

LPG : friend or foe?
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by

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1. Ladies and Gentlemen, I thank you for giving me this opportunity to address you on this important, sensitive and timely issue of LPG as an alternative fuel for vehicles in Hong Kong. I am a university academic with actual, first hand practical experience with cars running on Liquefied petroleum gas LPG and Compressed Natural Gas (CNG)
2. In the 1980's, in my home country of New Zealand, I embraced a government-led, nation wide scheme to convert a significant percentage of the nations 1.5 million cars to either CNG or LPG.
3. This scheme born at a time of uncertain oil prices and growing environmental awareness. The government of the day facilitated low interest Bank loans to encourage ordinary people to convert their cars to alternative fuels. Many drivers embraced the scheme. A new industry was born with its associated infrastructural spin offs eg conversion courses at Polytechnics for mechanics, alternative fuel distribution systems ect.
4. I would now like to briefly consider some key questions people often ask about LPG in particular. I will keep Hong Kong in mind as the questions and answers unfold.
 - 4.1 Is LPG dangerous? There is little difference between petrol and LPG on the question of danger.
 - 4.2 Is LPG expensive as a fuel? Many factors influence the price of a key fuel such as petrol or LPG but in countries that have LPG available as an alternative fuel such as New Zealand, Japan, Thailand, Italy, LPG is typically cheaper than petrol. LPG is competitive!
 - 4.3 Is it expensive to convert? Today in Auckland (New Zealand) the typical conversion of a petrol car to LPG costs HK\$10,000. Prices vary depending on make, cc, type of LPG conversion kit (equipment) used.
 - 4.4 Is LPG a good fuel? Does an LPG car have less power than a petrol car? The % drop in power is a tiny 1-2% and is impossible to detect. Thus in Hong Kong a typical 1.5 to 2.0L car running on LPG would not be affected by a power loss, winter or summer. Clearly, LPG is a very good fuel. The % drop in power with GNG is greater and approximates 10-15%.
5. Should we target taxis for conversion to LPG?
 - 5.1 In my opinion the targets for conversion to alternative fuels should be urban cars and vans generally and not just taxis.

- 5.2 Petrol driven vehicles produce unseen dangerous gases eg carbon monoxide, nitrogen dioxide. Diesel taxis are obvious targets, but the issue of urban air pollution due to exhaust gases is much broader than taxis.
- 5.3 Converting existing diesel vehicles to LPG may not be as economically sound as starting afresh with a new taxi fleet running in LPG from the start.
- 5.4 In New Zealand diesel vehicles have been converted to CNG but with LPG available, I believe, in southern China this LPG option as a fuel for new taxis sounds much better.

CNG cylinders are heavy, requiring a much thicker and stronger metal container.

- 6. Some data on comparative emissions of Carbon monoxide (CO), Nitrogen oxides (eg NO₂) and hydrocarbon (HC) from gasoline and diesel engines in grams per km (g/km). The engines were operating in urban traffic.

Emission	Gasoline engine	Diesel engine
CO	73	17.8
HC	3.7	2.9
NO ₂	7.1	11.2

Source : Modified from Henry et al (1989)
Environmental Science and Engineering, Prentice Hall (p496).

Particulate matter (small particles) emissions associated with poorly maintained diesel vehicles are a huge concern; but this data highlights the unseen but undesirable waste gases – a product of both main fuel types currently used in Hong Kong.

- 7. How can we encourage Hong Kong people to embrace LPG in times of economic downturn?

A few famous people like movie stars could convert their cars to LPG and create a new fashion with huge environmental advantages.

- 8. Costing LPG and replacing diesel taxis and petrol cars with this fuel is worthy of a detailed cost-benefit analysis (CBA). A think big approach is required : a CBA of LPG may reveal a net saving to the people of Hong Kong in terms of :

- *medical
- *environmental health
- *quality of life
- *image and tourism
- *new industries (LPG kits made in HK)?
- *new infrastructure (conversion courses at Polytechnics) and other advantages.

I will stop here. Thank you all on the panels for this opportunity to speak. Onward!

Signed,
Dr. Gordon S. Maxwell


