

Green Energy at Connecticut College

I. History of Green Energy at Connecticut College

The current green energy program at Connecticut College is an outgrowth of the program that began as a student initiative in 2001. Several students who were concerned about the environmental effects of energy production believed that the College could use Connecticut's newly deregulated electricity market to have a positive environmental impact. After some research they found that there was only one independently certified, 100% renewable electric product in Connecticut - EcoWatt from the Connecticut Energy Co-operative. As the price of this electric product was slightly higher than the standard offer from Connecticut Light and Power (CL&P), the students formed the Renewable Energy Club and ran a door-to-door campaign to convince students to add \$25 a year to the comprehensive fee to offset the price differential. Their campaign was successful and the College agreed to purchase all of the electricity for the athletic center and the non-dormitory housing, about 17% of the college's total electric use, from renewable sources.

In the fall of 2002, the Co-op went out of business. No other 100% certified green electricity product had become available during that time period. Without a clear alternative to EcoWatt, students in the Renewable Energy Club worked with the administration to seek alternative ways to offset the negative environmental impact associated with the College's electric use. After some research, they came to the conclusion that the market was moving away from the model of independent energy suppliers represented by the Co-op and was instead moving towards the sale of Tradable Renewable Credits (TRCs). These credits were part of a national strategy to encourage the generation of new clean, renewable energy sources. The students and administration decided that the purchase of TRCs was within the mandate of the original student initiative, and was the option that most closely resembled the arrangement with the Co-op.

II. Tradable Renewable Credits (TRCs)

The TRC system is a market-based approach for encouraging green energy production. Unfortunately, for many reasons electricity from green sources still tends to be more expensive than electricity produced by traditional sources such as coal and nuclear. The extra revenue that is provided by the sale of TRCs allows these green sources of electricity to remain viable business ventures. This system provides incentives for the production of new green energy sources, as well as allowing the ones that already exist to continue to operate. Each green power provider generates or purchases from a generator enough green energy to supply the amount of electricity that green power customers are purchasing. By selecting wind energy over dirty conventional sources, the College is demonstrating support for the growth of America's wind energy industry and encouraging Connecticut's utilities to add green power offerings.

The TRC system is highly conceptual, so perhaps it would be beneficial to look at a concrete

example - a wind turbine. When the wind blows and turns the blades of the turbine, two commodities are being created. The first commodity, the electrons that power our homes and businesses, is what we typically regard as standard electricity. The second commodity is something that is referred to as the "green attributes" of those electrons. These green attributes represent the positive environmental impacts associated with producing electricity from a clean source such as wind. This is in contrast to negative environmental impacts caused by traditional energy sources such as coal, oil and nuclear plants. Green attributes are only produced by green energy sources. They are quantified in kilowatt-hours (kWh) the same way that electricity is, and can be sold on the national market place like any other commodity. By purchasing these green attributes in addition to electrons from Connecticut Light & Power, the College has found a creative solution to the problem of not being able to purchase green electricity directly. Essentially, we have bought the elements of green electricity (the electrons and the green attributes) and re-bundled them to create our own green power.

The impact of this system can be seen when one looks at the electricity grid as a whole. Think of the grid as a large swimming pool. This pool has many hoses (power plants) adding water into it. Some of the hoses are adding dirty water (coal, oil, and nuclear power) and some are adding clean water (wind and solar power). The pool also has many drains (electric users) that are taking water out of the pool. Unfortunately, you cannot choose which molecules of water you want in your drain. This is also true of electrons - you cannot choose which ones you want to flow to your outlets. Rather, like the molecules of water in our analogy, electrons follow the path of least resistance. Therefore, the best way to ensure that you are taking clean water out of the pool (and clean electricity from the grid) is to increase the amount of clean water and to decrease the amount dirty water in the pool. This is what you are doing when you buy TRCs - you are helping to change the mix of generating plants that put electricity into the grid.

The effectiveness of TRCs is compounded when they are used in conjunction with a piece of electricity legislation called the Renewable Portfolio Standard (RPS). Many states have passed laws requiring utilities to maintain a certain percentage of green energy sources as a part of their total energy portfolio. Any utilities that do not meet this percentage with actual generation in their portfolio must purchase TRCs to cover the difference. It is important to understand that TRCs are limited in quantity. A TRC is created only when a given quantity of electricity is generated from a renewable energy source. Generators and other companies that deal in TRCs must maintain accounting systems to make sure that there is no "double counting" and that the same TRC is not sold to more than one customer. Therefore, when the College and other institutions purchase TRCs, we are limiting the supply that is available to utilities. This is important in encouraging the building of new clean energy sources two ways. First, if enough TRCs are purchased by independent institutions such as the College, the supply of TRCs could become too small for the utilities to meet their legal requirements. This would either force utilities to invest in building new green energy sources, or would spur on independent contractors to build new green energy sources to keep up with the excess demand. The second and more likely scenario is that by limiting the supply of available TRCs, we would cause their price to increase. As the price of purchasing TRCs increases, building new green energy sources becomes more financially attractive. Utilities will realize that it is in their long-term financial interest to build new green energy sources. Not only will it be cheaper and easier for them to comply with the RPS, but any extra TRCs they generate could be sold, creating a source

of revenue for the utility. In any of these scenarios, the TRC program together with the RPS will create a market structure that will encourage the production of more green energy.

III. EAD Environmental

In the spring of 2003, the College solicited bids from several TRC marketers. A company named EAD Environmental offered the College the best arrangement at that time. With the remainder of the student funds that had been earmarked for green energy purchasing for that year (remember, a semester's worth of green energy had already been purchased), the college was able to purchase 3200 megawatts of TRCs. These TRCs, which were generated by a wind farm in Kansas, represented 22% of the college's electric load for the year.

IV. Decision 2003

At the beginning of the '03-'04 academic year the College was set to once again purchase TRCs from EAD at a slightly lower price than last spring. However, upon hearing of some concerns with the TRC program, we decided to more fully research the TRC system, as well as some alternative approaches to purchasing green energy for the College. At the same time we also began a process of seeking out a better price on TRCs, in case the College decided to continue on with the TRC program.

These are the options that we considered:

Option 1: Wyre Wynd

Wyre Wynd is a small hydropower facility in northern Connecticut. In the past this facility has allowed classes from the College to tour its premises and educate themselves about its operations. It was also one of the main suppliers of green energy for the Co-op, so the owner of Wyre Wynd was familiar with Connecticut College and our green energy program. We attempted to negotiate a deal that would allow the College to purchase the facility's electrons and credits bundled together as a full green electricity product. However, in order to do this, Wyre Wynd would have to be registered as a green energy supplier, which they were not. This is a long and complex process, and it was determined that this alternative was not one that could be achieved at the present time.

The possibility of purchasing the TRCs generated by Wyre Wynd was also explored. However, in the end it was decided that if the College was going to purchase credits that we wanted to continue to support the generation of wind energy, which has been determined to cause fewer negative environmental impacts than hydro.

Option 2: Solar panels

The College also explored the option of purchasing a photovoltaic installation, similar to the one on top of Park dormitory. There are several advantages to this proposal. First, the College would be able to produce some of its energy right on site, which would allow us to forgo the purchasing of energy generated somewhere else in an environmentally unsound manner. These

solar panels would also provide the student body with a tangible asset that would provide long-term production of green energy, as well as a record of what the College is doing with student funds. The panels could also be used as an educational tool for many academic disciplines of the College. Additionally, the energy production from this installation could be metered and the TRCs that are generated could be sold, creating a new revenue stream for the College and possibly funding more green energy initiatives.

It was determined that with the amount of money allocated by students the College could purchase a 4 kW photovoltaic installation. By comparison, the one that is already on top of Park is 10 kW. Because of our location in southeastern Connecticut, it was determined through discussions with Peter Horgan, the College Engineering Systems Manager, and Paul Popinchalk, a private engineer and former employee of the Co-op, that the estimated electric production from an installation of this size would be between 7300 and 8800 kWh. To put that number in perspective, the College uses about 15 million kWh in an average year. The production of the panels would have been slightly less than the amount that Earth House uses in a typical year.

Although this alternative was attractive for many reasons and would have been within the student mandate to use the money for renewable energy, we concluded that the positive environmental impact of using the money in this way would have been very small. The electricity produced by the panels would have only accounted for .06% of the College's total annual electric use. Also, the amount of money that could be generated by selling the TRC's is minimal (\$200-300 a year) and would not be much help in funding other environmental initiatives.

Option 3: Energy Efficient Systems

It was also suggested that the money be spent on upgrading the energy efficiency of several systems on campus. Although these improvements are great ideas that should be explored, it was concluded that this use of the money would not fall within the mandate of the original student resolution to purchase renewable energy. To use the funds in this way would be questionable from a legal standpoint, and had the potential for student backlash against what might be viewed as the administration using money from a specially designed student program for the purpose of covering routine maintenance. It was decided that this was not an appropriate option and that all energy efficiency projects should be brought to the Environmental Model Committee and funded separately.

Option 4: TRC's

At the same time that we were exploring alternate renewable energy options, we also began the process of seeking out other TRC marketers. After a couple of conversations with other TRC marketers, it became clear that we should solicit bids for a new contract. At the end of that process, it was determined that there were two marketers who would be able to meet all of the college's needs - Sterling Planet and EAD, who had submitted a revised bid that was more favorable to the College.

Our Decision

After evaluating all the options it was determined by a group of students and administrators that the option with the greatest positive environmental impact and that most closely followed the mandate of the original initiative was the continuation of the TRC purchasing program. Given that the bids by EAD and Sterling Planet were comparable, it was decided that we would remain

with EAD at this time. The College already had a standing relationship with EAD that was on good terms and was convinced that EAD's could provide the College with good public relations as a result of our purchase. As an added benefit, EAD also offered to help us install meters on our photovoltaic array on Park and to act as a marketer for those credits if we decide to sell them. We chose to sign a two-year contract with EAD because it allowed the College to lock in a low rate on a commodity that we expect will continue to increase in price. By signing for two years, the College is making an effort to ensure that the students are getting the best possible deal for their money.

In the future, the College hopes to draft an energy policy that will allow more input from all areas of the campus community and will provide a clearer and more orderly process for decision-making about all aspects of the College's green energy program.

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