Transmission grid tariffs for 2020

Model description and rates

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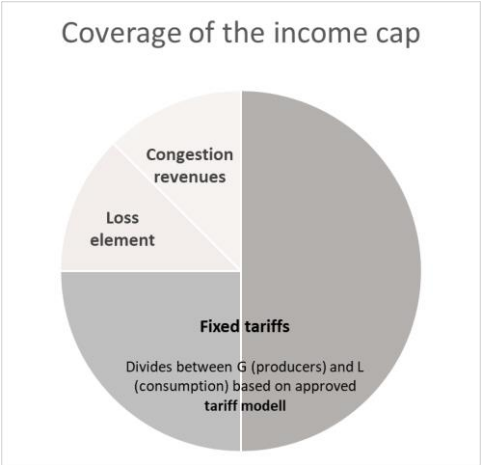
Tariffs 2020

Tariff rates for 2020 apply from 1 January 2020 until 31 December 2020.

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 income cap is called "permitted income". The permitted income for the transmission network for 2020 is estimated at approx. NOK 9.8 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 (bottleneck income). 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. One elementt in the model are changed in connection with determining the tariff for 2020.

- Maximum tariff reduction for large power consumers is limited from 75% to 60%

Annual tariffs must be published no later than 30 September of the year before. At that time, no allowable income, bottleneck income or income from the energy component is known. These figures are not available until the end of the year. Annual tariffs are thus set on the basis of forecasts.
Forecast deviations mean that the sum of tariff revenues and bottleneck revenues will deviate from the transmission network's allowable income for each year. This discrepancy is called 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 2018, the transmission network had a recognised surplus of NOK 113 million.

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. and10 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 feed in (generation/production) and drawing (load/consumption).

The fixed component for producers is based on how much *energy (MWh)* they have fed into the transmission and regional networks. The feed-in tariff rate for 2020 is set at NOK 12.1/MWh, of which NOK 0.5/MWh comprises related system operating costs. The rate is reduced NOK 1.3/MWh from 2019.

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/kW for 2020. The rate is unchanged from 2019.

Production tariffs

Basis for calculation

The production tariff is calculated on the basis of average annual production for the last 10 years. (MWh). Tariffs for 2020 are based on data for the period 2009–2018.

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 2020 will be NOK 0.5/MWh. The rate is NOK 1.5/MWh lower than in 2019. The reduction is due to the reversal of overcharged in the years 2017-2019.

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 1.0/MWh.

Consistent feed-in tariff

The transmission network's feed tariff shall be used at all grid levels. This means that the producer must pay the same feed-in tariff regardless of whether the power is fed directly into the transmission network or whether it is fed via high voltage (HV) and low voltage (LV) distribution networks.
Revenue from feed-in tariff to the high voltage distribution network shall be transferred to overlying networks (ie the transmission network), while revenues feed-in tariff to the low voltage distribution network shall be used to cover costs in the low voltage distribution network.

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 2015–2019 form the basis of the tariff for 2020.

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 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:

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

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.

<u>Available winter output (P_t)</u>

- <u>Hydropower plants:</u> 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.
- <u>Wind farms:</u> 50 per cent of installed capacity
- <u>Thermal power stations:</u> 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 consumtion.

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. In 2019, a limit of 75% was set for how high a tariff reduction a single customer can achieve. By 2020, the limit has been reduced to 60%.

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. In 2019, a limit of 75% was set for how high a tariff reduction a single customer can achieve. **By 2020, the limit has been reduced to 60%.**

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 2020, the amount is calculated on the basis of peak load data for the years 2015–2019.

The calculation of the company's individual tariff reduction is based on measured hourly values for the last full year. Tariff reductions for 2020 are based on the company's measured power consumption (MW) from the network per hour in 2018.

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 be registered on one (1) own measuring point ID in Elhub. The end user must ensure that Statnett as a third party has access to these meter values. It is Statnett's customer and end user who is responsible for this being carried out. Until this is in place, the customer must continue to send consumption values for the plant weekly to Statnett

Hourly values for large consumption facilities established in 2018 or later

Facilities established in 2018 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 2020 is the customer's power consumption during the system's peak load for the years 2015–2019, while the basis for calculating tariff reductions for high consumption is calculated using hourly measurements in 2018.

- 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:

Average consumption during peak load (MW) * k-factor for the connection point * (tariff rate for consumption – 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 peek hour		**100 MW**		
k-factor		**0.700**		
Tariff rate 2020		**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				**60 %**
Individual tariff rate				**Tariff rate NOK/MW**
Tariff consumption 2020				393,000
Individual reduction		60 %	of 393,000	-235,800
Customer's tariff rate				**157,200**

Tariff fixed components consumption 2020	Consumption (MW)	k-factor	Tariff rate (NOK/MW)	Cost (NOK)
High-consumption customer	**100**	**0.700**	**157,200**	**11,004,000**

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.

Obtaining measurement values for flexible consumption

- The customer must report annually on NettWeb the sum of flexible consumption in the peak load hour for each category and point in the transmission network
- All consumption defined as flexible consumption must be reported to Elhub on its own measuring point ID. Statnett must, on request, get an overview and access via Elhub to these.
- When requesting consumption for a given week or day, the customer must be able to document all measurement point IDs and associated meter values included in flexible consumption for each category and point in the transmission network. Here, the customer must produce a separate report that is sent to Statnett.

Basis and calculating of tariffs for flexible consumption

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.

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:

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.

From 2020, only reactive power exceeding 20 MVAr will be charged.
The rate is set at NOK 40 / kVAr, compared to NOK 35 / kVAr in 2019

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 2020 is **1 November 2019**

Tariff rates for 2020

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 2020 tariff rates for fixed components are as follows:

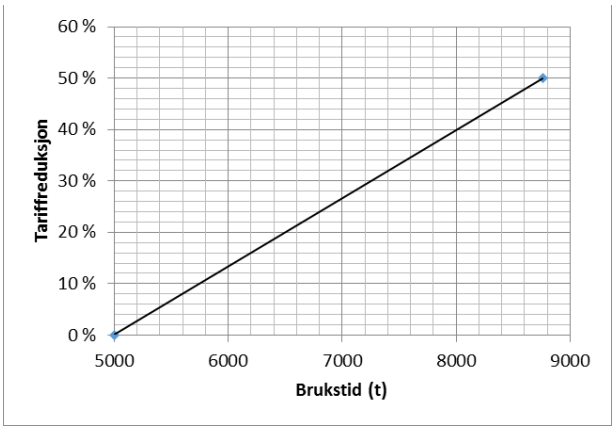
	Tariffs 2020
Feed-in tariff (production)	NOK 11,6/MWh
Surcharge for system services (production)	NOK 0,5/MWh
Production with agreement on phase-in tariff	NOK 1,0/MWh
Consumption	NOK 393/kW
Flexible consumption with 15 min. notice	NOK 20/kW
Flexible consumption with 2 hours notice	NOK 98/kW
Flexible consumption 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 40/kVAr
Maximum achievable tariff reduction for large consumption	60%

Description of formulas

1 High usage time

Hours of utilization is calculated using the following formula:

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



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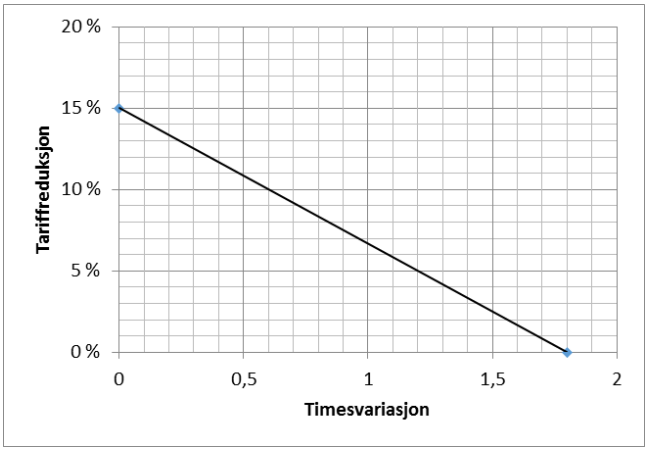
$$\frac{[ABS]Change\ from\ hour\ to\ hour\ (MW)^{2}}{Customer's\ peak\ load\ (MW)}$$



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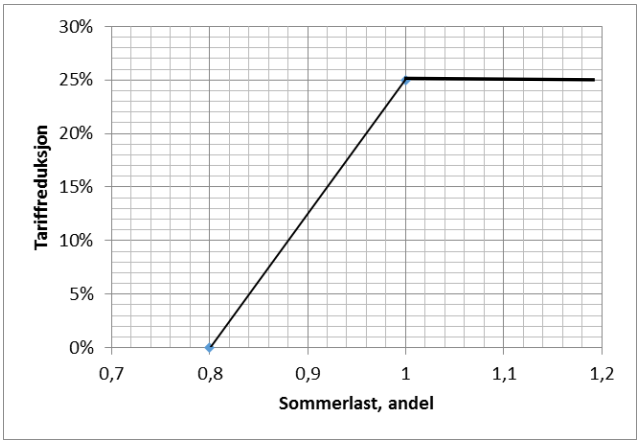
$$\frac{Avg.consum.per\ hour\ June, July, Aug\ (MW)}{Avg.consum.per\ hour\ rest\ of\ year\ (MW)}$$



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