

Abstract: Efficient Measures to decrease private vehicle emissions - a local context

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The energy situation in Iceland is unique. Although, the annual primary energy use is one of the highest per capita in the world, 85% are stationary produced by utilization of renewable geothermal heat and hydropower. Furthermore, in 2010, 19% of the greenhouse gas (GHG) emissions (without LULUCF) accounted for in Iceland's National Inventory Report submitted to UNFCCC in 2012 originates from land transport. Thus, it is of a high priority to reduce the GHG emissions from vehicles to achieve the aim of Iceland's *Climate Change Strategy*, which is 50-75% net reduction of total GHG emissions from 1990 to 2050.

Private cars are a dominant travel mode in Iceland and vehicle ownership is one of the highest per capita in the world – e.g. about 40% higher than in Norway and Sweden. The degree of the challenge ahead reflects in a growth of VKT on national roads by 226% from 1980 to 2009 while the population grew by 39%. Also, GHG emissions from land transport grew by 57% from 1990 to 2008, and recent studies show that 70-80% of all GHG emissions within Reykjavik come from traffic.

In 2007, the Minister for the Environment appointed a committee of experts to explore the possibilities of mitigating GHG emissions in different sectors of the Icelandic economy. Mannvit, working for the Icelandic Road Administration, was the committee's consultant on mitigation measures in the field of transport.

The GHG emission mitigation measures explored by Mannvit in terms of possibilities of reducing emissions beyond an official BAU scenario without decreasing economic activity, were 1) Reinforcement of public transport in the Reykjavik Area by Bus Rapid Transit (BRT) and Light Rail Transit (LRT) systems, 2) Increased walking and cycling alternatives in the Reykjavik Area, 3) Gradual increased blending of bioethanol, biodiesel and renewable methanol in fossil fuels, 4) Improved energy efficiency of the vehicle fleet by more fuel economic private cars and electric hybrid vehicles, and 5) Broad introduction of new vehicle technology, such as biogas, E85, electric and hydrogen vehicles.

The effects of each mitigation measure were evaluated based on cost, benefits and quantity abated using a bottom-up methodology developed by the IPCC. The exploration concluded that the most economical short-term mitigation measures are – not surprisingly – increased walking and cycling and improved energy efficiency of the vehicle fleet through considerably increased share of fuel economic and diesel fuelled private cars. Increased walking and cycling, and increased share of fuel economic private cars were also the most economical long-term mitigation measures together with a broad introduction of electric hybrid vehicles. On the other hand, a gradual switching to electric and/or hydrogen vehicles would be the most efficient measure in terms of reduced GHG emissions, but it would also be the most expensive one together with a build-up of a LRT system.

Since 2008, Mannvit has been the main consultant for the city of Reykjavik in the development of *The Reykjavik Climate and Air Quality Policy*. The traffic part of the policy is based on the results of the mitigation measure exploration described above. The city of Reykjavik signed the Covenant of Mayors, a commitment to go beyond the objectives of EU energy policy in terms of reduction in GHG emissions, in 2010 and with the help of Mannvit submitted a *Sustainable Energy Action Plan (SEAP)* in 2011 where the Covenant objectives and measures to reach them were justified.