

Photovoltaic Technology

Crystalline Silicon and Flexible Thin Film



Building Systems

Innovations in Solar Arrays



North America is the leading consumer of energy in the world. While greenhouse gas emissions negatively impact the environment, our dependence as a country requires us to rely on foreign suppliers, as our individual usage rates force each of us to pay excessive costs. Whether social, political or purely economical, a call for innovation has been made. Fortunately, forward progress is already underway and can be found in the resurgence of an old idea. Solar.

Solar Technology has advanced since its inception decades ago especially in the era of photovoltaic or PV systems. Federal and local governments are evaluating and adopting tax incentive programs to encourage companies and individuals to install solar power systems on their property and some utility companies are buying unused energy at preset rates, sometimes above what they sell it for.

Photovoltaic systems still require exposure to the sun making a building's roof one of the more favorable installation locations. Garco Building Systems metal roofs provide an ideal substrate for solar arrays and offer unique environmental and performance advantages consisting of:

- Long-lasting durability that factors into an overall low lifetime cost while outliving currently available PV systems
- A virtually maintenance-free system
- Superior warranties
- Virtually 100% recyclable material comprised of 20 to 30% post-consumer recycled steel
- A wide array of vibrant cool roof colors that are highly reflective, reducing the heat island effect in urban areas while contributing to energy efficiency in southern climates
- For net heating environments, Galvalume Plus™ panels offer an economical solution with low emittance, maximizing a building's ability to hold heat while still offering a reflective surface to aid in the reduction of summer cooling loads.
- Consult our experts to get help in determining which solution saves the most energy.

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Garco Building Systems roof panels provide an ideal substrate for photovoltaic arrays.



The flat surfaces incorporated into various profiles allow Garco Building Systems' metal roof panels to support two PV offerings:

- **Glass-Based Crystalline Silicon**, a rigid photovoltaic module, which can be installed on standing seam roofs using a non-penetrating clamp assembly, offers the highest energy conversion. It weighs 3-4 pounds per square foot.
- **Flexible Thin Film**, a lightweight (approximately ¼ pound per square foot) module that is typically adhered to the metal roof panel in a factory environment, allows the photovoltaic array to be installed as the roof panels are installed. Though less efficient than crystalline modules, flexible thin film is often preferred due to its lighter weight and discreet appearance.

Existing and new metal roofs make ideal substrates for PV systems since they can be installed without penetrations.

Furthermore, a metal roof is poised to outlive the solar equipment, saving removal and replacement costs associated with roof materials with shorter life spans.

Typical commercial roof installation example:

Monthly PV Production - 15kW System

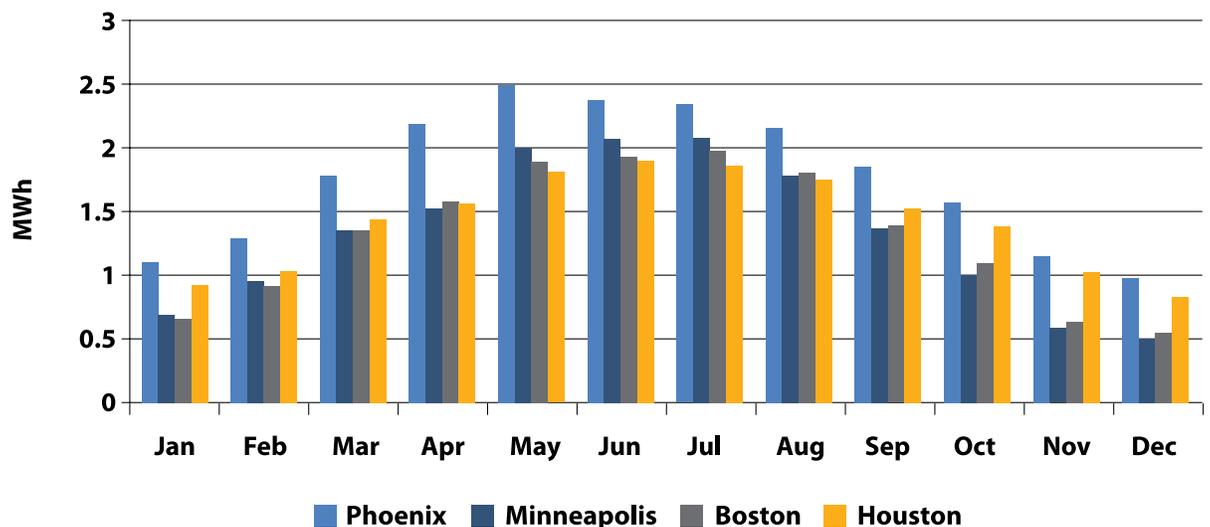
PV System:

- 15kW with polycrystalline modules

Roof

Application:

- Metal Roof
- South-facing
- ½":12" slope



Garco Building Systems has the expertise to model PV systems in this fashion for most locations in the United States and Canada as well as perform payback calculations for those systems taking advantage of the latest incentive programs.



Pre-designed Grid-tied Kits:

From 1.9kW to 60kW, Garco Building Systems kits are ideal for existing or new commercial construction projects. With more than 40 standard capacities available, Garco Building Systems will provide the education, guidance, technical support and materials needed for a successful solar implementation.

Each solar kit contains:

- Leading brand name polycrystalline or amorphous silicon PV modules
- Inverter
- AC and DC disconnect switches
- DC Electrical wiring (DC fuses and 50' wire whips for each string sized to meet the requirements of the National Electric Code (NEC) and the Canadian Electric Code (CEC)
- Combiner boxes
- Lightning arrestors
- Warning labels required by the NEC and CEC
- Mounting hardware for PV modules, if required
- One-line electrical drawings
- Electrical specifications for the contractor's installation
- All required specifications for architectural applications
- Module and inverter installation manuals



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