

# The Role of Community Solar in Enhancing Grid Resiliency

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# Metropolitan Energy Center

In the past five years alone, MEC has effectively managed \$25 million in federal grants to disperse training, resources, and new technology across Kansas and Missouri.



## Kansas City area nonprofit since 1983

- 40 years of energy efficiency

## Building Performance

- Commercial and residential buildings
- Project Living Proof demo home in heart of KC

## Sustainable Transportation

- Kansas City Regional Clean Cities - 1998
- Central Kansas Clean Cities - 2013



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# Grid Resiliency

# Understanding Grid Resiliency



## Resource Adequacy

Balancing supply and demand across the grid ensures capacity is always met by grid generation.



## Ancillary Grid Services

Functions grid operators use to maintain reliability such as voltage control, frequency response, and ramping capabilities.



## Extreme Weather Response

The ability to respond to weather relates disruptions or outages and keep power on in any given community.



# Current State of Grid Resiliency

*Fragile and increasingly vulnerable to disruptions.*

## 214 Minutes

Yearly average time with lost power per household in the U.S.

## 1 Billion Dollars

Average damages per month from major grid disaster.

## 90%

Percentage of outages due to coal and gas plants in Winter Storm Elliot.



# Energy Efficiency

## Crucial to maintaining livable conditions during outages

- Building energy codes establish minimum requirements regarding the efficiency of new and major renovations of residential and commercial buildings.
- Energy codes contain certain safeguards to minimize the damage a flood or storm can wreak on walls, floors, ceilings, windows, and ducts.
- They also ensure our homes stay dry, remain at a consistent temperature throughout, have correct humidity levels, and stay allergen free.
- [A study](#) on energy codes was conducted after blackouts caused by Hurricane Sandy in 2012.
- Newer energy codes allowed people to remain in their homes longer.
- “Building code adoption and enforcement are one of the strongest strategies jurisdictions can take to protect their communities against extreme weather.” – [Federal Emergency Management Agency \(FEMA\)](#)





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# The Impact of Community Solar



# Grid Flexibility

- Under old infrastructure and power plants, the modern grid lacks the flexibility needed to sharply scale its output up or down.
- The inherent modularity of solar increases resiliency and flexibility of its output.
- Allows renewables to respond to fluctuation in supply and demand with greater efficiency.
- However, brings us to a criticism of Community Solar: Its intermittency.
- Many critics argue resource adequacy will struggle to be met.





# Facing Community Solar's Intermittency

*The challenge of the duck curve can be solved with energy storage and by utilizing more constant renewables in conjunction with solar.*

## Storage

Under the usage of storage systems, the intermittency issues of solar are completely solved.

Energy can be stored when demand is low and released into the grid once demand reaches higher levels. The Biden Administration's agenda, Investing in America, has made progress toward developing energy storage solutions.



## Other Renewables

Other energy sources such as geothermal, hydropower, and biomass do not have the same intermittency issues. These plants could help overcome the variation in output from solar and ensure demand is met through every season and time of day.

# The Research Affirms

*A fully renewable grid can achieve resource adequacy.*

## University Of California, Berkeley

Study found 90% clean grid is achievable by 2035. The projections demonstrate energy demand could be met at all times, while retiring all coal plants and 70% of fossil fuel capacity.

## Energy Innovation

A meta-analysis from Energy Innovation looked at 11 studies by researchers who modeled an 80% clean energy grid. They found in all studies, the grid was able to match supply and demand.

# Solar Provides Improved Ancillary Services

- Ancillary grid services are essential in recovering from power disruptions.
- Include load regulation, voltage support, frequency response, and ramping capabilities.
- Renewable sources are often more effective than conventional fossil fuel generators at providing these services.

**NREL, First Solar, and California ISO** conducted a trial on a solar power plant to examine the effectiveness of its ancillary services

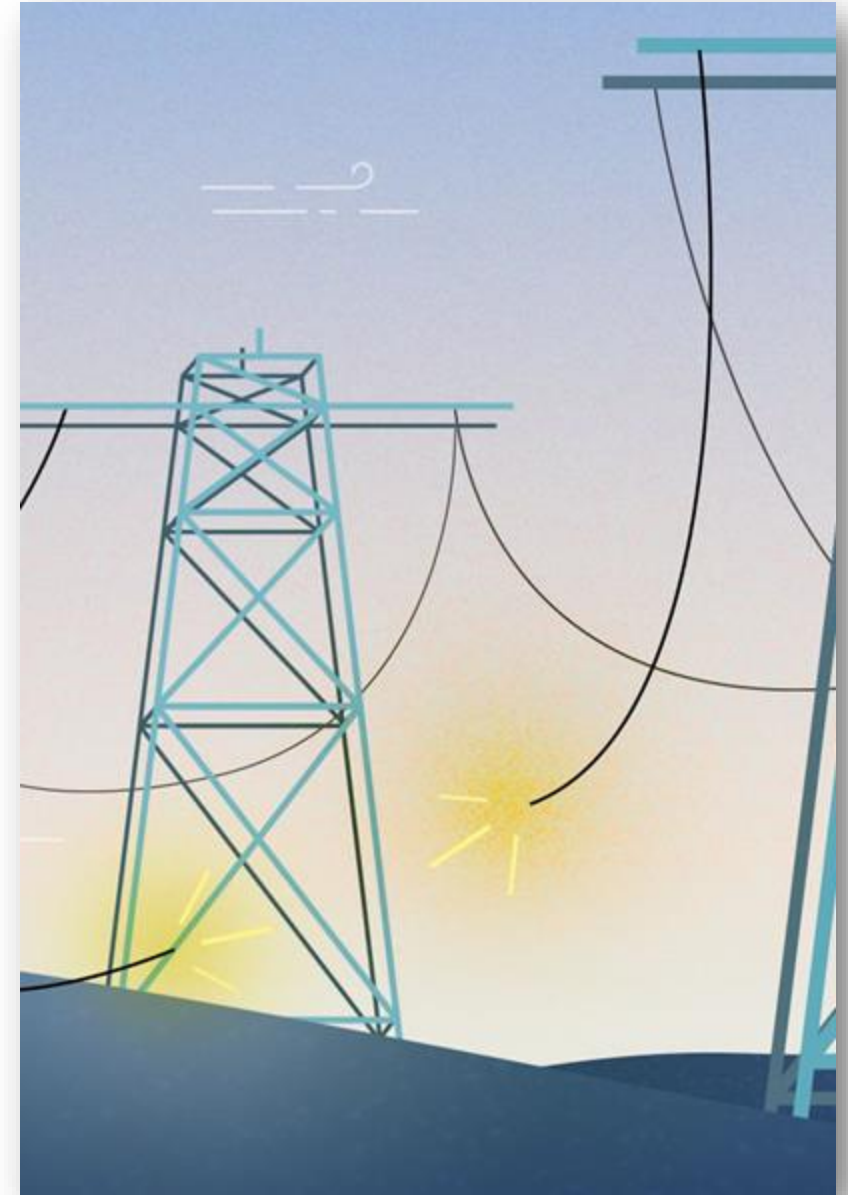
- In all tests, the solar plant performed similar to or better than a conventional fossil fuel plant.
- The vast impact of renewable sources on grid resiliency cannot be understated.
- Ramping up renewable energy sources is the ideal solution to build grid reliability and resiliency



# Response to Extreme Weather

*Community solar strengthens response to outages.*

- Community Solar has a high potential to be used as decentralized forms of power.
- Operating essentially as microgrids, they would allow communities to protect themselves against natural disasters or any other disruptions to the main grid.
- As these sources would be distributed across various locations, the risk of widespread outage caused by a single point of failure would be greatly reduced.
- This application is particularly useful for public buildings or businesses such as hospitals, where the loss of power can be lethal.





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# Challenges

# Pushback from Utilities

## Protecting Profits

Utilities claim their opposition to community solar is due to Cost Shift: The idea that when one ratepayer benefits from community solar with lower energy bills, others will suffer the costs. However in reality, community solar does not result in cost shifts. Utilities simply advocate against community solar in order to safeguard their own profits.

## Cost Benefits

A study by Vibrant Clean Energy shows that if 10% of the grid were distributed projects like community solar it would save half a trillion dollars in total, lowering costs and bringing benefits for all ratepayers. This is due to various factors such as peak reduction, economic growth, and the higher efficiency of community solar.

## Value to Grid

In New Hampshire, utilities are deregulated so they have less financial incentive to oppose community solar. Hence, they admitted that “distributed generation facilities can provide greater benefits than larger generation resources.” This statement came after a government commissioned study which found that avoided cost value of distributed generation could go from \$0.18/KWh in 2021 to \$0.23/KWh by 2035.



# Kansas Net Metering Policy

*Lacks sufficient support for community solar.*

- Pushback from utilities was seen in 2014 from Westar Energy and Kansas City Power and Light (two utilities that merged to form Evergy).
- They lobbied for bills to eliminate the net metering policy in Kansas
- The legislature did not repeal net metering completely, but passed legislation that reduced the value of the power solar owners sell back to the grid and reduced the size of solar installations that qualify for net metering
- **Residential:** 15 kWh or less **Commercial:** 100 kWh or less
- However, new legislation was passed and as of April 30, 2024, it's 150kw for all installation types
- Community solar projects average 1,000 kW
- Potential for community solar is substantially limited by this policy
- Kansas energy is .38% solar while national average is 5.6% despite fact that Kansas is an ideal location for solar



# Questions?

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**MEC's energy efficient demo-home, Project Living Proof.**