SDERC

San Diego Regional Energy Office

Photovoltaics

Technology Description:

Photovoltaics (PVs) contain semiconductor materials that convert sunlight into electricity. PV modules are combined to create panels which are combined to form arrays. These solar electric power systems may also have batteries, charge controllers, and inverters – which convert the direct current generated by PV system into an alternating current, the type of energy required to run most appliances and electronic devices.

There are two main types of PVs. Crystalline cells are rigid and convert about 10-15% of the sunlight to electricity. Thin films can be flexible and are about 5-10% efficient.

Application:

PVs can be used in residential, commercial and industrial applications. They can be installed on home or building rooftops, mounted on the ground, on covered parking structures or installed as an integral element of the building, like a window shade.

Potential Energy Savings:

According to the CEC, 1 kW of PV will generate between 1400 and 1700 kWh annually, depending on various factors. At $0.15 per kWh, this is equivalent to $210 to $255 per kW per year. Since photovoltaics produce peak electricity, when we need it most, customers who pay time-of-use rates can offset more expensive peak power and potentially reduce peak demand charges.

Case Study:

A business that installs a 30 kW system at $8 per Watt would pay just over $49,000 after all rebates and state and federal tax incentives. The chart below depicts the cost breakdown:

PV Project Cost	$240,000
SELFGEN Rebate	$120,000
Federal Credit	($12,000)
Net Cost	$108,000
State Tax Credit	($16,200)
Federal Depr.	($38,760)
State Depreciation	($6,410)
Final Cost	$46,630
Average Yearly Production (kWh/ yr)	49,165
Simple Payback	7.9

Additional Information:

Rebates:

Self-Generation Incentive Program
www.sdenergy.org/selfgen
California Energy Commission's Emerging Renewables Buydown Program
http://www.consumerenergycenter.org/buydown/index.html

California Tax Incentives:

Homes and businesses can receive a 15% state tax credit for all systems up to 200 kW. Qualified business customers can receive a 10% federal investment tax credit and accelerated depreciation benefits.

Considerations:

Energy efficiency is the first step. A home or building should be as energy efficient as possible before considering photovoltaics.

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