**GIS Analyses using Free- and Open-Source-Software**

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**Project Proposal**

Germany works on the shift from fossil energies to renewable energies. This is even enshrined in German laws. Especially the state of Baden-Württemberg in southern Germany aims to get 10% of the needed energy out of wind energies produced within the state until 2020 (Windenergieerlass Baden-Württemberg 2012). Even tough that legal basis became inoperative in May 2019 it is still an important topic.

To achieve the goal of more renewable energies it is necessary to find suitable places for new wind turbine parks. In the project work an analysis of possible locations within the regions of Rhein-Neckar-Kreis and Neckar-Odenwald-Kreis. It is assumed that both the region of Mannheim and the region of Heidelberg are to small and have to much population to offer spots for a wind turbine park.

The most important criteria to find a suitable location for a wind turbine park are the wind speed and the profitability considering the energy the park can produce and the coast of building and operation services. Criteria are divided in two groups: knock-out criteria and trade-off criteria. Knock-out criteria consider any form of settlement, traffic areas, energy piplines/cables, radio stations, military stations, airports (no matter which size), natur and landscape aspects, waterbodies, some sorts of forest (protected, to use for relaxation or soil protection) and areas where natural resources are exploited. Trade-off criteria consider also nature and landscape aspects, regional important relaxation areas and cultural and soil landmarks (Gesellschaft für Landmanagement und Umwelt mbh 2013). For many of these criteria a certain distance to wind turbine parks is necessary as proposed in Bergmann und Höfle 2013.

**Sources:**

* Bergmann, M. und Höfle, B. (2013): GIS-gestützte Standortplanung von Windenergieanlagen mit freien und amtlichen Geodaten. In: Strobl, J., Blaschke, T., Griesebner, G. & Zagel, B. (Hrsg.) (2013): Angewandte Geoinformatik 2013. Berlin/Offenbach (Herbert Wichmann Verlag / VDE Verlag GMBH).
* Gesellschaft für Landmanagement und Umwelt mbh (2013): Standortanalyse für Windkraftanlagen zur Ausweisung von Konzentrationszonen für die Stadt Neustadt an der Aisch Westmittelfranken Bayern. Erläuterungsbericht. Weikersheim (Klärle).
* WINDENERGIEERLASS BADEN-WÜRTTEMBERG (2012): Gemeinsame Verwaltungsvorschrift des Ministeriums für Umwelt, Klima und Energiewirtschaft, des Ministerium für Ländlichen Raum und Verbraucherschutz, des Ministeriums für Verkehr und Infrastruktur und das Ministerium für Finanzen und Wirtschaft. http://gewerbeaufsicht.baden-wuerttemberg.de/servlet/is/37557/Windenergieerlass\_-\_Ausser\_Kraft\_seit\_09-Mai-2019.pdf (26.11.2019).

•Which GIS methods were applied?

•Which criteria where considered?

•Which data sets were used to represent these criteria?

•Which FOSSGIS toolsexist to implement these methods? (e.g. GRASS GIS / QGIS tutorials, GitHub)