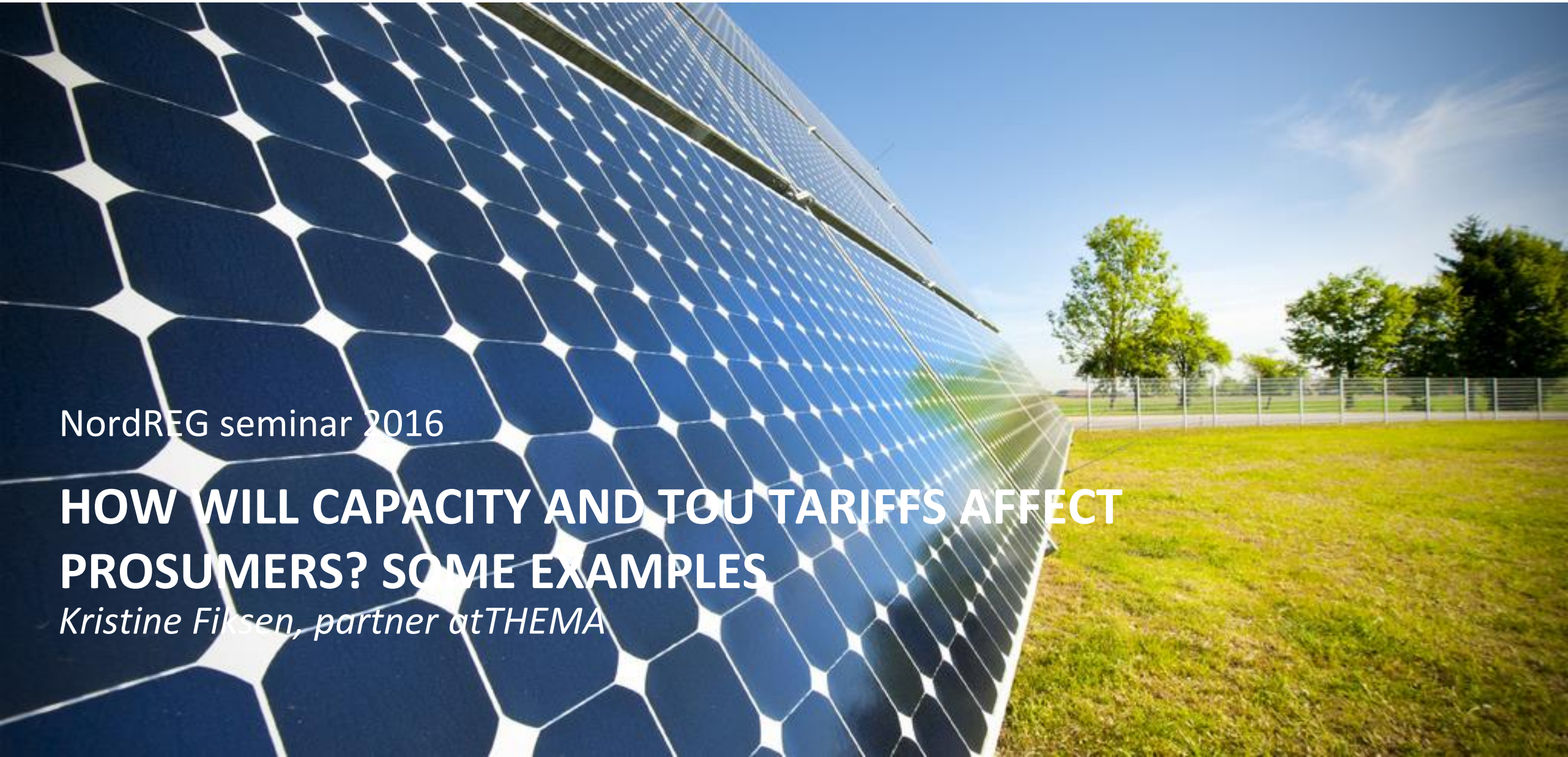


NordREG seminar 2016

HOW WILL CAPACITY AND TOU TARIFFS AFFECT PROSUMERS? SOME EXAMPLES

Kristine Fiksen, partner atTHEMA

PROSUMERS

- Maksimum feed-in to the grid: 100 kW
- One meter
- Exempt from tariff on energy fed into the grid
- Supplier to provide market access. But the grid company may buy energy from prosumers until the central hub is in place (Elhub)

KEY QUESTION: HOW WILL THE TARIFF CHANGE FOR PROSUMERS IF WE SHIFT FROM VOLUMETRIC TO CAPACITY OR TOU TARIFFS?

Method for calculations of prosumer`s tariffs:

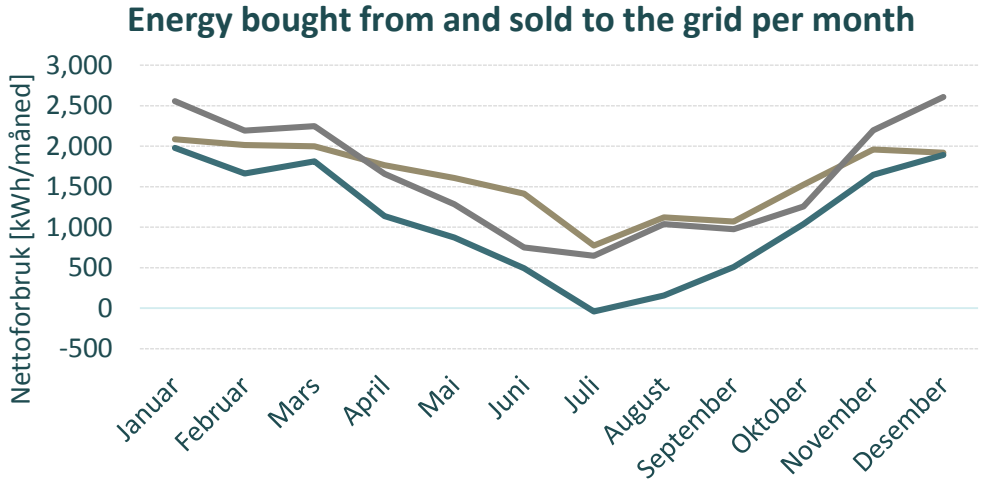
- The basis is 7 prosumers' usage profiles with **hourly resolution**
- Calculated tariff for the prosumers with
  - the **current volumetric tariff**.
  - the **current capacity tariff for big customers**
  - **TOU tariff example** from NVE

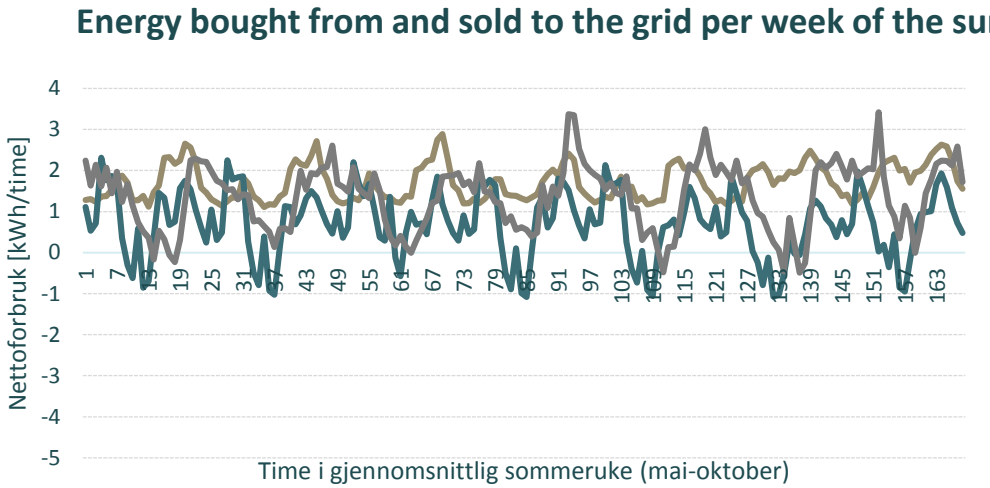
Assumptions:

- The current volumetric tariff component for large customers equals the marginal loss
- Symmetric marginal loss: consumers pay and prosumers are payed the same level
- We have not included energy sale from the prosumers (to the network company or utility)

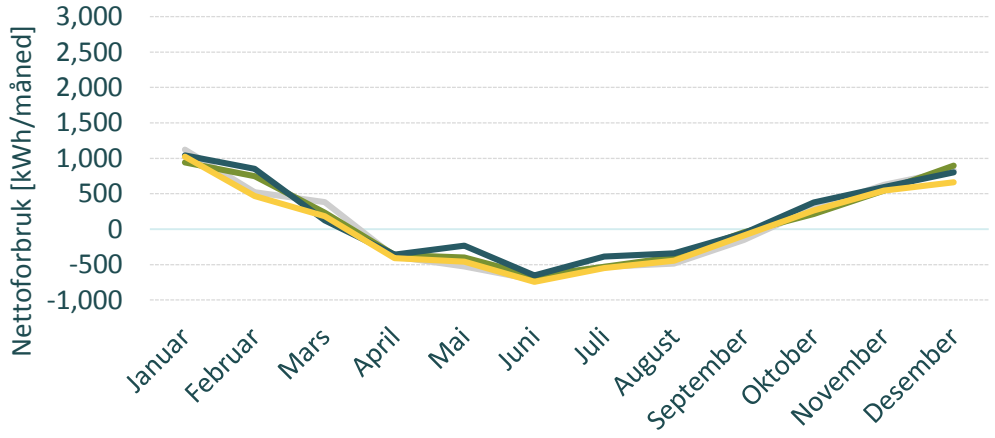
SOME OF THE PROSUMERS ARE NET ENERGY SUPPLIERS, BUT CONTINUES TO USE ENERGY FROM THE GRID IN SUMMER

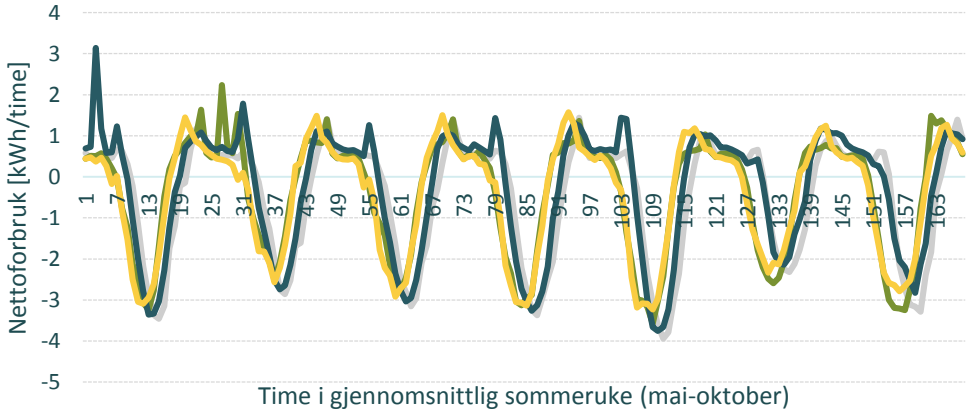
Normal buildings with solar panels





Low energy buildings with solar panels

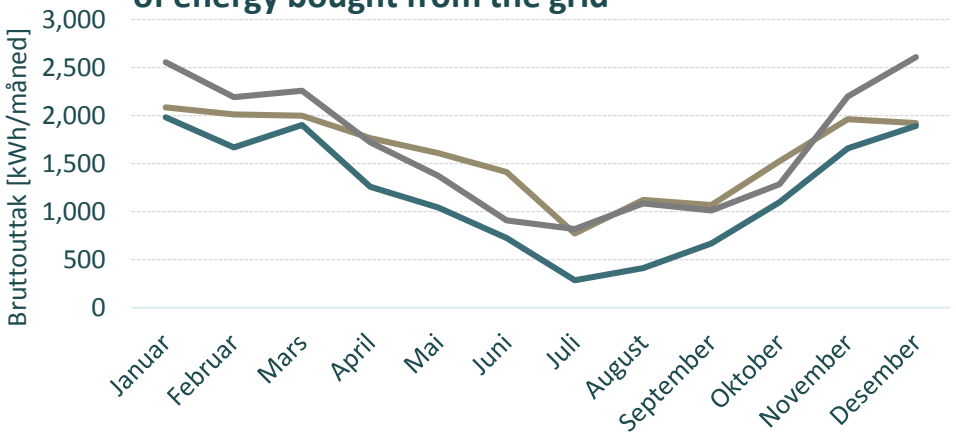




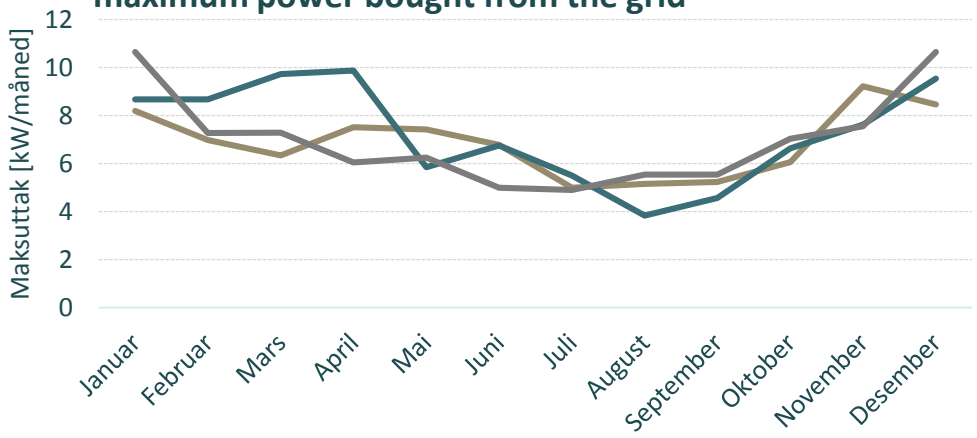
THE NETWORK TARIFF IS BASED ON THE VOLUME OF ENERGY OR THE MAXIMUM POWER PER MONTH

Normal buildings with solar panels

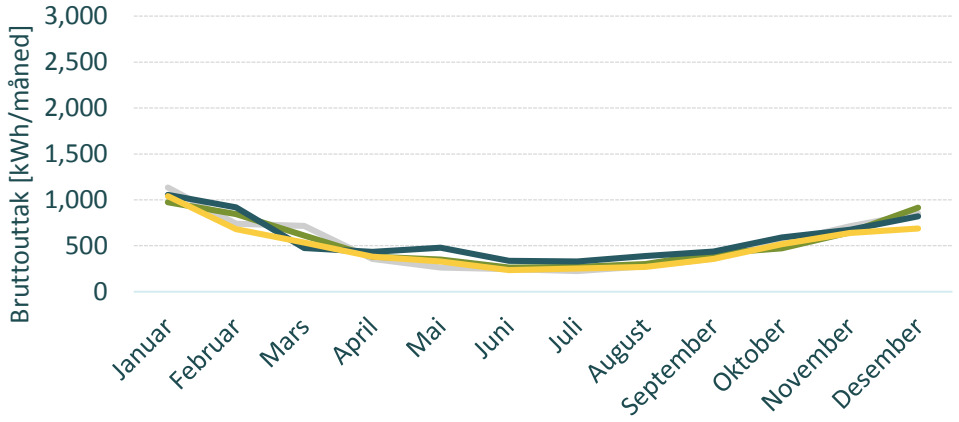
The volumetric tariff component is based on the volume of energy bought from the grid

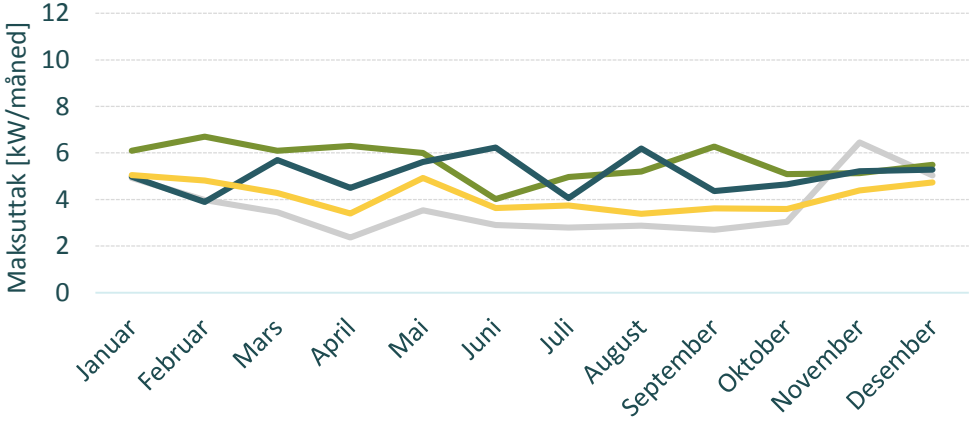


The capacity tariff component is based on the maximum power bought from the grid



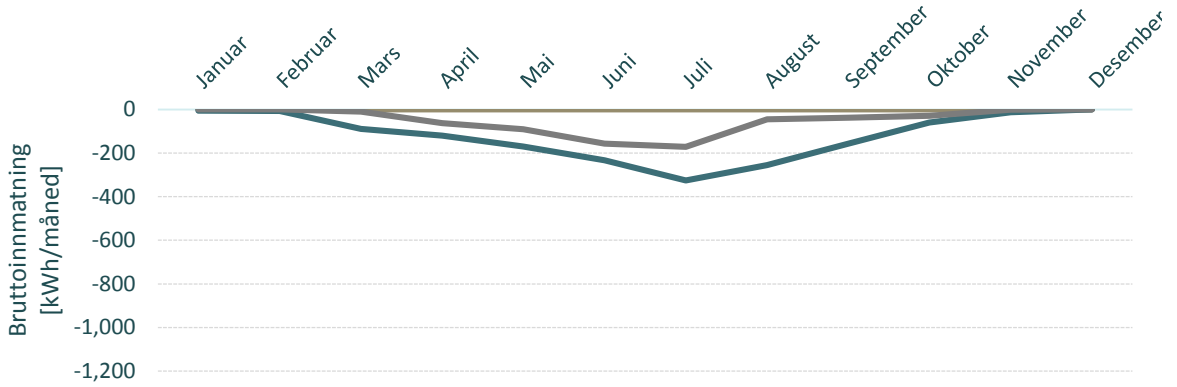
Low energy building with solar panels





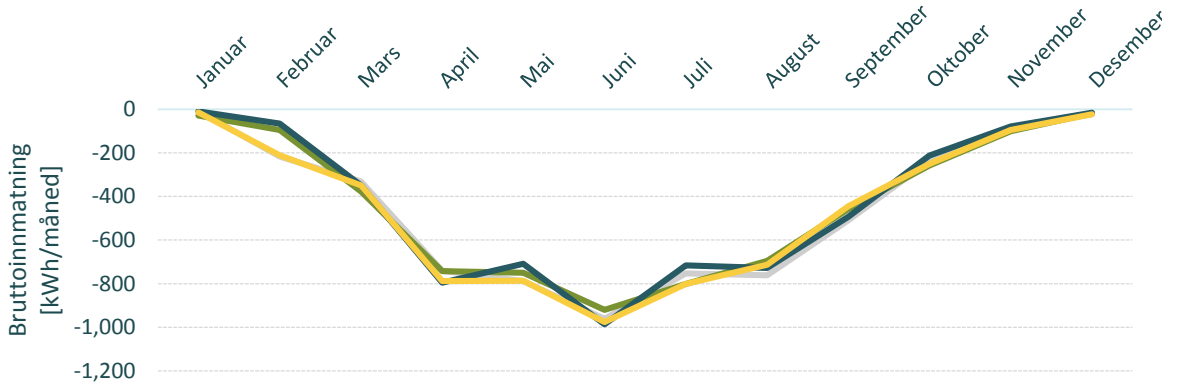
NO NETWORK TARIFF ON ENERGY DELIVERIES – THE PROSUMERS ARE PAID CORRESPONDING TO THE MARGINAL LOSS COST OF CONSUMERS

Normal buildings with solar panels



- One of the buildings delivers little energy to the grid, and produces almost exclusively for its own usage
- One of the buildings delivers energy in the period from march to October
- One of the buildings delivers energy mainly in the period from April to July

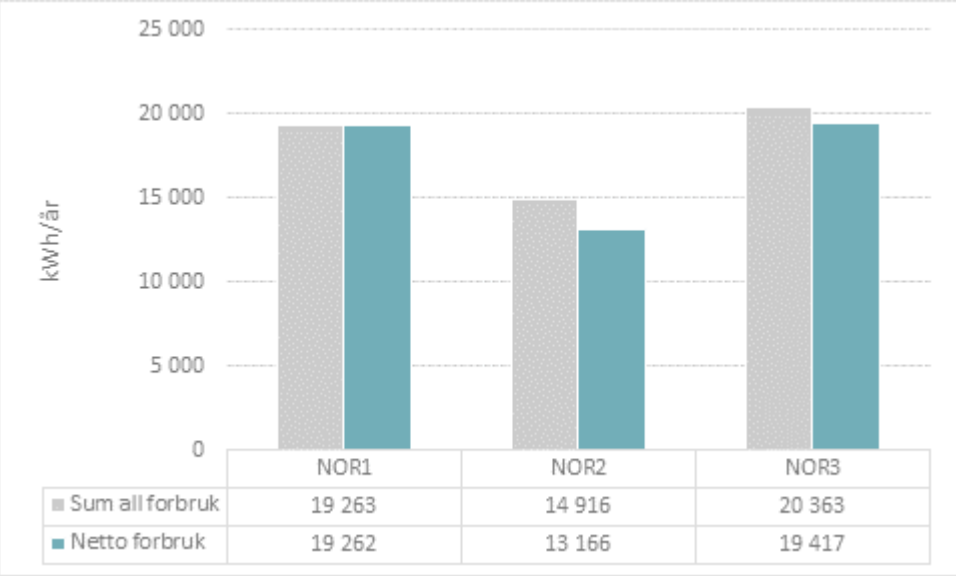
Low energy buildings with solar panels



- All of the buildings delivers energy to the grid in the period February to November

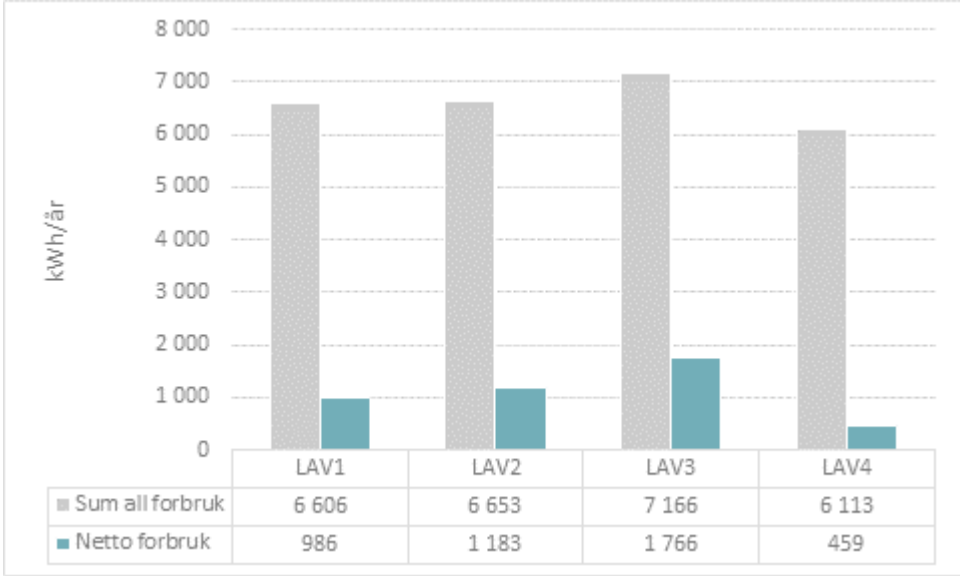
LOW ENERGY HOUSES USE 1/3 OF THE ENERGY OF A REGULAR HOUSE AND PRODUCE 80-90% OF ITS OWN ENERGY CONSUMPTION

Normal buildings with solar panels



	NOR1	NOR2	NOR3
Sum all forbruk	19 263	14 916	20 363
Netto forbruk	19 262	13 166	19 417

Low energy buildings with solar panels



	LAV1	LAV2	LAV3	LAV4
Sum all forbruk	6 606	6 653	7 166	6 113
Netto forbruk	986	1 183	1 766	459

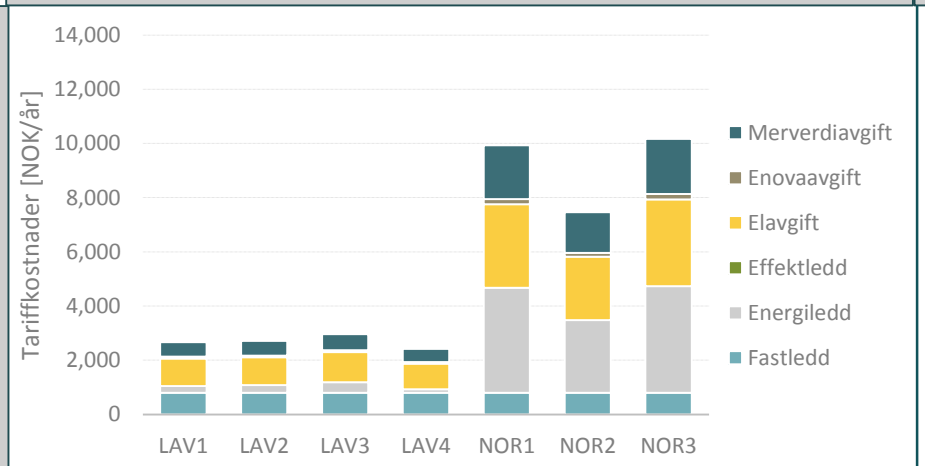
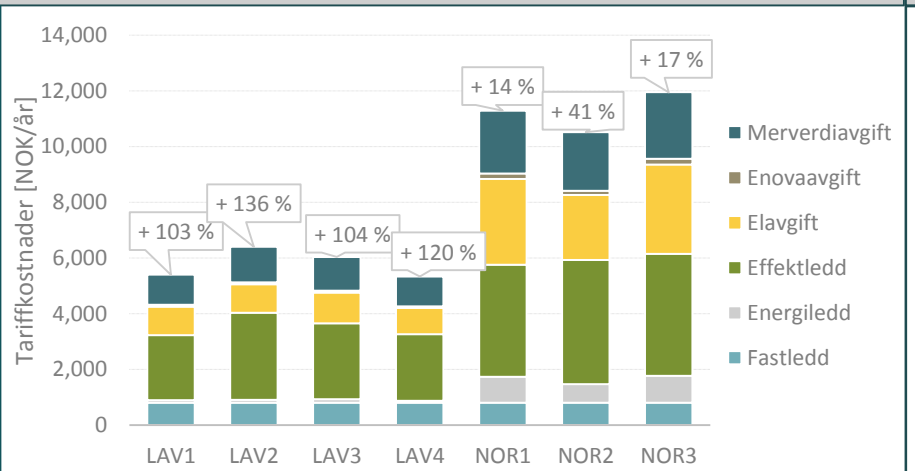
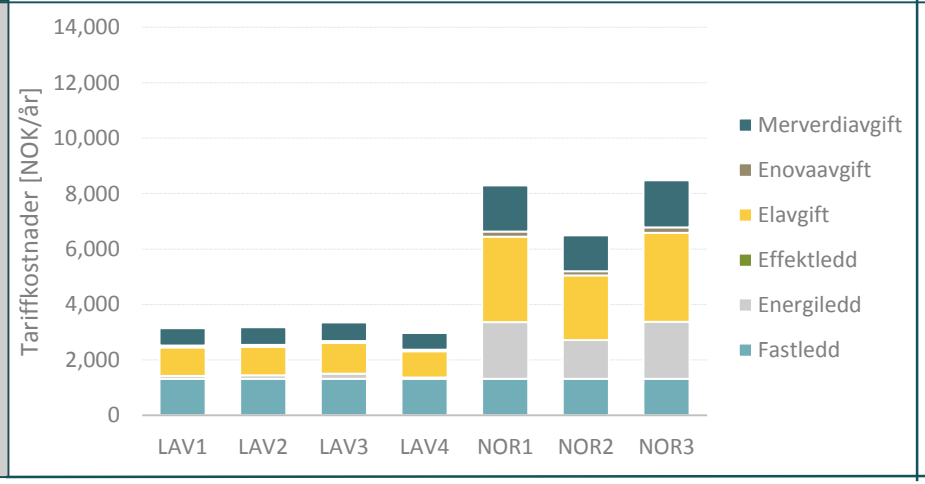
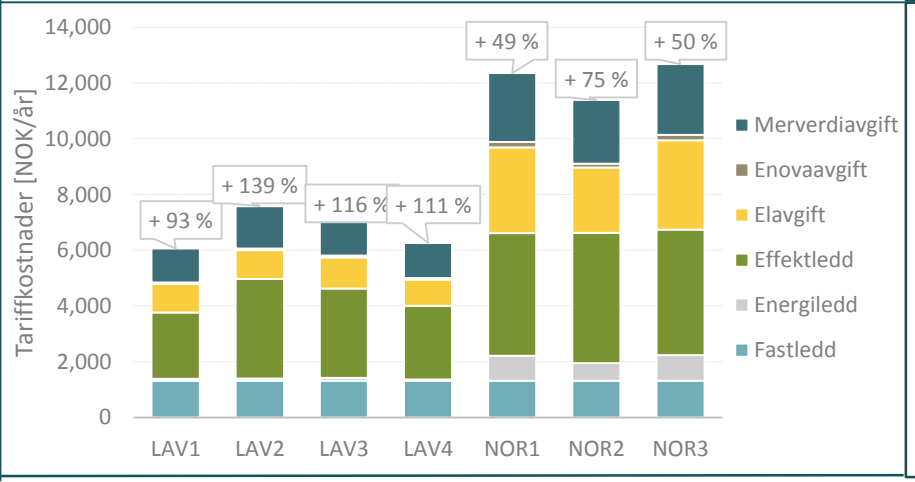
CAPACITY TARIFFS

WE ARE USING TWO CURRENT TARIFFS – WITH AND WITHOUT LARGE DIFFERENTIATION BETWEEN SUMMER AND WINTER

Nettselskap	Tarifftype	Eks. avg.	Inkl. avg.	Enhet
EB_husholdning	Fastledd	800	1000	*NOK/år*
EB_husholdning	Energiledd, vinter	20.81	47.3	*øre/kWh*
EB_husholdning	Energiledd, sommer	19.01	45.0	*øre/kWh*
EB_husholdning	Effektledd, vinter	0		*kr/kW/mnd*
EB_husholdning	Effektledd, sommer	0		*kr/kW/mnd*
EB_næring	Fastledd	800	1000	*NOK/år*
EB_næring	Energiledd, vinter	+/- 5.5	28.1	*øre/kWh*
EB_næring	Energiledd, sommer	+/- 3.9	26.1	*øre/kWh*
EB_næring	Effektledd, vinter	79	98.75	*kr/kW/mnd*
EB_næring	Effektledd, sommer	12	15	*kr/kW/mnd*
BKK_husholdning	Fastledd	1320	1650	*NOK/år*
BKK_husholdning	Energiledd, vinter	10.6	34.5	*øre/kWh*
BKK_husholdning	Energiledd, sommer	10.6	34.5	*øre/kWh*
BKK_husholdning	Effektledd, vinter	0		*kr/kW/mnd*
BKK_husholdning	Effektledd, sommer	0		*kr/kW/mnd*
BKK_næring	Fastledd	1320	1650	*NOK/år*
BKK_næring	Energiledd, vinter	+/- 4.9	27.4	*øre/kWh*
BKK_næring	Energiledd, sommer	+/- 4.3	26.6	*øre/kWh*
BKK_næring	Effektledd, vinter	57	71.25	*kr/kW/mnd*
BKK_næring	Effektledd, sommer	49	61.25	*kr/kW/mnd*

- We have combined capacity tariffs for large consumers and fixed tariff from small consumers.
- Volumetric tariffs for large consumers eqals the marginal loss of the grid
- Prosumers are paid for marginal loss of their energy delivered as comsumers pay marginal loll
- Levies are included, payment for energy delivered is not

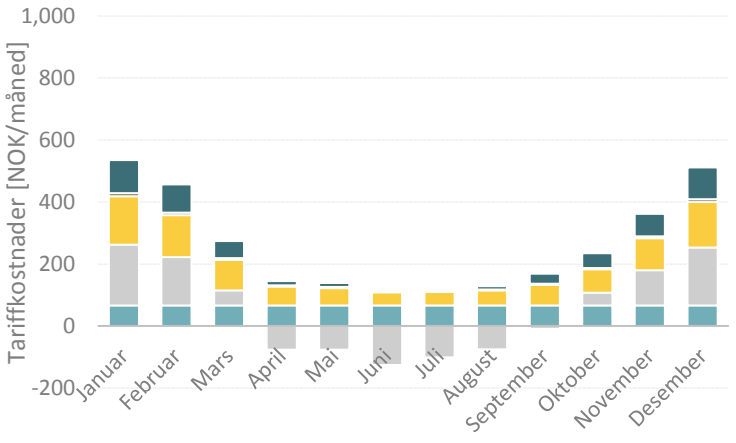
THE GRID TARIFF INCREASES SUBSTANTIALLY WHEN CHANGING FROM VOLUMETRIC TO CAPACITY TARIFFS

	Volumetric tariffs	Capacity tariffs	
EB per 2016			**High differentiation between summer and winter:** ▪ Low energy buildings: yearly tariff increase 115 per cent ▪ Normal buildings: yearly tariff increase 22 per cent
BKK per 2016			**Small differentiation between summer and winter:** ▪ Low energy buildings: yearly tariff increase 115 per cent ▪ Normal buildings: yearly tariff increase 57 cent

THE DISTRIBUTION OF PAYMENT PER MONTH CHANGES TOO

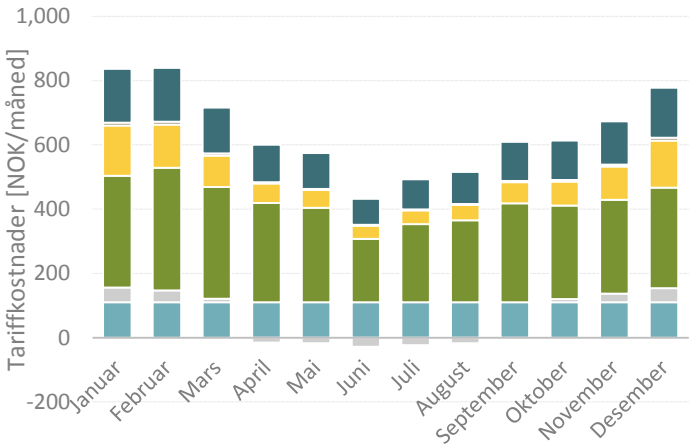
LOW ENERGY BUILDINGS

Volumetric tariff (from EB NEtt)



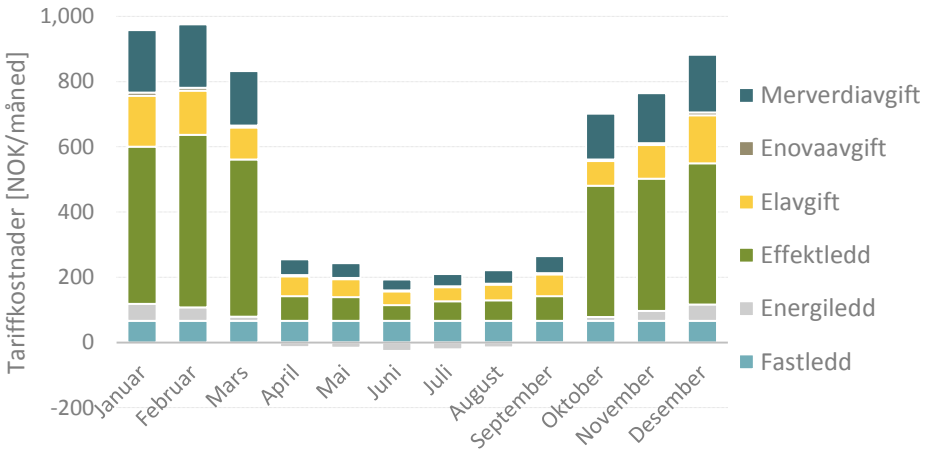
- Fixed fee: 800 kr/ year
- Volumetric tariff:
  - Summer: 0,19 kr/kWh
  - Winter: 0,21 kr/kWh

Capacity tariff (from BKK Nett)



- Fixed fee: 1320 kr/ year
- Volumetric tariff:
  - Summer: 49 kr/kW
  - Winter: 57 kr/kW

Capacity tariff (from EB Nett)



- Fixed fee: 800 kr/ year
- Capacity tariff:
  - Summer: 12 kr/kW
  - Winter: 79 kr/kW

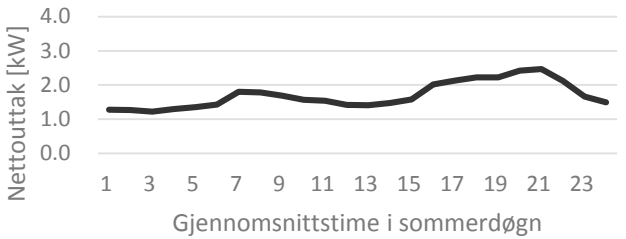
TIME-OF-USE TARIFFS

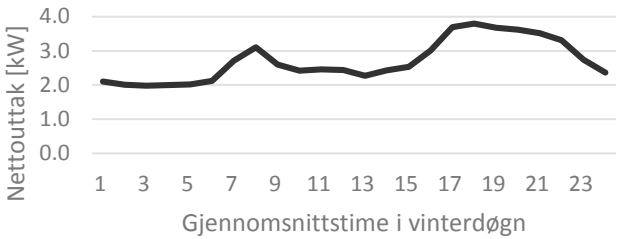
DAILY ENERGY PROFILES

Distribution over an average summer day

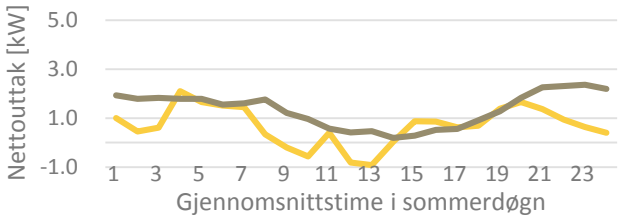
Distribution over an average winter day

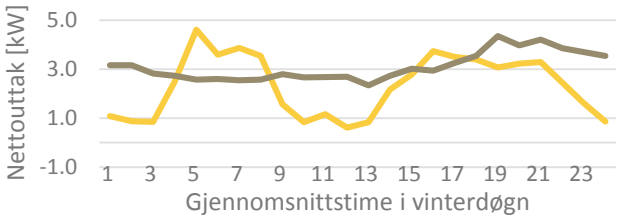
Normal - consumption



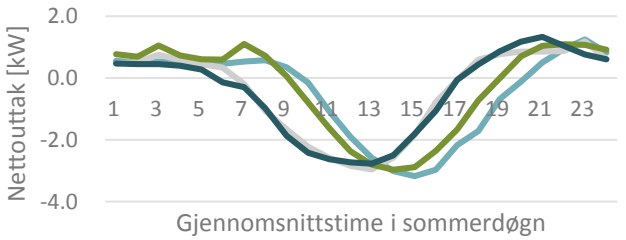


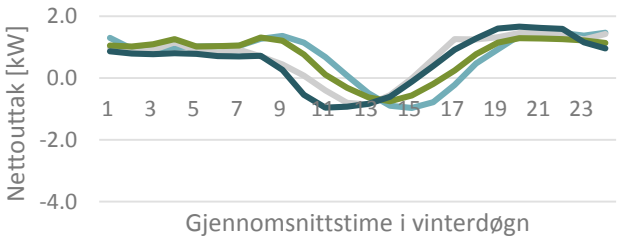
Prosumers – normal building





Prosumers – low energy





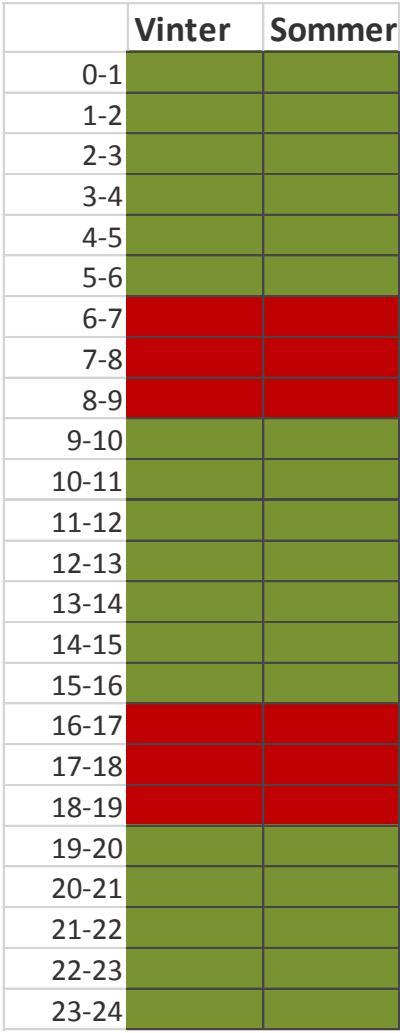
TIME-OF-USE TARIFF USED IN THE CALCULATIONS

VOLUMETRIC TARIFF

- Fixed fee: 1500 kr/ year
- Energy fee: 0,19 kr/kWh
- Payment for energy to the grid (negative loss):
  - 0,05 kr/kWh
- Levies are included

TOU-TARIFF

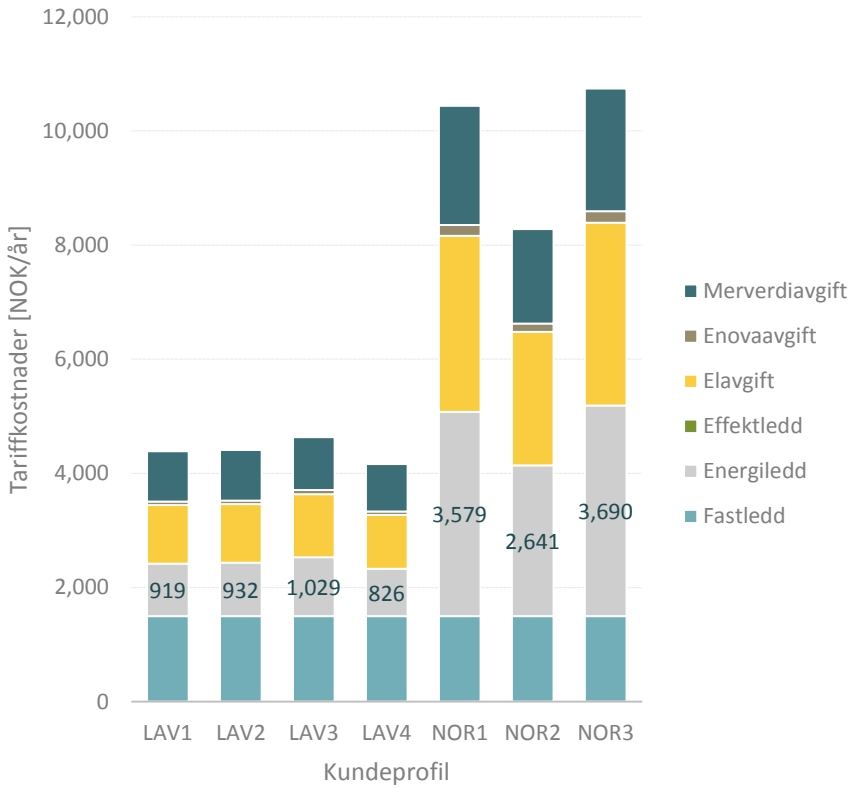
- Fixed fee: 1500 kr/ year
- Low (green) energy fee:
  - 0,05 kr/kWh
- High (red) energy fee:
  - 0,40 kr/kWh
- Payment for energy to the grid (negative loss):
  - 0,05 kr/kWh
- Levies are included



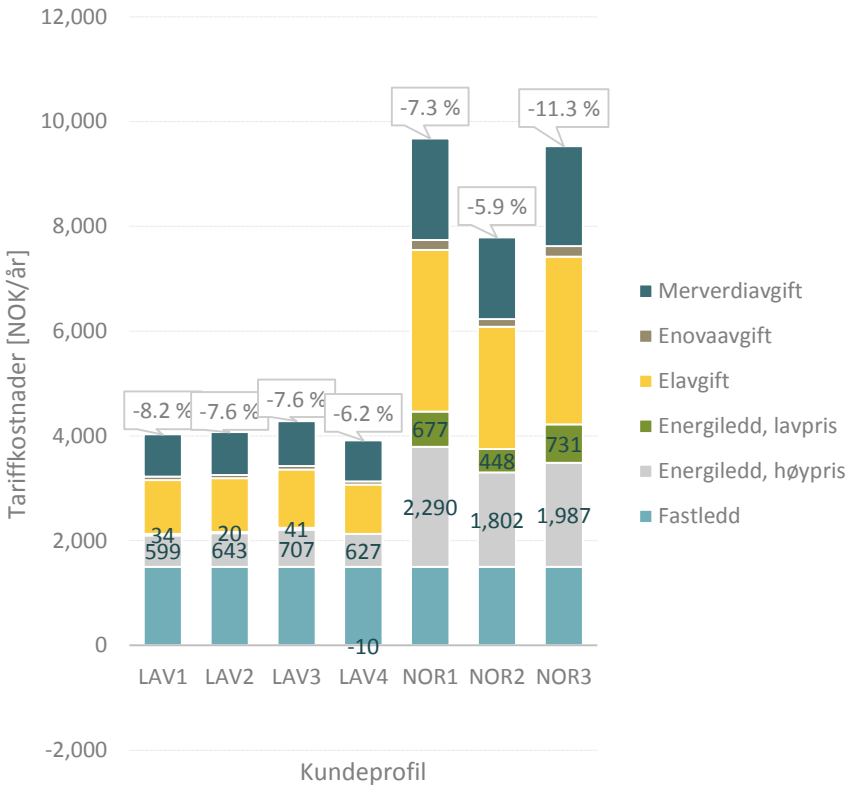
	Vinter	Sommer
0-1		
1-2		
2-3		
3-4		
4-5		
5-6		
6-7		
7-8		
8-9		
9-10		
10-11		
11-12		
12-13		
13-14		
14-15		
15-16		
16-17		
17-18		
18-19		
19-20		
20-21		
21-22		
22-23		
23-24		

ANNUAL GRID TARIFFS REDUCED 6 TO 11%

Volumetric tariffs



Time-of-use tariff



Tariff med TOU

- Reduced tariffs for all prosumers
- No systematic difference between normal and low energy buildings

SUMMARY

SUMMARY OF OUR EXAMPLES

- Prosumers grid tariffs:
  - Are increased by a change to capacity tariffs
  - ..but capacity tariffs reduce the variation between months since the maximum loads vary less by season than energy use

- TOU- tariffs
  - Reduces tariffs, but not very much
  - Not much energy produced from solar in «red» hours during winter in Norway

THEMA

CONSULTING GROUP