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Wind Power

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Siemens' statement on the Swedish Energy Agency's report:

ER 2015:12 Offshore wind power

Siemens welcomes the Swedish Energy Agency's report on the Swedish offshore industry. It is an ambitious expert report covering most aspects of future offshore wind in Sweden.
As the major offshore wind supplier, in our comments we have focused on the areas closest to our skills profile, i.e. technology development and market considerations, our experience of the latter being based on our activities in all countries where offshore wind turbines are currently being built.

We have also chosen to comment briefly on Sweden's very favourable environmental conditions for deployment of offshore wind from a European perspective, as this is an absolutely fundamental consideration, albeit slightly beyond the present scope.
The following are Siemens' comments with regard to ER: 2015:12, concerning support for offshore wind energy in Sweden.

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General comments on the report

Firstly, and as a basis for this input, it is important to acknowledge that Sweden's unique environmental conditions put the country at an advantage in terms of production of offshore wind energy. Sweden has great potential for offshore energy production, and the offshore industry could play an important role in Sweden's future energy mix.
Siemens is in favour of a more European approach to the future energy mix, with production of energy where the conditions are best. Energy from offshore wind in Sweden could also be exported, utilising a future European transnational grid, and could constitute a substantial contribution to a future northern European energy mix.

In developed countries all new energy production requires the establishment of some kind of subsidiary system. The report's timeframe seems reasonable, as major changes in the energy mix require long-term planning. The establishment of a viable offshore wind industry will take at least seven to ten years, thus it is thus important that Sweden should come to a decision soon, as long-term planning, clarity and stability are crucial to the creation of an offshore energy industry and to attraction of investors.
Sweden could also benefit from a first-mover advantage in the Baltic Sea region (Finland, Poland, the Baltic countries), and could supply countries entering the offshore market with certain products and expertise. A future offshore industry in Sweden could also generate a substantial number of local jobs.

Specific comments on the report

1) Support system for offshore wind energy

Given the EU's state-aid rules, a tender procedure involving a 'sliding premium' is a model that seems to be gaining support in the majority of EU countries that are introducing or amending their existing support schemes. The design of the support scheme should provide investors and suppliers with predictable and long-term market conditions, and should create a cost-effective process. The system will also ensure that projects are implemented where they are most economically feasible, taking all the relevant considerations into account.
The selected tendering system also has a big impact on price. Roughly speaking there are two tendering systems: the Danish model and the UK model. Both models could work well on the Swedish market.
So far the Danish tendering system has resulted in the lowest prices. Besides being efficient, the Danish model has the advantage that the government can decide on the actual site of the wind farm, and hence harmonise the establishment of wind farms with the onshore grid investments.
A potential problem with simply applying the Danish model to Sweden would be that the Swedish government has already granted permits to some projects, and the owners have already started to develop these projects. It is thus important to consider the investments hitherto, so as to ensure trust in the government and show stability.
The projects that have already been developed are also a valuable asset for Sweden, as they can speed up the expansion of offshore wind. Ensuring that the projects already developed or in the process of development can gain permits or extend them will therefore be vital.

2) A trial run: could be a good start, but …

A trial run is a good idea in many respects. Market players gain a good understanding of the tendering system, and can be active and mobilise its resources, but it is crucial that the project be of a substantial size (300-500MW). Bigger projects are more cost-effective in terms of LCOE (levelized cost of energy), simply because building an offshore wind farm involves many synergies, e.g. planning, construction, operations and logistics. A small test run, however, will not reflect the true technical or commercial potential for offshore wind in Sweden. The current average project size in Europe is roughly ~340MW per project, but it is expected to increase to ~450MW by 2020.

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3) Grid connection

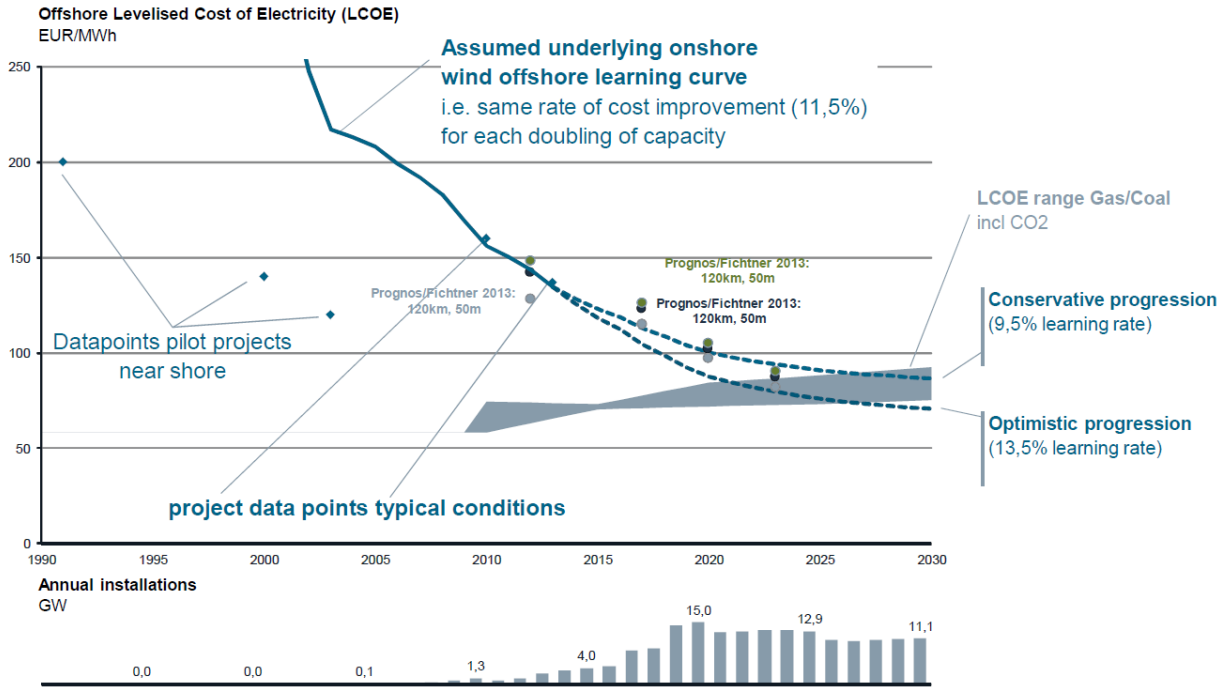
The report lacks a description of how the grid connection is to be defined, managed and linked to the overall project. There are big risks regarding grid accessibility and timely completion to coincide with that of the wind farm. One way of resolving this issue is to exclude the grid from the project and instead make a grid owner responsible. Different countries have resolved the issue differently, and the report lacks an analysis and a description of how risks are mitigated.

Common practice (except for the UK and Belgium) is for the grid operator to be responsible for development of the grid. In the UK wind farm owners are also responsible for creating the grid connection, which they later sell to the grid operator.

4) The technology: cost development for offshore wind

Compared with other renewable-energy sources, offshore wind energy is still a relatively young technology. A steep learning curve and significant cost reductions can thus be expected in connection with offshore wind in the coming years.

As the market's most experienced manufacturer of offshore wind turbines, Siemens is leading this development, and has committed to the target of reducing the LCOE for offshore wind to below €100/MWh for projects committed as from 2020, and sees the potential for €70-90/MWh for projects committed as from 2030 (see Fig. 1).
Fig.1. Source: Siemens, 2015



This forecast is in line with other studies e.g. that carried out by the Crown Estate, which predicts £100/MWh for the UK by 2020. Further studies e.g. Ernest and Young (March 2015) and Prognos/Fichtner (2013),), report similar cost developments.
Renewable UK's report Our Offshore Energy Future (2015) states that the offshore industry is in rude health, finding that the cost of offshore has fallen by 11% over the past five years. This finding has also recently been demonstrated by the Swedish power company Vattenfall's Horns Rev 3 project (400MW) in Denmark, which was awarded at the price of €103/MWh. This excludes the costs for a substation.

However, there are significant differences when it comes to the costs for an offshore wind farm, with factors such as water depth, distance to shore and weather all having a huge impact. Sweden, because of its environmental conditions, is thus in a very favourable position as regards offshore wind energy.
Conditions such as

- Shallow water and good soil conditions, which will reduce the costs for foundations and installation
- Close proximity to shore locations, thus lower costs for installation, the grid, servicing and maintenance
- Close proximity to load centres for potential locations in southern Sweden, reducing the onshore grid connection costs
- Less harsh weather conditions than in the North Sea, thus lower installation, servicing and maintenance costs thanks to less weather-related downtime
- Lower salt levels in the Baltic Sea than in the North Sea, thus less wind-turbine corrosion

will with margin compensate for the slightly inferior wind conditions in the Baltic Sea compared with those in the North Sea.

The above information indicates that Sweden's LCOE for offshore expansion will be below Siemens' general LCOE- reduction target for 2020 (€100/MWh), and might therefore also be below the estimate for 2030 (€70-90/MWh).

Conclusion

Overall, the situation regarding establishment of offshore energy production in Sweden is very good. In a comparison with more developed markets Sweden has unique and good conditions for offshore wind. Siemens believes that offshore wind will be an important component in Sweden's future energy mix.

Compared with other renewable-energy sources, offshore wind energy is still a relatively young technology. A steep learning curve and significant cost reductions can thus be expected in connection with offshore wind in the coming years.

If implemented, the subsidiary system outlined in the Swedish Energy Agency's report will enable the expansion of offshore in Sweden, to the benefit not only of Sweden and the Nordic region but probably also of northern Europe.

Kind regards

Hans Carlsson