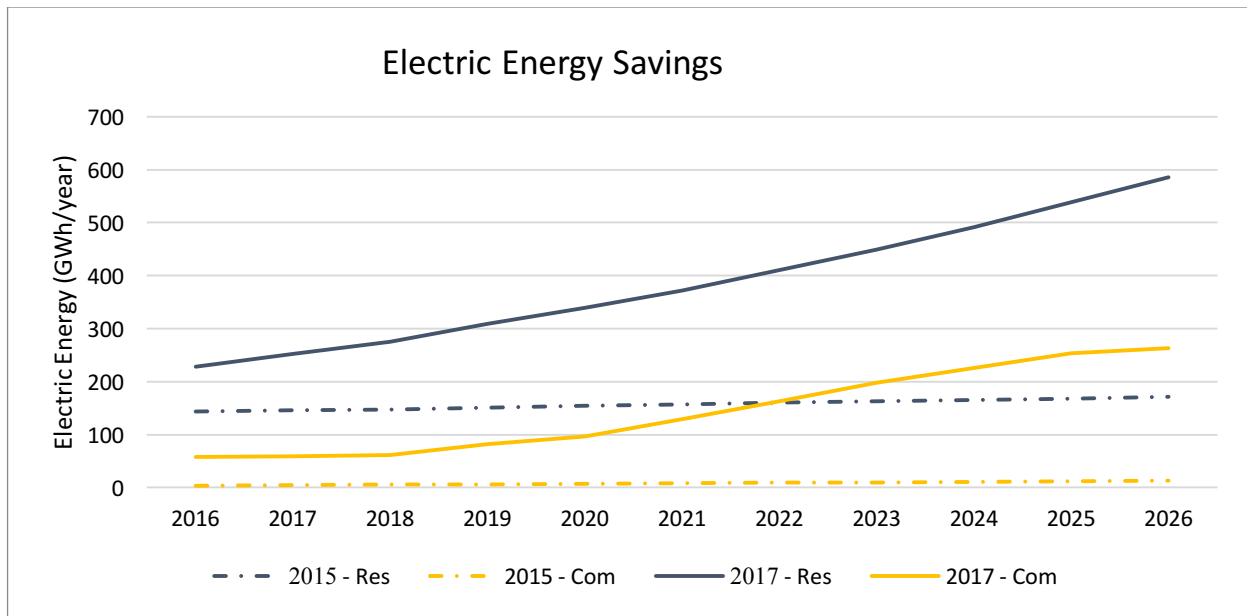


TURN Informal Comments to Energy Division Staff and Navigant Consulting regarding the
DAWG Energy Savings Pup Webinar April 20, 2017
CPUC 2018 and Beyond Energy Efficiency Potential and Goals Study:
Behavioral, Retro- Commissioning and Operational Savings (BROs)

May 8, 2017

TURN offers the following comments regarding the CPUC 2018 and Beyond Potential and Goals (PG) study draft update of Behavior, Operational Efficiency and Retro-commissioning (BROs) savings potential per Navigant Consulting's overview of the Residential and Commercial BROs methodology and draft results for stakeholder review and comments. TURN's comments focus on BRO methodology as applied to the residential sector.

The 2017 forecast of residential behavior savings is significantly greater than the 2015 forecast, showing 2017 forecast savings at 600 GWh year in 2026 relative to the 2015 potential forecast of 150 GWh in 2026, per the Navigant slide below.¹ While this may be plausible, there is insufficient information and data in the draft study as to the underlying basis for the significant run-up in the existing the Home Energy Reports (HERs) penetration rates and resultant savings. Similarly, the draft study offers insufficient support for the assumed penetration rates and savings from an on-line portal program that is not currently offered, to TURN's knowledge, and may not be readily implementable because of IT requirements.



¹ Navigant powerpoint presentation April 20, 2017.

Prior to the webinar, Navigant provided a Draft BROs Appendix dated April 13, 2017 that discusses the BROs interventions that are included in the PG model. A separate spreadsheet was also provided with the inputs for interventions specific to each utility and building type. For the webinar a power point was provided summarizing the information and data. Following the webinar Navigant updated the Appendix and spreadsheet data.

The residential draft forecast of behavioral savings potential has three program components: (1) Home Energy Reports, (2) Real-Time Feedback: In Home Displays and Online Portals, and (3) Competitions – Large and Small. As explained in the Navigant Draft BROs Appendix, pages A-1 through A-7:

- Home Energy Reports (HERs) is the current California utility residential customer behavior program. Residential customers are periodically mailed HERs that provide feedback about their home's energy use, including normative comparisons to similar neighbors, tips for improving energy efficiency, and occasionally messaging about rewards or incentives. Estimated annual electric savings range from 1.0-2.3%, while gas savings are 0.6%-1.9%.

- Real-Time Feedback: In Home Displays (IHDS) and Online Portals (Web) are not a current California utility residential customer behavior program. Real-time feedback programs change customer behaviors by delivering advanced metering data on household consumption to utility customers via an in-home display or remotely via an online portal, such as a website or a smart phone application. Navigant developed potential estimates based on the percentage of households in California with AMI meters and the percentage of residential customers who currently receive detailed energy use information online. Estimated annual electric and therm savings range from 1.3 - 2.3%.

- Residential competitions to date have been very limited in California. Residential competitions are a behavioral intervention approach in which participants compete in energy-related challenges, events, or contests. The goal of such challenges is generally to reduce energy consumption either directly or by raising awareness, increasing knowledge, or encouraging one or more types of action (i.e., conservation, buying efficient light bulbs, etc.). Navigant derived participation data from SDG&E's "Biggest Energy Saver", "San Diego Energy Challenge", and "Manage – Act – Save" programs, Southern Maryland Electric Cooperative's (SMECO's) "Energy Savings Challenge",

Minnesota Valley Electric Cooperative’s “Beat The Peak” program, and Puget Sound Energy’s “Rock the Bulb” program. Navigant averaged the percentage of kWh savings reported for small competitions at 8.1% and for large competitions at 4.1%, with therm savings averaged at 5.3% for both small and large competitions.

The following ppt slide 14 summarizes the inputs developed for the three types of residential behavior programs. The data indicates a considerable range between relatively modest savings for the existing HERs program and significantly higher savings for the pilot programs with small sample sizes.

INPUTS DEVELOPED - RESIDENTIAL

Type	EUL years	Savings		Cost		kW/kWh Savings Ratio
		kWh	Therm	kWh	Therm	
Home Energy Reports (HERs)	1	1.0 – 2.3%	0.6 – 1.9%	\$0.09	\$3.06	0.00019058
Real-Time Feedback – In Home Display	1	2.3%	--	\$0.26	--	0.00019058
Real-Time Feedback – Online Portal	1	1.3%	1.3%	\$0.07	--	0.00019058
Small Competitions (<10,000 ppl)	1	8.1%	5.2%	\$0.050	\$1.344	0.00019058
Large Competitions (>10,000 ppl)	1	4.1%	5.2%	\$0.007	\$0.101	0.00019058

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Across the utilities, Navigant applies a 98-100% applicability factor for the programs for single and multifamily electric savings, with the applicability factors for therm savings ranging from 0 – 100%. (see spreadsheet draft input data release 4-20-2017, tab 3 measure inputs)². Penetration rates, or the percentage of eligible customers participating in a program, are developed for each utility and each program on a reference and aggressive case basis. (see tab 4

² Applicability factor is the percentage of the customer sector assumed able to participate in the program.

penetration rates).

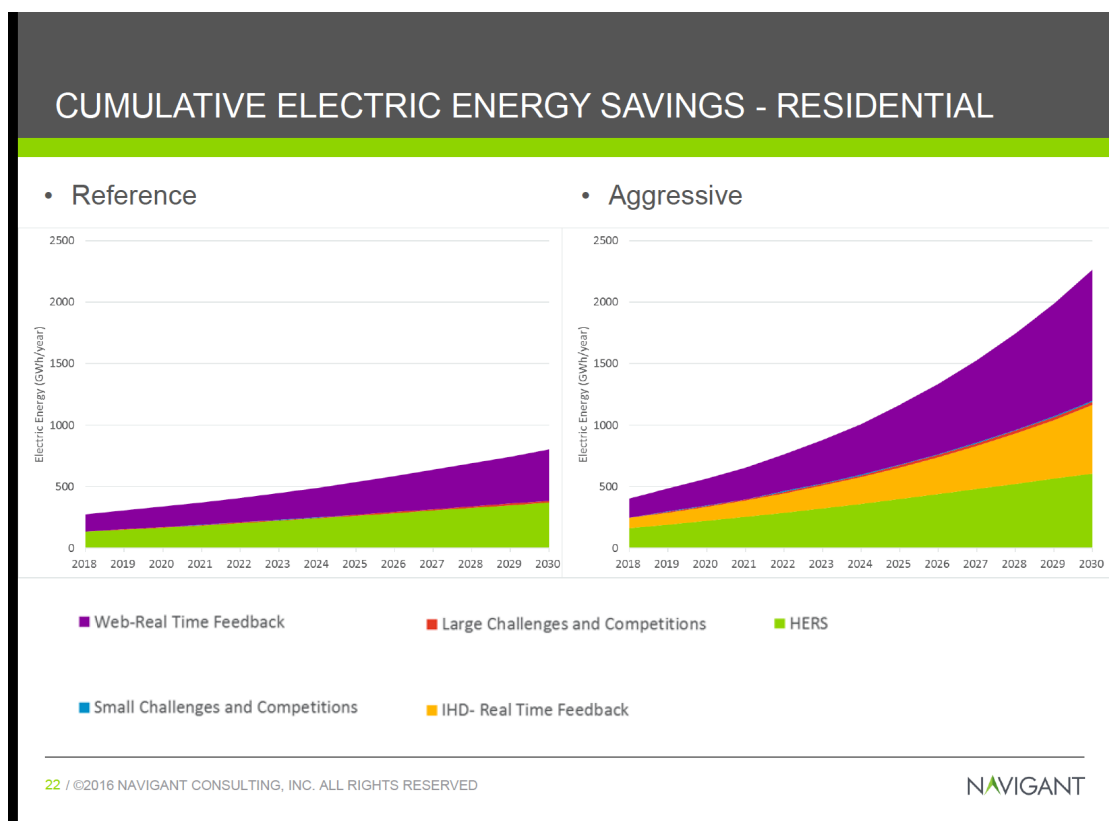
TURN developed the table below summarizing Navigant's assumed penetration rates for PG&E in the reference and aggressive case scenarios. The data show that in the reference case, by 2020 over one-third of all PG&E residential customers will be engaged in the existing HERs program, with nearly 20% of the HERs participants' and/or additional customers also participating in web and IHD feedback. By 2030, the respective figures increase to over 50% and about 40%.

For the aggressive case, the HERs and Web participation rates approach one-third in 2016, increasing to over 40%, 60%, and 80% in 2020, 2025, and 2030, respectively. By 2030, IHD participation is nearly one-third. Related, the savings rates for dual program participation should be clarified as simply additive or discounted for overlapping effects.

It is unclear to TURN the extent to which the penetration rates reflect dual and single program participation. The penetration rate assumptions should distinguish and provide the analytical basis for the split between dual and single program participation. That is, per the TURN table below, for the reference case 2020, what percentage, if any, of the HERs participants (35% of population) are also participants in the Web program (13% of population)? Also, per the Navigant table above, does dual HERsS and Web program participation equate to the sum of the savings projected from each or something lower?

Navigant Draft Potential Residential Behavior Program Savings PG&E Example				
Penetration Rates Reference Case				
	2016	2020	2025	2030
HERS	27.21%	34.99%	44.71%	54.43%
Web Feedback	10.00%	13.35%	19.17%	27.52%
IHD Feedback	4.00%	5.34%	7.67%	11.01%
Small Comp	0.00%	0.01%	0.01%	0.01%
Large Comp	0.00%	0.14%	0.29%	0.36%
Penetration Rates Aggressive Case				
	2016	2020	2025	2030
HERS	27.21%	42.76%	62.20%	81.64%
Web Feedback	27.21%	42.76%	62.20%	81.64%
IHD Feedback	4.00%	7.00%	14.07%	28.30%
Small Comp	0.00%	0.03%	0.06%	0.06%
Large Comp	0.00%	0.29%	0.57%	0.71%

The power point slide below provides the reference and aggressive forecasts of residential behavioral savings, showing for the reference case approximately 800 GWh/year savings in 2030.



TURN is concerned how the input assumptions on penetration rates discussed above translate on an aggregate basis into a forecast of residential behavioral savings.

The 2015 potential study considered only the HERs program for residential behavior, and assumed a constant penetration rate over time, and significantly lower participation rates for SCE, SCG, and SDG&E relative to PG&E, per the table below reproduced from Navigant's 2015 potential study.³ Starting the HERs reference case penetration rate at 27% in 2016 (see TURN table above) may not be realistic for utilities as a whole. Actual 2016 participation rates

³ Navigant 2015 Potential Study, p. 42.

in HERs for each utility could be provided to support the draft study's assumption. Similarly, the significant increase in HERs penetration rates over time (over 50% in 2030) may require differing utility trajectories to reflect differing start points, depending on the actual program penetration rates in 2016.

TURN would like further explanation as to the near equivalent projected savings in HERs and Web portals in the reference case, given Navigant's recognition that on-line portals are not a current California utility residential customer behavior program. Starting at a 10% penetration rate in 2016 (TURN table), with strong growth thereafter must be grounded in information and data that is currently not provided in the potentials draft. As an opt-in application, the basis for the assumption that that a high proportion of residential customers will log in regularly and closely monitor their energy consumption, must be further justified.

Also, assuming an 11% penetration in 2030 for the IHD program may not be reasonable given Navigant's recognition that this program is not cost-effective (see Navigant first table above showing IHD cost at \$0.26).

Table 3-15: Residential Inputs for 2013 and 2015 Studies

Residential Inputs	PG&E	SCE	SCG	SDG&E
Participation Rates 2014-2026 -- % of Residential Population				
Assumes constant rates of participation, applied to shifting number of customers in each IOU territory by year.				
2013 Study	5.00%	5.00%	5.00%	5.00%
2015 Study	22.62%	4.96%	0.82%	16.00%
kWh Savings Rates 2014-2026 -- % per Household				
Assumes constant savings rates.				
2013 Study	1.80%	1.80%	n/a	1.50%
2015 Study	1.08%	1.40%	n/a	2.60%
Therm Savings Rates 2014-2026 -- % per Household				
Assumes constant savings rates.				
2013 Study	1.30%	n/a	1.30%	0.90%
2015 Study	0.61%	n/a	1.30%	2.00%
Behavior vs. Equipment				
2013 Study	67.00%	67.00%	67.00%	67.00%
2015 Study	100%	100%	100%	100%

Source: Navigant team analysis, 2015

