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An Investigation into Designing a Derivative Vehicle Based on Liquid Natural Gas

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Introduction
There are growing concerns about global warming and growing carbon dioxide levels in atmosphere. Transportation produces about 20% of the total CO\textsubscript{2} emission.

This study proposes to investigate is the fuelling system for a derivative car based on a natural gas fuelling system.

Why Natural Gas?
Natural gas is an indigenous fuel that could replace crude oil. Natural gas (methane) has the lowest carbon to hydrogen ratio, and the potential to produce less CO\textsubscript{2} per kilometre of travel than any other carbon-based fossil fuel.

LNG vs. CNG
Liquid natural gas (LNG) has more than 2.4 times the energy density of compressed natural gas (CNG). This means that LNG vehicles can travel 2.4 times the distance of its CNG counterparts or that LNG powered vehicles need 2.4 times less fuel tank capacity than the CNG counterpart. LNG powered weigh less than CNG powered vehicles therefore can carry more payload.

Outcome
The study will combine the existent but mutually exclusive technologies of LNG and compressed natural gas CNG vehicles by designing a hybrid fuelling system to capitalise on the advantages of both types of fuel, namely the range for LNG vehicles and the easy availability of CNG conversion kits for petrol engines.

Global mean surface temperature

Global energy scenarios to 2050 and beyond
Source: World Energy Council

Cryogenic LNG storage tank

Contribution to total CO\textsubscript{2} emissions from fuel combustion
Source: United Nations Framework Convention on Climate Change

Energy Industries 30.1%
Transport 19.4%
Commercial 12.1%
Other 0.5%
Industry 16.6%

Why Natural Gas?

Global Temperatures
Global mean surface temperature

LNG fuel station

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