# Statistics and Forecast– Q1 2023

17/05/2023

Statistics and forecast updated quarterly.

The figures are produced with data from turbine manufacturers and other market participants.

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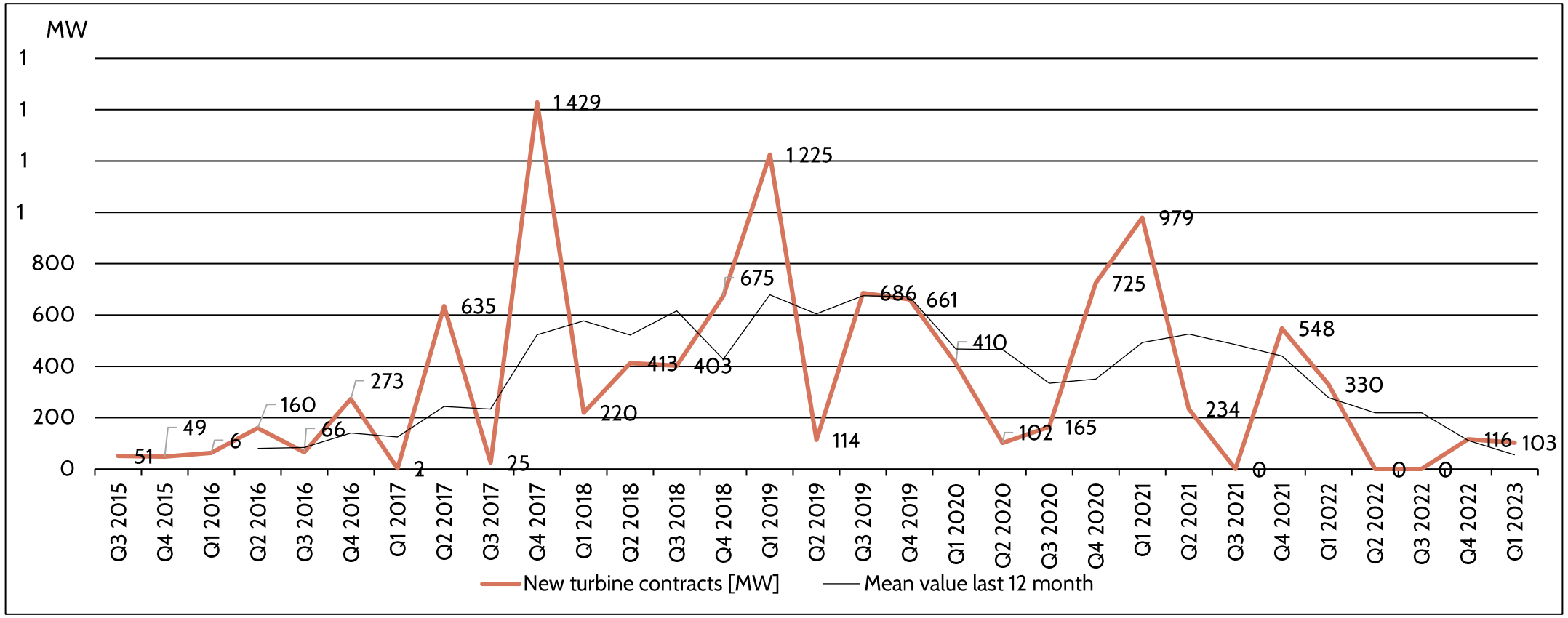
# Turbine Contracts per Quarter (Megawatt, MW)

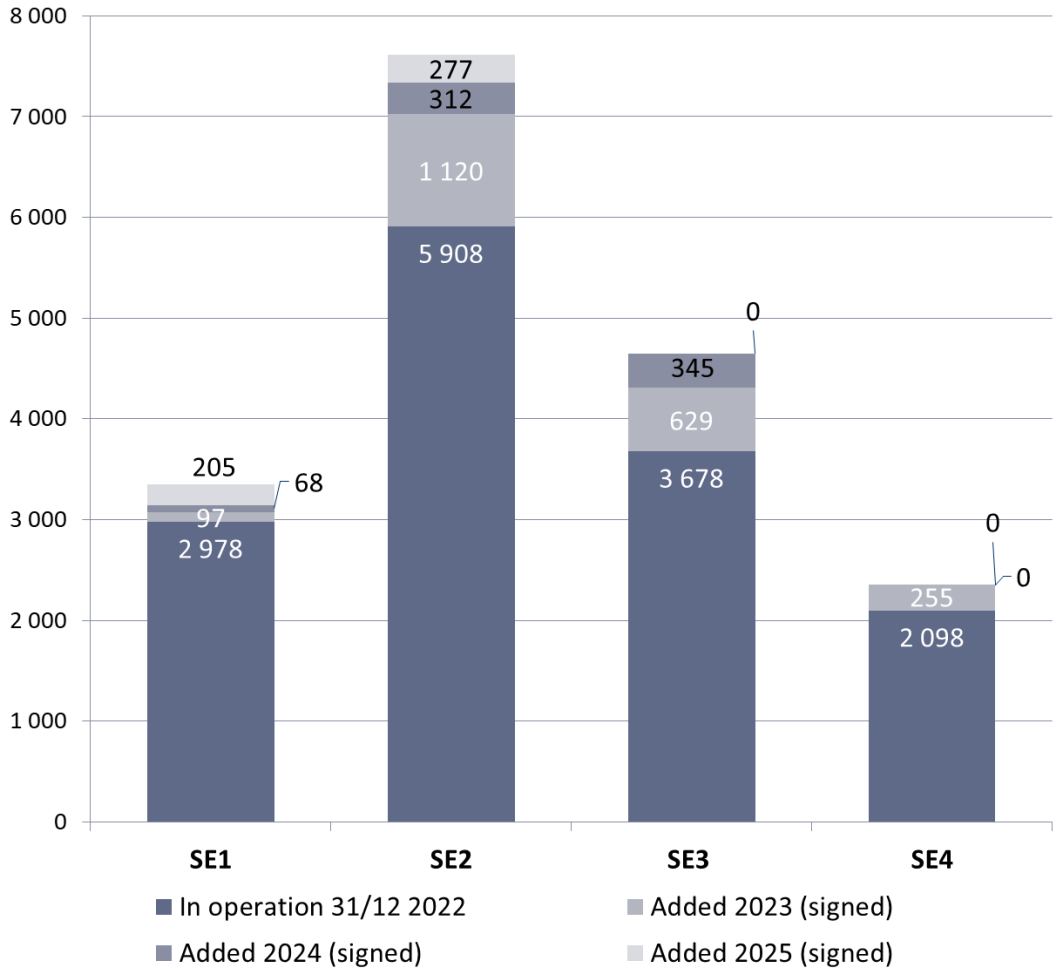


# Scheduled Commissioning (Megawatt, MW)

According to turbine manufacturers order books for installations.

| 2022 | *2023 Q1* | *2023 Q2* | *2023 Q3* | *2023 Q4* | *2023 (Tot)* | *2024* | *2025* |
|---|---|---|---|---|---|---|---|
| 2054 | *132* | *666* | *847* | *456* | *2100* | *725* | *482* |

# Scheduled Commissioning* (Megawatt, MW)



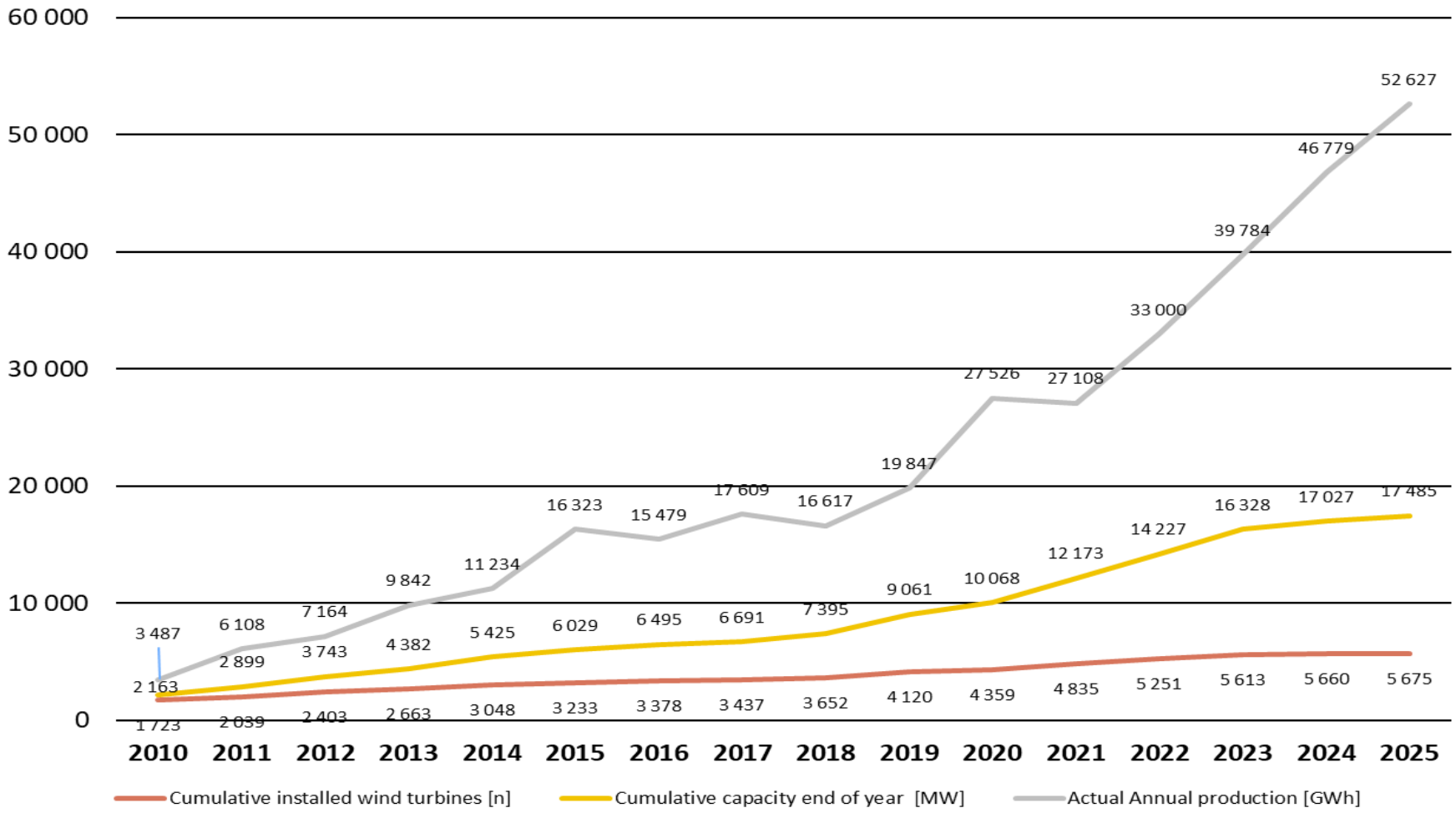


* Confirmed orders

# Short Term Forecast (17/05/2023)

- First quarter of 2023 103 MW of turbines was ordered.
- Continued high build out 2023 with only minor adjustments between quarters compared to last forecast.
- Expansion is expected to slow down after 2024 - especially in southern Sweden.
- By the end of 2025, SWEA estimates that wind power will reach an installed capacity of 17,500 megawatts (MW) and an annual production of 52.6 terawatt-hours (TWh).
- The short-term forecast is based on investment decisions and an estimate of buildable projects and new projects based on the permitting situation.

# Short Term Forecast (17/05/2023)



# Different Stages in the Permitting Process

- **Under construction**: Project with investment decisions taken and turbines ordered.
- **Announced**: Projects with permits and backing investors, but investment decisions have not yet been made.
  - Can be operational 2-3 years after investment decision.
- **With permits**: Projects with environmental permits, but the grid concession (electricity grid permit) remaining.
  - Can be operational 3-5 years after the grid connection is decided.
- **Projects under permit review**: Projects that have applied for an environmental permit to the County Administrative Board's Environmental Assessment Delegation or to the Government.
  - Attaining an environmental permit can take 3-7 years.
  - For onshore wind power, 45% have received environmental permits (2014-2021).
  - For offshore wind power, the figures apply to both projects in the Swedish economic zone and the territorial sea (in total).
- **Consultation**: Projects in pre-study, for which an application for an environmental permit has not yet been submitted.
- **Early-stage projects**: Projects that have not yet started the formal consultation process.

# Project Portfolio (2023-05-17)*

| **Under construction** | **Onshore** | **Offshore** | **Total** |
|---|---|---|---|
| WTG's | 765 | 0 | 789 |
| Capacity (MW) | 4 279 | 0 | 4 279 |
| Annual normal production (TWh) | 14,2 | 0,0 | 14,2 |

| **Announced** | **Onshore** | **Offshore** | **Total** |
|---|---|---|---|
| WTG's | 186 | 0 | 186 |
| Capacity (MW) | 1 156 | 0 | 1 156 |
| Annual normal production (TWh) | 3,8 | 0,0 | 3,8 |

| **With permits** | **Onshore** | **Offshore** | **Total** |
|---|---|---|---|
| WTG's | 842 | 146 | 988 |
| Capacity (MW) | 5 093 | 2239 | 7 332 |
| Annual normal production (TWh) | 16,1 | 9,3 | 25,4 |

* The data in the Swedish Wind Energy Association's project portfolio is based on reported data from SWEA members, Vindbrukskollen.se and statistics compiled by Westander Klimat och Energi on behalf of SWEA.

# Project Portfolio (2023-05-17)*, cont.

| **Projects under permit review** | **Onshore** | **Offshore** | **Total** |
|---|---|---|---|
| WTG's | 1 180 | 1 193 | 2373 |
| Capacity (MW) | 7 700 | 17 375 | 25 024 |
| Annual normal production (TWh) | 25,6 | 80,5 | 106,2 |

| **Consultation** | **Onshore** | **Offshore** | **Total** |
|---|---|---|---|
| WTG's | 115 | 3 160 | 3 275 |
| Capacity (MW) | 749 | 57 710 | 58 460 |
| Annual normal production (TWh) | 2,5 | 250,9 | 253,4 |

| **Early-stage project** | **Onshore** | **Offshore** | **Total** |
|---|---|---|---|
| WTG's | 448 | 2 131 | 2 579 |
| Capacity (MW) | 3 120 | 39 840 | 42 960 |
| Annual normal production (TWh) | 10,5 | 174,5 | 185,0 |

* The data in the Swedish Wind Energy Association's project portfolio is based on reported data from SWEA members, Vindbrukskollen.se and statistics compiled by Westander Klimat och Energi on behalf of SWEA.

# How Sweden Can Meet Industry's Electricity Demand By 2030

Permitting Needs for New Electricity Production

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# Major Need For New Electricity Generation by 2030

- Several analyses now indicate that expansion of new electricity production in Sweden is most critical up until first half of the 2030s.
- The cooperation of Swedish electric intense industry, SKGS, recently published a report showing that industrial electricity demand alone will increase by 70 terawatt hours (TWh) by 2030.
- Swedish Energy Agency's scenarios point out electrification of industry as the driving factor for the need of new production, and that a massive build out of new wind power will be necessary to meet the short-term demand.
- If Sweden is to meet the industry electricity demand by 2030, we must maintain a high rate of expansion of electricity production. A condition for this is a high rate of approved environmental permits for wind power.

# How To Meet Growing Industry Demand

- In the Swedish Energy Agency's short-term forecast extending to 2025, the industry's increased electricity has not yet had a major impact. Granted SKGS's assessment for an increase of 70 terawatt hours (TWh) by 2030, electricity consumption then increases from 140 TWh in 2021 to 213 TWh in 2030.
- With the cautious assumptions of the build-out potential of other energy sources, and that half of the wind turbines currently in the permitting process are granted permits*, electricity production could increase from 170 TWh in 2021 to 232.5 TWh in 2030.
- Wind power would then expand from 52.6 TWh in 2025 to 86.3 TWh in 2030.
- Electricity production would increase by 7.8 TWh per year. Of this, wind power would account for 6.7 TWh per year.

* Slightly higher share of permits than during the period of 2014-2021

# Electricity Production by 2030* If Half of Wind Power Is Permitted

| | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2023-2030 | Per year 2023-2030 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Net utilisation** | **141,6** | **136,8** | **138,4** | **148,7** | **156,2** | **166,3** | **181,9** | **189,3** | **198,5** | **213,6** | **76,8** | **9,6** |
| ***Production*** | | | | | | | | | | | | |
| Hydro | 73,3 | 69,6 | 66,2 | 66,2 | 66,2 | 66,2 | 66,2 | 66,2 | 66,2 | 66,2 | -3,4 | -0,4 |
| Wind | 27,1 | 33,1 | 42,5 | 48,7 | 52,6 | 61,7 | 70,8 | 73,9 | 86,3 | 86,3 | 53,2 | 6,7 |
| Nuclear | 51,0 | 50,1 | 49,5 | 52,0 | 52,0 | 52,0 | 52,0 | 52,0 | 52,0 | 52,0 | 2,0 | 0,2 |
| Solar | 1,1 | 2,0 | 2,8 | 4,0 | 5,4 | 6,3 | 7,24 | 8,2 | 9,1 | 10,0 | 8,0 | 1,0 |
| CHP | 15,4 | 15,1 | 15,2 | 15,3 | 15,3 | 15,84 | 16,38 | 16,9 | 17,5 | 18,0 | 2,9 | 0,4 |
| **Net production** | **168,0** | **170,0** | **176,4** | **186,4** | **191,6** | **202,1** | **212,6** | **217,2** | **231,1** | **232,5** | **62,5** | **7,8** |
| **Import-export** | **25,6** | **33,2** | **38,5** | **45,2** | **44,1** | **35,8** | **30,7** | **27,9** | **32,6** | **18,9** | **-14,3** | |

* The tables is based om the Swedish Energy Agency's short-term forecast for electricity use and production, as well as the industry's expected electricity use leading up to 2030. We have made a cautious assumption about expansion and power increase for other power sources. We have also assumed that 50 per cent of wind turbines in the permit process are granted permits, which is a slightly higher permitting rate than during 2014-2021.

# Quicker permitting process essential

- The proportion of environmental permits granted for electricity production in the near future will be crucial to meeting future electricity needs.
- In 2014-2021, 45 per cent of onshore wind turbines were granted environmental permits. Between 2020-2022, the rate was only 36 per cent.
- It is positive that the Government now has issued environmental permits for two offshore wind farms in the Kattegat and has previously authorized Vattenfall to lay the underwater cables required to operate the planned Kriegers Flak wind farm in the southern Baltic Sea.
- However, it is necessary to speed up the permitting process for both onshore and offshore wind and to increase the rate of permits to meet electricity demand by 2030.

# Tougher competition requires better conditions

Sweden is facing increasing competition from other countries, while our own issues remain unresolved:

- In April, 9 countries signed an agreement to build 120 gigawatt (GW) of offshore wind in the North Sea by 2030. Sweden was not one of these countries.
- Finland's wind power increased by 75 per cent in 2022.
- In Europe, several auctions for offshore wind are planned for 2023, including in our neighboring countries Germany, the Netherlands, Norway and Denmark.
- According to the British consultancy Amber, Sweden has the second slowest permitting process in Europe.
- The municipal veto still stop too many new wind power projects in Sweden.
- Overall, increased competition, rising non-market-based costs and a slow permitting process may lead to Sweden to becoming less attractive for investments, compared to other countries.

# The Swedish Wind Energy Associations suggestion for a faster build out of wind power*

1. Apply EU rules on shorter permitting processes for electricity generation
2. Introduce a maximum one-year rule for permits for power plants and simplify the assessment of power line upgrades
3. Make possible to apply for grid connection in parallel with the environmental permitting process
4. Introduce a time limit for municipal decisions on wind power
5. Climate benefits should play a bigger part in the assessment of electricity production that contributes to Sweden's electrification
6. Strengthen municipalities' incentives to authorise electricity production
7. Strengthen ties between the Defence Forces and electricity producers
8. Develop new marine spatial plans with expanded areas for electricity production
9. Mandate the relevant authorities to contribute to the electrification of society
10. Use existing grid more efficiently and enable conditional access contracts

* How wind power can deliver industrial electrification and competitiveness

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