

Appendix B: PRISM Benefits Model

Quantifying the Benefits of Dynamic Pricing In the Mass Market

Prepared by:

Ahmad Faruqui, Ph.D. and Lisa Wood, Ph.D.

The Brattle Group

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701 Pennsylvania Avenue, N.W.

Washington, D.C. 20004-2696

Phone: 202-508-5000

Web site: www.eei.org

APPENDIX B: PRISM BENEFITS MODEL

The PRISM Benefits Model consists of several spreadsheets, the purposes of which are described below.

Customer Forecast

The market forecast spreadsheet allows the user to input the number of customers, the growth rate, the CAC saturation, and the enabling technology saturation. The worksheet also allows the user to roll out advanced metering infrastructure (AMI) over a period of four years rather than instantaneously, and incorporates a deployment ramping rate that represents how quickly customers can be enrolled in and started on the dynamic pricing program. The user also specifies the specific participation scenario (opt in, opt out, mandatory, or peak-time rebate (PTR) awareness) as well as the percentages. This information is used to compute the number of program participants by customer type under each option (e.g., opt in or opt out) over the forecast horizon.

PRISM Benefits Inputs

Many of the user-defined inputs to the cost-benefit analysis (CBA) model are entered into the PRISM Benefits Inputs spreadsheet. The first is the demand response for each type of hour by customer class. This is an output of the PRISM Impacts Estimation model. This hourly reduction in demand is adjusted by a set of user-defined factors. These factors represent savings on losses during transmission and capacity reserve requirements that no longer need to be fulfilled. The adjusted reduction is an estimate of the total avoided kW. This spreadsheet also contains the user-defined weighted average cost of capital (WACC) rate and the user-defined forecast of the number of customers participating in the dynamic rate. Finally, the spreadsheet contains the average monthly kWh consumption per customer in each class.

Capacity Value per Customer

The Capacity Value per Customer spreadsheet calculates the avoided capacity costs per customer based on the adjusted average hourly reduction in demand from the PRISM Benefits Inputs worksheet and an assumed capacity price. The present value of avoided capacity costs per customer is computed for a 15-year period using the WACC from the PRISM Benefits Inputs worksheet.

Energy Value per Customer

The Energy Value per Customer spreadsheet uses the adjusted demand response from the PRISM Benefits Inputs spreadsheet and applies a user-defined locational marginal price (LMP) value (as a proxy for the marginal cost of electricity) to calculate the total annual savings resulting from energy only. The present value of avoided capacity costs per customer is computed for a 15-year period using the WACC from the PRISM Benefits Inputs worksheet.

Transmission Value per Customer

The Transmission Value per Customer spreadsheet uses one user-defined variable that represents the total cost of transmission infrastructure on a \$/kW basis. This input is then applied to the adjusted demand response for each customer class from the PRISM Benefits Inputs spreadsheet to calculate the annual per-

customer transmission savings. The present value of transmission savings per customer is computed for a 15-year period using the WACC from the PRISM Benefits Inputs worksheet.

Distribution Value per Customer

Similar to the Transmission Value per Customer spreadsheet, the key user-defined variable in this worksheet is an all-encompassing cost of distribution infrastructure on a \$/kW basis. This is applied to the adjusted demand response values from the PRISM Benefits Inputs worksheet to determine the annual savings from distribution infrastructure. The present value of distribution system savings on a per-customer basis is computed for a 15-year period using the WACC from the PRISM Benefits Inputs worksheet.

Price Mitigation Value per Customer

This worksheet computes the expected short-term reduction in wholesale prices resulting from lower peak demand due to dynamic pricing. The user-defined inputs are for the expected price reduction per 1 percent of demand response, the average LMP during critical peak hours, the energy demand during the critical peak period, a demand growth rate assumption, and the peak load forecast for the control area. The spreadsheet uses these inputs to calculate the peak load reduction and the reduction in the critical peak LMP. These calculations are then applied to the critical peak demand forecast. The present value of these savings represents the Price Mitigation value.