Conditions for deployment of wind power in the Baltic Sea Region

- Project summary -

1. Key facts

Client: Baltic Sea Region Energy Co-operation (BASREC); Lead country: Sweden; Project manager: Jörg Neubauer, Swedish Energy Agency; Conductors: GL Garrad Hassan & Deloitte; Time of implementation: Dec 2010 - April 2012

2. Scope and objectives

The project aims to provide a strategic outline through the recommendation of concrete initiatives focused on co-operation within BASREC for the integrated economic promotion of wind power in the Baltic Sea Region (BSR).

With a focus on offshore, the project highlights technical and regulatory issues related to the deployment of wind energy in 2020 consistent with its expected contribution, as per national action plans, towards the EU 20-20-20 targets and other energy policy targets in the BSR. Furthermore the study reviews the technical potential and related actions required for the BSR region to go beyond the deployment expected in national action plans and target a world leading status in offshore wind energy deployment. The analysis of barriers and potential strategic initiatives for addressing these barriers is based on evaluation of potential production sites, grid integration possibilities and appropriate supporting regulatory frameworks.

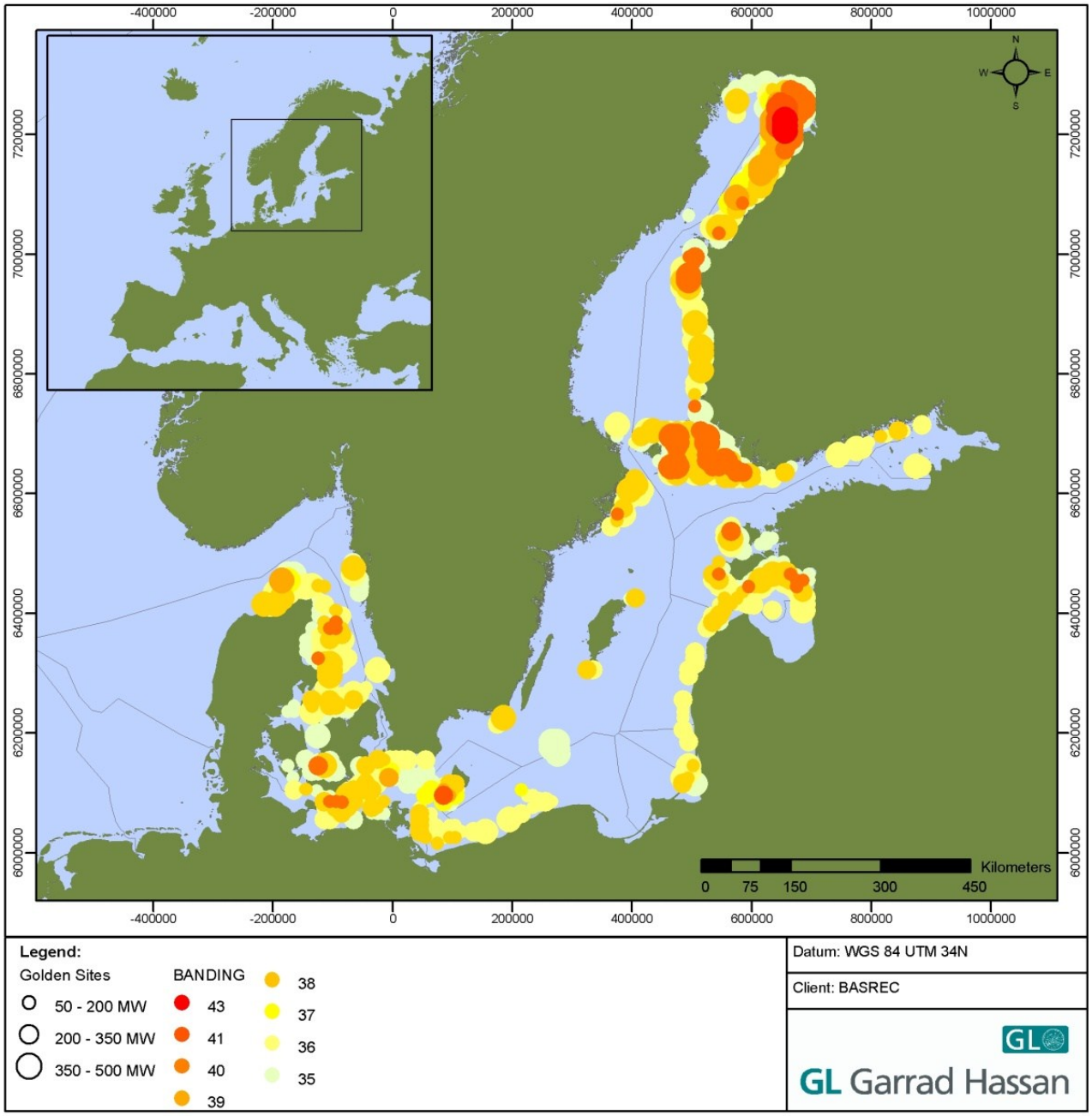
3. Findings

The offshore wind resource in the Baltic Sea Region is very large. Based on an initial evaluation of the three primary cost drivers for offshore wind deployment - namely wind speed, water depth and distance from shore - and utilizing current assumptions regarding turbine size and capacity density, there are space for approximately 300 GW of offshore wind energy capacity in locations considered attractive with current technology. The study found that accounting for estimations on known environmental and social constraints and then assuming a further 80% rate of attrition due to constraints not considered, there nevertheless would remain approximately 40 GW of capacity deployment potential.

This figure is sufficient to meet NREAP expectations (Scenario 1 in the Strategic Outline) in all countries considered and go substantially beyond in many. While substantial work on strategic environmental assessments and marine spatial planning remains to be done, it is clear that significant offshore wind resources exist to be exploited in locations which can be considered attractive by international standards within the BSR should the desire be there to do so. Indeed the

resource is sufficient for the BSR to be considered among the world leading regions for offshore wind power (Scenario 2) if appropriate actions are taken to enable this.

Figure 1: Overview of areas considered favourable for offshore wind



Note that there are significant issues involved with development of offshore wind in the southern region of Finland.

However, a number of strategic initiatives in transnational cooperation (cf. Strategic Outline) must be taken in order to turn the deployment of offshore wind into a macro-regional competitive advantage and meet the level of political ambitions. Many BSR countries are well underway fulfilling their 2020 NREAP targets; however four countries - Finland, Poland, Estonia and Latvia – earmark a substantial contribution from offshore wind within the next decade, but do not currently provide the necessary financial and regulatory framework for this to be achieved. The Strategic Outline makes recommendations for initiatives aimed at bridging these gaps.

If Scenario 2, the world leading region scenario, is to be achieved, the BSR would require a much higher degree of harmonization of policy and regulation, dramatically strengthen R&D, establish a common consenting approach and develop a BSR internal and external integrated grid.

The grid and interconnection study in the analysis identified that, including already planned transmission reinforcements and cross-country grid interconnections within the BSR, there will be sufficient transmission capacity for all countries to reach their NREAP expectations for wind deployment in 2020. Furthermore given the NREAP capacity deployment expectations, the level of penetration of variable wind power on synchronized grid networks in the BSR does not surpass those currently dealt with on other international networks and therefore should not present new technical challenges regarding system security and stability. However, development of additional offshore wind capacity above and beyond NREAP expectations will need additional transmission capacity and for some regions may require additional investigation on issues of system security and stability.

Undoubtedly there will in reality be scope for some transfers between BSR countries, but it appears likely that a substantial expansion of offshore wind generation in the BSR beyond the existing 2020 targets is possible only if (i) it replaces alternative local generation and/or (ii) substantial exports are made from the BSR.

4. Future work beyond the project (selection)

- Defining a common BSR long-term strategy and action plan for offshore wind deployment 2020 and beyond (e.g. 2030)

- Engaging in physical and virtual cross-country demonstration projects for offshore wind deployment (e.g. Gulf of Riga or Northern part of the Gulf of Bothnia) for dealing with issues particular to the region – specific suggestions are provided by the study

- Looking over financial incentive regulations and development cost structures for offshore wind farms for countries where NREAPs forecast deployment but such support is currently lacking (FI, PL, EE and LV)

- Initial environmental and social screening of the EEZs and coastal zones (FI, PL, EE and LV)

- More detailed environmental and social screening of potentially most attractive areas and sites (golden locations) through full SEAs and Marine Spatial Planning

- Further study into the interaction of potential additional offshore wind generation in the BSR with the hydro generation in Scandinavia, especially Norway.

5. Disclaimer

The content and result of this study does not necessarily reflect the opinion of BASREC. The analysis is designed for use in broad strategic planning purposes rather than a guide to the selection of specific future offshore wind project sites. Developing such projects in any given locality requires completion of substantial area specific environmental and social screening analyses which is outside the remit of this study.