

# Cold Climate Wind Energy in 78° North

**Hann, R., Veshniakova, L., Romero, M., Cicilio, P.R. (2017).**

Longyearbyen is a remote town near the North Pole at 78° N. The community is economically and historically built on coal energy. Causes and effects of the climate change go hand in hand here and give a taste of what may come for the rest of the planet. There is an opportunity to use wind turbines in Longyearbyen as a renewable energy source. High average wind speeds, high air density and all-year availability make wind a suitable candidate for a sustainable energy supplier in the Arctic. However, the cold climate and remoteness of the location brings several challenges which are discussed in depth. Atmospheric icing is an issue that can negatively affect wind power production and may even damage wind turbines. To mitigate this problem, icing protection systems have to be implemented in the turbine blade. The permafrost is a significant challenge for building stable foundations of the turbines. In addition, installation of the wind power plants is an issue that needs to be accounted for. This paper will look at three possible locations for a wind farm and discuss them with regards wind potential and practical challenges. Last but not least, an evaluation of the health, safety and environmental (HSE) impacts is included.