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Energy White Paper Task Force
Department of Industry
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ENERGY WHITE PAPER 2014 - SUBMISSION ON THE GREEN PAPER BY THE INTELLIGAS GROUP

INTRODUCTION.

This submission is made in the expectation that an effective Energy Policy will be developed as a result of the White Paper.

The submission does not address all the **A simple example of an opportunity for liquid fuel displacement is the highway truck fleet.**
headings in the Green paper, but comments on:

- Attracting Energy Resources Investment,
- Building Gas Supply and Improving Market Operation,
- Security, Innovation and Energy Productivity,
- Trade and International Relations, and,
- Driving Energy Productivity.

These are addressed in particular as they relate to the use of natural gas in heavy duty engines in both on-road transport fleets and in off-road use as an alternative fuel to imported liquid fuels.

Of particular relevance is the recent development by the Australian gas technology specialists, The IntelliGas Group, of **HDCNG™** systems and processes that are now market ready and capable of revolutionizing the use of natural gas in heavy duty fleets (both highway and off-road) which consume vast quantities of imported liquid fuels. Until now, natural gas has struggled for relevance in these markets for a number of reasons.

HDCNG™ is breakthrough technology and anticipates a paradigm shift which will allow natural gas to penetrate these markets.

This is the first time HDCNG™ it has been presented to Government, and it is on the cusp of recognition by the gas industry worldwide as an emerging enabling technology for heavy duty applications.

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1. ATTRACTING ENERGY RESOURCES INVESTMENTS

The submission first addresses Alternative and Emerging Technologies and focuses on recent and ongoing technology developments that are designed to effect a new paradigm for the use of high density compressed natural gas - **HDCNG™** - compressed natural gas at 350 bar (5076 psi).

Until quite recently, compressed natural gas systems have been limited by circumstance and equipment suitability in the Australian marketplace to a nominal 200 bar (nominal 3000 psi). Liquified natural gas (LNG) has been generally considered to be the only mechanism available to transport, store and dispense natural gas when supplied to large energy users such as highway trucks, rail locomotives and mining machinery.

Now, however, new and emerging technologies including HDCNG™ provide new and economic opportunities for gas to substitute for diesel and other liquid fuels. The technologies are related to gas engines, gas storage and dispensing, and on-board gas fuel systems.

Gas Engine Technologies.

There are three generic examples of large mobile gas engine technology:

- **Direct Injection** gas to High pressure Direct Injection (HPDI) diesel cycle engines, displacing approximately 95% of the diesel normally used. Such engines are available up to 600 HP and are suitable for use in heavy duty highway trucks and mining on-road ore haulage fleets. NOTE: The Westport GX 15 litre HPDI engine discussed here has been withdrawn from sale.
- **Dual Fuel** engines in which gas is introduced into the engine combustion air system, reducing the diesel fuel requirement by up to 70%. Such engines are also available up to 600 HP and are suitable for use in heavy duty highway truck fleets and mining ore haulage fleets, and,
- **Spark Ignition** engines, common in small vehicles, and now available for larger heavy duty vehicle engines (up to 400 HP), in which gas is a 100% substitute for liquid fuels, albeit with some losses of efficiency: these engines are emerging as suitable for smaller highway trucks such as single semi –trailers and heavy rigid trucks.

Australian heavy duty prime movers, uniquely, require an engine that produces in excess of 500 HP, and , in the case of our road trains, around 600 HP. Advances in gas engines are in the planning and design stage, and expectations are that natural gas engines will become even more advanced, available and accepted in the next few years. A problem, however, for Australia is that the new engines are generally limited to about 425 HP maximum, and thus are unsuitable for the Australian Heavy Duty market.

The collapse of the vehicle manufacturing industry has resulted in a large number of people with mechanical skills suited to engine manufacture being out of work. The development of 500 HP + engines for the Australian heavy duty fleet would be an ideal opportunity to use these skills, and is to be encouraged.

Gas Storage and Dispensing Technologies.

Natural gas can be stored and dispensed in either liquid form as Liquefied Natural Gas (LNG), as Compressed Natural Gas (CNG), or as High Density Compressed Natural Gas **(HDCNG™).**

- LNG offers the advantage of an energy density approximately 60% that of diesel, offset by significant disadvantages resulting from it being a cryogenic fluid, including inadvertent venting to atmosphere and OH and S handling, maintenance and training issues.
- LNG is notably expensive to produce, store and transport, and is experiencing difficulties in capturing its target market. It is suffering buyer resistance as, in addition to the handling difficulties outlined above, it does not provide sufficient financial incentive for fleet conversion from diesel.
- CNG, does not have the OH&S nor other problems of LNG, is normally stored and dispensed at 200 bar (3000 psi), and has an energy density of approximately 20% that of diesel, with inherent limitations on the amount of energy that can be stored and dispensed, due to excessive on-vehicle space and weight claims for fuel storage in the present CNG fuel tanks.
- **HDCNG™** describes a new paradigm for CNG in which it is stored and dispensed at elevated pressures up to 438 bar (6345 psi) and has an energy density relative to diesel of 37% at 350 bar (5076 psi). At this density it is a competitor to LNG in the heavy duty truck, locomotive and mining machinery market and in many cases, due to packaging advantages, has similar on board weight and space claims whilst providing similar range between fills as LNG.

Note: LNG is converted to CNG on-board the vehicle as all gas engines are CNG engines.

On Board Gas Fuel Systems - Composite Overwrap Pressure Vessels

These vessels had their origins in the space program and hydrogen storage in which applications they are subject to extremely high pressures, well in excess of anything contemplated for gas storage. They have now been designed and sized for use as high pressure fuel tanks. Type 4 cylinders are now available with a Service Pressure of 350 bar at 21 degrees C and a Maximum Allowable Operating Pressure of 1.25 times the Service Pressure.

Such vessels have now been adopted in **HDCNG™** systems as on vehicle fuel tanks, with similar space and weight claim as LNG tanks and associated re-gasification equipment. HDCNG provides impressive range between re-fuelling stops for heavy duty trucks, and is fully competitive with LNG in that regard. **HDCNG™** and CNG also have the benefit of being able to be packaged on both prime mover and trailers opening a wide variety of packaging and weight distribution options.

Australian Patented HDCNG™ Technology – Intelligas Cool5000™

The IntelliGas Group is an Australian gas technology business which has developed world patented components and processes that deliver **HDCNG™** at pressures up to 438 bar (6345 psi). The technology deals with the following applications:

- **HDCNG**™ storage and fuel systems for heavy duty trucks and other heavy duty vehicles
- Rapid re-fuelling of **HDCNG™** equipped heavy duty trucks and vehicles
- "Virtual Pipelines" - Filling and transport of multiple **HDCNG™** cylinders to provide enhanced economics for delivery of **HDCNG™** to remote locations such as remote mine sites.

The Intelligas patents include component parts and processes to enable the rapid transfer of **HDCNG™** from pipelines or storage to fuel tanks whilst eliminating the threat of excessive heat of compression in the transfer process. The IntelliGas patents provide 100% fill to name plate capacity with gas that at no time exceeds the vessel liner temperature limits imposed by the manufacturer.

IntelliGas has adopted composite vessels in **HDCNG™** on-ground storage and dispensing systems to enable rapid transfer and fill capability in future re-filling stations. The first such station has been built at Crestmead in Queensland, and was commissioned in March 2014.

IntelliGas is also developing **HDCNG™** systems to equip heavy duty machinery such as rail locomotives and mining machinery to be fuelled with natural gas. Work has commenced in a pilot project to fuel Heavy Duty mine dump trucks with **HDCNG™**.

IntelliGas has also designed and is offering a "virtual pipeline" system that will see multiple composite cylinders on B triple road trains delivering **HDCNG™** to remote mining locations for power generation and mining machinery where the circumstances of the mine prevent delivery via pipeline. Negotiations have commenced with a number of mining companies.

IntelliGas is active in the USA with an office and staff in Salt Lake City, Utah. Discussions are under way with a USA based composite cylinder and refuelling system manufacturer that should result in IntelliGas **HDCNG™** products and processes being offered to the North American market.

2. BUILDING GAS SUPPLY AND IMPROVING GAS MARKET OPERATION

Every opportunity should be taken to identify and support industries which:

- **Reduce the consumption of imported liquid fuels, and,**
- **Increase the consumption of domestically produced fuels.**

Australia is an importer of crude oil and refined liquid petroleum products, and imports are rising dramatically as demand rises and local production levels fall. We are also a large exporter of natural gas. It is absurd that we find ourselves in a position where we export natural gas and import liquid fuels (at higher cost per unit of energy) to burn in applications suitable for natural gas.

The single most effective decision that can be taken to increase energy security is to reduce our reliance on imported liquid fuels. To do this requires that we have a fully functional and effective gas market with discoverable price points and ease of trading. For natural gas to become an effective competitor to diesel fuel it will need to be commoditized.

Although there has been recent controversy and speculation regarding the rising price of domestic gas, the much larger problem is availability of gas. For a nation with such immense reserves, it smacks of market failure when gas users complain that they cannot get sufficient supplies of gas for their contractual needs or dire warnings are being made regarding imminent shortfall of supply.

It is now apparent that gas which had been previously identified as gas for the domestic market is being diverted to support feed-stock shortfall for the Queensland LNG export projects, and has not been made available to the domestic market. The imminent shutdown of gas fired power generators announced recently in Queensland as gas is diverted to export contracts signals the start-up of moth-balled coal generators with rising greenhouse gas emissions.

Availability on reasonable terms is the main issue with domestic gas supply, not price.

Australia is blessed with abundant reserves of natural gas, but is suffering market failure in relation to domestic gas. The majority of these reserves has only recently been identified and is in coal seam methane and shale gas deposits. The difference in the cost of incremental gas from conventional reservoirs and these non-conventional deposits is substantial.

Conventional reservoirs invariably have both gas and liquids in place and failure to produce the gas can limit or inhibit valuable liquids production. Incremental gas production can be achieved from conventional reservoirs by the drilling and completion of additional wells which can produce at substantial flow rates over extended periods of time, with associated liquids contributing to the profitability of the wells.

Not so with coal seam gas which exists within the coal seam as almost pure methane. New CSM production wells must immediately be placed on production, have very low average production rates compared to conventional wells, have immediate depletion profiles, water disposal costs and practically no petroleum liquids production. Such gas will be produced over time with uncertainties regarding both cost and rate of production. Gas from such wells will almost certainly prove more expensive to produce than gas from conventional reservoirs, so upward pressure on prices can be expected.

More importantly, these characteristics of incremental CSM wells create difficulty in a gas market unless a deep and liquid commodity market exists for natural gas as it does in the USA. There, the American Gas Association President, Dave McCurdy, in an interview in January 2014 described natural gas as ".....a foundation fuel with the most profound links to energy security for the nation as well as national efficiency and competitiveness."

The current problem for gas users is that insufficient production has been directed towards the domestic market: indeed conventional gas which was originally developed for the domestic market is being diverted to export.

LNG exporters argue that they should be free to export as they see fit into the world market, and as a matter of principle that proposition is agreed, provided that such exports do not impinge on the availability of gas for domestic purposes. The USA, which has a similar abundance of shale gas, has recently approved export of LNG, including to countries without a free trade agreement, but only after careful consideration of the impact on the domestic market. Any responsible government would adopt this perfectly sensible position.

The export of natural gas from the USA to countries which do not have a free trade agreement with the USA are subject to a public interest test, for which guidelines have been established. These guidelines include whether there is a threat posed to the security of domestic gas supplies. Natural gas security is no less important to Australia.

A perfectly sensible strategy for government to adopt in an Energy Policy is to consider the impact that the export of natural gas will have on the domestic market.

As the East coast LNG projects approach completion it is becoming clear that the production levels required to fill the export contracts may not be available at the time the first export cargoes are produced. Should that be the case, then domestic customers will almost certainly have supply curtailed as gas is diverted to the export liquefaction plants. This is an unacceptable position for Australian industry and consumers to be placed in, and will be a major political embarrassment.

The CSM producers of Queensland have been fortunate in the timing of their export contracts and have achieved what has been described as "premium Asia Pacific LNG pricing." Those prices are being touted as the new benchmark for world natural gas prices. They are already under downward pressure, and this will pressure increase as additional supplies of LNG become available from suppliers such as the USA and Canada, and Asian buyers resist pricing formulae.

We note that gas contracts have been negotiated with crude oil relativity clauses and other metrics to artificially support higher prices. Arguments that there exists a world price for natural gas and a relativity to oil prices (which themselves are periodically subject to cartel manipulation) must be resisted, particularly arguments that suggest the "premium Asia Pacific LNG pricing" represents a world price. Gas prices should be an outcome of supply/demand sufficiency, with supply provided to the market by an increasing number of willing sellers.

Sufficient gas being offered on the domestic market will eventually see prices reflect the true supply / demand tension that exists in a true market: producers will rightly not accept pricing below the cost of production, but true market prices will emerge.

Warnings by major gas users of the difficulty in gaining sufficient gas with acceptable contract terms for their needs should be heeded. Recent investments by Dow Chemicals in large fertilizer plants in the USA (where a true gas market exists), coupled with their announcement of a three year only extension of their supply contract at seriously elevated prices for an Australian plant may signal their intent to abandon Australian operations when the USA plants are completed.

It is to be hoped that the restriction on supply which is emerging in the domestic market is indeed temporary. The producers may be either worried that they have insufficient production to supply their export contracts or cautious about offering sufficient quantities to the domestic market, but neither circumstance is in the interests of gas users. The effect is ultimately that supply is withheld.

Government should insist that gas production for the domestic market is maintained and that a truly competitive market for domestic gas is sustained.

The present market lacks transparency and liquidity and creates the opportunity for producers to exercise market power in the interests of export customers and at the expense of domestic gas users. We should not be surprised if they take advantage of that opportunity.

Government policies should be shaped to encourage producers to deliver gas into a competitive domestic gas market with suitable terms and conditions.

A market designed to make the transition from the present model of long term bi-lateral contracts to a truly competitive commodity market is to be encouraged, with an emphasis on the development of conventional gas reservoirs for domestic consumption.

There is no world price for gas: gas as a commodity is relatively cheap and increasingly abundant in various markets. Gas is universally much cheaper than oil on an energy equivalent basis, although relative prices do vary across the globe.

Official forecasts are very conservative when contemplating the possible future domestic gas markets. An energy policy that reflects a desire to reduce dependency on imported fuels will encourage both the development of gas technology and the conversion of transport fleets and mining fleets to domestic gas.

In all official gas usage forecasts, the amount of gas that might be used in transport is miniscule. This conservatism is perhaps understandable as the historical uptake of gas a fuel for both on-road and off-road machinery has been negligible. Recent North American experience however suggests that with the new impetus of gas availability and price, a quiet revolution is underway which will result in dramatic increases in the amount of natural gas consumed by transport.

This increase is also stimulated by the new engines and fuel systems available and under development to encourage the transition to natural gas and a political desire to reduce dependency on imported fuels.

3. REGULATORY REFORM AND THE ROLE OF GOVERNMENT.

Natural gas fuelled trucks are disadvantaged relative to liquid fuelled trucks as in many cases the additional weight and space claim on the truck from the gas fuel tanks and gas management equipment result in the pay-load reduction and/or overall length extension. The limits on length and weight are considered arbitrary should be relaxed to allow gas fuelling to be adopted without commercial penalty.

Regulations and charges that apply to trucks should be uniform between states.

Fleet owners who fuel with gas should not be penalized for that choice by arbitrary pay load and length limits.

For excise purposes, CNG is disadvantaged relative to competing fuels. Both LNG and LPG are classified as distributed fuels and, as a consequence, excise calculation and payment is deferred to the point of sale, providing alignment with liquid fuels.

For CNG /HDCNG, it is different: CNG is classified as a "manufactured fuel" at the point of compression, and excise is calculated and levied immediately the fuel is compressed, with no opportunity to "bond" the product until the point of sale to a consumer. This may be satisfactory for sales made at the location where compression takes place, but places an unnecessary burden in cases where the gas is compressed at one location and subsequently transported to another location for storage and sale.

Excise regimes for all gaseous fuels should be similar. HDCNG™ and CNG when manufactured for distribution should only pay excise at the point of sale to a customer / user, as is LNG and LPG.

Potential users of natural gas as fuel in heavy duty truck fleets face two problems:

- the lack of re-fuelling infrastructure, and,
- the additional cost of the gas engine and on-board fuel storage systems

The cost of the engine and fuel storage systems should be able to be absorbed via the savings from natural gas compared to liquid fuels, however consideration may be given to providing assistance to enable a rapid roll-out of refuelling infrastructure so that sufficient access to re-fuelling is available on major routes to remove an impediment to the fleet owner's decision process.

Government assistance may assist the roll-out of natural gas re-fuelling infrastructure, however such assistance should avoid "picking winners" when considering which gas should be assisted. Let the market decide which type of fuel it wishes to adopt and the price at which it will shift to gaseous fuels.

4. TRADE AND INTERNATIONAL RELATIONS.

The cost to balance of trade from continuing to import energy (import liquid fuels) at a price greater than we sell it for (export LNG) is an increasing burden.

A narrow view of the gas issue, limited to evaluation of the contribution export LNG makes to the economy, fails to address the contribution a vibrant local natural gas market with certainty as to supply and contract terms makes to our energy and economic security, and fails to evaluate the lost opportunity cost of this contribution.

There is a tendency to assess the value to the economy of the gas export industry in isolation, whereas it is our opinion that a proper assessment should include the cost to the economy of imported energy that could be replaced by indigenous natural gas.

Energy security and economic security are inextricably linked.

The use of natural gas instead of petrol or diesel to fuel the national vehicle fleet is a low cost low emission strategy that can reduce our dependence on imported fuels whilst also helping to satisfy greenhouse gas emissions targets.

The Eastern Australian highway truck fleet consumes over 3 billion litres (estimated) of imported liquid fuel each year at a cost of over $2.5 billion (estimated) to the balance of trade. Technology now exists for these fleets to displace up to 95% of the diesel with natural gas, provided the infrastructure to deliver the gas can be installed and fleet owners persuaded to convert. Natural gas at the right price will encourage the conversion, however gas as fuel will also need to be commoditised to remove from fleet owners the risks and constraints inherent in bilateral contracts, and to more closely match the availability of and access to the traditional liquid fuel.

Although international obligations for greenhouse gas (GHG) reduction are elusive, at all levels in Australian Government it is accepted that GHG reduction is an important objective and a mechanism to help maintain our reputation for diligence in environmental matters.

Natural gas, when consumed as fuel in efficient gas combustion engines results in a reduction in greenhouse gas emissions of between 20 and 27% relative to diesel. Natural gas consumption as an alternative to diesel therefore has the potential to significantly contribute to greenhouse gas reduction targets.

5. DRIVING ENERGY PRODUCTIVITY.

Current demand estimates for the Australian gas market beyond the current LNG development phase indicate that by 2018 export markets will have grown to 4420PJ and will account for 81% of national gas production, whilst the balance of production (domestic consumption) remains static. (Source: AEMO 2013).

The Eastern Australian Domestic Gas Market Study released in January 2014 when contemplating gas demand beyond ramp-up of the export projects (i.e beyond 2018) concludes:

- AEMO expects average annual decline in gas-powered electricity generation of 9.8% from 2014 to 2022 followed by steady recovery till 2032 as power demand strengthens.

- Gas production that would have been consumed in power generation post 2014 flows to support export LNG contracts
- Gas fired generation being used as a balancing item for LNG production post 2014
- Residential gas demand is likely to be steady despite significant wholesale price increases
- The most significant and uncertain element of the debate on demand is primarily around the impact on large industrial users, particularly manufacturers.

Energy policy must encourage the use of indigenous fuel.

Nowhere in the study is the possibility of fuel switching from imported liquid fuels to indigenous gas contemplated, and nowhere are the benefits of increased domestic use of natural gas explored.

The Eastern Australian heavy duty high mileage first tier trucking fleets alone consumes over 120 PJ of energy per annum, and the use of HDCNG to fuel that fleet alone would result in significant cost reduction for East Coast transport owners and their customers, and a reduction of an estimated $2.5 billion in liquid fuel imports.

The National Institute of Economic and Industry Research (NIEIR) in a report titled Large Scale Export of East Coast Australia Natural Gas: Unintended Consequences - October 2012 concluded:

- The benefit of exporting LNG should be weighed against the benefit of ensuring competitive supply to the domestic gas-dependent manufacturing sector
- Due to the nature of the gas resources, their location, limitations in infrastructure and the way we manage these resources, there is a serious risk that .....additional supply will not be made to meet domestic demand
- To ensure gas availability for domestic users, the management of reserves and their supply to market needs attention if domestic needs are not to be overlooked in the rush to export this valuable resource
- **Each petajoule of gas that is shifted away from industrial use towards export whether because of tight supply or uneconomic pricing means giving up $255 million in lost industrial output for a $12 million gain in export output.**

A simple example of an opportunity for liquid fuel displacement is the highway truck fleet.

CONCLUSIONS.

Australia must develop and embrace a coherent and sensible energy policy. That policy should encourage the use of indigenous natural gas as fuel.

Natural gas is a vital component in Australia's energy mix and, as a readily available indigenous fuel, should be the fuel of choice and the foundation fuel for our transport fleets, rail locomotives, mining machinery and remote power generation.

New and emerging Australian technology has been developed including the use of High Density CNG (HDCNG™) in conjunction with Type 4 Composite Cylinders, gas storage and dispensing and new engine developments as an entirely efficient mechanism to enable natural gas to be consumed in heavy duty applications.

Australia's heavy duty fleet uniquely requires 500 + HP engines. These are no longer available as gas engines, and the opportunity exists for the mechanical skills of the collapsed Australian motor industry to be utilised to develop such an engine, and should be encouraged.

Australia's energy security requires we reduce our dependence on imported liquid fuels, and for this to occur we need a fully functional and effective gas market.

Natural gas is in abundance in Australia, but it must be brought to market domestically and be available for industry on acceptable terms and at reasonable prices. This can only be achieved with the introduction of transparency and flexibility into the domestic gas market, and will require market design for natural gas to be re-visited.

The pricing for domestic and export gas markets may be similar at times, but the present claim that the highest price paid for export LNG is the "world price" and can therefore be expected to be the domestic price is false.

Insufficient gas is presently directed towards the domestic market. Producers must be encouraged to present gas for sale in the domestic market, and should not be permitted to hoard gas to support their argument for higher prices.

A market requires willing buyers and willing sellers: every effort must be made to create a market that has gas available from multiple sources with true price discovery, information symmetry through the revised market mechanisms and accelerated production to provide sufficient volume to the market.

Joint marketing arrangements are counter to an efficient and transparent market and should not be permitted if we are to have an effective marketplace. Those that exist should be brought to an end expeditiously, and exemptions from Competition Law should no longer be permitted.

Regulations and charges that apply to trucks should be uniform between states, and gas as fuel should not be penalised by arbitrary pay load and length limits.

Excise regimes for gaseous fuels should be similar.

Natural gas, when consumed as fuel in efficient gas engines results in a reduction of greenhouse gas emissions of between 20 and 27% compared to diesel.

The benefits that accrue to the nation from the use of our indigenous natural gas as fuel for our domestic needs should be quantified and judged against the decision to permit unbridled export of this precious resource.

Stapylton Queensland
6 February 2014
Revised
18 October 2014

ATTACH: The intelliGas group and High Density CNG>

ATTACHMENT 1.

THE INTELLIGAS GROUP AND HIGH DENSITY CNG.

The IntelliGas Group (comprising iGas Energy Holdings Limited and associated Companies) is a privately owned Australian gas technology specialist which has developed world patented processes and components for the production, storage, dispensing and utilization of **High Density Compressed Natural Gas (HDCNG™).**

HDCNG is natural gas produced, stored and dispensed at pressures of 350 barg (5076 psig) to provide high energy density compressed natural gas as fuel for large fixed and mobile engines in such applications as heavy duty highway trucks, rail locomotives, mining machinery and remote power generation.

HDCNG is stored in and dispensed from high pressure light weight composite overwrap vessels, operating at up to 438 barg (6345 psig). Such vessels are now available from a number of manufacturers, and are manufactured from high strength light weight composite materials such as carbon fibre, having had their genesis in the space program and in hydrogen storage operating at pressures in excess of 700 barg (10152 psig).

HDCNG is a viable and economic alternative to imported liquid fuel such as diesel in heavy duty vehicles when suitable engine technology is used. Recent developments in engine technology are rapidly making such engines available for these heavy duty high horsepower applications.

HDCNG is a substantial improvement on conventional CNG, is a viable alternative to LNG as a mechanism to utilise gaseous fuel, and has several distinct advantages over LNG. HDCNG is relatively cheap to produce, store and transport. HDCNG systems can be efficient and economic for installation in quite small fleets, and importantly it is scalable to match the market as the acceptance of natural gas as a viable substitute for liquid petroleum fuels in the heavy duty vehicle fleet accelerates.

HDCNG will improve vehicle range along as well as reduce the space claim, weight claim and cost of gas fuel systems for existing conventional CNG natural gas fuelled fleets such as passenger buses, box trucks and refuse vehicles.

HDCNG is able to be transported economically via trailer mounted "virtual pipelines" to locations where pipelines are not viable, creating the opportunity for natural gas to displace diesel as fuel in remote mining power generators and mining machinery.

HDCNG technology is market ready and in the early stages of commercialisation. The IntelliGas Group has offices and workshops in Stapylton, Queensland and Salt Lake City, Utah, USA.