



Workshop Economic Evaluation of Transmission Expansion

September 14-15, 2004
Portland, Oregon

PROGRAM

Day 1 – September 14 - Economic Evaluation of Transmission Additions – what we currently do

Moderator for Day 1 – Dean Perry – SSG-WI

7:15 am – Coffee and Pastries

8:00 am – Introduction

- Arrangements & Introductory Remarks
- Summary of Challenges Faced in Western Transmission Expansion Studies
Viewpoints from SSG-WI, the SPGs and the States

Dean Perry

Dean Perry – SSG-WI, Mike DeWolf - RMATS, Doug Larson - CREPC

8:45 am - Session I. Overview and Introduction to Production Cost Studies

Jeff Miller
California ISO

- 1) Overview of market simulation tools
What these tools do and why we need them

9:30 am - Break

9:45 am - Session II. Production Cost Modeling -
Inputs and Outputs

Mike DeWolf, Kurt Granat,
Jamie Austin, James Gall - PacifiCorp

- 2) Load forecast data and load modeling
 - a. Data required: Monthly peak load, monthly energy, and hourly load shape
 - b. Calculation of hourly loads: development of hourly load forecast for the area and distribution to buses based on powerflow distribution.
- 3) Modeling of transmission network and constraints
 - a. Full network modeling
 - b. Are transport models inadequate?
 - c. Paths
 - d. Nomograms
 - e. Modeling lower voltage limitations
 - f. What do we mean by “security constrained”?
 - g. Phase shifter and DC line control actions
- 4) Modeling of thermal generation
 - a. Variable O&M costs
 - b. Average heat rate versus average heat rate curve and marginal heat rate curve

- c. Unit commitment, start-up costs, ramp rate
 - d. Annual maintenance scheduling
- 5) Modeling hydro and wind generation
- 6) Market simulation model outputs
- a. Changes in production costs
 - b. LMP prices and shadow prices
 - c. Generation dispatches and capacity factors
 - d. Transmission loadings and limit identification
- 7) Limitations of market simulation models
- 8) Fixed Costs

12:00 Lunch Break - -

1:00 pm - Session III. Benefits Assessment – Interpreting Study Results

**Mingxia Zhang, Ph.D.
California ISO**

- 10) Identifying Economic Benefits of Transmission Expansion
- a. Concepts of Economic Surpluses and Economic Benefits
 - b. Benefits of Transmission Expansion
 - Benefits to Load
 - Benefits to Generation
 - Benefits to transmission rights holders
 - c. Example of Benefit Calculation from a Societal and Individual Entity's Perspective.
 - d. The effect of contracts on benefits
- 11) Benefit Tests
- a. Societal – Overall reduction in production and capital cost
 - b. Participant – From the perspective of the entity funding the transmission project and its users
 - c. Should generation revenue be included (competitive revenues and market power revenues)
- 12) Overview of Example Case Study

3:00 pm - Break

3:15 pm - Session IV. Mitigation of Market Power

**Anjali Sheffrin, Ph.D.
Mingxia Zhang, Ph.D.
California ISO**

- 13) Assessing the ability of new transmission to mitigate market power
- a. Bid adders
 - b. Residual supply index (RSI) models
 - c. Game theory models
 - a. The effect of generation contracts on market power
 - b. The effect of transmission contracts on market power
 - f. Localized market power (i.e., a generator on the San Francisco peninsula)

4:30 pm – Adjourn Day 1

DAY 2 – September 15 – Modeling Issues

Moderator for Day 2 – Ed Cazalet - The Cazalet Group

7:15 am – Coffee and pastries

8:00 am - Introductory Remarks

- a) Introduction to Day 2 Sessions
- b) Keynote address – “Where we go from here”

Mary Johannis - BPA
Joe Eto, Lawrence
Berkeley Labs

8:30 am - Session I. Modeling Transmission

- a) AC vrs DC vrs transport algorithms – what’s required for transmission planning?
Henry Chao – ABB, Gary Jordan – GE, James Weber – Power World
- b) Bus bar loads/marginal losses/transmission-generation ownership, existing contracts - - how much detail do we need? Where’s the data?
Gary Jordan – GE, Norm Richardson - New Energy Assoc.

10:00 Break

10:15 am - Session II. Modeling Resources

- a) Dynamic dispatch of cascaded hydro plants – what’s involved and is it necessary?
Luiz Barroso – Power Systems Research, Carl Huppert – Henwood Energy Services
- b) Wind – can we do a better job?
Jayson Antonoff – Green Energy
- c) Resource –transmission adequacy/reliability – how should these issues-constraints be modeled?
Henry Chao - ABB
- d) Gas/coal fuel supply infrastructure – are we ignoring something?
Dale Nesbitt – Altos Management Partners
- e) Resource expansion – hardwired scenarios or dynamic expansion logic?
Norm Richardson - New Energy Associates

12:00 pm – Lunch Break

1:00 pm - Session III. Modeling Markets

- a) Energy and ancillary service markets – Are real time markets enough? Do we need to model forward capacity and firm energy markets?
George Backus – Policy Assessment Corp
- b) Localized market power and imperfect markets - - How can we simulate these effects in our models? What is a Nash-Cournot equilibrium?
James Weber – Power World

2:00 pm - Break

2:15 pm - Session IV. Modeling Uncertainty and the Curse of Dimensionality

- a) The strengths and weaknesses of scenario analysis
Carl Huppert – Henwood Energy, Dale Nesbitt – Altos Management Partners

- b) Price volatility – why don't we see it in planning models? In addition to imperfect markets should we also incorporate longer term load, fuel price, resource availability, hydro inflow, and other "forecast" uncertainties in the internal decision logic affecting today's current resource expansion, hydro storage, annual maintenance scheduling and unit commitment allocation decisions - - how might we do this?
Luiz Barroso – Power Systems Research

- c) The "Curse of dimensionality" – The problem and potential solutions
Ed Cazalet – The Cazalet Group

3:30 pm – Wrap-up

3:45 pm - Adjourn