

CORNELL UNIVERSITY

Town of Caroline Energy Independence

General Overview

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September 26, 2011

This document outlines a process developed with the assistance of the Cornell Cooperative Extension and the town of Caroline to help small communities develop new energy use and production models centered around “green” energy sources. This short document is intended as a general overview and for informing members of the public about the process. (The companion, full, long version is intended for consumption by community organizers and planning officials, as well as technically inclined members of the general public.)

Town of Caroline Energy Independence

An economist would say that achieving energy independence for a small community is simple and easy – when everyone in the community is willing to pay 10% or 15% more for local, renewable energy, there will be plenty of surplus profit to develop local power options to fill that demand. They would argue that since many renewable power options pay for themselves by reducing waste, town governments looking to raise money should find renewable power an easy sell – an investment that the population makes in the community. And strictly by numbers, they would be correct.

But that kind of detached economic analysis underestimates how hard it can be to find money to spare, the value of community's non-monetary resources, and the difficult technical and planning problem involved. The enthusiasm, effort, and time of people who are determined to make their town a more environmentally friendly, sustainable community can be that community's greatest asset – but in order to use it, the community must have the information required to effectively work towards its energy goals. For this reason, this planning process, developed at Cornell with the assistance of the Town of Caroline, focuses on using the energy and interest of the community to maximum effect. In other words we are seeking ways to make the town as energy independent and sustainable as possible while spending a minimum of funds.

The plan developed for Caroline will eventually exist in three formats – this general summary, intended for consumption by the entire Town of Caroline; a technical summary and supporting information intended for use by town officials and other planning bodies and people with technical interests; and, eventually a long-form set of technical information intended for use by the Tomkins County and other Planning Boards, to help towns like Caroline develop their own energy plans. In each case, the reports will contain the same four-point plan – the improvement of homes, the improvement of public buildings and utilities, the improvement of public services, and the development of new, renewable energy sources. By following these steps in this order, a community can improve its energy usage for a minimum of cost.

There are already many programs available for reducing home energy bills and basic improvements to public structures. The *Cut your Energy Bills* CD made available by the Cornell Cooperative Extension through Energy Independent Caroline, the Cornell Cooperative Extension web site, and the Tomkins County energy efficiency website are all good examples of free services that list low or no-cost methods for improving structures' energy efficiency. This report for the town of Caroline continues that trend, offering more technical data on how to improve public utilities, and develop renewable energy options. We do not present a specific plan for the Town of Caroline, but instead present decision making

Raising Savings, Not Cash

The enthusiasm of a community is its most valuable asset for change. But at some point, it will have to raise money in order to develop new energy systems. One way to do this is to collect a percentage of the savings people make on more efficient energy systems. This is one of the most important concepts introduced in this report, as it allows the members of a community to save money even as they raise money, eliminating the burden of renewable development while helping less privileged parts of the community.

methods and technical data arranged to enable easy decision-making based on the town's goals and needs.

In the more technical associated reports, this data takes the form of a handout and detailed appendices for each renewable energy source, listing its economic cost, strengths and weaknesses, and other concerns a community might have before committing to that new energy type in their town. In this summary, we attempt to offer a general overview designed to encourage discussion, and allow members of the Caroline or other communities to participate in public discussion and planning on how they would like their community to develop. In order to do this, it covers the four basic steps of renewable energy development, as well as some important concepts the community will need to discuss as a whole.

Key Concepts: Improving Home Efficiency

The technical details of improving home energy efficiency for a minimum of cost are already fully covered in *Cut your Energy Bills* and other free works, but sometimes, a home requires improvements that do require significant funds – such as new insulation, or improved windows. In this case, it may benefit the community to raise funds to pay for individual home improvements, collecting the savings as the communities “fee” in order to recoup the investment. There are legal problems to that sort of investment that must be considered, but before things reach that point, the community should consider if they're willing to make that kind of investment. If so, how would the town government raise money? If it raised money, how would it repay the money – and what kind of time frame is acceptable for returning the communities investment?

Bonds are a traditional solution, but communities have other options. If even a small portion of the community pledges a fraction of their energy savings to the town, it can produce a reasonable amount of funds for further investment without making the community raise money per se. A community can also try to attract business partners to raise capital, depending on the needs and wishes of its people.

Key Concepts: Improving Public Buildings and Utilities

To some extent, improving public buildings and utilities is similar to improving home efficiency – raising questions of how the community will raise money, and of what improvements are to be made. But public buildings are much simpler to improve, and dividing the returns is less complicated. In order to improve public structures and services, the community needs to decide how long they are willing to wait to see a return on investment. As hypothetical examples, replacing all public lighting with LED lamps might pay for itself in eight years, while running all public buildings on solar power might pay for itself in 4. Deciding if the town should do one, both, or neither, is not a technical choice, but a matter of how patient and invested the community is willing to be.

Key Concepts: Improving Public Services

Public services – such as bus lines, can be improved by adding new equipment and new infrastructure. But for most communities it will be cheaper and more effective to improve usage with increased community participation and awareness. By creating more support mechanisms (for example, parking) for public services, a community can encourage their use, and produce a savings for the entire community. However, such development requires careful planning and consideration. A plan that relies on the continual enthusiasm, dedication, and generosity of its participants is not stable in the long term – communities must decide what services are of greatest value and interest to the community, and then develop structures to encourage their use.

A simple example of this is the farmers market. “Buy local” is an excellent rallying cry, but people’s enthusiasm for driving to many distinct local shops or farms can quickly wane. However, a farmers market provides a single location, encouraging a community to support its farmers. Systems like this cannot be constructed for every public service, but by building them for the most valuable services, a community can greatly encourage participation.

Key Concepts: Developing Renewable Energy Sources

Developing new, renewable energy sources is the most capital and technical intensive part of making a community more energy independent and it is what we have focused on the most in making this document. The last step in developing a more sustainable, environmentally friendly energy structure for a community, the development of new renewable energy systems, requires the community to settle on a means of raising funds, who is going to administrate these power systems, and how the town will use those power systems proceeds.

We can rank systems by cost effectiveness, return, and suitability for an area – and our full technical report aids in those calculations. But it is ultimately up to a community to decide how much money can be raised, and what kind of administrative structure they would find acceptable. Other important questions such as if the town government can act as a business, and exactly what the towns energy goals are, must be answered before this step can proceed.

Sometimes, things such as federal or state government grants make going forward with a project conditional – but it is still important that a community know what its own level of commitment is before applying for such grants, in order to make sure the grant can be properly used.

Key Concepts: Cycles of Investment

Rome wasn’t built in a day – and Caroline’s or other communities new power systems won’t be either. Developing a complete new power infrastructure is expensive – more expensive than any town or county can afford at once. Development occurs in *cycles* – using the returns from the first cycle to pay for the second, so new energy options continue to develop without the town continuously having to pay for them. For this reason, power options should not be considered only in terms of how much *total*

clean energy they produce or save, but for how much of a *return* they give. Because that return can be turned around and put into more steps forward.

Investment in a community is always a long term prospect. No power system or energy saving method can put a community on all renewable power right away. It may take twenty years for Caroline to be fully renewable and green, but careful consideration of long term goals and cycles of development can make that process smoother, easier, and lower cost.