

**Spatial analysis of the existing WTG in Germany, a GIS-based analysis**

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The main focus was to present and analyse the spatial distribution of existing WTGs in Germany. This poster could be described as a DEWI internal working result of analysing and regarding the Wind energy situation in Germany. For this purpose a spatial database was developed, which includes especially the information about regionally installed WTGs within administrative districts or for example the locations and the properties of existing WTG sites.

For this purpose all WTG, announced to the DEWI by the manufacturer were spatially geocoded and displayed in a GIS (Geographic Information System). This process of geocoding describes the spatial classification with an geographic ID, an attribute which describes a place or an area where the object is located. In this case the announced WTG of the DEWI database have two IDs which implement geographic information, the post zip code and the name of the place or the site, where the WTGs or wind farm is located.

In a next step this information is used to join the WTG information with georeferenced information (geodata), in this case a combination of post-zip code and place name. Figure 1 describes this common procedure of geocoding geodata with additional information.

This methodology has the advantage that it is now possible to analyse exactly the spatial distribution of Wind energy within administrative regions as for example within counties or provinces.

The result of this work is shown in the following Map. In this overview the locations of all announced WTG until June 2004 are displayed and are classified by the installed capacity of the installed WTG type.

As expected there are concentrations of existing WTG within the federal states of Niedersachsen, Schleswig-Holstein, in the northern parts of Mecklenburg-Vorpommern and in several parts of Nordrhein-Westfalen. A more detailed analysis reveals also the increasing amount of large WTGs in Sachsen-Anhalt, Brandenburg and Thüringen.

This development is also described in the DEWI-Magazine.

In a next step it is the aim to analyse the installed capacities within the counties. To find an acceptable way to analyse the installed capacities properly, it is necessary to regard the installed WTG under the consideration of the area of each county. The result of this analysis is shown in map 2.

This analysis shows again the large amount of installed capacity/m<sup>2</sup> in the coastal regions and also in some parts of Sachsen-Anhalt, where especially a concentration of several large windfarms have to be taken into account. The red marked counties show the administration regions were no existing WTG are announced. These counties are describing on one hand urban areas and city districts, on the other hand regions in the southern parts of Germany, where until now no WTG is announced.

To find acceptable explanations for the fact that some regions show obviously different results in installed capacity/m<sup>2</sup> in comparison to neighbored or nearby regions a more detailed analysis could be necessary. In this case not only the amount of installed wind energy power has to be taken into consideration, also other aspects like political and physical restrictions for the Use of wind energy in general are important.

To find proper answers for these questions, the collected information has to be complemented with additional information, describing the relevant facts to analyse. In this case, it is the long-term aim of the DEWI, to complete this spatial database with this information, which is until now just partly

implemented in the described wind energy database.

An example of such a detailed analysis is presented in Map 3, which shows the currently installed capacities for the federal state of Schleswig-Holstein combined with the designated areas which are legitimated for wind energy use. Such an analysis allows to find a proper way to analyse the existing potentials for new WTG or for the repowering of existing old WTG (replacement).

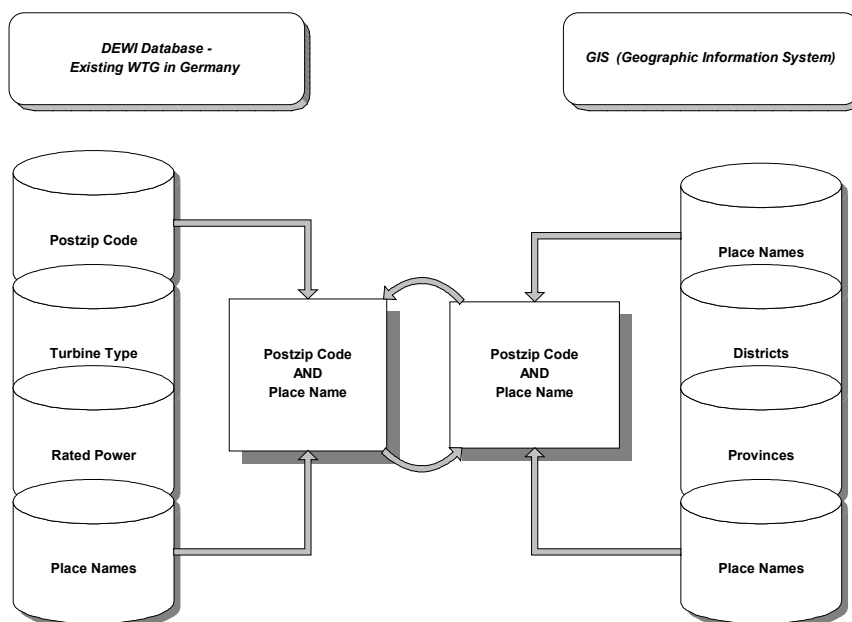


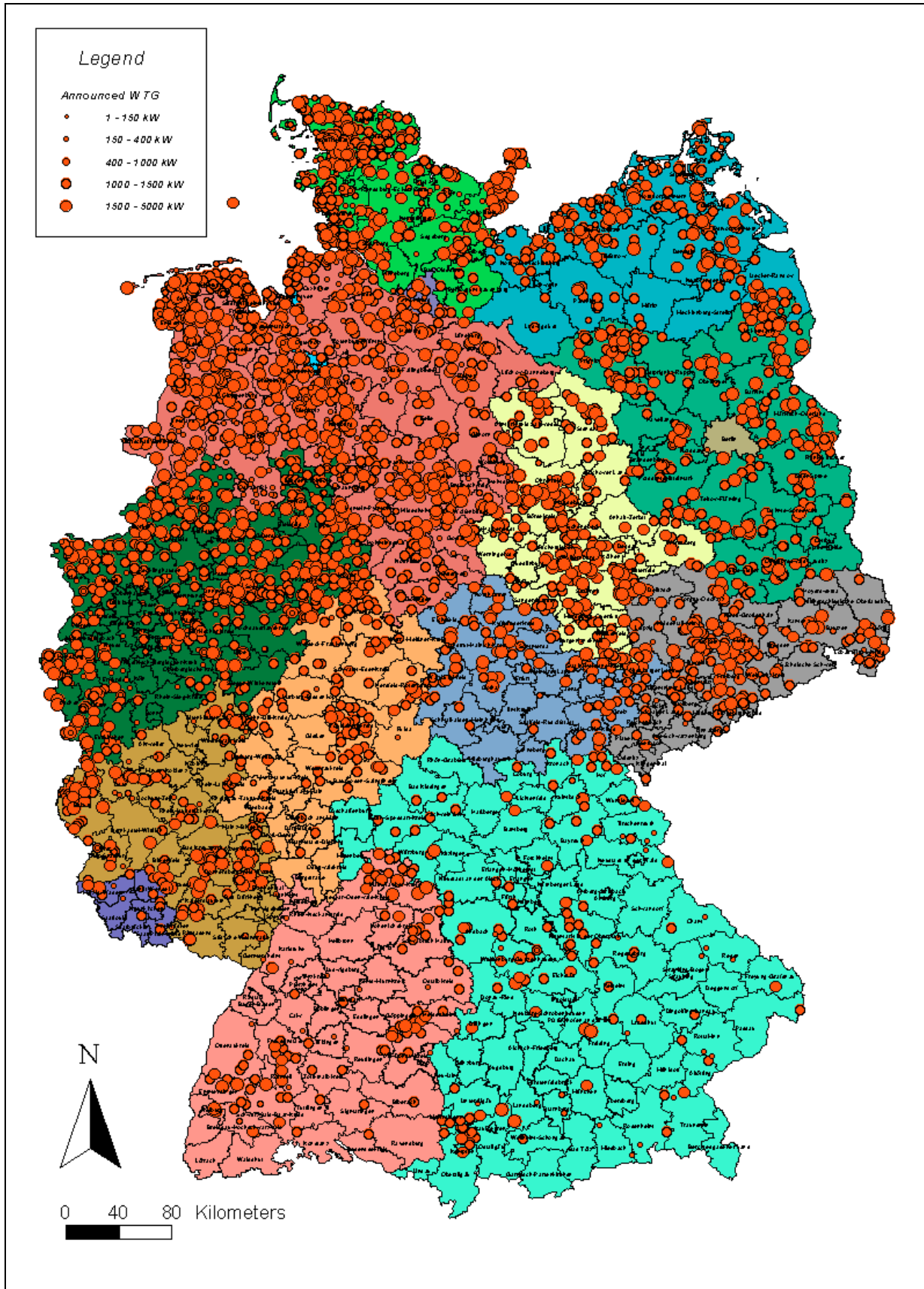
Figure 1: Process of geocoding objects in a GIS

**Summary**

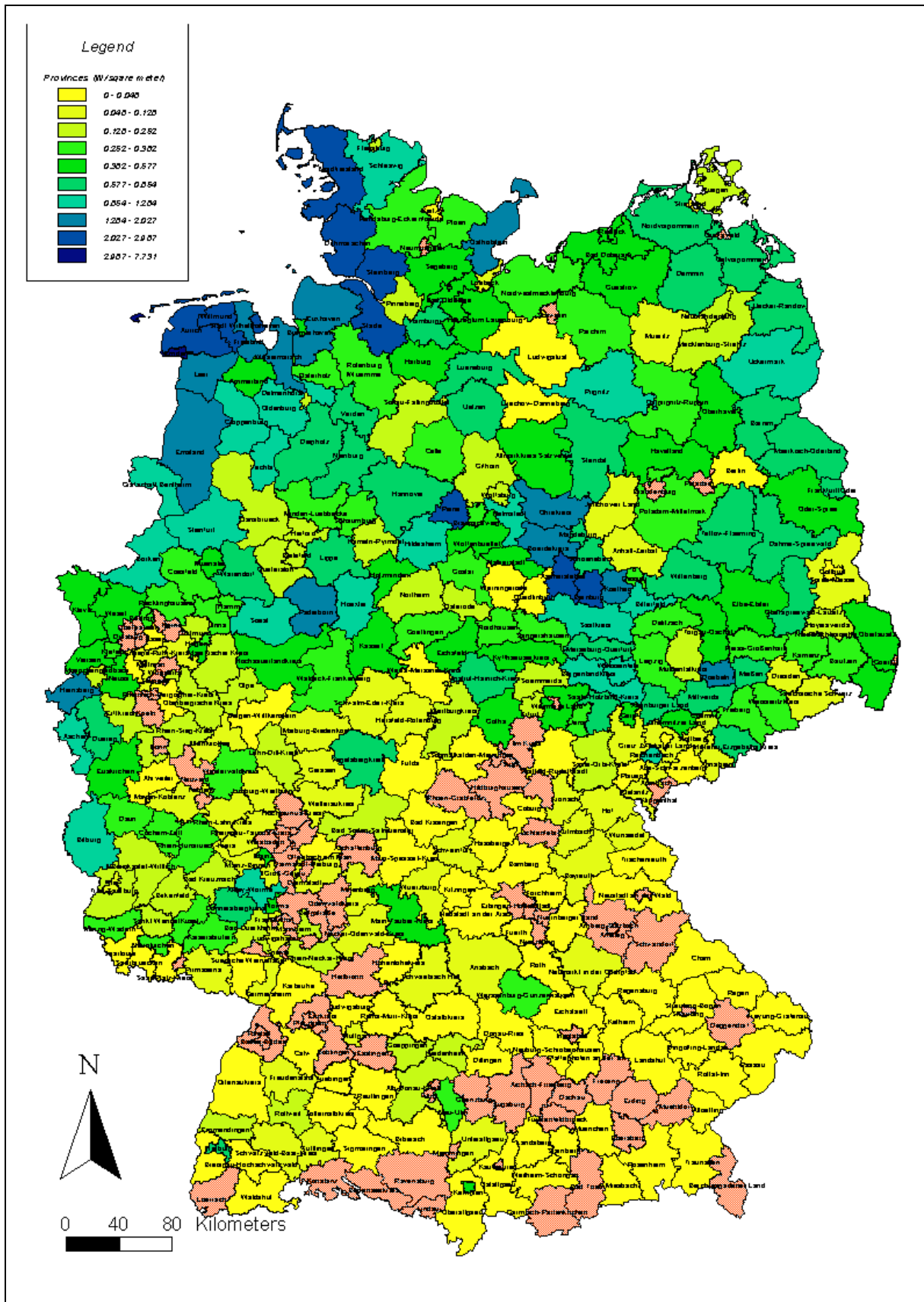
It is shown that the use of a geospatial database allows to regard and to interpret important elements of the wind energy in a different way by regarding the spatial distribution.

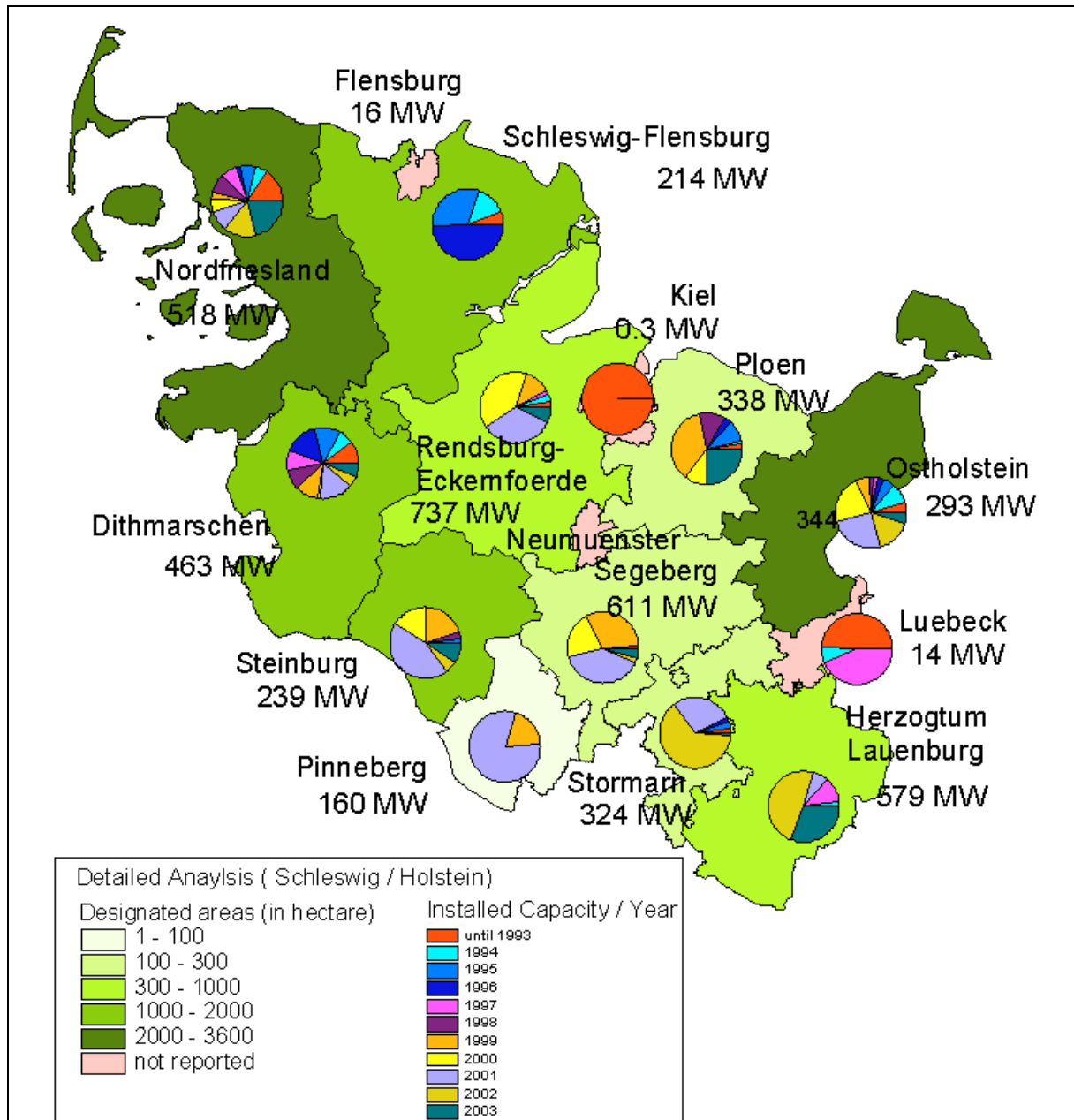
This developed geospatial database combined with a GIS could be used for analysing and displaying

even more detailed topics of the wind energy in general. In the near future it is planned to update this database within defined intervals and to integrate further important information. This integration of different information will allow a more site orientated and more focused view of the wind energy situation in Germany for the future.



Map 1: Locations of installed WTGs in Germany





Map 3: Example of a detailed analysis – Schleswig Holstein