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ACCELERATING & ADVANCING A SOCIALLY JUST CLEAN ENERGY ECONOMY & SUPPORTING COMMUNITY RESILIENCE

SUPPORTING COMMUNITY RESILIENCE: PROSUMER ENERGY STORAGE SOLUTIONS BRIEF

The reasons to install home and single-premises energy storage, especially when paired with rooftop solar, have recently become overwhelmingly compelling in Colorado despite many changes at the federal level. Producer-consumer, or "prosumer," owners of such distributed energy resources have seen payback periods on their investments reduced based on new time-of-use billing savings. Shorter payback may also be possible depending on what value the prosumer owner may place on resilience due to damages from outages. The emergence of virtual power plants, or aggregations of these resources, improves the value further. For those looking to improve their resilience in the face of increasing outage durations due to extreme weather events, the value proposition of adding bidirectional charging for vehicle-to-home (or vehicle-to-building) surpasses even gas backup. Moreover, ***reducing the load on the grid and providing stabilizing grid services near those loads, can improve quality of service and save all grid participants money versus traditional grid investments****.* — James Gilbert, 30 July 2025

"PROSUMER" OWNERSHIP OF HOME AND SINGLE-PREMISES ENERGY STORAGE

While the dream of going completely "off-grid" with such solutions is still impractical for most, the break-even point for even just the average case of offsetting net billing time-of-use has come down with proper system sizing and smart home technologies. In places subject to long-duration outages, when paired with **bidirectional charging, or vehicle to home or building (V2H, V2B) technologies**, this has become an even more mobile, affordable, and clean solution than investing in and maintaining backup gas generators with fuel on-hand. This can be crucial in deciding on batteries for many of us in Boulder. In 2024 many Boulder residents experienced up to 700 minutes (11.6 hours) of outages. Some are on the order of days each year.

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Moreover, as virtual power plants come on line that promise to compensate prosumer owners of these distributed energy resources for other grid services beyond simply sharing their excess energy, the value proposition gets even better to fully participate as active co-investors in their own community's cleaner and more stable grid. The bonus being higher grid reliability and resiliency, as well as avoiding more costly traditional investments in the grid, such as gas peakers that would otherwise be required to provide extra energy on a hot day. That means prosumers save money to the affordable benefit of all grid participants.

Exploring the grid benefits further, storage paired with renewable sources is a multiplier of the reliability and resilience of those sources. It not only provides clean energy backup when the wind is not blowing or the sun is not shining, but can provide necessary balancing, stabilization, and flexibility services when grid loads and sources suddenly change. While storage at remote utility-scale source sites can provide those services to the transmission side of the grid, storage on the distribution side, where homes and businesses are connected, can likewise provide these stabilization and flexibility services to improve quality of service, supply

peak loads, and even absorb some of that peak sun from solar panels right at the loads. More and more utilities are recognizing the need for these services and providing incentives to storage prosumers, be it their wall battery or EV, through new battery demand management and virtual power plant programs like **Xcel Energy's Battery Connect program in Colorado**.

HOW TO GET STARTED IN THE BOULDER AREA?

First, if you haven't already, get an energy audit and electrification consult like those available through **Boulder's Energy Smart** program. These are currently offered for a modest fee to most Boulder residents, but if you are income qualified, they may be free. Be prepared to share with them your electricity usage information from Xcel, and whatever backing information your smart home sensors might be able to provide, if you have them. Look at making as many efficiency upgrades to your home energy usage as possible, like adding insulation, or sealing those old leaky windows. Check out any recommendations your auditor may have on upgrading old appliances to newer, more efficient, smart home appliances. The difference for instance between a 20-year old dryer and a new one in energy savings may surprise you.

Your electric vehicle may also have vehicle-to-load with outlets you can use for emergency backup.

Then get a solar plus storage system quote from your local installer, like those available through **Boulder County's Switch Together** program. Switch Together offers lower prices as it makes group purchases. They will also help you through the process of getting rebates and joining new programs like Xcel's Battery Connect, or other demand response and virtual power plant programs available in the Boulder area.

When you are looking at storage for back-up, you will need to decide what circuits or things that you must have power for during an outage. This is called identifying your "critical loads." For instance, obviously, you need your refrigerator, but do you really need that extra wide-screen TV on? Tell your installer that you want to optimize your time-of-use savings, but still have some resilience time for backup of critical loads during extended outages. As bidirectional charging is such a new technology, it may come as a surprise, even to savvy installers, that reducing your battery size to handle shorter time-of-use savings and augmenting resilience with vehicle-to-home to handle those longer outages may make more sense than buying a much larger battery. Make sure that the installer is familiar with the configuration requirements for doing this and that your electric vehicle is vehicle-to-home ready and compatible.

If a home battery system is still too expensive, you may wish to investigate smaller, uninterruptible backup systems on select loads like your refrigerator and medical devices. Your electric vehicle may also have vehicle-to-load with outlets you can use for emergency backup. Ask your energy auditor and installer about these options, too. You may be surprised how well even such modest devices like these may work for your needs in critical situations.

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