# Smart Schools Presentation

## Why it Pays to Go Solar

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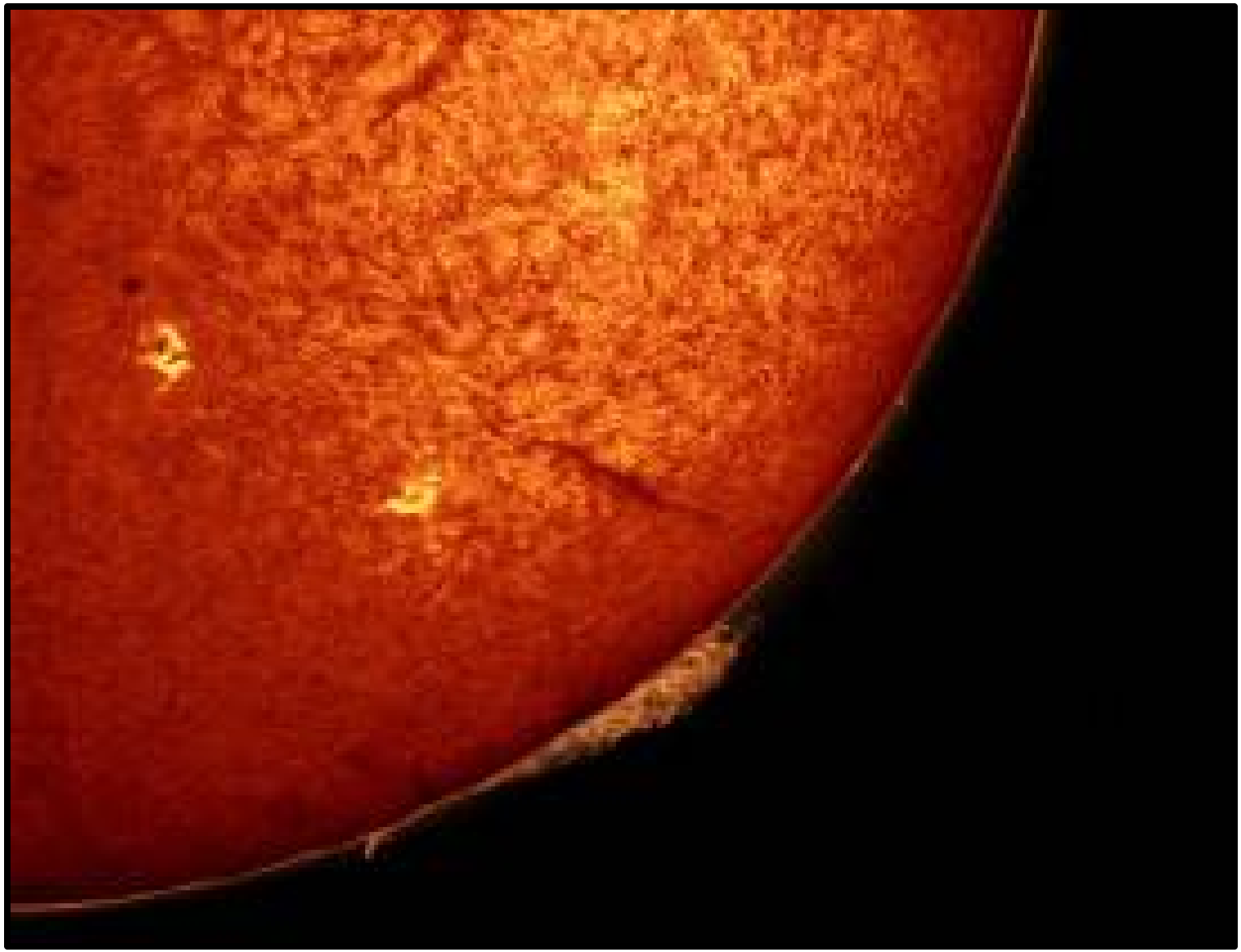
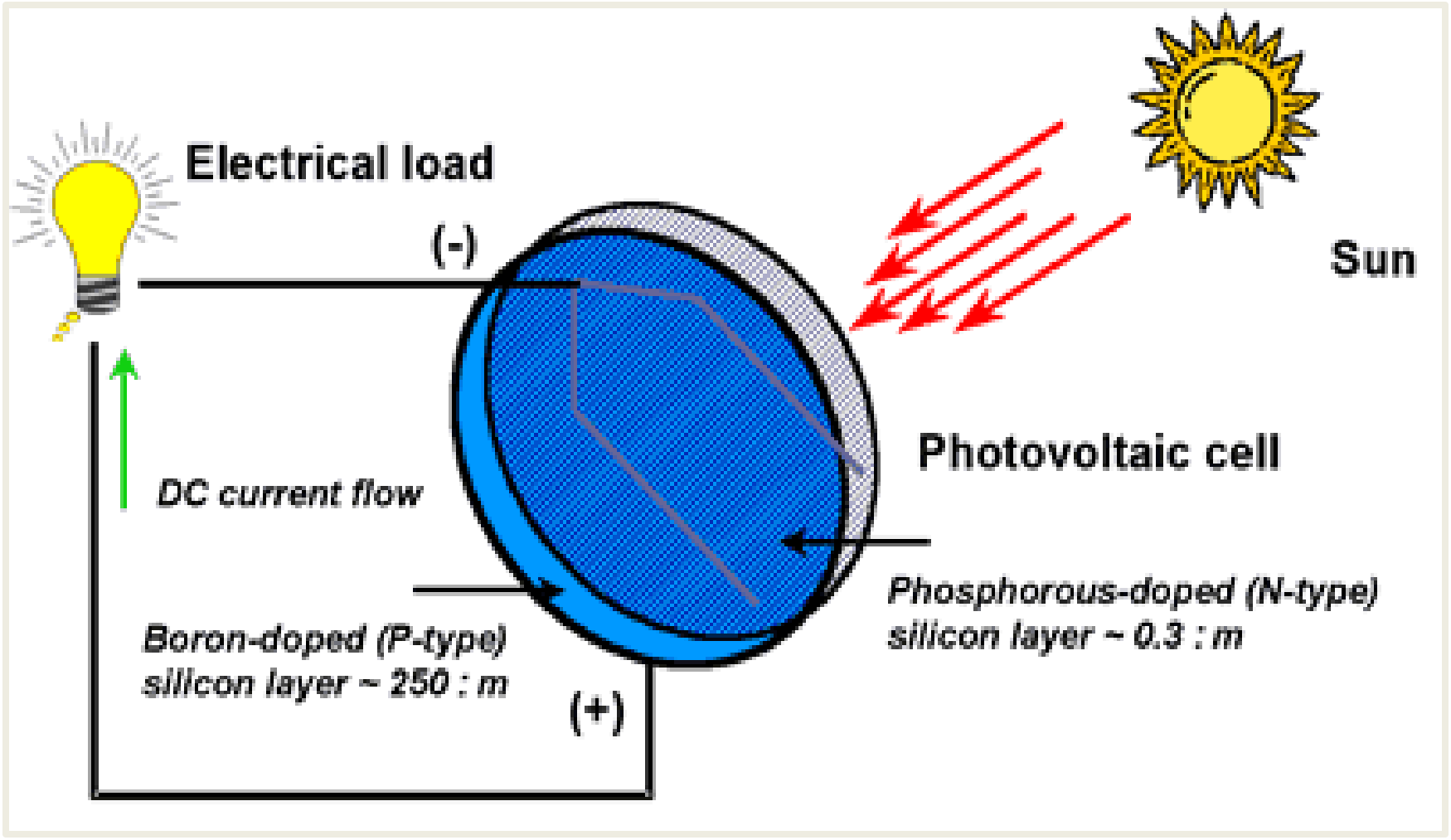
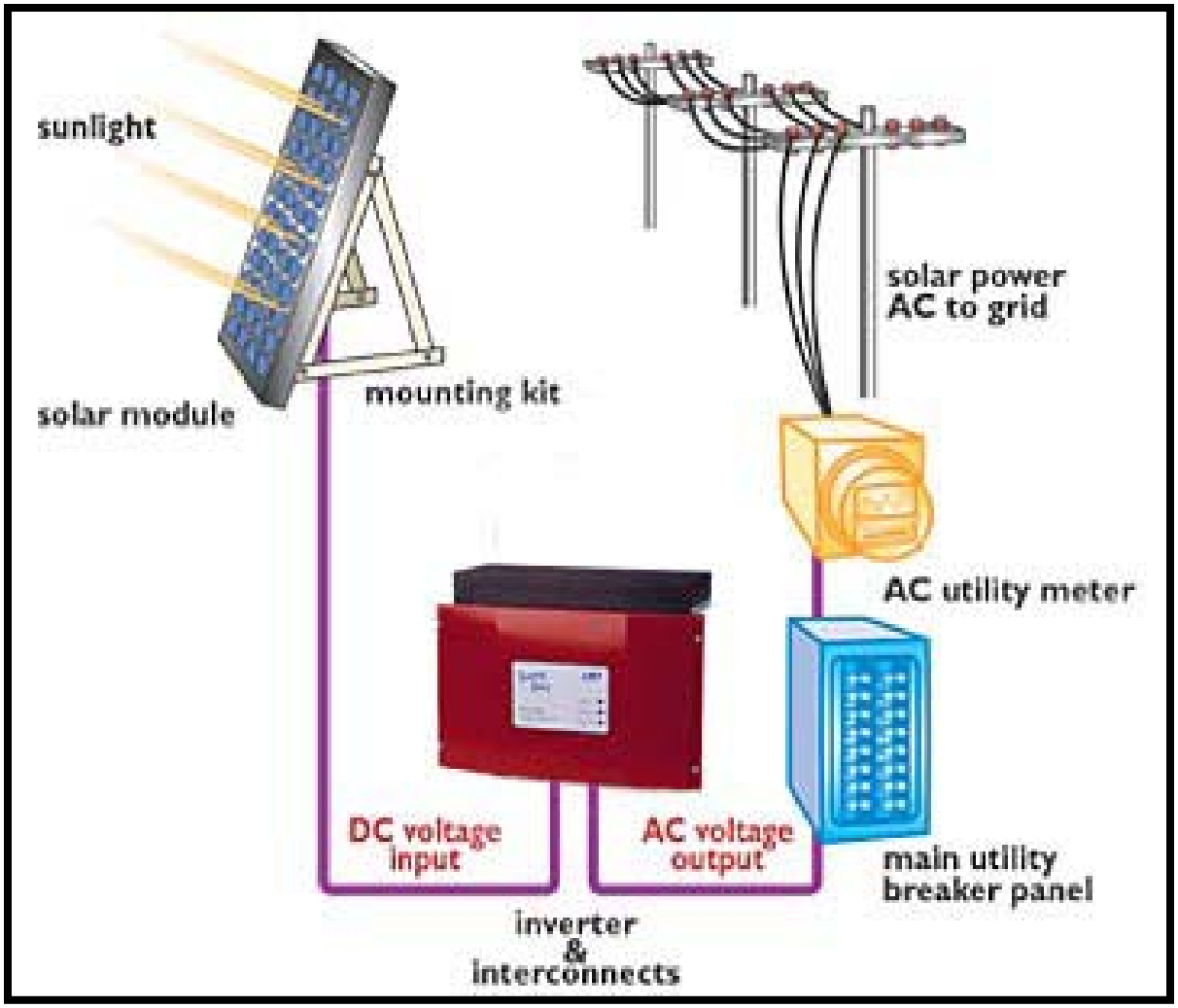
# What?

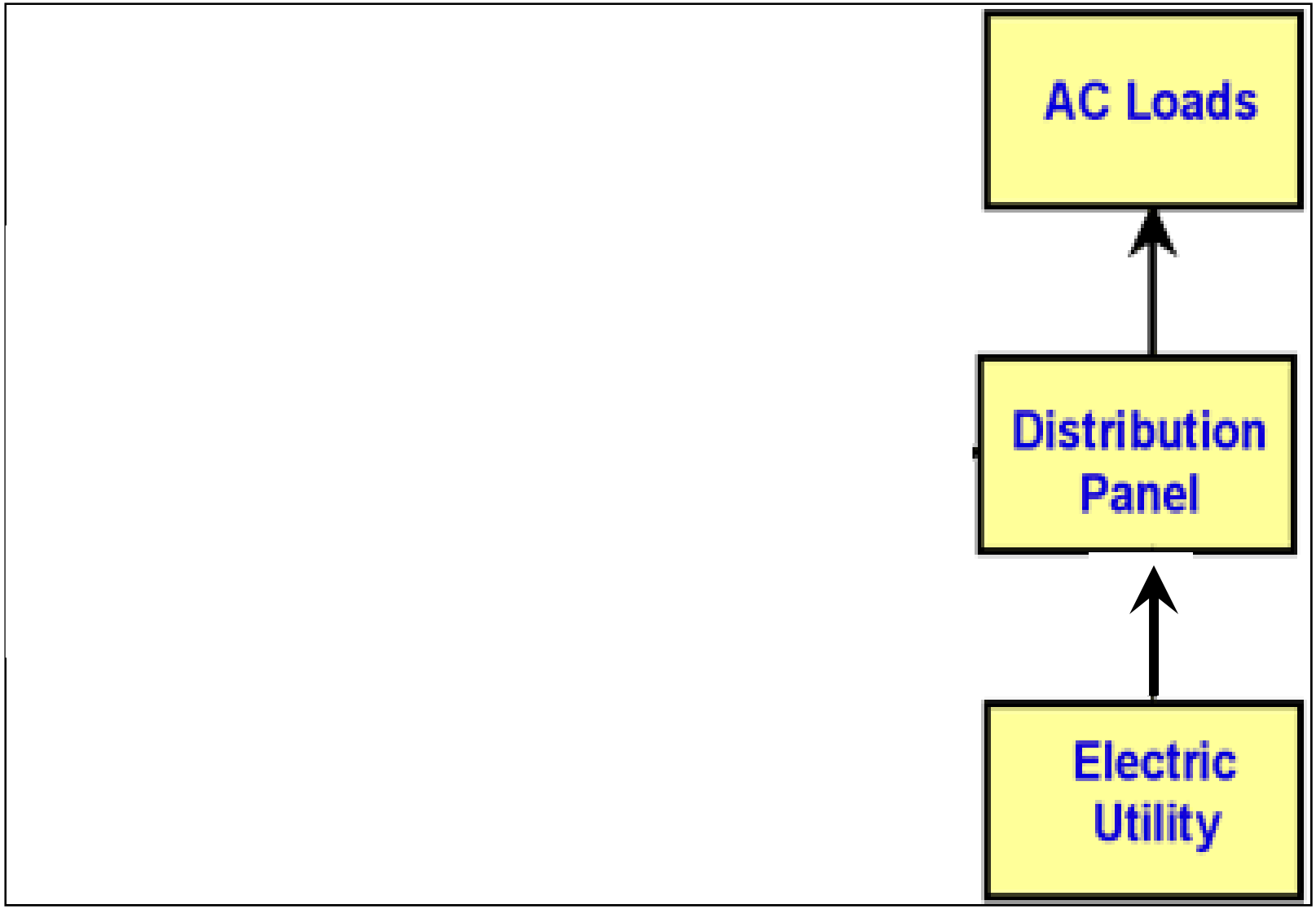


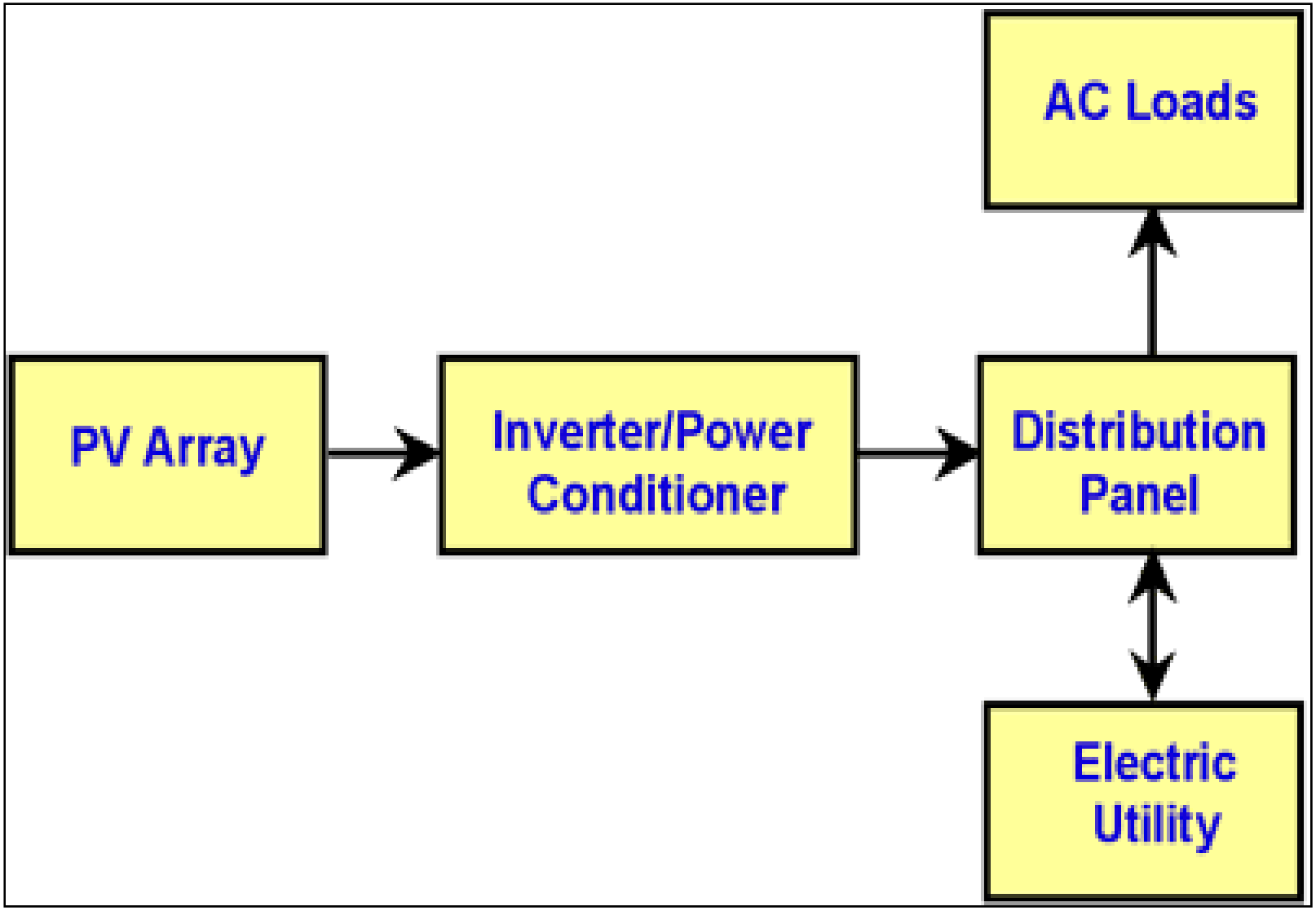
# PV


Electrical load
(-)
Sun
Photovoltaic cell
DC current flow
Phosphorous-doped (N-type)
silicon layer ~ 0.3 : m
Boron-doped (P-type)
silicon layer ~ 250 : m
(+)

# Solar Energy: Photovoltaics




AC Loads
Distribution Panel
Electric Utility


AC Loads
PV Array
Inverter/Power Conditioner
Distribution Panel
Electric Utility

# Where?

# Why?

# Solar – A Clean Energy that Benefits Everyone

- **Solar energy is:**
  - Safe
  - Green
  - Sustainable
  - Predictable

23 kW, The Overlook at Rob Roy, Austin, TX

# Solar – A Proven Technology Built to Last

- No moving parts
- Easy to maintain
- 25-year power production guarantee from most leading manufacturers

50.1 kW, Lowry Fitness Center, Texas City, TX

# Solar – Putting Roofs to Work

The roof of your school could be worth millions of dollars in:

- Rebates
- Energy Savings

23.3 kW, ABC Bank, Austin, TX

***Solar energy can turn an empty roof into a financial asset!***

# Solar – A Green Marketing Powerhouse

•Solar is a visible and powerful statement that shows your school cares about the environment and embraces green initiatives

- Provides great PR value
- Fosters corporate and community goodwill
- Contributes to a positive brand association

24 kW, REI, Round Rock, TX

# What to Look For in a Solar Company?

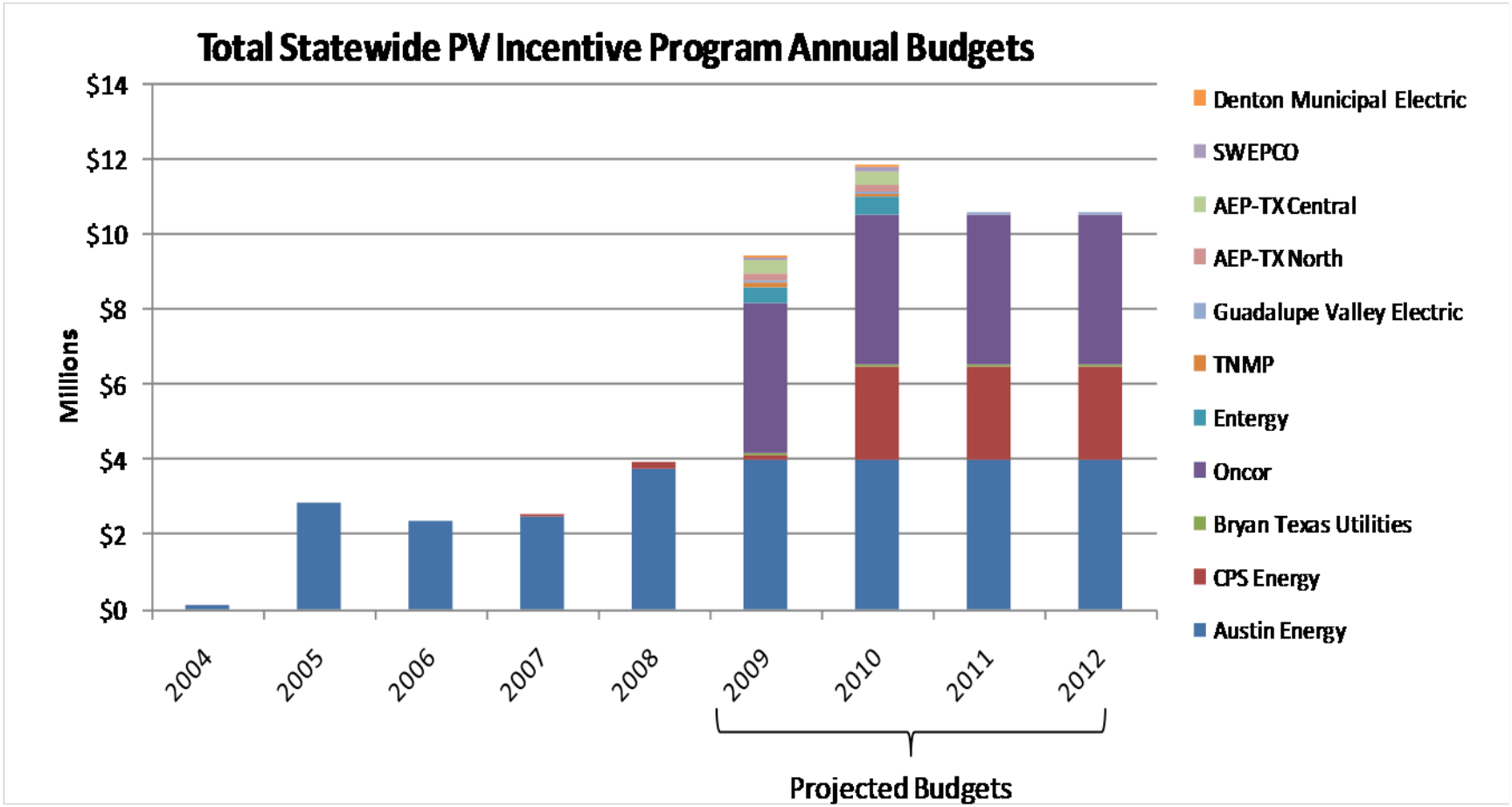
Not all solar design and installation firms are equal. To get the most from your solar company, you should demand:

| | |
|---|---|
| Quality | **A proven track record with satisfied clients** |
| Experience | **Solar is still an emerging industry in some areas, therefore many firms lack the deep experience key to a trouble-free installation** |
| Specialization | **Quality PV design and installation requires specific knowledge and skills not often found at one-stop shops** |

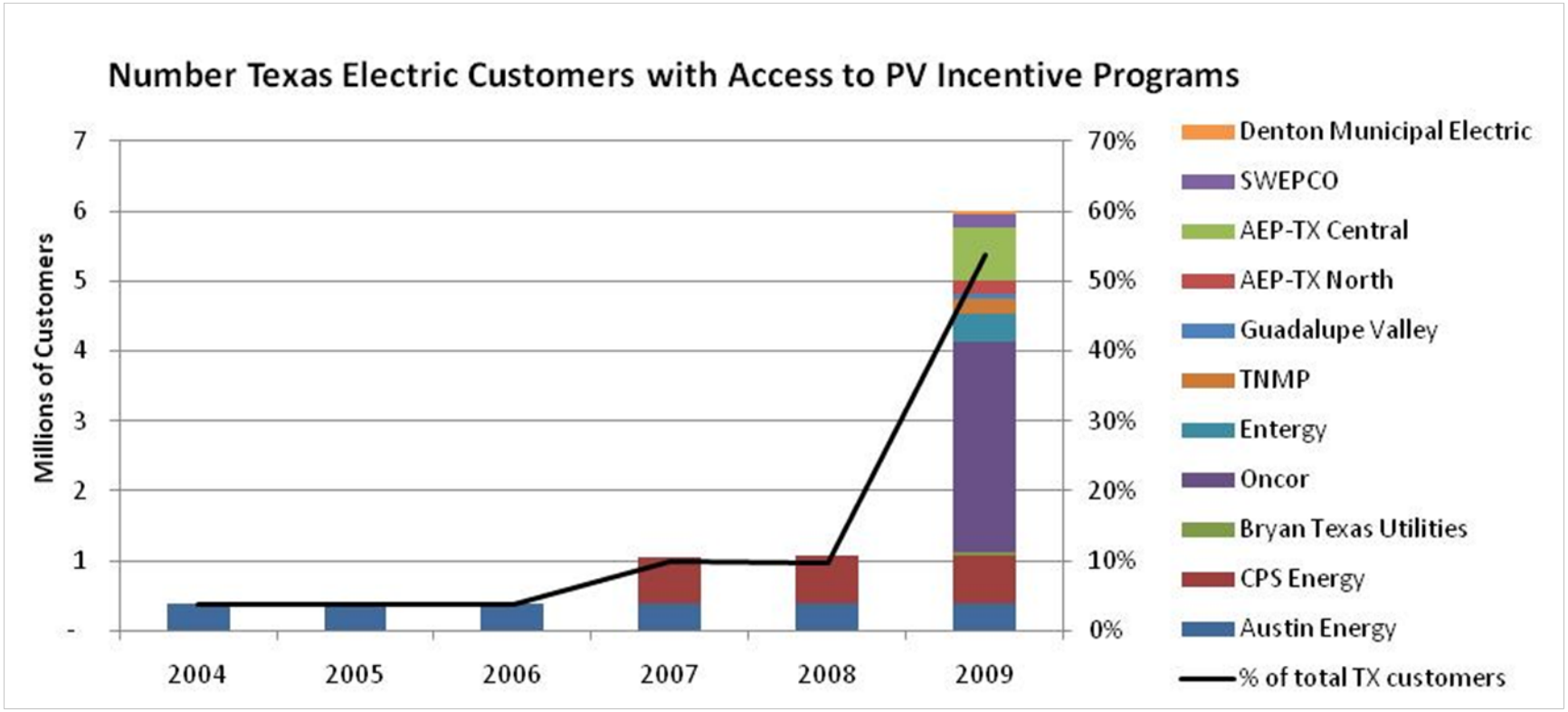
# Why Now?

- Dramatic drop in solar panel manufacturing costs resulting in the lowest prices in the history of solar PV
- Influx of funding opportunities via the American Recovery and Reinvestment Act of 2009
- Rising cost of energy
- Opportunity to become a leader in the green technology sector and to utilize the investment for educational purposes
- Expansion of local utility rebate programs (currently 11 throughout Texas)

# Texas Utility PV Incentive Programs



# Access to PV Incentive Programs in Texas

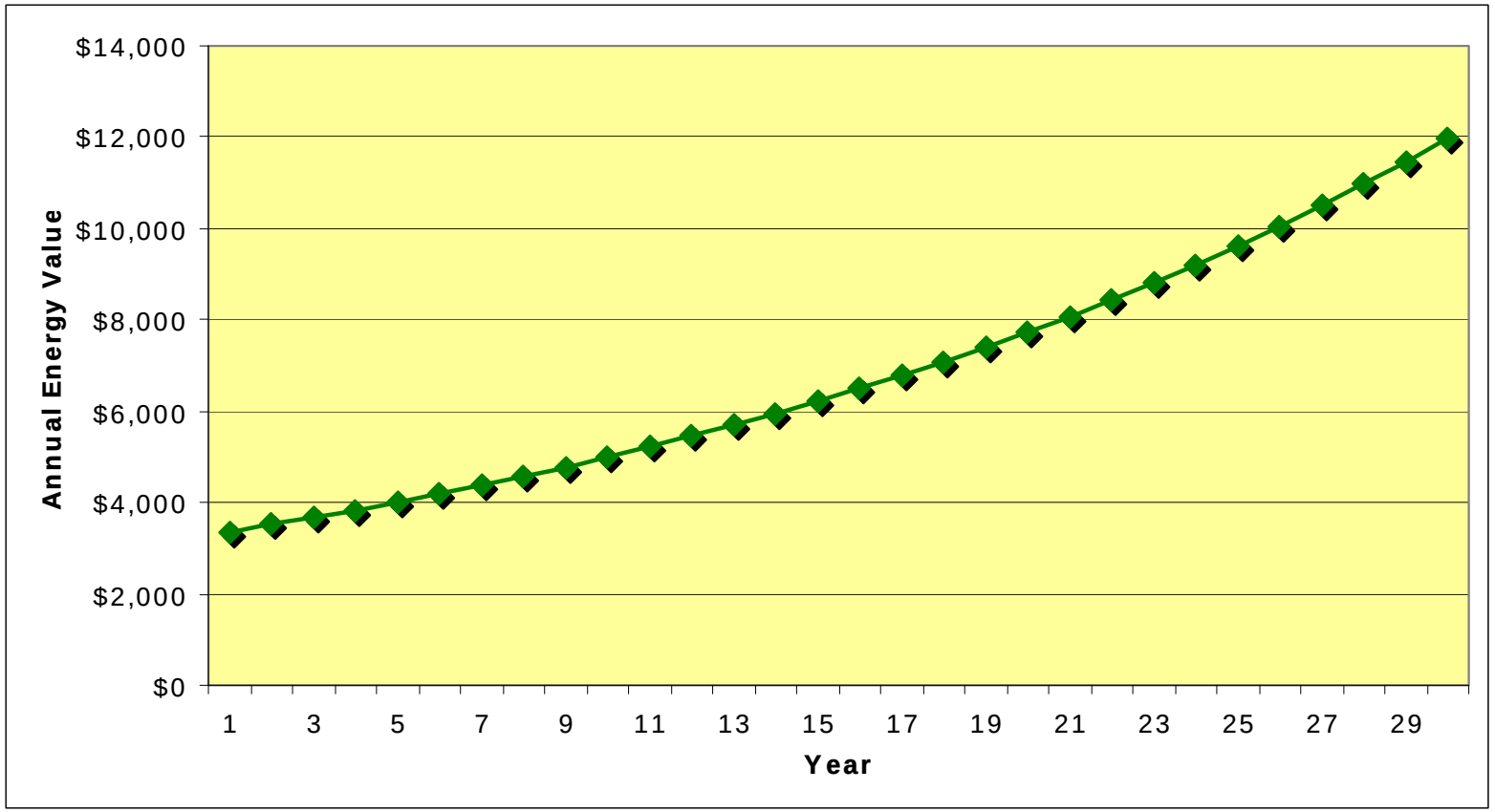


# How?

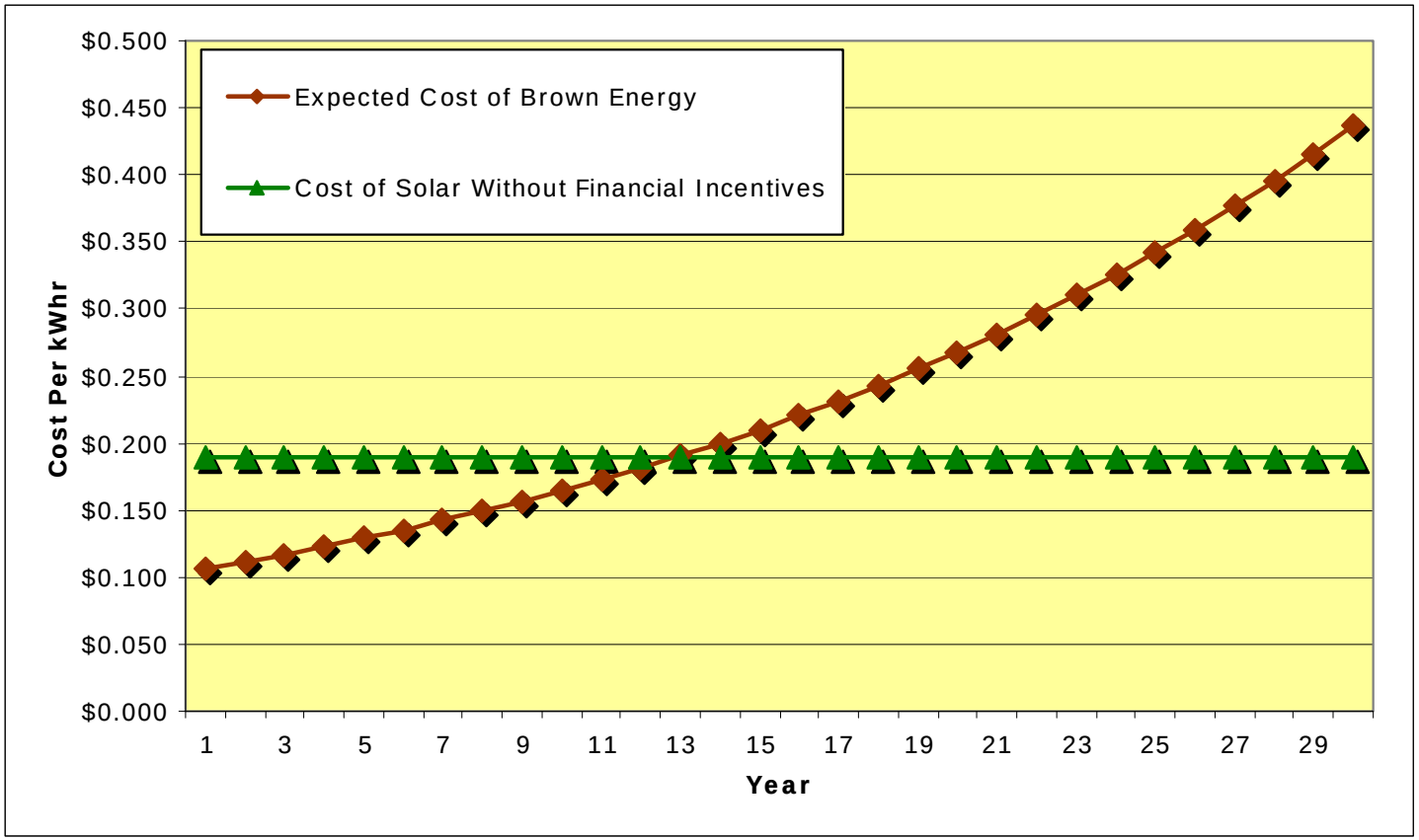
# What to Consider?

- **Available Area/Un-shaded Space –** Ideal array orientation is facing south or southwest at a 30º pitch
  - Roof
  - Parking Lot
  - Electrical
- **Budget/Financing Options**
  - Rebates
  - Grants
- **Energy Requirements**

# Value of Energy Production Over 30 Years



# Expected Cost of Energy Over 30 Years



# Smart School Solar Project: 24 kW

## System Cost

| | |
|---|---|
| **Installed Cost** | **$123,600** |
| **Avg. Local Utility Solar Rebate** | **-$98,800** |
| **Net Cost after Incentives** | **$24,800** |

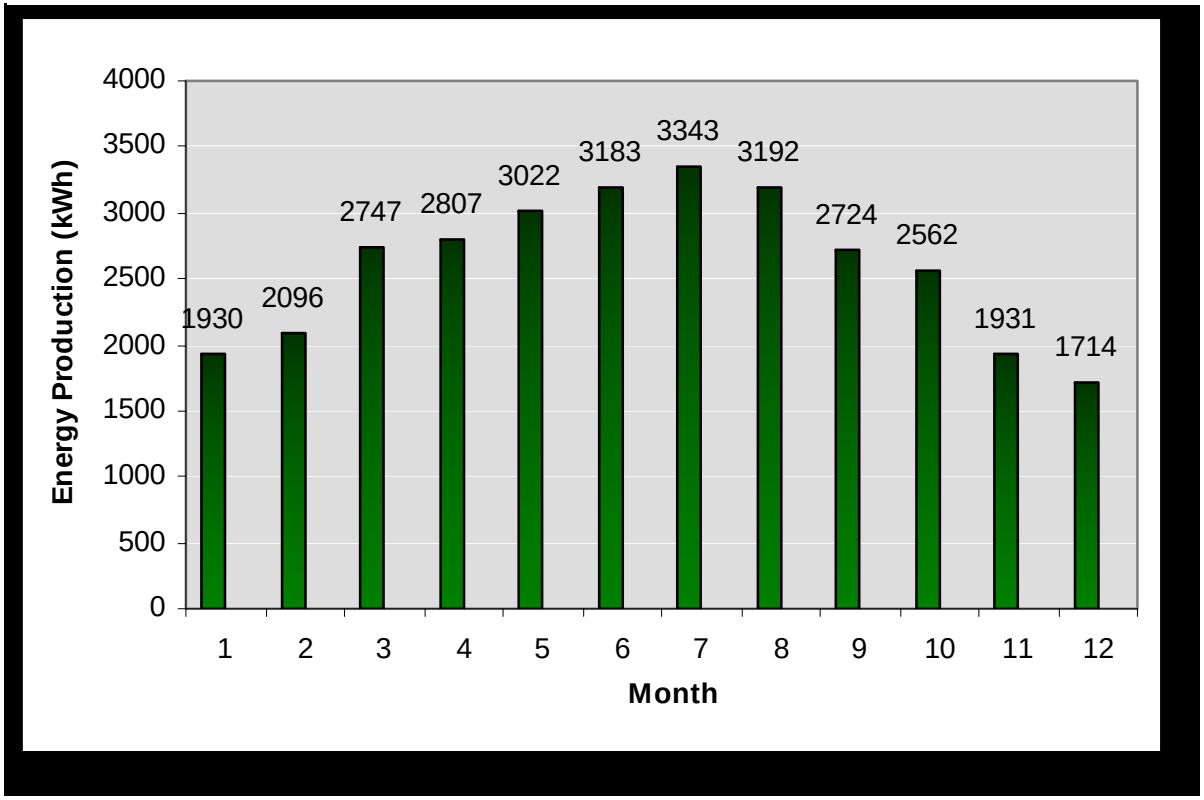
# Smart School Solar Project: 24 kW

**Financial Performance**

| | |
|---|---|
| **Yr. 1 Electrical Savings** | **$2,578** |
| **30 Yr. Avg. Annual Cost / kWh** | **$0.028** |
| **Est. Simple Payback** | **9.9 Years** |
| **Net Present Value (NPV)** | **$13,672** |
| **Internal Rate of Return** | **9.6%** |

# Smart School Solar Project: 24 kW

## Annual Energy Performance



# Smart School Solar Project: 24 kW

## Environmental Performance

| | |
|---|---|
| **Equiv. Acres of Trees Planted** | **5.9 Acres** |

| | |
|---|---|
| **Annual CO2 Emissions Reduced** | **43,210 lb** |

# Grant Programs for Solar

- **Distributed Renewable Energy Technology Program (SECO)**
  $30M statewide - Grant
  - Government entities (i.e. public schools) eligible only
  - $2M cap per project
  - 20% match required
  - Must be grid connected

- **Building Efficiency/Retrofit Program (SECO)**
  $158.2M statewide - Financing
  - Based on SECO's LoanSTAR program, of which municipalities and schools have traditionally taken advantage
  - $10M cap per project
  - 2% interest rate
  - Renewable energy projects have 15-year simple payback period

- **Build America Bonds – School Construction Bond Allocations (Treasury)**
  $11B nationwide - Financing
  - Divided among the 50 states and 100 largest local school districts based on Federal school funding
  - May be issued to finance certain construction and land acquisition expenses relating to public school facilities

- **Energy Efficiency and Conservation Block Grants (DOE)**
  $456M nationwide - Grant
  - Competitive grant (guidelines pending)
  - Funding can be used for:
    - energy efficiency and conservation programs and projects community wide
    - renewable energy installations in or on government buildings

# The Solar Installation Process

# The Solar Installation Process

When you have an organization to run, you need the transition to solar to be simple and seamless

- Design and installation process:
  - Step I:  Consultation
  - Step II:  Design
  - Step III:  Supply
  - Step IV:  Installation
  - Step V:  Monitoring & Service

# The Solar Installation Process: Step I

| | |
|---|---|
| **Step I: Consultation** | The only way to accurately pre-determine the impact of a solar installation is through a personal, customized assessment. Here, the solar company should explain the concepts, terminology, expectations, and budget.<br><br>After a comprehensive analysis of your site's mechanical, structural, and electrical systems, your school will receive a feasibility/cost study of its renewable energy potential, including recommendations on component placement and aesthetics to optimize the production of solar electricity.<br><br>The solar company should identify each and every rebate and special program for which you are eligible as well as do the paperwork and follow-up required to receive the potential rebate. |

# The Solar Installation Process: Step II

| | |
|---|---|
| **Step II: Design** | The best way to protect your investment in a renewable energy system is to consider the integrity, the design, and the quality of the components involved.<br><br>Complete design packages include an electrical design, illustrations, array layout, output projection, bill-of-materials, and installation estimates for precise project forecasting. The solar company should also handle all interaction with local permit offices to save you the hassle.<br><br>Fees for design, engineering, and planning services are often negotiated based on a percentage of project cost and depend on the scope of the project and the degree of specialized engineering required. |

# The Solar Installation Process: Step III

| | |
|---|---|
| **Step III: Supply** | The solar company should provide you the widest variety of products, the best overall system pricing, and excellent support services.<br><br>It should be familiar with the latest cutting-edge technology and the dependable, proven performers from the world's leading photovoltaic companies. The solar company should provide an unbiased analysis of the various products in the marketplace and provide custom recommendations based on what's best for your school's unique installation. |












# The Solar Installation Process: Step IV

| | |
|---|---|
| **Step IV: Installation** | The solar company's installations should offer maximum performance, the highest regard for electrical safety issues, and a cost-effective use of materials. It should also ensure that each customized installation complies with all national and local engineering and electrical codes.<br><br>Installation is one of the most critical phases of the process, and experience matters. Beware of contractors with little or no training in photovoltaic installation.<br><br>Once your system is up and running, the solar company should train you and your staff in daily performance monitoring, preventive maintenance and troubleshooting to ensure optimum system operation.<br><br>The best system operates without problems year after year. The solar company's systems should be backed by a comprehensive system warranty covering parts, workmanship, and repairs. |

# The Solar Installation Process: Step V

| | |
|---|---|
| **Step V: Monitoring & Service** | Although renewable energy systems are highly automated and generally care-free when installed properly, the solar company should provide 24 hour-a-day monitoring to insure system performance at-a-glance and to track important performance data.<br><br>If you are not inclined or able to do the minimal maintenance, the solar company should offer a service contract to insure systems are kept in top condition, and should also review and document systems that are not performing properly. |

# Monitoring & Display Option

- **Real-Time Display**
  - Second by second readings of:
    - Instantaneous, daily, or monthly system output
    - Emissions offsets
    - Weather conditions
- **Project History**
  - Complete history of project including images of system under construction
- **Introduction to Renewable Energy**
  - Clear overview of renewable energy from a layperson's point of view
- **Benefits of Renewables**
  - Presented in equivalents with which visitors are readily familiar
  - Monthly generation presented as either:
    - A percentage of the location's monthly electricity consumption
    - The consumption of a typical home
- **Web Enabled**
  - Remote monitoring
  - Website broadcast

# In Summary, Adding Solar to Your School Building Provides:

- Control over rising energy costs
- An investment that delivers value and savings for decades to come
- An on-site, interdisciplinary teaching resource
- Clean, green energy


***Do your research to ensure that you are working with <u>experienced</u> professionals who are <u>dedicated</u> to providing your school the industry's <u>highest quality</u> solar system design and installation.***

# Thank You