The Benefits of Distributed Resources to Local Governments: An Introduction

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Executive Summary

Numerous publications, reports, and case studies have demonstrated that distributed resources provide benefits to both the resource owner and the electric utility. This report begins to examine the benefits that distributed resources provide to the government.

The report discusses how local governments benefit from distributed resources. It includes the following benefits.

- Provide direct benefits when used in government buildings
- Improve the environment
- Guide economic development
- Ensure electrical system reliability for constituents
- Protect constituents from high electricity prices
- Provide disaster relief support

The report then suggests some actions that local governments can take to encourage the use of distributed resources.

- Integrate bundled systems of energy efficiency and renewables into government buildings where they are cost-effective
- Eliminate biases in the tax system that favor traditional electricity supply over distributed resources
- Include distributed resources as part of their overall planning process, particularly in the areas of disaster preparedness and economic development.

This report presents several preliminary findings as to how governments might benefit from distributed resources. Next steps include the identification of other ways that governments benefit from the distributed resources, quantification of the benefits, and determining other beneficial actions that governments can take.

Introduction

Local governments have typically left electric power infrastructure planning and operation to the local electric utility. This was acceptable when a single agency was responsible for the planning and operations. The advent of deregulation and the introduction of distributed resources into the electric utility network disrupts this model because a single entity is no longer responsible for overseeing the planning process and operation of the utility grid. Rather, the planning and operations has become the domain of a number of parties.

As a result, the government can play an important role with regard to distributed resources. This is being clearly illustrated in California. The California state government[1] recently took actions with the electric grid in general and has used distributed resources (energy efficiency and load management) in particular to solve a set of pressing issues. California Governor Gray Davis signed three executive orders (directions that the governor gives to state agencies) on August 2, 2000 in response to the recent electrical power crisis in California (see Appendix for the full text of the orders).[2]

Executive Order D-14-00 directs state agencies involved with the licensing of new generation facilities to speed up the approval process. The order states that the California Energy Commission shall propose legislation and/or regulations to prioritize and expedite the State Power Plant Licensing Process for the cleanest projects.

Executive Order D-15-00 directs state agencies to institute energy conservation measures (load management) that will reduce energy consumption during stage II and stage III electrical emergencies. The order states that one of the reasons this is done is "if local and federal government facilities, business and residential consumers followed the State's lead during an emergency and similarly reduced their power by two to three percent or more, many severe electricity emergencies could be averted."

Executive Order D-16-00 directs state agencies to implement sustainable building practices (including the use of energy efficiency) in government buildings. The order states that "the sustainable building goal of my administration is to site, design, deconstruct, construct, renovate, operate, and maintain state buildings that are models of energy, water, and materials efficiency; while providing healthy, productive and comfortable indoor environments and long-term benefits to Californians." Furthermore, new and retrofit buildings should take into account the life-cycle energy costs when they are being designed. One of the reasons this is being done is that an opportunity exists for the State of California to foster continued economic growth and provide environmental leadership by incorporating sustainable building practices into the state capital outlay and building management processes.

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[1] An example of the federal government's role can be see in the presidential Executive Order signed on June 3, 1999, which promotes energy efficiency in government buildings (http://home.doe.gov/news/releases99/junpr/pr99136.htm).

[2] These are the only executive orders Governor Davis had signed to date in 2000. www.governor.ca.gov/briefing/execorder/index.shtm

These executive orders are important because they demonstrate that one governmental body believes it has an important role in promoting distributed resources. In addition, these examples indicate that the benefits of distributed resources have been recognized by a large state government.[3]

Benefits of Distributed Resources To Government

Objective

Distributed resources provide benefits to a variety of parties. The benefits of distributed resources have typically been analyzed from the perspective of the resource owner and the electric utility. Distributed resources also provide benefits to the government. The objective of this study is to enhance local government officials' understanding of the benefits of distributed resources as they apply to the local government.

The benefits that will be discussed in detail in the subsequent sections of this report include the following.

1) Provide direct benefits when used in government buildings;
2) Improve the environment;
3) Guide economic development;
4) Ensure electrical system reliability for constituents;
5) Protect constituents from high electricity prices; and
6) Provide disaster relief support

The concluding section will give some recommendations as to what the local governments can do to promote distributed resources.

Provide Direct Benefits

Governments can use distributed resources in public facilities and directly reap the benefits like any other customer. While it is beyond the scope of this work to give a detailed description of all of the benefits, some of the more important benefits that the resource owner may obtain are listed below.[4,5]

- Reduced utility bills
- Cleaner, quieter operation with reduced environmental impacts (efficiency, renewable, and cogeneration technologies)
- Greater market independence and consumer choice
- Ability to produce green power
- Higher reliability and enhanced power quality
- Cogeneration capability (fossil fuel-based systems)
- Building materials replacement (building-integrated PV systems)

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[3] While the orders refer to energy efficiency, the benefits of renewable distributed resources are similar to the benefits of energy efficiency

[4] www.sustainable.doe.gov/municipal/arttoc.shtml

[5] NREL has assembled a good brochure that describes the benefits of distributed generation. Christy Herig, Distributed Generation, National Renewable Energy Laboratory brochure available at www.nrel.gov/docs/fy99osti/23398.pdf.

- Aesthetic improvements
- Economic incentives and/or tax savings
- Mitigation of energy price risks (particularly renewable systems)

A particularly interesting way that distributed PV systems might be cost-effectively integrated into government buildings is to bundle them with energy efficiency. The City of Tucson is a good example of a local government that took such an approach. They built the new Southeast Service-Center (shown in Figure 1) to a sustainable energy model. This meant that it would use 50 percent less energy than a building constructed to the model energy code. In addition, they installed a 5 kW_{AC} PV system. Vinnie Hunt[6] with the City of Tucson estimates that the efficiency investments cost $24,000 and saved $3,100 per year and that the PV cost $49,000 and saved $1,100 per year. Assuming that such a PV system would cost about $40,000 today, the total cost would be $64,000 with an annual savings of $4,200 per year. If the City of Tucson took out a 30 year-loan on the $64,000 using its 5 percent cost of capital, the annual loan payment would be $4,163, which is less than the annual savings of $4,200.

While it could be argued that the City of Tucson could have saved money by only implementing the energy efficiency investments, it was also able to install a PV system in a cost-effective manner. As a result, it will reap additional distributed benefits associated with the PV system described above.[7]

According to Hunt, the City has decided to extend its efforts in solar energy utilization projects. With deregulation in electricity markets in Arizona, Tucson Electric Power implemented a 1 percent rate reduction on July 1, 2000. Rather than reducing their electric bills, the Mayor and Council passed a resolution that uses the 1 percent rate reduction to promote solar energy utilization projects for the next 5 years.

[6] Vinnie Hunt, City of Tucson (520) 791-5111.

[7] While the PV system does not currently have any battery storage, it would not be too difficult to equip it with the backup in the future.

Figure 1. City of Tucson's Southeast Service-Center (highly efficient with PV).

Improve the Environment

The potential to reduce electricity consumption and the associated environmental emissions is large. Consider the effect distributed resources could have in the residential sector in the U.S.[8] Figure 2 presents the fuel consumed to produce electricity and the natural gas used for heating in the U.S. residential section in 1995. The figure is drawn to scale. It represents 16.5 Quads of energy consumption, 30 percent of which is natural gas and 70 percent of which is for electricity generation. The figure shows that two-thirds of the fuel consumed is lost in waste heat.[9]

Figure 2 highlights the existence of two energy-savings opportunities. First, large energy savings can be realized by using electricity more efficiently at the point of consumption. This is because a unit of electricity saved at the point of consumption results in two additional units of energy that do not need to be produced in the first place. Second, energy savings can be realized by having more efficient gas appliances; the savings, however, are not as great as from an electrical perspective because there are minimal losses associated with delivering natural gas to consumers. Energy efficiency experts have recognized and exploited both of these opportunities for more than two decades.

[8] While this analysis is focused at the entire residential sector in the U.S., the same analysis has been applied at a state level (and could be applied at a local level as well).
[9] The analysis in this section is taken from T. E. Hoff, J. P. Weyant, C. Herig, and H. J. Wenger, Forthcoming in the International Journal for Global Energy Issues. Available at www.clean-power.com.

Another way to view the potential for energy savings is to assume that the U.S. transitions from a centralized electric system to a distributed system. More specifically assume that each of the 100 million households in the U.S. takes a three-pronged approach to satisfying its electricity needs. Each household: (1) reduces its electricity consumption by one-third using electrical end-use efficiency measures; (2) meets one-third of its needs using a photovoltaic (PV) system; and (3) meets the remaining one-third using cogeneration (either district heater or individual cogeneration units) that produces both electricity and heat and operates the unit so as to consume the same amount of natural gas as it currently consumes. The total fuel consumption for electricity and heating needs is as presented in Figure 3. The result is that all of the fuel used to generate electricity in the top portion of Figure 2 is eliminated. That is, 11.5 Quads or 70 percent of the total fuel currently used by residential consumers is no longer consumed; only the natural gas that is currently consumed continues to be consumed.

An important issue that arises after examining Figure 3 is whether or not there is a balance between production from the distributed resources and consumption over time. The first step in addressing this issue is to examine the match on a monthly basis. Figure 4 presents the measured electricity consumption and estimated production using distributed resources by month for the residential sector in 1995. The figure suggests that there is a good match between consumption and production. This is due to the fact that electricity produced by distributed cogeneration occurs primarily during the winter when space heating requirements are the greatest while electricity produced by distributed PV occurs during the summer when there is the most sunlight and cooling need. That is, the cogeneration and PV complement each other.

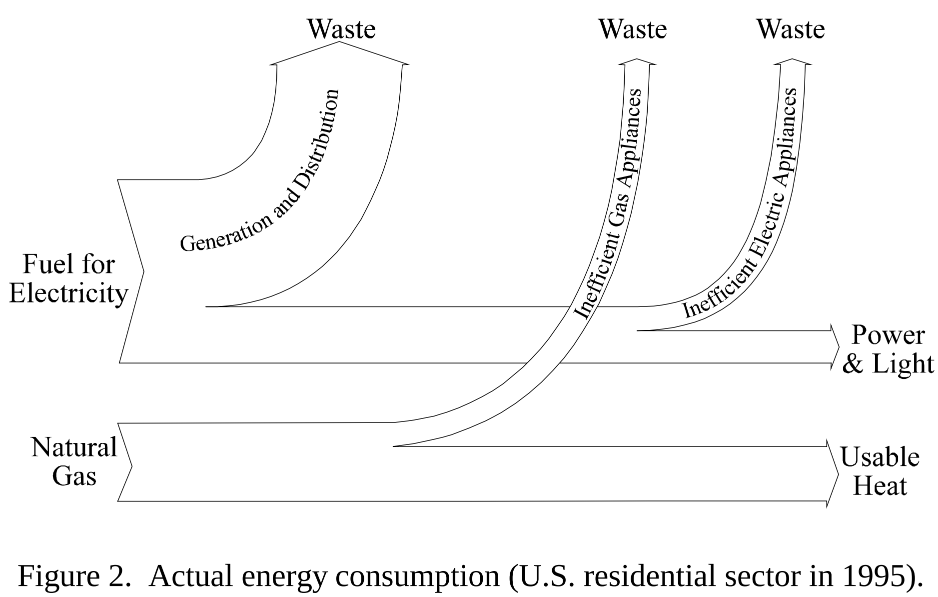

Figure 2. Actual energy consumption (U.S. residential sector in 1995).

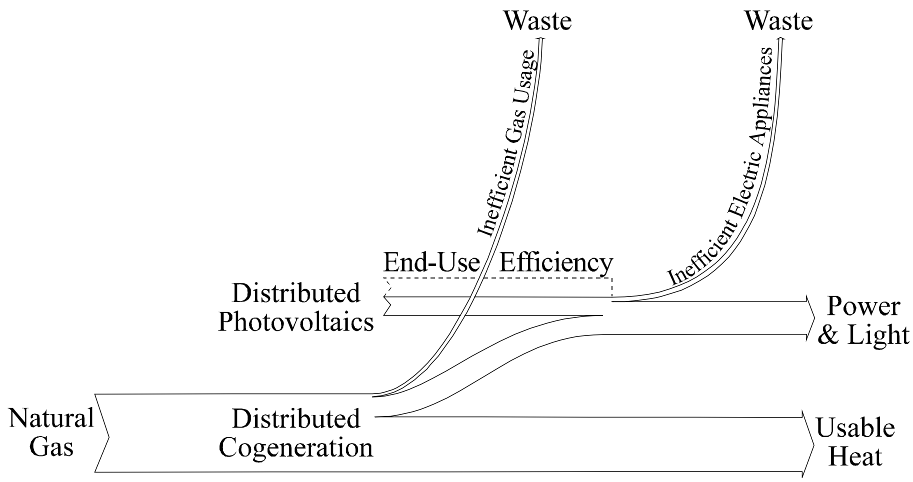

Figure 3. Potential energy consumption with distributed resources (U.S. residential sector in 1995).

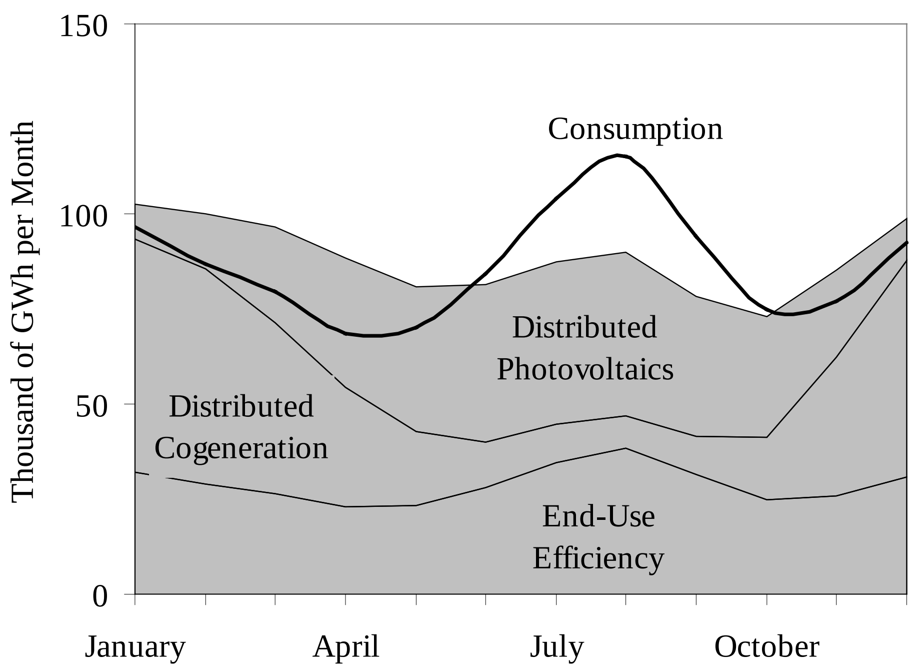

Figure 4. Measured electricity consumption and estimated production using distributed resources (U.S. residential sector in 1995).

Guide Economic Development

Distributed resources can help to guide economic development within a community. One of the things that will attract different industries to an area are the characteristics of the electrical system. Some industries are very sensitive to the cost of power while others are particularly sensitive to the quality of power.

The process might go something like this. The community would determine what type of jobs it desires to attract to the city. It could then use the types of distributed resources that will support the needs of these industries. Consider two examples: information industries and manufacturing industries.

Information Industries

One city may want to attract telecommunication, Internet, and banking businesses.[10] These businesses require a highly reliable power system. In fact, suppose they can tolerate expected outages of 15 minutes per year. In addition, suppose that the city is located in an earthquake zone and the technology choice is between a PV/battery system and a fuel cell.

It has been determined that the electric grid has an expected 8 hours of outages per year so that it is clear that some sort of distributed generation is required. Six hours of the outages are due to local transmission and distribution system disturbances while 2 hours are due to earthquakes. The natural gas supply has to be shut off four out of every five times that there is an earthquake for safety reasons; the gas is always available under all other circumstances. In addition, the fuel cell equipment manufacturer has given an unconditional guarantee that the equipment has 100 percent reliability. The PV/battery system is available 99.9 percent of the time under most circumstances; during earthquakes, it has a 10 percent chance of failure.

Without performing an analysis of this situation, one would expect that the fuel cell would be most reliable technology. As shown in Figure 5, however, these assumptions result in an expected outage time of 1 hour and 45 minutes per year for the utility grid in combination with the fuel cell. The utility grid in combination with the PV/battery system has an expected outage time of less than 15 minutes per year, thus satisfying the reliability requirements of the businesses you want to attract.

The point of this simple example is not that PV/battery systems are always preferable over fuel cells. Rather, it is that technology selection depends upon both the community-specific risks and the technology risks.

[10] A good contact for more information on this subject is David Tooze at the City of Portland (503) 823-7582.

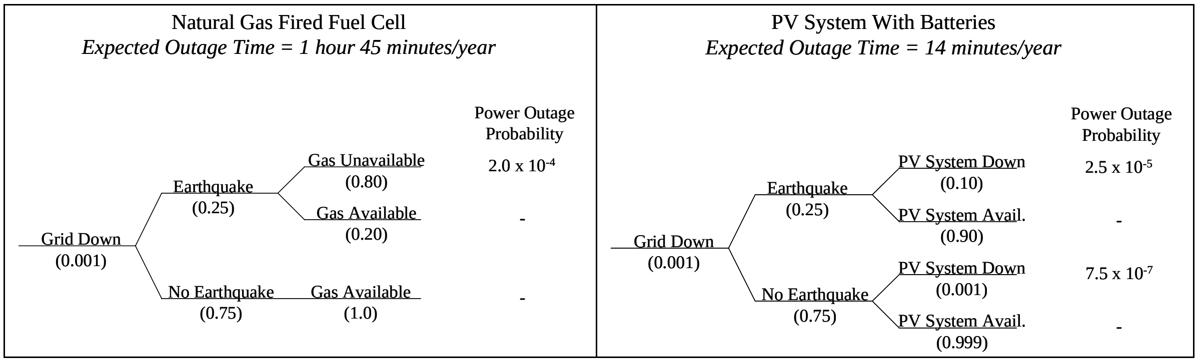

Figure 5. Expected outage time for fuel cell and PV/battery systems.

Manufacturing Industries

Now suppose that another city wants to attract energy-intensive manufacturing businesses. This city might consider the encouragement of intensive energy efficiency investments and gas turbines operated in a cogeneration mode so that the technology produces both heat and electricity. Cities, such as Osage, Iowa, have shown that lower utility bills will attract industry to an area.[11]

Electrical System Reliability

Electrical system reliability is an issue that is closely linked to a community's economic health. Ensuring a reliable electrical system is an important concern of the government. The previous subsection illustrated how a reliable electrical system might help the local government to guide its economic growth plan.

In addition to short-term outages, communities need to evaluate the possibility and the effect of a sustained outage. Businesses, particularly small businesses, could be closed down due to a major power outage that takes weeks to restore. For example, consider the effect of the sustained power outage that occurred in Auckland, Australia several years ago.[12] Citizens will suffer in communities whose businesses fail.

Communities need to assess their vulnerability to a sustained power outage. Are they in a remote location that has only one source of power? Is their power supplied by a long transmission line that, if damaged, would take a long time to repair? Is the community reliant on a single source of power?

The community might consider the development of an emergency level of power that could provide power in the event of a sustained outage.

Price Protection

Another benefit of distributed generation is that it can help to provide electricity price protection for its citizens and businesses.

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[11] www.sustainable.doe.gov/municipal/energyuse.shtml
[12] www.info-sec.com/denial/battlechips/crisis1.htm

The negative political effects of high and uncertain energy prices has been made very clear by the situation in San Diego, California. When California deregulated its power markets, rates were initially frozen for customers of the state's three investor-owned utilities. Investor owned utilities were to leave the generation and transmission business and retain the distribution business.

San Diego Gas and Electric (SDG&E) customers were the first to experience the full effect of deregulation when the rate freeze was lifted in early 2000. In theory, electricity supply costs should no longer be a concern to SDG&E because their job is to deliver the electricity, not to generate it; they simple pay the market price.

The situation, however, has not turned out this way. On August 30, 2000, more than two-thirds of the California Assembly passed emergency legislation (Assembly Bill 265) that establishes a $0.065/kWh cap on the cost of energy for ratepayers, a price that is less than a third of the current ``free market'' cost of $0.20/kWh. The cap is retroactive to June 1, 2000, the time when rates began to skyrocket. SDG&E will initially pay the difference between the rate cap and the market-based rate. The utility will recoup the shortfall from customers at a later date.

This example[13] highlights the fact that highly uncertain electricity prices are politically unacceptable. These high prices also offer an opportunity to use distributed resources. Consider what distributed PV systems would have done on one of the highest cost days in California. Figure 6 presents the match between estimated PV energy output (for two different systems) and energy prices on June 14, 2000. Notice that there is a fairly good match between high energy prices and PV system output for a west-facing PV system.

[13] The same sort of situation is occurring in Europe with the high gasoline prices in September 2000. Protests are even occurring in a number of European countries. The message: skyrocketing gas prices will not be tolerated. Even though the gas prices are market-based, the people expect the government to take action in (such as tax breaks) in response to such situations.

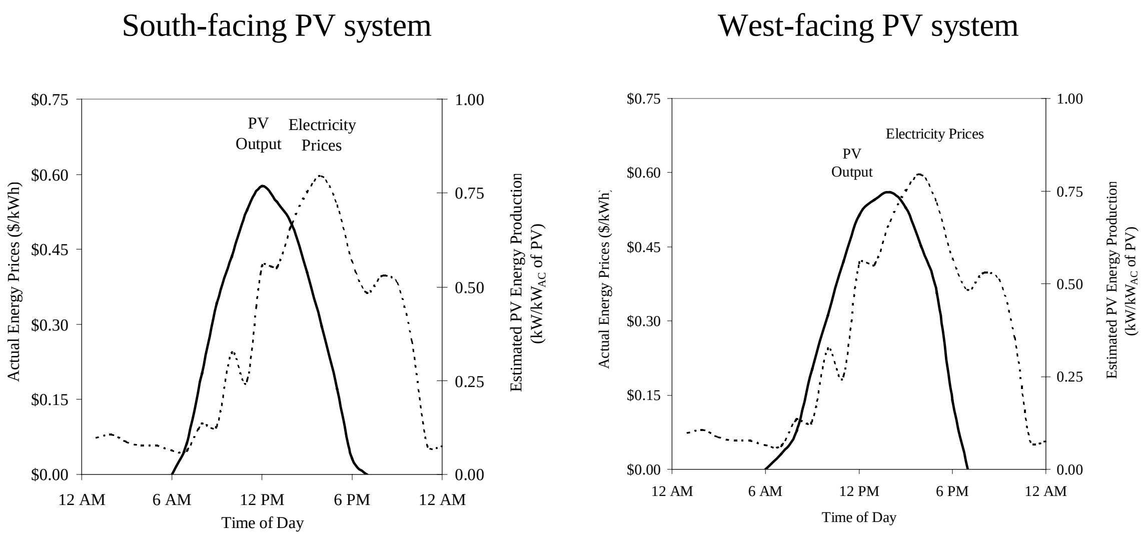

Figure 6. Managing price risks in San Diego with PV (June 14, 2000).[14]

There are several actions governments might take based on this sort of information. First, widespread implementation of PV would benefit all electricity consumers in California because it would increase supply during high price periods and thus reduce prices for everyone.

Second, the government may want to encourage particular orientations of PV systems that are not necessarily optimal for individual customer. For example, Table 1 presents the utility bill savings and energy production for a 30° tilted PV system in San Diego, CA that faces either south or west.[15] The table shows that a PV system that faces south will both produce more electricity and also have higher utility bill savings (when evaluated using a standard net metering tariff) than a PV system that faces west. That is, the best system for the customer is a system that faces south.

Table 1. Value and energy production of 1 kWAC PV systems in San Diego, CA.

30° Tilted PV System	**Utility Bill Savings**	**Energy Production**
Facing South	$279/year	1,894 kWh/year
Facing West	$238/year	1,615 kWh/year

It may be beneficial for the government to give higher incentives for PV system orientations that benefit a broader number of Californians. The reason for this is that, as shown in Figure 6, PV systems that face west have a better match to the peak energy prices than PV systems that face south. If enough west-facing PV systems were installed that produced power during these peak price periods, electricity prices would decrease because the electricity supply would be less constrained. All electricity consumers in

[14] Energy prices are actual prices reported by SDG&E (www2.sdge.com/eic/px/pxhourly.cfm); PV system output is estimated output.
[15] It is assumed that the customer is on a non-time-of-use residential rate structure.

California would benefit from those who install the PV systems and face them west. That is, even when electricity prices are supposed to be market-based, there is an externality benefit that derives from investment decisions made by individual consumers.

Disaster Relief Support

Hurricanes, tornadoes, fires, floods, earthquakes, ice storms, etc. are not inherently catastrophic but are simply natural occurrences. They become disasters when they disrupt people's lives and damage property.

A number of groups and organizations have focused on the benefits of distributed PV systems during disasters. Florida Solar Energy Center, for example, has an extensive set of resources, publications, and training in this area.[16] They show how PV has been a valuable asset from a variety of perspectives in recent disasters. The systems are capable of providing the electrical needs for vaccine refrigerators, microscopes, medical equipment, lighting, radios, fans, traffic control devices, communications and other general electrical equipment. The Center of Excellence for Sustainable Development also contains good information on this subject.[17] Others, such as those at Lawrence Berkeley Labs, have shown how energy efficiency can be used as an insurance loss-prevention strategy in the context of natural disasters.[18]

There are several ways that local governments might consider the use of distributed generation from a disaster relief support perspective. First, local governments should consider incorporating PV backup systems into government facilities beyond just police stations, fire stations, etc., many of which already have backup generation. It is possible that it could do this in a cost-effective manner by bundling PV systems with energy efficiency as described earlier for the City of Tucson.

Second, local governments might consider encouraging residential customers to have a small PV/battery system as part of their overall emergency preparedness. People will be willing to live on a small amount of power much longer than they would be with no power. The average customer can greatly reduce their energy consumption during emergency situations. They may require only enough electricity to run a refrigerator and power a few lights and a radio. As a result, there are political benefits/public safety benefits. In addition, landfills will benefit by reducing the number of people who provide their emergency power needs with disposable batteries. Batteries get old and need to be replaced; many of those batteries end up in landfills.

Third, local governments might consider encouraging commercial customers to have a small distributed generation system that would enable them to operate their core business even in outage situations. A city's tax revenues will thrive if its businesses revenues thrive. Thus, it is in the best interests of the city government if it provides ways for its businesses to be as healthy as possible.

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[16] www.fsec.ucf.edu/PVT/disas1.htm.
[17] www.sustainable.doe.gov/disaster/disintro.shtml
[18] http://eetd.lbl.gov/CBS/insurance/index.html.

Conclusions

Numerous publications, reports, and case studies have demonstrated that distributed resources provide benefits to both the resource owner and the electric utility. This report begins to examine the benefits that distributed resources provide to the government. The report discusses how distributed resources benefit local governments in the following ways: (1) provide direct benefits when used in government buildings; (2) improve the environment; (3) guide economic development; (4) ensure electrical system reliability for constituents; (5) protect constituents from high electricity prices; and (6) provide disaster relief support.

Local governments can take a number of specific actions to encourage the use of distributed resources. First, they can integrate bundled systems of energy efficiency and renewables into their buildings where they are cost-effective. The money that is saved with the low-cost energy efficiency investments can offset the higher cost renewables so that the overall utility bill remains the same. The result is that the government does not need to increase taxes to pay for the distributed resources and yet still obtains the added distributed benefits.

Second, governments can eliminate biases in the tax system that favor traditional electricity supply over distributed resources. To illustrate the importance of the biases, consider a California customer who is selecting between electricity from an Energy Service Provider and purchasing a PV system.[19] The California electrical energy surcharge excise tax on electricity is 0.02 percent[20] while, until a few years ago, the combined sales and property taxes over the life of the PV system were over 22 percent.[21] Such a tax policy discourages the use of PV.

Third, governments should include distributed resources as part of their overall planning process. Distributed resources are a valuable tool that governments can use to help accomplish their goals and objectives. This inclusion is particularly important in the areas of disaster preparedness and economic development.

The majority of the analysis of distributed resources has been from the perspective of the distributed generation owner and the local utility. This report represents an initial effort as to how governments might benefit from distributed resources. There is much room for further work on the subject. This further work includes the identification of other ways that governments benefit from the distributed resources, quantification of the benefits, and a list of suggested actions that governments can take.

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[19] In order to make a fair comparison, assume that the customer finances the PV system with a long-term loan (that has no tax benefits) and that the annual cost of the PV system is the same as the annual cost of purchasing electricity from the ESP.

[20] A representative at the California Board of Equalization quoted this figure. Some cities also tax electricity but many do not.

[21] The sales tax is at least 7.25 percent (www2.boe.ca.gov/ixpress/jurisdiction/jurisdiction/JurInput.dml) and prior to property tax exemption legislation, the property taxes would have been an additional 15 percent (based on a 30-year PV system life, an annual property tax rate of 1.25 percent, and an 8 percent discount rate).

Appendices

EXECUTIVE ORDER D-14-00 by the Governor of the State of California

WHEREAS, there has been a combination of continued electric load growth and lack of proposed new generation facilities in California and the western United States during recent years; and

WHEREAS, restructuring of the electricity markets in California and the western United States has increased competition for electricity generated within California and has reduced the availability of electricity imported from other states; and

WHEREAS, there have been a growing number of electricity supply alerts declared by the Independent Systems Operator, local electricity system reliability problems, and high electricity prices; and

WHEREAS, this circumstance may exist for the next two summers until new generation sources currently licensed become operational.

NOW, THEREFORE, I, Gray Davis, Governor of the State of California, by the virtue of the power and authority vested in me by the Constitution and statutes of the State of California, do hereby issue this order to become effective immediately:

All state agencies involved in the licensing of proposed electric power plants in California will participate to implement the State's energy facility siting process in a timely manner without compromising the protection of public health and safety, the quality of the environment, or public participation. All agencies shall diligently review proposed license applications and provide timely comments to the lead agency within 100 days of the date the application is deemed to be complete.

The California Energy Commission shall propose legislation and/or regulations to prioritize and expedite the State Power Plant Licensing Process for the cleanest projects, those likely to result in the fewest or least public health, safety or environmental impacts and fully comply with all applicable federal, state, and local requirements. The California Energy Commission shall consult with the California Environmental Protection Agency, Resources Agency and the Governor's Office of Planning and Research in developing those regulations.

The President of the Public Utilities Commission, the Chairperson of the Electricity Oversight Board, the Chairperson of the Energy Commission, the Secretary of Resources Agency, the Secretary of the Environmental Protection Agency and the Director of the Governor's Office of Planning and Research shall comprise the Governor's Task Force on Energy Reliability to consider, coordinate and advise me on energy generation, reliability, siting, conservation, and efficiency policies.

EXECUTIVE ORDER D-15-00 by the Governor of the State of California

WHEREAS, the California Energy Commission has determined that California faces potentially severe shortages of electricity this summer that could extend into the summers of 2001 and possibly 2002; and

WHEREAS, the California Independent System Operator (ISO), a not-for-profit corporation, is responsible for managing the State electrical power grid; and

WHEREAS, during periods of peak demand the California Independent System Operator (ISO) may declare in progressive stages an Electrical Emergency, depending upon the amount of reserve generation available to the California electrical grid; and

WHEREAS, conscientious management practices at State facilities can reduce energy consumption; and

WHEREAS, during periods in which electrical demand puts strains on the electric systems of the state's utilities every effort to reduce energy demand and increase needed electricity supplies is critical to ensuring the stability of the electrical grid; and

WHEREAS, the state's effort to lead, shed electrical loads, and encourage load shedding by other consumers can have an important impact on statewide energy supplies and reduce the seriousness of some future situations; and

WHEREAS, if local and federal government facilities, business and residential consumers followed the State's lead during an emergency and similarly reduced their power by two to three percent or more, many severe electricity emergencies could be averted.

NOW, THEREFORE, I, Gray Davis, Governor of the State of California, by virtue of the power and authority vested in me by the Constitution and statutes of the State of California, do hereby issue this order to become effective immediately:

1) Direct the State and Consumer Services Agency in consultation with the Department of General Services; the Business, Transportation and Housing Agency in consultation with the Department of Transportation; the Youth and Adult Correctional Agency in consultation with the Department of Corrections and the Youth Authority; and the Resources Agency in consultation with the Department of Water Resources to immediately institute energy conservation measures that will reduce energy consumption during stage II and stage III electrical emergencies.

2) Direct the aforementioned agencies and departments, under the leadership of the State and Consumer Services Agency to coordinate response efforts for any future electrical emergencies, to monitor the effectiveness of responses and to develop training programs for State facility managers.

3) Direct the State and Consumer Services Agency in consultation with the Department of General Services and the Office of Emergency Services to develop and implement a comprehensive communications strategy to ensure that critical information regarding any energy emergency accurately and quickly flows from the utilities to the agencies of State government and their facility managers.

EXECUTIVE ORDER D-16-00 by the Governor of the State of California

WHEREAS, California is committed to providing leadership on energy, environmental and public health issues by implementing innovative and resource-efficient public building design practices and other state government programs that improve the lives of California's 34.5 million residents; and

WHEREAS, the state invests approximately two billion dollars ($2,000,000,000) annually for design, construction and renovation, and more than six hundred million dollars ($600,000,000) annually for energy, water, and waste disposal at state-funded facilities; and

WHEREAS, a building's energy, water, and waste disposal costs are computed over a twenty-five year period, or for the life of the building, and far exceed the first cost of design and construction; and

WHEREAS, an opportunity exists for the State of California to foster continued economic growth and provide environmental leadership by incorporating sustainable building practices into the state capital outlay and building management processes; and

WHEREAS, sustainable building practices utilize energy, water, and materials efficiently throughout the building life cycle; enhance indoor air quality; improve employee health, comfort and productivity; incorporate environmentally preferable products; and thereby substantially reduce the costs and environmental impacts associated with long-term building operations, without compromising building performance or the needs of future generations; and

WHEREAS, the widespread adoption of sustainable building principles would result in significant long-term benefits to the California environment, including reductions in smog generation, runoff of water pollutants to surface and groundwater sources, the demand for energy, water and sewage treatment services, and the fiscal and environmental impacts resulting from the expansion of these infrastructures; and

WHEREAS, it is critical that my Administration provide leadership to both the private and public sectors in the sustainable building arena;

NOW, THEREFORE, I, GRAY DAVIS, Governor of the State of California, by virtue of the power and authority vested in me by the Constitution and statutes of the State of California, do hereby establish a state sustainable building goal and issue this order to become effective immediately:

The sustainable building goal of my administration is to site, design, deconstruct, construct, renovate, operate, and maintain state buildings that are models of energy, water, and materials efficiency; while providing healthy, productive and comfortable indoor environments and long-term benefits to Californians.

The Secretary for State and Consumer Services (hereinafter referred to as "the Secretary") shall facilitate the incorporation of sustainable building practices into the planning, operations, policymaking, and regulatory functions of State entities. The objectives are to implement the sustainable building goal in a cost effective manner, while considering externalities; identify economic and environmental performance measures; determine cost savings; use extended life cycle costing; and adopt an integrated systems approach. Such an approach treats the entire building as one system and recognizes that individual building features, such as lighting, windows, heating and cooling systems, or control systems, are not stand-alone systems.

In carrying out this assignment, the Secretary shall broadly consult with appropriate private sector individuals and public officials, including the Director of the Department of Finance; the Secretary of Business, Transportation, and Housing; the Secretary for Education; the Secretary for Environmental Protection; the Secretary of Health and Human Services; and the Secretary for Resources. The Secretary shall submit a report to the Governor within six months of the date of this order, containing a recommended strategy for incorporating sustainable building practices into development of State facilities including leased property.

Thereafter, on an annual basis, the Secretary shall report on the activities and on the efforts of all State entities under the Governor's jurisdiction to implement the Governor's sustainable building strategy. The Secretary shall devise a method for compiling such information and reporting it to the Governor and the Legislature.

All State entities under the Governor's jurisdiction shall cooperate fully with the Secretary and provide assistance and information as needed. The Regents of the University of California, Boards of Governors of Community College Districts, Trustees of the California State Universities, the State Legislature, and all Constitutional Officers are encouraged to comply with the Executive Order.

Nothing in this Order shall be construed to confer upon any state agency decision-making authority over substantive matters within another agency's jurisdiction, including any informational and public hearing requirements needed to make regulatory and permitting decisions.