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# The impact of wind turbine generators on the landscape - Løgstør - Denmark

When preparing the wind energy development plan for its area, Løgstør particularly insisted on the need to reduce the impact of wind turbine generators on the landscape.

Target Groups	Sector	Field
<ul style="list-style-type: none"> <li>- Local authority</li> <li>- Regional authorities</li> <li>- Decision makers</li> </ul>	<ul style="list-style-type: none"> <li>- Energy supply</li> </ul>	<ul style="list-style-type: none"> <li>- RES</li> <li>- Equipment / appliances</li> <li>- Information</li> </ul>

## ANALYSIS

### CONTEXT

Løgstør (10600 inhabitants), is in the North of Jutland, on flat land bordering the sea.

Apart from the fashion for wind energy in Denmark, the number of wind generators has increased in areas with good potential, particularly Løgstør which already has a large number of small 75 kW wind generators, often intruding visually into the landscape.

This intrusion has led to local opposition linked to the impact on the landscape and the noise level. The municipality has therefore taken the opportunity of this wind energy development plan to review its policy.

The Jutland regional authorities have drawn up wind energy development plans specifying the strategic locations where wind energy projects can be installed, as well as guidelines for designing wind turbines and distributing production capacity between the various areas.

The regional plan for North Jutland shows that Løgstør must devote 14.5 MW to wind energy in its area.

## DRAFT PLAN

Løgstør has drawn up its wind energy plan, taking regional planning directives into account.

The planners had to identify the host sites from potential sites with adequate wind speed, then eliminate those which were unsuitable according to the following criteria: the site's ecological status, landscape, noise, presence of high voltage lines, proximity to housing etc.

In Løgstør, independent consultants performed a specific study on the visual impact of wind turbines and recommended a list of sites with characteristics which would help them to be better integrated into the landscape and for which local plans should be drawn up.

These plans define the areas where wind turbines can be installed: location, maximum height, power, etc. They include photomontages of the machines proposed.



SITE PLAN TAKEN FROM LØGSTØR LOCAL PLAN N° 90

## COST AND BENEFITS

A number of these sites have been defined with the aim of replacing existing wind generators which are poorly placed or badly designed. A maximum mast height of 42m has been imposed, except for the biggest site where a height of 46 m is accepted. This plan brings the number of wind turbines to 39, plus the 36 already in operation, although many of the existing small wind turbines must be replaced.

Løgstør is in a flat part of Denmark with very little in the way of hills, so that wind turbines are particularly visible. Assessment of their visual impact is, above all, a question of aesthetics.

The plans are regularly reviewed. The previous Løgstør plan was only approved three years previously, but at that time, the most modern wind turbines were only 150 kW. Now 750 kW models are standard and 1.5 MW units are common.

This considerable increase in the power of wind turbine generators means that their height has more than doubled in five years. This height is an essential criterion and the way the plans are prepared has to be adapted to these new data, with heavy demand and constant technical progress meaning that plans often reviewed almost as soon as they are completed.

## PARTNERSHIP

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A consultation process has been set up on the basis of specific studies performed by consultants. A working group consisting of representatives of associations has been set up by the municipality to discuss the wind energy policy (e.g. whether or not to install large or small wind energy groups, the maximum size of the units, etc.).

The group has also met with the owners of wind turbines on unsuitable sites, to see if they would like to reinstall them elsewhere.

## RECOMMENDATIONS

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The plan accepted suggests four scenarios:

- Total height of wind turbine generators is limited to 70 m near the coast, 75 m inland and 50 m near airports.
- The minimum distance from residential areas is set at 500 m in the urban area and 300 m from isolated houses. Wind turbines or groups of turbines must also be at least 2 km from each other.
- Small 35 kW wind turbines reserved for personal use are normally authorized but must respect a noise limit of 45dBa in residential areas.
- Local churches also pose a problem. There is a Danish tradition according to which the bell towers of neighbouring village churches must always be visible from the other village. Consequently, it was decided that no wind turbines could be located less than 500 m from these optical lines, but voices were raised and this distance was extended to 1 or 2 km.

The wind turbine plans finally accepted clearly define the sites which can host new wind turbine generators, so that there can be no conflict when a promoter comes to file a claim. The procedure takes place in stages, in a clear context so that the stakes at hand and national and regional interests are well served throughout the procedure.

However, these plans raise the question of knowing whether local authorities should be allowed to define the exact location of wind turbines and their power, since these criteria both affect the profitability hoped for by the site promoter.

## TO KNOW MORE

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## USEFUL INFORMATION

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List of Publications

<b>WIND TURBINES IN HARMONY WITH THE LANDSCAPE /</b>	<b>Technical Department - Municipality of Logstor /</b>	<b>Municipality of Logstor /</b>	<b>/</b>	<b>1996</b>
<b>RECORDS OF EXISTING WIND TURBINES AND A STUDY OF THE POSSIBILITY OF REPLACING THEM /</b>	<b>Moller &amp; Gronborg, Architects &amp; Planners SA /</b>	<b>Municipality of Logstor /</b>	<b>/</b>	<b>1996</b>

## THIS CASE HAS BEEN REALISED BY

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