

NEM (Net Energy Metering) vs. Microgrids

Executive Summary

The global energy landscape is undergoing a transformative shift as the world transitions from fossil fuels to renewable energy sources. Two key technologies at the forefront of this transition are Net Energy Metering (NEM) and microgrids. While NEM has been a popular mechanism for incentivizing rooftop solar adoption, microgrids are emerging as a more sustainable, resilient, and future-proof solution for decentralized energy systems. This white paper explores the limitations of NEM, the advantages of microgrids, and why microgrid technology represents the future of green and reliable power.

Introduction

The urgency to combat climate change has accelerated the adoption of renewable energy technologies. Rooftop solar, in particular, has gained significant traction, thanks in part to policies like Net Energy Metering (NEM). However, as the energy grid evolves, the limitations of NEM are becoming increasingly apparent. Microgrids, on the other hand, offer a more comprehensive solution that addresses the challenges of grid reliability, energy equity, and decarbonization. Drawing insights from the Los Angeles Times article ["Big Utilities' War Against Rooftop Solar"](<https://www.latimes.com/environment/story/2025-02-24/big-utilities-war-against-rooftop-solar>), this paper argues that microgrids are the future of energy systems.

The Rise and Limitations of Net Energy Metering (NEM)

What is NEM?

Net Energy Metering (NEM) is a billing mechanism that allows homeowners and businesses with rooftop solar panels to sell excess energy back to the grid. In return, they receive credits that offset their energy bills. NEM has been instrumental in driving the adoption of rooftop solar by making it financially attractive for consumers.



The Success of NEM

- Rooftop Solar Growth: NEM has spurred the widespread adoption of rooftop solar, particularly in states like California, where solar penetration is among the highest in the U.S.
- Consumer Empowerment: NEM has enabled homeowners and businesses to take control of their energy production, reducing reliance on centralized utilities.

The Limitations of NEM

Despite its successes, NEM faces significant challenges that undermine its long-term viability:

1. Utility Opposition: As highlighted in the Los Angeles Times article, large utilities have lobbied against NEM, arguing that it shifts grid maintenance costs onto non-solar customers. This has led to policy rollbacks and reduced incentives for rooftop solar.
2. Grid Reliability Issues: NEM relies on a centralized grid infrastructure that is increasingly vulnerable to outages, wildfires, and extreme weather events.
3. Energy Inequity: NEM primarily benefits wealthier homeowners who can afford the upfront costs of solar installations, leaving low-income communities behind.
4. Scalability Challenges: As more consumers adopt rooftop solar, the grid faces challenges in managing two-way energy flows, leading to potential instability.

The Case for Microgrids

What Are Microgrids?

Microgrids are localized energy systems that can operate independently or in conjunction with the main grid. They integrate renewable energy sources, energy storage, and advanced control systems to provide reliable, resilient, and sustainable power.

Advantages of Microgrids

1. **Energy Resilience:** Microgrids can operate autonomously during grid outages, ensuring uninterrupted power supply for critical facilities like hospitals, schools, and emergency services.
2. **Decentralization:** By reducing reliance on centralized utilities, microgrids empower communities to generate and manage their own energy.
3. **Scalability:** Microgrids can be tailored to meet the needs of individual homes, neighborhoods, or entire communities, making them highly adaptable.
4. **Energy Equity:** Microgrids can be designed to serve low-income and underserved communities, addressing the energy inequities associated with NEM.
5. **Integration of Renewables:** Microgrids seamlessly integrate solar, wind, and other renewable sources with battery storage, optimizing energy use and reducing carbon emissions.

Microgrids in Action: Lessons from the Los Angeles Times Article

The Los Angeles Times article highlights the growing conflict between utilities and rooftop solar advocates. Utilities argue that NEM undermines their business model, while solar advocates emphasize the need for decentralized energy solutions. Microgrids offer a middle ground by:

- **Reducing Grid Strain:** By generating and consuming energy locally, microgrids alleviate pressure on the centralized grid.
- **Empowering Communities:** Microgrids enable communities to become self-sufficient, reducing their dependence on utilities.
- **Enhancing Grid Stability:** Advanced microgrid technologies can provide grid services like virtual power plant (vpp).

Why the Future Belongs to Microgrids

1. Climate Resilience

As climate change intensifies, the frequency and severity of extreme weather events are increasing. Microgrids provide a resilient energy solution that can withstand and recover from disruptions, ensuring continuous power supply.

2. Decarbonization Goals

Microgrids are inherently designed to integrate renewable energy sources, making them a key tool for achieving global decarbonization targets. Unlike NEM, which relies on the existing grid, microgrids can operate entirely on clean energy.

3. Technological Advancements

Advances in energy storage, smart inverters, and artificial intelligence are making microgrids more efficient and cost-effective. These technologies enable microgrids to optimize energy use, reduce costs, and enhance reliability.

4. Economic Benefits



Microgrids create local jobs in installation, maintenance, and operation. They also reduce energy costs for consumers by minimizing transmission losses and optimizing energy use.

Conclusion

While Net Energy Metering has played a crucial role in promoting rooftop solar adoption, its limitations are becoming increasingly apparent. Microgrids offer a more sustainable, resilient, and equitable solution for the future of energy. By decentralizing power generation, enhancing grid reliability, and integrating renewable energy, microgrids represent the next evolution in the energy transition.

As the Los Angeles Times article illustrates, the conflict between utilities and rooftop solar advocates underscores the need for innovative solutions like microgrids. By embracing microgrid technology, we can build a greener, more reliable, and more equitable energy future.

Recommendations

1. **Community Engagement:** Utilities and policymakers should work with communities to design and implement microgrid projects that address local needs.
2. **Research and Development:** Continued investment in microgrid technologies, including energy storage and smart grid systems, is essential to drive down costs and improve performance.
3. **Pilot Projects:** Utilities and governments should launch pilot microgrid projects to demonstrate their viability and benefits.



The future of energy is decentralized, resilient, and green. Microgrids are not just an alternative to NEM—they are the foundation of a sustainable energy system that empowers communities, enhances reliability, and accelerates the transition to a low-carbon future.