INTRODUCTION

- Transmission represents very small percent of electric power revenues
- Yet transmission has been perhaps the most intractable problem of institution design
- Even before restructuring, problem of access
- Indeed, restructuring in part because of access problem
- Problem has persisted even as restructuring has proceeded
Struggle notable for:

- Variety of approaches
- Failure of all of them
- Growth of problem over time

New facet of transmission problem is congestion

- Began as creep
- Exacerbated as wholesale markets broadened
- Now threatens system reliability as well as “competition”
FIGURE 1: Total Annual PJM and NY Congestion

Total Congestion Charges (1999 - 2004) = $2.193 Billion

Source: Congestion Costs from PJM State of the Market Report 2004
*Includes PJM West going forward
**Includes ComEd/AEP
OUTLINE

Factual:
- Nature of problem
- Series of approaches
- Reasons for failure
- Latest ideas

Analytical:
- Lessons from past
- Possible new approaches
- Networks and systems
TRANSMISSION THEN AND NOW

- Emergence of market for wholesale power
- Historically, vertically integrated (VI) utilities and little open market sale
- PURPA (1978) encouraged IPPs, wholesale market
- VI utilities owned grid, routinely denied equal access
- Series of efforts to make competition work
First approach: Nondiscriminatory access

- EPAct (1992) plus FERC Order 888 (1996) were rule-making approach
- Had modest effect, but ultimately no match for VI and their
  - Operating control of grid
  - Ownership rights to grid
  - Incentives to deny access to rivals
- Retained grip on the grid
Second approach: Modify control (but not ownership)

- Pushed VI utilities to cede control over transmission line operation to RTOs
- “Functional unbundling”
- RTOs are nonprofit entities modeled after ISOs, governed by independent boards
- Ultimately five created, including NE and PJM
- Have had some benefits in places, but several problems
  - Governance (“too” independent)
  - Accountability (unresponsive to stakeholders)
  - Costly (especially for grid management protocols)
  - Completely ineffective with respect to congestion problem
Third approach:  
Transcos (modify ownership as well as control)

- Permitted under Order 2000 but not pursued
  - Now aggressively encouraged by FERC (2005)
  - For profit entities, subject to FERC regulation
- Transcos own and operate entire transmission grid in region
- Owners of lines transfer ownership to transco, gain equity stake
- Equity stake capped
- Governed by board comprised of market participants
- Charged with grid operation and expansion
MODELS OF TRANSCOS

- Vermont Electric Power Company (VELCO)
  - Formed in 1956
  - Owned by 22 state utilities (investor-owned, munis, coops)
  - Represented on Board
  - Capital projects funded by shareholders in proportion to load ratio
MODELS OF TRANSCOS

• American Transmission Company (ATC)
  • Formed in 2001 in parts of Wisconsin, Michigan, Illinois
  • Created primarily from transmission assets of 5 VI utilities
  • Now owned by 28 IOUs, munis, and coops
  • Board consists of 5 original members plus 4 independent directors
  • Has invested nearly half billion in transmission since 2001
  • Plans to invest $3.4B over next ten years
  • Debt well received
STANDING BACK...

- Little doubt that transmission issue difficult
  - More difficult in US than many countries due to perceived legal constraints
  - Contrast UK system with National Grid
- UK has true Independent Transmission Company (ITC)
  - All transmission divested to entity with no interest in generation, distribution
  - Wide area of operation
  - For profit, regulated
  - Market participants cannot have financial stake
  - No incentive to discriminate
• **Some concerns about transcos**
  - Profit incentive incompatible with public interest
  - Suboptimazation: Transmission solutions to system problems

• **Some evidence of this in UK**
  - Despite National Grid and regulatory oversight, problem of congestion
  - Remedied only through NETA (2001) and implementation of PBR (2002)
FIGURE 3: Congestion Costs in England and Wales

Introduction of Financial Incentives
REVIEW OF ALTERNATIVE ORGANIZATIONAL FORMS

- One extreme is traditional VI utilities
  - Problem of discriminatory access
  - Mixed incentive with respect to investment
    - Regulatory compact and obligation to serve
    - No reason to expand to serve merchant market
- RTOs moderate access problems
  - Governance still an issue
  - As is cost
  - Ultimately do not own assets
  - Long-run investment beyond their capabilities
- **Transcos may further moderate access problems**
  - Unclear if all concerns eliminated
    - Joint ownership
    - Board representation may favor some parties
  - Capacity investment decisions may be improved
    - May suboptimize

- **ITCs represent final stage**
  - In principle seem capable of effective grid management and expansion
  - Still requires regulation as natural monopoly
  - Still appears to need explicit incentives to reduce congestion
SOME OBSERVATIONS ABOUT THESE ALTERNATIVES

1. If PBR is necessary even for ITC, isn’t it necessary for transcos, RTOs etc. to work???
2. If PBR works in case of ITCs, is it possible that PBR would be equally decisive for transco or even RTOs???
3. If PBR works in sense of reducing congestion, do we know that reduction is optimal, as opposed to excessive???
FURTHER HERESIES

- New institutions for transmission have moved us away from “systems”
  - VI utilities represented such systems
  - Competition of sorts existed insofar as large industrial customers, pure distribution utilities could access alternative suppliers via alternative delivery arrangements
  - Key really was open access

- Emphasis in RTOs on wide-area coverage virtually precludes alternative delivery arrangements
  - Might be OK if RTOs addressed grid management, expansion effectively

- Alternative of transcos (or ITCs) might bring back some degree of competition between systems
  - Not as geographically encompassing
  - Might permit evolution of alternative delivery arrangements
• **Re-appearance of vertical integration**
  - Some distribution utilities “solving” transmission problem by building generation
  - Risk that this is uneconomic
  - Also may reflect recognition of advantages of vertical integration

• **Those economies in electric power are considerable**
  - Not (yet) recaptured by alternative institutions
  - Imply possible re-emergence of systems and systems competition in electric power