Form Follows Function (F3): A Framework for Community-based Energy Resilience Planning in the Midwest

Last 5 digits of project number: **10419**
Principal Investigator (PI): **Mindy Granley**
Lead Organization: **City of Duluth**
PI Email: **mgranley@duluthmn.gov**

SYSTEMS INTEGRATION TRACK

Planning community energy resilience: community and asset-based approaches.

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BACKGROUND and OVERVIEW

- Several community resilience planning approaches have been developed, but present challenges to communities with limited capacity to optimize them for their use.
- As cities explore opportunities to site and invest in solar, community resilience can be an added-value benefit.
- Addressing the functional resilience needs of community members and solar + storage options.
- Creating a replicable model for community energy resilience planning in cold-climate communities.

METHODS

- Establish a City asset-based resilience power siting criteria with a rubric including the evaluation of outage data, past damages, and social vulnerability.
- Research (focus groups, surveys) the distribution of negative impacts at the individual and community levels to establish minimum resilience standards and solution sets.
- Develop a Community Energy Resilience Planning Toolkit for testing and replication in other cold-climate communities at risk of low-attention disasters.

KEY MILESTONES

- Using our criteria and rubric, we identified ten potential sites for solar + storage to be evaluated by engineers.
- Examined power outage and cascading events with Emergency Services and community stakeholders on response and recovery.
- Hold three focus groups with residents to understand lived or potential individual experiences.
- Develop planning toolkit and use Duluth as a case study.
- Recruit two communities for implementation and feedback on the Toolkit and planning process.

CONCLUSION

- Provide a replicable and scalable framework for addressing energy resilience planning that includes community benefits for resiliency.
- Create of Community-based Minimum Resilience Standards and solutions sets to inform decisions and investments.
- Develop a Community Energy Resilience Planning Toolkit that can be applied to various communities to inform the optimization of resilience investments.

1 *Potential Sites in for Solar + Storage in Duluth, Minnesota*

Site Use/Name	Rank	Score
Pump: Bayview	1	90
Morgan Park Community Center	2	88
Pump: Middle	3	86
Reservoir: Lincoln Park	5	79.5
Gary-New Duluth Community Center	7	78.5
Police Headquarters	9	78
Fire Hall 2	10	78
City Center West	12	74
Property Maintenance	13	72
Water Treatment Plant (Site)	14	71
Water Treatment Plant (Building)	15	66

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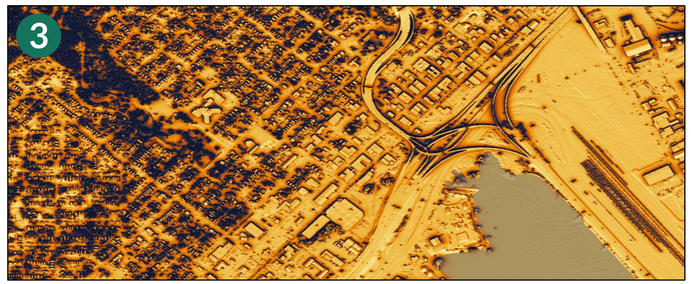
Category (multiplier)	5 Points (or as noted)	4 Points (or as noted)	3 Points (or as noted)	2 Points (or as noted)	1 Point (or as noted)
	Grid Access	Transformer upgrade/install	Line Extension	Line extension & Transformer	No Grid Access
Grid Accessibility (x2)	x				
	200+	151-200	101-150	51-100	0-50
SAIDI Score (x1.5)			x		
	2.00+	1.34-1.99	0.67-1.33	0.01-0.66	0
SAIFI Score (x1.5)		x			
	Permitted & Accessory Use	Conditional Use (3 pts)	Potential Zoning Change (1 pt)	Not Permitted (0 pts)	Within Flood Zone or Shoreland (-2 pts)
Zoning	x				
	South	SW or SE	West	East	North
Orientation	x				
	Critical Infrastructure (CI)		Community Shelter/Hub		No CI resiliency created
Service Disruption & Resilience (x2)	x				
	70% Rebate Possible	60% Rebate Possible	50% Rebate Possible	40% Rebate Possible	30% Rebate Possible
IRA Funding (x2)		x			

3



1. Final selection of 10 potential sites for solar + storage in Duluth, MN. **2.** Asset-based resilience power siting criteria and rubric for Pump: Bayview. (Not full criteria/rubric) **3.** Map of Duluth solar potential. (Lighter areas = more suitable for solar)

Additional project contributors: Jodi Slick, Ecolibrium3; Brett Crecelius, City of Duluth; **Reese Van Houten**, Ecolibrium3