

Statistics and Forecast – Q3 2023

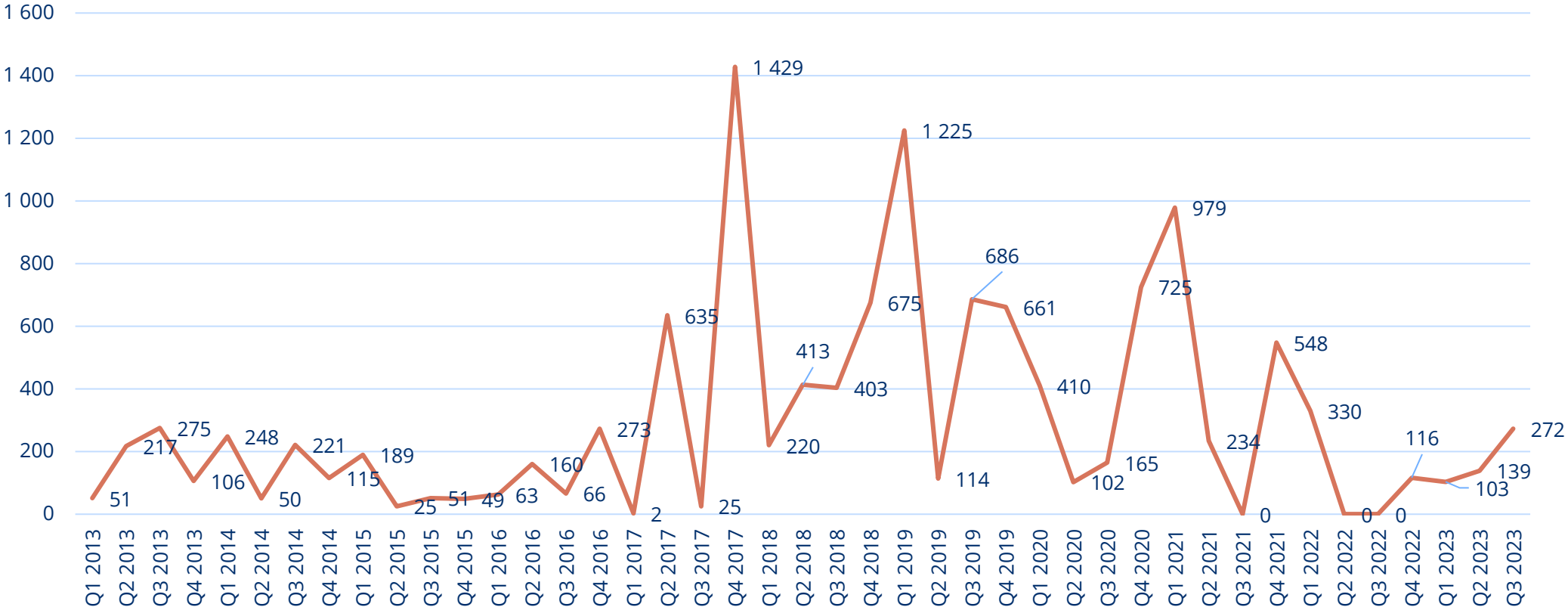
2023-11-08

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Electricity grid and market
073-025 78 46

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
					85	523	1,68	

New Turbine Orders, Megawatts (MW)



Commissioning, Megawatts (MW)

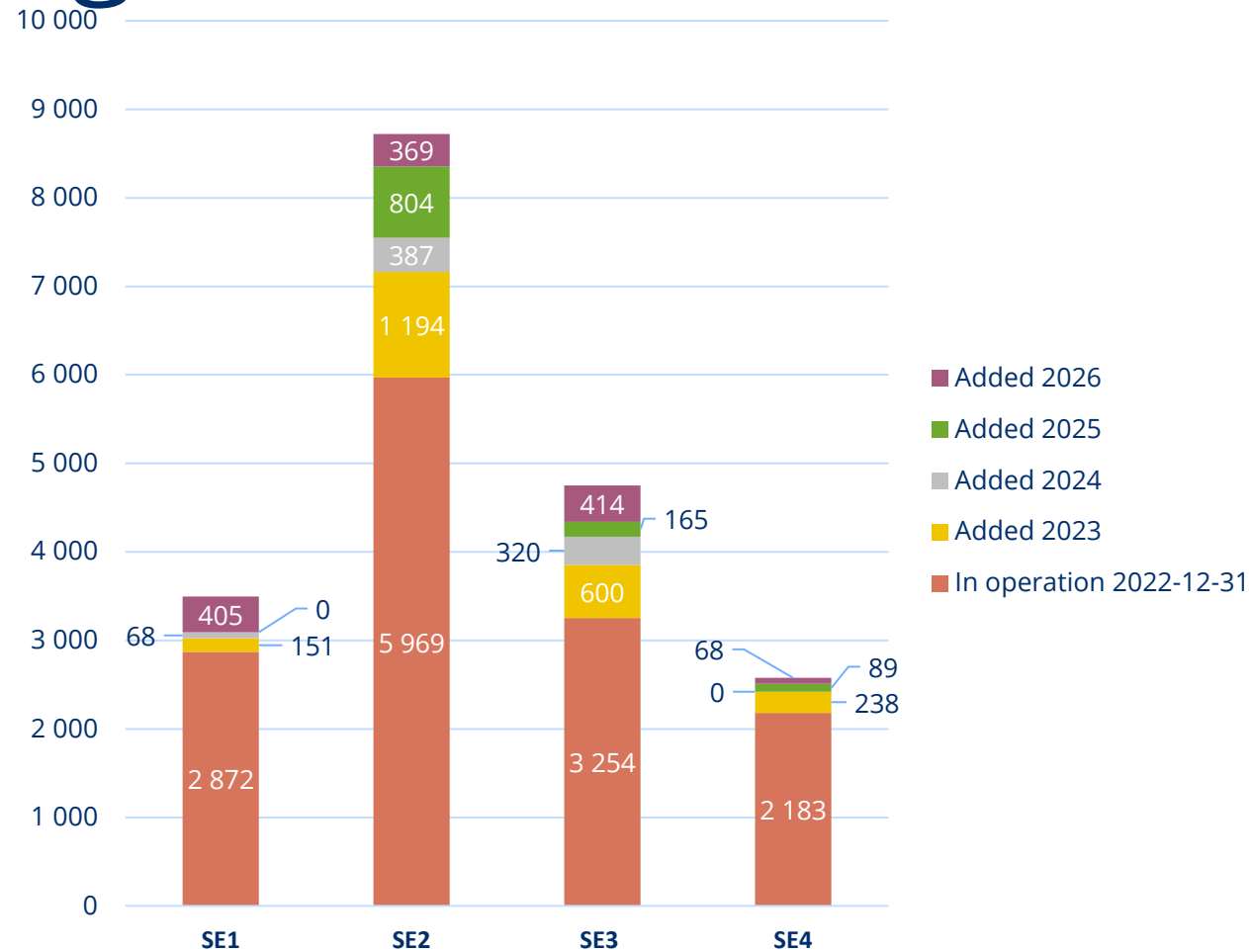
In commission 2022-12-31	2023 Q1	2023 Q2	2023 Q3	2023 Q4	2023 (Tot)	2024	2025	2026	In commission 2026-12-31
14 278	233	482	645	822	2 182	774	1 058	1 256	19 549

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
Skafståsen	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
Rosenskög	2023	3	19	0,06	Västra Götaland	Kölvallen	2025	42	277	0,92	Gävleborg
Björnberget	2023	60	372	1,24	Västernorrland	Dållebo	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
Stöllsäterberget	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
Karskrub	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						
								906	5 270	17,21	

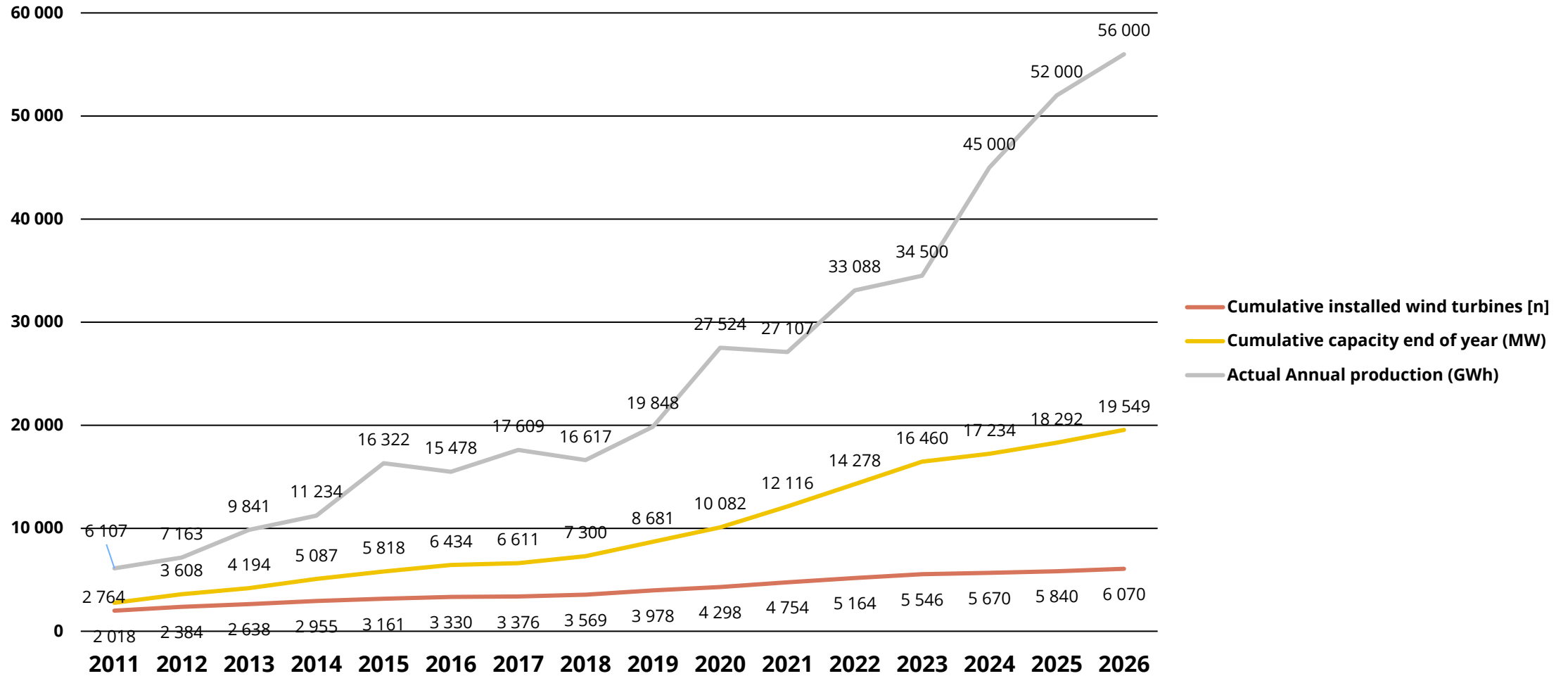
- Investment approx. 61 billion SEK
- Projects with turbines ordered
- Announced projects included with 172 WTG, 1 071 MW and 3,5 TWh

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

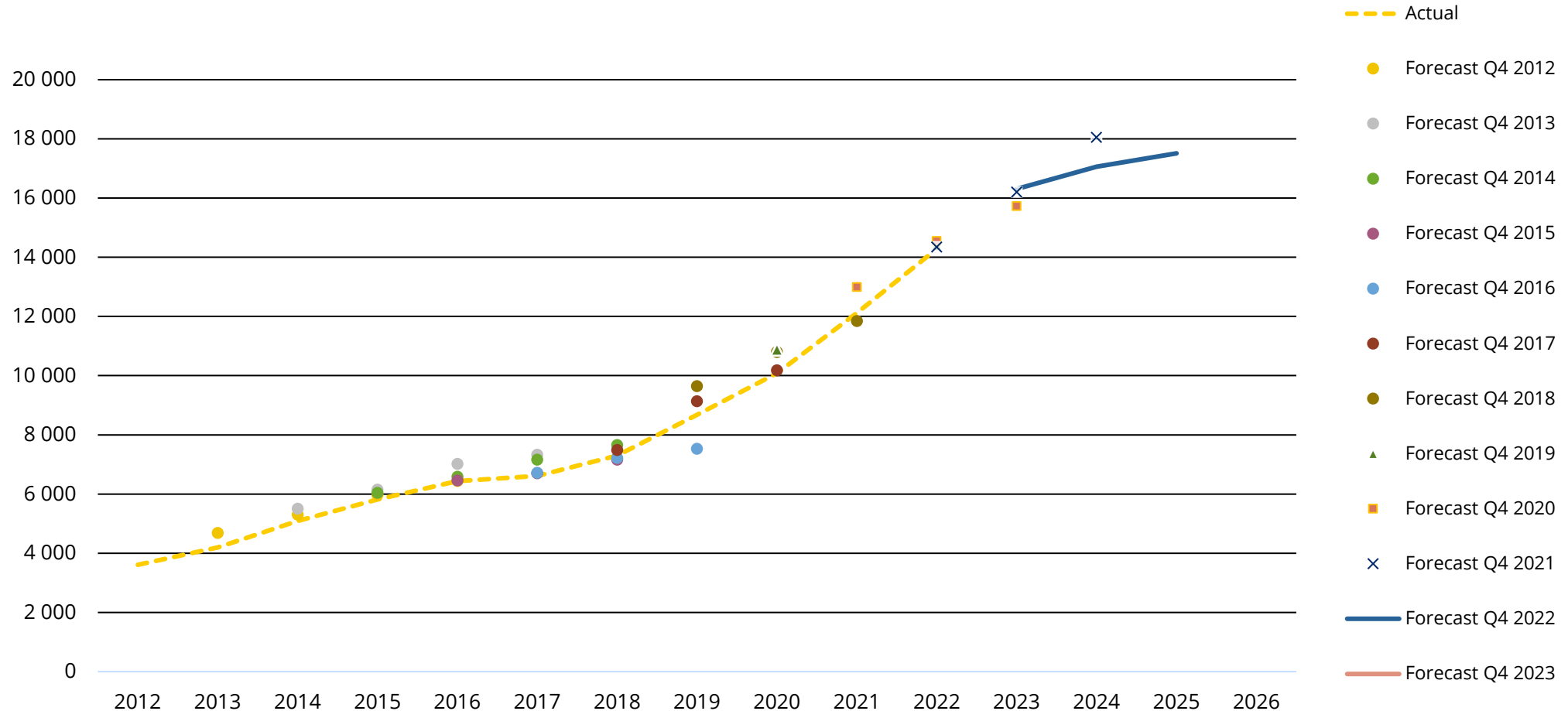


- Projects with turbines ordered
- Announced projects are included with 1 071 MW

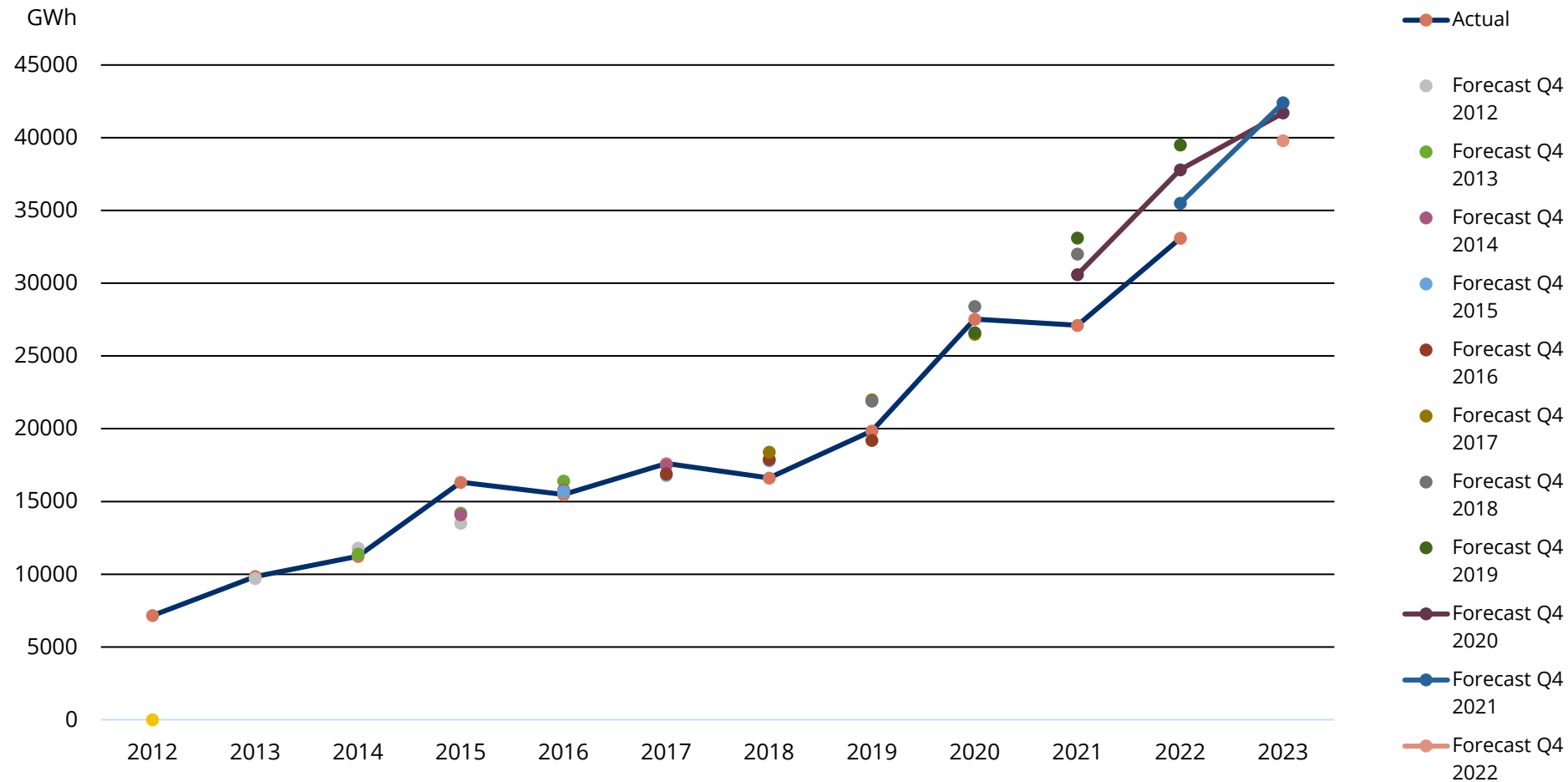
Forecast 2023-09-30



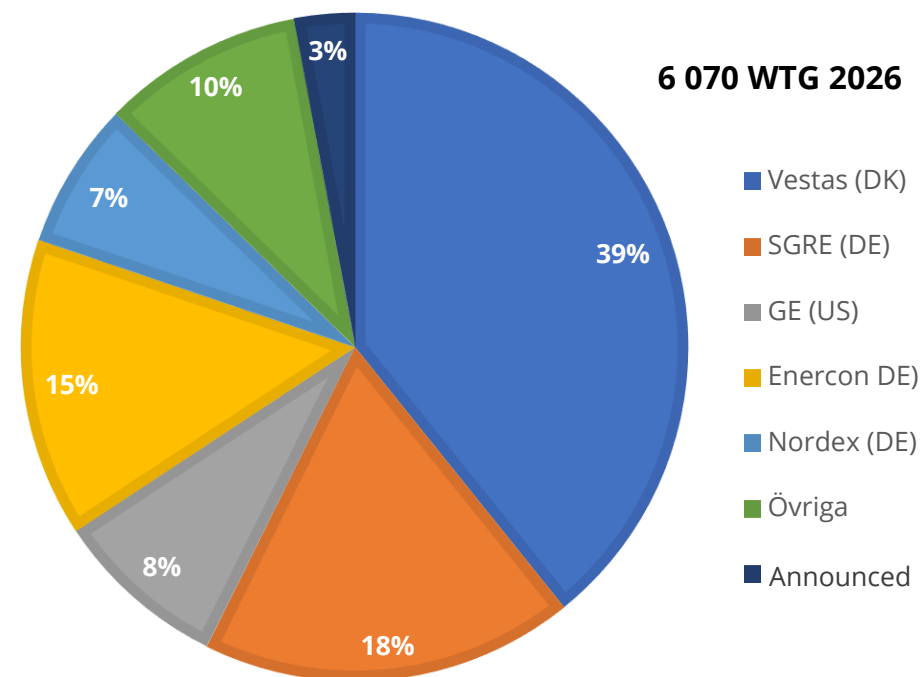
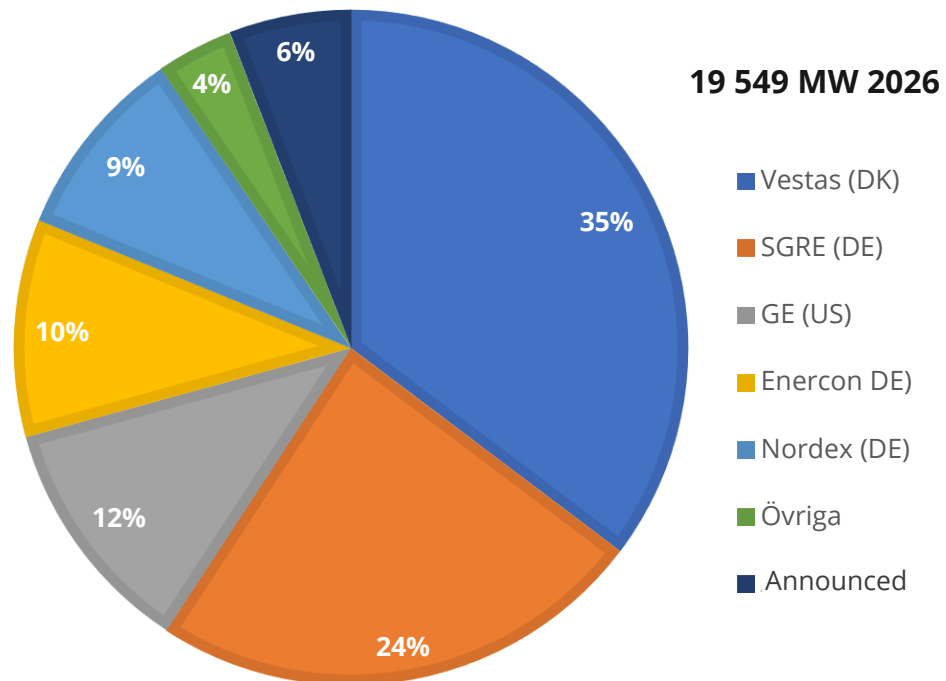
Follow-Up, Forecast vs. Outcome, Megawatts (MW)



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



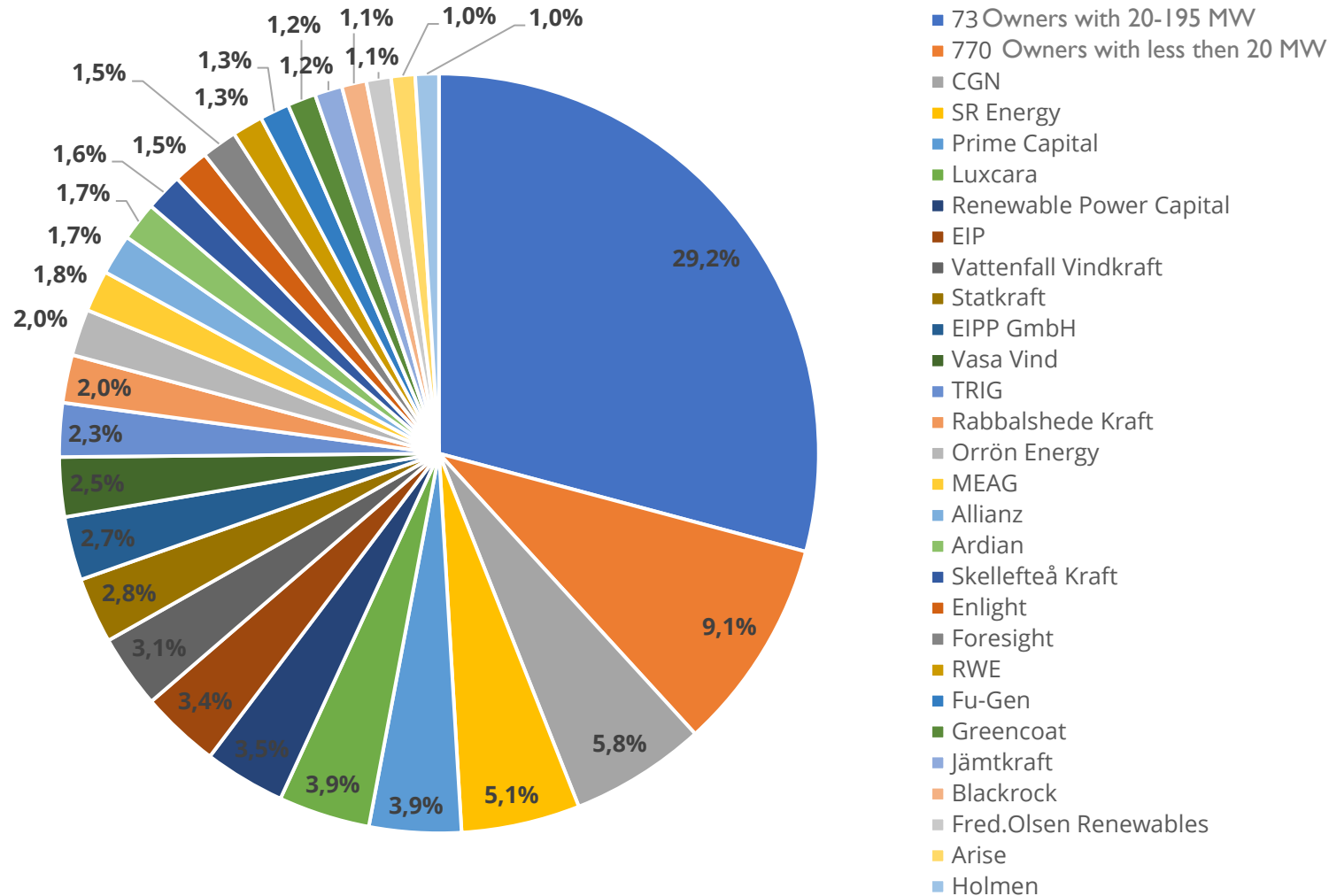
Market Shares 2026



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.

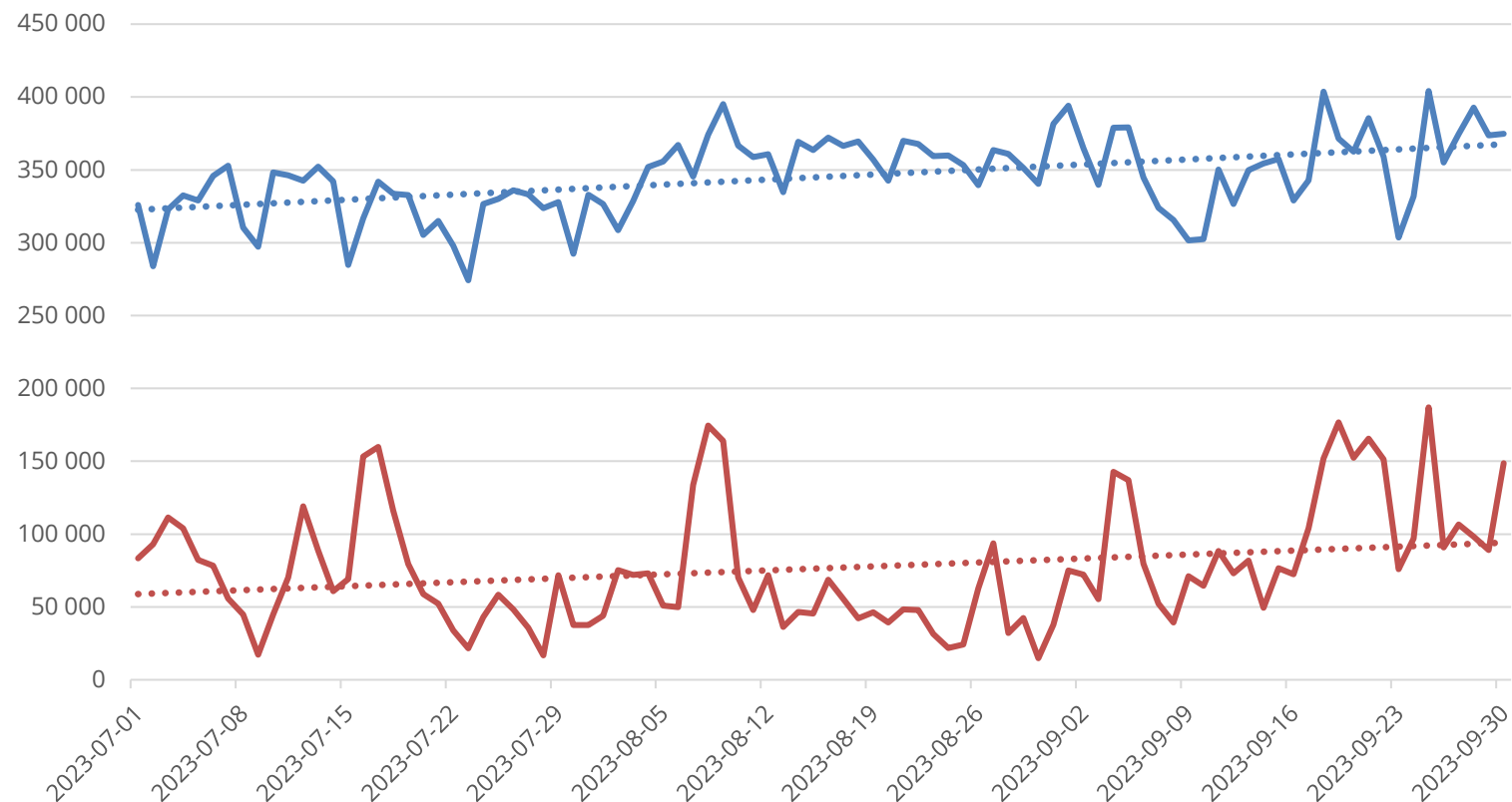
27 big owners, with more than 195 MW, will account for 62 % of the installed capacity 2026.

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 (GWh)
— Wind power (GWh)

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

Announced	Onshore	Offshore	Total
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.

With permits	Onshore	Offshore	Total
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.

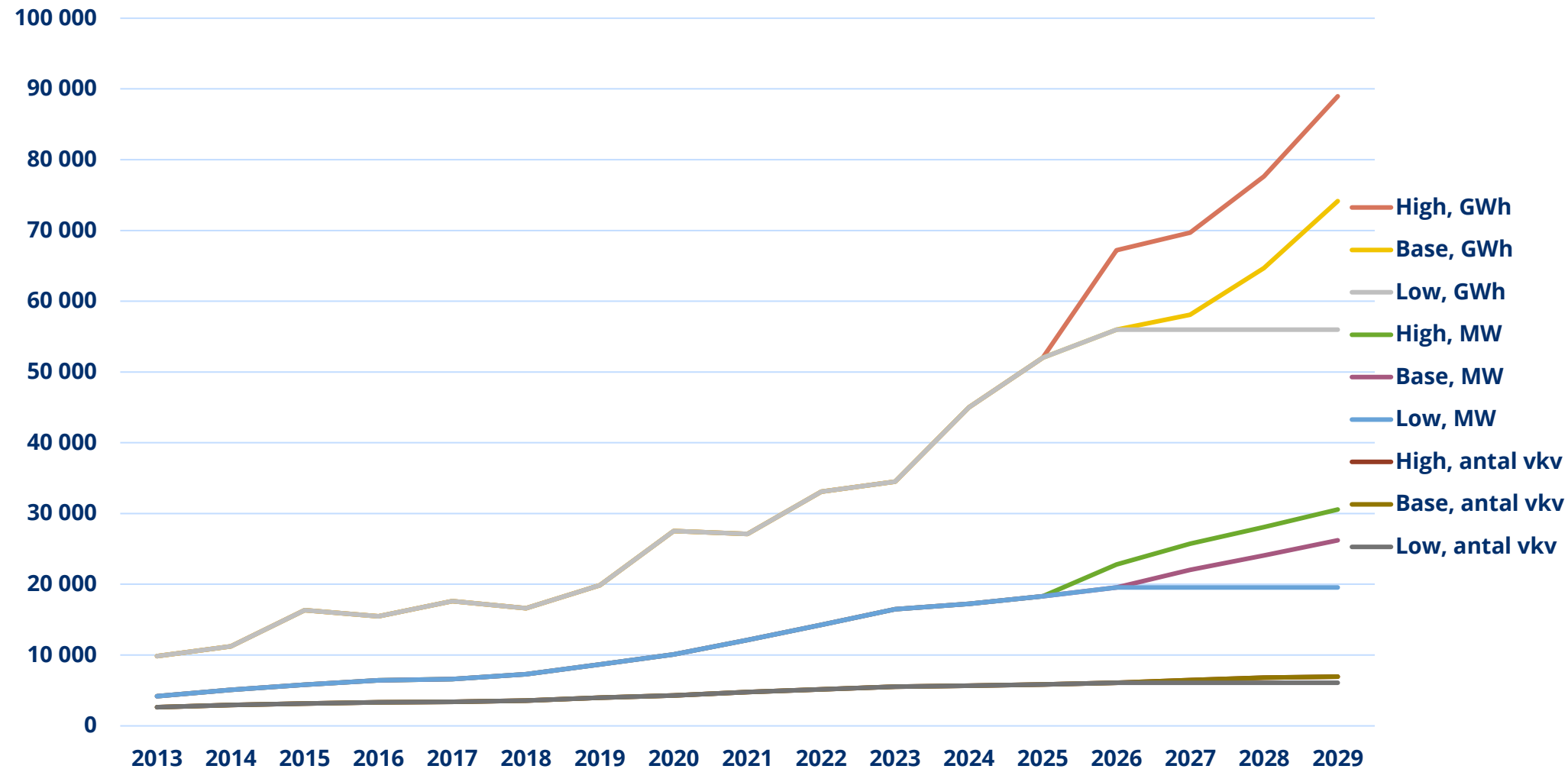
Projects under permitting review	Onshore	Offshore	Total
Projects	52	19	71
WTG's	873	2 364	3 237
Capacity (MW)	5 809	38 456	44 265
Annual normal production (TWh)	19,61	163,76	183,37

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.

Statistics and Forecast – Q3 2023

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