ProAktivNetz

Predictive automated active distribution network management with integration of distributed generators

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Main goal

Ensure a safe and efficient operation and maximum of integration of distributed Renewable Energy Sources (RES) in ALL operating situations by taking into account the actual and forecasted energy production from the RES.

Project objectives

Energy Forecast: Development of methods for calculation of energy production from distributed generators such as photovoltaics or hydropower by using weather forecast. The weather forecast is optimized by integrating objective analysis for every particular application.

Forecast based algorithm for network configuration: Development of algorithm concepts for finding appropriate network configurations that include both the planned work in a network within a defined time horizon as well as the distributed generation within that timeframe. The result should be a process by which a schedule can be created that contains all necessary switching commands and control statements for the tap changer transformer, generators set points etc.

Evaluation with regard to practicality and integration of RES: Deployment of the concepts for the automation of operational tasks using the example of time-series-oriented planning. Assessment of the possibilities to use the results for the extension of the ability of a distribution system to integrate existing distributed RES.

Energy production forecast

- Calculation of shading by the relief and nearby objects through GIS -based digital terrain analysis.

- Adaptation of the meteorological model (1 km resolution) to the orographic conditions in Carinthia by intersection with the calculated shading because of the relief. This refinement of spatial resolution is achieved up to 1 m.

- In the particular case of the precipitation analysis and forecasts, objective IST-surface precipitation analysis is conducted and is refined with the aid of radar and model data (radar calibration).

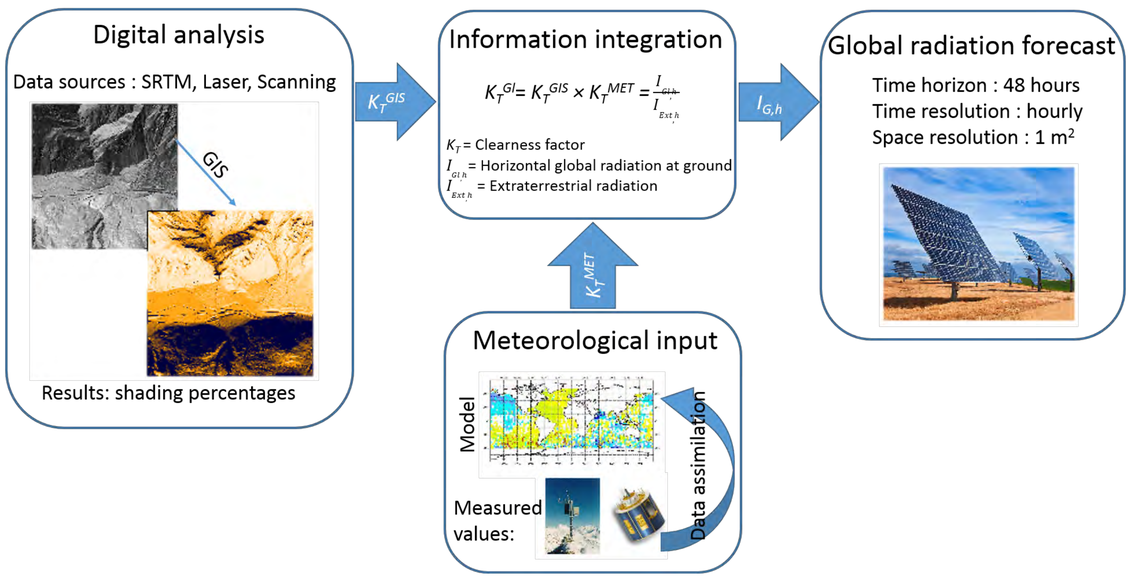

Figure 1

- Historical data are collected from different PV installations including power production, ground solar radiation and ambient temperature. Having the solar radiation forecast (figure 1) the historical data are used to extrapolate the power production for other PV installations when no other data is provided.

- In the case of energy production forecasts for hydroelectric power plants, neural network methods are used by having as inputs historical and statistical data as well as weather forecasts for rainfall, snowfall, humidity and temperature.

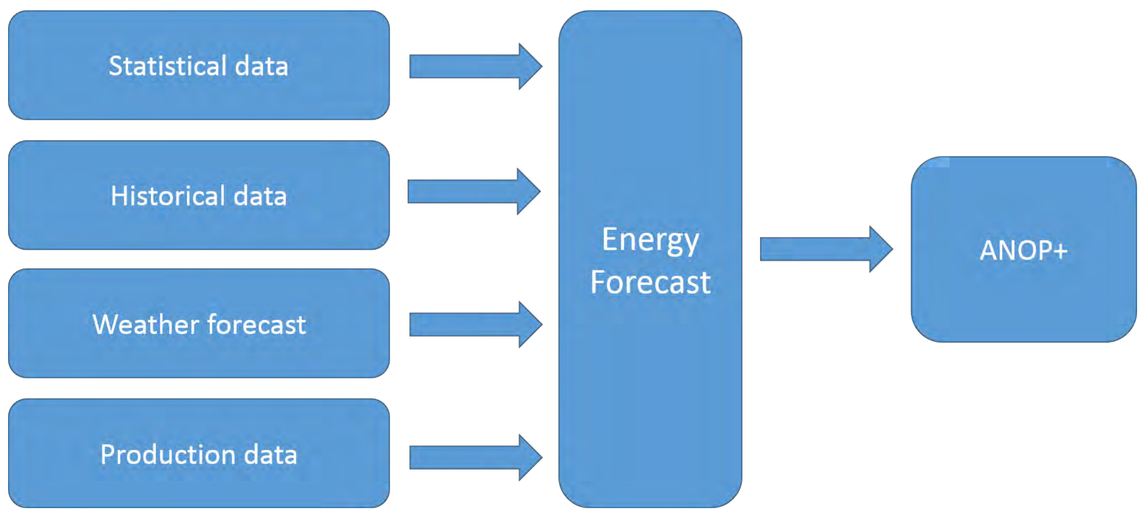

Figure 2

Acknowledgment

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