

IEA-Advanced Motor Fuels ANNUAL REPORT

2019

Finland



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Drivers and Policies

The 2016 energy and climate strategy for 2030 calls for a 50% reduction of CO₂ emissions from transport by 2030, the reference year being 2005.¹ Three key measures to reduce emissions are listed, improving the energy efficiency of the transport system, improving the energy-efficiency of vehicles and replacing oil-based fossil fuels with renewable and/or low emission alternatives. The 2019 Government Programme basically follows the 2016 energy and climate strategy, with a couple of additions related to low-emission transport.² A new upper level target was set: Finland will achieve carbon neutrality by 2035, and aim to be the world's first fossil-free welfare society.

The current biofuels obligation (liquid biofuels) calls for 20% biofuels in 2020, taking into account double counting for advanced biofuels. In spring 2019, the biofuels obligation was revised again, and the pathway toward 2030 was set. The biofuel target for 2030 is 30%, and this time actual energy contribution without double counting. There is also a separate sub target for advanced biofuels, 10%, i.e., one third of the total contribution.³

As of 2011, the fuel tax system consists of an energy component, a CO₂ component and a bonus for reduced local emissions. The system favors the best of biofuels, but is still transparent and technology neutral, and can be used in combination with the obligation for liquid biofuels. Passenger car taxation (purchase tax and annual tax) has been CO₂-based (tailpipe) as of 2008, providing substantial incentives for BEVs and PHEVs.⁴

Advanced Motor Fuels Statistics

In 2018, the energy consumption in domestic transport (all modes together) was 181 PJ, and energy consumption in road transport 165 PJ or 3.94 Mtoe (see Table 1). Relative to the total final consumption of 1128 PJ the figures were 16.0% and 14.6%, respectively.⁵ In 2018, total CO_{2eqv} emissions were

¹ <https://tem.fi/en/energy-and-climate-strategy-2016>

² <https://valtioneuvosto.fi/en/rinne/government-programme>

³ <https://www.finlex.fi/fi/laki/alkup/2019/20190419>

⁴ Parkkonen, L. (2013). Taxation of petroleum products and vehicles in Finland. CEN/TC 19 Conference. Helsinki, 27 May 2013.

⁵ http://pxnet2.stat.fi/PXWeb/pxweb/fi/StatFin/StatFin__ene__ehk/statfin_ehk_pxt_011_fi.px/

56.4 Mt. The emissions from transport were 11.7 Mt (all modes together) and 10.9 Mt (road), 20.7% and 19.3%, respectively.^{6,7}

Table 1 Energy in road transport in 2018⁵

2018	PJ	ktoe	Share of fuels (%)	Share of bio (%)
Petrol (fossil)	52.3	1250	31.8	
Biocomp. petrol	3.4	82	2.1	6.2
Diesel (fossil)	96.7	2310	58.7	
Biocomp. diesel	11.8	281	7.2	10.9
Natural gas	0.14	3.2	0.1	
Biomethane	0.20	4.7	0.1	59.1
∑ fuels	164.6	3932		9.4
	PJ	ktoe	Share of total (%)	
Electricity	0.17	4.0	0.1	
∑ fuels	164.6	3932	99.9	
Total	164.8	3936		

The contribution of biofuels relative to the total amount of actual fuels is 9.4% in terms of energy, varying from 6.2% in petrol (mostly ethanol, some ETBE and also bio-naphtha, but the statistics do not give details on this) to 59% in methane. In 2018, the biofuels mandate (for liquid fuels) called for a 15% share of biofuels. The actual amount was 364 ktoe or 9.3% of the liquid fuels, meaning that the greater part of the biofuels used was eligible for double counting.

The four major Finnish players in biofuels are Neste (being the world's biggest producer of HVO), UPM, St1 and Gasum. Total production of biofuels in Finland was some 540 ktoe.⁸ As the Finnish consumption of biofuels in 2018 was some 370 ktoe, Finland is more than self-sufficient in the production of biofuels. However, it should be noted that Neste relies mainly on imported feedstocks, whereas UPM, St1 and Gasum use indigenous feedstocks. All Finnish biofuel producers have announced major increases in capacity either in Finland or abroad.

⁶ http://www.stat.fi/til/khki/2018/khki_2018_2019-12-12_kat_001_fi.html

⁷ <http://lipasto.vtt.fi/en/liisa/index.htm>

⁸ https://valtioneuvosto.fi/artikkeli/-/asset_publisher/10616/selvitys-biopolttoaineiden-kustannustehokkaat-toteutuspolut-vuoteen-2030

Table 2 presents the vehicle fleet in use at the end of 2019 (without two- and three-wheelers and light four-wheelers). Table 3 presents the sales figures for new passenger cars in 2015 to 2019.

Table 2 Vehicle fleet at the end of 2019 (in use, without two- and three-wheelers and light four-wheelers)⁹

Fuel	Cars	Vans	Trucks	Buses	Special vehicles
Petrol	1 916 849	9 780	1 764	26	321
FFV ^a	4 298	9	101	0	0
Diesel	760 330	319 769	93 000	12 425	1 738
Methane	3 121	460	84	52	0
Methane bi-fuel	6 255	274	91	0	0
BEV	4 661	312	2	62	0
PHEV petrol	22 653	25	0	0	0
PHEV diesel	2 050	14	0	3	0
Other	90	28	99	9	0
Total	2 720 307	330 671	95 141	12 577	2 059
Fuel	Cars	Vans	Trucks	Buses	Special vehicles
Petrol	70,5 %	3,0 %	1,9 %	0,2 %	15,6 %
FFV	0,2 %	0,0 %	0,1 %	0,0 %	0,0 %
Diesel	28,0 %	96,7 %	97,7 %	98,8 %	84,4 %
Methane	0,1 %	0,1 %	0,1 %	0,4 %	0,0 %
Methane bi-fuel	0,2 %	0,1 %	0,1 %	0,0 %	0,0 %
BEV	0,2 %	0,1 %	0,0 %	0,5 %	0,0 %
PHEV petrol	0,8 %	0,0 %	0,0 %	0,0 %	0,0 %
PHEV diesel	0,1 %	0,0 %	0,0 %	0,0 %	0,0 %
Other	0,0 %	0,0 %	0,1 %	0,1 %	0,0 %

^a Flexible fuel vehicle.

Table 3 Sales of new passenger cars in 2015 – 2019¹⁰

Year	Petrol	FFV	CNG	Diesel	HEV P	HEV D	PHEV P	PHEV D	BEV
2015	66248	105	158	38797	2817	29	400	15	243
2016	73251	14	165	39451	4668	11	1115	93	223
2017	70520	1	433	36060	8512	2	2401	152	502
2018	73065	0	1161	28710	11631	224	4797	135	776
2019	67751	0	2142	20871	14582	990	5807	159	1897

⁹ <https://www.traficom.fi/fi/tilastot/ajoneuvokannan-tilastot>

¹⁰ http://www.aut.fi/tilastot/ensirekisteroinnit/kayttovoimat/henkiloautojen_kayttovoimatilastot

The share of alternative fuel vehicles (including electric vehicles) ranges from 1.6% (cars) to 0% (special vehicles). Within passenger cars, plug-in hybrids is the largest alternative vehicle group.

From 2018 to 2019, registrations of petrol cars fell 7% and registrations of diesel cars fell 27%, whereas registrations of BEVs increased 144% and CNG vehicles 84%. Registrations of PHEVs and petrol-fueled HEVs all increased some 20%. One abnormality was diesel-fueled HEVs, as registrations increased more than 300%.

There are some 300 alternative fueled trucks, including FFVs and bi-fuel vehicles. The numbers for these two categories are explained by the fact that some heavy pick-up trucks and vans are registered as trucks. With the development of LNG refueling infrastructure and increased offerings of heavy gas trucks, LNG fueled trucks have entered Finnish roads, although still in limited numbers. In the case of buses, the number of battery electric buses has surpassed the number of gas buses.

Research and Demonstration Focus

There are currently no major end-use related research and demonstration programs going on. The BioOneHundred pilot project, led by Helsinki Region Transport (HSL) and covering years 2016 to 2019, has ended. The project focused on high-concentration biofuels for carbon-neutral urban traffic. Partners in the project were, in addition to HSL, the Construction Services of the City of Helsinki (Stara), the cities of Espoo and Vantaa, the Finnish Post, Neste, St1, UPM, the Smart & Clean Foundation and VTT. The project was supported financially by the Ministry of Economic Affairs and Employment. No technical problems were accounted for, and preparedness to implement high concentration biofuels is now there.

The MARANDA project (2017- 2021), a hydrogen-related project aiming at hydrogen-fueled fuel cell-based hybrid powertrain system for marine applications, is still active.

From 2017 to 2021, Business Finland is running a program called “Smart Energy Finland.”¹¹ The program brings together the services for technical development and exports and will grant 100 million euros to smart energy solution innovations in 2017 to 2021. The program will also grant support for the international expansion of growth-oriented companies that possess

¹¹ <https://www.businessfinland.fi/en/for-finnish-customers/services/programs/smart-energy-finland/>

growth potential and feature renewable energy and smart energy solutions in their product portfolio. The scope of the program is quite wide, and transport-related issues are only a minor part of the program. However, one subtheme of the program is “sustainable bioenergy solutions,” covering both biogas and advanced liquid biofuels. Another subtheme is dealing with batteries, thus having couplings to the transport sector.

Outlook

Finland has to reduce its CO₂ in the non-ETS (emissions trading system) sector by 39% by 2030. This puts pressure on emission reductions in transport. Biofuels—or, in more general terms, renewable fuels—are seen as a very important element in emission reductions in transport. With its new liquid biofuels mandate, written into law in the spring 2019, Finland is one of the few countries with a fixed biofuels policy all the way to 2030. In parallel with increasing the amount of biofuels, energy efficiency and electrification in transport are promoted as well.

In the newest Government Programme, much attention is given to circular economy and biogas, so there is a political will to promote the use of biomethane in transport. Opening up of the gas market (gas transmission and sales separated¹²) as of 2020, a new pipeline connector to Estonia and terminals for LNG import open up new possibilities for methane, in stationary applications as well as in mobile applications on land and at sea. Currently, the Finnish LNG vessel fleet encompasses some 10 LNG-fueled ships, including passenger and cargo ships, as well as one icebreaker and one border patrol vessel.

The Finnish energy companies have a record of being active in the field of biofuels. New capacity is to be expected both within the borders of Finland and abroad.

Major changes

The Government changed in the spring of 2019. Still with the old Government in place, a new liquid biofuels obligation law calling for 30% (actual energy share) in 2030 was approved. This means that Finland is implementing one of the most progressive biofuels policies. The new Government sustains the target of a 50% CO₂ for transport by 2030. Additionally, the new Government emphasizes circular economy and the development of biogas. A new upper level target for Finland to be CO₂ neutral by 2035 has been set.

¹² <https://figas.fi/en/gas-market/>