

Propane and the Future of Power:

Achieving Reliability Beyond the Grid

Executive Summary

Power outages in the United States have become recurring, high-impact events with measurable financial, operational, and human consequences. Recent research commissioned by the Propane Education & Research Council (PERC) surveyed 2,000 stakeholders across commercial and residential sectors to quantify these impacts.

The findings reveal a widening gap between perceived preparedness and actual resilience. **Both commercial organizations and residential households reported experiencing an average of three outages over the past two years.** And 33% of businesses and 48% of homeowners experienced outages lasting four hours or longer during that same period.

The financial consequences are substantial. **For a commercial organization, a single outage can result in losses of up to \$78,000,** driven by lost revenue, equipment damage, labor disruption, and operational downtime. Homeowners typically experience lower overall costs, but the research shows that outage-related expenses can still exceed \$1,000 and can include costs related to structural damage or temporary relocation.

While the risks are clear, comprehensive preparedness has yet to be achieved; **72% of businesses have backup power, but only 13% protect their entire operation.** Only 26% of homeowners have a backup power system.

Reliance on the electric grid alone is no longer sufficient. In their 2025 resource adequacy report, *Evaluating the Reliability and Security of the United States Electric Grid*, **the U.S. Department of Energy (DOE) found that annual loss of load hours could increase by a factor of 100 by 2030** compared with the current system due to announced power plant retirements and projected load growth. Rising demand, changing load profiles, and constrained grid resources are reshaping the energy landscape in ways that require proactive preparedness.

As outages grow longer and more disruptive, resilient energy strategies, like those including propane-based systems, are essential for maintaining continuity, safety, and economic stability.

About the Research: In 2025, PERC partnered with market research firm B2B International (a Merkle Inc. company) to conduct a study to understand the financial and emotional impact of power outages on commercial organizations and residential homeowners across the U.S. and to explore the role of backup power solutions, particularly those powered by propane, in mitigating these impacts.

The study surveyed 2,000 respondents comprising 750 commercial facility decision-makers, 250 commercial and residential construction professionals, and 1,000 homeowners and renters. The commercial respondents included representatives from a broad range of industries, including manufacturing, healthcare, retail, education, government, and hospitality.

The Rising Instability of the Electric Grid

Power outages are more common and increasingly substantial. Both commercial organizations and residential households report experiencing an average of three outages over a two-year period.

Power outages tracked by *USA Today* and PowerOutage.com from 2018 to 2025 reveal extreme volatility in the electric grid's ability to deliver power. While a county might average four hours of outages a year over this eight-year period, catastrophic weather events can paralyze an entire region. For example, while outages in Jefferson, Louisiana (a parish just outside New Orleans) averaged under an hour in 2018 and 2019, that figure surged to 19.3 hours in 2021 as Hurricane Ida crippled the region. In some suburban counties, average annual outage durations approach 10 hours, while certain rural areas experience nearly 20 hours of outage time per year according to that same data. However, grid vulnerability is not solely a product of extreme weather. The DOE reports that as power plant retirements coincide with massive load growth, the electric grid is being stretched to its breaking point. Even in projections where no power plants are retired, outage risk will increase by a factor of 34 in 2030. The reliability challenge is not limited to a single policy decision, weather event, or region.

The research shows that both commercial organizations and homeowners reported experiencing increasingly lengthy power outages — 33% of businesses and 27% of residents reported experiencing a power outage lasting eight hours or more.

The underlying drivers of this instability are well understood but increasingly difficult to mitigate at the grid level. Aging electric infrastructure continues to degrade reliability, while rising energy demand places additional strain on utilities. At the same time, extreme weather events are becoming more frequent and severe, exposing weaknesses in grid resilience. As a result, many organizations and homeowners are losing confidence in the grid and experiencing the grid's inability to deliver uninterrupted power.

- **52% of businesses say they have enhanced or changed their backup power strategy** because of increased critical loads requiring protection, grid instability, or concerns about local power reliability, sustainability mandates, natural disasters, and regulatory codes.
- **Approximately 40% of homeowners say they have increased or changed their backup power strategy** because of grid instability or concerns about local power reliability. A similar share cite increased natural disasters as a factor, indicating that homeowners are experiencing more extreme weather and have less confidence in their local power systems.

These findings suggest that decision-makers are no longer treating backup power as optional; they are actively reassessing their energy strategies in response to reliability concerns, critical load growth, and extreme weather risk.

DOE Reliability Outlook Through 2030

SCENARIO	PROJECTED RELIABILITY RISK
Current Grid Conditions	8.1 annual loss-of-load hours
2030 (No Additional Plant Closures)	269.9 annual loss-of-load hours (34x increase)
2030 (With Plant Closures)	817.7 annual loss-of-load hours (100x increase)

Even under scenarios with no additional power plant closures, DOE projections indicate a substantial increase in reliability risk by 2030 due to growing demand and constrained grid resources.

The Real Cost of Power Outages

The consequences of inadequate preparedness extend far beyond inconvenience. Outages represent material financial risk and operational instability.

These costs frequently fall between \$5,750 and \$8,750 per category, with total losses reaching as much as \$78,000 per outage.

Power outages introduce multiple financial implications. Commercial respondents were asked to identify the greatest impacts power outages caused to their organization:

- 29% of businesses identified **loss of revenue** and/or opportunity.
- 20% of businesses identified **labor costs** and/or lost wages.
- 20% of businesses identified **damage to electronic equipment**.
- 17% of businesses identified **material loss and/or spoilage**.

And the remaining respondents identified a mix of other expenses, such as increases in insurance costs, relocating personnel, and penalties incurred during downtime, among other expenses.

Critically, these impacts are not isolated. Revenue loss disrupts cash flow. Equipment damage requires capital reinvestment. Operational downtime reduces customer trust and long-term competitiveness. Industries with continuous operations, such as healthcare, manufacturing, and government, face heightened exposure, where outages can trigger safety risks, regulatory issues, and reputational damage.

For homeowners, the financial impact is typically smaller than commercial operations but still significant. Food spoilage is the most common expense, though more severe events can result in substantial costs related to home damage or temporary relocation.

- 36% of homeowners cited **damage to their home** as the highest financial burden with 22% reporting damages of over \$1,000.
- 24% of homeowners cited **damage to electronics** as the highest financial burden with 14% reporting damages of over \$1,000.
- 19% of homeowners cited **cost of purchasing supplies** as the highest financial burden with 8% reporting damages over \$1,000.

Beyond financial losses, outages impose meaningful emotional and operational burdens. These intangible effects can have lasting consequences for workforce morale and customer relationships.

Commercial respondents were asked to identify what consequences of a power outage had the greatest emotional effect on their organization:

- 23% identified **loss of work** and/or data.
- 22% identified **employee safety** and well-being.
- 20% identified **loss of comfort** due to downed HVAC systems.
- 17% identified needing to **make up for lost time** and/or productivity.

And the remaining respondents identified threat of security breach, spoilage, loss of communication, customer dissatisfaction, and damage to credibility, among other impacts.

Residential respondents were asked the same question:

- 48% identified **loss of comfort** due to downed HVAC systems.
- 32% identified **family safety** and well-being.
- 26% identified **loss of communications**.

And the remaining respondents identified not being able to use basic amenities, medical supplies spoiling, children being afraid, and threat of home security breach, among other impacts.

These findings highlight that outages affect not only economic stability but also contribute to long-term performance erosion, stress, instability, and reduced well-being.

The Preparedness Gap

While awareness of outage risk is increasing, preparedness remains structurally incomplete across all respondents. Survey data shows that 86% of businesses report feeling at least somewhat prepared, and 73% of homeowners express similar confidence. However, these perceptions contrast sharply with their realities.

- **77% of businesses rely primarily on the electrical grid for power, and only 13% have full operational backup coverage**, meaning the vast majority are exposed to partial shutdown scenarios.
- **Among homeowners, 67% rely primarily on the electrical grid for power while 74% lack any backup power systems** whatsoever, leaving critical home systems entirely dependent on grid availability.

Even among organizations with backup systems, coverage is typically limited to essential loads, such as lighting, HVAC, critical machinery, appliances, and IT/data infrastructure. This selective approach creates operational bottlenecks, where portions of a facility remain functional while others fail, leading to productivity loss, safety risks, and cascading inefficiencies.

Cost remains the primary barrier to full preparedness, with nearly 50% of non-adopters citing upfront cost as the primary deterrent.

However, this cost sensitivity often fails to account for the compounding financial exposure of repeated outages, where even a single extended event can exceed the cost of a comprehensive backup solution.

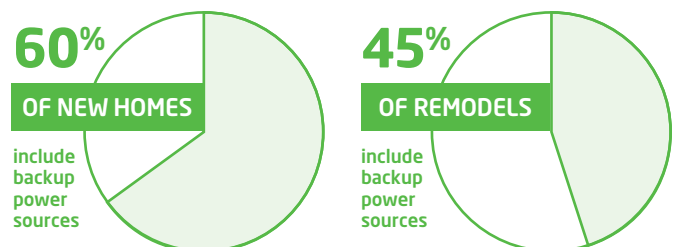
Builders and Specifiers Design for Resilience

The construction and design community is increasingly responding to these grid instability challenges by incorporating backup power into new projects. Approximately 60% of new homes and 45% of remodels include backup power sources, reflecting a shift in how resilience is prioritized in modern construction.

Builders and specifiers are influenced by several key factors, including operating costs, system reliability, and evolving customer expectations. As clients become more aware of outage risks, demand for integrated energy solutions is rising. This demand is shaping both design decisions and technology selection.

At the same time, the energy landscape is becoming more complex. While natural gas and diesel remain widely installed

as backup power sources (~60%), solar and battery storage are becoming more common. While solar and battery storage can play an important role in diversified energy systems, they face limitations related to upfront cost, available space, useful life, weather dependence, and duration of stored energy. These constraints create opportunities for hybrid systems that pair renewable or battery assets with propane power generation to extend runtime and improve reliability.



Propane as a Cornerstone of Energy Resilience

The opportunity for propane is clear, yet it is currently met with an awareness challenge. While propane offers a unique combination of attributes that align with modern energy needs, its adoption is often limited by perception and awareness rather than performance.



Commercial respondents who are familiar with propane tend to view it positively, particularly regarding its reliability and accessibility, but also cite concerns with perceived emissions and price.



Specifiers are familiar with propane, but consideration of and recommendation of propane as a backup power source lag behind natural gas, diesel, and battery storage.



Homeowner respondents' knowledge of propane as a backup power source is lacking, with 46% saying they are unfamiliar.

As outage frequency and duration increase, resilience strategies must evolve beyond single-source energy dependence. Within this landscape, propane serves as a critical point between grid vulnerability and total energy independence. Its unique physical properties and delivery model address the primary pain points identified in the research:



On-Site Reliability: Unlike natural gas, which can be disrupted by the same seismic or weather events that affect the electric grid, propane offers reliable on-site fuel storage.



Scalable Duration: Propane can support primary and backup energy needs for long durations, a necessity given that 33% of businesses and 27% of homeowners reported outages lasting eight hours or longer.



Portability and Flexibility: Organizations rank propane highly for its portability (19%) and reliability (22%), allowing for deployment in diverse environments where major utility lines are unavailable or compromised.



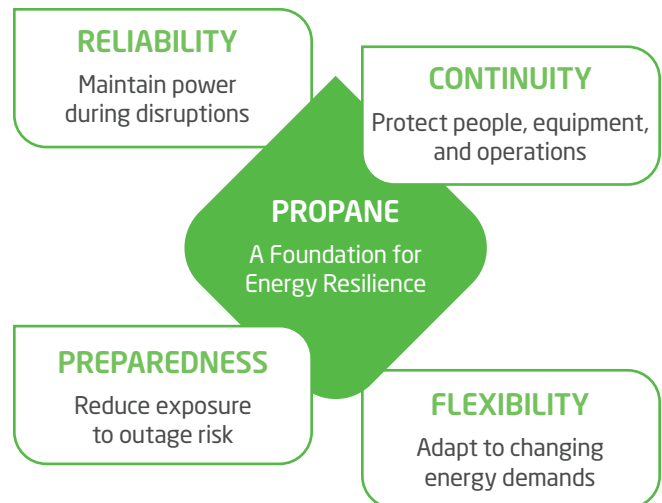
Sustainability Alignment: Propane supports long-term resilience goals as a clean energy that produces fewer emissions than diesel, making it an ideal choice for businesses looking to change their energy strategy to meet sustainability mandates.

Conclusion

The U.S. is entering a new era of energy uncertainty. Grid reliability challenges are intensifying, and the consequences of power outages are becoming more severe. At the same time, energy demand continues to rise, placing additional strain on already constrained infrastructure. The DOE reinforces that these challenges are not temporary: even in a 2030 scenario with no additional plant closures, outage risk is projected to increase significantly, underscoring the need for businesses and homeowners to adopt resilient backup power strategies before grid constraints become more severe.

Reliable power must be viewed not as a discretionary investment, but as a fundamental component of operational and personal security. Propane offers a dependable, scalable solution that addresses both immediate needs and long-term resilience goals. The cost of being unprepared is measurable, repeatable, and often greater than the cost of preparedness itself.

The question is no longer whether outages will occur, but how prepared we will be when they do. Acting now to strengthen energy resilience will determine the ability of organizations and households to navigate an increasingly unpredictable future.



THE PROPANE EDUCATION & RESEARCH COUNCIL was authorized by the U.S. Congress with the passage of Public Law 104-284, the Propane Education and Research Act (PERA), signed into law on October 11, 1996. The mission of the Propane Education & Research Council is to promote the safe, efficient use of odorized propane gas as a preferred energy source.