

Denver Regional Council of Governments: Solar Map Project

Denver, CO

Population: 2.8 million

Size: 5,288 square miles

www.drcog.org

303.455.1000

Since 1955, the Denver Regional Council of Governments (DRCOG) has served as a voluntary association of local governments and a voice for regionalism in the nine-county Denver, Colorado region. DRCOG serves as the region's planning commission, metropolitan planning organization (MPO) and area agency on aging (AAA), and also fosters cooperation among local governments for other regional needs related to the environment, data, growth, development and many more issues that cross jurisdictional boundaries.

DRCOG and Solar

In December 2009, DRCOG received a New Energy Economic Development grant from the Colorado Governor's Energy Office to develop a solar map that provides information on a given rooftop's solar capacity and simultaneously connects residents and businesses with installers who could help them capitalize on that capacity. Where detailed building data was available, the interactive solar map analyzed the roof space (without significant obstructions) and solar orientation of commercial and residential buildings in the 56 cities, towns and counties represented by DRCOG. This data was then translated into an easy-to-understand calculation, providing residents and business owners with an accurate assessment of their building's potential for solar photovoltaic (PV) installation. The project started out with a focus on commercial buildings, but expanded to include residential buildings.

The solar map, which supports the sustainability aspects of DRCOG's Metro Vision 2035 plan

and the achievement of Colorado's Renewable Portfolio Standard, was created with support from a public/private partnership with Woolpert Inc. (Dayton, Ohio) and the Colorado Solar Energy Industries Association (COSEIA) (Boulder, Colorado) in an effort to more easily link building owners with solar installers that would have the potential to create jobs, stimulate the economy and encourage broader solar energy adoption. Both partners were key in the project development and implementation process – Woolpert provided the technical knowledge that existing data could be used to create the map, and COSEIA provided rooftop solar potential information more specific and tailored to the Denver region than material publicly available from sources like the U.S. Department of Energy's (DOE) National Renewable Energy Laboratory (NREL).

The result is a user-friendly map with a simple interface that requires no training. When a user types in an address or zooms in to a building on the map, the first information displayed is a month-by-month estimate of the power generation capacity in kilowatts if a solar PV system were installed on all available roof area for that address. If a user clicks "Next," he or she will see estimated electric bill savings, as well as related information about the

estimated system sizes and available incentives. Clicking "Next" again leads the user to a contact form where the user can input his or her name, contact information and a few preferences so that an area solar installer may contact the user directly to provide a personalized estimate with detailed incentive opportunities. The information submitted is

DRCOG is proud of the solar map project, and it really helps supplement our very successful ongoing regional data efforts. Residents, businesses, and other organizations now have access to this very useful tool, and we've received a lot of positive feedback. The project itself aligns perfectly with the goals set forth in our long-range Metro Vision plan, which emphasizes sustainability and more broadly making life better in the Denver region.

– Jennifer Shaufele, Executive Director,
DRCOG

then passed on to regional solar installers who have access to the solar map and more detailed data provided by DRCOG and its partners.

For a map like DRCOG's, several key datasets are essential, including high-resolution digital orthophotography for feature and building identification, Light Detection and Ranging data (LiDAR) to quickly identify obstructions on rooftops that could inhibit PV panel placement, and building footprints and parcels (property ownership) for areas where LiDAR does not exist. DRCOG and its partners created the map using data from its ongoing Denver Regional Aerial Photography Project (DRAPP) and Denver Regional Data Consortium which fosters regional data development and is used for transportation, parcel, land use and zoning, among others. Using LiDAR, Woolpert built a web-based computer program that analyzes the roof space and solar orientation of commercial and residential buildings throughout the DRCOG region. In addition, some federally and locally funded LiDAR data created when Denver hosted the Democratic National Convention in 2008 was leveraged for this project. Finally, local governments coordinated with DRCOG and Woolpert to provide building footprints for areas without LiDAR data. This fit in well with DRCOG's on-going efforts to collect similar data from its members, as this information is used to support other long-range planning, transportation and land use modeling efforts.

After collecting the data and beginning to build the map, DRCOG worked closely with COSEIA to develop solar power generation estimates specifically for the Denver region. Beyond these estimates, the team also identified estimates of PV system size for given buildings and projected electric bill savings estimates.

The datasets from DRCOG's member governments and region-specific information from COSEIA were then loaded into DRCOG's enterprise Geographic

Information System (GIS) database. Each time a user accessed the Google Maps Application Programming Interface (API) or Solar Map interface to look up their address or click on a building, a query is sent to DRCOG's database and a custom calculation is performed on-the-fly and the information is sent back to the user via the Google Maps interface. After identifying a building of interest, users can access the information described above. In the map's first month of activity, there were nearly 8,000 unique visitors. Within the first two months of the map's release, 14 leads were generated for solar installers from the online form. Both measurements are important indicators of how the map is educating the public about solar information. DRCOG is currently working on measuring the data created by the site, specifically job creation numbers. DRCOG is developing partnerships to continue efforts to educate the public about how the site helps residents and business owners connect with local solar providers.

Lessons Learned

DRCOG and its partners identified several areas where their experiences could help inform other regional planning organizations developing similar mapping projects. The organization found that their partnerships were critical for success – both with the technical partnership for LiDAR data processing, database and map design and maintenance, as well as with the solar installers who had a stake in providing accurate solar PV potential estimates, while creating a system that informs and connects them with potential customers. DRCOG's team effectively maximized available data and tools, resulting in not only cost savings for the project, but also in a familiar user interface and easy to update back-end system. Finally, DRCOG has recognized the need for continuing funding or partnerships that could market and maximize the number of end users, resulting in an even larger impact on the growth of the solar PV industry within their region.



Tool #6:

Solar Mapping

What is it?

Solar mapping can be used as an effective tool to raise awareness and interest in solar energy in your region. Solar maps provide a portal for connecting residents and businesses with local solar installers as well as financing information. Depending upon the mapping software, maps can estimate the generating capacity and cost of a solar installation by neighborhood, by block or even on the rooftop of a particular building.

How do you do it?

- Identify what type of mapping software would be required based upon the needs of your region and the preferred level of detail.
- Determine whether the map can be created in-house. If the map must be outsourced, find a vendor with solar mapping expertise.
- Create an inventory of any existing solar installations in your region.
- Create links on the map to solar financing information. If desired, provide site-specific financing information.
- Develop a database of recommended local installers and provide links to them on the map.
- Link web tracking software with the map to count the amount of people using the site.
- Link the map with the National Renewable Energy Laboratory's (NREL) Open PV Project, which tracks solar installations throughout the country.
- Consider using the map to publicly track progress towards a stated installation target.

Who else is doing it?

- The Denver Regional Council of Governments (DRCOG) developed a solar map that displays the solar capacity for an individual site and connects residents and businesses with local solar installers. For more information see the DRCOG case study on page 26 of this *Guide* or visit <http://solarmap.drcog.org/>.
- The City of Houston, TX developed an interactive solar map, which includes photos and case-study information on individual solar installations around the city. www.solarhoustontx.org/Experience/ASESAnnualHoustonSolarTour/Tour2010/tabid/1805/Default.aspx
- San Francisco, CA designed a web-based solar tool to assess a rooftop's solar potential and any related economic or environmental benefits that would result from installing solar on that site. For more information, visit <http://sf.solarmap.org>.
- New York City's solar map shows the solar energy potential for every building within New York's five boroughs in addition to displaying the city's real-time solar production. For more information, visit <http://www.nycsolarmap.com>.
- Boston, MA developed an Interactive GIS Map indicating the active renewable energy installations within the city and also providing the ability to calculate the solar potential of building rooftops. For more information, visit <http://gis.cityofboston.gov/solarboston/#>.

Where can I get more information?

- The National Renewable Energy Laboratory's (NREL) Open PV Project tracks solar installations throughout the country. <http://openpv.nrel.gov>
- NREL's In My Backyard tool estimates the PV array production based upon a site's system size, location and other variables. www.nrel.gov/eis/imby
- NREL created an analysis of web-based solar PV mapping tools. The report identifies and analyzes several web-based solar mapping tools based upon various criteria. http://solaramericacommunities.energy.gov/PDFs/Analysis_of_Web_Based_Solar_PV_Mapping_Tools.pdf
- The U.S. Department of Energy's Solar Powering Your Community: A Guide for Local Governments is a comprehensive resource created to assist local governments and stakeholders in designing and implementing a strategic local solar plan. The guidebook includes a section on including solar mapping on page 120-122. http://www4.eere.energy.gov/solar/sunshot/resource_center/resources/solar_powering_your_community_guide_local_governments