

Wind energy in Sweden – opportunities and threats

Almedalen 2009



- Potential
- Support system
- Financial crisis
- Local production

The projects under construction together with smaller projects and single WTG's are expected to contribute an additional 2 TWh of electricity before the end of 2010.

Today Sweden produces 2 TWh of wind electricity, some 1.5 % of the Swedish consumption

Vindkraftprojekt > 10 MW i Sverige

Status
maj 2009

Under byggnad

I drift

1. Ullabuoada 10 verk, 30 MW
Skellefteå Kraft
Planerad i drift 2009
Årsproduktion 0,085 TWh

2. Dragaliden 12 verk, 24 MW
Svevind
Planerad i drift 2010
Årsproduktion 0,070 TWh

4. Gabrielsberget 40 verk, 80 MW
Svevind
Planerad i drift 2010/12
Årsproduktion 0,24 TWh

6. Hörnefors 11 verk, 22 MW
Umeå Energi
Planerad i drift 2009
Årsproduktion 0,056 TWh

7. Storrön 12 verk, 30 MW
Storrön Vindkraft
Planerad i drift 2009
Årsproduktion 0,080 TWh

8. Havsås 48 verk, 95,4 MW
HgCapital/NV Nordisk Vindkraft
Planerad i drift 2010
Årsproduktion 0,25 TWh

12. Gällingegrund 10 verk, 30 MW
Vindpark Vänern
Planerad i drift 2009
Årsproduktion 0,075 TWh

13. Brattön 1, 6 verk, 15 MW
Rabbslshede Kraft
Planerad i drift 2010
Årsproduktion 0,036 TWh

17. Stentjärnsåsen, 5 verk,
10 MW
Wallenstam Energi
Planerad i drift 2009
Årsproduktion 0,03 TWh

18. Rätan-Digerberget 5 verk,
10 MW
Wallenstam Energi
Planerad i drift 2010
Årsproduktion 0,03 TWh

3. Bondön 14 verk, 35 MW
Global Green Energy
Årsproduktion 0,080 TWh

5. Blåkevära 16 verk, 32 MW
o2 Vindkompaniet
Årsproduktion 0,083 TWh

9. Heddöberget 1, 5 verk, 10 MW
o2 Vindkompaniet
Årsproduktion 0,029 TWh

10. Sällträdberget 8 verk, 16 MW
o2 Vindkompaniet
Årsproduktion 0,043 TWh

11. Saxberget 17 verk, 34 MW
Stena Renewable Energy
Årsproduktion 0,110 TWh

14. Laholm 12 verk, 24 MW
Arise Windpower
I drift 2009
Årsproduktion 0,070 TWh

15. Lillgrund 48 verk, 110 MW
Vattenfall
Årsproduktion 0,330 TWh

16. Hud 6 verk, 15 MW
Rabbslshede Kraft
Årsproduktion 0,036 TWh

19. Röbergetället 8 verk, 16 MW
o2 Vindkompaniet
Årsproduktion 0,047 TWh

20. Håcksta 5 verk, 10 MW
Umeå Energi
Årsproduktion 0,025 TWh

21. Hornberget 5 verk, 10 MW
Jämtkraft
Årsproduktion 0,03 TWh

22. Silkenhöjden 6 verk, 12 MW
Eolus Vind
Årsproduktion 0,03 TWh

23. Sotared 5 verk, 10 MW
Triventus
Årsproduktion 0,03 TWh

This map shows projects with all necessary permits in hand.

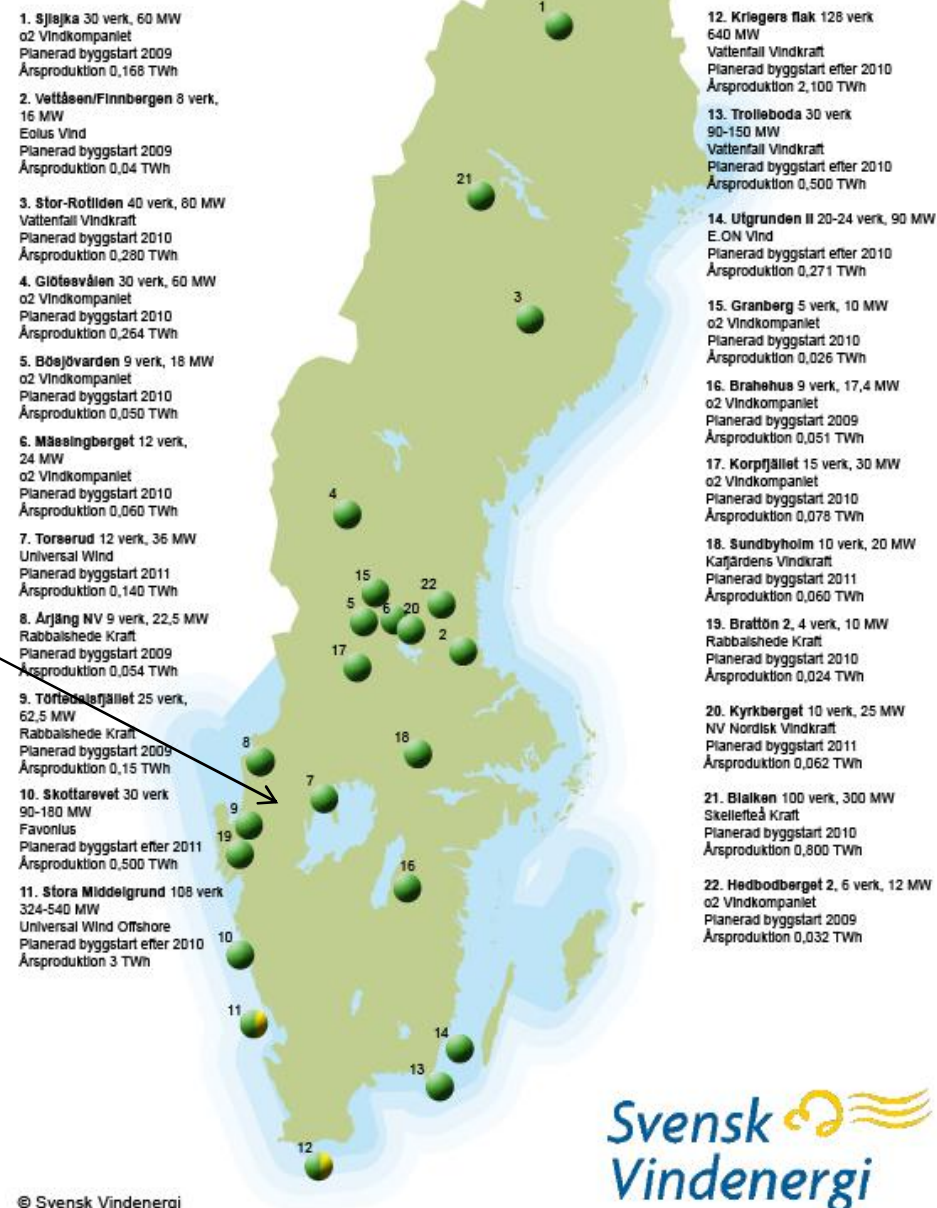
Due to the global financial crisis, most of these projects will face a delay in terms of financial close.

Almost all projects south of Lake Vänern are offshore projects and will only be built if the Government introduces a separate support system.

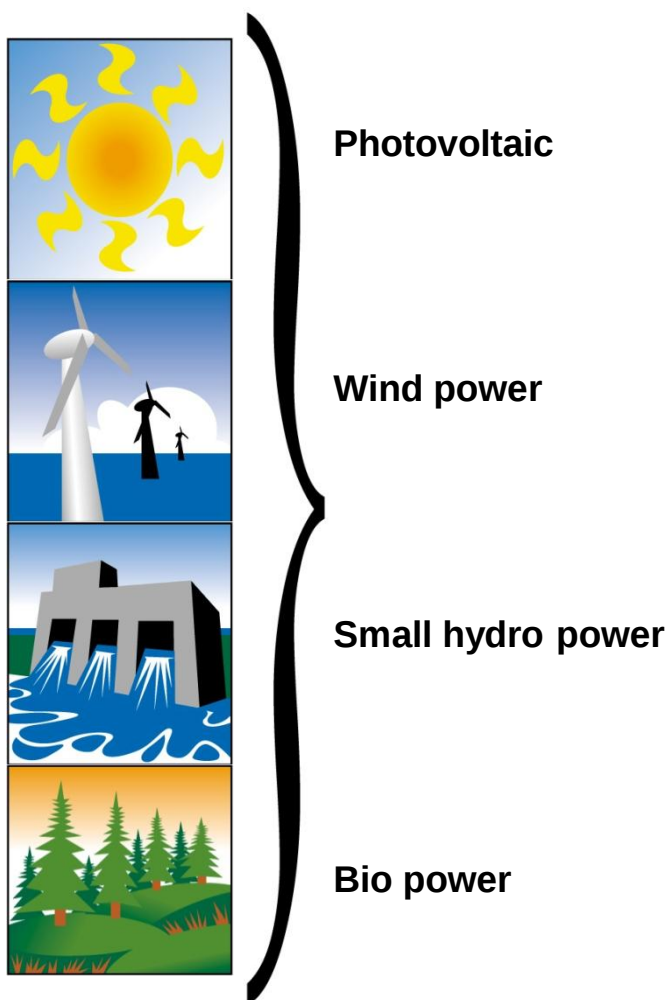
Vindkraftprojekt > 10 MW i Sverige

Status
maj 2009

- Med alla tillstånd/godkänd anmälan
- Tillstånd för park, ej för elanslutning



Support system 1



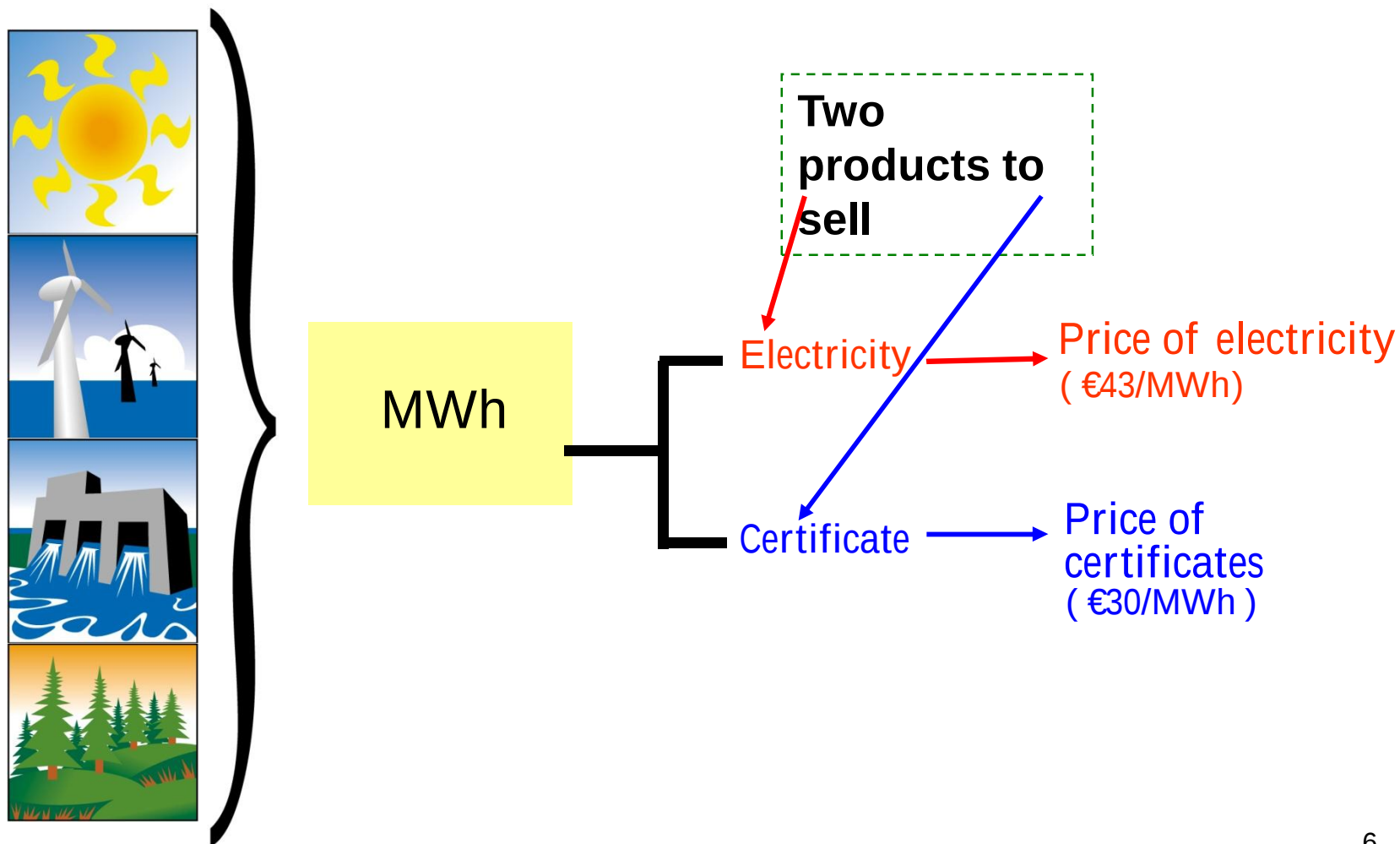
Every electricity wholesaler has to show at least a certain amount of these in their mix.

He does this by buying certificates from the producer

The amount of necessary certificates (the quota) rises up to 2016

Year 2016 Sweden will have 17 TWh *more* renewable electricity as compared to 2002

Support system 2



This example: €73 /MWh

Wind investment in Sweden

- Support system

- Tradable green certificate system since 2003
 - Works well and will result in 17 TWh new RES-E until 2016
 - About 7 wind, 9 biomass CHP and 1 hydro
 - The system will be extended in time and volume to generate 25 TWh RES-E until 2020
 - All of the additional 8 TWh will be wind

- Required investment

- Additional 13 TWh wind energy
 - requires about 5 000 MW installed capacity
 - Equals 2 500 2MW WTG's
 - 7.5 billion euro



The Financial Crisis

- All industrial sectors are affected
- Renewable energy sector will come out earlier than others.
 - "No money" available
 - The SEK has been devaluated against the €
 - Only the best projects will get funding
 - Developers try to postpone some of the projects.



The financial crisis

- Is global
- Cheaper wind turbines
- No waiting lists
- The not-so-good projects are ruled out



The targets will be met

- Swedes are very positive to wind power
- The government will do anything (almost) to fulfil the EU- directive of 49 % (50) renewable energy 2020.
- For this we will need some 15 TWh Wind Power.
- Some 5 000 MW, 3 000 turbines in 10 years



Local manufacturing

- Sweden has companies that play an important role as sub-suppliers to most WTG manufacturers
 - ABB, SKF, ESAB, Roxtec etc
- WTG manufacturers also produce components in Sweden
 - Enercon and WinWind produce towers
 - Vestas produces casting components



Local manufacturing

- The Government will support any company, foreign or Swedish, that wishes to establish a manufacturing base in Sweden
- Swedish industry is ready to enter into alliances
- The Swedish Wind Energy Association will warmly welcome and assist any company that wishes to manufacture WTG's in Sweden



Thank you
For your attention!

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Wind investment in Sweden

- Onshore vs. Offshore
 - We expect that the 13 TWh will all be built onshore
 - We will have 0.45 TWh offshore at end of 2009
 - Offshore development requires a separate support system that we currently do not have in Sweden
- The Nordic region
 - Investments in wind energy will also take place in Norway, in Finland, in the Baltic states as well as repowering in Denmark
 - The total new installed capacity is expected to be 15 000 MW onshore plus some 3 000 MW offshore