

# Understanding the Cumulative Cost Impact of Energy Independence

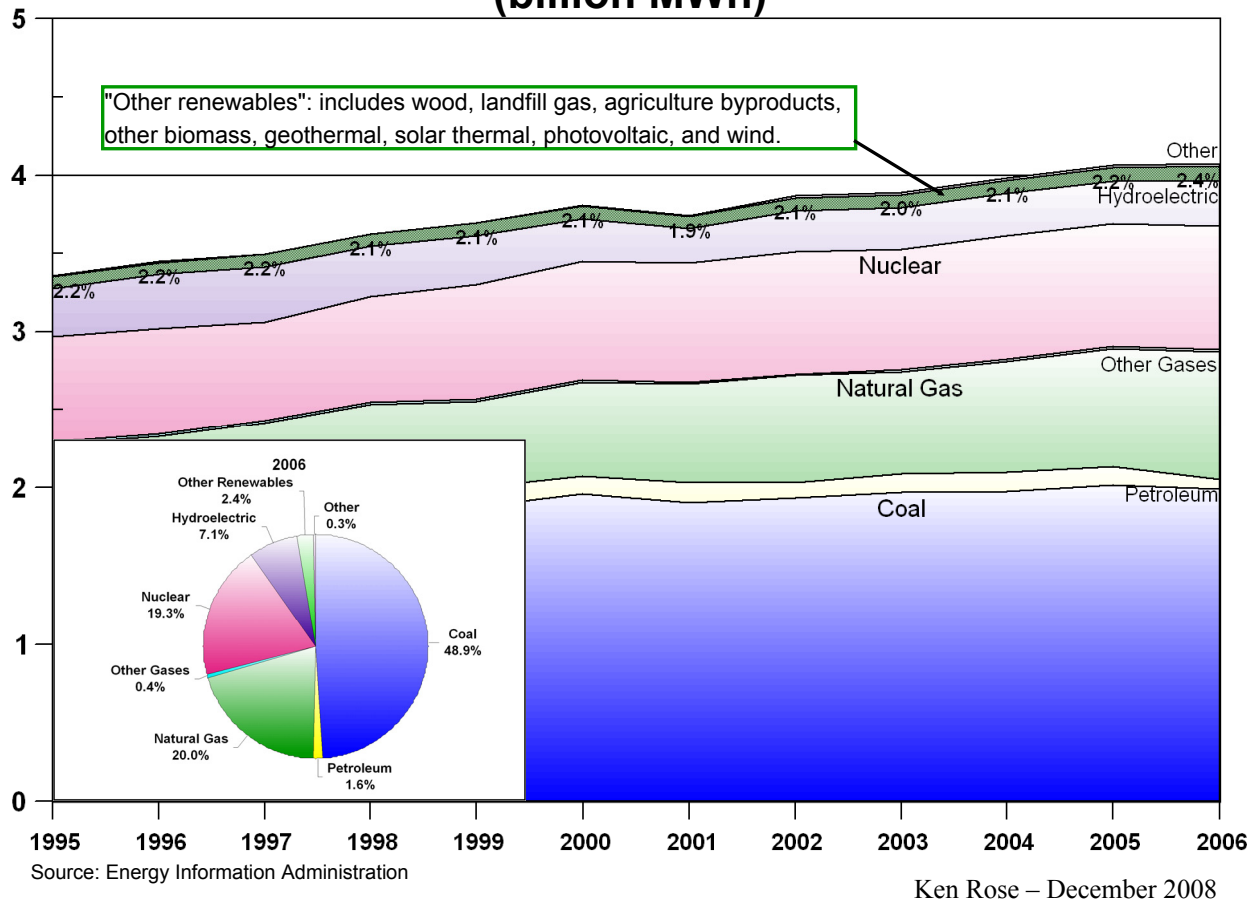
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## Energy Independence and Electricity

- How independent is electricity?
- Do, or can, renewable energy help?

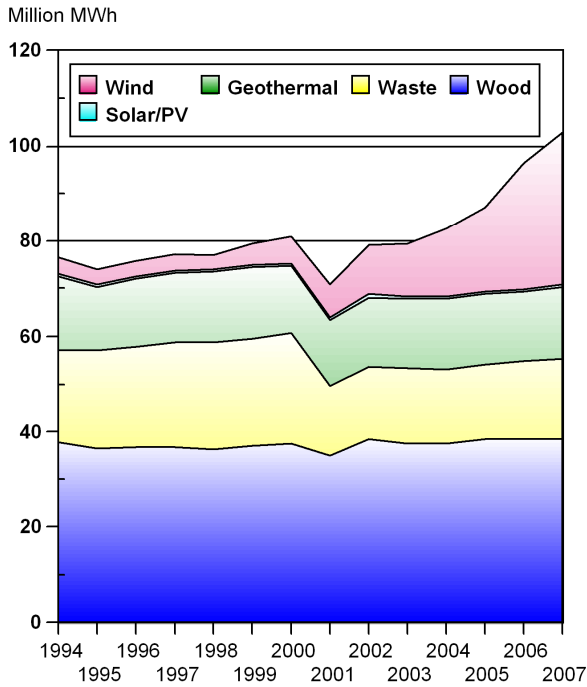
## Net Generation by Energy Source, 1995 through 2006 (billion MWh)



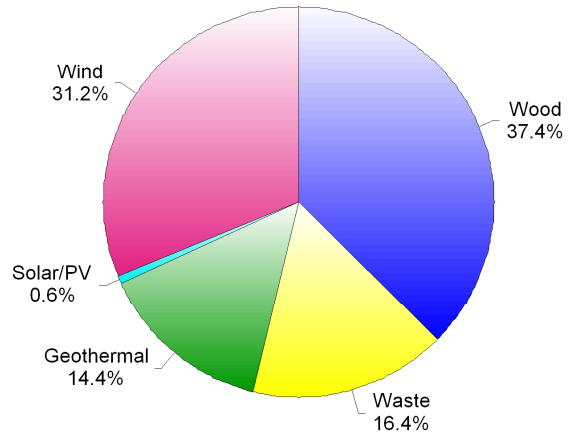
## How Independent is Electricity?

- Coal
  - imported coal was only 3.2% of total U.S. coal production in 2007 (exports were 5.2%)
- Natural Gas
  - 21.7% of natural gas delivered to consumers in U.S. in 2007 was imported
  - 82.1% of the imports came from Canada
- Uranium for civilian nuclear power reactors
  - 92.2% was from foreign sources
  - 32.9% was from Russia (the leading source)

# Net Generation by "Other Renewables" 1994 through 2007



2007 percent of total "other renewables"

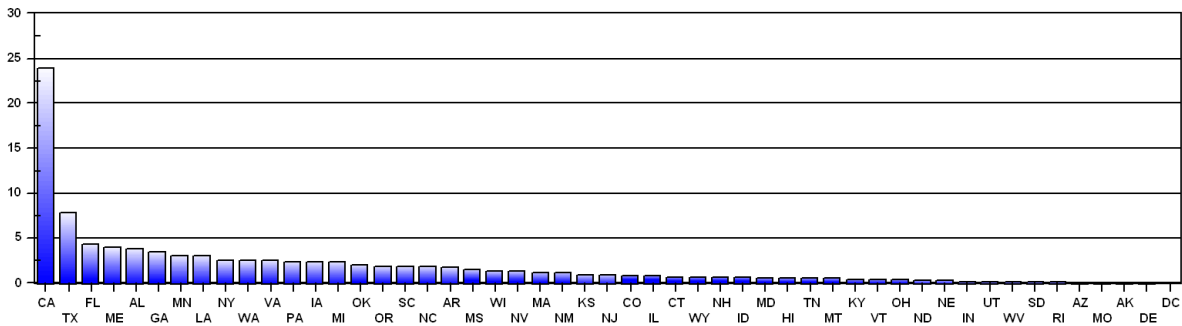


Source: Energy Information Administration

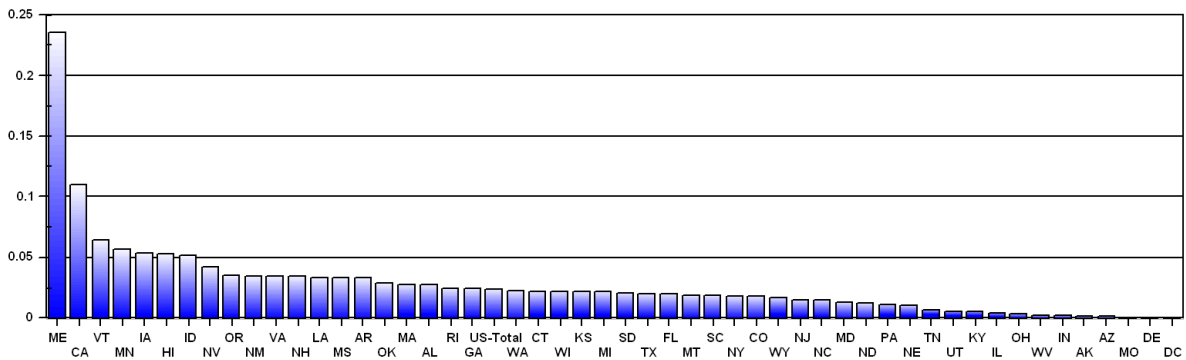
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## Total "Other Renewable" Generation by State, 2006 (millions of MWh)



## Percent of State Total Generation that is "Other Renewable," 2006



Source: Energy Information Administration

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## **Siting of generators and transmission lines will slow renewable development**

- Apt, Lave, and Pattanariyankool (of Carnegie Mellon University):
  - cite the difficulty in obtaining the land and permission to build wind farms and transmission lines
  - as a result, state RPS deadlines, especially those for 2015 and earlier, are unlikely to be met
  - for lines more than 50 miles long, the median time to obtain permission and build the line has been 7 years

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## **Siting of generators and transmission lines will slow development (*continued*)**

- Electricity can be generated by wind turbines for an unsubsidized cost of 8 to 8.5 cents/kWh -- competitive in some locations
- However, they note some problems:
  - good wind sites are generally located far from load centers -- transmitting electricity 1,000 miles from wind site to load centers would double the delivered cost
  - wind generally not available when electricity demand is high -- thus, investment in wind does not lower the amount of dispatchable capacity needed

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## They also note problems with other renewable energy sources

- Geothermal power is almost competitive with fossil generation -- however, the best locations are clustered in the Southwest (transmission again increases the cost to bring power to load centers)
- PV has a non-subsidized cost of 33 to 61 cents/kWh, almost ten times the cost of the current electric power generation mix

From an *Energy Bulletin* article, Nov. 19, 2008

- Due to the economic slowdown, "Ventyx, an energy consulting firm based in Atlanta, reports that 66 of the 262 wind projects announced this year have already been canceled or postponed."
- T. Boone Pickens is now putting the construction of the world's largest wind farm on hold -- due to deteriorating market conditions and the current low cost of natural gas (Pickens also wants to build 170 miles of transmission lines)
  - *The Wall Street Journal* reported investors are bailing out of the project

# Conclusions

- Coal and natural gas may help with “energy independence” – but at a cost of higher CO<sub>2</sub> emissions and other environmental costs
- Renewable energy sources are not likely to help much with “energy independence” in the foreseeable future
- If we do use substantially more renewable energy sources, how do we keep it affordable?