Planning for the Next Blackout:
Optimizing the Use of Distributed Energy Resources

Joan Glickman and Shawn Herrera, U.S. Department of Energy
Keith Kline, Oak Ridge National Laboratory
Mike Warwick, Pacific Northwest National Laboratory

ABSTRACT

Given recent blackouts and concerns of terrorist attacks, some public and private organizations are taking steps to produce their own heating, cooling, and power in the event of future, potentially prolonged, outages. For example, military installations, such as Fort Bragg in North Carolina, and the Marine Task Force Training Command in Twentynine Palms, California, turned to combined heat and power and other distributed energy technologies to reduce costs and simultaneously manage their energy and reliability needs. While these individual efforts can help ensure reliability for these facilities, public policies continue to discourage most individual public and private entities from making such investments. As a result, communities across the country are not adequately prepared to protect human health and ensure safety in the event of a prolonged emergency. Significant cost savings and social benefits can accrue if parties interested in emergency preparedness, energy efficiency, and environmentally preferred technologies, come together to identify and implement win-win solutions. This paper offers recommendations to help federal, state, and local governments, along with utilities, jointly plan and invest in cleaner distributed energy technologies to address growing reliability needs as well as environmental and emergency preparedness concerns.

Introduction

Given recent blackouts and concerns about vulnerable infrastructure, some public and private organizations are taking steps to ensure reliable power and continuity of operations in the event of future outages. Many government facilities and private companies have the capacity to survive short-term power outages, but are now evaluating whether their back-up power capabilities are sufficient to serve their most critical needs during a prolonged outage. First, this paper describes the context in which energy reliability is gaining more public and private attention. Second, the paper presents two examples to examine how some military installations are turning to distributed generation to meet reliability and other energy needs. Third, this paper outlines how public policies hinder or promote increased use of distributed energy. Fourth, this paper describes some of the views held by consumers; federal, state, and local governments; and utilities and why they might be interested in improved reliability. Finally, in light of these various stakeholder interests, the paper suggests collaborative approaches and policies that can lead to more strategic, cost-effective, and reliable energy investments.

Part I: Grid Problems, Extreme Weather, and Terrorist Threats: Potentially Driving Investments for Enhanced Reliability

A series of events have highlighted the need for enhanced reliability and increased protection against power outages. Most recently, the Northeast Blackout of August 2003, as well as weather-related outages in the Washington, D.C. area and other regions, rekindled interest in self-generation and further fueled a fire built on consumer concerns about power quality and reliability; service restoration after storms; utility costs; and price volatility.

The relatively brief, but large-scale, Northeast Blackout, affected up to 50 million North Americans, and cost as much as $6 billion due to business losses as well as emergency response and grid restoration costs. An emergency planning study conducted by NYC after the August blackout identified major deficiencies in communications systems and health care services due to limitations of many backup energy systems. Many of New York City's 58 hospitals experienced difficulties with backup generators (New York Daily News 2003). And, since hospitals are only legally required to have backup generation to meet the energy requirements of their critical needs, most hospitals were able to provide only limited services. The fact that many of these systems were inadequate to maintain normal operations calls into question the nation's approach for ensuring adequate power for key facilities in times of emergency, especially over an extended period.

The blackout also exposed weaknesses in our ability to maintain fully effective communication. Thousands of New Yorkers were unable to use their cell phones after wireless providers lost power at their cell towers. (Blankinship 2004) And, households that relied on battery operated cordless phones realized that these devices become inoperable during outages.

In contrast, those businesses and government facilities that had on-site generation were generally able to continue operating. For example, a police station in Central Park was an "oasis of light in the sea of darkness" with power from its fuel cell. Similarly, WestPoint Military Academy's demonstration fuel cells allowed the facility to operate as an electrical "island", powering household lights, air conditioning, and appliances during the outage. With the help of a proven combined heat and power (CHP) gas turbine system, Montefiore Medical Center in the Bronx was reportedly one of the few hospitals in NYC that continued to admit patients, perform surgeries, and maintain fully normal operations during the blackout. (USCHPA 2004)

As disturbing as recent outages have been to those affected, the attacks of September 11th and subsequent studies on grid vulnerabilities made it vividly clear that much more severe, long-term disruptions are possible. Sudden and severe power disruptions can potentially undermine near-term emergency response activities, as well as precipitate long-term economic dislocations. As a result, federal, state, and local governments have begun to look more closely at how to protect our nation's energy infrastructure and maintain critical operations in the event of long-term power outages, resulting from a malicious act or other circumstances.

The National Academy of Sciences report on the role of science and technology in countering terrorism included recommendations for installing more distributed generation to decrease power grid susceptibility to terrorist attacks. According to the study, "technology should be developed, tested, and implemented to enable an intelligent adaptive electric power grid." The National Research Council report also encouraged "adaptive islanding" to prevent prolonged, grid-wide outages from exploitation of known grid vulnerabilities.[1] (NRC 2003)

In December 2003, the White House issued a number of new directives that call on federal agencies to take steps to improve their emergency preparedness. Per these directives, federal agencies must inventory their assets and enhance their ability to respond in the event of an emergency. In particular, *Homeland Security Presidential Directive #7* (HSPD 7, DHS, Dec. 2003) calls on the Department of Energy to coordinate protection and readiness for critical energy distribution systems and infrastructure related to oil, gas and electricity. In terms of federal government operations, *Federal Preparedness Circular #66* (FEMA-2001) provides guidance to all federal departments and agencies for developing viable programs to support continuity of operations in the event of an emergency.

Part II: Military Case Studies

Traditionally, military installations have relied primarily on diesel generators for back-up power. While these generators demonstrate a first-cost advantage and have a proven track record for providing power during brief outages, they offer few other benefits and depend on access to fuel supplies. Due to the nature of their design, as well as permitting restrictions that limit operating hours in a growing number of areas, they generally cannot be used on a daily basis to reduce purchased power costs or to sell power back to the utility grid.

Infrastructure security experts recommend that investment in additional power supply options is needed to assure continuity of operations for extended periods. When we begin to consider the possibility of long-term outages, it quickly becomes clear that diesel backup systems, alone, do not offer the most reliable solutions. In addition to the evidence provided by the August blackout, a number of studies have documented failure rates associated with diesel and gas backup systems. In a study of diesel backup systems at nuclear power plants, the probability of failure to complete a 24-hour run was found to exceed 13 percent (G.M. Grant, et al. Feb 1996). In the event of a prolonged emergency, the probability of failure increases. In addition, continuous operation requires refueling. Assuring replacement supplies during a prolonged outage, especially after a catastrophe, may be problematic. Furthermore, storing large quantities of fuel on site poses environmental and other risks.

As one alternative, larger installations can set up "microgrids" which are electronically managed networks of small generating units. In addition to improved power reliability, the interconnection of multiple on-site power generators allows peak shaving; maintenance and performance testing under normal operating conditions; and, the ability to dispatch generators seamlessly for economic purposes. (Meyer et al) Given these benefits of interconnection, as well as concerns about traditional back-up generators, some federal installations are investing in newer, cleaner and larger capacity distributed generation options and integrating them in energy management systems. The following case studies look at how two military installations turned to distributed generation to meet their various energy needs.

[1] Islanding is a utility practice whereby areas that have generation are cut off from other parts of the grid so they can continue to operate until the main power grid is restored.

29 Palms Marine Air Ground Task Force Training Command

The mission of the Marine Air Ground Task Force Training Command at Twentynine Palms, California is to operate the U.S. Marine Corps Air Ground Combat Center for live-fire combined arms training that promotes readiness of operating forces. More than 10,000 military personnel and families are housed at the base. Prior to implementing major on-site energy infrastructure improvements, the base faced a number of energy concerns, including the fact that it is located in the desert at the end of a transmission line, had already experienced multi-day outages, and was subject to high prices and operational uncertainties. With summer temperatures at times reaching higher than 120 degrees, the base needed a more self-sufficient and reliable energy source to adequately control indoor environments and assure continuity of training operations during common outages as well as in the event of an extended emergency.

With some initial support from the Department of Energy to assess the feasibility of on-site power generation, managers at the base realized that a large scale power project could meet a variety of their needs: greater energy security, enhanced ability to operate during the course of longer outages, improved energy efficiency, as well as reduced costs. In 2001, the installation entered into an energy savings performance contract to replace existing boilers with a new CHP system that addressed energy supply, cost and reliability concerns simultaneously. The new cogeneration system now provides approximately 7.2 MW of electrical power and 21 MMBtuH of high temperature hot water through a heat recovery system. The system's dual fuel capability enables the base to make a seamless switch between natural gas and liquid fuels in the event of a failure in the gas supply. The system greatly increases the reliability of power supply for critical loads on the base while generating significant reductions in utility bills. When fully interconnected with new absorption chiller plants, the overall system efficiency is expected to be 75 percent, or more than twice the average efficiency of the U.S. electric grid.

Using a portion of the operational savings from the CHP system, the Marine Corps base also installed one MW of new photovoltaic (PV) generating capacity, with plans to double the system's capacity in the future. With financing from the energy savings performance contract, and the help of California state subsidies for PV, the Marine Corps is installing these new on-site power generating systems—more than 9 MW of capacity at maximum output after the remaining PV is installed—without any significant capital outlay. The energy manager estimated that these systems, coupled with existing backup power generators, could provide enough generating capacity to fully meet their training mission power requirements. This example demonstrates how energy efficiency can help pay for significant enhancements in reliability.

A recent study by Warwick, et al. took another look at 29 Palms and confirmed that renewable energy can play an important role as part of an energy security and reliability strategy for military installations, and perhaps communities in general. The CHP system and renewable resources, in contrast to diesel backup generators, can provide useful power throughout the life of the system, not only during an outage. Renewables have no fuel costs, low O&M costs, and relatively few environmental restrictions. Furthermore, the power generated by on site CHP and renewables can be valued at whatever is higher: prevailing market prices, prevailing prices for green power, or the avoided costs of power purchases from the local utility.

The Warwick study compares the cost of improving reliability either through investment in additional diesel fired generators or renewable systems. The study considered which options would best enable the facility to contend with a potential 30-day power outage, occurring once in 20 years. The analysis indicates that even modest amounts of solar and wind power can significantly extend emergency power operations and expansion of either resource can significantly increase the amount of load that can be served beyond "critical" loads that are backed up by dedicated emergency power systems. (While not considered by the study, CHP would provide similar benefits.) From a cost perspective, both the wind and geothermal options evaluated produced enough revenue over the 20-year period to provide a positive net present value when compared to the cost of simply buying additional diesel generators. In fact, the wind and geothermal options were found to be cost advantageous, even though the study ignored environmental benefits of renewables and potential state and federal rebates. The cost benefits would be even greater if outages exceeded 30 days over a 20-year period. (Warwick et al, 2003)

Fort Bragg Microgrid[2]

Fort Bragg military base in North Carolina constructed a microgrid to reduce costs and simultaneously improve reliability and diversify its energy supply options. A microgrid is defined as an "electrical subsystem which combines distributed generation with loads and provides a controlled single point of connection to the grid, or operates isolated." (Lasseter 2002) A microgrid often includes an energy management system to optimize energy use by making decisions regarding the best use of generators for producing electricity and heat, and for supplying critical loads in an emergency.

The Fort Bragg microgrid currently controls 17 generating units representing more than 13 MW of capacity, including a new combined heat and power plant that began operating last summer. With the help of an automated control system, each generator can respond to utility real time price signals and/or reduce peak demand, and thereby reduce utility bills. By taking advantage of a real time pricing electric tariff, Fort Bragg saves $4 million each year; and, an additional $1.2 million is saved each year by operating the generators in peak shaving and demand management modes.

In addition to providing cost savings, the microgrid enhances power reliability for a variety of reasons. First, the base now relies on more diverse energy resources. Second, rather than relying on manual systems, the microgrid automatically monitors and diagnoses the operational functions of generators. Third, with each generator fully interconnected to the grid, testing is done under real conditions to demonstrate that the generator can seamlessly connect to the grid and carry the required load. This has allowed the base to identify and correct several deficiencies that otherwise would have only become apparent during an outage. Fourth, if one generator unit fails or is down for service, other units on the microgrid can pick up its load. Finally, the interconnected system can isolate from the grid in the event of a utility power failure and continue to serve the base's critical power needs.

While the technologies deployed at Fort Bragg and 29 Palms differ, both systems succeed in meeting a variety of interests including cost savings, increased reliability, and an enhanced ability to operate during a long-term outage. Like 29 Palms, the Army at Fort Bragg was able to use an energy savings performance contract to finance most of the system upgrades. Both systems are highly efficient and help the federal government meet energy conservation and emission reduction goals. Furthermore, both examples illustrate the recent dramatic technological improvements that are making distributed generation and microgrids increasingly viable—both technically and economically.

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[2] Large military installations have their own distribution systems to serve on-base loads; however, very few have their own generation.

Part III: Policy Considerations

As the case studies above illustrate, some consumers are clearly investing in various forms of distributed energy to meet their needs. But, given the reliability and other benefits offered by these technologies, why are they not more widely used?

Barriers to Widespread Use of DER/CHP

State and local policies, along with cumbersome utility practices and technical challenges, often stand in the way of widespread use of distributed generation, including combined heat and power. Obstacles can include:

- Lack of capital for high upfront costs;
- Restrictive or lengthy permitting processes (air quality, siting);
- High standby, exit or interconnection fees;
- Low costs of electricity;
- Consumer reluctance to "get into the utility business";
- Lack of awareness of risks of being unprepared with no or ineffective backup power;
- Lack of awareness of potential savings if distributed generation systems are properly designed and managed;
- Complexity of systems and the need for custom engineering;
- Past failures due to poor designs and inadequate operations and maintenance; and,
- Risk and uncertainty associated with the pricing of alternative fuels.

Evolving State and Local Policies

A number of states have adopted policies, including standard interconnection requirements, design and construction standards, and net metering, to promote distributed generation, including combined heat and power. In addition, many states[3] offer technical assistance as well as financial incentives in the form of tax benefits, grants, loans, and rebates, among other types of assistance.

Earlier this year, the American Planning Association issued a policy guide on energy that calls on communities to institute subsidies and building regulations that promote the use of on-site distributed generation technologies. Making the connection between clean, distributed generation and smart growth, the guide suggests that local planners help broker discussions between utilities and customers to promote smart investments in clean and efficient forms of distributed generation. (APA 2004) While these policy developments suggest significant potential for distributed generation, renewable energy, and combined heat and power, more can be done to fuel government and consumer investment in these technologies and reliability improvements.

[3] Many utilities also offer technical assistance to assist with distributed energy systems.

Part IV: Understanding the Perspectives of the Various Stakeholders

In order to suggest policies and approaches that can encourage more strategic investment in distributed generation, the following discussion, while not comprehensive, outlines some of the issues that motivate different stakeholders.

Local Governments. Local governments represent the first line of responsibility in protecting public health and safety. And, this is likely their primary concern. When California instituted rolling blackouts in 2001, local governments were faced with managing massive traffic gridlock created by dead traffic lights. Similarly, local governments in the Washington, D.C. metropolitan area needed to devote significant police resources to directing busy intersections when traffic signals were off for as much as a week after Hurricane Isabel in 2003. And more serious concerns were raised when emergency response and healthcare were affected by disruptions in communications and other services due to limitations in backup energy systems.

In their daily operations and decision-making, local governments need to balance the interests of the various members of their communities. When tackling reliability and energy challenges, they may consider:

- What types of services and functions need to be maintained to protect public health and safety during an outage? (e.g., fire and police stations, hospitals, street lighting, traffic signals, communications, water and sewage, etc.)
- How will the public react to siting of new power generation?
- What types of services are needed to attract and retain local businesses?

State Governments. State governments also play a role in maintaining public health and safety as well as civic order. In addition to their role in safeguarding state facilities and interstate transportation routes, they are concerned on a day-to-day basis with a wide-range of issues, including environmental protection, economic vitality, consumer rights, and other public policy issues. State public service and utility commissions are also playing increasingly important roles in establishing rules and policies that affect the viability and economics of distributed generation.

Federal Facilities. Although not all federal facilities have critical functions that need to be maintained 24/7, many military installations, as well as other facilities, must be prepared to continue operations in the event of outages. VA hospitals and penal facilities are excellent candidates for CHP because they have high electrical and thermal energy needs. More than 200 hospitals and healthcare facilities nationwide are using CHP to lower energy costs by up to 50% and decrease power outages and interruptions by up to 95%.

While distributed generation may be attractive in terms of helping agencies safeguard their essential functions, most federal facilities lack the resources to pay for needed improvements. The federal government can turn to alternative financing when projects are economically viable. In fact, more than 20 federal installations have used alternative financing to reduce costs and improve reliability by installing 117 MW of new CHP capacity over the past 4 years.

In addition to securing power for its critical functions, the federal government, like state and local governments, can play an important role in establishing incentives and encouraging utilities to bolster the national grid with upgrades and strategic load enhancements. Effective national energy policies are critically important in encouraging more strategic investment; however, a discussion of federal rules and regulations is beyond the scope of this paper.

Businesses. Private sector companies, if they are actually paying attention to the possibility of outages, analyze their own facility energy needs, risks and opportunity costs in order to determine whether to invest in distributed generation. They balance the potential costs of outages, with the upfront costs of investments, as well as the potential savings from peak shaving. Generally, only those businesses that have already been adversely affected by power outages, or have requirements for high power quality and continuous operations, invest in backup power.

Households. While the average household might be inconvenienced by an outage, consumers generally do not make personal investments to safeguard against these relatively rare occurrences. Consumers tend to focus more on their monthly utility bills. And, they might voice concerns over air quality and noise pollution, particularly if new generation is sited in or near their communities.

Utilities. Although not responsible for ensuring 100 percent reliable power, utilities are sensitive to maintaining good relationships with their customers. For example, after Hurricane Isabel caused massive outages that left more than 500,000 without power in the Washington, D.C. area for as much as a week, Pepco came under significant criticism for not responding more quickly.

At the same time, utilities may look at some investments in distributed resources as potentially reducing their market. Given that they are responsible for maintaining power quality and safety, and are potentially liable for damages, utilities are particularly concerned with ensuring that interconnected, distributed energy systems work well within the grid, do not create any safety hazards, and maintain an acceptable voltage band width and frequency.

According to Alternative Generation's Joe Kerecman, most utilities have not figured out how to leverage distributed generation for their own economic benefit. "They have to learn to look at DG as a more manageable and less costly alternative way to mitigate higher cost infrastructure investment such as distribution, transformers and transmission systems." Alison Silverstein, advisor to FERC Chairman Pat Wood III, points out that "utility interest…should grow if they gain a better understanding of the location-specific benefits of DG. Then we may see better recognition of and compensation for real and reactive power in transmission-constrained urban areas. That's especially true if utilities take a greater role in owning, co-owning or locating the DG." (Blankinship 2004)

Utilities are more likely to be supportive of distributed energy resources if—

- the utility can maintain some control of the system, including how the generator's demands will fluctuate;
- the distributed systems help reduce peak demand and improve overall system reliability;
- the customer will pay for the ability to have grid service 100 percent of the time, so as to not pass on these costs to other consumers; and,
- new distributed generation systems allow them to delay the need for new distribution and generation investments to meet demand.

Part V: Recommendations

As the previous section points out, all levels of government have an interest in, and various responsibilities for, maintaining public health and safety. Although federal, state, and local governments do some emergency planning collectively, they currently are not investing together in solutions that will ensure continued power for critical needs in the event of a short or long-term outage. And, according to experts at all levels, we are not prepared for extended outages. The following recommendations focus on how federal, state, and local agencies, along with the private sector and utilities, can work together more effectively at the local level to create winning investments that improve overall reliability, help assure continuous power for critical functions, and address various stakeholder interests.

Strategic Microgrids and Islanding

Fort Bragg provides an example of how one large customer can create an effective microgrid that is connected to the grid, but can isolate itself, or create a strategic "island" in the event of an outage. By collaborating and investing in more distributed systems, federal, state, and local governments, along with utilities and businesses, can begin to create strategic microgrids designed specifically to serve critical needs. As these systems become more widespread, they could also improve the overall reliability of the grid. Through this type of collaborative approach, governmental agencies, utilities, and businesses can share in both the costs and benefits of establishing more reliable power.

Microgrids, given their potential for islanding, could prove to be win-win investments for military installations, public health and safety facilities, utilities, and surrounding communities by allowing strategic, electrical isolation of parts of the grid into self-sufficient regions or subunits. Microgrids, given recent improvements in software and electronics, can also allow users to balance their loads with the optimal mix of supply based on both financial and environmental criteria. If well planned, and based upon a diverse energy supply, these microgrids could help ensure power flows to critical military and civilian infrastructure during an extended grid outage.

Diversified Generation

While the options analysis for 29 Palms looked specifically at on-site renewables, it concludes that reliability concerns could be addressed similarly -- that is, the duration of emergency backup systems could be extended -- with the use of off-site renewable generation. In fact, diversifying generation with multiple types, fuels and geographical locations around a large installation would reduce intermittence (i.e., interruptions associated with individual renewable generation systems), thereby increasing the energy security contribution that renewables could make. Under such a scenario, multiple bases and municipalities could invest in wind and other resources with intermittent power, optimize their use, and mitigate intermittency issues through diversified investments. (Warwick et al. 2004)

As a first step in helping to finance such development, federal, state, and local customers with common interests (e.g. to serve a specific set of critical needs in an outage or emergency) can aggregate their demand in that district and thereby support the development of new renewable generation or district energy systems. This would be especially beneficial in congested areas or districts where new generation could be isolated to serve critical needs in the event of an outage. Aggregation, while difficult to coordinate, has succeeded in reducing costs and can also be used to spur development of new generation. For example, the Northeast Ohio Public Energy Council (NOPEC) brought together more than 600,000 residential customers from 112 member communities to aggregate demand for power, maximize their bargaining power, and thereby generate cost savings as well as support green power as part of a contract with Green Mountain Energy Company. As part of the deal, city and county facilities, as well as eligible small businesses receive a guaranteed discount on their bills if they choose Green Mountain Energy electricity through NOPEC.

Targeted Financial Incentives

Utilities, state and local governments, as well as the federal government can create financial incentives including subsidies, loans, rebates, tax benefits, and other mechanisms that encourage the strategic development of new generation and distributed generation. As stated previously, many state and local governments are already implementing progressive policies. The following lists some of the policies they should consider, if not already adopted:

- Adopt cost structures and tax incentives that encourage investment in highly congested areas. In particular, these policies should encourage consumers to strategically place distributed generation systems on the other side of congestion points.
- Send the right price signals so that consumers invest in systems that can help them reduce peak demand.
- Allow simplified and standardized interconnection as well as net metering.
- Set up revolving loan funds, or use a portion of existing public benefits funds, to finance development of new generation from renewables or clean, efficient district energy systems where new generation will improve local grid reliability.
- Set up mechanisms by which adjacent homes or businesses can jointly invest in distributed generation and share power, thereby reducing the costs and sharing the benefits (Warwick et al. 2002)
- Through government or utility subsidies, encourage the combined use of "smart" building systems and distributed generation systems so that grid operators and distributed energy systems can communicate with one another, reduce loads at critical times, and disconnect lines remotely to create strategic islands if necessary. (Warwick et al. 2002)
- Set up financial incentives and the legal framework whereby multiple parties can invest in setting up a microgrid that reaches beyond individual meters.

Enhanced Collaboration, Negotiation, and Education

Many of the aforementioned recommendations—in particular the development of strategic microgrids to support essential community services—depend on more effective collaboration between the various stakeholders. Since reliability is essentially a "local" issue, stakeholders may be more likely to bridge differences and find workable solutions at the local level. Given that local governments are charged with the primary responsibility for public health and safety, they can use their position to help broker discussions among community businesses, utilities, and federal and state facilities located in their jurisdictions. In particular, local governments should keep in mind that they generally have greater leverage over utilities when franchise agreements are up for negotiation. Furthermore, after recent outages, they can also use the media and public opinion to their advantage in negotiations.

Smart arrangements may require rethinking certain policies and practices that currently stand in the way of distributed generation. For example, state and local governments may need to reevaluate how clean air requirements are addressed so that relatively clean and efficient distributed generation systems can be sited in non-attainment zones where load needs are greatest. Similarly, in order to overcome "nimbyism", public fears, and reluctant zoning boards, the public needs to be educated concerning the benefits of siting distributed generation systems in their neighborhoods. Only when public institutions, businesses, and consumers understand the true financial and societal costs associated with short and prolonged outages will the various stakeholders come together to invest in reliability.

Regardless of who takes the lead in brokering these negotiations, all parties must be convinced of the benefits of investments if they are to share in the costs. Consumers, businesses, and public organizations need to have a better understanding of the benefits of investing in reliability, the potential risks of long-term outages, and the social, economic, and environmental trade-offs that must be made as we collectively and individually assess various investment options.

Conclusion

Recent outages and security threats have created a window of opportunity for the nation to begin to address reliability concerns, both in terms of improvements to the national grid and in terms of protecting critical functions. In fact, these events have set the stage for developing a more concerted, coordinated approach to ensuring reliable power. Federal, state, and local governments along with utilities and business owners should seize this opportunity by embarking on a coordinated effort that looks at serving the interests of multiple stakeholders at the local level. If each stakeholder considers only their own short term interests and a traditional "least initial cost" approach, we will waste money and may invest in diesel generators that sit idle most of the time and create air quality concerns when operating. Whether one cares about reliability, environmental protection, public health and safety, advanced technologies, or other concerns, a wide range of public and private sector stakeholders must come together to find solutions that address these wide-ranging interests. If we approach this challenge strategically as an opportunity, we can satisfy many different interests at the same time that we address reliability concerns. We not only have an opportunity to improve reliability, we have a chance to invest in cleaner energy options and more efficient technologies that offer superior performance.

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