

# INVENTIONS & INNOVATION

## Success Story



## PowerGuard®

### BENEFITS

- Saves energy and reduces emissions— a 200 kW system saves approximately 22,000 barrels of oil over its life, reducing harmful CO<sub>2</sub> emissions by 12,000 tons, acid rain (SO<sub>x</sub>) by 80 tons, and smog (NO<sub>x</sub>) by 50 tons
- R-19 energy-conserving roofing insulation (R-10) and shading, ensuring full roof insulation even above the purlins, saving heating and cooling costs
- Roof protection from UV rays and thermal cycling, approximately doubling the life of the roof
- Quick, inexpensive installation of interchangeable panels allows flexibility to work around existing rooftop penetrations and equipment
- No penetration to roof, support structures, or waterproofing materials, resulting in lower installation costs and ensuring that the roof warranty is not voided
- Can be used successfully in retrofit, re-roofing, and new construction applications
- 80 percent lighter than conventional aggregate-ballasted roofs, so that strengthening of the building structure is virtually never required for unit installation

“The DOE grant enabled us to perform wind tunnel testing at a critical early time in product validation. To raise money for testing at this stage might otherwise have been impossible.”

— Tom Dinwoodie, CEO and President, PowerLight Corporation

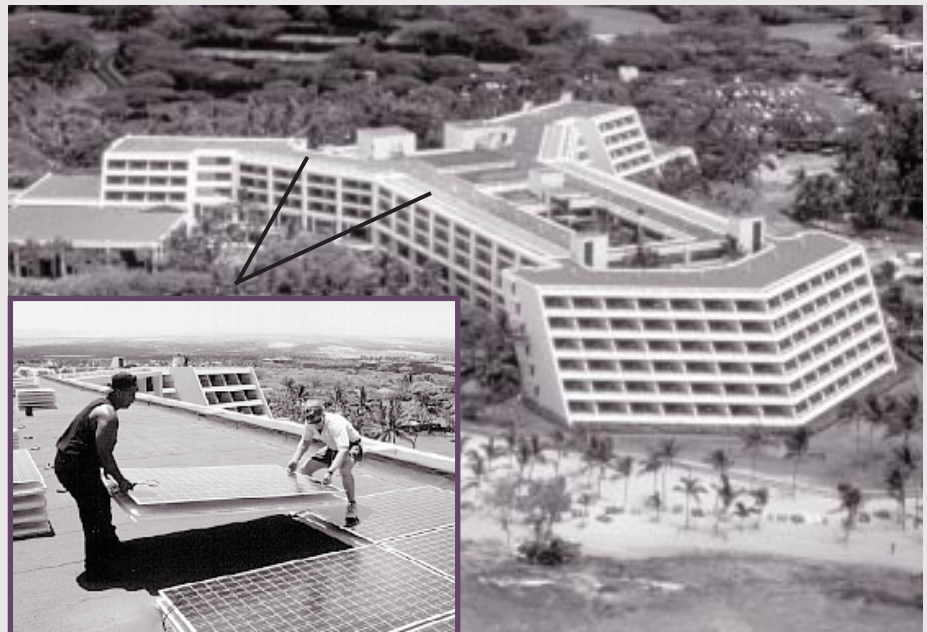


## A DAYTIME MEGAWATT FOR A MANUFACTURING PLANT

Energy is something that we rarely think about. We don't have to think about it. We flip a switch and our computers, hair dryers, dishwashers, and televisions go to work for us. With each technological advance, energy consumption rises, and it's only when the power goes out that we recognize our reliance on energy for our day-to-day needs. When power outages occur, we seem to lose our ability to function productively. What will happen if our conventional energy sources eventually run out?

As we enter a new millennium, we face multiple, complex energy questions. How will we use power in the coming centuries? What energy sources will still be available to us? How can we harness new energy sources and make them work for us? How will we be able to afford the energy we need to function effectively? Renewable energy sources, like solar power, are abundant, clean running, and free; however, the technology to harness these energy sources is often considered too costly when compared to conventional, fossil-fuel alternatives.

### POWERGUARD® ROOFING SYSTEM



**H**otel owners at Hawaii's Mauna Lani Bay Hotel installed a PowerGuard® system of photovoltaic (PV) roofing that will save 11,000 barrels of oil over its lifetime, while providing building insulation and protecting the roof. In addition, the system will save enough in utility bills to pay for itself in five years.

## Solution

PowerLight Corporation has devised a new technology that represents a novel approach to lowering the installed cost of photovoltaic (PV) power derived from the sun. Their patented, UL-listed PowerGuard® product joins two established products into a single roofing panel designed specifically for flat or nearly flat buildings, such as factories, warehouses, office buildings, schools, and libraries. A PowerGuard® system can typically create one megawatt of energy using 125,000 square feet of roof space. In places where utility electric rate billing is based on time of day and extreme peak demand charges are in effect, PowerGuard® can shave electrical demand during peak time rates, significantly lowering payback time. In addition, PowerGuard® offers building insulation and shading and roof protection at a cost substantially lower than each separate technology, all without damaging or changing existing roofing material. For new roof applications, PowerGuard® can offset the costs of conventional roof materials.

PowerGuard® integrates PV modules with extruded polystyrene insulation to form an insulating roof tile. The panels use a tongue-and-groove design to interlock adjacent panels without penetrating existing roofing material. Each PowerGuard® area is bordered with PowerCurb, which provides mechanical integrity, ballast, and wind resistance. For power generation, PowerGuard® uses flat-plate photovoltaic modules that deliver clean solar electricity whenever sunshine is available. When it's cloudy or dark, the building receives power from conventional electric utility grids.

PowerLight Corporation tailors systems from 1 kW to 1 MW to a building's peak load or budget and offers easy expansion. The system is designed to survive severe weather conditions, such as gusting winds greater than 130 miles per hour, temperature extremes, and corrosive coastal environments.

## Results

With the help of a nearly \$100,000 grant from the Inventions and Innovation Program in the Department of Energy's (DOE) Office of Industrial Technologies, along with additional funding provided by DOE's Office of Power Technologies, PowerLight Corporation was able to perform product validation testing that has resulted in product commercialization. PowerLight Corporation is a commercial success both in the United States and overseas, with systems installed from New York to Hawaii and from Switzerland to Australia. Their business continues to grow at approximately 300 percent per year.

Started in 1991 and based in Berkeley, California, PowerLight Corporation boasts over \$35 million in completed renewable energy products. With offices in California, Hawaii, and New York, this growing company of 30 employees offers energy solutions for the future—available today.



The Inventions and Innovation Program works with inventors of energy-related technologies to establish technical performance and conduct early development. Ideas that have significant energy savings impact and market potential are chosen for financial assistance through a competitive solicitation process. Technical guidance and commercialization support are also extended to successful applicants.

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