

## Solar Technologies

### Photovoltaic Systems

At the time of publication of this addendum, there are only two prevailing types of photovoltaic (PV) collectors: photovoltaic panels and building integrated photovoltaics (BIPV). Both systems exist to convert the sun's energy into electricity. BIPV can be considered because it typically makes less of a visual impact on a structure. Unfortunately, this technology is currently not as efficient as photovoltaic panels. The following guidelines should therefore be applied to any style of PV system that has been deemed appropriate according to each building owner's unique circumstances, keeping in mind that it is always preferable to use the least visible technology.

### Solar Thermal Systems

Solar Thermal refers to any system that harnesses the power of the sun to heat a liquid medium for specific applications such as domestic hot water, space heating, and pool heating. As of the publication of this addendum, there are a number of different technologies that are designed to help lower energy bills by utilizing solar thermal systems. Some technologies are available that allow collectors to be hidden entirely within the roof structure, and should be considered (especially for new construction) because of their minimal visibility. However, this guideline will primarily focus on technologies incorporating collectors (whether evacuated tubes or panels) that require direct sunlight.



Figure 7: Photovoltaic Ground Array

## Placement & Design of Photovoltaic and Solar Thermal Systems

The utilization of “energy producing” technologies, such as photovoltaics and solar thermal, should only be considered after every effort to reduce a structure's energy consumption have been made. It is appropriate to consider placement of PV or solar thermal arrays elsewhere on the property before considering mounting this technology onto the primary structure. This is especially important in Nantucket's Old Historic District, in Siasconset's Old Historic District, on contributing buildings or in historically important landscapes, where the use of this technology may have a higher degree of visual impact. When determining where to place PV or solar thermal collectors, it is important to attempt to minimize any adverse effects upon a structure's existing fabric, as well as to mitigate the visual impact these panels and all of their supplementary equipment may have upon the surrounding area. As eventual wearing out of parts is expected with these technologies it is important to note that equipment must be replaced with like kind. The HDC will consider any replacement that is not exactly like the original to be

### Not Recommended

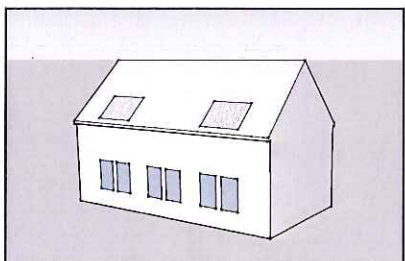


Figure 10: Panels on lower 2/3 of roof.

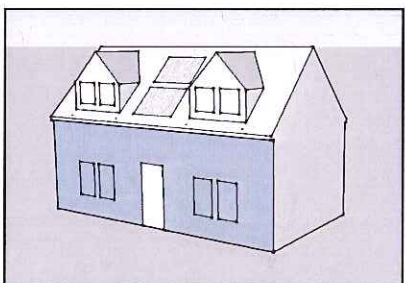


Figure 9: Panels located on primary facade and highly visible.

### Recommended

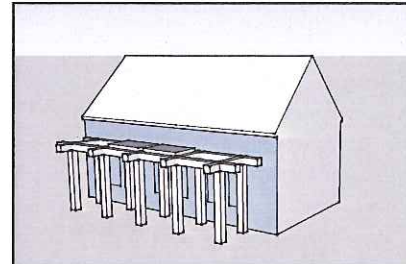


Figure 8: Solar panels incorporated into trellis

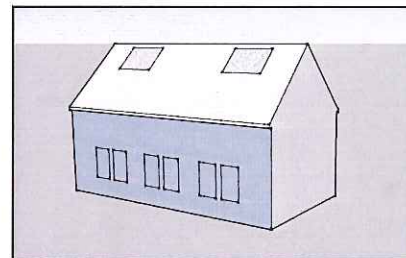


Figure 11: Panels placed on upper 2/3 of roof and aligned with windows.

a change in design, which requires a new application of appropriateness.<sup>13</sup>

When beginning an investigation regarding where best to incorporate PV or solar thermal collectors onto a property, the owner of any structure should always fully consider the principles of *minimum intervention* and *reversibility*.<sup>\*</sup> The entire site must be fully examined for its potential to accommodate these technologies effectively. The most preferable placements for these technologies will have no physical impact on the primary structure and have negligible visual impact upon the site as a whole. Therefore whenever possible, the least visible installation of ground arrays is preferred. If it is necessary for an array to be placed on a structure, it is encouraged that the array to be placed somewhere other than on the primary structure. For example, placement on any non-contributing ancillary structures (such as detached garages or sheds) would stand a greater chance of approval than an installation proposed only on the primary

<sup>\*</sup> **Minimum intervention** is the principle that the less change or alteration done to a historic resource the more integrity that resource retains. **Reversibility** is the principle that nothing should be done to a historic resource that cannot be undone or reversed without permanent damage to the resource.

building.\* The creative placement of PV and solar thermal collectors may be encouraged, if such placement limits any adverse impact of the array (e.g. in an existing skylight).

Because the sloped roofs typical of Nantucket's built environment are such a character-defining feature of the island's cultural heritage, rooftop equipment installations should be carefully designed and positioned on any roof. The basic elements of design to consider are: balance, proportion, color, rhythm, and scale. Additionally, PV and solar thermal collectors should be kept on the same plane as the roof, with the color of the panels in keeping with the surrounding roofing materials.

**Recommended**

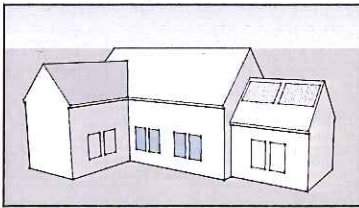


Figure 12: Panels on secondary massing

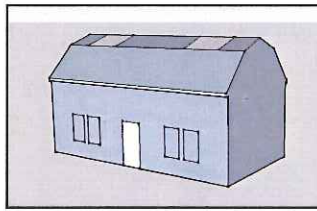


Figure 13: Panels placed with minimal visual impact.

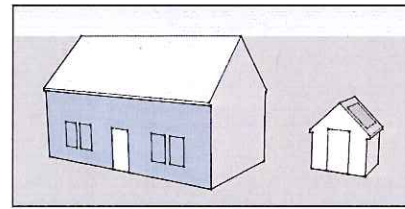


Figure 14: Panel placed on non-contributing ancillary structure

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\* A **non-contributing structure** is defined as a building, which is not an intrusion but does not add to a historic district's sense of time, place and historic development.

## Photovoltaic and Solar Thermal Guidelines

Applications for Photovoltaic and Solar Thermal systems in the Old Historic District, Siasconset Old Historic District, and those on contributing properties are likely to attract a higher level of scrutiny. This also is true for installations on contributing buildings, and where lack of vegetation makes an installation visible from surrounding areas.

### *Existing Buildings and New Construction:*

- The least visible application of technologies and their supplementary equipment is recommended. If the array is located on the ground, appropriate screening may be necessary.
- Applications of these systems as a ground array or on non-contributing ancillary structures (as opposed to on the primary structure) are encouraged.
- The appropriateness of a photovoltaic or solar thermal system will be based upon the historic character and architectural significance of the individual structure and its relation to its surroundings.
- Photovoltaic and solar thermal installations need to be designed carefully and positioned to be in scale with the structure's roofline, while maintaining a balance, scale, proportion, and rhythm with other features of that elevation.
- Systems should be on the same plane as the roof with the color of the panels in keeping with the surrounding roofing materials.

### *Recommended Application Materials:*

Applications for renewable energy systems should include materials adequate to describe the proposed equipment, the structure, and the surrounding area. These may often include:

- A sample of the product and supporting documentation if available.
- Photographs of the installation site and surrounding area.
- A scaled drawing of the proposed system including all supplementary equipment.
- If the system is being proposed on the primary structure the applicant should be prepared to discuss why placements with less visibility or less impact-were not used.