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Technology Collaboration Programme on
Advanced Motor Fuels

Case Study Finland “Biofuels”

AMF Annex 59 Lessons Learned Expert Workshop 30.10.2020

Picture: St1

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Finland relies heavily on biofuels for transport decarbonisation

The Finnish case study is an example of successful implementation of biofuels:

- Consistent policy
- Funding on R&D in the area of biorefining
- Investment aid to demonstration of biorefinery concepts
- Structural changes to the energy tax system
- Enhancing the development of a biofuels market by a biofuel obligation

Picture: UPM

Policy – recent guidelines

- The 2015 Government Programme of Prime Minister Juha Sipilä
- The 2016 national energy and climate strategy
- The 2019 Government Programme of Prime Minister Antti Rinne/Sanna Marin
- Ministry of Transport and Communications: Road map for fossil-free transport 27.10.2020

Policy – 2019 Government Programme Selected points

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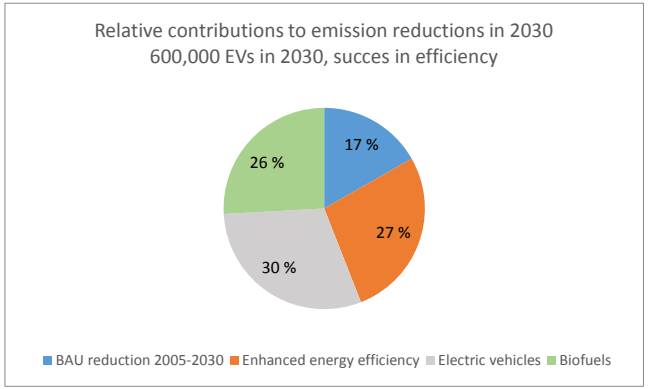
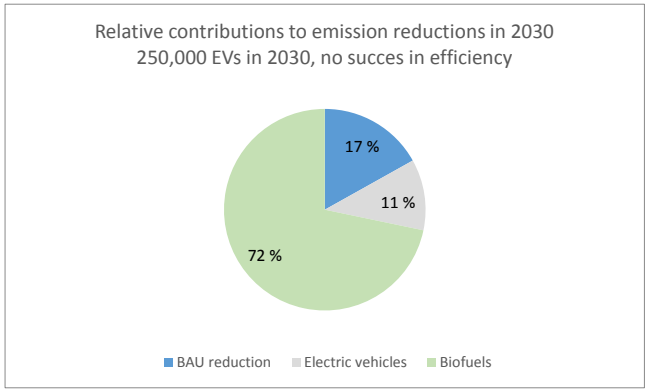
- By 2030, Finland will reduce transport emissions by at least 50 per cent compared to the 2005 level. This is a step towards carbon-free transport
  - Repetition of the 2016 energy and climate strategy
- 30 % share of biofuels in 2030
- The transition to sustainable biofuels in heavy goods vehicles and air transport will be promoted
- A reform of taxes and payments in sustainable transport will be initiated Sustainably produced biogas (biomethane) will be included in the scope of the biofuels distribution obligation
- Piloting of carbon neutral synthetic fuels and launching of their production in Finland will be promoted

Key measures for emission reductions

- Energy efficiency (vehicle and system level)
- Renewable fuels (biofuels)
- Electric vehicles
- Depending on success in EVs and system level energy efficiency, renewable fuels (biofuels) have to deliver one quarter to three quarters of the emission reductions





Policies to promote biorefineries

- The main measures to promote biorefinery development in Finland have been:
  - Funding on R&D in the area of biorefining, e.g. Tekes BioRefine-programme 2007-12, total budget 250 M€
  - Enhancing the development of biofuels market by
    - Biofuel obligation
    - Structural changes to energy taxes on transport
  - Investment aid to demonstration of biorefinery concepts (100 M€ in 2013 budget)

Fuel taxation

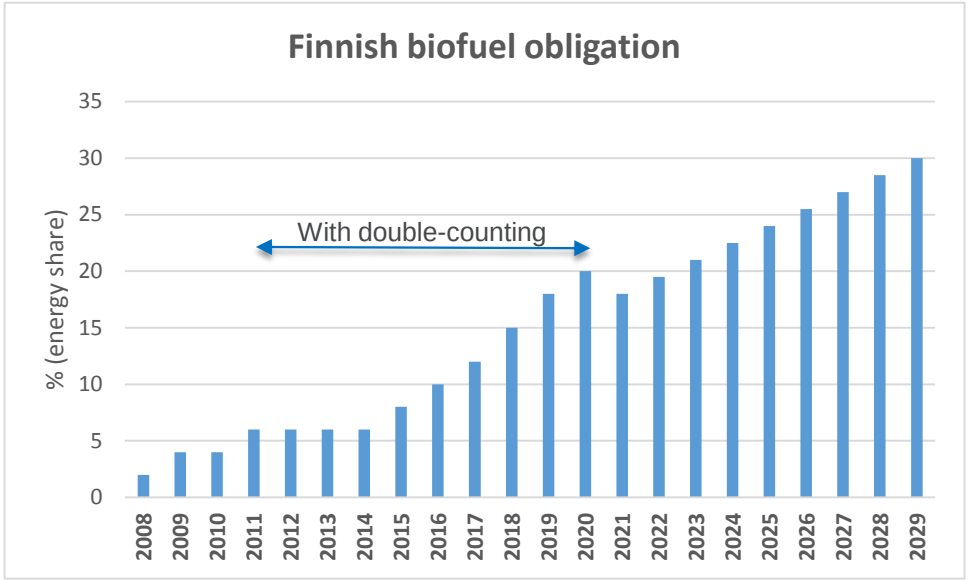
- The reformed fuel tax system, implemented as of 2011, is based on three components and takes into account:
  - energy content of the product → energy content tax (€/MJ)
  - CO_2 emissions (life cycle) of the product by setting a price on CO_2 → CO_2 tax (€/MJ),
  - reduced pollutant emissions → tax reduction from energy content tax (paraffinic diesel fuel)
- The Finnish tax system is that it is objective and transparent, and is not considered as subsidies for biofuels nor state aid, and can therefore be combined with a mandate (according to EU rules)
- The Finnish tax system, however, favors the best of biofuels taking into account true energy content, waiving CO_2 tax for sustainable biofuels and providing a small incentive for paraffinic diesel fuel

Biofuels mandate (liquid biofuels)

- The first biofuels mandate was introduced 2008
  - 2010 target 4 %
- Second phase 2011 – 2020
  - in combination with the tax reform
  - allows double-counting
  - 2020 target 20 %

- Third phase 2021 – 2029 and beyond
  - No double-counting, as main target is reduction of GHG emissions
  - 2029 (and beyond) target 30 %
  - Sub-target for advanced biofuels; 10 % in 2029
  - Ambition level significantly higher than in, e.g., the RED II Directive
  - The 2029/2030 target set already in 2019 provides certainty for the investors

Biofuels mandate (liquid biofuels)



Proposed (and probable) update of the biofuels mandate

- Methane (natural gas and biomethane) to be included in the mandate
- Electrofuels (PtX) to be included in the mandate
- Change of name from biofuels mandate to renewable fuels mandate
- Report by Pöyry Management Consulting (AFRY) September 2020

Description

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The players

- In Finland, biofuels for transport is a good example triple helix cooperation, meaning cooperation between government, industry and academia
- The Ministry of Economic Affair and Employment is responsible for energy and innovation policy
- The Ministry of Transport and Communications is responsible for transport policy Fuel quality matters are the responsibility of the Ministry of Environment
- Ministry of Finance is responsible for taxation
- Several universities and research organisations in Finland are working on advanced biofuels. St1 Biofuels is actually a VTT spin-off, and VTT has been working together with all Finnish biofuels related companies.

The players (industry)

- Neste is the world leader in the production of renewable diesel (HVO), with production facilities in Finland, the Netherlands and Singapore.
- St1 is a Nordic energy group that operates in several business areas in Finland, Sweden and Norway. St1 started its biofuels activities with production of waste based ethanol, but is now expanding into renewable diesel by building a biorefinery in Gothenburg, Sweden.
- UPM is producing tall oil based renewable diesel at its plant Lappeenranta, Finland (some 120,000 toe/a). UPM also has plans to build a 500,000 toe/a biorefinery in Kotka, Finland.
- Gasum is active in the gas sector in the Nordic countries. Gasum's activities in the transport sector encompass CNG (compressed natural gas), CBG (compressed biogas/biomethane), LNG (liquefied natural gas) and LBG (liquefied biogas/biomethane). Gasum is the biggest operator in both biogas and LNG in the Nordic market.

Key drivers of successes and key barriers of failures

- Consistent policies to promote the use of biofuels
- A combination of measures to drive biofuels: biofuels obligation, support for investments as well as for R & D activities and a reformed taxation system
- A progressive fuels industry highly committed to renewable fuels and reduction of CO_2 emissions
- International biofuel markets are seen as an opportunity for the Finnish energy companies, a strong home market is beneficial in this game

- The penetration of alternative fueled vehicles is hampered by reduced offering of new vehicles, first FFVs and now also methane fueled passenger cars (focus for methane/biomethane will turn to heavy-duty vehicles)
  - Offering of vehicles is not in the hands of Finland

Case specific lessons learned and recommendations

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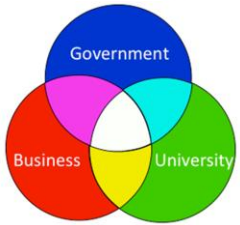

- Biofuels have been a success in Finland, partly thanks to the triple helix approach:
  government, industry and research community
- Technology neutrality and cost effectiveness are important when promoting low carbon fuels
- Don’t pick winners and losers, a better way is to set criteria for performance, environmental performance as well as cost competiveness
- When setting the 2030 obligation of 30 % biofuels with no double counting, cost effects were estimated. Compared to 2020 and an actual biofuel share of some 13 % (target 20 % but allowing double counting), the effect on fuel pump prices was estimated at a moderate +5 %.

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Closing Statement

Finland relies heavily on renewable fuels for transport decarbonisation in 2030

The triple-helix approach (government, industry, academia) has contributed to the success of biofuels in Finland