Certified Industrial Key Performance Indicators

Bureau Veritas certification guarantees the following validated performance metrics, based on extensive real-world testing at our Lonigo prototype facility. These are conservative figures proven over months of continuous operation.

H_2 Output Quality

99.997 % purity –
exceeding industry standards for fuel cell and industrial applications

Annual Operation

8,736 hours/year with only 1 day scheduled for maintenance service

Production Rate

32 kg/h continuous –
scalable linearly based on prototype values

System Availability

>95% uptime validated over extended real-world testing periods

Energy Efficiency

<1.5 kWh/kg H_2
versus
>60 kWh/kg H_2
for conventional electrolysis

Net Energy Output

+29 kWh/kg H_2
when combined with Enerblu cogeneration (electricity + heat)

Cost Advantage

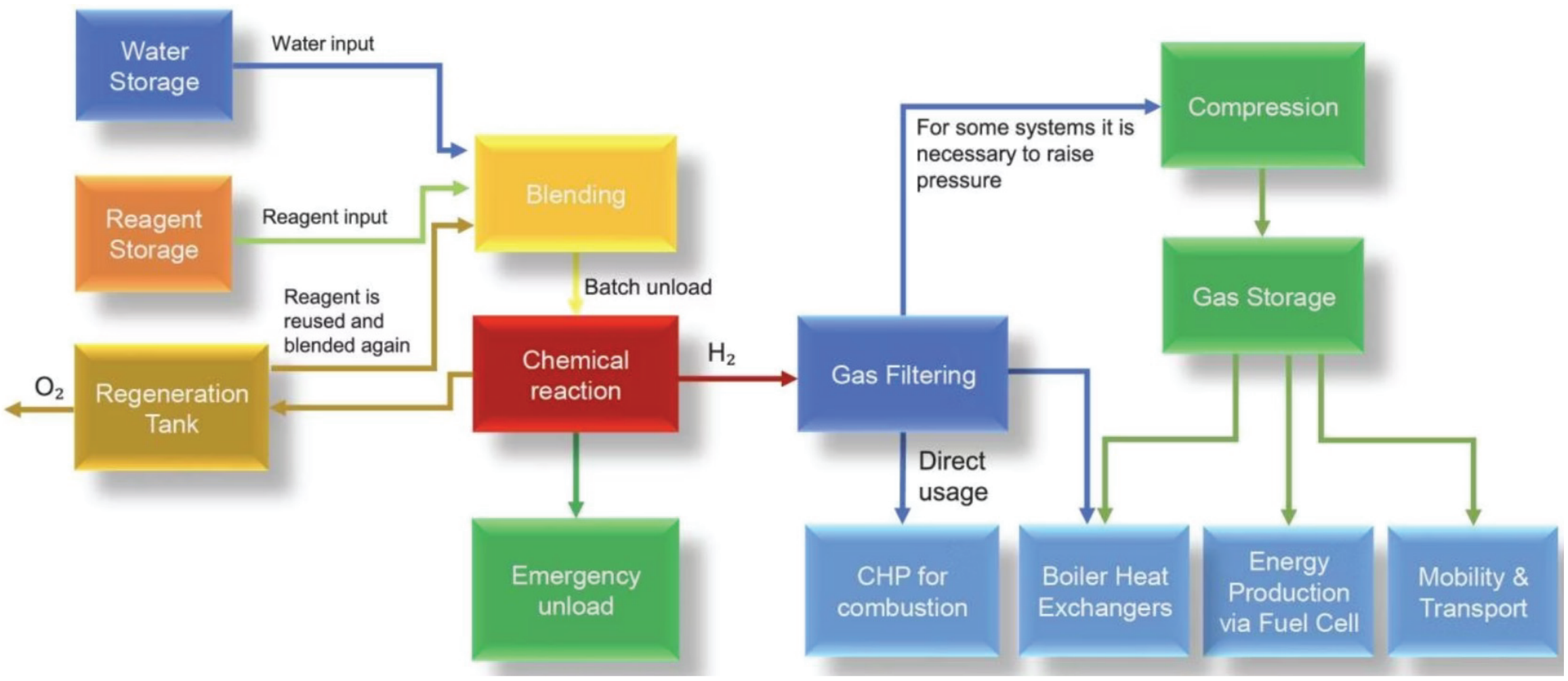
50% reduction –
hydrogen delivered at half the current market production price

Technology Comparison: Game-Changing Advantages

Stellar **electrochemical** process delivers transformative advantages over standard electrolysis technology across every critical performance dimension. The comparison below demonstrates why industrial energy buyers are choosing our solution for their decarbonization strategies.

TECHNICAL PARAMETER	STELLAR ELECTROCHEMICAL	STANDARD ELECTROLYSIS
Specific Electrical Efficiency	**< 1.5 kWh/kg H_2**	> 50 kWh/kg H_2
Energy Consumption Advantage	**~97.7% reduction** in energy requirements	
Hydrogen Purity	≥99%	≥99%
Operating Pressure	Atmospheric (±0.5 bar)	High pressure (15-30 bar)
Safety Profile	**Intrinsically safe** at atmospheric pressure	Requires high-pressure safety systems
Energy Self-Sufficiency	**Yes** – internal CHP system	No external energy required
Modularity and Scalability	**High** – containerized design	Limited – requires extensive infrastructure
Installation Speed	**Rapid** plug-and-play deployment	Lengthy construction and commissioning
Water Quality Requirements	Tap/salt/brackish water (300 L/h)	Demineralized water only
Operational Costs	**Significantly reduced** OPEX	Higher ongoing costs
Production Cost	**< 50% of lowest market price**	>US$ 3-6/kg

Production Process Flow



Integrated System Architecture

Our production process begins with water storage and reagent storage feeding into a precision blending system. The blended mixture undergoes our proprietary electrochemical reaction, which can be batch unloaded for reagent regeneration or produce high-purity H_2 gas.

The hydrogen output passes through advanced gas filtering before optional compression for storage applications. From storage, the hydrogen can be deployed across multiple end-use applications:

- **Combined Heat and Power (CHP)** for direct combustion in engines or turbines
- **Boiler heat exchangers** for industrial thermal processes
- **Fuel cell energy production** for clean electricity generation
- **Mobility and transport** for vehicle and fleet refueling

A key innovation is our regeneration tank system, which captures oxygen byproduct and enables reagent reuse, significantly reducing operational costs and environmental impact. The closed-loop reagent system minimizes chemical consumption while maintaining continuous 24/7 production capability.

Revolutionary Energy Balance

1.5

kWh Input per kg H_2

Minimal electrical energy required for hydrogen production

+29

kWh Net Output per kg H_2

Combined electrical and thermal energy generated through cogeneration

20x

Energy Return Ratio

For every unit of energy invested, system produces 20 units of usable energy

This remarkable energy balance means that for every 1.5 kWh of electricity consumed to produce one kilogram of hydrogen, the system generates 29 kWh of combined electrical and thermal energy when that hydrogen is used in our integrated cogeneration system.

This represents a net energy gain that fundamentally transforms the economics of green hydrogen production and utilization.

Performance Disclaimer: Performance figures and system characteristics are based on design parameters, internal testing, and pilot-scale data. Actual results may vary depending on site conditions, operating configuration, regulatory requirements, and system integration. Energy input and output values are indicative and provided for reference purposes only. Commercial performance is subject to further validation during full-scale deployment.