

## AES Technology for Lower Cost Green Hydrogen Production

T2M Global has pioneered world-class Advanced Electrolyzer System (AES) technology that allows lower cost production of hydrogen with no greenhouse gas emissions. AES is capable of producing high purity green hydrogen at highly competitive costs of <\$5/kg H<sub>2</sub> against current levels of \$15-20/kg H<sub>2</sub>.

Worldwide dilute syngas hydrogen market is valued at \$50B/yr with emerging green hydrogen market valued even higher. AES is a highly modular technology applicable to serve multiple industries such as fuel cell vehicles, renewables, stationary power, and chemical manufacturing. Our AES is capable of producing pure hydrogen from a variety of sources and excess renewable electricity, without any greenhouse gas emissions.

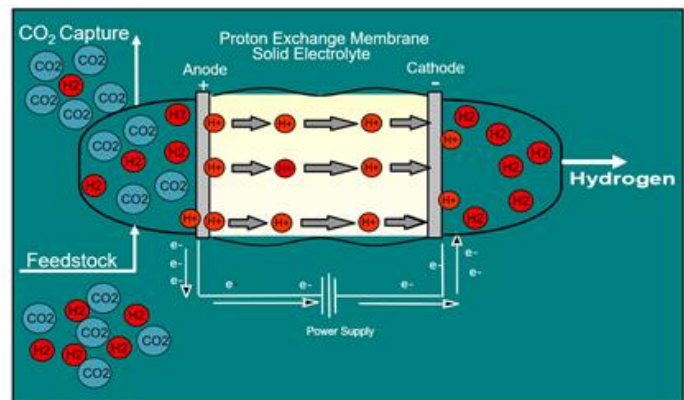
T2M Global has put together a team of world-renowned experts in hydrogen industry with over 300 years of relevant experience ([www.t2mglobal.com](http://www.t2mglobal.com)). This includes technology development, scaleup, design for manufacturing and commercialization. The team's experience in market responsive product development, cost reduction and service agreements will be available for AES. The team has an extensive network in hydrogen industry, including Air Products and Chemicals, Inc., Exxon, Shell, Toyota and US government.

**Technology Behind the Product:** Conventional hydrogen purification technologies are uneconomical with dilute hydrogen streams. AES offers highly selective hydrogen separation using advanced electro-chemical membranes and nano-materials for superior performance at a lower cost (Figure 1).

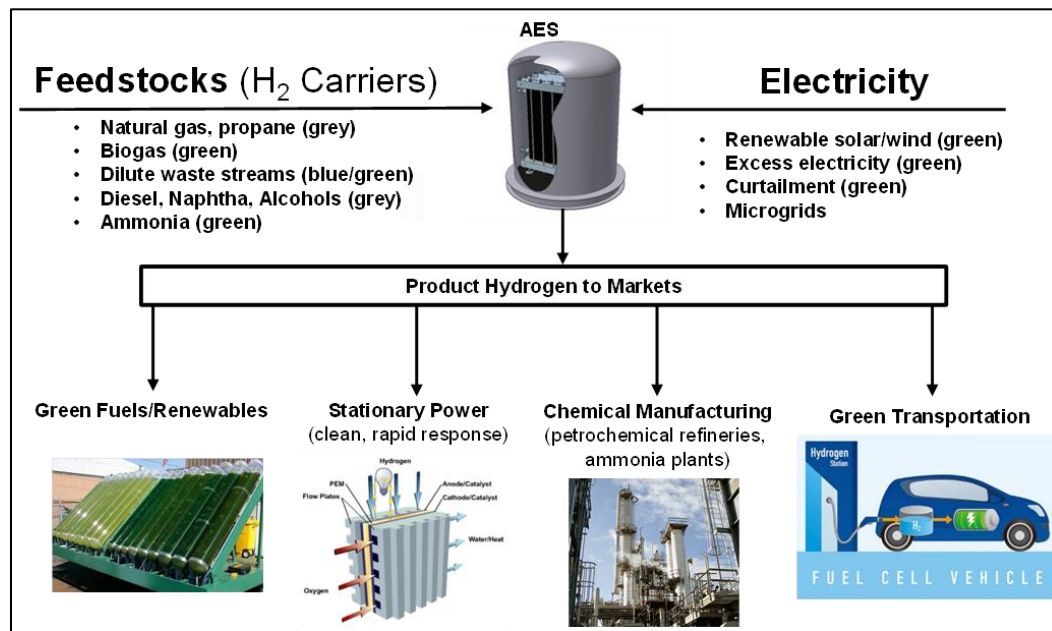
**Advantages:** AES produces green hydrogen from waste/dilute syngas streams, creating higher value for profitability and greater sustainability. Its ultra-high electrical efficiency reduces operating costs dramatically. Its inherently safe design makes permitting easier and enhanced safety features reduces insurance costs. Its modular design for mass production reduces capital and warranty costs. AES can operate on a variety of feedstocks from different markets - a highly desirable feature for greater market penetration. It has no incremental emissions. It is attractive for CO<sub>2</sub> capture with co-production of Blue hydrogen.

**Distribution Market:** USA is the largest producer of hydrogen in the world (\$25B/yr). It is also the largest source of waste/dilute hydrogen in syngas feedstocks. AES will recover higher value hydrogen from these feedstocks, adding up to \$10B/yr dollars in revenue for the industry.

Worldwide dilute syngas hydrogen market is even bigger at up to \$50B/yr. AES target market portfolio is illustrated in Figure 2. It can produce hydrogen from a variety of feedstocks via syngas process. These feedstocks are widely available in the chemical industry for rapid commercialization. The emerging green hydrogen market is even bigger - for fuel cell cars, buses, trucks, forklifts for warehouses, data centers and mission critical facilities. AES supports 21<sup>st</sup> century microgrids targeting 100% renewable energy.



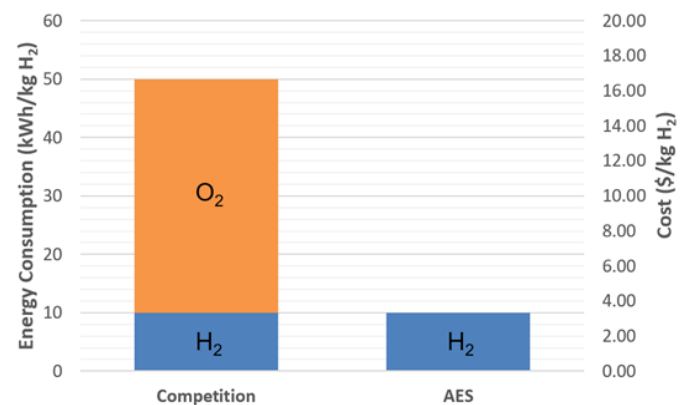
**Figure 1. How Does AES Work?**  
High purity H<sub>2</sub> from dilute feedstocks.



**Figure 2. AES Feedstocks and Target Markets**  
Multi-billion dollar untapped markets

**Competition:** For dilute hydrogen streams there is no cost-effective technology available today. AES is the only technology capable of producing high purity hydrogen from these dilute streams.

Conventional water electrolysis systems for H<sub>2</sub> production are energy intensive (>50 kWh/kg) and prohibitively expensive (**Figure 3**). AES offers 80% reduction in electricity use, thus reducing the hydrogen cost to less than \$5/kg. Patented design for fully automatic operation with remote troubleshooting makes AES customer friendly with minimal downtime for sustained profitability.



**Figure 3. Competitive Landscape:**  
AES will make hydrogen at <\$5/kg.

**Product Pricing and Marketing Strategy:** There are several business models for hydrogen supply to fuel cell users, including equipment purchase, leasing, and/or hydrogen purchase agreements. We will utilize market intelligence and early adopter experience in selecting the AES product pricing and market introduction strategy. Our preliminary estimates show a payback period of less than three years is feasible. Additional revenue will be expected from product service and warranty agreements, assured by the solid-state technology (lower maintenance costs). Plug Power and Toyota are interested in Green hydrogen purchase agreements.

**Contact**

Pinakin Patel  
203-300-6130  
ppatel@t2mglobal.com