

Nordic Tax Report 2023

Electricity sector

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Introduction

Terms of reference

The objectives of the Nordic Tax Group – WG Taxes&Levies - is to

- collect and exchange information about development and political discussions within the field of energy taxation and subsidy schemes, to
- monitor policy developments on energy taxes and levies at European level as well, including relevant EU regulations, and to
- perform an annual study presenting the tax systems and subsidy schemes in the Nordic countries and the level of taxes.

The study is consisting of

- a description of the national tax systems as of January 2023,
- an up-to-date list of taxes imposed in the electricity sector, taxes and parafiscal charges paid by the electricity companies as well as consumption-based taxes.

Nordic electricity – some key figures

Key figures 2022	Norway	Sweden	Finland	Denmark	SYSTEM
Spotmarketprice Area 1 (EUR/MWh)	192,5	59,1	154,0	219,0	135,9
Spotmarketprice Area 2	211,3	62,0		210,2	
Spotmarketprice Area 3	41,9	129,2			
Spotmarketprice Area 4	24,5	152,1			
Spotmarketprice Area 5	192,1				
Power production, TWh	146,0	168,6	71,7	34,1	420,4
of which Hydropower	128,7	69,6	13,6	0,0	211,9
Wind power	14,8	33,1	11,7	19,0	78,6
Biomass	0,0	13,4	12,4	6,2	32,0
Other renewable	0,2	2,0	1,4	3,2	6,8
Nuclear power	0,0	49,9	24,6	0,0	74,5
Other thermal power	2,3	2,2	8,0	5,7	18,2
Installed capacity, MW	38 240	46 454	21 572	17 148	123 414
of which Hydropower	33 691	16 302	3 301	7	53 301
Wind power	5 083	14 662	5 677	7 101	32 523
Biomass (+ waste for Sweden)	0	3 782	3 520	1 836	9 138
Other renewable ²⁾	300	2 000	500	2 998	5 798
Nuclear power	0	6 885	2 794	0	9 679
Other thermal power	700	2 823	5 780	5 206	14 509
Gross consumption, TWh	133,4	134,7	84,2	35,2	387,5
Net consumption, TWh	122,9	126,5	81,7	34,3	365,4
of which Energy intensive industry ¹⁾	46,9	33,7	36,3		116,9
General consumption	76,0	92,8	45,4	34,3	248,5
Net import, TWh	-12,6	-33,4	12,5	1,1	-32,4

¹⁾ Sweden, definition in accordance to the energy intensive definition in the renewable electricity certificates system

²⁾ Denmark, Biomass and other thermal power capacity is for 2020. The production is preliminary numbers for 2021.

Taxes in the Nordic countries

The tax system on company level differs a lot between the Nordic countries and between technologies. In short one may say that Norwegian Hydro Power experiences the highest tax level due to several specific taxes and Denmark the highest consumption-based taxes with very high energy taxes.

The development during recent years may briefly be summarized as:

- In **Norway** the taxation of hydropower is very high and has been increased several times since the introduction of the resource rent tax in 1997. As from 2021 the resource rent tax is designed as a cash flow tax, which means that the state covers part of the investment expenses and collects the equivalent part of the income the following years. As from 2023 the Government has decided to impose a cashflow tax on wind power production as well. The tax rate for hydro power is 45 per cent, for wind power 40 per cent (in addition to ordinary corporate tax). As from 2023 the Government has also introduced a "high price fee" of 23 per cent for income exceeding 0,7 NOK/kWh (from 28th of September 2022 for hydro power). This adds up to a marginal tax rate of 90 per cent for hydro power and 85 per cent for wind power. The "high price fee" is announced to be removed within 2024.
- In **Sweden** the property tax on hydro power plants was increased several times up to the level of 2,8 per cent from 2011. However, the Parliament in 2017 decided to reverse this extraordinary property tax to the general rate level of 0.5 per cent with a gradual decrease in the period 2017-2020, which was financed with an increased energy tax on electricity consumption. The special tax on nuclear capacity was also reduced by 90% from 1 July 2017 and totally phased out from 1 January 2018. A stepwise decrease of the corporate tax level to 21,4 per cent from 2019 and to 20,6 per cent from 2021 has been implemented. A temporary revenue cap tax for inframarginal electricity production applies during March-June 2023. Since 1 January 2023 the waste incineration tax and the carbon tax for CHP installations within EU ETS are removed.
- In **Finland** the electricity consumption tax for manufacturing industry was decreased from 0,69 cents/kWh to 0,05 cents/kWh in 2021. As from 2015 the electricity consumption tax levied on the consumers and other businesses has been 2.24 cents/kWh. The ordinary income tax has been 20 per cent since 2014. Finland has set a temporary windfall tax for 2023. The tax will be levied on top of the ordinary income tax. The property tax levied on the power plants is mainly higher than a common property tax. Taxes for energy production (fuels and property tax) have almost tripled past thirteen years in Finland.
- In **Denmark** the electricity tax is divided for manufacturing, heating and household consumption. These have been converging towards EU-minimum for years. It is only household consumption (above 4,000 KWh/y) where the rate is at

69.7 øre/kWh (9 cents). However, in the first 6 months of 2023 the rate will be EU-minimum due to the energy crisis. Since 2020, 4 subsidy schemes have been active – phasing out oil- and natural gas boilers. In 2022 these schemes received 50 mio. EUR in additional funding. In addition, the Parliament agreed on a *Green Tax Reform* in June 2022. From 2025 it, among other things, gradually phase out current energy taxation and phase in a new CO₂-tax overall. It will be 50 EUR/tCO₂ to 100 50 EUR/tCO₂ in 2030. Also sectors that are currently exempted by national energy- or CO₂-taxes today such as the heavy industry sector. ETS-companies receive a 50 pct. deduction in the national tax. The Parliament agreed to work towards ≈ 105 TWh from solar- and wind production in 2030. 2022 was record setting with 22 TWh. At the same time, in early 2023 the government halted the “åben-dør” scheme – a procedure where the project developer takes the initiative and submits an unsolicited application for a license to carry out preliminary investigations in the given area- even though there is a total of 20 GW of projects in the portfolio.

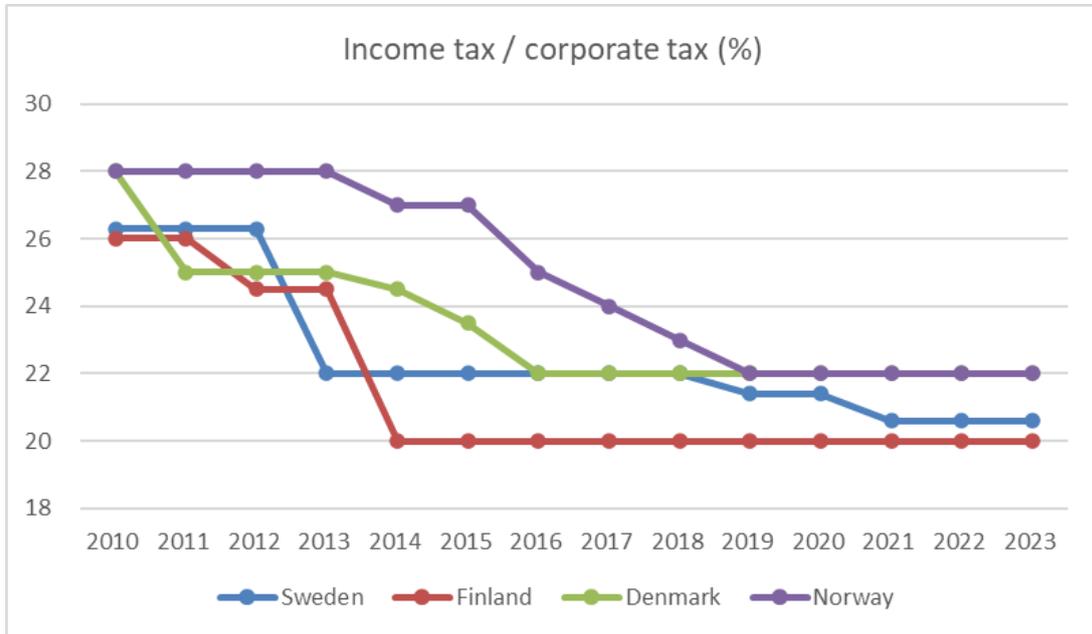
Increased subsidies for household to invest in renewable energies seems to be a general tendency in the Nordic countries. Different kinds of subsidies like direct support, energy tax exemptions and different kinds of general tax deductions are incentives to boost small scale production (for household consumption).

Some general tax rates 2023	Norway	Sweden	Finland	Denmark
Ordinary income tax, per cent	22,0	20,6	20,0	22,0
VAT, per cent	25,0	25,0	24,0	25,0
Energy tax households, EUR/MWh ²⁾	15,9	38,3	22,4	1,0/91,0
Energy tax manufacturing industry, EUR/MWh	0,5	0,6	0,5	0,5

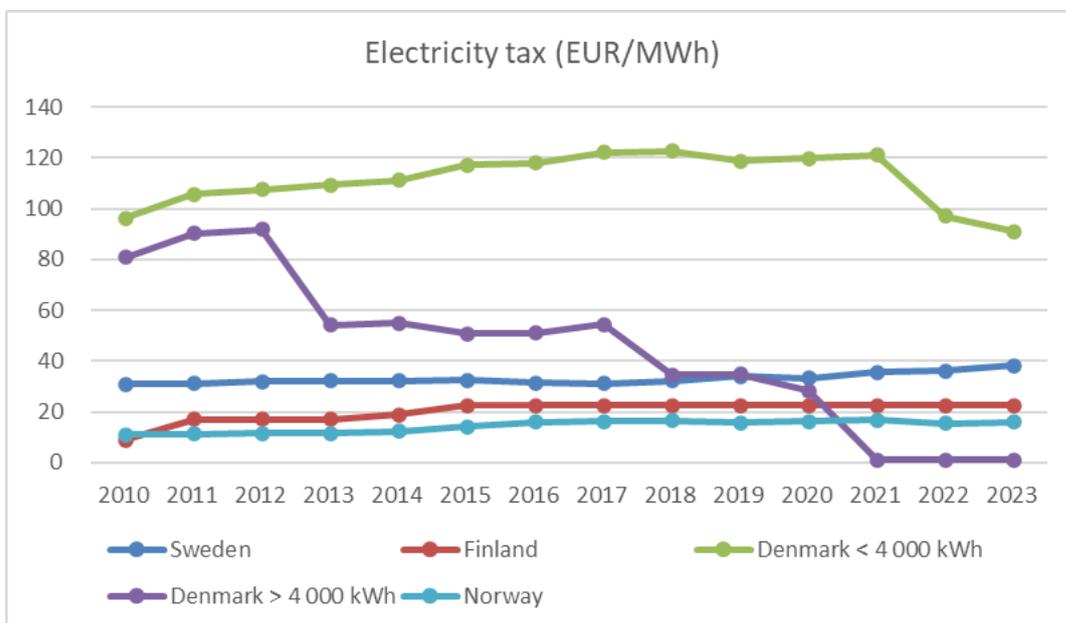
²⁾ Major consumption. Details and exemptions are described in text.

Denmark: The lower tax rate is paid by households using electricity for heating and only for consumption above 4 000 kWh/y. The higher rate is paid by all other household consumption

During recent years, many European countries have experienced a development towards lower income tax (corporate tax) as part of a policy to increase competitiveness and attract new industries. In the Nordic countries, Finland is in front (as from 2014):



When it comes to electricity tax, the level differs a lot between the Nordic countries:



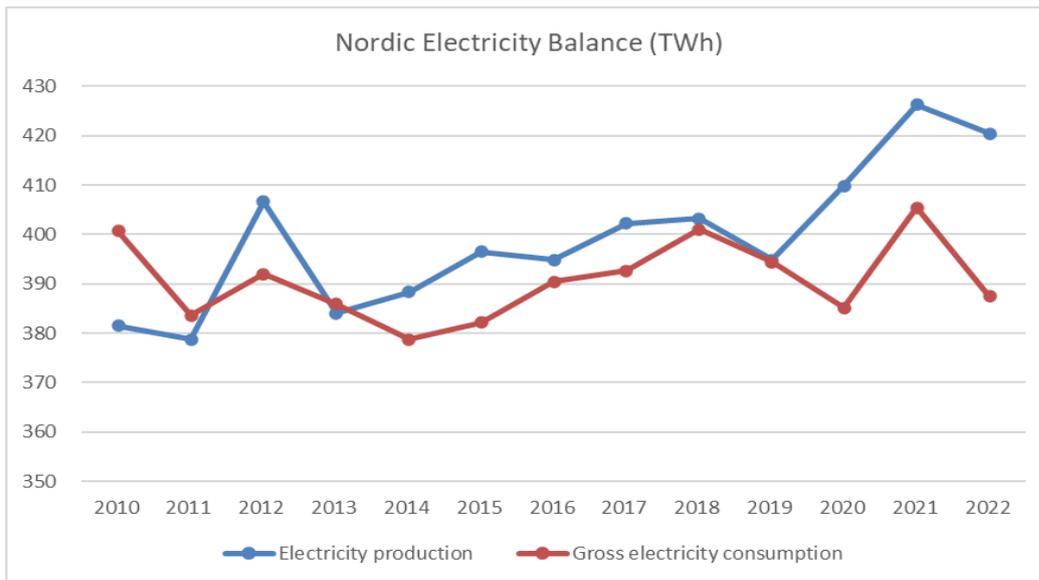
The electricity taxes in the Nordic countries, except Finland, are normally index regulated by the expected rate of inflation. The substantial drop in the Danish lower rate as from 2013, from 2018 and from 2021 is the most significant abruption from this development

during the last 10 years period. In general, the electricity tax in Denmark is *very* high. The lower rate applies for household use of electricity exceeding 4 000 kWh/y. At the same time, the household has to be registered as electrical heated, directly or via a heat pump. In 2022 the Parliament has reduced the electricity tax twice. First by 18,8 EUR/MWh and then 5,4 EUR/MWh. The reductions were implemented the third and fourth quarter of 2022.

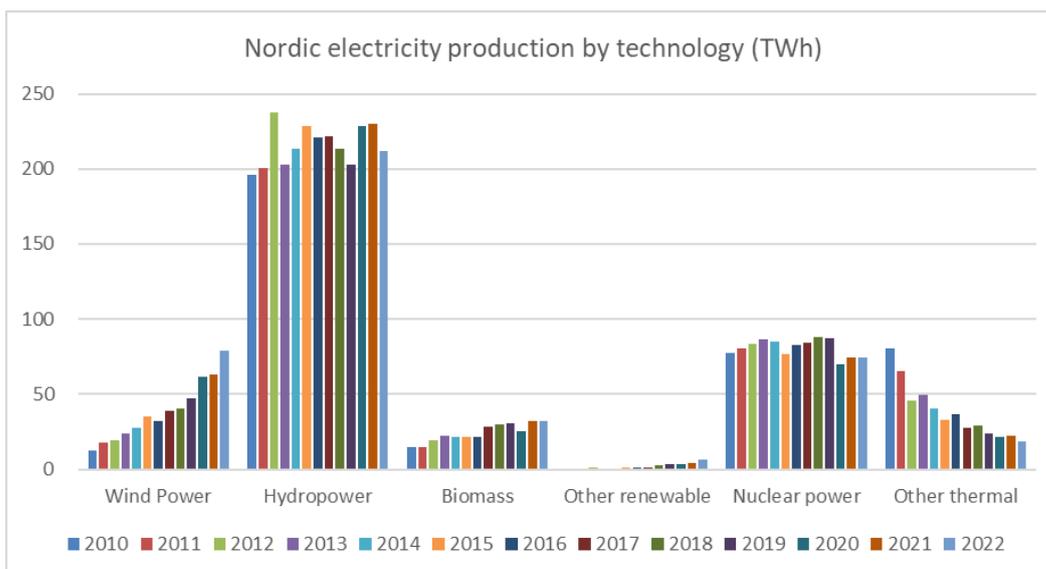
Traditionally tax competition occurs in corporate taxation but in past years it has expanded to energy taxation as well. Nordic countries have tried to attract data centers to invest with lower electricity taxes for manufacturing industry. Target of this competition is to make investment framework suitable and attractive for investors.

Nordic electricity production and balance

The Nordic electricity production is somewhat above 400 TWh and increasing, however a small drop in 2022 due to lower hydro power production. After a period of slightly decrease during the Covid-pandemic, the consumption increased a lot in 2021. Due to extremely high prices, the consumption decreased in 2022. The last years we have experienced a positive electricity balance around 20 TWh, 2022 is the record for this period with a positive balance of 33 TWh. For the years ahead, an increase in consumption is expected due to electrification and new, energy-intensive industries:

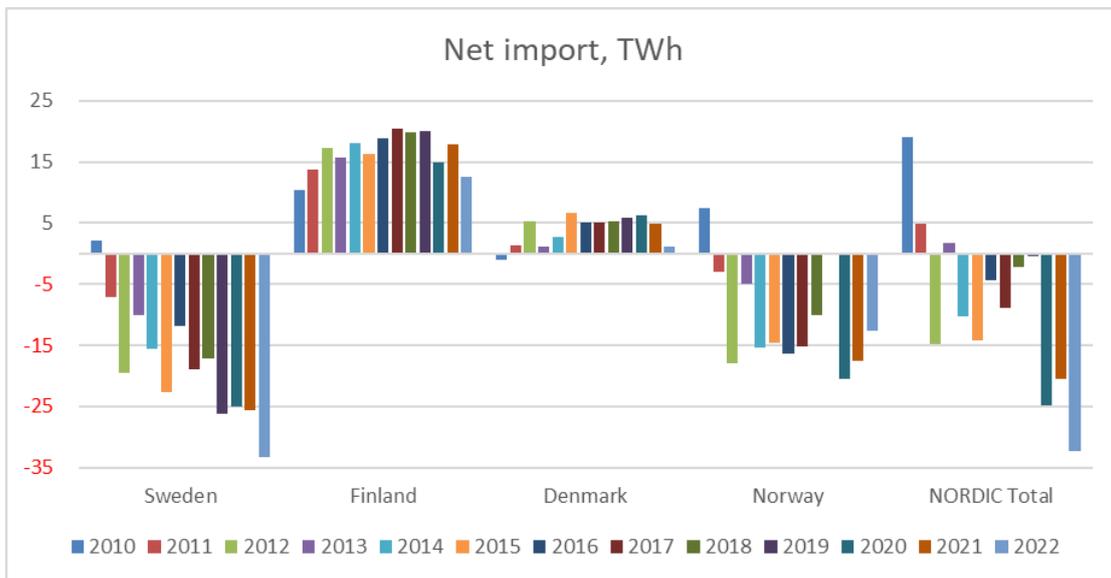


A closer look at the electricity production reveals a relatively strong increase in wind power during this period, and a similar decrease in other thermal power production. Hydropower is the major technology and varies a lot as expected:



As indicated in the electricity balance figure, the Nordic area has been in a net export situation for most of the years during this period. Finland has been in a stable net import situation, Denmark as well, while the balance in Sweden and Norway differs a lot, mainly due to variances in the hydropower production.

The Nordic electricity production has increased during the last couple of years. This development is expected to continue the next years due to investments in new, subsidised renewable energy and increased production from nuclear power plants in Finland. Increased electricity production is a necessity to meet the expected increased consumption due to electrification etc.



Structure of the report

The following information is divided in three parts and includes the following types of taxes for each country:

- A. Specific taxes and levies on production of electricity
 - Property taxes (e.g. land and real estate tax)
 - Environmental taxes
 - Other taxes (e.g. nuclear production taxes, tax on pollutant activity)
 - Parafiscal levies

- B. Specific taxes and levies on transport and consumption of electricity
 - Consumption taxes (e.g. tax on electricity consumption, mineral oil tax)
 - Environmental taxes
 - Other consumption taxes (e.g. energy contribution tax, levy, VAT)

- C. Subsidies

This report focuses on 2023 rates and regulations. In the end of each section, changes under political discussion, are described.

TAXES AND LEVIES ON ELECTRICITY IN NORWAY 2023

This report focuses on specific taxes and levies on the production, transport and sale of electricity in Norway.

The electricity sector is an important contributor to the State and many municipalities. 2022 was a profitable year, characterized by extraordinary high market prices and equivalent taxes and value of licence power supply (estimates):

Taxes and levies 2022, million EUR	Total	State	Municipalities
Property tax	300		300
Natural resource tax	170		170
Licence fees	90	20	70
Licence power supply	1 200		1 200
Corporate income tax	2 130	2 130	
Resource rent tax	5 200	5 200	
Fee to energy fund (Enova)	60	60	
Energy tax	1 000	1 000	
Total	10 150	8 410	1 740

A. Specific taxes and levies on production of electricity

Hydroelectric power generates 90 per cent of Norway's electricity production, and income from hydropower plants are subject to a variety of special rules concerning taxation. In addition to ordinary income tax (22 per cent) hydro power production is subject to the following taxes:

- Property tax, 0.7 per cent to the municipalities.
- Licence fees, approximately 0.7 €/MWh, mainly to the municipalities.
- Resource rent tax, 45 per cent on profit exceeding a tax-free revenue annually decided by the Ministry of Finance, to the state. Cash flow tax as from 2021.
- Natural resource tax, 1.3 €/MWh, to the municipalities and counties.
- Licence power supply, until 10 per cent of production to the municipalities at a very low price (app 11 €/MWh), part of it to the counties.
- Temporarily production fee (2023-2024), 23 per cent of income exceeding 0,7 NOK/kWh.

Wind power is also subject to property tax in accordance with general rules (0.7 per cent), in addition to ordinary income tax. As from 2022, wind power is also subject to a production tax of 0,01 NOK/kWh. This rate was increased to 0,02 NOK/kWh as from 2023.

As from 2023 the government has decided to implement a resource rent tax for wind power, following the principles for hydro power, designed as a cash flow tax (40%).

1. Property taxes

The municipalities may decide to levy a municipal property tax, and most municipalities where a power plant is situated, take this opportunity. The rate is 0.7 per cent, based on a calculated market value. This calculated value, a NPV where spotmarket price for a period of 5 years and a rate of interest set by the Ministry of Finance are the central elements, may vary between a minimum value of 0.95 NOK/kWh and a maximum value of 2.74 NOK/kWh (average production for the 5-year period).

For wind power plants, the tax base is set by the investment cost.

2. Environmental taxes

Licence fees

Licence fees represent a compensation for exploiting the waterfalls. Licence fees are paid annual to the local authorities and to the state. The basis for the taxation is the net power potential (in natural HP) of the river flow exploited.

3. Other taxes

Resource rent tax / cash flow tax

The resource rent tax was initially a tax on the possible extraordinary profit a company may achieve by exploiting a natural resource, the waterfalls. As from 2007 this principle was changed to a tax on profit exceeding a tax-free revenue annually decided by the Ministry of Finance. As from 2021, the resource rent tax for new investments was changed into a cash flow tax.

The resource rent tax for investments until 2020 is calculated at a rate of 45 per cent (increased from 37 per cent as from 2022) on the net resource rent revenue generated by each power plant. Resource rent revenue is calculated on the base of the individual power plant's production hour by hour, multiplied by the spot price for the corresponding hour, with some exception like delivery of licence power and some long-term contracts when the actual contract price is applied. This calculated revenue is thereafter reduced by the actual operating costs, depreciation and tax-free revenues, in order to arrive at the tax base for net resource rent tax. For 2022 the tax-free revenues were decided by the Ministry of Finance to 2.2 per cent of the value of the plant's operating assets for taxation purposes. Interest expenses are not deductible in the tax base for the resource rent tax. Negative net resource rent revenues in one plant can be offset against positive revenues in other plants. Income from electricity certificates (hydropower plants) is also subject to resource rent tax.

The resource rent tax together with ordinary income tax adds up to a marginal income tax of 67 per cent. For most hydropower plants, the actual interest expenses far exceed the very low tax-free revenues deductible in the tax base for the resource rent tax. For most companies, the consequence is effective tax rates *higher* than the marginal tax rate of 67 per cent, *increasing* by lower income before tax. For some hydropower plants, the effective tax rate the last years has exceeded 100 per cent.

As from 2021 the resource rent tax is designed as a cash flow tax. All new investments related to hydropower production can be deducted immediately for resource rent tax purposes. The tax rate is 45 per cent. A cash flow tax implies that the state covers part of the investment expenses and collects the equivalent part of the income the following years

The resource rent tax applies to hydropower plants with generators > 10 000 kVA.

As from 2023, the government has decided to impose a resource rent tax on wind power plants as well. As for hydro power, the tax is designed as a cash flow tax and the rate is set to 40 per cent.

Natural resource tax

The natural resource tax is to be a stable element in the municipalities' tax income from the hydropower plants. The tax is profit-independent, calculated on basis of the individual power plant's average production over the last seven years. The tax rate is 0.013 NOK/kWh (1.3 EUR/MWh). For most companies, the natural resource tax does not impose any additional burden since it is deductible from income tax. Any natural resource tax that exceeds income tax can be carried forward, together with interest, for deduction in later years.

Production fees

A production fee of 0,01 NOK per kWh for wind power production was introduced 2022. As from 2023 this fee is increased to 0,02 NOK per kWh.

At a press conference 28th of September 2022, the Prime Minister and Minister of Finance announced a number of tax changes, some of them due to extraordinary high power prices. One new fee was a production fee, a kind of "high price fee" for income exceeding 0,7 NOK/kWh (70 EUR/MWh). The rate is 23 per cent, which together with corporate tax and resource rent tax adds up to a marginal tax of 90 per cent for hydro power and 85 per cent for wind power.

This "high price fee" is effective for hydro power as from 28th of September 2022 and from 1th of January 2023 for wind power. The Government has announced the fee to be removed within 2024.

4. Parafiscal levies

Licence power supply

Local authorities affected by hydroelectric development are also entitled to buy a proportion of the power generated. The licensee can be required to sell up to 10 per cent of the electricity generated to the local authorities concerned. The power recipient pays a relatively low price (app 11 EUR/MWh), set in accordance with regulations from the central authorities.

For the licensee – the hydropower company – the difference between the price for this licensed power supply and the market price represents a loss of income.

B. Specific taxes and levies on transport and consumption of electricity

1. Property taxes

As for production plants, the municipalities may decide to levy a property tax on the grid network. Approximately 80 per cent of the Norwegian municipalities take this opportunity. The rate is 0.7 per cent.

2. Tax on electricity consumption (energy tax)

The grid companies are responsible for collecting the energy tax. Parts of the industrial consumption and households in some of the municipalities in the north-most part of Norway, are exempted. The rate is increased from NOK 0,1541 in 2022 to NOK 0.1589 per kWh (15.9 EUR/MWh) in 2023; 0.00546 NOK per kWh (0.5 EUR/MWh) for manufacturing industry.

Due to very high electricity prices, the ordinary electricity tax is reduced to NOK 0,0916 (9,2 EUR/MWh) for the period of January – March 2023.

3. Other taxes

Fee to energy fund

Activities at the state-owned Enova company are partly financed through an energy fund, which receives income generated by a levy of NOK 0.01 per kWh in 2021 (1.0 EUR/MWh), on the grid tariff. Industrial customers pay a fixed price, NOK 800 per year. Enova is charged with promoting more efficient energy use and to some extent R&D and subsidies in new, renewable energy forms. The grid companies collect this fee.

Value added tax (VAT)

25 % - not levied in the three north-most counties of Norway.

Green Certificates

As a consequence of the common green certificate market between Norway and Sweden, the consumers have to pay for these certificates, included in the electricity bill. The price has been very low for the last year. Exemptions from this obligation are almost the same as for energy tax.

C. Subsidies

A common electricity certificate market between Sweden and Norway was introduced as from 2012 (described under Sweden, 3.2).

1. Consumption from small scale production

Consumption from small scale hydropower production (< 100 kVA) is exempted from energy tax. This exemption includes consumption from small solar cell plants for household consumption as well (limited to the household's own consumption).

2. Subsidies for investment in small scale production

Small scale production (renewable energy) in solar cell plants or in small wind power plants, is (2023) entitled to an investment support of NOK 7 500 (EUR 750). In addition, you get a support of NOK 2 000 (EUR 200) per kW installed capacity, until 20 kW. The total, maximum support adds up to NOK 47 500 (EUR 4 750).

Industrial customers may get support exceeding this level, from a variety of support schemes offered by Enova.

3. Support scheme for household consumers

Due to very high electricity prices, starting in the autumn 2021, the Government introduced a compensation of 55 per cent of the spot market price exceeding 0,7 NOK (70 EUR/MWh), to household consumers. Maximum consumption was set to 5 000 kWh per month.

As from January 2022, the compensation rate was increased to 80 per cent of the spot market price exceeding 0,7 NOK, and the compensation scheme was extended to farmers. As from September 2022, the Parliament decided to improve the compensation to 90 per cent of the spot market price exceeding 0,7 NOK and this is still the level for 2023.

This support scheme is administered by the grid companies.

TAXES AND LEVIES ON ELECTRICITY IN SWEDEN 2023

This report focuses on specific taxes and levies on the production and sale of electricity in Sweden.

The Swedish energy taxation is regulated in the Act on Excise Duties on Energy (SFS 1994:1776). In the Act Sweden has implemented the harmonised taxation of energy products (fossil fuels like petrol, diesel, heating oils, coal and natural gas) and electricity. From 1 January 2004 the energy taxation directive, 2003/96/EC, has been implemented in the Swedish energy taxation legislation. The administration of harmonised excise duties is regulated in directive 2008/118/EC which has been revised directive in (EU) 2020/262 on general arrangements for excise duty. The revised directive has been implemented in 2022 and will enter into force in most parts in 2023.

The rates for energy and carbon dioxide tax have been adjusted for yearly indexing according to the Energy Tax Act (1994:1776).

The tax rates in Euro in this report are calculated with the **exchange rate 10,63 SEK** per EUR year 2022 (average 2022).

Taxes and levies 2022:

	SEK million
Property tax on hydropower plants, state tax	800
Property tax on nuclear power plants, state tax	100
Property tax on CHP plants, state tax	50
Property tax on wind power plants, state tax	210
Nuclear waste fees	2 050
Certain charges for government financing	300
Electrical safety tax, network monitoring fees etc	340
Tax on fossil fuels and some biofuels, state tax	130
Energy tax on electricity, state tax	27 000
Total excl. VAT	MSEK/ MEUR 30 980/ 2 917

A. Specific taxes and levies on production of electricity

1. Property taxes

A tax on real estate is levied on the industry including electricity companies. The tax is 0.5 % of the real estate property value excluding wind power. For wind power plants the real estate tax is 0.2%. For companies owning many wind mills the tax is 0.5% according to a legal position from the Tax Authority in March 2015 if the tax reduction with using the tax rate 0.2% will exceed the de-minimis limit stipulated in the rules for EU state aid.

For hydro power the tax was decreased to 2,2% from 1 July 2017 and then gradually down to 0,5% in 2020 of the real estate values. Due to updated estimations in 2013 (AFT13) of the values of the hydro power plants, the real estate values increased in 2013 up to 70%. In 2019 (AFT19) the renewed estimations were decreased by about 27%, for hydro power plants mainly due to lower electricity prices the past six year period.

The reduced taxes on hydro and nuclear (see chapter A.3.1) were financed by increases of the electricity energy tax on all consumers except the manufacturing industry, data centers and agriculture. The increase was implemented in two steps and the total amount was 4.2 öre/kWh.

2. Environmental taxes

There are three different kinds of excise duties, which are levied on fuels – energy tax, carbon dioxide tax and sulphur tax. There is also a nitrogen fee. The energy tax has been collected for many years, while the carbon dioxide tax was introduced in 1991. The carbon dioxide tax rates correspond from January 1st 2022 to approx. 1.20 SEK (0.11 EUR) per kilogram carbon dioxide released. Biofuels and peat are not taxed. However, the Parliament decided to introduce full energy and carbon tax for cropbased biofuels for heating from 1 January 2021 due to the end of the EU state-aid energy and environmental guidelines (EEAG) by 31 December 2020.

According to the Act on Excise Duties on Energy relief from energy tax and carbon dioxide tax is granted for fuels used for the production of electricity. However, 5 % of the fossil fuel is taxed (CO₂ tax and energy tax) in condensing plant and 1.5 % (from 1 July 2002) in the CHPs.

When the tax reduction is calculated the fuel consumption in the CHP plant shall be allocated to the production of heat and electricity respectively through proportioning. The proportion of the fuel that is related to the electricity produced is fully exempted from tax except the 1.5% share as mentioned before.

A uniform energy tax on fossil fuels was introduced from January 1st 2011. The level in 2017 was 8.3 öre/kWh (100 öre = 0,1063 EUR). For the industry, agriculture, CHP included in the EU ETS a 70% deduction was decided but phased out in two steps with full removal of deduction from 1st January 2022.

A 100 % reduction of the carbon dioxide tax was granted from January 2013 for fuels used for the production of heat in a combined heat and power plant (CHP) within the EU ETS system. From 2018 the reduction was decreased to 89%. Since 1st August 2019 the reduction was reduced dramatically to only 9%. As a consequence, and according to previous phase out plans, most of the few remaining fossil fuel-based CHP plants have shut down or converted to biofuels. However, the new Swedish Government decided to fully remove the carbon tax for both CHP and DH plants within EU ETS from 1 January 2023 as a measure to make more peak-load capacity available in the electricity market.

A 100 % reduction of the carbon dioxide tax was granted already from January 2011 for fuels used in the industry, including industry CHP, within the EU ETS system and are not affected by the reintroduced and increased CO₂-tax for CHP plants in 2018-2019.

From 1st of January 2011 the electricity efficiency in a CHP must be minimum 15 %, otherwise no reduction of the carbon dioxide tax will apply.

From year 2011 a 70 % reduction of the carbon dioxide tax is granted for heating purpose for fuel used in the industry and CHP outside the ETS system has been used. From the year 2015 this reduction was lowered to 40%. This reduction was further lowered to 20% from the year 2016 and was totally abolished from 2018.

Tax reductions can be applicable to energy intensive enterprises. This means that the remaining carbon dioxide tax must be at least 0.5 % of the value added for the manufactured products. If the paid carbon dioxide tax exceeds 1.2 % of the sales value of the products being sold by the enterprise. These reductions have been phased out from the year 2015.

The consumption tax on electricity is normally changed annually by an index.

The carbon dioxide tax has been increased by the rate of inflation. The tax is in 2022 approximately 120 öre/kg CO₂.

The sulphur tax on peat, coal, petroleum coke and other solid or gaseous products is set at 30 SEK (2,8 EUR) per kilogram of sulphur in the fuel. The sulphur tax on liquid fuels – such as diesel and heating oils – is 27 SEK (2.5 EUR) per m³ of oil for each tenth of a per cent by weight of the sulphur content. However, oil products with a sulphur content of a maximum of 0.05 % by weight are exempted from tax. Oils with a sulphur content above 0.05 % but below 0.2 % are taxed as oils with a sulphur content of 0.2 %.

The nitrogen fee is levied at SEK 50 (4,7 EUR) per kg of nitrogen oxides (designated as NO₂) from use of boilers and gas turbines with a utilized energy output of more than 25 GWh/year. The bulk of the fees are repaid to the taxable entities in proportion to their share of utilized energy. A governmental report (SOU 2017:83) proposed to replace the nitrogen fee with a nitrogen tax, but was not taken further. However, the Swedish Environmental Agency in August 2022 submitted a report to take steps to transform the nitrogen fee with a reduced repayment level to 60% to a tax. The proposal has been sent on consultation by the Government to stakeholders for comments.

In December 2017 a proposal on a new tax on waste incineration was proposed by a Commission of Inquiry (SOU 2017:83), which affects about 30 CHP plants. As part of the January agreement in 2019 between the Social Democrats, Green Party, Center Party and the Liberal party a waste incineration tax was introduced in April 2020. The tax level is 75 SEK per ton in 2020, 100 SEK per ton in 2021 and 125 SEK per ton from 2022 and then adjusted by index annually from 2023. The Tax Authority concluded in an evaluation report presented in October 2021 the tax to be inefficient and not steering to the set climate, energy and environmental goals. The new Swedish Government proposed in the Budget Bill for 2023 to remove the waste incineration tax which was taking effect

from 1st January 2023, based both on the evaluation made by the tax authority and the need for creating better conditions for local plannable electricity production.

3. Other taxes

3.1 Nuclear tax and fees

Apart from the energy tax, which is levied on the consumption of energy, there has been an additional tax on electricity, which is applied to the production of electricity in a nuclear plant. The duty rate applicable was 12 648 SEK (1 190 EUR) from January 1st 2008 per megawatt of thermal capacity and calendar month.

In the political agreement mentioned in chapter A.1 there was also a reduction of this special tax on nuclear. According to the agreement the tax was lowered to 1500 SEK (141 EUR) per megawatt of thermal capacity and calendar month from 1 July 2017. From 1 January 2018 the tax was taken away totally.

In order to cover future costs for final storage of spent fuel and decommissioning of the nuclear power plants, each plant is charged an individual fee. As a weighted average for the Swedish nuclear the fee in 2014 was 2.2 öre/kWh (0.0022 EUR per kWh), and almost doubled to 4.0 öre/kWh from the year 2015. Further increases were decided as a result of the decision by the owners of Ringhals and Oskarshamn nuclear power plants to close four reactors earlier than expected due to low electricity prices and the high tax on nuclear. The Government decided in December 2017 to increase the weighted average to 5 öre/kWh (0.0049 EUR per kWh) for the period 2018-2020. For 2021 the fees are lowered to between 3,0 to 4,7 öre per kWh for the three different Swedish nuclear power plants and for 2022-2023 the average fee level is set to 4,1 öre/kWh.

3.2 Temporary revenue cap for electricity producers in 2023

As an energy crisis measure the Swedish Government in February 2023 put forward a Bill to the Parliament with a new tax legislation with a temporary revenue cap for infra-marginal electricity producers for the period March-June 2023. The tax level is set at 90% for actual revenues exceeding the cap on 1 957 SEK/MWh (180 EUR/MWh).

4. Parafiscal levies

5. Income taxes

All companies are subject to income tax on their profits. The rate of taxation was lowered in 2013 from 26.3 % to 22%. In 2018 a stepwise decrease of the corporate tax level to 21,4 per cent from 2019 and to 20,6 per cent from 2021 was decided together with new interest rate deduction limitations. The amount may be reduced by for example temporary amount set aside (funds). A physical shareholder is then obliged to pay tax on the share dividend. The rate of taxation for dividends is 30 % (tax on capital). In practice this double taxation implies that the company profit is taxed by approximately 50 % tax.

B. Specific taxes and levies on consumption of electricity

1. Value-Added Tax (VAT)

Value added tax (VAT) is levied on all kinds of energy consumption with the exception of fuels used for air navigation. The tax rate is 25 %.

Environmental Taxes

Taxes on electricity – Energy Tax

Energy tax is levied on the consumption of electricity in Sweden. The rates vary according to for example the type of consumption (industrial or households). The network operators are responsible for collecting the energy tax. The consumer price index is used for adjusting the energy tax, which has led to an increase in the tax of electricity most years.

On 1 January 2012 Sweden introduced a reduced rate of electricity tax for electric power used in seagoing vessels with a gross tonnage of at least 400, when the vessel is lying at berth in a port and the voltage of the electric power transmitted to the vessel is at least 380 volts. The tax reduction was approved (2011/384/EU) by the Council of the European Union on 20 June 2011 in accordance with Article 19 of Directive 2003/96/EC and has been extended.

Energy tax rates in Swedish crowns (SEK) and Euro on electricity, 1 January 2023

Type of consumption	Energy tax SEK per kWh	EUR per kWh
1. Manufacturing industry and agriculture including commercial greenhouse cultivation	0.006	0.0006
2. Ships in harbours and connected to the grid	0.006	0.0006
3. Other consumption than specified under 1, in the northern regions of Sweden	0.296	0.0278
4. Other consumption than specified under 1, in the middle and southern parts of Sweden	0.392	0.0383

Exemptions from energy tax is granted if the electricity is produced in a certain manner or used for specific purposes, namely

1. produced and consumed on board a craft or other means of transportation,
2. used in connection with the production of electricity,

3. produced in a reserve power station,
4. generation of electricity in non-commercial power plants <250 kW for wind and waves and < 500 kW for solar is exempted from energy tax regarding its own electricity consumption and
5. supply of electricity <100 kW without compensation is exempted from energy tax

A survey regarding the re-design of the energy tax on electricity was started up during 2014 and delivered a proposal in October 2015. According to the proposals in this survey data centers should be included in category 1 and have their tax reduced to 0.005 SEK/kWh. Further it was suggested to abolish the special and lower electricity tax (0.194 instead of 0.294 SEK/kWh in 2015) for certain consumers in the northern parts of Sweden. The reason for this proposal is some difficulties with EU's state aid rules. Finally, the electricity suppliers will not be responsible to judge if a company is entitled to pay tax according to category 1 or the other categories. The supplier charges "full" electricity tax and then it is up to the company to claim a refund from the tax authorities. All these proposals were decided and implemented from 1 January 2017. However, the lower electricity tax in the northern parts of Sweden remains but as a general deduction by 9,6 öre/kWh which is in accordance with the EU state aid rules. From 1 January 2018 the responsibility to charge the customers the electricity tax was moved from the supplier to the network companies.

From 1 January 2019 a new possibility was introduced to achieve tax deduction from energy tax on electricity used for battery storages if the electricity is fed into an electricity network after being stored.

The Parliament decided in November 2020 an increase of the minimum rate for energy tax on electricity from 0,5 to 0,6 öre per kWh from 1 January 2021 with reference to have a margin to the minimum rate in the Energy Taxation Directive and to increase the steering effect to achieve more efficient energy use.

In the Budget Bill for 2023 which was approved by the Parliament a decision was made to remove the energy tax deduction on electricity used in data centers. This change will take effect from 1st July 2023 and full energy tax on 39,2 öre/kWh will then apply.

Other taxes, charges and support schemes

3.1 Charges to authorities

The electricity consumers are during 2022 paying charges to finance authorities (security regulations, supervision of the network etc). The charges are paid via the network companies. For the high voltage consumer, the charge is 2 129 SEK (210 EUR) per year and for the low voltage consumer the charge is 39,2 SEK (3,86 EUR) per year. The total amount of charges is estimated to about 340 million SEK (32 million EUR) during 2022.

3.2 Electricity certificate system (REC)

An electricity certificate system was introduced on 1 May 2003. This system replaced previous support systems for renewable electricity production. A producer of renewable electricity receives a certificate for the electricity that is produced. Each MWh of renewable electricity provides an electricity certificate, offered by the market. When the system was introduced, the quota obligation was assigned the electricity end-users (customers).

From January 2007 a change was implemented so that the quota obligation was shifted from the customers to the electricity suppliers. Each electricity supplier is obliged to purchase a certain quota/percentage of certificates corresponding his total electricity sales and usage.

In March 2010 the Swedish government presented a further developed system. The new target was 25 TWh additional renewable electricity year 2020 compared to the 2002 level and the system should be in operation up to 2035.

For 2022, the compulsory quota was 0.262 or 26,2 percent. Until 2012 the system has increased renewable electricity by just over 13 TWh in Sweden compared to the 2002 level, mainly in biomass fired CHP plants and wind. From 2012 up to 2019 there has been installed a further 28,5 TWh renewable electricity production in Sweden. The electricity-intensive industries are exempted from the quota obligation for electricity used in manufacturing processes, but not for their other electricity usage.

In 2021 around SEK 414 million (39 million EUR) was paid by electricity consumers in Sweden per year for the electricity certificate system. This corresponds to 0,5 öre/kWh plus VAT (0.0047 EUR per kWh).

In 2009 the Swedish and Norwegian Ministers for Energy agreed to strive towards a common Swedish-Norwegian green certificates market. This was realised on the 1st of January 2012.

The target was 26.4 TWh renewable electricity production between 1 January 2012 and 2020 in the joint system. In 2015 there was a new agreement between Sweden and Norway in which the target for new renewable electricity production is increased by 2 TWh to 28.4 TWh. Linked to this agreement is that the Swedish government has promised to take away some tax reductions for certain wind power which took effect in July 2016. In June 2017 the Swedish parliament approved a new target with an additional

18 TWh renewable electricity production to 2030. In November 2020 the Swedish Parliament decided on a proposal to introduce a date stop rule by 31 December 2021, in line with the present stop rule in Norway. This means the electricity certificate system also was decided to end by 2035 instead of 2045. In June 2022 the Swedish Energy Agency presented a report to the Government with some proposals of adjustment of the system including a review of if the system could be phased out earlier than in 2035. This is expected to be decided upon in next follow-up of the system during 2023.

3.3 Subsidies for micro-production of renewable electricity

Since 1 January 2015 there is an extra support for micro production of renewable electricity. This support applies to both private owners of facilities for production of renewable electricity and companies. The support is in the form of a tax reduction of 60 öre/kWh (0.059 EUR per kWh) for the renewable electricity that has been inserted to the grid in the same connection point up to maximum 30 000 kWh per year. However, the tax reduction is not based on higher amount of kWh than has been taken out per year from the grid at the connection point. In addition, from 1 July 2017 the electricity tax can be reduced to 0.5 öre/kWh (0,6 öre/kWh from 1st January 2021) for own consumption if one installs several separate installations which is owned by the same legal person, which is limited to maximum 255 kW per PV installation. In May 2021 the Parliament decided to increase the capacity thresholds from 1st of July 2021 to 500 kW for PV, to 250 kW for wind power and to 100 kW for small scale hydro power and CHP. In addition to this the electricity tax on 0,6 öre/kWh for own consumption for owners of several separate installations below the thresholds which are owned by the same legal person, was fully removed from 1st of July 2021.

The investment support for PV installations covering 20% of investment costs was stopped in July 2020. The Parliament decided to replace the support scheme with a tax deduction for private house owners covering both material and labour costs for PV installations with a limit on 50 000 SEK per year from 1 January 2021. The tax deduction scheme is also covering installations in charging points for electric cars and battery storages and has replaced previous investments support schemes for those applications. From 2023 the subsidy level was increased from 15 to 20% for PV installations.

3.3 Temporary subsidies due to high electricity prices during winters 2021/2022 and 2022/2023

Due to the high electricity prices in the winter 2021/2022 the Government decided to implement a temporary electricity price compensation to households for the period December 2021-March 2022. The compensation was depending on actual consumption from 700 kWh per month up to 2 000 kWh per month and up to 2 000 SEK per month. For March 2022 the compensation was limited to the southern electricity price areas SE3 and SE4, which were mostly affected by higher electricity prices. The compensation was paid by the electricity distribution companies that was appointed to administer the subsidy.

For the period September 2021- October 2022 the support level is 79 öre/kWh in price area SE4 and 50 öre/kWh in price area SE3 with certain limits. For the period November -December 2022 the support level is 129 öre/kWh in SE4, 126 öre/kWh in SE3 and 90 öre/kWh for SE1 and 2 price areas. In addition to this there are specific electricity support schemes for electricity consumption in companies and for electricity intensive companies that is planned to be paid out during spring 2023.

Changes in the future – proposed

In the text above some proposed changes in the taxation are described. The new Swedish Government taking seat autumn 2022 has also announced a review of the biofuel tax for heating production in CHP and DH plants.

TAXES AND LEVIES ON ELECTRICITY IN FINLAND 2023

This chapter focuses on specific taxes and levies on the production and consumption electricity in Finland. In addition, there is a short description of excise duties on heating fuels.

Taxes and levies 2022, mill EUR	Total	State	Municipalities
Corporate income tax (levied on energy sector)	N.A.		
Property tax (levied on energy sector) *estimation	100		100
Excise duties on heating fuels *estimation	766	766	
Electricity tax *estimation	980	980	
Total	1 846	1 746	100

A. Specific taxes and levies on production of electricity and heat

1. Property taxes

Property taxes are levied by local municipalities. A common property tax rate can vary between 0.93-2.00 % by the decision of a municipality. The property tax is levied based on the value of the property. A municipality can levy a higher rate for power plants and buildings used for nuclear waste management, in which case the maximum rate is 3.10 %. However, the rate for hydropower plants and wind power park with a nominal output of less than 10 MVA is the same as common property tax level.

2. Excise duty on heating fuels

Since the beginning of 2011 taxes have been separated into two parts: energy content tax and CO₂ tax. The energy content tax was increased by 2.7 €/MWh in the beginning of 2021 and now the energy content tax for all fossil fuels excluding peat is 10.33 €/MWh and CO₂ tax based on 53 €/ton of CO₂. Fuels used for heat production in CHP plants have a fixed energy content tax of 2.7 €/MWh from the beginning of 2021. From the beginning of 2019 CO₂ content of different taxable fuels have based on the average life cycle emissions.

For peat use in heat production there is a fiscal tax. From the beginning of 2021 the tax level of peat has been 5.7 €/MWh. The energy content tax for biogas in heating purposes was introduced beginning of 2023. The tax has been set at the EU's minimum rate (1,2 €/MWh).

3. Strategic stockpile fee

A strategic stockpile fee is levied for securing economical resources which are necessary for the subsistence of the citizens, the economy of the state and national defence. A stockpile fee is levied on fuels used in heat production. Stockpile fee levels are presented in the overview table.

4. Income tax

All limited companies are subject to a corporate tax on their profits. In 2022 the rate of the corporate tax was 20 %.

When a company pays dividends to its shareholders, the dividends will be taxed as shareholders' income.

Finland has set a temporary windfall tax for 2023. The government will tax a 30 % of the profits that exceed 10 percent of return on capital(equity). This will be on top of the corporate tax. The tax would apply to the electricity producers. Other activities like heating and distribution etc. has been excluded. The tax will be levied in 2024 and the same way as normal corporate income tax on profits. Profit levels of the firms are difficult to determine in advance, but the revenue for the government is expected to be between 300-400 million euros.

B. Specific taxes and levies on consumption of electricity

1. Electricity consumption taxes

In Finland there are two tax levels for electricity consumption, depending on where the electricity is consumed. Tax class 2 includes electricity consumed in the manufacturing industry, commercial greenhouse cultivation and eligible data centres.

On July 2022 electricity supplied to heat pumps and electric boilers that generate heat for the district heating network were also included to tax class 2. Other consumed electricity is taxed in class 1.

In 2020 electricity consumption tax in tax class 1 was 2.24 cents/kWh and in tax class 2 it was 0.69 cents/kWh. From the beginning of 2021 the electricity consumption tax for class 2 was decreased to 0.05 cents/kWh.

2. Tax refund for energy intensive industry

In Finland energy intensive industry is entitled to a tax refund if a company has paid fuel and electricity consumption taxes of more than 0.5 % of its annual value added. It can apply for an 85% refund on the share of paid taxes which exceeds 0.5 %. In addition, the refund will be paid only on the share which exceeds 50 000 €.

From the beginning of 2021, the possibility of this tax refund will be gradually phased out, so that from the beginning of the year 2025 the tax refund will no longer be applied. Already from the beginning of 2021 the electricity consumption tax shall not be applied for the tax refund.

3. Value added tax (VAT)

The common rate for value added tax was 24 % in 2022.

4. Strategic stockpile fee

A strategic stockpile fee is levied for securing economical resources which are necessary to the subsistence of the citizens, the economy of the state and national defence. A stockpile fee is levied on electricity. Stockpile fee levels are presented in the overview table.

Product	Unit	Year	Energy tax	Energy content tax	CO2 tax	Strategic stockpile fee	Total
Electricity, tax class 1	cents/kWh	2022	2,24	-	-	0.013	2.253
Electricity, tax class 2	cents/kWh		0.05	-	-	0.013	0.063
Heavy fuel oil	cents/kg		-	11.59	18.67	0.28	30.54
Light fuel oil	cents/litr		-	10.33	16.90	0.35	27.58
Natural gas	€/MWh		-	10.33	12.94	0.084	23.354
Coal	€/ton		-	71.45	147.81	1.18	220.44
Peat	€/MWh		5.70	-	-	0	5.70

Overview – taxes on electricity consumption and heating fuels 2022

C. Subsidies

1. Feed in tariff for renewable energy

The feed-in tariff system established in 2011 is closed down for new biogas, wood fuel and wind power plants. For forest chip fired plants the feed-in tariff system was closed on the 15th of March 2021 and therefore no new plants whatsoever will be accepted to the system. Power plants accepted to the system for the maximum 12 years will receive production subsidy (feed in tariff). Subsidy level varies on the basis of electricity market price for wind, wood fuel and biogas power plants and basis of EU-ETS price for forest chips.

2. Auction for renewable electricity

At the end of 2018 energy authority organised an auction for renewable electricity. The auction was open to projects generating electricity from wind, solar and wave power, and from biomass and biogas. The maximum annual electricity generation was 1.4 terawatt hours. The auction was one-off and new subsidy schemes are not planned.

All electricity suppliers eligible for feed-in premium will receive a premium based on their respective tenders (pay-as-bid). A full premium is paid when the average of the three-month market price of electricity is equal to or lower than the reference price of EUR 30 per MWh. If the market price exceeds the reference price, a sliding scale will be used. No aid will be paid if the market price is higher than the sum of the reference price and the approved premium. Aid will be paid for a period of 12 years.

3. Small scale electricity generation

Small scale electricity generation which is used for own use of producer in the same real estate is exempted from electricity taxes. Exemption applies if annual production is under 800 MWh.

4. Support scheme for household consumers

Due to spiking electricity prices the government decided to implement 4 different measures to support consumers in winter 2022-2023:

- The value-added tax rate on electricity was temporarily lowered from 24% to 10% between December (2022) and April (2023).
- A fixed-term tax credit for electricity, wherein taxpayers can apply for a tax card which takes into account the tax credit when calculating the withholding tax.
- A separate financial support for electricity that is available to households which are unable to make use of the fixed-term tax credit.
- The government will compensate electricity costs for households incurred during the four winter months (November-February). Fifty percent of the customer bill will be compensated. The compensation have a monthly deductible of 90 euros and maximum limit of 700 euros. It is to be disbursed to households through their electricity bills.

TAXES AND LEVIES ON ELECTRICITY IN DENMARK 2023

This chapter focuses on taxes, levies and subsidies on the production and consumption of electricity in Denmark.

A. Specific taxes and levies on production of electricity

1. Property taxes

Tax on land

The municipalities in Denmark levy a municipal land tax on the property's land value. The mean tax rate (over the municipalities) on land in 2021 was 25.36. per thousand of the value of the land.

2. Environmental taxes

Energy companies using fossil fuels pay a tax on NO_x and sulfur SO₂ emitted to the atmosphere. The rate for NO_x is 5.3 DKK/kg (0.71 EUR/kg) emitted in 2023 and 12.3 DKK/kg (1.65 EUR/kg) for SO₂, for biomass. For fossil fuels, the sulfur tax is generally 24.6 DKK/kg (3.3 EUR/kg). These rates are for sulfur levels above 0.05 pct pr. kg which are uncommon business standards, see table below. In addition to this there are specific taxes on different kinds of biomass. For instance, the burning of Straws is levied at 28,3 DDK/ton (3,8 EUR/ton) from the sulfur content.

As a general rule, companies using fossil fuels have to pay a CO₂-tax of 181.7 DKK pr. ton CO₂ (24,3 EUR/ton CO₂). However, all EU ETS companies are exempt and several non-ETS sectors are eligible of having it reduced by a varying fraction. The tax is also paid by consumers using petrol, diesel, natural gas, and oil (e.g., residential heating).

As a general rule, companies and consumers have to pay an energy tax of 63.9 DKK/GJ (8.6 EUR/GJ) on fossil fuels. There are several exemptions, see below.

3. Income tax

All companies are subject to a corporate income tax rate of 22 percent in 2023 on company profits. Capital gains tax is 27 percent and 42.0 percent (on positive returns). In Denmark, taxation of capital gains is complicated. In addition to capital gains, taxation is also levied on "lager" (stock). Contrary to capital gains tax, "lager" taxation is levied even if the gains have been made or not. It is levied on the principle of increasing (decreasing) value. The rate is 15.3-17.0 percent in 2023 and is primarily used on pensions funds, however the Parliament suggests expanding this to property investors and the increased value of property.

B. Specific taxes and levies on consumption of electricity

1. Consumption taxes

As a main rule, the Danish tax system levies the taxes for energy on the consumers and not the producers of energy.

Households

Households without electric heating

From 2014 the electricity tax rate has been unified, so only one rate applies. All households pay a tax of 69.7 øre/kWh (9.2 cents) in 2023 for their entire electricity consumption. This is also for public authorities, municipalities, and public companies. However, in the first 6 months the rate has been reduced to EU-minimum (0,1 cent pr. kWh) due to the high prices.

Households with electric heating, consumption above 4,000 kWh/y

If a household has a consumption of more than 4,000kWh/y and is heated by electrical power, it is entitled to a reduced tax rate for the consumption above 4,000 kWh/y. The tax rate is 0.8 øre/kWh in 2022 (0.1 cents).

In total households with a yearly consumption above 4,000 kWh/y which are heated by electrical power must pay a tax of 0.8 øre/kWh in 2021 (0.11 cents) for the part of their consumption above 4,000 kWh/y and a tax of 69.7 øre/kWh (9.2 cents) for the first 4,000 kWh. In the first 6 months of 2023 the rate will be EU-minimum for all consumption.

Companies

All Danish consumers have to pay the same taxes as the households pay. However, Danish companies are entitled to tax compensation depending on the purpose for which electricity is used.

Industrial processes

For all electricity used for processes Danish companies pay the full electricity tax rate which applies to households. Companies can then apply for a deduction of the main part of the tax rate, resulting in an effective tax rate of 0.4 øre/kWh (0.05 cents) equal to the EU minimum rate.

Heating purposes

Electricity used for heating purposes paid a tax in 2015 equal to the rate of households using electricity for heating. The 2023 tax rate for the companies' electricity use for heating is in total 0.4 øre/kWh (0.05 cents). From 2023 companies do not have to distinguish between electrical purposes to get the deduction. It is only micro business (who are exempt of VAT) that do not have the same rights as the other companies. They are regulated like households.

The following table presents an overview of electricity consumption taxes and taxes for the mostly used heating fuels in 2023. In 2023 almost nothing has happened only the electricity rate has been reduced significantly. Almost all environmental, energy and CO₂-taxes are indexed and increases by a certain, but low percent each year.

2023 Product / Tax	Unit	CO2 2018	Energy 2018	Sulphur 2018
Gas and Diesel oil (non-transport)	cent/l	6,5	30,8	0,0
Petroleum (non-transport)	cent/l	6,5	30,8	0,0
Gas (LPG)	cent/kg	3,9	25,6	0,0
Refinery Gas	cent/kg	7,2	39,5	0,0
Hard Coal	euro/ton	64,9	240,3	0,0
Lignite	euro/ton	44,0	163,1	0,0
Natural Gas	cent/m ³	5,5	34,0	0,0
Electricity for heating	cent/kWh	0,0	0,1	0,0
Electricity	cent/kWh	0,0	9,4	0,0
Garbage (fuel purpose)	euro/ton	24,4	0,0	1,5
Straw (fuel purpose)	euro/ton	0,0	0,0	3,8
Woodchips (sulphurous ,fuel purpose)	euro/ton	0,0	0,0	6,6

Note 1: The SO₂-tax is only paid, when the fuel contains more than 0.05 pct. sulfur. The values in the table are dependent on the actual sulfur content. Business standards have been used. For >0.05 pct. Sulfur it is generally 24.2 DKK/kg (3.2 EUR/kg) for fossil fuels, and half for biomass 12.1 DKK/kg (1.62 EUR/kg).

Note 2: All rates are subject to 25% VAT payment.

Note 3: Only non-biodegradable garbage must pay CO₂-tax. In Denmark, almost garbage capacity is under EU ETS and the CO₂-tax is 100% refundable in this case.

2. Environmental taxes

Energy companies using fossil fuels pay a tax on NO_x and sulfur SO₂ emitted to the atmosphere. The rate for NO_x is 5.3 DKK/kg (0.71 EUR/kg) emitted in 2023 and 12.3 DKK/kg (1.65 EUR/kg) for SO₂, for biomass. For fossil fuels, the sulfur tax is generally 24.6 DKK/kg (3.3 EUR/kg). These rates are for sulfur levels above 0.05 pct pr. kg which are uncommon business standards, see table below. In addition to this there are specific taxes on different kinds of biomass. For instance, the burning of Straws is levied at 28,3 DDK/ton (3,8 EUR/ton) from the sulfur content.

3. Other consumption taxes

The Danish VAT is paid by consumers only – refundable for all firms. The rate is 25 percent and is calculated on all other energy taxes as well as on the electricity itself.

4. Parafiscal levies

Grid and system tariffs

Energinet, the Danish TSO, owns the Danish high-voltage grid, the *grid tariff* covers the expenses of operating the high voltage grid. The *system tariff* covers the expenses of reserve capacity, system operation and the like. The grid operators (DSO) collect the tariffs on behalf of Energinet.dk via the electricity bill.

In 2023 the tariffs are 4.9 øre/kWh (0.71 cents) and 6.1 øre/kWh (0.59 cents) respectively and a balance fee of 0.23 øre/KWh. Together 11.2 øre/kWh (1.5 cents/KWh). Due to high income generation from balancing and congestion operations and special regulation, Energinet has able to keep the tariffs at the same level as 2022 despite of higher electricity prices.

PSO (Public Service Obligations) tariff

In 2022 the PSO is fully phased out. The PSO tariff covers the Danish system operators, Energinet.dk, costs relating to public service obligations as laid down in the Danish Electricity Supply Act. The tariff is used to finance the subsidies for renewable electricity production and is further used to pay for research funds in green technology. Finally, the PSO covers support for certain smaller local gas-powered CHP-plants.

The tariff changes every quarter, and is negatively correlated with the price of electricity, since many subsidies are given as a fixed level minus the electricity price.

The tariff is reduced for autoproduction, and for certain power intensive companies. The reduced PSO payment is on the condition that the company commits to relevant energy efficiency improvements. In 2016 it was politically decided to gradually phase out the PSO as renewable energy technologies matured. However, later in 2020 the PSO was deemed to be in violation of EU state aid and was phased out in primo 2022.

Connection fee for new electricity producers

From the 1 January of 2023 a new model is introduced to cover for the increasing expenses on the transmission- and distributions grid due to ever more solar and wind capacity. The model is the replacement of the PSO-model that was financed by the consumers. This model is financed by the developers.

Dependent on the local area (the current “strength” of the grid) and dependent on whether or not the area is production or consumption “dominant” the developer has to be a fixed upfront fee to be connected to the distribution grid. The fee is a connection fee and a transformer fee. The total fee ranges between 14.000-67.000 EUR/MW (consumption based and strong grid area vs. production based and weak grid area).

The effect was that many solar projects was forced through in late 2022 and is expected to halt new projects in 2023 and is expected to slow down the expansion in 2024. Recently, the Department of Climate, Energy and Utilities released a public analysis in which they expect *less* total landbased wind capacity in the end of 2023 than in 2022. This is because more windmills are expected to be decommissioned than commissioned in 2023.

5. Subsidies

Energy production through renewable energy sources has historically been subsidized in Denmark by the PSO-tariff which is phased out in primo 2022.

Power plants producing electricity based on *biomass* get 15øre/kWh (2 cents) for every kWh biomass produced electricity. However, this is only for not fully depreciated plants. In 2022 for fully-depreciated plants the subsidy will be 0 øre/kWh all biomass. Waste plants can receive a subsidy on the biomass-based waste by 15 øre/kWh.

Onshore windmills, up on until 2018, receive a premium on top of the electricity price of 25 øre/kWh (3.3 cents) for the first 20-25.000 fullload hours. The premium level is reduced one-to-one when the electricity price is above 33 øre/kWh (4.4 cents). Additionally, they receive 2.7 øre/kWh (0.36 cents) for all production as a support for balancing costs. The scheme is not active anymore for new windmills. In 2023 there are no new active subsidy schemes for onshore wind or solar as electricity prices soar.

Offshore wind farms are subsidized individually according to an auction where the suppliers of offshore wind farms bid on the lowest possible (guaranteed) price, which they can produce the required energy level for. A contract-for-difference (CFD).

The tender for the coming Krigers Flak (2021) park had a winning bid of a guaranteed price of 37.2 øre pr. kWh (5 cents). In 2022 the auction for the offshore wind farm “Thor” went to the zero-mark and was decided by random draw. This means that no guaranteed price is given. In effect, the developer of the project (RWE) is expected to pay 2.8 Bn DKK over the period 2025-2028 to the Danish state, because the CfD is “double-sided”. The wind park is expected to have a capacity of 1 GW and operational in 2027/2028.

In June of 2022 the Parliament agreed to an ambition to increase offshore by roughly 10 GW from what is already planned. Roughly 3 GW is planned to be from the so-called Energy Islands. Generally, Denmark has two models for offshore projects.

First, the government have public auctions. Historically, it has been 1 auction at the time. Due to the massive pressure of ever higher political ambitions the current government is expected to put forward public auctions of all 9 GW during 2023. The average time of each offshore project is 7 years, so 2023 is the last year, if we want it to be working by 2030.

Second, Denmark has a scheme called open door (“åben-dør”). In the open-door procedure, the project developer takes the initiative to establish an offshore wind farm. The project developer must submit an unsolicited application for a license to carry out preliminary investigations in the given area. The application must as a minimum include a description of the project, the anticipated scope of the preliminary investigations, the size and number of turbines, and the limits of the project’s geographical siting. In an open-door project, the developer pays for the grid connection to land.

The government in early 2023 halted the “åben-dør” scheme even though there was a total of over 20 GW of projects in the portfolio. The decision was made, because the Danish authorities were worried about the scheme violating EU state aid rules seen as the popularity skyrocketed. The argument is that the government is given out offshore area “for free” which is evidently very valuable. At the time of writing only 3 smaller projects have been granted permission to pursue their project further.

Other sources:

Electricity produced on *biogas* is eligible for subsidies. Either by a guaranteed a price of 87.4 øre/kWh (11.7 cents) or by a price supplement by 47.7 øre/kWh. The guaranteed price is not used now due to high electricity prices.

Households producing electricity on small solar cell plants or small household windmills are not paying anything for the electricity used when produced. There are multiple ways of registering these, however, most payments (subsidies) have been decreased or phased out in the last few years.

Larger commercial solar plant up to 500 kW received a subsidy that together with the market price, up to 60 øre/kWh (8 cents) in the first 10 years after grid connection, and hereafter 40 øre/kWh (5.3 cents) in the following 10 years. In the beginning of May 2016 this support scheme was abolished due to an unusual large number of applications that far exceeded expectations.

Four different subsidy schemes opened by the end of 2020 and in 2021. The first scheme finances the expense of decoupling the supply of gas to a gas-heated household. The value is 8.000 DKK (1.070 EUR) and is only conditioned on a switch to a clean heating technology. Two of the schemes’ subsidies the purchase of an electric heat pump by values between 15.000-30.000 DKK (2000-4000 EUR) dependent on type and household size. The last scheme subsidizes district heating projects. These are eligible for a 10.000 DKK (1.200 EUR) subsidy pr. household that are converted from fossil heating (gas or oil) to district heating.

In 2022 the scheme for district heating was increased by 250 million DKK to further expand the decoupling of gas-boilers. In 2023 an additional amount of 200 million DKK is added to the schemes; however, the money is yet to be distributed.

6. –Developments in 2023: Looking ahead

Electricity for space heating

Companies

In 2023 all companies are eligible for tax compensation of paid electricity, even liberal professions such as lawyers, advertisement offices and auditors.

Fossil Fuels and Industry

In the end of 2020, the Government presented “Grøn Skattereform” – the first phase of a larger Green Tax Reform. It aims at changing the energy taxes for the general industry, energy intensive industry and horticulture.

These industries, can partly or entirely get their energy taxes on fossil-fuel use for processes, reimbursed. The agreement aims to increase the energy tax by 6 kr./GJ (0.9 kr./GJ) across all 3 industries by 2025.

In 2023 the Parliament agreed a tax reform on industrial including electricity and heat production and transportation other than road vehicles called “Aftale om Grøn Skattereform af Industrien mv.”. This is the first part of the second phase two in the “Grøn Skattereform”. This agreement is much broader and much more crucial. Hereunder are a few points.

- In Denmark the CO₂-taxation is primarily through a high energy tax on around 67 DKK/GJ and a relatively low CO₂-tax on 180 DKK/ton CO₂.
- Most industries, can partly or entirely get their energy taxes on fossil-fuel use for processes, reimbursed. ETS-companies can also have the CO₂-tax reimbursed. The high rates are mostly levied on the households’ transport and heating.
- “Grøn Skattereform” seeks to adjust this. By 2025 the energy tax is slashed and instead a new CO₂-tax is introduced. The rate will rise from 2025-2030. As a main rule it will be 350 DKK/ton CO₂ rising to 750 DKK/ton CO₂ in 2030 (50 EUR-100 EUR).
- Heavy industries, eg. Cement producers will only be hit by 75 DKK in 2025 up to 100 DKK in 2030.
- All ETS companies other than heavy industries will be eligible for a 50% deduction in the new CO₂-tax. So they will have to pay at least 350 DKK in 2030 *on top of the EU ETS quota*.
- The new CO₂-tax covers all business with energy-related emissions. Also the non-road vehicle transport sector such as national aviation. It also covers non-energy related emissions from the industrial sector. Also, fossil fuel emissions and waste emissions from CHP is covered.
- Private heating emissions in households will not see an increase effectively, however the overall tax will be focused more on CO₂ instead of energy. Effectively increasing tax rates for oil-boilers, but not for gas-boilers.
- To mitigate loss of competitiveness and leakage to other EU countries, the agreement simultaneously establishes two new subsidy schemes. The first is about

2 billion DKK (0.8% of GDP) and is expected to be active from 2025-2030. The purpose of this is to enhance the transition from fossil fuels to eg. Electrification. It is especially aimed at heavy industries, horticulture, and fishery.

- The reform also establishes the notion of “negative emissions”. This is through Carbon Capture and Storage CCS and specially CCS on biomass-fired CHP in which biogenetic emissions captured by CCS will count as negative emissions. (BE)CCS will be eligible for up to 850 DKK/ton (115 EUR/ton) and will be taken from the second subsidy scheme. The subsidy will run in 15 years from approval and is “auctioned” through 2026-2030 with a total sum of 3 billion DKK.

These are only the main points. The agreement is not yet implemented but is expected to be enforced this year. The Green Tax Reform from 2022 is only the first of a larger tax reform. The aim is also to unified and align taxation towards CO₂e emissions in the road-vehicle transport sector and the non-energy related agricultural sector (cows and pigs). An expert advisory board is expected to give their analysis by the third quarter of 2023.

Landbased renewable energy deployment

The “lager” taxation (see beginning) is proposed to be introduced into land- and property ownership and investors for over 100 million DKK of value. This poses a threat indirectly to renewables (solar and wind) on land since especially landowners and agricultural farmers can be hit by a new tax when renting out their land to renewable energy developers. If for instance the land increases in value after the deployment of onshore windmills the landowner will be taxed from the value increase.

The current law is such that it is only if the property or land is sold that the capital gains are taxed. However, with “lager” taxation, the value increase is taxed each year. The first proposal of this change was discarded. The new Government has put through a new proposal, but nothing is yet to be decided.