

RENEWABLE RESOURCES SMARTCODE MODULE

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*There is a universal tendency to good... nature has order
and form; nothing comes from nothing.*

Aristotle

SMARTCODE ANNOTATED

These annotations are advisory only. The SmartCode itself appears only on the right side of each spread.

The Renewable Resource Module is regulatory. It is written with "shall" language to be inserted into the Base Code with little or no modification.

The extent to which this content may be implemented is subject to state law and local political support. If the municipality is unable to mandate these standards, they may be changed to "should" language, especially where "shall" appears in colored text, or included in a separate set of design guidelines.

RENEWABLE RESOURCES MODULE

These standards activate the Renewable Resources tables as regulatory. They may need further calibration with By Right and Warrant bullets, as local politics require. Spaces left blank mean that a Variance (public process) would be required for the device or facility. These tables currently show which Transect Zones are appropriate in terms of habitat character and design, but do not take into account political realities, which are always local.

The Renewable Resources tables are not numbered because they may be appropriate in various places in the calibrated code. As always, the insertion of new tables will require renumbering of subsequent tables and a Find/Replace of those numbers throughout the code text.

These regulations are basic. It may be necessary to further regulate the various agricultural farms, wind farms, and solar farms in Article 3 and on the Civic Space table or Civic Space Module. The building-scale energy devices and food production uses and facilities belong in Article 5 and Table 12 Specific Function and Use. For more detailed provisions regarding transect-based agriculture, see the Agricultural Urbanism Module and, specifically for green roofs, the Natural Drainage Module and the Sustainable Urbanism Performance-based Module. New tables that suit the purposes of the community may be assembled from a combination of these resources.

ARTICLE 3. NEW COMMUNITY SCALE PLANS**3.X CIVIC ZONES****3.X.X GENERAL**

- x. Alternative energy production devices shall be permitted by Warrant within the appropriate Civic Space for the Transect Zone, as provided on Table X Solar Power and Table X Wind Power.

3.X.X. CIVIC SPACE (CS) SPECIFIC TO ZONES T3, T4, T5

- x. Urban Farms and Community Gardens shall be permitted by Warrant as provided on Table X Food Production. They may be counted toward the Civic Space allocation by Warrant if they are open to the neighborhood at predictable hours or are visible from an adjacent Civic Space in a way that contributes to the enjoyment of that Civic Space.

ARTICLE 4. INFILL COMMUNITY SCALE PLANS**4.X CIVIC ZONES****4.X.X. CIVIC SPACE ZONES (CS)**

- x. Urban Farms and Community Gardens shall be permitted by Warrant as provided on Table X Food Production.

4.X.X. CIVIC BUILDING ZONES (CB)

- x. Alternative energy production devices shall be permitted by Warrant in Civic Space as provided on Table X Solar Power and Table X Wind Power.

ARTICLE 5. BUILDING SCALE PLANS**5.X BUILDING FUNCTION****5.X.X GENERAL To ZONES T2, T3, T4, T5, T6**

- x. Alternative energy production shall be permitted by Warrant as provided on Table X Solar Energy, Table X Wind Power, and Table 12 Specific Function and Use.
- x. A Solar Roof **should** be large enough to generate at least one megawatt.
- x. Agriculture shall be permitted by Warrant as provided on Table X Food Production and Table 12 Specific Function and Use.

RENEWABLE RESOURCES - FOOD PRODUCTION

This table shows ways of incorporating types of local food production along the Transect. Cities are increasingly allowing urban agriculture and the raising of animals for household use, to encourage lower-cost food supplies and reduction in the energy consumption for food transport. This code may be modified to require developers of infill projects to purchase vacant lots and make them available as community gardens for nearby residents.

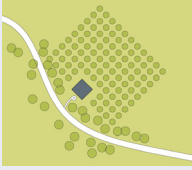
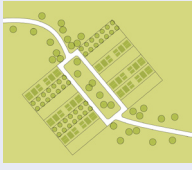
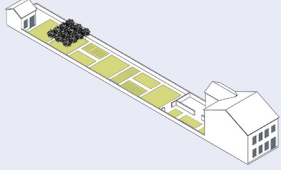
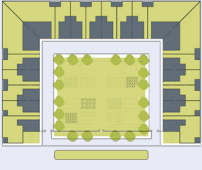
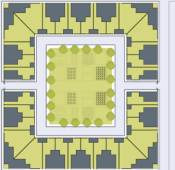
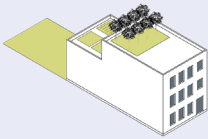
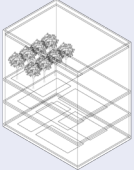
A community garden, or allotment garden, provides a locus of recreation and sociability greater than that of the private yard, being one of the so-called third places. They are also welcome by apartment-dwellers who may enjoy gardening. Allotment gardens can be large enough to hold habitable shacks as affordable surrogates for rural weekend cottages. Allotment plots are not sold, but let under municipal or private administration.

Green roofs are also opportunities for food production, even as they mitigate carbon emissions and reduce storm water runoff. They may be incentivized by giving developers bonuses for installing them.

As tree preservation and planting regulations are introduced, fruit trees may be included and designated for local food production.

For more detailed food production provisions, including the raising of animals, see the Agricultural Urbanism Module.

Renewable Resources - Food Production. This table shows ways of incorporating types of food production along the Transect.

	T1	T2	T3	T4	T5	T6	SD	Specific
Farm 		■					■	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
Agricultural Plots 		■	■				■	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
Vegetable Garden 		■	■	■				<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
Urban Farm 			■	■	■			<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
Community Garden 			■	■	■	■		<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
Green Roof - Extensive - Semi Intensive - Intensive 		■	■	■	■	■	■	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
Vertical Farm 					■	■	■	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

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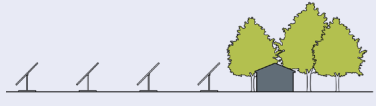
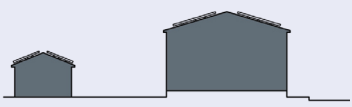

RENEWABLE RESOURCES-SOLAR ENERGY

This table shows opportunities for the placement of types of solar-powered devices within the Transect. Solar access should be protected in the T2 and T3 zones; this may be more difficult in T4-T6 density.

At the community scale, solar orientation should be considered when planning a hamlet or village, so that each lot receives optimum exposure. If this is not feasible, the code may require a percentage of lots, especially in the T3 zone, to be oriented for solar energy.

A solar dish engine system utilizes collectors tracking the sun on two axes, while concentrating the energy at the focal point of a separate dish.

Renewable Resources - Solar Energy. This table shows opportunities for the placement of types of solar-powered devices along the Transect.

	T1	T2	T3	T4	T5	T6	SD	Specifics
<p>Solar Farm</p> 	▪	▪					▪	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Roof Mounted Solar Panels</p> 		▪	▪	▪	▪	▪	▪	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Public Furniture</p> 			▪	▪	▪	▪	▪	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

RENEWABLE RESOURCES - WIND POWER


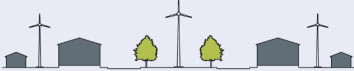
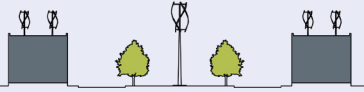
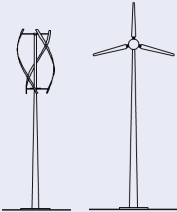
This table prescribes opportunities for the placement of types of wind-powered devices within the Transect. Wind turbines must be placed where there is wind. The best locations in general include shorelines and the edges of open plains. In the urban Transect Zones, T3-4-5-6, this usually means they must be placed quite high above the buildings. Care should be taken installing wind turbines near inhabited areas, as they tend to generate a steady white noise that is disturbing to some.

The horizontal axis wind turbine is suited for the more rural T-zones because it generally requires a large (20 foot) radius for the rotating blades. In addition, the head must rotate in order to receive wind from any direction.

The vertical axis wind turbine is suited for the more urban T-zones because it is significantly smaller than the horizontal axis type, sometimes only 4-5 feet in diameter, and less noisy. These are designed to operate with non-directional wind current, which makes them easier to accommodate, and more attractive in urban areas when in proximity to buildings. For further information see www.quietrevolution.com.

The definitions for the Renewable Resources Module are together on the page following them. If any part of this Module is used, the appropriate terms should be added to Article 6 Definitions during calibration.

Renewable Resources - Wind Power. This table prescribes opportunities for the placement of types of wind-powered devices along the Transect.

	T1	T2	T3	T4	T5	T6	SD	Specifics
<p>Wind Farm</p> 	▪	▪					▪	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Horizontal Axis</p> 	▪	▪	▪				▪	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Vertical Axis</p> 			▪	▪	▪	▪	▪	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Public Furniture</p> 			▪	▪	▪	▪	▪	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

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ARTICLE 6. DEFINITIONS OF TERMS

RENEWABLE RESOURCES

These terms should be added to the Definitions if they appear in the calibrated code.

**ARTICLE 6. DEFINITIONS OF TERMS
RENEWABLE RESOURCES**

Extensive Green Roof: a building roof with a planting medium six inches in depth or less, designed to be virtually self-sustaining and requiring a minimum of maintenance. Such roofs are intended to function as an ecological protection layer. They are planted with low-lying species designed to provide maximum cover achieving water retention, erosion resistance, and transpiration of moisture.

Green Roof: a building roof partially or completely covered with vegetation and soil, or a growing medium, over a waterproofing membrane. Green roofs are categorized as Extensive, Semi-Intensive, or Intensive, depending on the depth of the planting medium and the amount of maintenance required. (Syn: eco-roof, living roof, greenroof)

Horizontal Axis Wind Turbine: a Wind Turbine with its rotor on the horizontal axis, similar to an airplane propeller.

Intensive Green Roof: a building roof with a planting medium between 8 inches and 4 feet. It can sustain elaborate plantings that include shrubs and trees. Intensive Green Roofs are heavy and usually installed over concrete roof decks. They require considerable maintenance. In addition to their role in carbon mitigation, they are used for recreation or aesthetics, being park or garden-like.

Semi-Intensive Green Roof: a building roof with specifications between the Extensive and Intensive Green Roof systems. This type requires more maintenance, has higher costs, and weighs more than the Extensive Green Roof.

Solar Farm: a facility where solar powered devices, either photovoltaic (PV) or turbine systems, are clustered.

Solar Roof: a building roof that supports an array of solar panels, including solar shingles.

Sustainability: The basis upon which an organism or a community can manage its own continuing viability, meeting the needs of the present without compromising the ability of future generations to meet their own needs.

Urban Farm: agricultural land dedicated to food production to be locally consumed (by locavores).

Vertical Axis Wind Turbine: a Wind Turbine with its rotor on the vertical axis. Blades are usually helical and the device is usually more compact than the Horizontal Axis Wind Turbine. It does not have to rotate to face the prevailing wind.

Vertical Farm: agricultural production in buildings without yards, usually high and mid-rise buildings.

Wind Turbine: a rotary device for converting wind energy into mechanical or electrical energy.

