

Thoughts on transmission — and how to get it built

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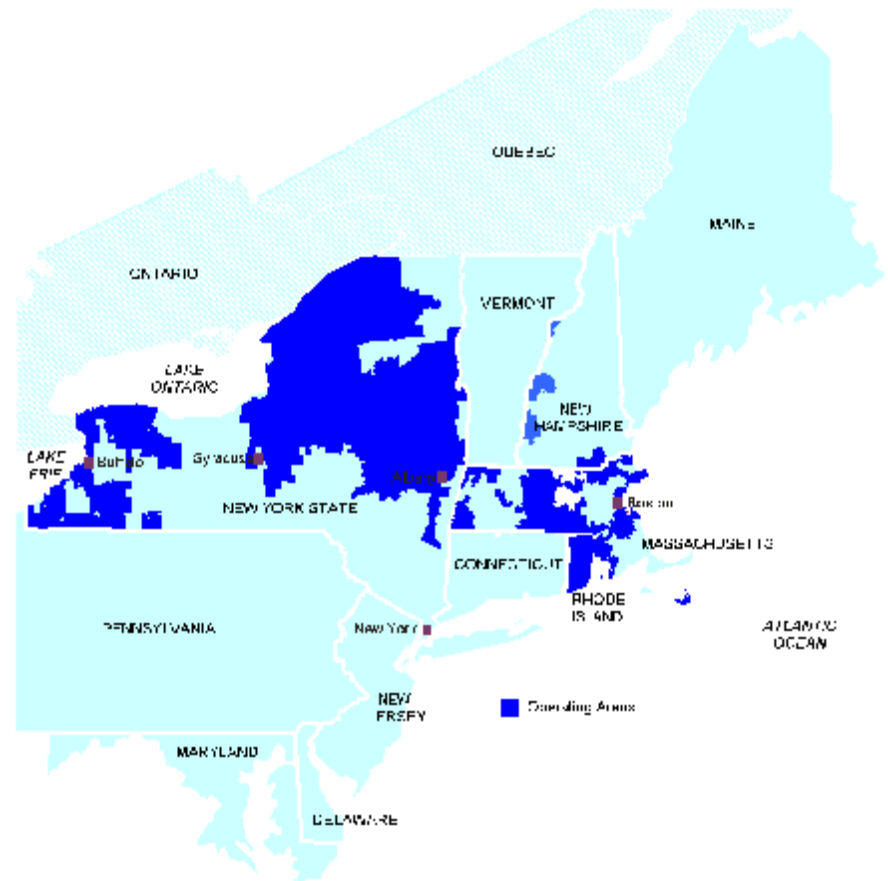
Topics to be covered

1. *What is National Grid?*
2. Essential elements of efficient power transfers
- and the role of transmission.
3. The US transmission environment.
4. How do we facilitate increased investment
- particularly in the West ?

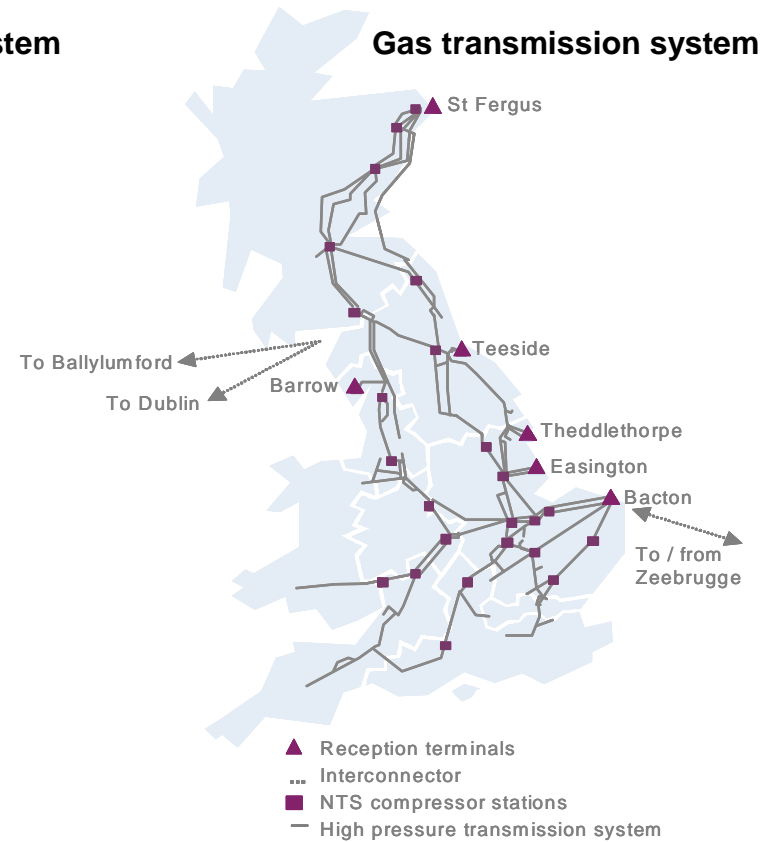
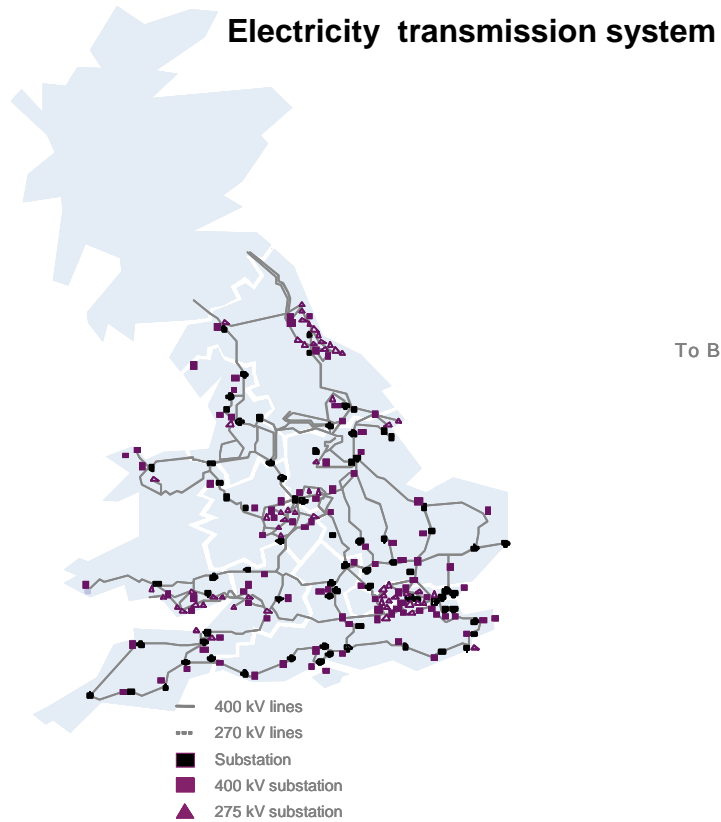
National Grid US

In the northeastern US

- w Owns and operates electricity transmission and distribution systems
- w Owns and operates gas distribution systems
- w Member of New England RTO
- w Long term incentive based rate plans in NY and NE
- w 3.2 million electric and 500,000 gas customers
- w Reduced controllable costs by 20% real between March 2002 and March 2005



National Grid UK

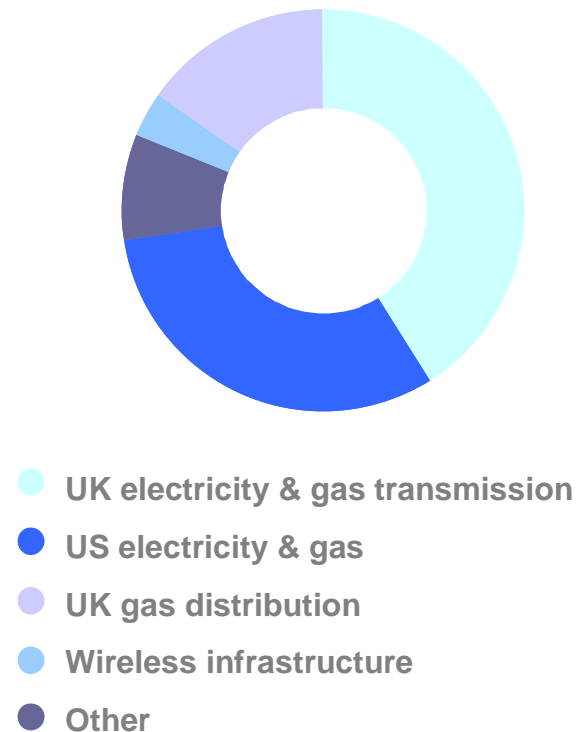


National Grid

Strategy

- w Asset based network provider
 - w operational expertise
 - w excellent regulatory relations
 - w disciplined approach to capital management
 - w FTSE 100 Award for Corporate Responsibility
- w Exploiting our skills and assets via
 - w organic growth of existing businesses
 - w energy networks assets and businesses
 - w selected network related businesses
- w Market Capitalization
 - w Approximately \$30 billion

Current shape of National Grid
(Proforma based on operating profit)



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Essential elements of efficient (power) transfers

- w Understandable rules that facilitate transactions.
- w Transparency of transmission pricing.
- w Variety of supply sources.
- w Adequate delivery system to facilitate access to adequate, low cost, environmentally responsible, sources of supply.
- w Oversight to minimize and redress abuses.
- w Create a level playing field (i.e. a robust transmission network) before starting the game (i.e. moving to organized markets).
- w If transmission capacity is limited, measures are (unfortunately) necessary to smooth transition to open market.

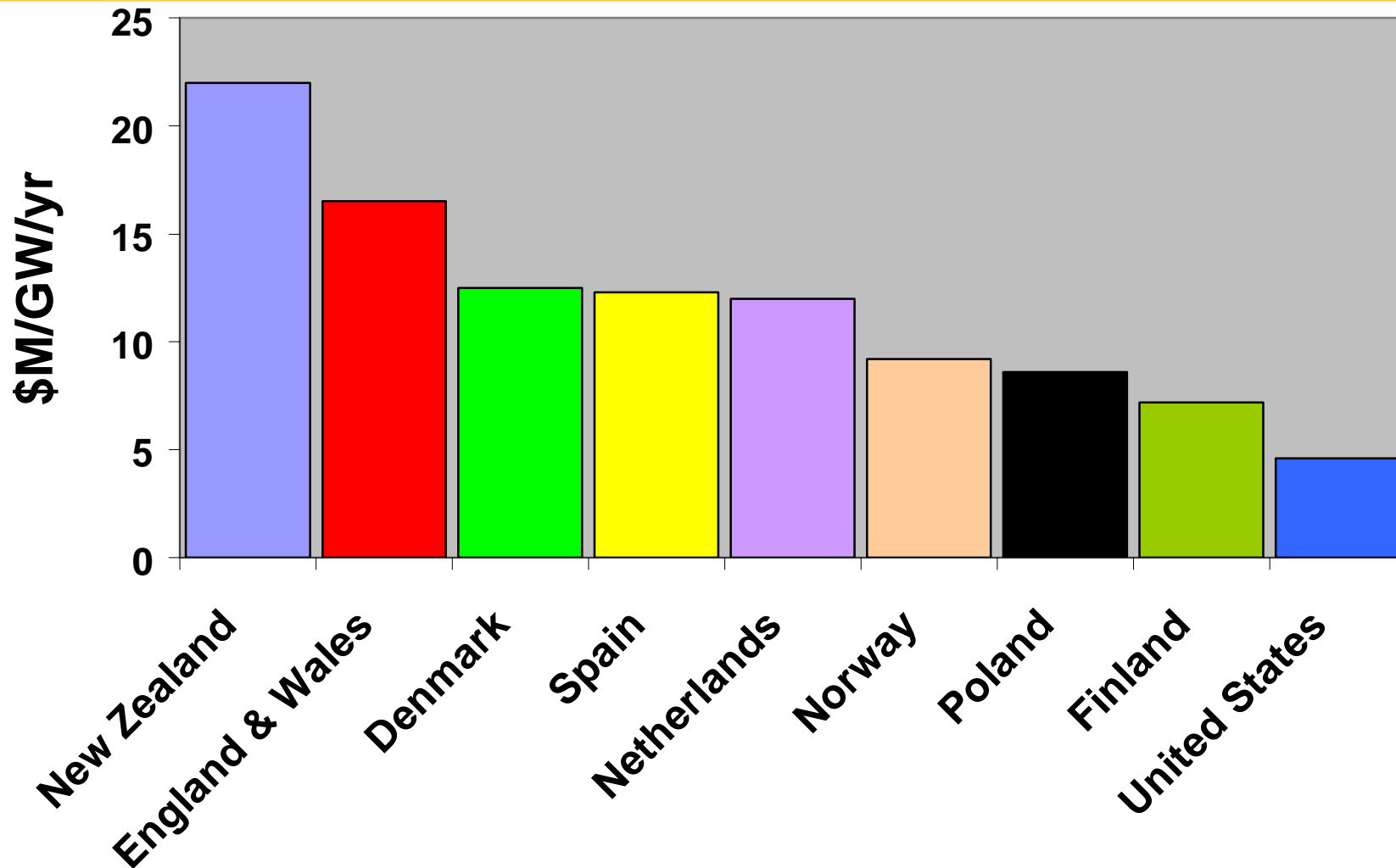
Transmission – the great facilitator

- w Robust transmission system brings more generation resources into play for any particular consumer.
- w Robust regional transmission system allows sharing of generation reserves.
- w Regional perspective on transmission capabilities further broadens choice of source to respond to environmental goals and/or price volatility within a particular commodity or commodities.
- w Independent operation of regional grid ensures evenhandedness of power transfers.
- w Independent regional planning of the transmission grid gives market participants (generators) confidence that grid will develop in a manner designed to enhance deliverability of efficient plants.

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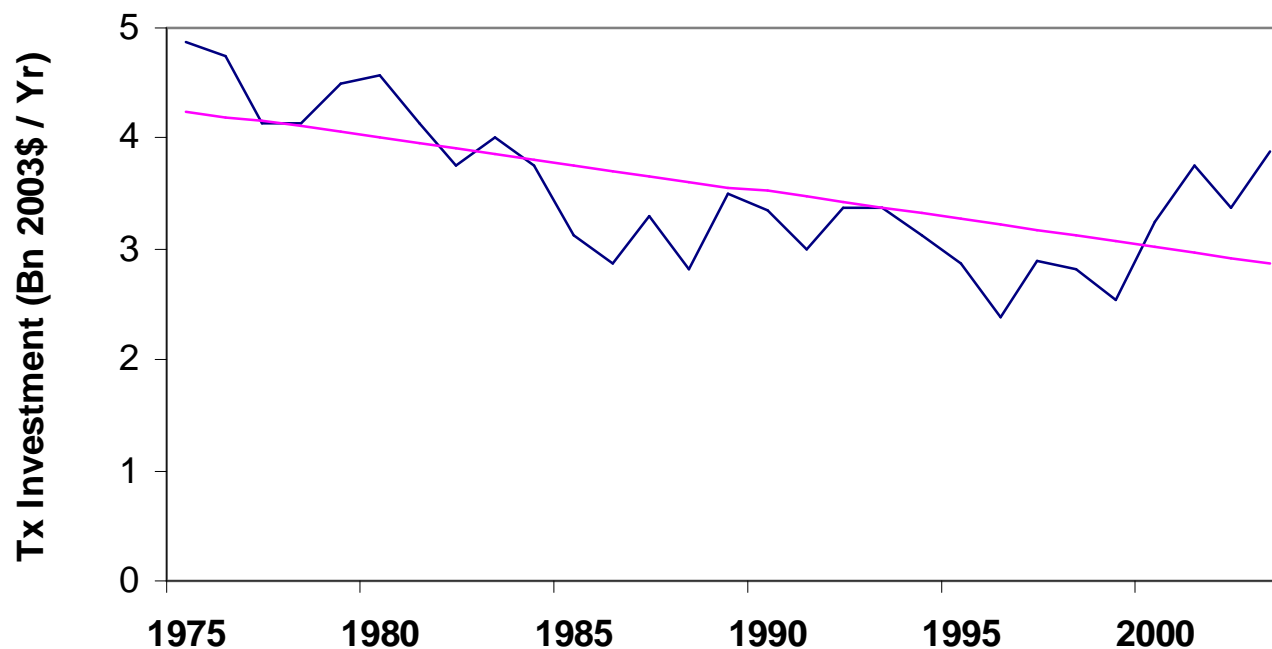
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International investment in transmission



Note: Graph shows investment in high voltage transmission (>230kV) Normalized by load for 04-08 (in \$M/GW/yr)
Source: http://www.nationalgridus.com/non_html/transmission_critical_link.pdf

US Transmission Investment: 1975 to 2003



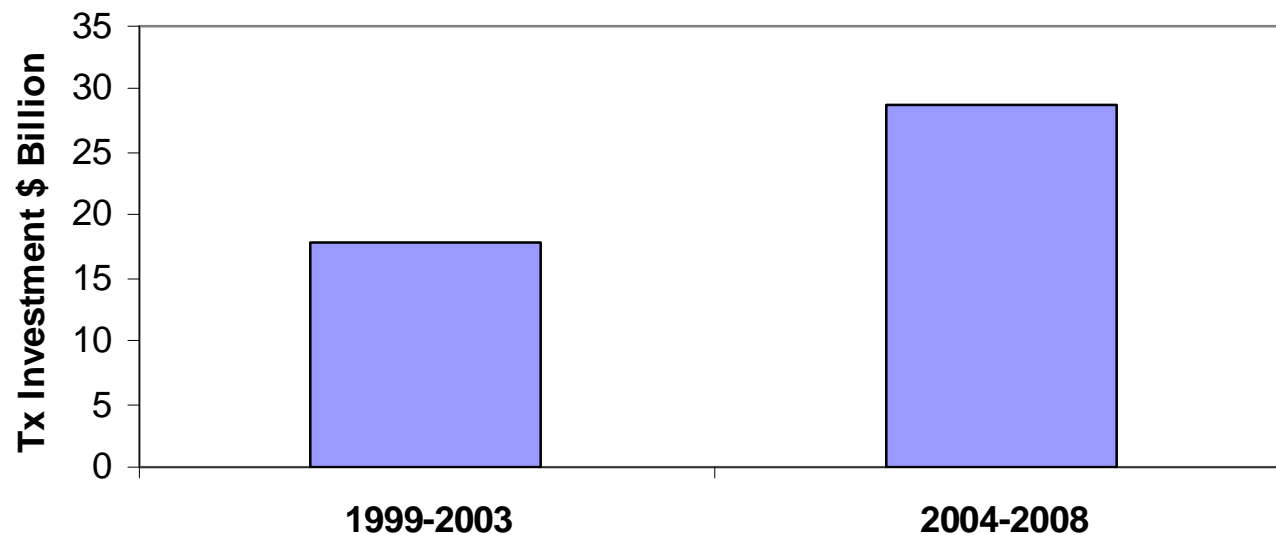
- w Over the period 1975 through 2003 the average annual decrease in transmission investment was ~\$50m per year.

Source: Eric Hurst

US Transmission Investment

- the view from the Edison Electric Institute

Total US transmission capital investment*



*Source: Investment by Edison Electric Institute members only.

(EEI member companies serve approximately 70% of the load in the contiguous US.)

Is US investment keeping up with need ?

- w US Reliability is significantly worse than international comparators:
 - w US energy unsupplied 0.0066%.
 - w European average energy unsupplied 0.001%.

Is US investment keeping up with need?

Examples from the East (and elsewhere)

- w Congestion is still rising in many jurisdictions:
 - w PJM congestion costs per MWh have increased 64% p.a. and have totaled \$2.2bn over the period 1999 to 2004.
 - w NY congestion costs have increased 50% p.a. over the three year period 2001 to 2003 totaling \$1bn.
 - w NE constraint costs are approximately \$200m a year, including reliability compensation to generators.
 - w By comparison, UK congestion levels peaked above \$350m p.a. during the 1990s. Following introduction of incentive mechanisms these are now less than \$50m per year.

Is US investment keeping up with need?

A view of the West – a problem bigger than mere “congestion”

- w Arguably, a principal cause of the 2001 Californian (Western) energy crisis was lack of transmission.
- w The August 2001 WGA report “Conceptual Plans for Electricity Transmission in the West” estimated that \$8 to \$12 bn of new transmission required providing annual fuel savings of \$4.3 to \$7.1 bn.
- w Remote sources of generation considered by the WGA report included:
 - w mine mouth located in the Powder River Basin (Montana/Wyoming).
 - w Wind in Montana and Wyoming.
 - w mine mouth located in the “Four Corners” Region.
- w September 2004 Rocky Mountain Area Transmission Study (RMATS) recommended:
 - w Phase 1: three significant upgrades within the Rocky Mountain footprint
 - w Phase 2: export potential outside the Rocky Mountain footprint at a cost of \$4.3 bn.
- w Frontier Project 2005 announcement referred to < \$5 billion of transmission with annual benefits in excess of \$2bn.

US Transmission is fragmented

- w ~ 450 separate transmission owning entities in the US
 - most developed countries have a single owner/operator.
- w > 100 control areas in the US
 - and at least 51 regulators.
- w Historically, transmission has been built to connect generation and native load within a utility footprint . . . not to move power across regions.
- w WAPA and BPA have unique issues of funding and constitution.
- w Lack of effective regional planning is also a significant factor.

The “*generation*” gap

- w First *generation* of transmission built by discrete utilities; part of bundled cost of delivered power, regulated by single jurisdiction.
- w The next *generation* must deliver higher volumes of power across vast expanses and must:
 - w Improve reliability to regionalized delivery area.
 - w Permit access to broader range of remote power sources, including renewables and lower cost traditional sources.
 - w Be regulated by multiple state and federal regulators.
 - w Be paid for by multiple users.

Impediments to transmission investment

The structural issues that lead to under-investment in transmission are well known: i.e.

- w Fragmentation and vertical integration.
- w Lack of effective regional planning
 - addressing both reliability and economics.
- w Rate uncertainty – cost allocation and sufficiency of returns.
- w Lack of clear demarcation between transmission as a market platform and the market participants.
- w Divided jurisdictions – PUHCA (no more!) / Siting / Cost Recovery.

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Ideal structures

w Get the basics right

- w** Secure system operation – a CAISO equivalent for the West ?
- w** Effective regional system planning – for both reliability and economics.
- w** Adequate investment for long term asset/system health.
- w** Competitive markets without market power mitigation fixes.

w RTOs are one approach

- w** RTOs in the east are effective at making equally available what transmission capacity there is - but not yet effective in increasing transmission capacity in either short or longer timescales.
- w** CAISO is heading in the right direction, but effective region probably extends beyond its jurisdictional reach.
- w** Promising signs that WECC will increase its role and partially fill the vacuum.

w International experience

- w** Not-for-profit transmission administration proving inefficient due to inability to exploit ownership/operations synergies and lack of cost accountability.
- w** Merchant transmission model is working in limited niche but regulated transmission is proving to be the most dependable.

How do we get there?

- w **Step 1: Empower an independent regional planning authority**
 - w With scope to evaluate both reliability and economic needs and opportunities.
 - w With power to order transmission improvements to be effected by incumbent utilities or third parties.
- w **Step 2: Establish equitable, predictable cost allocation regime**
 - w Avoid case-by-case adjudication as that would lead to quagmire and prevent necessary improvements.
 - w Recognize value of both reliability and economic impacts of improvements in formulaically assigning costs.

How do we get there? (cont'd)

w Step 3: Stimulate transmission investment

- w** Recognize the risks and time involved in planning and developing significant transmission improvements and allow commensurate return. Recognize and reward the value of the independent regional planning process.

w Step 4: Move towards improved transmission business structure

- w** Higher returns for independently owned/operated transmission systems and improvements.
- w** Allow incentive returns in transmission asset acquisitions, which returns invariably go to seller of transmission assets.

w Step 5: Self-sustaining incentives

- w** Incentives can be targeted on customer benefits.
- w** Large independent transmission entities can be incentivized to deliver enhanced performance with Performance Based Rates.

The Optimum (and ultimate?) transmission platform

- w Characteristics: independent, for-profit, asset-owning (big slabs), regionally planned, regulated.
- w Benefits:
 - w More transmission will be built; singular focus and no competition for capital.
 - w Smarter, more efficient grid management including scale synergies and active management of grid to facilitate trade in all timescales.
 - w Greater assurance of open access, as transmission owner is indifferent to identity of source and sink.
 - w More competitive markets; minimizing need for market mitigating measures (such as price caps, FTRs, ICAP and RMR payments).

Summary and takeaways – points for ongoing consideration

- w Transmission is fundamental to the economic health of the West.
- w Allows adequate, low cost, environmentally responsible energy to reach market.
- w The West needs to think and plan regionally.
- w There are a number of well recognized structural issues that have impeded transmission investment.
- w There are, however, a number of promising signs that some of these impediments are being addressed.
- w Internationally, independent transmission has a record of delivering.
- w The West needs to find a solution to the regional planning question.
- w Recognition that transmission is a market platform – not a market product.
- w Regional regulators need to address the cost allocation/cost recovery question.
- w Share vision and policy across regulatory jurisdictions, both state and federal.

Questions?

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