Creating Value through Transmission in an Era of RTOs

Electricity Transmission in Deregulated Markets

Carnegie-Mellon University

December 15, 2004

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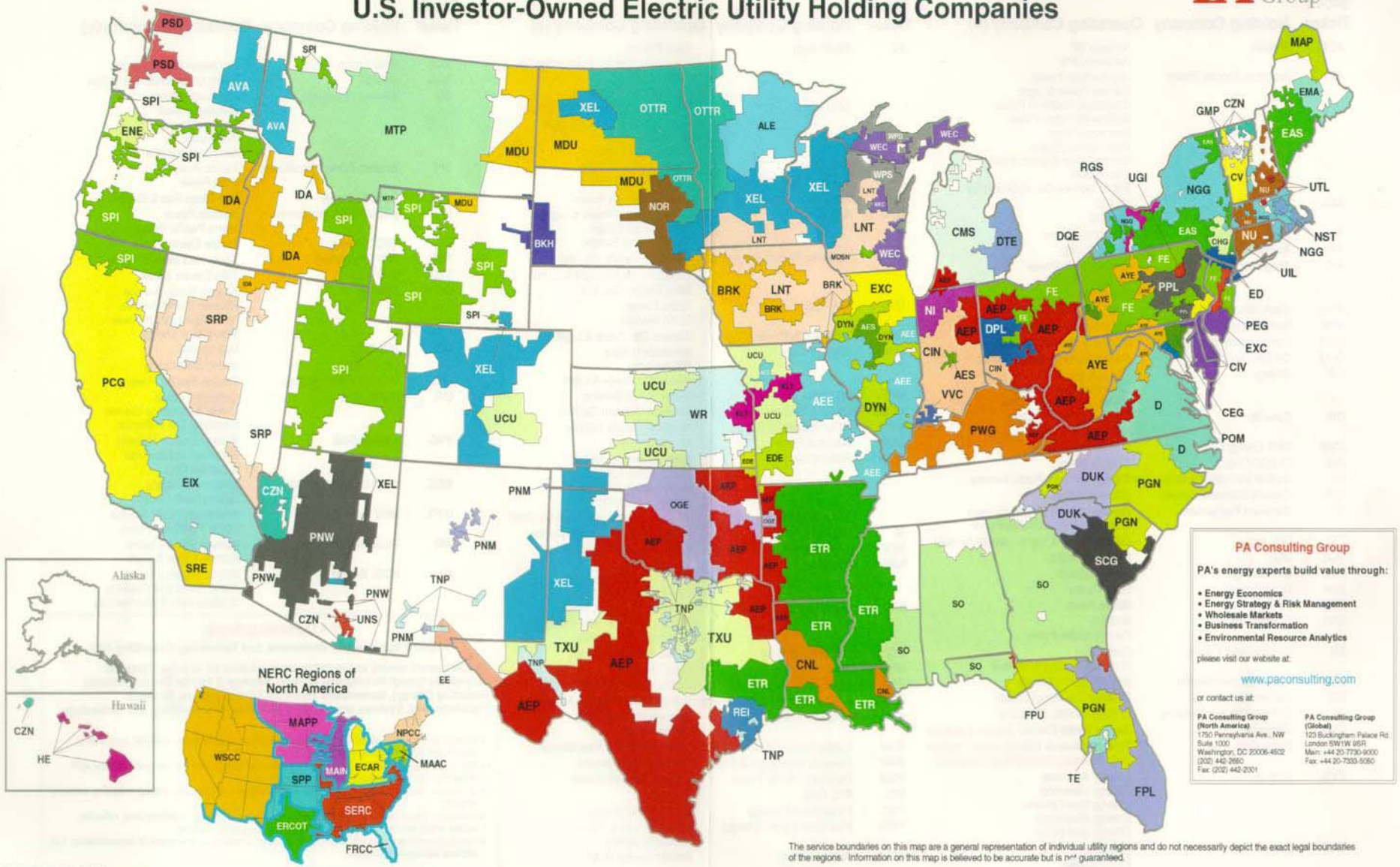
Agenda

- Current state of US Transmission
- Role of Transmission
- Characteristics of the Transmission Business
  - Key functions in Transmission Business
  - Decision Rights under RTO Governance
  - Regulatory Issues under the Current Setup
- Possible Improvements under Current Setup
- Way forward? - Promoting Independent Transmission

U.S. Transmission

- **Fragmented ownership**
- **Vertically integrated (mostly)**
- **Under-invested (with Long-lived Asset Lives)**
- **Continuing Regulatory Uncertainty with Significant Regional Differences**
- **Rising Congestion Costs**
- **Shared or Split Decision Rights under RTOs**
- **Consequently, transmission is difficult to manage as a commercial enterprise, i.e. as a business, with clear accountability of owners to customers, investors & regulators**

U.S. Investor-Owned Electric Utility Holding Companies



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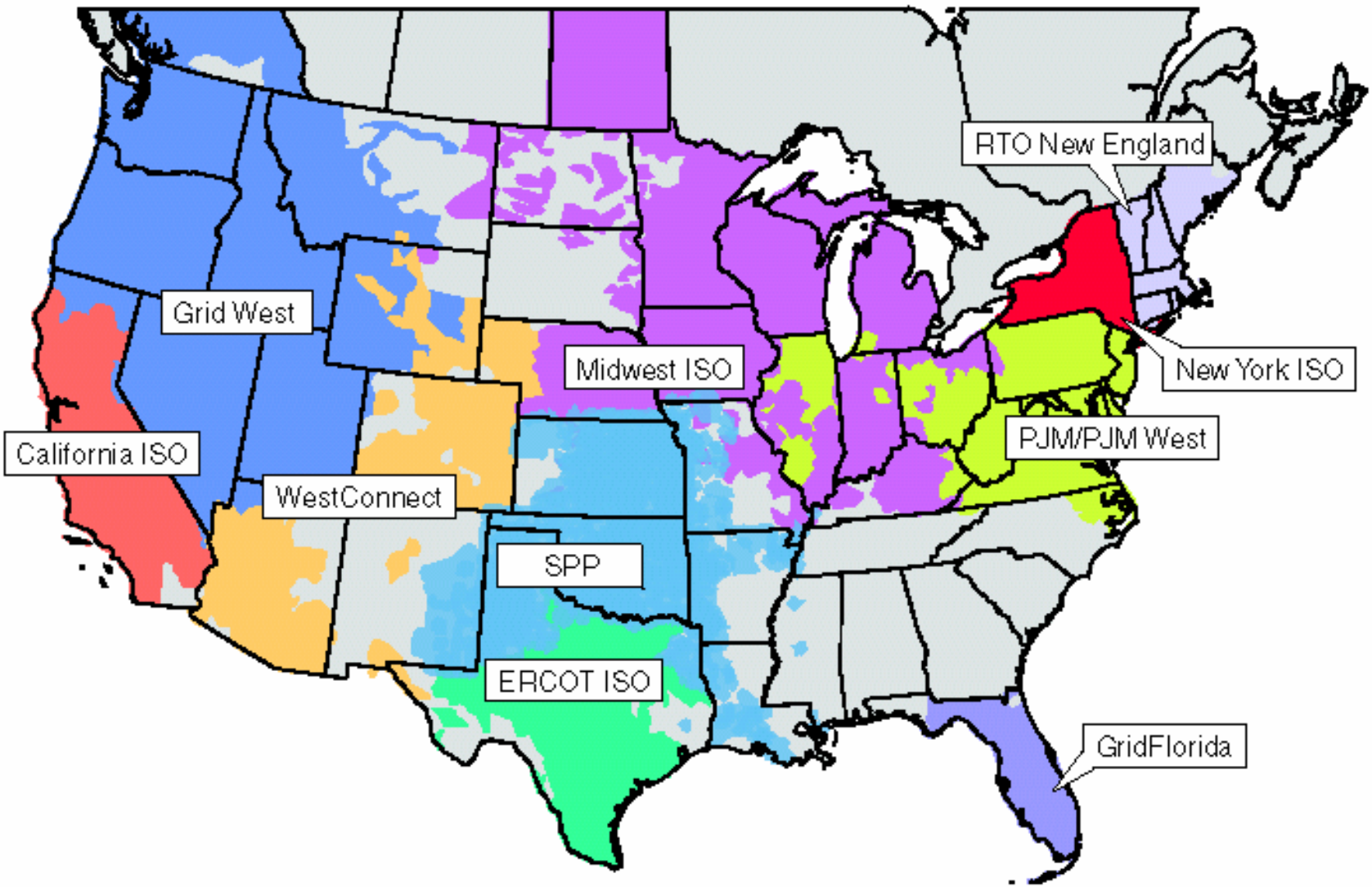
Approved RTOs and Existing ISOs

Utility Participation as of June 2004



Note: Map includes service territories of transmission-dependent utilities.
This map is available to EEI electric company members at http://www.eei.org/products/rto/maps/rto_map.pdf (PDF) or rto_map.ppt (PowerPoint)
 Service territory data source: POWERmap, 2nd quarter 2002 release,

Economic Role & Nature of Transmission

- Reliability: It is an essential part of the value chain to deliver reliable electricity to customers efficiently
- Market-Enabling: It facilitates a liquid regional electricity market and mitigates local market power on the generation side, whether from constrained generation, different vintage generation, or environmental effects
- Bulk Transport: Of course, transmission also serves its original mission of transmitting bulk power from cheaper power sources to areas of demand concentration
- Natural Monopoly: Therefore subject to regulation
  - Limited role for 'merchant' transmission
  - Does not 'compete' with generation or demand

US Transmission Investment Levels are Low - Relative

US: Since 1998, $1 - $3 million/GW peak load annually

Compare to UK:

UK: Since 1996, $10 million/GW peak load annually

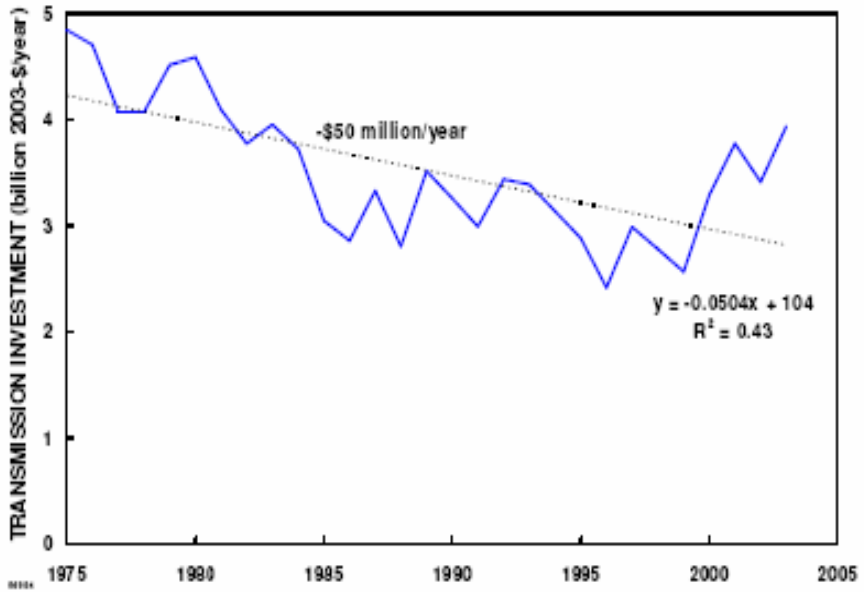


Fig. 3. Annual transmission investments by investor-owned utilities from 1975 through 2003.

Source: Eric Hirst (2004)

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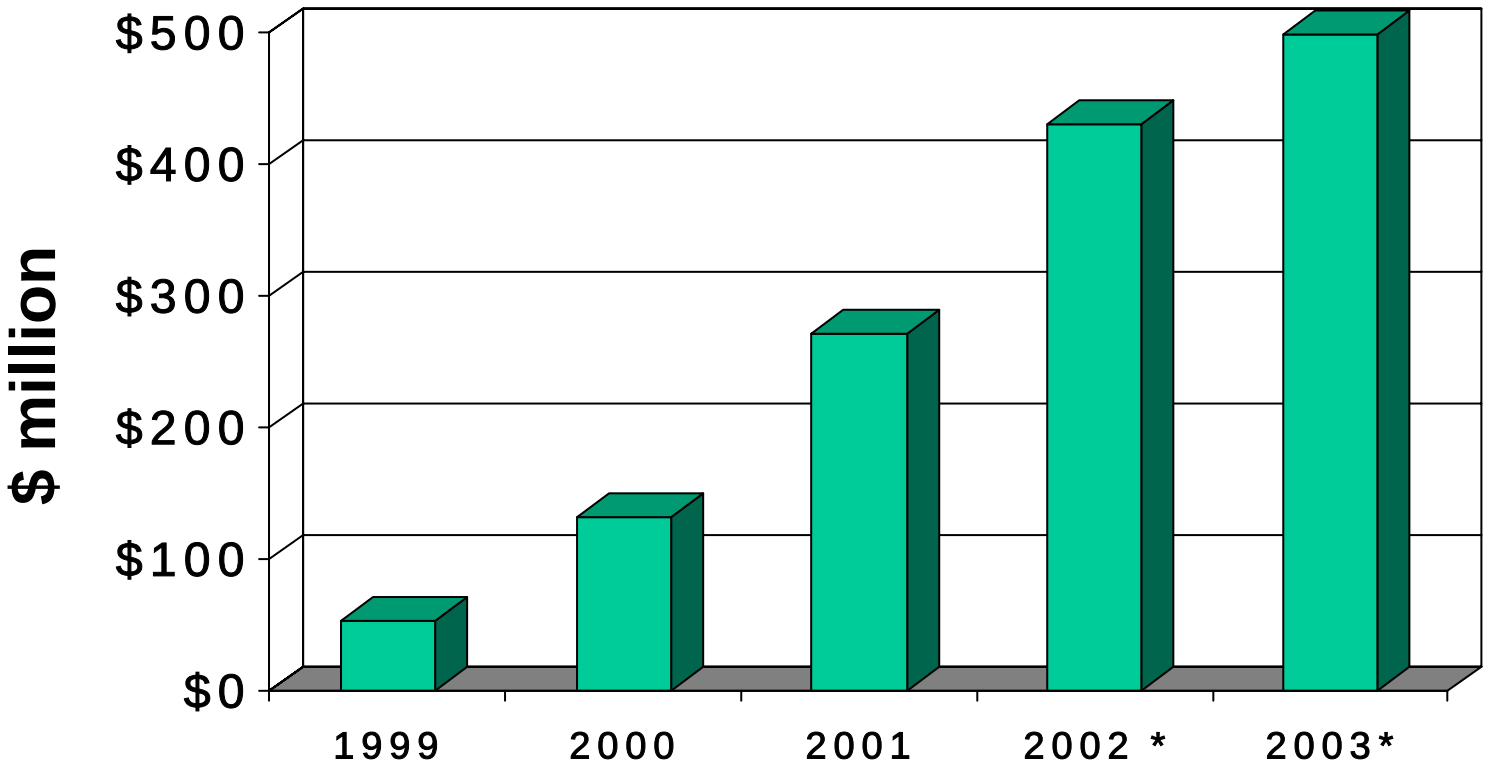
Barriers to Investment in U.S. Transmission

- **Vertical Integration**
  - Regulatory uncertainty for an independent Tx model
- **Misperception of Transmission as a market product**
- **Federal /State jurisdiction issues and other sources of regulatory uncertainty over the horizon**
  - This undermines returns relative to other investment opportunities, both in the sector and elsewhere
- **Regional fragmentation in transmission ownership and operation**
  - Lack of transmission planning on a regional basis
- **Rate cap based plans that impact transmission**
- **Lack of clarity in cost allocation**
  - Voluntary participant funding hasn't work to date
  - Difficulty in designing streamlined "Beneficiaries Pay" model
- **Siting process difficulties**

Congestion Costs Increasing in Some Regions, e.g. PJM



Source: State of the Market Report 2003

*** Includes PJM West**

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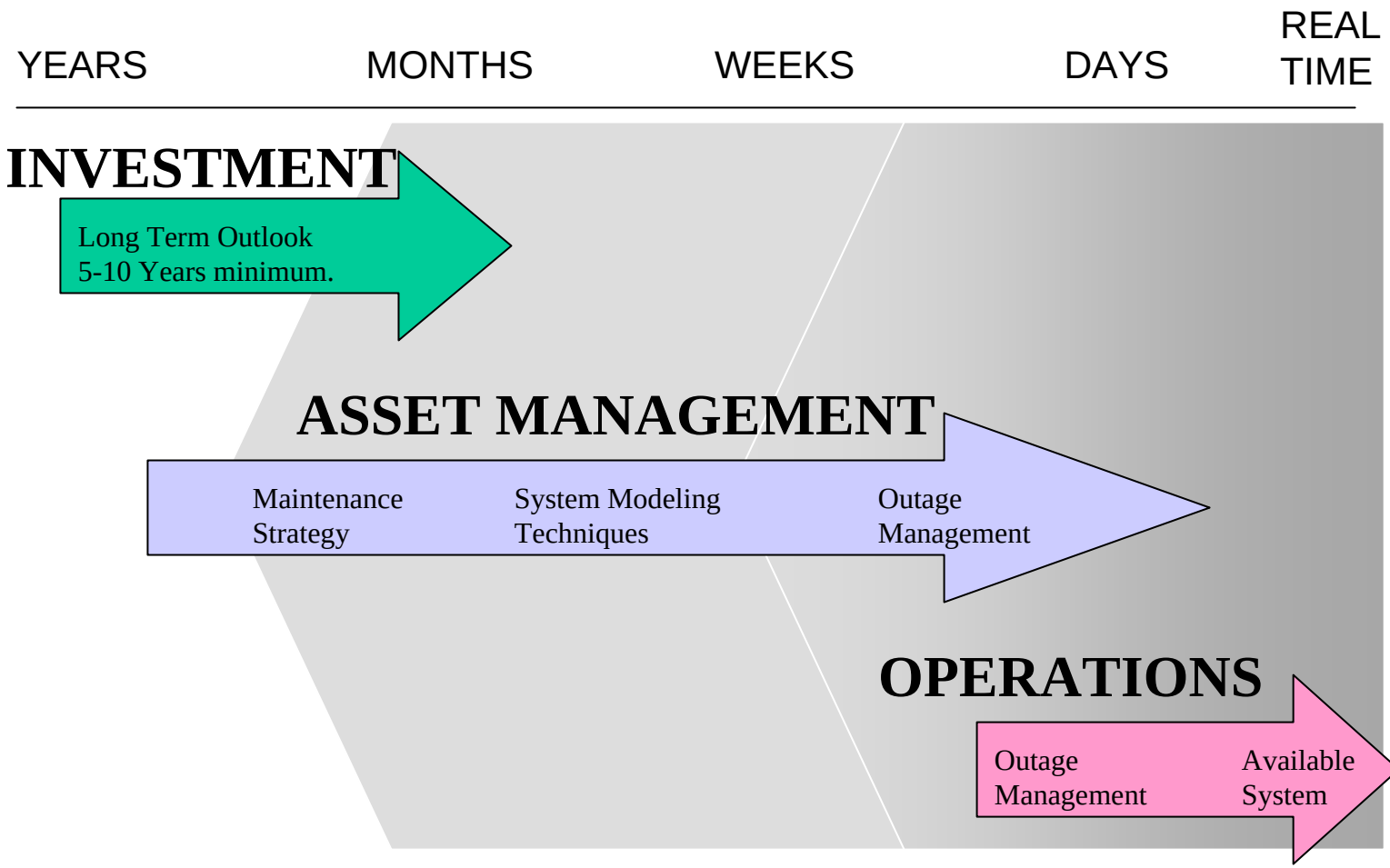
Transmission Business Life Cycle



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Flexibility throughout the asset life-cycle

Investment phase	Asset management phase	Operational phase
Increase power transfer and flexibility via:	Thermal modelling	Frequency response from demand side
(Relocatable) SVC's	Use time of real ratings and dynamic forecasting	Software for economic ancillary service call-off and settlement
(Relocatable) phase shifters	Risk assessment applied to plant strategy	Systems to monitor service delivery
New OHL conductors	Live line work at 400kV	Control software
New conductor bundle designs	Inter-trip schemes	

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Shared Decision Rights & Responsibilities

	Transmission Function	RTO	TO
1	System Control	√	√
2	Operations		√
3	Planning	√	√
4	Building New Investment		√
5	Regulation	√	√
6	Commercial Interface	√	√

Transmission Business Drivers and Decision Making

- **Bifurcation of Transmission Functions (as just noted)**
- **Non-profit vs. For-Profit Tensions**
- **Balkanization of the Grid**
- **Market Activities of Transmission Owners**
- **Rate Recovery Mechanisms**
- **State and Federal Regulatory Jurisdictions**

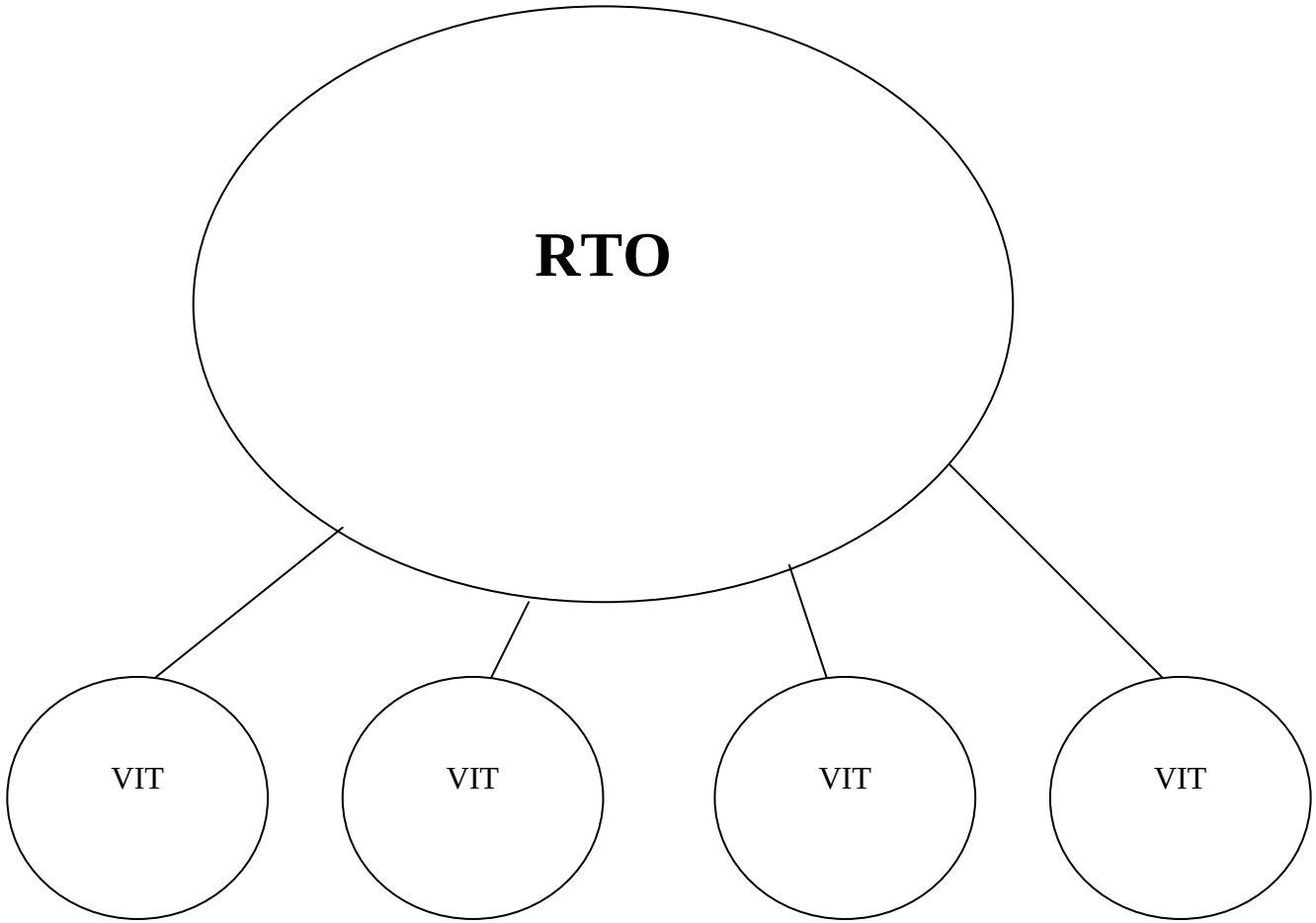
The Consequence of These Forces

- **Under the present RTO and Regulatory Structures, incentives for creating customer value from transmission investments and operations are muted at best.**

Danger of Current US RTO Approach

- **Current emphasis**
  - **Creating functional / operational independence via non-profit entities**
- **Leading to**
  - **Splitting of transmission ownership, functional and operational responsibilities**
  - **Putting functional responsibilities in not-for-profit hands and thereby reducing value creation opportunities**
  - **Thereby slowing down divestiture – no value to be created.**

RTO-Heavy / VIT Model



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Possible Improvements to Current RTO Regime

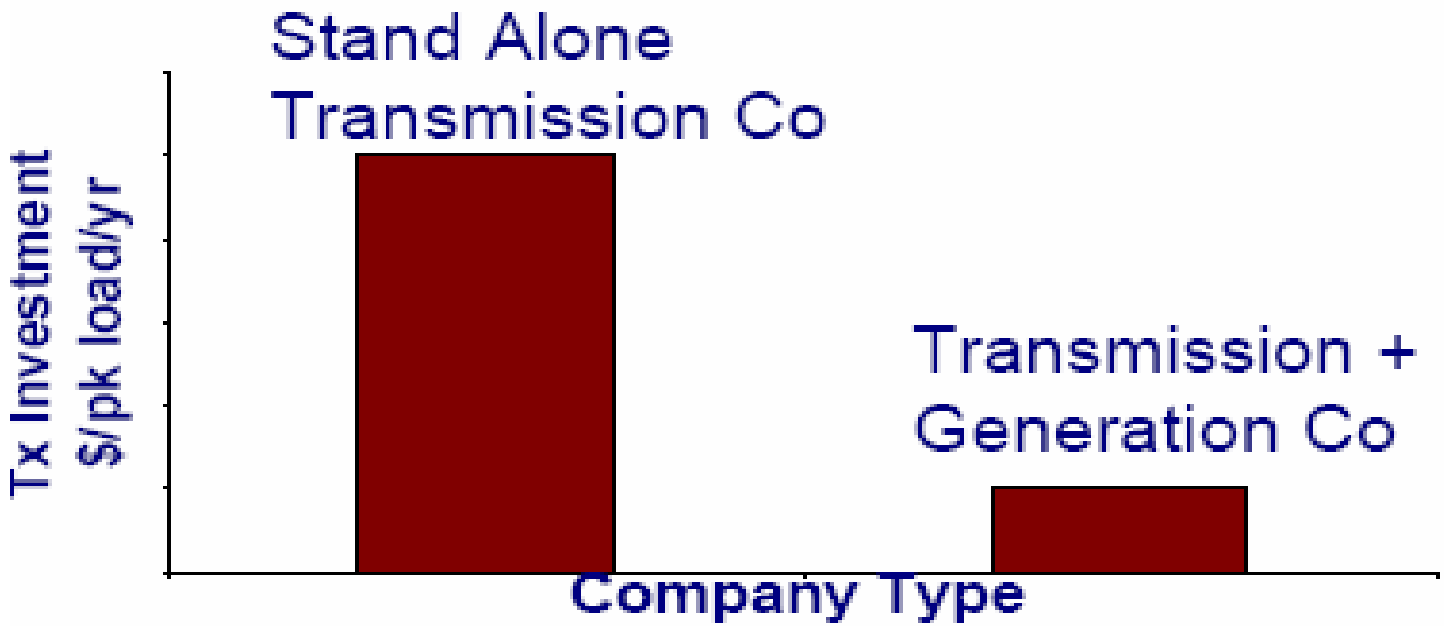
- **Better Metrics**
  - **Costs of Transmission Constraints**
  - **Cost of Transmission Losses**
  - **Service Quality/Interruptions**
  - **Outage Management**
  - **Transmission Facilities Availability**
  - **Customer Satisfaction (Interconnection, Billing and Credit, Information, …)**
- **Stronger Commitment to Cost Recovery and the Certainty Thereof**
- **Improved Regional Planning Process**

Direction for Future

- **Benefits of Independent Transmission**
  - **Ensuring non-discriminatory access and operational fairness**
  - **Provide management focus**
    - Operational performance
    - Cut costs
    - Innovate
  - **Attract capital and facilitate investment**

Transmission Independence

- Independence restores the incentive to invest



5 to 1 ratio based on reported capital expenditures of NGC, ATC, ITC compared to predecessors and U.S. average

Source: Unlocking Transmission Investment, Presentation by Pat Wood III, FERC, January 28, 2004

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An Independent Transmission Company, facing Appropriate Regulatory Incentives, will seek to…

- **Maximize system throughput and availability**
- **Consolidate operations and reduce costs**
- **Target transmission bottlenecks**
- **Rationalize the number and duration of outages**
- **Collaborate with asset owners to:**
  - Optimise work practices
  - Respond rapidly to faults and breakdowns
- **Invest in transmission**
- **Optimise use of existing rights-of-way**

Summary: Vision for Transmission

- **A viable, healthy business focused on improving the reliability and efficiency of the electric delivery system**
- **Truly independent of generation interests**
- **The right incentives for investment will attract capital into the sector**
- **Higher operational efficiency through management focus**
- **Regulated business providing critical infrastructure in the right places**

… leading to added value for all parties

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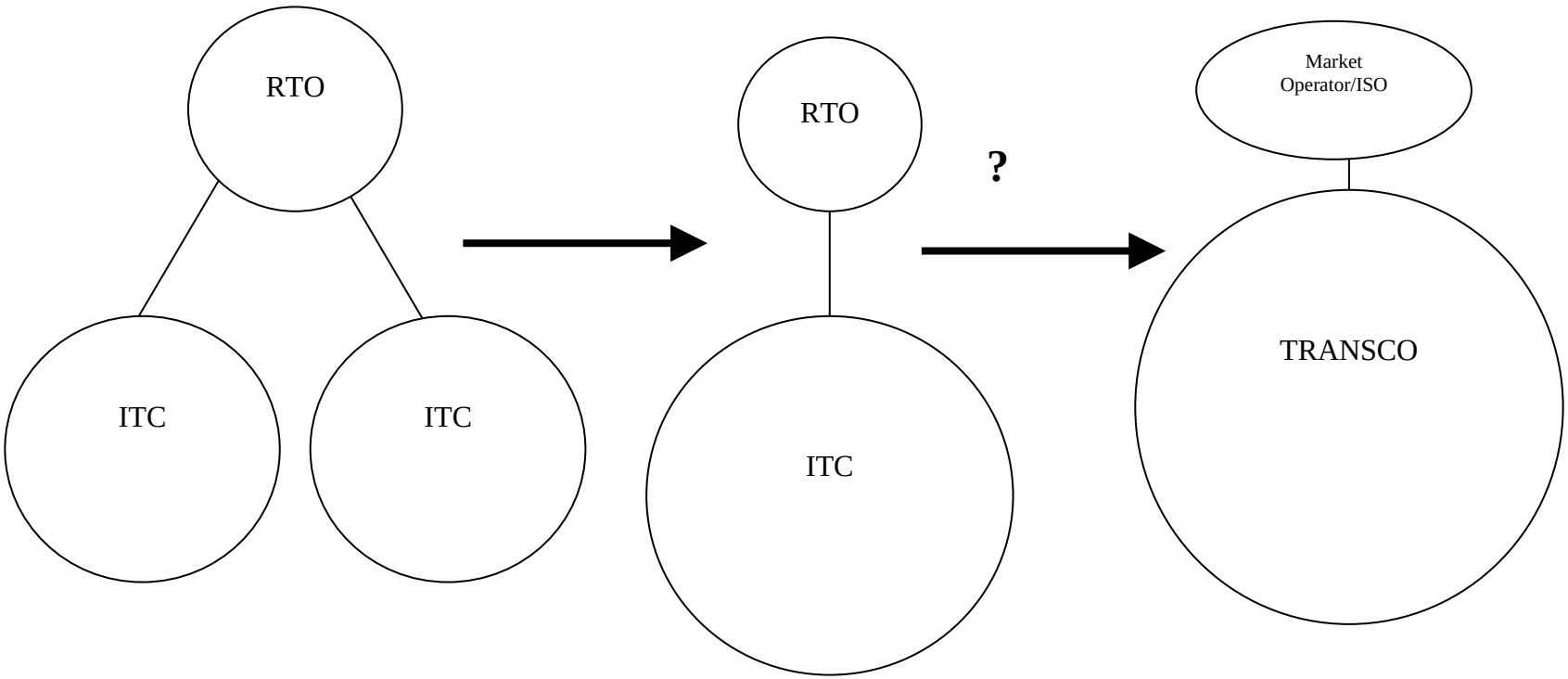
The RTO / ITC Model



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Conclusions for a Sustainable Future of Transmission as a Business

- **Alignment of cashflows and investment needs to support the Transmission business and investors**
- **Metrics: Transparent and based on performance and customer needs**
- **Regulation: Clarity and stability**
- **Independent Transmission Sector: Create a hospitable environment for larger footprint, for-profit ITCs**