



Incorporated in BVI New Zealand USA Botswana UK
Turning today's waste into tomorrow's renewable energy
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19th February 2020

Mark Jensen Mayor
City and Borough of Petersburg
P.O. Box 329
Petersburg AK 99833

RE: Kake Petersburg road

Dear Mayor Jensen and Assembly Members,

It appears several of your assembly members are against the road and possible intertie being built between Kake and Petersburg. I fail to see why.

I am in procession of Senator Stedman's letter to you and your assembly dated 14th February 2020 and I endorse all of his comments.

Global NRG is a major WTE, renewable energy and energy storage group operating around the world since 1976. During that time, we have developed several valuable technologies in our field. Included in these is our plasma gasification of wastes including MSW and waste plastic which results in ultra-low-cost electricity.

Because many of these wastes are destined for landfill, by diverting them away from landfill we can capture the gate fees and levies normally paid to send the waste to landfill. This results in us having a substantial credit before we even gasify the waste into syngas and use it to generate cheap electricity.

We can generate electricity at up to 80% cheaper than hydro, wind, or solar and it is base load renewable energy.

Some of you would be aware from news items featured in the Petersburg Pilot that I have been funding the legal battle over the last 5 years to free Kake Tribal Corporation (KTC) of the bankruptcy shackles rogue Petersburg attorney Fred Triem has had KTC tied up in for the last 23 years. We are at the final gate of removing the debt stigma and once the court approves it, KTC will at last be free to rebuild Kake and create new jobs.

As part of this rebuilding plan we intend first to install a biowaste gasification plant in Kake and KTC is in the process of applying for a generator's license. This will enable Kake residents to have access to electricity at around 8¢/KWh irrespective of how much electricity they use.

This low-cost electricity will facilitate KTC to build a biomass project to make charcoal, charcoal briquettes, biochar, wood pellets out of forest waste, and a new "Grill 'n' Smoke" briquette from Alder wood for local, lower 48 and export markets.

Global NRG is the world leader in the production of affordable hydrogen because of our ability to generate low-cost electricity, and we are presently rolling out the construction of 50 hub hydrogen manufacturing plants across USA. There will one in Alaska too. See attached.

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Global NRG is also among the largest producers of small microgrids with some 4.72 million already installed around the world.

Our microgrids are unique in that they incorporate a small hydrogen fuel cell which keeps the battery pack constantly recharged, just like a vehicle does its battery as it is driven along. This means that the household with one installed never runs out of power and that it has no need of the grid nor grid power. It also will not suffer outages or price spikes when there is a drought and hydro needs to be substituted with diesel generators as has recently been the case in Petersburg.

A household using 10 KWh of electricity would have a daily electricity cost of around 90¢/day or around \$27/month. Of course, they would also pay substantially less in tax on such a low bill. I am sure residents of Petersburg will be delighted to learn of this and, it doesn't matter whether it's a house, an apartment or someone just renting.

We will also be using hydrogen and fuel cells to help most remote villages reduce their power bills too.

Using wood pellets for heating and low-cost electricity will vastly reduce the cost of living for many of Alaskans.

But it doesn't stop there. The fishing fleet can retrofit fuel cells to their boats, not only reducing their fuel cost but also reducing carbon emissions.

Right now we are working on replacing diesel engines in ferries with hydrogen fuel cells and we are looking at operating a private ferry system in Alaska on a hub and spoke strategy, where smaller fast ferries running on fuel cells (37knots) can feed passengers and freight into a hub where passenger numbers and freight can be consolidated into a larger ferry for the rest of the journey to a capital city.

A road between Kake and Petersburg will therefore have significant commercial advantages for both Kake and Petersburg and allow new industries to develop in each. Most of Petersburg's objections are going to be overtaken by new technologies and strategies and as Senator Stedman rightly points out are misunderstood and of no reasonable argument.

Tourism is a significant financial contributor to the Alaskan and local economies and a road between Kake and Petersburg could allow both cities to benefit. Tourists have a limited visit time and want to see as much as possible in that time at the least possible expense and inconvenience and FIT travellers will always outnumber cruise passengers in numbers because more people can be moved by air more quickly at a lesser cost than by cruise ship and at present only those ports at which the cruise ships call benefit now and not in a substantial way as the cruise ships try to capture as much of the dollar expenditure as they can onboard and via extravagant commissions levied off onshore activities. An interlocking ferry system and a Kake Petersburg will facilitate travellers to move more freely.

Yours sincerely

MJBartlett

Michael Bartlett

President

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Hydrogen Fuel Cell trucks can decarbonise heavy transport

Global NRG Ltd is a WTE, renewable energy and energy storage business. We have developed a number of valuable technologies over the years around turning wastes ranging from MSW, waste plastics, organic, crop and animal wastes into renewable energy.

One area where Global NRG has been particularly successful is in the gasification of organic wastes into syngas and using the syngas to generate cheap electricity. This is brought about because most of the wastes are free as they have no commercial value, other wastes that would normally be sent to landfill attract gate fees and by diverting these wastes away from landfill most of these gate fees can be captured.

Capturing the gate fees puts the waste to energy project in credit even before the gasification or anaerobic digestion of the waste takes place. The result is that Global NRG can generate renewable energy up to 60 times cheaper than even wind or solar generated electricity depending on the gate fee contribution and the electricity is base load power, unlike the intermittency of solar and wind.

More recently in 2017 Global NRG developed a plasma gasification technology for MSW and the inclusion of up to 40% of waste plastic, which is becoming a world pollution problem, in the feedstock.

Affordable Green Hydrogen

As the world turns more and more to renewables and reducing carbon, energy storage and alternate ways of powering transport are fast developing markets.

The greatest source of carbon dioxide outside of agriculture is still transport using fossil fuels.

Battery storage and other methods of energy storage are running shoulder to shoulder with hydrogen. However, green hydrogen is the cleanest and more favourable renewable energy for transport whether for use in cars, trucks, ships or aircraft. Its by-products are just water and oxygen.

To date 90% of hydrogen is being made by reforming methane, but this process emits a huge amount of carbon dioxide and therefore is not a clean fuel. Electrolysis of water on the other hand emits no carbon dioxide and is about to close the gap. Both technologies are heavy electricity users and with methane reforming producing large amounts of CO₂ the enemy of climate change, it's not the road that hydrogen needs to take if it is to become a clean fuel for decarbonizing transport.

Global NRG believes it is in the box seat to turn water electrolysis into the cheapest way of making hydrogen because it can produce renewable energy at up to 60% cheaper than any other present generating method, because of our ability to earn a substantial credit from waste gate fees and levies.

One of the advantages of Global NRG's gasification technology is that it can use waste plastic, an environmental scourge, in its feedstock mix and waste plastic is available anywhere there is a town or

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Global NRG Hydrogen

city due to the enormous amount of it generated through the packaging and manufacturing industries, and simultaneously in each town or city there is usually also a plentiful supply of other organic wastes.

Another big advantage Global NRG's gasification technology is that it can be built on almost any sized scale and has a very small land footprint, whereas both solar and wind require large amounts of land and thus need to be located in remote areas needing to then involve grid costs. Even consolidating roof-top solar brings the expense of using the grid into play and this makes its cost uncompetitive with gasification.

Delivery and availability of hydrogen throughout the road network presents a major obstacle for those wanting to install fuel cells in trucks, busses and cars. However, Global NRG believes by constructing a matrix of medium sized 10MW to 20MW decentralized hub hydrogen manufacturing plants and by installing pressurised hydrogen tanks at existing gas stations similar to the way LPG and CNG are now delivered to transport, this is more easily accomplished.

With hydrogen hub plants around the country, hydrogen can be delivered even more efficiently than other gases, if the hydrogen only has to travel a short distance, and this can be achieved by only delivering it within a radius of 100 miles of the hydrogen hub, the hydrogen manufacturing hub would in fact be able to service an area of outlets in an area covering 32,400 sq. miles around it.

Modular electrolyzers

Global NRG will use 10MW modular electrolyzers in its hub plants around USA which it will manufacture in a JV with the expertise and experience in building electrolyzers. Global NRG is able to build electrolyzers for \$1,000/KWh. The volume we offer in terms of number of electrolyzers changes the economics of manufacture of electrolyzers.

This 10MW module size we believe is ideally suited to establishing initial decentralised hydrogen manufacturing hubs which can then quickly be expanded by adding additional modules and gasifiers to the initial plant.

Because Global NRG is in a unique position of being able to earn a substantial credit by diverting wastes, such as waste plastic, away from landfill and use them in its gasifiers thereby capture the gate fees and levies that would have to be paid if the wastes went to landfill, even the cost of compressing the gas like generating the electricity becomes cash positive just from the credit earned from taking the waste.

The more electricity that is used in the process the more credit the Global NRG plant earns. Wind and solar cannot achieve this credit advantage which means the Global NRG plant is profitable even if the electricity is supplied at no charge to the electrolysis because additional credit will be earned when the green hydrogen is sold. This results in Global NRG being able to generate renewable electricity at up to 80% cheap that wind or solar and it is base load electricity.

This cheap energy means Global NRG Hydrogen can wholesale green hydrogen for \$3.30/kg less than half the current price. This would put the retail price as \$3.45/kg, making hydrogen competitive with DGE at \$3.15/gal.

The flexibility of Global NRG hydrogen manufacture

Because the hydrogen market is still relatively small as far as transport goes, Global NRG does not need to rely totally of the use of hydrogen in transport in order for its decentralized plants to be viable.

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Low cost electricity can be fed into the grid maintaining sufficient cash flows to be profitable.

Hydrogen is in addition a feedstock for making fertilizers and is used in oil refining and can be combined with CO₂ to make RNG (Renewable Natural Gas) which can be fed into the gas grid or packed in pressurized cylinders for industrial and home use.

Microgrids

RNG and hydrogen can be used in Global NRG's microgrids which can power homes off-grid by means of a small fuel cell supplying a floating charge to its battery pack, similar to how a vehicle keeps its battery charges as it is driven along. (www.globalnrgstorage.com/microgrid.html). A household powered this way not only saves on its cost of electricity, but never runs out of power.

The household whether a house, apartment, or someone just renting and even a small business could be powered off-grid for most of the time or entirely.

A household or small business using say 10KWh of electricity a day, based on hydrogen costing US\$3.45/kg retail would have a daily electricity cost of just \$1.90 or \$57/month and be emitting no carbon dioxide.

Millions of homes already use our microgrids and tens of thousands more would leap at the opportunity to cut their energy bills and GHG emissions, creating an additional and substantial market for Global NRG's green hydrogen.

Decarbonizing Transport

Global NRG is partnering with Hyzon Motors which will be the first corporation to put fuel cell trucks and busses on the road in USA in 2020, as the hydrogen partner for their truck customers.

Our intention is to offer fleet operators a leasing package which would include the vehicle, its maintenance and the supply of green hydrogen at a rate more competitive than operating diesel-powered trucks and busses.

The roll-out of Global NRG's decentralized hydrogen plants in USA will overcome the negativity around the lack of hydrogen refuelling points adding confidence and encouraging truckers to switch to hydrogen fleets to cut their operating costs.

Cost of Global NRG's green hydrogen

Global NRG is confident from its modelling and its experience in generating electricity from gasifying wastes, that it will produce hydrogen via the electrolysis of water that will retail at US\$3.45/kg and wholesale at US\$3.40 /kg. Included in this figure is the cost of compressing the gas and the delivery cost over 100-mile spoke sectors radiating out from the hub manufacturing centres.

While an internal combustion engine is only 20% fuel efficient an FCV is >45% efficient.

As an example, a diesel-powered truck averaging 6.8 miles/gal would over a stage length of 500 miles consume 73.6 gallons of diesel at say \$3.17/gal, the current average US price for diesel, resulting in a total fuel cost of \$233.

An FCV (Fuel Cell Vehicle) similarly powered truck averaging 10 miles/kg of hydrogen would consume 50 kgs of hydrogen at say a \$3.45/kg retail price for a fuel cost of \$172.50 representing a saving of \$60.50 or 26% in the fuel cost over the same journey.

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While the diesel truck will generate 1,606 lbs of carbon dioxide over the 500 miles, the FCV truck would only generate a small amount of water and no carbon dioxide.

Where a truck is running up a high mileage over the course of a year this will represent a significant saving in both fuel and carbon emissions. To this saving must be added the much lower cost of maintaining an FCV powered vehicle as against a diesel-powered truck. The fuel cell is merely converting the hydrogen back into electricity that then powers the electric motors that propel the truck.

With a range of 500 miles an FCV truck would be well within the range of one of our planned hydrogen hubs and refuelling outlets.

Global NRG Hydrogen has already formed a partnership with Hyzon Motors a specialized builder of FCV trucks in USA, a subsidiary of Hydrogen Fuel Cell Technologies a world leading fuel cell manufacturer which will install fuel cells into truck and bus chassis in Rochester NY in a dedicated plant commencing 2020.

An FCV passenger car carrying 6kgs of hydrogen and achieving 65 miles (107km) to 1 kg of hydrogen would have a range of 390 miles (630 kms) and a fuel cost of 4 cents per mile.

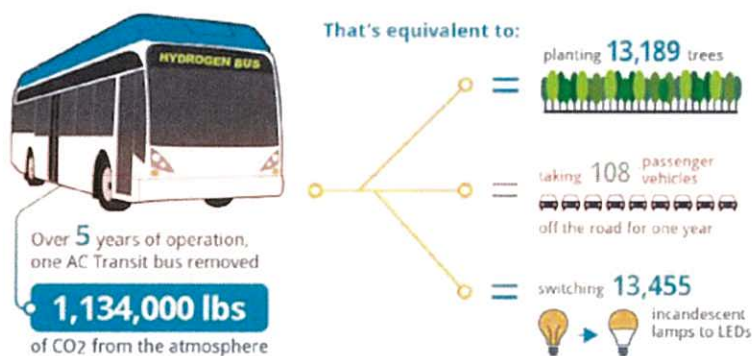
A similar powered car running on gasoline over the same distance would have a cost 7 cents per mile a near 75% additional cost.

5,000 FCV trucks running on hydrogen over a 500-mile sector each day versus a similar powered diesel truck doing 6.8mpg over the same distance the savings in carbon dioxide emissions would amount to 1.467 million tons a year.

For more information contact: admin@nuglobalnrg.com Box 237 Kake AK 99830 USA

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