

## Grand Marais Solar Resource

The University of Minnesota has developed a high-resolution statewide solar resource map that allows cities to calculate how much electricity they could potentially receive from locally installed solar energy systems. These data (see map, next page) were used to calculate Grand Marais’ solar resource, or the City’s “solar reserves.” The solar reserves are how much solar energy is reasonably economically available for development, similar to how oil or gas reserves are measured. The solar map shows the good sites for solar development and helps identify where there may be land use conflicts with solar development. Table 1, below, shows the amount of solar energy reasonably available for development in Grand Marais. The gross potential includes the total available resource, regardless of location; rooftop capacity and generation include only the resource available on the rooftops of commercial buildings located in the City.

Table 1. Grand Marais Rooftop Solar Resource

Community	Gross Potential	Commercial Rooftop Capacity	Rooftop Generation Potential	Solar Potential of Top 10 Rooftops
Grand Marais	1,972,771 MWh/year	4.5 MW	5,894 MWh/year	2,670 MWh/year

The rooftop resource is calculated using building footprint data compiled by the Minnesota DNR as part of a state-wide mapping project using LiDAR 3-dimensional imaging. Unfortunately, Cook County did not get county-wide building footprints calculated. Another data set was available that provided building footprints for most of the commercial building in the City. The rooftop solar resource measurements are therefore limited to the commercial buildings. A city-wide estimate of rooftop resources based on cities of similar size and building types is provided through the State and Local Energy dataset developed by the Department of Energy. Assuming Grand Marais buildings have a similar solar resource to other cities of similar size and location, Grand Marais would have 600 buildings with sufficient rooftop solar resource to install a solar energy system.

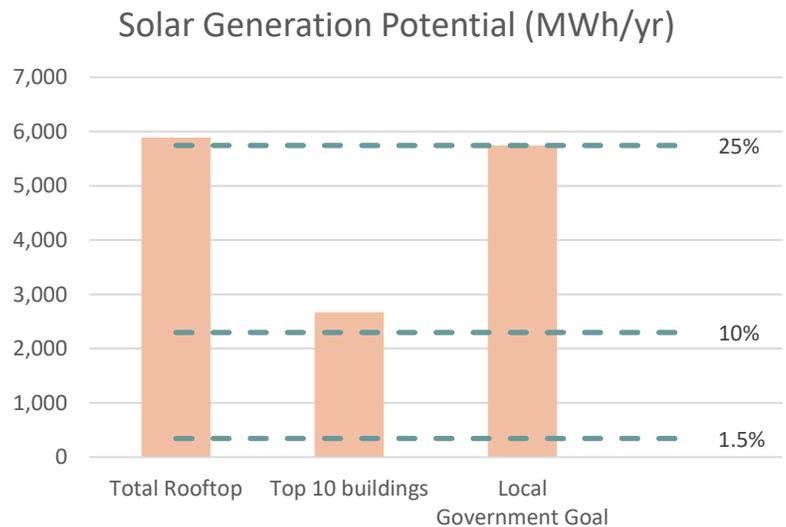


Figure 1 Example of Solar Potential and Community Goal

The total capacity of the commercial rooftop solar resource in Grand Marais is 4.5 MW, equal to approximately 25% of all the electricity consumed in the City. This means that if the City wanted to maximize its entire commercial rooftop solar resource, it could set a solar generation goal of up to 25% on-site solar generation (this is an upper limit, and does not consider individual site limitations due to roof structure, ownership, or local regulations that might limit solar installations). Nationally, communities typically see a solar rooftop potential (including residential roofs) equal about 40% of their electric needs. The residential rooftop potential would likely be close to the commercial rooftop potential.

Finally, if buildings undergo high levels of energy efficiency investment, the solar resource could meet a higher percentage of electric needs. The efficiency and solar resources are, in this analysis, calculated independently of each other.

Solar installations are not limited to rooftop applications. This analysis does not include ground-mount systems, but the City will want to develop criteria for where they would and would not allow solar. For instance, commercial parking lots may make good solar resources, or public right of ways; while areas planned for future development or park space may not. These criteria can be used to recalculate potential solar generation and redefine future solar goals for local development.

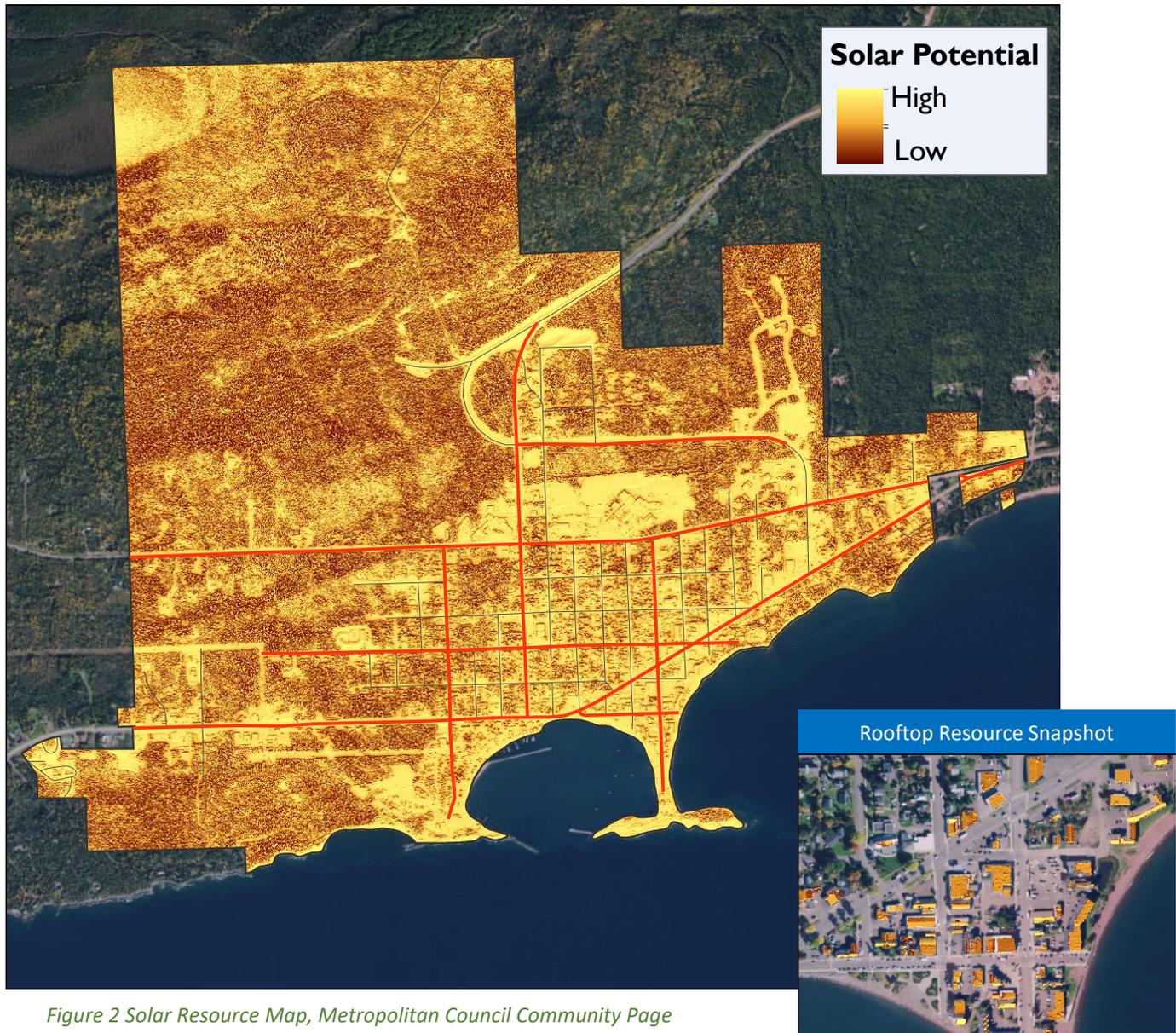


Figure 2 Solar Resource Map, Metropolitan Council Community Page