

Environment and territory

Advantages and limits of wind

However wind energy has some disadvantages. First of all it is an intermittent source, that varies with the seasons and from day to day. For this reason installing 100MW of wind turbines does not mean having 100MW power constantly available, but less power. The actual annual capacity is equal to 45% of the nominal power in the more windy areas, and an average of 30% on a global scale. In other words in order to have a power of 100MW available, 250MW must be installed.

Another problem that needs to be faced regards power transmission and distribution networks that the wind power plants are connected to. These must be designed to receive an intermittent medium voltage flow of electricity. The distribution networks that are currently present in the industrialized countries are designed in an entirely different manner, because these are connected to few large high-voltage wind power plants where the flow of energy is controlled and predictable. The different production of energy coming from numerous small scale wind power plants and also from other sources, requires suited and costly changes in the electricity distribution network.

Visual impact

The visual impact of an aerogenerator of a 40-60 metre tall wind power plant is obvious, but it can be downsized by building plants at a certain distance from the nearest urban centre. Today the visual impact is reduced by positioning the machines on a single row and using neutral colours (like white).

The lowest impact on the environment and landscape can be obtained by positioning the plants in the open sea, in places that are not visible from the coast. At the moment some less visible building solutions are being studied also with regard to installations on the land. It is possible to use chromatic tricks by painting wind towers with same colour as the surrounding landscape (for example the lower part could be green like the surrounding countryside, while the higher part could be light blue like the sky), or adapting shapes of wind plants to already existing structures.

Land occupation

The necessary land to build a wind power plant is generally wide, since the distance between the generators must be accounted for. From this point of view, the power density (10 watts per square metre) is rather low. However, if we consider that windmills and flanking works only cover 2-3% of the territory, the density grows to hundreds of watts per square metre and the space between the two machines can be used for cattle or rearing purposes.

Noise

The potential acoustic pollution caused by aerogenerators determines two types of noise: mechanical noise that comes from the generator and aerodynamic noise caused by the rotor blades.

With regard to noise, in terms of decibels, the humming of aerogenerators is far lower than town noise. The decibels that one can hear at three hundred metres from a wind farm are the same one would normally hear amidst traffic or near an industry. At the moment high-technology aerogenerators are very quiet. It was calculated that, at a distance of around 200 metres, the noise of rotation originated by rotor blades can be confused with wind noise that blows into the surrounding vegetation.

Electromagnetic effects

Possible interferences with telecommunication devices are irrelevant. Like any other obstacle, also the wind machine can interfere with telecommunication services, but a suitable distance makes the interference irrelevant.

Effects on plant and animal life

With regard to possible changes in plant and animal life, based on the available information, it has been reported that possible relevant interferences have been noted only with regard to the birds' impact with the machine rotors. Generally collisions are rare, and mostly limited to birds of prey. Migratory birds instead seem to adapt to the presence of these obstacles.

According to the US Fish and Wildlife Service the leading cause of mortality in the birds are cats (about one billion birds a year), followed by buildings (a little less than a billion), hunters (about 100 million a year) and lastly vehicles, telecommunication towers, pesticides and high-tension lines (each category accounts for about 60-80 million birds a year); the contribution of wind power plants appears to be an extremely modest fraction.

The impact on plants is noted specially when setting up the power plant, with the construction of roads and foundations, and when handling materials on site. Some measures are taken to reduce the impact on the territory, for example planting plants when the site has been completed, or compensating the impact with improvements in the surrounding areas, in order to have a positive overall balance.

Concluding, if some measures are taken when designing a wind farm, among all the energy producing industries, wind power plants are among the cleanest and safest. During operation they do not produce polluting substances, dusts and heat, even after they are dismantled, the former pristine state can be restored without leaving any traces in the environment nor on the people.