Baltic Windenergy Association
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Case study – Wind Energy

PROJECT: RES-CHAINS
PROGRAM: SOUTH BALTIC PROGRAM
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Windpark Gägelow

Summary

The wind farm is located in a terminal moraine area, shaped by the last ice age period, in the Northern German Federal State Mecklenburg-Vorpommern, only a few kilometres away from the Baltic Sea coast and the Hanseatic City of Wismar. It is named after the nearby located village Gägelow. The turbines are characterized by their gearless drive train and were manufactured by the companies Enercon and Vensys.

One particularity of the wind farm is that the group which comprises of six wind turbines was installed over a comparatively long period of time, from 2009 to 2012. There was an older wind farm next to the newly installed turbines.

The wind farm was planned, installed and handed over to the operator after commissioning by the project development office ZWE-Ingenieure GmbH resident in Wismar.

Site details

Start of operation (year):	In several stages from 2009 bis 2012
Location :	West of Wismar, Mecklenburg-Vorpommern, Germany
Coordinates (for the map):	53° 54’ N / 11° 58’ E

Manufacturing and installation (~Upstream)

What type of wind turbines has been installed?	1 wind turbine Enercon E70 2,3MW 1 wind turbine Vensys 70 1,5MW 3 wind turbines Vensys 77 1,5MW 1 wind turbine Enercon E702,3MW
What type of towers is used, how high?	1 wind turbine Enercon E70: tubular steel tower hub height 85m 1 wind turbine Vensys 70 1,5MW: tubular steel tower hub height 65m 3 wind turbines Vensys 77 1,5MW: tubular steel tower hub height 100m 1 wind turbine Enercon E70: hybrid tower concrete/steel hub height 113,5m
How has the turbines and the towers been transported form the manufacturer to the installation site?	All components were brought to the construction site by lorry. The longest items were the 35-metres-long rotor blades of the Enercon E70 and the tower segments with a length of 40 metres.
What type of foundations has been used?	Wind turbine Enercon E70 with hub height 85m: Gravity foundation of reinforced concrete Wind turbine Vensys 70 1,5MW with hub height 65m: Gravity foundation of reinforced concrete Wind turbines Vensys 77 1,5MW with hub height 100m: Gravity foundation of reinforced concrete 1 wind turbine Enercon E70 with hub height 113,5m: Gravity foundation of reinforced concrete
How long are the access roads being built or reinforced?	All public roads were accessible without modifications. As the accesses of the already existing wind farm were used in situ, only 1000 metres new pathway had to be built on the wind farm territory.
How has the grid connection been established?	Two cable routes had to be established newly: One with a total length of 6.500m up to the transformer station Wismar and a second one up to a 2,000 m distant grid connection point to the 20kW grid.
What the yearly production the wind turbine(s)? (MWh)	See: core process
How far is the transport on average, km?	The grid connection points are located in 2,000 and 6,500 m distance from the turbines.

Which way of drying is used?	No drying.
How is the storage organized?	No storage.
What's the duration of the storage?	No storage.
How many tons of fuel are delivered to the plant annually?	No fuels are needed here. The needed electricity is part of the turbine's operation costs.

Other important information

No important aspects not covered by the aforementioned question.

Core process

What's the total installed power? (MW)	4x 1,5MW, 2x 2,3 MW, 10.6MW connected power in total
What the yearly production the wind turbine(s)? (MWh)	An annual production of more than 22.000 MWh is expected.
What has been the technical availability? (%)	So far 99.5%.
What is the annual average wind speed at hub height? (m/s)	The annual average wind speed hub height is 7,2m/s (measured value)

Other important information

No important aspects not covered by the questions above.

Decommission (~Downstream)

Who is responsible for decommissioning?	The operator will be in charge of the decommissioning.
How will decommission be financed?	The decommissioning costs are registered in the relevant land register as construction charge (special procedure in
Will the site be completely restored?	in Mecklenburg-Vorpommern). In addition, a bank guarantee of the operator exists.
How will not recyclable material be handled?	After the end of operation, the wind farm will be disassembled completely up to a depth of one metre below ground, i.e. some foundation parts will remain inside the ground.

Other important information

No important aspects not covered by the questions above.

Environmental aspects

Environmental load from manufacturing, site preparation and installation.

The environmental loads related to wind farm preparation and installation were caused by the usual traffic loads related to construction, transport and crane vehicles.

All paths have been constructed to remain permeably.

What are the yearly emissions to air and water?
No regular emissions.

Environmental load from decommissioning

The environmental loads related to wind farm decommissioning will be caused by the usual construction, transport and crane vehicle motions as well as by the emissions caused by grinders, cutting torches etc.
When disassembling the concrete parts of the hybrid tower and removing the road ways related to the wind farm, temporary dust pollutions may occur.

Financial aspects

What are the overall investment costs and interest rate?	The overall investment costs are 16.000.000€ The interest rate is expected between 9% and 10%
What are the operational and maintenance costs?	
What is the total annual fuel cost?	No fuel used
Other costs?	No other costs
What's the estimated sales price of the electricity? (€/MWh)	950€/MWh
Other revenues? (€/MWh)	No other revenues
What is the life time of the wind turbines?	20 years life time with the option of prolonging the operation time – after related inspections of the turbine status – two times for five years each.

Other important information

No important aspects not covered by the questions above.

Summary

What's good and what's not so good with this installation.

Regarding the building aspects, the project was an excellent one: without problems caused by the subsoil or during the installation of the four wind turbines. Still, "obstructions by third parties" resulted into judicial litigation and, as a consequence, delays regarding project implementation.

Potential for replication, can this serve as a good example?

Technically, the wind farm can be considered as successful project.

Any suggestions for improvements, can the environmental and climate benefit be improved?

No.

More pictures of the installation.