

Methanol Reformer



Feedstock

Methanol & Water

Methanol Overview

- Methanol is a liquid fuel that is light, colorless, stable, and biodegradable
- Methanol contains more hydrogen than any other liquid fuel
- Methanol can be sourced regionally, and is produced globally at over 90 plants producing almost 24 billion gallons annually
- Methanol is easily mixed with purified water in a batch process by local chemical distributors
- Methanol & water feedstock can be delivered in 55-gallon drums or large 350-gallon stainless steel totes
- Methanol is an excellent fuel choice for H₂ generators when storage and delivery of compressed gas cylinders are logistically challenging or impossible

Scalable - Reliable - Affordable

On-Site / On-Demand Hydrogen Generation

- Reduces logistics related to delivery and storage of compressed hydrogen
- More cost competitive vs. compressed hydrogen

Multi-Fuel, Modularity, Scale

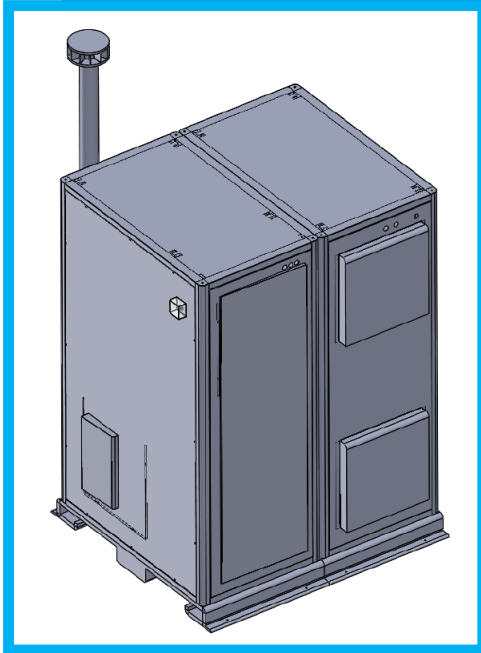
- Fuels: Methanol (Natural Gas / LPG in development)
- Generates 15 sLm to 150 sLm H₂ per unit (Q4 2013)
- Supports 1kW to 10kW fuel cell power load

Simple Design, Substantially Lower Part Count

- Lower cost
- Higher reliability



Product Features and Performance



Key Features

- Fuel cell (PEM) + reformer system
- Methanol/water fuel
- Flexible fuel tank (up to 38hrs autonomy @ 5kW for 208 L)
- Easy-to-replace filters
- Lighter, compact and customizable

Key Performances

- up to 32% efficiency (@ 5kW)
- Fuel consumption < 1l/kWh
- Standby power requirements: <300W (@48Vdc)
- Stack life time: 10,000hrs
- Reformer lifetime: > 5,000hrs

<u>Run Time</u>	<u>Load</u>
38 hours	5 kW
80 hours	2 kW
120 hours	1 kW

E1 System Advantages

- Small Footprint:
 - 2 x 19inch racks with Fuel Cell
- 2 cabinets with excess space / rack mountable
 - Can deploy each cabinet separately
- Consumption Example
 - 230 litre tank = 42 hours at 5kw
- Start up time: 90 seconds to full power
 - 108 ah/hr based on 5kw battery
- Low Power = 300 watts (standby)
 - 120 watts during production



Summary of Methanol Reformer

- Easier deployment options : rack mounted or 2 cabinet systems
- Eliminate cylinder delivery issues

Advantages over incumbent technologies

- **LOWER TOTAL COST**
 - Higher reliability lower repair costs improved availability
 - Fewer moving parts lower maintenance costs
 - Less theft
- Lower environmental impact
- Operates from -40C to +46C
- Light & compact

Use cases with strong value proposition

- Regions with lower grid reliability (100 to 1,000 hours annual grid loss)