Role of Universities Working to Address Issues of Local Social Acceptance: the UMass Outreach Experience

NAWEA Symposium
August 6, 2013

J. F. Manwell, Professor
Dept. of Mechanical and Industrial Engineering
University of Massachusetts Amherst

Timeline: UMass Outreach and Federal/State Agencies in Massachusetts

- 1990s→
  - DOE Region 1
  - Division of Energy Resource (DOER)
- 1990s-2000s→
  - Renewable Energy Trust (MRET) Fund/ Massachusetts Technology Collaborative (MTC)
- 2000s-2010s→
  - Massachusetts Clean Energy Center (MassCEC)
  - Massachusetts Dept. of Environmental Protection (MassDEP)

1990s

- UMass worked under contract or Intergovernmental Service Agreement (ISA) with DOE and DOER
  - Technology evaluations (Strategic Envirotechnology Program, STEP)
  - Technical advisor to DOER
    - Including re-assessment of offshore wind
    - Rule making regarding renewable portfolio standard (RPS) and renewable energy trust fund (RET)
  - Wind turbines for Hull
  - Wind resource assessments
  - Feasibility studies

First Hull Wind Turbine

Hull Wind I, Hull, MA, Vestas 660 kW, 47 m diameter, 50 m tower; 2001

1990s-2000s

- UMass worked under ISAs with MTC/MRET, mostly on→
  - Wind resource assessment
    - Preliminary feasibility studies
  - Community outreach
    - Wind energy 101s
  - Offshore wind energy
    - Cape Wind “honest broker”
    - Offshore wind energy consortium (OWEC)
- Blade test facility (w/ MRET and Mass Office of Business Development)

2000s-2010s

- ISAs with MassCEC
  - Mostly wind resource assessment
- Panel membership at request of MassDEP regarding→
  - Wind turbine health issues
  - Wind turbine noise technical advisory group

“Big Picture” of last 30 years

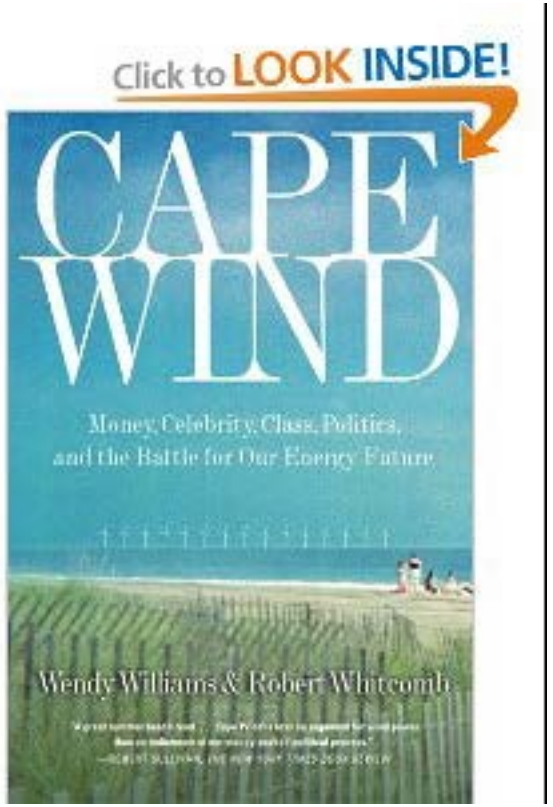
- Initially, little experience in Mass. with wind energy. Agencies appreciated assistance
- With increasing development of wind energy, focus changed to economic development. Agencies came to rely more on consultants
- In the 2000s, resistance to wind energy became more widespread. Some agencies took on new roles; other agencies became involved

Resistance to Wind Energy

- With proposal for Cape Wind (offshore wind) and increase in size and number of land based wind turbines, resistance has increased
- Factors→
  - Proximity to people
    - Conflicting uses of Nantucket Sound
    - Visual impact
    - Noise
  - Politics
  - Threat to conventional energy suppliers?

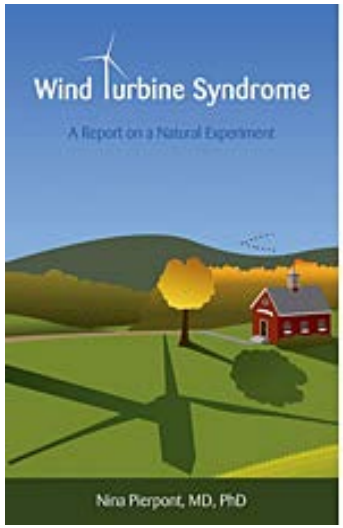
Cape Wind

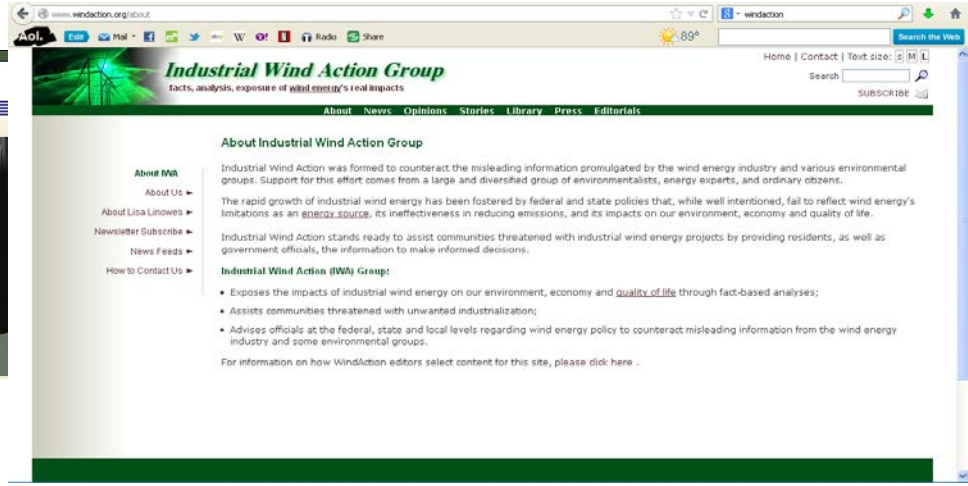
- A focal point for resistance to wind energy and an incredible story!



See this book for just part of the story: *Cape Wind: Money, Celebrity, Energy, Class, Politics, and the Battle for Our Energy Future*, by Wendy Williams

Some of the Objectors…

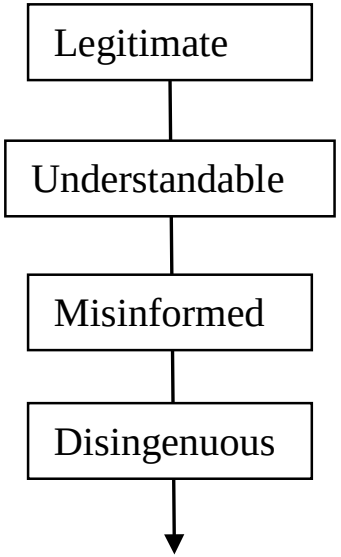




Objections to Wind Energy

- Some objections and the "scale of plausibility"

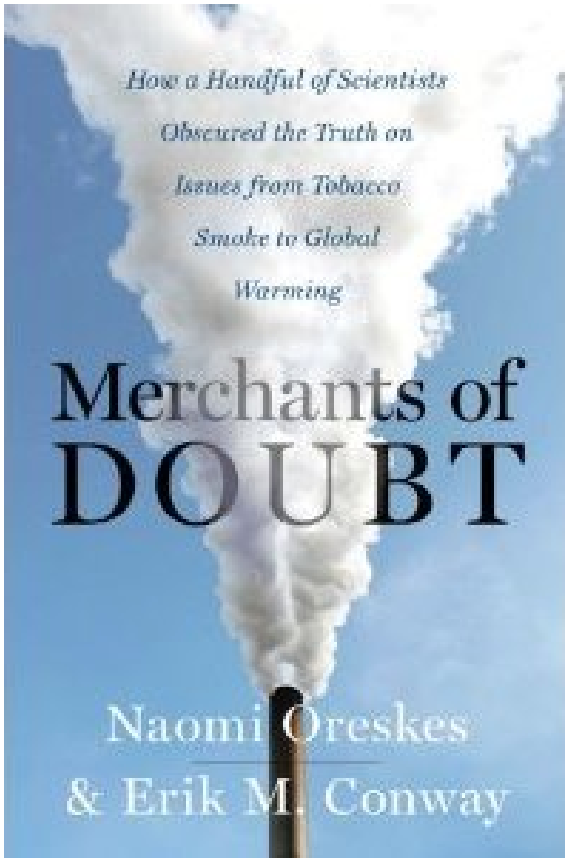
Turbine(s) too close		
Shadow flicker		
Excessive noise		
Turbines visible		
Audibility		
Visual impact		
Environmental impact		
Birds, bats, construction		
Health effects		
Wind turbine syndrome		
Infrasound		
Spurious complaints		
Turbines can break		
Developers get rich		
Implausible objections		
Turbines do not reduce CO2		



Inauspicious Precedents

- Campaign against wind energy has much in common with previous campaigns in defense of tobacco and DDT and sowing doubt about acid rain and global warming

- See *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming* by Oreskes and Conway



Wind Turbine Health Impacts?

- In 2011 Massachusetts Dept. of Environmental Protection convened an independent panel to review the literature on wind turbine health impacts, identify best practices and write a summary report
- Panel: 7 members, M.D.s or Ph.D.s, specializing in neurology, sleep medicine, acoustics, wind energy, environmental health, public health and epidemiology

Potentially Significant Impacts

- Ice throw
- Shadow flicker
- Audible unwanted sound (“noise”)

General Conclusions

- Ice throw is real; can be dealt with
- Shadow flicker is real; can be dealt with
- Noise is the most contentious
  - Resolving noise issues in densely populated areas is not easy

Wind Turbines and Noise Annoyance

- Noise annoyance related to
  - Amplitude/frequency
  - Characteristics of noise
  - Noise sensitivity
  - Fear of danger from noise source
  - Attitudes toward noise prevention
  - Attitudes about importance of noise source
  - Annoyance with non-noise aspects of noise source
- Annoyance often only weakly related to noise levels
- Excessive noise can affect sleep

Responding to Resistance

- Education
  - Wind energy has many advantages compared to other sources
- Some impacts are real
  - Benefits are global, impacts are local
  - Distance, turbine size and number matter
  - Policies should consider local impacts
- Many impacts are exaggerated
  - Objections must be supported by evidence!

Policy Suggestions

- Develop national/state energy policies emphasizing renewables
- Public education
- Encourage local participation/ownership in projects
  - Municipal electric companies
  - Cooperatives
- Financing incentives to recognize multiple aspects of projects
- Pay attention to experience elsewhere

Opportunities for Universities

- Universities can offer unbiased source of information
  - Advice and outreach are particularly compatible with Land Grant universities
- Best opportunities are dealing with cutting-edge problems, where students can provide useful contributions
  - Highly politicized issues are difficult
  - Universities can “stick to the facts”