Welcome to Markbygden, Sweden

Winterwind 2015-02-03, Piteå

Eva Sjögren, Sales, ENERCON Sweden

Agenda

- **ENERCON / market situation**
- **Markbygden/Skogberget**
- **Technology**

ENERCON: financial stability

EULER HERMES

RATING CERTIFICATE

Euler Hermes Rating GmbH
performed an extensive, neutral and independent evaluation
of the creditworthiness and sustainability of the

Enercon-Gruppe

The evaluation consisted of an analysis in all areas of the corporation including the financial situation, a market analysis, an analysis of strategy and corporate planning as well as management and organization.

In summary, Euler Hermes Rating GmbH assesses the corporate rating of Enercon-Gruppe based on information provided until June 2nd, 2014

EULER HERMES AA- RATING

The result of the rating analysis is documented in a rating report.

Hamburg, June2nd, 2014

Euler Hermes Rating GmbH

Ralf Garrn
Managing Director

Aloys-Wobben-Stiftung
Energie für die Welt

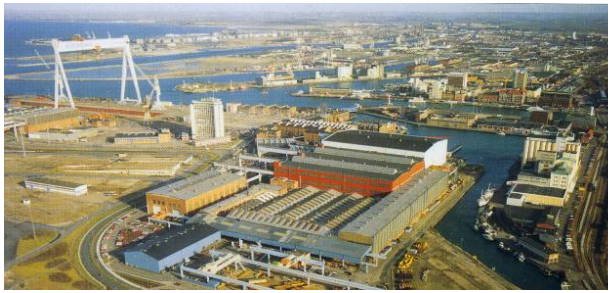
ENERCON in Sweden

ENERCON GmbH Germany Filial (Arlövsvägen 9, Malmö)

- Sales, PM, Site Assestment, Quality, Finance

ENERCON Energy Converter AB (Stenåldersgatan 19, Malmö)

- The Swedish service company
- > 150 employees
- ENERCON Training Center located at Arlövsvägen 9

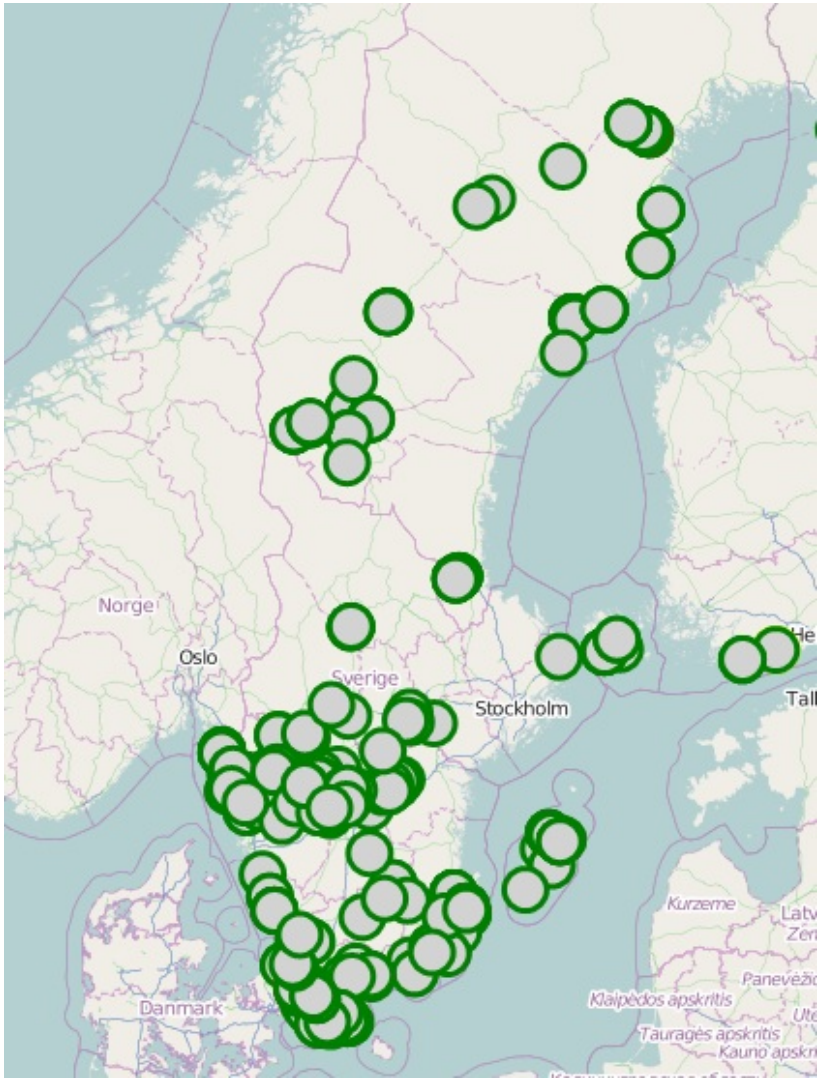


EWP – ENERCON Windtower Production (Malmö)

- Steel tower factory
- > 150 employees

ENERCON in Sweden

623 turbines / 975 MW



16 service stations

- Malmö (HQ och Lager)
- Eslöv
- Tomelilla
- Skara
- Falköping
- Kalmar
- Uddevalla
- Mellerud
- Askersund
- Östersund
- Nordmaling
- Piteå
- Falun
- Hede
- Sölvesborg
- Gotland

Project information, Markbygden

The project Skogberget is the first major part of the Markbygden project in the Norrbotten region, Sweden, close to the city of Piteå.

The wind farm consists of 36 x E 92 turbines installed on a 137m pre-fabricated concrete tower.

The scope for ENERCON is a turn-key /EPC solution including :

- Road works and crane hardstands
- Foundation construction
- Sea/ land transport and crane logistics
- Tower assembly+ WEC installation
- Wind farm cabling
- Part of the engineering and construction of 400kV substation
- Commissioning and Service of the power plant

Involved parties in the project - a salad bowl of international companies

The trades have been subcontracted to different international companies, all of them experts in their field and trade.

Access roads: BDX, Sweden

Foundation construction: Terraform, Germany

Windfarm cabling: Ramonat, Germany

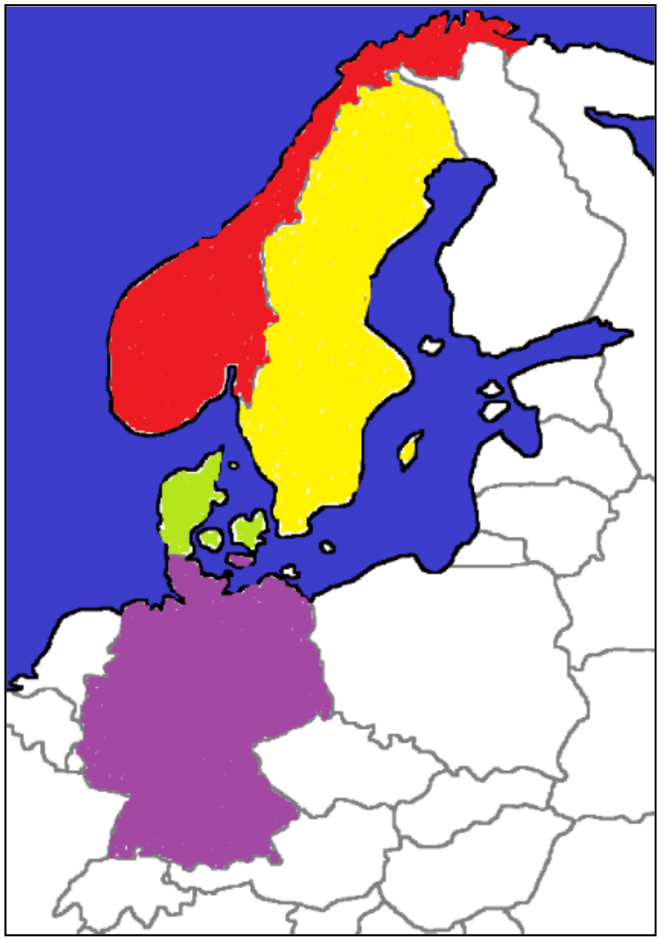
Substation building and engineering: ABB, Sweden

Transport: Uddevalla Specialtransporter, Sweden

Crane: a pool of experienced European crane providers

PCT assembly+ WEC installation: EU Montage, Denmark

WEC commissioning and Service: ENERCON



The project area of Skogberget

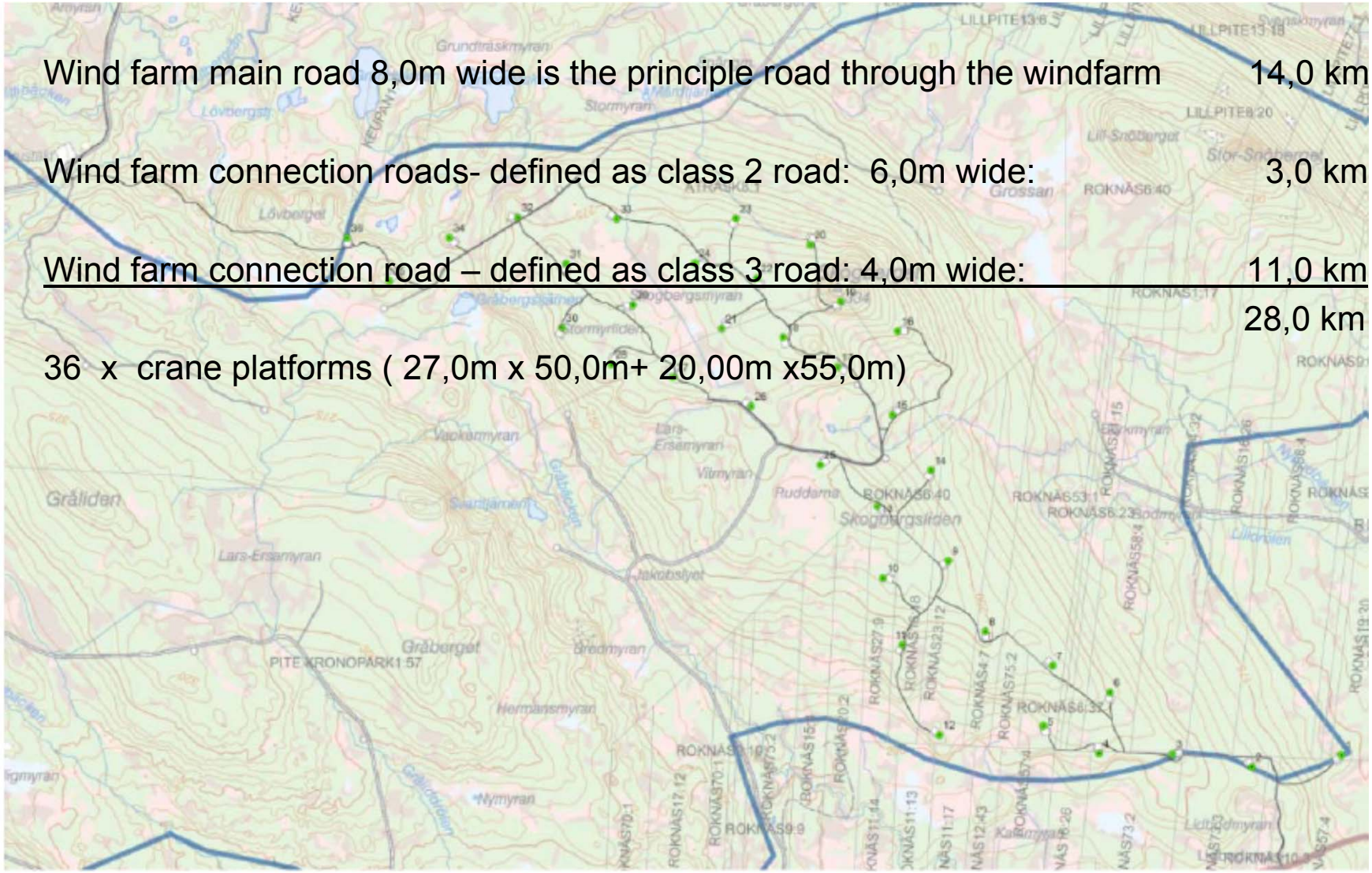
The project area is located in a forestal and slightly hilly area.

Tree cutting was necessary to allow the start of road works in autumn 2012.

Access roads and crane platforms

- Wind farm main road 8,0m wide is the principle road through the windfarm 14,0 km
- Wind farm connection roads- defined as class 2 road: 6,0m wide: 3,0 km
- Wind farm connection road – defined as class 3 road: 4,0m wide: 11,0 km

  28,0 km
- 36 x crane platforms (27,0m x 50,0m+ 20,00m x55,0m)



Foundation construction phase - on-site batching plant

To limit the traffic
to and on the wind farm
yard
the decision for
on-site-batching
was taken:

Productivity of the plant:
50m³/h

Gravel pit Lövberget - the local source on site

Gravel material for road & foundation construction, is blasted and crushed in the Lövberget gravel pit, located in the northern part of the wind farm area

Status:
>750 000 tons crushed and used by now (for Skogberget and Ersträsk)

Windfarm cabling

Cable trench lengths through wet land, moraine soil and rocky ground conditions : 26,5 km

Total cable lengths to install: 98,0 km

Substation construction - Råbäcken

General data/ voltage levels:

- Point of Connection at 400 kV Power Line
- Over Head Line Grid 130 kV
- Cable grid 33 kV

Milestones and timeline

- Substation: Start of Construction — April 2012
- Energization 400 kV switchyard — July 2013

- Energization 400/130/33 kV Power Transformer November 2013
- Energization 130 kV Switchyard November 2013

Råbäcken in construction - the transformer transport

Important milestone in September 2013:

Shipment of 300 t transformer from the Netherlands to Piteå Sandholmen with a Ponton

Ro-Ro operation: **Ro**ll on (the Ponton)- **Ro**ll off (the Ponton)

Transport to Råbäcken with a 16-axle special trailer.

Ponton at Piteå Älv

Roll off- operation

Turbines installed so far (Dragaliden and Skogberget)

E-82 E2

Rated power: 2300kW
Towers: 78m (119)
85m (126)
98m (139)
108m (149)
138m (179)
Wind class: IIA
SPL: 104 dBA

Cross sectional drawing of nacelle E-82 / E3

E-92

Rated power: 2350kW
Towers: 85m (130,6)
98m (144,3)
104m (150)
108m (154,3)
138m (184,3)
Wind class: IIA
SPL: 104,4dBA

ENERCON Cold Climate Package

If the wind energy converter is configured for the Cold Climate option, the parameter P2010 *Cold Climate* is set to *on* in the wind energy converter software. This changes the power curve as follows compared with normal operation:

The power curve during WEC operation is not affected at temperatures above -30 °C. Below this temperature, maximum wind energy converter power is gradually reduced to 25 % until a temperature of -40 °C is reached. At temperatures lower than -40 °C, the wind energy converter is stopped and remains ready for operation. It will be restarted as soon as the temperature has risen to -35 °C.

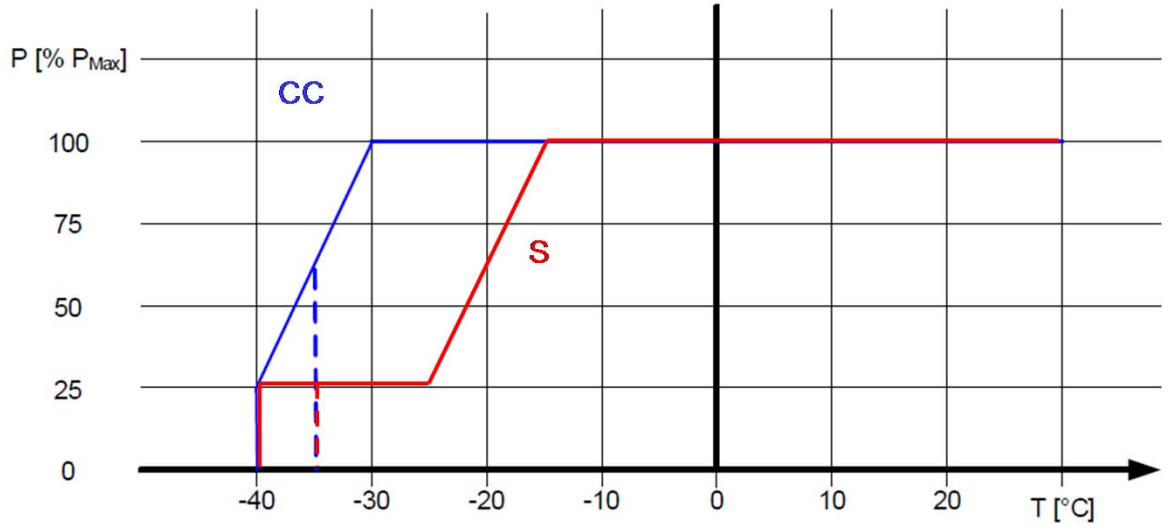
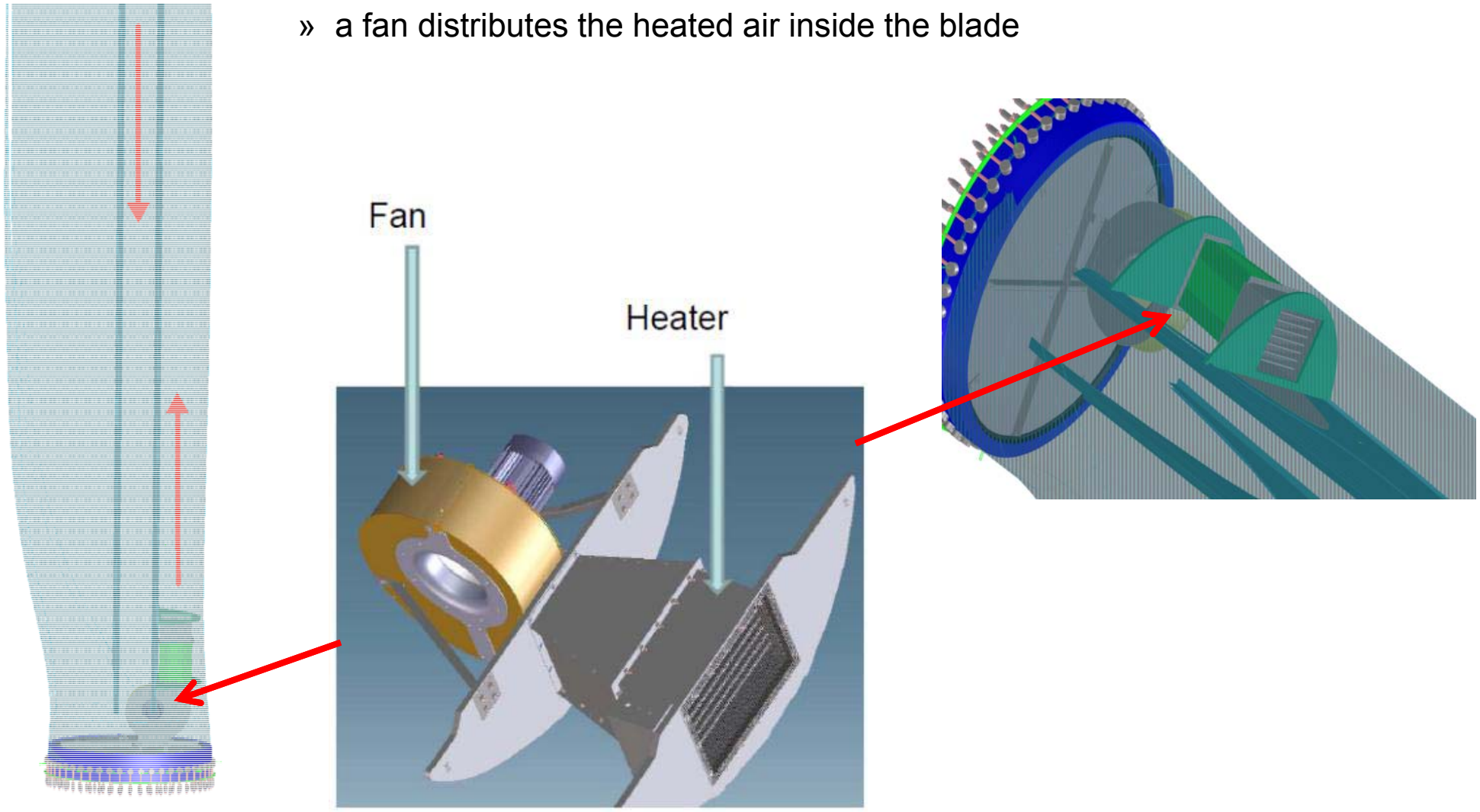


Fig. 1: Characteristic curve Cold Climate option

Hot air system

» heating elements heats up the air to a maximum of 72°C
» a fan distributes the heated air inside the blade



Summary

- Financial stability gives ENERCON a good rating AA- (summer 2014)
- > 37 000 MW installed capacity worldwide
- Skogberget – an important milestone for the Markbygden project!
- Local value in terms of jobs and resources on site
- Råbäcken – an unique substation with a close cooperation with SvK

Thanks a lot for your attention!

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