

Project North Pole – Summary of parts of the Environmental Impact Assessment for Phase 1

1. Consideration of site location with respect to protected areas, etc.

Early in the process, the company identified different areas where the conditions for constructing the wind turbines were less favourable with respect to proximity to protected areas, wet lands, relics, etc. These areas were considered and excluded from being subject to the establishment of the wind turbines.

2. Air emissions

The wind farm contributes to reducing emission of greenhouse gas, sulphur oxides and nitrogen oxides. The construction and operation of the wind farm results only in low emissions to air and do not present any risk of exceeding current environmental impact standards.

3. Visual impact on the landscape

The wind turbines are located within an area which does not entail any especially unique natural values, either locally, regionally or nationally. There are certain places in the area which contain certain knowledge based values, some which are protected areas.

The greatest quality for the phase 1 area lies within its utility value as a recreational resource for both visitors and inhabitants. The recreational values are associated with the possibilities to hunt, pick berries, fish, bird watching, etc. which is provided by the large forest area, including the waterways and lakes etc.

The contemplated establishment of the phase 1 wind park will entail major changes to the landscape. Given that it is a large number of wind turbines, the turbines will be the dominant visual impression of the landscape.

Despite the grand scale of the landscape and its resilience for new features, the contemplated wind park will have a material impact on the landscape.

The forest roads which will be built will additionally divide the forest area but will also entail a greater availability. Overhead lines, with its line corridors, could be visually seen from far away, also outside the phase 1 area, as "lines" going through the landscape.

The wind turbines will cause noise and shadows disturbances, but could also be provided with light obstacles that could contribute to such disturbances. This will affect people's impression of the landscape and thus the attractiveness and utility of the landscape. The obstacle lightning will however be fitted with low intensity red

light to minimize the impact, and the high intensity light will be shielded. The noise will not impact any permanent residential areas or exceed the conditions set out in the Governmental permit for the Markbygden project. Furthermore, the rotor blades of the wind turbines will be painted with a matt colour to reduce reflections.

The characterization of the landscape will be changed with the wind park and the impression of the area will after a change demand mental readjustment of the persons adapting to the new environment. The area for phase 1 will get a new attractive value in a national and international aspect since people will come to the area to experience the large scale wind park. The local impact and change will however remain substantial.

4. Obstacle lightning

The mandatory obstacle lights will be visible and may cause disturbance for nearby residential areas. However, most of the turbines will be provided with low intensity red light to minimize the impact. The high intensive lights will be visible within five kilometres of the respective wind turbines. From a number of places around and/or in the wind farm, the lights will have more impact than other places due to the distance to the nearest wind turbine. The obstacle lightning will be designed as to meet the instructions of the Swedish Transport Agency. The high intensity light will also be shielded so that the beam does not hit the ground within a radius of 5 km

5. Reindeer husbandry

The direct impact on the reindeer herd's sustainability, as a result of the land loss caused by the establishment, is deemed to be small. The impact on the amount of pasture due to disforestation along power lines is deemed to be insignificant, since forests in the area have been heavily affected by forestry and the ground below the power line can continue to be used for reindeer bushes.

Certain indirect consequences on the reindeers can also be expected during the construction phase and the operational phase, especially if some animals have had a negative experience within the project area during the construction phase. However, any negative response from the animals to the wind farm area is deemed to decrease over time.

The construction phase will reduce the amount of available resources for winter pastures. This would result in an additional need of feed the reindeers later in winter.

Furthermore, during the operational phase, the wind farm causes changes in the reindeers' grazing manner, with the consequence that the need of feed during winter time may increase.

Finally, it is likely that significant practical problems will arise in connection to the reindeer husbandry, mainly because of the extensive road network that will be established in connection with the wind farm, which will entail more work and increased operating costs for reindeer husbandry. The overall consequence could be loss of profit for the operator of the reindeer husbandry business.

The company will continuously consult the same village and acquire information regarding implications to the reindeer husbandry in order to reduce the impact. In addition, some adjustment and compensation measures will be taken, including financial support for additional habits, additional feed during winter and additional operating costs.

6. Noise

The wind turbines emits noise. Close to the wind farm, the noise is perceived as varying in strength and frequency. However, at a longer distances, the noise is perceived as more uniform. The noise levels in the wind farm will amount to 45-55 dBA. The noise level from the wind farm at residential areas with permanent housing will not exceed 40 dBA.

The wind farm will be built in an area where the noise level is in general very low. The wind farm could be heard at a long distances. The wind farm will therefore mean that the natural experience in the area, including Svartliden's Nature Reserve and Roka wildwater, will be subject to disturbances from the noise.

The company has made the assessment that no buildings within or adjacent to the phase 1 area are used in such a way (e.g. used as permanent housing) that they are encompassed by the noise condition set out in the Governmental permit.

7. Shadowing and reflections

The rotor blades on the wind turbines may give rise to shadowing. Some adjacent buildings will be subject to shadowing that exceeds the condition in the Governmental permit (eight hours a year and a maximum of thirty minutes per day). Shadowing and reflections can also cause disturbance to visitors to the area.

The buildings subject to shadowing that exceeds the conditions in the Governmental permit are not for permanent housing and therefore not included in the condition in the Governmental permit. Furthermore, the rotor blades will be painted with a matt colour which will reduce reflections.

8. Birds

The project area is dominated by species which are common and widespread in the Norrbotten county. The prerequisites for the fauna are controlled by young specimens with low nature values. Hence, the establishing of phase 1 within the project area will, despite its size, only lead to minor consequences for the forest bird fauna than if a corresponding facility with the same size were to be established in an area with a higher density of nature values.

The wet land fauna in and in connection with the project area is concentrated to the wetlands and lakes in the Rokån valley. In the north western part of the Rokån valley there are some sensitive species, for example the bean goose (which is red listed according to the Environmental Protection Agency). In order to protect the wet land fauna in the Rokån, certain measures will be taken, such as establishing a buffer zone in which construction work is not allowed during breeding season.

Notwithstanding, certain breeding birds will be affected by the project area, especially the golden eagle (which will be further investigated). Also the capercaillie could be affected due to loss of habitat and disturbance. This has however not been confirmed in subsequent inventories.

Under the construction work it is likely that noise and other disturbances will affect birds. The noise during the operation of the wind park is considered only to provide lasting effects locally. The project area is not located within any migratory routes. However, a few birds may collide with the wind turbines, but the risk that the phase 1 wind turbines will entail any noticeable loss in the migratory bird population is considered to be minor.

The company will carry out adaptation measures which will include that the facilities will not use land within a buffer zone of 200 meter from Svartliden nature reserve or other areas pointed out as containing high nature values. North parts of Rokåns valley with Dragaträsket, Dragamyran and Roka waterways will be exempted from the establishment of wind turbines and electrical lines due to the presence of breeding birds.

The electrical grid will mostly be land lines, which will prevent any risk for birds colliding with the grids. Any overhead lines will be designed to avoid electrocutions of owls or predatory birds. If any bird's nests are found during construction, the supervisory authority will be consulted.

9. Bats

Bats are often affected by the establishment of wind parks. The biotopes in the project area for phase 1 are however mostly lean and characterized by hard forestry (i.e. pine forests with a large proportion clearing and young forests), why it is assessed that the bat population is very low. Bats are more often concentrated to areas closer to water and with environmentally richer environments. Bats have been observed in Kolerträsk (in the south end of Bänkerträsket), but otherwise very little is known about any bats in the area. Bats in the area are most certainly Nordic bats, that has spread as far north as the Arctic Circle.

It should be noted that subsequent investigations has led to a condition in the permit that wind turbines within a certain area of Markbygden must be closed down under certain circumstances due to the presence of bats. This area is however located outside the location of the wind turbines for Markbygden Ett AB.

10. Natural values

As wetlands are generally excluded for being exploited by the wind farm, wind turbines will mostly be built in forest habitats, which in turn means that many natural values are spared. The forest habitats are generally consisting of productive forests, characterized by forestry and deforestation. The natural values in forest habitats are thus generally small and, if present, can be relatively easily protected. Forest areas containing natural values have therefore been excluded from being exploited.

In addition to the fact that the forest natural habitats are few and small, most wetlands and wetland forests are highly affected by ditching and lack almost entirely natural values. Both affected wetlands and used forest areas can, however, have a value for the natural environment and the area's large-scale structural composition. The greatest effect for the natural environment is the direct loss of forest environments, the transformation of the landscape from forestry landscapes to wind farms and the increased fragmentation due to expanded road network.

The company has assessed that no impact from establishing the wind farm, such as blasting or earthwork, on environmentally valuable areas shall occur except in exceptional cases, which is then subject to a prior approval from the supervisory authority. Moreover, some safeguarding measures are also to be implemented in some particularly sensitive areas to ensure that valuable areas are not damaged.

11. Cultural environment

The company will ensure that thorough archaeological studies in the area are conducted as to examine if further ancient or other cultural history remains exists in the area. In addition, the exploited areas will be adapted to the extent possible, so that any remains are not damaged or disturbed.

Despite measures taken by the company, the establishment will change the structure of the landscape. This will mean that the subtle imprints from man since 9000 years of land use are at risk of marginalization. Remains from the first stone age settlements and shorelines under the high coastline are likely to be damaged.

The construction of the wind farm will most likely affect important connections in the historical development of buildings up to today's land use, in a negative way. The readability of the landscape will be complicated by the large number of wind turbines.

12. Risks for accidents

There is a risk of ice falling from the wind turbines, despite the fact that the company intends to install a de-icing system. However, the risk is very small in general and the risk of a person being hit by falling ice is considered to be extremely small.

13. Electromagnetic fields

The conduction beam will give rise to electromagnetic fields. The magnitude of the electromagnetic field depends on the voltage in the line and turns off in proportion of the distance from the center of the power line. The risk of exposure to magnetic fields is deemed to be proportional to the magnitude of the magnetic field and the time range exposed. The exposure will not exceed the recommendations of the Swedish National Board of Health and Welfare.

14. Outdoor life

The wind farm will contribute to an increase of noise in the area and the area will no longer be a road less natural area. The wind farm will further be heard at long distances, which affects the nature experience of fishing.

The heights of the mountains Storsnöberget and Lillsnöberget will be intact as no works are allocated there. However, the view from the mountains will change due to the presence of the wind farm.

The Nasa hiking trail will be affected by the establishment of the wind farm and the trail needs to be partially revoked.

Areas containing berries will be reduced and the interest for hunting in the area will decrease.

The wind turbines has been located in such a way that the most visited places are affected as little as possible.

15. Water emissions

The wind farm will only entail marginal emissions to water. Operations are not expected to give rise to any emissions exceeding the environmental quality standards for water applicable to salmon and mussel waters.

16. Other usage of land and water

A consequence of the establishment of the wind farm is that areas suitable for the forestry industry are reduced.

The proposed positions for the wind turbines have been communicated with the Swedish Armed Forces. Discussions are being held with Armed Forces regarding the conditions for establishing as many wind turbines as possible.

17. Health

In general, the wind farm will contribute to positive health consequences by replacing the energy sources based on fossil fuels. In the local perspective, the establishment of the wind farm has marginal health consequences. For example, the wind farm will accumulate jobs, but could lead to stress for the operators of reindeer husbandry businesses.

18. Social consequences

The wind farm will lead to a large number of jobs during the construction period, and for the smaller companies in the area, such activities can cause a significant financial boost.

19. Consequences during the construction period

During the construction phase, machinery and vehicles will produce noise. There will also be an increase in traffic during the operation phase due to service and maintenance.

Transports cause noise and to some extent damage. Transports generally lead to an increased risk of accidents and impaired road safety. This applies mainly during the construction phase.

During the construction phase, a large part of the area will be unavailable to the public. Furthermore, the road network may be damaged by heavy transports operating the roads during the construction phase.

The company will implement several safety measures to reduce the risk of accidents, such as placing warning signs and road gates.

20. Especially sensitive areas

After consultation with the County Administrative Board in Norrbotten County and the municipality of Piteå, three particularly sensitive areas have been identified. The company has developed alternative strategies aimed at highlighting the consequences for these areas under various alternative layouts. After considerations the company has found a layout for the wind turbines which will take into account the effects on these areas, and other natural values and aspects raised in the EIA, but also the efficiency in relation to the electricity production. The impact on the natural environment means, for example, that some areas with natural values will be affected by the establishment and the landscape character features in these areas will be adversely affected.

The overall assessment, however, is that the main option will not significantly affect the natural values or landscape in these particularly sensitive areas.
