

Portsmouth RI Wind Energy Update

Presented by

Portsmouth Economic Development Committee

Rich Talipsky
Chair

Portsmouth EDC Sustainable Energy Subcommittee

Gary Gump
Chairman

Please see the descriptive text narration
on the page following each slide

www.portsmouthRlenergy.com

- Welcome to our Portsmouth Wind Energy Public Forum. The Portsmouth Sustainable Energy Subcommittee was formed by the Economic Development Committee in Twenty oh five to look at ways that we could improve the Town's economic posture through the pursuit of renewable energy sources and work toward a goal of becoming "sustainable" in our energy usage. An update to our efforts can be found at our web site – www.portsmouthRlenergy.com.

Sustainable Energy

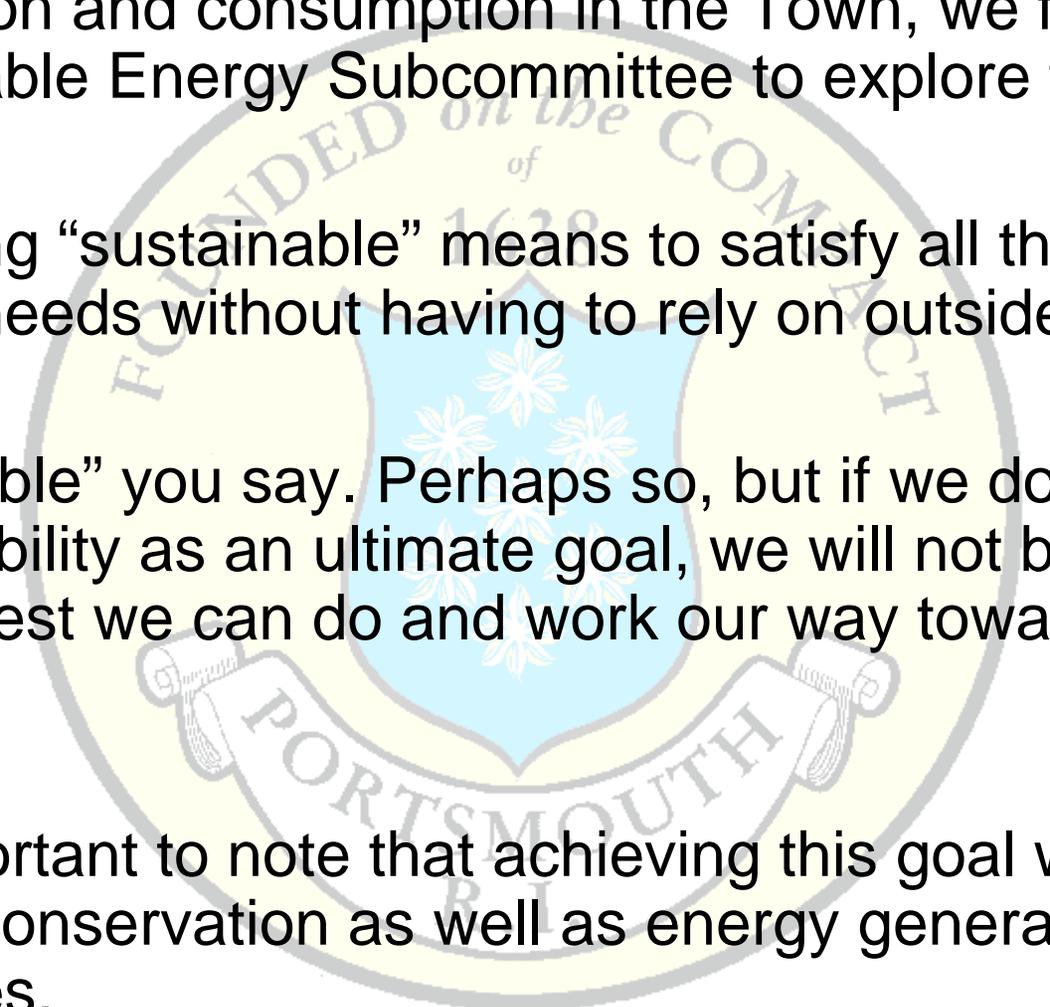
We formed a Sustainable Energy Subcommittee to look at ALL the ways that the Town can work toward a goal of being “sustainable” in its energy needs.

“Sustainable” means not reliant on outside sources for energy needs.

“Totally Sustainable” is difficult goal to achieve, but a great one to strive towards.

It will require emphasis on both energy generation and conservation.

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- When we first started looking at the economics of energy production and consumption in the Town, we formed a Sustainable Energy Subcommittee to explore the issue.
 - Becoming “sustainable” means to satisfy all the Town’s energy needs without having to rely on outside sources.
 - “Impossible” you say. Perhaps so, but if we don’t look at sustainability as an ultimate goal, we will not be striving for the best we can do and work our way toward that goal
 - It is important to note that achieving this goal will require energy conservation as well as energy generation measures.

Why Wind? Why Now?

- We have the wind in Portsmouth
- Wind generation technology has matured
- Wind projects are more likely to get grants
- Other Renewable Energy Forms?
 - Expensive
 - Have not technologically matured
- Wind is the best bet on near-term return on investment for our town.

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- Why Wind? And Why Now?
- First and foremost, we are lucky to have sufficient wind in Portsmouth.
- Wind turbines now are more efficient, quieter and affordable.
- Being the “first Town on the Block” to have a wind turbine makes it easier to get money in the form of grants from that renewable energy fund that you pay as part of your electric bill each month.
- Although there are many potential technologies, our research showed that the best bet in near term energy generation technology comes with the wind. With sufficient wind in Portsmouth to produce power and with many funding subsidies being offered, wind energy is the best current option for us to pursue. In coming years, when other technologies emerge that give us other cost effective alternatives, we will look at other renewable energy sources for the Town.

Portsmouth Municipal Wind Energy Activity

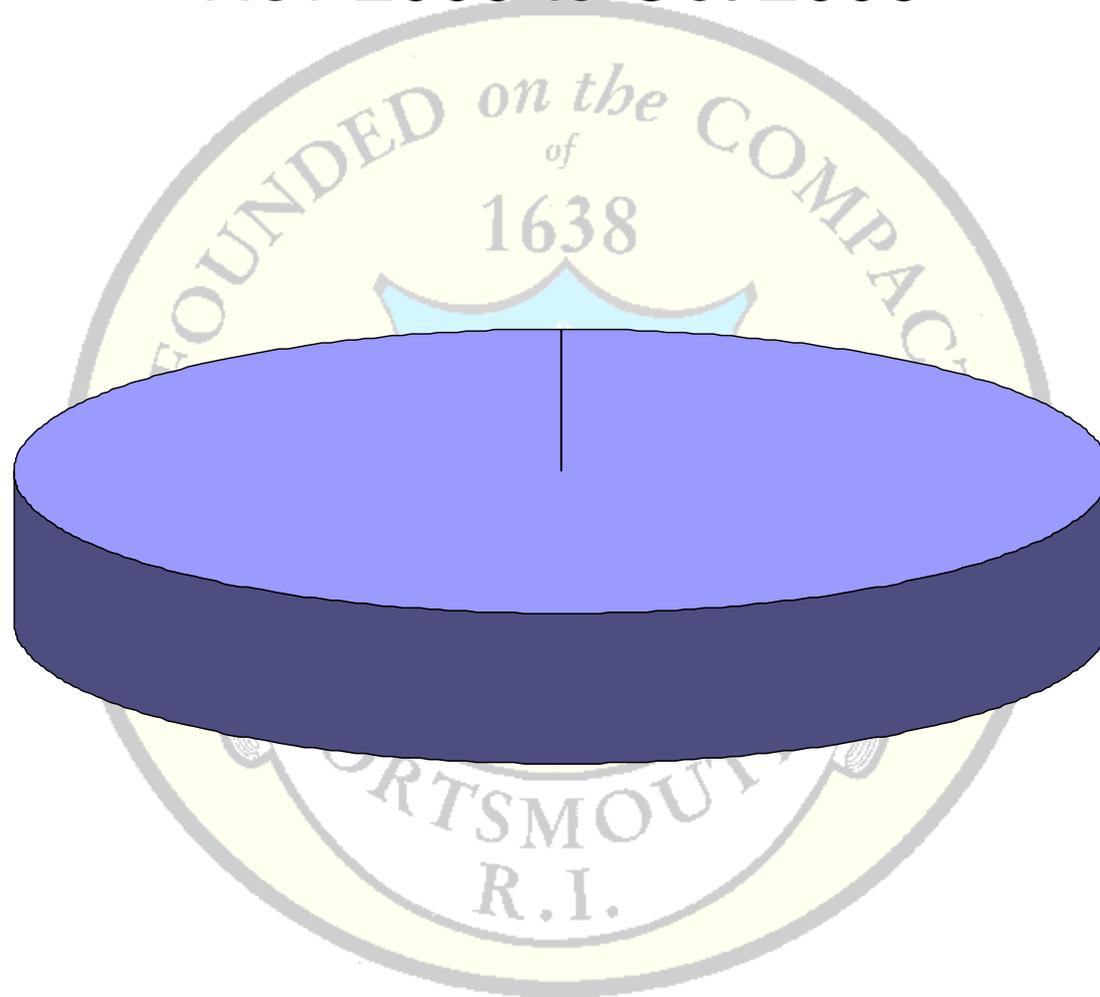
- 2005
 - PEDC created Sustainable Energy Subcommittee
 - Participated in National, Regional and Statewide energy forums
 - Supported Portsmouth Abbey WTG effort
 - Worked with RWU student teams/ Supported RWU Wind energy survey
- 2006
 - Won \$25K feasibility grant from RI REF in Q2 06
 - Applied for/ received CREB go-ahead for \$2.6M Zero interest bonds
- 2007
 - Jan - Drafted legislation for voter wind power referendum
 - On RI House and Senate Calendars for April 25
 - Apr - Awarded Contract for Wind Resource and Economic Analysis
 - Apr – Launched www.portsmouthRIenergy.com
 - Jun – Plan to Complete Feasibility Study
 - Present to Town Council
 - Fall - Present to Voters (if Town Council approves)
 - Fall – Order turbine (if Voters approve)
- 2008
 - Generate Power

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- After a significant amount of research in twenty oh five, we decided that wind energy was the most promising path to pursue. We gained a lot of information from the Portsmouth Abbey wind turbine project. In early twenty oh six, the State Energy Office offered grants of up to \$25,000 for wind energy project studies. Portsmouth applied for and was awarded a grant of \$25,000 for a wind energy study to see if it would be technically feasible to erect a wind turbine at either or both of the High school and middle schools. There were several reasons to pick the schools as potential sites. They would be on Town-owned land with available open space and have a large enough electrical load for the project. We'll talk about why this electrical load is important in a moment.
- Also, a Federal Law was enacted that allowed the IRS to issue zero-interest for Clean Renewable Energy projects. These Clean Renewable Energy Bonds (called CREBs) would be for specific renewable energy projects. We had to be specific on project location and chose the school sites. We won authorization for \$2.6 Million of these bonds.
- This year we awarded a contract to a wind energy expert firm, Applied Technology and Management, to help us determine, with some certainty, that we have enough wind to make this a money-making proposition. Our study, that takes a look at the gambit of Technological, Economic, Political and Social aspects of a project such as this is in progress and we hope to have it complete by the end of June. These public workshops are part of our campaign to gather information on what the public thinks about the project and to better educate them on all the facets of the project.
- Although the Town may borrow money for this project without specific voter approval, we want to make sure we have approval of the majority of our citizens on this project. Even though we knew it would be a lot more work and cause us to jump through more "hoops" we felt that this was important. The process of drafting legislation and getting it through the RI assembly was long and we _____. Our plan is to provide our feasibility study to the Town Council, and if they approve, send it to the voters in a ballot referendum. We expect this to occur in the fall along with a few other Town referendum issues.
- So, it will ultimately be the choice of our voters on whether or not to go forth with the project.
- If the voters approve then we will move on the process of ordering and construct one or two turbines. Since there is a high demand on turbines, we expect 10 -12 month lead time to get one after it is placed on order.

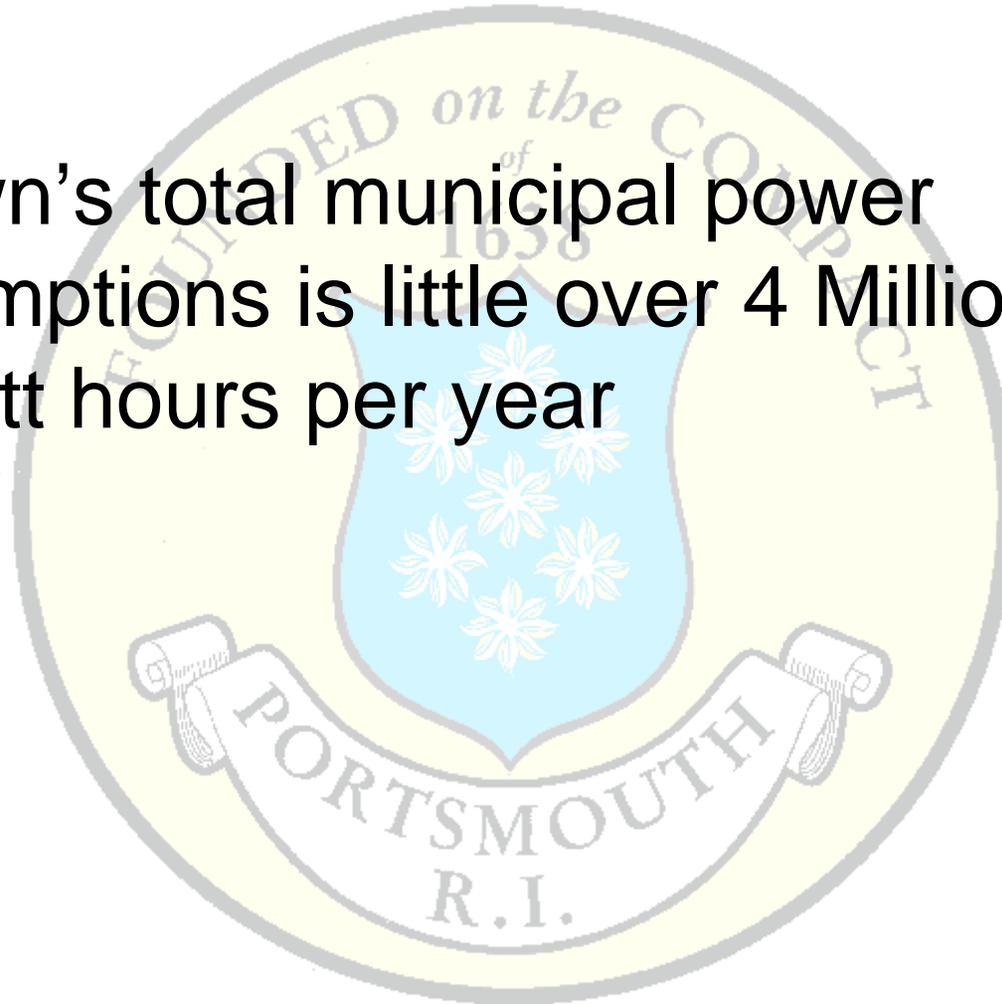
Portsmouth Municipal Energy Use

Nov 2005 to Oct 2006



Municipal Energy Consumption = 4,240,000 KWH

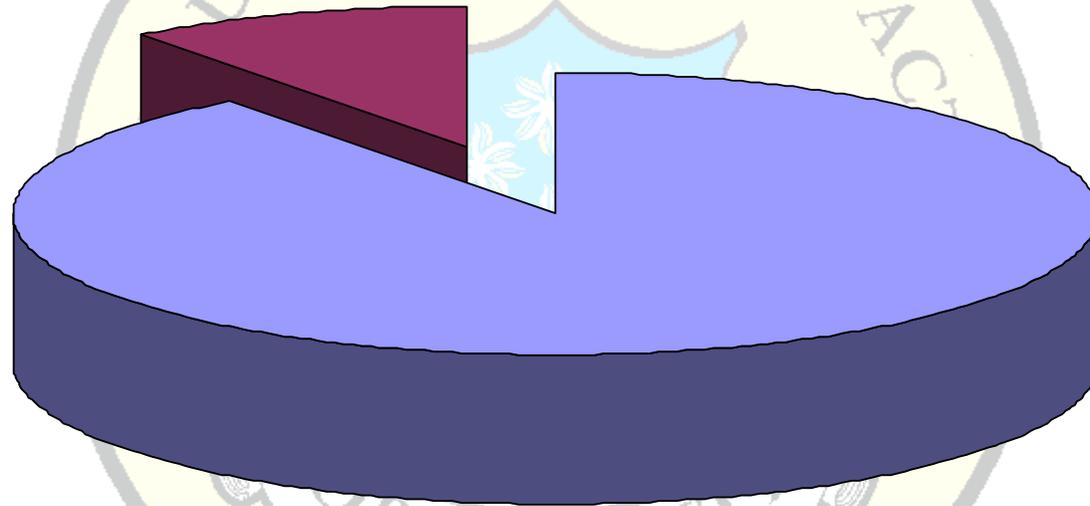
The Town's total municipal power consumptions is little over 4 Million Kilowatt hours per year



Portsmouth Municipal Energy Use

Nov 2005 to Oct 2006

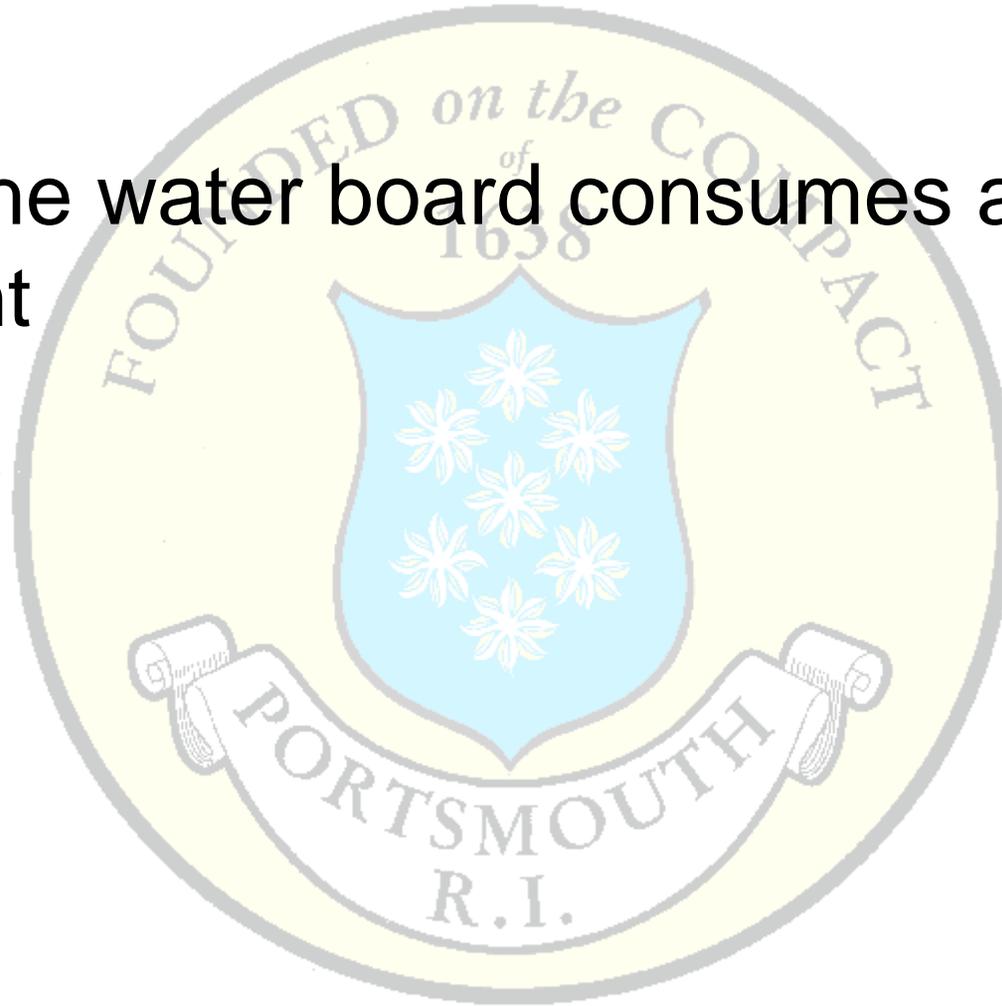
Water Board = 440,000 KWH
10%



Municipal Energy Consumption = 4,240,000 KWH

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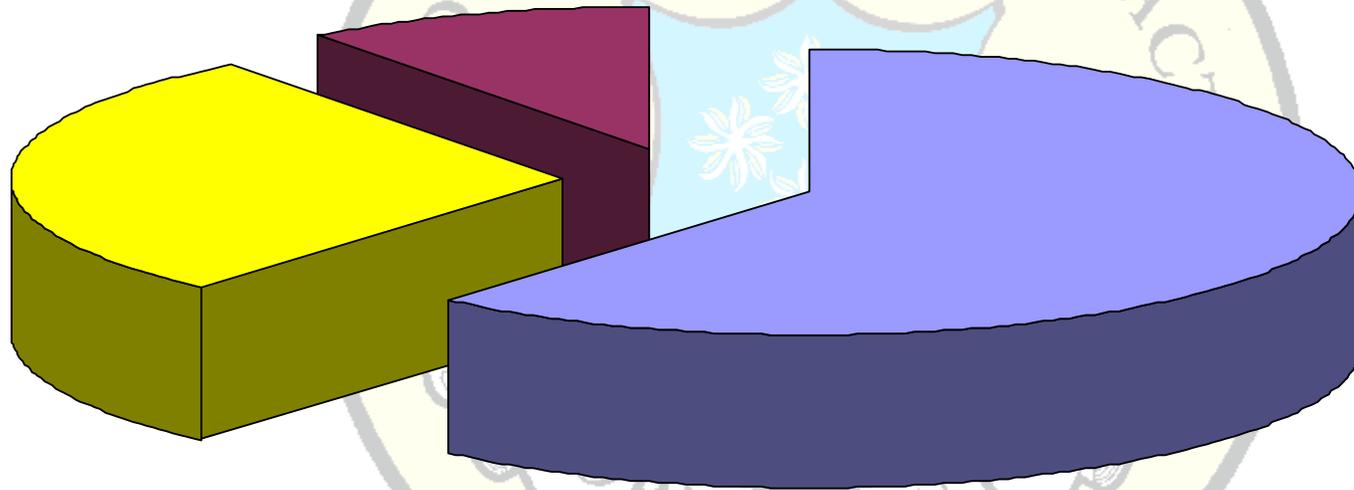
Of that the water board consumes about 10 percent



Portsmouth Municipal Energy Use

Nov 2005 to Oct 2006

Water Board = 440,000 KWH
10%

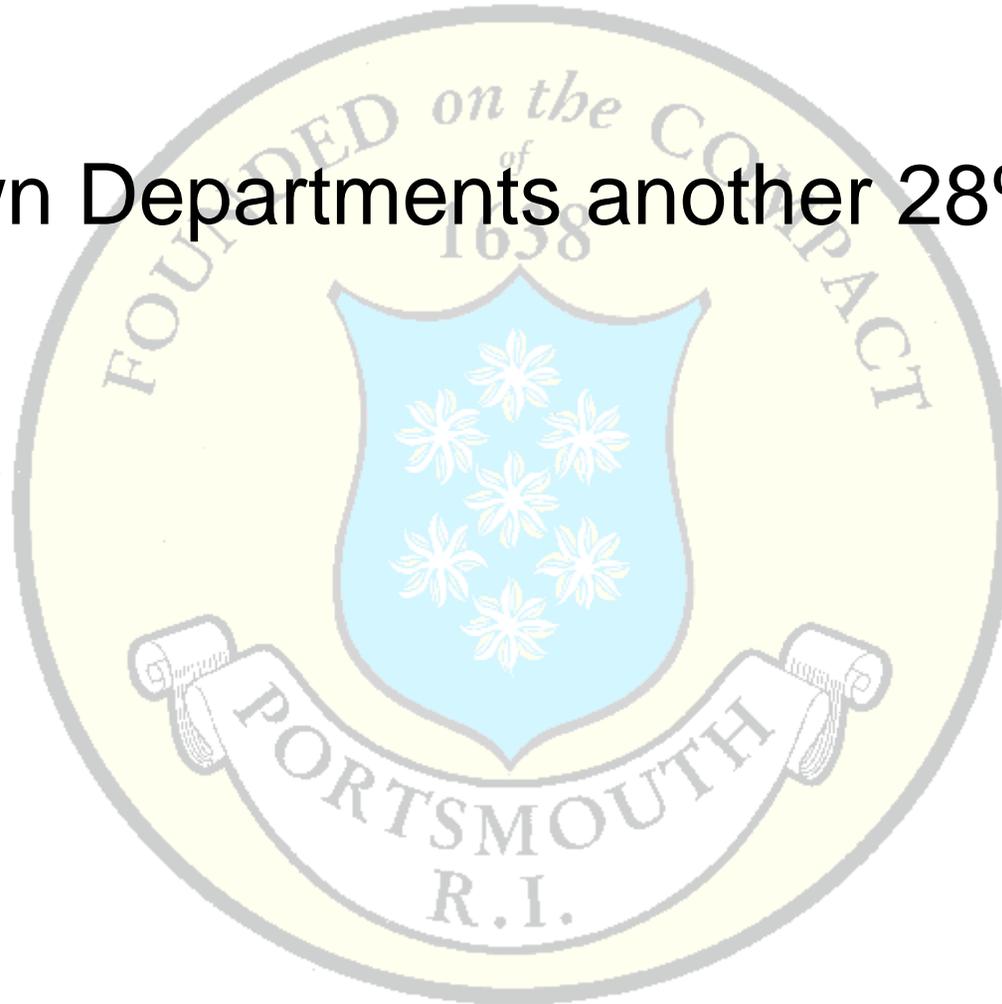


Town Departments = 1,200,000
28%

Municipal Energy Consumption = 4,240,000 KWH

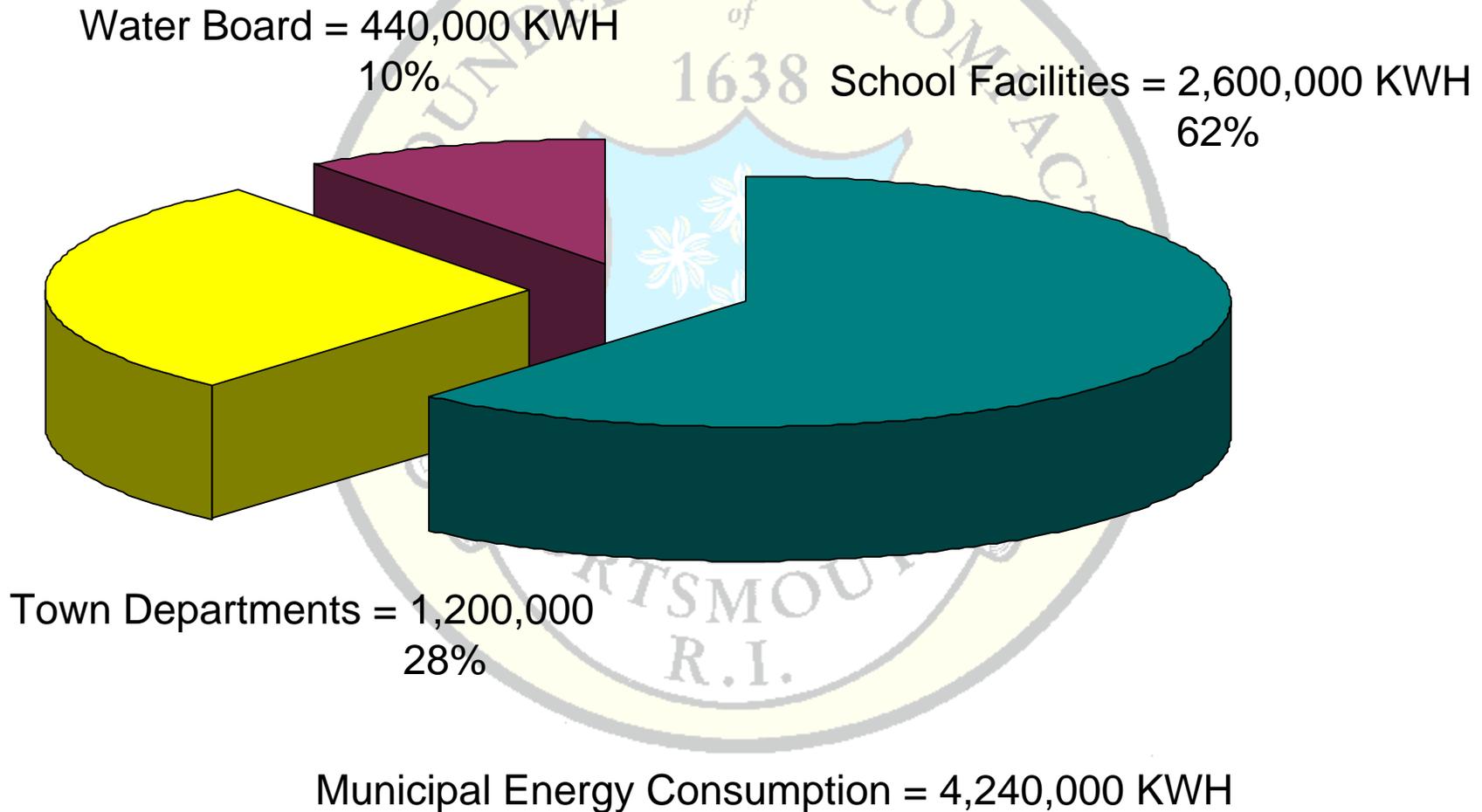
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The Town Departments another 28%



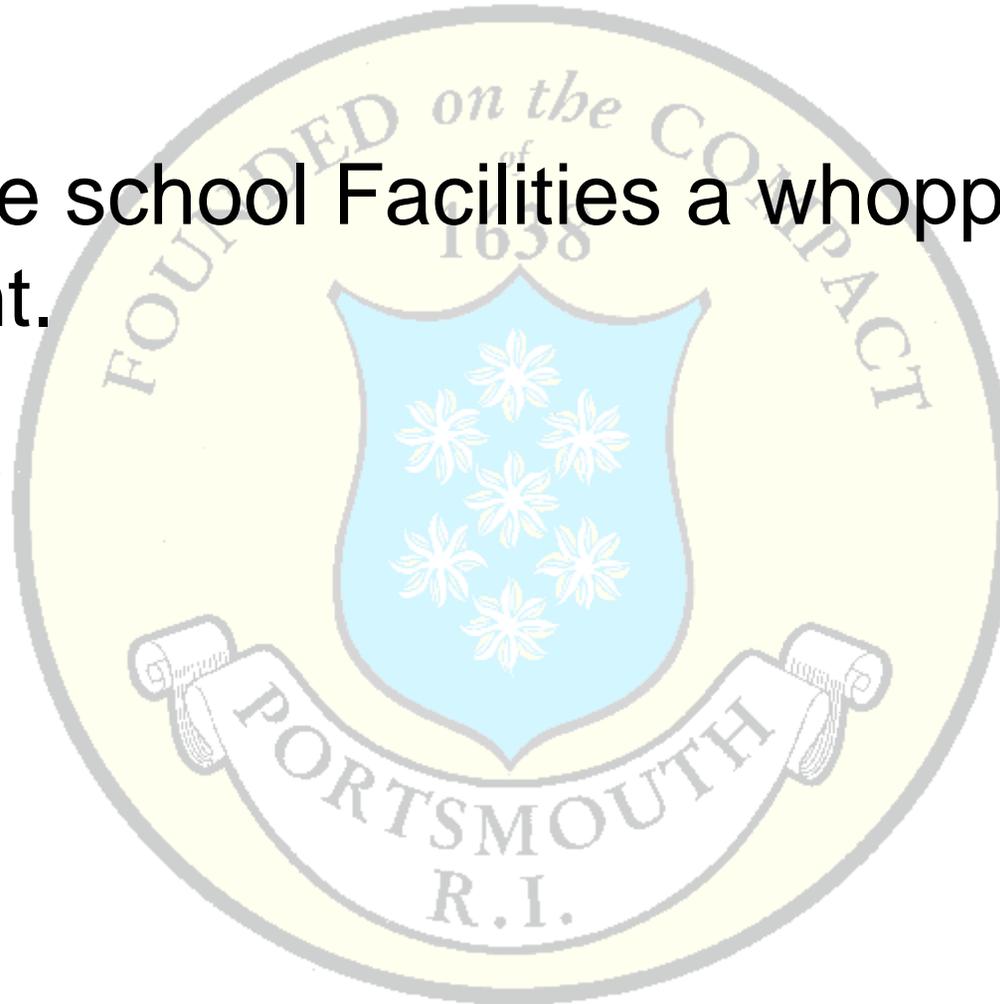
Portsmouth Municipal Energy Use

Nov 2005 to Oct 2006



See narration on next page

- And the school Facilities a whopping 62 percent.



Portsmouth Municipal Energy Use

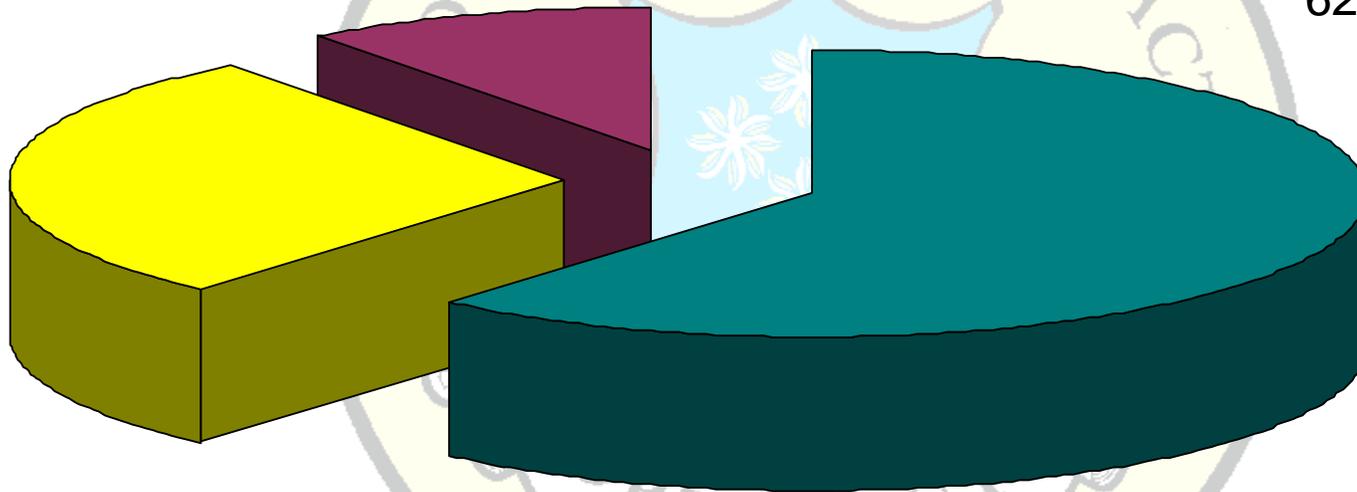
Nov 2005 to Oct 2006

\$50,000

Water Board = 440,000 KWH
10%

\$360,000

School Facilities = 2,600,000 KWH
62%



Town Departments = 1,200,000
28%

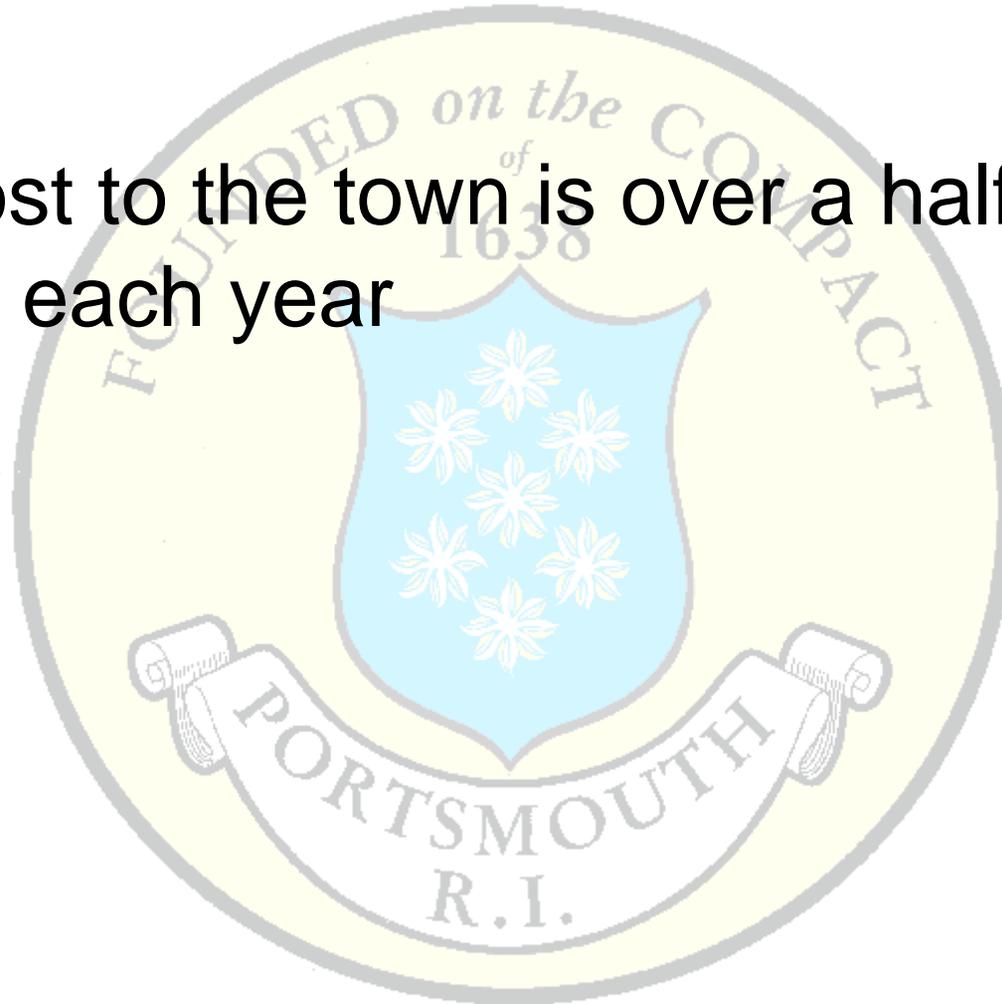
\$170,000

Municipal Energy Consumption = 4,240,000 KWH

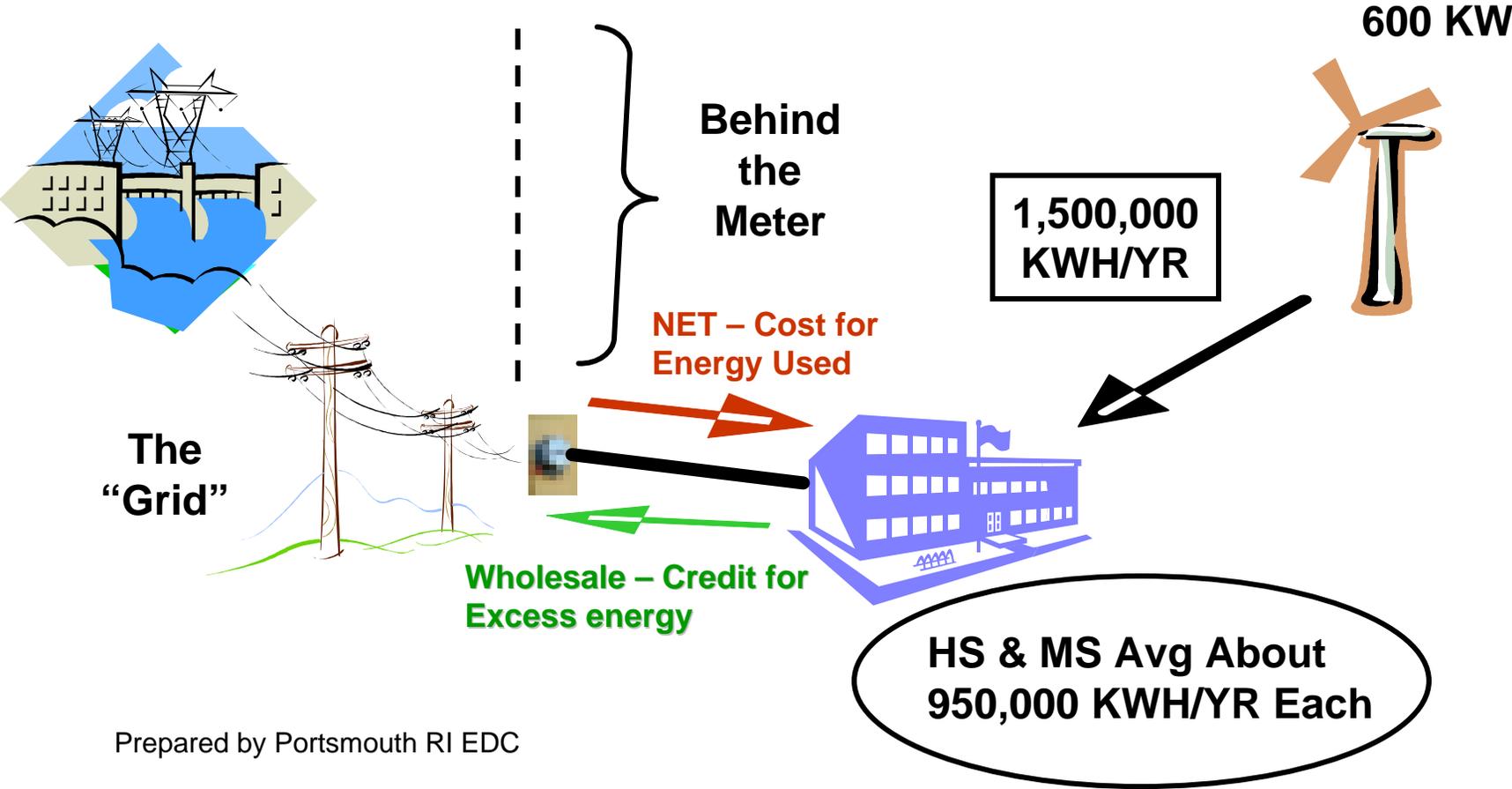
\$580,000

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- The cost to the town is over a half million dollars each year



Power Generation and the “Grid”



Prepared by Portsmouth RI EDC

2/12/2007

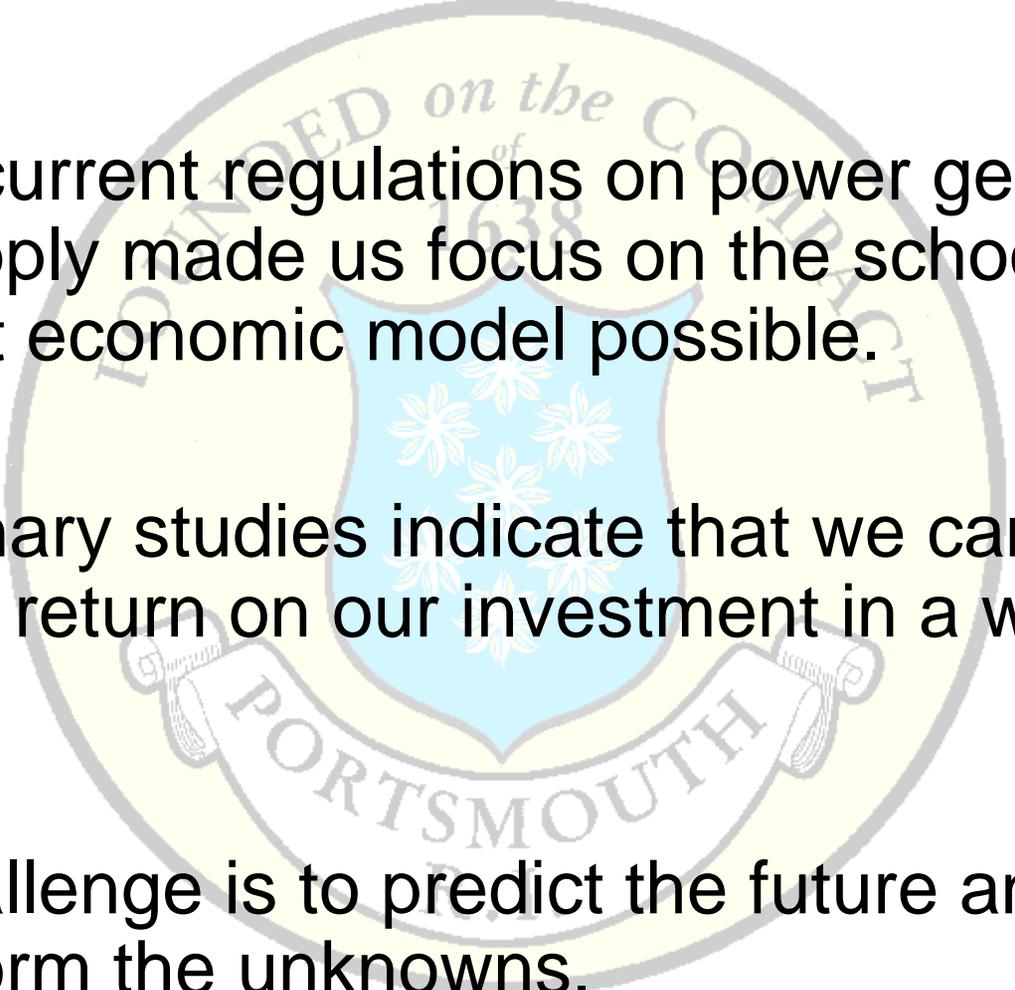
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- Consuming electricity “behind and electric meter” becomes important because of the manner in which energy is bought and sold.
- The power company provides power on a electric supply system (we’ll call it “the grid”). Simply, the grid is anything outside an “electric meter”. Suppliers that put electricity onto the grid sell it to the electric company at a wholesale rate. Users, that take electricity off the grid buy the electricity at a retail rate. The retail rate includes a number of charges for maintaining the electric lines and power supply infrastructure. (If you look at your electric bill, many of these charges are listed.) The “device” that measures all this is your electric meter. If you supply your electricity needs “behind your electric meter” (say, with a wind turbine) you provide yourself electricity at the equivalent of a wholesale rate. Whenever you need to get electricity from the grid, you have to buy it at the retail rate. Since the Town has many electric meters and with the current regulations, if we built a BIG wind turbine to supply the whole town, we would be continuously putting electricity on the grid (at getting paid ‘wholesale’) and using it behind some other town electric meter I (buying it back at “retail). That throws a ‘monkey wrench” in the economic analysis for building a wind turbine.
- One way to solve the problem is to have a wind turbine “behind a town electric meter” that exactly matches the demand eliminating the need to place power on the grid or take power for it. That is the basic premise of erecting a wind turbine at a school where the annual power demand is close to the turbine output. But, alas, the wind does not always blow when the peak electrical demand occurs and no cheap and effective “power storage” devices have been devised. So, even at a school, we are faced with continually putting power on the grid and taking power from it all day long.
- This does not help the economic value of wind turbines.
- The next questions is, “ why not just let the meter run ‘backwards’ when we put electricity on the grid and run ‘forward’ when we use electricity from it?” . That sounds great, but the power company says “Wait a minute, we have to maintain power generators and power lines and then provide you electricity (and backup capacity if your wind turbine stops) for free?”
- Because small wind power projects are essential to the sustainable energy goals the rule-makers are working on schemes to provide wind turbine owners some relief in the amount of credit they get for putting power on to the grid. The Portsmouth Economic Development Committee is actively participating in the discussion of changes in the regulations that would make economics of a town wind turbine even more positive.

Portsmouth Municipal Wind Energy Activity

- Initial focus on “behind the meter” applications
- HS and MS best application
 - Preliminary study indicated positive payback
 - Subsequent investigation indicates generation lags demand and weakens business case
- Challenge now is how to balance current reality against future unknowns
 - Goal of our feasibility study

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- The seal of the University of Portsmouth is a circular emblem. It features a central shield with a blue background and white floral patterns. Above the shield, the text "FOUNDED on the" is written in a serif font, with "1638" below it. The word "PORTSMOUTH" is written in a large, bold, serif font across the bottom of the shield. The entire seal is set against a light yellow background.
- Those current regulations on power generation and supply made us focus on the schools to get the best economic model possible.
 - Preliminary studies indicate that we can get positive return on our investment in a wind turbine.
 - Our challenge is to predict the future and try to brainstorm the unknowns.

Is the Wind Turbine a Good Investment?

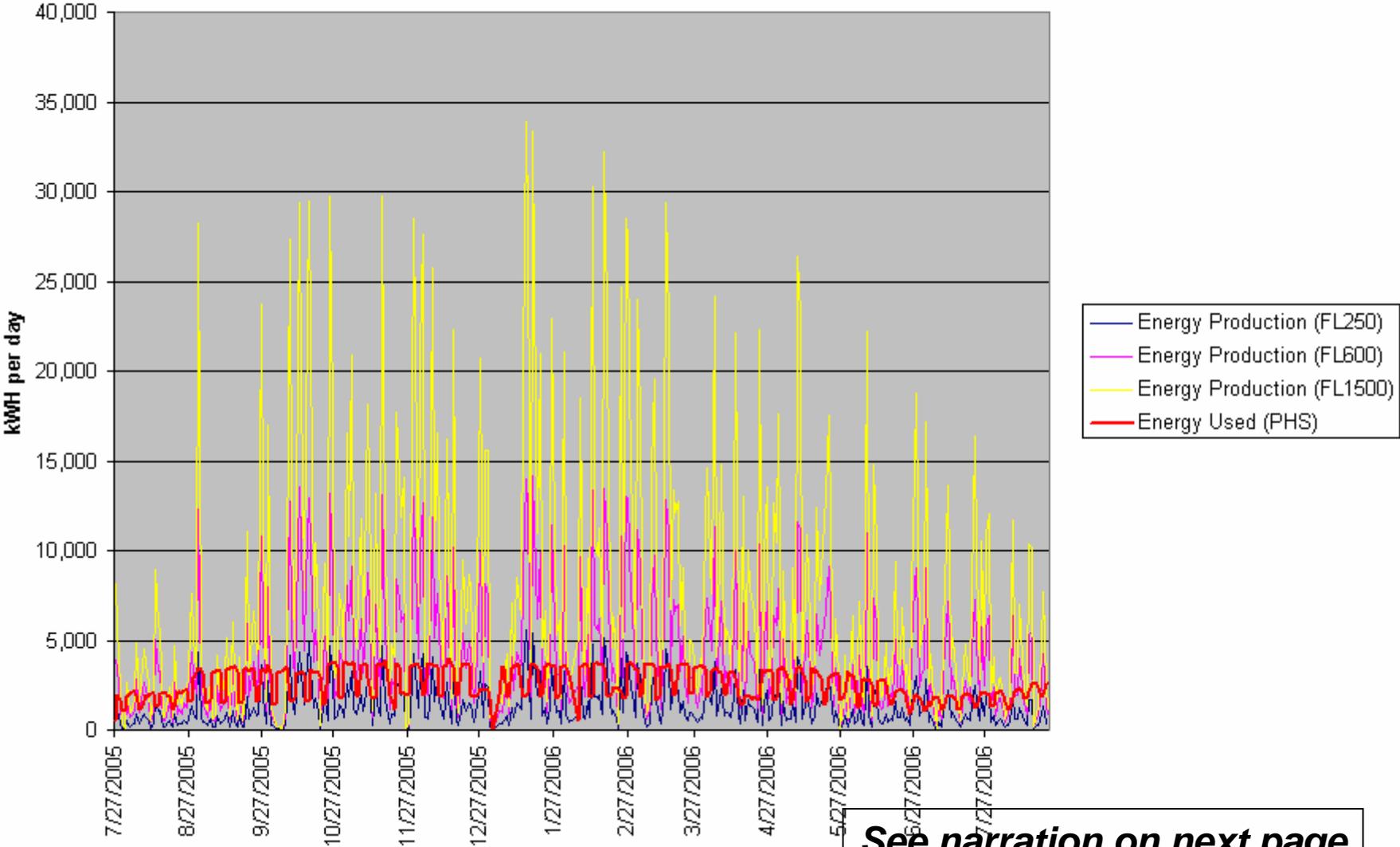
1. Cost Factors	\$
<i>a. Preliminary Analysis</i>	\$
<i>b. Construction</i>	\$
<i>c. Turbine Operation</i>	\$
<i>d. Liability Insurance</i>	\$
<i>e. Decommissioning</i>	\$
<i>f. Cost of Financing</i>	\$
<i>g. Cost of Electricity</i>	\$
2. Revenue Factors	\$
<i>a. Displaced Power Cost</i>	\$
<i>b. Power Sold</i>	\$
<i>c. Renewable Energy Certificates</i>	\$
<i>d. Grants</i>	\$
3. Cost of Electricity with a Turbine (2 minus 1 from above)	\$
4. Cost of Electricity without a Turbine	\$
5. Net Savings or Cost (3 minus 4 above)	\$

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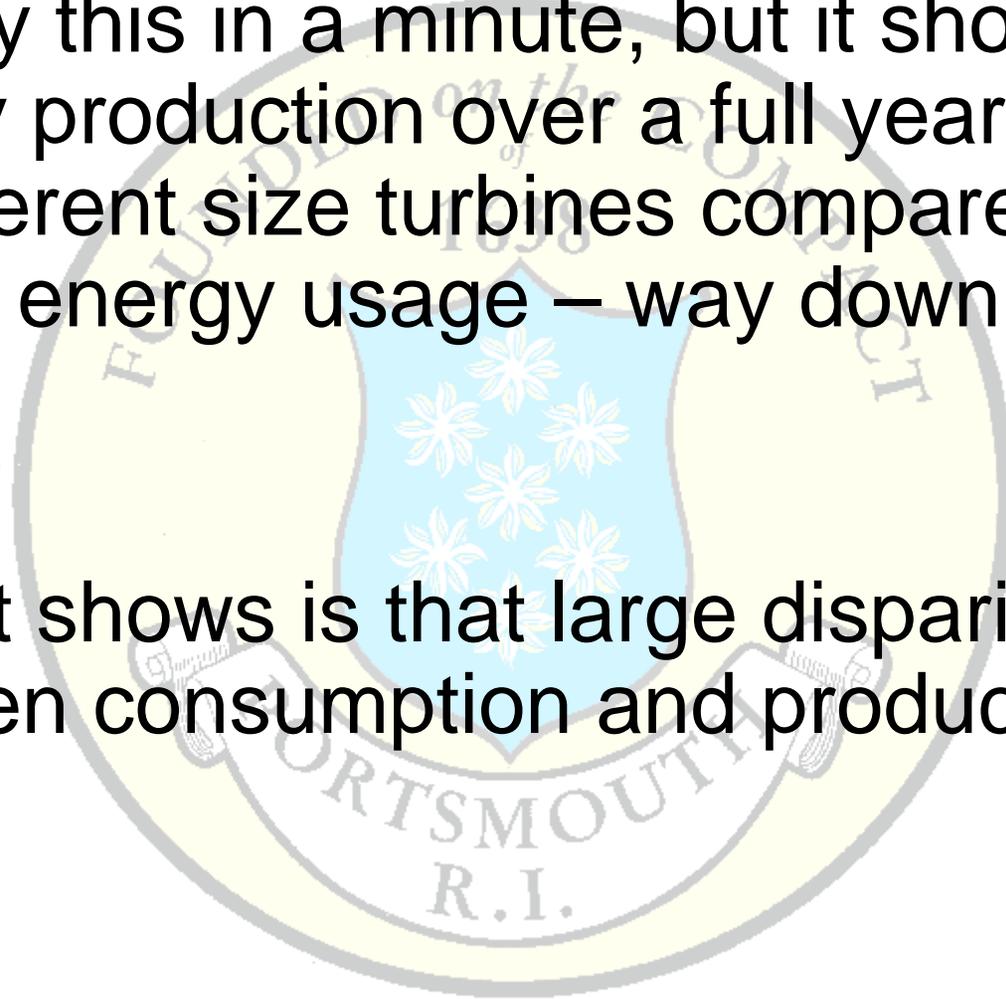
- Putting our preliminary findings into numbers, we will show the business case for placing a wind turbine at the high school, middle school or both.
- The Cost factors for a turbine are the cost of preliminary analyses, buying the turbine, putting it up, operating and maintaining it, insuring it, the cost of the “mortgage” and the cost to take it down and haul it away at the end of its useful life.
- The turbine will generate revenue in the way of displaced power that we don't have to buy from National Grid, what National Grid pays us to supply excess power and incentives such as renewable energy certificates and Energy Fund grants.
- Comparing the “bill for the turbine and the cost of electricity still needed from the Grid to the cost of electricity without the turbine give you gives you the net savings. Putting our preliminary findings into numbers, we will show the business case for placing a wind turbine at the high school, for example.
- First let's look at using today's rules and today's energy prices
- If we buy a 600 kilowatt turbine it will generate about 1 and a half megawatt hours of electricity each year. That' s based on the wind blowing enough to make power about 25% of the time.
- The school consumes about 600 thousand kilowatt hours of Wind generated energy in a year displacing a cost of \$67,000 . That means and extra 900 thousand kilowatt hours of electricity is sent back to the power grid. We get wholesale payback for that – about \$54K.
- We also get 1500 Megawatt hours Renewable Energy Certificates for making Green Power. These RECs are a commodity that people can buy to help them reach their renewable energy goals. Currently, they sell for about \$40 buck per Megawatt hour, so that gives us another \$60000 back.
- So our net return, less operating cost, is about \$150,000 per year. Now, for years one through 13, we are paying back the “mortgage” on the turbine. This is about \$133K per year. So for years 1-13 we bring in about \$28,000 per year. Over the first 20 years of turbine operation we put over 1.6 million in to the town treasury. And all this is based on 2007 energy prices.

Power vs. Use

PHS Power Production Vs Utilization

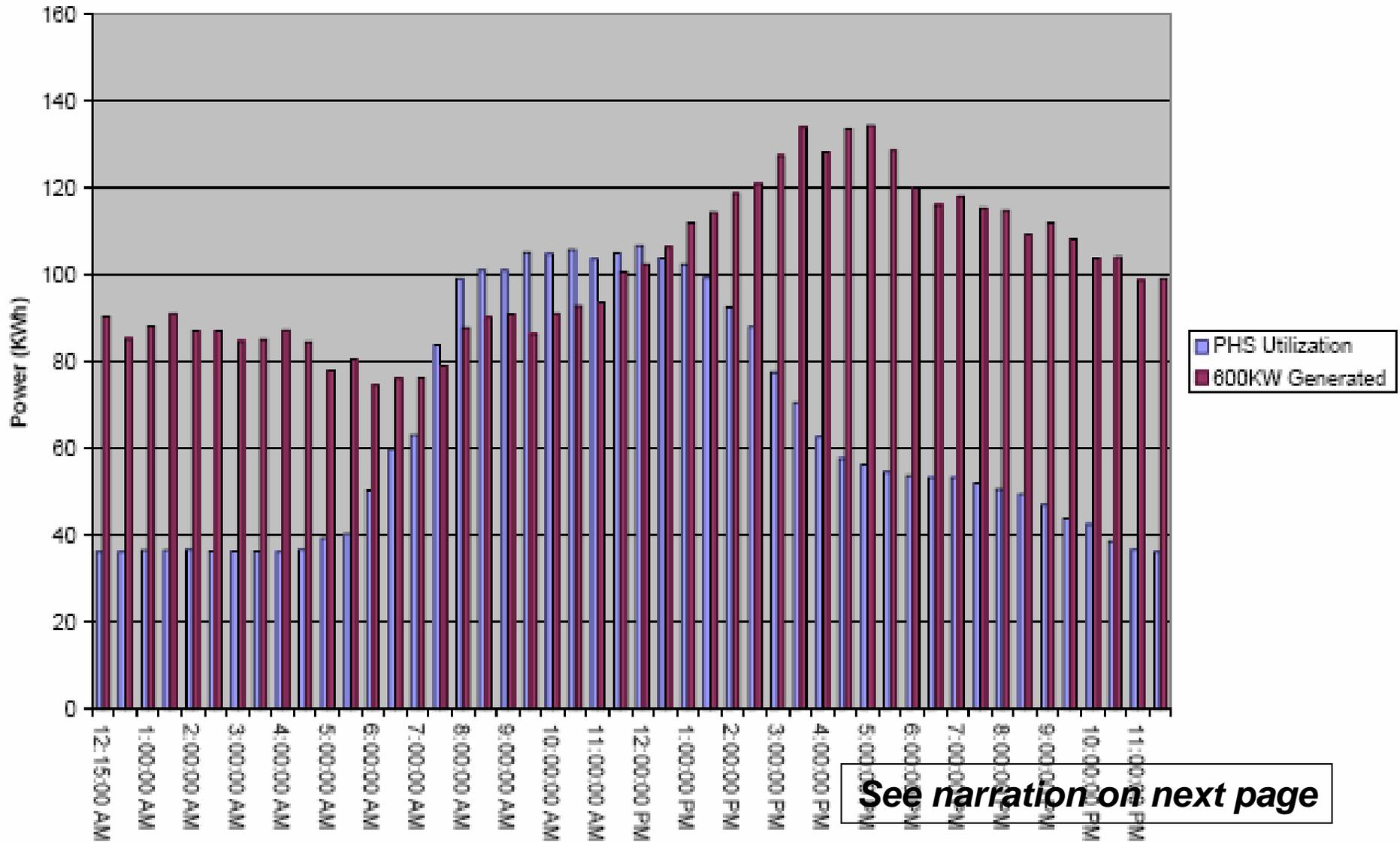


- We call this the “fireplace diagram” - we’ll simplify this in a minute, but it shows energy production over a full year period for different size turbines compared to high school energy usage – way down in here in red.
- What it shows is that large disparity between consumption and production



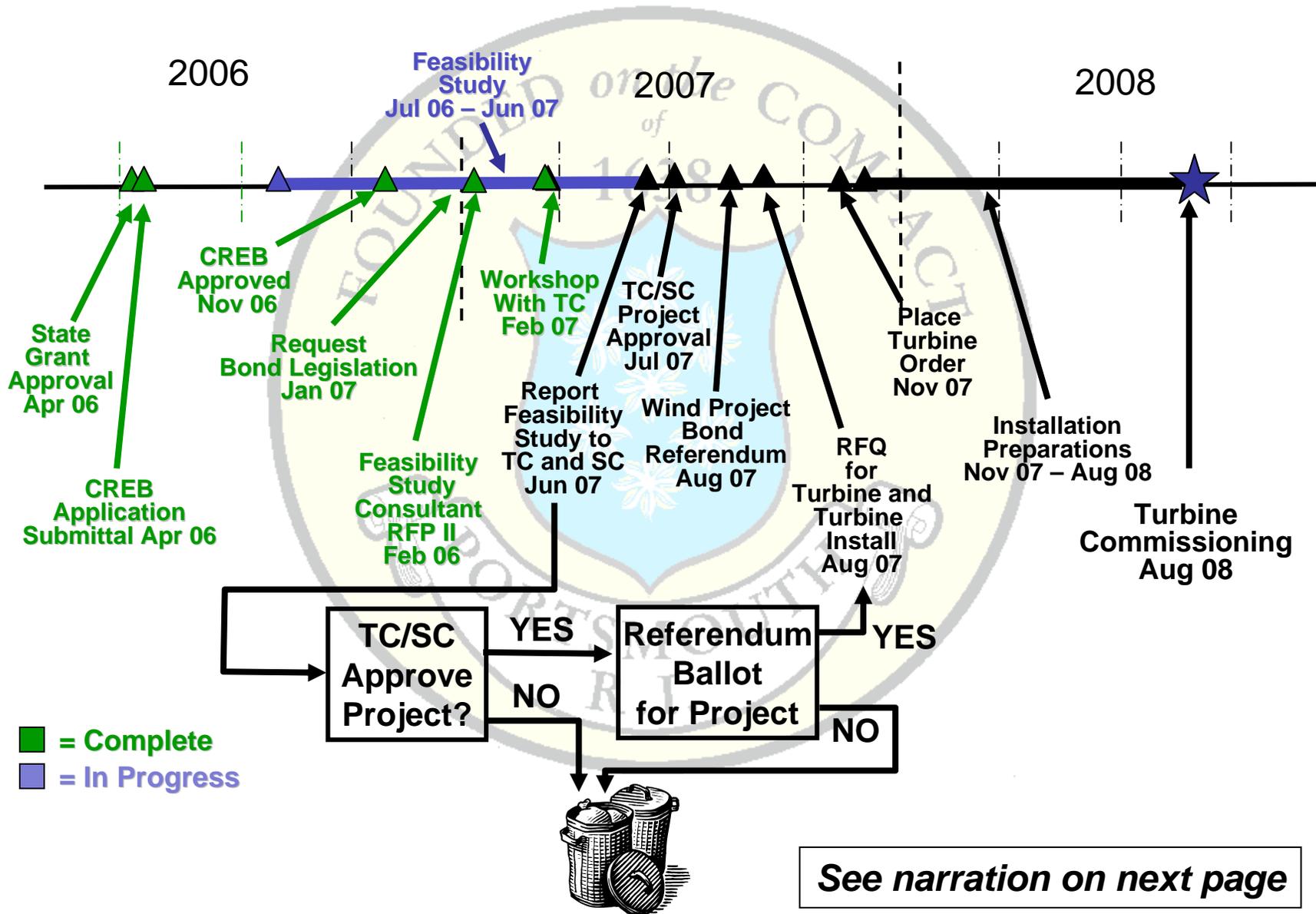
A "Typical Wednesday"

Power Used vs Generated (Average Wednesday)



- To simplify the explanation, let's look at a "typical Wednesday" out of that year. High School energy consumption over the day is shown in maroon and energy production for a 600 KW turbine in the blue bars. As you can see the maroon "production" curve, during the day, when high school power consumption is greatest, we need to buy power from the grid. However, in the morning and evening we generate more power than is needed and we "sell" power back to National Grid.
- If there was some way to "level out" the maroon usage curve it would help. But remember, because of the rules on selling power back to the grid, doing whatever we can "behind the electric meter" give us the best economic return. We are working on potential ways to do this including, trying to put the water board pumping station behind the middle school electric meter, changing the entire Fleet of Town vehicles to electric and charge them at eh school every night, and use of electric heat I the evening and night.

Portsmouth School Wind Power Timeline



- Our timeline looks like this. We are right here on the chart completing our feasibility study. We hope to have that done soon. All indications are that we will get a positive result. Then, we will present the study to the Town Council for approval. If they approve, we'll put the question to the voters – probably in November with several other referendum issues. If the Town council or the voter don't approve, we'll throw the whole thing into the trash and move on to something else.

Portsmouth Municipal Wind Energy Activity

- We will work with any and all citizens or citizen groups to ensure we have the most informed electorate who will be called on to make the decision on the project.
- Call on us, we are ready!
- See www.portsmouthRIenergy.com
- Questions: e-mail questions@portsmouthRIenergy.com

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As we said, our goal is to provide our citizens a complete and balanced information package concerning our wind turbine project. We want to make sure that when each voter goes to the ballot box to vote on the wind project that they are satisfied that they have the information to make an informed decision.

See our web site for more information.

www.portsmouthRIenergy.com

Send questions to

questions@portsmouthRIenergy.com

