

After Installation	<ul style="list-style-type: none"> • Additional customer education associated with the specific Smart Meter User Manual disseminated throughout the assessment period. • Six to nine demand response events called during the assessment period. • Electrical usage data collected on a monthly basis for duration of the assessment. • Throughout assessment: Phone or email survey of random sample of subjects to assess demographics, energy change behaviors and potential threats to validity. • At one year: Survey (demographic and behavioral intention); includes link to web-based survey. \$15 bill credit for completing survey; \$35 bill credit if pre-survey was completed.
Assessment Conclusion	<ul style="list-style-type: none"> • Notification letter that AMI assessment is concluded. It explains: <ul style="list-style-type: none"> ○ The various study applications and results. ○ URL or phone number for providing open-ended comments and suggestions.
CONTROL F3	AMI Meter Flat Rate No Enabling Technology SM Education
Objective	Control for effects of the AMI installation event by collecting data from customers within the assessment area.
Before Installation	<ul style="list-style-type: none"> • One month prior to installation, customer receives notification letter. • Notification letter includes <ul style="list-style-type: none"> ○ Basic program awareness information, informed consent, and URL for further information. AMI meter installation is framed as a “technology test”. ○ Rate information. ○ Pre-installation survey (demographic and behavioral intention); includes link to web-based version of survey. \$15 bill credit for completing survey.
During Installation	<ul style="list-style-type: none"> • AMI meter installed. • Customer receives Smart Meter User Manual F3 (SM). • Phone survey of random sample of customers to assess demographics, installation quality and behavioral intention.
After Installation	<ul style="list-style-type: none"> • Electrical usage data collected on an hourly basis for duration of the assessment. • Throughout assessment: Phone or email survey of random sample of subjects to assess demographics energy change behaviors and potential threats to validity. • At one year: Survey (demographic and behavioral intention); includes link to web-based survey. \$15 bill credit for completing survey; \$35 bill credit if pre-survey was completed.
Assessment Conclusion	<ul style="list-style-type: none"> • Notification letter that AMI assessment is concluded. It explains: <ul style="list-style-type: none"> ○ The various study applications and results. ○ Options for acquiring other enabling technology. ○ URL or phone number for providing open-ended comments and suggestions.

APPLICATION F4	AMI Meter Flat Rate No Enabling Technology Education
Objective	Assess the effects of customer education on subjects from inside the assessment area.
Before Installation	<ul style="list-style-type: none"> • One month prior to installation, customer receives notification letter. • Notification letter includes <ul style="list-style-type: none"> ○ Basic program awareness information, informed consent, and URL for further information. ○ Invitation to sign up for demand response notifications ○ "Rate information. ○ Pre-installation survey (demographic and behavioral intention); includes link to web-based version of survey. \$15 bill credit for completing survey.
During Installation	<ul style="list-style-type: none"> • AMI meter installed. • Customer receives Smart Meter User Manual F4 (SM+PP+TT+FR). • Invitation to sign up for demand response notifications. • Phone survey of random sample of customers to assess installation quality and behavioral intention.
After Installation	<p>Same as F3, plus:</p> <ul style="list-style-type: none"> • Six to nine simulated demand response events called during the assessment period. • Additional customer education associated with the specified Smart Meter User Manual disseminated throughout the assessment period.
Assessment Conclusion	Same as F3.
APPLICATION F5	AMI Meter Flat Rate Web Only Education
Objective	Assess the effects of web-only feedback on energy behaviors, such as reducing kWh or signing up for EE programs.
Before Installation	<p>Same as F4, with this addition:</p> <ul style="list-style-type: none"> • Web presentment information and My Account sign-up URL.
During Installation	<p>Same as F4, with this change:</p> <ul style="list-style-type: none"> • Customer receives Smart Meter User Manual F4 (SM+PP+TT+FR+WEB).
After Installation	<p>Same as F4, with this change:</p> <ul style="list-style-type: none"> • Throughout assessment: Phone or email survey of random sample of subjects to assess energy change behaviors, web usage, and potential threats to validity.
Assessment Conclusion	Same as F3.
APPLICATION F6a	AMI Meter Flat Rate Basic IHD - FREE Education
Objective	Assess the effects of web and basic IHD feedback on energy behaviors when the IHD is offered to customers for free.

Before Installation	Same as F5, with this addition <ul style="list-style-type: none"> Notification letter includes information that customer will receive a basic IHD for free.
During Installation	Same as F4, with these additions/changes: <ul style="list-style-type: none"> Customer receives basic IHD (this is customer-installable) Customer receives Smart Meter User Manual F6 (SM+PP+TT+FR+ BIHD).
After Installation	Same as F5, with these additions/changes: <ul style="list-style-type: none"> Customers may purchase additional IHDs at any time. Throughout assessment: Phone or email survey of random sample of subjects to assess energy change behaviors, web usage, IHD usage, and potential threats to validity.
Assessment Conclusion	Same as F3.
APPLICATION F6b	
Objective	AMI Meter Flat Rate Basic IHD - PURCHASE Education Assess the effects of web and basic IHD feedback on energy behaviors when the IHD is offered to customers for purchase.
Before Installation	Same as F5, with this addition <ul style="list-style-type: none"> Notification letter includes offer to purchase basic IHD.
During Installation	Same as F4, with these additions/changes: <ul style="list-style-type: none"> If IHD not yet purchased, provide second offer to purchase IHD. If purchased, customer receives basic IHD. Customer receives Smart Meter User Manual F6 (SM+PP+TT+FR+BIHD).
After Installation	Same as F6a.
Assessment Conclusion	Same as F3.
APPLICATION F7a	
Objective	AMI Meter Flat Rate Advanced IHD - FREE Education Assess the effects of web and advanced IHD feedback on energy behaviors when the IHD is offered to customers for free.
Before Installation	Same as F5, with this addition <ul style="list-style-type: none"> Notification letter includes information that customer will receive an advanced IHD for free.
During Installation	Same as F4, with these additions/changes: <ul style="list-style-type: none"> Customer receives advanced IHD (field service must install). Customer receives Smart Meter User Manual F7 (SM+PP+TT+FR+AIHD).
After Installation	Same as F6a.
Assessment Conclusion	Same as F3.

APPLICATION F7b	AMI Meter Flat Rate Advanced IHD - PURCHASE Education
Objective	Assess the effects of advanced IHD acquisition, as well as web and advanced IHD feedback on energy behaviors when the IHD is offered to customers for purchase. ⁴
Before Installation	Same as F5, with this addition <ul style="list-style-type: none"> Notification letter includes offer to purchase advanced IHD.
During Installation	Same as F4, with these additions/changes: <ul style="list-style-type: none"> If IHD not yet purchased, provide second offer to purchase IHD. If purchased, customer receives advanced IHD (field service must install). Customer receives Smart Meter User Manual F7 (SM+PP+TT+FR+AIHD).
After Installation	Same as F6a.
Assessment Conclusion	Same as F3.

Energy Efficiency Applications - Cell Details

APPLICATION E1	AMI Meter IBR Rate Web Only Education
Objective	Assess the effects of web-only feedback and an increasing block rate on energy behaviors, such as reducing kWh or signing up for EE programs.
Before Installation	Same as F5.
During Installation	Same as F4, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual E1 (SM+PP+TT+IBR+WEB).
After Installation	Same as F5.
Assessment Conclusion	Same as F3, with this addition: <ul style="list-style-type: none"> Transition back to flat rate.
APPLICATION E2a	AMI Meter IBR Rate Basic IHD - FREE Education
Objective	Assess the effects of an increasing block rate, as well as web and basic IHD feedback on energy behaviors when the IHD is offered to customers for free.
Before Installation	Same as F6a.
During Installation	Same as F6a, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual E2 (SM+PP+TT+IBR+ BIHD).
After Installation	Same as F6a.
Assessment Conclusion	Same as E1.

APPLICATION E2b	AMI Meter IBR Rate Basic IHD - PURCHASE Education
Objective	Assess the effects of an increasing block rate, as well as well as web and basic IHD feedback on energy behaviors when the IHD is offered to customers for purchase.
Before Installation	Same as F6b.
During Installation	Same as F6b, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual E2 (SM+PP+TT+IBR+BIHD).
After Installation	Same as F6b.
Assessment Conclusion	Same as E1.
APPLICATION E3a	AMI Meter IBR Rate Advanced IHD - FREE Education
Objective	Assess the effects of an increasing block rate, as well as well as web and advanced IHD feedback on energy efficiency behaviors when the IHD is offered to customers for free.
Before Installation	Same as F7a.
During Installation	Same as F7a, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual E3 (SM+PP+TT+IBR+AIHD).
After Installation	Same as F7a.
Assessment Conclusion	Same as E1.
APPLICATION E3b	AMI Meter IBR Rate Advanced IHD - PURCHASE Education
Objective	Assess the effects of an increasing block rate, as well as well as web and advanced IHD feedback on energy behaviors when the IHD is offered to customers for purchase.
Before Installation	Same as F7b.
During Installation	Same as F7b, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual E3 (SM+PP+TT+IBR+AIHD).
After Installation	Same as F7b.
Assessment Conclusion	Same as E1.

Demand Response Applications - Cell Details

APPLICATION D1	AMI Meter CPP Rate Web Only Education
Objective	Assess the effects of web-only feedback and a CPP rate on energy behaviors, such as reducing kWh or signing up for EE programs.
Before Installation	Same as F5.
During Installation	Same as F4, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual D1 (SM+PP+TT+ CPP+WEB).
After Installation	<ul style="list-style-type: none"> Same as F5.
Assessment Conclusion	<ul style="list-style-type: none"> Same as E1.
APPLICATION D2a	AMI Meter CPP Rate Basic IHD - FREE Education
Objective	Assess the effects of a CPP rate, as well as web and basic IHD feedback on energy behaviors when the IHD is offered to customers for free.
Before Installation	Same as F6a.
During Installation	Same as F6a, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual D2 (SM+PP+TT+ CPP+ BIHD).
After Installation	Same as F6a.
Assessment Conclusion	Same as E1.
APPLICATION D2b	AMI Meter CPP Rate Basic IHD - PURCHASE Education
Objective	Assess the effects of a CPP rate, as well as well as web and basic IHD feedback on energy behaviors when the IHD is offered to customers for purchase.
Before Installation	Same as F6b.
During Installation	Same as F6b, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual D2 (SM+PP+TT+ CPP+BIHD).
After Installation	Same as F6b.
Assessment Conclusion	Same as E1.
APPLICATION D3a	AMI Meter CPP Rate Advanced IHD - FREE Education
Objective	Assess the effects of a CPP rate, as well as well as web and advanced IHD feedback on energy efficiency behaviors when the IHD is offered to customers for free.

Before Installation	Same as F7a.
During Installation	Same as F7a, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual D3 (SM+PP+TT+ CPP+AIHD).
After Installation	Same as F7a.
Assessment Conclusion	Same as E1.
APPLICATION D3b	
Objective	Assess the effects of a CPP rate, as well as well as web and advanced IHD feedback on energy behaviors when the IHD is offered to customers for purchase.
Before Installation	Same as F7b.
During Installation	Same as F7b, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual D3 (SM+PP+TT+CPP+AIHD).
After Installation	Same as F7b.
Assessment Conclusion	Same as E1.
APPLICATION D4a	
Objective	Assess the effects of a CPP rate, web and IHD feedback, and PCT automation on energy behaviors when the IHD is offered to customers for free.
Before Installation	Same as F5, with this addition <ul style="list-style-type: none"> Notification letter includes information that customer will receive a PCT/IHD for free.
During Installation	Same as F5, with these changes: <ul style="list-style-type: none"> Customer receives PCT/IHD (professionally installed). Customer receives Smart Meter User Manual D4 (SM+PP+TT+ CPP+PCT).
After Installation	Same as F5, with this change: <ul style="list-style-type: none"> Throughout assessment: Phone or email survey of random sample of subjects to assess energy change behaviors, web usage, IHD usage, PCT usage, and potential threats to validity.
Assessment Conclusion	Same as E1.
APPLICATION D4b	
Objective	Assess the effects of a CPP rate, web and IHD feedback, and PCT automation on energy behaviors when the IHD is offered to customers for purchase.
Before Installation	Same as F5, with this addition <ul style="list-style-type: none"> Notification letter includes offer to purchase PCT/IHD.

During Installation	Same as F5, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual D4 (SM+PP+TT+ CPP+PCT).
After Installation	Same as D4a.
Assessment Conclusion	Same as E1.
APPLICATION D5 AMI Meter PTR Rate Web Only Education	
Objective	Assess the effects of web-only feedback and a PTR rate on energy behaviors, such as reducing kWh or signing up for EE programs.
Before Installation	Same as F5.
During Installation	Same as F4, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual D5 (SM+PP+TT+ PTR+WEB).
After Installation	Same as F5.
Assessment Conclusion	Same as E1.
APPLICATION D6a AMI Meter PTR Rate Basic IHD - FREE Education	
Objective	Assess the effects of a PTR rate, as well as web and basic IHD feedback on energy behaviors when the IHD is offered to customers for free.
Before Installation	Same as F6a.
During Installation	Same as F6a, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual D6 (SM+PP+TT+ PTR+ BIHD).
After Installation	Same as F6a.
Assessment Conclusion	Same as E1.
APPLICATION D6b AMI Meter PTR Rate Basic IHD - PURCHASE Education	
Objective	Assess the effects of a PTR rate, as well as well as web and basic IHD feedback on energy behaviors when the IHD is offered to customers for purchase.
Before Installation	Same as F6b.
During Installation	Same as F6b, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual D6 (SM+PP+TT+ PTR+BIHD).
After Installation	Same as F6b.
Assessment Conclusion	Same as E1.

APPLICATION D7a	AMI Meter PTR Rate Advanced IHD - FREE Education
Objective	Assess the effects of a PTR rate, as well as well as web and advanced IHD feedback on energy efficiency behaviors when the IHD is offered to customers for free.
Before Installation	Same as F7a.
During Installation	Same as F7a, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual D7 (SM+PP+TT+ PTR+AIHD).
After Installation	Same as F7a.
Assessment Conclusion	Same as E1.
APPLICATION D7b	
Objective	Assess the effects of a PTR rate, as well as well as web and advanced IHD feedback on energy behaviors when the IHD is offered to customers for purchase.
Before Installation	Same as F7b.
During Installation	Same as F7b, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual D7 (SM+PP+TT+PTR+AIHD).
After Installation	Same as F7b.
Assessment Conclusion	Same as E1.
APPLICATION D8a	
Objective	Assess the effects of a PTR rate, web and IHD feedback, and PCT automation on energy behaviors when the IHD is offered to customers for free.
Before Installation	Same as D4.
During Installation	Same as D4, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual D8 (SM+PP+TT+ PTR+PCT).
After Installation	Same as D4a.
Assessment Conclusion	Same as E1.
APPLICATION D8b	
Objective	Assess the effects of a PTR rate, web and IHD feedback, and PCT automation on energy behaviors when the IHD is offered to customers for purchase.
Before Installation	Same as F5, with this addition <ul style="list-style-type: none"> Notification letter includes offer to purchase PCT/IHD.

During Installation	Same as F5, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual D8 (SM+PP+TT+ PTR+PCT).
After Installation	Same as D4b.
Assessment Conclusion	Same as E1.

Load Shifting Applications - Cell Details

APPLICATION L1	AMI Meter DA-RTP Rate Web Only Education
Objective	Assess the effects of web-only feedback and a DA-RTP rate on energy behaviors, such as reducing kWh or signing up for EE programs.
Before Installation	Same as F5.
During Installation	Same as F5, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual L1 (SM+PP+TT+ DA-RTP+WEB).
After Installation	Same as F5.
Assessment Conclusion	Same as E1.
APPLICATION L2a	AMI Meter DA-RTP Rate Basic IHD - FREE Education
Objective	Assess the effects of a DA-RTP rate, as well as web and basic IHD feedback on energy behaviors when the IHD is offered to customers for free.
Before Installation	Same as F6a.
During Installation	Same as F6a, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual L2 (SM+PP+TT+ DA-RTP+ BIHD).
After Installation	Same as F6a.
Assessment Conclusion	Same as E1.
APPLICATION L2b	AMI Meter DA-RTP Rate Basic IHD - PURCHASE Education
Objective	Assess the effects of a DA-RTP rate, as well as well as web and basic IHD feedback on energy behaviors when the IHD is offered to customers for purchase.
Before Installation	Same as F6b.
During Installation	Same as F6b, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual L2 (SM+PP+TT+ DA-RTP+BIHD).
After Installation	Same as F6b.

Assessment Conclusion	Same as E1.
APPLICATION L3a	AMI Meter DA-RTP Rate Advanced IHD - FREE Education
Objective	Assess the effects of a DA-RTP rate, as well as well as web and advanced IHD feedback on energy efficiency behaviors when the IHD is offered to customers for free.
Before Installation	Same as F7a.
During Installation	Same as F7a, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual L3 (SM+PP+TT+ DA-RTP+AIHD).
After Installation	Same as F7a.
Assessment Conclusion	Same as E1.
APPLICATION L3b	AMI Meter DA-RTP Rate Advanced IHD - PURCHASE Education
Objective	Assess the effects of a DA-RTP rate, as well as well as web and advanced IHD feedback on energy behaviors when the IHD is offered to customers for purchase.
Before Installation	Same as F7b.
During Installation	Same as F7b, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual L3 (SM+PP+TT+DA-RTP+AIHD).
After Installation	Same as F7b.
Assessment Conclusion	Same as E1.
APPLICATION L4	AMI Meter TOU Rate Web Only Education
Objective	Assess the effects of web-only feedback and a TOU rate on energy behaviors, such as reducing kWh or signing up for EE programs.
Before Installation	Same as F5.
During Installation	Same as F5, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual L4 (SM+PP+TT+ TOU+WEB).
After Installation	Same as F5.
Assessment Conclusion	Same as E1.
APPLICATION L5a	AMI Meter TOU Rate Basic IHD - FREE Education
Objective	Assess the effects of a TOU rate, as well as web and basic IHD feedback on energy behaviors when the IHD is offered to customers for free.

Before Installation	Same as F6a.
During Installation	Same as F6a, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual L5 (SM+PP+TT+ TOU+ BIHD).
After Installation	Same as F6a.
Assessment Conclusion	Same as E1.
APPLICATION L5b	
Objective	Assess the effects of a TOU rate, as well as well as web and basic IHD feedback on energy behaviors when the IHD is offered to customers for purchase.
Before Installation	Same as F6b.
During Installation	Same as F6b, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual L5 (SM+PP+TT+ TOU+BIHD).
After Installation	Same as F6b.
Assessment Conclusion	Same as E1.
APPLICATION L6a	
Objective	Assess the effects of a DA-RTP rate, as well as well as web and advanced IHD feedback on energy efficiency behaviors when the IHD is offered to customers for free.
Before Installation	Same as F7a.
During Installation	Same as F7a, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual L6 (SM+PP+TT+ TOU+AIHD).
After Installation	Same as F7a.
Assessment Conclusion	Same as E1.
APPLICATION L6b	
Objective	Assess the effects of a TOU rate, as well as well as web and advanced IHD feedback on energy behaviors when the IHD is offered to customers for purchase.
Before Installation	Same as F7b.
During Installation	Same as F7b, with this change: <ul style="list-style-type: none"> Customer receives Smart Meter User Manual L6 (SM+PP+TT+TOU+AIHD).
After Installation	Same as F7b.

Assessment Conclusion	Same as E1.
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Appendix B – Descriptions of Models for Estimating Price Elasticity

1. Cobb-Douglas Functional Form

The Cobb-Douglas functional form is widely used in the literature mostly due to its ease of implementation and interpretation. This form has the benefit of directly yielding the own price elasticity of demand and also the associated cross-price elasticities. However, the elasticity of substitution between the hourly consumption values is fixed at unity which is a strong restriction. The functional form for Cobb-Douglas is as follows:

$$\log y = b_0 + \sum_{i=1}^n b_i \log x_i$$

2. Trans-log Functional Form

The trans-log function is a generalization of the Cobb-Douglas function. One improvement over the double-log function is that elasticities of substitution between the hourly consumption values are not fixed at unity and can acquire any value. For that reason, the function comes from a class of flexible functional forms. One drawback of the trans-log function is the susceptibility to multicollinearity due to the inclusion of the inputs as well as their interactions with other inputs. Another drawback is that the estimated demand functions may not satisfy the “concavity” restrictions and be unstable. The functional form for trans-log is as follows:

$$\log y = b_0 + \sum_{i=1}^n b_i \log x_i + \sum_{i=1}^n \sum_{j=1}^n b_{ij} \log x_i \log x_j$$

3. Generalized Leontief (Diewert) Functional Form

The Generalized Leontief (Diewert) function can accommodate numerous inputs in the production function and allows the elasticities of substitution vary between the inputs. Generalized functional form for Generalized Leontief is as follows:

$$y = b_0 + \sum_{i=1}^n a_i \sqrt{x_i} + \sum_{i=1}^n \sum_{j=1}^n a_{ij} \sqrt{x_i x_j}$$

4. Generalized McFadden Functional Form³³

The Generalized McFadden function can also accommodate numerous hourly consumption values inputs in the utility function as well as allowing the elasticities of substitution to vary between the hourly consumption values. The functional form for the Generalized McFadden is as follows:

$$y = \sum_{i=1}^n \sum_{j=1}^n x_j \phi^{ij} \left(\frac{x_i}{x_j} \right) b_{ij} \quad \text{where } \phi^{ij} \text{ is a known concave function.}$$

³³ For more information, see W.E. Diewert and T.J. Wales (1987), “Flexible Functional Forms and Global Curvature Conditions,” *Econometrica*, Vol. 55, No.1, 43-68.