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Review article

Evaluating sustainability of using natural gas as a major transport fuel in Australia: A life cycle assessment approach

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ABSTRACT

For reasons of sustainability, greenhouse gas emissions, and energy security, it becomes necessary to properly evaluate all of Australia's options for powering its transportation fleet. When doing this it is equally important to understand all the costs (economic, social, and environmental) and emissions during the fuel extraction, refining and distribution stages as well as the final combustion stage. All steps in the full pathway contribute to the final economic and environmental profile of any given fuel. The natural gas (NG) family of fuels has to be seriously considered as providing for large-scale transportation. From a combustion point of view, NG derivatives have a lower carbon-to-hydrogen ratio than oil-based fuels and should therefore be cleaner, but the upstream emissions of the fuels need to be properly understood. The supply pathways of gaseous fuels are more diverse than the oil-based fuels pathways, because the sources of gas are varied and can imply substantially different emissions profiles. It is therefore important to understand these various pathways so that the profiles for each can be documented and policy formulated accordingly. This preliminary study is conducted based on a life cycle assessment (LCA) approach to evaluate potential sustainability of using gaseous fuels (ONG/LNG) for light commercial and passenger vehicles in Australia taking into account information on the production, distribution and use of gaseous fuel. Data for this study are mostly sourced from published literature. The results of the study reveal a significant opportunity for Australia to increase sustainability of the transport fleet if it takes gaseous fuels on as major source for transport vehicles.

Keywords: Transport, Sustainability, Gaseous fuel, Life-cycle approach

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Natural Gas In Developing Countries Evaluating The Benefits To The Environment

Annelies Wilder-Smith



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Table of Contents Natural Gas In Developing Countries Evaluating The Benefits To The Environment

1. Understanding the eBook Natural Gas In Developing Countries Evaluating The Benefits To The Environment
 - The Rise of Digital Reading Natural Gas In Developing Countries Evaluating The Benefits To The Environment
 - Advantages of eBooks Over Traditional Books
2. Identifying Natural Gas In Developing Countries Evaluating The Benefits To The Environment
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Natural Gas In Developing Countries Evaluating The Benefits To The Environment
 - User-Friendly Interface
4. Exploring eBook Recommendations from Natural Gas In Developing Countries Evaluating The Benefits To The Environment
 - Personalized Recommendations
 - Natural Gas In Developing Countries Evaluating The Benefits To The Environment User Reviews and Ratings
 - Natural Gas In Developing Countries Evaluating The Benefits To The Environment and Bestseller Lists
5. Accessing Natural Gas In Developing Countries Evaluating The Benefits To The Environment Free and Paid eBooks
 - Natural Gas In Developing Countries Evaluating The Benefits To The Environment Public Domain eBooks
 - Natural Gas In Developing Countries Evaluating The Benefits To The Environment eBook Subscription Services
 - Natural Gas In Developing Countries Evaluating The Benefits To The Environment Budget-Friendly Options

6. Navigating Natural Gas In Developing Countries Evaluating The Benefits To The Environment eBook Formats
 - ePub, PDF, MOBI, and More
 - Natural Gas In Developing Countries Evaluating The Benefits To The Environment Compatibility with Devices
 - Natural Gas In Developing Countries Evaluating The Benefits To The Environment Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Natural Gas In Developing Countries Evaluating The Benefits To The Environment
 - Highlighting and Note-Taking Natural Gas In Developing Countries Evaluating The Benefits To The Environment
 - Interactive Elements Natural Gas In Developing Countries Evaluating The Benefits To The Environment
8. Staying Engaged with Natural Gas In Developing Countries Evaluating The Benefits To The Environment
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Natural Gas In Developing Countries Evaluating The Benefits To The Environment
9. Balancing eBooks and Physical Books Natural Gas In Developing Countries Evaluating The Benefits To The Environment
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Natural Gas In Developing Countries Evaluating The Benefits To The Environment
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Natural Gas In Developing Countries Evaluating The Benefits To The Environment
 - Setting Reading Goals Natural Gas In Developing Countries Evaluating The Benefits To The Environment
 - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Natural Gas In Developing Countries Evaluating The Benefits To The Environment
 - Fact-Checking eBook Content of Natural Gas In Developing Countries Evaluating The Benefits To The Environment
 - Distinguishing Credible Sources

13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

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