



# **Solar-Ready Construction Guidelines**

## ***A Guide for Residential Developers, Architects, and Builders*** **Planning & Zoning Department**

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

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, homeowners can save on solar system costs down the road compared to a conventionally designed home.

### **1. Site Considerations**

#### **1.1 Building and Roof Orientation**

Buildings should be oriented so as to provide a south-facing roof, and designed to minimize sunlight obstructions to 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 Rooftop Space for Solar Collectors**

The south-facing portion of the roof should include a contiguous area that is free of rooftop obstruction and sufficient in size for a solar system. At minimum, an area of 100 ft<sup>2</sup> 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.

#### **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 Additional Weight**

The roof should be adequately reinforced 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 ft<sup>2</sup> to the dead load of a roof, and up to 45 pounds at specific attachment points. If a ballasted system is installed on a flat roof, it may add up to 20-30 pounds per ft<sup>2</sup> to the roof's dead load.

#### **2.5 Roof Reinforcements**

Any reinforcements to the roof should be recorded on official drawings for the benefit of solar installers.

#### **2.6 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 Wall Space for Inverter**

A 3x3-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 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 Breaker Space**

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 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 Equipment and Reserved Spaces**

Clearly label any and all future solar system installation components such as conduit, wall space, and breaker space.