project CAINE

PV is important

To the Economy
To Energy Assurance
To the Environment
To You

Because

It's highly reliable and needs little maintenance.

It costs little to build and operate. It has virtually no environmental impact.

It's produced domestically, strengthening our economy and reducing our trade deficit.

It's modular and thus flexible in terms of size and applications.

It meets the demand and capacity challenges facing energy service providers.

It helps energy service providers manage uncertainty and mitigate risk.

It serves both form and function in a building.

Why PV is Important to our clients.

Several electric companies have set up demonstration projects to study the durability, maintenance requirements, and useful life of solar-powered water-pumping systems. Solar electric systems are an ideal choice in Florida's diverse areas, especially those at a considerable distance from conventional power lines.

Photovoltaics (PV) is an important energy technology for many reasons. As a solar energy technology, it has numerous environmental benefits. As a domestic source of electricity, it contributes to the nation's energy security. As a relatively young, high-tech industry, it helps to create jobs and strengthen the economy. As it costs increasingly less to produce and use, it becomes more affordable and available. And there are many more reasons, as we shall see.

Few power-generation technologies have as little impact on the environment as photovoltaics. As it quietly generates electricity from light, PV produces no air pollution or hazardous waste. It doesn't require liquid or gaseous fuels to be transported or combusted. And because its energy source - sunlight - is free and abundant, PV systems can guarantee access to electric power.

PV frees us from the cost and uncertainties surrounding energy supplies from politically volatile regions. And in addition to reducing our trade deficit, a robust domestic PV industry creates new jobs and strengthens the U.S. economy.

The Benefits of PV

- The State of Florida provides a $4 per watt rebate up to $20,000 for residential systems and up to $100,000 for commercial systems
- There is a 30% Federal Tax Credit
- The systems can be depreciated over 5 years
- A 25 Kw system will save you approximately $6,000 per year
- A 5 Kw system will save you approximately $1,200 per year
- The systems come with a 25 year warranty
- Battery free systems are more efficient and less expensive
- Glass panels provide sun shading
- Systems can qualify for as many as **13 LEED points**
- Governor Crist is interested in creating a REC market in FL
- Florida is a Net Metering State

* U.S. Department of Energy - Energy Efficiency and Renewable Energy Solar Energy Technologies Program

Why PV is Important To You

PV is highly reliable and needs little maintenance.
What's the value of electricity when it's unavailable?

To put this question in perspective, think back to your home's last power outage. Depending on what you were doing at the time, it was either a minor inconvenience or it brought your activities — such as cooking a holiday meal, for example — to a standstill. Now consider the fact that amazon.com loses $1 million per minute when a power disruption makes its Internet site unavailable. It's easy to see that reliability is key, whether you're feeding your family or fueling the U.S. economy.

PV systems, originally developed for use in space — where repairs are extremely expensive, if not impossible — are highly reliable. PV still powers nearly every satellite that circles the Earth, because it operates reliably for long periods of time and needs virtually no maintenance. And to dispel a commonly held "PV myth," PV systems can generate power in all types of weather. On partly cloudy days, they turn out as much as 80% of their potential energy. Even on extremely overcast days, they can still produce about 25% of their maximum output.

Each PV shingle being installed on this roof will produce 17 watts under full sun, for a total system size of 1.2 kW. The shingles mount directly on to the roof structure and take the place of asphalt shingles.

The whole PV system is connected to the utility grid through an inverter and produces electricity on customer's side of the meter.

PV systems are easy to maintain. They have no moving parts, so visual checks and battery servicing are enough to keep systems up and running. Because manufacturers test solar panels for hail impact, high wind, and freeze-thaw cycles representing year-round weather conditions, weather damage is no greater potential problem for PV systems than for other types of energy production systems.

A PV system in Arlington, Virginia, feeds clean energy into the utility grid that supplies electricity to the Pentagon. As a distributed resource, PV puts the power supply at the point of use. The benefits of PV systems often far outweigh the cost because of their modularity, reliability, environmental benefits, and ability to augment traditional power sources during peak demand.

PV costs little to build and operate.
Isn't PV expensive?

Although we've made great strides in reducing costs in the last 20 years or so, electricity from PV is not yet cost-competitive with electricity from an established grid. However, it really doesn't have to be! PV supplies electricity when and where energy is most limited and most expensive, making a valuable strategic contribution to our energy mix. Energy from PV doesn't simply replace some fraction of the generation; it displaces the right portion of the load. Once installed, PV systems can produce power continuously with little upkeep and minimal operating costs.

Consider these facts. Because PV cells use the energy from sunlight to produce electricity, the "fuel" is free. PV systems are usually placed close to where the electricity is used and usually require much shorter power distribution lines than those needed to bring power in from the utility grid. In addition, using PV eliminates the need for a transformer to "step down" the power from the utility line. Less wiring means lower costs, shorter construction times, and reduced

* The Office of Energy Efficiency and Renewable Energy (EERE)

This 4-kilowatt solar electric system, dubbed "Solar Independence," is the largest mobile power unit ever built. The flag's field of blue consists of photovoltaic panels made of silicon; these panels generate enough electricity to provide power to one or two homes.

Workhorse batteries that can store up to 51 kilowatt-hours of electricity are in a portable trailer behind the flag. This system has been part of several emergency training exercises in Colorado and has been exhibited on the National Mall in Washington, D.C. *

* The Office of Energy Efficiency and Renewable Energy (EERE)

permitting paperwork, particularly in urban areas. All these factors make PV systems cost-effective over their useful lives.

Low-maintenance, cost-effective PV systems are ideal for supplying power to remote communications stations, navigational buoys at sea, and homes more than a quarter mile from utility power lines.

These are serious numbers, and the potential of PV-generated energy to make such great strides in avoiding pollution will only continue to climb as the PV industry grows and expands.

PV is produced domestically, strengthening our economy and reducing our trade deficit. Is it important to you to know that your power doesn't depend on foreign oil?

It seems pretty clear that reducing our nation's dependence on foreign oil is a worthy goal. Using PV protects us against the threats of fuel price volatility and political instability, and it allows us to produce our own energy within our own borders. By building the PV industry, we're investing in "home-grown" energy, which creates domestic jobs and strengthens our economy.

With PV, one size does not fit all.

That's one of its main advantages. A PV system can be constructed to any size in response to the energy needs at hand. And a PV system can be enlarged or moved as these energy needs change. For instance, homeowners can add modules every few years as their energy usage and financial resources grow. And ranchers can use mobile trailer-mounted pumping systems for watering cattle that are rotated around different fields.

In urban applications, PV can eliminate the need for costly trenches in streets. PV can be an outstanding choice for urban areas where grid power is unavailable or grid connections would be very costly or cumbersome. Lighting, irrigation, median sprinklers, water pumping, school and hospital warning signs, communications, and emergency services are just a few of the many successful uses for PV in our cities and towns.

PV meets the demand and capacity challenges facing energy service providers. Can PV help prevent brownouts and blackouts?

The answer is a resounding yes. When demand for electricity is high, such as during a heat wave when everyone's air conditioner is running, utilities must fire up their "peaking" power plants to meet the demand for just a few hours a day. These peaking plants are expensive to operate, and the utility's electric distribution system must be sized to handle these high, albeit short-term, loads. When a utility installs grid-connected PV arrays, the PV-generated electricity is used directly to help supply a building's peak demand; this is often called "peak

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After decades of use on Earth and in space, solar electricity made its debut on another planet in 1997 when "Sojourner" began exploring Mars.

High-efficiency photovoltaic (PV) cells located on top of the Sojourner vehicle generated 16 watts of power at noon on Mars, which was enough to carry out a day's mission.

* The Office of Energy Efficiency and Renewable Energy (EERE)

load shaving." Coincidentally for photovoltaics, the need to meet peak loads arises when the sun is shining the brightest!

Another important benefit of PV systems is that they can produce power near the point of use — a concept we call "distributed generation." Before the grid becomes overloaded, then, PV systems step in to provide electricity to individual homes and buildings.

CASE STUDY: 4 Times Square — a 48-story New York City skyscraper designed in the 1990s — features a photovoltaic "skin" that includes thin-film PV panels which replace traditional glass cladding material. The PV skin extends from the 37th to the 43rd floor, on the south and west walls, and is a highly visible part of the midtown skyline. Durst Organization, the developer, included a variety of energy efficiency strategies in the building. Kiss + Cathcart Architects designed the PV system in collaboration with Fox and Fowle, the base building architects. Energy Photovoltaics of Princeton, NJ, developed the custom PV modules.

PV serves both form and function in a building.
But doesn't PV look really ugly on the roof?

Not anymore. State-of-the-art PV modules are now available in a variety of colors and styles, allowing designers to use them as aesthetic elements built right into roofs, skylights, awnings, entryways, and facades. Today's modules can even be specified to transmit a percentage — usually 80% to 90% — of natural light. Mixed with nontransmissive modules, these systems create a pleasant environment inside the building, helping to ventilate and heat the building at the same time.

When PV systems are properly integrated into a building "envelope," they don't just provide power and light, they contribute to the structure itself. This relatively new concept, called "building-integrated PV," is taking hold. Think of it this way — since a building has to have windows, why not have windows that produce power? It makes financial sense, too, because the savings on conventional structural materials often offset the cost of the PV materials.

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