

# Statistics and Forecast – Q3 2023

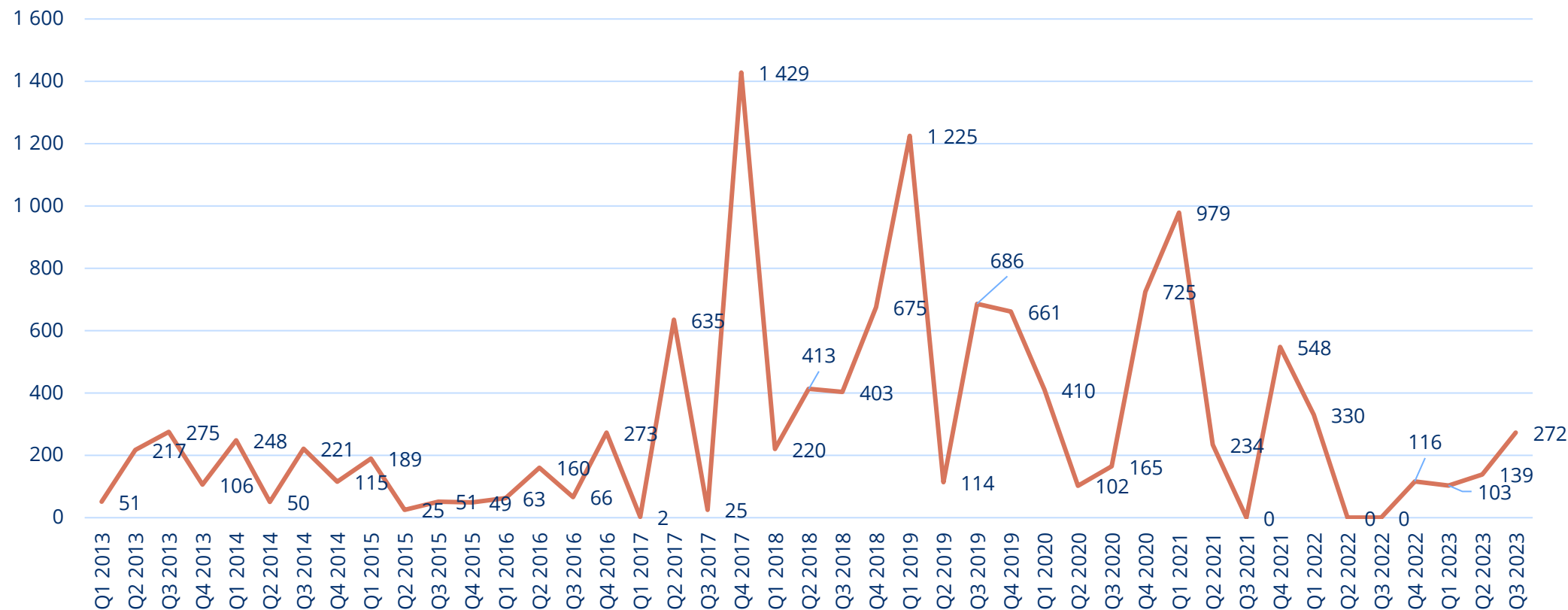
2023-11-08

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# Investment Decisions Q1-Q3 2023

|         | Project       | Developer              | Start year | Owner                  | WTG       | MW         | TWh         | County       |
|---------|---------------|------------------------|------------|------------------------|-----------|------------|-------------|--------------|
| Q1 2023 | Örken 2       | RWE Renewables         | 2023       | RWE Renewables         | 2         | 8          | 0,03        | Halland      |
| Q1 2023 | Tomasliden    | wpd Scandinavia        | 2024       | wpd Scandinavia        | 10        | 68         | 0,20        | Västerbotten |
| Q1 2023 | Bruzaholm     | Vattenfall Vindkraft   | 2025       | Vattenfall Vindkraft   | 23        | 139        | 0,46        | Jönköping    |
| Q2 2023 | Fäbodliden II | Fred. Olsen Renewables | 2024       | Fred. Olsen Renewables | 4         | 17         | 0,06        | Västerbotten |
| Q2 2023 | Munkhyttan I  | Cloudberry Wind        | 2024       | Cloudberry Wind        | 3         | 18         | 0,06        | Örebro       |
| Q3 2023 | Rosenholm     | SR Energy              | 2025       | SR Energy              | 5         | 31         | 0,10        | Kronoberg    |
| Q3 2023 | Älmedal       | SR Energy              | 2025       | SR Energy              | 9         | 58         | 0,19        | Kronoberg    |
| Q3 2023 | Horshaga      | SR Energy              | 2026       | SR Energy              | 11        | 68         | 0,23        | Kronoberg    |
| Q3 2023 | Ånglarna      | OX2                    | 2026       | EWZ                    | 18        | 115        | 0,36        | Dalarna      |
|         |               |                        |            |                        | <b>85</b> | <b>523</b> | <b>1,68</b> |              |

# New Turbine Orders, Megawatts (MW)



# Commissioning, Megawatts (MW)

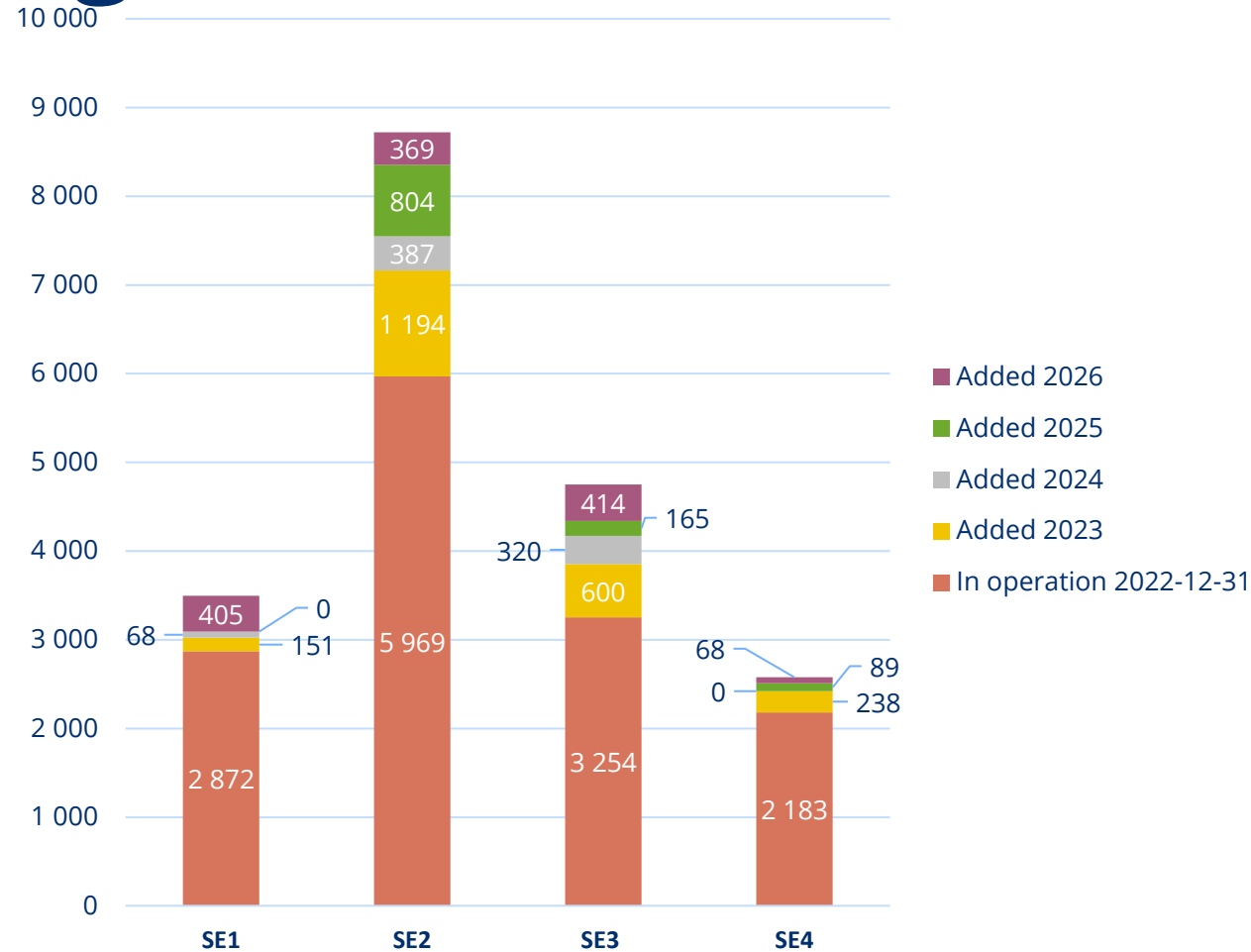
| In<br>commission<br>2022-12-31 | 2023 Q1 | 2023 Q2 | 2023 Q3 | 2023 Q4 | 2023 (Tot) | 2024 | 2025  | 2026  | In<br>commission<br>2026-12-31 |
|--------------------------------|---------|---------|---------|---------|------------|------|-------|-------|--------------------------------|
| 14 278                         | 233     | 482     | 645     | 822     | 2 182      | 774  | 1 058 | 1 256 | 19 549                         |

# New Wind Power 2023-2026

| Project                       | Start year | TWG | MW  | TWh  | County          | Project                   | Start year | WTG        | MW           | TWh          | County          |
|-------------------------------|------------|-----|-----|------|-----------------|---------------------------|------------|------------|--------------|--------------|-----------------|
| Hocksjön                      | 2023       | 23  | 131 | 0,44 | Jämtland        | Lervik                    | 2024       | 7          | 46           | 0,15         | Kalmar          |
| Rödene                        | 2023       | 13  | 86  | 0,29 | Västra Götaland | Fäbodliden II             | 2024       | 4          | 17           | 0,06         | Västerbotten    |
| Stor-Blåliden, Pilot 2        | 2023       | 3   | 17  | 0,05 | Norrbottn       | Storbrännkullen           | 2024       | 10         | 57           | 0,16         | Jämtland        |
| Furuby                        | 2023       | 10  | 62  | 0,21 | Kronoberg       | Ranasjö- och Salsjöhöjden | 2024       | 39         | 242          | 0,81         | Västernorrland  |
| Skåramåla                     | 2023       | 8   | 50  | 0,17 | Kronoberg       | Tomasliden                | 2024       | 10         | 68           | 0,20         | Västerbotten    |
| Grevekulla                    | 2023       | 6   | 36  | 0,10 | Östergötland    | Munkhyttan I              | 2024       | 3          | 18           | 0,06         | Örebro          |
| Knöstad                       | 2023       | 8   | 50  | 0,17 | Värmland        | Boarp                     | 2024       | 4          | 24           | 0,08         | Västra Götaland |
| Skaftåsen                     | 2023       | 35  | 210 | 0,70 | Jämtland        | Riberget                  | 2024       | 11         | 70           | 0,23         | Gävleborg       |
| Gubbaberget                   | 2023       | 12  | 74  | 0,25 | Gävleborg       | Älgkullen                 | 2024       | 15         | 93           | 0,31         | Dalarna         |
| Rosenskog                     | 2023       | 3   | 19  | 0,06 | Västra Götaland | Kölvallen                 | 2025       | 42         | 277          | 0,92         | Gävleborg       |
| Björnberget                   | 2023       | 60  | 372 | 1,24 | Västernorrland  | Dällebo                   | 2025       | 4          | 26           | 0,09         | Västra Götaland |
| Femstenaberget                | 2023       | 7   | 46  | 0,15 | Västra Götaland | Knäsjöberget              | 2025       | 15         | 92           | 0,31         | Västernorrland  |
| Lursäng                       | 2023       | 3   | 20  | 0,07 | Västra Götaland | Storhöjden                | 2025       | 24         | 145          | 0,48         | Västernorrland  |
| Hultema                       | 2023       | 11  | 72  | 0,24 | Östergötland    | Vitberget                 | 2025       | 26         | 158          | 0,53         | Västernorrland  |
| Örken 2, Munkaböl             | 2023       | 2   | 8   | 0,03 | Halland         | Sörlidsberget             | 2025       | 22         | 132          | 0,44         | Västernorrland  |
| Frykdalsh. - N Länsmansberget | 2023       | 10  | 62  | 0,17 | Värmland        | Rosenholm                 | 2025       | 5          | 31           | 0,10         | Kronoberg       |
| Stölsäterberget               | 2023       | 8   | 46  | 0,16 | Dalarna         | Älmedal                   | 2025       | 9          | 58           | 0,19         | Kronoberg       |
| Sundby                        | 2023       | 9   | 32  | 0,09 | Södermanland    | Bruzaholm                 | 2025       | 23         | 139          | 0,46         | Jönköping       |
| Tormoseröd                    | 2023       | 11  | 73  | 0,24 | Västra Götaland | Fasikan                   | 2026       | 15         | 105          | 0,35         | Västernorrland  |
| Ersträsk North                | 2023       | 34  | 134 | 0,45 | Norrbottn       | Horshaga                  | 2026       | 11         | 68           | 0,23         | Kronoberg       |
| Stor-Skälsjön                 | 2023       | 42  | 260 | 0,81 | Västernorrland  | Velinga                   | 2026       | 12         | 68           | 0,18         | Västra Götaland |
| Marhult                       | 2023       | 7   | 32  | 0,10 | Kronoberg       | Fageråsen                 | 2026       | 33         | 230          | 0,71         | Dalarna         |
| Karskruv                      | 2023       | 20  | 86  | 0,29 | Kronoberg       | Maximus, MB South         | 2026       | 97         | 405          | 1,35         | Norrbottn       |
| Hallösa                       | 2023       | 13  | 59  | 0,19 | Jönköping       | Ånglarna                  | 2026       | 18         | 115          | 0,36         | Dalarna         |
| Klevberget                    | 2023       | 24  | 146 | 0,49 | Västernorrland  | Fjällberg                 | 2026       | 24         | 144          | 0,48         | Västerbotten    |
| Lebo                          | 2024       | 5   | 33  | 0,11 | Kalmar          | Hornmyran                 | 2026       | 9          | 54           | 0,18         | Västerbotten    |
| Skallberget/Utterberget       | 2024       | 12  | 79  | 0,26 | Dalarna         | Vinliden                  | 2026       | 11         | 66           | 0,22         | Västerbotten    |
| Tjärnäs                       | 2024       | 4   | 26  | 0,09 | Dalarna         |                           |            | <b>906</b> | <b>5 270</b> | <b>17,21</b> |                 |

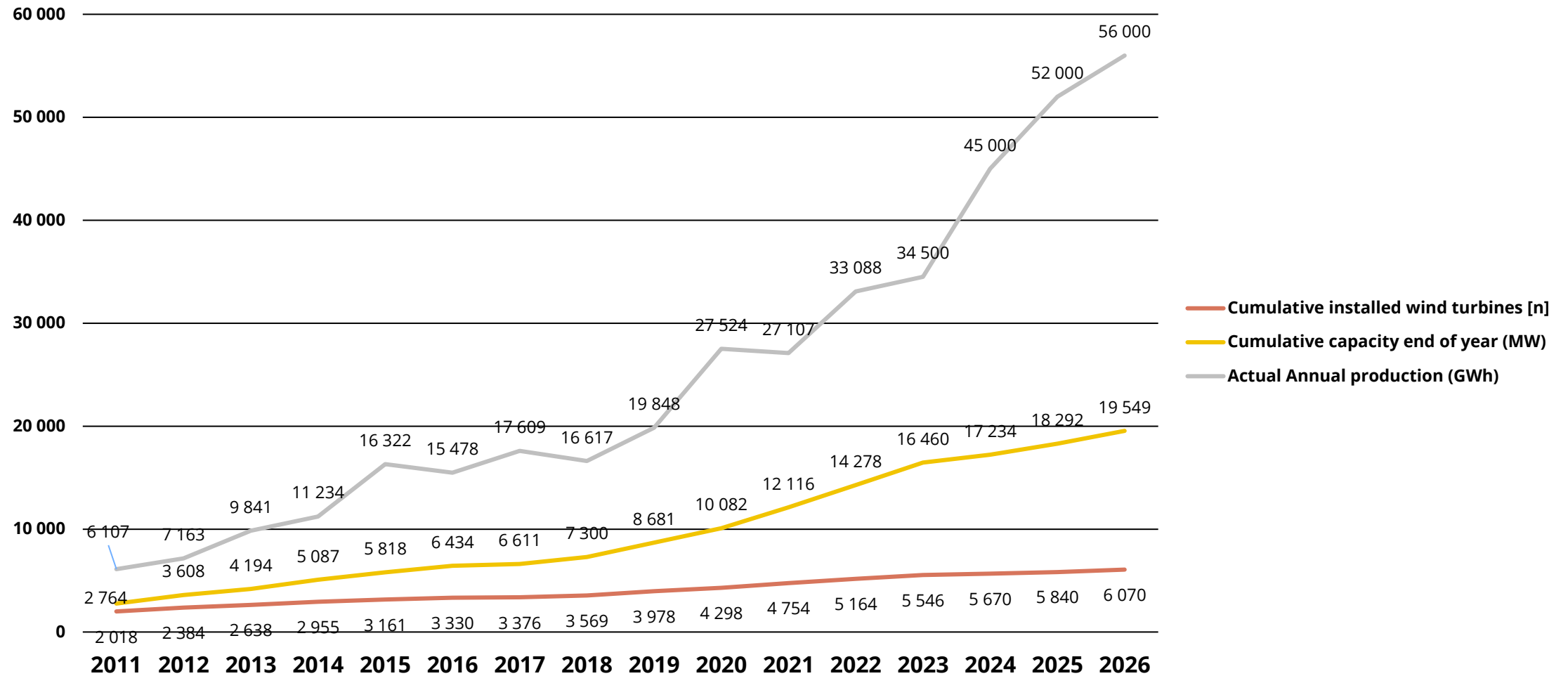
- Investment approx. 61 billion SEK
- Projects with turbines ordered
- Announced projects included with 172 WTG, 1 071 MW and 3,5 TWh

# Installed Capacity 2026-12-31, Megawatts (MW)

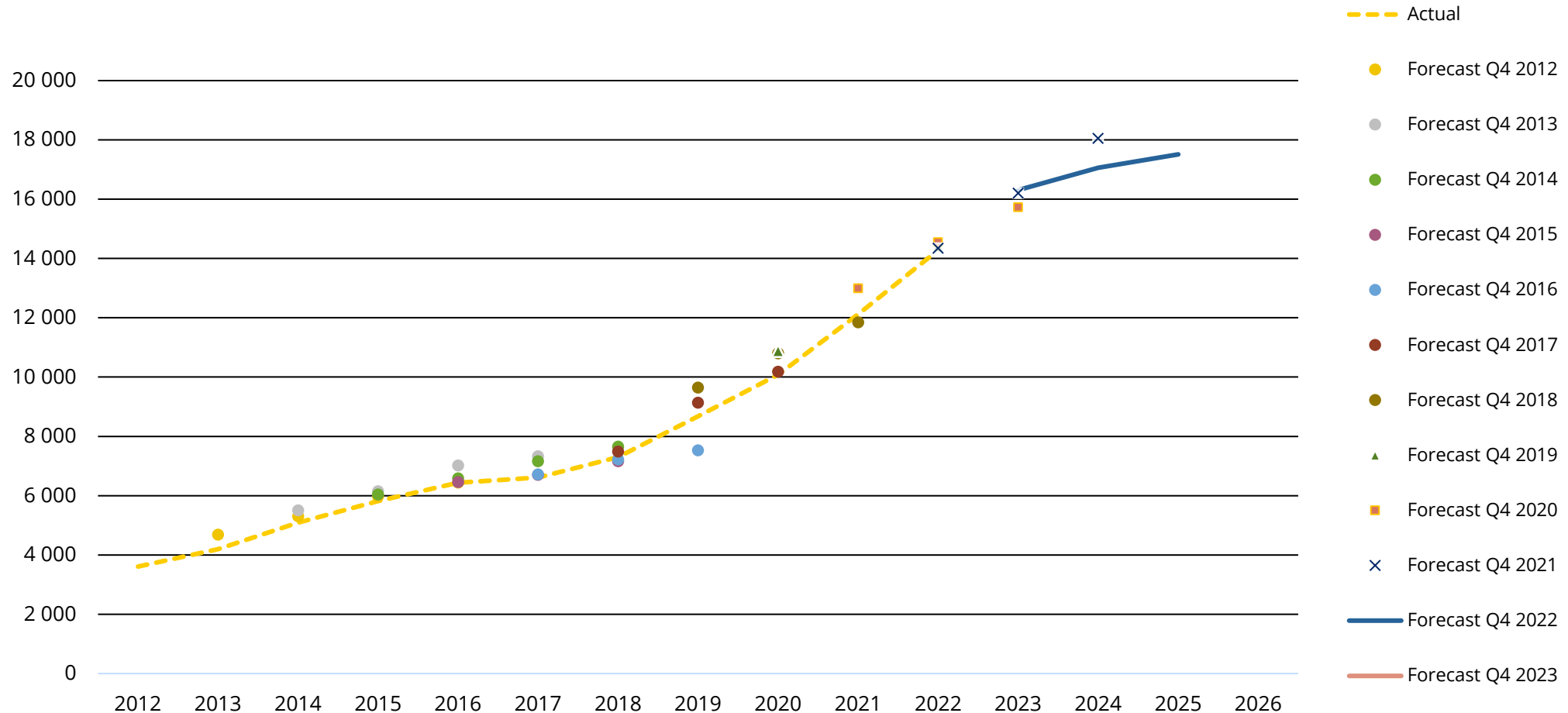


- Projects with turbines ordered
- Announced projects are included with 1 071 MW

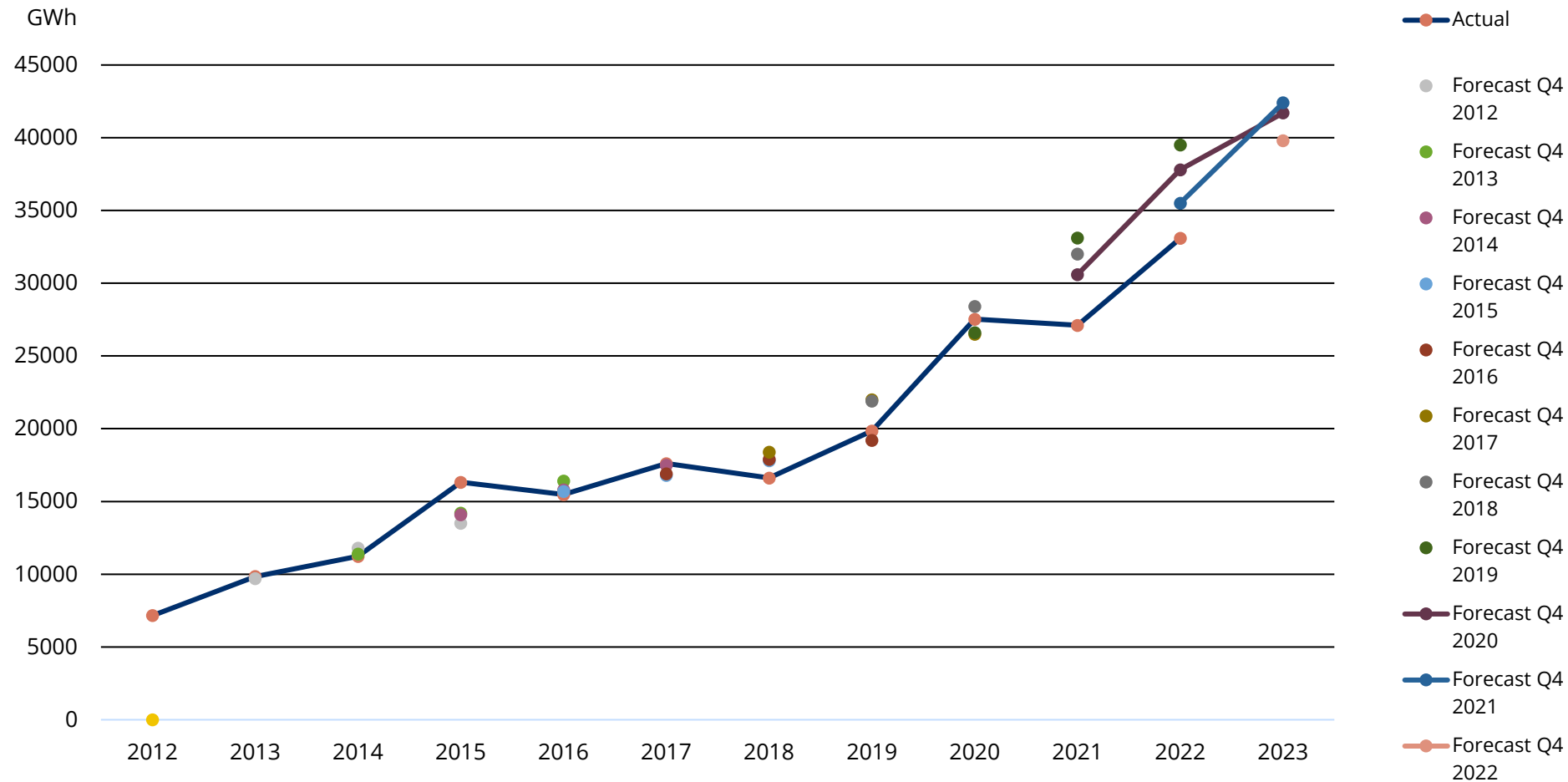
# Forecast 2023-09-30



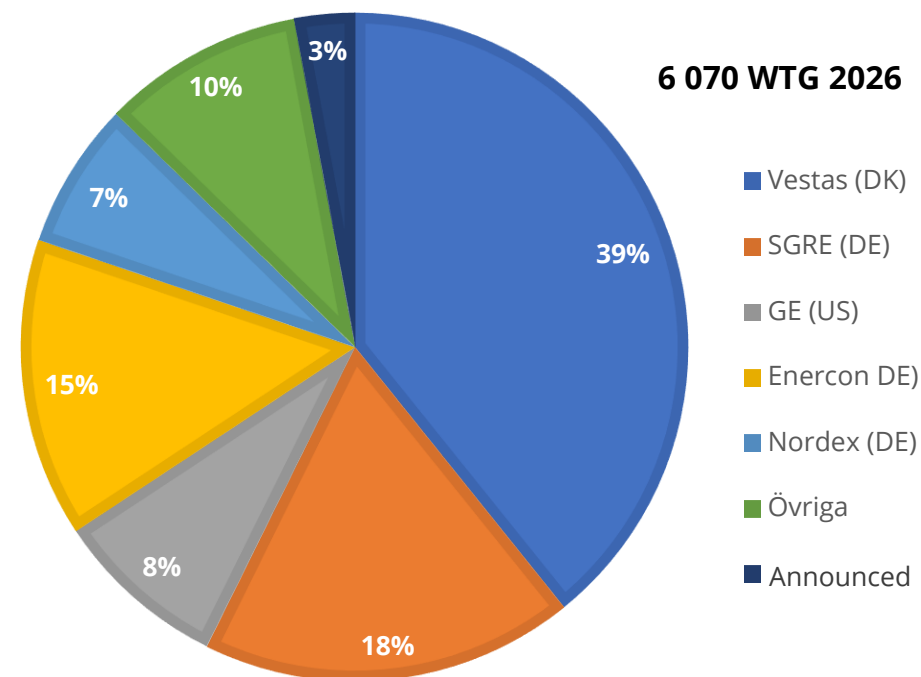
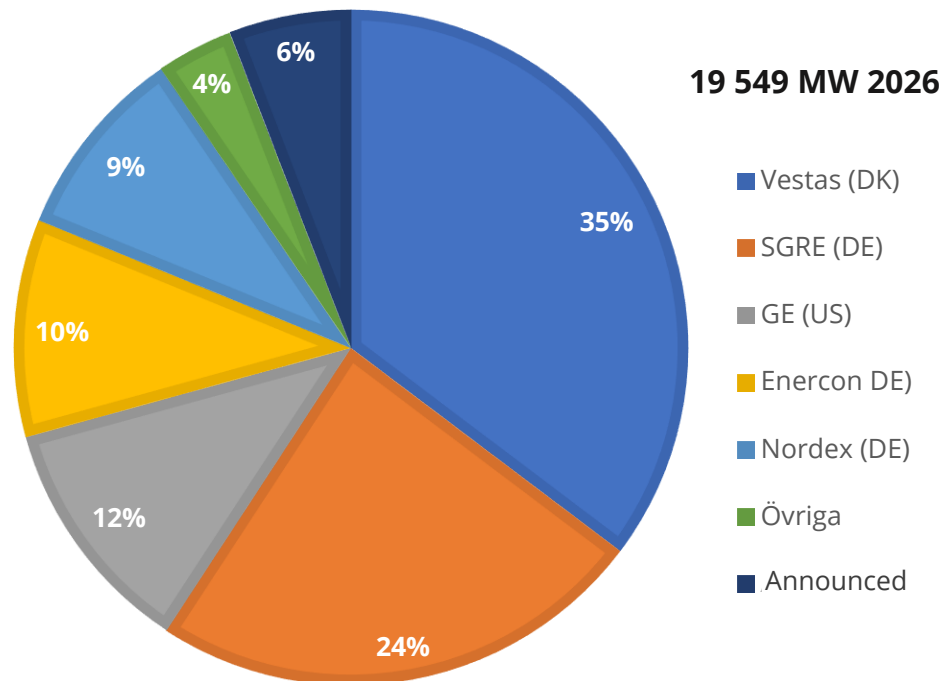
# Follow-Up, Forecast vs. Outcome, Megawatts (MW)



# Follow-Up, Forecast vs. Outcome, Gigawatt Hours (GWh)



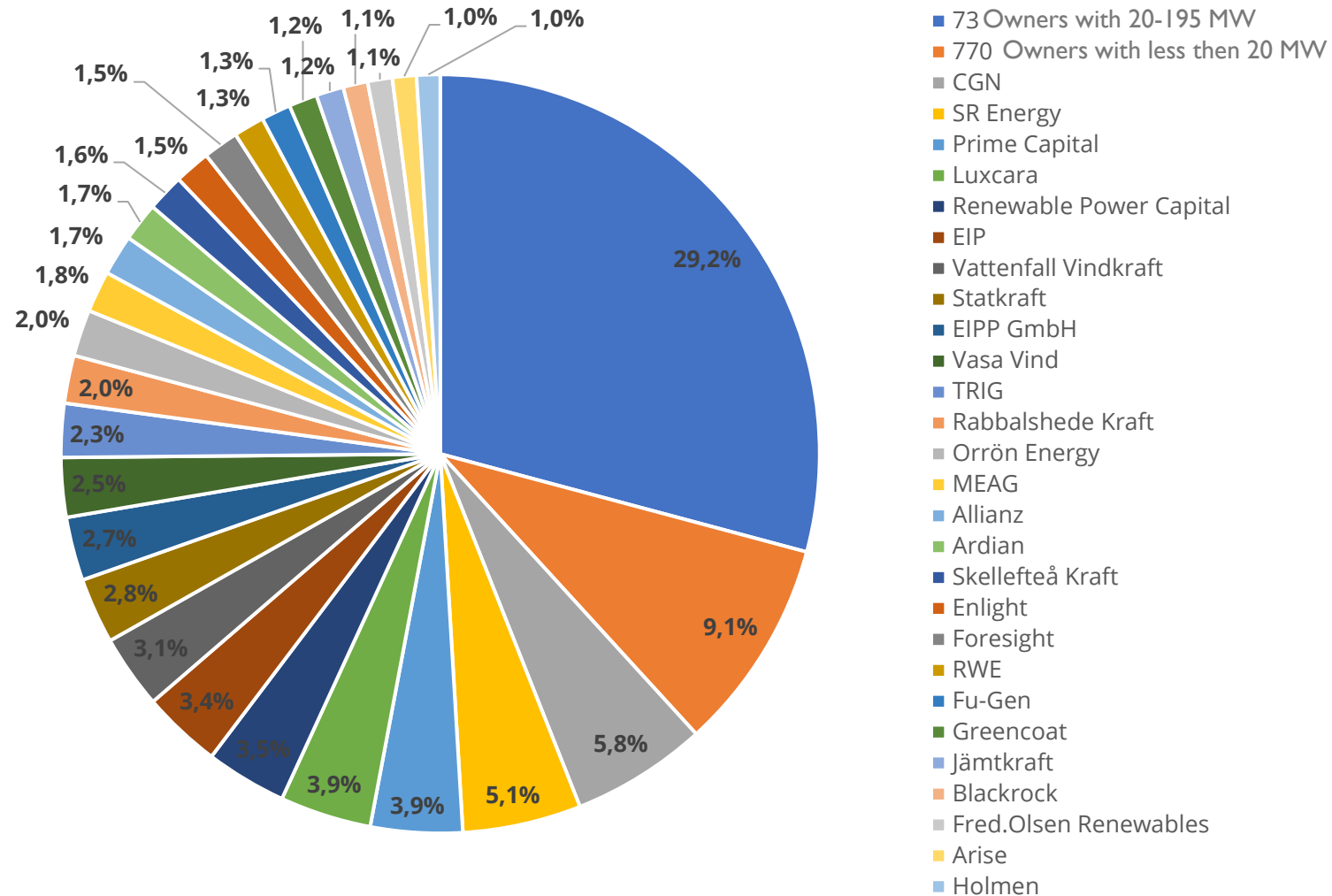
# Market Shares 2026



Other turbine suppliers:

Dongfang (CN), Windworld (DK), Senvion (IN), NEG Micon (DK), WinWind (FI), Sinovel (CN), Kenersys (DE), Fuhrländer (DE), ENO Energy (DE), Nordic (DK), EWT (NL), Vindsyssel (DK), Vertical Wind (SV) m.fl.

# 870 Wind Farm Owners 2026



## Diversified ownership

843 owners accounts for 38% of the installed capacity 2026.

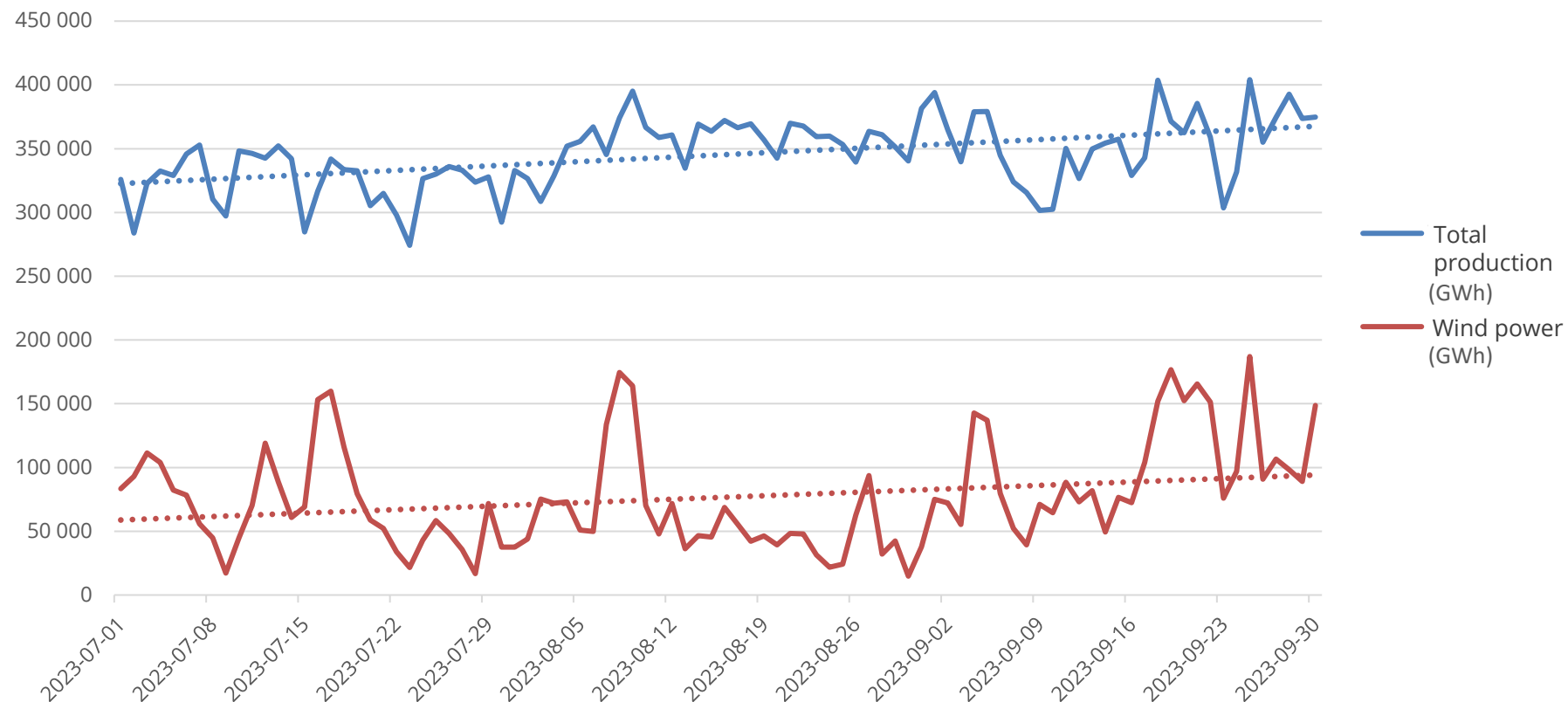
27 big owners, with more than 195 MW, will account for 62 % of the installed capacity 2026.

## Total 19 549 MW 2026

## Snapshot 2023-09-30

Changes when new projects are realized and when there is a change of ownership.

# Production Q3 2023



Total production  
31,75 TWh

Total electricity use  
26,24 TWh

Wind Power  
7,04 TWh

Share of production  
from wind power  
**22,2%**

Share of electricity use  
from wind power  
**26,8%**

Source: Nord Pool

# Project Portfolio

| <b>Announced</b>               | <b>Onshore</b> | <b>Offshore</b> | <b>Total</b> |
|--------------------------------|----------------|-----------------|--------------|
| Projects                       | 10             | 0               | 10           |
| WTG's                          | 172            | 0               | 172          |
| Capacity (MW)                  | 1 071          | 0               | 1 071        |
| Annual normal production (TWh) | 3,51           | 0,00            | 3,51         |

**Announced:** Projects with permits and ready with investors, but where investment decisions have not yet been taken. Can be in operation 2-3 years after investment decision.

| <b>With permits</b>            | <b>Onshore</b> | <b>Offshore</b> | <b>Total</b> |
|--------------------------------|----------------|-----------------|--------------|
| Projects                       | 46             | 4               | 50           |
| WTG's                          | 789            | 167             | 956          |
| Capacity (MW)                  | 4 806          | 2 279           | 7 085        |
| Annual normal production (TWh) | 15,14          | 9,77            | 24,91        |

**With permits:** Projects with environmental permits, where the network concession (electricity network licence) remains. Can be in operation 3-5 years after the grid connection is decided.

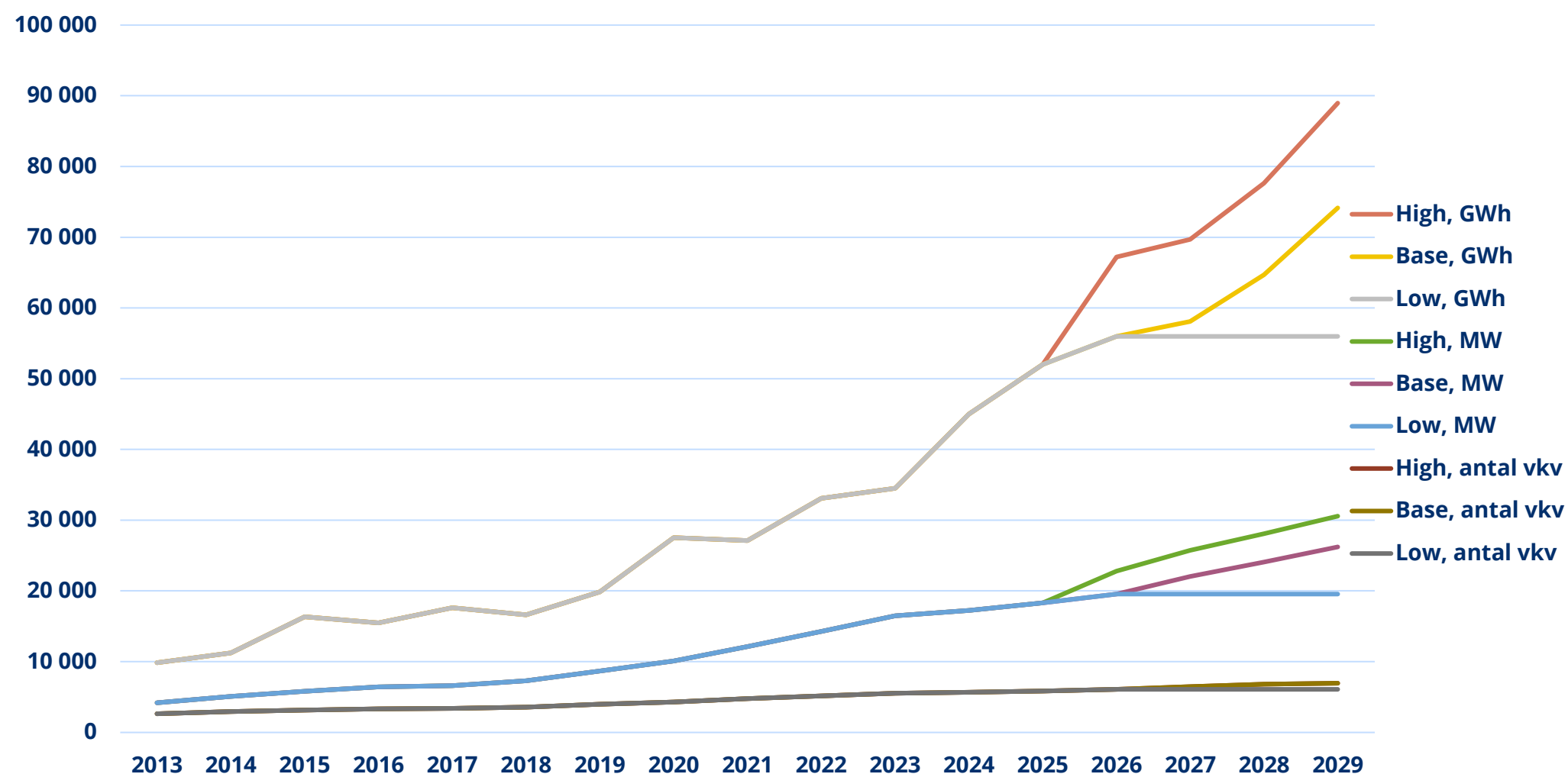
| <b>Projects under permitting review</b> | <b>Onshore</b> | <b>Offshore</b> | <b>Total</b> |
|-----------------------------------------|----------------|-----------------|--------------|
| Projects                                | 52             | 19              | 71           |
| WTG's                                   | 873            | 2 364           | 3 237        |
| Capacity (MW)                           | 5 809          | 38 456          | 44 265       |
| Annual normal production (TWh)          | 19,61          | 163,76          | 183,37       |

**Projects under permitting review:** Projects that have applied for an environmental licence to the county council or government. It takes 3-7 years to obtain an environmental licence.

# 134 TWh New Wind Power 2023-2035

- According to the Swedish Wind Energy Association's forecast, wind power production will be 56 terawatt-hours (normal annual production) in 2026.
  - There are 15 TWh of onshore wind power with permits. If two-thirds of investments are decided within two years, 10 TWh of onshore wind could be added in 2025-2027.
  - $56 + 10 = \mathbf{66 \text{ TWh of wind power 2027}}$
- If 50% of the wind turbines in the onshore projects in the permitting process are authorised, investment decisions are made and construction proceeds at a steady pace, 9,8 TWh of onshore wind could be added by 2026-2029.
  - $56 + 10 + 9,8 = \mathbf{75,8 \text{ TWh of wind power 2029}}$
- If the permitted offshore parks Kriegers Flak, Kattegat South and Galena are realised and put into operation in 2029, 9.6 TWh can be added in 2029.
  - $56 + 10 + 9,8 + 9,6 = \mathbf{85,4 \text{ TWh of wind power 2029}}$
- If 50% of the wind turbines in the offshore projects in the permitting process are authorised, investment decisions are made and construction proceeds at a steady pace, 82 TWh of offshore wind could be added by 2029-2035.
  - $56 + 10 + 9,8 + 9,6 + 82 = \mathbf{167,4 \text{ TWh of wind power 2035}}$
- In 2022, about 33 TWh of wind power was produced.
  - $167,4 - 33 = \mathbf{134 \text{ TWh of wind power could be added between 2023-2035}}$

# Three Scenarios – Development to 2029



## High-scenario

- Faster permitting processes
- Improved investment climate
- All current permitted land-based projects are realized
- All today's licensed offshore projects are realized
- The new turbines' capacity output increases and production increases by 20%.
- Announced projects are realized
- Ordered turbines delivered

## Base-scenario

- Ordered turbines delivered
- Announced projects realized
- 50% of today's licensed onshore projects realized
- All current permitted offshore projects realised

## Low-scenario

- Ordered turbines delivered
- No new wind power is added after 2026

# An Electricity System in Transition

# The Electricity System Enters a New Phase

- Recent reports from the International Energy Agency and the Nordic TSOs indicate that renewable electricity production is growing rapidly and will become a dominant source of production in the future.
  - [IEA Energy Outlook 2023](#)
  - [Nordic Grid Development Perspective 2023](#)
- A unique shift in history that will place new demands on the electricity system and the need to develop new technologies and solutions.
- This will present new challenges and opportunities for the electricity system.

# Several Reasons Why Renewables Are Growing Rapidly

- The share of renewables is rising due to several interacting factors:
  - Policy and market forces are phasing out fossil fuels in society to tackle climate change.
  - Renewables are by far the cheapest to build and put pressure on the price of electricity\*.
  - It has become a security policy risk to be dependent on fossil fuel imports.
- As solar and wind power put pressure on the price of electricity, countries with a high share of renewables will gain a competitive advantage for their industries when they switch to electricity.
- According to a new report from the Swedish Energy Agency, Swedish industry is at the forefront of the transition.
- SKGS also points out that the industry needs 70 TWh of new electricity production by 2030.
- It is therefore important that Sweden maintains a favourable investment climate for wind power, which is the fastest form of power to be developed on a large scale.

\*Electricity price effect of wind power

# The Changes in the Electricity System Are Already Here

- Already today we can see the effects of the changing electricity system.
- The need for flexibility has become increasingly important as production and prices become more variable. This also affects behaviour and business models.
- ACER and the European Environment Agency, among others, describe in a new report that the developments require a more flexible energy system.
- Electric vehicles, batteries, solar cells and hydrogen are examples of new technologies that have emerged and will be an increasingly important flexibility resource to support the electricity system.
- These developments have also affected the stability of the electricity grid.
- To ensure the robustness of the electricity grid, Svenska kraftnät currently procures so-called ancillary services, primarily for frequency maintenance.
- Wind power contributes to frequency maintenance by regulating its production on the balancing market, especially for deregulation.

# Wind Power Is Already Helping to Stabilise the Electricity System

- In recent years, when wind power produces the most in combination with lots of sun or water, we have seen extremely low electricity prices and sharply rising balancing costs.
- Too much production in relation to too little consumption or export can also cause the frequency to increase beyond the authorised range of 50.1Hz.
- This requires so-called deregulation resources that operators can get paid for on Svenska kraftnät's balancing market.
- Historically, it has been hydropower that has contributed the most with regulatory resources, but the Swedish Wind Energy Association asked Sweco to produce two reports on the ability of wind power to participate in the balancing market and the barriers that existed.
- The main conclusions:
  - Wind power is already participating, and many more actors are preparing to participate.
  - Over the next few years, Svenska kraftnät will make several changes that will facilitate the participation of wind power.
  - There are challenges for wind power, including some technical upgrades for older parks, uncertain future revenues, and knowledge sharing about ancillary markets among wind energy actors.

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