



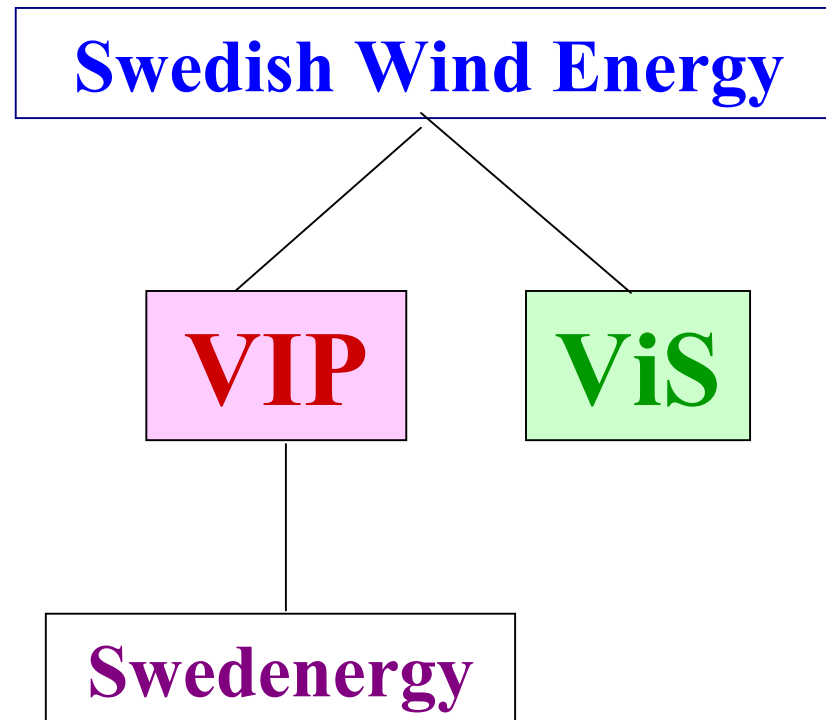
Wind Power Potential in Sweden

Presentation
at

Renewable Energy Conference:
Development and Sustainability

- The Swedish Wind Energy Association
- The potential and the projects
- Capacity and production targets
- Positive and negative in Sweden
- Support system
- The EU
- The wind industry
- The Baltics
- Recommendations

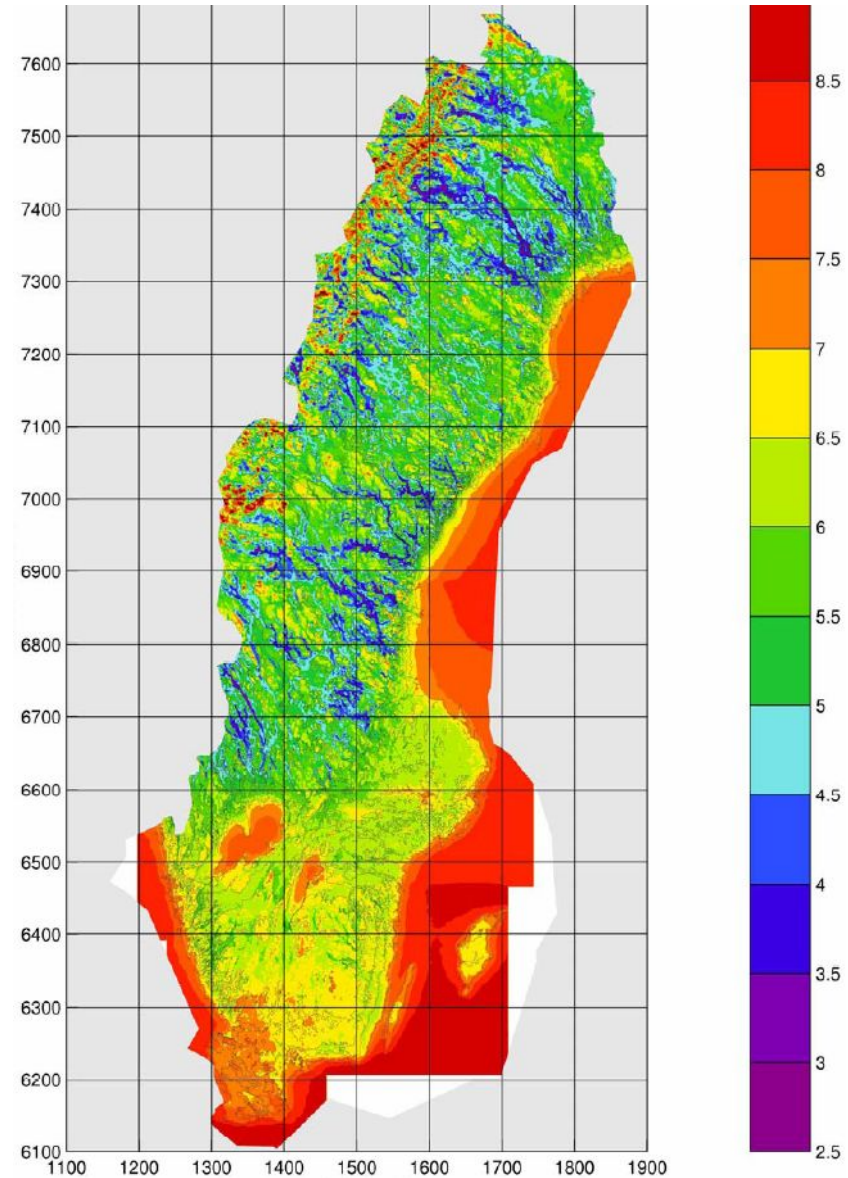
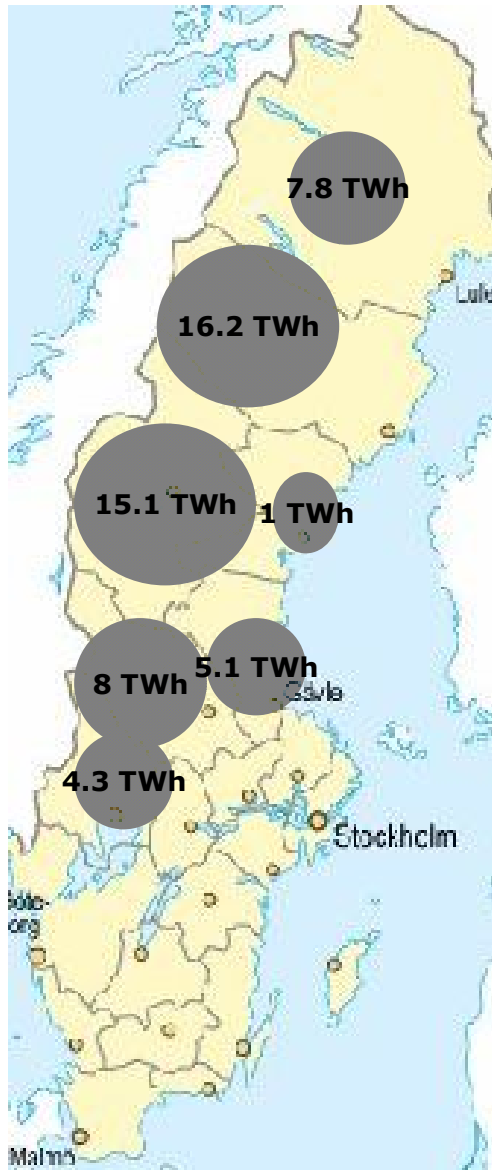
the wind industry in Sweden



Swedish Wind Energy has 72 member companies

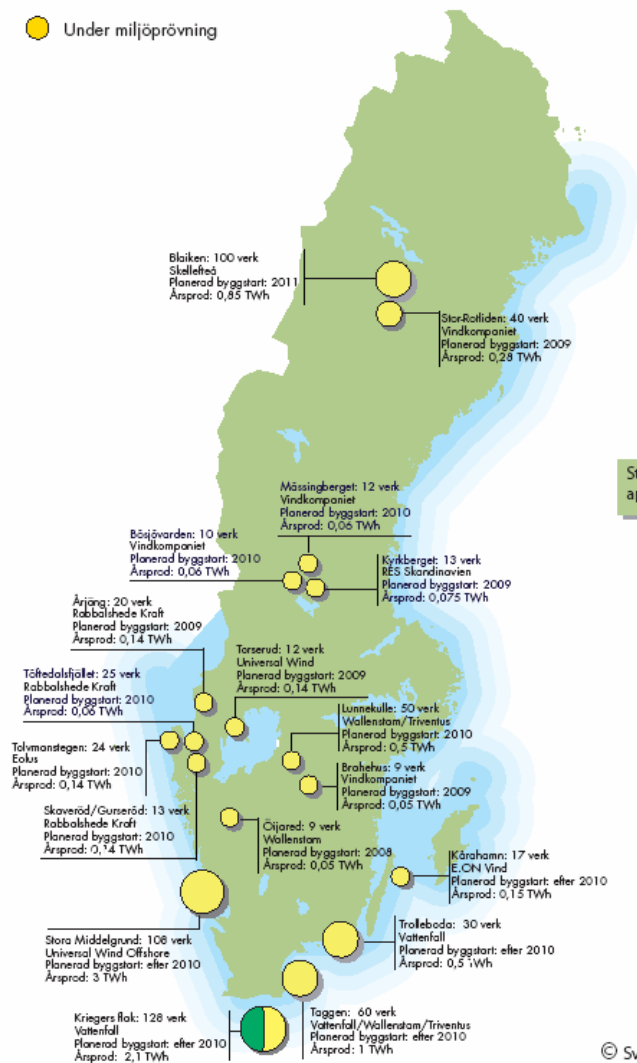
- 5 multinational utilities
 - Vattenfall, E.ON, Dong, Statkraft and Fortum
- 5 wind turbine manufacturers
 - Vestas, Enercon, Siemens, Nordex, WinWind
- 25 Developers
- 5 Financial investors
- 6 Municipal utilities
- 5 Banks
- 5 Law firms
- 14 consultants and sub-suppliers

wind power potential



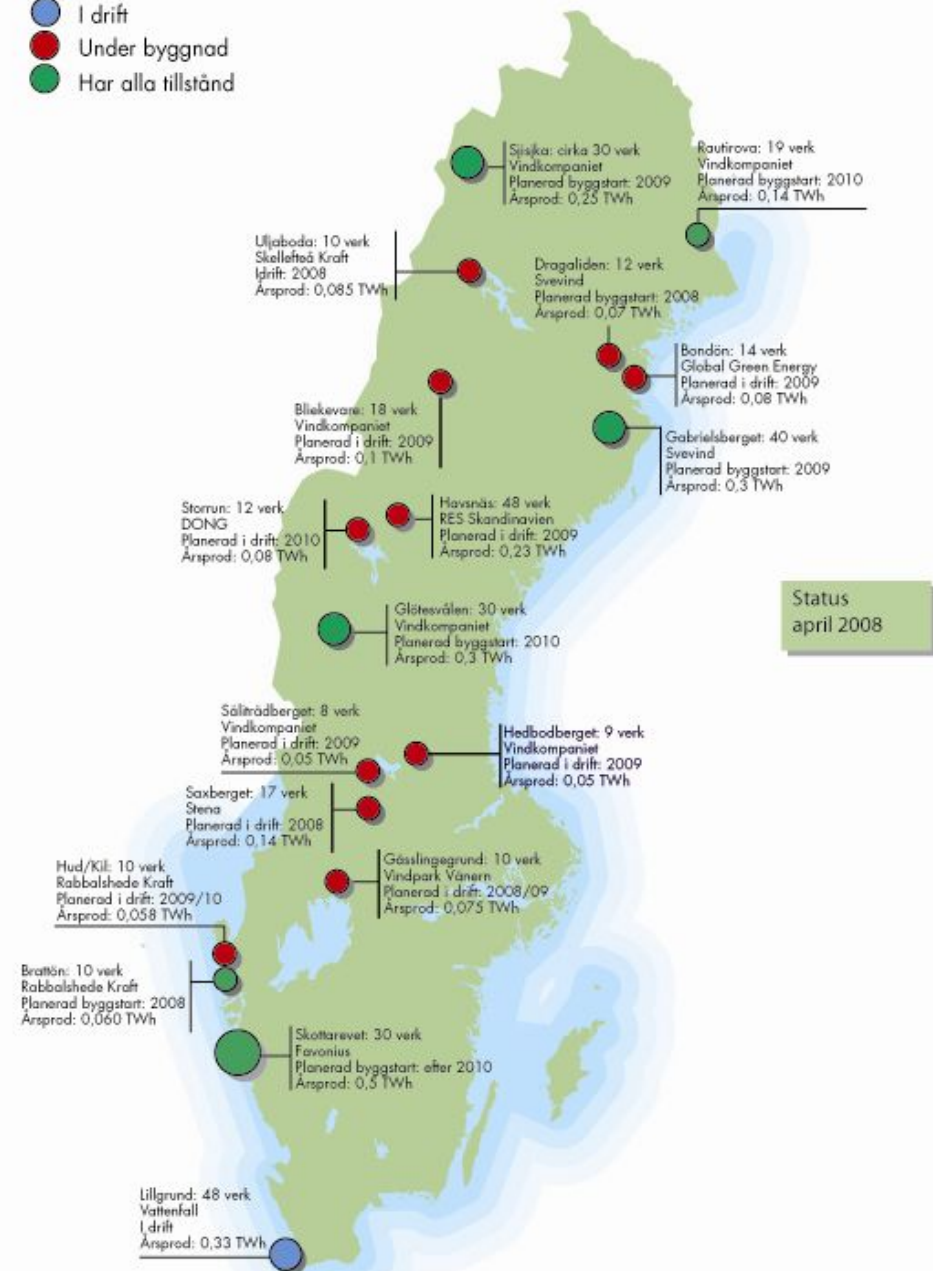
Vindkraftprojekt > 20 MW i Sverige

● Under miljöprövning



Vindkraftprojekt > 20 MW i Sverige

● I drift
● Under byggnad
● Har alla tillstånd



- In the years 2000 to 2006 only **50-60** MW were installed annually.
- In 2007 **217** MW was installed
 - Including Offshore wind farm Lillgrund, 110 MW
- In 2008 we expect **> 300** MW to be installed
- In 2009 to 2020 we expect **500-700** MW to be installed annually
- In 2020 the total installed capacity is expected to be **7 500-10 000** MW

- At the end of 2007 the wind power production reached **1,4** TWh
 - Equal to 1 % of power production
- At the end of 2010 we expect production from wind to reach **> 4** TWh
 - Equal to 3 % of power production
- In 2020 we expect production from wind to reach **20-25** TWh
 - Equal to about 15 % of power production

Positive and negative

- + Very **good wind speed** = very high potential
 - Up to 550 TWh at a cost below 6,5 €cents
 - Onshore wind speeds > 7 m/s
 - Forrest locations are being developed
- + Good potential for **offshore wind**
 - strengthens grid in southern Sweden
- + Strong **political consensus** for wind power
 - x-party support

Positive and negative

- Slow and cumbersome **permitting process**
 - Improvements are expected from 2009
- Complicated **appeal system**
 - Will prolong permitting period further
- Slow political **decision making**
 - Current support system will not be able to generate the necessary RE to 2020

Sweden has a **green certificate system**

- In place since May 2003
- Covers **biomass CHP**, **small hydro power** and **wind** power
- Aim is 17 TWh by 2016
- Increasing **annual quota** obligation
- High **penalty** for non-compliance
- **Good security** for bank project financing
- Electricity intensive industry excluded

- Sweden has the **highest target** of all EU member countries by 2020
 - 49 % renewable energy
 - Will add 40 - 45 TWh of new RE production
- Sweden will become a **net exporter** of CO₂ free electricity
- **Interconnectors** important
 - E.g. cable to Lithuania via offshore wind farm

- Sweden does not have a domestic WTG industry
 - Assembly of Finnish WinWind WTG's
 - Tower production for Enercon
- Sweden has a strong component industry
 - ABB (cable, generators, power electronics)
 - SKF (bearings, control equipment)
 - ESAB (welding equipment)
 - and many more

Swedish Wind Energy



Country	TEC 2005, TWh	RES of TEC 2005, TWh	RES of TEC 2005, %	RES target for 2020, %	Share of Wind for 2020, TWh
Sweden	416,4	166,0	39,8	49,0	20
Denmark	183,4	31,2	17,0	30,0	12
Norway	256,7	118,0	46,0	?	18
Finland	300,0	85,5	28,5	38,0	8
Estonia	36,9	6,6	18,0	25,0	2
Latvia	48,0	16,8	34,9	42,0	1
Lithuania	64,7	9,7	15,0	23,0	1,5

- Copy the Swedish support system!
 - Politicians set the volume target
 - The market sets the price
- Set a high but realistic target for wind power production in 2020!
 - At least 15 % of total electricity consumption
- Use your offshore potential
 - The EU will need all it can get!