

Step 1 S2 is the Bulk Manufacture and Distribution of

H2 Hydrogen or Ammonia Nh3 by Secure Supplies

STORE RENEWABLE ENERGY

- Solar PV
- Solar Thermal
- Wind
- Hydro
- Geothermal
- Biogas
- Natural Gas

STEP1 S1
PRODUCTION

MW Class Storage



Global Distribution

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Hydrogen is sold per kilogram.

The energy in one kilogram of hydrogen is equal to one gallon of gasoline.

Hydrogen can fill a vehicle's tank in minutes, like gasoline at the pump.

Hydrogen *Fast* recharging and refueling makes life easy and saves you alot of time.



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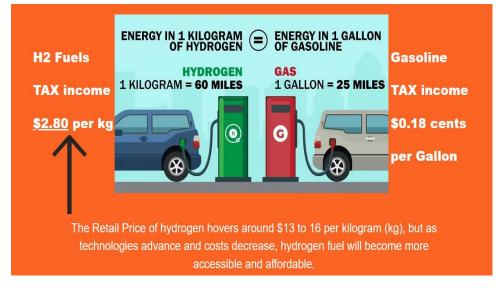
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TAX MARGIN and incomes on H2 FUELS are much Higher for local and Federal Government whilst zeroing national import deficits Ask us now.

Hydrogen fuel cell–powered vehicles travel longer distances using less energy.

One kg of hydrogen contains about the same energy as a gallon of gasoline. A fuel-cell electric vehicle with 1 kg of hydrogen can drive approximately 60 miles, compared to conventional vehicles, which get about 25 miles on a gallon of gasoline.

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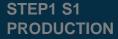


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Hydrogen Fuel Energy Storage Plant S1 Price from \$3,900,000 installed Product out 1 MW Power / Gas 700 Bar 60 kg per hr

Solutions STEP 1







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Stationary Hydrogen Filling Station

Main Parameters:

Coverage: about 4,000m2 1 acre Construction Period: about 6 months

Daily Hydrogen Filling Capacity: not less than 100kg/200kg/500kg 1500,kg

2500kg,4000kg

Hydrogen Compression: rated working pressure 45Mpa/ to 87.5Mpa

Compressor Form: booster pump / diaphragm compressor

Hydrogen Storage: 45Mpa/87.5Mpa

Hydrogen Filling: rated working pressure 35Mpa/70Mpa

Hydrogen Filling Flow Rate: 60kg- 200Kg/min

Hydrogen Supply Method: external hydrogen supply /electrolyzed water to

produce hydrogen

Category: Hydrogen Engergy Application System

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Description

The main equipment of the external hydrogen supply hydrogen filling station consists of a hydrogen unload column (unloading hydrogen from a long tube trailer), a hydrogen diaphragm compressor, a hydrogen storage cylinder group, a hydrogen filling machine, etc.

When the hydrogen filling station adopts the external hydrogen supply mode as the hydrogen source, that is, the hydrogen in the long pipe trailer is compressed into the high-pressure hydrogen storage cylinder group through the high-pressure compressor through the unload column, a long pipe trailer unload position is set at the hydrogen filling station. When the unloading is completed, the long tube trailer can be directly off the station.

After the hydrogen is stored in the hydrogen storage cylinder group, it is divided into high and medium groups, and formed into a high, medium and low three-stage filling cylinder group mode together with the lone pipe trailer to realize the graded filling of the hydrogen fuel cell vehicle.

The advantage of this design is that the efficiency is high and the filling time is short, and at the same time it has both safety and reliability. It can ensure that 10 fuel cell buses (8×140L hydrogen storage cylinders) filling indicators, and the filling time of a single bus is ≤20min.

According to the process requirements and design control requirements of the hydrogen filling station, the station control system takes the data acquisition control system and the host computer as the core to form a station monitoring system to realize the monitoring of the entire production process.

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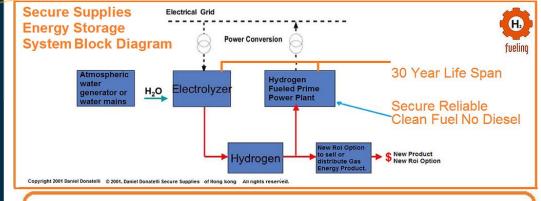
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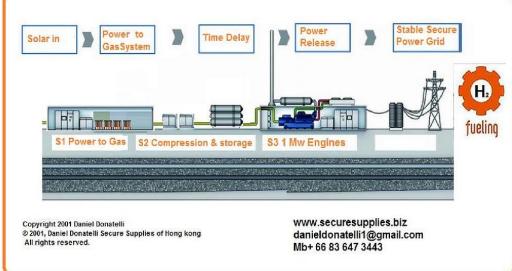
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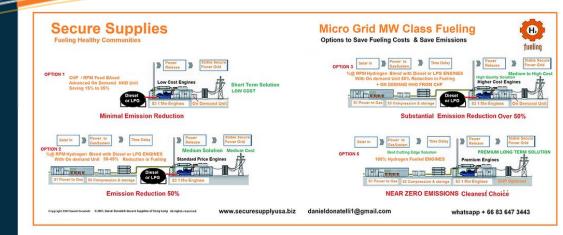


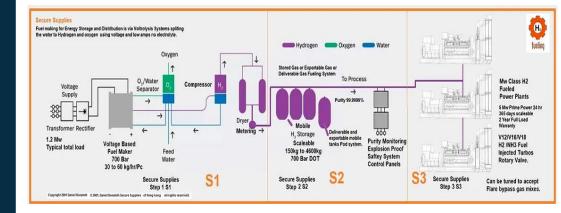
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Secure Supplies SAVE FUELING MONEY **Fuel Consumption Improvements**



	Approximate Diesel Fuel Consumption				Approximate Diesel / Hybrid Fuel Consumption H2 / HHO				Approximate Hydrogen Fuel Consumption100% Pure H2 6 bar				
Generator Size	¼ Load (litres/hr)	½ Load (litres/hr)	% Load (litres/hr)	Full Load (litres/hr)	¼ Load (litres/hr)	½ Load (litres/hr)	% Load (litres/hr)	Full Load (litres/hr)	¼ Load (Kg/hr)	½ Load (Kg/hr)	% Load (Kg/hr)	Full Load (Kg/hr)	
8kW / 10kVA	0.9	1.2	1.7	2.1	0.54	0.72	1.02	1.26	1.0	1.7	2.5	8kW 3.	.4 \$2
10kW / 12kVA	1.0	1.4	2.1	2.6	0.6	0.84	1.26	1.56	1.5	2.4	3.6	10kW 4.	,8 S2
12kW / 15kVA	1.3	1.8	2.6	3.2	0.78	1.08	1.56	1.92	1.6	2.6	3.8	12kW 5	.1 \$4
16kW / 20kVA	1.7	2.4	3.5	4.3	1.02	1.44	2.1	2.58	2.0	3.0	4.8	16kW 6	.4 \$4
20kW / 25kVA	2.1	3.0	4.3	5.4	1.26	1.8	2.58	3.24	2.8	4.5	6.6	20kW 8	.8 \$4
24kW / 30kVA	2.6	3.6	5.2	6.4	1.56	2.16	3.12	3.84	2.9	4.7	6.9	24kW 9	.1 \$4
32kW / 40kVA	3.4	4.8	7.0	8.6	2.04	2.88	4.2	5.16	3.3	5.4	7.9	32kW 10	,4 S6
40kW / 50kVA	4.3	6.0	8.6	10.7	2.58	3.6	5.16	6.42	3.7	6.1	8.9	40kW 11	.8 \$6
60kW / 75kVA	6.4	9.0	12.7	16.1	3.84	5.4	7.62	9.66	3.8	6.2	9.1	60kW 12	.1 \$6
80kW / 100kVA	8.3	11.9	16.1	21.4	4.98	7.14	9.66	12.84	4.2	6.9	10.1	80kV 13	.4 S6
120kW / 150kVA	10.9	17.3	24.1	32.1	6.54	10.38	14.46	19.26	4.7	7.6	11.2	120k 14	.8 V12
160kW / 200kVA	14.1	22.9	32.7	42.8	8.46	13.74	19.62	25.68	6.4	9.0	12.7	160k 16	.1 V12
200kW / 250kVA	17.4	28.6	40.8	53.5	10.44	17.16	24.48	32.1	8.3	11.9	16.1	200k 21	.4 V12
280kW / 350kVA	23.7	39.3	56.0	74.9	14.22	23.58	33.6	44.94	10.9	17.3	24.1	280k 32	.1 V12
400kW / 500kVA	33.3	55.6	79.6	107.0	19.98	33.36	47.76	64.2	14.1	22.9	32.7	400k 42	.8 V16

A Diesel Generator at partial load cost is \$0.3 and \$0.6 l/kWh) Our H2 Engine at full load is \$0,003 and \$0.005 I/kWh / 5 Gallon Water per hr \$0.14/ Kwh at Full Load if you buy H2 in tanks IF Hybrid at full load it is aprox. A Diesel cost. is \$0.15 and \$0.3 l/kWh)

We adjust the Laminar Flame Speed with in a % range tuned with egr to maintain more complete burn of diesel raiing effciency over 60 % but not too much % to reduce the diesel heat yeild there is a sweet balance to avoid putting in too much h2/hho to use more diesel.

For the Hydrogen Fuels we have made chart based on Tanked H2 or On demand h2. We are using a very high ratio of EGR % to recycle exhaust volume to mix in the non combustible gas to slow the burn rate of the hydrogen content. The laminar flame speed is reduced to co equal and replace all other fossil fuels. H2 fuels Have zero carbon. This chart is not for Nano Bubble water fuels or Ammonia fuels.

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All Figures Stated are Approximate for Reference and scaled comparison

whatsapp + 1520 848 1659 danieldonatelli1@gmail.com

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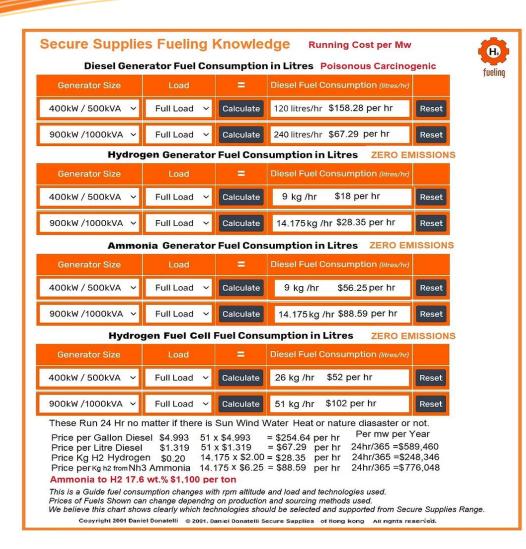
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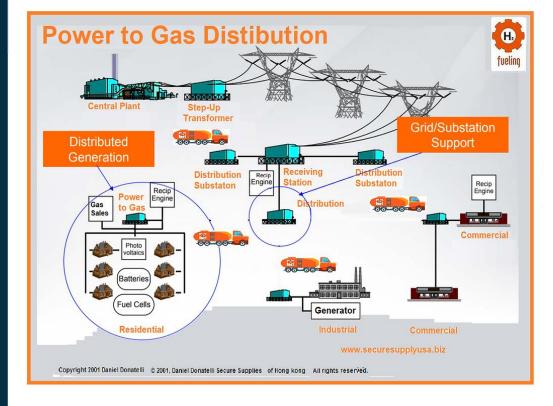


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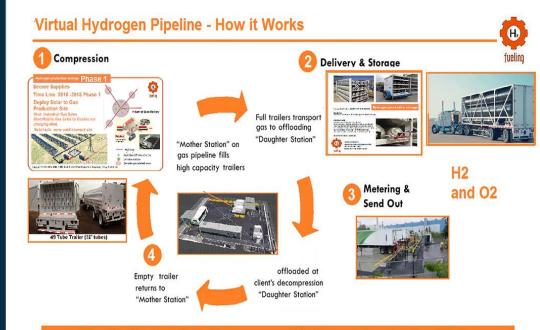
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Typical Industrial Consumer Hydrogen Production & Storage

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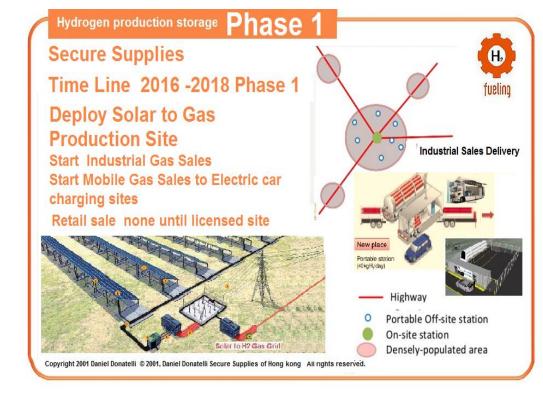


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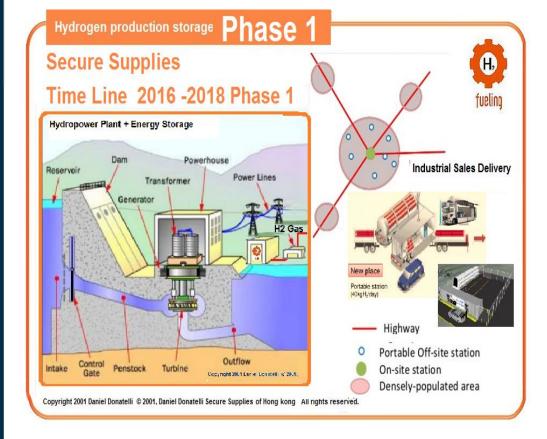


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Hydrogen production storage Phase 2 **Secure Supplies** Time Line 2018-2025 Phase 2 More urban people in Strong Co2 densely-populated area Reduction Massive infrastructure especially

in densely-populated area

hydrogen developing area

to surround off-site stations

95 % urban people can

access within 15min

Develop on-site stations

Arrange more off-site

stations densely

on industrial fixed engines



Do Gas grid Demo to fuel cells in parking garages

fueling

Gather stations in denselypopulated area

Use portable station

Highway

Portable Off-site station

On-site station

Densely-populated area

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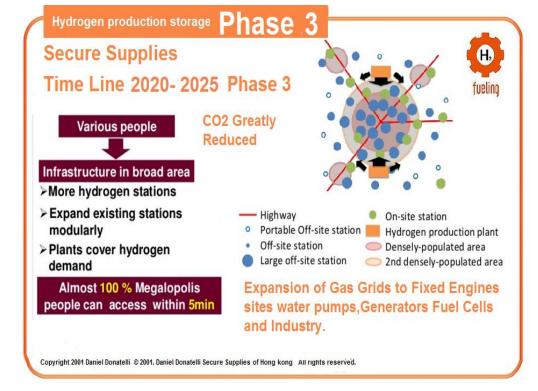


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Stored Energy to Engine Power Systems Value



System Component	High-Cost Case Values \$900,000 to \$1,200,000	System High-Cost Case Values \$3,000,000 to \$5,000,00
Hydrogen Fu Engine insta Capital cost	\$1 2000/VM	Fuel cell system installed capital cost (\$2008) \$3,000/kW 10kw to 500 KW
Engine Refi frequency/co	initial canital cost	Stack replacement frequency/cost 13 yr ¹ /30% of initial capital cost \$900,000
O&M costs	\$2-\$5/kW-yr	O&M costs \$50/kW-yr ² More if run at Full load
Engine life	25 yr (150,000-hour operation) Full Load Prime Power 24 hr Use	13 yr Fuel cell life (20,000-hour operation) NOT Full Load Standby Power NOT 24 hr Use
Engine syste efficiency (C		Fuel cell system Under 74,8%Total Efficiency efficiency (LHV) lower non combustion heat BTU

Bottom Line: What is the \$ value of the heat recovered vs. the cost associated with retrieving and distributing the CHP heat of Engine vs Fuel Cell? Stacked Running Costs & Credits (cents/kWh) Combined Heat and Power (CHP) also known as

? Stacked Running Costs & Credits (cents/kWh) +Plus Fuel +Plus Capital Recovery + Plus O & M - LessThermal Credits = Total cents/kWh

Combined Heat and Power (CHP) also known as cogeneration"The simultaneous and sequential use of power and heat from the same fuel source."

Operation and maintenance are critical aspects to consider when planning for distributed generation installations.

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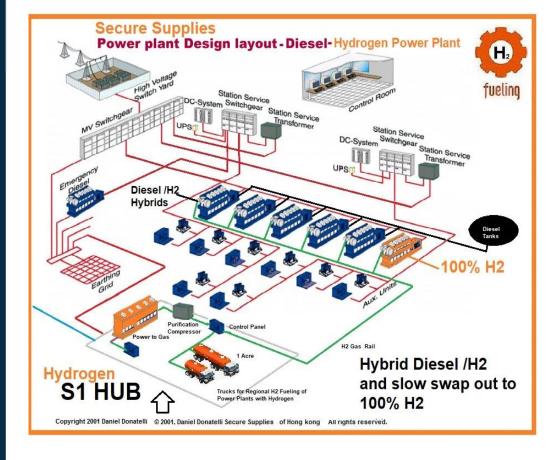


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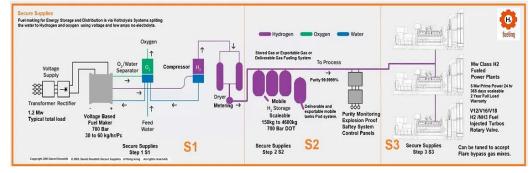
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