

# **Current Issue Envirothon 2024**

## **Renewable Energy for a Sustainable Future**

### **WELCOME TO YOURTOWN, CT USA**

Land use management and resource protection can be complicated. How do we make wise choices when environmentally sound decisions may conflict with the use of resources? That is the challenge facing us today when we must site or plan for our energy needs yet still provide for habitat diversity, public health and safety, environmental infrastructure, and economic stability.

#### The Task

Your team represents a development company. You are to create housing for 100 families in a community to attract diverse groups who will support green jobs featured in Connecticut. Your development will feature strategies discussed in Connecticut to support its energy initiatives. This will be specifically to reduce the use of fossil fuels and increase the use of renewable energy sources toward electrification and zero-carbon energy. The town you are to develop in, Yourtown, requires that all new developments offset energy demand through design and/or microgrids in all new residential and commercial developments. This will help to offset the power demands from the regional grid system and increase local autonomy and resiliency. Providing green energy and green design is your primary goal for your 100 families. Multi-solving is a secondary benefit that increases community buy-in and reduces impacts on surrounding resources.

Use your map packet of the community to identify the location(s) to create your housing development. Identify and explain what types of homes and design features you will provide for them. Explain how this will highlight the use of renewable resources for a sustainable future and fit the requirements of Yourtown's energy offsets. Provide for the offset of energy these new homes will require through energy sources, efficiency designs, or any combination of systems and actions.

Review the information to assess the impacts, pros and cons of energy sources, land use choices, equity, and mutually benefit others for your placement choices. Be able to explain your decision for placement.

Decide how you will offset the energy grid requirement and provide for the energy needs using renewable resources or a combination of energy supply and efficiency actions. Remember to configure the space for additional renewable alternative energy needs if required.

What are you proposing to provide for a family-oriented market? How will you meet the energy demand to avoid using strain national grid energy or need to continue extending fossil fuel use? Use the map packet to help make decisions and answer the questions necessary to explain your proposed development plans. Be able to explain and answer questions about your energy choices and overall decisions.

## Scenario Details

The Development Team must:

Provide for family-based homes, 100 total units for a max of 400 people. Homes can be free-standing, mobile, tiny, condo, apartments, duplex, etc. Design styles are up to your team and can be split into different areas.

Plan on 1 plug-in EV (Electric Vehicle) per household

The minimum annual electrical needs for 100 homes required 1000 Mwatts, which must be provided or offset.

Land space required for energy requirements: if looking for full green space, placement will use a maximum of seven square acres of south-facing land.

You may use a combination of green design or energy microgrid production to provide for renewable energy on a local level.

Explain how your proposal aligns with Connecticut's goals:

- Move off fossil fuel-generated electricity
- Move toward Renewable Energy Sources
- Zero Carbon electricity by 2050
- Provide for equity access and public health

You must be able to explain how electricity is created and delivered.

You must identify the pros and cons of your selected renewable energy choices or designs related to climate change impacts and improvements, e.g., carbon dioxide reduction, heat reduction, methane reduction, flood control, air quality, etc.

Explain how you addressed land use issues and conservation of natural resources in your final selection.

## **Site Selection Summary: Yourtown, Connecticut**

Yourtown consists of suburban, industrial, agricultural, and undeveloped land. Two sites within the town have been designated as brownfields – sites where the soil had been contaminated from past use but could be used for housing development due to site cleanups. One site (Brownfield #1) is a former shooting range contaminated with lead. The site has reverted to a field of grasses, wildflowers, scattered shrubs, and young trees. The other site (Brownfield #2) is an abandoned chrome-plating factory where the soil had been contaminated with chromium. Brownfields are targeted as potential construction sites for renewable energy infrastructure, but their development needs careful consideration. A species assessment has been conducted at both brownfields. The list of species for each site can be found in the packet.

As part of a geothermal initiative, sites across the town have been sampled to determine suitability for geothermal. Sample sites with suitable soil types and depth to bedrock are shown as red dots on the maps.

The town has two large forest blocks where several Species of Greatest Conservation Need (SGCN) have been documented. Three of these species depend on large forests of this size. Reduction or fragmentation of the forest would likely contribute to the decline of their populations. We are facing both a climate crisis and a biodiversity crisis. How do we solve one without contributing to the other?

The town contains many wetlands. Wetlands are essential for wildlife habitat, flood control, and water filtration. Providing a vegetated buffer of 100 feet around wetlands helps to protect them. Climate impacts have resulted in a 38% increase in annual rainfall in Connecticut. Consideration for drainage, storm protection, and flooding is critical without adding to problems and impacts.

Agriculture is an integral part of the Yourtown community. Farmland has been an easy target for development due to the low price of land and open areas for easy access and building. You must consider the loss of farmland soil, agricultural productivity, and habitat against the placement and development of new energy systems.