

*RTO Formation:  
Lessons from Experience to Date*

Presented by Scott M. Harvey

*EEI, RTO Filings Conference*

Washington, DC

November 3, 2000

## GOING FORWARD

---

*The author is or has been a consultant on electricity market design and transmission pricing, or market power or generation valuation for Calpine Corporation, Commonwealth Edison, Constellation Power Source, General Electric Capital, GPU, GPU Power Net Pty Ltd, ISO New England, Midwest ISO, New England Power, New York Energy Association, New York ISO, New York Power Pool, Ontario IMO, PJM Supporting Companies, Reliant Energy, San Diego Gas & Electric, Sempra Energy, Southern Energy, Transpower of New Zealand Ltd, Westbook Power, Williams Energy Group, Wisconsin Electric Power Company.*

*The views presented here are not necessarily attributable to any of those mentioned, and any errors are solely the responsibility of the author.*

# TOPICS

---

1. Choice
2. Congestion Management
3. Market Power
4. Cooptimization

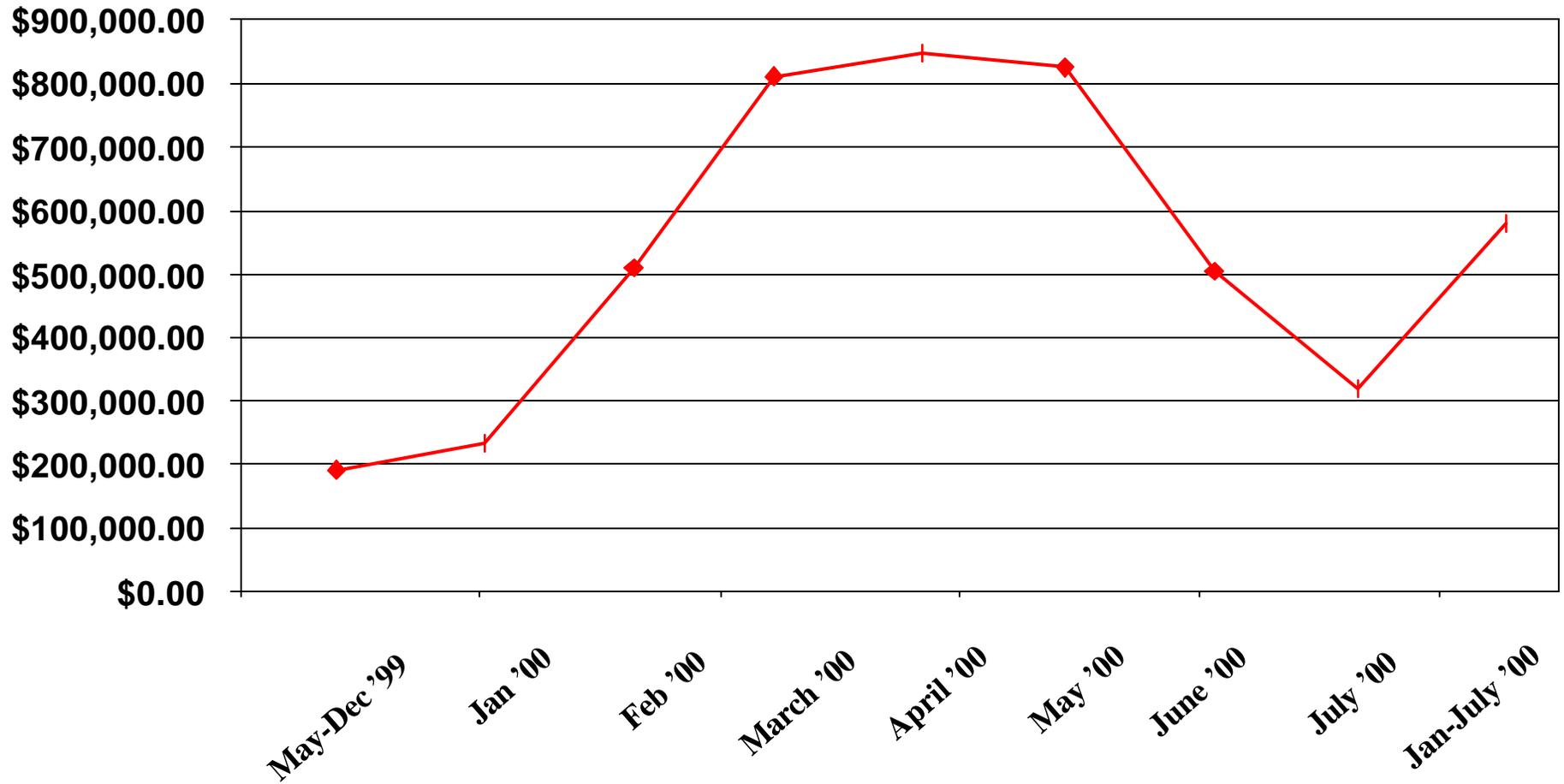
## CHOICE

---

Open access is about providing market participants with more choices.

- When given choice, market participants will do what is most profitable;
- Pricing rules that are inconsistent with RTO operational requirements will be inconsistent with choice.

### NEPOOL Congestion Costs



Source: New England ISO website.

## CONGESTION MANAGEMENT

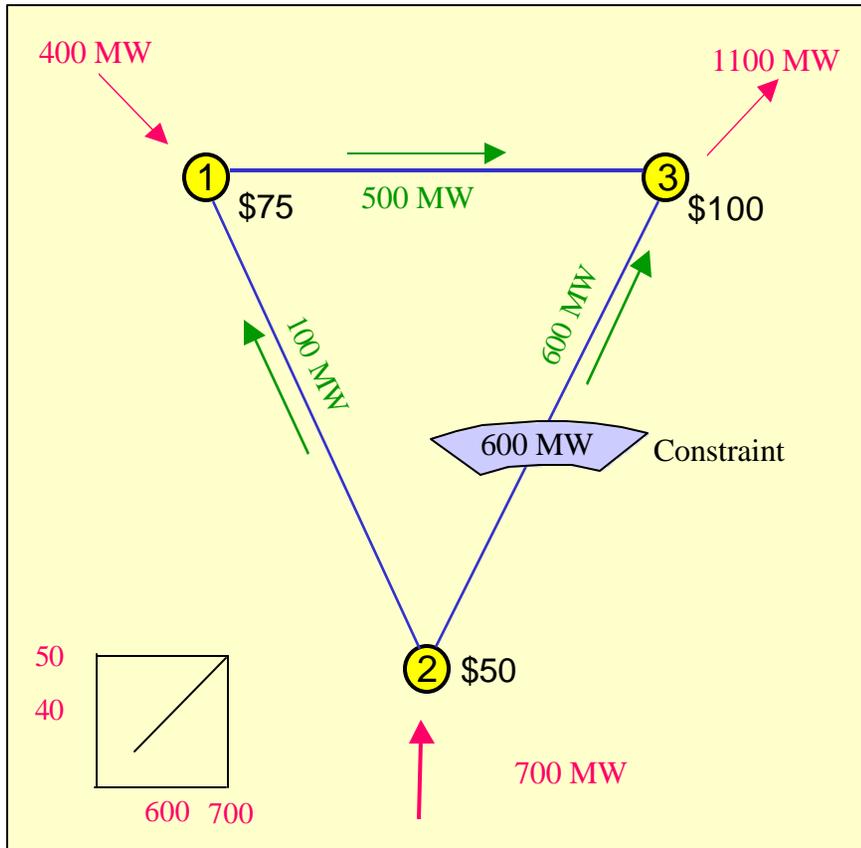
---

Transmission congestion is usually described as a problem that does not exist “here,” or is significant only on a small number of constraints.

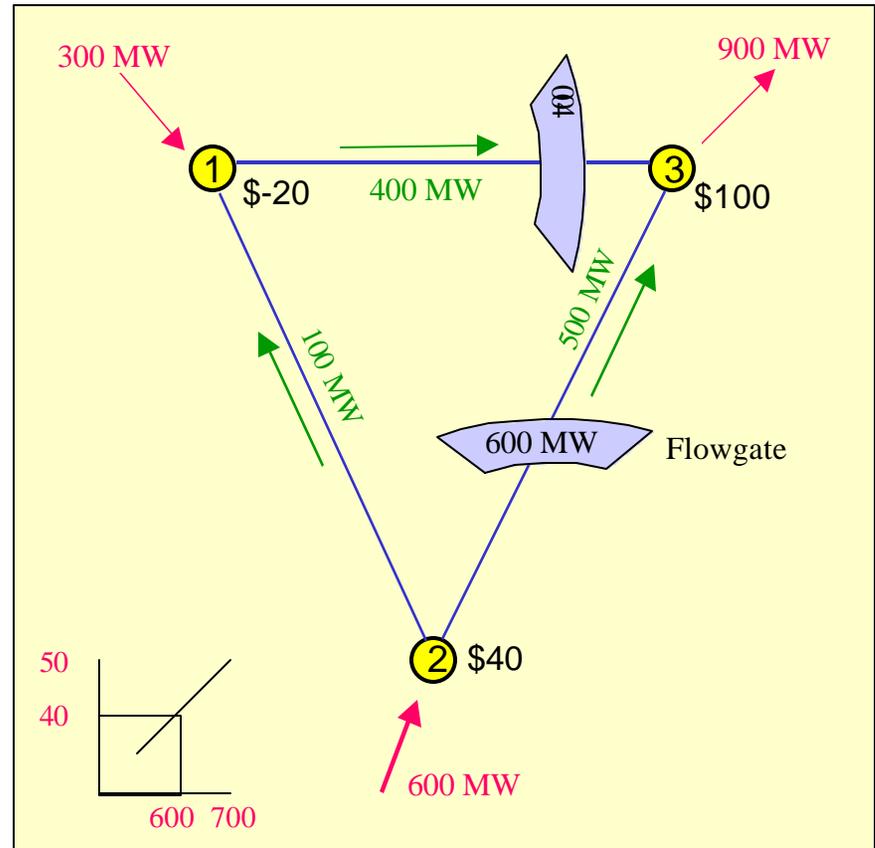
- NEPOOL’s market model was based on “full integration” and the widely stated absence of significant congestion;
- There has turned out to be lots of congestion, even before new plants came on line.

Lesson: Congestion depends on costs and bids, not just transmission capability and the way the grid was operated by vertically integrated utilities is not always a good guide to future congestion costs.

### “Commercial Model” Schedules



### Real System Redispatch



The constraint on line 2-3 is in the commercial model.

The constraint on line 1-3 is not in the commercial model.

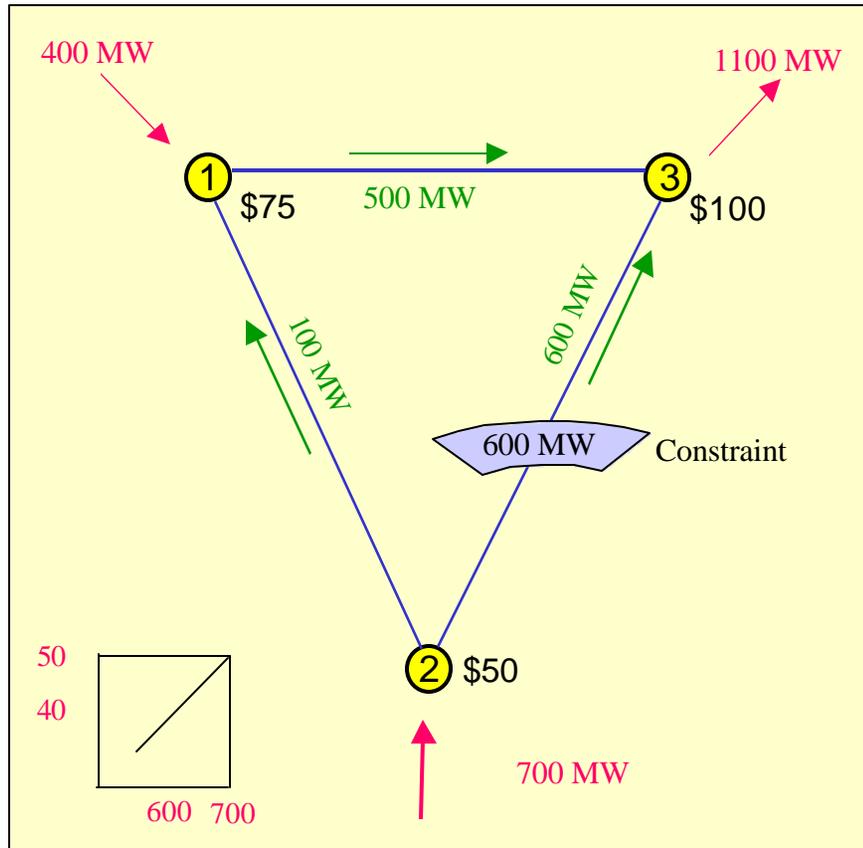
## CONGESTION MANAGEMENT

---

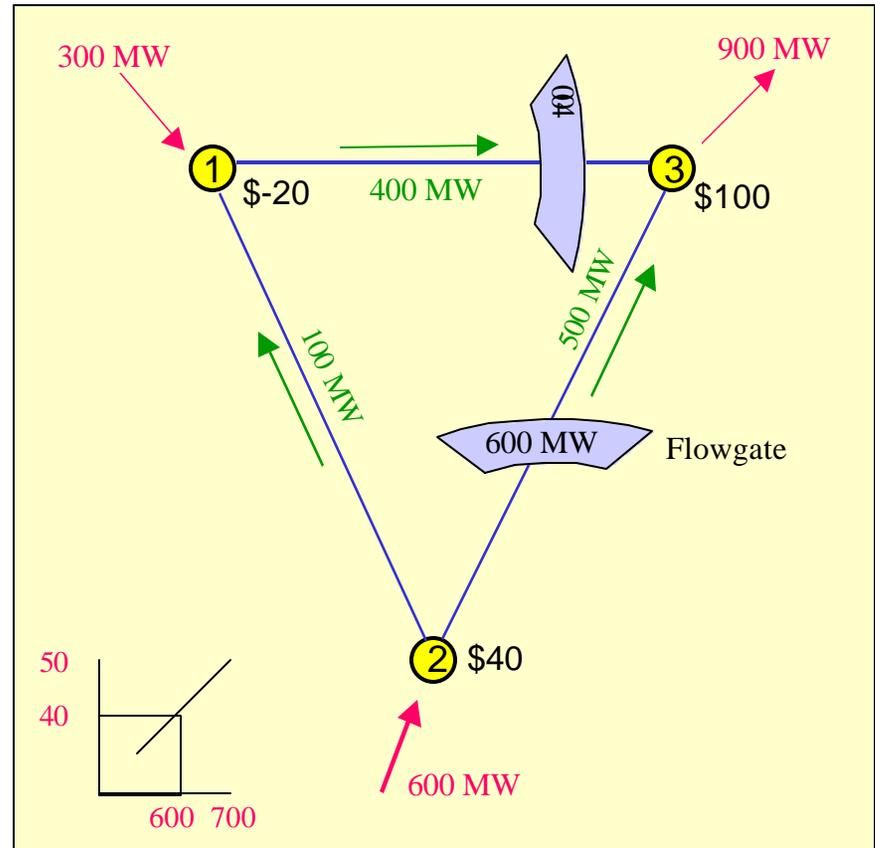
Any transmission or operating constraint that is not priced, and can be made to bind, will be made to bind.

- The RTO will then be offered congestion management at \$750/MWh or \$1000/MWh or \$10,000/MWh.
- An RTO's exposure from unpriced constraints is not measured in hundreds of thousands of dollars a year, it is measured in millions of dollars per hour.

### “Commercial Model” Schedules



### Real System Redispatch



The constraint on line 2-3 is in the commercial model.

The constraint on line 1-3 is not in the commercial model.

## CONGESTION MANAGEMENT

---

If the congestion management system requires the system operator to accept schedules while examining the feasibility of these schedules for only a subset of the potential transmission constraints (i.e. using a “commercial model”) the system operator will likely be required to make constrained off-payments in real-time. In the illustration, the ISO:

- Sells back 100 MW at 2 for \$40/MWh;
- Pays \$20/MWh to sell back 100 MW at 1;
- Buys 200 MW at 3 at \$100/MWh.

The ISO incurs constrained off-payments of \$18,000.

## CONGESTION MANAGEMENT

---

Artificial restrictions on the congestion management alternatives available to the RTO can dramatically increase redispatch costs.

- Redispatch should be based on constraint impact and as-bid costs;
- Zonal restrictions, balanced schedule restrictions, minimizing redispatch rules will be very expensive for those paying the redispatch costs.

## MARKET POWER

---

All of the ISOs have had to address locational market power issues.

- Bad market design can exacerbate locational market power or create artificially narrow markets in which locational market power exists but good market design can't prevent the exercise of locational market power;
- LSEs divesting their generation must be prepared to live with the market power consequences of their divestiture packages.

## MARKET POWER

---

Socializing congestion management costs is also a decision to socialize costs arising from the exercise of market power.

- The revenues from asset divestitures are not shared;
- Socializing congestion management costs means that the costs of failing to mitigate market power are shared, but the benefits are not.

**California  
June 2000 Price Relationships**

	# of Hours	Percentage of Hours
Energy Price < Spin Price	61	8.47%
Energy Price < 10 Minute Reserves Price	62	8.61%
Energy Price < Replacement Reserves Price	75	10.42%

**California  
June 2000 Reserve Prices**

	# of Hours	Percentage of Hours
Spin Price < 10 Minute Reserves Price	205	28.47%
Spin Price < Replacement Reserves Price	93	12.92%
10 Minute Reserves Price < Replacement Reserves Price	173	24.03%

The energy price is the unconstrained PX price.

## COOPTIMIZATION

---

RTOs that coordinate ancillary service markets critically need to be able to simultaneously optimize the supply of energy, regulation, and reserves.

- Pricing systems that try to trick suppliers and pay them less than the market clearing price don't succeed;
- The impact of tricks is that suppliers bid differently, the market becomes less efficient, and loads pay for the inefficiency.

# Scott M. Harvey (617) 761-0106

---

350 Massachusetts Ave.  
Suite 300  
Cambridge, MA 02139  
(617) 252-9994  
(617) 621-8018 – fax

2700 East Bypass  
Suite 4800  
College Station, TX 77845  
(409) 694-2421  
(409) 694-2442 – fax

2000 Powell St.  
Suite 600  
Emeryville, CA 94608  
(510) 653-9800  
(510) 653-9898 – fax

1603 Orrington Ave.  
Suite 2000  
Evanston, IL 60201  
(847) 475-1566  
(847) 475-1031 – fax

---

445 S. Figueroa St.  
26<sup>th</sup> Floor  
Los Angeles, CA 90071-1630  
(213) 489-6884  
(213) 489-6885 – fax

1700 Broadway  
38<sup>th</sup> Floor  
New York, NY 10019  
(212) 468-7878  
(212) 468-7879 – fax

980 9<sup>th</sup> Street  
16<sup>th</sup> Floor  
Sacramento, CA 95814  
(916) 449-9520  
(916) 449-9522 – fax

201 South Main  
Suite 900  
Salt Lake City, UT 84111  
(801) 350-9040  
(801) 350-9047 – fax

---

1600 M Street, N.W.  
Suite 700  
Washington, DC 20036  
(202) 466-4422  
(202) 466-4487 – fax

Stéphanie Square Centre  
Avenue Louise, 65  
1050, Bruxelles, Belgium  
32 2 534 5545  
32 2 534 5775 – fax

Av. Alicia M. de Justo  
1148 4 Piso, Of. 405B  
Planta Alta, Buenos  
Aires, Argentina (1107)  
541 341 4551  
541 341 4552 – fax

40/43 Chancery Lane  
London WC2A 1SL,  
England  
44 171 269 0500  
44 171 269 0515 – fax

---

180 Bloor Street West  
Suite 1100  
Toronto, Ontario M5S 2V6  
Canada  
(416) 927-0479  
(416) 927-7621 – fax

8, Esplande Campans  
Caffarelli, B.P. 813  
31080 Toulouse Cedex 6  
France  
33 5 62 30 50 20  
33 5 62 30 20 00 – fax

9<sup>th</sup> Floor, 1 Willeston St.  
P.O. Box 587  
Wellington, New Zealand  
64 4 472 0590  
64 4 472 0596 - fax