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Planning and management of solar photovoltaic plants through a climate service

The electric system is rapidly evolving toward the diversification of distributed energy resources (DERs), leading to an increase in the use of renewable energy sources (RES). This change in the energy sector will involve new opportunities for the integration of these into the whole power system.
The main challenge for RES to participate in the energy market is their strong dependence on the weather. Forecasting is needed to plan and maintenance the supply of these variable resources. Predict the weather variations in the coming hours, days, or weeks will allow decision-makers to anticipate the purpose of the energy, helping to the participation of the RES collectively and on time. In contrast medium-range forecasts, from weeks to months, provide knowledge that can be used to improve situational awareness, evaluate multiple potential network scenarios, optimize economic results, leverage smart statistics, and improve plans.
Within the framework of renewable energies, photovoltaic is one of the technologies with the greatest future projection. However, the fluctuating, unpredictable, and unmanageable character of renewable generation systems, subject to intermittent atmospheric conditions, increases the difficulty of ensuring the reliable and stable management of the electricity systems. This is one of the main disadvantages of this type of renewable facility, especially in the energy market. It is necessary to redefine the planning, management, and operation of this type of facility. In the framework of the H2020 project CLARA (Climate forecast enabled knowledge services) the University of Cordoba has developed one tool for automating both spatial and operational assessment of utility-scale photovoltaic (PV) power plants. This paper presents the SEAP service which gives a global simulation to determine solar radiation and energy produced, providing forecasts from short-term to long-term to climate change conditions.

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