

May 4, 2017 | PG&E Informal Comments in response to Navigant’s Draft BROS Appendix for the “Energy Efficiency Potential and Goals Study for 2018 and Beyond.” and the April 20 Potential and Goals presentation on BRO savings.

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Pacific Gas and Electric Company (PG&E) appreciates this opportunity to comment on Navigant’s Draft BROS Appendix for the “Energy Efficiency Potential and Goals Study for 2018 and Beyond.” Parties were asked for provide informal comments on the draft appendix. PG&E provides some general comments followed by more detailed comments on the BROS assumptions and inputs, and proposes consideration of alternate values, approaches, and/or sources where available.

PG&E recognizes that some of our detailed comments may not be specific enough to substantively inform the model inputs at this time, but has included them at least for discussion purposes. We asked a number of internal subject matter experts to contribute to these comments. If you have follow up questions, please contact Halley Fitzpatrick or Luke Nickerman who can connect you with the appropriate staff at PG&E.

Double Counting: In previous versions of the potential study, Navigant created “competition groups” (for a footnote: see page 48 of the 2013 study, where Navigant notes that “the market adoption methodology considers that some efficient technologies will compete against each other for the same installation” and then goes on to explain that Navigant defines and uses “competition groups” to prevent multiple measures that address the same available savings from realizing that savings in the model output). PG&E notes that it is important to apply this same concept in a BROs context. For example, the residential sector has three potential programs (home energy reports, real-time feedback, and competitions), a customer participating in one of these, let’s say home energy reports, could participate in another one, for instance a competition, however, the realizable savings from that customer participating in the competition should not be the same as a customer who only participates in the competition, as some available savings is already being captured by the home energy report. PG&E recommends addressing this by eliminating customers participating in one program from consideration in the available customer base for the next one.

EUL: We provided several detailed comments relating to EUL below. At a high level, we would like to note that EULs for BRO measures is limited by Decision or Ruling to 1 to 3 years. It’s not clear exactly how those CPUC Decisions inform the PG&E study in some cases. BRO measures may be offered in concert with retrofit measures or add-on devices (such as controls) that have EULs much longer than 3 years. We expect these BRO + equipment interventions may require the savings to be parsed out to reflect different savings attributes (especially EUL). While BRO savings (savings associated with non-equipment based measures) are limited to 3 years at this time, the EULs of equipment based measures (which may enable further behavioral, commissioning, or operational savings) are not limited in that way.

Focus: We recognize that some program types or measures offer much more potential than others. Our comments here address each program/measure similarly, though the impacts at the portfolio level for some measures/programs are trivial. We would expect the focus of any model adjustments made in response to these comments to be weighted toward those adjustments with the greatest impact on the portfolio. However, it is important for each measure/program potential to be accurate to some degree, as one would expect that program goals and budget decisions may be made in response to the P&G study.

More detailed comments provided in the following pages.

1. Home Energy Reports

Topic	Content with current values?	Considerations / proposed new values	Better References (provide link or type title and upload to SharePoint or cite CPUC Decision or Rulings)
Savings Values	Yes	<ol style="list-style-type: none"> We recommend that energy savings assumptions be expressed in ranges of average kWh and Therms saved by household rather than in as percentages of household energy use saved. The savings values from published third-party evaluations reflect the underlying targeting decisions made by program administrators to maximize energy savings. When HERs are deployed more broadly—specifically to include lower-usage customers and customers in mild climates with relatively low heating and cooling needs—we see savings achieved are far lower in kWh and Therms even if they are similar when expressed as percentage of usage saved. 	
Applicability/ Penetration Rates	No	<p>The applicability and penetration rates estimated for HER programs are too high. PG&E has determined that the maximum penetration rate for HER is limited to approximately 35%-40% of its residential customer base. Here are the factors that lead to this estimate:</p> <ol style="list-style-type: none"> It is not cost effective to treat customers in the lowest quartile of energy use. These customers already use less than 75% of all customers (by definition) and therefore have less capacity to save energy. Customers must have more than one year of past billing history at the same address to establish a baseline. Customers who have opted out of receiving marketing information from PG&E are not eligible. Many classes of customers are not eligible (and previously-enrolled customers will be removed from treatment) if customers are on medical baseline rates, accounts flagged as being medically vulnerable, those on net metering, those living in mobile homes, those on electric or gas vehicle rates, those on rates other than the standard residential rates E-1, E-6, and E-7. A substantial proportion of customers must be held back indefinitely from treatment to serve as the control group. <p>Further, PG&E has experienced an opt-out rate of approximately 0.5% (not 2%).</p>	
EULs	Yes	We agree with the current EUL assumption; however the EUL should be soon corrected to take into consideration the findings of recent persistence studies.	
Costs	No	<p>For Calendar Year 2015, the latest period for which full data are available, PG&E's costs for HER were \$0.14 per kWh and \$4.11 per Therm.</p> <p>The costs included were based off of the data from the eestats.cpuc.ca.gov website, which are not specific to HER. They refer to the sub-program that contains HER, thus also encompass costs for several other measures. The specific cost of HER programs is lower.</p>	Source: PG&E's comments to the 2015 draft final <i>Home Energy Reports - Cost-Effectiveness Memo</i> (DNL-GL). See https://pda.energydataweb.com/#/documents/1825/view
Other	n/a		
Eligibility / Policy	n/a		
Additional comments/ considerations	n/a		

2. Real-Time Feedback: In Home Displays and Online Portals

Topic	Content with current values?	Considerations / proposed new values	Better References (provide link or type title and upload to SharePoint or cite CPUC Decision or Rulings)
Savings Values	No	For E6 customers, up to 8% in kWh for In Home Displays (IHD) has been observed in HAN Phase 3 trials.	http://www.calmac.org/publications/han_final_report_final.pdf http://www.calmac.org/publications/HAN_Impacts_and_Savings_Report_FINAL2.PDF
Applicability/ Penetration Rates	No	IHD device and gateway (Mobile App) penetration is currently about 2200 residences out of more than 5 million residential customers. The natural growth rate (without PG&E marketing etc) is about 200 new units per year. We would expect an increase in adoption of about 25% year over year with marketing and outreach. In an extremely aggressive case, involving substantial financial backing and marketing would be no more than 5000 new units year.	
EULs	No	IHDs are physical devices, not behavioral measures. If the EUL for BRO savings for real-time feedback is limited to 1 year (and as such is disassociate with the physical device), then perhaps the cost of the measure should be significantly reduced or set to zero (e.g. dissociated with the physical device).	IHD life should be 3 to 5 years as a consumer electronics product.
Costs	No	Per unit cost is not \$500 but \$100, market price.	Aztech IHD and Rainforest Automation Eagle Gateway https://www.amazon.com/Rainforest-Energy-Monitor-ZigBee-Gateway/dp/B00AII248U
Other (describe here)	n/a		
Eligibility / Policy	TBD	In-home devices connected to SmartMeter meters (either directly or through wireless signaling via ZigBEE) that provide demand response, load control, and/or energy conservation benefits were key benefits expected by the installation of Smart Meters. The result is that savings from many in-home devices may not be claimed through energy efficiency programs since these benefits were claimed in the Smart Meter upgrade case. Further study may be needed to parse out opportunities and timeline of double counting risk.	See Ordering Paragraph 8 and 10 of Decision (D.) 09-03-026. http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/98486.PDF
Additional comments/ considerations	<p>PG&E's infrastructure cannot support real-time online portal based feedback without an HAN connected device. It's not clear from the appendix if the cost of HAN devices (required enable realtime online feedback) is being considered.</p> <p>The savings opportunity from in-home device providing real time feedback that the customer responds to directly seem like they would be very different from a Home Energy Report or Contest. In the latter, the customer is engaged, and then later takes some unspecified action to save energy. Does the study contemplate these differences?</p>		

3. Competitions: Large and Small

Topic	Content with current values?	Considerations / proposed new values	Better References (provide link or type title and upload to SharePoint or cite CPUC Decision or Rulings)
Savings Values	No	We believe the estimates of potential savings from residential competitions is likely high and in need of further study. First, savings should be reflected in terms of kWh and Therms saved and not solely in terms of percentage savings reported among active participants. Second, given the bias that suppresses the publication of failed or otherwise disappointing results the results shown in publicly-available research may overstate the average potential. Nevertheless PG&E will continue to engage third parties on options to pursue other behavioral savings potential.	This study of the Cool California Challenge highlights the finding that competitions can result in high energy savings from active participants, but the difficulty in getting households to participate. Consequently, while active participants saved an average of 14% on electric use compared to controls, only 2,667 households participated in the 8 cities targeted. https://www.arb.ca.gov/research/apr/past/10-325.pdf
Applicability/ Penetration Rates	No	We are not currently pursuing competition approaches in our residential programs road map because we view the measurable savings potential as low, and difficult to assign to the activity as a direct outcome. Also, a consideration is whether or not competitions yield new and sustainable savings or are just increasing already achievable savings through existing programs. In other words, we question whether competitions are best applied as non-resource, marketing efforts rather as standalone resource programs.	
EULs	Yes		
Costs	Yes		
Other (describe here)	N/A	In addition to the published findings from the initial Cool California competition, we would suggest that Navigant incorporate any savings results from the follow-on 2014-2015 “Cool California” Competition run by Energy Upgrade California. This initiative seems to be a structured competition conducted throughout California and may reveal a more accurate assessment of how cost effective a competition approach might be.	http://www.coolcalifornia.org/coolcalifornia-challenge-overview
Eligibility / Policy	N/A		
Additional comments/ considerations	<p>PG&E’s Step Up and Power Down Residential marketing initiative did not conduct “competitions” through the marketing initiative, though we did use social norming messaging and commitments/pledging to motivate customers to reduce unnecessary energy use. These were small community initiatives with less than 10,000 ppl.</p> <p>We found the initiative to be costly to implement and difficult to quantify and measure actual kWh and Therm savings attributable to the initiative in a reliable way.</p>		

4. Strategic Energy Management

Topic	Content with current values?	Considerations / proposed new values	Better References (provide link or type title and upload to SharePoint or cite CPUC Decision or Rulings)
Savings Values	Yes (see comment below)	Saving value, i.e. percentage of market total annual usage is determined for commercial sector while CA IOUs are implementing SEM for industrial. However, assumed percentage of savings for commercial BRO is coincidentally matching assumption for industrial	As SEM adopts NMEC and dynamic baseline to determine short and long energy savings, would be more beneficial, if savings values are determined utilizing these concepts.
Applicability/ Penetration Rates	No	As California IOUs are launching new SEM for industrial market references and assumption should be based on studies for industrial SEM programs.	
EULs	Yes	Although, source for information for the study was associated with programs for commercial sector, assumption for EUL seems adequate. CPUC Decision defines EUL for BROs at 2-3 years, but as SEM includes persistence monitoring and actionable measures to secure consistent savings overtime, EUL of 5 years is acceptable, if approved by policy makers.	
Costs	No	Source for information is associated with commercial sector	Costs for industrial sector should be used.
Other (describe here)	No	Unclear how the numbers for past participation in SEM by commercial customers are applicable to California context	Need market characteristics for industrial sector in California
Eligibility / Policy	N/A		
Additional comments/ considerations	Navigant presents potential for SEM while there is probably very little information and data related to program implementation in commercial sector. Vast majority of SEM programs in 14 states of US are implementing SEM for industrial customers. Reference to SEM study conducted by CEE is attached. PG&E would like to see additional data support if available on the applicability of SEM to the commercial sector.		

5. Building Operator Certification

Topic	Content with current values?	Considerations / proposed new values	Better References (provide link or type title and upload to SharePoint or cite CPUC Decision or Rulings)
Savings Values	No	The BOC savings estimate in this study is troubling because the only program cited with projected savings is an energy savings per square foot value rather than as a percentage of total energy use. Using back-of-the-envelope calculations, we estimate the projected savings to be around 1% of total building energy use (we find this estimate to be conservative even for a behavior-based program but less than the savings potential of benchmarking).	
Applicability/ Penetration Rates	No	Penetration rate is unclear. The report states that it varies from 15-100% depending on the market segment. Given natural staff turnover rates and since BOC training is a professional certification and not a building certification, it seems unrealistic to assume 100% penetration in any market segment.	Include the average applicability factor or factor per market segment in the report.
EULs	No	In February 2014, ODC conducted a 2010-2012 Impact Evaluation of the California Statewide BOC. The Opinion Dynamics study proposes to use a duration of four years for a conservative estimate of O&M persistence. We will provide the replaced equipment lifetime savings separate from the annual participant savings estimates.”	http://www.calmac.org/publications/BOC_10-12_Impact_Evaluation_Report_FINAL.pdf
Costs	No	The cost does not appear to take into account the cost of the certification – only the savings	
Other (describe here)	N/A		
Eligibility / Policy	N/A		
Additional comments/ considerations	While we have some concerns about these assumptions, we recognize that the potential is relatively small for this measure and would likely be further reduced if our comments are addressed. Adjusting these values is not a major concern for PG&E at this time.		

6. Building Energy and Info. Mgmt. Syst.

Topic	Content with current values?	Considerations / proposed new values	Better References (provide link or type title and upload to SharePoint or cite CPUC Decision or Rulings)
Savings Values	No	1) Starting Saturation of EMS by Building Type is the same for the every year in the 4.BROs – Draft Input Data Release_2017-04-20 assumption spreadsheet for BEIMS. We would imagine that it would increase over time (linearly or exponentially, depending on sub-segment). Was it averaged over the 15-year period? 2) Unit Energy Savings would improve over time as the data analytics and software algorithms (e.g. machine learning) improve over the next few years with real-world data	
Applicability/ Penetration Rates	No	Generally good assumptions, but a 1% applicability factor seems way too low for restaurants considering this is BEIMS specifically for building HVAC savings.	
EULs	Yes		
Costs	Yes		
Other (describe here)	N/A		
Eligibility / Policy	N/A		
Additional comments/ considerations	Basically, it is still early days for BEIMS, both for HVAC and other end-uses, and as such, it is very hard to predict the adoption rate in the commercial sector. But we expect it will certainly be higher over time, especially as the business model (operating expense vs capital expense) will allow for faster adoption rates than just a pure capital expenditure model.		

7. Business Energy Reports

Topic	Content with current values?	Considerations / proposed new values	Better References (provide link or type title and upload to SharePoint or cite CPUC Decision or Rulings)
Savings Values	No	<p>We believe the energy savings potential for Business Energy Reports (BER) is vastly overstated and is likely due to publication bias. We note that the two major vendors of BER, Opower and EnerNOC, no longer offer BERs as a product: this is telling of their lack of potential.</p> <p>PG&E has conducted two trials of Business Energy Reports (BERs), neither of which found energy savings. As a result of these two large-scale trials, PG&E has determined not to continue with their use. The first trial involved a single vendor (Pulse, subsequently acquired by EnerNOC) and included approximately 40,000 small- and medium-size non-residential customers divided evenly into treatment and control groups. The trial began in January 2014 and concluded in October 2014. The savings evaluation was completed in early 2015 and found estimated percent reductions of 0.32% for electricity and no savings for gas.</p> <p>The second trial of BERs initiated in November 2015 and concluded in September 2016. This trial tested reports by two vendors, Opower (subsequently acquired by Oracle) and EnerNOC. This trial involved approximately 65,000 businesses. Initial evaluation of this phase two trial (conducted by Nexant on behalf of PG&E) does not show statistically significant energy savings for any of the three treatment groups for electricity or natural gas. The final evaluation is expected to be completed in the third quarter of 2017.</p>	<p>The Emerging Technologies Report, to be completed by Nexant, will not be completed until the third quarter of 2017. However there are interim results from Nexant published in presentation form for both of these studies, which are included for Navigant reference.</p>
Applicability/ Penetration Rates	n/a		
EULs	n/a		
Costs	n/a		
Other (describe here)	n/a		
Eligibility / Policy	n/a		
Additional comments/ considerations	n/a		

8. Benchmarking

Topic	Content with current values?	Considerations / proposed new values	Better References (provide link or type title and upload to SharePoint or cite CPUC Decision or Rulings)
Savings Values	n/a		
Applicability/ Penetration Rates	n/a		
EULs	n/a		
Costs	n/a		
Other (describe here)	n/a		
Eligibility / Policy		<p>As discussed in the CPUC Statewide Benchmarking Process Evaluation, Volume 1, CPU0055.01, Benchmarking is a way to encourage customers to participate in energy efficiency programs and a way for customers who track benchmark scores over time to validate that the energy efficiency measures they undertook have worked. Customers who benchmark their buildings see that one is not performing as well as others, they will be more likely to participate in an energy efficiency program. Positive feedback obtained by customers tracking benchmark scores can also encourage them to undertake more energy efficiency activities and participate in more programs.</p> <p>If Benchmarking as a standalone behavioral program or measure spurs a customer to participate in additional energy efficiency opportunities, then clear guidance needs to be provided around a customer’s eligibility to participate in additional energy efficiency offerings (BOC, RCx, Competitions, etc.) subsequently and/or simultaneously. This guidance should also elaborate on the interaction of any of these other offerings with benchmarking, and how savings claims would be affected. It would be our expectation that savings attributed from additional energy efficiency activities would be claimable by the utility.</p>	<p>http://www.calmac.org/publications/Statewide_Benchmarking_Process_Evaluation_Report_CPU0055.p df</p>
Additional comments/ considerations	<p>Benchmarking of energy use in commercial buildings is required by city, state, and federal government entities. Consequently benchmarking activities resulting from energy efficiency programs may be duplicative of mandated efforts and may result in minimal incremental impact on energy use.</p>		

9. Competitions

Topic	Content with current values?	Considerations / proposed new values	Better References (provide link or type title and upload to SharePoint or cite CPUC Decision or Rulings)
Savings Values	No	<p>We believe that methodology employed in the evaluation of the Smart Energy Now Program that is cited as a key source for savings estimates by Navigant (see Impact Evaluation of the Smart Energy Now Program (NC) (Pilot), TecMarket Works, February 2014) does not provide for a reasonable estimate of savings. The pre/post billing analysis does not employ a comparison group and therefore does not control for exogenous changes (other than temperature) that may have impacted energy use.</p> <p>PG&E recently completed a large-scale marketing initiative targeting non-residential customers in downtown San Francisco and San Jose. This large-scale effort, called Step Up and Power Down, awarded \$1.25 million in shareholder funding to each city as a prize for exceeding energy saving goals. PG&E did not claim savings for Step Up and Power Down, but attempted to measure BRO savings with an eye to the future. PG&E, in coordination with ED staff, enlisted the assistance of UC Berkeley E2e to design a quasi-experimental control and treatment group. E2e concluded that even in PG&E's most populous urban centers, competition participation wasn't large enough and savings weren't high enough have the statistical power to use a control and a treatment group effectively. Nevertheless, PG&E calculated savings as a KPI for the initiative using three methodologies: Weather-normalized, calculated, and modeled. The results of this analysis are currently under review. Initial results are 1.9% or less depending on the model and, again, lacking a control group to which to compare these results.</p>	There may be published results coming soon from CLEAResult. Not yet available.
Applicability/ Penetration Rates	No	The Step Up and Power Down initiative targeted roughly 14,000 businesses in these target markets and had roughly 1,250 sign up – a participation rate of 8%. If Step Up and Power Down were a resource program with a TRC we would likely have much less to spend on customer acquisition so participation rates would be even lower.	
EULs	N/A		
Costs	No	Costs for implementation and evaluation for this type of program that is at the level of rigor suitable for California are very high.	
Other (describe here)	n/a		
Eligibility / Policy	n/a		
Additional comments/ considerations	We believe that the potential for commercial competitions to drive energy savings is vastly overstated in the draft Navigant analysis. Not only are these types of programs difficult and expensive to administer, they are extremely difficult to evaluate (in large part because comparison groups are difficult to identify). Because of the evaluation challenges, the Step Up and Power Down initiative was a non-resource program. Nonetheless, we remain interested in continuing to explore how competitions and gamification can drive energy savings through behavioral interventions.		

10. Retrocommissioning

Topic	Content with current values?	Considerations / proposed new values	Better References (provide link or type title and upload to SharePoint or cite CPUC Decision or Rulings)
Savings Values	Yes	<p>2.3% to 12.7% is in line with what we typically see in PG&E projects. In addition, several studies point to a range of savings that is consistent with that.</p> <ul style="list-style-type: none"> • LBNL study (2009) states an average expected savings of 10-15% 	http://cx.lbl.gov/documents/2009-assessment/lbnl-cx-cost-benefit.pdf
Applicability/ Penetration Rates	Yes	<p>Applicability factor is simply listed as a range from 18% to 70% without supporting references. However, there is no better data out there that we are aware of for how applicable RCx is for various market sectors.</p> <p>Penetration rate is listed as 1.9% to 2.3%. Again, no supporting reference is provided. There is a evaluation study done by The Cadmus Group for the Northwest Energy Efficiency Alliance (NEEA) done in 2014 that lists the market penetration range of about 0.9% ranging from as low as 0.1% to as high as 1.7% for the four northwestern states included in the study. California is anticipated to be a bit more progressive so the 1.9% to 2.3% modeled in the Navigant study seems reasonable.</p>	http://neea.org/docs/default-source/reports/ace-mondel-commisioning-and-retrocomm.pdf?sfvrsn=10
EULs	Yes	Assumes 5 years which is what the PG&E has historically been using for most RCx “measures”. Our understanding is that the CPUC has settled on 3 years for the time being.	
Costs	Yes	This stated numbers seem reasonable based on PG&E’s project data.	
Other (describe here)	N/A		
Eligibility / Policy	N/A	<p>Eligibility and policy are not discussed. Some relevant issues may be:</p> <ul style="list-style-type: none"> • Which code is used? Currently CPUC requires use of code when building was built or last alteration. 	
Additional comments/ considerations	The study is limited to “retrocommissioning” and excludes “recommissioning”. Our programs allow for “recommissioning” as long as it’s been 5 years since the last activity and the building is at least 5 years (per latest CPUC disposition).		