Technology Fact Sheet

Liquefied Natural Gas in trucks and cars[i] /http://climatetechwiki.org/technology/lng/

General Description

The use of Liquefied Natural Gas (LNG) in transport is a suitable option to power, large long distance trucks in areas where gas is transported as LNG because there are indigenous gas supplies and no gas network. The use of LNG in passenger cars is far less viable because on average passenger cars stand idle more often, which would give rise to high evaporative losses. The use of LNG requires storage facilities for the cold (-162 ^{0}C) liquid natural gas at the roadside refueling stations and special fuelling equipment which can handle cryogenic temperatures. In addition, the trucks must be equipped with special dual fuel engines to be able to use LNG. Moreover, the fuel tank on board of the truck needs to be adapted for LNG usage. These requirements make the use of LNG relatively expensive. Nevertheless, the use of LNG in the transport sector can still have substantial environmental benefits. It has been stated that a truck powered by a dual fuel LNG-diesel engine can emit up to 75% lower NO_x emissions and about 13% lower Well-To-Wheel CO_2 emissions compared to diesel powered trucks. Overall, the technology to use LNG as a transport fuel is well developed.

Implementation

Implementation of this technology will require construction of 24 filling stations countrywide and purchasing the same number of special trucks for LNG transportation.

Implementation barriers

- lack of required infrastructure;
- lack of investments.

GHG emissions reduction (megatons CO2 equivalent) – 85.5 thousand tons CO_2 in 2030.

Impact on development priorities:

a) social

- create jobs;
- decrease health risks.

b) economic

- decrease for goods shipping costs.

c) environmental

- air quality improvement.

d) other

Investments

A 2006 study estimates that natural gas can be economically produced and delivered as LNG in a price range of about $2.5-$4.6 per Giga Joule, (Centre for Energy Economics, 2006). The financial benefits of LNG over CNG (compressed natural gas) are mainly lower transportation costs, which makes the LNG technology efficient only in countries with large areas and lack of natural gas network: transportation of CNG / LNG at 100 km - 4.7 / 0.6 $ / GJ, at 400 km - 18.3 / 2.3 $ / GJ.

In most cases the LNG is re-gasified in the port and transported further inland via pipelines. However, when the LNG is to be used directly in trucks, it has to be transported via special LNG trailers to the inland refueling sites. According to research in the field, it has been stated that investment costs for infrastructure with a capacity of 2.4 TWh / year (Petterson, 2006) are: production - 1.8 $ / GJ, transportation in special trailers - 0.045 $ / GJ or 385 000 $ / trailer, fuelling station - $ 0.063 / station or 530 000 $ / station. Taking into account the size of the Republic of Moldova, it is estimated that by 2030 energy consumption for goods transportation will be cca.40 thousands TJ, and the market share of this fuel will be 20%. In order to meet these needs, the country will need to have 24 stations countrywide with a total investment of $ 12.7 million and the same number of trailers to transport the fuel, with a total investment of $ 9.2 million. Consequently, the total investment in infrastructure is estimated at $ 22

million.

Operation and maintenance costs – are estimated at 10% from annual investment costs or $ 0.12 million.

GHG reduction cost - taking into account the needed investment of $ 22 million, technology lifetime, annual maintenance and operating costs, the GHG reduction cost is $ 273 / ton CO2.

Technology lifetime: 10 years – for GNL transportation trucks and 40 years – for filling stations.

Other

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[i] This fact sheet has been extracted from TNA Report - Technology Needs Assessment for climate change mitigation - Republic of Moldova. You can access the complete report from the TNA project website **http://tech-action.org/**