



CALIFORNIA ISO

California Independent
System Operator

Transmission Economic Assessment Methodology (TEAM)

CEC IERP Workshop on 2004 Transmission Update
June 14, 2004

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Why did we develop TEAM ?

- No major transmission upgrades added by IOU's in last 20 years.
- Lack of consensus how to assess economic benefits for various parties
- Lack of regulatory predictability on economic need determination
- Many non-economic factors
 - Right of way
 - environmental costs
 - Multi-party agreements



Goals of TEAM Effort

- Develop a common methodology to evaluate economic need for transmission upgrades.
- Present a framework which can be used today to make effective decisions on transmission upgrade.
- Provide transparency in methods, databases and models so a variety of stakeholders can understand the implications of a transmission upgrade.



Public Process

- ✓ In Feb. 2003, CAISO filed general blueprint of economic methodology and held a public workshop March 14, 2003 to fully review methods.
- ✓ In Dec. 2003, CPUC ALJ requested full implementation of methodology to be demonstrated using network model.
- ✓ In 2004 CAISO held 3 Public Workshops, 12 technical calls and solicited input from Market Surveillance Committee (MSC)
 - Filed TEAM with CPUC on June 2
 - Hearing to occur summer/fall 2004



What are the major contributions from TEAM?

- Developed consistent methodology to identify benefits
- Incorporated process reflecting impact of bids on market prices
- Applied dynamic bidding strategy in a network model
- Enhanced method to compute the expected value and expected range of benefits, and the insurance value of transmission
- Integrated decisions on generation and transmission investment
- Demonstrated methodology for a Path 26 Upgrade



Key Principles of TEAM

1. **Benefits Framework** - Standard framework to measure benefits regionally and separately for consumers, producers, and transmission owners in different regions.
2. **Market Prices** – Utilize market prices rather than costs to evaluate transmission expansion.
3. **Uncertainty** - Consider impact of wide range of future system conditions -- dry hydro, gas prices, demand growth, under- and over-entry of generation.
4. **Network Representation** – Demonstrate flow is physically feasible in a network model.
5. **Generation/Demand-Side Substitution** – Review alternatives to transmission expansion.



Should TEAM be accepted as the standard for transmission evaluations?

- Most complete and well documented approach to date
- Clearly indicates impacts winners and losers of an upgrade at any level of participant and region.
- Demonstrate in actual study using market prices in network model



What are the valid application of TEAM?

- Planning for a specific project
- Long-term strategic planning
 - A. SSG-WI identified value of relieving congestion on major corridor in the WECC for 3 different resource strategies
 - B. Strategic decisions on where to build transmission to promote cost effective and renewable generation
 - C. Evaluate resource alternatives to transmission including energy efficiency, demand side programs, and distributed generation
 - D. Ensure regional generation adequacy



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Identifying Benefits by Participants Summary

For a Typical Scenario in 2013 -- Path 26 Upgrade

Perspective	Description	Consumer Benefit (mil. \$)	Producer Benefit (mil. \$)	Trans. Owner Benefit (mil. \$)	Total Benefit (mil. \$)	Production Cost Savings (mil. \$)	Notes
<i>Societal</i>	<i>WECC</i>	50.69	(31.68)	(14.73)	4.28	4.281	
						17,096.33	Production Cost before upgrade
						17,092.05	Production Cost after upgrade
<i>Modified Societal</i>	<i>WECC</i>	50.69	(28.93)	(14.73)	7.04		Excludes monopoly rent
<i>California Competitive Rent</i>	<i>ISO Ratepayer Subtotal</i>	10.92	0.04	(1.75)	9.21		Includes consumers, UDC generators and ISO PTOs. SMUD and some munis are treated as part of the CAISO due to data limitations.
	<i>ISO Participant Subtotal</i>	10.92	7.04	(1.75)	16.22		

Definitions:

Consumer Benefit – Reduction in cost to consumers.

Producer Benefit – Increase in producer net revenue.

Transmission Owner Benefit – Increase in congestion revenues.

WECC Societal – Sum of Consumer, Producer, and Transmission Owner Benefit in WECC.

Also equal to difference in total production costs for the “without” and “with upgrade cases.

WECC Modified Societal – Same as Societal but excludes Producer Benefit derived from uncompetitive market conditions.

ISO Ratepayer – Includes ISO consumers and utility-owned generation and transmission revenue streams.

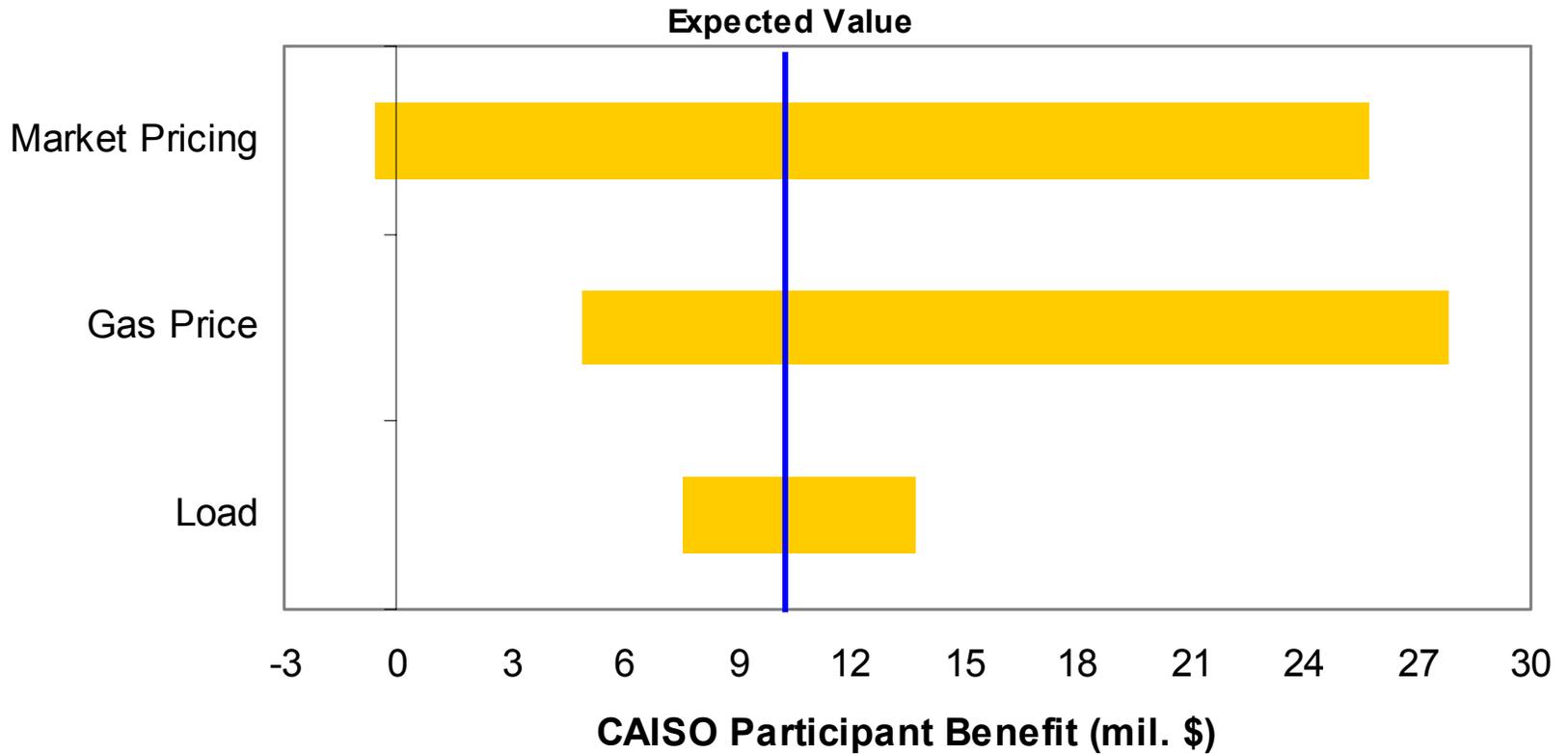
ISO Participant – Includes ISO Ratepayer plus the CA IPP Producer Benefit derived from competitive market conditions.



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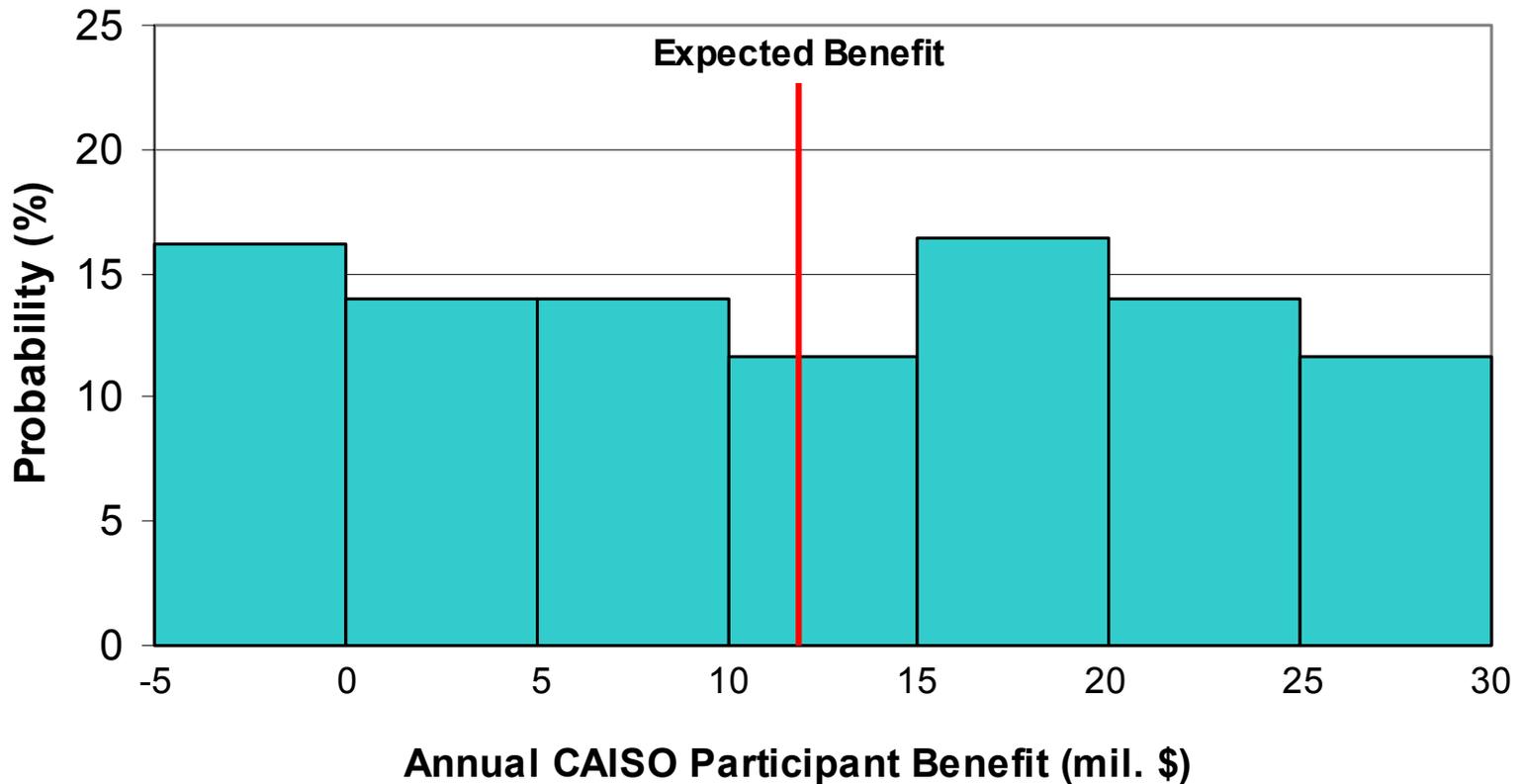
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Potential Impact of Uncertain Variables on Benefit Calculations in 2008





Range of 2013 Annual CAISO Participant Benefits and Expected Value of Benefits for Path 26 Upgrade





Recommendations

- Initial study suggests a Path 26 upgrade may be feasible
- Additional items to be checked:
 - ✓ Refine capital cost estimates to less than +/- 50%
 - ✓ Consider other Path 26 alternatives including RAS
 - ✓ Review impact of other lines such as PVD2
 - ✓ Calculate insurance value by assessing risk aversion profile of policy makers
 - ✓ Include environmental costs
 - ✓ Determine benefits in 2018 for selected cases