Solar Ready Construction Guidelines

A Guide for Residential Developers, Architects and Builders

More and more, people are turning to solar power for their energy needs, and this trend is expected to continue as the cost of "going solar" declines. Developers, homebuilders and architects can help prepare for the growing demand for solar by designing buildings with future solar installations in mind.

As part of its Solar Ready II initiative, the Mid-America Regional Council developed voluntary guidelines for local governments in the Kansas City metropolitan region to help homebuilders and others work through the design steps that will make new construction solar ready. Each local government can customize the guidelines with specific setback requirements.

These guidelines include best practices to minimize the costs of future solar installation and maximize potential system efficiency. The guidelines apply to site selection, building design and building construction. With solar-ready construction, future homeowners can save thousands of dollars when they install solar, compared to installing solar on a conventionally designed home.

1. Site Considerations

1.1. Building and Roof Orientation

Buildings should be oriented to provide a south-facing roof and designed to minimize the obtrusiveness of solar panels.

1.2. Avoid Shading

Buildings and landscaping should be designed to prevent shade on the south side. Select shade tree species and planting locations that will shade windows and walls but not the solar collector on the roof.

2. Roof Design Considerations

2.1. Preserve Rooftop Space for Solar Collectors

The south-facing portion of the roof should include a contiguous area that is free of rooftop obstruction and of sufficient size for a solar system. At minimum, an area of 100 square feet per kilowatt (kW) should be preserved for solar collection. Typical residential solar installations range from 3–7 kW, depending on the size of the home and the amount of electricity the homeowner wishes to generate. Additionally, in North Kansas City, minimum setback requirements for solar are three feet.

2.2. Flat Roof Configuration

For flat roofs, designers should ensure the building has adequate roof access and consider integrating rooftop safety equipment, such as guardrails, when appropriate. The area identified for solar collection should be near the middle of the roof, away from any parapets to avoid shading. Rooftop HVAC equipment should be positioned to avoid conflicts with the location of the solar collector.

2.3. Pitched Roof Configuration

For pitched roofs, designers should optimize the degree of pitch to maximize the generation of solar panels located flush against the roof. In the Kansas City region, an optimal roof pitch for solar is 30 degrees.

2.4. Allow for Additional Weight

The roof should be adequately constructed to allow for the additional weight of the solar system itself,

as well as the impact of wind and snow loads. Solar PV systems add 3–6 pounds per square foot to the dead load of a roof, and up to 45 pounds at specific attachment points. Generally, code-compliant roofs designed for single family residential construction are strong enough to hold systems up to 15 kW; however, larger residential systems or systems for commercial buildings will sometimes need reinforcement. If a ballasted system is installed on a flat roof, it may add up to 20–30 pounds per square foot to the roof's dead load.

2.5. Record Roof Reinforcements

Any reinforcements to the roof should be recorded on official drawings, such as the code sheet, for the benefit of solar developers.

2.6. Record Potential Layouts

Provide detailed drawings and potential layouts to code officials for filing. Future homeowners and/or contractors will benefit from understanding the design intentions.

2.7. Roof Warranty

Determine if any material or installation warranties would be jeopardized with a future solar installation and document findings for homeowner records.

3. Electrical and Mechanical Considerations

3.1. Reserve Wall Space for Inverter

A 3-by-3-foot area of wall space next to the building's main electrical panel, with an additional 3 feet of clearance space in front of the wall, should be reserved for the installation of an inverter. To minimize voltage loss, the meter box and reserved inverter space should be located just below the rooftop space reserved for the solar collector.

3.2. Install Conduit

Metallic conduit at least 1 inch in diameter should be installed from the area identified for the inverter to the area identified for the solar collector.

3.3. Leave Room for Breaker

The electric panel should include the necessary space for a power input breaker at the opposite end of the electric service panel from the main breaker.

3.4. Provide Adequate Home Electrical Service

Electrical service of at least 200 amperes in residential buildings is preferable to ensure that solar power generation can be accommodated.

3.5. Label Equipment and Reserved Spaces

Clearly label any conduit, wall space and breaker space reserved for future solar installation.