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Preface

Electrical energy costs the average Town of Windham ratepayer nearly $2000 per year. In a town with flagging economy and a reported median income of $25000, (poverty level for a family of five) the increasingly rising energy costs represent a significant hardship.

It is clear that the rising costs of electricity will continue to usurp a larger and larger portion of the local area income. There are a number of ways the Town of Windham can stem the flow of these nonproductive funds from the Windham economy. The Town of Windham Renewable Energy Committee, in this report described a number of these methods in the remaining sections of this report as follows:

Part I Future of Electricity prices shows some of the trends toward increasing electrical energy prices. With a stable electricity infrastructure increased energy produces no increased economic return to the community. This increased energy cost depletes ratepayers discretionary funds with a negative effect on the local Windham economy.

Part II Conservation outlines numerous conservation measures which may be implemented to save the Town of Windham taxpayers funds and mitigate in some measure the rising costs of energy to the town. Conservation in light of the increasing costs of electricity is essential.

Part III Production presents several techniques or projects by which the Town of Windham and its residents may profit from various methods of producing renewable energy.

Part IV What to do about it discusses several techniques to lower the costs of energy by negotiating with aggregators, purchasing wires and poles and developing a municipal electricity utility to benefit for both the municipality and the residents of the Town of Windham.

Part V Comparing Windham’s Energy costs gives an example of a Municipal utilities in New England and compares the cost of energy with Windham. The appendic to this part of the report also provides examples from other New England Communities, who have their own municipal electric utilities in the face of constantly rising electricity costs.

Part VI Finances discusses sources of income and funding possibilities including Federal and State grants, Municipal Utility Bonding and income from sale of electricity.

Appendices: In addition attached are several Appendices which spell out in greater detail many of the findings of the Renewable Energy Committee.

Introduction
A hundred years ago Windham was a major industrial and vacation center in New England. Artists and wealthy vacationers from New York and Boston flocked to the grand homes and farms in the Windhams for the summer season. Mills producing silk, linen, and cotton sent their products via 35 railroads to all parts of the nation and the world. No passenger train between New York and Boston was without a stop in Willimantic. The town populace supported five theaters. Numerous stores and small businesses filled Willimantic’s commercial district. Magnificent homes were built on the hill and in other sections for the prosperous merchants. The Windhams were a thriving economic hub for southern New England.

The Town of Windham is about 28 square miles. The City of Willimantic is about 4 square miles. Our population is mostly located in the 4 square miles (about 16,000 of the approximate 23,000 total population). Most of the Town services are in the Willimantic which has a full time police and fire department, as well as most of the school system.

Fifty years ago these mills were all but gone. The railroads had largely vanished into tanks in WW II and the downtrend has continued. The small businesses that once inhabited our commercial district have gradually succumbed to the pressures of malls and big box stores. Large sections of our once thriving commercial district have simply disappeared to the bulldozer. In a town which once had near the highest median income in the state, more than half our workers now makes less than $25,000, the poverty level for a family of five. We have been woefully unable to attract businesses to fill our empty factories and stores. There is little need to dwell further on this continuing economic downturn which effects most of Eastern Connecticut.

“Nothing is sure but death and taxes”; and increases in energy costs. These rising costs forced on us impact community and its citizens alike. The more economic resources Windham residents are forced to devote to basic energy needs, the less economic support is available for local businesses, much less the arts and entertainment district we are attempting to stimulate. The future, in the face of increasing energy costs, looks even more bleak.

A taxpayer is a finite source of funds. This should come as no surprise to Windham residents. As the taxpayers proportion of fixed expenses increase, taxpayer discretionary money decreases. As taxpayer discretionary funds decrease, local businesses suffer. Eventually some go out of business. As a business leaves a community, its contribution to the circulation of funds is withdrawn from the community economy, causing a cumulative negative effect in the economy. This leads to empty stores, decreased jobs, and depressed, apathetic citizens. We in Windham are not unfamiliar with this process. What are the solutions? There seem to be three directions

**STIMULATING BUSINESS**

Solutions are easier said than done. The first and most obvious solution is bringing businesses and industry to town. New England’s exceptionally high energy costs make for an unfavorable industrial climate. Windham’s relatively inexpensive labor pool, the availability of some magnificent vacant factory buildings, access to transportation, are offset by these highest energy costs in the nation. In spite of economic development efforts; more businesses have left Windham for more economically positive environments, than have come to our community. Certainly more could be done in this area but it requires funds. The Town of Windham, like its taxpayers, does not have the surplus funds to mount a vigorous campaign to bring major businesses and industries to our town.

**TOURISM, ARTS, ENTERTAINMENT AND RESTAURANTS**
The second solution: The Town of Windham is attempting to cultivate an Arts and Entertainment center to attract tourism. This approach has two prongs, the first involves attracting artists and providing space for them to exhibit their talents. Windham has done reasonably well with this aspect and a number of highly skilled artists live within in the Windham Economic area. This area of growth is continuing to expand.

The second is to increase the attractiveness of the downtown shopping district so that pedestrians feel comfortable on our city streets. Windham is making some moves in this direction, but more needs to be done in the areas of noise and speed control, lighting, and facade reconstruction to make Willimantic an attractive tourist destination. Continued improvement in this area is going to require taxpayer funds. Arts and entertainment as an economic support is volatile and funded on surplus funds. Tourism is exceptionally susceptible to economic downturn and is thus directly competitive with energy costs.

REDUCING FIXED EXPENSES

The third alternative is to reduce the fixed expenses. Any reduction in fixed expenses will directly impact consumer discretionary funds and stimulate our local economy. Mostly we take the fixed expenses for granted. What are these fixed expenses? What are the unfailing absolutes in life? Death, Taxes, Mortgages and Utilities.

TAXES

In a healthy economy a town may have excess funds to provide some stimulation for self improvement. Local taxes are most sensitive to economic ebb and flow into the community. Unfortunately resulting decreases in local taxes is like shooting oneself in the foot; the lower the local taxes the less economic stimulation from your tax dollar, and the more precipitous the local decline.

Taxes, which support community functions, are directly competitive with the cost of energy for the economic dollar in the community. The higher the cost of electricity the less money available to the tax payer. Since the taxpayer feels he has no control over the Utilities he is more likely to complain about the taxes. The enigma is local taxes have a direct reciprocal economic feed back into the community itself, whereas funds from an increase in utility bills leave the local economy for increased stockholder and management benefits. In essence money for increased utility bills depresses the local economy.

On the other hand, most local taxes serve to pay local salaries to people who spend their money locally, and stimulate local businesses. On the positive side, poor economic times may increase scrutiny of public expenditures which may lead to the discovery of waste, or ill defined projects which should be eliminated, or like renewable energy, methods for reducing the fixed expenditures. In essence however, taxpayers have only limited control over any tax rate.

UTILITIES

Like death and taxes, increases in the unfettered utilities costs; natural gas, heating oil, and electricity are imposed on the taxpayer with little or no recourse. Connecticut’s Northeast Utilities electricity costs are higher than those of California during the Enron scam. Unlike local taxes, very little of the money collected for utilities remains in the community to stimulate the
local economy. An increase in a residential utility bill provides no additional service to that previously provided at a lower price. Any increase in utility costs is simply money flowing out of the local economy with little or no increase in local economic benefit. Citizens of Connecticut have become stolidly accepting of periodic increases in utilities costs to the highest level in the nation. In the meantime failure of CL&P to modify the infrastructure sufficiently to avoid an energy crisis has caused Federal intervention with yet a new tax on rate payers.

Put Graphic Here!!

Figure 1 The top line is the CL&P price to the consumer for electric power (presently $.1914). The next line down is the ISO New England price. The third line is the average Grid price for all the other grids in the remainder of the United States,(presently $.117). Finally, the lowest line represents the cost of electricity to customers of Municipal Electric Utilities.

With rising fuel costs we can only expect utility costs to rise still further; drawing even more discretionary funds and further depressing the Windham area economy. In the past, grumbling, about increased utility costs has been met with the futility of grumbling passivity. The Connecticut administrative, and legal route for protesting energy price increases is long, torturous, and sufficiently expensive to mitigate any perceived advantage, thus frustrating action.

A tremendous amount of electric generation goes to waste each day. None the less rate payers pay for this wasted power. Simplified, what causes this waste is the need to plan for peak system draw down. Although this occurs only about 100 hours per year, we produce peak plus about 17% additional year round 24/7. This built-in excess safety capacity is wasted 99% of the time, but is paid for 100% of the time by rate payers. (See Appendix A)

Investigation of electricity costs, was in part, stimulated by the CL&P Card Street Plant proposal, and has been a major concern of the Town of Windham Renewable Energy Committee. While the renewable energy concept has laudable environmental consequences, renewable energy resources can be designed to reduce town energy expenditures, save taxpayers millions of dollars in electricity costs, and have beneficial effects on the Windham area economy. It is to this end we have prepared this report. We
can do something toward bringing Windham to a sound economic footing and attract industry and commerce to our area

**ESTABLISHING A MUNICIPAL UTILITY FOR ENERGY INDEPENDENCE**

The Renewable Energy Committee of the Town of Windham Connecticut was formed to explore the potential of renewable energy for reducing pollution, increasing efficiency, and saving money for the municipal government, reducing costs for the citizen tax payers, and stimulating the local economy.

Renewable energy offers a viable solution to the increasing rate of depletion of funds both for the residents and the municipality. Connecticut General Statutes Title 7 authorizes municipalities to establish a public electricity utility. It is a realistic solution to high energy costs that the municipality and it’s citizens can control themselves. Windham is in an extremely fortunate position for developing renewable energy resources and becoming energy independent.

The road to energy independence is not easy. There are numerous regulatory and quasi-legal inhibitions placed in the way. On the other hand, it offers a way out of this economic slump that infects our town. In the following pages we will describe more fully the economic costs of increased utility bills, and alternatives to using electricity from CL&P and the ISO New England.

The goal of the Town of Windham Renewable Energy Committee is to promote the increased use of energy conservation, and the application of Windham’s many opportunities for renewable energy production toward increased quality of life, and the economic recovery of the Town of Windham.
Part I THE ENERGY PROBLEM

WHAT PRICE ELECTRICITY

We, in New England, pay the highest prices for Electricity in the nation. The price of electrical energy in Connecticut is the highest among New England States. The prices continue to rise every six months. In the year 2000 the price of electricity was $0.124 per kWh. Currently, as of the August, 2008 increase in power rates, it is $0.1914 per kWh. The recent CL&P proposal to Department of Public Utility Control, (DPUC) concerning the Card Street plant indicates a potential price of $0.294 per kWh. Even though the Card Street proposal has been shelved for the moment, the DPUC did recommend several other installations. The cost of construction and amortization of these peaking power plants will be passed along to the consumer and we can still anticipate increases in electricity rates to pay for unnecessary peaking power. Fortunately for the consumers in the Windham area CL&P is restricted by the DPUC, to raising the price to the consumer only two times each year.

THE “GREEN” ENERGY INITIATIVE

The state mandated in 2006 push for 20% ‘Green” energy by 2010. The green energy mandate is anticipated to cost consumers an additional $0.01 to $0.02 per kWh. Even without the expected CL&P increases, the Green Energy Mandate is expected to drive energy prices in Windham to $0.20 to $0.22 per kWh within the next two years. It will not stop there. In August 2007, the U.S. House of Representatives passed energy legislation (H.R. 3221) that included a 15 percent clean energy by 2015 as the national standard.

With the actual shortage of available Green energy we can expect a bidding war for “Green Energy Credits” in the near future, providing large profits for those who control green energy, and seriously increased cost to the consumer. The Town of Windham is currently estimated at 1.8% Clean energy by the Connecticut Clean Energy Fund (CCEF). To meet the 20% by 2010 mandate the Town of Windham will have to purchase Green Energy Credits from speculators. The Town alone would be required to buy 120 Green (Carbon) credits a month at a cost of $1194 additional dollars per month, or $14,238 additional per year at the current market. Since these credits are sold on a futures market, as the demand in 2010 increases this cost is expected to increase.

Ironically, within the Town of Windham there is almost 4.0 MW of hydroelectric power, clean energy, generated. This is just about 20% of the Town of Windham’s energy power needs. Unfortunately, Windham receives no Clean Energy Credits for these hydro installations, since these were all sold to outside interests. In effect, the town will have to buy back power generated in our own river at a significant premium. Interestingly, since the town has no municipal utility, tangled regulations prevent us from buying the green electricity directly from our own river.

From the Town and the Windham residents point of view, electricity prices represent a serious $20,000,000 a year drain on the local economy. Electric Utilities generally have an established infrastructure which rarely needs upgrading. There is little
increased return to the town or to the Windham Economic Area to match the increased energy prices. Add to this the fact that considerable industry and subsequent jobs have left the area, the high cost of power is a deterrent to location of new industry. The rapidly increasing energy prices will continue to bleed the local economy providing little economic input in return.

However all is not lost. It has been the goal of the Town of Windham Renewable Energy Committee to discover and explore alternatives to this economic depletion of Windham and our surrounding economic area. This report will explore the options available to ease this increasing burden, increase economic opportunity, and improve the quality of life in Windham.

**RISING ELECTRICITY RATES: HOW MUCH WILL IT COST US?**

Electricity rates are slated to rise precipitously within the next few years. In the CL&P proposal for the Card Street Peaking Power Plant they indicated they expected the energy rate per kilowatt to rise from the then $0.1078 to $0.294 nearly three times the current rate. Each rise in electricity price of $0.01 costs the Town of Windham an additional $25,000 and the Windham Rate Payers over $1,044,000. What are the forces that may contribute to this increase? (See Appendix A Why are your electric rates so high?)

1. **“Green” Energy.** Green energy can currently be bought on the market for an additional increase in price of $0.014 per kilowatt bringing the cost of green electricity to $0.2054 per kWh. It is expected as the 2010 approaches and demand increases that the cost of the necessary green energy will further increase by another $0.02 to $0.04 per kilowatt.

2. **“Private” Renewable Energy Production** Conversely, renewable energy production will be reflected in the price of electricity. As businesses, municipalities and homeowners conserve energy and produce greater and greater amounts of their own power, especially as the costs of renewable energy equipment drops, the demand for CL&P electricity will diminish. Contrary to the law of supply and demand, since CL&P has captive rate payers among the remaining “brown” energy users, CL&P will feel compelled to raise rates, to maintain their customary profitability of 10.25%.

3. **Increasing Fuel Costs** Most of the brown electricity is made from fossil fuels, coal, natural gas and oil. The inevitable rise in the price of fossil fuels, will be reflected in higher electricity costs. While we have just experienced a sharp increase in fuel oil prices, the full impact will only be felt in February when the DPUC allows CL&P their semiannual rate increase.

4. **Combined Public Benefits charge (PBF)** is presumed to fund such things as “Conservation and Load Management”, “Renewable Energy Investment” and some vague “Systems Benefit” Public benefits is charged to the Windham consumer at the rate of $0.006250 per kWh. A little more than six mills does not appear to be a great amount of money on the face of it for a good cause like Clean Energy. The average consumer pays a mere $62.34 per year. The so called Public Benefits Charge sucks from the Town of
Windham economy $652,674 every year. Most of the money seems to be spent in advertising Clean Energy public awareness. Large amounts need to be spent in administration of the money by Connecticut Clean Energy Fund and other corporations set up to administer the funds. As the demand for clean energy rises, so will the cost of these “Public Benefits.” Thus far no discernable amount of this more than 650 thousand dollars Windham contributes each year to these so called Public Benefit funds has been returned to Windham,

5. The Competitive Transition Charge (CTC) which apparently funds changes in the infrastructure was reduced in this last round of raises. Cl&P is currently informing the public in our area of a new transmission line to triple its capacity to send electricity to and from Boston and Providence, which rate payers are required to pay for with a new rate increase. The Competitive Transition charge costs each Windham rate payer a $101.73 per year. The total rate payers in Windham contribute $1,092,361 to the C.T.C. Most of these monies are to relieve the congestion in the broad metropolitan New York area. None of these funds are returned to the Town of Windham economy. We can expect this tax to be increased as CL&P begins “Forward Pricing” their new transmission 375 volt line to Boston and Providence.

6. Bypassable Federally Mandated Congestion Charge CL&P and its parent NU Serves those unfortunates in New York and on Connecticut’s Gold Coast to prevent brownout or even a blackout on those eight or ten hot summer days. The Federal Government at the behest of the local electric companies, decided somehow that taking money out of Eastern Connecticut, where the brownouts are unlikely, would solve the problem for the Gold Coast. This tax has apparently been so unsuccessful it was raised this August to $0.006880 per kWh or $68.62 per average household per year. Town of Windham residents are spending by $718,463 per year to help solve the Gold Coast’s and metropolitan New York City’s electricity problem during those 8 or 10 hot days in the summer. It should be noted that this problem was caused by short term greed and the lack of foresight by CL&P, NU, and ISO-New England.

These “extras” cost the average Windham rate payer $232.69 above and beyond the already high CL&P energy and transmission costs. These “extras” draws $2,436,264 from the Windham economy each year, and provide no additional benefit to the town or its residents. Now let’s explore some actions to reduce the high cost of electricity in the Town of Windham.
Part II CONSERVATION MEASURES
What can we do about Energy usage??

TOWN OF WINDHAM CONSERVATION POTENTIAL

SAVING ENERGY.
Most of our town buildings and many homes use excessive amounts of energy. Work on windows, insulation, heating, cooling, and lighting will save money in the short run. We have instituted some of these measures and will continue in this direction. CL&P’s systematic twice yearly rate increases will soon eat up any savings, but the impact would be worse if these energy saving measures were not implemented.

1. MORE EFFICIENT FUEL BURNING
   Fitch Catalyst. We have explored the Fitch Catalytic process which atomizes fuel and makes it burn cleaner and more efficiently. It was invented by a John Fitch and vetted by UConn. The process can be applied to cars and trucks, It is relatively inexpensive and claims to save 15% on fuel costs. In Town Hall that would amount to about $7200 a year in fuel costs and would reduce particulate emissions and maintenance. The savings would likely be considerably higher in the fire/Police complex and Kramer
   Gas conversion. The use of natural gas (NG) as a heat source has the advantage that it burns cleaner and more completely than fuel oil. Maintenance is reduced. Gas conversion in F/P complex has been instituted awaiting laying the gas line in the street. Traditionally natural gas has been considerably more expensive per btu than fuel oil and it is only with the precipititous rise of oil prices that there is any economic benefit to NG. We can expect over time that this economic advantage will disappear. The Fitch Catalyst does not work on NG
   Efficient boilers. Some of the boilers in the town buildings are old and inefficient. Newer boilers can recapture much of the heat that is dissipated from current boilers into the boiler room or up the stack. An exchange of boilers for these newer, more efficient models would save in fuel costs.
   Caution: would dictate that where possible the town maintain dual burners, preferably with Fitch catalysts on the oil intake and calculate the relative cost of natural gas versus fuel oil at least yearly. For many years natural gas heat has been considerably more expensive than fuel oil. It is only because of the great increases in fuel oil costs that natural gas has become attractive for reasons other than it’s cleaner burning qualities. It may be with the 15% savings with the Fitch catalyst oil may still be preferable. History tells us the present differential favoring natural gas is likely not long lived. Conversion contracts with a guarantee to remain a customer for a number of years, may be immediately attractive but may in the long run be extremely costly, especially with uninsulated buildings

2. ELECTRICITY AUDIT
An electric audit was conducted by CL&P and the light bulbs in most of the buildings are now energy efficient. Further some automatic switches which shut down the lights when no one is in the room have been installed. This may result in considerable savings in Kramer where lights are often left on all night. This work will be paid for from the actual savings in electricity over a span of four years. Eventually the town will realize some reduction in electricity costs, $33,419/yr. at present prices. However this will more than likely be offset by rising electricity rates. The company that performed the task of changing the light bulbs receives the state rebates.

3. INSULATION

Insulation of town buildings holds promise of considerable conservation of energy. Insulation in the Town Hall and the Fire Police complex is virtually non existent. Kramer devours nearly 30,000 gallons of fuel oil per year. The potential for conservation and savings by insulating these and other town buildings is huge. Applying the calculations for R19 to the Windham Town Hall with a square footage of 30,717 square feet, we calculate a saving of $12,100 = 25.2%. With R30 insulation the savings is $12,500 or 26.1% (see Appendix B; Insulating Windham’s Town Hall; The Economics of Insulation).

4. HEAT CONTROLS ON THE RADIATORS IN KRAMER.

Apparently the heat controls on the radiators in Kramer are non-functional and obsolete. Thus the temperature is often close to 80°F. Consequently the windows in Kramer are often opened day and night during the winter months. This fault requires an estimate from someone knowledgeable. The Committee has not pursued this option with a local heating consultant.

5. STREET LIGHTS: REPLACING INCANDESCENT STREET LIGHTS WITH LEDS

Most of Windham’s street lights are currently 250 watt incandescent bulbs. The lights poles and fixtures are owned by CL&P. The Town of Windham currently owns around a dozen street lights. LED’s are considerably more economical in saving energy and in replacement cost. We approached CL&P about conversion of street lights to LED bulbs and were refused. It would reduce their income from cheap nighttime kilowatts for each street light by about 11,000 kWh per year. A single LED street light would have about a 4 year payback.

We searched for American companies and found only one, who offered to sell and install LED’s for $1400 each. Since they would be on CL&P Poles it seemed doubtful that we could get permission and any savings would be eaten up in the installation costs by this company.

There are several foreign companies who sell LED replacements. The prices vary in the neighborhood of $200 to $500. We would have to install them ourselves. I have used this figure for calculating the relative cost of LED, Incandescent, and High density Sodium bulbs. LED’s installed in 12 street lights owned by the Town of Windham would save slightly more that $21,000 over a 12 year period. (about $1750 per year) Converting 1000 streetlights from 250 watt incandescent to 25 Watt LED’s would produce the same number of lumens and save,over a 12 year period., the Town of Windham taxpayers $1,776,000. We have not yet explored the possibility of getting a grant for this change. (See Appendix C
for Calculation of potential savings.)

6. SMART METERS

The Legislature enacted a “smart meter” bill in 2006. In effect all Public Utilities were mandated to install meters which directly reflected the rate for electricity. The smart meter is designed to allow the purchase of electricity at the extremely low nighttime rates when most of the electricity is going to waste. The Windham ratepayer could opt to buy electricity during the night time hours when it is cheaper. A consumer with some battery storage and an inverter could theoretically, take advantage of the low ISO nighttime rates and pay approximately 1/3 of his current bill.

The first sign of the Smart Meter is the flat fee Customer Charge of $15.00 which was increased in February, 2008, presumably for “forward pricing” for the Smart Meters. In spite of the fact that this increased rate has been in effect for six months and the law requiring Smart Meters has been in effect since 2006 these meters have not been made available to rate payers. While smart meters are found operating in many areas of the nation, CL&P has chosen to prolong the installation by “testing” them in a few select towns. Thus the smart meters will be delayed for several years except in some few chosen pilot communities but are unavailable in other communities. We have been exploring ways to make these mandated “Smart Meters” available in Windham.

Further, to mitigate any advantage of the smart meter, CL&P currently provides only a “day” rate and a single “night” rate this differential appears to be as low as $0.0029. This does not reflect the extremely low ISO night time usage price, often as low as $0.01 to $0.02 per kWh to CL&P but the municipal street light night rate is stable at $0.115.

The practical side of this is that CL&P has not complied with Connecticut Public Act #07-242 requiring “Smart meters” that allow consumers to purchase low-cost off-peak power nor has the Department of Public Utility Control defined peak and off-peak times reasonably. The smart meter with appropriate electricity storage would help relieve excessive demands during peak power requirements. In turn, this would eliminate the demand for a peaking power plant.

7. BATTERY STORAGE

While it might be nice to stay up to 3:00 AM to run the clothes dryer, there is an effective alternative, the use of battery storage. Here the rate payer sets the time for Smart meter to charge his batteries from 2:00 AM until 4:30 AM and draws some of the wasted cheap power into his batteries. The rate payer uses this stored battery power during the day, thus operating on cheap wasted electricity and saving considerable money. All that is required is a Smart meter, an inverter, pricing that reflects the ISO-NE night rate, and enough battery storage to last through the day. Battery storage is the main requirement for successful renewable energy Solar, with out storage, is worthless at night. Similarly, wind power without storage is useless on those hot muggy days when you want air conditioning.

8. ELECTRIC CARS AND TRUCKS

One way to utilize this excess (wasted) capacity is to charge electric vehicles (EV). It would have a significant effect on both our budgets and our environment. The pollution associated with producing this electricity is there whether it is used for a purpose or just
wasted. Electric vehicles provide a noble purpose.

When it comes to energy efficiency, electric vehicles hold the promise of being many times more cost effective to run and maintain over their lifetime than comparable gasoline or diesel powered vehicles. Conventional fuel powered vehicles cost on the order of $0.60 cents per mile to run according to the latest available figures while EVs run on about $0.06 cents per mile saving 90% of our current town fuel bill and considerable savings in automotive repairs.

In addition to the efficiency savings, is the effect on the environment of replacing carbon-fuel based vehicles with zero-emission vehicles. The Town of Windham has about 140 vehicles in its fleet. If all were eventually replaced, this would mean elimination of a minimum of about 1.5 tons of CO2 per vehicle or 210 tons of CO2 per year from the area of greatest population density. This may understate municipal savings as many of our vehicles are Heavy duty trucks and older, less fuel-efficient models.

9. CON-EDISON SOLUTIONS PROPOSAL

We have investigated having the insulation, and the heating and lighting projects all supplied by ConEdison Solutions. This company was previously selected by the Windham Board of Education to increase the energy efficiency of the schools. The proposed contract, which includes buying the electric poles for the town is estimated to cost $1,381,600 and estimated savings would be $212,000/year paid off over a ten year period at 4% tax free. This proposal would at least stabilize costs for a period of time. This proposal requires considerably more discussion and investigation before it is brought to the Board of Selectmen.

10. CONSERVATION IS ESSENTIAL

For some reason. the State, or DPUC, CL&P or somebody I have not tracked down, seems to have guaranteed CL&P a 10.25% profit. Thus as their income is reduced as the result of conservation, Smart Meters, or consumer generated renewable power, CL&P’s electricity prices will have to be increased to maintain this level of profitability. CL&P’s systematic twice yearly rate increases will soon eat up any savings. It will be worse if these energy saving measures are not implemented. If these conservation measures are not implemented the negative impact on our local Windham economy will be accelerated.

Part III - RENEWABLE ENERGY

Why not make our own

A. SOLAR POWER

According to the National Oceanic and Atmospheric Administration the sun shines with sufficient intensity to make electricity 1460 hours per year in Connecticut. While this is not the best level of sunshine for generating photovoltaic energy in the nation, with some care, solar energy may be economically feasible in Connecticut.
1. SOLAR BRICKS IN SIDEWALKS:
Quality of life and the friendliness of the commercial areas may be improved by the use of solar bricks placed in the sidewalks, or used to light the cross walks. I have explored a couple of sources for solar bricks. The samples seem to vary considerably in their emitted light and their longevity when exposed to weather. There are other alternatives in both source and construction materials. The committee has purchased four solar bricks. One appears too weak, a second has failed in the rain, the other two continue to function. This option will require more extensive testing before implementation.

2. INSTALLING SOLAR STREET LIGHTING
The preset street lighting in downtown Willimantic is inconsistent. Dark areas alternate with lighted areas. Installing solar powered street lights in between, or instead of the current streetlights is necessary to provide consistent illumination. The current Town of Windham street lighting requires about 1,228,356 kWh per year at a cost of about $120,000 per year at the lower nighttime rate. If we owned the poles we could converted the present incandescent 250 watt bulbs to 25-28 watt LED. This would reduce our night time electricity cost by about $108,000, or an overall 12 year saving, including the cost of the LED Bulbs of $1182.60 per pole just in reduced electricity costs. LED also last much longer leading to large savings in bulb replacement costs.

There is less economic advantage to solar powered street lights which cost in the neighborhood of $950 to $1900 each. Over a twelve year period, at present market prices, comparing solar LED street lights with electricity driven LEDs shows a relative loss of approximately ($820 each light) over the twelve years. However there is a solar LED saving over the cost of each incandescent street light of $960 each and a saving of $1620 over each HID replaced. The up side is the solar lights leave us independent from the inevitable price increases. Plus there may be the possibility of state grants or rebates (See Appendix D)

3. SOLAR PANELS ON TOWN BUILDINGS
The four largest town buildings Town Hall, Kramer, Fire/Police, and Library use, as of 2005, total of = 1,328,149 kWh per year. At present CL&P energy rates these four buildings consume about $258,000 of taxpayers money. These buildings have roofs amenable to solar panels. To produce enough energy to supply these four buildings would require 184 - five thousand watt installations.

With the current CCEF policy, after rebate, the project would cost the town $3,312,000. If we used all the electricity, the project would have a 13 year payback, if the current electricity rate remains stable. Unfortunately, we are caught in the same problem as the residential rate payer. While the sun shines, we may sell the surplus to CL&P for $0.055 only to buy it back later in the day for $0.1943. This changes the economics considerably. Without storage the payback increases to about 40 years.

On the other hand for the same $3,300,000, without the CCEF rebate, we could purchase about the same amount of solar wattage and have it installed by local electricians. The addition of battery storage would make the solar operation economically feasible. If the CCEF policy were changed, so we could have the panels installed by a local electrical contractor, and still get the State Rebate, could essentially get the whole system free
including the appropriate storage.

4. SOLARIZING THE TOWN OF WINDHAM
In addition to putting Solar panels on the Town buildings we may be able find a cost sharing arrangement to put solar panels on many of the buildings on Main Street, on industrial plants, and south facing residences. This should both increase income and cut costs. We would be able to use cheap electricity as a bargaining chip to bring businesses and factories to Windham. We could consider using a tax incentive for the installation, while Windham maintains ownership of the equipment. This would allow us to combine across buildings and save inverter and battery costs. This would help provide cheaper electricity for the Town of Windham.

5. COST OF SOLAR PANELS
Currently the available solar panels are made from either monosilicate or polysilicate and are sensitive primarily to the visible spectrum and are about 16% to 18% efficient. They cost about $3.00 to $4.60 per watt. This makes Solar installations only marginally economic at present electricity prices. As the price of electricity rises installation of solar panels becomes more economically feasible. While silicon is the second most common element on the planet, rumors are being spread that it is in short supply, suggesting the market may begin to creep downward. The current polysilicate panels have a life of about 25 years.

There are several other possible types of solar panels. Some sensitive to a broader spectrum of light including ultra violet and infrared making them functional even on cloudy days. Some of these are up to 12% efficient, but produce energy on hot or cloudy days. It is important to note that some of these panels degenerate more rapidly than others. There are companies who indicate that they are able to make roofing shingles or thin film plastics printed in a printing press. Unfortunately these appear to be only about 4% efficient at the present time and thus a much larger area is required. There appears to be a long future in photovoltaics. Attracting these companies to utilize vacant factories in Windham would be a wise move.

B. WINDHAM’S CURRENT HYDRO-POWER
There has been some speculation about the electric potential in the Willimantic, Natchaug and Shetucket rivers, with little information readily available. Information on present power generation facilities for Windham along its three rivers, has been difficult to obtain and I’m not sure how much information is speculative. The Mystery begins to unfold There are five active hydroelectric sites in the Town of Windham, and several non-operational dam sites without a FERC license at present.

NATCHAUG RIVER
1. The Willimantic Water Works has a capacity of 520 kW and a FERC # CT036
   Maximum Capacity 4,555,200 kWh per year wholesale @ $0.0555 = $173,098
This plant is in application form and has not been constructed

**WILLIMANTIC RIVER**

2. In Windham on the Willimantic River there is a 390 kW unlicensed hydro unit owned or operated by Summit Hydro  FERC #09731 (expired license)
   Maximum Capacity 3,416,400 kWh per year, wholesale @ $0.055 = $187,886
   There is a question as to whether this unit currently is operational or not.

3. Willimantic 1 Class II with a 700 kW capacity licensed to Willimantic Power Corp
   FERC #08047 License expires 9/30/2025
   Maximum 6,123,000 kWh per year , wholesale @ 0.055 = $336,765

4. Willimantic 2 Class II with a 700 kW capacity licensed to Willimantic Power Corp
   FERC #08051 license expires 11/30/2025
   Maximum 6,123,000 kWh per year , wholesale @ 0.055 = $336,765

**SHETUCKET RIVER**

5. Scotland Dam Class II with 2,200 kW License expires in 2012
   Windham Missed the opportunity to file with FERC for this generator early last November
   Maximum 19,272,000 kWh per year wholesale at $.055 = $1,059,960

The Willimantic and Shetucket Rivers combined currently have the potential to produce 15,662,400 kWh @ wholesale $0.055 = $1,921,392 per year. This is enough renewable energy for 3,500 residences a little more than 30% of Windham’s homes.

*Please note: no electric facility runs at capacity for long. Over the year with fluctuations in demand and in water, and maintenance they are likely to average closer to half maximum capacity. This is still close to a million dollars a year.*

**FLOW OF THE RIVER ELECTRICITY GENERATION**

Recently there has been some concern mostly from fishermen and white water kayakers about the electric power dams on Connecticut rivers. In their best of all possible worlds all dams would disappear and the fish and kayakers would have untrammeled run of the river. There are many arguments pro and con to this concept which is beyond our scope here. These groups have raised the concept of “Flow-of-the-River” electricity generation” to resolve our some of our electrical needs.

Flow-of-the-river electricity generation is a technique of anchoring small, floating or suspended generators in the river and making use of the movement of the water to generate electricity. Most folks advocate this technique assuming the generators will be along the side and the center of the river will be available for navigation. Unfortunately, as Mark Twain in Huckleberry Finn so aptly demonstrated several times, the movement of water on the sides of rivers is much slower than that in the center as the banks and shallower sides generate friction to slow, stop and sometimes even reverse the flow. Flow of the River electricity is possible only in the middle of small rivers and streams. Unfortunately these flow of the river generators and their supports are a hazard to navigation but could actually add to the thrill of kayakers.
Flow of the river is dependent upon the speed of the water. Most sources I consulted want at least a speed of 4 to 5 feet per minute for small run of the river turbines.

Cubic feet per second (cfs) is the measure used by the US Geological Survey to determine the amount of water flow in a river. These figures show the use of flow of the river electricity generation and shallow draft navigation as well in the Willimantic, Natchaug, and Setucket rivers is impractical for two to five months of the year. If the dams were removed the amount of available water in the summer and early fall would diminish even more and the danger of winter and spring floods would increase.

There are alternatives. First is construction of a flume which narrows the river and increases the speed of the flow. Unfortunately, for navigation, the turbine must be within the flume so careful design will be required.

A second alternative is to build a canal to divert some of the water into a large pond which will act as a reserve and the turbines can be fed downstream through a pentstock.

For many of the months of low water and hence diminished Hydro power there is greater sunshine. Solar power can in some measure offset the diminished hydro power.

Additional waterpower potential for the three rivers using flow of the river generation is estimated at approximately an additional 4.0 MW approximately double the output of existing dams.
C. WIND POWER POTENTIAL:

According to the National Oceanic ans Atmosphere Administration, inland in the State of Connecticut has a class 3 wind power potential described as “fair”. However as the elevation increases the constancy and speed of the wind also increases. Within Windham there are five elevations over 500 feet and one over 600 feet. A windmill with a 200 ft tower would each at least 700 feet and might be appropriate for wind power.

The members of the Renewable Energy Committee have purchased and installed an anemometer of on Hosmer mountain to gather data on the feasibility of wind power installations in the Windham area. This study will not be completed until June 2009. At that time we will be able to calculate the economic potential for the use of wind mills for generating electrical power in Windham.

D. BIOMASS

The Town of Windham has been contacted by several companies interested in putting biomass installations within the town of Windham

1. One possibility is the production of methane at our sewage treatment plant. In other installations the methane from sewage is sufficient to generate the electricity to run the sewage treatment plant with surplus to sell some power to the grid. This was apparently not included in the current proposed revamping of the plant.

2. An alternative to this was a proposal to use chicken, other animal waste and other biomass to generate methane and to sell the resultant non-odorous residual as fertilizer.

3. A third possibility at the sewage treatment facility is the use of the waste grease to produce bio-diesel. This proposal apparently involved trucking in waste grease from other areas.

4. Another group presented a technique for generating low-cost hydrogen from water. The hydrogen could then be used to power zero emissions engines or to generate heat or electricity.

5. Still another group presented a plan to build a plant to use household waste to make hydrogen and to construct a factory to use the waste residual to construct carbon fiber products like airplane parts or windmill blades.

6. Another company also would use household waste in a plasma burner to produce a hydrogen and a commercial gas. The residual slag from this operation could be used as an abrasive or further refined into its component elements and molecules.

The committee has listened to these proposals. We have referred some of them, but we have not evaluated any of them for their verity or practicality.

MAJOR STUMBLING BLOCKS TO PROFITABLE RENEWABLE ENERGY

The DPUC regulations have the effect of inhibiting renewable energy with power generation be it Solar, Wind or Hydropower. According to DPUC regulations, no one, other than a recognized public utility may put a wire across any road. Thus if we put a large number of Solar panels of the Kramer building and wished to transport the surplus to Town Hall, not advantageously situated for solar panels, we would have to sell it from
Kramer at $0.055 to CL&P and buy the same electrons back from CL&P at Town Hall for $0.1943. The same economics obtains if we were to operate hydroelectric plants in the Willimantic River. Basically this regulation prevents the municipality from generating power anywhere and transporting it anywhere except within the same city block. This problem can only be resolved by instituting a Town of Windham Municipal Electric Utility and buying the utility poles.

**CCEF’s Sweetheart installation contracts**

The State of Connecticut through the Connecticut Clean Energy Funds (CCEF) pays a rebate, presumably to encourage the installation of solar power. The Connecticut Clean Energy fund was set up by CL&P at the behest of the state to disperse funds supplied to CL&P by the rate payers presumable to promote clean energy. Much of the funds go into advertising clean renewable energy. Most of the solar rebate funds go to southwest Connecticut and to big box stores. The reason: a 5000 watt installation requires $18,000 outlay by the rate payer. In a town with a median income of $25,000, installing solar panels and receiving a rebate is indeed improbable.

Further these installations are designed without battery storage. This allows the sunny day time surplus to be sold to the CL&P for $0.055 per kWh. This energy is, in turn, sold back to that same customer in the evening at $0.1943 per kWh. The rate payer receives a minimal reduction of $415, from his yearly average electricity bill of $1938 which amounts to a 43 year payback on his $18,000 investment.

The reason for this lies perhaps in CL&P’s reluctance to foster solar power and in particular energy independence for the small rate payer. The CCEF fund has mandated, to get this State rebate, the installation must be installed by a “certified” contractor. Interestingly, these contractors apparently do not even need to be licensed electricians. While any licensed electrician is knowledgeable enough to properly do the installation, in essence the rebate of $5.00 per watt is only paid to the “certified”, but not necessarily licensed, contractors. In reality the rate payer is paying nearly the full price for the installation and the rebate is mostly profit for the “certified” contractor.

**Alternative to the CCEF Rebate**

Note that wiring a Solar installation is a simple task for a local licensed electrical contractor. Without the “Certified” contractor stipulation most 5000 watt installations can be constructed for about $25,000 including battery storage. If the CCEF rebate were made available, the rebate of $25,000 would cover the cost of the whole installation and the payback is 0 years. This would make the clean energy fund moneys available to a wider range of ratepayers. When battery storage is included the homeowner can produce and use 6059 kWh of his own electricity or a saving of $1177 per year from his electricity bill. Conversely this reduces his average payments to CL&P to $760, (see Appendix F)
Part IV   TOWN OF WINDHAM ENERGY OPTIONS

What can we do about it??

Conservation work on windows, insulation, and lighting will save money in the short run. We have instituted some of these measures and will continue in this direction. Solar energy installations or Smart Power meters will also save the consumer.

1. SAVING ENERGY IS CRUCIAL.

The price of energy following the increases in fuel cost, the need for ratepayers to pay for new transmission lines, peaking power plants and other infrastructure, and the demand for increased “green” energy is expected to soar. Most of our town buildings and many homes use excessive amounts of energy. While the savings from energy reduction plans like light bulbs, insulation and windows will save money in the short run, but will soon be offset by the increased energy prices. Without these savings, costs for electricity will be prohibitive. We have instituted some of these measures and will continue in this direction. Smart Power meters will also save the consumer but without storage systems may require getting up at 3:00 AM to do the washing and vacuuming. CL&P’s systematic twice yearly rate increases will soon eat up any savings, but it would be worse if these energy saving measures are not implemented.

2. BARGAIN WITH AGGREGATORS.

By bargaining with an aggregator, we have been able to reduce the Town’s electricity costs by $0.01 or $0.02 below the CL&P rates. Each penny saves the Town about $25,000 over the CL&P cost, but you are still subject to increases in both energy rates and Transmission/Extra Charges. We have currently negotiated with PPNU, saving Town Electric about $51,130 per year. We may be able to increase our negotiation leverage by including the residents and industries on an on a town wide basis, or by joining other independent communities for a larger negotiation base.

These aggregators want a long term contract. They usually allow only a few hours for a decision. Since the market is so apparently volatile, the danger of being stampeded into an unfavorable contract is high.

3. BECOME AN AGGREGATOR.

Entering the market at the next level down one can buy electricity at a lower rate. This lower rate might also be passed down to consumers and perhaps to other towns. There is even the chance to make a profit. The problems here are three:

1. Several million dollars up front credit.
2. Risk, you need someone skilled in the Electricity commodities market else you can end up paying more, and
3. You are still subject to CL&P’s raises in Transmission/Extra Charges

Aggregation of “dirty energy” is long term gambling. It might save an additional
Title 7 of the Connecticut General Statutes allow Cities and towns to establish their own Municipal Utility. There are numerous advantages beyond cheaper renewable energy and the ability to move it. Most New England towns that have taken this step enjoy electricity rates less than half those of Windham Rate payers. In addition to providing jobs and affording the residents more money to spend in the local economy, the lower energy rates will help attract business and industry to the Windham area. Further, a Municipal Public Utility can enter into aggregation directly with power generators for better energy prices, skipping the numerous layers of free market aggregators. A municipal utility may sell energy and/or carbon credits on the open market. (in Appendix J there are some arguments in favor of exercising that authority)

$0.02 to $0.03 ie. $50,000 to $75,000. Aggregation is a somewhat risky business. We might also loose the same or more.

4. PRODUCE RENEWABLE ELECTRICITY Several of the Town buildings, residences, and many commercial spaces could be readily adapted to solar energy. There are other possibilities for wind or hydro power. Most of these are variable thus solar energy often produces an excess which you can sell to the grid for $0.055. Installations then in the present regulatory climate must be dispersed within a city block. Thus the power from a generator in the river can only feed installations with no road between it and the recipient. One option is to form an electric company within each city block, the second and more realistic is to form a municipal electric utility and purchase the poles and wires and deliver the cheapest possible energy to consumers.

5. BUY THE WIRES POLES AND METERS Many towns have saved money and some of those”extra charges” by buying the poles, wires and meters. If Windham owned the wires the exorbitant CL&P Customer Charge could be reduced, from $15.00. We could institute our own smart meters. We would save The CL&P Transmission/or distribution charge and shave other charges, perhaps as much as $0.024 Per kWh. In fact the public has already paid for the telephone poles and wires and they have been amortized to a tax value of zero. The poles and wires do not appear of Windham’s tax rolls

   If we are able to only save the Transmission charge of $0.0147 per kWh, which costs each rate payer $146.62 per year, could be eliminated to release $1,535,088 or 61 job equivalents into the Windham economy. Further with our own wires to maintain some part of the 1.75 million we pay yearly to maintain CL&P’s profitability could be markedly reduced. We would still have to maintain and pay off the poles, and do the billing ourselves but these procedures are already in place, Owning the wires should save the town residents collectively 2.5 million. Managing this operation without a Municipal Electric Authority Commission would be difficult. On the other hand replacement of CL&P’s the current 250 watt incandescent bulbs 25-28 watt LED lights will save the Town of Windham nearly $100,000 per year

   In addition, we could move our renewable electricity freely from one building to another on our own, another saving the town and the Windham residents potentially as much as nearly 4.5 million per per year. (See Appendix H)

6. ESTABLISH A MUNICIPAL UTILITY

   Title 7 of the Connecticut General Statutes allow Cities and towns to establish their own Municipal Utility. There are numerous advantages beyond cheaper renewable energy and the ability to move it. Most New England towns that have taken this step enjoy electricity rates less than half those of Windham Rate payers. In addition to providing jobs and affording the residents more money to spend in the local economy, the lower energy rates will help attract business and industry to the Windham area. Further, a Municipal Public Utility can enter into aggregation directly with power generators for better energy prices, skipping the numerous layers of free market aggregators. A municipal utility may sell energy and/or carbon credits on the open market. (in Appendix J there are some arguments in favor of exercising that authority)
If a Windham Municipal Electric Utility could save $0.05 per kWh more

Town of Windham savings = $127,825 per year
Residents savings = $5,441,000 per year
Commercial/Industrial savings est = $4,350,000 per year
Part V Comparing Windham’s Energy Costs with Municipal Utilities

It should be noted that all Municipal Utilities have lower costs to the consumer. Cheap Electricity from a municipal utility reduces the flow of money from the community economy. In addition it directly produces jobs and keeps money within the community. The savings from a municipal and the jobs further stimulate the economy. The cheaper electricity is a direct stimulus for business bringing more jobs and business into the community. Savings to the rate payers depends upon the model used to establish the Municipal Utility. Remember, I have figured energy cost and consumer charges only. For comparison CL&P’s Energy + Consumer Charges is $0.138 per kWh. Energy only costs $1376.41 per year for the average CL&P residential rate payer. The ratepayer savings with a Municipal Utility, in reduced transmission, distribution, and “extras” will be even greater.

1. Municipal utilities that generate their own power, and sell the surplus, save the most money for their consumers (between $600 to as much as $1200 per rate payer less that Windham rate payers give CL&P).

2. Municipal Utilities that may themselves make some of their power but broker directly with power producers are next in line with savings to the consumer $480 to $550 per rate payer less than CL&P’s energy cost.

3. The smallest savings come from second level “Decontrolled Free Market” brokers and “Municipal Cooperatives” but even here the savings are appreciable ($300 to $320 savings over Windham’s CL&P rates)

AN EXAMPLE: COMPARISON OF CURRENT TOWN OF WINDHAM WITH READING MA MUNICIPAL UTILITY

Windham’s electric power costs are much higher than any Municipal Utility in the New England area. They are more than two and one half times greater than Reading Mass. Municipal Power, the most economical New England municipal utility I found: .Reading Mass, Total energy cost of $0.0727630 per kWhNo Transmission or Rate charges are posted Reading MA. Energy Savings over Windham $0.065017 per kWh Estimated Household energy savings per year $648.48 Plus Transmission etc saving $538.88Reading Ma residents Total Savings $1187.36 each per year compared with WindhamTown of Windham, residents estimated potential yearly savings:(based on 10,470 Windham residential customers) Estimated savings over Windham residents per year = $12,431,166 Estimated savings over Town of Windham per year $166,217 That is 497 job equivalents (at Mdn $25,000 ea) lost to the Town of Windham in excess electrical energy costs At the Reading Ma. rate, the electricity bill for all the residents in Windham a mere $7,598,479

Note: There is apparently no distribution costs since they own their own poles and facilities

A SHORT HISTORY OF THE READING MA MUNICIPAL POWER COMPANY
In 1894, the power station was equipped with two 125 hp boilers and two Corliss engines, one 100 hp, the other 200 hp. The engines were belted to a jack shaft, which extended the length of the engine room where four electric generators were belted. The plant was put into operation on September 26, 1895. In 1926, an agreement with Boston Edison to purchase the required current was reached. RMLD became the first Massachusetts electric plant to offer customers a residential rate for the use of electricity anytime and for any purpose. The residential rate was further modified to a low rate of 2.33 cents per kilowatt hour, making it the lowest in Massachusetts. Then after several years, Boston Edison raised their rates significantly. Town of Reading exercised its rights under its agreement with Boston Edison to purchase underground ducts and cables. In 1978, more than 84 years after that Town Meeting members voted to establish their own electric utility, the Department had 19,500 customers and gross revenues of $17 million. By 1984, an additional 1,500 customers were added, to bring the total number of meters to 21,000.

Revenues in 1984 increased to $45 million. The plant value of $13 million in 1976 increased to $24 million by 1984. (See Appendix K for further examples of saving by New England Municipal Electric Utilities)
Part VI Financing Energy Savings

Renewable energy credits
Renewable energy programs have become mandatory. The town is required by both state and federal law to receive 20% of its energy from green renewable sources by 2010. The United States Congress is currently considering a law making 15% green energy mandatory nationwide by 2015.

If the town does nothing, to meet the 20% by 2010 criterion, the Town of Windham, considering currently usage, would be required to purchase of 120 “Green” Energy credits at a cost of $1,194.00 per month, an increase in the yearly electricity bill of $14,304 per year.

FINANCING OPTIONS FOR RENEWABLE ENERGY
There are multiple avenues to financing energy improvement projects through the judicious use of federal and state grants many large projects can be made relatively inexpensive to the taxpayer.

1. ENERGY IMPROVEMENT COMPANIES
These companies will perform energy saving or energy producing tasks and pay for their work from grants and from the savings. They also collect the grant money that is available for the projects. Hence their capital outlay is often minimal. They usually want exclusivity for 5 to 10 years and perhaps more. We have one such contract for replacing all light bulbs with energy efficient bulbs. Unfortunately light bulbs and insulation do not count toward the Green energy goal, they do reduce energy consumption and thus the actual amount of energy required to meet the goal is reduced.

One drawback to these energy improvement companies is we would be bound to the company for the period of the contract. These companies may reap the benefits of any future improvements the town may make or fund from other sources. Thus while they are a way to get some projects accomplished without additional up front capital, the town may not reap the full benefits of these improvements until project obsolescence. The major drawback is as the town becomes active in making additional conservation savings or producing renewable energy, these companies reap the major benefit.

This contract should not be entered without the advise of a lawyer specifically skilled in energy and available grants.

2. THE TOWN OF WINDHAM
The Town of Windham itself may have funds which may be diverted from Capital Improvement funds, grant funds, other funds for smaller projects. For example changing the bulbs in town owned street lights to LED would be relatively inexpensive and has a short payback period. (See Appendix G) If we authorize formation of a Municipal Utility of Town of Windham it may also issue bonds for renewable energy projects, with approval from the Board of Selectmen (Appendix J)

3. STATE GRANTS AND INCENTIVE PROGRAMS
There are several grant opportunities within the state of Connecticut. Windham has not in the past taken full
advantage of many these opportunities

STATE OF CONNECTICUT FINANCIAL INCENTIVES

There are a number of incentive programs in the State of Connecticut. As we move from exploration into an action program these incentives will have to be explored seriously for their potential benefit for the Town of Windham and it’s residential and commercial rate payers. The following are listed on the internet.

Industry Recruitment/Support

* CCEF - Operational Demonstration Program

* OPM - New Energy Technology Program

Production Incentive


Property Tax Exemption

* Property Tax Exemption for Renewable Energy Systems

Sales Tax Exemption

* Sales and Use Tax Exemption for Solar and Geothermal Systems

State Grant Program

* CCEF - Community Innovations Grant Program

* CCEF - On-Site Renewable DG Program

* CCEF - Project 150 Initiative

EEPP Energy Efficient Partner Program Connecticut's Electric Efficiency Partners Program

* DPUC - Capital Grants for Customer-Side Distributed Resources

State Loan Program

* CHIF - Energy Conservation Loan

* DPUC - Low-Interest Loans for Customer-Side Distributed Resources

State Rebate Program
SEC. 32-80A. ENERGY IMPROVEMENT DISTRICTS.
One option for providing funds is the establishment of an Energy Improvement District which is able to float bonds. It then purchases or rents “distributed resources” which are in turn means one or more of the following owned, leased, or financed by an Energy Improvement District Board: In essence the Energy Improvement District is a shell company which can float bonds and then lend money or equipment at interest to a municipal utility or any company involved in renewable energy
(A) Customer-side distributed resources, as defined in section 16-1;
(B) grid-side distributed resources, as defined in said section 16-1;
(C) combined heat and power systems, as defined in said section 16-1; and
(D) Class III sources, as defined in said section 16-1; and

This act provides for more rapid funding and reduces the steps to bonding as well as the facilitation the operation of a Municipal Utility. The down side is that less of the income can be used to provide savings for the direct consumer.

SECTION 94 OF PUBLIC ACT 07-242
This is an Act Concerning Electricity and Energy Efficiency. It requires the Department of Public Utility Control (DPUC) to establish guidelines for the administration of the Connecticut Electric Efficiency Partners Program, and authorizes the DPUC to spend up to $60 million annually to fund projects that will reduce Connecticut's peak electric demand under the Partners Program.

ISO-NE CAPACITY PAYMENTS
ISO New England Accepts “Show of Interest” Applications from New Power Resources in implementing the region’s Forward Capacity Market (FCM), a wholesale market enhancement November 1, 2006. This means if we build a new generator, it is can be a Forward Capacity contribution to the market and they will have to adjust the market to compensate for it. (i.e. raise prices)

FEDERAL FUNDING SOURCES
Qualified Zone Academy Bonds (QZAB) provides interest free bonds applicable to clean energy projects within an academic setting. School districts need assistance renovating schools, and the federal role in school construction was improved to help
schools meet their needs. In addition, these benefits can be used for other types of school renovations, such as paying the interest on loans. QZABs cannot be used for new construction but can be used for the following activities:

* Renovating and repairing buildings
* Investing in Equipment and Up to Date Technology
* Developing Challenging Curricula
* Training Quality Teachers


There is also a wide range of Federal Grant opportunities from DOE and EPA and other agencies which I have been unable to access.

**SOME STUMBLING BLOCKS TO RENEWABLE ENERGY**

Department of Public Utilities Control. Any scheme or plan for generation or distribution of an amount of surplus electricity is required to have the approval of the Connecticut Department of Utilities Control (DPUC). Thus process is usually long, arduous, and expensive. Further if the project is sizeable it is in the best interests of NU and CL&P and ISO-NE to control it in their best interests. Further, DPUC’s current regulations require that we pay those “Extra” charges Currently slightly more than $0.03 per kWh on any current we generate. Whether or not we are an independent Municipal Utility. These charges which largely support CL&P’s lack of foresight will be taxed to the Municipal Utility.

FERC Federal Energy Regulatory Commission. The FERC was set up to expedite the generation if energy within the country. It that end they have veto power over all electrical generation plants in excess of 250kW or generation sufficient energy for approximately 450 homes. To insure that all the governmental regulations are met a lengthy application must be filled out. Prior to the application there is a necessary request for permission to fill out an application. The whole process including environmental impact studies takes on the order of four years and several inches of documents. In the meantime any project large enough to provide sufficient electrical energy for the Town of Windham will be put on hold. In general it appears better to do one huge project, or numerous projects of less than 250kw such as run of the river generation or moderate sized solar arrays.