Wind Power Development Issues from an Electric Power Perspective: Electrical and Institutional

Edgar A. DeMeo

Renewable Energy Consulting Services, Inc.

(EPRI Wind and Renewables Programs 1976-1998)

Currently DOE-NREL Liaison to UWIG and NWCC

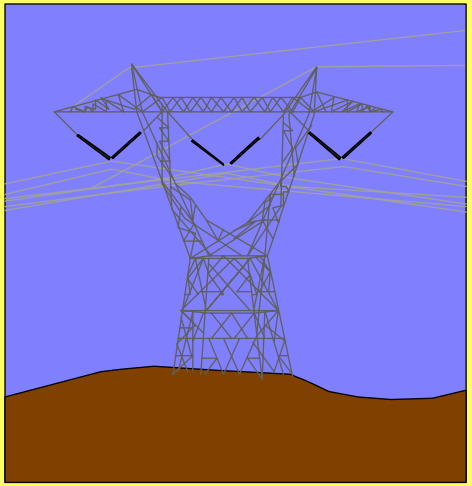
Wind Power's Natural Characteristics

- ***Remote:*** Wind resources often distant from major markets
- ***Variable:*** Plant output varies with variations in the wind
- ***New:*** Operators more comfortable with established power technologies

Key Issue: Should wind be disadvantaged by its natural characteristics ?

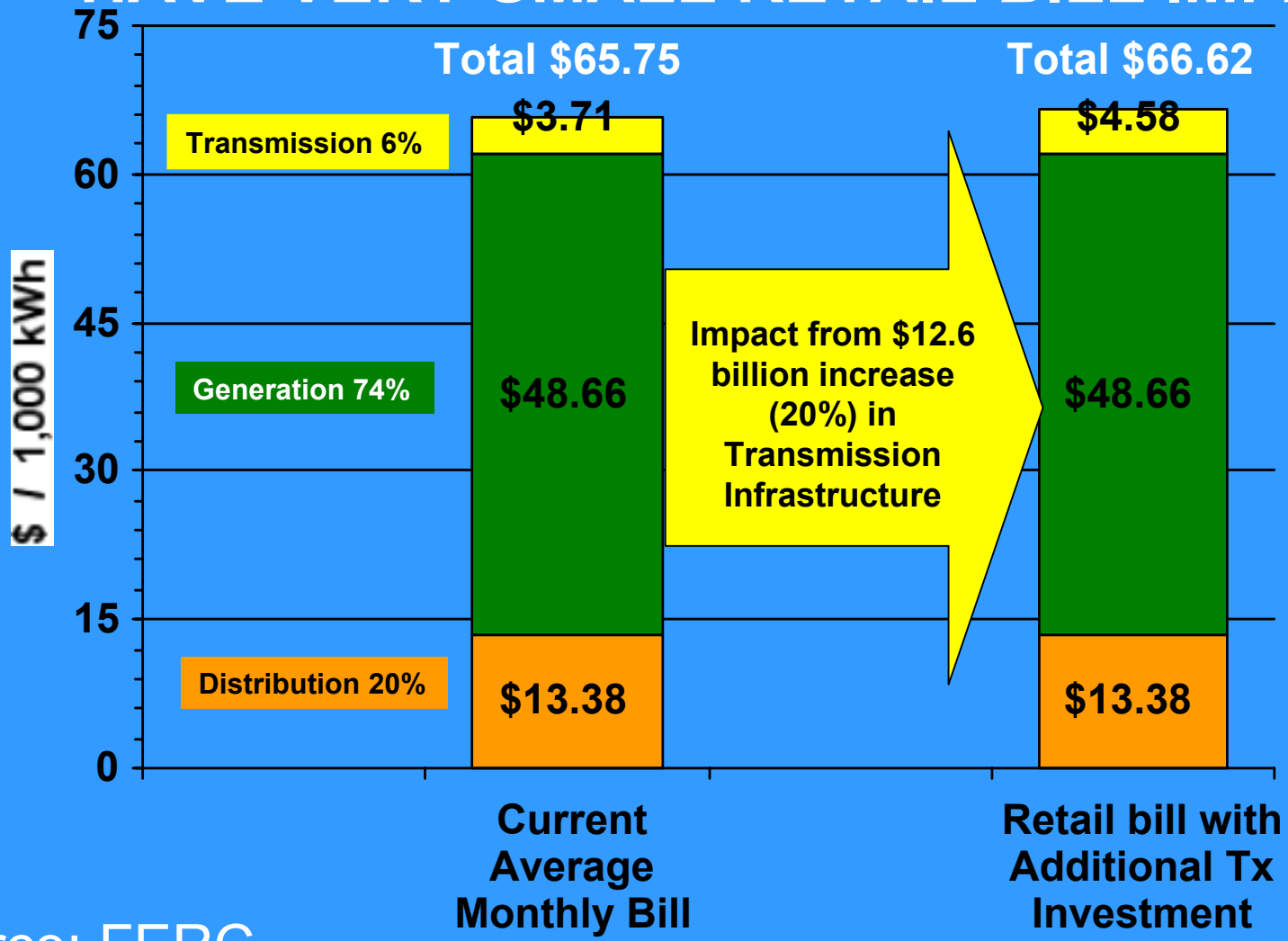
Remote: Transmission is Required

- *New Transmission:* siting and approval highly contentious
- *Cost Allocation:* wind plant or overall system?
- *Return on Investment:* commensurate with risk?
- *Landowners Compensation:* revenue stream?



Key Policy Issue: Is the transmission system a common carrier operating in the public interest ?

LARGE TRANSMISSION INVESTMENTS HAVE VERY SMALL RETAIL BILL IMPACTS



Source: FERC

Variable: Transmission Access

<u>Firm Transmission Rights</u>

- Blocks for specified times
- Underutilized by wind
- Too costly

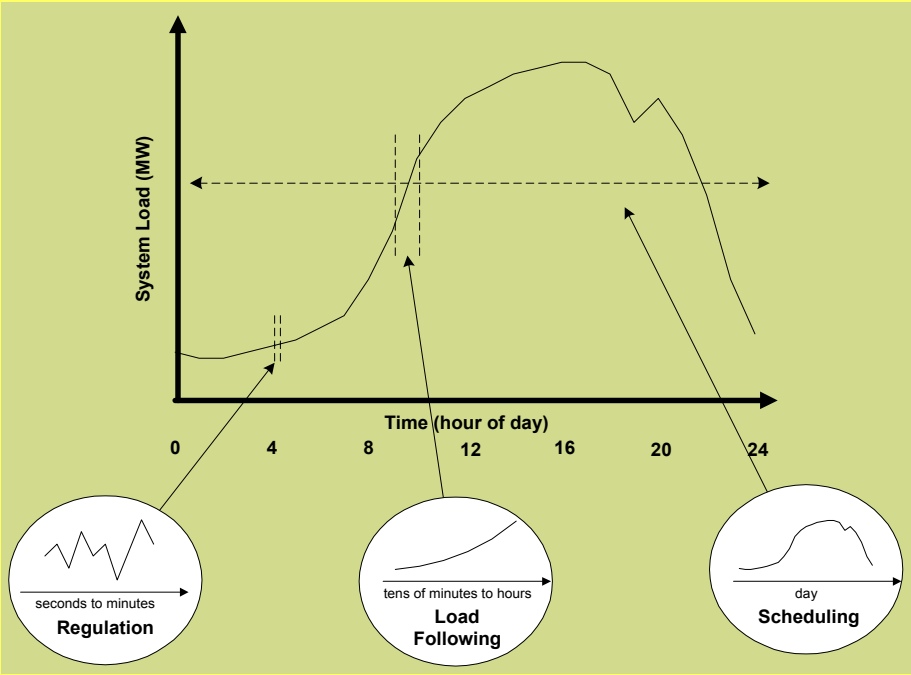
<u>Non-Firm Rights</u>

- Can be curtailed, but often OK for wind
- Not available long-term
- Insufficient assurance

Middle ground? Flexible-firm?

Wind-plant financing requires reasonable assurance of path to energy marketplace

Variable: Power-System Operation Impacts



- Regulation -- seconds to a few minutes -- similar to variations in customer demand (loads)
- Load-following -- tens of minutes to a few hours -- usage follows predictable patterns, wind less so
- Scheduling and commitment of generating units -- one to several days -- wind impacts unclear

Wind controlled by nature, not power-plant operators!

Variability Can Increase Operating Costs

- Committing unneeded generation
- Scheduling unneeded generation
- Allocating extra load-following capability
- Violation of system performance criteria
- Increased cycling operation
- **These are reflected in *ancillary services* costs**

Incremental cost added by wind's variability:
Is it ~0.1¢/kWh or ~1¢/kWh?

New: Contrasting Approaches to Change

Europe Wind power is environmentally preferred. How can we best accommodate it within the existing power system?

U.S. How can we integrate wind into the existing system with minimal impact on traditional rules and procedures?

Wind needs fair -- not preferential -- treatment in electricity-services markets. This is most likely with leadership from the public-policy sector.

Who Should Take the Lead?

Power Utilities? No

- Main job: Keep the lights on!
- Natural aversion to change

Legislators and Regulators?

- Encouragement of wind and other renewables is a public policy issue

Bottom Line: States can make a commitment to wind power without fear of breaking the bank!