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Potential Impacts of a Renewable Electricity Production Tax Credit Extension

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NEMS Conference

March 23, 2004

Washington, DC

Overview

- Background
- Description of 4 scenarios for PTC extension
- Results
- Legislative status

Background

- Significant Federal subsidies to non-hydro renewable electricity originated in 1970's
  - Response to "energy security" concerns arising from oil market shocks
  - Response to environmental concerns from fossil and nuclear-based generation technologies

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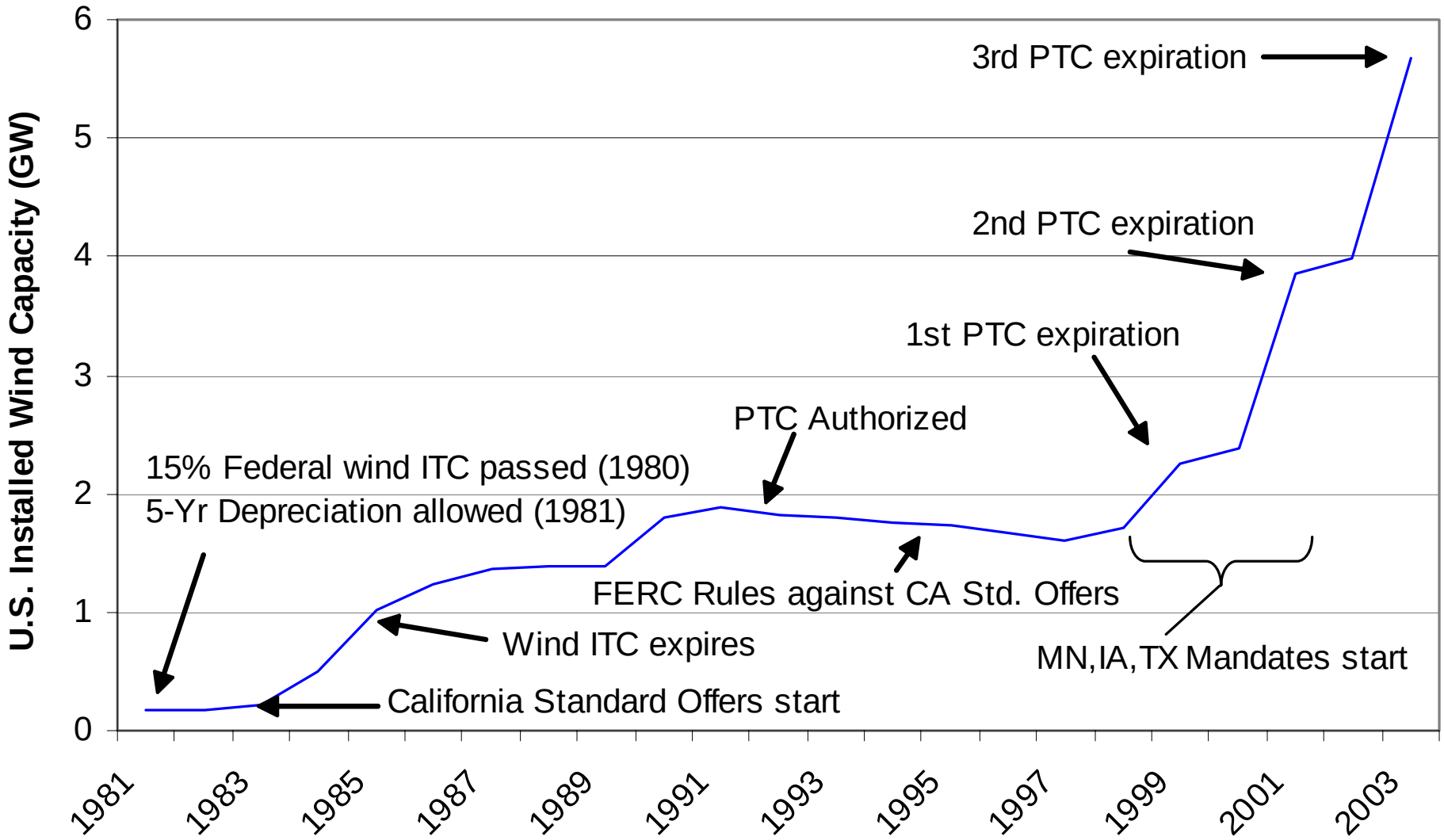
Federal and State Support Drives Wind Development



Key Support of Renewables

- PURPA (1978) required utilities to purchase renewable generation from “qualifying facilties” (QFs) at “avoided cost”
  - California combines state-level programs with Federal QF and ITC support in “Standard Offer” contracts for renewables
- Energy Tax Act (1978) established a 10-percent Investment Tax Credit (ITC) for wind, solar, geothermal
  - Later raised to 15%, then back to 10% in 1986
  - ITC for wind is allowed to expire in 1985
- Economic Recovery Tax Act (1981) gives most renewable capacity a 5-year depreciation schedule
  - 15 or 20-year depreciation for most other capacity types

The Production Tax Credit

- Established by the Energy Policy Act of 1992 (EPACT)
- Available to wind and “closed-loop” biomass generated electricity
- A 1.5 cents per kilowatt-hour tax credit available for 10 years from initial plant operation
  - Indexed for inflation, worth 1.8 cents per kilowatt-hour for 2003 tax year
  - Only goes to tax-paying owners; muni’s/co-ops get REPI
- Rewards production of electricity, not investment in capital stock

Slow Response to PTC

- No discernable effect on biomass
- Little impact on wind up to 1998
- State-level programs, combined with PTC, spur significant wind development starting in 1998
  - Minnesota mandates wind power in exchange for licensing of nuclear waste storage
  - Texas mandates renewable capacity
  - Other states provide additional project support
- Allowed to expire, then re-authorized in 1999 and 2001
- Expired December 31, 2003 – not yet re-authorized

Key Features of the PTC

- A tax *credit*, not a tax deduction (non-taxable income)
  - Project owner would need 2.8 cents per kWh in taxable revenue to compensate for 1.8 cent credit
- Requires sufficient non-wind income to get full value
  - Credit cannot reduce tax liability to below zero
  - Credit value is larger than income-tax on typical wholesale electricity revenue
- Ability to claim full credit value may also be impaired by Alternative Minimum Tax liability
- Credit can be claimed for first 10 years of plant life
  - EIA assumes that electric power projects have a 20-year financial life (period to recover costs)
  - Credit is worth about 2.0 cents per kWh on a pre-tax, level 20-year payment basis (if claimed in full)

Four Scenarios for a PTC Extension

- AEO2004 Reference Case assumes PTC is not re-authorized
- Alternatives examined to inform discussion over extension, not intended to be prescriptive
  - EIA does not establish or lobby for particular policy or legislation
  - Scenarios do not describe preferred or presume to predict policy outcomes
- Cases
  - 3-year extension
  - 9-year extension
  - 9-year half extension
  - Conference Energy Bill (3-year extension)

Summary of 4 PTC Cases

	3-Year Case	9-Year Case	9-Year Half Case	CEB Case
Expiration Date	12-31-2006	12-31-2012	12-31-2012	12-31-2006
Eligible Technologies	Wind, Closed-Loop, Open-Loop, LFG	Wind, Closed-Loop, Open-Loop, LFG	Wind, Closed-Loop, Open-Loop, LFG	Wind, Closed-Loop, Open-Loop, LFG, MSW, Solar, Geothermal
Credit Value (in 2003)	1.8 ¢/kWh	1.8 ¢/kWh	0.9 ¢/kWh	1.8 ¢/kWh for wind, closed-loop, solar & geothermal; 1.2 ¢/kWh for open-loop, LFG, MSW
Co-firing Provision	None	None	None	5-year, 1.2 cent/kWh credit to open-loop; 10-year, 1.8 cent/kWh credit to closed-loop (closed-loop credit not modeled)

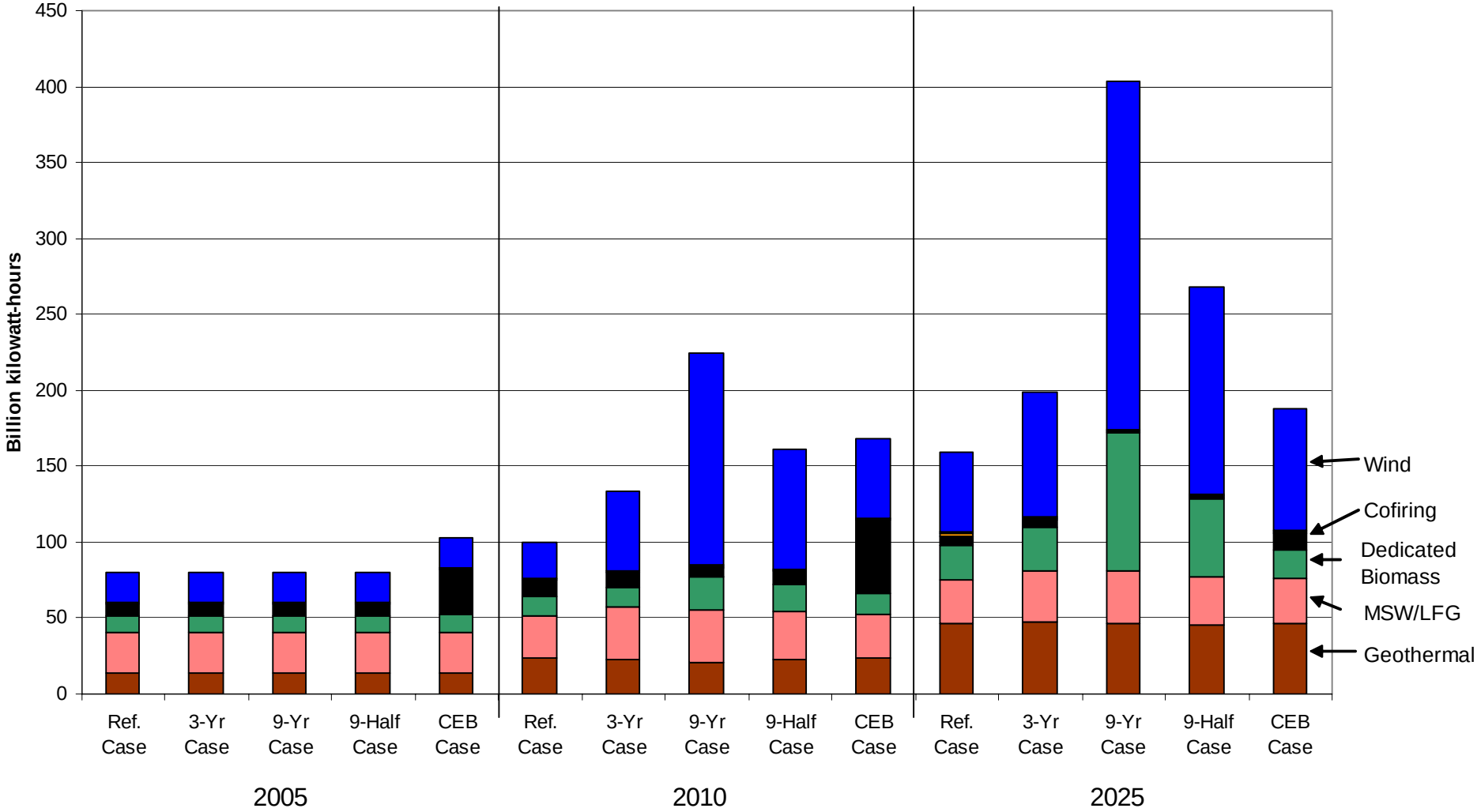
Key Assumptions

- 3-Year, 9-Year and 9-Year Half Cases use common elements of House and Senate Energy Bills, as of September 1, 2003
- 9-Year cases: Extension is assumed to be continuous, not “stop-and-go”
  - Some claim that expiration/extension cycle of current PTC reduces program effectiveness
  - NEMS cannot easily model such impacts
- Half case provides a sensitivity to value-limiting effects of insufficient tax liability and AMT liability

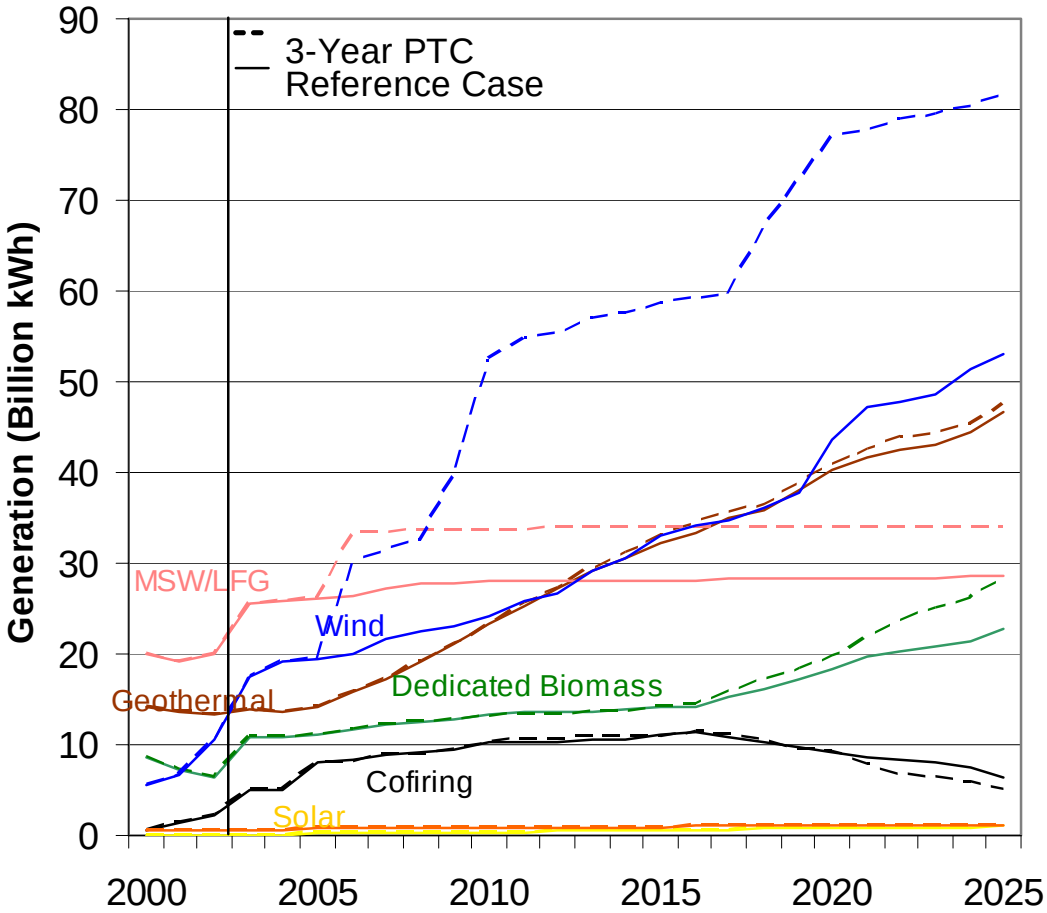
More Key Assumptions

- Conference Energy Bill (CEB) released after AEO went to press
  - CEB included provisions different than modeled for AEO analysis
  - Co-firing of “open-loop” biomass *may* be allowed in existing coal plants
  - Solar, geothermal, and municipal solid waste eligible
  - Credit value and claim period is reduced for new technologies
- Provisions modeled as “stand-alone” (not including other impacts of the CEB)

Results from 4 Cases vs. AEO2004 Reference Case

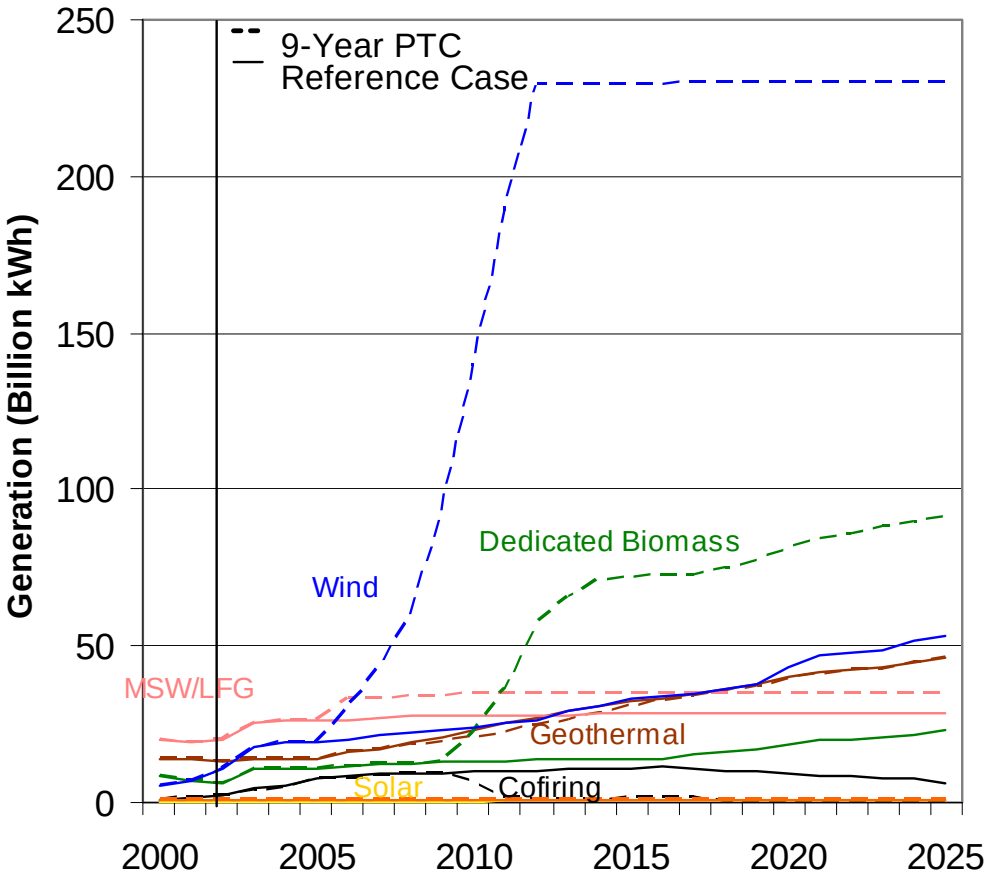


3-Year Case Spurs Wind Development



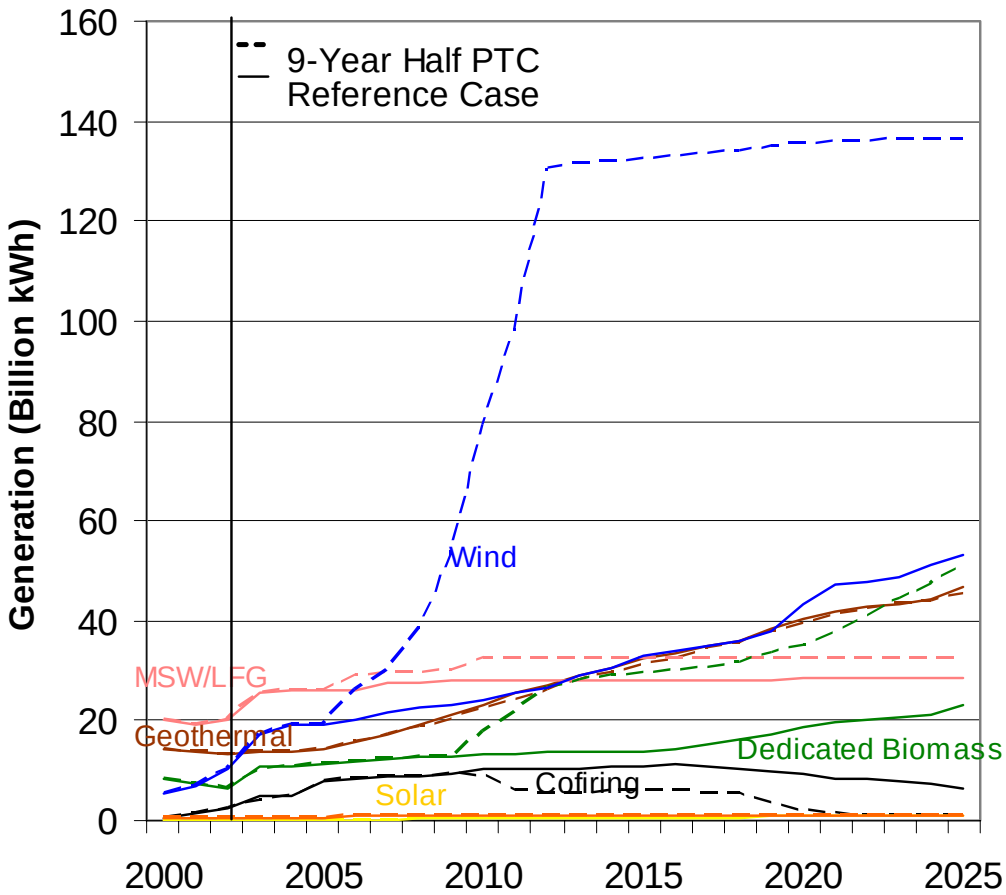
- About 8 gigawatts of additional wind by 2025 compared to the Reference Case
  - All incremental builds (vs. Ref. Case) occur prior to 2010, indicating little lasting "induced learning effect"
- Does not spur development of new biomass capacity
  - Insufficient time for industry to respond

9-Year Case also Supports Biomass



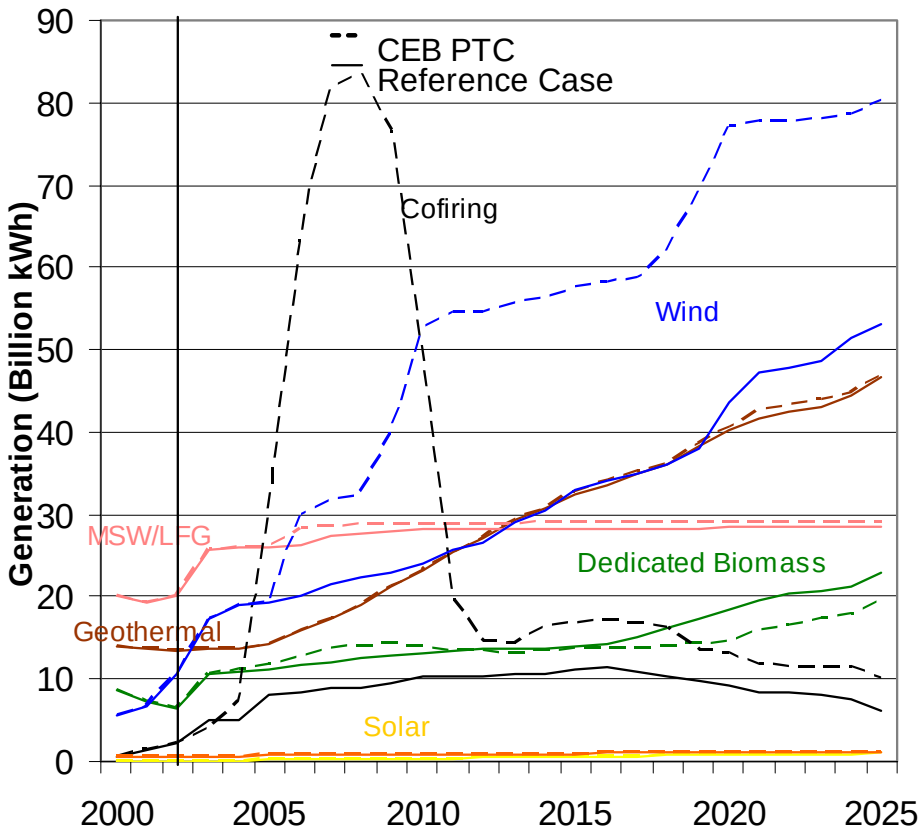
- Nearly 50 gigawatts of additional wind capacity by 2025 compared to the Reference Case
- 10 gigawatts of additional biomass capacity by 2025 compared to the Reference Case
  - Significant biomass capacity growth continues after 2012, indicating “induced learning effects” for this technology
  - Competition for biomass fuel makes co-firing uneconomic

9-Year Half Case Still Results in Significant Renewable Growth



- 23 gigawatts of additional wind capacity by 2025 compared to the Reference Case
  - 27 gigawatts less than the 9-Year Case
- Biomass capacity is 4.3 gigawatts more than the Reference Case in 2025
  - Co-firing is reduced compared to Reference Case, but not eliminated as in the 9-Year Case

CEB Case Supports Early Co-firing



- Significant co-firing through 2008
  - After 5-year claim period, credit is gone and co-firing returns to near Reference Case levels
  - Insufficient time for dedicated biomass industry to respond
- Over 7 gigawatts of additional wind capacity by 2025 compared to the Reference Case
- Geothermal, solar, and LFG have minimal response
  - Insuffcient time for geothermal industry to respond
  - Solar is still too expensive
  - LFG has a very small supply curve

Status of PTC and Wind Industry

- Efforts are underway to revise bill and resubmit
  - As of Feb 18, S. 2095 (Domenici replacement bill) retains most PTC provisions, eliminates LFG and inflation-index from CEB version
  - As of Mar 4, S. 1637 (Grassley tax bill) provides simple 1-year extension
- Wind industry capacity expansion for 2003 was near record of 1,700 MW
  - Record was set in 2001, the year prior to the last PTC expiration

Outlook for Wind

- There are increasing indications that recent wind additions were less reliant on state policies (although still reliant on PTC)
  - Installations occurred in states like Oklahoma and West Virginia, which don't have mandate or subsidy programs
  - These installations still may have benefited from "green power" markets and/or programs in neighboring states
- Without the PTC (or other significant support), wind is expected to be a niche resource
  - Largely depended on long-term trends in natural gas prices

Questions?

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Reports available at:
http://www.eia.doe.gov/oiaf/forecasting.html

- *Annual Energy Outlook 2004*, “Issues in Focus”
- *Summary Impacts of Modeled Provisions of the 2003 Conference Energy Bill*