Suruhanjaya Tenaga

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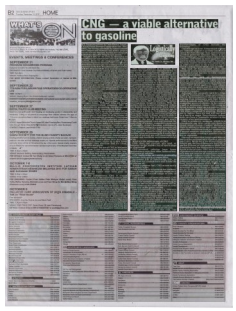
MediaTitle	Borneo Post (KK)		
Date	19 Sep 2013	Color	Black/white
Section	Home	Circulation	88,150
Page No	B2	Readership	166,173
Language	English	ArticleSize	699 cm²
Journalist	N/A	AdValue	RM 4,025
Frequency	Daily	PR Value	RM 12,075



CNG — a viable alternative to gasoline

MY Congratulations to Dato Harun Ismail, CEO of Sabah Energy Corporation Sdn. Bhd, (SEC), for having successfully commissioned the Compressed Natural Gas (CNG) project via its Virtual Pipeline System at Colourcoil Industries Sdn Bhd Telipok last month.

Sabah's SEC is the first in Malaysia to introduce the innovative CNG distribution system. Prior to the introduction of the Virtual Pipeline System, SEC could only distribute natural gas via underground gas pipelines in the Kota Kinabalu Industrial Park (KKIP). Beyond KKIP, it is uneconomical to build and distribute natural gas by pipelines due to the high capital cost and the relative small demand volume. But having completed in-depth study, SEC decided to implement the Virtual Pipeline System as the alternative mode of distributing natural gas for distant customers. SEC is confident that the use of natural gas would reduce maintenance costs and increase the operating efficiency, competitiveness and profitability of the customers' business.

Currently SEC is exploring the possibility of bringing natural gas to the east coast of Sabah and Sipitang. That was the high call by the Minister of Resource Development and Information Technology Datuk Siringan Gubat. Why not? After all, being a government-linked company, SEC is responsible for promoting, facilitating and developing energy resources in Sabah.

In Sabah, CNG is an available alternative to gasoline that's made by compressing natural gas to less than 1% of its volume at standard atmospheric pressure. Consisting mostly of methane, CNG is odorless, colorless and tasteless. It's drawn from domestically drilled natural gas wells or in conjunction with crude oil production. Natural gas powers more than 12 million vehicles on the road today. Expanding the numbers of CNG fueling stations would allow for the increase of CNG vehicles on the roads. New technologies and greater demand mean that the number of new stations is climbing rapidly. CNG costs about 50% less than gasoline or diesel, emits up to 90% fewer emissions than gasoline and it's clean, affordable abundant

As per record, the use of CNG in Malaysia is not new; it was introduced for taxicabs and airport limousines during the late-1990s, when new taxis were launched with Natural Gas Vehicle or NGV engines. Taxicab operators were encouraged to send in existing taxis for full engine conversions so as to trim down their costs of operation.

In Singapore there were about 400 CNG-powered vehicles in mid-2007. By February 2008, the number has gone up to 520 CNG vehicles, of which about half are taxis. To date the figure must have gone up significantly.

To the Indonesians, CNG is almost unheard of as a transport fuel before 2010 in the archipelago except in Jakarta, where a very relatively minor amount of vehicles, most notably Transjakarta buses, use the fuel. However, since 2010 there has been a government emphasis to push usage of CNG not only for vehicle fuel, but also for domestic consumption over wood burning (which can produce deadly methanol) and kerosene.

Logistically the concept of "motherships" as focal points introduced by SEC is applicable in the gas distribution via Virtual Pipeline System. It is known as 'virtual pipeline' because there is no physical pipeline for the continuous flow of natural gas from the mother station to the daughter station at the user's premises.

The virtual-pipeline is a system that allows the natural gas transportation in the form of compressed/ liquefied gas using modules coupled to mobile platforms, which are transported by trucks, ferry boats, boats and/or rail platforms. When the product reaches its destination, the module is connected to a decompression/ regasification station for ready consumption. The great advantage is that the amount of natural gas transported varies according to the needs previously determined by the customers. In short, versatile systems are supported by natural gas compression/ liquefaction modules, regulation stations and the transportation system itself. In a layman's term, SEC owned mother station serving many daughter stations. With the mother station located strategically within the Kota Kinabalu Industrial Park (KKIP) area, it is able to deliver natural gas to customers within a 70-kilometer radius. Hence industries in the west coast extending from Kota Belud to Papar would be able to

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benefit from this. Due to its clean burning property, the use of natural gas would reduce maintenance costs and increase the operating efficiency, competitiveness and profitability of one's business. Additionally the consistent temperature and pressure and flame properties of CNG have also resulted in a superior manufactured end product besides being environmentally-friendly fuel, the use of natural gas will contribute to a cleaner and healthier environment for all of us.

What are the Advantages of CNG?

CNG does not contain any lead or benzene; so the lead-fouling of spark plugs is eliminated.

CNG-powered vehicles have lower maintenance costs than other hydrocarbon-fuel-powered vehicles.

CNG fuel systems are sealed; preventing fuel loses from spills or evaporation.

Increased life of lubricating oils, as CNG does not contaminate and dilute the crankcase oil.

Being a gaseous fuel, CNG mixes easily and evenly in air.

CNG is less likely to ignite on hot surfaces, since it has a high auto-ignition temperature (540 °C), and a narrow range (5–15%) of flammability.

Less pollution and more efficiency: CNG emits significantly less pollutants than petrol. For example, an engine running on petrol for 100 km emits 22,000 grams of CO_2, while covering the same distance on CNG emits only 16,275 grams of CO_2.

CNG is essentially methane, i.e., CH_4 with a calorific value of 900 kJ/mol. This burns with oxygen to produce 1 mole of CO_2 and 2 moles of H_2O. By comparison, petrol can be regarded as essentially benzene or similar, C_6H_6 with a calorific value of about 3,300 kJ/mol and this burns to produce 6 moles of CO_2 and 3 moles of H_2O.

CNG-powered vehicles are considered to be safer than gasoline-powered vehicles.

On the other side of the coin, the disadvantages of CNG include the following:

Gas storage in a car. Compressed natural gas vehicles require a greater amount of space for fuel storage than conventional gasoline powered vehicles. Since it is a compressed gas, rather than a liquid like gasoline, CNG takes up more space for each gasoline gallon equivalent (GGE). Therefore, the tanks used to store the CNG usually take up additional space in the trunk of a car or bed of a pickup truck which runs on CNG.

The lack of harmonized codes and standards across international jurisdictions is an additional barrier to CNG related market penetration.

Despite the lack of harmonized international codes, natural gas vehicles have an excellent global safety record. Existing international standards include ISO 14469-2:2007 which applies to CNG vehicle nozzles and receptacle and ISO 15500-9:2012 specifies tests and requirements for the pressure regulator.

Although CNG can easily catch fire, it has a narrow flammability range, according to the U.S. Environmental Protection Agency, making it an inherently safe fuel. Strict safety standards make CNG vehicles as safe as gasoline-powered vehicles. In the event of a spill or accidental release, CNG poses no threat to land or water, as it is nontoxic. CNG also disperses rapidly, minimizing ignition risk when compared to gasoline. Natural gas is lighter than air and will not pool as a liquid or vapor. Nevertheless, indoor leaks can form a flammable mixture in the vicinity of an ignition source.

CNG is primarily methane, which is a greenhouse gas that could contribute to global climate change if leaked. Methane is slightly soluble in water and under certain anaerobic conditions does not biodegrade. If excess amounts accumulate, the gas can bubble in water creating a possible risk of fire or explosion.

One may be aware that Compressed Natural Gas is often confused with liquefied natural gas (LNG). While both are stored forms of natural gas, the key difference is that CNG is gas that is stored at high pressure, while LNG is stored at very low temperature, becoming liquid in the process. CNG has a lower cost of production and storage compared to LNG as it does not require an expensive cooling process and cryogenic tanks. CNG requires a much larger volume to store the same mass of gasoline or petrol and the use of very high pressures (3000 to 4000 psi, or 205 to 275 bars). As a consequence of this, LNG is often used for transporting natural gas over large distances, in ships, trains or pipelines, and the gas is then converted into CNG before distribution to the end user.

As gasoline and diesel prices increase, the need for a cleaner and less expensive alternative fuel becomes even more important. Today, there are many kinds of alternative fuels available to us. New technologies that will power the cars or industries of the future are being developed. However some of these technologies are still in its infancy and are not yet readily available. More and more people all over the world are also looking for an alternative fuel. And among the many options available, compressed natural gas or CNG appears to be the viable option. But the question that needs to be answered is whether CNG is indeed a better fuel and why. The advantages of CNG as I have discussed above say it all. May I remind the potential

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user that SEC is just around the corner in Kota Kinabalu? Have a nice day.