



Sector focus – Ammonia

# Ceres electrolysis technology supports green ammonia

**ceres**<sup>®</sup>

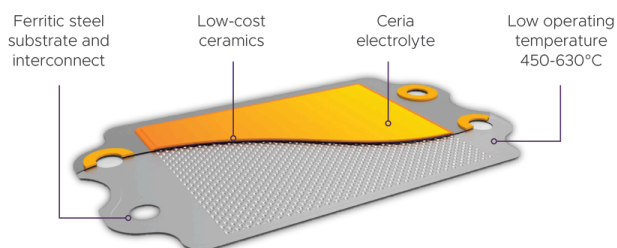
Version 1 – July 2025

# Ceres' role in ammonia production

The future market for green ammonia is expected to experience significant growth driven by various factors, including sustainability initiatives, technological advancements, and increasing demand across multiple industries and territories. Cost effective green hydrogen production will be required at large scale to meet demand, with Ceres solid oxide electrolysis ready to support.

## Revolutionary solid oxide technology

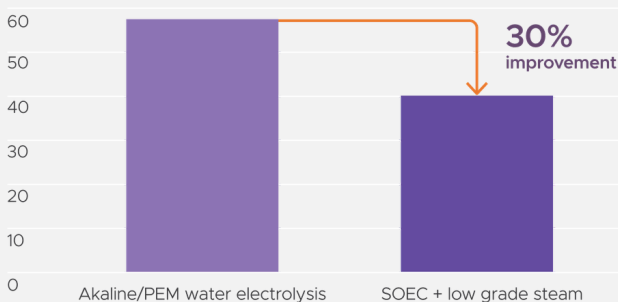
Ceres SteelCell® technology offers class-leading robustness, efficiency, and cost-effectiveness, supporting the ammonia sector with electrolyser solutions that deliver exceptional plant-level efficiency and seamless integration.



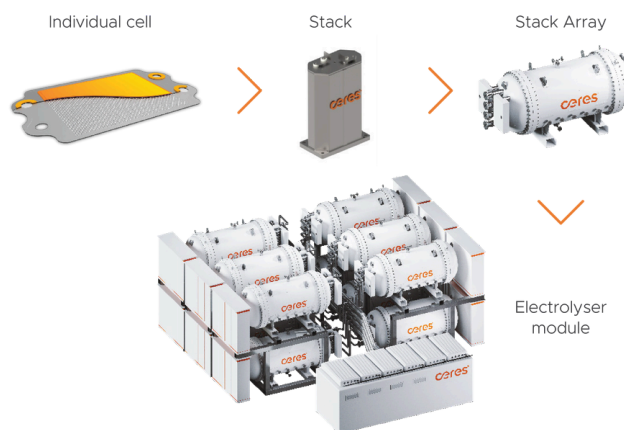
## Highest efficiency drives down costs

Electrolysis using Ceres technology is fundamentally more efficient than low temperature technologies, offering ammonia producers significant savings in energy costs.

Energy required (kWh) to produce 1kg of hydrogen



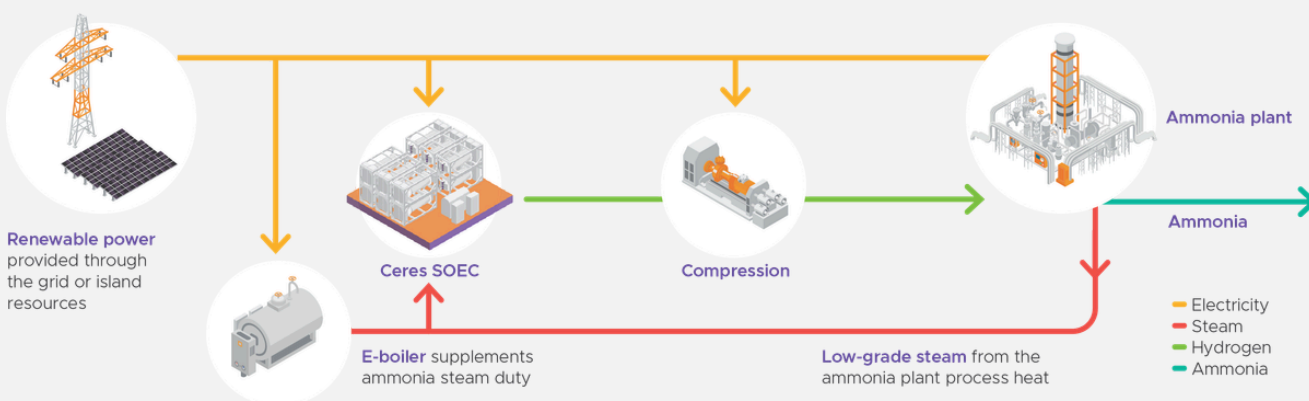
\* Only low-grade ~150° saturated steam is required to achieve the added efficiency improvement



Concept Electrolyser Module is a standardised 9MW building block delivering 6 tonnes of hydrogen per day at 1.7bar(g).

## Close integration with ammonia production

When Ceres SOEC electrolyser modules are integrated with ammonia synthesis, waste heat is used to support raising steam, maximising efficiency of hydrogen production. For projects with dedicated renewables, Ceres SOEC minimises the electrical power required.



## Modules support large scale H<sub>2</sub> production

Concept electrolyser modules have been developed into supporting industrial or commercial ammonia production hydrogen plant designs supporting industrial or commercial ammonia production.

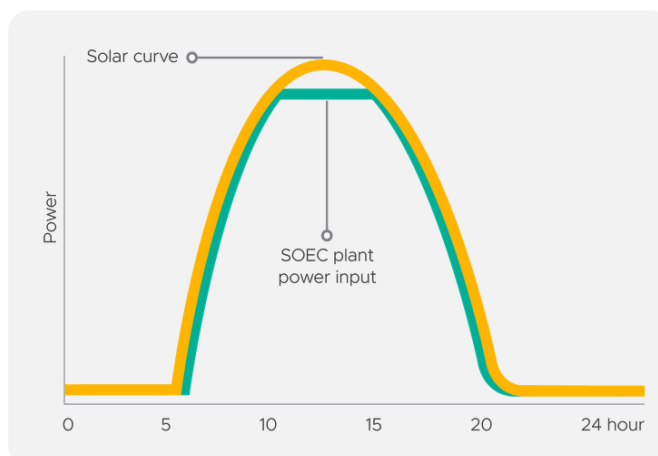
- Standardised building block supports large scale projects
- Pressurised delivery from the electrolyser module at 1.7bar(g) – reducing downstream compression complexity, CAPEX and OPEX



## Ready for use with variable renewables

Ceres electrolyser modules can follow variable renewable power - maintaining high efficiency at part load and with the ability to run in a 'hot idle' condition when renewable power isn't available.

- Fast ramp up of power input to maximise use of solar power.
- Ability to use a hot idle mode overnight to allow fast restart in the morning.

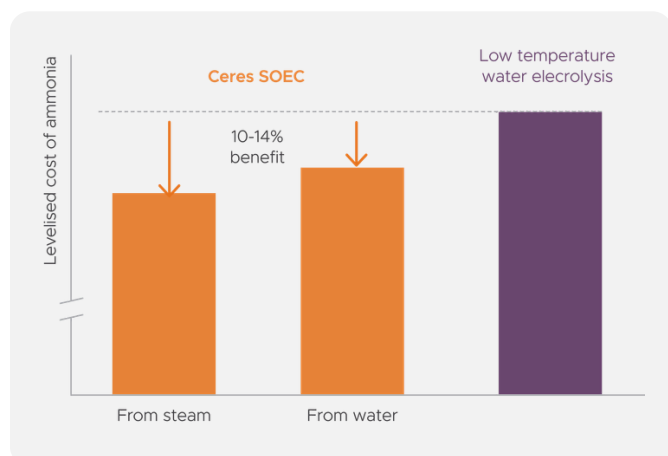
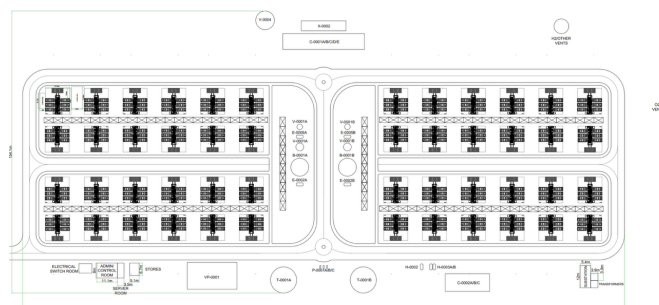


## Ceres SOEC offers operational benefits

Ceres electrolyser modules are straightforward to integrate and operate in your green hydrogen plant.

- Electrolyser module does not require a dedicated building\*
- Electrolyser module does not require significant cooling
- No liquid electrolyte required for electrolysis process
- Straightforward system maintenance

\*In arctic conditions, a basic snow shelter is anticipated.



## Ceres SOEC supports competitive green ammonia costs

Using Ceres SOEC electrolysis drives down energy costs, reducing hydrogen cost, supporting competitive green ammonia cost points for your business.

The modelling results shown indicate the positioning compared to alternative electrolyser technology.

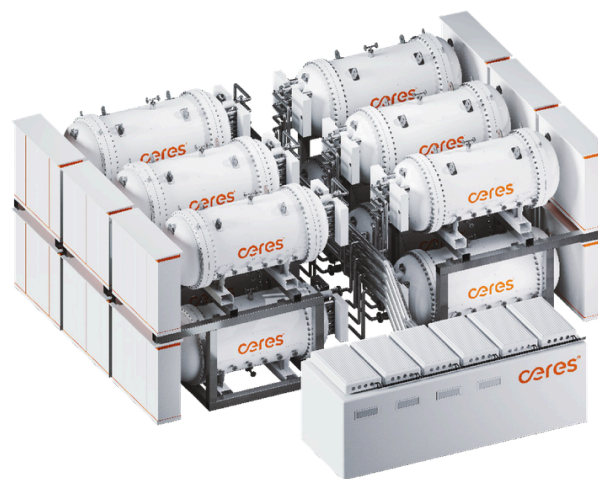
Please contact Ceres to discuss your project scenario in detail.

## Key Specification Targets

The concept electrolyser module is a standardised 9MW building block delivering 6 tonnes of hydrogen per day – the target specifications are shown below.

Further details including cost indications can be found in a white paper written in collaboration with Atkins Realis.

Please contact us to discuss how Ceres electrolysers can support your green ammonia project development.



| Target specification  | Electrolyser Module   |
|---|---|
| AC hydrogen readiness efficiency, kWh/kg (including stacks, heaters, control system, rectifier, transformer and DC control) | 37  |
| Input electrical power, MW DC (to stacks)   | 8.6   |
| Input electrical power, MW AC (rectifier input to power stacks, heaters and control)  | 9.2   |
| Hydrogen output, tonnes/day   | 6   |
| Hydrogen delivery pressure, bar(g)  | 1.7   |
| Footprint, m <sup>2</sup>   | 220   |
| Hydrogen production density, m <sup>2</sup> /(tonnes/day)   | 37  |
| Emergency shutdown  | Tolerant to uncontrolled shutdowns without forming gas flow |
| Ramp up rate, %/min   | 7   |
| Hot idle capable?   | Yes   |

\* Specifications are shown as project targets, and may differ in final configurations

## Contact us

### About Ceres

Ceres is a leading developer of solid oxide technology: fuel cells for power generation and electrolysers for the production of green hydrogen. Based in the UK, we partner with multinational corporations to manufacture our technology for a wide range of clean energy applications across global industry.

+44 (0)1403 273463  
 info@cerespower.com

**Ceres Power**  
 Viking House  
 Foundry Lane Horsham  
 RH13 5PX UK

The information contained in this Version 1 - Sector Note - Ammonia is general in nature and intended only as a guide. Ceres makes no representation and assumes no responsibility for the information contained in this Version 1 - Sector Note - Ammonia or its suitability for any particular purpose. The information is subject to change without notice. It is not intended to form the sole basis of any technical or commercial decisions that you may make. It is your own responsibility to ensure that any products, services or information meet your specific requirements. You may not, except with our express written permission, copy or distribute this Sector Note or any of its content. Printed in July 2025. All information is correct at time of going to print.