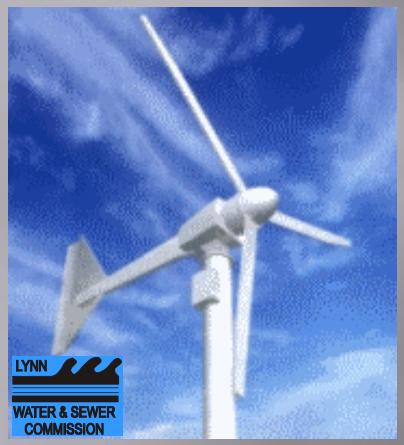

LYNN WASTWATER TREATMENT PLANT Wind Turbine project

ROBERT J. TINA

DIRECTOR OF OPERATIONS
LYNN REGIONAL WATER POLLUTION CONTROL FACILITY

2 Circle Avenue
Lynn, MA 01905-3037

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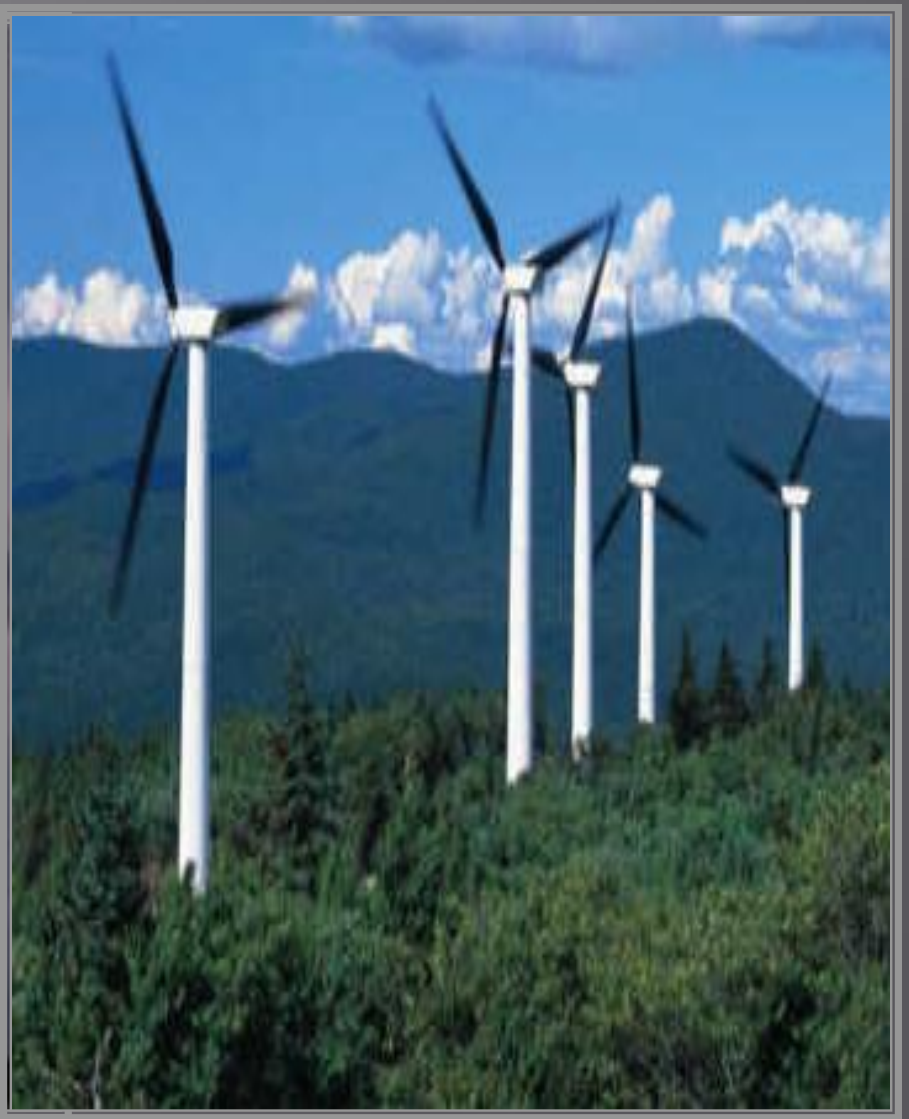
A special THANKS to our partners who without their help and support this project may not have been possible

- Mass Energy, *Larry Chretien*, Executive Director and his accomplished staff who provides REC financing. We also thank Mass Energy for awarding the Lynn Water and Sewer Commission its "Outstanding Public Sector Leadership Award".

- Mass Clean Energy Center, *Rachel Ackerman* and a host of helpful people who throughout the years assisted in providing grant funding for this project.

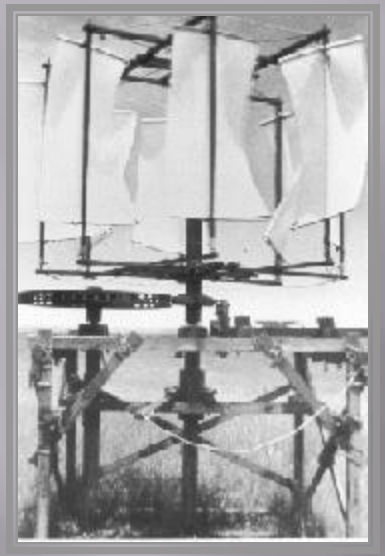
- Department of Environmental Protection and EPA, working with *Jennifer Wood* and others, DEP provided low interest funding. I also want to thank *Jason Turgeon* from EPA for his involvement throughout this project.



One of the Top Polluters in MA for 2006-2012 – Brayton Point Power Station in Somerset MA - 1,646,002 Pounds of Chemical Pollutants including 84 pounds of Mercury released annually,

According to a recently released Environmental Rhode Island report entitled "Dirty Energy's Assault on our Health and the U.S. EPA's Toxics Released Inventory list

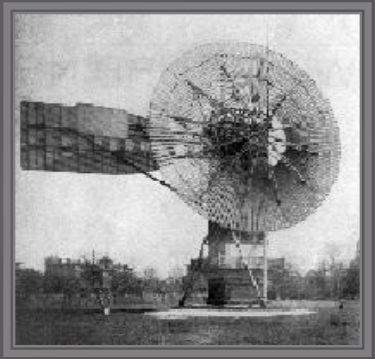
THE BEGINNING OF WIND TURBINES



Persia about 500-900 A.D.

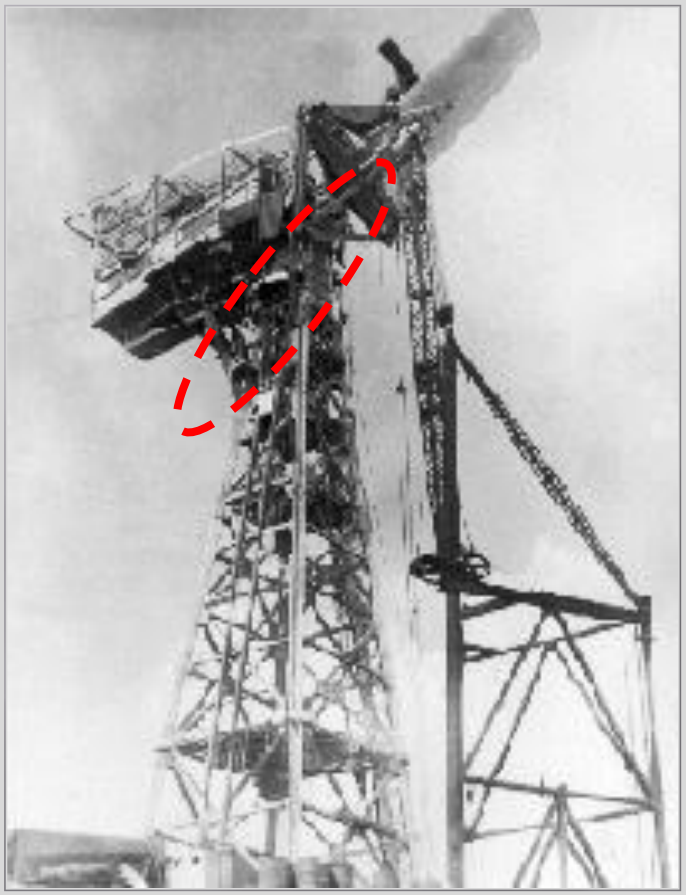
Western Europe 1207 AD

Cleveland Ohio 1888



Rutland VT in 1941

THE BEGINNING OF WIND TURBINES



Rutland VT - Built 1941

In 1941 the largest turbine in the Northeast was a 1.25 megawatt Smith-Putnam machine, installed in Vermont. This horizontal-axis design featured a two-bladed,175-foot diameter rotor. The 16-ton stainless steel rotor used full-span blade pitch control to maintain operation at 28 RPM. In 1945, after only several hundred hours of intermittent operation, one of the blades broke off near the hub, apparently as a result of metal fatigue.

Wind Turbine Location

Lynn Wastewater Treatment Plant

Lynn Water and Sewer Commission

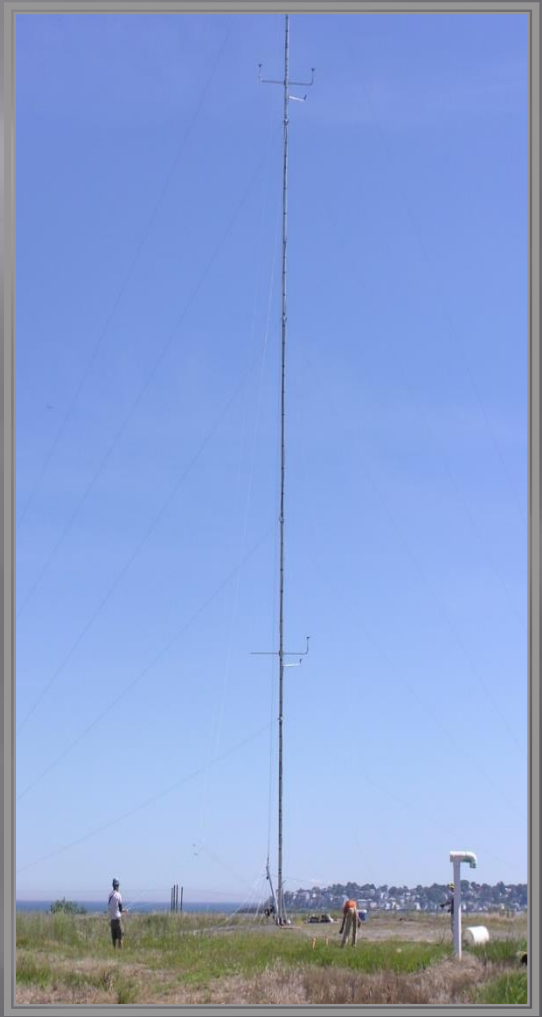

Lynn Water and Sewer Commission

TURBINE IN INDIA

Turbine blades in India ready for shipment

Turbine generator in India ready being tested

Lynn Anemometer



Lynn's wind anemometer was erected in August of 2004 and measured wind speed, shear and direction for a 12-month period.

Wind data recorded from August 04 through July of 05 was 5.7 m/s (12.743 MPH) at the tower height of 39 meters (127.95 feet).

PILINGS DOWN 169 FEET

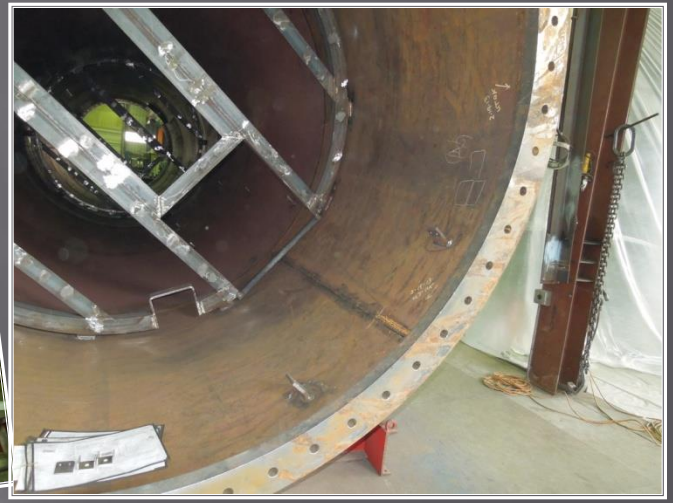
A Total of 12 Pilings
each
16 Inch in Diameter

FOUNDATION

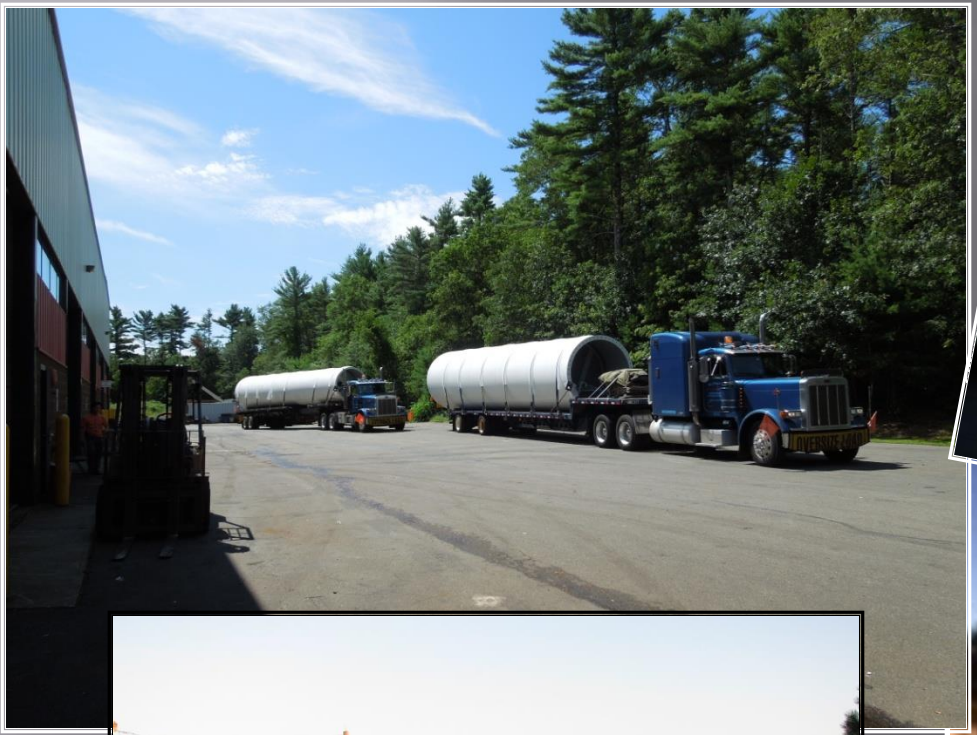
In addition to filling each of the 12 pilings totaling 104 cu/yd of concrete, the foundation itself was 102 cu/yd.

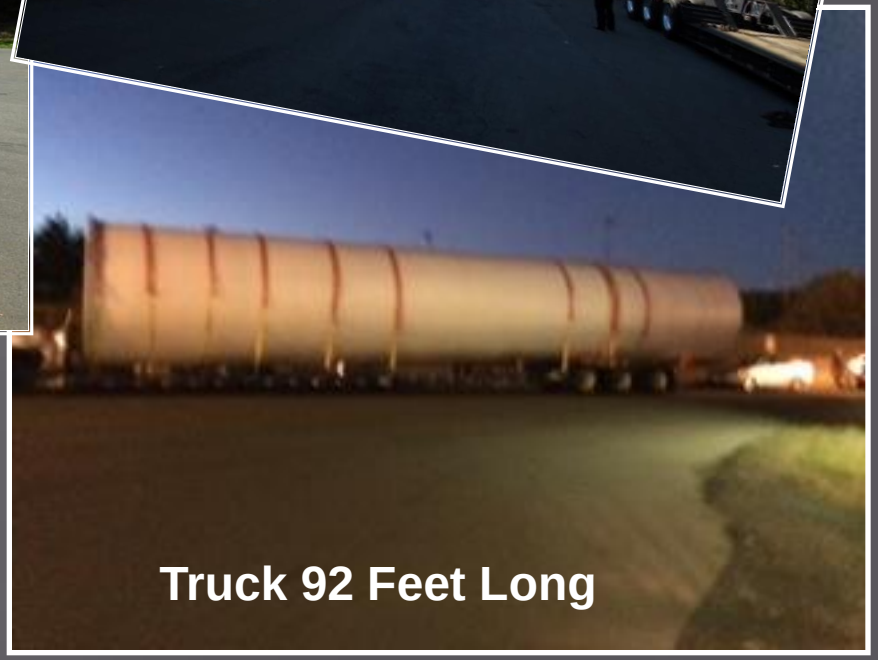
TOWER FABRICATION

Middleboro, MA



MOVING OF THE TOWER



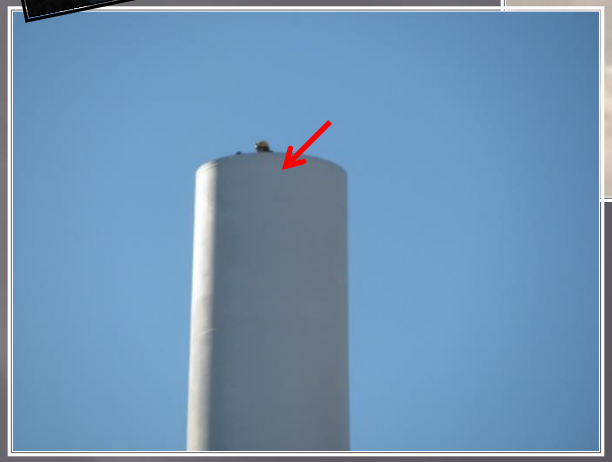


CRANE ARRIVES ONSITE

TOWER HOISTING

BASE Section 37 Tons and 66 Feet Long

TOWER



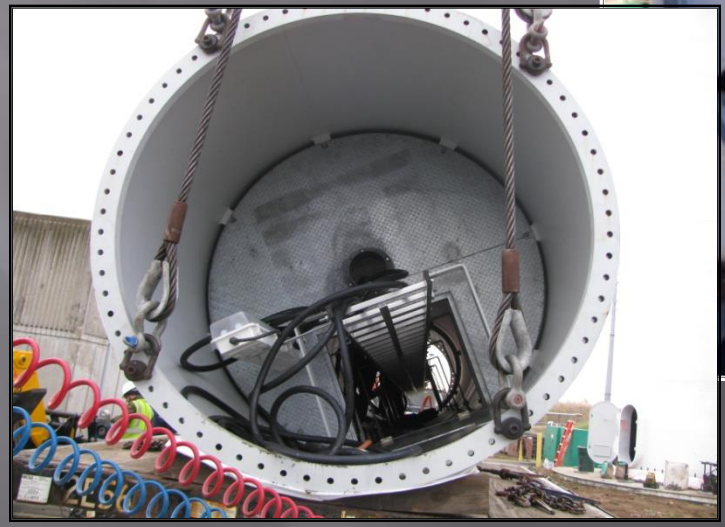
Lynn Water and Sewer Commission

BLADE ASSEMBLY & MOUNTING

Each Blade weighs 2 Tons and is 75 Feet long

Lynn Water and Sewer Commission

WIND TURBINE



Lynn Water and Sewer Commission

FINANCIAL HIGHLIGHTS

• TOTAL cost of the Turbine including Equipment, Construction and Engineering	$ 2,185,889.00
• Grant for construction provided by MA CEC	$ 600,000.00
• REC contract (10-years) by Mass Energy	$ 20,000.00
• Debt forgiveness by MA State Revolving Fund	$ 681,932.00
• Net Cost	$ 883,957.00

CRACKED ROTOR ASSEMBLY


Irish Se7en
PHOTOGRAPHY
SHAWN HOGAN

Timeline Highlights

- 2004 - Conceptual Idea of a Wind Turbine
- 2004 – 2005 Initial Engagement of the Stakeholders
- 2006 - Site Assessment, Erection of the Wind Anemometer and
- Stakeholder Engagement
- 2007 - Wind Data, Financial Modeling, Stakeholder Engagement
- 2008 - Stakeholder Engagement, Applying for Grants, Process to
- change building ordinances
- 2009 - Stakeholder Engagement, Formulating the Bid
- 2010 - Stakeholder Engagement, Bidding
- 2011 - Stakeholder Engagement and start of the Contract
- 2012 - Construction began April-May
- 2012 - Pilings were driven for the foundation beginning in August (10 at 145 ft. deep)
- 2012 - Wind turbine shipped from India and arrived in the US October
- 2012 - Contractor Default December
- 2013 – Insurance Company takes over construction February
- 2013 – Construction complete, Commissioning and Testing occurred December. Full Scale operation in February / March 2014