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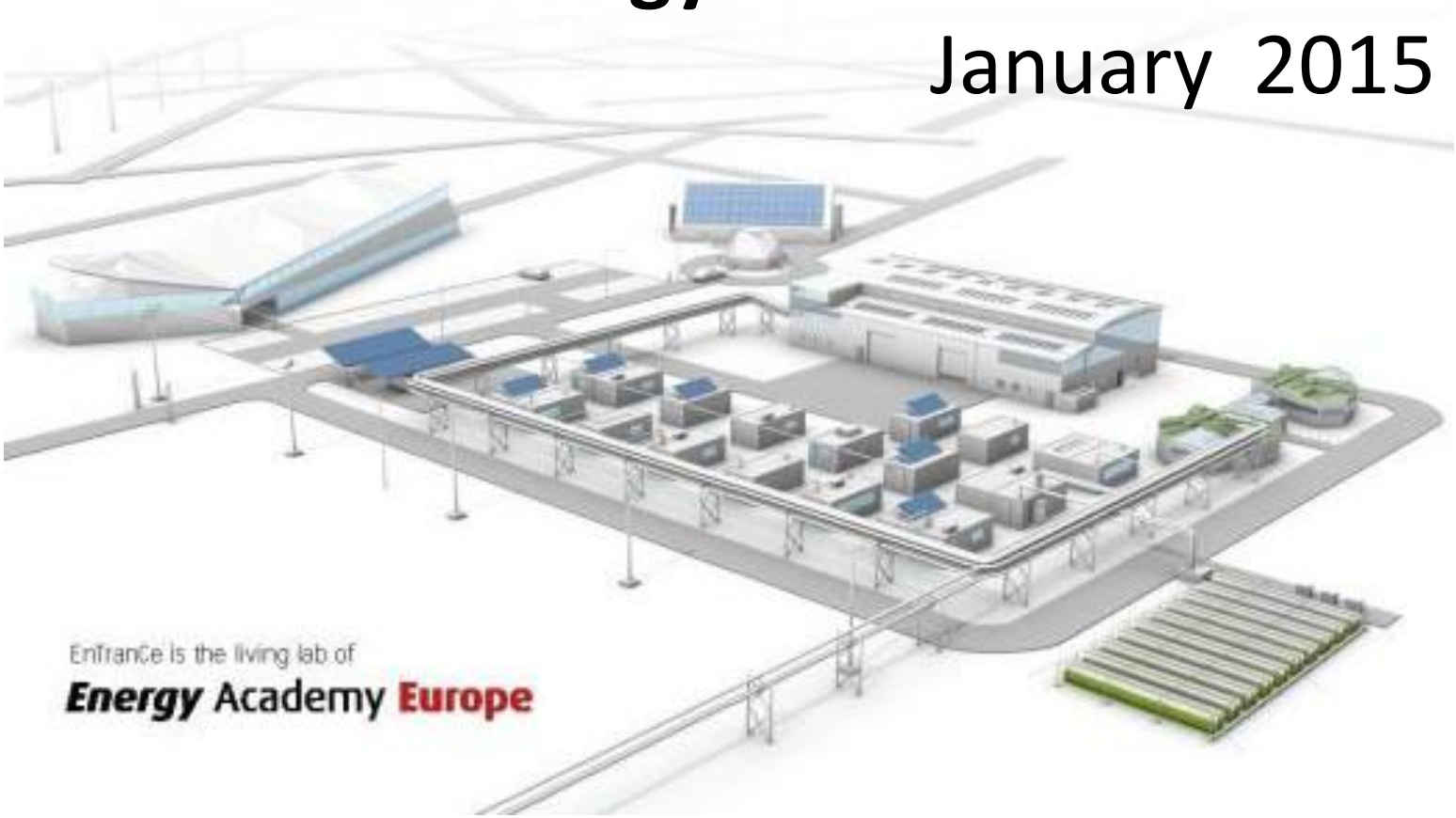
Renewable Energy in The Netherlands
January 2015



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This analyses contains information of various sources and own analyses, including various estimates.

Readers are encouraged to add, to improve the quality of the information provided.

January 2015

In a Nutshell

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- On Sunday January 11th, renewable power production peaked to 20% of total power demand. A record for The Netherlands.
- On Saturday January 10th, renewable energy production peaked to 6% of the total energy demand (excluding feedstock and international shipping and aviation).
- In January 2015, power generation with Solar-PV was 50% higher than in January 2014.
- In January 2015, wind power generation was equal to previous year.
- The relatively cold period in the 3rd week of January coincided with a lack of wind and net power exports. Hence daily power generation by fossil fuels peaked to 350 GWh.
- In January 2015, temperatures were slightly higher than normal

Content

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- January data
- Monthly profiles
- Monthly data
- Hourly data
- Miscellaneous

SELECTED ENERGY DATA FROM JANUARY

Final Energy Demand

January 2015

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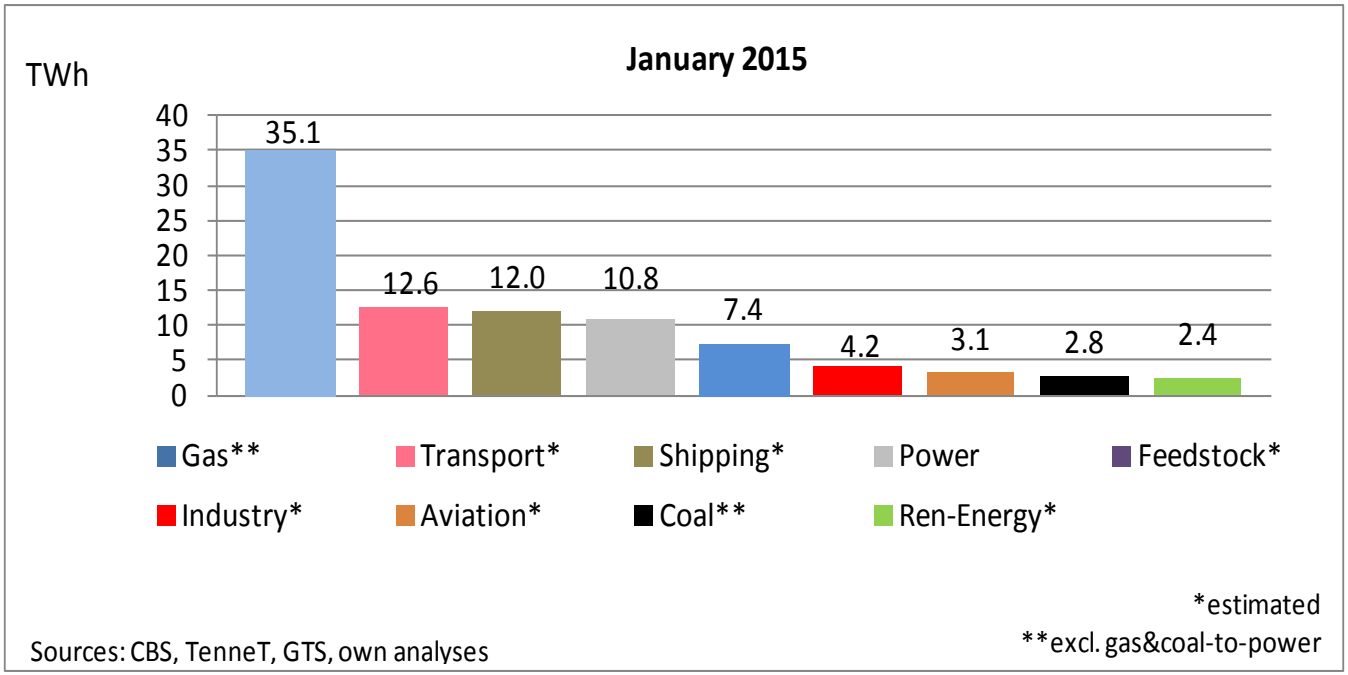

Energy is used for many different purposes. The most important applications are heating/gas (35 TWh) and various forms of transport (27 TWh). Final energy demand, including sources that do not contribute to national CO2 targets, was 89 TWh. Renewables are given by comparison.

Final Energy Demand

January 2015

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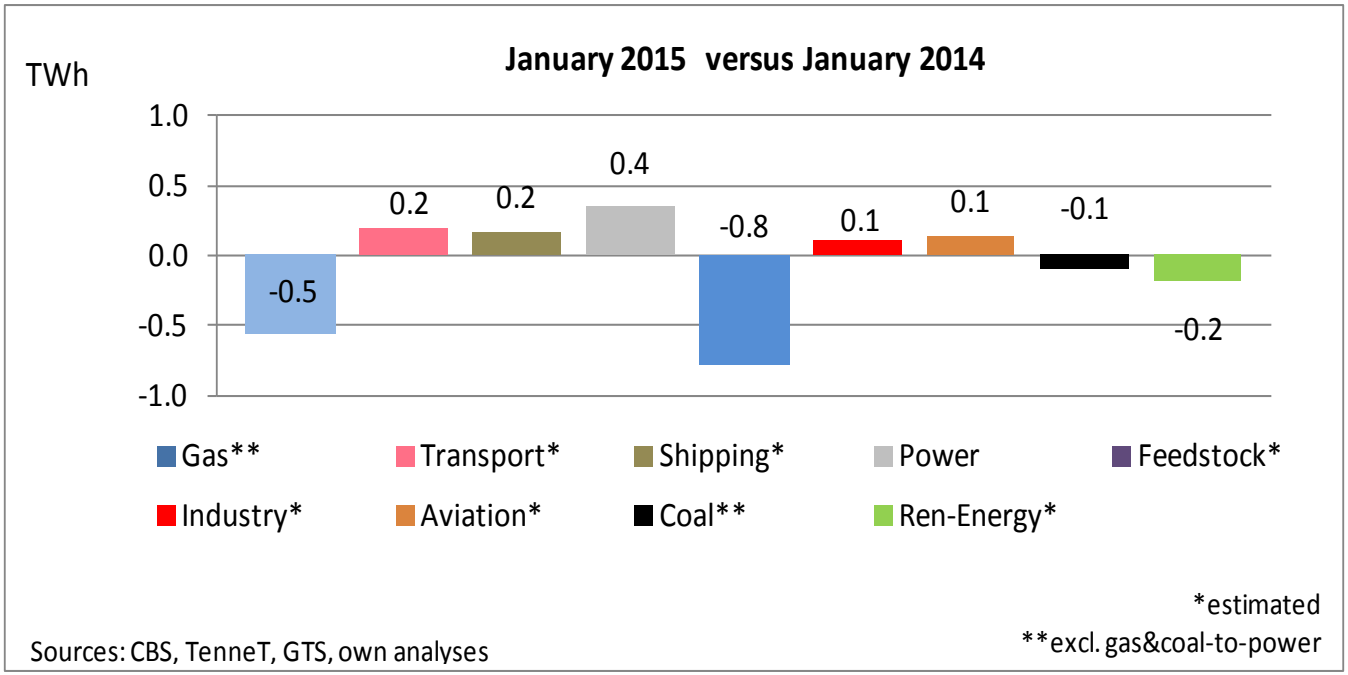
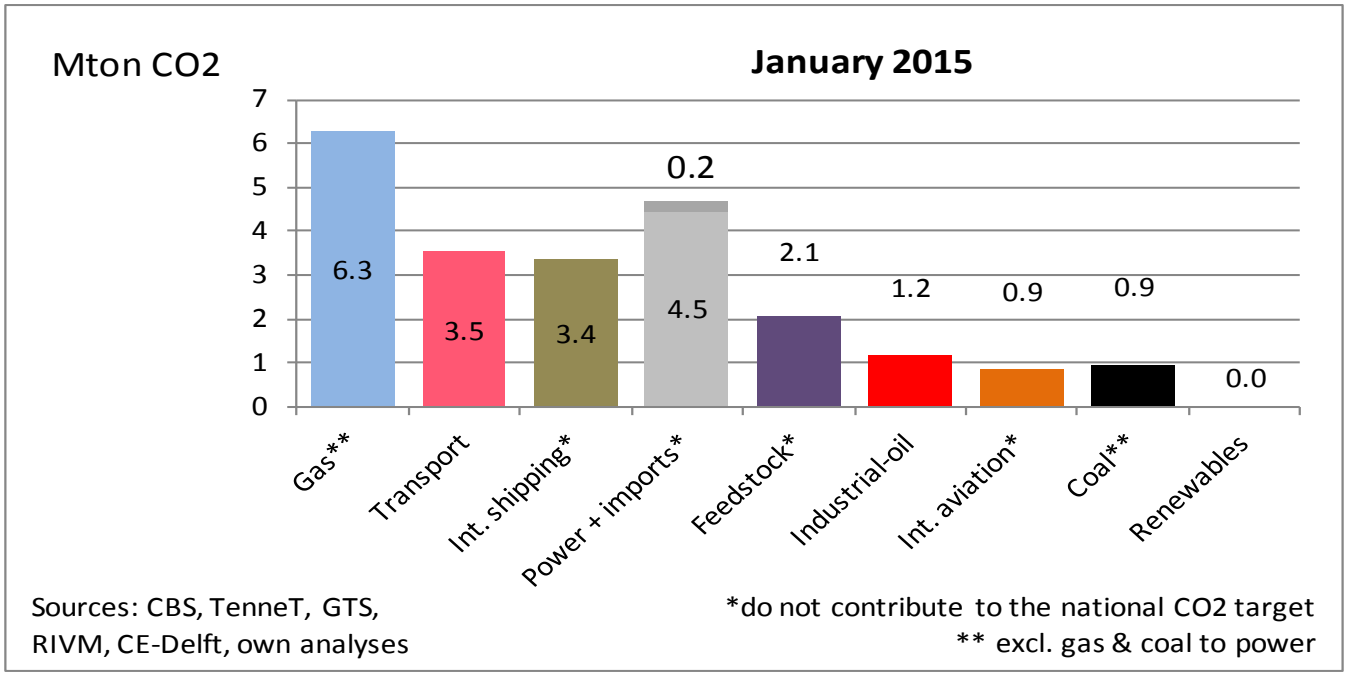


Final energy demand in January 2015 was similar to that in January 2014. Data on oil consumption are not yet available and have been estimated using extrapolations of monthly data which are available until October 2014.

CO2 Emissions

January 2015



In January 2015, the estimated national CO2 emission (excluding power imports, feedstock and international shipping & aviation) was estimated at 16.3 Mton. Slightly higher than in January 2014 (15.7 Mton). Main reason is more national power production, due to less power imports.

Power Generation Capacity January 2015

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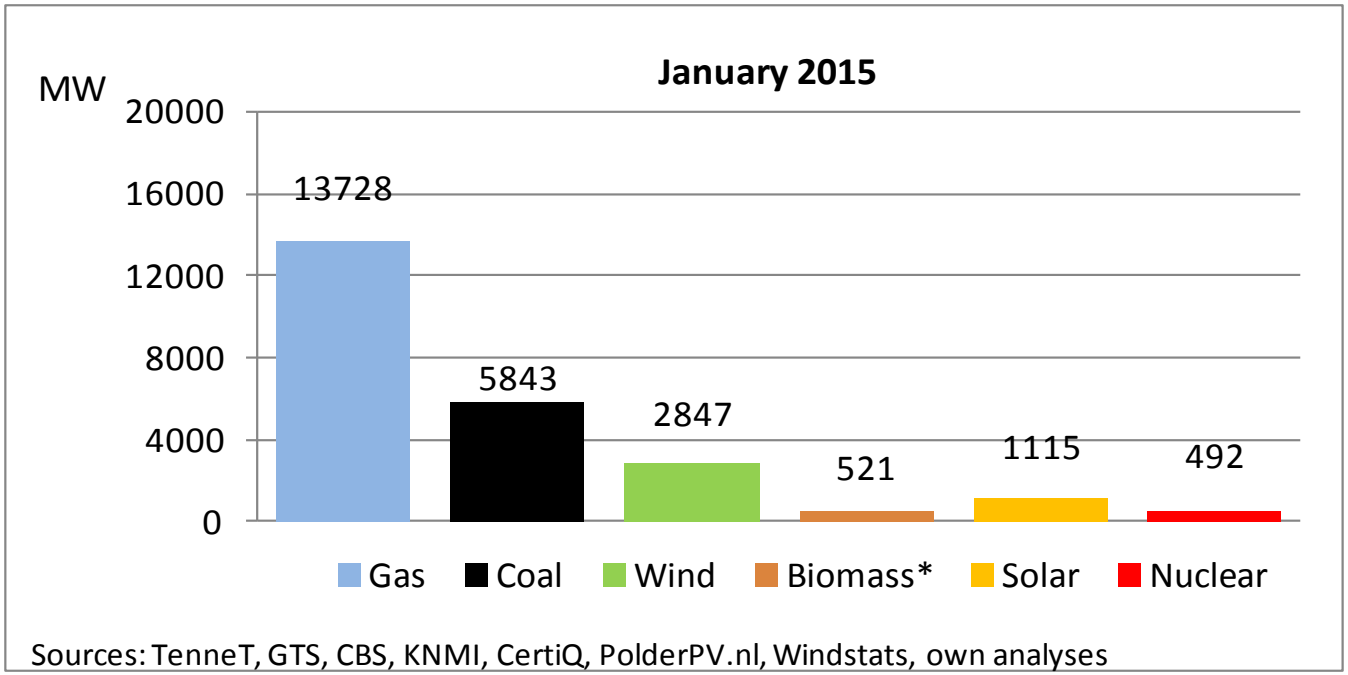

In January 2015 the installed power generation capacity was 24760 MW, significantly lower than in January 2014. Gas capacity decreased , Solar PV (+50%) and wind capacity (+6%) have increased in 2014.

Power Supplies

January 2015

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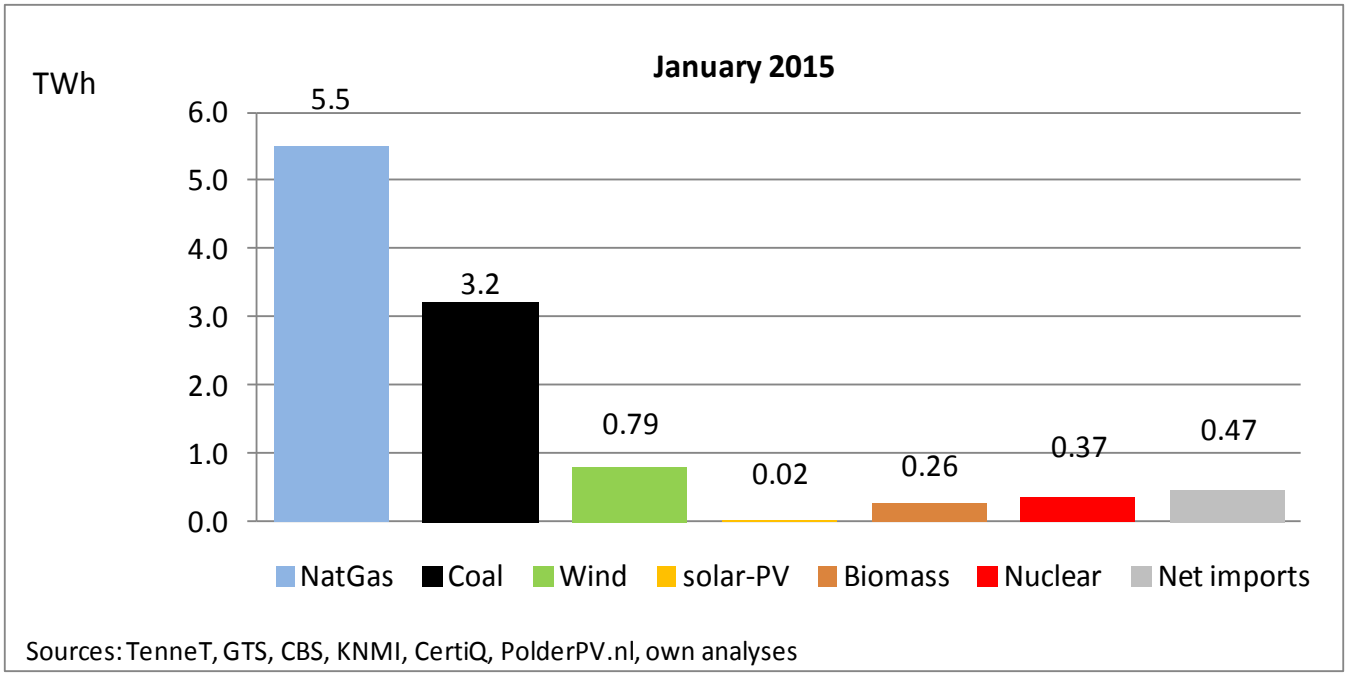

In January 2015, power consumption in 2014 was 10.8 TWh, 2% higher than in January 2014. Net imports decreased significantly and coal- and gas-fired production increased. The average contribution from renewable energy to power demand is estimated 9.6%.

SELECTED MONTHLY PROFILES

(using daily data)

Gas and Power Demand January 2015

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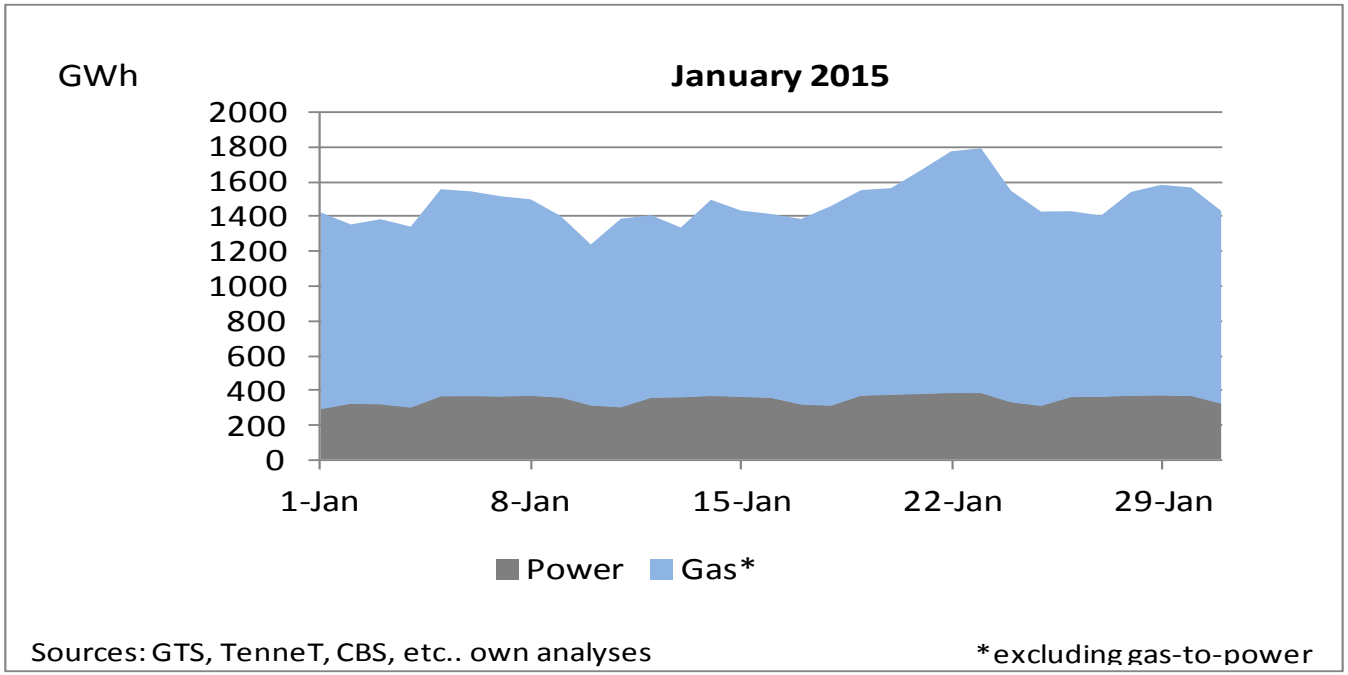
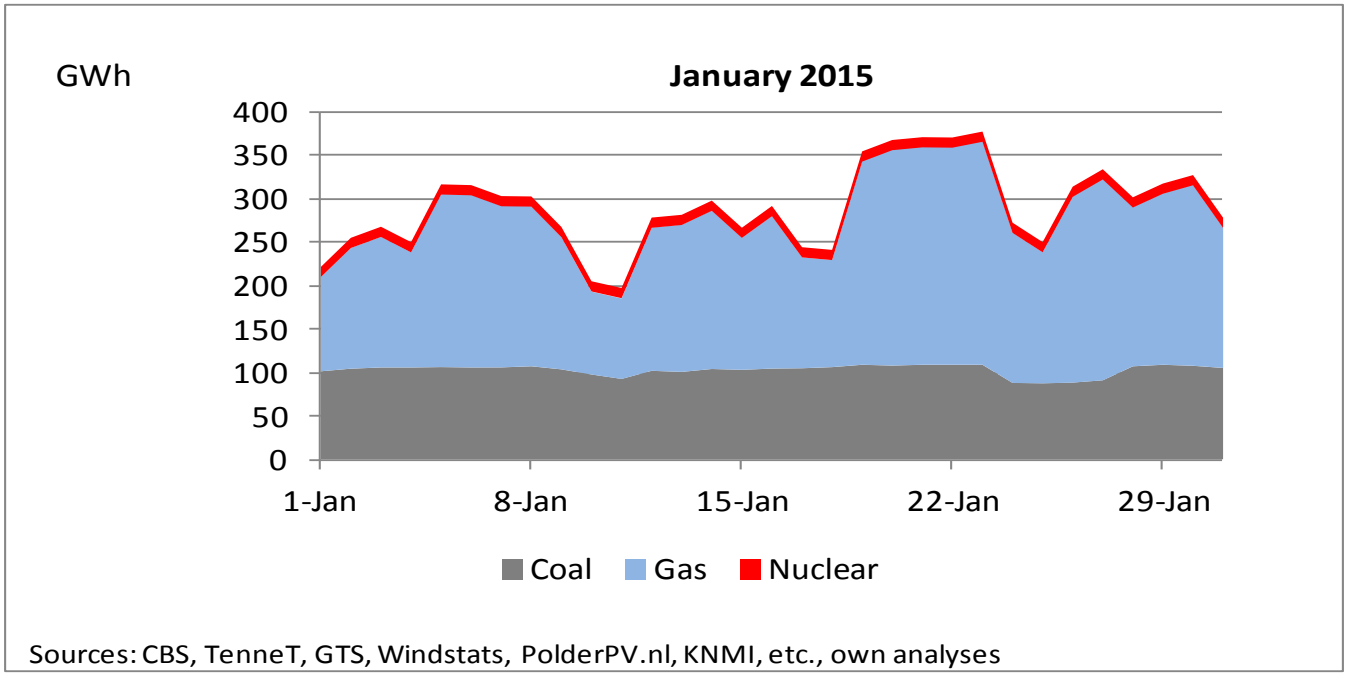


Daily power demand shows a typical week-weekend pattern. Daily gas demand (excluding the gas demand for power) is mainly used for the heating market and affected by ambient temperature.

Conventional Power Production January 2015



Sources: CBS, TenneT, GTS, Windstats, PolderPV.nl, KNMI, etc., own analyses

Daily conventional power generation peaked in 19-23 January. This was a week with relative low wind production and low net power imports.

Wind and Solar Power Production January 2015

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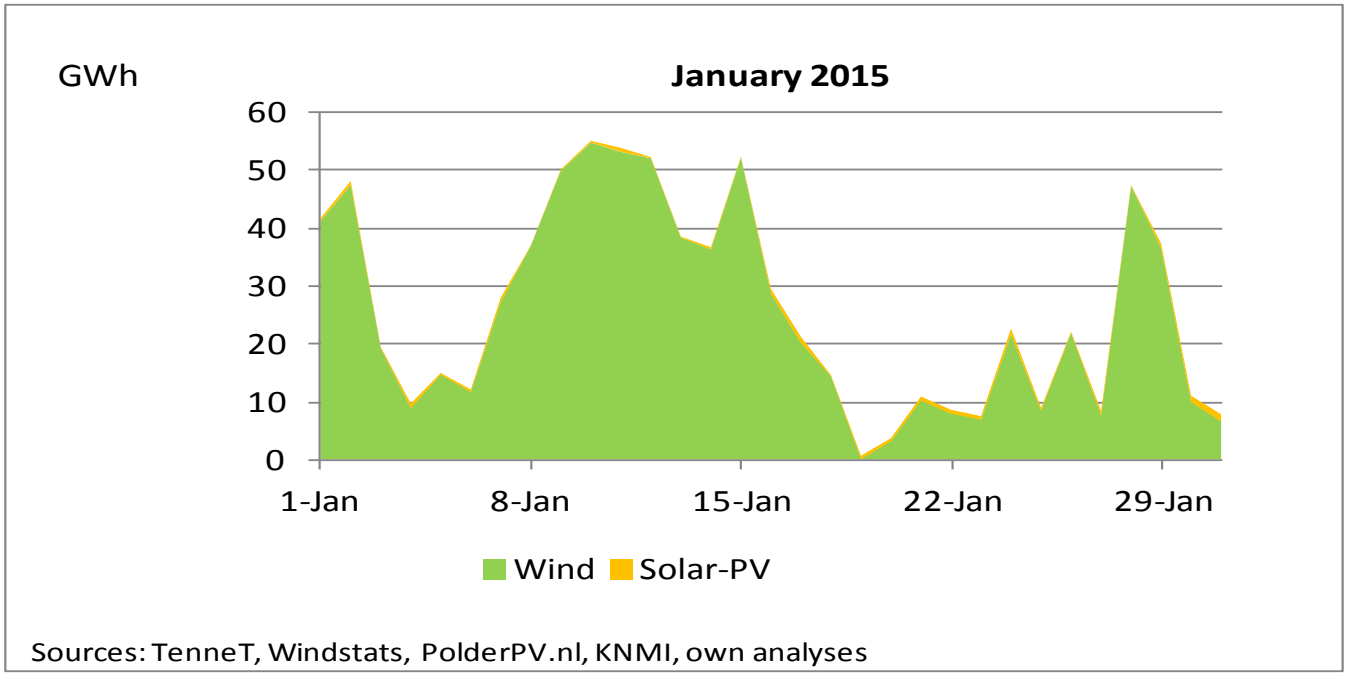

Sources: TenneT, Windstats, PolderPV.nl, KNMI, own analyses

Daily Wind Production peaked to 53 GWh on January 10th.

1 GWh is sufficient to provide electricity for a year to 300 households

Contribution of Renewable Energy January 2015

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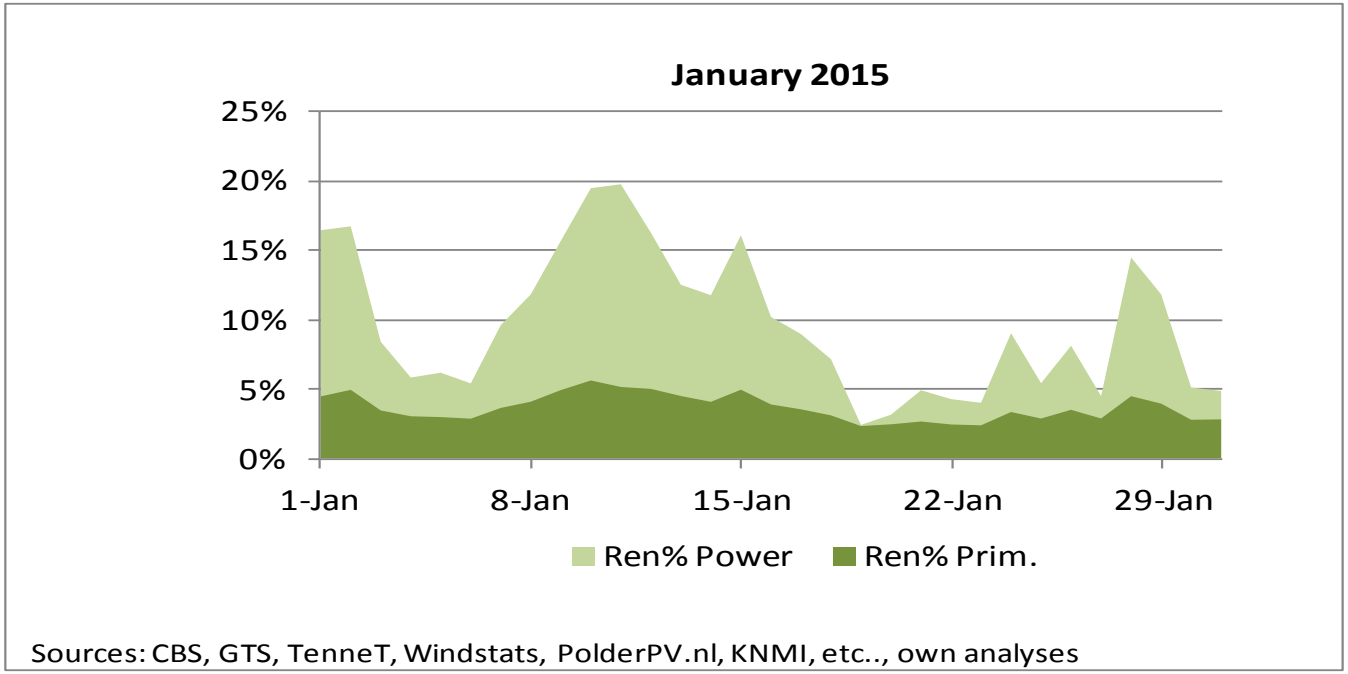
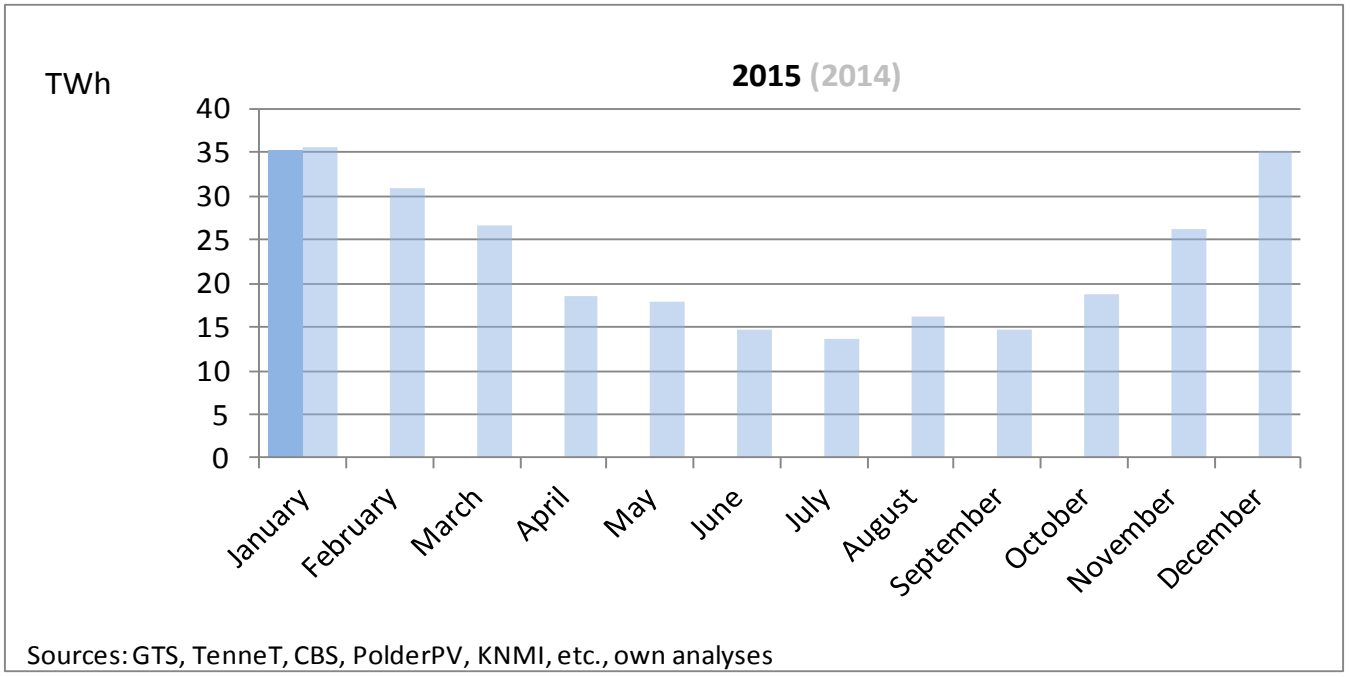


Sources: CBS, GTS, TenneT, Windstats, PolderPV.nl, KNMI, etc.., own analyses

On January 11th the contribution of Renewable Power to the total power demand peaked to 20%. One day earlier, the contribution of all renewable energy forms to the primary energy demand peaked to 6%. Variations in renewable power originate mainly from variations in wind.

SELECTED MONTHLY ENERGY DATA

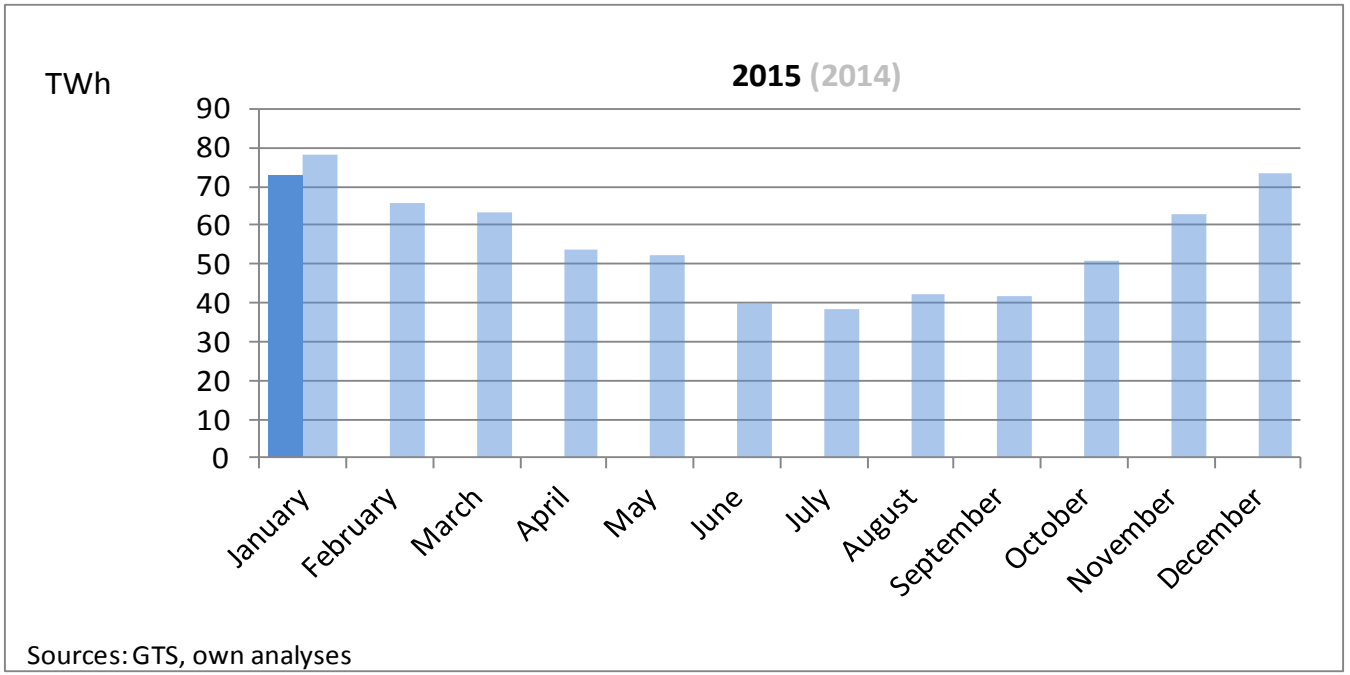
Gas Demand 2015 (and 2014)



Sources: GTS, TenneT, CBS, PolderPV, KNMI, etc., own analyses

In January 2015 gas demand (excluding the gas demand for power production) was equal to January 2014.

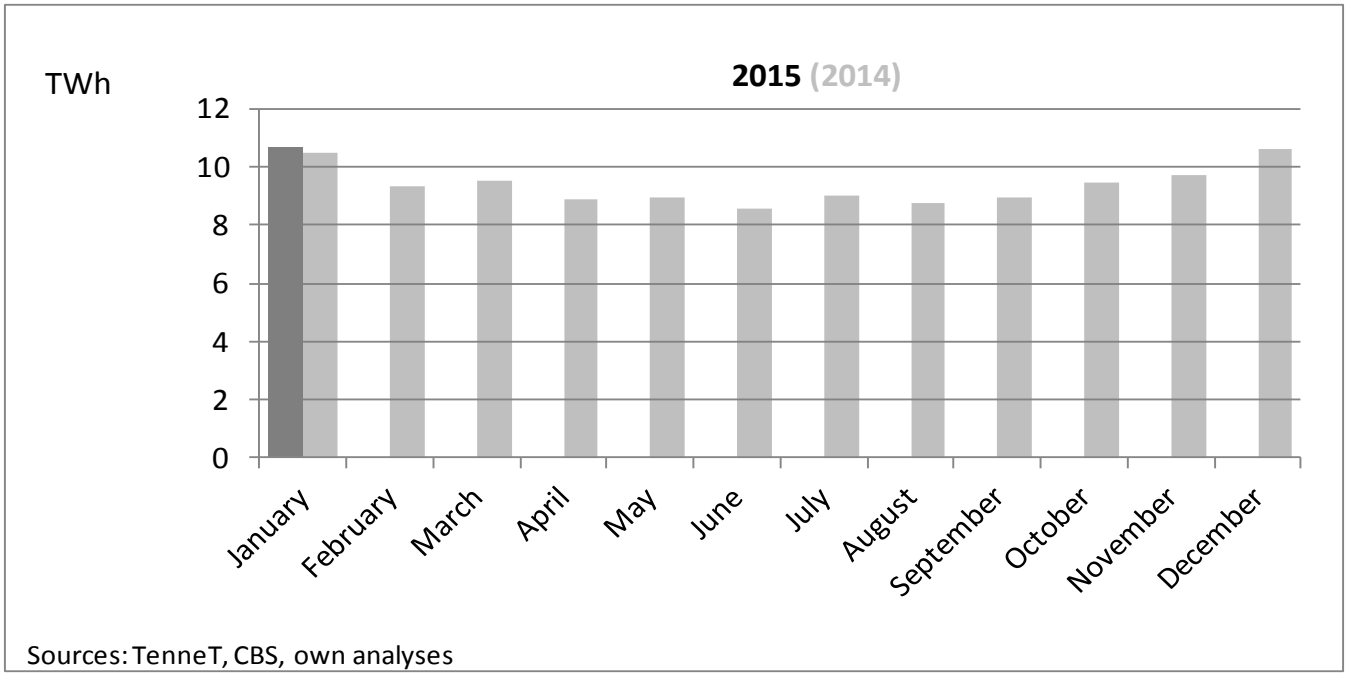
Gas Production 2015 (and 2014)



Sources: GTS, own analyses

In January 2015, gas production was lower than in January 2014. Production is higher than consumption because of gas exports to neighboring countries.

Power Demand 2015 (and 2014)



Sources: TenneT, CBS, own analyses

In January 2015, power demand was 2% higher than in January 2014

Wind Production 2015 (and 2014)

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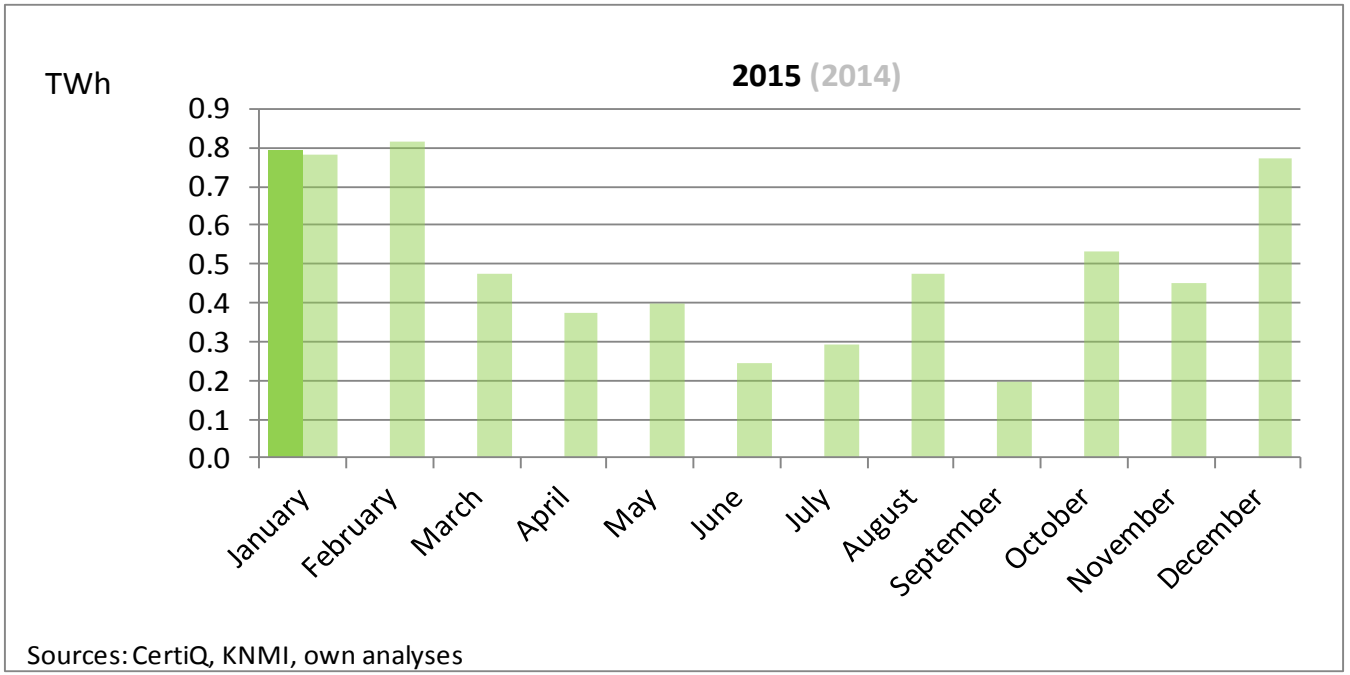
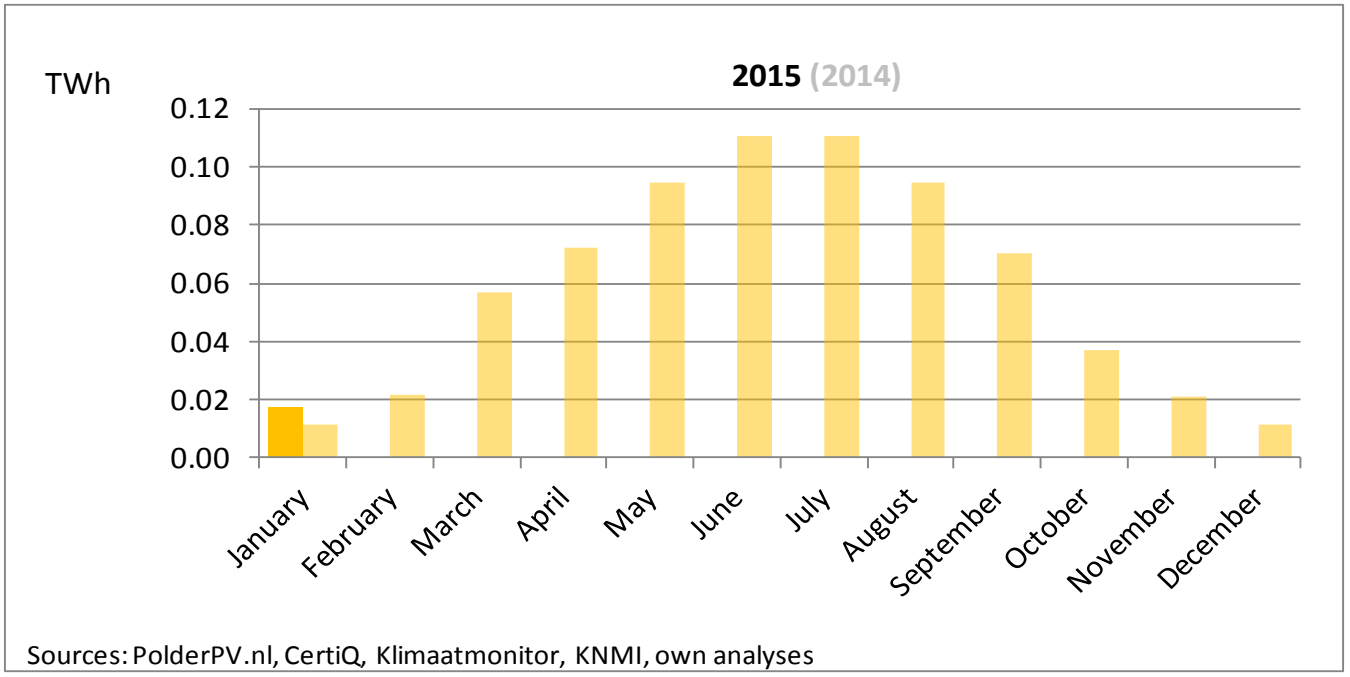


Sources: CertiQ, KNMI, own analyses

In January 2015, wind power generation was equal to January 2014. The moderate increase in wind capacity was compensated by slightly less wind.

Solar PV Production 2015 (and 2014)



Sources: PolderPV.nl, CertiQ, Klimaatmonitor, KNMI, own analyses

In January 2015, Solar PV was low, although 50% higher than in January 2014, due to a significant increase of Solar PV capacity.

Coal-to-Power 2015 (and 2014)

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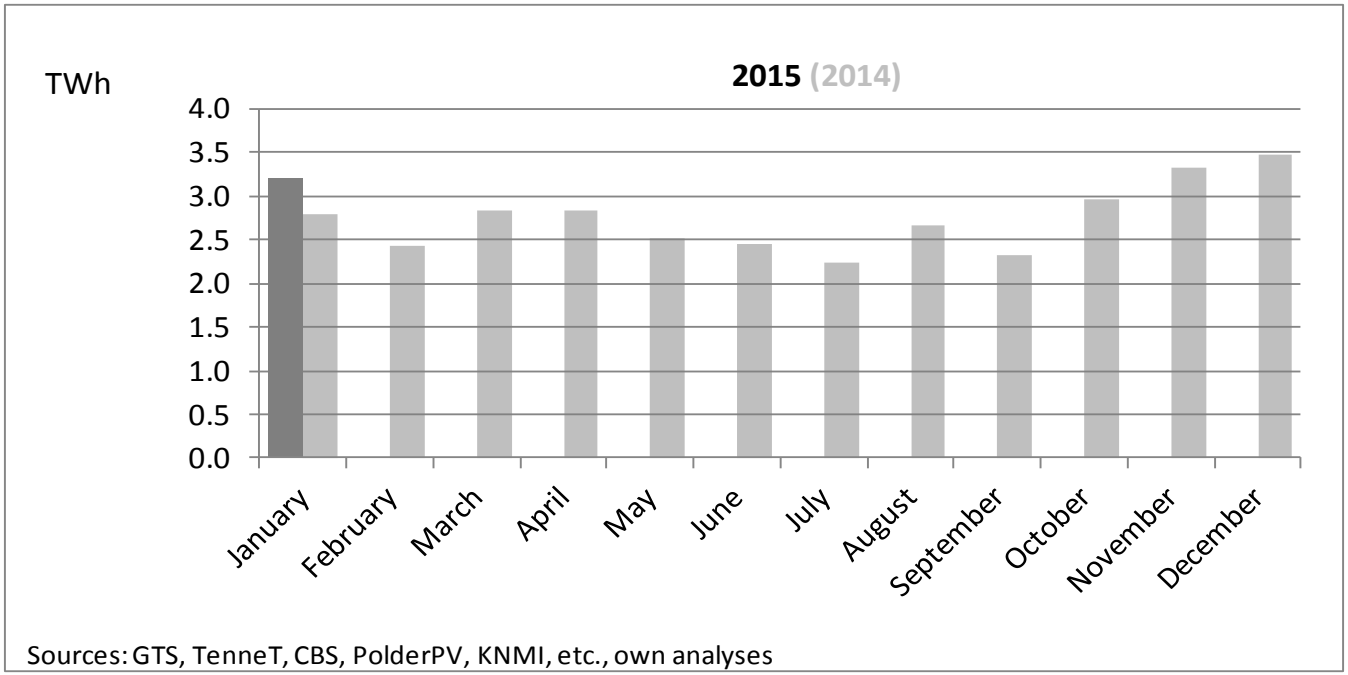

Sources: GTS, TenneT, CBS, PolderPV, KNMI, etc., own analyses

Estimated power production by coal-fired power stations has increased compared to previous year. Coal demand for power generation is difficult to estimate because the status of the new coal-fired power stations is not publicly known.

Gas to Power
2015 (and 2014)

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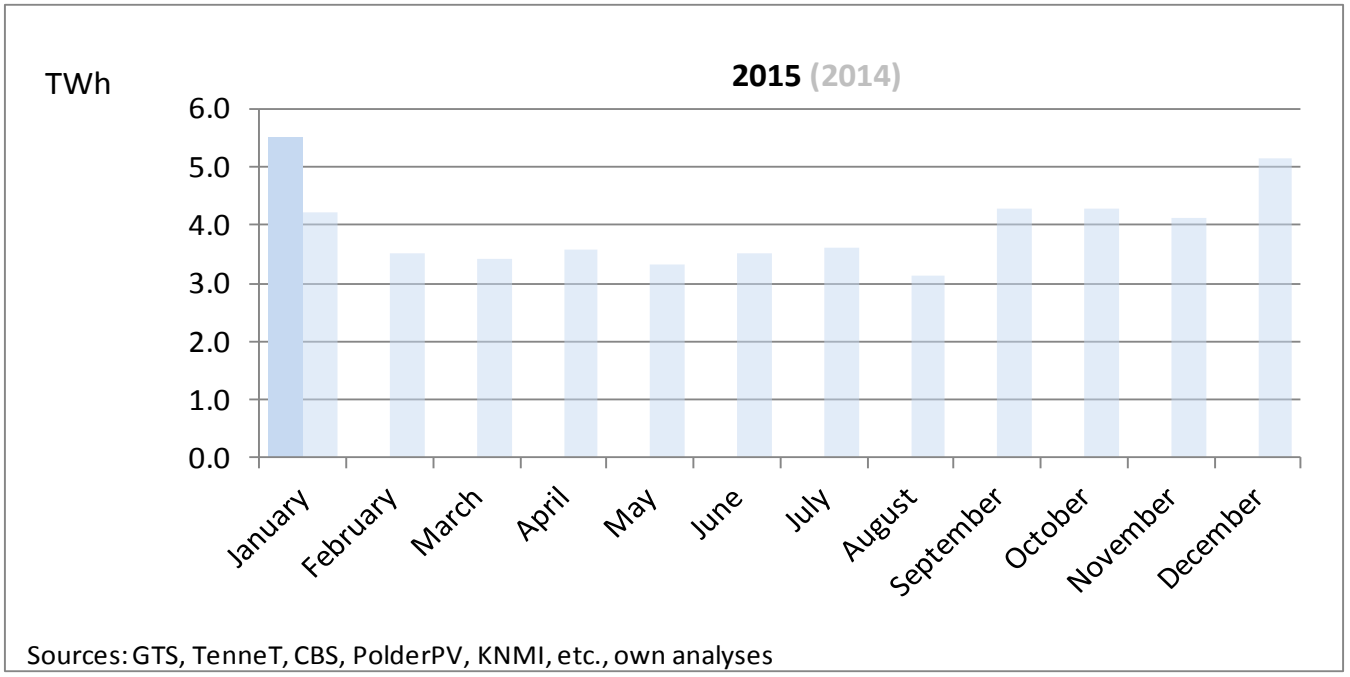

Sources: GTS, TenneT, CBS, PolderPV, KNMI, etc., own analyses

Estimated power production by gas-fired power stations and cogeneration has increased compared to previous year. Decreased power imports, compared to previous year, have been compensated by an increased use of gas for power.

Renewable Energy
All Sources
2015 (and 2014)

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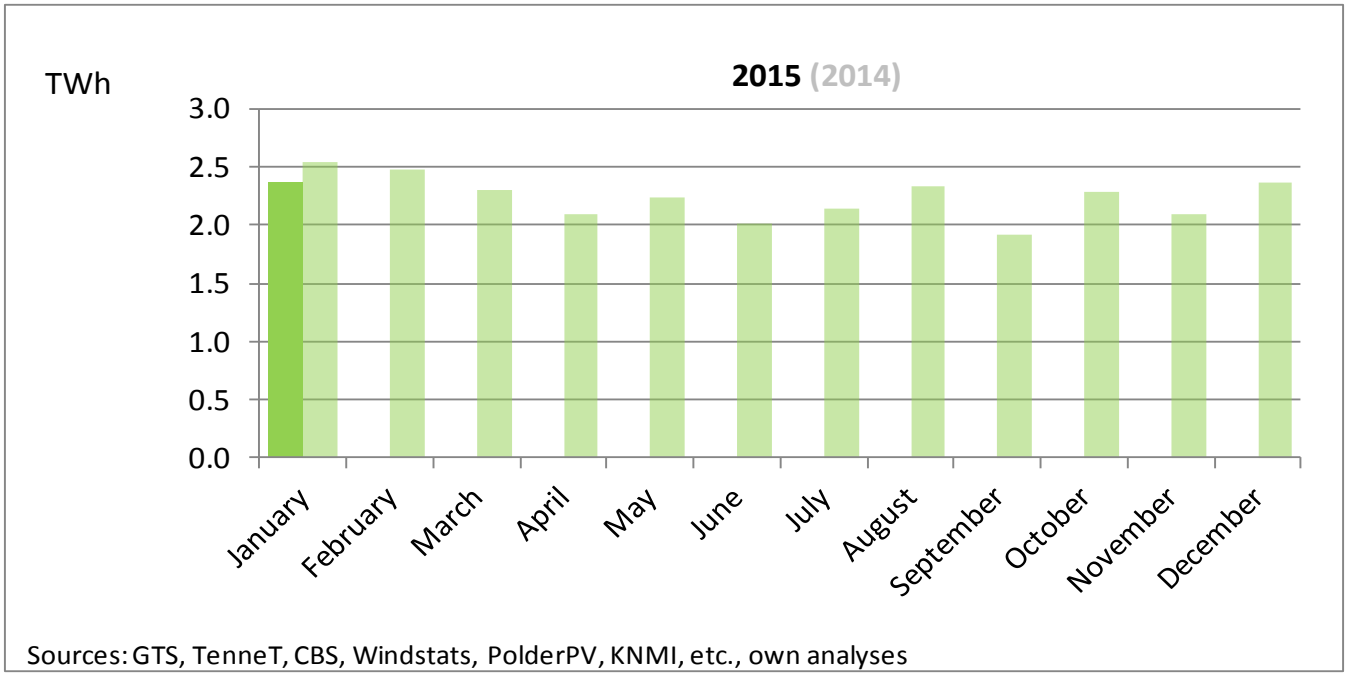

Sources: GTS, TenneT, CBS, Windstats, PolderPV, KNMI, etc., own analyses

In January 2015, total renewable energy (EU norms) was about 2.4 TWh (wind, solar, hydro, biomass, others). The production of renewable energy is slightly lower than in January 2014, due to a lower contribution from biomass.

Renewable Energy Percentage 2015 (and 2014)

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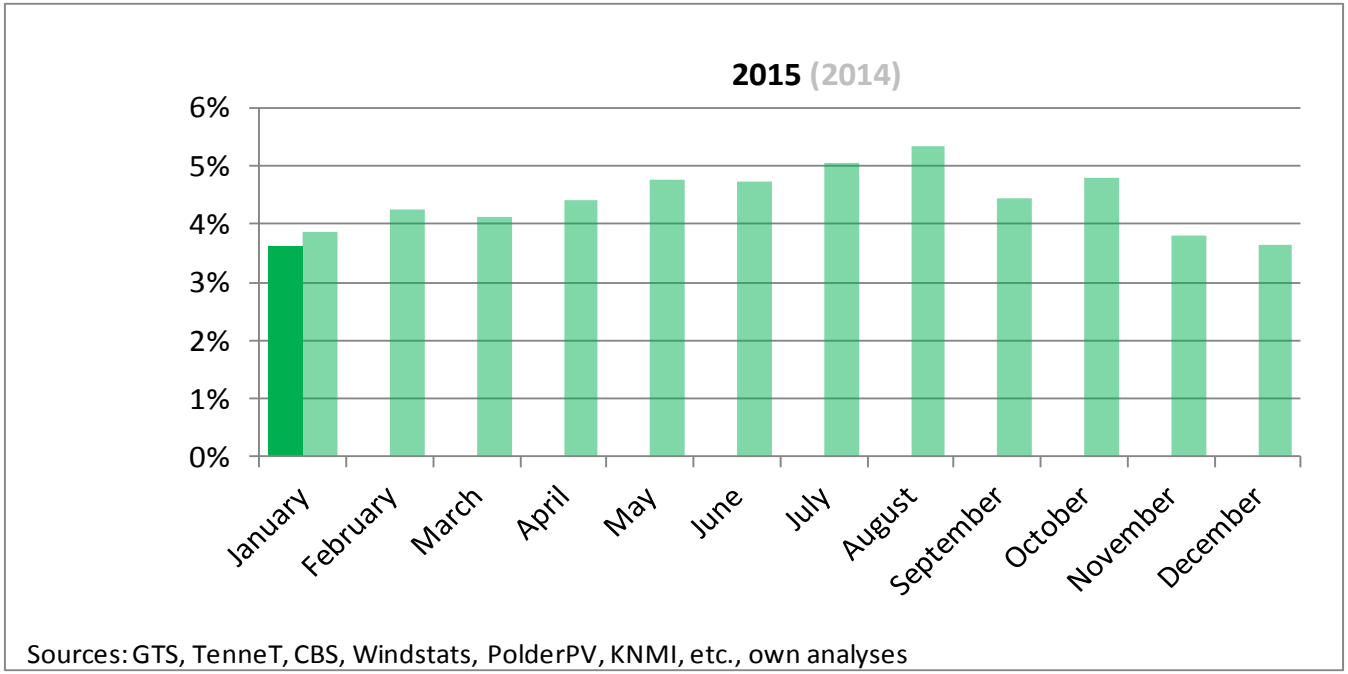
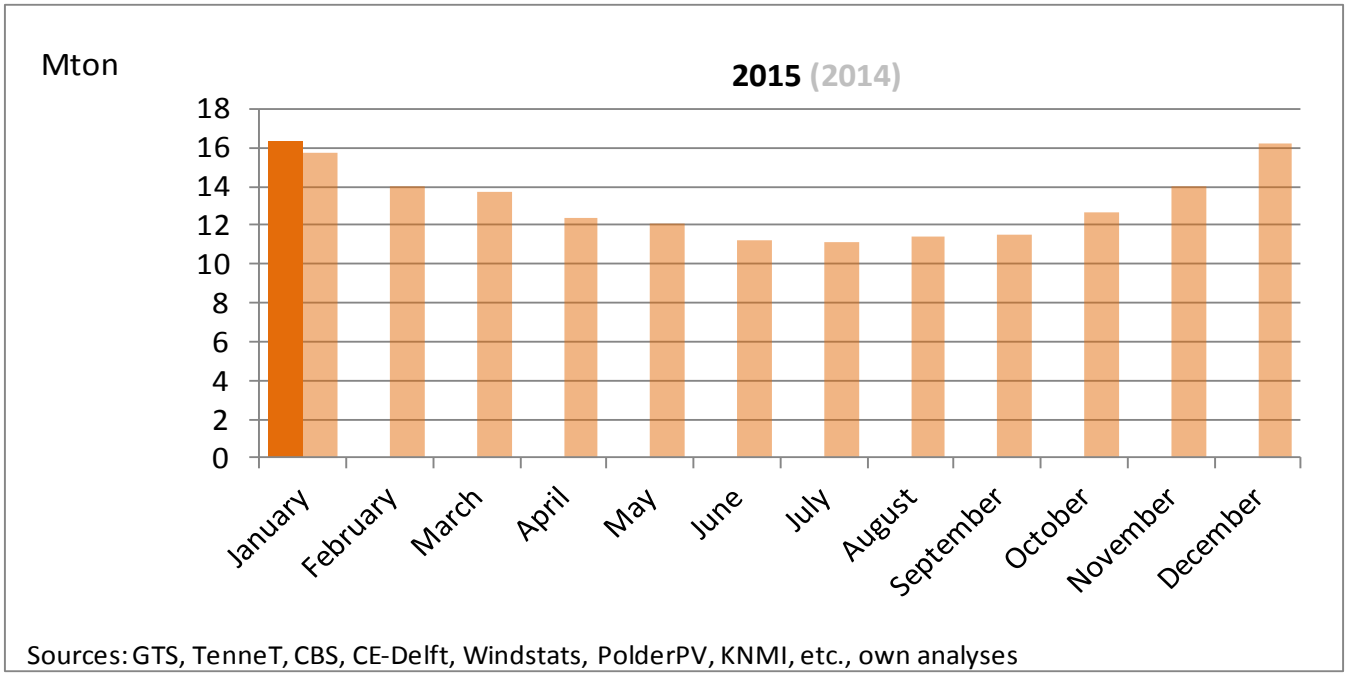


Sources: GTS, TenneT, CBS, Windstats, PolderPV, KNMI, etc., own analyses

In January 2015, the estimated national percentage of renewable energy as fraction of total primary energy demand has been estimated at 3.6% (EU norms). In this calculation, energy demand covered by electricity imports, feedstock and international shipping and aviation have been neglected.

CO2 Emissions 2015 (and 2014)

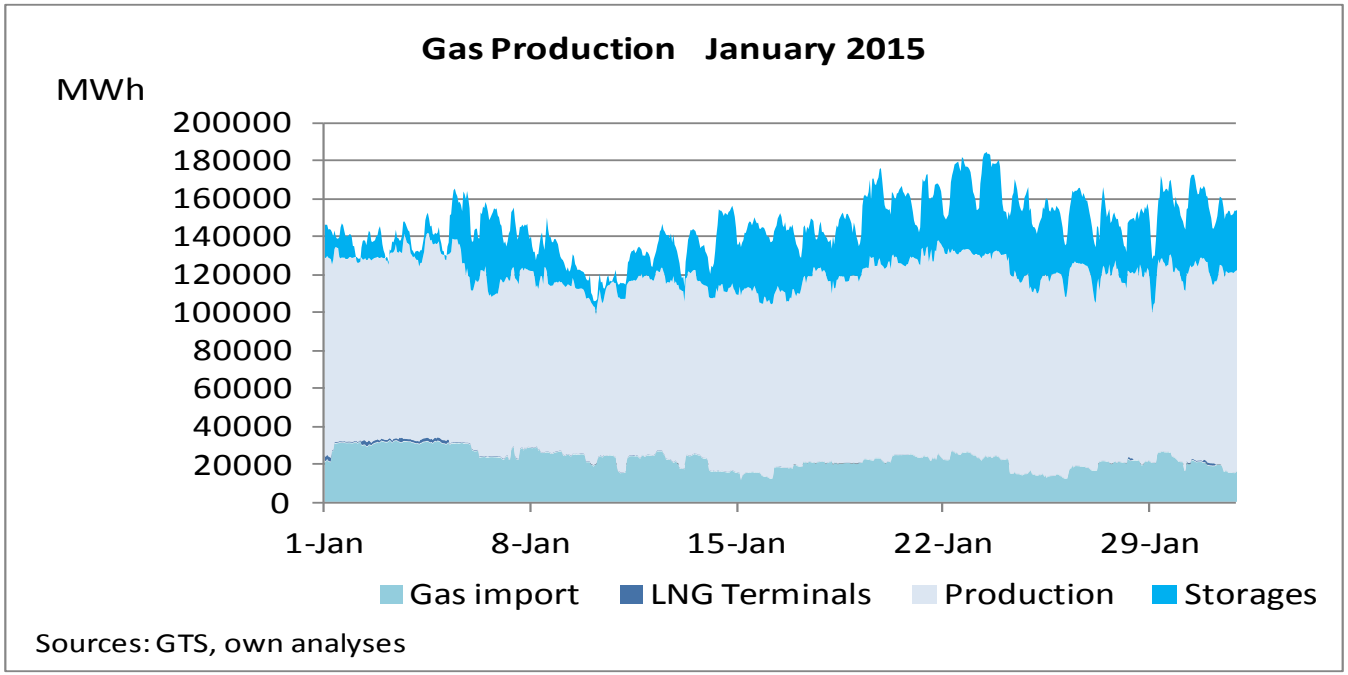


Sources: GTS, TenneT, CBS, CE-Delft, Windstats, PolderPV, KNMI, etc., own analyses

In January 2015, CO2 emissions are higher than in January 2014. The main reason is that less power is imported and thus, more power had to be produced in The Netherlands. Imported power does not contribute to the national CO2 balance. Contributions from feedstock and international shipping and aviation are not taken into account.

SELECTED HOURLY ENERGY DATA

Gas Supply January 2015



In January 2015, hourly gas production peaked at 180.000 MW (180 GW)

Gas Demand
Including Gas-to-Power
January 2015

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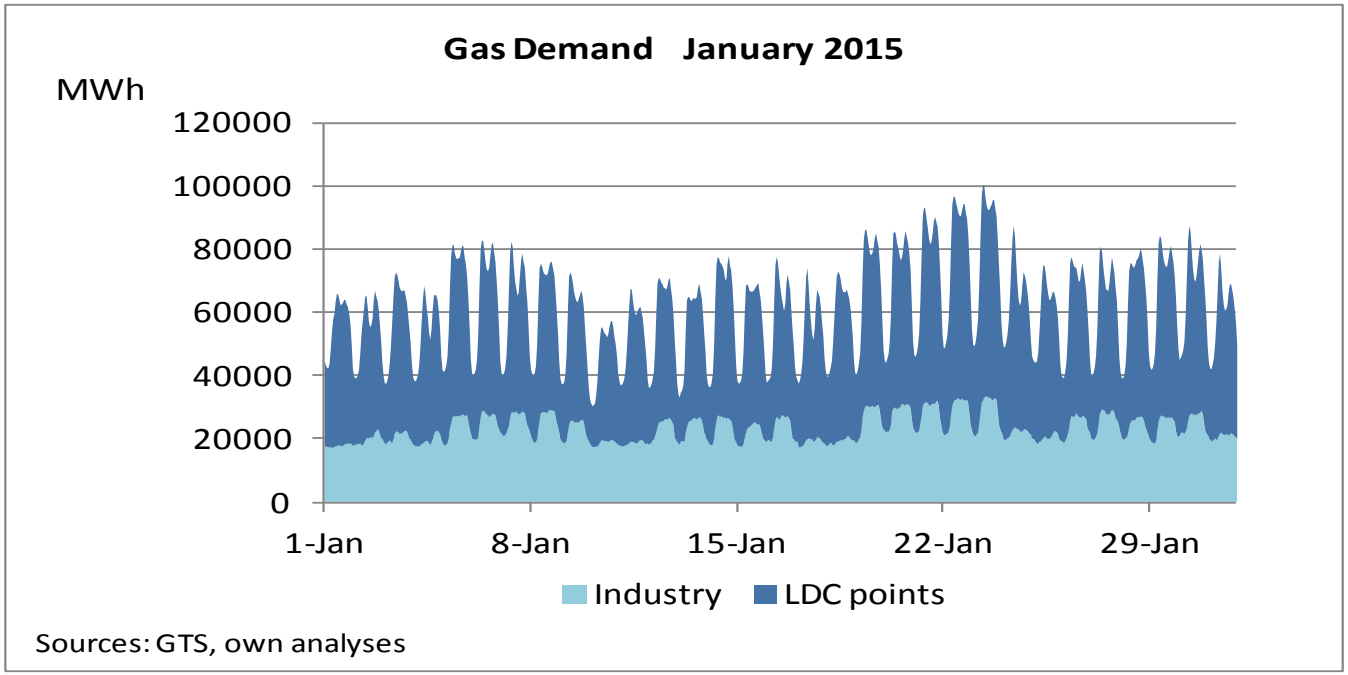
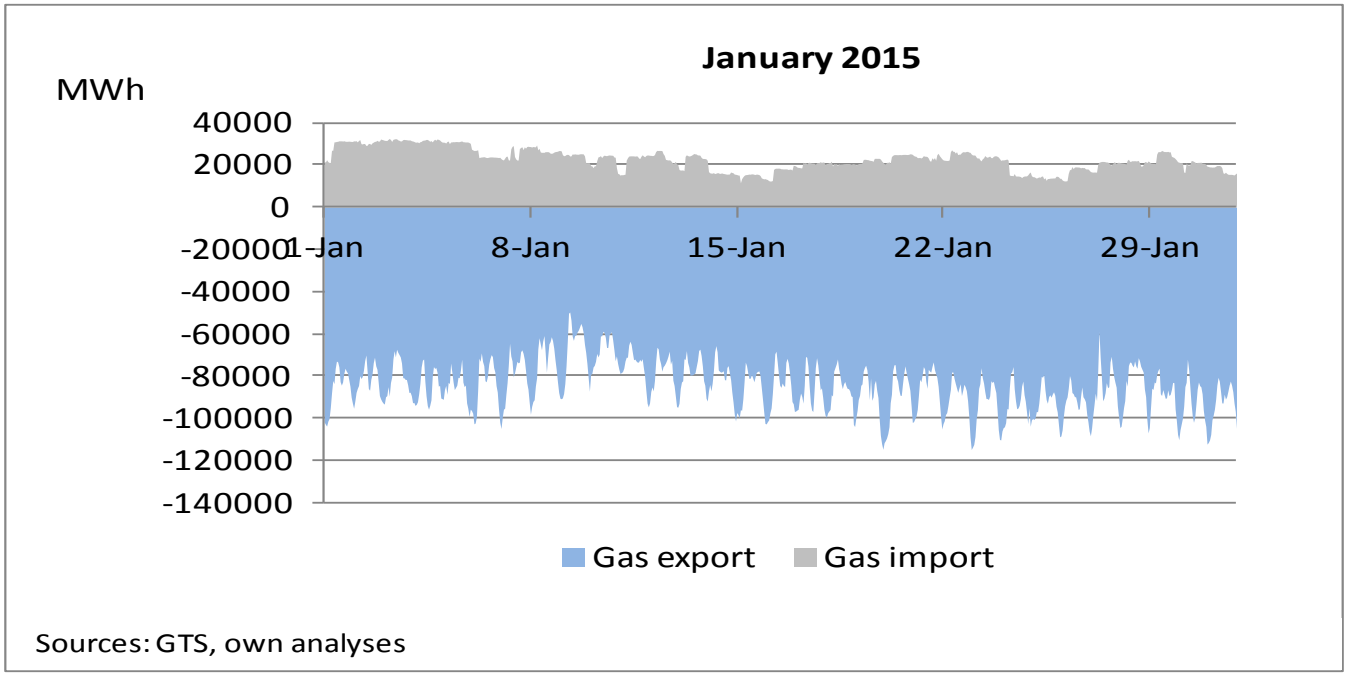


Sources: GTS, own analyses

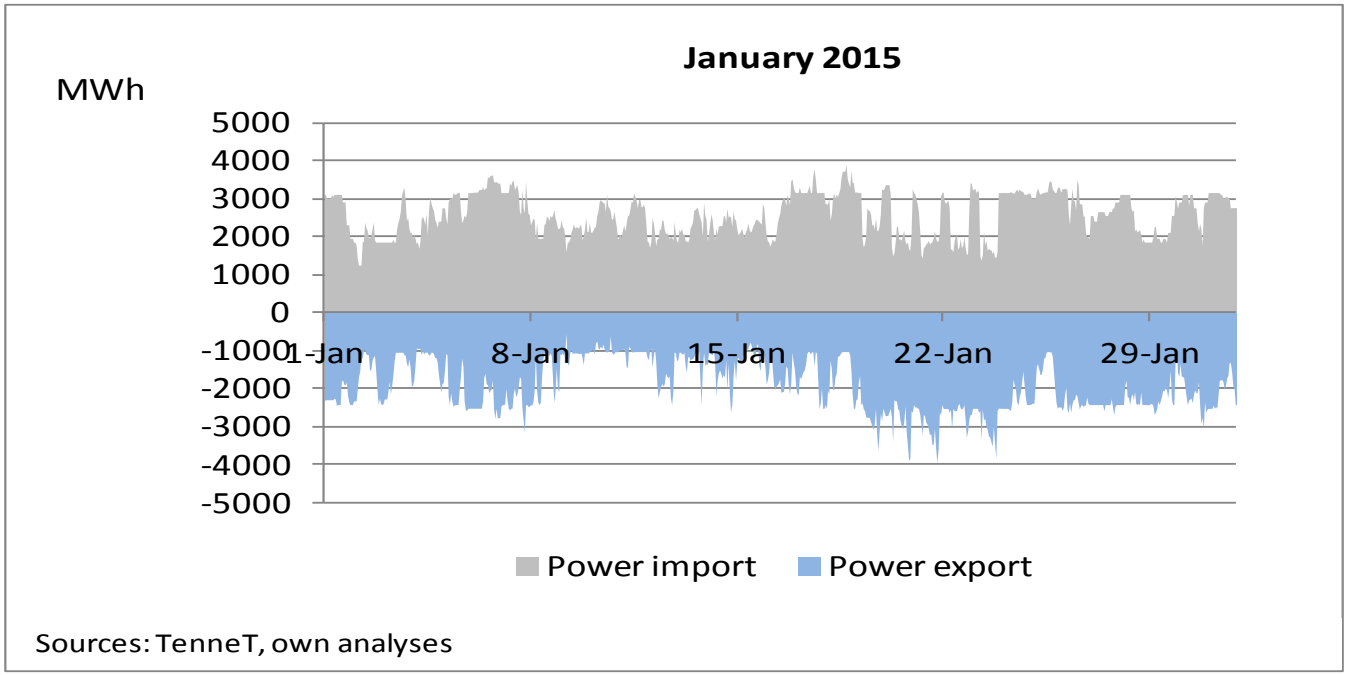
On January 24th, gas demand in The Netherlands peaked to 100.000 MW (100 GW). The peak in gas demand was caused by a combination of relatively low temperatures and high demand of gas from the power sector.

Gas Imports & Exports January 2015



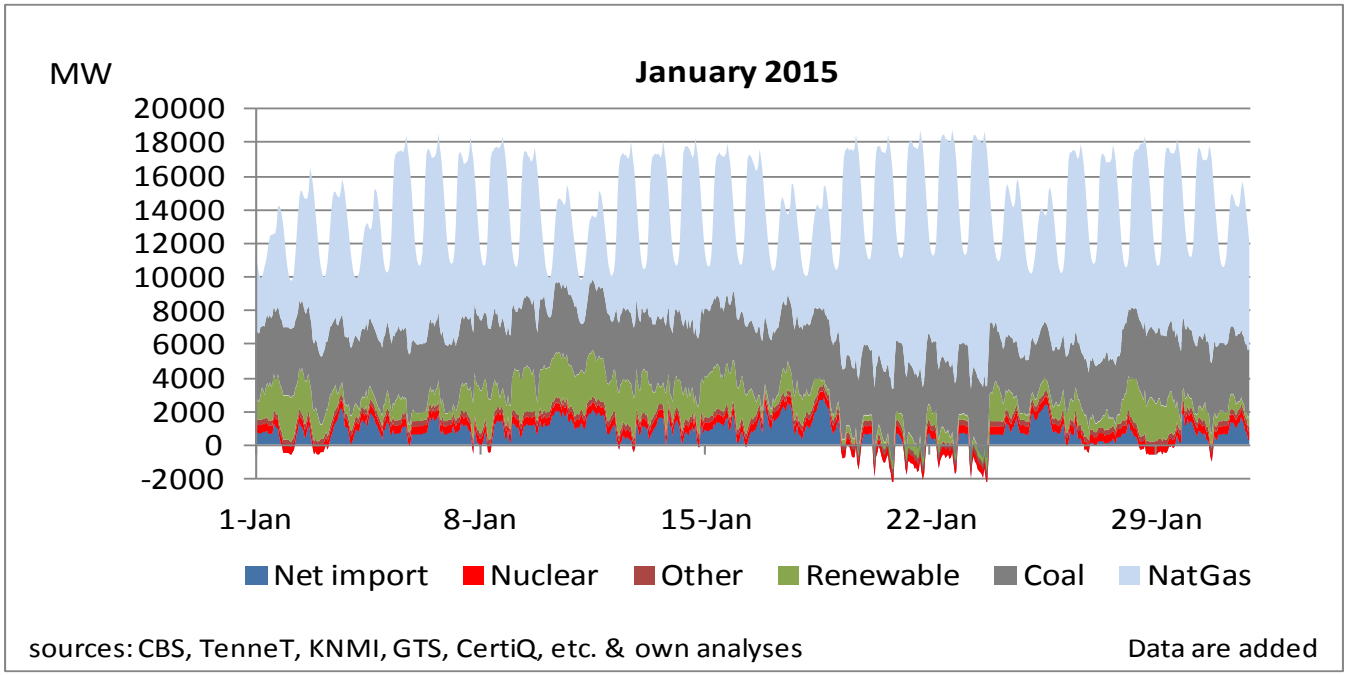
In January 2015, gas exports were 63 TWh, equal to 140% of national demand. Gas imports were 17 TWh. Gas exports peaked at January 24th to 115.000 MW (115 GW).

Power Imports & Exports January 2015



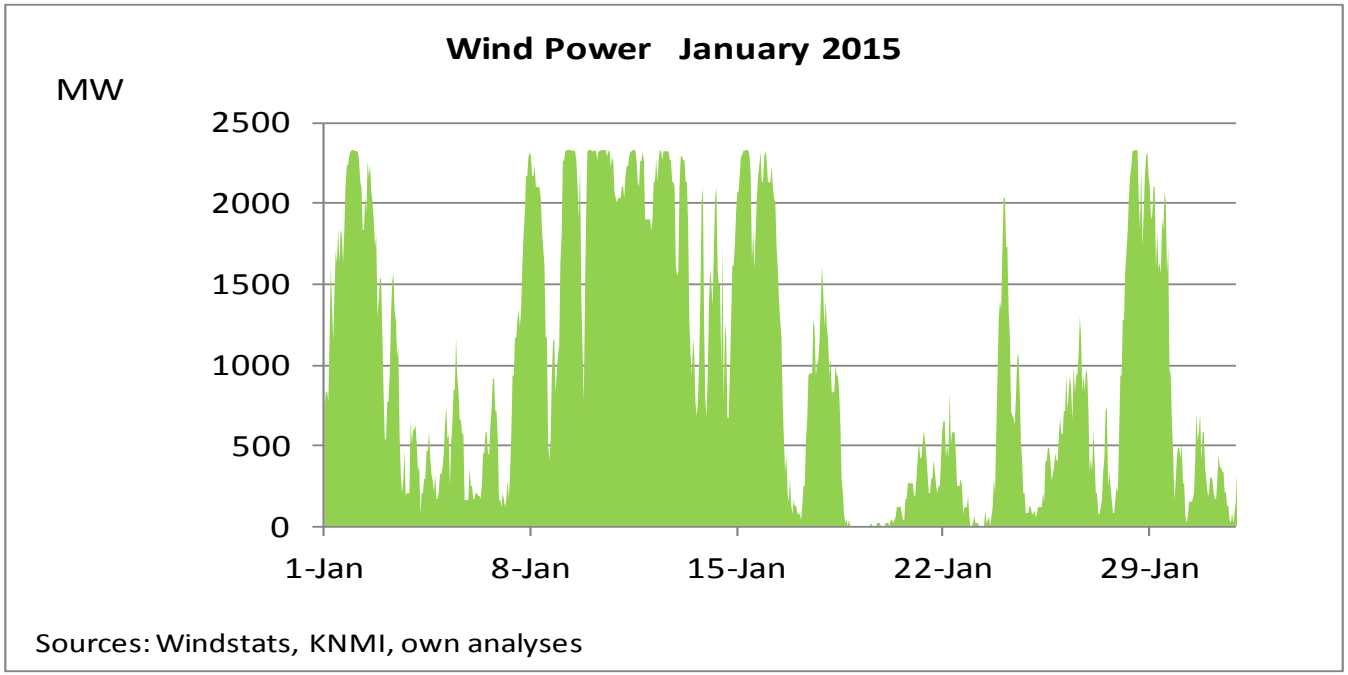
In January 2015, power imports were 1.9 TWh, equal to 18% of national demand. Total power exports were 1.4 TWh. Power exports peaked to 4000 MW on January 20th.

Power Generation January 2015



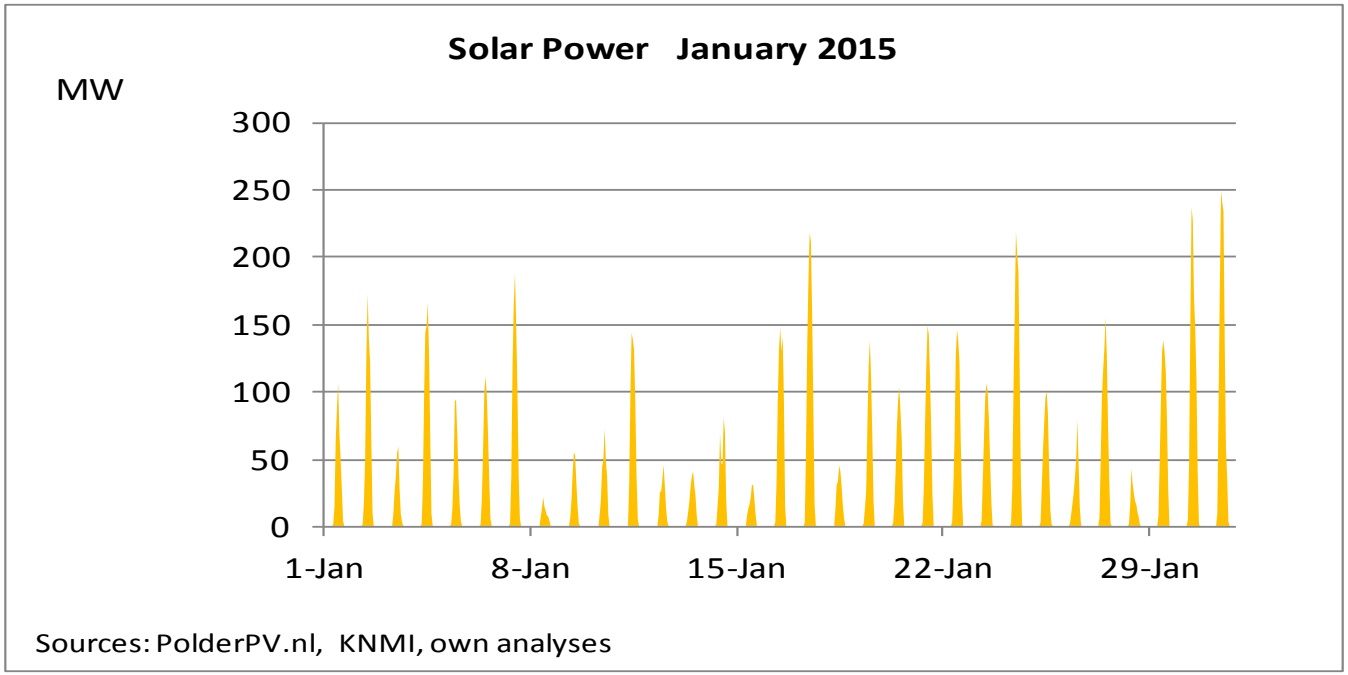
In the week of 20-24 January, power generation peaked, due to the net exports that occurred. The majority of the additional power generation has been generated by gas-fired installations.

Wind Power
January 2015



In January 2015, wins energy peaked to 2350 MW. Wind power generation varied widely in January.

Solar PV Power January 2015



At the end of January, power generation by Solar-PV peaked at 250 MW. In January 2014, the peak in Solar-PV power generation was (only) 140 MW. Days in January are short. Thus, solar production occurs only on a limited amount of hours.

The following set of slides presents for each week in 2015 the hourly contributions of wind and solar-PV to the total power consumption in The Netherlands.

Hourly Solar-PV and Wind Generation 2015

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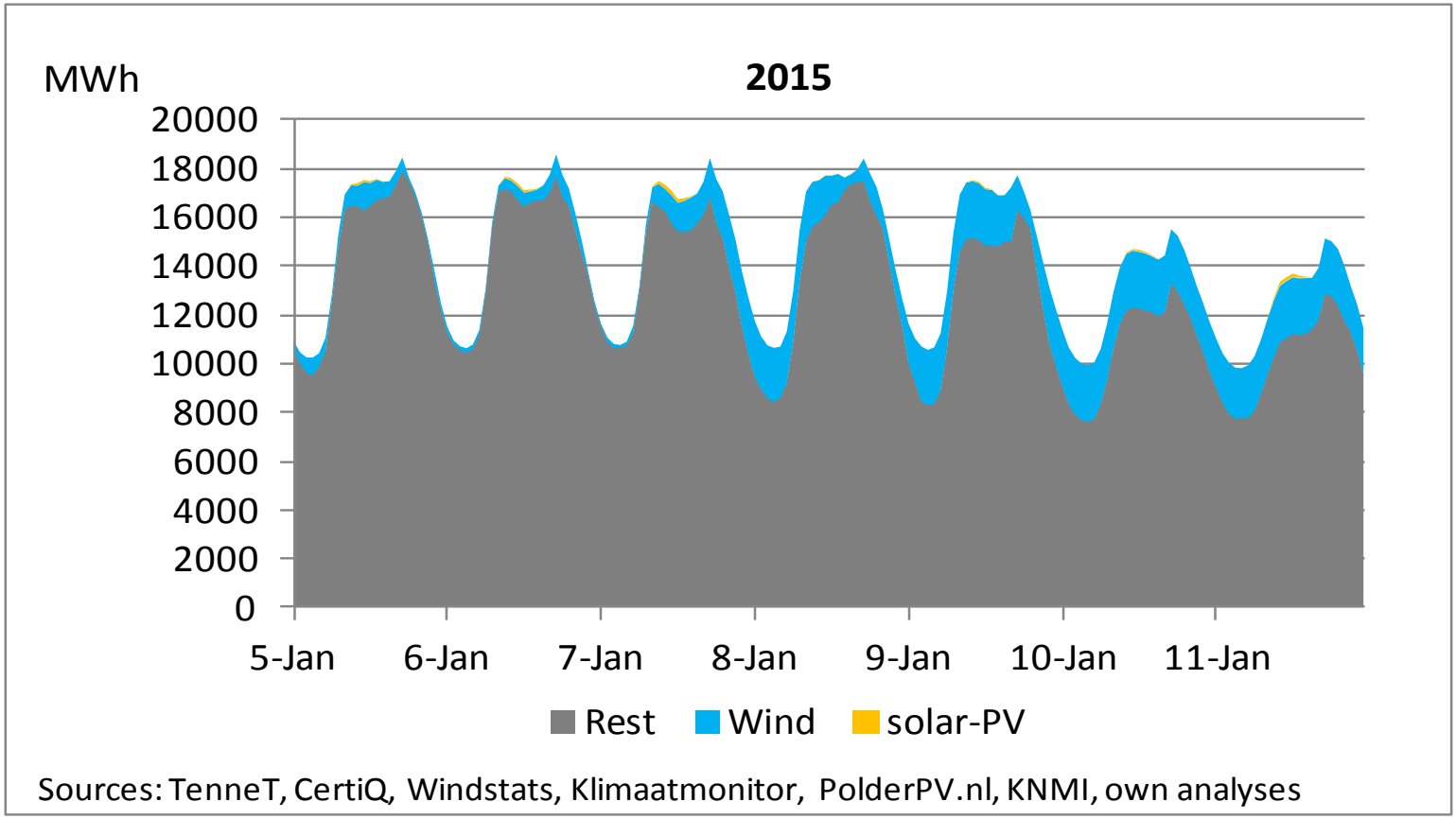

Sources: TenneT, CertiQ, Windstats, Klimaatmonitor, PolderPV.nl, KNMI, own analyses

Hourly Solar-PV and Wind Generation 2015

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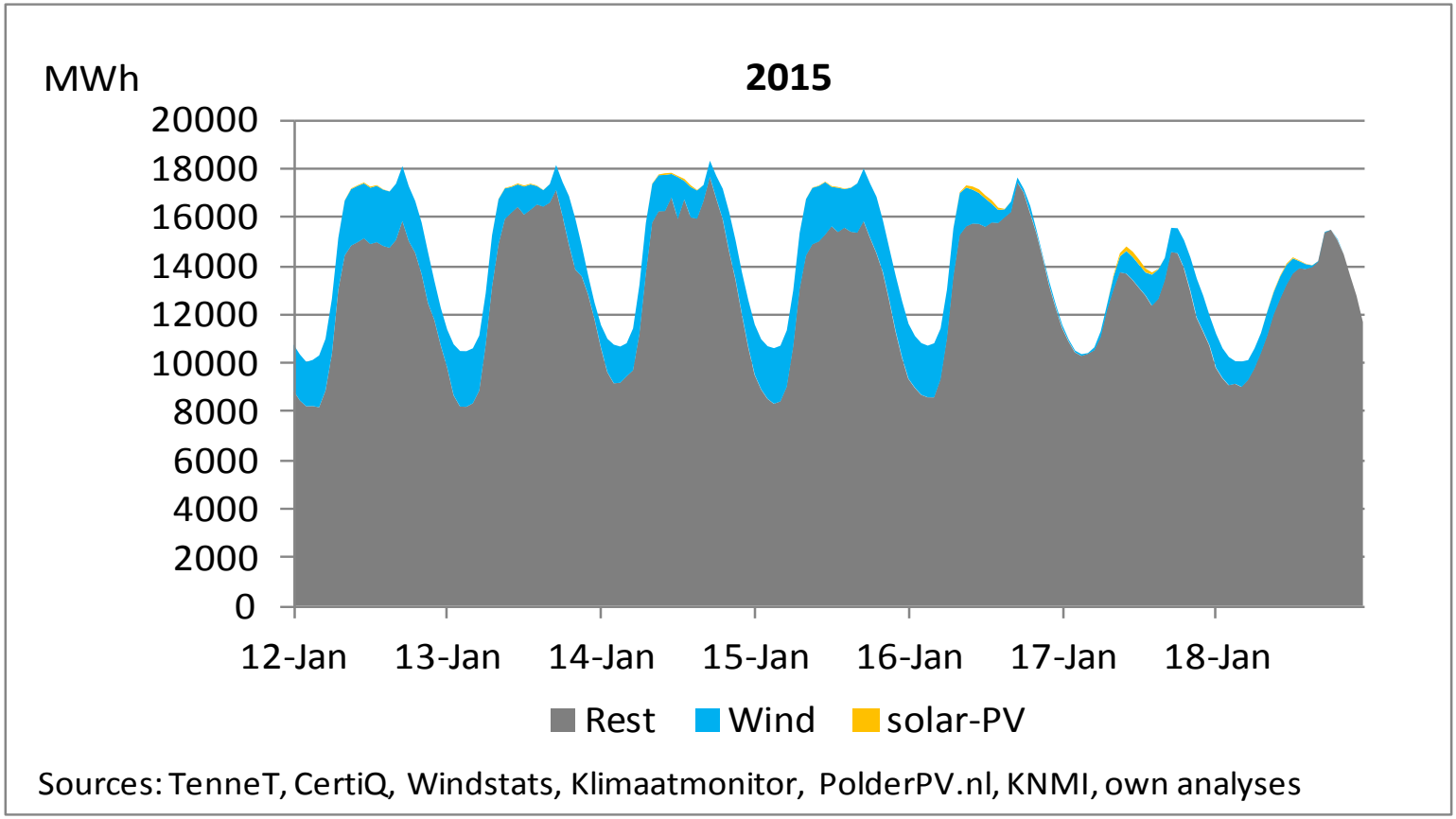

Sources: TenneT, CertiQ, Windstats, Klimaatmonitor, PolderPV.nl, KNMI, own analyses

Hourly Solar-PV and Wind Generation 2015

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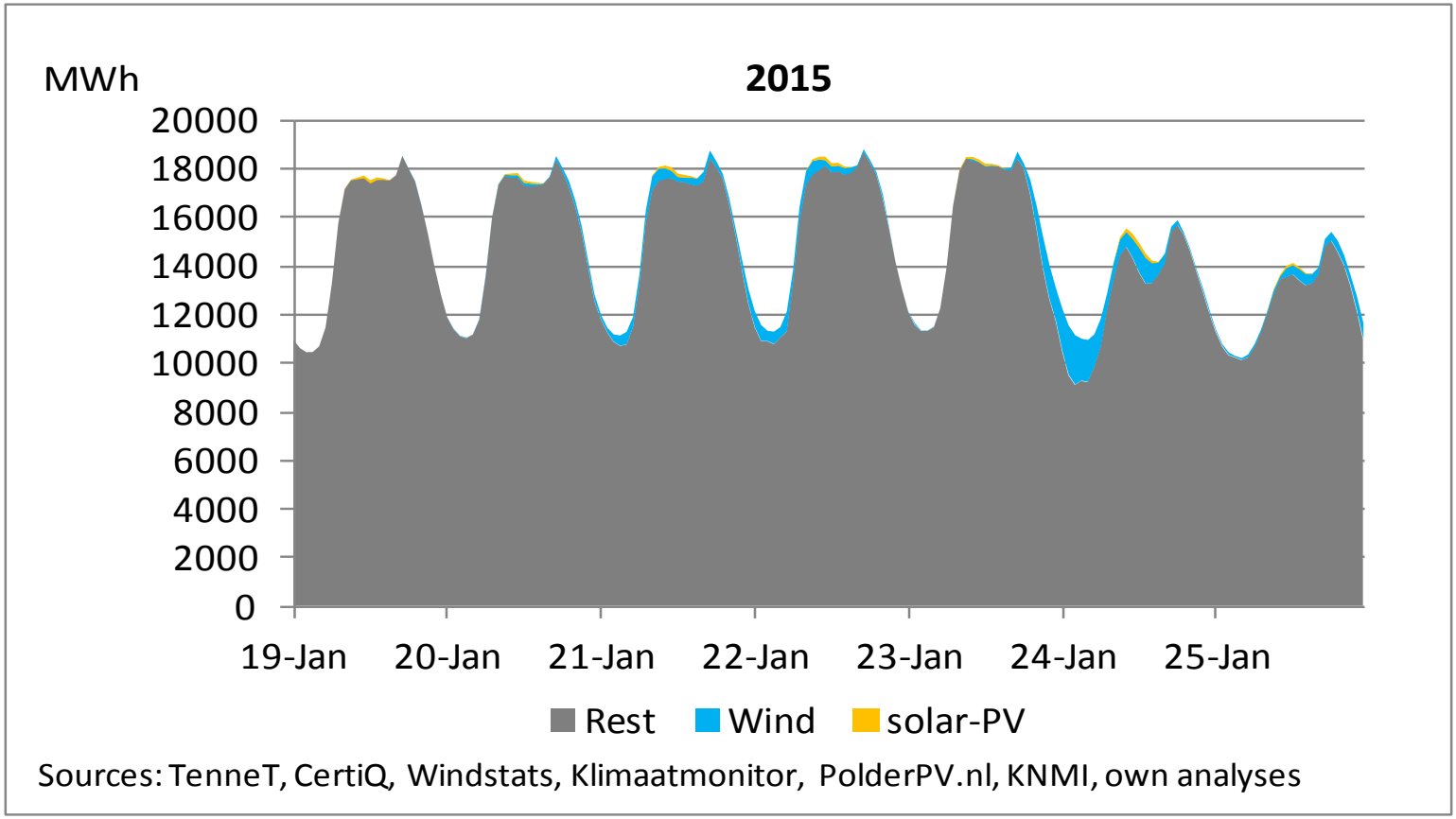

Sources: TenneT, CertiQ, Windstats, Klimaatmonitor, PolderPV.nl, KNMI, own analyses

Hourly Solar-PV and Wind Generation 2015

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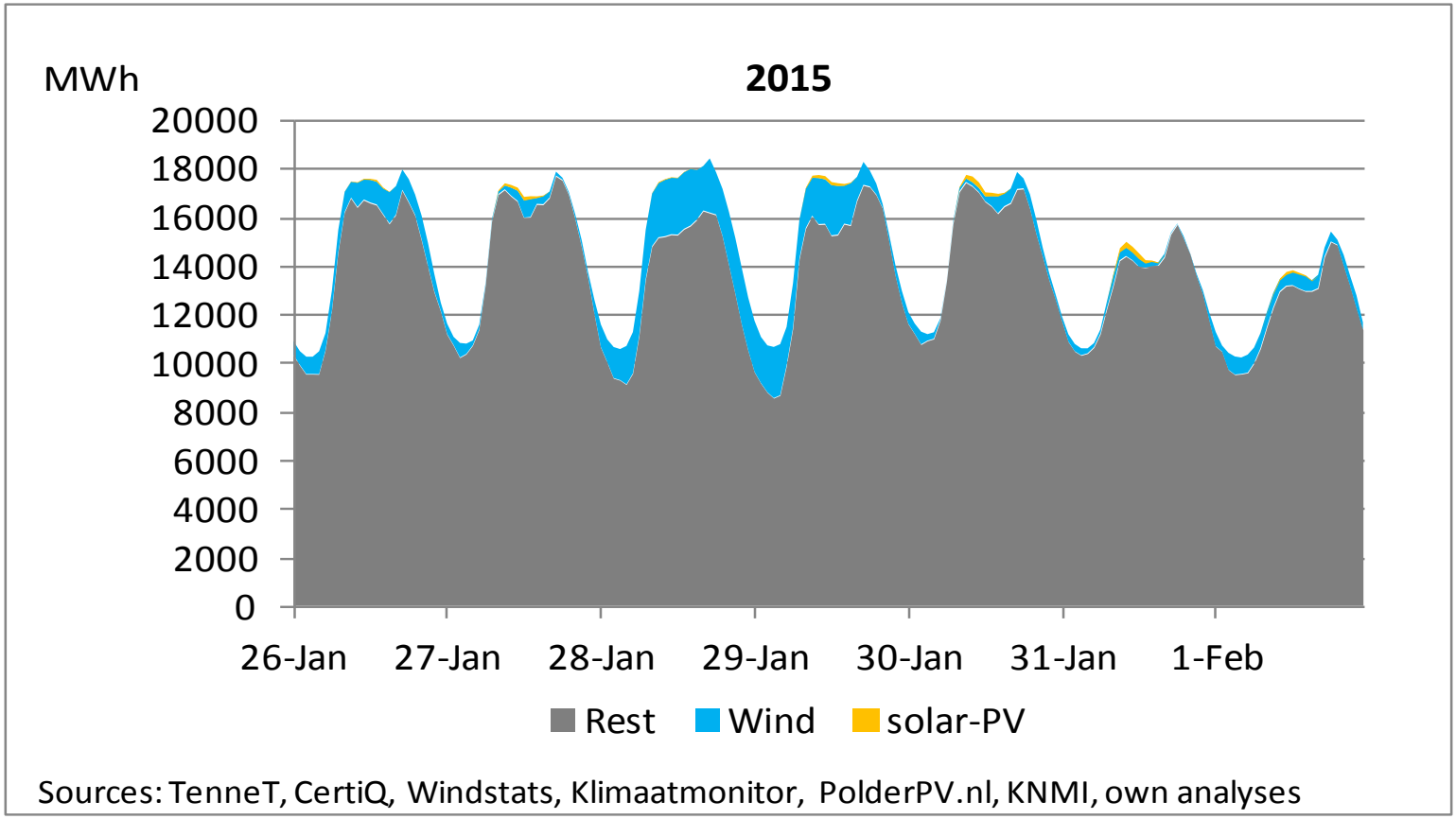
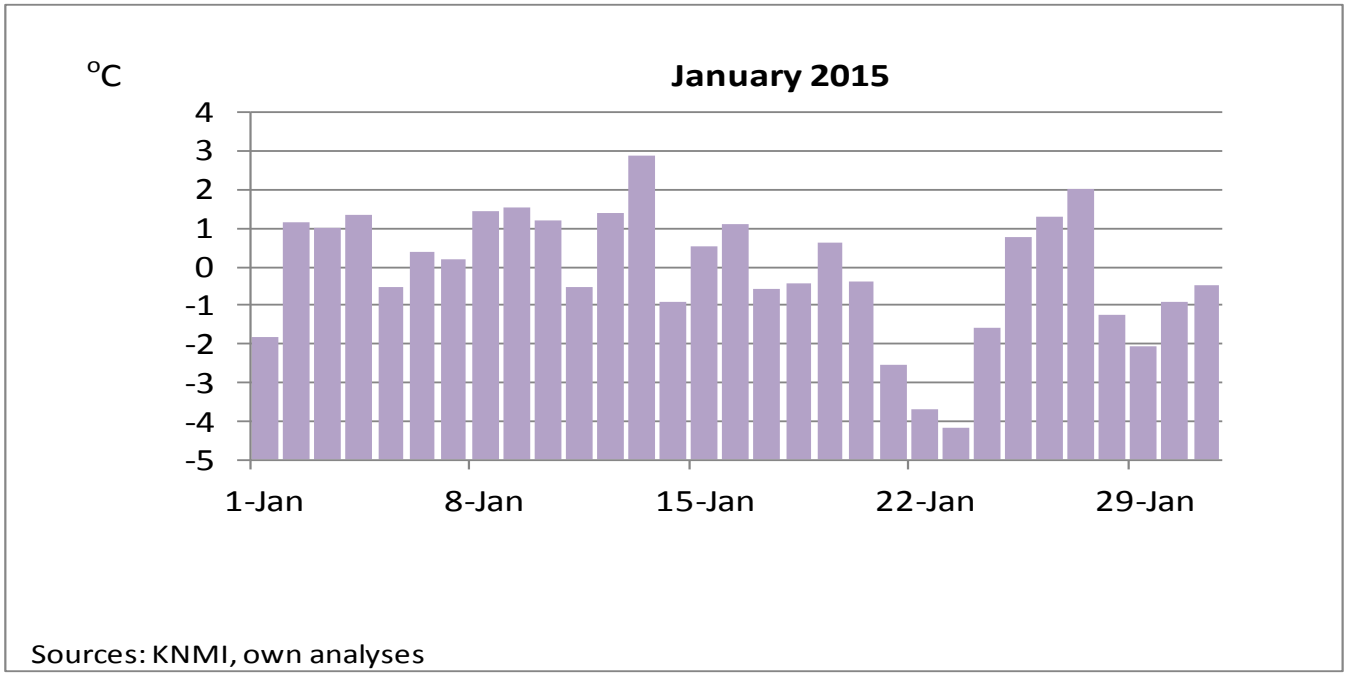


Sources: TenneT, CertiQ, Windstats, Klimaatmonitor, PolderPV.nl, KNMI, own analyses

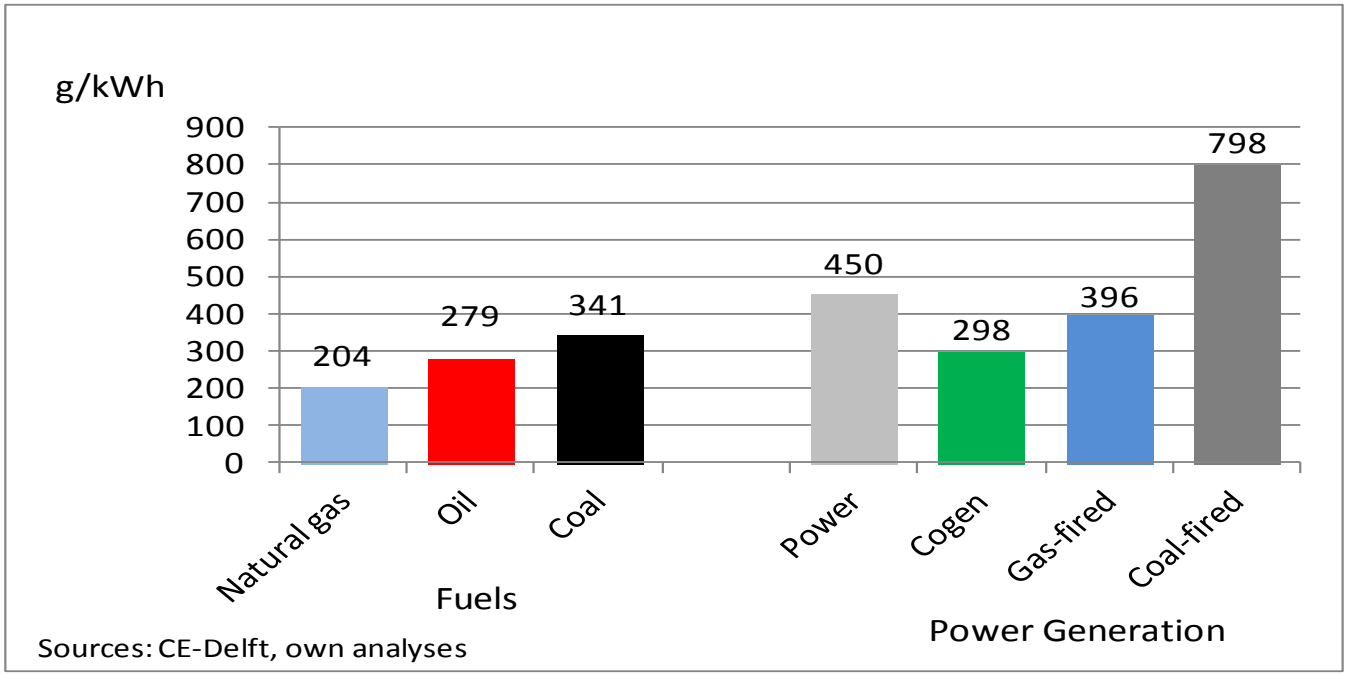
MISCELLANEOUS

Effective Temperature January 2015



The effective temperature (temperature including wind shield factor) in January 2015.

Fuel Specific CO2 Emissions



Characteristic CO2 emissions used in this presentation.

Epilogue

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This presentation is based on numerous sources which present data on energy demand and supply in The Netherlands. These data, however, do not cover the entire energy system. Some approximations and scaling factors were thus needed. The author would like to thank students from Hanze University of Applied Science in Groningen and various energy experts in The Netherlands which gave suggestions for improvements of the methods used. Currently, the aggregated results of this work are in good agreement with data supplied by the Dutch National Office of Statistics (CBS). It is believed by the author that the detailed results in this presentation give a fair presentation of the complex reality of the Dutch energy system.

Nevertheless, the author invites readers to comment on the data provided with the objective to further improve this work. After all, good and reliable data are at the heart of any successful policy to make our world more sustainable.