



PRODUCT GUIDE

**ELECTROLYZER
TECHNOLOGY
SOLUTIONS**

**SUPERIOR EFFICIENCY
& COST SAVINGS**

Experience unparalleled 94.7% efficiency that drives down energy consumption and operational costs, allowing you to achieve green hydrogen production at an exceptionally competitive price point.

**IMMEDIATE STARTUP &
SEAMLESS SCALABILITY**

Begin producing hydrogen within seconds and easily scale from pilot projects to large-scale installations. Reduce downtime, adapt to fluctuating demand, and integrate effortlessly with renewable energy sources.

Empower Your Energy Future

Tobe Energy's groundbreaking electrolyzers transform how green hydrogen is produced. By achieving an industry-leading 94.7% wall-to-plug efficiency, our technology dramatically lowers energy costs and scales effortlessly—helping you turn clean hydrogen into a practical, reliable, and profitable energy solution.

Key Differentiators

Immediate Startup:

No lengthy warm-up times. Begin producing hydrogen in seconds—ideal for pairing with intermittent renewable sources, enabling dynamic load balancing and rapid response to market demands.

Exceptional Efficiency, Lower Costs:

Operating at near-ambient temperatures and free of exotic materials, our systems minimize both CAPEX and OPEX. The result? More affordable green hydrogen and an accelerated return on investment.

Sustainable and Scalable:

By eliminating waste heat and reliance on costly membranes, Tobe Energy's design ensures long-lasting performance. Our modular approach makes it easy to scale from pilot installations to full industrial setups without compromising quality or efficiency.

Membrane-Free for Maximum Reliability:

With no fragile membranes or caustic electrolytes, maintenance is simpler, safer, and more predictable. Our systems use standard stainless steel components, driving down costs and complexity.

How We Compare

Tobe Energy: ~35.2 kWh/kg at 94.7% efficiency

Typical PEM Electrolyzer (e.g., Nel Hydrogen): ~53.2 kWh/kg

The Bottom Line:

By choosing Tobe Energy's electrolyzer over a typical PEM system, a plant producing 2,500 kg of hydrogen per day could save approximately **\$4,500** per day in electricity costs (based on \$0.10 per kWh).

Core Product Line

Find the perfect fit for your application—from small-scale demonstrations to large-scale hydrogen hubs. All Tobe Energy models maintain exceptional efficiency and immediate responsiveness.

Model	Daily H ₂ Output (kg/day)	Energy Use (kWh/kg)*	Daily Energy (kWh/day)	Approx. Electrical Rating (kW)**
Tobe-25	25	~35.2	~880	~37
Tobe-250	250	~35.2	~8,800	~367
Tobe-2500	2,500	~35.2	~88,000	~3,667 (3.7 MW)

*Calculated from a 94.7% efficiency using the lower heating value (LHV) of hydrogen (~33.3 kWh/kg).

**Assuming continuous operation.

Tobe Energy Electrolyzer – Specifications (2,500 kg/day model)

Category	Tobe Energy Specification
Net Production Rate	~1,160 Nm ³ /h (at 0°C, 1 bar) 2,500 kg/24 h
Turndown Range	10 to 100%
Power at Stack at 100% Capacity*	~3.16 kWh/Nm ³ – ~35.2 kWh/kg
Purity	99+%, saturated gas with liquid water
O₂ Content in H₂	< 1 ppm v
N₂ Content in H₂	< 2 ppm v
Operating Pressure	Up to 350 psig (can operate lower)
Dimensions (W x D x H)	~10 m x 2.5 m x 2.5 m (modular design)
Ambient Temperature Range	-30 to 50°C
Electrolyte	Membrane-free, caustic-free

*Based on 94.7% efficiency using the lower heating value of hydrogen (~33.3 kWh/kg).

Membrane-Free Technology

Conventional electrolyzers rely on fragile and costly membranes that drive up costs and limit system life. Tobe Energy eliminates this bottleneck with a fully membrane-free design:

No Caustic Electrolytes	Eliminates hazards, reduces complexity, and simplifies maintenance.
Longer Lifespans	Removing the primary failure point (membranes) significantly extends operational life and lowers replacement costs.
Cost-Effective Materials	Standard 304 stainless steel construction replaces exotic, expensive materials for universal availability and lower CAPEX.

The result is a solution that's easier to deploy, maintain, and scale, opening the door to hydrogen production in emerging markets and remote regions.

Versatile Applications

Tobe Energy electrolyzers empower a wide range of sectors, driving innovation and efficiency wherever hydrogen can play a role:

Agriculture & Chemicals	Ammonia Production, Fertilizer Production, Chemical Feedstock, Desulfurization, Hydrogenation, Methanol & Biomethanol Production
Metallurgy & Materials	Annealing, Blast Furnace Injection, Direct Reduced Iron, Powder Metallurgy, Protective Atmosphere, Sintering, Catalytic Atmosphere, Float/Flat Glass Production
Energy & Fuel Sectors	Autoconsumption, Biofuel Production, Biogas/Biomethane Production, Carbon Capture, Energy Storage, Waste-to-Synthetic Fuels
Industrial & Transportation	Cylinder/Tube Truck Filling, Fuel for Fuel Cells, Fuel for Turbines, Fuel for Hydrogen Internal Combustion Engines (HICE), Extreme Ultraviolet Lithography, Combustion, Grid Stabilization, Space Heating
Advanced Processes	Direct Gas Injection, Powder Processing

With Tobe Energy, hydrogen production becomes more accessible, economical, and easily integrated into existing and emerging markets.

Redefining Cost and Efficiency

Overcoming Traditional Shortcomings

Legacy systems struggle with waste heat, reliance on exotic materials, and high-pressure, high-temperature conditions. Tobe Energy's approach addresses each of these drawbacks:

**No Waste Heat,
No Cooling**

Eliminates the need for complex heat management, reducing both CAPEX and OPEX.

**Standard
Materials**

Avoiding rare metals and membranes drastically cuts component costs.

**Immediate
Startup**

Seamless hydrogen production on-demand, with no hazardous chemicals, enhances safety and operational flexibility.

These improvements translate directly into lower costs, easier maintenance, and scalable solutions that drive broad adoption of green hydrogen.

Why It Matters

Tobe Energy is not just refining existing technology; we are reimagining hydrogen production from the ground up. Our system opens new possibilities for clean, efficient, and economical hydrogen across industries, geographies, and scales.

Take the Next Step

Interested in exploring a pilot installation or sizing a system for your specific needs? Our expert team is ready to guide you through integration, financial modeling, and long-term energy strategies.

Contact Us

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Join us in shaping a cleaner, more sustainable future— together, we can revolutionize the global energy landscape with accessible, high-performance green hydrogen.

