

What Can the “Water People” Learn from the Electricity Forecasters?

Indiana Water Forum
November 12, 2015

State Utility Forecasting Group

- Executive Order 3-84, which was issued in January 1984 by Indiana's Governor Robert D. Orr, created a special committee designated to address Indiana's utility future. In December 1984, that committee produced a report providing options and specific recommendations.
- The committee recommended four alternatives models for a forecasting system
 - utilities produce their own forecasts independently
 - utilities work together to produce forecasts as a group
 - the Utility Regulatory Commission produces the forecasts
 - another public or quasi-public entity produces the forecasts
- The 4th option was chosen and Purdue was chosen to house the Indiana State Utility Forecasting Group.

Indiana Code 8-1 TO 8-5 (Amended in 1985)

“The commission shall establish a permanent forecasting group to be located at a state-supported college or university within Indiana ... This group shall develop and keep current a methodology for forecasting the probable future growth of electricity within Indiana and within this region of the nation.”

History of SUFG

- Marble Hill and Bailly – early 1980s
- Public Law 85.5 – 1985
- SUFG forecasts – 1987, 1988, 1990, 1993, 1994, 1996, 1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015
- Regulatory and legislative testimony
- Air emissions studies – 1989, 2000, 2001, 2006, 2008, 2012
- Demand-side management – since early 1990s
- Electricity deregulation – 1996-2001
- Annual renewable resources studies – 2003-present
- Natural gas modeling – 2002-2003
- Involvement with RTO/FERC issues
- Other studies/reports

Statewide Electricity Projections

- Long-term (20 year) statewide projections
 - Electricity requirements
 - Peak demand
 - Retail prices
 - Resource needs
 - Sectoral (residential, commercial, industrial) detail

Air Emissions Regulations

- 1990 Clean Air Act controls on SO₂ and NO_x emissions expected to cost Indiana electricity utilities 1.0-1.5 billion dollars and lead to rate increases of 10-15 percent to recover cost of compliance.
- Additional restrictions on NO_x emissions that began in 2004 expected to lead to rate increases of 6 to 8 percent.
- Restrictions on SO₂, NO_x, and mercury associated with CAIR/CAMR (2006) expected to lead to rate increases of 7 to 15 percent.
- Proposed CO₂ restrictions (Lieberman-Warner, 2008) could raise electricity rates by 45 percent by 2025.
- Pending regulations (CSAPR, MATS, 111(b), 316(b), CCR) on various emissions (2012) could result in an additional 14 percent increase by 2020

Demand-Side Management

- Cautioned against impact of one class of ratepayers subsidizing another
 - Programs that benefit society should be encouraged with compensation structured such that both participants and non-participants benefit or at least are unharmed.
- Member of utility conservation program oversight board
- OED energy efficiency database

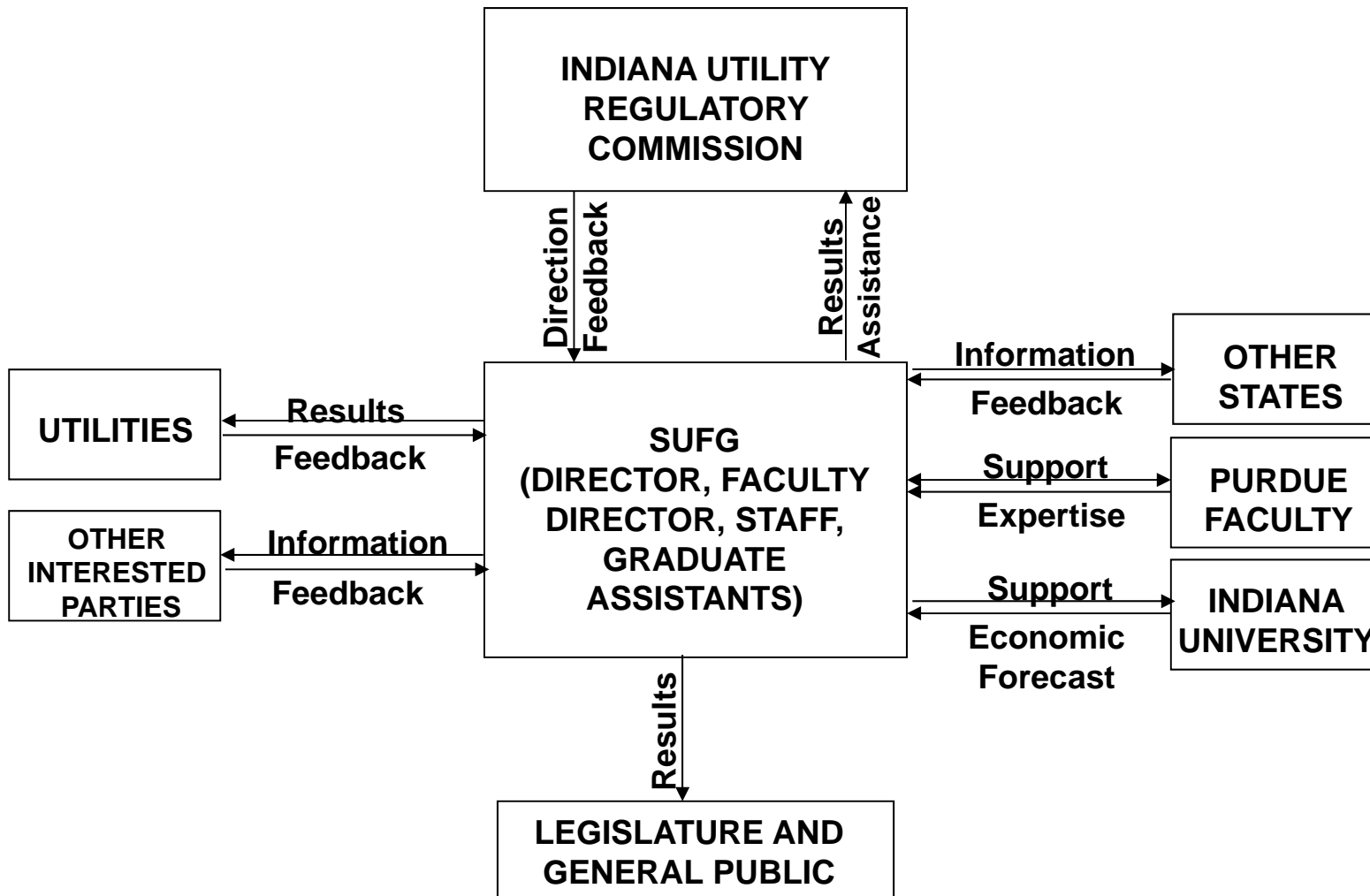
Other Studies

- Deregulation
 - Deregulation would decrease Indiana electricity prices in the short run, but increase them in the long run because of increased exports to more expensive jurisdictions and because of higher cost of capital with riskier investments. If suppliers could exercise market power, prices would rise further.
- Natural gas
 - Construction of new natural gas-fired electricity generators were not expected to increase overall demand enough to result in an inability of the natural gas system to deliver its product, but could result in increased costs.

Other Studies

- Risk management
- Wind integration
- Nuclear power
- Biomass/biogas
- Energy storage

Interactions with other Entities



SUFG Structure

- Director, staff, and students at Purdue University
- Under contract with Indiana Utility Regulatory Commission (IURC)
- Subcontract with Indiana University:
 - Economic forecasts
- Access to faculty expertise through Energy Center
- Feedback from utilities and other interested parties

Relationship with IURC

- **Cooperative**
 - SUGF takes direction from the Commission as to what topics need to be addressed
 - The Commission provides feedback and constructive criticism to SUGF
- **Independent**
 - While SUGF works under contract with the Commission, it is part of the university
 - SUGF has developed working relationships with the utilities that are separate from the regulator-utility relationship
 - SUGF is responsible for the quality of its models and reports

Relationship with Utilities and Other Interested Parties

- Cooperative
 - SUFG operates under a “no surprises” policy
 - Access to sensitive data
 - Constructive feedback
- Independent
 - SUFG has no financial connection to any of the parties
 - Independence is crucial to SUFG’s credibility

Education

- Workshops, short courses, and tutorials
 - For IURC
 - SUGF's models
 - Electric power systems
 - Risk management
 - Regional interest
 - Market power
- Presentations to the legislature and general public
- Graduate student support

Graduate Research Assistants

- In its history, SUFG has supported a number of graduate students
 - 25 Ph.D. dissertations
 - 21 M.S. theses
- Typically, between 3 and 6 GRAs at any given time

Recent PhD Dissertations

- Liwei Lu
Major Professor: Preckel
“An Assessment of the Efficacy and Cost of Alternative Carbon Mitigation Policies for the State of Indiana,”
Department of Agricultural Economics
May 2015
- Clay Davis
Major Professor: Preckel
“Three Essays on the Effect of Wind Generation on Power Systems Planning and Operations,”
Department of Agricultural Economics
May 2013

Recent Publications

- *Indiana Electricity Projections: The 2015 Forecast* November 2015 (draft)
- *2015 Indiana Renewable Energy Resources Study* September 2015
- *Assessment of the National Prospects for Electricity Generation from Biomass* April 2014 (for USDA)
- *Natural Gas Market Study* November 2013
- *Valuation of Energy Storage with Wind Generation* August 2013
- *An Assessment of the Potential for Electricity Generation in Indiana from Biogas Resources* June 2013
- *Utility Scale Energy Storage Systems: Benefits, Applications, and Technologies* June 2013

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