Technology Fact Sheet

Compressed Natural Gas (CNG) in transport[i] /http://climatetechwiki.org/technology/cng/

General description

The use of Compressed Natural Gas (CNG) as a transport fuel is a mature technology and widely used in some parts of the world. Although compressed natural gas is a fossil fuel, it is the cleanest burning fuel at the moment in terms of NO_x and soot (PM) emissions.

CNG can be employed to power passenger cars and city busses. CNG passenger vehicles emit 5-10% less CO_2 than comparable gasoline powered passenger vehicles. Generally, there is no benefit over diesel powered cars in terms of CO_2 emission reduction. However, the NO_x and soot emissions of CNG powered vehicles are substantially lower than from diesel powered vehicles. Thus for city busses, often diesel powered, the benefits of CNG lay in the improvement of the local air quality and not in the CO_2 emission reduction. The introduction of CNG in the transport sector provides a good stimulus for biogas. Biogas has the potential to lower the CO_2 emissions by almost 75%.

Technically, natural gas vehicles function very similarly to gasoline-powered vehicles with spark-ignited engines. It is possible to retrofit a gasoline powered vehicle with a natural gas tank. However, these vehicles are in general not as fuel efficient as original equipment manufacturer natural gas powered vehicles. In addition, retrofitted vehicles have higher emissions of NOx and soot. Compressed natural gas is also ideally suited for city busses. In Los Angeles, for example, 95% of the city busses employ CNG.

Implementation

Because of the relatively limited driving ranges, it is assumed that technology will be applied only to urban buses, which will enable transporting about 1.118 million passenger-km.

Implementation barriers

- lack of refueling infrastructure with sufficient national coverage. The low penetration of CNG refueling stations is caused by the fact that the investment costs for a natural gas refueling station are significantly higher than for liquid fuels. (Roeterdink et al, 2010). These high investment costs slow down the growth of a CNG vehicle park because owners of fuelling stations will only offer CNG when there is a sufficient demand. However, consumers will only purchase such a vehicle when there are sufficient CNG refueling stations.
- a relatively short driving range, about ~ 50% shorter than vehicles powered by regular gasoline;

GHG emissions reduction (megatons CO_2 equivalent) – 11 thousand tons CO_2 in 2030.

Impact on development priorities:

a) *social*

b) *economic*

c) *environmental*

- improved local air quality due to with very low NO_x and soot emissions;

d) *other*

Investments

The purchase price of natural gas powered vehicles is in general higher than the purchase price of comparable gasoline and diesel powered vehicles. Depending on the country the additional price ranges from 3 to 30% (International Gas Union, 2009). However, the lower price of CNG will compensate for the extra purchase cost. According to the statistics of the International Association for Natural Gas Vehicles (http://www.iangv.org/tools-resources/statistics.html) by the end of 2010 the Republic of Moldova had 5,000 CNG vehicles (0.95% of total number of vehicles) and 14 CNG stations. Worldwide average share of CNG vehicles is 0.99%, significantly higher rates being recorded in Pakistan (61.14%) and Armenia (32.13%), while Ukraine's share is 2.60 %.

Given the implementation of CNG only for urban buses with a capacity of 1.118 million passenger-km, the annual capacity of one bus being 382,000 passenger bus-km, it will be necessary to purchase approx. 3000 CNG buses. The estimated cost of one CNG bus is $ 149,500, and the total investment - $ 448.5

million.

Operation and maintenance costs– were estimated at 10% of the annual investment cost, which is 1.5 thousand $/year per one bus, or $4.5 million for the total number of 3 000 buses.

GHG reduction costs– 4.771 $/ton CO_2.

Technology lifetime– 10 years.

Other

Source: http://climatetechwiki.org/technology/cng

[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/**