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AUTO RICKSHAW OWNERS USING LPG ENERGY IN VALLAM, THANJAVUR DISTRICT- A CASE STUDY

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ABSTRACT

At the present time biofuels are liquid or gaseous fuels produced from biomass resources and used in place of, or in addition to, diesel, petrol or other fossil fuels for transport, stationary, portable and other applications. Biomass' resources are the biodegradable fraction of products, wastes and residues from agriculture, forestry and related industries as well as the biodegradable fraction of industrial and municipal wastes.

Ministry of New and Renewable Energy cited in their National Policy on biofuels the Goal of the Policy is to ensure that a minimum level of biofuels become readily available in the market to meet the demand at any given time. An indicative target of 20% blending of biofuels, both for bio -diesel and bio-ethanol, by 2017 is proposed. Blending levels prescribed in regard to bio-diesel are intended to be recommendatory in the near term. The blending level of bio - ethanol has already been made mandatory, effective from October, 2008, and will continue to be mandatory leading up to the indicative target.

This study reveals that biofuel particularly in LPG provides social, economical enhancement to the people, especially in auto rickshaw and their owners. The specific aim of this study is to understand the pre and post level of living standards of LPG users. The study mainly focused on LPG energy users' socio economic status and to find out its influence on the livelihood of auto rickshaw owners in Vallam, Thanjavur District. The researcher has adopted qualitative method by using Case study to collect the details from the respondents and to assess the socio economic statuses. The study reveals that the level of awareness and socio economic statuses of the respondents has greater influence on adoption of bio energy methods particularly in LPG. The information was collected using self prepared questionnaire. The influence of the LPG system in the living standards of the users been discussed in the full paper.

Keywords: LPG, Living standards, Bio Energy.

INTRODUCTION

Bio energy is one of the renewable energy source that has been used as a alternative source of energy for transport fuel supply today. In particular to the road sector, it is dominated by oil, which has proven reserves that are expected to last around five decades. The combustion of mineral oil derived fuels gives rise to CO₂ emissions and, despite the fact the fuel efficiency of new vehicles has been improving, so that these emit significantly less CO₂. The total CO₂ emissions from transport have increased the decarbonisation of transport and the substitution of oil as transport fuel. Improvement of transport efficiency and management of transport volumes are necessary to support the reduction of CO₂ emissions while fossil fuels still dominate, and to enable finite renewable resources to meet the full energy demand from transport in the long term.

In India, LPG has been officially recognized as an auto fuel in 2002 after amendment of all relevant Acts/Rules by the Central and State governments. Use of LPG as automotive fuel is an age-old practice in various countries.

Central Pollution Control Board, Ministry of Environment & Forests, Govt. of India, mentioned in their report on status of the vehicular pollution control programme in India (2010). The 2005 *WHO Air quality guidelines* (AQGs) of World Health Organization (WHO) are designed to offer global guidance on reducing the health impacts of air pollution. The guidelines first produced in 1987 and updated in 1997 had a European scope. The new (2005) guidelines apply worldwide and are based on expert evaluation of current scientific evidence. They recommend revised limits for the concentration of selected air pollutants: particulate matter (PM), ozone (O₃), nitrogen dioxide (NO₂) and sulfur dioxide (SO₂), applicable across all WHO regions

Global Emissions of GHG's from Transport Sector

Transport sector contributes around 14% towards the global emissions of green house gases. Carbon dioxide represents the largest proportion of basket of greenhouse gas emissions. During, the past three decades, carbon dioxide emissions from transport have increased faster than those from all other sectors and are projected to increase more rapidly in future. The Road transport alone emits around 16% of the global CO₂ emissions (Source: OICA). From 1990 to 2004, carbon dioxide emissions from the world's transport sector have increased by 36.5%. For the same period, road transport emissions have increased by 29% in industrialized countries and 61% in the other countries (IEA, 2006).

Athena Infonomics India Pvt. Ltd., noted in their study report in 2012. An economy's development would be reflected in its consumption of energy. Growth in developing economies, for instance, would be indicated to a large extent by the utilization of industrial energy. India is an illustration of one such developing economy. In order to be able to sustain a growth rate of roughly 9 % and to accommodate some elasticity, one would require the supply of energy to increase at approximately 6.5 % a year. This ability to meet our demands would in turn rest on our capacity to expand Indian production in critical sub sectors of energy. These sub sectors would include mostly petroleum and coal and also face a challenge of meeting the deficits through imports.

The pattern of energy demand would be needed to satisfy the projected growth rate of the country. The import requirements associated with the above energy projections are also shown in the table below. It is worth noting that dependence on imported oil is expected to increase from 76% in 2010-11 to 80% by the end of the Twelfth Plan. Import dependence on natural gas is projected to increase from 19% in 2010-11 to 28.4% in 2016-17. In the case of coal, it will increase from 19.8% in 2010-11 to about 22.1% in 2016-17.

Organizations across the globe, including governments, are making strides towards reducing their dependence on oil. Countries in Europe and America are giving financial incentives to companies to develop technologies that can harness alternate sources of energy. In this context, biogas is of significant relevance. The advantages of adopting biogas on a large scale are abundant. An obvious advantage would be the reduction in dependence on non renewable sources of energy such as coal and petroleum. In addition to enhancing the energy utilization process, there are certain other aspects which have characteristic advantages of incorporating biogas into our energy map.

Biogas and Advantages

Reliability Biogas not only is a renewable energy source but is also a reliable fuel. Unlike other renewable energy sources such as wind or solar energy, biogas production is relatively unaffected by the weather conditions. **Versatility** Biomass is the only renewable energy source that is suitable for generating heat, power, gas and liquid fuels as well. The energy obtained from biogas is not only environmental friendly, but also is incredibly versatile. E.g. the waste heat that is a by-product from biogas generation process can be used to heat greenhouses or even for cooling. In particular, usage of biogas as an automobile fuel and as an injection into the existing natural gas grids will increase significantly in the coming years.

Environmental Compatibility Combustion of biogas does not produce any additional carbon dioxide (CO₂), unlike the combustion of fossil fuels. The CO₂ emission that originates from the use of biogas matches the amount that plants need to grow and produce the renewable resources. In this way no additional carbon dioxide is being produced, which otherwise is considered to be harmful to the environment. **Production Process and By-products** The production of biogas results in high-quality fertilizer as by products. Nitrate, phosphor and potassium remain nearly untouched during the biological process. Almost half of Nitrate by-product is ammonium, which plants absorb fast and easily. The other part is organic nitrate, an ideal long term fertilizer for crop plants.

Avenue for safe disposal of bio-waste

Biogas is produced from renewable resources, agricultural residues and certain industrial effluents or even waste. Normally these wastes deteriorate the environmental quality of the region where they are produced. The collection and energy exploitation of these materials through anaerobic digestion, not only provides significant amounts of green energy to the grid, but also mitigates the pollution effects on the local ecosystems.

Liquefied Petroleum Gas (LPG)

LPG is a mixture of commercial butane and commercial propane having both saturated and unsaturated hydrocarbons. LPG marketed in India shall be governed by Indian Standard Code IS-4576 and the test methods by IS-1448.

Advantages of Auto LPG:

- 1 ALPG is most economical fuel for petrol vehicles. At current prices, there is a saving of about 40% when compared to petrol. □
- 2 ALPG meets BIS standard IS: 14861 which have Octane Number of 88 (minimum).
- 3 ALPG fitment in vehicles is safe. □
- 4 Less pollution, Smooth running and easy drivability. □
- 5 Availability in major cities and towns.

Biofuels could technically substitute oil in all transport modes, with existing power train technologies and existing re-fuelling infrastructures. Use of biomass resources can also decarbonise synthetic fuels, methane and

LPG. First generation biofuels are based on traditional crops, animal fats, used cooking oils. They include FAME biodiesel, bio ethanol, and biomethane. Advanced and second generation biofuels are produced from lignocellulosic feedstock and wastes. They include bio ethanol, HVO, higher alcohols, DME, BTL and biomethane. The production of biofuels from both food and energy crops is limited by the availability of land, water, energy and co-product yields, and sustainability considerations, such as the life-time accountancy of CO₂ emissions. Second generation biofuels from wastes and residues are also limited by the availability of these materials. The development of feedstock potential and of optimised production processes is of the highest priority. A supportive policy framework at the EU level and harmonised standards for biofuels across the EU are key elements for the future uptake of sustainable biofuels.

LPG (Liquefied Petroleum Gas) is a by-product of the hydrocarbon fuel chain, currently resulting from oil and natural gas, in future possibly also from biomass. LPG is currently the most widely used alternative fuel in India for transportation and cooking in households purposes. Transport has been the sector most resilient to efforts to reduce CO₂ emissions due to its strong dependence on fossil energy sources and its steady growth, offsetting the considerable vehicle efficiency gains made. Energy efficiency, transport efficiency, and effective transport demand management, can substantially contribute to reduce emissions.

Methane can be sourced from fossil natural gas or from biomass and wastes as biomethane. Biomethane should preferentially be fed into the general gas grid. Methane powered vehicles should then be fed from a single grid. Additional refueling infrastructure has to be built up to ensure widespread supply. Propulsion uses internal combustion engines similar to those for liquid hydrocarbon fuels. Methane in compressed gaseous form (CNG) is an unlikely option where high energy density is required. Liquefied methane gas (LNG) could be a possible option in these cases.

The report of the European Expert Group on Future (2011) mentioned that transport has been the sector most resilient to efforts to reduce CO₂ emissions due to its strong dependence on fossil energy sources and its steady growth, offsetting the considerable vehicle efficiency gains made. Energy efficiency, transport efficiency, and effective transport demand management, can substantially contribute to reduce emissions. But the ultimate solution to near full decarbonisation of transport is the substitution of fossil sources by CO₂-neutral alternative fuels for transport. Oil, the main energy source for transport overall, supplying nearly 100% of road transport fuels, is currently expected to reach depletion on the 2050 perspective. Substitution of oil therefore needs to start as soon as possible and increase rapidly to compensate for declining oil production, expected to reach a peak

within this decade. Climate protection and security of energy supply therefore both lead to the requirement of building up an oil-free and largely CO₂-free energy supply to transport on the time horizon of 2050. Increased energy efficiency is not an alternative to oil substitution but a bridge to alternative fuels. More efficient use of energy in transport stretches the potential for supply from finite oil reserves, contributes to curbing greenhouse gas emissions from the combustion of fossils, and facilitates full substitution by alternative fuels, which will be production limited rather than reserve limited, as fossil resources. Therefore, a consistent long-term strategy should aim at fully meeting the energy demand of the transport sector from sustainable and secure largely CO₂-neutral sources by 2050. Decarbonising transport is a core theme of the EU 2020 strategy.

Classification of Alternative fuel options for substituting oil as energy source for propulsion in transport are:

- Electricity/hydrogen, and biofuels (liquids) as the main options
- Synthetic fuels as a technology bridge from fossil to biomass based fuels
- Methane (natural gas and bio methane) as complementary fuels
- LPG as supplement

METHODOLOGY

The respondents were the auto rickshaw owners using Liquefied Petroleum Gas (LPG) energy. The respondents of the auto rickshaw owners using LPG energy were collected from one of the selected vallam village. The case study method has been adopted to collect the data and the respondents were from vallam village panchayat of Thanjavur district, Tamilnadu.

CASE INTRODUCTION

The case study method has been adopted and three cases were selected whereas, the auto rickshaw owners using LPG energy were approved by Regional Transport Office, Government of Tamilnadu for the commercial purpose in the autos and are residing in the selected vallam village, situated around 9 km away from Thanjavur City Corporation.

Case study 1:

Dhamodharan (52) is an auto driver with 25 years of experience in driving auto also a owner lives in Vallam village. He lives with his wife and has two children. He everyday goes to his auto stand and to have a

regular earnings with his auto. He has been using LPG gas kit past seven years with the Regional Transport Office approved amount Rs.38000 in the year 2008. He could not spend money for diesel many years. This made him to approaches the dealer for LPG gas kit. He said that now he saves money merely Rs.20000 per month sufficiently. He expressed that *'LPG improves his economic improves my standard of living'*. He opined that significance of renewable energy has to be insisted to be educated in the educational institutions. He said that LPG kit bio energy is a sustainable energy for the future Transportation energy needs. He strongly agrees that the LPG is easy to adopt while utilizing bio energy which in turn contributes in mitigation of green house gases.

Case study 2:

Thiruselvam (46) is a contract auto driver lives in Vallam. His wife is a flouriest in vallam flower market and they have two boy and one girl children. Every day he takes the regular customers, school children trips as per the schedule, rest of the time he covers other public trip. He has bought a new auto endorsed with LPG energy with the help of bank loan sum of amount Rs.250000 for an auto and Rs.38000 for LPG provided by State Bank of India. He said LPG energy is a major contributor in climate change mitigation. Bio energy is environment friendly energy source. He always shares his experience about LPG energy and other renewable energy to the known drivers and friends. He expressed that LPG energy contributes in empowering the economical enhancement and it also ensure low expenditure for fuel merely Rs.10000 per month. He expressed that *'I'm feel free in financial dependency from money lenders for fuel expenses in my business'*. He said that LPG energy is a new way of employment opportunity. He expressed that LPG energy always ensures good mileage and pollution free for the environment.

Case study 3:

Swaminathan (37) years old auto driver cum owner having one auto. He lives with his wife and 2 boy children. He have been own interest in using LPG gas kit in his auto. The LPG gas kit has 35,000 of cost with registration. When he was depending on the diesel or petrol to full his auto. He use to spend Rs.25, 000 for every two month. He strongly believed that LPG gas kit is the majorly contributor for his fuel needs. Now he realise that less consumption of diesel saves his money approximately **Rs.15,000** after implementing the LPG kit bio at while this LPG energy acts in climate change mitigation and also agreed that LPG bio energy is an environment friendly energy source. Every time he updated about other renewable energy through daily newspapers and television media. He also insisted that importance of renewable energy has to be included as a subject in the existing educational systems. He expressed that he is willing to share his experience to others in implementing

LPG kit bio energy. He said *“future source of energy is only Bio energy”* and bio energy contributes in mitigation of green house gases. It is recorded that when bio energy is utilized properly this LPG unit can be a sustainable model. Renewable energy scheme are the emerging models for economic development and generates employment opportunity. He said *“I never wait for bunks after installing LPG”* and *LPG energy is one of the unique scheme to fulfill our energy needs to our households with ease to handle its technologies.*

RESULTS AND DISCUSSIONS

The respondent reveals that LPG energy is one of the useful and essential energy for transportation in their daily lives. All the respondents are using LPG energy to their energy needs. The researcher observed the level of awareness in LPG energy, socio economic statuses and climate change and mitigation strategies. All the respondents said that LPG energy ensures in savings and enhancement of economic conditions. All the respondents said that LPG energy has creates employment opportunity. All the three respondents said that LPG energy could protect our existing fossil fuels. This study confirms that LPG energy taken place major role in contributing climate change mitigation. This study finds that LPG energy does not contribute any harmful emissions to the environment. Researcher found that all the respondents agreed that LPG energy is easy to handle and user friendly. All the respondents also agreed that LPG bio energy is an alternative source of energy. They all strongly stated that creating awareness regarding bio energy to the states and introduce about the bio energy studies in educational institutions. The researcher found out that the respondents were more aware about the fact that LPG bio energy is one of the major contributors of reduction Green House Gases. The case study has revealed that all the respondents strongly agreed that bio energy technology is safe and hazards free and can be adopted without any hitches leading to climate change mitigation strategies.

CONCLUSION

To conclude, the research demonstrates that LPG energy contributes in money savings that have create economic development. This study found out LPG energy has improvement in living standards. This study reveals that the LPG energy is also takes place major role in climate change mitigation. The climate change has no shortcuts and LPG energy brings solution to reduce the carbon emissions. This study reveals that the LPG energy will have been creating employment opportunity. This study revels LPG energy is a sustainable energy source contributes in less emission of green house gases. The study reveals that bio energy, solar energy, wind energy are similar source of energy obtained from nature. The study expressed that every human has to protect environment and our responsibility by promoting renewable energy.

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