

ACTA ACADEMIAE STROMSTADIENSIS

Ari Lampinen



**Fossil Fuel Support
Mechanisms in Finland**

No. XVII, OCTOBER MMXIII

ISBN 978-91-86607-18-0

Fossil fuel support mechanisms in Finland

Ari Lampinen

Abstract

Fossil fuel subsidies and other state support for fossil fuels are forbidden by the Kyoto Protocol and other international treaties. However, they are still commonly used. This publication presents and analyses diverse state support mechanisms for fossil fuels in Finland in 2003-2010. Total of 38 support mechanisms are covered in quantitative analysis and some other mechanisms are mentioned qualitatively only. For some mechanisms the study includes a longer historical perspective. This is the case for tax subsidies for crude oil based traffic fuels that have been maintained in Finland since 1965.

Keywords: fossil fuels, state subsidy, tax expenditure, tax sanction, climate change, renewable energy

Contents

ABSTRACT	2
CONTENTS	2
PREFACE.....	3
ENERGY RESOURCES AND MARKET STRUCTURE.....	4
PRICES, TAXES AND SUPPORT MECHANISMS.....	5
DATA DOCUMENTATION	8
Producer Support Estimates.....	8
<i>Electricity Production Subsidy for Waste Plastic and Other Sorted Dry Burnable Waste (L 1260/1996)</i>	8
<i>Electricity Production Subsidy for Peat Used in Small CHP Plants (L 1260/1996)</i>	8
<i>Feed-in Tariff for Large Peat Condensing Power Production (L 322/2007)</i>	8
<i>Peat storage support (L 321/2007)</i>	9
Consumer Support Estimates	9
<i>Reduced Energy Tax Rate on Diesel Used in Transport (L 1472/1994)</i>	9
<i>Reduced Energy Tax Rate on Kerosene for Domestic Use in Pleasure Aviation (L 1472/1994)</i>	9
<i>Reduced Energy Tax Rate on Gasoline for Domestic Use in Pleasure Aviation (L 1472/1994)</i>	9
<i>Reduced Energy Tax Rate on Light Fuel Oil Used in Mobile Machines (L 1280/2003 6 and 7 §)</i>	10
<i>Reduced Energy Tax Rate on Electricity Used in Transport (L 1260/1996)</i>	10
<i>Reduced Energy Tax Rate on Natural Gas Used in Transport (L 1260/1996)</i>	10
<i>Reduced Energy Tax Rate on Heavy Fuel Oil (L 1472/1994)</i>	10
<i>Reduced Energy Tax Rate on Coal (L 1260/1996)</i>	11

<i>Reduced Energy Tax Rate on Peat (L 1260/1996 1 §)</i>	11
<i>Reduced Energy Tax Rate on Natural Gas Used for Heating (L 1260/1996)</i>	11
<i>Reduced Energy Tax for Heating Greenhouses by Heavy and Light Fuel Oil (L 1472/1994 10a §)</i>	11
<i>Reduced Electricity Tax for Industrial Consumers (L 1260/1996)</i>	12
<i>Reduced Energy Tax for Industrial Consumers (L 1260/1996 8a §)</i>	12
<i>Reduced Energy Tax for Agriculture (L 603/2006 4 §)</i>	12
<i>Reduced CO₂ Tax for Combined Heat and Power Production (L 1260/1996 4 §)</i>	12
<i>Reduced Vehicle Sales Tax for Cars Used as Taxi (L 1482/1994 28 §)</i>	12
<i>Reduced Value Added Tax for Commercial Passenger Transport Services (L 1501/1993 § 85a)</i>	13
<i>Energy Tax Exemption for LPG (L 1472/1994 9 §)</i>	13
<i>Energy Tax Exemption for Peat (L 1260/1996 1 §)</i>	13
<i>Energy Tax Exemption for Peat used at most 5000 MWh/a (L 1260/1996 15 §)</i>	13
<i>Energy Security Levy Exemption for Peat (L 1260/1996)</i>	13
<i>Energy Tax Exemption for Aviation Fuels in Commercial International Traffic (L 182/2010 19 §)</i>	14
<i>Energy Tax Exemption for Aviation Fuels in Commercial Domestic Traffic (L 1472/1994 9§)</i>	14
<i>Energy Tax Exemption for Marine Fuels in Commercial International Shipping (L 182/2010 19 §)</i>	14
<i>Energy Tax Exemption for Marine Fuels in Commercial Domestic Shipping (L 1472/1994 9 §)</i>	14
<i>Electricity Tax Exemption for Rail Transport (L 1260/1996 7 §)</i>	14
<i>Vehicle Tax Exemption for Vehicles Using Peat or Peat Based Fuel (L 1281/2003 12 §)</i>	14
<i>Motive Power Tax Exemption for Vehicles Using Natural Gas (L 1281/2003 12 §)</i>	15
<i>Vehicle Sales Tax Exemption for Certain Vehicle Types (L 1482/1994 21 §)</i>	15
<i>Value Added Tax Exemption for Domestic Part of International Transport (L 1501/1993 § 66)</i>	15
<i>Motive Power Tax Sanction for Cars and Vans Using Other Motive Power than Gasoline (L 1281/2003 11 §)</i>	15
<i>Energy Tax Sanction for Renewable Liquid Traffic Fuels (L 1472/1994)</i>	16
<i>Fuel Levy Sanction for Renewable Fuels in Mobile Road and Off-Road Use (L 1280/2003)</i>	16
<i>Fuel Levy Sanction for Renewable Gaseous Fuels in Pleasure Use of Private Boats and Ships (L 1307/2007)</i>	16
REFERENCES	17
ACKNOWLEDGEMENT	17

Preface

This publication is an extended version of the chapter on Finland in the OECD book “Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil Fuels 2013” released in December 2012. In

the OECD book certain common methodologies have been applied to all OECD countries leaving out some support mechanisms. In the book 18 fossil fuel support mechanisms are presented for Finland, whereas in this publication a total of 38 fossil fuel support mechanisms are covered. Also, the introductory and explanatory background texts are expanded compared to the book, and there are some format changes. This publication is the original study conducted and written in 2010-2011 for the OECD and no updates have been made.

Support mechanisms have been analysed for various time periods within 2003-2010, although for some mechanisms it was possible to make estimates until 2012. Of some mechanisms, much longer history is discussed. This is the case especially for the several tax subsidies for crude oil based transport fuels, which have been maintained in Finland since 1965 against renewable fuels. Further information of this can be found in the author's article "Development of tax subsidy mechanisms for fossil traffic fuels in Finland" in the Finnish Law Journal 4/2008, p. 453-473.

Summary tables for support of coal, crude oil and natural gas are presented in the book, but they have not been recalculated for this publication. Since here many additional support mechanisms are presented, the summary tables would show much higher support than the tables in the book.

Energy resources and market structure

Finland has no known resources of conventional coal, crude oil or gas. Also, no unconventional crude oil or gas resources have been identified. However, Finland has very large resources of peat. About one third of Finnish surface area is covered by swamps and wetlands. Of its 9.3 million hectares of peatlands, 1.1 million hectares are protected and 0.06 million hectares are currently being harvested for peat. Very large increases in peat harvesting are possible. Technically and economically harvestable peat resources have been estimated at 12 800 TWh (1100 Mtoe), which is 400 times larger than Finland's total annual primary energy consumption and about $\frac{2}{3}$ of the EU peat resources. The total peat resource in Finland is 5 times larger. Finland is the only country in the world where peat is a significant source of energy: peat covers 5-8% of primary energy consumption (20-30 TWh/a), 5-8% of electricity consumption (4-7 TWh/a) and over 20% of district heat consumption. The total investments in peat production and use are about EUR 5000 million. Peat is used in 55 large power plants (most of them CHP plants) and 120 medium-size district heating plants. It is used also in small heating plants. The energy use of peat is planned to be extended to transport: two peat-to-diesel plants are currently in the environmental impact assessment phase. Peat employment is 12 000 person-years and its net impact on the national economy is EUR 500 million annually. Most of this employment and value added is directly or indirectly connected to VAPO (State Fuel Centre), a state energy company with 50.1% state ownership. VAPO has an 80% market share in Finland and is the largest peat supplier globally. Finland accounts for $\frac{1}{3}$ of global peat production for energy use. VAPO was established in 1940 for providing fuelwood for state companies and other state organizations, such as the state railway company. Between 1949 and 1984 Vapo also delivered imported fossil fuels (coal, coke and fuel oil). Its peat business started in the mid-1940s and since 1980s peat has been the core business of VAPO, including both production and use, and it is no longer restricted to serving state organizations only. Finland differs from all other countries in the world in classifying peat not as a fossil fuel but as a "slowly renewable biomass fuel". In practise, peat is often simply called a biofuel in domestic marketing.

In 2009, 52% of Finnish TPES (total primary energy supply) consisted of fossil fuels (crude oil 25, coal 11, natural gas 10 and peat 5). The share of renewable energy was 25% (wood 20, hydropower 3, other 2). Nuclear energy also played an important role, accounting for 19% of TPES. Other energy sources and

imported electricity accounted for the rest. Energy intensity and energy consumption per capita are very high. They can partly be explained by large share of heavy industry (especially paper and metals) in GDP, cold climate, and sparse population. Energy self-sufficiency was 30%, i.e. dependence on imported energy was 70%, which is high compared to OECD countries on average. Most of Finland's imported energy comes from Russia.

Finland's energy market is dominated by several large state companies (VAPO, Fortum, Neste Oil, Gasum), which have inherently privileged access to ministries and the parliament due to state budget, state ownership policy and board nomination reasons. Municipal energy companies also have a strong role in Finnish electricity, district heating and gas markets (and a very small role in the market for transport fuels). The role of private companies is therefore small compared with most other OECD countries. The Energy Market Authority (*Energiamarkkinavirasto*), subordinate to the Ministry of Employment and the Economy, oversees Finnish electricity and gas markets.

The Finnish electricity market is dominated by a state company, Fortum (established as IVO in 1932), which is 50.8% state owned. Fortum is the largest power distributor and heat producer, second largest electricity seller and third largest power generator in the Nordic countries. Fortum owns condensing coal, condensing nuclear, peat CHP, wood CHP, hydro and wind power plants and also peat and fuel oil heating plants. Finnish transmission grid is owned by Fingrid, which has 53.1% state ownership. The Finnish electricity market is fully liberalised and all customers are free to choose their own supplier. Grid access for small independent distributed electricity producers is in principle guaranteed, but all costs are subject to negotiations between the producers and distribution grid operators.

The Finnish oil market is also dominated by a state company, Neste Oil (established in 1948), with 50.1% state ownership. Neste owns the only two refineries in Finland, located in Naantali and Porvoo, and operates Finland's leading chain of service stations. Products refined from crude oil constitute Neste's core business, but Neste also produces and distributes biofuels, mainly based of palm oil, but also many other types of domestic and imported biomass.

The Finnish gas market is dominated by Gasum (established in 1994), whose shares are 24% owned directly by the state and 31% by Fortum. Gasum owns and operates the Finnish gas transmission network (1200 km), and all its natural gas originates from Russia. Although natural gas constitutes the core business, Gasum is involved in biogas business, too. Gasum also owns gas distribution networks (500 km), gas-fired power plants and filling stations for natural gas vehicles. Gasum started transmission and distribution of biogas for traffic use in its network in October 2011. Gasum is the only supplier of natural gas and biogas to the transmission network. Distribution networks are owned by 23 companies, most of them municipal. One of them is also a supplier of biogas.

Prices, taxes and support mechanisms

Energy prices are determined by the market, subject to regulation by the Energy Market Authority.

Energy is subject to an energy tax, which was renewed in 2010 and entered for the most part into force in 2011. The energy tax is the sum of the energy-content tax, the CO₂ emission tax and the energy-security levy. The energy-content tax component dominates for most fuels. The CO₂ emission tax and the energy-security levy have small or marginal roles, except in a few cases, such as coal and heavy fuel oil, where the CO₂ tax is larger than the energy-content tax. Rates of tax vary by fuel and according to whether it is being used for heating, power production or in transport, whether by manufacturing industry, energy

industry or households. There are also several exemptions. The energy tax is applied to electricity, all solid fuels except wood, all liquid fuels and natural gas. The tax rate per energy content for liquid renewable fuels is the same as for liquid fossil fuels they replace, by default. However, there is no CO₂ tax for biofuels that are double counted according to the EU Directive on Renewable Energy Sources (RES Directive) 2009/28/EC article 21(2). The biofuels with the best carbon balance and ecological impacts are counted twice when determining the fulfilments of renewable energy requirement for transport in member states. For example, 5% share of biowaste based biogas is enough for fulfilling the 10% commitment. Waste based and lignocellulosic biofuels are double counted. Other biofuels filling the sustainability criteria of the RES Directive have a 50% reduction of the CO₂ tax. No reductions in the energy-content tax are given for renewable fuels, with one exception: for synthetic biodiesel, currently produced in Finland by Neste Oil at their oil refinery, the energy-content tax is reduced by 14% compared with traditional biodiesel, which is produced by several small producers in decentralized facilities. Tax rates for liquid fuels used for transport are approximately three times higher than liquid fuels used for heating. A tax on bio-oil used for heating was introduced and the level was set the same as for light fuel oil.

The renewal of energy taxation in the beginning of 2011 had a neutral effect on taxation of transport fuels, though for some fuels with currently low use, taxes were significantly changed. For example, the tax rate on natural gas was increased 6.5 fold. The tax rate on gasoline was not changed. The tax rate on diesel was increased, but offset (in part) by a lowering of the motive power tax. Therefore, the renewal of energy taxation did not affect the tax burden of gasoline and diesel use.

Taxation of electricity and heavy fuel oil, light fuel oil, coal, peat, natural gas and tall oil used in heat and power production was increased by EUR 730 per year. Of fuels used for power and heat production peat has a strongly reduced rate: 77% lower than coal and 72% lower than natural gas per unit of energy. Until 2010, peat was energy tax free. Peat used in small plants that produce less than 5000 MWh annually continues to be exempted from energy tax.

Until 2010 taxing of renewable liquid fuels was based on their volume instead of their energy content and was set at the same rate as for the liquid fossil fuels they replaced. Because renewable liquid fuels usually consist of organic molecules containing a lot of oxygen, their energy content per volume is lower than fossil fuels that mostly consist of hydrocarbons. Therefore, renewable fuels had higher taxes per energy content than fossil fuels. For example, ethanol had about a 30% higher tax rate than gasoline.

Condensing peat power production was supported by a feed-in tariff from 2007 through 2010. Finland was the first and the only country in the world to use a feed-in tariff to support fossil energy. (And only fossil energy, since no feed-in tariffs have ever been used in Finland for supporting renewable energy sources. Some of the renewable energy sources are supported by a production subsidy scheme that came into effect in 2011.) The peat feed-in tariff payment was not fixed, but adjusted monthly based on market prices of electricity, peat, coal and ETS credits. The peat feed-in tariff was paid by the owner of the national transmission grid, Fingrid. Fingrid charged this from all users of the transmission grid.

Motive power tax has been used since 1965 as a sanction for vehicles using other motive power than gasoline, with two exceptions: peat and wood gas vehicles were exempted in 1978 and methane (natural gas, biogas etc.) vehicles were exempted in 2004-2012, i.e. the tax will return in 2013. Motive power tax is a surcharge tax on annual vehicle tax. Its level has always been low for diesel vehicles, but until 2003 its level was very high for vehicles that were able to use renewable energy sources, e.g. biogas. In 2003 the tax rate for these vehicles was about EUR 10 000, to be paid annually for vehicles registered for traffic, whether they used fuels other than gasoline or not. The tax did not have fiscal value, but it discouraged

purchases of vehicles adapted for renewable energy use. In 2004 the tax rates for alternative-fuel vehicles were substantially reduced, and removed entirely on methane vehicles. However, in 2010 methane vehicles were again made subject to the motive power tax (from January 2013). It is structured in the following way. There is no tax for gasoline vehicles, but only if they are unable to use renewable fuels or renewable electricity. If the ability to use e.g. biogas is added to the vehicle, a tax is collected. If the ability to use renewable electricity charged from the grid or private production system, e.g. solar cells or wind turbine in one's own house, is added to the vehicle, tax will be collected. If the ability of using gasoline in such a vehicle is removed, the tax is tripled. This applies also to other technologies for utilizing renewable energies. The tax rate is set based on the weight of the vehicle. In the case of a car weighing 1800 kg, the annual tax is EUR 33 for plug-in gasoline hybrids, EUR 99 for electric cars, EUR 204 for biogas (and natural gas) cars and EUR 361 for all other cars built for using alternative energies, e.g. hydrogen, compressed air, FAME-biodiesels and pure plant oils.

Fuel levy has been used since 1994 as a tax sanction for using other fuels than gasoline and diesel for transport and mobile work engines in road and off-road use. The main purpose of the levy has been to prevent the use of light fuel oil in vehicles, but the fuel levy was defined to apply to all traffic fuels, which have a lower fuel tax than the gasoline or diesel that they replace. Originally it applied to all biofuels, since they were fuel-tax exempted. In 1995 the fuel tax was introduced for liquid biofuels at a higher rate than for gasoline and diesel, and therefore the fuel levy did not apply any longer for them. But it has been applied to most gaseous fuels, because the fuel tax rate of natural gas is lower than gasoline and diesel, and all the other gaseous traffic fuels are exempted from fuel tax. The sanction for using gaseous fuels in cars is EUR 330 per day and more for heavier vehicles. Peat and wood gas use has always been exempted and methane was exempted in 2004. In addition, LPG use is exempted for heavy vehicles. Light fuel oil is exempted from fuel levy in tractors used in agriculture and for peat harvesting.

Gasoline and diesel have been promoted since 2007 as fuels for private boats and ships in pleasure use. It is applied to fuels, which have lower fuel tax than gasoline or diesel, which they replace. In practise it means all gaseous fuels. The rate of levy is EUR 750-4 000 depending on the engine power of the vessel.

The Finnish Environmental Protection Act includes elements in support of peat production and energy use. Damages to ecosystems, i.e. loss of ecosystem in the harvesting area and damages in lakes and rivers downstream from the harvesting area, cannot be used as a cause for denying environmental permit for peat harvesting, unless Natura 2000 areas or other explicitly protected areas are directly affected. Although the use of fossil fuels and greenhouse-gas emissions can according to the Act be cited as a cause for denying an environmental permit for an energy-production plant, or the use of fossil fuels can be restricted in permit regulations of energy production plants, this option has been explicitly excluded from the EU ETS sector plants.

The Ministry of Employment and the Economy grants investment subsidies for domestic energy production, i.e. peat and renewable energy. Maximum subsidy of 40% is only available for small plants with new technology. Decisions on subsidy level are made on a case-by-case basis. In 2009 these subsidies totaled EUR 31.1 million.

The Ministry of Agriculture and Forestry grants subsidies for heating plants in farms. In 2009 these subsidies totaled EUR 2.5 million. Ministry of Agriculture and Forestry also grants interest subsidies for loans for the same purpose, in 2009 total of EUR 7 million.

Agriculture is supported in Finland by over 100 different mechanisms. Some of them also support peat production, since some agricultural tractors are also used in peat harvesting and transport.

Act on energy peat storage defines peat storage support as an energy security measure with a purpose of storing part of the annual peat harvest in good production years for use in bad production years, i.e. years with large rainfalls. The support, EUR 0.03/MWh per month, is paid by the National Emergency Supply Agency.

Use of peat as an energy source is supported by state research organizations. The Geological Survey of Finland (GTK) is in charge of peat resource exploration and mapping. Technical Research Centre of Finland (VTT) is in charge of researching technologies for peat harvesting and energy production.

Data documentation

Producer Support Estimates

Electricity Production Subsidy for Waste Plastic and Other Sorted Dry Burnable Waste (L 1260/1996)

The production subsidy is EUR 2.5/MWh for electricity made using sorted dry burnable waste, of which plastic usually makes a significant part.

Tax expenditure 2004-2010 in million euros (Finnish Customs 2011):

2004	2005	2006	2007	2008	2009	2010
0.55	0.63	0.43	0,82	1.00	0.98	0.85

Electricity Production Subsidy for Peat Used in Small CHP Plants (L 1260/1996)

The production subsidy was EUR 2.5/MWh for small and medium-size peat powered CHP plants. This tax expenditure was removed in 2006.

Tax expenditure 2004-2005 in million euros (Finnish Customs 2011)

2004	2005
2.95	1.44

Feed-in Tariff for Large Peat Condensing Power Production (L 322/2007)

The tariff supported four power plants, with electric power production capacity of at least 120 MVA between 2007 and 2010. Support varied based on price of electricity, coal, peat and CO₂ emission rights between EUR 0 and 4.5/MWh. This was charged from all users of transmission grid by national transmission grid operator Fingrid. The charge varied between EUR 0.002 and 0.08/MWh.

Tariff support 2007-2010 in million euros (Fingrid 2011)

2007	2008	2009	2010
1.4	0.2	3.0	0.7

Peat storage support (L 321/2007)

Peat storage support EUR 0.03/MWh per month is paid the National Emergency Supply Agency, subordinate to the Ministry of Employment and the Economy, for storing part of peat harvest. This support mechanism has been in use since 2007.

Tax expenditure 2008-2009 in million euros (NESA 2011)

2008	2009
3.177	0.163

Consumer Support Estimates

Reduced Energy Tax Rate on Diesel Used in Transport (L 1472/1994)

The energy tax rate on diesel between 2008 and 2010 was EUR 34.1/MWh (48%) lower than the benchmark for transport fuels, which is the energy tax rate on gasoline (EUR 70.5/MWh). This tax expenditure will be reduced in 2011, since the tax rate on diesel was increased by 21.7%, while the tax rate of gasoline was not changed. The new tax support is EUR 26.2/MWh (37%). Between 2003 and 2007 the tax rate on gasoline was EUR 66.1/MWh and tax support for diesel was EUR 34.2/MWh (52%).

Tax expenditure 2003-2012: in million euros, (2003-2007: calculated based on Statistics Finland (2011, Table 5.1); 2008-2012: VATT (2010, 2011), based on data from Finnish Customs and Ministry of Finance)

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
777	812	819	845	896	908	883	870	964*	754*

*preliminary estimates by VATT (2011)

Reduced Energy Tax Rate on Kerosene for Domestic Use in Pleasure Aviation (L 1472/1994)

The energy tax rate on pleasure aviation kerosene (jet fuel) for domestic use was between 2008 and 2010 EUR 30.1/MWh (43%) lower than the benchmark for transport fuels, which is the energy tax rate on gasoline. This tax expenditure was removed in 2011, when the tax rate on kerosene was increased by 74%, while tax rate of gasoline remained unchanged. Before 2008 all aviation fuels were exempted from energy tax.

Tax expenditure 2008-2010 in million euros (VATT 2011)

2008	2009	2010	2011	2012
< 0.5	< 0.5	< 0.5	0	0

Reduced Energy Tax Rate on Gasoline for Domestic Use in Pleasure Aviation (L 1472/1994)

The energy tax rate on pleasure aviation gasoline for domestic use was between 2008 and 2010 EUR 20.1/MWh (29%) lower than the benchmark for transport fuels, which is the energy tax rate on gasoline. This tax expenditure was removed in 2011, when the tax rate of aviation kerosene was increased by 44%, while tax rate of gasoline remained unchanged. Before 2008 all flight fuels were exempted from energy tax.

Tax expenditure 2008-2012 in million euros (VATT 2010 and 2011, based on data from Finnish Customs and Ministry of Finance)

2008	2009	2010	2011	2012
< 0.5	< 0.5	< 0.5	0	0

Reduced Energy Tax Rate on Light Fuel Oil Used in Mobile Machines (L 1280/2003 6 and 7 §)

Tractors used in peat harvesting and agriculture, and other mobile machines may use light fuel oil, which is similar to diesel fuel, without paying the fuel levy. The energy-tax rate on light fuel oil was between 2008 and 2010 EUR 61.8/MWh (88%) lower than the benchmark for transport fuels, which is the energy tax rate on gasoline (EUR 70.5/MWh). This tax expenditure will be reduced by 12% in 2011, since the energy tax rate on light fuel oil was increased by 84%, while the tax rate of gasoline was not changed. The new tax support is EUR 54.45/MWh (77%). Between 2003 and 2007 tax rate on gasoline was EUR 66.1/MWh and tax support for light fuel oil was EUR 59/MWh (89%).

Tax expenditure 2008-2012 in million euros (VATT 2011)

2008	2009	2010	2011	2012
628	526	543	409*	409*

*preliminary estimates by VATT (2011)

Reduced Energy Tax Rate on Electricity Used in Transport (L 1260/1996)

The energy tax rate on electricity is EUR 61.2/MWh lower than the benchmark for transport fuels, which is the energy tax rate on gasoline. This tax expenditure will be reduced in 2011, since the energy tax rate on electricity was increased by 93%, while the tax rate of gasoline was not changed.

Tax expenditure 2008-2012 in million euros (VATT 2010 and 2011, based on data from Finnish Customs and Ministry of Finance)

2008	2009	2010	2011	2012
< 0.5	< 0.5	< 0.5	< 0.5*	< 0.5*

*preliminary estimates by VATT (2011)

Reduced Energy Tax Rate on Natural Gas Used in Transport (L 1260/1996)

The energy tax rate on natural gas was between 2008 and 2010 EUR 68/MWh (96%) lower than the benchmark for transport fuels, which is the energy tax rate on gasoline. This tax expenditure will be reduced in 2011, since the energy tax rate on natural gas was increased by 554%, while tax rate of gasoline was not changed. The new tax support is EUR 56.8/MWh (80.5%)

Tax expenditure 2008-2012 in million euros (VATT 2011)

2008	2009	2010	2011	2012
< 0.5	< 0.5	< 0.5	< 0.5*	< 0.5*

*preliminary estimates by VATT (2011)

Reduced Energy Tax Rate on Heavy Fuel Oil (L 1472/1994)

The energy tax rate of heavy fuel oil was between 2008 and 2010 EUR 2.8/MWh lower than the benchmark in heating energy, which is the energy-tax rate on light fuel oil. This tax expenditure was removed in 2011, since the energy-tax rate on heavy fuel oil was increased by 180%. However, tax

expenditure remains for the use of heavy fuel oil in traffic, in practice shipping, since the benchmark is gasoline. This has not been estimated.

Tax expenditure 2008-2012 in million euros (VATT (2010, 2011), based on data from Finnish Customs and Ministry of Finance)

2008	2009	2010	2011	2012
27	20	21	0	0

Reduced Energy Tax Rate on Coal (L 1260/1996)

The energy tax rate of coal was between 2008 and 2010 EUR 1.6/MWh lower than the benchmark in heating energy, which is the energy tax rate on light fuel oil. This tax expenditure was removed in 2011, since the energy-tax rate on coal was increased by 150%.

Tax expenditure 2008-2012 in million euros (VATT 2010 and 2011, based on data from Finnish Customs and Ministry of Finance)

2008	2009	2010	2011	2012
13	13	13	0	0

Reduced Energy Tax Rate on Peat (L 1260/1996 1 §)

Peat was exempted from energy tax from 2005 until 2010. In 2011 energy tax was introduced at a rate of EUR 3.90/MWh. Tax benefit is EUR 12.15/MWh (76%) compared to light fuel oil, which is the benchmark for heating energy. Peat has 77% lower tax rate than coal and 72% lower tax rate than natural gas. Future tax expenditure not estimated.

Reduced Energy Tax Rate on Natural Gas Used for Heating (L 1260/1996)

The energy tax rate of natural gas was between 2008 and 2010 EUR 6.6/MWh (76%) lower than the benchmark in heating energy, which is the energy tax rate on light fuel oil. This tax expenditure will be reduced since the energy tax rate on natural gas was increased by 554% in 2011. The new tax support is EUR 2.3/MWh (14%).

Tax expenditure 2008-2012 in million euros (VATT 2010 and 2011, based on data from Finnish Customs and Ministry of Finance)

2008	2009	2010	2011	2012
129	117	126	68*	67*

*preliminary estimates by VATT (2011)

Reduced Energy Tax for Heating Greenhouses by Heavy and Light Fuel Oil (L 1472/1994 10a §)

Professional greenhouse agriculture is entitled to energy tax rebate on heavy and light fuel oil. In 2011 this rebate was increased and moved to L 603/2006.

Tax expenditure 2004-2009 in million euros (Finnish Customs 2011)

2004	2005	2006	2007	2008	2009
1.7	1.47	1.46	1.37	1.09	1.44

Reduced Electricity Tax for Industrial Consumers (L 1260/1996)

Tax reduction for industrial consumers and professional greenhouse agriculture compared to other consumers was EUR 6.19/MWh between 2008 and 2012. It was increased to EUR 10/MWh in 2011.

Tax expenditure 2008-2012 in million euros (VATT 2010 and 2011, based on data from Finnish Customs and Ministry of Finance)

2008	2009	2010	2011	2012
260	223	241	395*	404*

*preliminary estimates by VATT (2011)

Reduced Energy Tax for Industrial Consumers (L 1260/1996 8a §)

Tax rebate for energy intensive industry for taxes paid for electricity, coal, natural gas, light fuel oil and heavy fuel oil.

Tax expenditure 2004-2009 in million euros (Finnish Customs 2011)

2004	2005	2006	2007	2008	2009
21.8	18.67	17.53	8.38	6.97	4.78

Reduced Energy Tax for Agriculture (L 603/2006 4 §)

Tax rebate for agriculture on light and heavy fuel oil and electricity. This was raised in 2011 and bio-oil used for heating was included, but no other renewable energy sources.

Tax expenditure 2008-2012 in million euros (VATT 2011)

2008	2009	2010	2011	2012
12	17	#	23*	50*

#not estimated *preliminary estimates by VATT (2011) for 2011 and 2012

Reduced CO₂ Tax for Combined Heat and Power Production (L 1260/1996 4 §)

CO₂ tax is halved for CHP production from 2011, if fuel used is coal or natural gas. Until 2010 fuel taxes were the same for CHP production as for separate heat or power production, and therefore CHP use was not supported by tax benefits.

Tax expenditure 2008-2012 in million euros (VATT 2011)

2008	2009	2010	2011	2012
0	0	0	68	67

*preliminary estimates by VATT (2011)

Reduced Vehicle Sales Tax for Cars Used as Taxi (L 1482/1994 28 §)

Cars registered as taxis receive discount of vehicle sales tax. Fuel used in taxis is almost always diesel.

Tax expenditure 2008-2012 in million euros (VATT 2010 and 2011, based on data from Finnish Customs)

2008	2009	2010	2011	2012
30	27	30	32*	33*

*preliminary estimates by VATT (2011)

Reduced Value Added Tax for Commercial Passenger Transport Services (L 1501/1993 § 85a)

Value added tax was 8% until 2010 and is 9% from 1 July 2010 instead of benchmark 23%. Fuels used for such transport are diesel, kerosene, heavy fuel oil and light fuel oil.

Tax expenditure 2009-2012 in million euros (VATT 2011)

2009	2010	2011	2012
218	234	246*	258*

*preliminary estimates by VATT (2011)

Energy Tax Exemption for LPG (L 1472/1994 9 §)

Tax expenditure 2008-2012 in million euros (VATT 2011)

2008	2009	2010	2011	2012
< 0.5	< 0.5	< 0.5	< 0.5*	< 0.5*

*preliminary estimates by VATT (2011)

Energy Tax Exemption for Peat (L 1260/1996 1 §)

Peat was exempted from energy tax from 2005 until 2010. Between 2008 and 2010 the tax benefit was EUR 8.7/MWh compared to the benchmark in heating energy, which is the energy tax rate on light fuel oil. Between 2005 and 2007 tax benefit of peat was EUR 7.06/MWh. In 2011 energy tax was introduced at a rate of EUR 3.90/MWh. Since the tax rate of light fuel oil was raised to EUR 16.05/MWh, tax benefit increased to EUR 12.15/MWh (76%). Peat has 77% lower tax rate than coal and 72% lower tax rate than natural gas. Peat used less than 5000 MWh annually continues to be energy tax exempted.

Tax expenditure 2005-2010 in million euros (calculated based on Statistics Finland (2011, Table 1.1) and Statistics Finland (2011e))

2005	2006	2007	2008	2009	2010
135	184	201	197	173	226

Energy Tax Exemption for Peat used at most 5000 MWh/a (L 1260/1996 15 §)

From 2011 peat used at most 5000 MWh annually in plants of any size and type continues to be energy tax exempted. Until 2010 all peat use was energy tax exempted. Future tax expenditure not estimated.

Energy Security Levy Exemption for Peat (L 1260/1996)

Peat was exempted from energy security levy as a part of total energy tax exemption until 2010. From 2011 energy tax was introduced, but energy security levy exemption remained. Tax

expenditure is estimated based on levy of coal as the benchmark and assuming constant 2009 level consumption.

Tax expenditure 2011-2012: in million euros

2011	2012
3*	3*

* estimated by the author

Energy Tax Exemption for Aviation Fuels in Commercial International Traffic (L 182/2010 19 §)

These fuels have always been exempted from energy taxation. Tax expenditure is considered zero, because this exemption is based on international agreements and therefore benchmark is zero (VATT 2011). Fuel used in international aviation is kerosene.

Energy Tax Exemption for Aviation Fuels in Commercial Domestic Traffic (L 1472/1994 9§)

Tax expenditure is considered zero (VATT 2010). Fuels used in domestic aviation are kerosene and gasoline.

Energy Tax Exemption for Marine Fuels in Commercial International Shipping (L 182/2010 19 §)

These fuels have always been exempted from energy taxation. Tax expenditure is considered zero, because this exemption is based on international agreements and therefore benchmark is zero (VATT 2010). Fuels used in international shipping are heavy fuel oil and light fuel oil.

Energy Tax Exemption for Marine Fuels in Commercial Domestic Shipping (L 1472/1994 9 §)

Commercial vessels use the same taxed fuels as pleasure vessels. Taxes are rebated by application for use of vessels in commercial traffic. These rebates form the tax expenditure. Fuels used in domestic shipping are heavy fuel oil, light fuel oil, diesel and gasoline.

Tax expenditure 2004-2009 in million euros (Finnish Customs 2011)

2004	2005	2006	2007	2008	2009
2.60	2.42	1.98	2.00	2.46	2.66

Electricity Tax Exemption for Rail Transport (L 1260/1996 7 §)

Trains, trams and metros are exempt of electricity tax. Tax benefit compared to ordinary consumers was EUR 8.83/MWh in 2008-2010. It was increased to EUR 17.03/MWh in 2011.

Tax expenditure 2008-2012 in million euros (VATT 2011)

2008	2009	2010	2011	2012
7	6	6	13*	13*

*preliminary estimates by VATT (2011)

Vehicle Tax Exemption for Vehicles Using Peat or Peat Based Fuel (L 1281/2003 12 §)

This exemption is applied to vehicles using peat and/or wood as the main fuel.

Tax expenditure 2008-2012 in million euros (VATT 2010, based on data from Finnish Transport Safety Agency)

2008	2009	2010	2011	2012
< 0.5	< 0.5	< 0.5	< 0.5*	< 0.5*

*preliminary estimates by VATT (2011)

Motive Power Tax Exemption for Vehicles Using Natural Gas (L 1281/2003 12 §)

This exemption was applied from 2004 for cars and vans using natural gas or other methane fuels. It will be removed in 2013.

Tax expenditure 2008-2012 in million euros (VATT 2010 and 2011, based on data from Finnish Transport Safety Agency)

2008	2009	2010	2011	2012
< 0.5	< 0.5	< 0.5	< 0.5*	< 0.5*

*preliminary estimates by VATT (2011)

Vehicle Sales Tax Exemption for Certain Vehicle Types (L 1482/1994 21 §)

Vehicles registered as invalid taxis, ambulances, some other emergency vehicles and some other special vehicle types are vehicle sales tax exempt. Fuel used in these vehicles is almost always diesel. In 2009 about 2800 were registered.

Tax expenditure 2008-2012 in million euros (VATT 2010 and 2011, based on data from Finnish Customs)

2008	2009	2010	2011	2012
61	53	60	63*	65*

*preliminary estimates by VATT (2011)

Value Added Tax Exemption for Domestic Part of International Transport (L 1501/1993 § 66)

There is no value added taxes for international transport services, including domestic part of international transport services. Fuels used for such transport are kerosene and heavy fuel oil.

Tax expenditure 2009-2012 in million euros (VATT 2011)

2009	2010	2011	2012
4	5	5*	5*

*preliminary estimates by VATT (2011)

Motive Power Tax Sanction for Cars and Vans Using Other Motive Power than Gasoline (L 1281/2003 11 §)

Annual motive power tax is collected from cars and vans that use other motive power than gasoline, such as renewable energy sources. This tax sanction has been in force since 1965 and was continued in the energy tax renewal in 2010 to be utilized from 2011. Between 1965 and 2004 sanction rates were so high that renewable energy could not be used in cars and vans except wood gas vehicles that were exempted in 1978. Tax sanctions are actual motive power taxes paid. They do not take into account amounts of vehicles (i.e. vehicles utilizing renewable energy forms) that were not registered due to the sanction.

Tax sanction 2008-2012: in million euros (VATT 2011, based on data from Finnish Transport Safety Agency)

2008	2009	2010	2011	2012
223	228	242	220*	220*

*preliminary estimates by VATT (2011)

Energy Tax Sanction for Renewable Liquid Traffic Fuels (L 1472/1994)

Until 2010 energy tax rates of renewable liquid traffic fuels were based on their volume instead of their energy content and was made the same as liquid fossil fuels they replaced, i.e. gasoline or diesel. Because renewable liquid fuels usually consist of organic molecules containing a lot of oxygen, their energy content per volume is lower than fossil fuels that mostly consist of hydrocarbons. Therefore, renewable fuels had higher taxes per energy content than fossil fuels. For example, ethanol had about 30% higher tax rate than gasoline. The tax sanctions are estimated based on ethanol use only, since the use of other renewable liquid fuels has been very low except for synthetic biodiesel made by Neste Oil that has been used a lot since 2009 (but it is hydrocarbon, i.e. no sanction). Benchmark is the energy tax rate of gasoline. Ethanol has been used almost entirely as low blends (up to 5% vol until 2010 and up to 10% vol from 2011) in gasoline. The amount of E85 (85% vol) vehicles is very low and E100 (100% ethanol) vehicles are not used at all. In 2002-2004 ethanol was exempt from this sanction for technology and market demonstration programme of Neste Oil. This tax sanction was removed in 2011.

Tax sanction 2005-2009 in million euros (calculated based on Statistics Finland 2011, Table 5.1)

2005	2006	2007	2008	2009
0	0.2	0.3	17	21

Fuel Levy Sanction for Renewable Fuels in Mobile Road and Off-Road Use (L 1280/2003)

Gasoline and diesel have been promoted as fuels for mobile applications since 1994 using a fuel levy. Between 1994-1995 all renewable fuels except wood gas, between 1995-2003 all gaseous renewable fuels except wood gas and since 2004 all gaseous renewable fuels except wood gas and biomethane have been subjected to fuel levy in mobile road and off-road use. The daily rate of levy is EUR 100 for motor cycles, EUR 330 for cars, EUR 500 for vans, EUR 670 for buses, EUR 1000 for lorries and EUR 100-670 for work engines. The rate is so high that it has completely prevented the use of gaseous renewable fuels, except in research and demonstration for which temporary exemptions have been provided. Due to the lack of a suitable benchmark, the annual values have not been estimated.

Fuel Levy Sanction for Renewable Gaseous Fuels in Pleasure Use of Private Boats and Ships (L 1307/2007)

Gasoline and diesel have been promoted as fuels for private shipping since 2007 using a fuel levy. It is applied to fuels, which have lower fuel tax than gasoline or diesel, which they replace. In practise it means all gaseous fuels and light fuel oil. The rate of levy is EUR 750-4000 depending on the engine power of the vessel. This levy is paid on each time such fuels are used. It is not paid for each day the fuel is used, like the road and off-road fuel levy. The rate is so high that it has completely prevented the use of gaseous renewable fuels in pleasure boats and ships. Due to the lack of a suitable benchmark, the annual values have not been estimated.

References

Legislature

L 1501/1993: Act on value added tax
L 1472/1994: Act on excise duty of liquid fuels
L 1482/1994: Act on vehicle sales tax
L 1260/1996: Act on excise duty of electricity and some fuels
L 86/2000: Environmental protection act
L 1280/2003: Act on fuel levy
L 1281/2003: Act on motor vehicle tax
L 603/2006: Act on rebate of taxes on some energy sources used in agriculture
L 321/2007: Act on energy peat storage
L 322/2007: Act on feed-in tariff for peat used as fuel in condensing power plants
L 182/2010: Act on excise duty

Other

Fingrid (2011), Peat feed-in-tariff reports at www.fingrid.fi

Finnish Customs (2011) Tax rebates paid by Customs Finland in 2004-2010, personal communication (in Finnish)

NESA (2011) Personal communication, National Emergency Supply Agency.

Statistics Finland (2011), *Energy Statistics Yearbook 2010*, Helsinki (contains energy production and consumption data until 2009)

Statistics Finland (2011e), Electronic database at www.stat.fi

VATT (2010) *Verotuet Suomessa 2009 (Tax expenditure in Finland 2009)*. Kröger, Outi & Rauhanen, Timo (eds.). Valmisteluraportit 5. Valtion taloudellinen tutkimuskeskus VATT (Government Institute for Economic Research), Helsinki, Available at: http://www.vatt.fi/file/vatt_publication_pdf/valm.rap.5.pdf (in Finnish)

VATT (2011) *Verotuet 2008-2012 (Tax expenditure 2008-2012)*. Rauhanen, Timo (ed.). Valtion taloudellinen tutkimuskeskus VATT (Government Institute for Economic Research), Helsinki, Available at: http://www.vatt.fi/file/verotukiselvitys/verotuet%20_vuosina_2008-2012.pdf (in Finnish)

Acknowledgement

This work was funded by the OECD, with the exception of the abstract and the preface, which were written exclusively for this Stromstad Akademy edition. This publication was published with permission from the OECD.