

**Workshop on Designation of
National Interest Electric Transmission Bottlenecks**

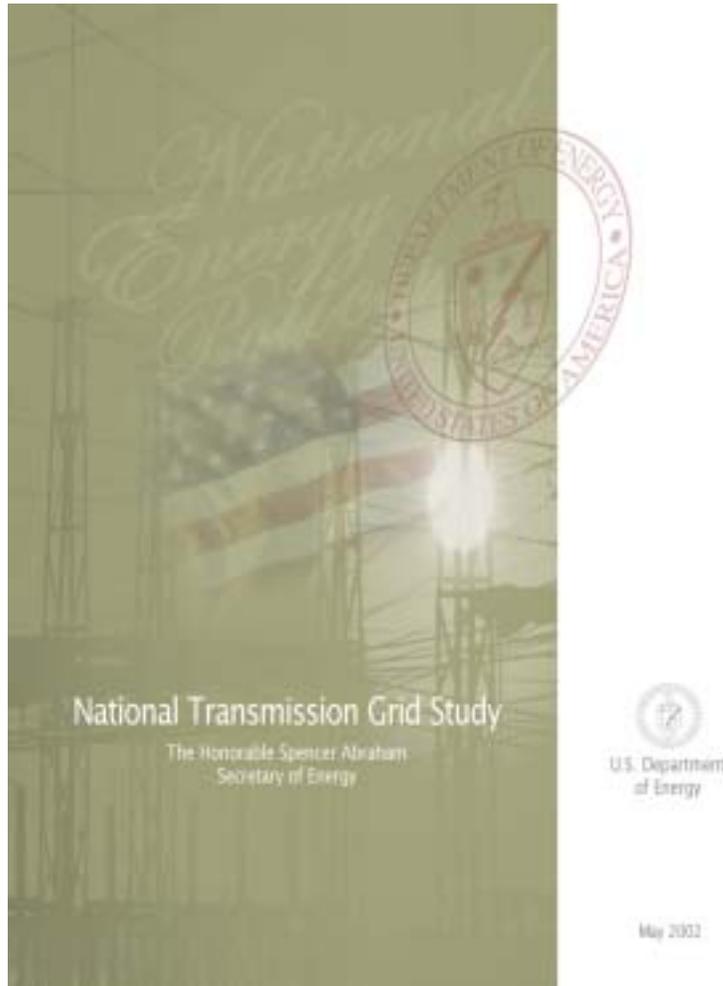
*Economic Indicators for
Designation of National Interest
Electric Transmission Bottlenecks*

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DOE National Transmission Grid Study



**“National-interest transmission
bottlenecks create congestion that
significantly...**

*restricts competition, enhances
opportunities for suppliers to
exploit market power, increases
prices to consumers...”*



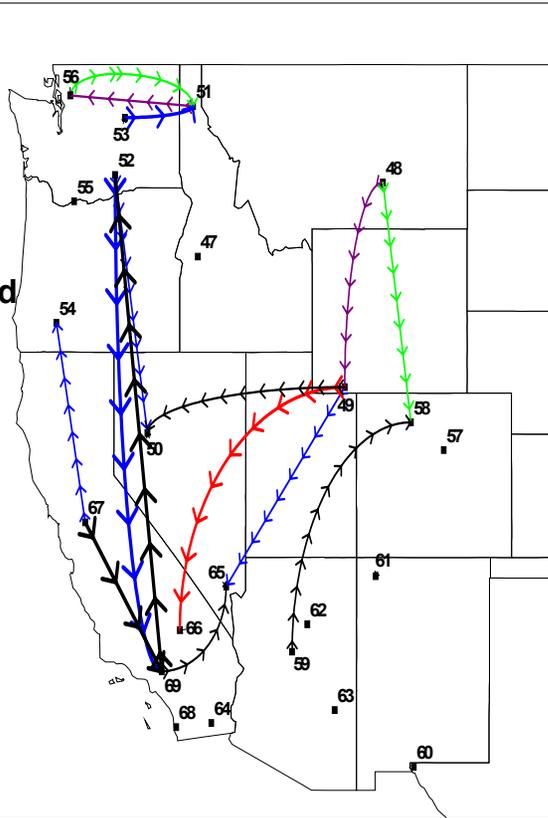
NTGS Examined Congestion in the U.S.

Size of Transmission Paths

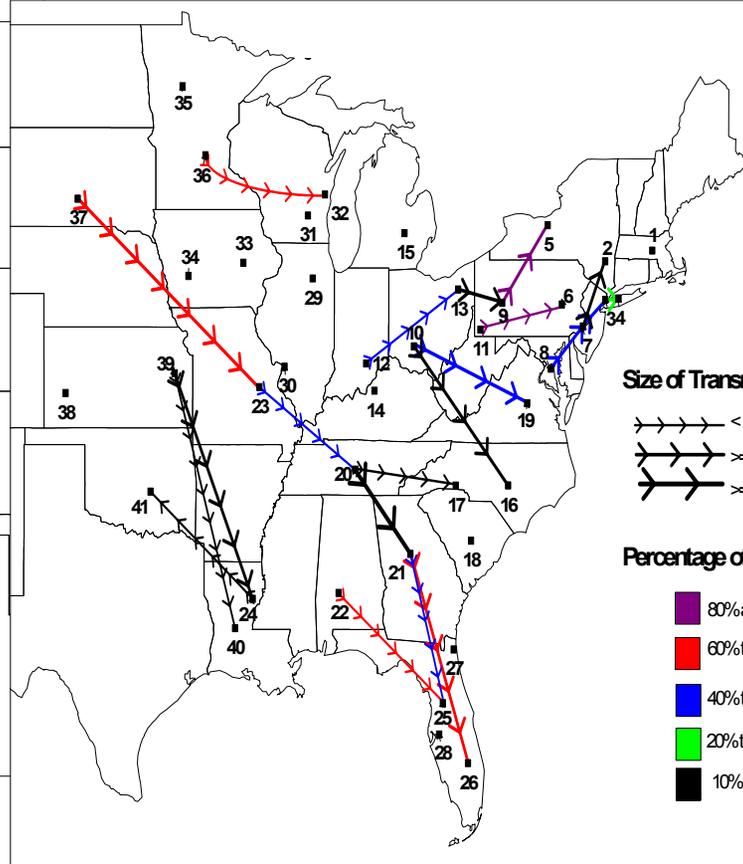
- <1 GW
- ≥1 and <3 GW
- ≥3 GW

Percentage of Hours Congested

- 50% and greater
- 40% to 49%
- 30% to 39%
- 20% to 29%
- 10% to 19%



National Transmission Grid Study. POEMS Base Case Scenario



Size of Transmission Paths

- <1 GW
- ≥1 and <3 GW
- ≥3 GW

Percentage of Hours Congested

- 80% and greater
- 60% to 79%
- 40% to 59%
- 20% to 39%
- 10% to 19%



Wholesale Elect. Markets Report Congestion Costs Yet, Reported Costs Must Be Examined Carefully

	Period	Congestion Costs	Congestion Cost-Calculation Method(s)
PJM [1]	1999	\$53 M	Congestion Revenues
PJM [1]	2000	132 M	
PJM [1]	2001	271 M	
PJM [2]	2002	430 M	
ISO-NE [3]	5/99-4/00	\$99 M	Uplift Charges ¹
ISO-NE [3]	5/00-4/01	120 M	
ISO-NE [4]	2003	50 – 300 M	System Redispatch Payments
CAISO [5]	2000	\$391 M	Congestion Revenues
CAISO [5]	2001	107 M	
CAISO [6]	2002	42 M	
CAISO [7,8]	2005	-7.47 – 306 M	System Redispatch Payments+ Congestion Revenues
NYISO [9]	2000	\$1,240 M	System Redispatch Payments (est) + Congestion Revenues
NYISO [9]	2001	570 M	
NYISO [10]	2000	517 M	Congestion Revenues
NYISO [10]	2001	310 M	
NYISO [11]	2002	525 M	
FERC [12]	6/00-8/00	\$891 M	System Redispatch Payments (partial) + Congestion Revenues
DOE [13]		\$157 M – 457 M	System Redispatch Payments + Congestion Revenues



Source: Lesieutre, B. and J. Eto. *Electricity Transmission Costs: A Review of Recent Reports*. LBNL-52739. download from <http://certs.lbl.gov>



Assessing Transmission Bottlenecks

Using Congestion Cost Info is Complicated

Additional information is needed on:

- **Operation of congestion revenue rights markets to assess the impacts of congestion revenue charges on consumers.**
- **Generators' offers to assess system redispatch payments.**
- **Competitiveness of markets to assess generator offers**

Reducing congestion can lead to counterintuitive results:

- **Customer costs may rise**
- **Minimizing consumer costs may not increase aggregate social wealth.**

A standardized conceptual framework is needed for studies of congestion costs



— Source: Lesieutre, B. and J. Eto. *Electricity Transmission Costs: A Review of Recent Reports*. LBNL-52739. download from <http://certs.lbl.gov>

CERTS
CONSORTIUM FOR ELECTRIC RELIABILITY TECHNOLOGY SOLUTIONS

Methods for Assessing Market Power in Electricity Markets are Under Development

Examples of CAISO Market Monitoring Data and Indices

Data	Indices
Market Clearing Prices	Percentage of time a participant sets or nearly sets the clearing price
	Correlations between clearing prices in various markets (ancillary service and imbalance markets, for example)
Bidding Strategies	Comparison of bidding strategies in markets
	Comparison of bidding strategies for like-type generation (same technology and age)
	Comparison of bidding strategies under different conditions (congestion, must run)
	Comparison of bidding strategies to market share
	Correlation of bidding strategies to expected outages
Concentration Measures	Difference between clearing price and estimated competitive price
	Residual Supply Index (to identify pivotal suppliers)
	Supply Responsiveness – derivative of supply to price
	Traditional measures of concentration (e.g., HHI), applied to zones, different markets, and different conditions
	Additional measures of concentration as available
Other	Generation and transmission outages relative to historical averages
	Unexpected congestion
	Comparisons of clear prices and fuel prices



Source: Goldman, C., Lesieutre, and Bartholomew, E.. A
Review of Market Monitoring Activities at U.S.
Independent System Operators LBNL-53975.
 download from <http://eetd.lbl.gov>

Engineering Perspectives on Relieving Transmission Bottlenecks

“...No matter how strong or robust a network is there will always be a reliability limit at some level and direction of electricity transfer...

Relieving a particular reliability limit will allow electricity transfers to increase, but only up to the level where the next higher reliability limit is encountered...

Some reliability limits prevent one area of the network from importing sufficient electricity to serve all firm customer demands in that area, regardless of price...

In other cases, reliability limits restrict the amount of electricity trade between buyers and sellers...”

Source: DOE Electricity Advisory Board.
Transmission Grid Solutions Report

