Energy and Environmental Web Mapping and Geoprocessing

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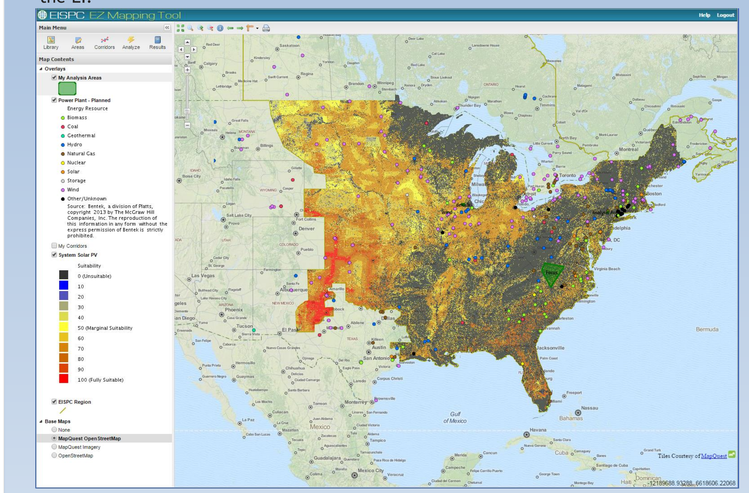
EISPC Energy Zones Mapping Tool

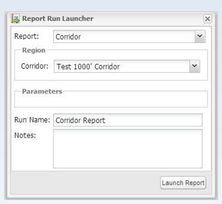
http://eispctools.anl.gov

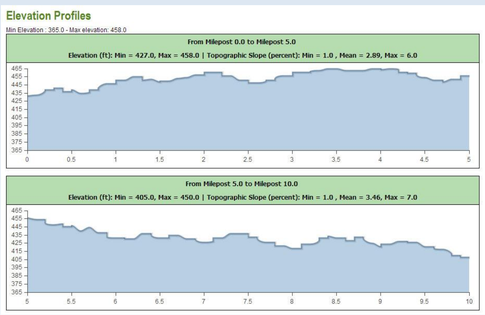
The Eastern Interconnection States Planning Council (EISPC) Energy Zones Mapping Tool (EZMT) was developed primarily to facilitate identification of potential energy zones or areas of high resource concentration for nine different low- or no-carbon energy resources, spanning more than 30 grid-scale energy generation technologies. The geographic scope is the Eastern Interconnection (EI), the electrical grid that serves the eastern U.S. and parts of Canada. The EZMT includes more than 250 map layers, a flexible suitability modeling capability with more than 35 pre-configured models and 70 input modeling layers, and 19 reports that can be run for user-specified areas within the EI.



Reporting: Elevation Profile along User-Specified Corridor Centerline Using Elevation Data Stored as Raster Data

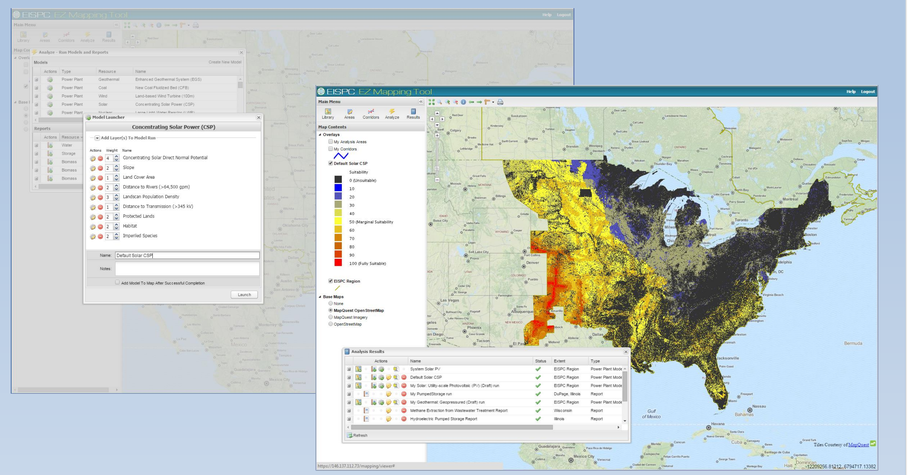
The Corridor Report includes elevation profiles along a corridor centerline input by the user. The report is implemented as a Web Processing Service in Python, running on PyWPS. PostGIS is used to generate regularly spaced locations along the corridor and then extract the elevation values at those locations.





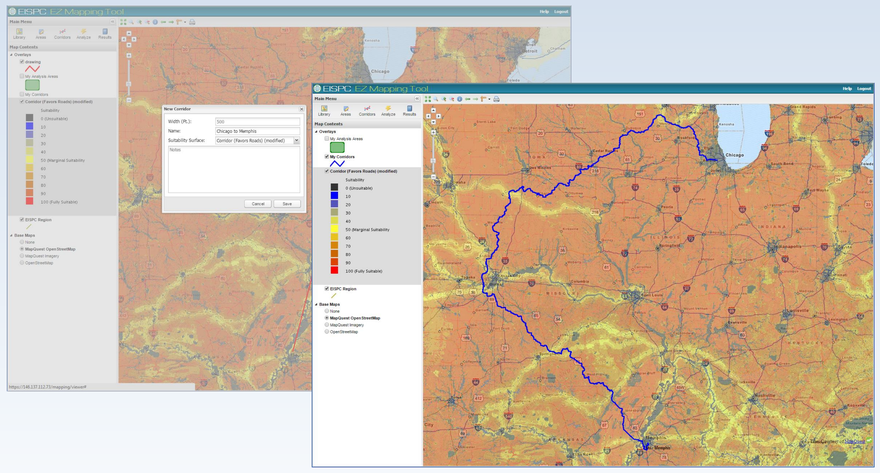
Raster Modeling: Computing Suitability Maps for Solar Power Plants

Suitability models are computed with GRASS. The functionality is implemented as a Web Processing Service in Python, running on PyWPS. The models' inputs are raster layers, each representing a siting factor such as solar energy potential, environmental sensitivity, proximity to existing transmission infrastructure, etc. Input layer values range from 0 (Completely unsuitable) to 100 (Completely suitable). Weights are assigned to each layer to adjust its relative importance. The GRASS function `r.mapcalc` performs the computation to generate the suitability map. The resulting raster is published to GeoServer and made available to the user.



Route Generation: Generation of Transmission Corridors in GRASS

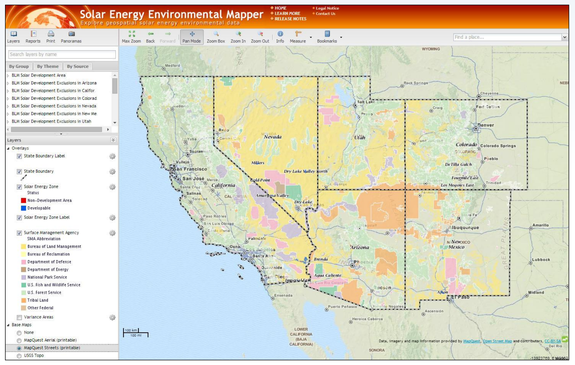
Corridor route alternatives are generated by running least-cost path algorithms over an impedance surface between two user-specified end points. A corridor suitability surface is created using the raster modeling functionality (similar to suitability modeling described above) but with transmission-related layers and parameters. The suitability surface is then inverted to become an impedance surface needed by the GRASS algorithms. The GRASS modules `r.cost` and `r.drain` are then used to generate the corridor route. Finally, the resulting raster is converted to a vector route (which can be used to generate corridor reports described at the lower left).



Solar Energy Environmental Mapper

http://solarmapper.anl.gov

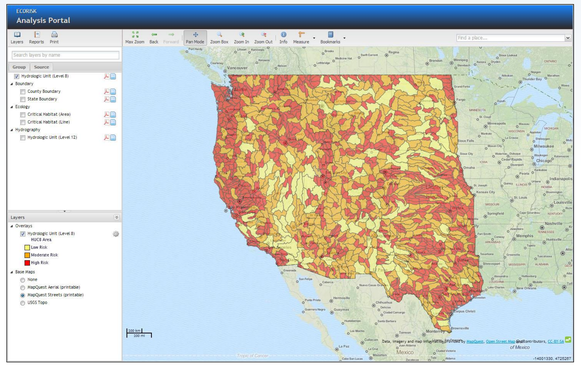
Solar Energy Environmental Mapper (Solar Mapper) provides interactive mapping data on utility-scale solar energy resources and related siting factors in the six southwestern states studied in the Solar Energy Development Programmatic Environmental Impact Statement. The application was first launched in December 2010 and was built on proprietary software. The application was rebuilt with open-source components and launched in December 2014. Solar Mapper supports identification and screening-level analyses of potential conflicts between energy development and environmental resources and is designed primarily for use by regulating agencies, project planners, and public stakeholders.



Ecological Risk Calculator

http://bogi.evs.anl.gov/erc/portal

Ecological Risk Calculator (ERC) estimates risk in individual watersheds in the western U.S. to federally listed threatened and endangered species, and their designated critical habitats, from energy-related surface and groundwater withdrawals. The approach takes into account several biogeographical characteristics of watersheds including occupancy, distribution, and imperilment of species, and their sensitivity to impacts from water withdrawals, as well as geophysical characteristics of watersheds, known to include designated critical habitats for species of concern. The ERC is intended to help project planners identify potential levels of conflicts related to listed species (and thus the associated regulatory requirements) and is intended to be used as a preliminary screening tool.



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This work was supported by the U.S. Department of Energy, Office of Electricity Delivery and Energy Reliability; and the U.S. Department of Interior, Bureau of Land Management, through U.S. Department of Energy contract DEAC02-06CH11357.

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