



# ICF Benefit Study of the Midwest ISO Market

## Presentation to the Midwest ISO Board of Directors

February 15, 2007  
Carmel, Indiana



# Origin & Timeline of the ICF Study



- ICF released in October 2005 an initial cost/benefit analysis on the Midwest ISO market based on a 24-hour period from July 2005<sup>1</sup>
- The Midwest ISO also hired ICF in November 2005 to conduct an independent evaluation utilizing a much longer timeframe (10 months)
- ICF 10-Month Study Chronology
  - Feb 06: data gathering for model development initiated
  - Apr 06: first model preliminary estimates completed
  - May – Aug 06: generators requested to review, revise and approve data
  - Sep 06: revised discrete flowgate data
  - Oct 06: preliminary estimates from second model runs completed
  - Nov 06: modeling to evaluate potential benefits largely complete, showing estimated production cost savings of 2% to 5%
  - Nov – Dec 06: Midwest ISO worked with ICF, the Independent Market Monitor and SAIC to identify assumption variables that should be reflected in preliminary results from third model run to better reflect actual study period conditions
  - Feb 07: ICF to provide full report

<sup>1</sup> This was a follow-up to the study conducted at the request of the Department of Energy by the Environmental Energy Technologies Division (EETD) of the Ernest Orlando Lawrence Berkeley National Laboratory that was released in October 2004 and analyzed a one-hour time period

# ICF Study – What it is



- Focus on subset of operational benefits
  - Regional unit commitment and security-constrained economic dispatch
  - Improved utilization of transmission assets
  - Tool to evaluate trends in market outcomes; “high-level” indication of market benefits
  
- Highlights differences between realized and potential benefits
  - Potential benefits reflect optimization of regulation and reserves
  - Inefficiencies in actual operations reflect, in part, conservative operating decisions on behalf of Midwest ISO and participants during market start-up
    - Unit commitment (level and type of capacity)
    - Generation offer flexibility (EcoMin, EcoMax, ramp)

# ICF Study – What it is not



- Tool that can be utilized to answer questions for individual generation units or the corresponding Balancing Authority
- A “rate case-quality” tool for states in the Midwest ISO footprint
- Areas not Covered by the ICF Study:
  - Transmission access, expanded markets & reduced barriers to trade
  - Improved reliability through regional power flow visibility and dispatch
  - Improved generator availability and efficiency in peak load periods
  - Opportunities for greater participation of price responsive demand

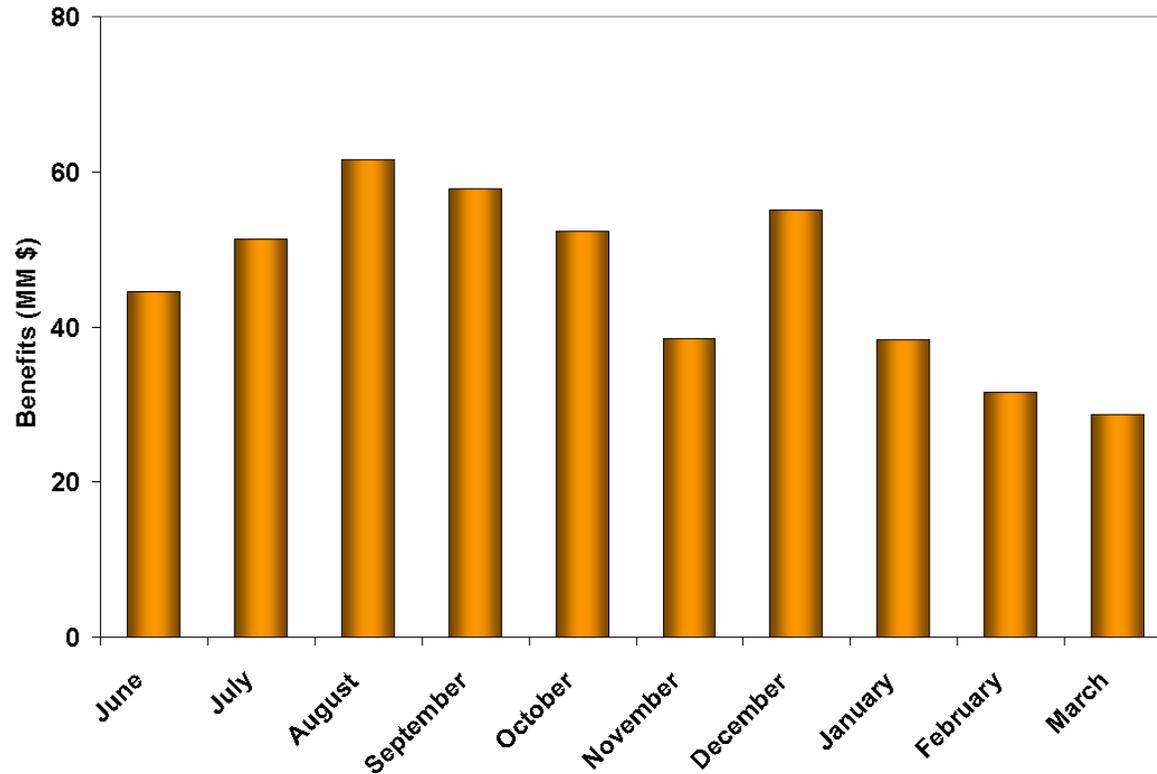
# Key Factors to Consider



- A comparison of potential to actual outcomes of this magnitude, scale and scope has not previously been conducted and is unprecedented
  - Necessary to model the entire Eastern Interconnect
  - Millions of theoretical model and actual market variables
  - Interchange and seams issues and assumptions
- Development of benchmark against which to compare actual outcome required considerable effort and time to ensure that the best data was utilized in order to deliver the most accurate results (e.g. load uncertainty, refinement of reserve and capacity assumptions throughout the Eastern Interconnect, incorporation of daily outage and derate history)
- ICF believes that current results offer an excellent representation of potential and actual benefits

# ICF Benefit Study – Summary Results

June 2005 – March 2006

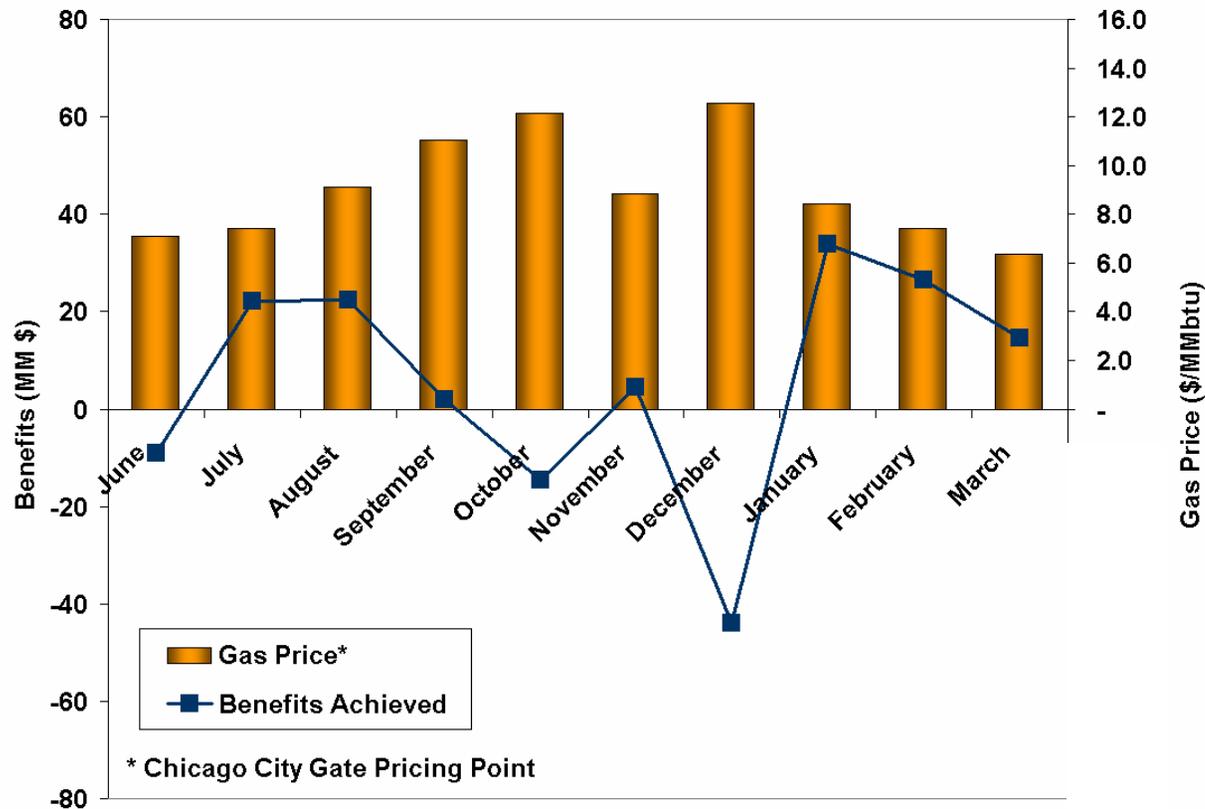


**Summary (MM\$):**  
Theoretical Maximum - \$460

Note: Reflects theoretical maximum benefit including benefits associated with an Ancillary Services Market (ASM)

# ICF Benefit Study – Summary Results

June 2005 – March 2006



**Summary (MM\$):**

Theoretical Max	\$460
ASM <sup>1</sup>	(\$189)
Achievable	
Theoretical	\$271
<b>Actual</b>	<b>\$ 58</b>

<sup>1</sup> Ancillary Services Market (ASM) Theoretical Value calculated by ICF. Given that the Midwest ISO has not launched the ASM initiative, these should not be included in actual achievable results. Note that the ASM theoretical value generated by ICF is within the range of the Midwest ISO value estimates generated and shown in the April 3, 2006 Filing to FERC (EL06-\_\_\_-00). The ASM Market Potential Benefits are shown in the filing as \$113 to 208m.

# ICF Study – Summary Conclusions



- Centralized unit commitment is a key driver of market benefits
- Associated with improved ability to displace gas with coal, more efficient use of coal and better use of import potential is important
  - Growing reliance on natural gas generation within MISO footprint associated with power plant additions over the last ten years and ongoing load growth could increase the scope for savings from central dispatch in future years
  - Tightening environmental controls and resulting greater diversity in coal plant fleet could also make optimization of coal plant utilization more important in future years
- A confluence of factors led to 100% theoretical benefits not being realized
  - Improved operations especially crucial during periods of extremely high gas prices since even small deviations can have large effects
  - Overall optimization may be assisted by optimization of operating reserves
- While benefits were small during initial start up, improvement demonstrated towards the end of the period
  - In addition to general start up, MISO also faced record natural gas, emission allowance and coal prices which exacerbated shortcomings