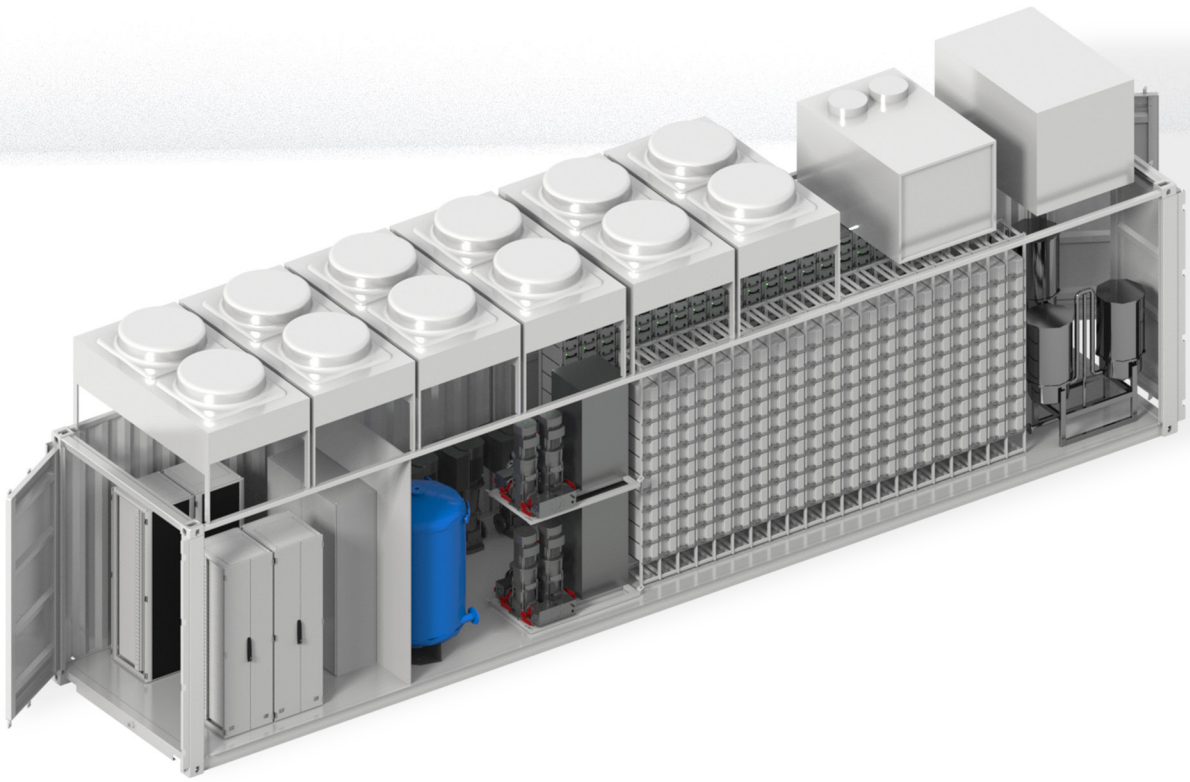
AEM Multicore™

Lowest-cost flexible hydrogen
at megawatt-scale



October 2021

Introducing the AEM Multicore

Enapter is known for compact, modular AEM Electrolysers delivering on-site green hydrogen. And we're now leveraging the power of our AEM core modules to build megawatt-scale electrolysers.

Our AEM Multicore is a megawatt electrolyser featuring several hundred AEM cores around a balance of plant with built-in redundancy – for optimal efficiency and reliability in the face of fluctuating renewable energy.

Go big at the lowest cost

Enapter's AEM Multicore unifies the chemistry of alkaline water electrolysis with the best features and functionality of PEM technology – at a lower cost than same-sized PEM electrolysers. Effortlessly deploy the lowest-cost flexible green hydrogen at scale.

Reactive to your needs

The AEM Multicore is at the top of the field for rapid reaction to intermittent renewable energy loads, producing quality hydrogen with high efficiency in any context.

Keep the downtime down

Our AEM Multicore uses many electrolyser cores for a more reliable and resilient system that always runs at optimal efficiency. Individual core modules can be replaced without shutting down the entire system.
Maximum uptime = maximum hydrogen.

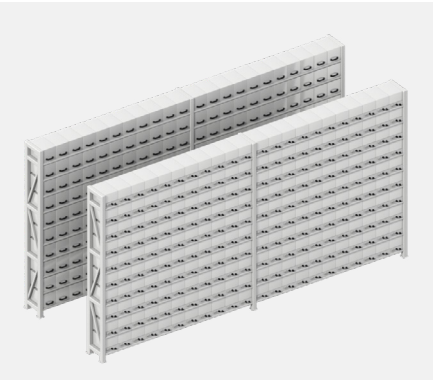
How it works

Introducing AEM

Anion Exchange Membrane (AEM) stacks – or “cores” – are known for producing hydrogen with high pressure and purity. At the same time, AEM tech uses widely available and hence low-cost materials which results in significantly lower-cost hydrogen.

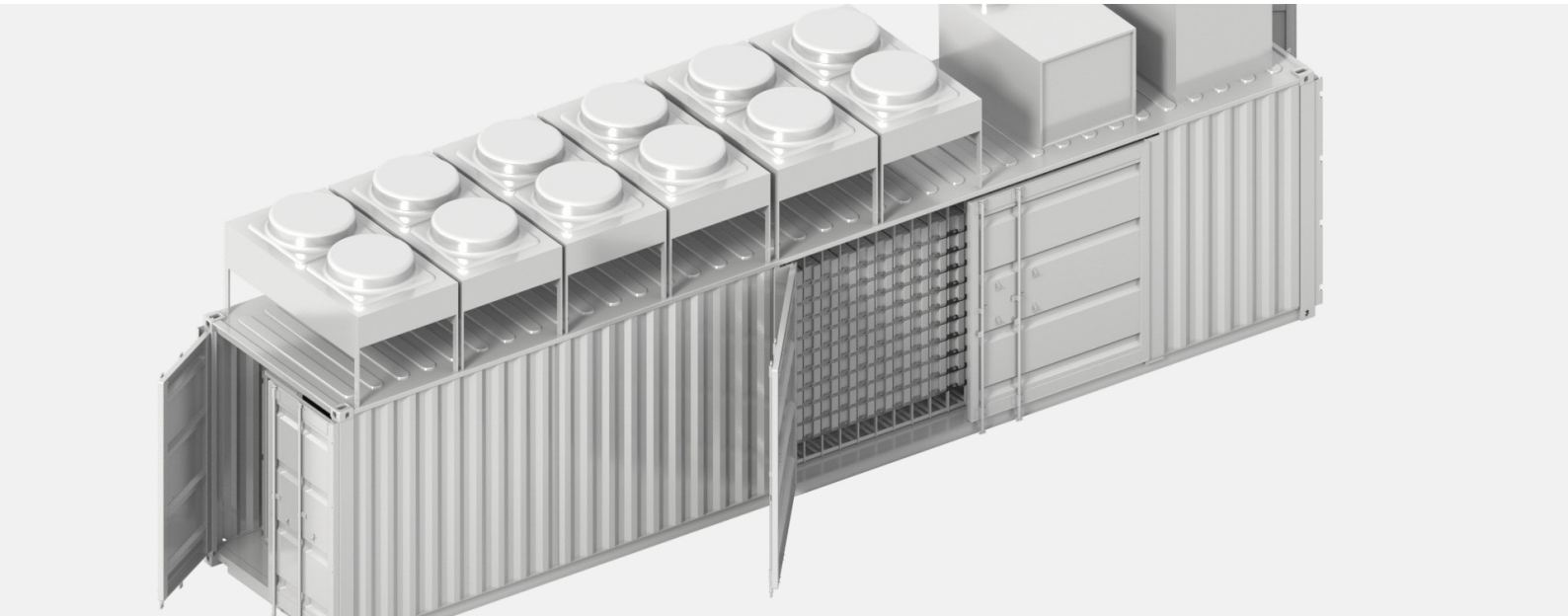
Stacking AEM cores

For a bigger electrolyser system, we stack AEM cores, taking our proven AEM stack module with its 0.5 Nm^3/h hydrogen production rate and integrating several hundred of them to reach a megawatt electrolyser. Individual stack modules are mounted into racks, which in turn can be enclosed in containers or delivered on skids.



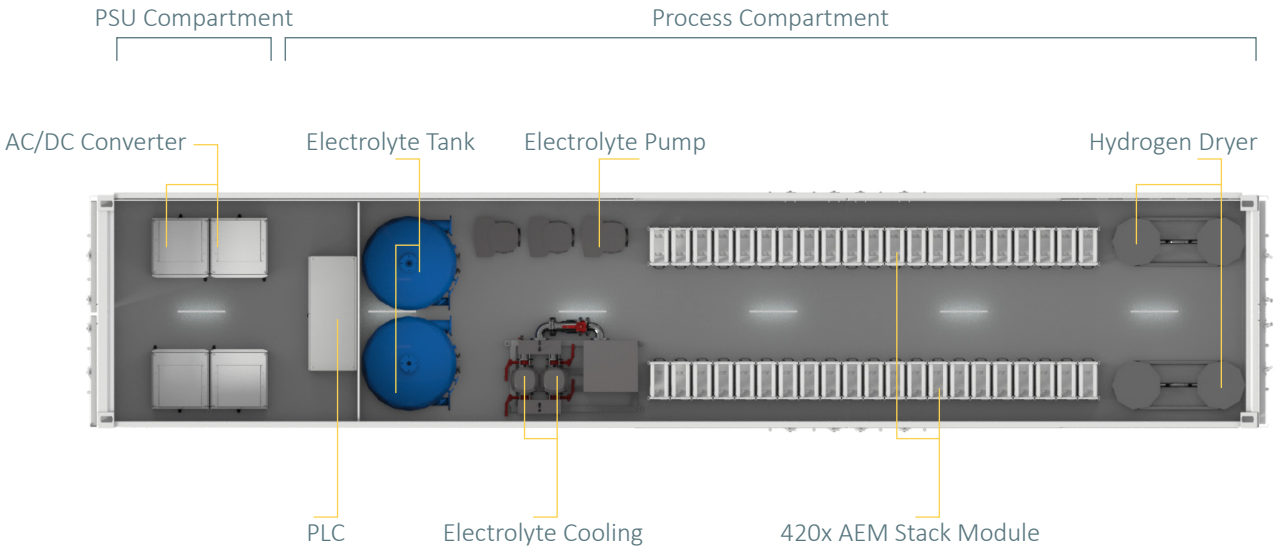
Modular System architecture

We connect our AEM stacks in strings. Multiple strings are connected in parallel and powered by standard off-the-shelf power supply units. They allow each string to be individually regulated and switched on/off, ensuring optimal operation at different load levels when integrated with renewables like wind and solar. Regulation of hydrogen production based on energy load is managed automatically by the Enapter control system.



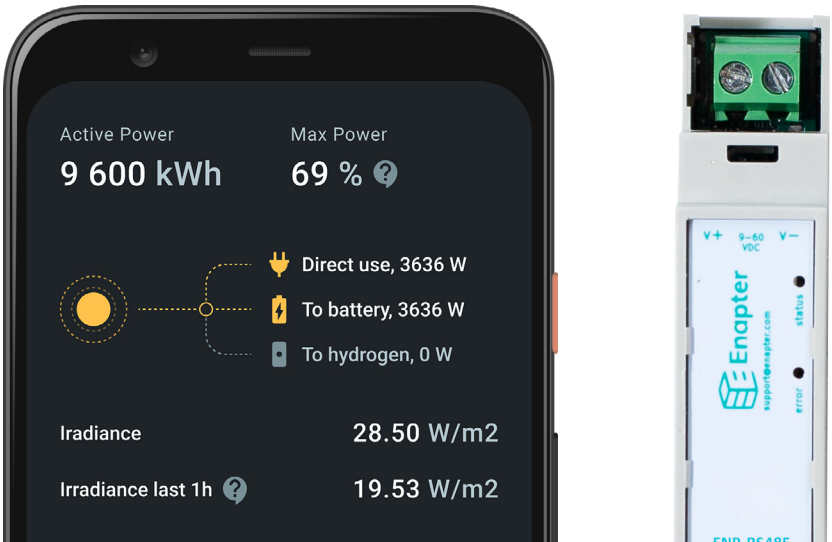
No single point of failure

Multiple stacks avoid a single point of failure. But not only this, a redundant balance of plant fully ensures that the failure of any single component doesn't result in complete shutdown of hydrogen production. Racks are installed on each side of the container, with plenty of working space in between.



Getting smart with the Energy Management Toolkit

AEM Multicores are hardware and software hybrids that come with our intelligent Energy Management Toolkit for automated energy generation, storage and transmission. The toolkit also has everything needed to integrate the AEM Multicore into a unified energy network with other devices. Control and visualise your hydrogen production on the go with mobile and web apps.



Technical paramenters AEM Multicore

Production rate	210 Nm^3/h	Net volume flow rate
Hydrogen output pressure	Up to 35 bar	
Hydrogen output purity	99.8% in molar fraction	Impurities: $H_2O \approx 1500$ ppm, $O_2 <$ 5ppm
Hydrogen output purity (with optional dryer)	99.999% in molar fraction	Impurities: $H_2O < 5$ ppm, $O_2 <$ 5ppm
Flexibility	3% - 105% of nominal production rate	
Oxygen output pressure	Atmospheric	
Nominal power consumption per Nm^3 of H_2 produced (beginning of life)	4.8 kWh/Nm^3	Including all utilities inside the battery limits of module
Nominal electrical power consumption	1,008 kW	
Voltage	3 x 400 Vac three-phase grid	
Frequency	50/60 Hz	
Nominal water flow	0.19 Nm^3/h purified water	Consumption of tap water input for water purification is approximately 2x higher
Inlet water pressure	0.5 bar - 4 bar	
Inlet water temp.	6 °C - 30 °C	
System life	20 years	
Stack life	> 35,000 operating hours	
Hot startup time	0 - 100% within seconds	
Cold startup time	0 - 100% in ca 30 minutes, depending on ambient temperature	
Footprint	L: 12.192 m × W: 2.438 m × H: 2.591 m	
Weight	Approximately 30 t	
Transport dimensions	40 ft container	

NOTE: The AEM Multicore is in development and technical specifications can be subject to change.

About Enapter

Hydrogen is essential for the rapid decarbonisation of sectors which are reliant on liquid and gaseous fuel. Our mission is to make green hydrogen production accessible, affordable and scalable with AEM Electrolysers, enabling society to replace fossil fuels and flip global warming.

We've developed our standardised electrolysers to be manufactured at scale: Mass-produced Anion Exchange Membrane (AEM) Electrolysers will make the most affordable green hydrogen possible.

Over the last decade, Enapter's patented AEM technology has been used in 34 countries by 140+ customers in many applications. We're now preparing for mass fabrication with increased production capacity at our Italian facilities, as well as the planned completion and operational start of our 'Enapter Campus' mass-production site and extensive R&D facilities in Saerbeck, Germany in 2022.

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