Evaluation of long-term global radiation measurements in Denmark and Sweden

The climate, especially global radiation is one of the key factors influencing the energy yield of solar energy systems. In connection with planning and optimization of energy efficient buildings and solar energy systems it is important to know the climate data of the area where the buildings/systems are located. This study is based on yearly and monthly values of global radiation based on measurements from a climate station placed on the roof of building 119 at Technical University of Denmark in Kgs. Lyngby, from different Danish climate stations runned by Danish Meteorological Institute and from different Swedish climate stations of Swedish Meteorological and Hydrological Institute. The global horizontal radiation has been measured for a high number of years at all of these stations. The values show a tendency of increased annual global radiation, most likely due to decreased pollution of the atmosphere, increased duration of periods without clouds and/or combination of both these effects.

Twenty years of measurements from a climate station in Lyngby, Denmark show that the global radiation increase is almost 3.5 kWh/m² per year, corresponding to a growth of 7 % for the last 20 years. The global radiation variation between the least sunny year to the sunniest year is 22%. Twenty-nine years of measuring of global radiation from twelve radiation stations across Sweden shows an increase of 3.1 kWh/m² per year. The increase is 87 kWh/m², corresponding to 9 % of global radiation growth during the last 29 years. The annual global radiation varies between 838 kWh/m²/year in 1998 and 1004 kWh/m²/year in 2002 with an average radiation of 932 kWh/m²/year, corresponding to a radiation variation from the least sunny year to the sunniest year of 20 %.

General information

State: Published
Organisations: Department of Civil Engineering, Section for Building Physics and Services, Slovak University of Technology, Danish Meteorological Institute, Swedish Meteorological and Hydrological Institute
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Number of pages: 8
Publication date: 2012
Peer-reviewed: Yes
Electronic versions:

EuroSun2012_full-paper-SKALIK_29.6.pdf
Source: dtu
Source-ID: u::6349
Research output: Research - peer-review; Paper – Annual report year: 2012