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## Solar as a Viable Energy Source for Commercial and Residential Development

Modern solar technology far surpasses the modest applications of the past. In the Jimmy Carter era, solar technology was functional but fraught with maintenance problems and improper installation techniques. Because the technology was not ready for mainstream deployment, solar energy acquired a stigma that persists even today. Preconceptions about solar are being shattered, however. Commercial and residential developers are discovering that solar is a viable source of energy, even in northern climates, and that it is becoming increasingly cost-effective to incorporate into projects.

The first step toward becoming a solar-savvy developer is to understand the basics. There are two main types of commercial and residential solar applications available today: **Photovoltaic (PV) Solar** and **Solar Thermal**.

**PV Solar** creates electricity from solar rays. PV technology has been around since 1954, but recent upgrades in manufacturing techniques, higher energy costs, and increased demand have made PV economically viable. It is widely assumed that PV will produce energy at the same cost as existing technologies by 2015 – without government incentives.

Contrary to common belief, PV systems operate most efficiently in temperatures below 77 degrees. In fact, solar resources in Minneapolis outpace those of Houston, San Francisco, and parts of Florida. Systems in northern regions can produce more power during cooler seasons by avoiding overheating, thereby compensating for reduced hours of sunlight during the winter months.

PV technology has several advantages over other energy sources. First and foremost, PV panels have minimal location requirements. All the panels need is a shade-free site, allowing PV systems to be located at the urban core. By generating energy for electricity right where it is consumed, solar is freed up from the infrastructure and expense of transmission lines. PV panels also require very little maintenance, having no moving parts and being made from durable materials. Similar to shingles, most panels are UL-rated for hail and wind. PV systems can be integrated into construction materials and used as a replacement for glass and roofing membranes.



Photovoltaic panels are recognizable by their metallic-looking face, but often go unnoticed because they are integrated into rooftops and facades.

**Solar Thermal** creates heat energy from solar rays by warming water. Similar to geothermal heat pumps, solar thermal systems typically utilize a heat exchanger to transfer heat from the solar panels to the building's water or space heating system. The panels are made primarily from metal and glass and are designed to circulate water, which prevents sub-zero temperatures from damaging the system.

Solar thermal systems usually replace or augment natural gas, which represents about one-third of the total energy consumed in the Midwest. Solar thermal panels are highly efficient and able to capture more energy per square foot than solar PV, making solar thermal an attractive option for commercial and residential applications with large heating or hot water loads.

Our society is clearly in a transition toward renewable sources of energy. By becoming savvy about solar, commercial and residential developers can be ready for sunny days ahead.



The "smoky" look of solar thermal panels and their thick black frames distinguish them from PV systems, but they can be similarly integrated into building architecture.

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