University of Huddersfield Repository

Mansoor, Shahid

An Investigation into Designing a Derivative Vehicle

Original Citation


This version is available at http://eprints.hud.ac.uk/5212/

The University Repository is a digital collection of the research output of the University, available on Open Access. Copyright and Moral Rights for the items on this site are retained by the individual author and/or other copyright owners. Users may access full items free of charge; copies of full text items generally can be reproduced, displayed or performed and given to third parties in any format or medium for personal research or study, educational or not-for-profit purposes without prior permission or charge, provided:

- The authors, title and full bibliographic details is credited in any copy;
- A hyperlink and/or URL is included for the original metadata page; and
- The content is not changed in any way.

For more information, including our policy and submission procedure, please contact the Repository Team at: E.mailbox@hud.ac.uk.

http://eprints.hud.ac.uk/
An Investigation into Designing a Derivative Vehicle Based on Liquid Natural Gas

Researcher: Shahid Mansoor
Supervisors: John Fieldhouse, Rakesh Mishra

Introduction
There are growing concerns about global warming and growing carbon dioxide levels in atmosphere. Transportation produces about 20% of the total CO₂ 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 CO₂ 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.

Why Natural Gas?
Global mean surface temperature

LNG fuel station

Cryogenic LNG storage tank

Contribution to total CO₂ emissions from fuel combustion
Source: United Nations Framework Convention on Climate Change

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