All Energy Is Local
NIMBY and Why Should We Worry About Competition or Kyoto?

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Energy in the News...

• Is it Newsworthy?
  › Is it new?
  › Is it correct?

• Is it Important?
  › Is it novel?
  › Should we hold our breath?

• Should We Care?
  › Will we “pay later?”

• How should we (MIT) engage?
**Electric Power Party Animals...**

Suddenly, knowing a lot about the U.S. power grid became sexy at cocktail parties.

To protect the pen or the pocket?

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**Steve’ Topics for Today...**

- NIMBYisms and Rational/Responsible Change
- Reporting and Public Debate on Energy Infrastructures/Markets
- Managing Expectations...
  - Who’s expectations?
  - A full-time job
- Elevating Debates...
  - What to agree upon...
  - What to argue about...

- Cape Wind
- LNG Terminals (old and new)
- Mergers & Acquisitions
- Hurricanes & Ice Storms
Biases in the Debate

• Do Politicians & the Press Talk About the Important Pieces?
  » The Supply Side Bias
    – A lack of emphasis on demand-side options
  » The Electricity Bias
    – A lack of emphasis on transportation & “heat”
  » The Technology/Component Bias
    – A lack of emphasis on integrated systems & infrastructures
  » The (Big) Project Bias
    – A lack of emphasis on small scale or full infrastructure
  » The Air Emissions Bias
    – A lack of emphasis on solid waste, water systems, toxics
  » The Auto Bias
    – A lack of emphasis on Freight, both On and Off-Road

A Taxonomy of NIMBYs

• Common NIMBYs • AGREA NIMBYs

  » NIMBY
    Not in My Backyard
  » NOTE / NOPE
    Not Over There Either Not On Planet Earth
  » BANANA
    Build Absolutely Nothing Anywhere Near Anybody

  » NUMBY
    Not Under My Backyard
    • Originally for pipelines
    • Equally good for carbon sequestration
  » NIMO
    Not In My Ocean
    • Ocean Disposal of CO2
  » NOMH (‘gnome’)
    Not On My Horizon
    • Originally conceived for offshore wind
    • Equally good for onshore-ridge wind
Pop Quiz: Is Windpower Pretty?

- Denmark/North Sea www.hornsrev.dk
- Alliance to Protect Nantucket Sound
- Washington State www.res-us.com

Energy is Not Pretty...

- Or is it?
- Energy as Art?
- Is Christo Interested?

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Energy is Evil!

• Local NIMBY “Debates”

NukeProvidence.com

Windpower’s Getting BIG!!!

• Comparative Size/Height
Not Just The Generator...

- Baseload/Intermediate/Peaking

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<th>Type of Combustion Generation</th>
<th>Combustion Type</th>
<th>Turbine Type</th>
<th>Primay Power</th>
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<td>External</td>
<td>Gas</td>
<td>Shaft Generator</td>
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<td>Gas</td>
<td>Inverter</td>
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<tr>
<td>Ocean Thermal</td>
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Coordinated Energy Carriers

- Hydrogen – Another Energy Carrier
**Lessons: Seasonal & Daily Variability**

- **Generation Summed by Month and Hour-of-Day (2004)**
One Site for Many Years...

- **Nantucket (Sleigh Ride?)**

![Graphs showing average seasonal windspeed and seasonal capacity factor over time.](image)

Variability and Duty Cycles

- **Resource Variability**
  - Wind, Sun and Rain
- **Fuel Markets**
  - World & Continental Prices, Pipeline/Refinery Investment
- **Power Markets**
  - Nuclear Availability, Market Structure, Grid Operations
- **Energy Demands**
  - Economic Growth, Heating/Cooling Degree Days
- **Duty Cycle/Driving Cycle Analogies**
  - Baseload Nuclear -> Trans-Atlantic Tanker
  - Large Coal -> Freight Train
  - Cycling Coal/Oil -> 18 Wheeler
  - Comb.Turbine/Diesel -> UPS/FedEx Truck
  - Windpower -> Sailboat?
  - Solar -> Hot Air Balloon?
How Much Detail?
What’s Missing?

Lots of Things

- Time and Spatial Distribution of Energy Resources
- Seasonality and Relative Growth of Energy Demands
- Variability & Covariance of Resources & Demands
- Aspects of the Energy Market, Namely Who Owns and Invests in Which Parts
- Trends in Infrastructure Age Growth and Aging
- Greenhouse Gas “Management” and Other Emissions Controls
- What Else?

Have We Had It Too Easy?

- What Direction Has Our, Should Our Energy Infrastructures Head?

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<th>Centralized</th>
<th>Decentralized</th>
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<td>Fuels &amp; Feedstocks</td>
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<td>Biofuels, Hydrogen, etc.</td>
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<td>Windpower, Solar, Distributed Generation, etc.</td>
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<tr>
<th>End-Use</th>
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<tr>
<td>Large Industry</td>
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<tr>
<td>Everything Else!</td>
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Dispatchable | Non-Dispatchable
**Who’s in Charge?**

Long-term coordination would be nice.
Is anybody in charge?
If so, are they a good listener?

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**Is NIMBY Fundamentally Unfair?**

### Alternate NIMBYs

- **TOMBY / NTMBY**
  - (Not) TO My Backyard?
    - Power lines
    - Pipelines
    - Rail Networks, etc.

- **NIMBY = YITBY**
  - If “not in my backyard” then *Yes in Their Backyard*

### Key Questions/Insights
- Who “hosts” energy facilities
- Local generation for local consumption
- Ultimately “Environmental Equity/Justice”
Steve’ Topics for this Year...

- Will We Be Able to Live with NIMBY?
  - Why are we prattling on about Kyoto or competition in electricity, etc.

- How to Achieve a Quality Long-Term Public Debate on Rational Energy Investments and Collectively Infrastructures/Markets

Source: giss.nasa.gov/mta.asp
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Thanks for Listening...
Thanks for Your Questions...

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