Geophysical Research Abstracts,
Vol. 11, EGU2009-14044-1, 2009
EGU General Assembly 2009

Refined estimation of solar energy potential on roof areas using decision trees on CityGML-data

K. Baumanns and M.-O. Löwner
Vildandsvägen 26 A Läg 524, 22734 Lund, Sweden (kerstinbaumanns@gmx.de)

We present a decision tree for a refined solar energy plant potential estimation on roof areas using the exchange format CityGML. Compared to raster datasets CityGML-data holds geometric and semantic information of buildings and roof areas in more detail. In addition to shadowing effects ownership structures and lifetime of roof areas can be incorporated into the valuation.

Since the Renewable Energy Sources Act came into force in Germany in 2000, private house owners and municipals raise attention to the production of green electricity. At this the return on invest depends on the statutory price per Watt, the initial costs of the solar energy plant, its lifetime, and the real production of this installation. The latter depends on the radiation that is obtained from and the size of the solar energy plant. In this context the exposition and slope of the roof area is as important as building parts like chimneys or dormers that might shadow parts of the roof. Knowing the controlling factors a decision tree can be created to support a beneficial deployment of a solar energy plant. Also sufficient data has to be available.
Airborne raster datasets can only support a coarse estimation of the solar energy potential of roof areas. While they carry no semantically information, even roof installations are hardly to identify. CityGML as an Open Geospatial Consortium standard is an interoperable exchange data format for virtual 3-dimensional Cities. Based on international standards it holds the aforementioned geometric properties as well as semantically information. In Germany many Cities are on the way to provide CityGML dataset, e. g. Berlin.

Here we present a decision tree that incorporates geometrically as well as semantically demands for a refined estimation of the solar energy potential on roof areas. Based on CityGML's attribute lists we consider geometries of roofs and roof installations as well as global radiation which can be derived e. g. from the European Solar Radiation Atlas. After identifying the shadow free area of the roof we recognize manufacturer dependent device sizes as well as lifetime of the building. While more and more CityGML data will be available in future or approach is a valuable contribution for decision makers and private households to estimate the return on invest of solar energy plants.