

# EcoGlobalFuels

*renewable sustainable energy transport fuels*



## The power to create renewable carbon neutral Ethanol

EcoGlobalFuels

addresses two significant problems:

Waste CO2 green house gas

emissions and the need for renewable carbon

neutral transport fuels

## A TURNING POINT IN HISTORY



### **We are creating**

- Renewable
- Cost Effective
- Carbon Neutral
- Transport Fuels
- Excellent ROI

### **We are producing Solanol™**

- Ethanol
- DME and Butanol
- MTBE
- Aviation Fuels
- Pure Oxygen
- All alcohol fuels from only natural earth friendly elements

### **We are only using**

- Sunlight (solar panels) also GeoThermal and Wind power for DC generation
- Water (hydrogen and oxygen)
- Unique cell electrolysis configuration to produce hydroxy energy
- Catalyst
- CO<sup>2</sup> green house gases extracted from the atmosphere.

# YOU CAN BE PART OF THE SOLUTION TO GLOBAL WARMING AND THE ENERGY CRISIS.

## The problem

- \* Fossil fuels are finite, and have reached their 'peak'
- \* Fossil fuels create air and environmental pollution, global warming and dependence on imports.
- \* It is predicted that energy demand will increase 63% over the next 20 years.
- \* Soaring energy prices threaten our economic development
- \* Bio-Fuels are not carbon-neutral, use food and other resources, and basically are not cost effective
- \* Governments are demanding that renewable carbon-neutral transport fuels like Ethanol be added into petrol stocks in the range of between 10-80 % within the next few years.
- \* New forms of energy being developed do not have an infrastructure to support them
- \* Release of CO<sub>2</sub> into the air contributes greatly to global warming
- \* Global Kyoto agreements are forcing governments and industry to DO SOMETHING about the CO<sub>2</sub> greenhouse gas emissions, which will cost billions- a significant cost burden to all western economies....

**and there is simply is no known economic method of**

## Sequestering

**that works!**

**Until now...**

*We have developed a method of producing DME, Butanol, Ethanol and Aviation grade fuels by combining our Hydrogen production (the lowest cost hydrogen available) with carbon dioxide (waste gas) emissions.*

## The Solution

Develop a process that takes waste CO<sub>2</sub> gas emissions and recycles it into a fuel, than can be easily transported, uses existing infrastructure and can be used in any vehicle

The Eco Global Fuel solution has developed a process that takes waste CO<sub>2</sub> gas emissions from coal/oil/gas/industry and also directly from the atmosphere and recycles and converts it into renewable, carbon neutral Ethanol, which we have branded as Solanol

It uses RECYCLED CO<sub>2</sub>

...and sunlight, geothermal, wind power

Plus WATER plus ELECTROLYSIS (our cell technology produces the cheapest Hydrogen in the world)

Plus catalyst with known proven industrial processes

And produces a fuel everyone can use...ETHANOL

We extract CO<sub>2</sub> from the atmosphere and also can use the CO<sub>2</sub> from coal and oil plants, gas fields and other dirty greenhouse gas producing industries and CONVERT IT INTO FUEL

We use water which is readily available. We can also use seawater and dirty / gray water if necessary as filtering reverse osmosis systems are now efficient and cost effective. Filtering hardly adds any cost to the overall process.

We run water through our electrolysis system, powered by solar, wind, geothermal or any renewable energy source, which breaks the bonds between (H) and (O) and which is our IP, patentable, the most cost efficient in the world and .....

- \* you can scale it up economically
- \* it is reliable, durable
- \* it does not need expensive exotic materials to build it
- \* it does not use diaphragms that need replacing and which clog up
- \* it is a quarter of the price of any other known electrolysis process.

**Eco Global Fuels**

**A pioneer in clean renewable energy**

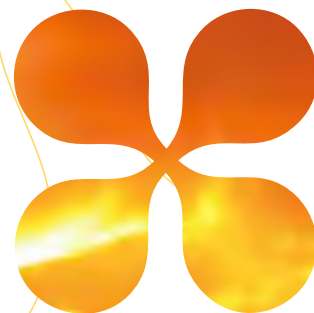
**The key strategy to this whole process is we can do two things uniquely:**

Make hydrogen and oxygen from water- without much energy required and with no mess and extract CO2 either directly from the atmosphere or from smoke stack industries.

We don't need to store hydrogen, which is dangerous, volatile and has no infrastructure - because we convert it immediately into transport fuels like Ethanol that can be stored, transported and use existing infrastructure.

We build this on cheap un-farmable land, including deserts, arid and unused industrial land- anywhere in the world. We can also build next to remote Geothermal plants where there is no infrastructure to carry electricity, as we will convert their energy into liquid alcohol fuels that can be transported out. We can also locate next to smoke stack industries such as coal power plants to supply them with pure oxygen (rather than their present system of using air hence, causing Nitrogen being released into atmosphere, and use their CO2 emissions for our water to ethanol process. The electrolysis process is economic (the cell last 25 years!) Our transport fuels refineries can compete with petroleum on a cost basis, as well as our branded ethanol called SOLANOL can compete with corn/sugar ethanol, without government subsidies and it is completely carbon neutral, renewable and does not use food. We separate the hydrogen from the oxygen, using the known industrial process of cryogenic separation, and we SELL the oxygen onto the market place as an added by- product. For each litre of Solanol, we also produce 8 Kg of saleable oxygen, which of course can also be sold to smoke stack industries This dramatically helps to deal with the problem of sequestering, Kyoto economics and global warming.

**In fact- it is the solution!**



*Solar energy potential is off the chart. The energy in sunlight alone striking the earth for 40 minutes is equivalent to the US energy consumption in a year. The goal then is to properly convert that sunlight into fuels which our existing infrastructure is readily able to utilize.*

## **SUMMARY of PRODUCTION OF SOLANOL**

Solar panels, geo thermal or any renewal energy source is used as the power source.

Hydroxy cells are utilized for the production of “Hydroxy Gas”

It is then separated from Oxygen by our own unique cost efficient separation chamber

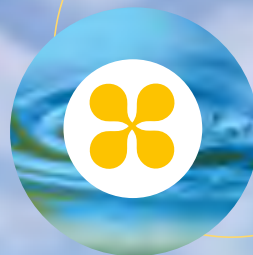
We add CO<sub>2</sub> either from the atmosphere or from normally invented industrial sources e.g. coal powerstations and gas fields

CO<sub>2</sub> is converted to CO by the Fischer Tropsch Process

CO plus the Hydrogen is then compress together with a ethanol catalysis to produce **Carbon neutral, Solanol.**

Reverse Water Gas Shift (RWGS) is used to produce carbon monoxide (CO) from carbon dioxide (CO<sub>2</sub>). The CO is added to the Hydrogen to form the most basic of energy fuels- methane. In a widely used known process called Fischer Tropsch Synthesis (FTS), developed over the last 60 years, fuels like ethanol and aviation fuels are produced by varying the catalysts used. The good news is these catalysts are forever being refined and coming down in price as the renewable energy industry increases demand. Our cost analysis proves it is doable, safe, and economic with the desired ROI.

**JOIN US the creation of MANY SOLANOL REFINERIES AROUND THE WORLD.**



# **solanol**



# The Market place

**Sunlight + CO<sup>2</sup> + Catalyst + Hydroxy = all sorts of high power fuels.**

**Sun + Water + Carbon Dioxide = balanced carbon-neutral alcohol fuel (Solanol)**

**5 gallons of water + 15lb of CO<sup>2</sup> will produce 1 gallon Solanol + 17lb of enviro-liquid oxygen.**

Solanol is approximately 70% more cost effective than corn or sugar based ethanol, which at current pricing costs approximately \$4.00 /Gallon without government subsidies and uses no food, fossil fuels or government subsidies in its production.

We are not in competition with biofuels, as the alternative fuel marketplace cannot get enough to meet government guidelines.

Currently gasoline is priced in the US at \$ 2.50 - \$3.00 gallon while Solanol is positioned to sell at current pricing of \$2.30 per gallon with a current cost to produce @ \$1.56 US per gallon, which produces a healthy ROI.

This ROI does not include the sale of oxygen or licensing fees from CO<sub>2</sub> emissions, and carbon foot print credits.

EcoGlobal Solanol production is financially achievable because it can be economically scaled up, is half the cost of conventional electrolysis, has very low maintenance costs, does not use diaphragms which clog and need constant replacement, and has reliable cell units made from low cost materials that are durable and last for approx. 25 years. The reported price of photovoltaic electricity (solar panels) is becoming cheaper by the year (21,36 cents per kWh)

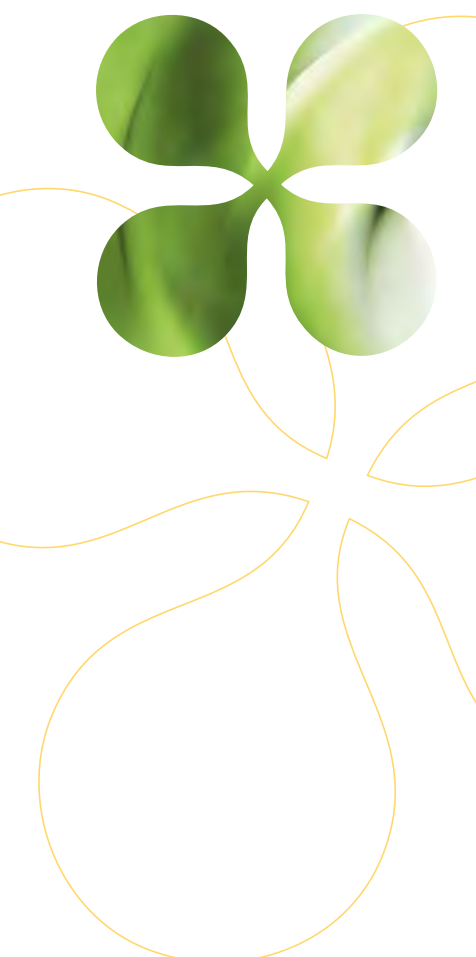
## **Products/Services/ROI revenue streams/Target markets**

Sales of Ethanol and other transport energy fuels are made directly into the market place. By-product oxygen is sold, also channeled into coal power stations to produce clean (non nitrogen) emissions. We contract licensing fees to entities that wish to reduce their high volume CO<sub>2</sub> emissions, such as coal power stations and gas fields, producing a clean by-product that can be converted into useful products such as carbon black. We use their CO<sub>2</sub> to convert it into renewable Ethanol branded as SOLANOL

We produce and sell electricity and gain massive carbon footprint credits.

## **PROJECTED PROFIT MARGINS:**

### **Metric system with \$US:**

- 
- The sale of ETHANOL currently has a wholesale value of \$0.80 per litre i.e. this is what the market pays for Ethanol
  - The price for us to produce 1 litre of Solanol ® Ethanol is \$ 0.41
  - That is a margin of 0.39 per litre (not including our by-product oxygen)
  - For each litre of Solanol, we also produce 2 Kg of salable oxygen
  - Currently wholesale market prices for oxygen is \$ 0.41 per Kg
  - Because we produce 2 Kg's, that equals \$0.82 per litre of Solanol produced
  - Adding these two commodities together, we have the wholesale value of each litre of Solanol produced calculated as:
    - \$0.80 Ethanol + \$0.82 Oxygen = \$1.62
    - \$1.62 turnover from each litre of solanol minus production costs of \$0.40 per L

**This equals \$1.20 profit margin per Litre**

## PROJECTED PROFIT MARGINS:

### The same calculations in Imperial measurements with \$US:

- The sale of SOLANOL™ ETHANOL currently has a wholesale value of \$3.00 per gallon – i.e. the marketplace value for Ethanol
- The price for us to produce 1 gallon of Solanol @ Ethanol is \$ 1.56
- That is a margin of 1.44 per gallon (not including our by-product oxygen)
- For each gallon of Solanol, we also produce 17 lbs of oxygen
- Currently wholesale market prices for oxygen is \$ 0.18 per lb
- Because we produce 17 lbs, that equals \$3.00 per gallon of Solanol produced
- Adding these two commodities together, we have the wholesale value of each gallon of Solanol produced calculated as:
  - \$3.00 Ethanol + \$3.00 Oxygen = \$6.00
  - \$6.00 turnover from each gallon of solanol minus production costs of
  - \$1.56 per gallon

**This equals \$4.44 profit margin per Gallon**

*When we  
honor Nature,  
Nature  
honors us.*

*William Tara*

## REVENUE STREAMS SUMMARY

- Production and Sale of Ethanol (and other carbon neutral fuels) directly into marketplace
- Production and Sale of oxygen directly into marketplace
- Production and Sale of electricity directly into marketplace
- Licensing fees to coal / oil based industries needing to reduce CO2 emissions along with sale of carbon black products.
- Reduces the dependence on imported oil, and reduces greenhouse emissions, so it is supported by large Government grants and subsidies
- Massive Carbon footprint credits

# SEQUESTERING

The first logical priority is to produce carbon neutral alcohol SOLANOL fuels.

This will reduce the amount of carbon dioxide now released into the atmosphere by one third e.g. the combustion and production of Solanol is nontoxic and produces no containments to pollute the atmosphere or the environmental, ecological of planet Earth. Because all the elements necessary to synthetically produce Solanol, are a cyclical, CO<sub>2</sub> recycled, o<sub>2</sub> recycled, h<sub>2</sub>O recycled.

The remaining two thirds of carbon dioxide now released into the atmosphere are produce by natural gas and coal fired power plants.

China, India, and other nations rapidly increase their demand for fossil fuels, future fighting over energy and fuels looms large. In the meantime, the 328 coal fired power plants, and 321 natural gas fired plants in the US as well as vehicles everywhere, continue to pour 6.35 billion tonne / 7 billion ton of pollutants and greenhouse gases into the atmosphere annually threatening the planet.

Unfortunately there is 700 years of coal reserves remaining to be utilized. The burning of coal will not stop in the foreseeable future, therefore;

ECO GLOBAL FUELS produces for every 1 kg of Hydrogen, 8 kg of PURE OXYGEN. The consequences of this novel industrial hydrogenation process results in the creation of the most cost-effective in-situ supply of pure commodity hydrogen and pure commodity oxygen in the world.

Because of these gas ratios a major revenue stream can be developed by on selling the commodity enviro-oxygen to coal and gas fired power stations.

If the Coal Industry used PURE OXYGEN from our solanol process- it would clean up its act DRAMATICALLY

Currently national (international) coal and gas-fired power stations have an inherent environmental impediment that being the 300 million tonnes of carbon dioxide in emitted into the atmosphere annually. The cost of removing this carbon dioxide component vented from the flu gases is a major technical-cost-deficit problem.



This will be overcome by introducing enviro-oxygen, which is a surplus by-product of the Solanol fuel process, to combust with coal or gas fired power stations instead of with air.

The flu gases produced by coal and natural gas fired power stations utilizing enviro-oxygen, will now consist of mainly carbon dioxide that can be converted into stable carbon products such as;

1. Olefin
2. Formaldehyde
3. Carbon black
4. Carbon fertilizer
5. Carbon graphite
6. And other products that will not produce air-born carbon dioxide.

This national market will require 218 million tonne/240ton of enviro-oxygen annually.

### **Carbon dioxide atmospheric extraction process**

EGF is working together with a major chemical company to extract carbon dioxide from the atmosphere. Our unique process has the capacity of absorbing the CO<sub>2</sub> directly from atmosphere, and along with EGF's computer modeling on how to apply and distribute the material in the application area. Vast quantities of CO<sub>2</sub> can be absorbed even with only a low percentage of the atmosphere consisting of CO<sub>2</sub> amounting to 0.04%.

This material is completely recyclable and is totally environmental. This methodology is commercially viable because of the ROI via the revenue stream generated from the sale of Solanol fuel and enviro-oxygen.

Solanol fuel is combusted and the emissions are released and then the CO<sub>2</sub> is re captured to produce Solanol fuel once again, it creates a carbon dioxide recycle, in the atmosphere, and is the only recycling fuel matrix-model that imitates nature exactly-as it is in nature: by absorbing, storing, and releasing, but acknowledging at all times, the environment with economic growth in a global system that combats global warming and climate change.

**Enter a new Fuel Entity....the "Solanol" economy.**



*We are not  
here merely to  
make a living,  
we are here  
to enrich the  
world and we  
impoverish  
ourselves if  
we forget this  
errand!!!*

*Woodrow Wilson*

## **USING ETHANOL**

The Eco Global Fuels model for energy fuel production is more cost-effective than our competitors, including corn and sugarcane based ethanol, yielding a higher ROI without subsidies and without having any effect on food prices or harmful unsustainable mono-agriculture practices. Solanol Ethanol is produced without using oil, coal, LNG, or any other fossil based hydrocarbon feed stock fuel. Also for every one kg/lb of hydrogen produced, eight kg/lb of oxygen is also manufactured and sold.

Research has revealed carbon neutral liquid alcohol fuel (Solanol) has superior properties in combustion engine economy, engine performance and exhaust emissions. Because of global fuel distribution and marketing infrastructure - any breakthroughs in renewable alternative fuel have to attain these criteria:

- a) Liquid at room temperature.
- b) Carbon neutral.
- c) Cost-price competitive with liquid fossil hydrocarbon fuel.

## **Engine Economy**

Fuel economy tests resulted in an increase in kilometers of 16% in a loaded vehicle and a decrease of 5% in an unloaded vehicle, even though the calorific value of the Ethanol alcohol was only 23.44MJ per Litre when compared with Petrol having a calorific value of 34.6MJ per Litre.

## **Exhaust Emissions**

As alcohol burns much cleaner when combusted, with the resultant added range the exhaust emissions are drastically reduced by 92%. Solanol has the added benefit of being carbon neutral.

## **SUMMARY : ETHANOL – SOLANOL ® ADVANTAGES:**

1. The cost of Ethanol in 2009 per 789 kg / 1740lb = US\$1000 equivalent to 1000 Litres / 264 Gallons @ US\$1.00 Litre / \$3.80 Gallon.
2. Has superior properties when combusted than hydrocarbons and with the same range.
3. Better suited to the hybrid electric car market because it's carbon neutral.
4. Can be easily produced using off-the-shelf catalytic infrastructure.
5. Has a high Octane @ 120 and can be easy blended into existing petrol infrastructure.
6. Because of the above advantages and that Ethanol-SOLANOL is carbon neutral it can be sold @ a current of Gate price-US\$1.00 per litre / US\$3.80 per Gallon into the wholesale and retail transport Industry.



*The real  
voyage of  
discovery  
consists  
not in  
seeking new  
landscapes  
but in having  
new eyes*

*Marcel Proust*

## **COMPETITION**

### **Conventional diaphragm electrolysis**

Conventional diaphragm electrolysis technology is expensive to scale up, unreliable, often 'clogs' up, does not last long and have higher maintenance levels. Conventional diaphragm electrolysis, utilizing 50MW would approximately cost \$70 million +\$7 million for the cryogenic storage of liquid oxygen.

ECOGLOBAL SOLUTION: Scaled up hardware is less than half the price! The Eco Global Fuels hydroxy electrolysis, utilizing 50MW would approximately cost \$25 million + \$7 million for the cryogenic separation of hydrogen from oxygen including storage of the liquid oxygen. EcoGlobal Solanol production is financially achievable because it can be economically scaled up, (half the cost of the competition), has very low maintenance costs, does not use diaphragms which clog and need constant replacement, and has cell units made from low cost materials that are durable and reliable.

### **The new 'hydrogen economy'**

The majority of hydrogenation processes rely on hydrogen produced from fossil hydrocarbon stocks, which is polluting and inefficient. Hydrogen itself as a fuel is dangerous, not easily transportable, inefficient to transport (hard to compress) and has no existing distribution infrastructure.

ECOGLOBAL SOLUTION: We convert the hydrogen we produce immediately on site to useable transport fuels such as ethanol, which uses existing infra structure to transport and distribute. The process we use to manufacture hydrogen is 60 % more efficient, without polluting the environment or using fossil fuels.

### **The new Biofuel Industry**

In the US the feedstock is primarily corn, while in Brazil it is sugarcane. The USA in 2007 was producing 7 billion gallons (26.9 liters) per year, while the world production of biofuel ethanol was around 13.5 billion gallons. There are some big players, and large agribusinesses like ADM, and Cargill. Interesting technology is emerging with Algae fuel, which uses large scale open ponds, sunlight, photosynthesis and organisms.

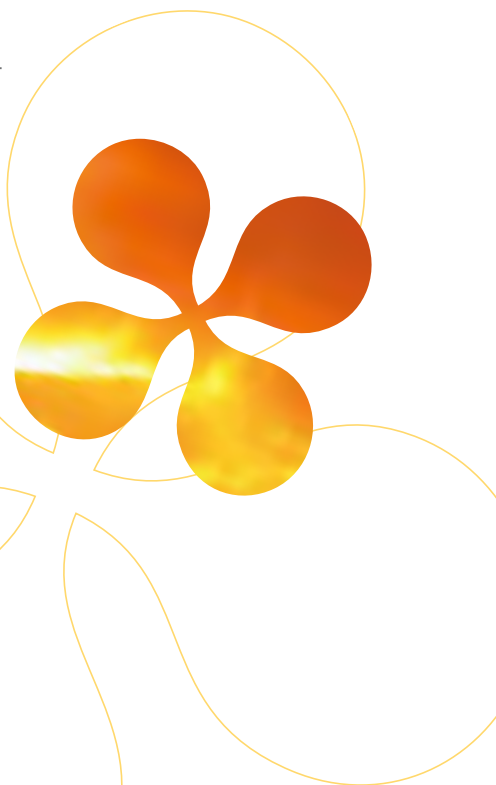
ECOGLOBAL SOLUTION: We do not use food. Food is for people to eat. The use of cellulose products, such as corn or sugar in the production of the Ethanol, is not carbon neutral, increases the cost of basic foods which causes a negative effect on the worlds food supply. There is some new interesting developments using Algae for ethanol production, which is more sustainable and less harmful to the environment, and per unit mass yields 30 times more than biofuel crops. However, such fuel remains too expensive, with algae species costing between \$5-10 per kilogram.

NOTE: We are not in competition with any biofuel companies because the marketplace cannot get enough of renewable fuels. The future will have a variety of bio-fuel sources, and governments are requesting the widest possible variety of carbon neutral energy. The U.S. federal government gives ethanol producers a 51-cent-per-gallon tax credit and mandates that their fuel be blended into the nation's gasoline supplies. The Energy Policy Act of 2005 requires that 4 billion gallons of "renewable fuel" be used in 2006 and this requirement will grow to a yearly production of 7.5 billion gallons by 2012.

### **UV artificial photosynthesis to produce methanol**

This technology is modeled after the photosynthesis effect that occurs in plant cells. A process of artificial photosynthesis, and a chemical reaction during which water and carbon dioxide, in the presence of a catalyst and under the influence of deep ultraviolet, converts (hydrogenation) the feed stock into methanol. This method is being spearheaded in Poland. The formula is  $2n \text{ CO}_2 + 2n \text{ H}_2\text{O} + \text{photons} \rightarrow 2(\text{CH}_2\text{O})_n + 2n \text{ O}_2$ . The missing "energy complement" is provided by the methanol-to-gasoline (MTG) process. Methanol produced in the process is separated from water and, through MTG, it is concentrated to higher hydrocarbons, which is different kinds of gasoline and diesel fuel. MTG synthesis is a highly exothermic reaction (the energy does not come from combustion) and employs a catalyst based on ZSM-5 zeolite, a compound classified as synthetic aluminosilicate. The researchers are yet to study the impact of pollution on methanol production and check the course of the process whereby  $\text{CO}_2$  mixes with air. For the time being, the  $\text{CO}_2$  has to be separated from other gases, including oxygen and nitrogen, and the photocatalyst is only efficient in the presence of high-energy photons (5eV).

ECOGLOBAL SOLUTION: Methanol, which the UV process produces, has a very low octane value and is not suited to the transport fuel industry. Ethanol, which the EcoGlobal process produces, is totally suited to the transport fuels industry. The catalyst they use is not cheap. The catalyst EcoGlobal uses is economically viable. The surface area necessary for the UV light is massive! If they use UV light bulbs- they still need to be 'powered' by the sun or wind power to make it carbon neutral- hence making the whole procedure very inefficient. We use 100% sunlight for Solanol production. They use only the UV spectrum, which is 0.002 % of sunlight. They are mixing  $\text{CO}_2$  with steam and steam needs energy to be produced. The ultraviolet energy from the sun will not, commercially or cost-effectively, sustain ROI for this process. Artificial photosynthesis cells (currently) last no longer than a few years (unlike PV and passive solar panels, for example in our Solanol production, which last twenty years or longer). The cost for alteration right now is not advantageous enough to compete with fossil fuels and natural gas as a viable source of mainstream energy. Their research is still several years away- the planet cannot wait that long.



### **New MIT technologies**

Solar power has a unique potential to generate vast amounts of clean energy that's doesn't contribute to global warming. But without cheap methods to store this energy, at the moment it cannot replace fossil fuels on a larger scale. In the MIT scenario, sunlight would split water to produce versatile, easy to store hydrogen fuel that could be later be burned in an internal combustion generator or recombined with oxygen in a fuel cell. For a household, MIT researchers have devised an inexpensive catalyst that produces oxygen from water at room temperatures, like the same benign conditions found in plants. There are problems with its scalability and it seems the setup to split water is much slower that using electrolyses. Many researchers suggest it is better to spend the money on improving battery storage of solar energy, rather than developing an artificial form of photosynthesis.

ECOGLOBAL SOLUTION: We can do the same; units can be scaled down to household size, and can be used for heat and electricity generation. However that is not our focus at the moment.

### **Electric car development and cell technology**

Research has revealed that plug-in electric vehicles are limited in range to a maximum 400 kilometers using the most up- to-date battery technology. (With a one-hour recharge). It becomes obvious that hybrid technology must be incorporated to extend range. Solanol can complement and supply the necessary carbon neutral alcohol fuel to extend this range. The world uses 40% of its energy as liquid fuels for transportation

ECOGLOBAL SOLUTION: We see no competition with this developing technology. Remember, the electricity used for cars comes from smoke stack coal burning industries. Hybrids will also need access to fuels such as Ethanol. Larger vehicles such as trucks, trains and planes will always need a high-octane fuel. Potentially, the electricity required for hybrid cars could be produced by a Solanol Plant making the whole process of driving an electric car a 100% carbon neutral experience! Now that's what we call a sexy car!



### **PRINCIPLES**

The founders and management team is comprised of Mr. Ross Spiros and Mr. Roger Green.

**Mr. Ross Spiros** is an Australian inventor and researcher with over 25 years devoted to active development of hydrogen based fuels. Mr. Spiros, based on decades of research, has refined and improved efficiencies in the technology of harnessing the power of water and sunlight for the manufacture of cost efficient hydrogen. Through his efforts, Mr. Spiros has developed a unique technology where the processes are cost effective, efficient and can produce commercially viable transportation fuels.

**Mr. Roger Green**, a New Zealander, is an international businessman based in New York, responsible for the development and promotion of the Eco-Global concept and is the driving force in the realization of this technology. Mr. Green has been active for over 25 years in environmental and eco-design initiatives around the world. He is an active principal and sponsor of the Breakthrough Technologies conferences. Roger Green is the Founder and CEO of Eco Global Fuels, with offices in New York City and Sydney Australia.

**Eco Global Fuels**

**The Power to Create Renewable Carbon Neutral Transport Fuels**  
**Sustainable Solanol Ethanol**

**In the future, the production of transportation fuels will be sustainable, affordable and ecologically sound.**  
**Thanks to Eco Global Fuels, the future is now.**

**SOLANOL is our registered Trade Name for any transport fuel produced with our unique technology,**

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