Appendix B: Tompkins County Energy Recommendations for New Construction (2018)

Tompkins County Energy Recommendations for New Construction (2018)

The Tompkins County Energy Roadmap is intended to help inspire immediate action to reduce energy use and transition to renewable energy as a way to help meet our County's goal of reducing greenhouse gas emissions by at least 80% compared to 2008 by 2050. Constructing buildings at higher energy efficiency standards and incorporating renewable energy systems are essential to attaining that goal. For more information on these recommendations, please see the Green Energy Incentives Assessment Project Final Report (2016), **http://www.tompkinscountyny.gov/planning/energy-greenhouse-gas#incentives**

New Construction Projects

Applicants should address how they will support this goal, including ***documenting*** that they have ***considered*** each of the following four energy elements.

1) ENERGY STAR® products include a wide range of **equipment and appliances** that are independently certified to save energy without sacrificing features or functionality. Water saving fixtures can reduce energy needed for hot water. Recommendations**:**
   - Require that water fixtures meet EPA's Water Sense requirements.
   - Require that permanent appliances (apartment refrigerators, restaurant cooking equipment, etc.) be ENERGY STAR rated.

2) Recent advances in **heat pump** design have reduced installation costs and made them more cost-effective than electric resistance heat, propane, and oil, and close in life cycle costs to natural gas. Use of electric heat pumps allows elimination of fossil fuels as they can be powered by renewable energy sources such as solar photovoltaic. Recommendations**:**
   - Utilize electrically-powered heat pump systems (ground- or air-source heat pumps); avoid boiler-assisted heat pump systems, avoid systems that burn fossil fuels.
   - Utilize air-source heat pump hot water heaters.

3) The state has a goal that 50% of NYS electricity will be generated by **renewables** (solar, wind, hydropower, and biomass) by the year 2030. Recommendations**:**
   - Design roofs to be "solar receptive": Maximize area available for solar collection systems. For pitched roofs, place roof-mounted components (plumbing vents, exhaust fans, etc.) on north-facing roof surfaces, to keep south-facing surfaces available for solar collection systems. Orient one roof surface to the south, plus/minus 30 degrees, to maximize potential for solar energy.
   - Maximize solar collection systems on available roof areas, and consider using high-production solar panels to maximize solar production for a given roof area, especially for medium-rise and high-rise buildings.

4) Energy-efficient building design begins with the **building envelope** – the walls, windows, foundations, and roof. Recommendations**:**

- Design to window-to-wall ratio less than 25% (the new energy code requires 30% or less). Keep large windows on south-facing surfaces and important facades; minimize windows on north-facing surfaces and in spaces that see low occupancy (stairwells, corridors, utility rooms, etc.).
- Avoid unusually complex building shapes.
- Use 20% more insulation R-value than required by the energy code.
- Use best practices for minimizing infiltration and stack effect, and require inspection/commissioning of these elements: vestibules at entrance doors, air sealing around window and door frames, sealing at exterior wall/floor junctions, and guarded blower door testing of individual spaces or entire building floors.

Greater than 20 Units - New Construction Projects

In addition to the above, applicants should also ***document*** that they have ***considered*** each of the following three additional energy elements.

5) Lighting controls and high-efficiency **lighting technology** (such as LED or induction) offer significant benefits including greatly reduced energy use and cost, sophisticated controls, simplified maintenance, and longer life. Recommendations**:**

   - Perform lighting design on a space-by-space basis, using the space-by-space lighting power density method (not the whole-building method). Use LED lighting where possible. Design to lighting power density of 15% less than required by the energy code.
   - Require occupancy sensors where possible, for both indoor and outdoor lighting. Require short off-delay (1 minute or less), and commissioning of lighting controls.

6) High-efficiency **heating and cooling systems** may cost incrementally more than standard-efficiency but have a positive payback over their useful life. Recommendations**:**

   - Select high-efficiency heating and cooling plants with rated efficiencies at least 15% higher than required by the NYS Energy Conservation Construction Code.
   - Select high-efficiency domestic hot water (DHW) plants with rated efficiencies at least 15% higher than required by the NYS Energy Conservation Construction Code.
   - Avoid placing heating and cooling distribution systems in unheated spaces, such as attics, basements, etc. Give preference to systems that have efficient distribution systems and low distribution losses (for example, room-by-room fan coils).
   - Use energy-recovery ventilation systems in air-conditioned buildings, and heat-recovery ventilation systems in buildings that do not have air-conditioning. Design ventilation systems to be separate from heating and cooling systems.
   - Assess ductwork for heating, cooling and ventilation. If leakage is greater than 10%, seal chases and shafts with aerosol duct-sealing process.
   - Select heating/cooling systems that allow thermal zoning on a space-by-space basis.

7) **Whole-building energy modeling** can allow you to dramatically reduce energy costs, reduce carbon emissions, and even reduce some construction costs. Recommendation**:**

   - Employ whole-building energy modeling to optimize building energy performance.