

New Solar Resource Maps for South Africa

Stellenbosch University, in cooperation with GeoSUN Africa and GeoModel Solar, this week released updated solar maps for South Africa. The German Government, through their development agency the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), made funding available for this task, as well as to install six radiometric stations in South Africa, in areas where high accuracy ground measurements were not available. Solar resource data from these stations as well as other stations were used by the Slovakia-based company GeoModel Solar to update the existing SolarGIS satellite-derived solar resource database, from which these maps are constructed.

This week, two maps were released, showing Direct Normal Irradiation (DNI) and Global Horizontal Irradiation (GHI). The DNI map is used by developers of CSP (concentrating solar power) thermal power stations as well as CPV (concentrating photovoltaic) power stations to evaluate the available resource in an area for their technology. The highest DNI predicted in South Africa is now 3 200 kWh/m² per annum in the Northern Cape. The accuracy-enhanced database shows DNI values higher, up to 10% in some areas, compared the previous database, positioning South Africa as an excellent candidate for CSP power stations. The updated yearly GHI is also higher at about 3%, confirming vast and unique potential for photovoltaic (PV) power.

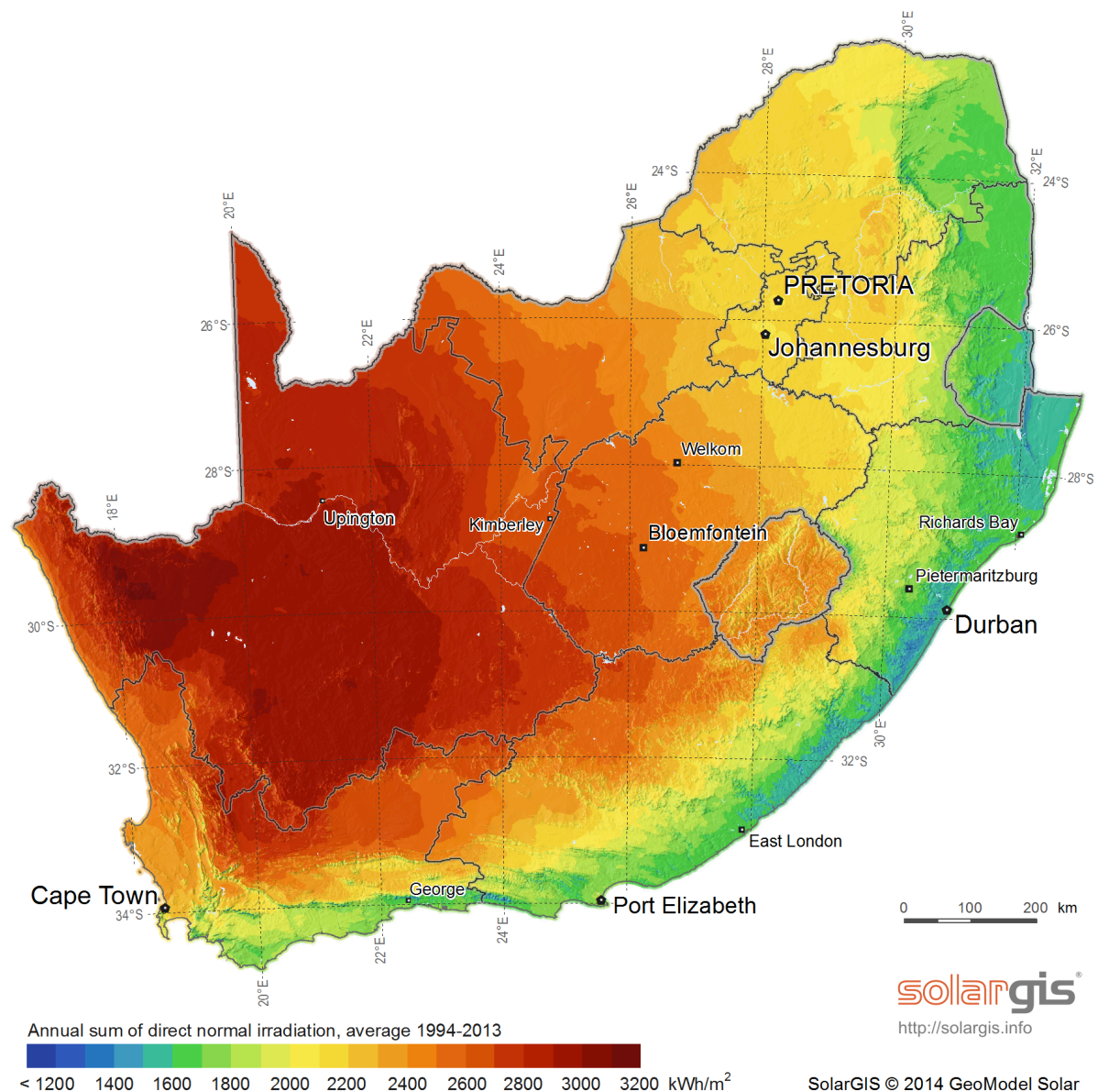
This is the first time in the history that such a large number of high-quality ground-measured data sets were used to update the satellite-based solar maps in Africa. Up to fourteen radiometric stations' data were used, from Durban and Vryheid in KwaZulu/Natal, to Port Elizabeth, Graaff Reinet, Vanrhynsdorp, Sutherland and Stellenbosch in the Western and Eastern Cape to Bloemfontein, Aggeneys and Upington in the Northern Cape and Free State. In the northern part of the country, data from Sasolburg, Pretoria and Lephalale were used.

The maps will be available on the website of the Southern African Universities Radiometric Network (SAURAN www.sauran.net). This network consists of 12 radiometric measurement stations in Southern Africa and on the island of Reunion equipped with top-class instrumentation to measure solar irradiation and other meteorological parameters. The measured data and the new solar maps are made publically available on the SAURAN website, for free download. "This is the first time that high quality measured solar data is available in the public domain. This is a great example how foreign public funding can support the important solar energy industry in South Africa" said Dr Soeren David, Programme Manager of the South African – German Energy Programme who funded the project. The main purpose of making the data available is to promote the use of solar energy in SADC countries and to improve the accuracy of satellite-derived solar data available for the area.

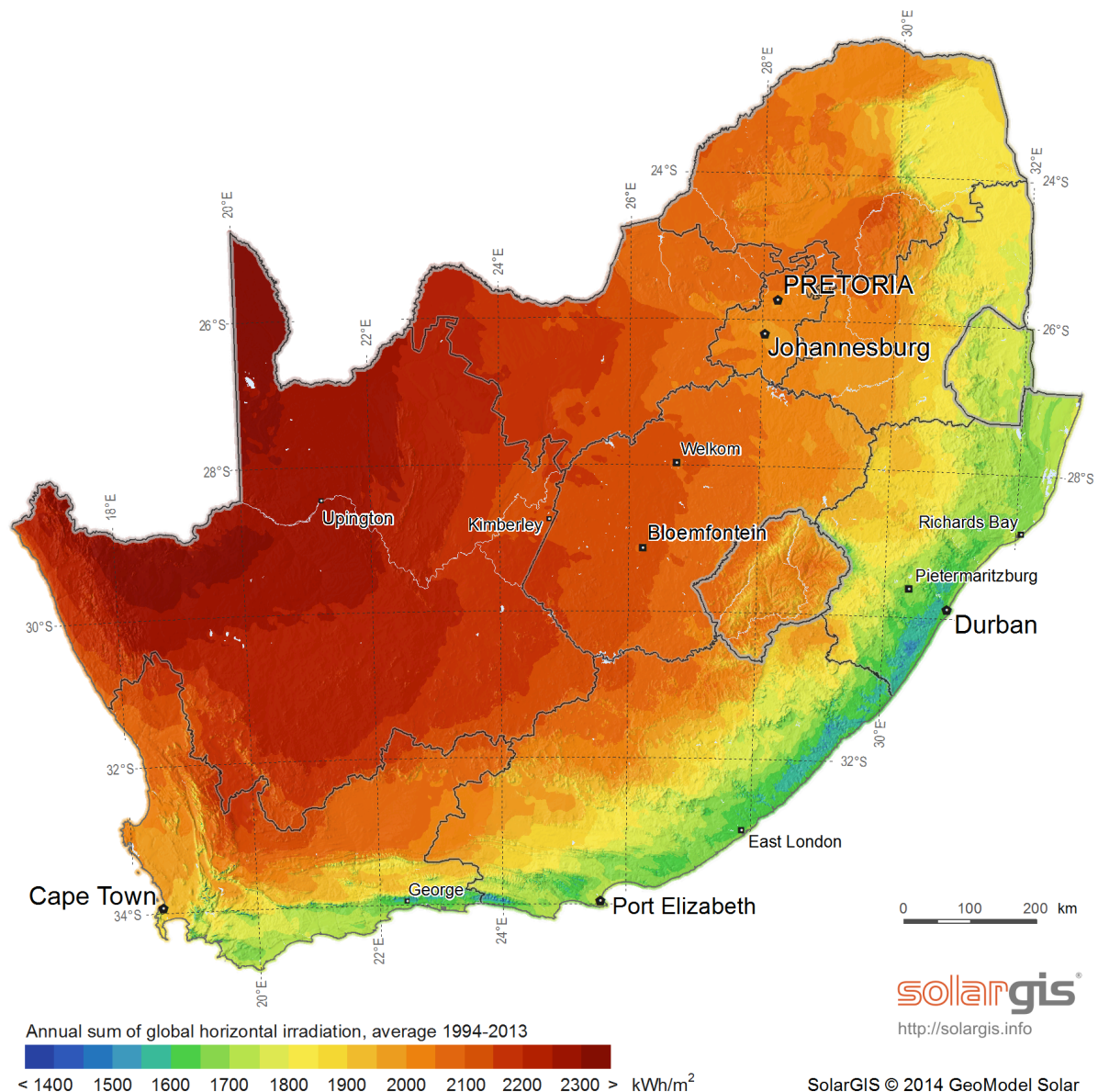
The purpose of placing the maps in the public domain is to make it possible for industry and public to assess the solar resource at any site of interest in the country. By providing accurate information the maps support cost-effective decision-making already in the preliminary stages of a solar power project development. Once an area and a technology is identified, a more detail assessment is required. This is usually based on a full analysis of more than 20 years of history of satellite-derived solar data, available for the region through GeoSUN Africa.

"Reducing uncertainty of solar resource data is one of the imperatives to make solar energy less expensive and more effective. Satellite-based models and ground measurement stations are two pillars of monitoring infrastructure that guarantee sustainable quality of solar data", said Dr Marcel Suri, Managing Director of GeoModel Solar.

Prof Wikus van Niekerk, the Director of the Centre for Renewable and Sustainable Studies (CRSES) at Stellenbosch University, said: “These new maps come at a very opportune time in South Africa as there is a lot of interest from companies, farmers and individual home-owners to install rooftop PV systems. With the current prices of PV systems and the cost of electricity charged by most municipalities it is now less expensive to generate one’s own electricity from photovoltaic modules”. The longterm effort and focused collaboration on this project between the different universities, GeoSUN Africa, GeoModel Solar and the GIZ made this project success. We also thank those companies who contributed data to develop these new maps, including Eskom, Sasol, Exxaro and Ripasso. The new maps and the SAURAN network will continue to add value to the Southern African solar energy industry and research community for many years to come.”



Updated Direct Normal Solar Irradiation (DNI) map of South Africa, Lesotho and Swaziland



Updated Global Horizontal Solar Irradiation (GHI) map of South Africa, Lesotho and Swaziland

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The Centre for Renewable and Sustainable Energy Studies at Stellenbosch University is supported by the Department of Science and Technology through the National Research Foundation. The Centre also host the Specialisation Centre in Renewable Energy Technology as part of the Eskom Power Plant Engineering Institute.

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GeoSUN Africa (Pty) Ltd is a spinoff company of Stellenbosch University and provides a broad range of services and products that relates to solar resource assessment. GeoSUN specialises in the

installation, monitoring and maintenance of solar resource measurement equipment. The services include satellite-based and meteorological data from the SolarGIS database.