

MEMORANDUM

TO: North St. Paul City Council
FROM: Veronica Alarcon, Christopher Waltz, Shankha Seal, Ryan Noe
DATE: December 2, 2013
RE: Meeting Minnesota State 2025 Renewable Energy Objective through Distributed Generation (DG).

Problem statement

The city of North St. Paul (NSP) must expand its renewable energy portfolio in order to comply with new state laws. Due to limited space and high up-front costs, energy generation through wind and residential solar panels is not feasible. The city should consider other alternatives to achieve renewable energy sources quota. NSP city council could consider DG as part of its future energy portfolio by developing a community solar garden.

Analysis

In 2013, Minnesota Statutes established renewable objectives under the 216B.1691 Sub 2a statute, which mandate that "each electric utility shall generate or procure sufficient electricity generated by an eligible energy technology to its retail customers in Minnesota"¹. By "eligible energy technology" the statutes refer to solar, wind, hydroelectric, and hydrogen sources. The law requirements will gradually be increased from 12% by 2012, 20% by 2020, and up to 25% by 2025².

In Minnesota, DG has been a common practice among power users and utility companies. DG can be explained as power generation at the point of consumption. Power is generated on-site, contrary to centrally. On-site generation can include generation from renewable energies, like solar, wind, and geothermal, or from fossil fuel sources like diesel generators. The electricity produced by these smaller generators is fed into, and consumed, on the local distribution network. This eliminates the cost, interdependence, and inefficiencies related with larger companies distribution. The major advantages of DG are the potential to increase efficiency by peak shaving and reduce transmission losses, increase reliability, and meet base load with renewable or more efficient sources³. Despite benefits of DG, its adoption rate remains low, due to the complexity of implementation and lack of policies that support DG⁴. However, solar energy has become a popular option for DG because of its clean output. In Minnesota a successful implementation that could be easily replicated in NSP is the Wright Hennepin Community Solar Project (WHCSP). WHCSP consists of a community solar garden, which utilizes battery storage to meet community's peak energy demand. WHCSP was initiated in partnership with Clean Energy Collective, which helped to lower the payback period by 8 years⁵. The project aimed to involve as many community residents as possible by offering each panel at an affordable price of \$869⁶. The result was that on average each participant invested on 12 panels⁶. The solar garden project consists of 171 solar panels with a total output capacity of 40kW⁶.

¹ "Minnesota Statutes, Laws, and Rules - Minnesota Legislature " 2009. 24 Nov. 2013 <<https://www.revisor.mn.gov/pubs/>>

² "216B.1691, 2013 Minnesota Statutes - Office of the Revisor of Statutes." 2010. 26 Nov. 2013 <<https://www.revisor.mn.gov/statutes/?id=216b.1691>>

³ Thornton, A. "Distributed power generation in the United States - ScienceDirect." 2011. <<http://www.sciencedirect.com/science/article/pii/S1364032111003157>>

⁴ "The Potential Benefits of Distributed Generation and the Rate ..." 2011. 26 Nov. 2013 <<http://energy.gov/oe/downloads/potential-benefits-distributed-generation-and-rate-related-issues-may-impede-its>>

⁵ "Wind and Solar - Wright-Hennepin Cooperative Electric Association." 2010. 25 Nov. 2013 <<http://www.whe.org/for-my-home/resources/wind-solar.html>>

⁶ "In U.S., mid-size project momentum "puts solar ... - PV Magazine." 25 Nov. 2013 <http://www.pv-magazine.com/news/details/beitrag/in-us--mid-size-project-momentum-puts-solar-where-the-sun-doesnt-shine_100011529/>

Some of benefits for the Wright Hennepin Community include the use of public spaces rather residential properties, low or no cost of maintenance, and a generous federal tax credit⁷. Due to the tax credit, each participant will receive a higher bill credit, that is 12 cents per KWh, as compared to current retail price of 9.3 cents per KWh⁸. Some of the long-term benefits include a net lifetime saving of \$20,000⁸ over a period of 50 years⁸, and the compliance to Minnesota State Renewable Energy Objectives.

Stakeholder Analysis

The following analysis⁹ is critical to determine not only the 'who' in the policy decision-making process, but how NSP participants will be affected, highlight their guidance and leadership in the process, show the likelihood of support or opposition, and level of buy-in. Five major groups of stakeholders were identified in NSP. The groups identified are the NSP Municipal Utility, NSP residents, the NSP City Council, trade allies, and regulatory agencies. The specific issue of renewable energy development includes a combined effort of all parties, with leadership from the municipal utility and city council. Utilities have state mandated renewable energy portfolio requirements; their interest is in customer's satisfaction and energy reliability. Local residents are concerned with the rising cost of electricity, electrical reliability, local economic development, and have environmental concerns. Local governments have been long-standing leaders in their communities; probably their most important asset is in consumer education. Trade allies have traditionally been left out of these policy discussions and educational responsibilities, however these are people on the ground, that will be implementing DG technologies and, therefore, their ideas and techniques are greatly needed. The analysis also includes regulatory agencies as stakeholders. It is the responsibility of regulatory agencies to provide accurate, unbiased information that is easily accessible to North St. Paul community members.

Stakeholders	Characteristics	Interest	Influence	Position	Impact
NSP Municipal Utility	High economic interest in ensuring shareholder (public utilities) and customer satisfaction.	High	High	Supportive and open to new ideas	Medium
NSP residents	Multiple concerns. Economic vitality, health and safety, costs, system reliability, and environmental concerns.	High	Medium	Very Supportive (based on community engagement event)	High
NSP city council	Interested in promoting community development and renewable energy education.	Medium	High	Favorable	High
Trade Allies (vendors, contractors, energy consultants, engineering firms)	Interested in increasing work, education need on potential technologies, and product delivery.	Low	Medium	Favorable	Low
Regulatory Agencies (MN Dept. of Energy Resources,	Responsible for information to customers, meeting state	High	High	Favorable	High

⁷ "WH Solar Community." 2012. 25 Nov. 2013 <<http://www.whe.org/for-my-home/products-services/wh-solar-community.html>>

⁸ "Minnesota's First Community Solar Project is Minnesota-Made ..." 2012. 3 Dec. 2013 <<http://www.ilsr.org/minnesotas-community-solar-project-minnesota-made/>>

⁹Brugha, Ruairi, and Zsuzsa Varvasovszky. "Stakeholder analysis: a review." *Health policy and planning* 15.3 (2000): 239--246.

MN Dept. of Employment and Economic Development, MN Dept. of Human Services, MN Dept. of Human Services, Dept. of Human Rights, MN Dept. of Health, MN Indian Tribes)	and federal mandates, and a duty to assist low-income residents.				
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Policy Alternatives

Based on the accomplishments of Wright Hennepin project, the City of North St. Paul could embrace an ambitious agenda for solar energy generation using DG technology. NSP DG project should consist of a short-term target of installing 40kW of photovoltaic (PV) arrays by 2017 and a long -term goal of fulfilling 10 percent of the total energy with solar power by 2025 as part of the renewable energy portfolio. To achieve these goals, the City of NSP should continue to work to eliminate barriers to solar energy through public policy. Some alternatives to achieve this are¹⁰:

- Tackle public ignorance towards renewable energy DG technologies. Comparative analysis and cost-benefit analysis could show the public that DG systems are an option to help meet renewable energy state requirements and lower their utility bills.
- Integrate renewable energy produced by third parties to the NSP's existing power grid.
- Longer delays to connect renewable energy to the existing power grid can de-motivate customers from installing solar panels or wind turbines. NSP can work with the utility to eliminate such barriers.
- City of NSP and MMPA can work together and focus in delivering other low cost renewable alternatives, such as solar panels or wind turbines, to homeowners.

Recommendation

Given that the city of NSP needs to comply with Minnesota statutes of generating 25% of its energy from renewable sources by 2025, and city's limited space, we recommend as a first step to gauge public interest in participating in a community solar garden. After this, the city council shall study the possibility of using public buildings' rooftops as sites for the application of DG technologies using solar community panels. Furthermore, we recommend the city council to utilize NSP's utility building rooftop as the first solar community garden site.

¹⁰ "Massachusetts' Solar Leaders | Frontier Group." 2012. 3 Dec. 2013 <<http://www.frontiergroup.org/reports/fg/massachusetts-solar-leaders>>