

# Press release

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IEA PVPS Task 1 collects data on the solar PV market in Norway that is then published by the international working group alongside equivalent figures for other countries. Data is collected by Multiconsult and the work is funded by the Research Council of Norway.

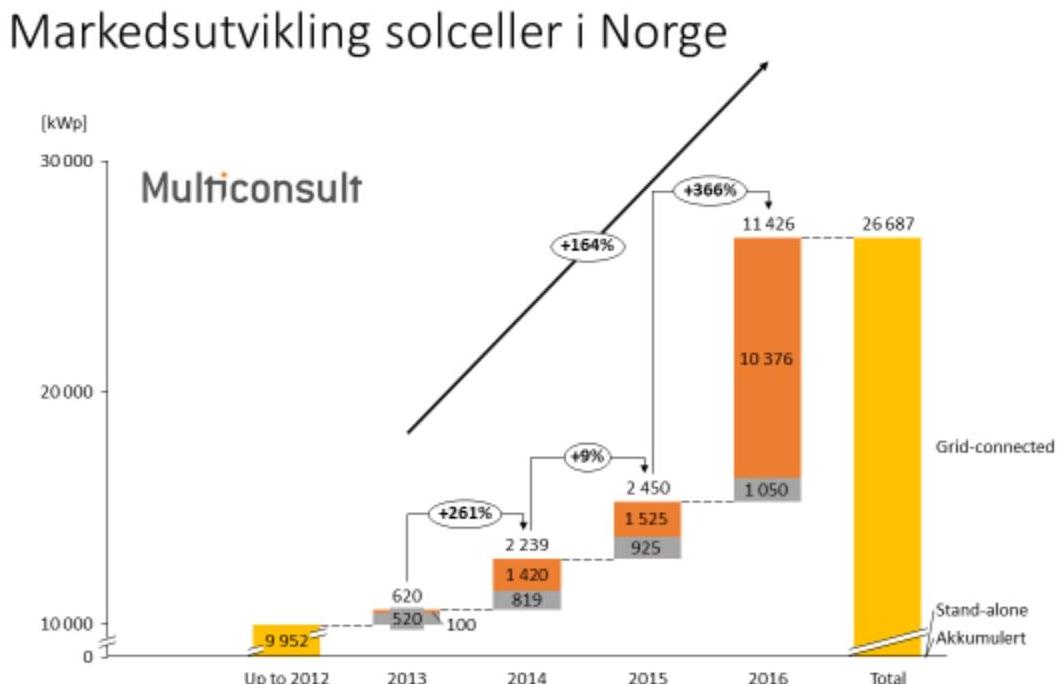
The figures being presented now are preliminary ones, while final figures will be published in the National Survey Report (NSR) for Norway in summer 2017. The biggest uncertainty relates to the market for off-grid systems.

# Rapid growth in the solar energy market in 2016

366% growth in installed capacity

In total, over 11 MWp of solar panels were installed in Norway in 2016, which was 366% higher than in 2015. The market is dominated by grid-connected solar PV plants, while off-grid systems represent around 10% of the market by installed capacity.

Caption: Trends in the Norwegian solar PV market

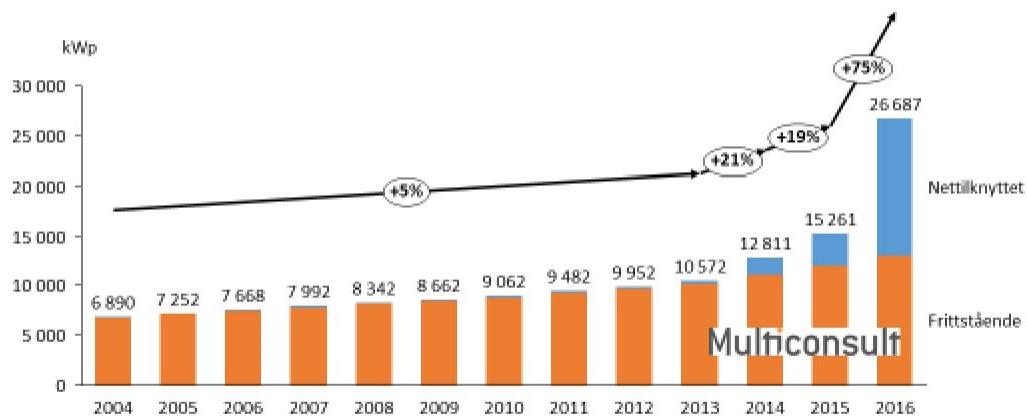


## 75% increase in cumulative installed capacity

Total cumulative installed capacity rose 75% from 2015, reaching almost 27 MWp by the end of 2016.

Caption: Cumulative solar PV capacity in Norway

### Akkumulert solcellekapasitet i Norge



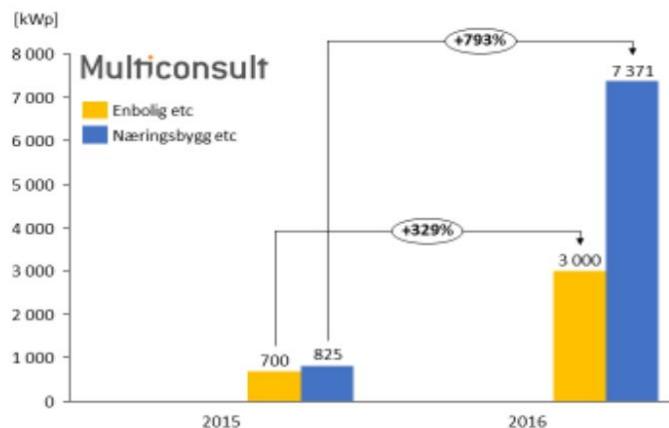
Cumulative grid-connected installed capacity was 13.6 MWp. Assuming average electricity generation of 750 kWh/kWp, these grid-connected solar PV systems will supply approximately 10 GWh/year.

## Market segments

In 2016, grid-connected systems with an installed capacity of approximately 10 MWp were added (1.5 MWp in 2015). In 2015, the market was severely held back by uncertainty over the rules on self-consumption and green electricity certificates, but these issues were solved at the start of 2016. More information is available from NVE and the Norwegian Solar Energy Society (see References). Confirmation that all solar PV generation would be eligible for electricity certificates, together with the “Plus Customer” self-consumption scheme, led many investors to go ahead with projects in 2016. This probably helps to explain the exceptionally high growth rate (almost 800%) in the commercial building segment. In 2016, Enova supported 13 projects that included solar panels for commercial buildings.

Caption: Strong growth in both the residential and commercial segments

## Sterk vekst både i bolig- og næringssegmentet



The residential segment also expanded very strongly, growing over 300% from 2015. We believe that greater competition and the introduction of new business models played a significant role here.

Of the 3,000 kWp installed in total in the residential segment, 660 kWp was financed through the Enova subsidy scheme launched in January 2015. This scheme provides a NOK 10,000 lump sum subsidy for solar PV systems up to 15 kWp, plus NOK 1,250 per installed kWp. Based on the average price of systems, in practice this subsidy covers between 10% and 30% of the total investment. The City of Oslo’s Climate Change Department provided support for 167 kWp spread across 30 residential systems.

Preliminary estimates suggest that approximately 1,000 kWp of off-grid systems were installed (925 kWp in 2015). In the market for holiday cottages, there is a trend towards advanced hybrid systems combining higher capacity solar arrays and batteries with wind turbines, diesel/petrol generators and 230 Volt transformers.

## Cost trends

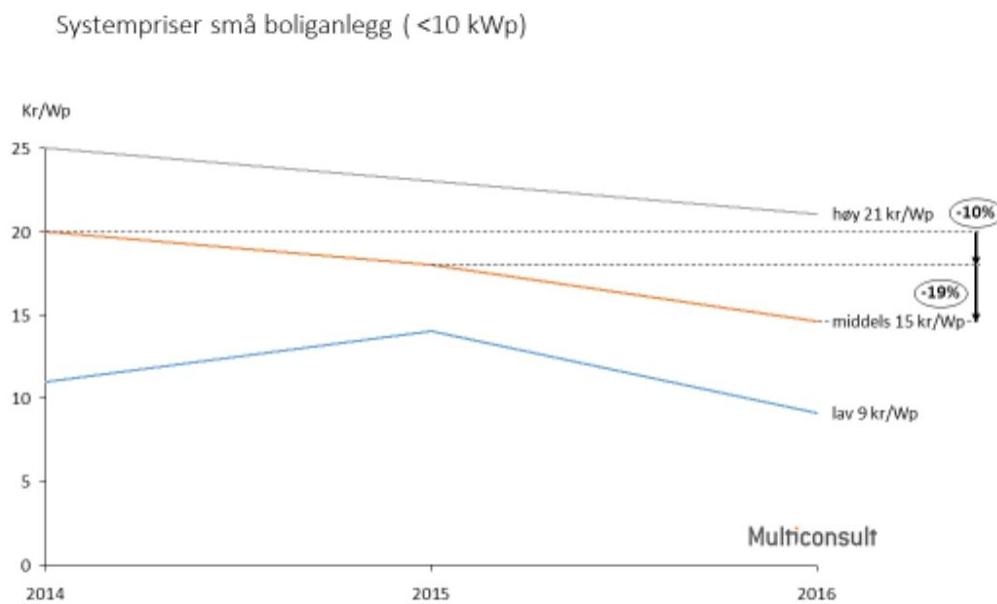
The costs of PV modules and other system components are falling in line with international prices, although this is not fully reflected in system prices in Norway, primarily because the market remains relatively small. It should be pointed out that the system prices quoted are based on a limited amount of price data from a minority of suppliers, and that some outliers were excluded because the services included in the price differed significantly from what is typical in the relevant market segment. The price trends for PV systems should therefore only be considered indicative; specific quotes and actual system prices may be significantly higher or lower. One source of price variation for building-mounted solar PV systems is the ease of installing solar panels on the building in question. Installing a system on a building with good access, where the solar panels are close to the grid connection point and it is easy to work on the roof, will normally be cheaper than doing so where these conditions are not met.

All prices are stated in Norwegian krone excl. VAT per Wp of installed capacity.

### Residential systems

The average price of small residential systems fell approximately 19% compared with 2015, and 27% from 2014. The typical price of a residential system is around NOK 15/Wp, with a range of NOK 9-21/Wp.

Caption: Prices of small residential systems (<10 kWp)

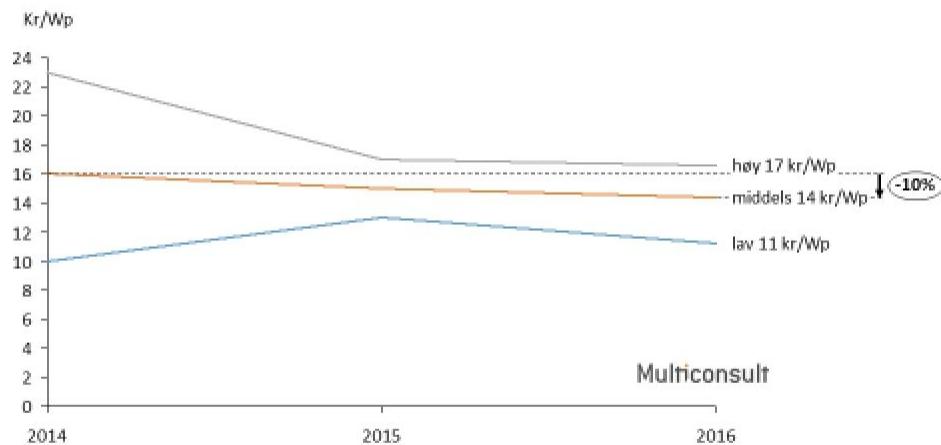


## Commercial systems

The average price of medium-sized systems for commercial buildings fell approximately 4% compared with 2015, and 10% from 2014. The typical price of a commercial system is around NOK 14/Wp, with a range of NOK 11-17/Wp.

Caption: Prices of solar PV systems on commercial buildings (10-100 kWp)

Systempriser solceller på næringsbygg (10-100 kWp)

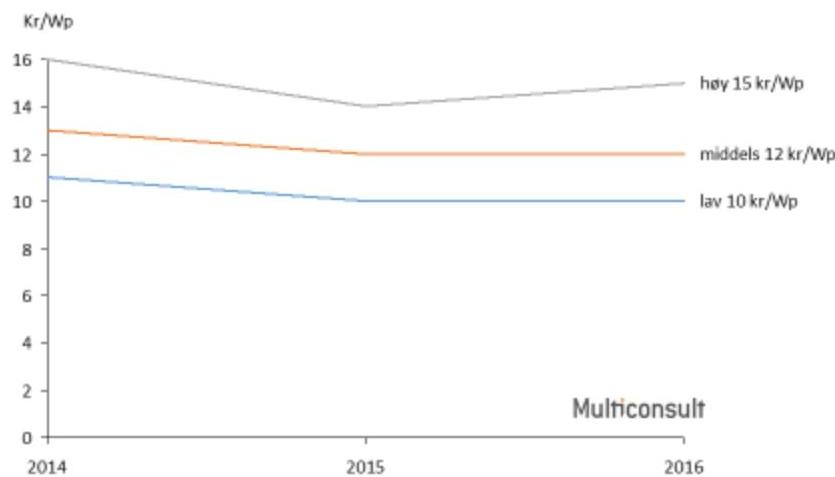


## Large commercial/industrial systems

In 2016, several large systems of over 1 MW were installed (cf. Top 10 list below). These are comparable in size to small hydro plants. It is hard to find information about the prices of these systems, but it is thought to be approximately NOK 12/Wp, with a range of NOK 10-15/Wp.

Caption: Price of solar PV systems on large industrial buildings (100→kWp)

### Systempriser solceller på store industribygg (100→ kWp)



### Norway's 10 largest solar PV installations



### Multiconsult

NORGES 10 STØRSTE SOLCELLEANLEGG

Nr.	Navn	Merkeeffekt [kWp]	Tilknyttet [år]
1	Asko Vestby	1 851	2016
2	UNIL Våler	1 322	2016
3	Asko Kalbakken	1 147	2016
4	Asko Sør	720	2016
5	Asko Midt	429	2016
6	Powerhouse Kjørbo	312	2014
7	Hareid Elektriske	293	2016
8	Storcash Buskerud	250	2016
9	Vabakkjen Stord	230	2016
10	Solsmaragden Drammen	183	2015

## Market segments

The solar PV market can be split into the following market segments:

### **Large grid-connected systems (100 kWp → 1 MWp)**

Solar PV systems to supply very large buildings and ground-mount systems.

### **Grid-connected systems on commercial buildings (10 → 100 kWp)**

Solar PV systems to supply large commercial buildings operated by the private or public sector.

### **Small grid-connected systems (0 → 10 kWp)**

Solar PV systems to supply small buildings operated by the private or public sector.

The typical residential system.

### **Small off-grid systems (0 → 50 kWp)**

Solar PV systems designed to supply electricity to small buildings and installations without access to the power grid. The typical system for holiday cottages, lighthouses and telecommunications infrastructure.

## Abbreviations

kWp kilowatt-peak; the nameplate capacity, which means installed capacity under standard test conditions (STC)

STC Standard Test Conditions, which means solar irradiance of 1000 W/m<sup>2</sup>, AM=1.5 and solar cell temperature of 25°C.

IEA International Energy Agency

PVPS Photovoltaic Power Systems

## References

### The “Plus Customer” self-consumption scheme

<https://www.nve.no/elmarkedstilsynet-marked-og-monopol/nettjenester/nettleie/tariffer-for-produksjon/plusskunder/>

[http://solenergi.no/wp-content/uploads/2015/09/1sider\\_Plusskunde-Elsertifikater.pdf](http://solenergi.no/wp-content/uploads/2015/09/1sider_Plusskunde-Elsertifikater.pdf)

## Green electricity certificates

<https://www.nve.no/energiforsyning-og-konsesjon/elsertifikater/siste-nytt-om-elsertifikater/informasjon-om-mikroprodusenter-og-elsertifikater/>

[http://solenergi.no/wp-content/uploads/2015/09/Høringsnotat-Norsk-solenergforening\\_OED-Elsertifikater.pdf](http://solenergi.no/wp-content/uploads/2015/09/Høringsnotat-Norsk-solenergforening_OED-Elsertifikater.pdf)