

Transmission grid tariffs for 2019

Model description and rates



Photo: Statnett ©

Tariffs 2019

Changes in the Energy Act were adopted with effect from 1 July 2016. Among other things, the Act defines changes in the network structure, from three levels to two: the transmission network and the distribution network. The transmission network mainly corresponds with former central networks.

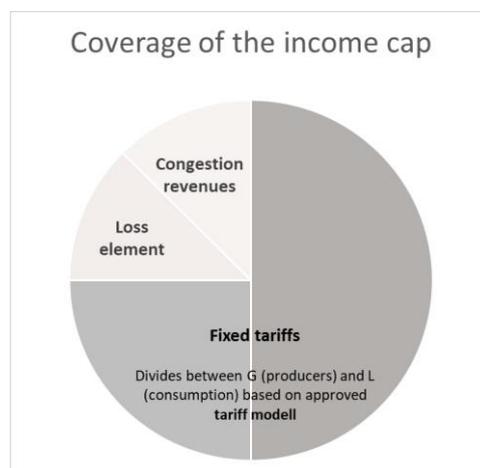
Tariff rates for 2019 apply from 1 January 2019 until 31 December 2019.

Basic principles for determining tariff rates

Tariffs shall be structured in accordance with regulations set out in the Norwegian Water Resources and Energy Directorate (NVE) FOR 1999-03-11 no. 302 Regulations governing financial and technical reporting, income caps for network operations and transmission tariffs. (*Control Regulations*).

Network activities are regulated as a natural monopoly, with the NVE setting an annual cap on how much revenue each network operator can collect. The annual cap is called the permitted income. The permitted income for the transmission network for 2019 is estimated at approx. NOK 9.6 billion.

Permitted income is collected through customer tariffs, broken down as an energy component (loss element) and a fixed component, as well as congestion revenues. Congestion revenues are revenues that occur when power is transferred between Transmission System Operators (TSOs) that charge different prices. The revenues are divided 50/50 between the TSOs “on each side of the congestion”.



The structure of the tariff is intended contribute to the efficient development and utilisation of the network. Based on current regulations, a model has been developed to calculate the size of the payment from each customer and customer group. The structure and changes in the tariff model are discussed with consumer organisations and adopted by Statnett’s Board of Directors. Two elements in the model are changed in connection with determining the tariff for 2019.

- k-factor "floor" is raised from 0,5 to 0,6
- Maximum tariff reduction for large power consumers is limited to 75%

Annual tariffs must be published no later than 30 September of the year before. At that time, however, details of permitted income, congestion revenues or income from the energy component are not known. These figures are not available until the end of the year. Annual tariffs are thus set on the basis of projections. The actual total revenue deriving from tariffs and congestion revenues in any year is therefore likely to deviate somewhat from the TSO’s permitted income for that year. This deviation is called an income surplus/shortfall. Surpluses and shortfalls are repaid to customers by adjusting tariffs in subsequent years. To avoid major fluctuations in tariff rates from one year to the next, surpluses and shortfalls are distributed over several years.

At the end of 2017, the transmission network had a recognised surplus of NOK 200 million. Tariff 2019 aims to reduce the income surplus to zero by the end of 2019.

Description of the tariff model

The tariff model calculates how permitted income in the transmission network is to be distributed between the customers connected to it. The model has been developed in accordance with the rules set out in the Control Regulations.

The Control Regulations set a number of requirements for the structure of tariffs, including:

- Tariffs should signal effective utilisation and development of the network
- Any differentiation of the tariff between customer groups shall take place on the basis of objective and verifiable network conditions
- Total tariff revenues shall not exceed the permitted income of the TSO.

The transmission network tariff consists of a variable component (energy component) and a fixed component.

The energy component

The energy component is a consumption-dependent component, which reflects the load each customer puts on the network system when drawing power from it or feeding power into it. The energy component is calculated on the basis of the actual energy fed into the network or the amount of energy drawn from it hour by hour.

System load is reflected through unique margin loss rates calculated for each connection point in the central network. Separate marginal loss rates are calculated for daytime, night time and weekends. Daytime is defined as workdays between 6 a.m. and 10 p.m.

The calculations are based on projected load flows in the Nordic network. The marginal loss rate is symmetric around zero for feeding and drawing power at each individual connection point.

The marginal loss rates are administratively restricted to ± 15 per cent.

The marginal loss rates are published on Statnett's website and distributed to our customers on Fridays before the start of a new week. The rates are available on <http://www.statnett.no>.

When calculating the energy component, the price for the relevant price area is used. Area prices are available on Nord Pool Spot's website: <http://www.nordpoolspot.com>.

Fixed components

The tariff's fixed components are intended to ensure that the TSO can generate its total permitted income. Cost allocation and differentiation between customer groups must take place in accordance with network-based, objective and non-discriminatory criteria.

When determining the fixed tariff component, a distinction is made between feeding into (production) and drawing (consumption) power.

The fixed component for producers is based on how much *energy* (GWh) they have fed into the transmission and regional networks. The feed-in tariff rate for 2019 is set at NOK 0.0134/kWh, of which NOK 0.002/kWh comprises related system operating costs. The rate is increased NOK 0,004/kWh from 2018.

The fixed component for consumers is based on the *amount* (MW) that the individual customer draws during the system's peak load. The tariff for consumption is set at NOK 393/kWh for 2019. This is an increase of NOK 33/kWh from 2018.

Production tariffs

Basis for calculation

The production tariff is calculated on the basis of average annual production for the last 10 years. (GWh). Tariffs for 2019 are based on data for the period 2008–2017.

The basis for calculating the production tariff is referred to as “ex-power station”, i.e. produced volume less the power station’s consumption and step-up transformation. For pumped-storage hydropower plants, gross production will be included in the basis for calculation.

The data set has been established on the basis of reported annual values from the individual producer or customer in the transmission network. The data is automatically retrieved from submitted values.

Customers have the ability to control and approve the values at NettWeb.

The customer’s calculated production tariff and cost per year are displayed on the login page at NettWeb.

New production units

New production units that will feed transmission or regional networks will lack historical data. For such units, the *expected* annual production stated in their operating licence is used as the basis for calculating the production tariff for the start-up year and the following two calendar years. Subsequently, actual production data will be used to calculate the production tariff.

New production units will be charged from the month in which they start up. Information about new units must be submitted to Statnett as early as possible before start-up.

Wind farms are usually constructed in stages. The basis for calculating the production tariff in the first few years must therefore be agreed separately for each wind farm.

Surcharge for coverage of system operating costs

The feed-in tariff includes a surcharge for system operating costs from 2014 onwards.

The surcharge for 2019 will be NOK 0.002/kWh.

Network-based phase-in tariff for production

Statnett currently has no areas where there are network-related grounds for a reduced feed-in tariff. For production that has a phase-in tariff from previous years, the rate in 2019 is still NOK 0.001/kWh.

Through-tariffs

The feed-in tariff is a through-tariff for transmission and regional networks. This means that producers pay the same fixed component regardless of whether the power is fed directly into the transmission network or if it is fed through the regional network. Regional network owners must charge producers that feed in power at the regional network level the same tariff rate as is set for the transmission network. Regional network owners must pass on feed-in revenues from the regional network to the TSO.

The feed-in tariff for the transmission network are “normative” for power fed into the distribution network. Revenues from power fed into the distribution grid are meant to cover distribution network costs and are not intended to be passed on to overlying networks

Consumption tariffs

Basis for calculation

The consumption tariff is calculated on the basis of the customer's power consumption (MW) during the system's peak hour. A description of "peak hour" is available at NettWeb.

Power consumption is calculated for each connection point in the transmission network. The calculation is made by taking measured net power exchange during the peak load hour corrected for production during the peak load hour (Pp). All exchange data (net MW in/out) is automatically retrieved from meters connected to the system, while all production facilities must report production during peak load (Pp) behind each connection point.

The charge for plus customers is based on net power consumption during peak load. Thus, no peak load data is reported for plus customers' production facilities.

The consumption tariff is calculated on the basis of average consumption (MW) during the peak load hour over the last 5 years. The years 2014–2018 form the basis of the tariff for 2019.

In the event of significant and lasting changes in consumption within the five-year period, Statnett may, in consultation with the customer, find a more representative basis for the calculation of the consumption tariff.

Consumption co-localised with power production (k-factor adjustment)

The consumption tariff is reduced for connection points where power is also *fed in* into the network. The adjustment is made using a correction factor (k-factor). The size of the correction factor depends on the ratio between feed-in and consumption at the connection point. In 2014, a limit was set for how low the k-factor at one connection point may be. The limit was set to 0.5. In 2019 the limit is raised to 0,6. The maximum reduction resulting from co-localisation is thus reduced from 50 per cent to 40 per cent.

A k-factor is calculated for each connection point in the transmission network. The calculated k-factor for a connection point is used to adjust the amount charged for all consumption at that connection point, regardless of whether it is defined as high consumption, other consumption or flexible consumption.

The k-factor is calculated using the following formula:

$$k = \frac{F_s^{tot}}{P_t + F_s^{tot}}, \quad \text{if the formula gives } k < 0,6, k \text{ is set to } 0,6$$

F_s^{tot} : Total of all customers' average consumption at the connection point in MWh/h during the peak load hour over the previous 5 years.

P_t : Total available winter output at the point.

Available winter output (P_t)

- Hydropower plants: The highest output that can be produced during a continuous 6-hour period under highest winter consumption. Normal water flows for run-of-river power

stations and normal reservoir levels for reservoir-based power stations are assumed, both in reference to the third week of the year.

- Wind farms: 50 per cent of installed capacity
- Thermal power stations: 100 per cent of installed capacity

Tariff groups – consumption

Consumption is divided into the following tariff groups:

Flexible consumption – Consumption that can be disconnected from the network by agreement

Large consumption – Individual customers with power consumption over 15 MW for more than 5,000 hours a year

Other consumption – Consumption not included in the other categories

The structure and calculation of tariffs for the individual groups are described in more detail below.

Tariffs for other consumption

Other consumption includes all consumption from the network that is not included in the categories high consumption or flexible consumption.

The tariff basis for other consumption is the average power consumption during the peak load hour per connection point over the last 5 years, multiplied by the k-factor of that point.

Annual cost is calculated using the following formula:

Average consumption during peak load (MW) * k-factor
for the connection point * tariff rate for consumption

The customer's basis for calculation and cost per year are displayed on the login page at NettWeb.

Tariffs for large consumption

As of 2015, a new model was introduced for tariffs for large consumption.

The model prices large consumption lower tariff than other consumption. The tariff reduction will vary from customer to customer, depending on how favourable the consumption is for the network. Differentiation is based on defined characteristics of the consumption. By 2019 there is a limit to how high tariff reduction an individual can achieve. The limit is set at 75%.

Definition of large consumption

Individual customers with power consumption that is greater than 15 MW for more than 5,000 of the 8,760 hours of the year are included in the definition of large consumption. In this context, *individual customer* means a company that has the same registration number and is located at the same site. The facility may draw power from several connection points in the central network, but it must be at one site or one “production line”. Industrial parks, etc., are therefore not included in the definition of large consumption.

If changes indicate that expected consumption will be below 15 MW for a long period, the right to reduced tariff will lapse with immediate effect.

In such case, the customer must notify Statnett, and the basis for calculation will be corrected from the applicable date.

Registration of facilities that qualify for a reduced tariff

In order to qualify for the large consumption tariff, the customer must ensure that all relevant facilities are always registered in Statnett’s billing system. In this context, customer means large individual consumers directly connected to the transmission network or regional networks with large single consumers connected to their networks.

Information about new facilities, along with the required documentation, must be sent to Statnett by e-mail.

New facilities with an expected consumption of more than 15 MW will be charged from the month they start operations. The charge for new high-consumption customers will be calculated on the basis of the agreed projected peak load consumption and consumption profile. Subsequently, peak load data is used from the last available years. For each year thereafter, one year is added to the average until an average is based on 5 years of peak load data.

Qualification criteria for a reduced tariff

The model defines three stability criteria that qualify customers for a reduced tariff

1. Hours of utilization (stability within the year) – up to 50 per cent reduction
2. Hourly variation (stability within 24 hours) – up to 15 per cent reduction
3. Summer load – up to 25 per cent reduction

In total, a customer can qualify for a maximum 90 per cent reduction in the tariff rate. By 2019 there is a limit to how high tariff reduction an individual can achieve. **The limit is set at 75%.**

A detailed description of the formulas can be found at the back of the booklet.

Basis for calculating fixed tariff components and tariff reductions for large consumption

The basis for calculating the fixed tariff components for consumption is the customer's power consumption during the system's peak load. For 2019, the amount is calculated on the basis of peak load data for the years 2014–2018.

The calculation of the company's individual tariff reduction is based on measured hourly values for the last full year. Tariff reductions for 2019 are based on the company's measured power consumption (MW) from the network per hour in 2017.

Reporting and controlling hourly values

In order to qualify for a special large-consumption tariff, the customer must ensure that all relevant hourly values per facility are correctly reported to the billing system. Preferably, it should be possible for hourly values to be retrieved automatically by the billing system.

All customers with SFHB facilities must, until the introduction of Elhub, send *weekly* consumption values for the facility to Statnett. This will be the case throughout 2017 and 2018, right up until the values can be retrieved from Elhub.

Following the implementation of Elhub, large consumption must be registered using a unique meter ID in Elhub, so that Statnett can receive values from Elhub for each large consumption facility.

Hourly values for large consumption facilities established in 2017 or later

Facilities established in 2017 or later will not have a full data set to build on. Tariff reductions must therefore be based on the projected load profile, i.e. the customer's peak load and hourly values throughout an entire year. Projections must be supported by hourly measurements from the time the facility has been in operation. A reduction based on estimated data may be corrected during the start-up year if there is a more than nominal deviation between the expected and measured consumption profile.

Correction of hourly values

If the reported hourly data contains errors or for other reasons does not provide a representative picture of the company's consumption profile, changes may, *in consultation with Statnett*, be made to the hourly data. Any corrections must be reported to Statnett and registered by 1 November.

Requirements for adjusting hourly values:

- It must be possible to document the adjustments in the form of measured hourly values.
- The adjustments must have a significant impact on the customer's tariff costs. This means a change in tariff costs of more than five per cent.

Customers that have electric boilers or recycling plants

The basis for calculating the fixed tariff components for 2019 is the customer's power consumption during the system's peak load for the years 2014–2018, while the basis for calculating tariff reductions for high consumption is calculated using hourly measurements in 2017.

- For customers with **electric boilers**, measured power consumption (MW) will include consumption for electric boilers.
- For customers with **recycling plants**, measured power consumption (MW) will be deducted from own production.

This applies both to peak load data that is included in the 5-year average in the basis for calculation and to the series of hours that forms the basis for calculating the customer's individual tariff reduction.

The owner of a recycling plant is not considered a producer and consequently does not pay a feed-in tariff.

Adjustment of hourly values for customers with electric boilers and recycling plants

The model for high consumption tariffs should not undermine any energy efficiency measures that the industry has established.

The use of electric boilers and recycling plants may, in certain cases, cause the series of hours used as the basis for calculating tariff reductions to vary more than if the boiler or recycling plant had not been established. The customer may therefore experience a lower tariff reduction than if the measure had not been implemented.

If the tariff reduction is reduced as a result of energy efficiency measures, the hourly values may be adjusted if the reduction exceeds the customer's total benefits from the measure. This is carried out in accordance with the rules established for the correction of hourly data.

Calculation of annual tariff costs for high consumption

Annual tariff costs are calculated using the customer's tariff basis (MW) multiplied by the customer's individual tariff rate.

The tariff basis for large consumption is the average power consumption during the peak load hour per connection point over the last 5 years, multiplied by the k-factor of that point.

The tariff rate will vary depending on the size of the reduction the customer achieves through the three stability criteria.

Annual cost is calculated using the following formula:

$$\text{Average consumption during peak load (MW)} * \text{k-factor for the connection point} * (\text{tariff rate for consumption} - \text{individual reduction})$$

The basis for calculating the customer's consumption, individual reduction and total cost per year are displayed on the login page at NettWeb.

An example:

Consumption	100 MW
k-factor	0.700
Tariff rate 2019	NOK 393/kW

Customer's consumption pattern			Tariff reduction
Hours of utilization	hours	8,000	40,0 %
Hourly variation	%	1.0%	6.5 %
Summer load	%	96%	20.0 %
Total tariff reduction for customer			66,5 %
Maximal reduction			75 %
Individual tariff rate			Tariff rate
Tariff consumption 2019			NOK/MW
Individual reduction	66,5 %	of 393,000	393,000
Customer's tariff rate			-261,345
			131,655

Tariff fixed components consumption 2019	Consumption	k-factor	Tariff rate (NOK/MW)	Cost (NOK)
High-consumption customer	100	0.700	131,655	9,215,850

Tariffs for flexible consumption

By agreement, Statnett offers special tariffs for flexible consumption. These are divided into four categories with notification periods of:

- 15 minutes without limitation on the duration of the disconnection
- 2 hours without limitation on the duration of the disconnection
- 12 hours without limitation on the duration of the disconnection
- 15 minutes with the duration of the disconnection limited upwards to a maximum of 2 hours .

For all categories, it is necessary to allow re-connection as soon as the basis for disconnection no longer exists. There must be a specific reason if consumption cannot be reconnected at night and weekends. This must be specified in the disconnection notice issued by the National Control Centre.

Hourly values for flexible consumption must be measured and sent to Statnett weekly.

The tariff basis for flexible consumption is the average available power during the peak load hour per connection point over the last 5 years, multiplied by the k-factor of that point.

A separate tariff basis will be established for each category of flexible consumption.

Tariff rates for each category are set for one year at a time.

It should be noted that customers with a flexible consumption tariff agreement cannot be charged in accordance with the same principles as high-consumption customers.

Annual cost is calculated for each category based on the following formula:

$$\text{Average available power during peak load (MW) * k-factor of the connection point * tariff rate}$$

The customer's basis for calculation and cost per year are displayed on the login page at NettWeb.

Tariffs for reactive power

Both the consumption and feed-in of reactive power can be a problem for the operation of the central network. Tariffs for reactive power should contribute to the installation of compensation systems where this is needed. Reactive power is subject to tariffs in cases where it is a drawback for the system.

Basis for the calculation of reactive power

After heavy and light load periods, five control hours will be recorded. The basis for calculation is set to the highest consumption level during these hours.

Other guidelines for reactive power tariffs are:

- It must be measured at all exchange points with the central network.
- Where customers operate a contiguous network, we will look at the customer's total net exchange.
- Tariffs are applied both after the light load and heavy load periods. The heavy load period lasts from 1 November to the end of February. The light load period lasts from 1 May to the end of August.
- Clean production points will not be subject to tariffs.
- The minimum level for tariffs is set at +/- 20 MVA per exchange point / contiguous network and regardless of period.

The tariff rate for 2019 is set at NOK 35/kvar. The rate is unchanged from 2018.

Miscellaneous

Billing

- The energy component is invoiced weekly
- Fixed tariff components are invoiced monthly
- Flexible consumption is invoiced monthly
- Reactive power is invoiced twice a year (after the heavy load and light load periods)

Deadline for reporting and controlling billing data

The fixed tariff components are based on a number of data (annual production, power consumption during peak load, power consumption per hour etc.). The data is retrieved automatically where possible and through separate reporting from customers.

Billing data for each customer will at all times appear on the login page at NettWeb.

Customers in the central network must ensure that the billing data is correct. The deadline for checking billing data for tariff 2019 is **1 November 2018**

Tariff rates for 2019

The energy component

The energy component is the product of the applicable margin loss rate, area price and net consumption/feed-in at the relevant exchange point hour by hour.

energy component (NOK) = area price (NOK/MWh) * margin loss rate (%) * energy consumption/feed-in (MWh)

Margin loss rates are calculated weekly. These are distributed and posted on Statnett's website by Friday at 12 noon of the week before the new rates are applicable.

Fixed components

The 2019 tariff rates for fixed components are as follows:

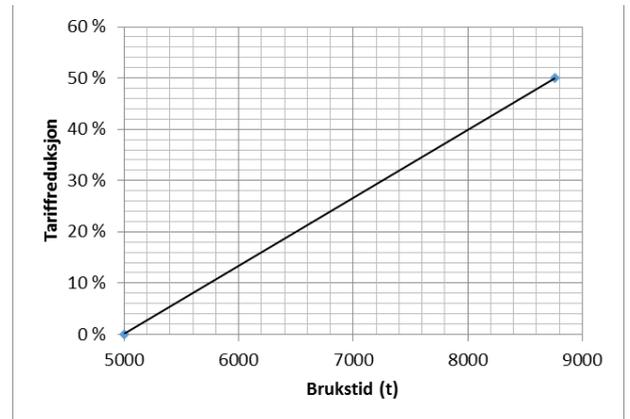
	Tariffs 2019
Feed-in tariff (production)	NOK 11,4/MWh
Surcharge for system services (production)	NOK 2,0/MWh
Production with agreement on phase-in tariff	NOK 1,0/MWh
Consumption	NOK 393/kW
Flexible consumption with 15 min. notice	NOK 20/kW
Flexible consumption with 2 hours notice	NOK 98/kW
Flexible consumption with 12 hours notice	NOK 196/kW
Flexible consumption with 15 min. notice, max 2 hours duration	NOK 294/kW
Reactive power – rounded to the nearest 5 Mvar	NOK 35/kvar

Description of formulas

1 High usage time

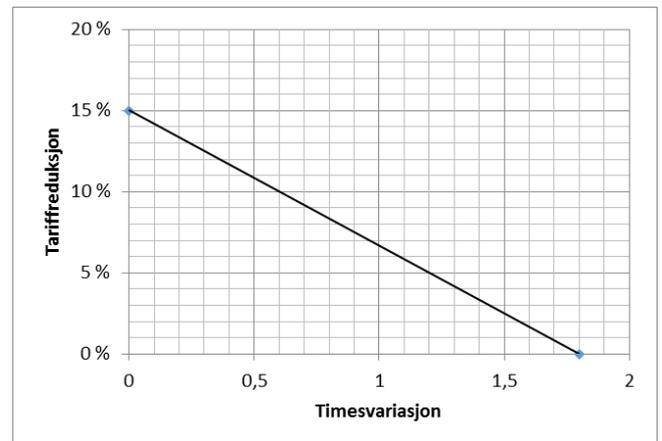
Hours of utilization is calculated using the following formula:

$$\frac{\text{Customer's annual consumption (MWh)}}{\text{Customer's peak load}^1 \text{ (MW)}}$$



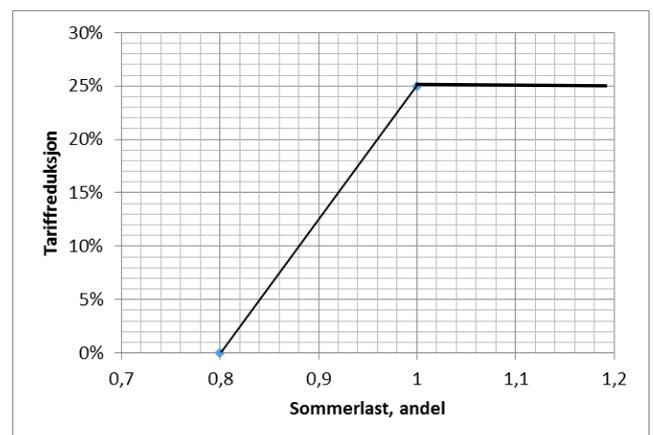
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$$\frac{[\text{ABS}] \text{Change from hour to hour (MW)}^2}{\text{Customer's peak load (MW)}}$$



3

$$\frac{\text{Avg. consum. per hour June, July, Aug (MW)}}{\text{Avg. consum. per hour rest of year (MW)}}$$





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