

Product S5: CSP-GIS for Morocco

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A web-based geographical information system for concentrated solar power in Morocco

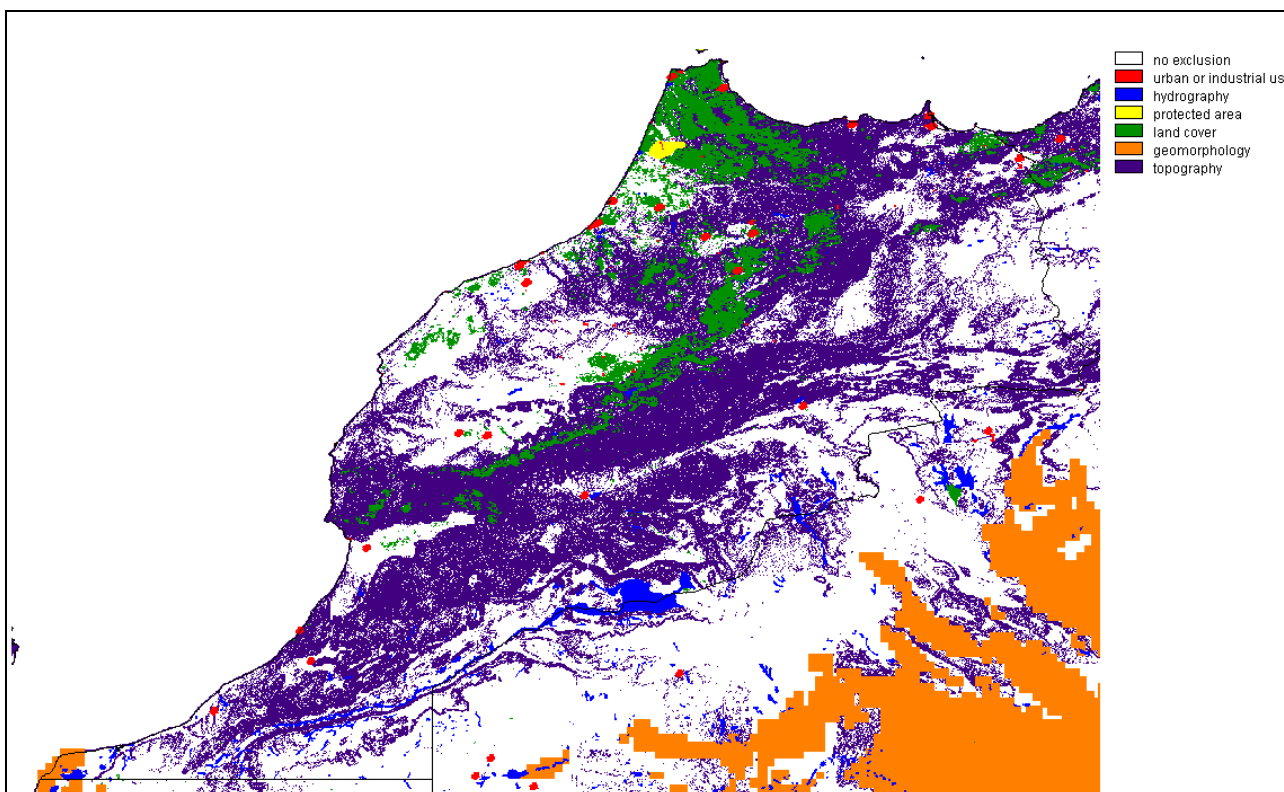
Aim: to develop a web-based tool that allows users to determine the energy production potential for concentrated solar power (CSP) plants and to easily discover whether a given location is suitable for such power plants.

Intended users:

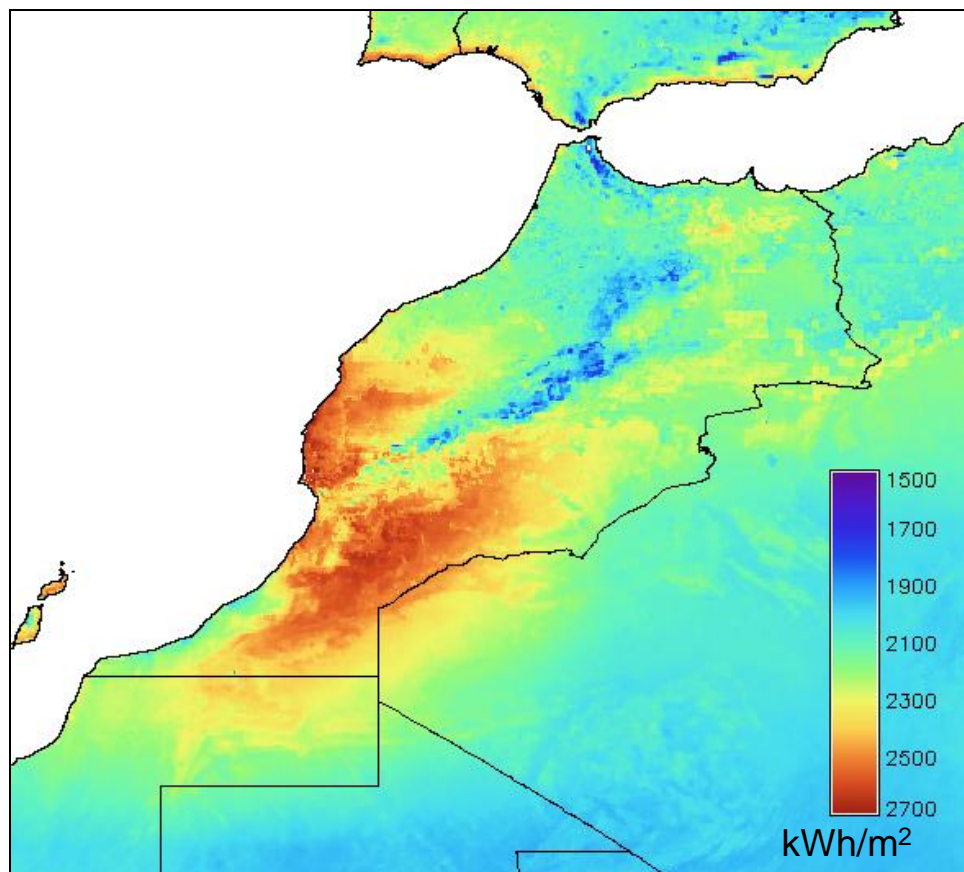
- Project planners, use in the pre-feasibility phase of projects
- Policymakers, to get knowledge of the potential for CSP in the region

Necessary data inputs

- Spatial database of direct normal irradiation (DNI).
- Map of excluded areas. Areas may be unsuitable for a number of reasons:
 - Built-up areas
 - Rough sloping terrain
 - Protected areas
 - Large distance to high-voltage lines
 - Land surface type (such as moving sand)



Example of exclusion map for Morocco (DLR)



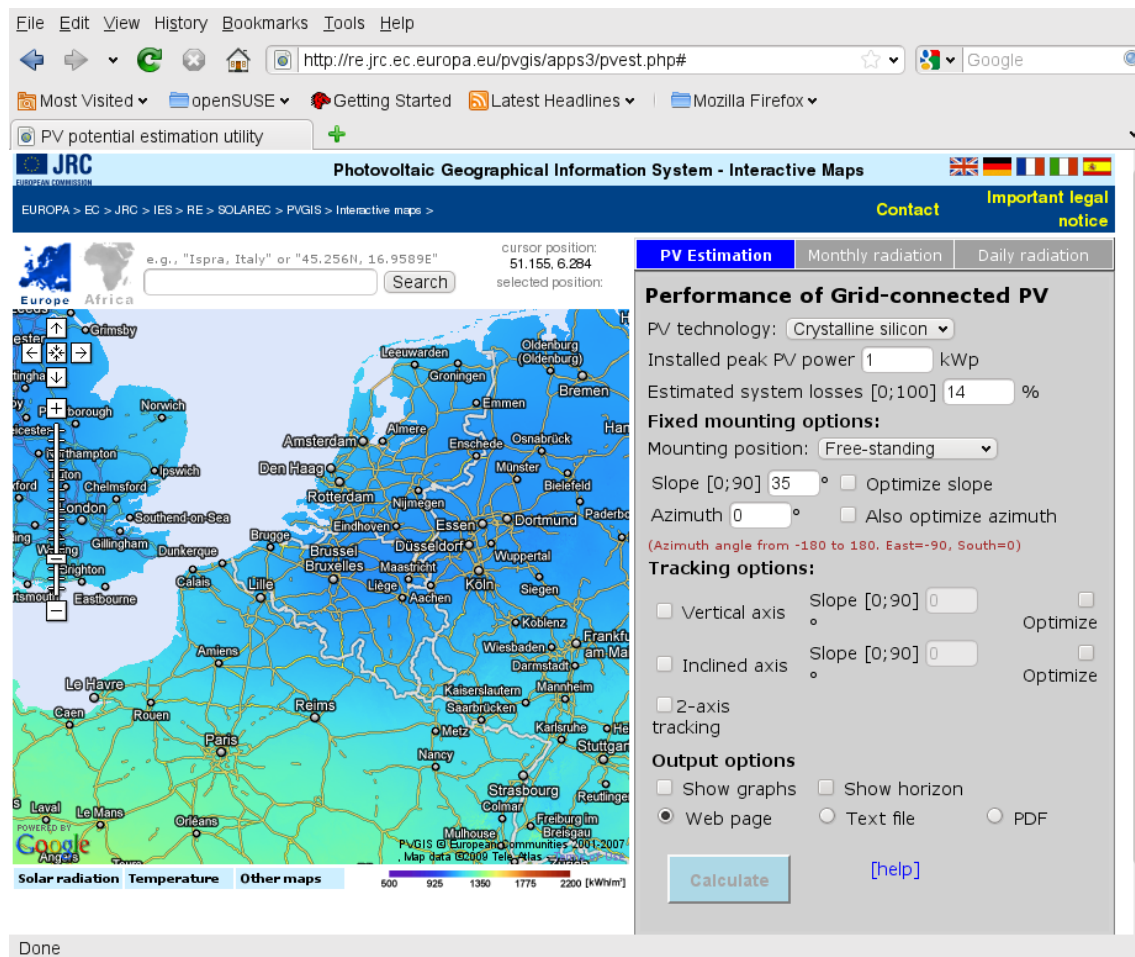
Example of DNI map (from CM-SAF and JRC)

Possible data sources

- Exclusion maps:
 - Topography from digital elevation models like SRTM or ASTER
 - Land cover and other data possibly from GMES Geoland2
- DNI:
 - The SOLEMI database from DLR
 - Climate Monitoring SAF (DWD and JRC). Validation of this database is not complete.

Web interface features

- Probable use of Google Maps API
- Various map layers to visualize areas of interest
- Zoom ability
- Point-and-click interface to get local values of DNI for selected locations
- Demonstration case for Morocco, possible later extension
- Features by test user requests?



The screenshot shows a web browser window displaying the PVGIS (Photovoltaic Geographical Information System) interface. The browser address bar shows the URL: `http://re.jrc.ec.europa.eu/pvgis/apps3/pvest.php#`. The page title is "Photovoltaic Geographical Information System - Interactive Maps".

The interface is divided into several sections:

- Navigation and Search:** Includes a search bar with a placeholder "e.g., 'Ispra, Italy' or '45.256N, 16.9589E'" and a "Search" button. A cursor position is shown as "51.155, 6.284".
- Map:** A Google Maps-style map of Europe is displayed, showing solar radiation levels. A legend at the bottom indicates solar radiation values in kWh/m², ranging from 600 to 2200.
- PV Estimation Panel:**
 - Performance of Grid-connected PV:**
 - PV technology: Crystalline silicon
 - Installed peak PV power: 1 kWp
 - Estimated system losses [0;100]: 14 %
 - Fixed mounting options:**
 - Mounting position: Free-standing
 - Slope [0;90]: 35 ° Optimize slope
 - Azimuth 0 ° Also optimize azimuth
 - (Azimuth angle from -180 to 180. East=-90, South=0)
 - Tracking options:**
 - Vertical axis Slope [0;90] 0 ° Optimize
 - Inclined axis Slope [0;90] 0 ° Optimize
 - 2-axis tracking
 - Output options:**
 - Show graphs Show horizon
 - Web page Text file PDF
- Buttons:** A "Calculate" button and a "[help]" link are visible at the bottom of the panel.

Example of Google Maps based interface (PVGIS)