Regulatory experiences: From volumetric- to capacity based tariffs

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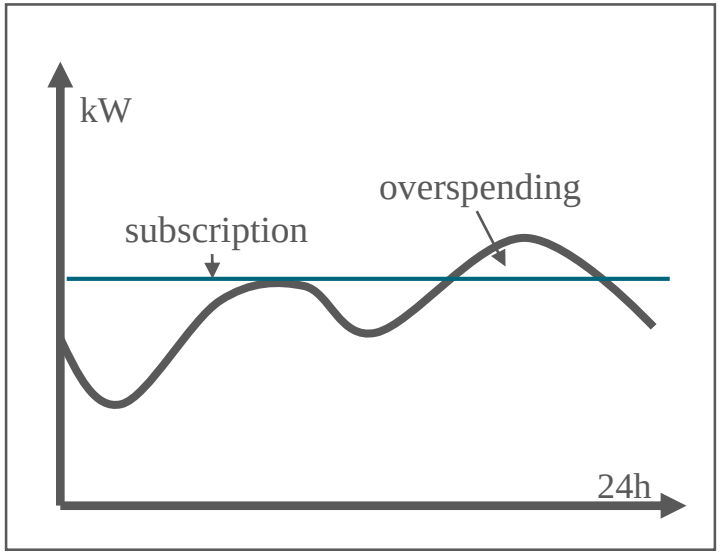
Key takeaways (1): Shifting to a more cost reflective tariff design gives better price signals

- Improve utilisation and development of the network, by shifting to a more cost reflective tariff design
- From volumetric- (kWh) to capacity based (kWh/h) tariffs (<22kV)
- "Our" model - Subscribed capacity:
  - "Fixed" subscription price
  - Energy charge equal to the marginal cost
  - Overspending charge
- New public consultation in 2019



Key takeaways (2): Three important criteria for the new tariff structure in the distribution grid

Energy charge equal to the costs of marginal losses when there is excess capacity in the grid.

Higher price than the costs of marginal losses when capacity is limited.

A reasonable distribution of fixed costs.

EV picture: Gronnemil.no

Outline

Current status: Trends. Current regulatory framework on tariffs.

Rising challenges: Distributed production and electrification (of transportation).

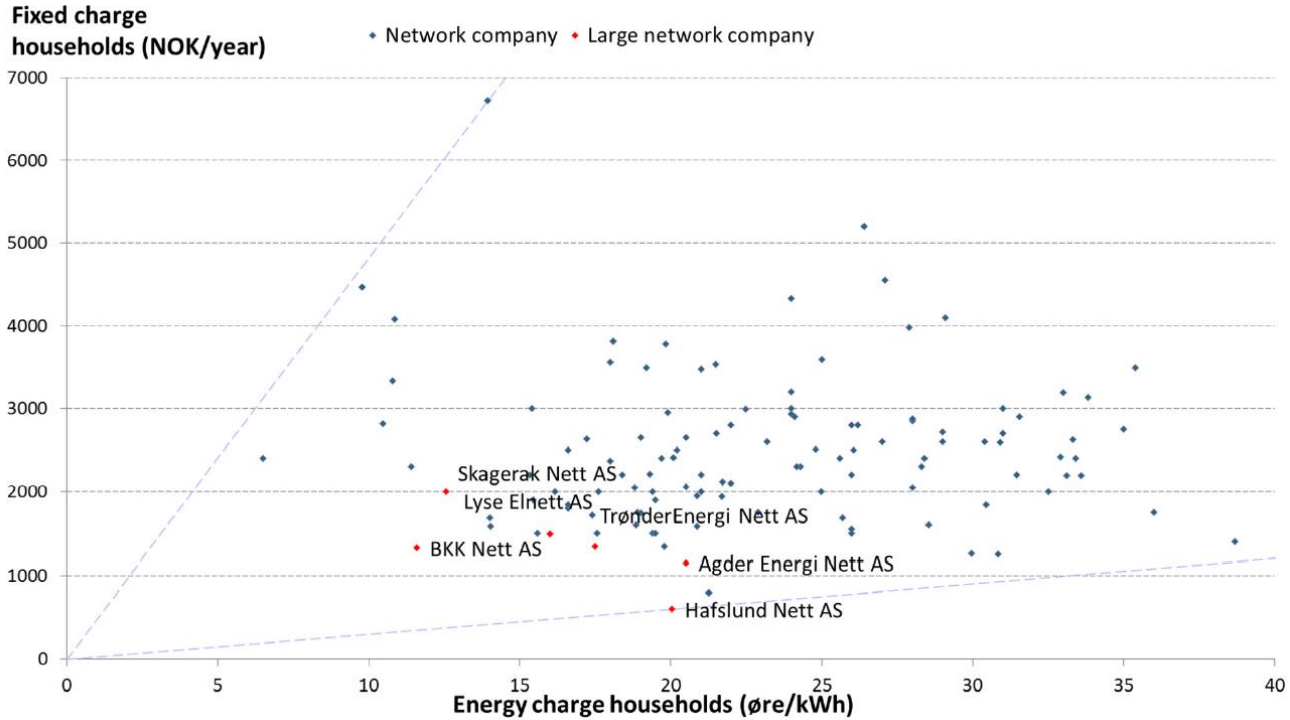
Going forward: Reception of the model. New public consultation.

Current status: Trends. Current regulatory framework on tariffs.

New technology and rising costs motivate a discussion on the cost reflectiveness of current tariffs

- Current tariff structure not incentivising load shifting/reduced demand in peak load
- January 2019, «all» electricity customers in Norway have a smart meter. Increased digitalization.
- 140 billion NOK of planned investments in the grid (2014-2023)
- Tariffs expected to increase by 30%, ceteris paribus
- Demand for capacity growing faster than demand for energy

The current regulation gives DSOs a large degree of freedom regarding how to design tariffs



Tariffs for households, vacation homes and small commerical customers mainly consist of a fixed- (NOK/year) and an energy charge (NOK/kWh)

Customers with an installed capacity exceeding a set limit usually have a capacity charge (NOK/kW) in addition to the fixed- and energy charge

Rising challenges: Distributed production and electrification (of transportation).

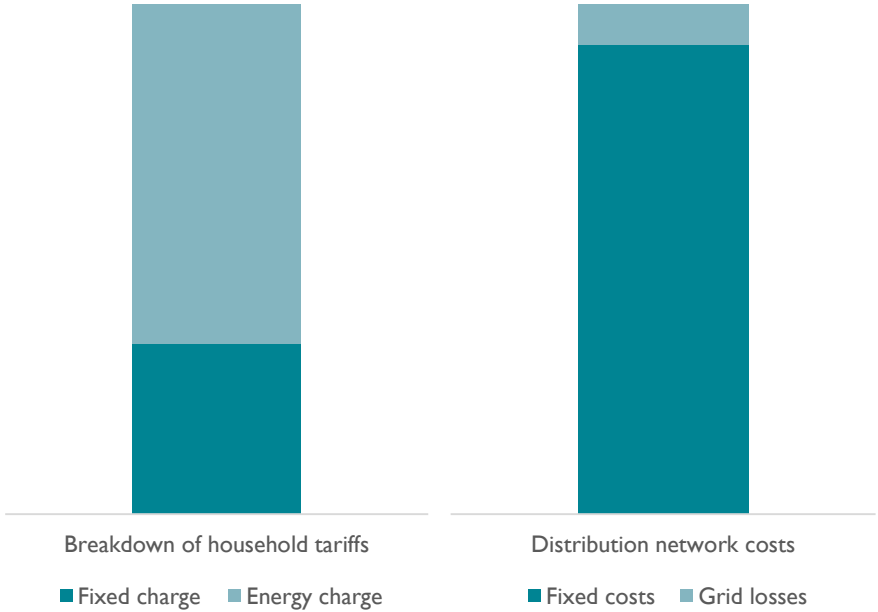
Challenge 1: Current tariffs are non-cost reflective providing incorrect incentives

Energy charge equal to the costs of marginal losses when there is excess capacity in the grid.

Value of investment in production behind the meter

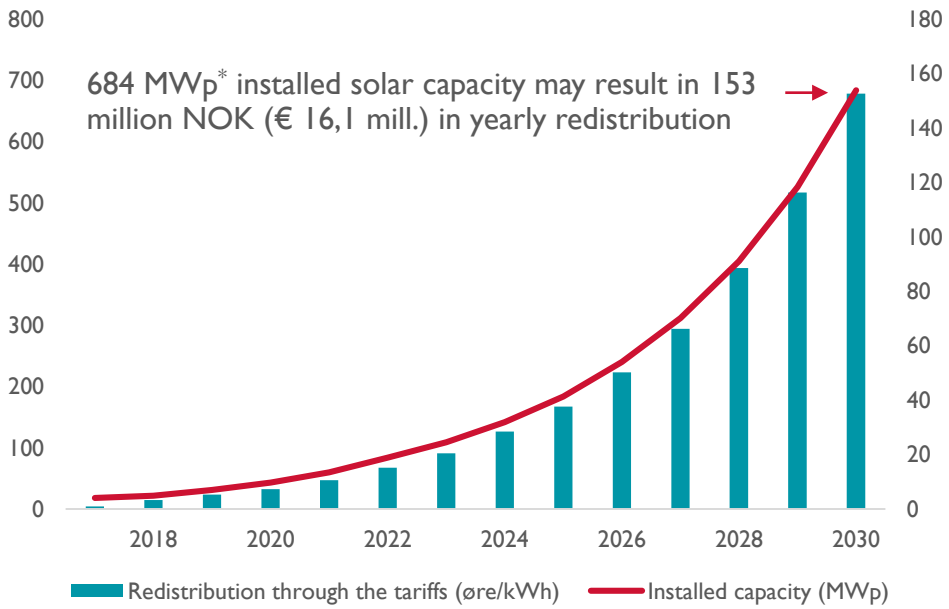
Value for the customer	
Electricity price («normal year»)	30
+ Energy charge (consumption)*	18,22
= Private savings	48,22
Value for the power system	
Electricity price	30
+ Energy charge (reduced losses)	5
= Value of energy delivered to the grid	35
Redistribution through tariffs (øre/kWh)	13,22

Utilisation of the grid too expensive today



*Weighted national average excluding taxes and levies: Enova-fee, consumption tax and VAT.

Challenge 1 (contd.): Redistributional effects from non-cost reflective tariffs



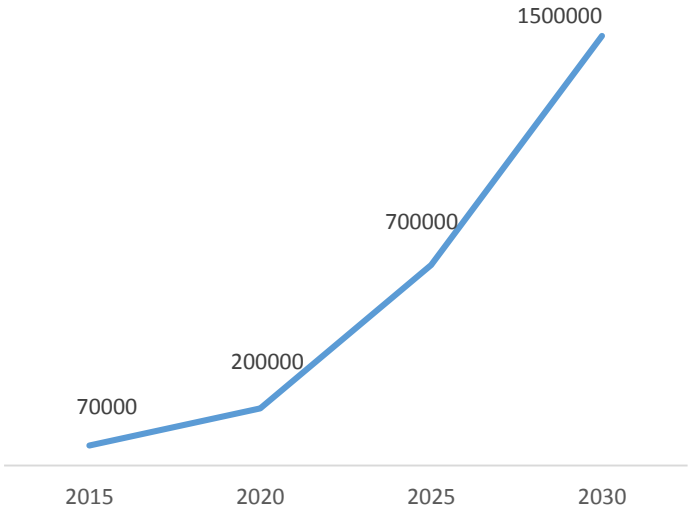
- Incorrect price signals lead to challenging redistributional effects.
- The consequences are increasing over time due to solar, batteries, etc.
- The energy charge should be set equal to the costs related to the marginal losses in the grid.

* Data for installed capacity from Solenergiklyngen. Assumes 50 % of production from customers with energy based tariff today. Redistributional effects are shown on the secondary axis.

Higher price than the costs of marginal losses when capacity is limited.

Challenge 2: Customers should internalise the cost of their capacity utilisation

Development – EVs (Norway)



- Statistics often focus on capacity usage as kWh/h.
- Instantaneous capacity usage most important for operational issues and dimensioning of the (local) grid.
- More capacity intensive loads of shorter duration.
- Almost ¼ of all EVs sold in Europe are delivered to the Norwegian market
- «Simultaneity factor» used in planning is increasing.

Statistics are from NVE (2016)

Challenge 2 (contd.): The cost of «home charging» could be very high, if charging is not conducted in a «smart manner»

Case: Drammen

- City 40 km. from Oslo, ca. 70 000 inhabitants
- 47 000 private cars and vans
- Future charging need per customer: 10 kWh/day
- Estimate from DSO – Glitre Energi Nett

1) Charging of EVs "spread out"

- Current grid capacity can handle future charging

2) Everyone charges at the same time

- Potential grid investments of 1-2 billion NOK (€ 105-211 million)

Picture: danvikfhs.no

Going forward: Reception of the model. New public consultation.

Capacity-based tariffs are in general supported, but it is difficult for stakeholders to agree on one model

- In general, capacity-based tariffs are supported.
- However, challenging to agree on one model.
- Working closely with stakeholders on revised models.
- Relevant models must satisfy three main criteria.
- New public consultation Q1 2019.

Current and future tariff structure

Current tariff structure:

Tariff = Energy Charge + Fixed Charge

Future tariff structure:

Tariff = Energy Charge + Subscription + Overspending Charge

Thank you for your attention

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