



J. Técnica del H2 verde Producción de Electrolizadores en España

David Heredero



accelerate the shift™



INTRODUCING ACCELERA

The new brand for
New Power,
Cummins' fifth
business segment,
focused on zero-
emission technologies.

Cummins and Accelera



Engines



Power generators

Components

Distribution



Electrolysis



Fuel cells



Batteries



e-Traction

Accelera by Cummins

190
Countries



59.9K
Global employees



1.3M+
Engines built



10.6K
Distributor & dealer
locations



\$1.1B
Invested in research &
development



103 YEARS
of industry leadership



*2021 figures

Reduced Emissions vs Zero Emissions



CUMMINS

REDUCED EMISSIONS

Cummins' comprehensive range of low-to-near zero emissions solutions has the right tech at the right time to help you run your business more sustainably.

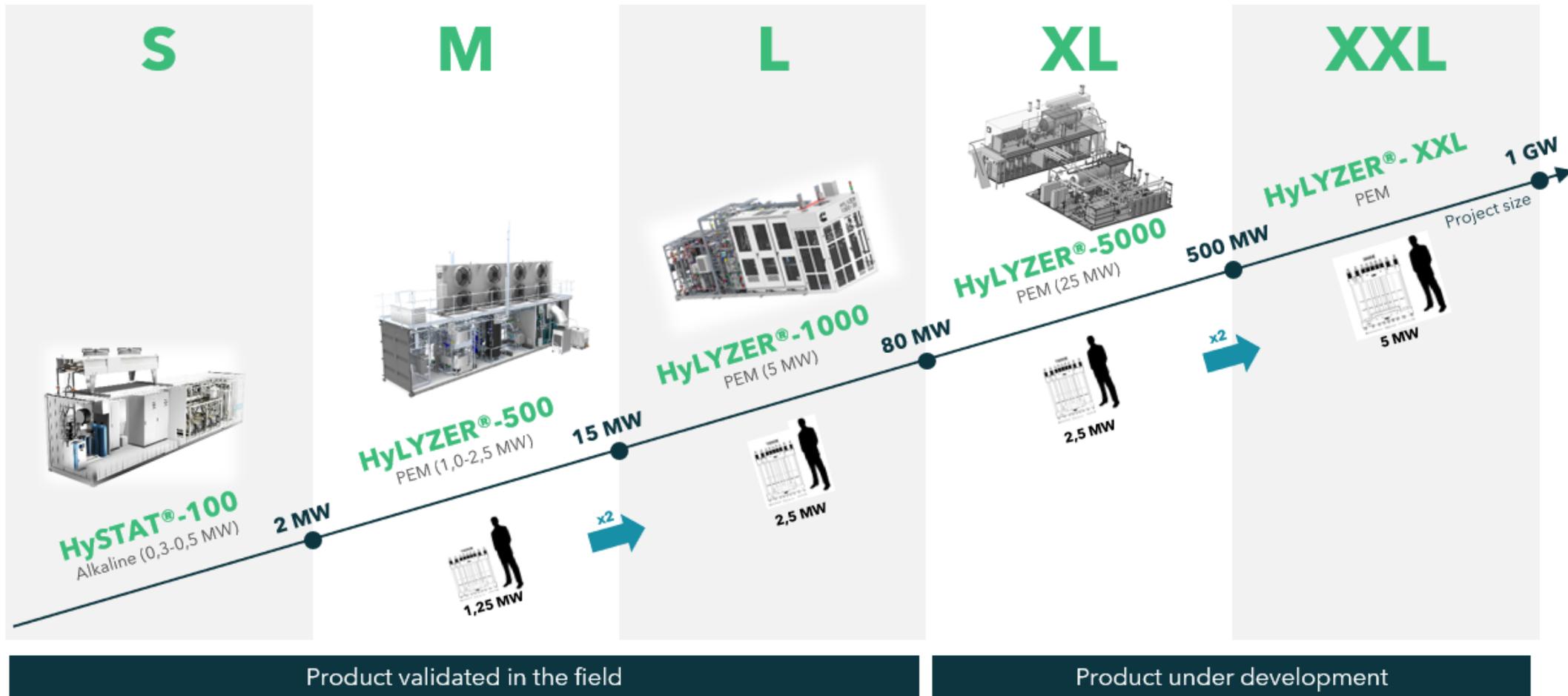


ACCELERA

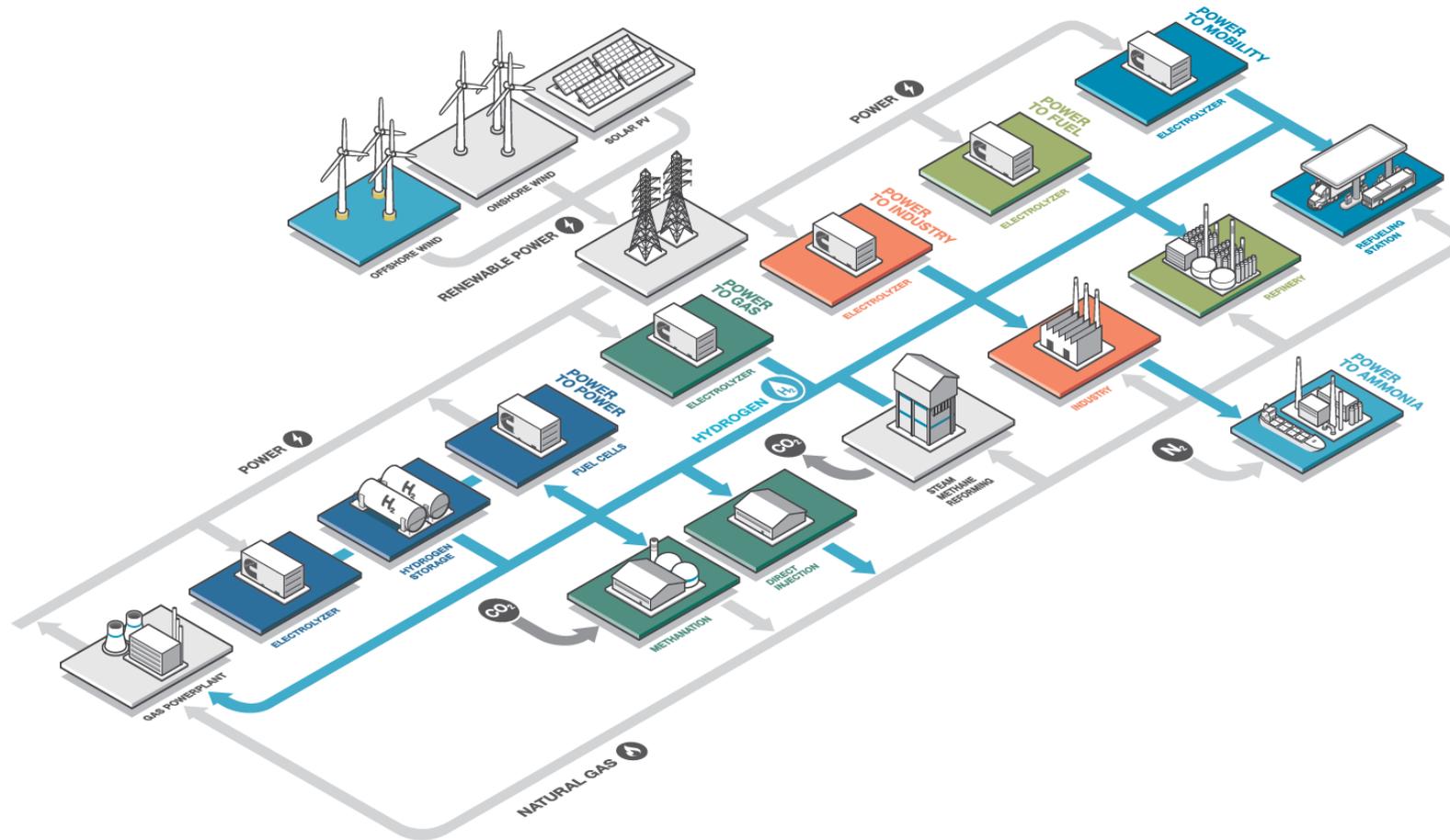
ZERO EMISSIONS

Accelera hydrogen fuel cell, battery electric, electrolyzer and ePowertrain solutions are ready to transition your fleets, construction sites, ports, factories and grids to zero emissions today.

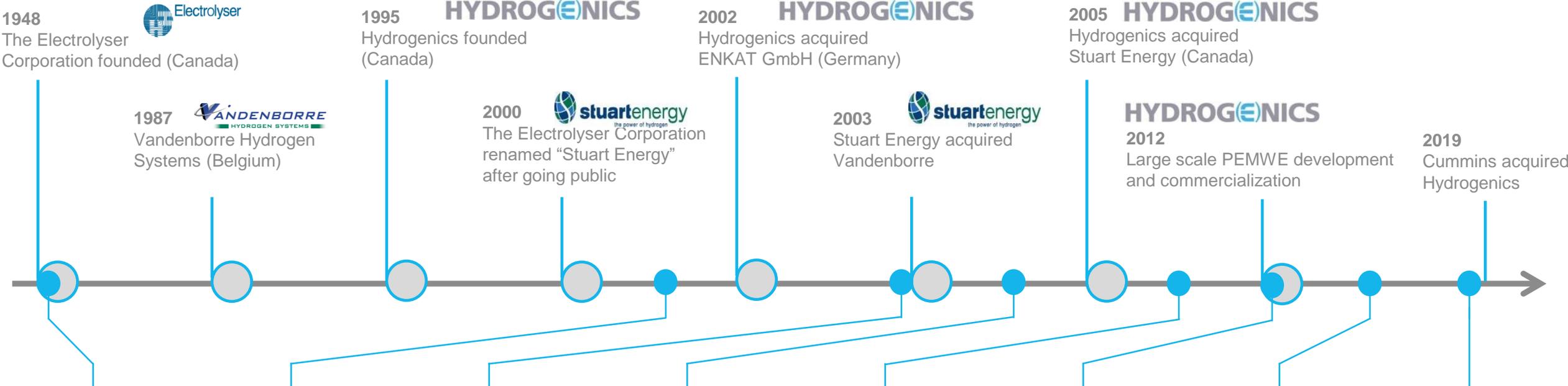
Accelera's Electrolyzer product offering



Renewable hydrogen

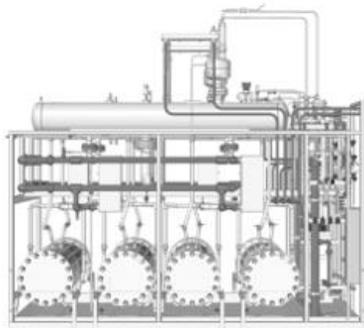
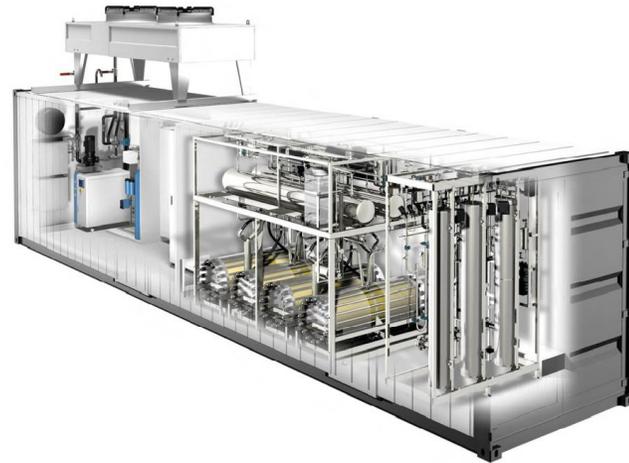


Over 70 Years of Advancement in Electrolyser Technology

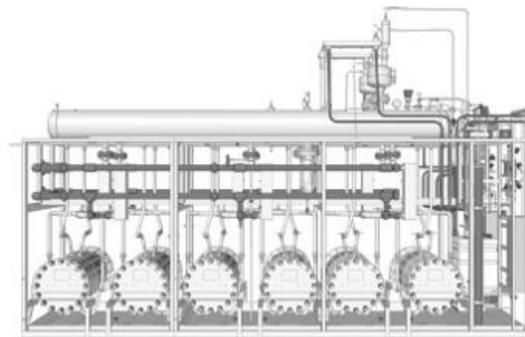


							
Alkaline	PEM	PEM	Alkaline	Alkaline	PEM	PEM	PEM
Gen II	90E	701E	S1000	S2500/S4000	1500E	450E	1500E
Atmospheric mono-polar	Small scale PEM program started	Low pressure high surface area demonstrated	Pressurized bipolar (IMET)	Large active area pressurized (IMET)	MW single stack development and deployment	Differential pressure system deployment	3MW single stack market introduction

HySTAT[®] alkaline electrolyzers



4 cell stacks
70 Nm³/h



6 cell stacks
100 Nm³/h



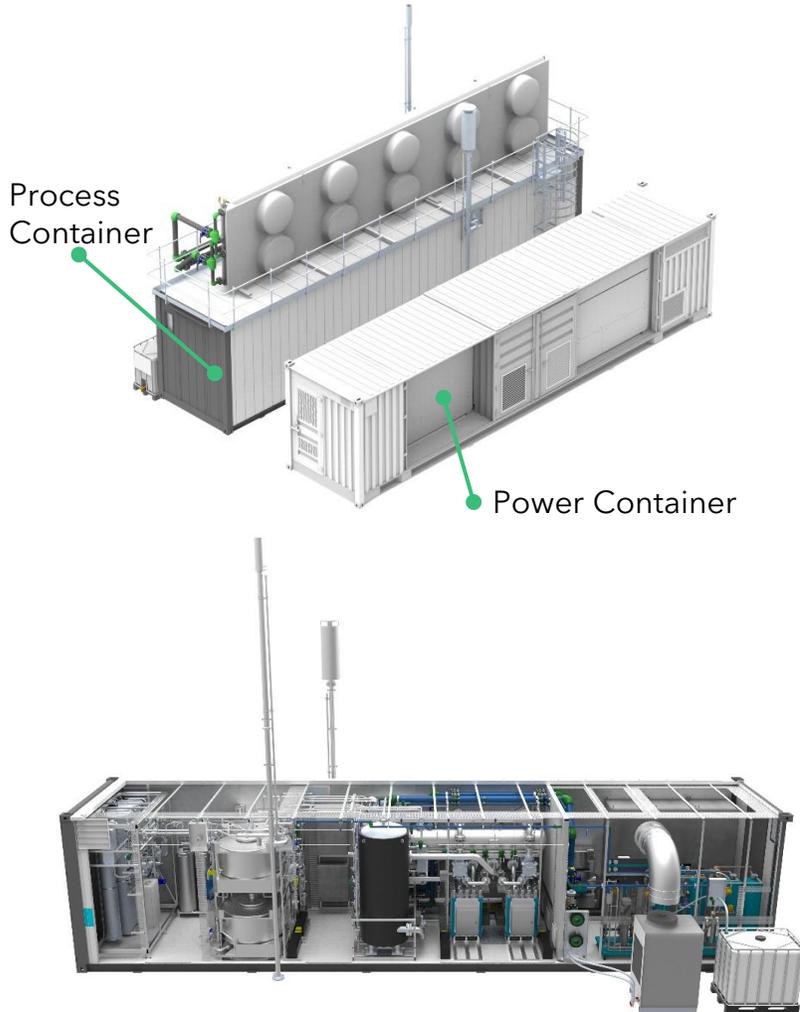
> 600 references

HyLYZER® PEM stack the industry benchmark



	1500E cell stack (small)	1500E cell stack (high)
Nominal input power (Max)	1,25 MW (1,5 MW)	2,5 MW (3 MW)
Nominal H2 flow (Max)	250 Nm³/h (310 Nm³/h)	500 Nm³/h (620 Nm³/h)
Operating pressure	30 barg	30 barg
Used in products	HyLYZER®-500	HyLYZER®-1000 HyLYZER®-5000

HyLYZER[®]-500 PEM Electrolyzer



HyLYZER[®] 200/250/400/500-30

- Containerized system
- **Turnkey (Plug & Play):** including hydrogen gas generation system, power transformer and rectifiers AC-DC, water purification (reverse osmosis), cooling (dry cooler)
- **Dual stack platform:** up to 2 cell stacks of 250 Nm³/h (1,25 MW) to reach 500 Nm³/h (2,5 MW)
- **Product versions:**
 - 1,0 MW: 200 Nm³/h (1 stack)
 - 1,25 MW: 250 Nm³/h (1 stack)
 - 2,0 MW: 400 Nm³/h (2 stacks)
 - 2,5 MW: 500 Nm³/h (2 stacks)
- **Output pressure:** 30 barg

HyLYZER®-1000 PEM Electrolyzer

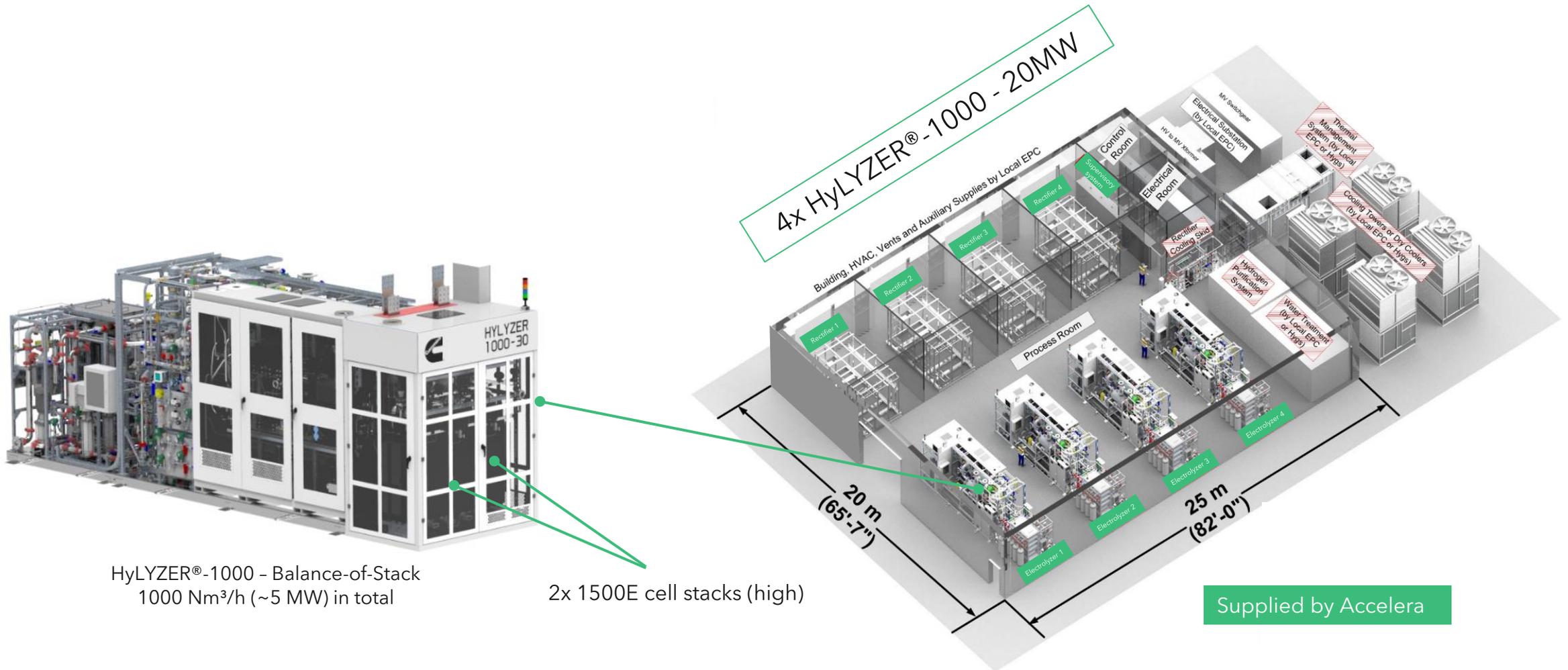


HyLYZER® 1000-30

- Indoor system
- **Modular product** (to be integrated): including hydrogen gas generation system, power transformer and rectifier AC-DC
- **Dual stack platform:** 2 cell stacks of 500 Nm³/h (2,5 MW) to reach 1000 Nm³/h (5 MW)
- **Output pressure:** 30 barg

Every hazardous zone of the product is enclosed (ventilated enclosure + hydrogen detection) preventing the building to be classified as ATEX zone → cheaper equipment inside the building + ease of operation & maintenance

HyLYZER®-1000 Modular Product



HyLYZER®-1000 - Balance-of-Stack
1000 Nm³/h (~5 MW) in total

2x 1500E cell stacks (high)

Supplied by Accelera

World's Largest PEM Electrolyzer by Accelera



Air Liquide Becancour, Canada

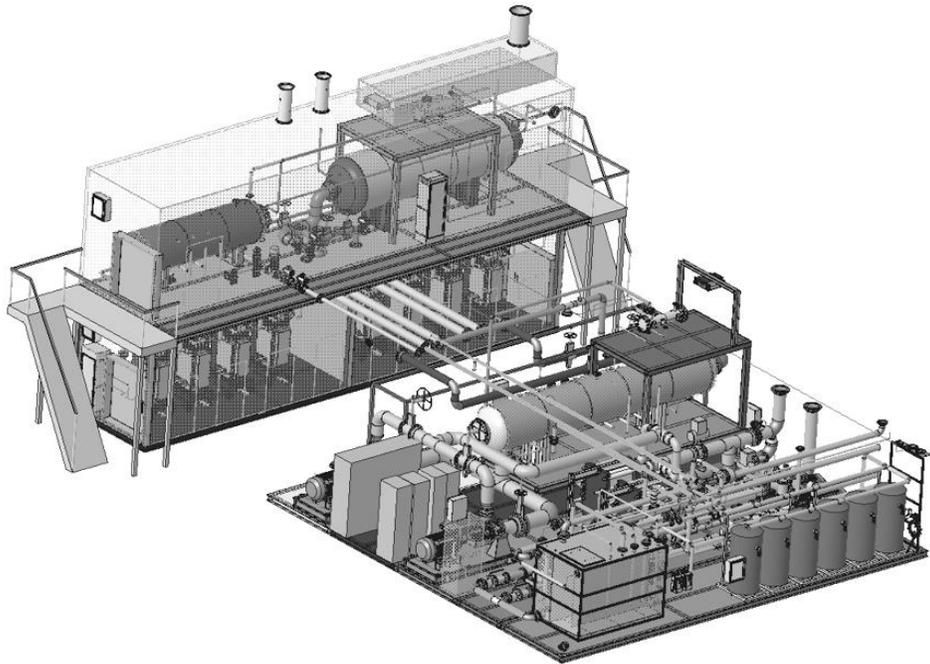
- 4x HyLYZER® 1000-30 - indoor - 20 MW - 4.000 Nm³/h - 8,6 TPD

More info & video tour:

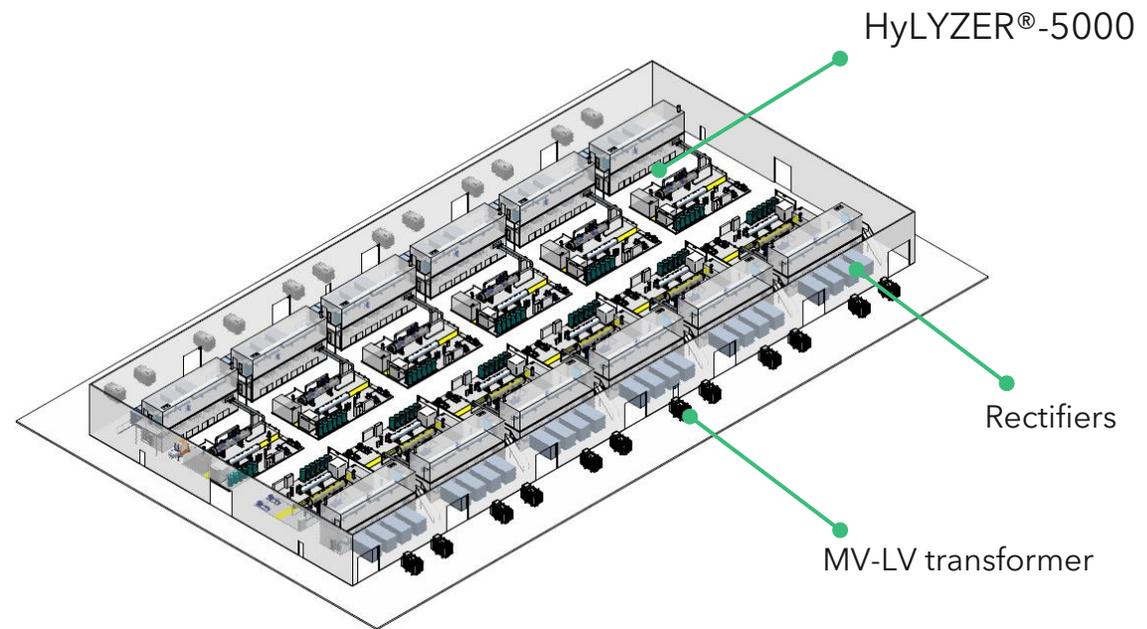
<https://www.cummins.com/news/2021/10/04/video-case-study-cummins-hylyzerr-pem-electrolyzer-becancour-quebec>

HyLYZER[®]-5000 PEM Electrolyzer

Plant layout 60.000 nm³/h (~300 MW)

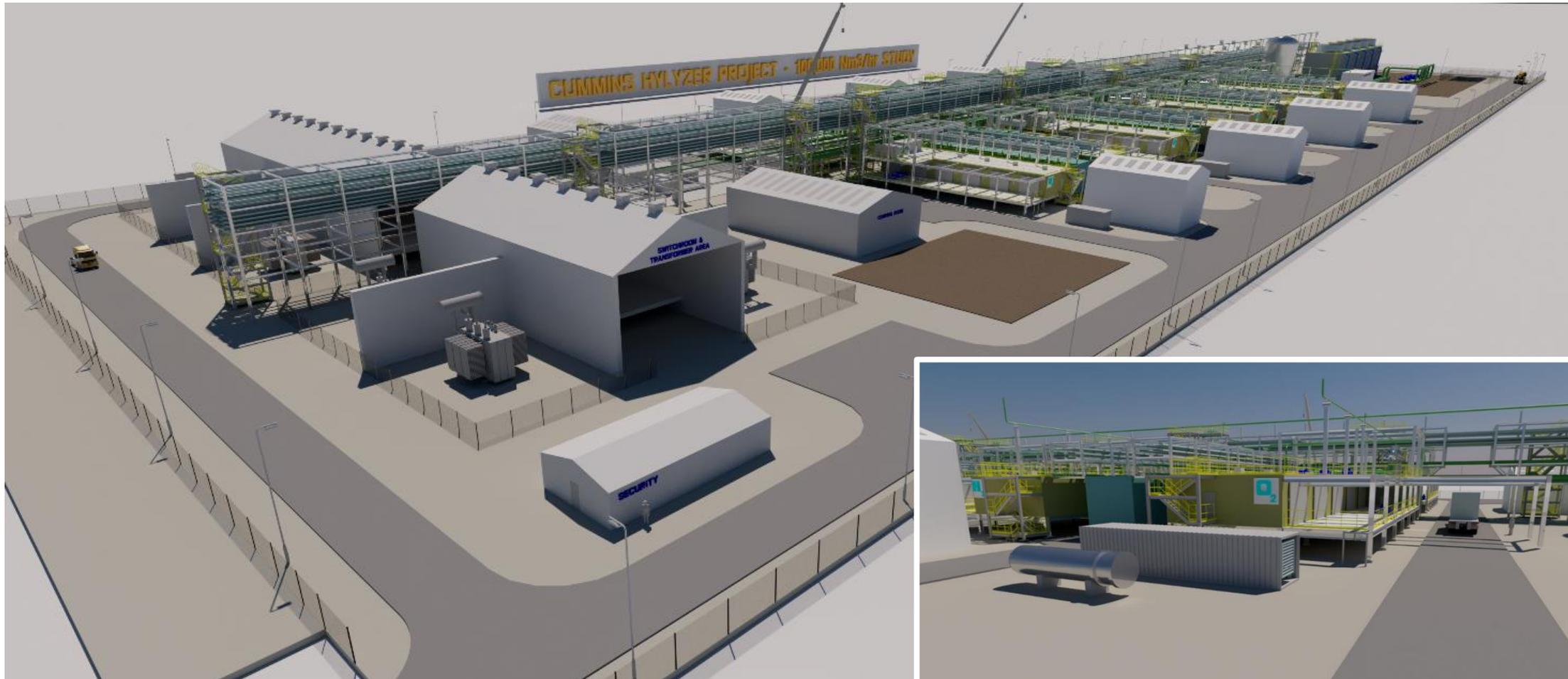


HyLYZER[®]-5000 (~25 MW)



HyLYZER[®]-XXL PEM Electrolyzer

Plant layout 100.000 nm³/h (~500 MW)



Accelera Electrolyzer manufacturing expansion



Country	Belgium	Spain	Canada	USA	China	China (in JV with Sinopec)
City	Oevel	Guadalajara	Mississauga	Fridley	Shanghai	Foshan
Status	Extension	New	Extension	Conversion	New	New
HyLYZER® PEM cell stacks	●		●		●	
HyLYZER® PEM systems	●	●	●	●		●
HyLYZER®-500	●			●		●
HyLYZER®-1000	●	●	●			●
HyLYZER®-5000		●		●		

GLOBAL ANNUAL CAPACITY: 2-3 GIGAWATTS IN 2024

PLANET 2050 aspirational targets

COMMUNITIES ARE BETTER BECAUSE WE ARE THERE

2050 Targets

- ❑ Net positive impact in every community in which we operate
= sum of environmental good > local environment footprint
- ❑ Near zero local environmental impact

DOING OUR PART TO ADDRESS CLIMATE CHANGE AND AIR EMISSIONS

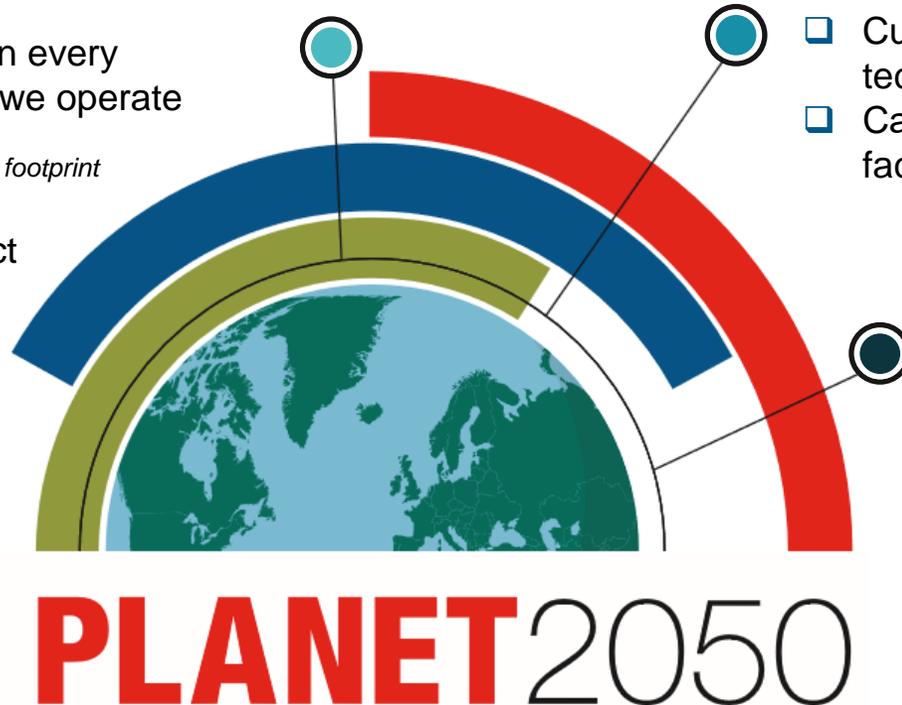
2050 Targets

- ❑ Customer success powered by carbon neutral technologies that address air quality
- ❑ Carbon neutrality and near zero pollution in Cummins' facilities and operations

USING NATURAL RESOURCES IN THE MOST SUSTAINABLE WAY

2050 Targets

- ❑ Nothing wasted
 - ❑ Design out waste in products and processes
 - ❑ Use materials again for next life
 - ❑ Reuse water and return clean to the community



References to "facilities" relate to all consolidated operations and joint ventures subscribing to Cummins' Enterprise Environmental Management System. Goals will be periodically assessed for progress and continued practicability

A history of environmental action



Provided 43% of U.S. electricity via wind and solar



Solar installations completed or underway at more than 40 locations



1 billion gallons of water use avoided since 2010 through water conservation efforts



Achieving water neutrality at 16 sites through community partnerships – restoring 4.3 billion gallons of water annually



35 sites achieved zero disposal; Cummins recorded highest recycling rate ever (93%)



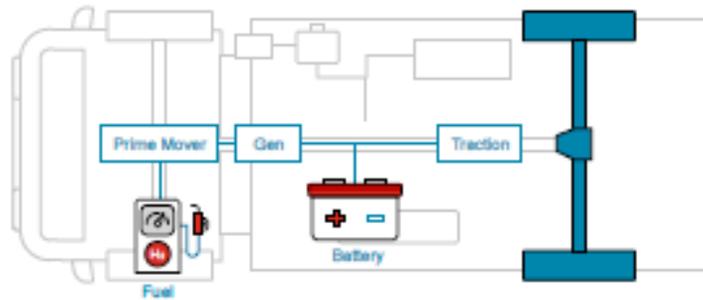
Achieved 4.9 million annual metric ton rate of CO₂ reduction from products in-use since 2015

Complementary Technologies

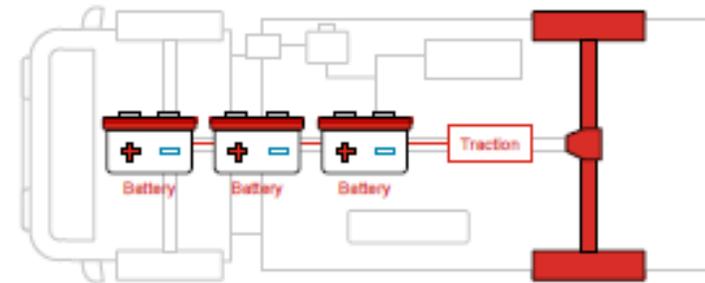
SERVICE + SUPPORT

System Offerings

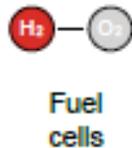
FUEL CELL & IC ENGINE HYBRIDS



FULL ELECTRIC



BATTERY MATERIALS, MEA'S & CELLS



INTEGRATED POWERTRAIN SYSTEM

BATTERY/ STACK REUSE OR RECYCLE

Components

CHARGING, CONNECTIVITY, HYDROGEN GENERATION + SUPPLY

Cummins New Power Applications

DEMONSTRATORS

BATTERY ELECTRIC

1. Heavy-duty truck
2. Electric step-in van
3. Hybrid utility truck
4. Excavator
5. Terminal tractor



FUEL CELLS

1. Class 8 Semi Truck
2. Transit bus
3. Helicopter
4. Airplane
5. E-Ferry



On Thursday, 15 September 2022, the Alstom Coradia iLint, the world's first hydrogen train successfully traveled 1,175 km without refueling its hydrogen tank.

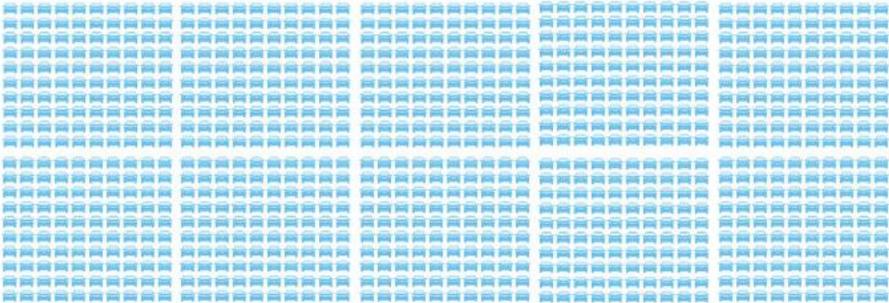


The benefits of Hydrogen

What can you do with 1000 kg of Hydrogen?

1000 kg of H2 per day

1000 Fuel Cell Electric Vehicles (FCEVs)

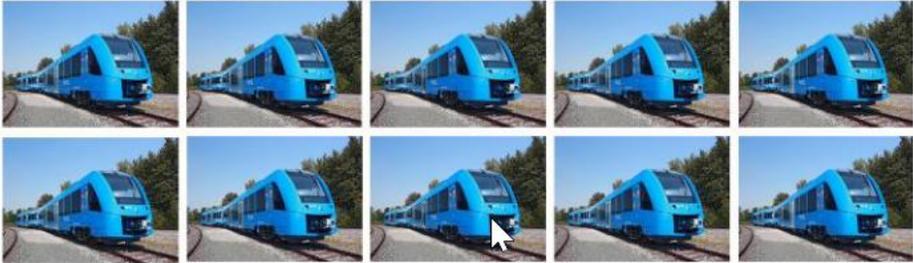


X  100 km

What can you do with 1000 kg of Hydrogen?

1000 kg of H2 per day

10 ALSTOM Coradia iLint Fuel Cell Electric Trains



X  500 km

What can you do with 1000 kg of Hydrogen?

1000 kg of H2 per day

32 Fuel Cell Electric Buses

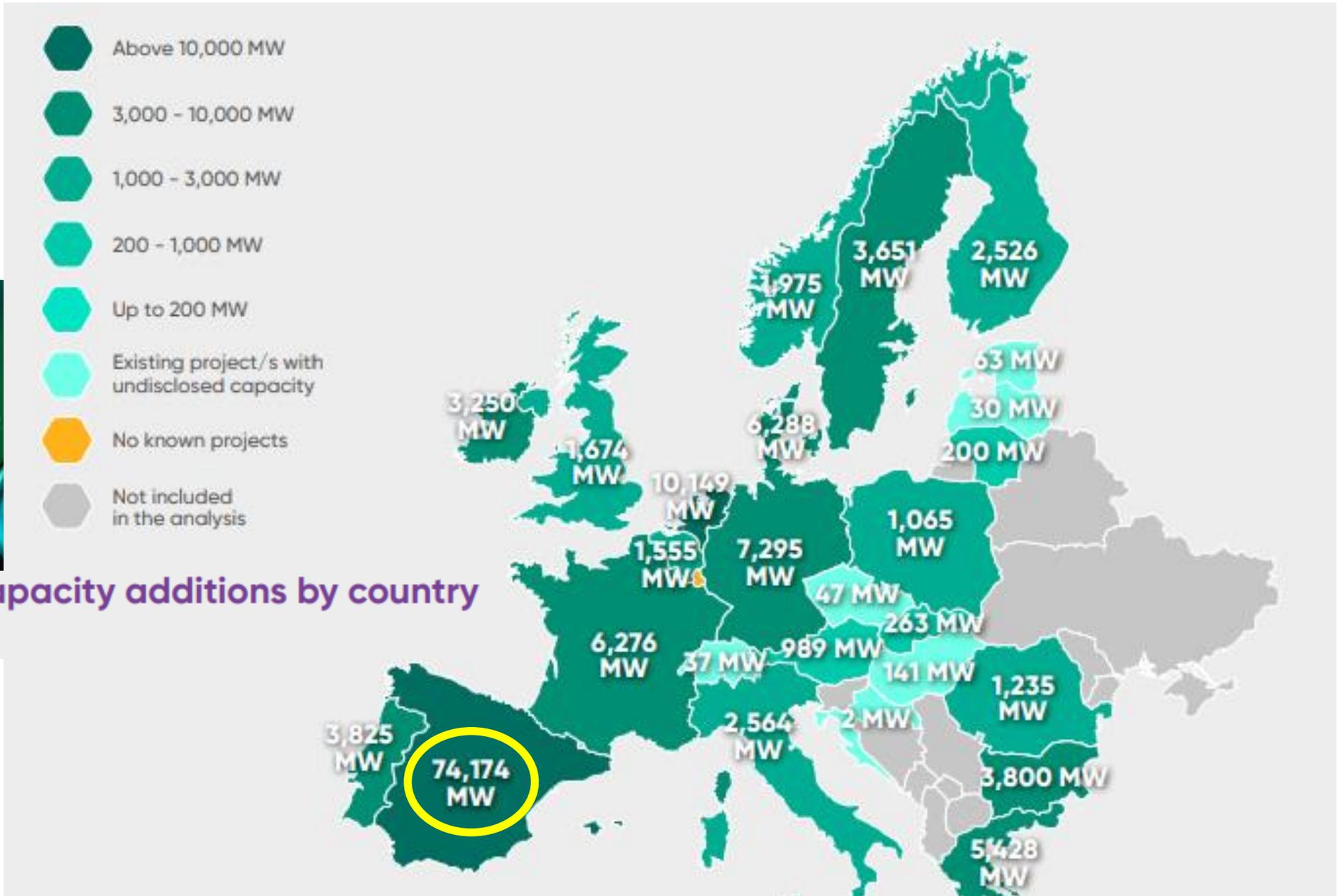


X  350 km

Why Spain?



Map of planned PtH capacity additions by country 2022 - 2030 in MW

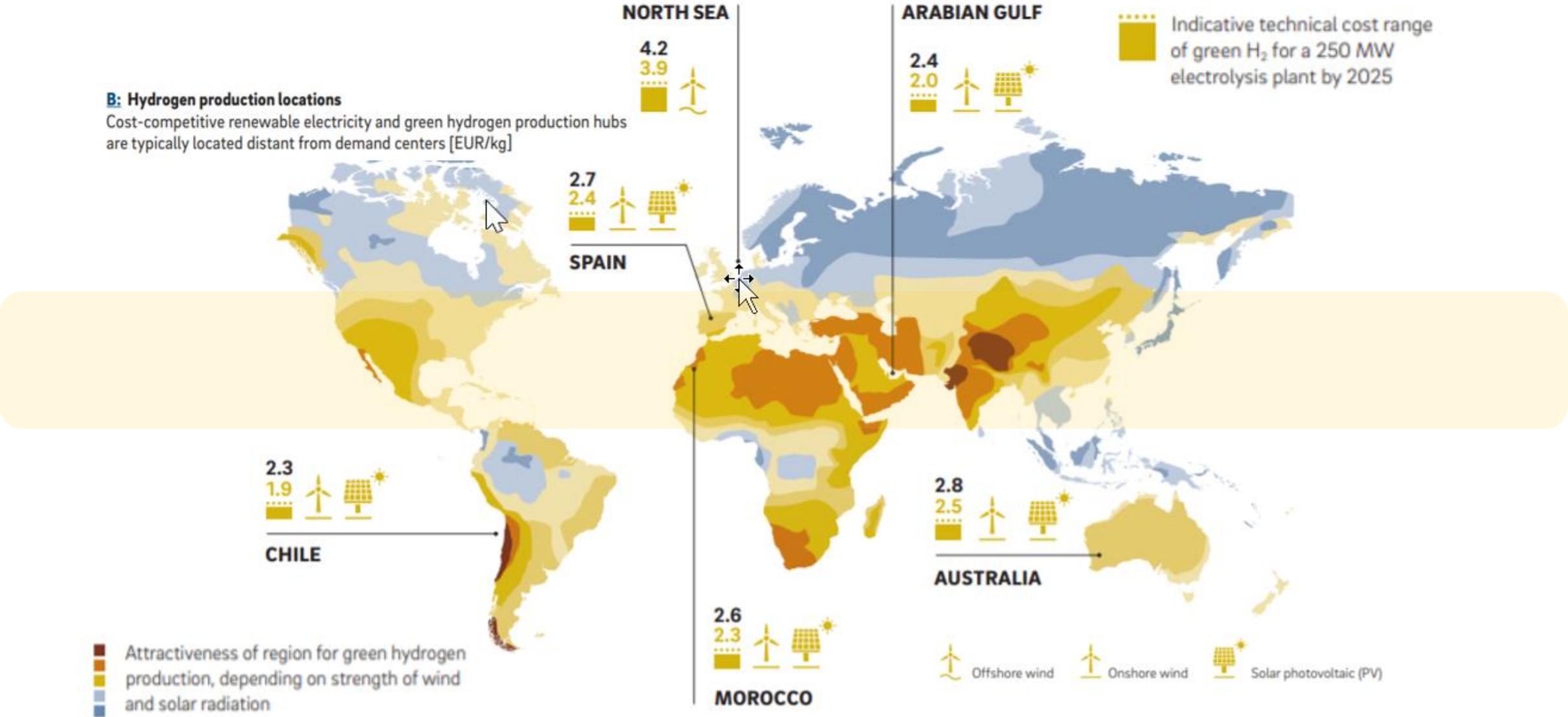


PtH: Power to Hydrogen

Why Spain?

B: Hydrogen production locations

Cost-competitive renewable electricity and green hydrogen production hubs are typically located distant from demand centers [EUR/kg]



Spain Plant Location: Guadalajara



- Site located very close to Guadalajara city.
- Located at North-East of Madrid, 20 min driving.
- Airport at 15 min driving. Dry port at 5 min driving.
- Train Station just 7 min walking from the site.

- Strong support from Local and Regional Administr.
- Good access to qualified direct & exempt workers.
- Lower salaries, less attrition than Madrid.
- Custom made training plans for our workers.

Competitive Logistics from Guadalajara

“**Puerta Centro**” → future intermodal **logistics platform with rail access**, will have a **2.2 million m2 footprint** that it is aimed to become **the main "dry port" in the center of the Iberian peninsula**.

The project constitutes **the link of the different logistics chains across:**

- **Madrid and the Henares Corridor**
- Spanish ports (**Barcelona, Valencia, Algeciras, Bilbao, Málaga and Cádiz**)
- Connections with **France, Morocco and Portugal**
- With other **large logistics platforms** based in Spain

Tender budget is 16,994,702€ distributed in three annual payments (22-23-24).

Puerta Centro is located in **Marchamalo, just 5min distance from our Plant.**

Some additional facts:

- ✓ **750m long trains**, 5 on each direction
- ✓ up to **45.000 std container storage** area
- ✓ **>10.000 std containers** transported each day



Emisiones CO₂ por tonelada movida y Km recorrido



carretera
163,3g
de CO₂



ferrocarril
28,8g
de CO₂

Groundbreaking event (Oct22)





Internal use

Diversidad, Equidad e Inclusión

¿Qué es DE&I?



Diversidad

Tener representación de todo tipo de personas a lo largo de Cummins, incluyendo diferentes géneros, culturas, habilidades, etc., para reflejar las comunidades en las que hacemos negocios.



Equidad

Trabajar para lograr resultados justos para personas o grupos, tratándolos de manera que aborden sus ventajas o barreras únicas. Por ejemplo, eliminar barreras físicas o digitales de el lugar de trabajo, como añadir una rampa para silla de ruedas en una entrada o proporcionar subtítulos a los videos, puede ayudar a los empleados con



Inclusión

Un entorno en el que todos los empleados son valorados, pertenecen, contribuyen y tienen éxito.

Equidad no es Igualdad



Esta ilustración se basa en el gráfico original "Qué es la equidad sanitaria" de la Fundación Robert Wood Johnson de 2017.



T1 de 2022

% de todos los empleados



OBJETIVOS ASPIRACIONALES

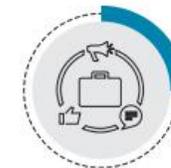
% de empleados (todos los niveles)



¿Cuáles son nuestros objetivos?



Fortalecer nuestra cultura



Mejorar la forma en que contratamos, promovemos, entrenamos y mucho más



Dejar espacio para que todos tengan éxito en Cummins



Reflejar las comunidades donde operamos

New Business Startup

**Built a new Electrolyser Gigafactory in Spain to produce H1000, H5000 and future XXL Products.
... and allocation for an Engineering HUB!**

Architect / Engineering consultants – IDOM
Project management – ARUP

Plot size: 56,000m²

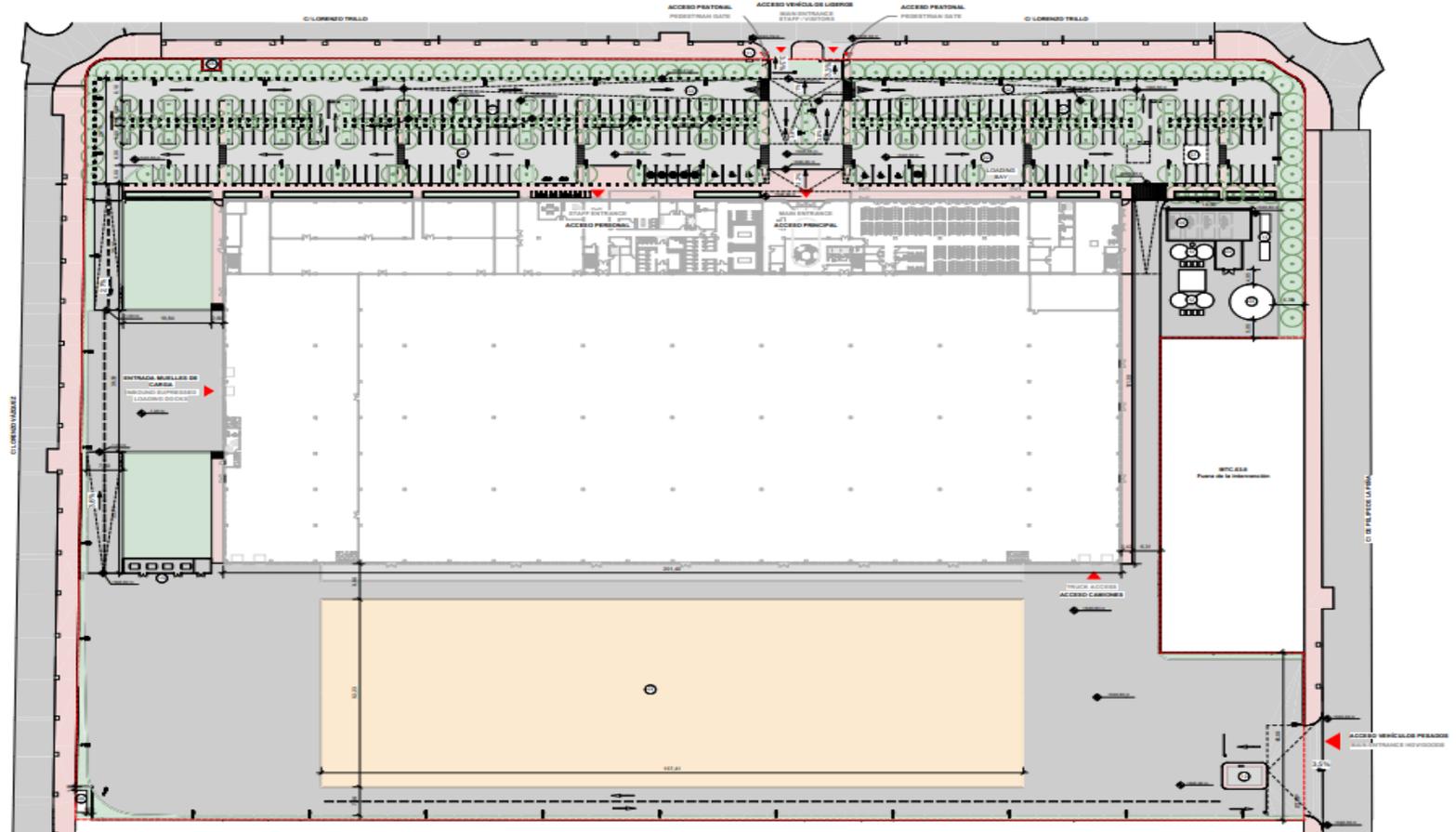
Building: 24,506m² of which:

- **Manufacturing 15,046m²**
- **Warehousing 5,460m²**
- **Offices 4,000m²**

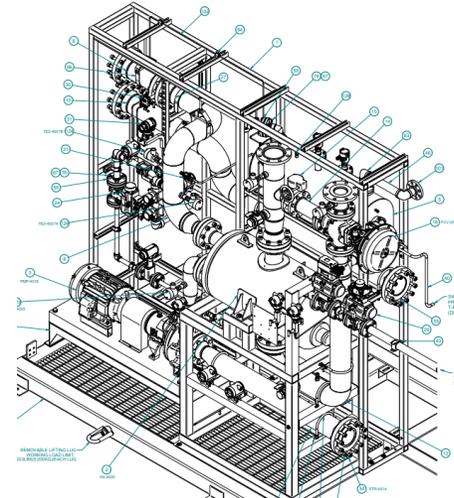
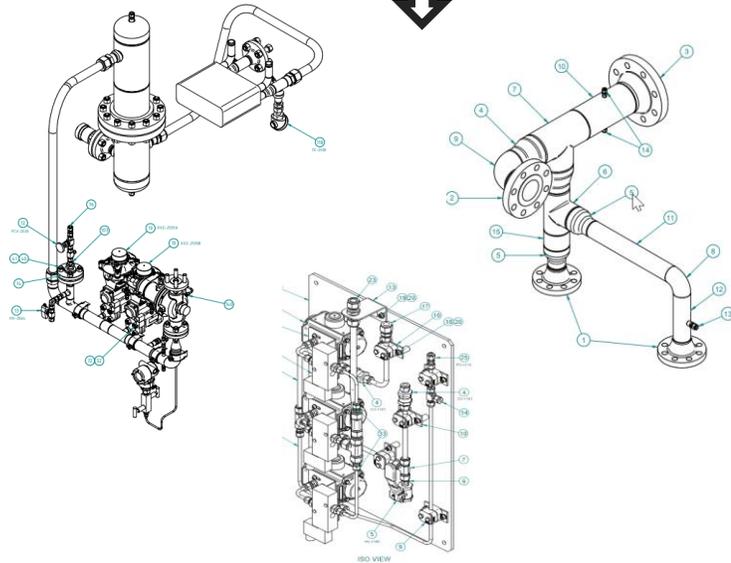
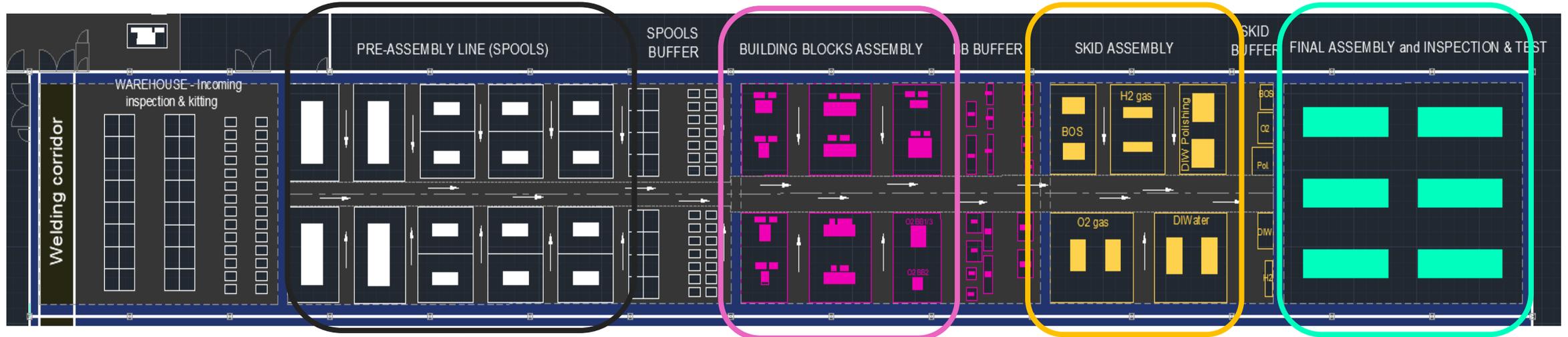
Staffing:

- **~200 shop workers**
- **~ 100 exempt**

PEM Technology Electrolysers



Production Line Strategy



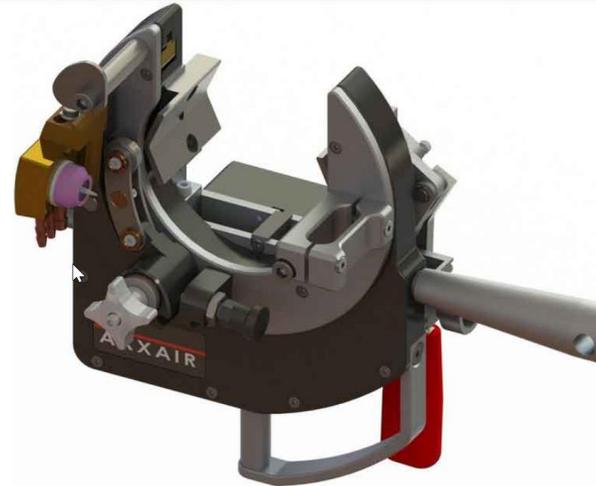
Training Installations CEAGU



Training Installations CEAGU



Orbital Welding



Mechanical System Orbital for Welding

Industries which apply the orbital TIG Welding

- Aeronautics/Aerospace Industry
- Food and beverage industries
- Pharmaceutical and Biotechnology industries
- Manufacture of Semi-Conductor devices
- Chemical industries
- Fossil and Nuclear Power plants



Welding Training



Adecco School

PIEZAS DE SOLDADURA
 LAS PIEZAS DE FORMACIÓN EN SOLDADURA MÁS COMPLETAS Y AVANZADAS PARA FORMAR A TODO TIPO Y NIVEL DE SOLDADOR, Y A CASI TODAS LAS SECUENCIAS DE PROCESOS DE SOLDADURA

ADVANCED WELDING MULTIJOINTS
 Diseñado para sectores verticales y soldadores avanzados.

<p>Foundational Arches GMAW (MIG/MAG) Acero al carbono Posiciones: PB & PF - 2F / 3G, 3F AWM 001</p>	<p>Foundational Complex Sequence GMAW (MIG/MAG) Acero al carbono Posiciones: PB, PE, PD & PH - 2F / 3G, 3F, 4F / 5F, 5G AWM 002</p>
<p>Heavy Industry Specific Practices GMAW (MIG/MAG) Acero al carbono Posiciones: PB, PF, PD & PA - 2F / 3G, 3F / 4F / 1G, 1F AWM 003</p>	<p>Automotive Chassis Assembly GMAW (MIG/MAG) Arco pulsado en Aluminio Posiciones: PB - 2F AWM 004</p>
<p>Automotive Thin Plates GMAW (MIG/MAG) Aluminio Posiciones: PA, PB, PC, PD, PE, PF - 1G, 1F / 2F, 2G, 4F, 4G, 3G, 3F AWM 005</p>	<p>Shipbuilding Open Root GMAW (MIG/MAG) Acero al carbono Posiciones: PF - 3G, 3F AWM 006</p>
<p>Shipbuilding Backing Strip GMAW (MIG/MAG) Acero al carbono Posiciones: PF - 3G, 3F AWM 007</p>	<p>Pipeline 6" Schedule 80 GMAW (MIG/MAG) & FCAW Acero al carbono Posiciones: 6G AWM 008</p>

EDUCATION WELDING JOINTS
 Las piezas de soldadura más utilizadas para la formación de soldadores en el mundo. Con certificación UNE-EN ISO 9606 compatible con AWS y ASME

<p>Union tubo-tubo a tope en V</p>	<p>Union en chapa</p>	<p>Union de chapa en ángulo T</p>	<p>Union de chapa a solape</p>	<p>Union en ángulo T tubo-chapa</p>
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INDUSTRIAL WELDING MULTIJOINTS
 Lleve las piezas de soldadura reales a la realidad aumentada. Desarrollado para cubrir necesidades específicas de formación y rendimiento en soldadura.

<p>De la Realidad</p>	<p>A la Realidad Aumentada</p>
-----------------------	--------------------------------

<p>Robotic Foundational "Hour" GMAW (MIG/MAG) Acero al carbono Posiciones: A - 1G, 1F AWM 009AWM 10</p>	<p>Robotic Foundational "Face" GMAW (MIG/MAG) Acero al carbono Posiciones: 6G AWM 010</p>
<p>Pipeline Monitor Coupon GMAW (MIG/MAG) Acero al carbono Posiciones: PA - 1G, 1F AWM 012</p>	<p>Foundational Multilap GMAW (MIG/MAG) & GTAW Helarc Acero al carbono Posiciones: PA - 1G, 1F AWM 014</p>

<p>34% más soldadores certificados para IW que con la metodología tradicional</p>	<p>56% reducción del tiempo de aprendizaje</p>
<p>68% ahorro medio en consumibles</p>	<p>84% menos accidentes</p>

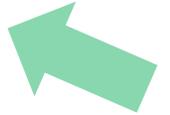
56% less learning time, **68%** savings in consumables, **84%** less accidents

Victaulic fittings



STYLE D08 STRENGTHIN™ RIGID COUPLING FOR HIGH PRESSURE STAINLESS STEEL

- Designed to accommodate high pressure weld-like load carrying capabilities on stainless steel systems
- High strength groove designed to provide increased performance on thin-wall, super austenitic, duplex and super duplex stainless steel pipe
- Sizes from 2 - 20" | DN50 - DN500 piping
- 2 - 6" | DN50 - DN150 designed for Schedule 10S pipe
- 8 - 20" | DN200 - DN500 designed for Schedule 20 pipe
- Pressures up to 1200 psi | 8274 kPa | 83 bar



High Pressure Rigid Coupling

STYLE HP-70

[Download publication 06.12](#) for complete information

- Heavy housing for high pressure service
- Sizes from 2 - 16" | DN50 - DN400
- Pressures up to 1000 psi | 6895 kPa | 69 bar



Valves

-  Vic-300™ MasterSeal™ Stainless Steel Butterfly Valve (Series 461)
-  Stainless Steel Check Valve (Series 416)
-  Stainless Steel Swing Check Valve (Series 712S)
-  Duplex Double Disc Check Valve (Series 415)
-  Type 316 Vic-Ball Valve (Series 726S)
-  Super Duplex Vic-Ball Valve (Series 726D)
-  Duplex Plug Valve (Series 465)
-  Three-Piece Vic-Press™ Ball Valve (Series P569 Groove x Groove)

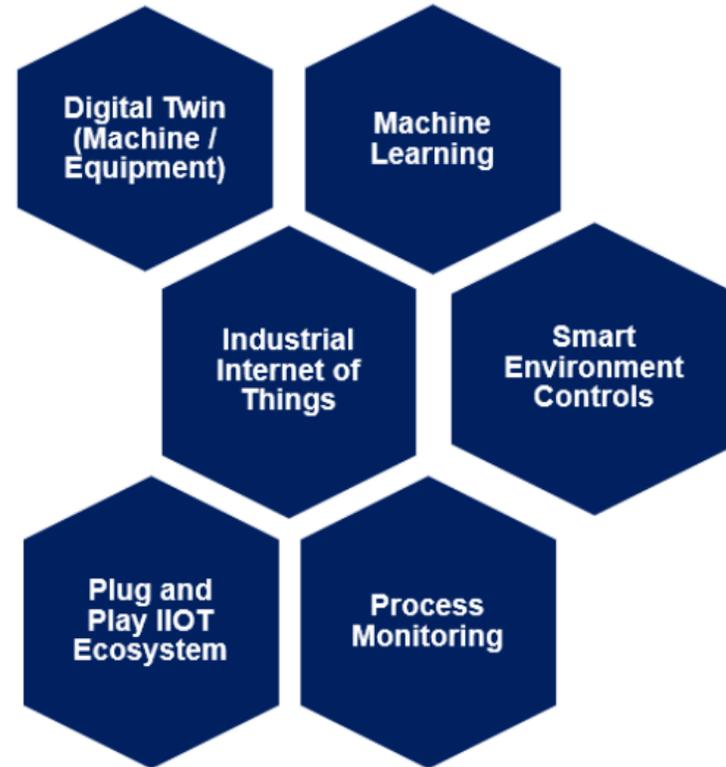
Certifications/Listings:



Automatic Inspection



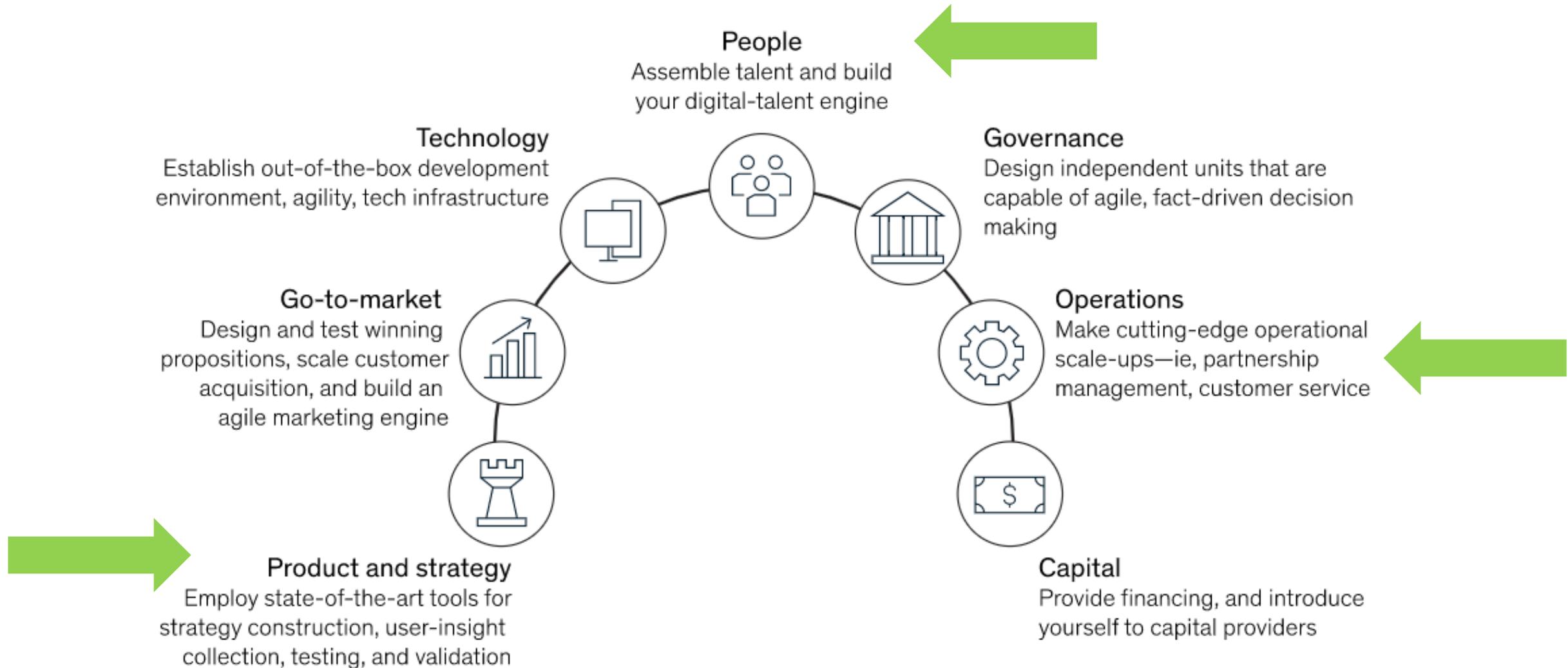
Industry 4.0



- Collaborative Robots
- Augmented Reality/Virtual Reality
- Additive Manufacturing
- 3D Scanning
- Industry 4.0 Home Page
- Secure, Reliable Networks
- Standard Core Systems
- Industrial Internet of Things
- Enterprise Manufacturing Data Hub
- People

- [New product validation and tools](#)
- [Collaborative Robots](#)
- [Augmented Reality / Virtual Reality applications](#)
- [Additive Manufacturing](#)
- [Exoskeletons](#)
- [3D Scanning](#)

New Business Startup: Key drivers



Engagement levels

INSPIRED EMPLOYEES...

Get meaning and inspiration from their company's mission

Are inspired by the leaders in their company

ENGAGED EMPLOYEES...

Are part of an extraordinary team

Have autonomy to do their jobs

Learn and grow every day

Make a difference and have an impact

SATISFIED EMPLOYEES...

Have a safe work environment

Have the tools, training, and resources to do their jobs well

Can get their jobs done efficiently, without excess bureaucracy

Are valued and rewarded fairly

Construction status











Our new Plant when completed:



Our new Plant when completed:



Our new Plant when completed:



¿QUIERES TRABAJAR EN CUMMINS GUADALAJARA?

Únete a nuestro equipo, buscamos gente como tú.
 Rellena el formulario y adjunta tu CV en
www.trabajaencumminshidrogeno.es
 o escaneando el código QRy nos pondremos
 en contacto contigo lo antes posible.



**FOR
 A WORLD
 THAT'S
 ALWAYS ON™**



www.accelerazero.com

