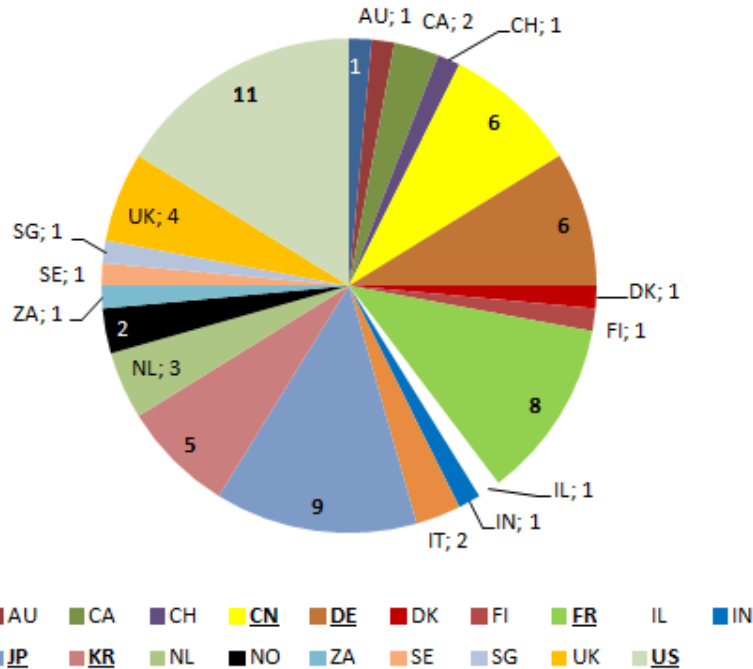


	FC manufacturers	
	old	new
# manufacturers	24	68
# single products	76	278
Also manufacturing electrolyzers		11

Approach – Fuel cell manufacturers by country

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Number of FC manufacturers by country



■ Distribution of 68 manufacturers to 21 countries

- USA (11)
- Japan (9)
- France (8)
- Germany, China (6)
- South Korea (5)
- UK (4)
- Netherlands (3)
- Canada, Italy and Norway (each 2)
- Austria, Australia, Switzerland, Denmark, Finland, Ireland, India, South Africa, Sweden and Singapore (each 1)

Thank you for your attention!

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