

## Automotive LPG and Natural Gas Engines

### Highlights

- 1. **Process and Technology Status** – Internal combustion engines running on liquid petroleum gas (LPG) and alternative technologies that use either the gasoline-powered spark-ignition engine (gasoline engine) or diesel engine are well understood. They are typically used as base engines for industrial (gas-fired) and cars, but have also been used for aviation, in compressed-air-gasoline (or diesel) engines, and for heavy-duty vehicles. Both LPG and NG are not used alone, but instead in either vehicles in combination with gasoline, or further vehicles that use and adjust to separate fuels and the engine runs on one fuel at a time. Efficient vehicles have the capability to switch back and forth from gasoline to the other fuel, usually in automatically. In the past most in-fuel vehicles were derived from fuel gas lines changed by adding a tank and an electronic injection regulation system for the alternative fuel. In recent years, the offer of better in-fuel vehicles has increased. They have two separate tanks and use alternative injection/regulation programs.
- 2. **Performance and Costs** – In-fuel LPG and dual-fuel natural gas-powered gas (NG) engines are 10% as compared to petrol-powered. They use a high octane (90-100) combination of up to 20% LPG. The energy efficiency of engines running on natural gas is generally equal to that of gasoline engines, but a class of engines with modern diesel engines. The conversion costs for LPG vehicles range from \$1,100 to \$2,000 (to 10% conversion cost). The conversion costs for light-duty NG vehicles are generally between \$1,500 and \$2,500 (to 10% conversion cost). Heavy-duty and LPG or NG, 2000 vehicles are at least 10% or 20% more, respectively, if compared to gasoline. Better vehicles derived on their own of mileage per gallon.
- 3. **Production and Markets** – In 2009, more than 17 million natural gas (NG) vehicles were on the roads, most notably in Argentina, Brazil, Thailand, Italy, India, China, and Iran, with South Korea leading the global market with a 30% share. The number of LPG-fueled cars sold globally is estimated to reach 500 million by 2020. An extensive infrastructure along with governmental support, that accelerates the growth of LPG and NG as green alternatives to petroleum that now, stands the government and investment of LPG and NG technologies and the lack of economic infrastructure for fuel distribution and refueling, the higher vehicle cost, and the competition from alternative options (e.g. hybrids).

**Technology Status and Performance** – Internal combustion engines running on liquid petroleum gas (LPG) and natural gas are well-understood technologies and use both the gasoline-powered spark-ignition engine (SI) and diesel engine (DE). They are typically used as base engines for industrial (gas-fired) and cars, but have also been used for aviation, in compressed-air-gasoline (or diesel) engines for heavy-duty vehicles. Both LPG and NG are not used alone, but instead in either vehicles, in combination with gasoline, or in-fuel vehicles that use and adjust to separate fuels and the engine runs on one fuel at a time. Efficient vehicles have the capability to switch back and forth from gasoline to the other fuel, usually automatically. In the past most in-fuel vehicles were derived from fuel gas lines changed by adding a tank and an electronic injection regulation system for the alternative fuel. In recent years the availability of better in-fuel vehicles has increased. They have two separate tanks and use alternative injection/regulation programs.

**LPG Vehicles** that use the gasoline-powered vehicles with spark-ignited engines. LPG is stored as a liquid in a separate tank or compressed vessel at the pressure of 10 bar, although it can stand a pressure of

20-30 bar. LPG enters to the engine is controlled by a regulator or injection valve inserts the LPG to a burner. The burner is fed by a meter located near the valve manifold, where it is reduced and mixed with filtered air before being drawn into the combustion chamber where it is burned to produce power, just like gasoline. LPG injection engines developed over the past 10 years, do not require the LPG tank, the LPG is injected into the combustion chamber in liquid form. These systems have proven to be superior in terms of power, engine durability, and cold-starting.

In the 1970s Toyota made a number of LPG-fueled engines for use. Today, most LPG vehicles are conversions that retrofit existing. Many car makers offer conversion-ready vehicles. LPG technology is rather popular in the European Union, Australia, Hong Kong, India, South Korea, Serbia, the Philippines, Turkey and Armenia. The most rapid is probably Armenia where about 20-30% of vehicles run on LPG, which offers a cheap alternative to diesel and petrol. LPG engines and fueling systems are also available for medium- and heavy-duty vehicles such as school buses and other transport. For example, the school district in Dallas, Drexler, Texas, Poland and Chengde rely on LPG. (Mechanical link: 00)

<sup>1</sup> Under Northstar vehicles (Volvo), that use the two different fuels mixed together in the same tank, and the switching device is located in the intake combustion chamber.

# Automotive Lpg And Natural Gas Engines Iea

**Hongsheng Guo,Hailin Li,Lino  
Guzzella,Masahiro Shioji**



## **Automotive Lpg And Natural Gas Engines Iea:**

**Renewable Fuels for Sustainable Mobility** Pravesh Chandra Shukla,Giacomo Belgiorno,Gabriele Di Blasio,Avinash Kumar Agarwal,2023-05-06 This volume discusses the use of renewable fuels for clean transportation and its applications on internal combustion engines The contents focus on the key aspects of fuel production processes and its impact on various segments of the transportation sector and for sustainable mobility Several kinds of fuels are assessed such as biofuels alcohols and hydrogen and their effects on the combustion process are characterized by application This volume will be of use to those working in academia and industry as well as energy experts and policy makers *Advances in Compression Ignition Natural Gas - Diesel Dual Fuel Engines* Hongsheng Guo,Hailin Li,Lino Guzzella,Masahiro Shioji,2021-03-23

**Automotive Fuels for the Future** International Energy Agency Implementing Agreement on Advanced Motor Fuels. Automotive Fuels Information Service,1999 Which alternative motor fuels will be in common use tomorrow Which criteria should be used to assess them No simple answers exist Complex trade offs are involved in the decision making process But the most important ingredient for making informed choices is sound information produced by a transparent methodology Automotive Fuels for the Future offers a digest of basic data on the critical fuel choices for the future It is a well balanced compendium of concise technical information as well as an overview of the essential issues in deciding among alternative fuels Fuels such as natural gas LPG or alcohols and biodiesel derived from different feedstocks are considered over the entire cycle from production to use They are analysed in terms of environmental effects safety availability and cost Their weaknesses and strengths are judged against the yardsticks of established gasoline and diesel technologies This publication from IEA AFIS the information service of the IEA Implementing Agreement on Advanced Motor Fuels makes this information accessible to the general reader **The IEA Natural Gas Security Study** International Energy Agency,Organisation for Economic Co-operation and Development,1995 *Can Cars Come Clean? Strategies for Low-Emission Vehicles* OECD,2004-03-10 This report identifies policy options and makes recommendations on market oriented actions to promote the purchase of the most environmentally friendly vehicles [The Replacement of Petroleum-based Fuels by Alternative Sources of Energy](#) Australia. Parliament. Senate. Standing Committee on National Resources,1980 *Annual Energy Outlook 2009 With Projections to 2030* ,2009-05-08 AEO 2009 The Annual Energy Outlook 2009 presents projections and analysis of US energy supply demand and prices through 2030 The projections are based on results from the Energy Information Administration s National Energy Modeling System The AEO2009 includes the reference case additional cases examining energy markets and complete documentation *Energy Policies and Programmes of IEA Countries: Review* International Energy Agency,1993 [2nd International Symposium on Fuels and Lubricants \(Vol II\)](#) S. P. Srivastava,2000 [Energy Research, Development and Demonstration in the IEA Countries](#) International Energy Agency,1982 *Asian Natural Gas* Donald L. Klass,Hirofumi Kataoka,Kozo Ueda,1993 **Renewable Energy Sources and Climate Change**

**Mitigation** Ottmar Edenhofer, Ramón Pichs-Madruga, Youba Sokona, Kristin Seyboth, Susanne Kadner, Timm Zwickel, Patrick Eickemeier, Gerrit Hansen, Steffen Schlömer, Christoph von Stechow, Patrick Matschoss, 2011-11-21 This Intergovernmental Panel on Climate Change Special Report IPCC SRREN assesses the potential role of renewable energy in the mitigation of climate change It covers the six most important renewable energy sources bioenergy solar geothermal hydropower ocean and wind energy as well as their integration into present and future energy systems It considers the environmental and social consequences associated with the deployment of these technologies and presents strategies to overcome technical as well as non technical obstacles to their application and diffusion SRREN brings a broad spectrum of technology specific experts together with scientists studying energy systems as a whole Prepared following strict IPCC procedures it presents an impartial assessment of the current state of knowledge it is policy relevant but not policy prescriptive SRREN is an invaluable assessment of the potential role of renewable energy for the mitigation of climate change for policymakers the private sector and academic researchers

*Machine and Industrial Design in Mechanical Engineering* Milan Rackov, Aleksandar Miltenović, Milan Banić, 2025-01-01 This book gathers the latest advances innovations and applications in the field of machine science and mechanical engineering as presented by international researchers and engineers at the 12th International Conference on Machine and Industrial Design in Mechanical Engineering KOD held in Balatonfüred Hungary on May 23 26 2024 It covers topics such as mechanical and graphical engineering industrial design and shaping product development and management complexity and system design The contributions which were selected by means of a rigorous international peer review process highlight numerous exciting ideas that will spur novel research directions and foster multidisciplinary collaborations

**Asian Energy Markets** Emirates Center for Strategic Studies & Research, 2004-12-24 With the Arab Gulf States supplying the major proportion to Asian energy needs Gulf Asia links will emerge as a key factor in the global energy scenario What are the economic and strategic implications of Asia s growing dependence on Gulf oil How far can Asian countries counter such dependence by improving energy efficiency and developing new sources What are the energy transitions that Asian nations are undergoing This book seeks to address these questions and other issues relating to the Asian energy sector including supply security consumption trends privatization moves energy diversification energy self sufficiency and foreign investment

**Euro Abstracts** ,2002 *Emissions of Greenhouse Gases from the Use of Transportation Fuels and Electricity* M. A. DeLuchi, 1991 This report presents estimates of full fuel cycle emissions of greenhouse gases from using transportation fuels and electricity The data cover emissions of carbon dioxide CO2 methane carbon monoxide nitrous oxide nitrogen oxides and nonmethane organic compounds resulting from the end use of fuels compression or liquefaction of gaseous transportation fuels fuel distribution fuel production feedstock transport feedstock recovery manufacture of motor vehicles maintenance of transportation systems manufacture of materials used in major energy facilities and changes in land use that result from using biomass derived fuels The results for electricity use are in

grams of CO<sub>2</sub> equivalent emissions per kilowatt hour of electricity delivered to end users and cover generating plants powered by coal oil natural gas methanol biomass and nuclear energy The transportation analysis compares CO<sub>2</sub> equivalent emissions in grams per mile from base case gasoline and diesel fuel cycles with emissions from these alternative fuel cycles methanol from coal natural gas or wood compressed or liquefied natural gas synthetic natural gas from wood ethanol from corn or wood liquefied petroleum gas from oil or natural gas hydrogen from nuclear or solar power electricity from coal uranium oil natural gas biomass o\_ solar energy used in battery powered electric vehicles and hydrogen and methanol used in fuel cell vehicles

Energy Policies and Programmes of IEA Countries International Energy Agency, 1979

**Sustainable Automobile Transport** Lisa B. Ryan, Hal Turton, 2007 Transport and in particular road transport represents a significant global threat to long term sustainable development and is one of the fastest growing consumers of final energy and sources of greenhouse gas emissions In this book long term energy economy environment scenarios are used to identify the key technological developments required to address the challenges passenger car transport poses to climate change mitigation and energy security It also considers possible targets for policy support and examines some of the elements that contribute to the significant levels of uncertainty particularly social and political conditions The book then builds on this long term scenario analysis with a broad review of recent empirical examples of relevant policy implementation to identify near term options for the passenger transportation sector which may promote a shift towards a more sustainable transport system over the longer term Sustainable Automobile Transport will be of particular interest to those in the policy process who are striving to address the automobile derived challenges associated with climate change a growing rather than declining problem It will have a worldwide audience as every developed and rapidly growing society struggles to address the dynamic growth in greenhouse gas emissions from automobiles

**Alternative Fuels in Australian Transport**, 1994

**Climate Change 2001: Mitigation** Bert Metz, 2001-07-12 Climate Change 2001 Mitigation is the most comprehensive and up to date scientific technical and economic assessment of options to mitigate climate change and their costs The report Makes clear there are strong inter linkages between climate change policy and policies towards sustainable development Assesses information on technological options to reduce greenhouse gas emissions or enhance their sinks Analyses technologies and practices available to achieve the targets of the Kyoto Protocol and stabilise atmospheric concentrations of greenhouse gases Evaluates barriers impeding implementation of these options and methods available to overcome them Summarises the economic literature on costs of climate change mitigation at global regional and national levels Evaluates the other benefits that climate policy can deliver or the climate benefits of other socio economic policies Assesses how this information can be used to support climate policy decision making acknowledging various decision making frameworks This latest IPCC assessment will again form the standard scientific reference for all concerned with climate change and who want to be informed of ways to address this important global problem including students and researchers in environmental and

social sciences and policymakers and analysts in governmental and non governmental organisations and the private sector  
world wide

## Unveiling the Magic of Words: A Review of "**Automotive Lpg And Natural Gas Engines Iea**"

In a world defined by information and interconnectivity, the enchanting power of words has acquired unparalleled significance. Their capability to kindle emotions, provoke contemplation, and ignite transformative change is truly awe-inspiring. Enter the realm of "**Automotive Lpg And Natural Gas Engines Iea**," a mesmerizing literary masterpiece penned by a distinguished author, guiding readers on a profound journey to unravel the secrets and potential hidden within every word. In this critique, we shall delve to the book is central themes, examine its distinctive writing style, and assess its profound impact on the souls of its readers.

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