2009 Integrated Energy Policy Report Staff Workshop

LEVELIZED COST OF ELECTRICITY GENERATION TECHNOLOGIES PROJECT

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Context to the Levelized Cost of Generation Project

- Support the development of the 2009 Integrated Energy Policy Report (IEPR)
- Update of the 2003 and 2007 IEPR cost analysis
- Levelized cost model for public use
- Serves as a building block for electricity resource planning studies

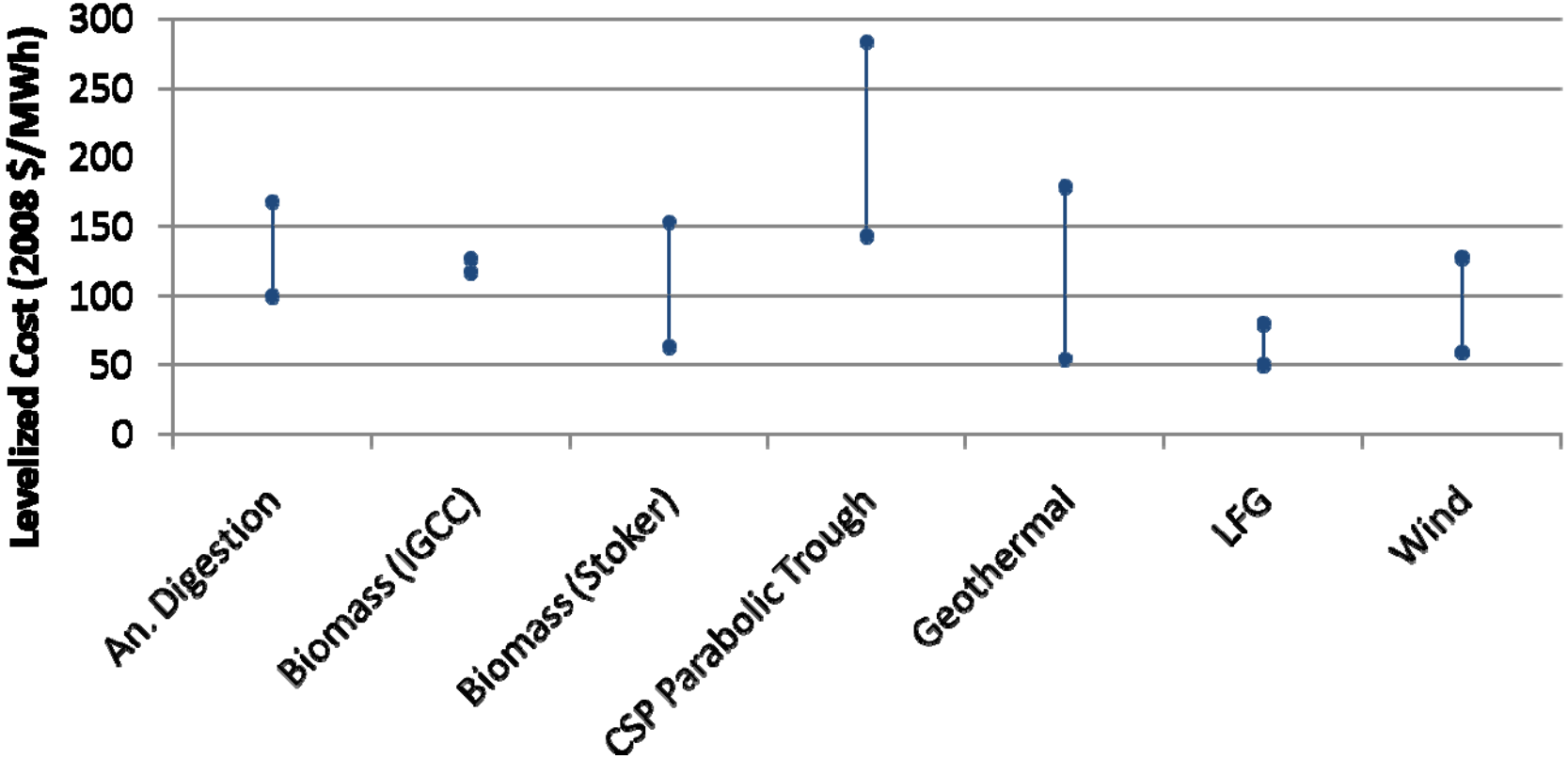
Cost of Generation Project Tasks:

- Modify the Levelized Cost of Generation Model
- Update engineering and financial model inputs
  - Renewable, IGCC and Nuclear generation
  - Natural Gas-fired generation
  - Building and community scale renewables
- Study how individual factors may change in time
- Consider uncertainty variables
- Calculate range of current and future costs

Goals of Project:

- Develop transparent and easy to use analytical features in the Levelized Cost of Generation Model
- Consistent set of financial and operational assumptions that apply to different generation technologies
- Understand the variables and scope of uncertainty that will affect the future costs of different technologies
- Calculate range of levelized costs that can be used for resource planning studies

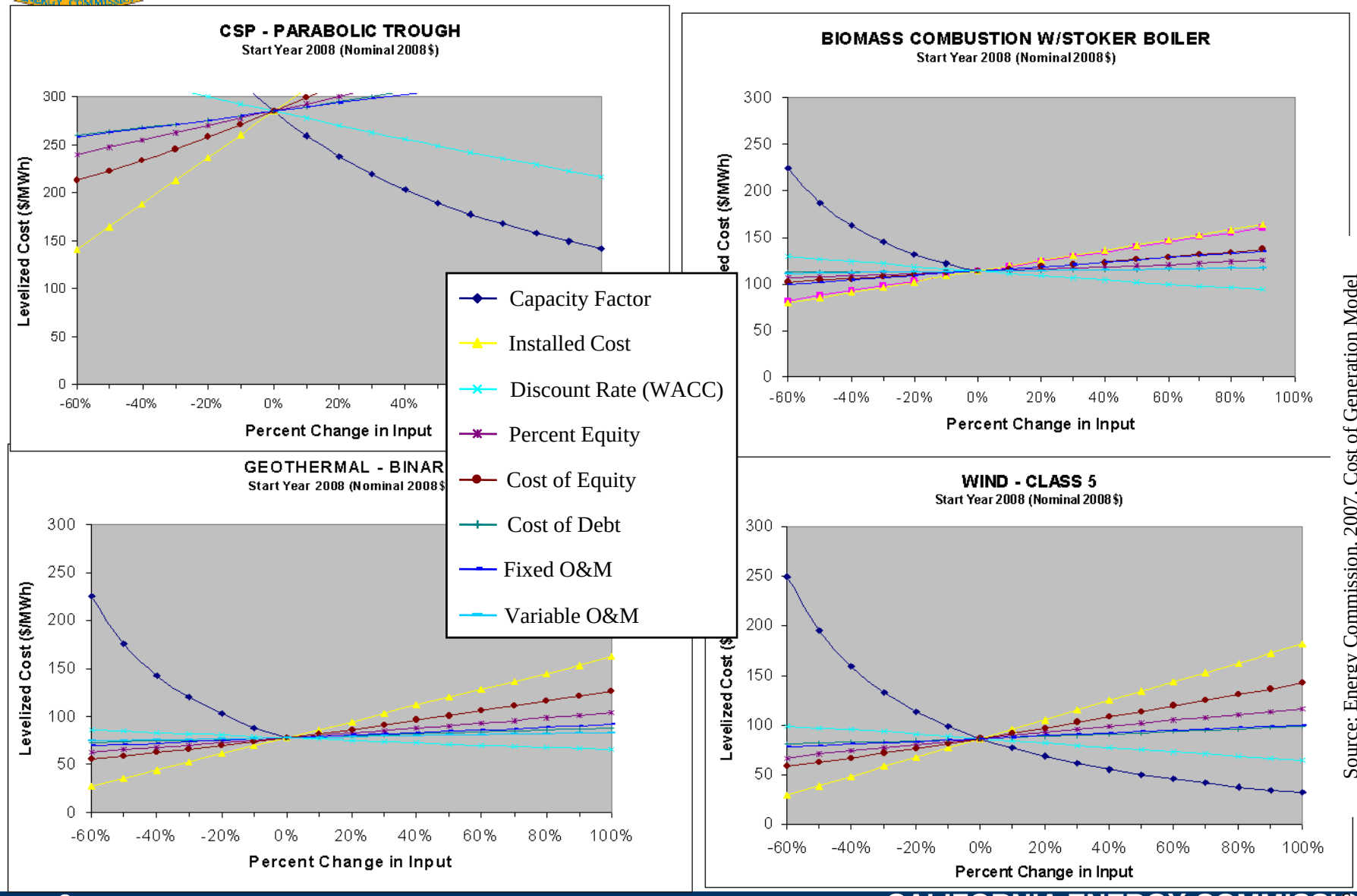
Comparison of Levelized Costs in Different Studies



Data Sources: [1] California Energy Commission, 2005, *Strategic Value Analysis* [cost data reports]; [2] California Energy Commission, Dec 2007, *Comparative Costs of California Central Station Electricity Generation Technologies*, Final Staff Report; [3] California Energy Commission, 2008 (forthcoming), *Scenario Analyses of California's Electricity System: Final Results for the 2007 Integrated Energy Policy Report*, Final Staff Report; [4] CPUC, Nov 2005, *Achieving a 33% Renewable Energy Target,* by CRS for the CPUC; [5] E3, 2008 (forthcoming), *CPUC GHG Modeling*; [6] RETI Coordinating Committee, March 2008, *Renewable Energy Transmission Initiative Phase 1A Draft Report*; [7] US Department of Energy, EERE, May 2008, *20% Wind Energy by 2030 Increasing Wind Energy's Contribution to U.S. Electricity Supply*.

Note: Anaerobic Digestion data from [2] and [6]; Biogas data from [2] and [5]; Biomass data from [2], [3], [5], and [6]; Concentrating Solar Power and Geothermal data from [1], [2], [3], [4], [5], [6]; Landfill Gas data from [1], [2], [4], [5], [6]; and Wind data from [1], [2], [3], [4], [5], [6], and [7].

Levelized Cost Estimates Are Sensitive to Input Assumptions



Source: Energy Commission, 2007, Cost of Generation Model

Application of Levelized Cost of Generation Project:

- Evaluate how different factors may affect current and future levelized costs
- Analyze the financial feasibility of generation project proposals
- Screening tool to compare different technologies
- Energy Efficiency program evaluation
- Input to resource planning studies
- Benchmark for wholesale and retail energy costs

MODEL LIMITATIONS

- Assumptions are variable as evidenced by the high low and trend numbers/figures we have shown.
- In some cases, can’t know how the system will effect the operation of the technology.
  - Capacity factor is a good example.
- Can’t tell how technology will affect the system.

Agenda for Workshop

- Summary of the levelized cost of generation results
- Overview of the Cost of Generation Model and latest modifications
- Review of the cost drivers for renewable, IGCC and nuclear generation technologies
- Preliminary characterization of building and community scale renewable technology costs

WORKSHOP QUESTIONS

- How might the COG effort be revised to make it more useful.
- Do the technology levelized costs appear to be reasonable?
- Are the tax and tax credit assumption reasonable?

Next Steps

- Modify renewable, IGCC and nuclear generation levelized cost based on today's workshop comments and compelling information
- Post staff model and user's guide
- Final Staff Report in September 2009