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BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking Concerning Energy Efficiency Rolling Portfolios, Policies, Programs, Evaluation, and Related Issues	Rulemaking 13-11-005 (Filed November 14, 2013)

COMMENTS OF THE NATURAL RESOURCES DEFENSE COUNCIL (NRDC) ON ADMINISTRATIVE LAW JUDGE'S RULING INVITING COMMENTS ON DRAFT POTENTIAL AND GOALS STUDY

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I. Introduction

NRDC respectfully submits these comments in response to Administrative Law Judge's Ruling Inviting Comments on Draft Potential and Goals Study ("Ruling"). NRDC is a non-profit membership organization with more than 95,000 California members who have an interest in receiving affordable energy services while reducing the environmental impact of California's energy use.

II. Discussion

NRDC recommends that the California Public Utilities Commission ("Commission") and Commission's consultants first address all the errors and areas for improvement that NRDC has identified in these comments before applying the results of the "2019 Energy Efficiency Potential and Goals Study" (2019 PG Study) to develop energy efficiency goals for 2020 and 2021.

NRDC's comments on the Ruling and the 2019 PG Study can be summarized as follows:

- The 2019 PG Study is not informative of incremental energy savings opportunities. The Commission should re-think the scope for future such studies to make them informative.

- Low-income market potential estimates produced by this study are meaningless; Low-income technical potential should inform low-income sector goals through the low-income specific proceeding.
- More research is required to determine industrial sector energy savings potential; industrial sector potential estimates vary significantly in each study iteration.
- Technical issues with the existing PG Study:
    - Weather sensitive measures are modeled incorrectly
    - Erroneous economic potential results should be further investigated and corrected

A. The 2019 PG Study Is Not Informative of Incremental Energy Savings Opportunities

The potential study should provide informed guidance on how utility programs can best target and acquire incremental cost-effective energy savings. This potential study does not accomplish this. The Navigant study applies broad averages and at-best reconstructs existing program portfolios. NRDC understands the importance of ground-truthing the potential model to existing programmatic accomplishments in order to develop reasonable forecasts of future programmatic potential; however, NRDC is concerned that the calibration and forecasting technique applied by Navigant results in a model that mostly replicates existing portfolios – both measures offered by the program and the efficacy of existing programs – thus failing to truly inform the Commission and stakeholders of the incremental achievable energy savings opportunities in California. Given the design of the existing study, NRDC recommends that the study results shouldn't be called "Market Potential," but rather "Existing Programmatic Achievable Potential."

NRDC's assertion on why this study isn't informative can be explained as follows:

- A key assumption of this (and recent) potential study is that market conditions for energy efficiency technologies are the same as programmatic achievements, thereby anchoring key market modeling parameters to programmatic accomplishments. The result of this assumption is that the model considers existing programmatic offerings and market appetite for energy efficiency measures to be one and the same. This is problematic because this key assumption inhibits new energy savings potential in the near-term which

is the time-period for which Commission needs to set energy savings goals. For example, if a high savings potential measure wasn't appropriately offered by existing programs, the potential model will assume that this measure has low uptake and its potential savings will remain low. This effect is exacerbated for measures that aren't offered by existing programs; the market potential for these new measures stays negligible.

- A study update is conducted every two-years and every-two years the potential model is re-calibrated to recent programmatic accomplishments. Thus, the energy savings potential for the initial forecast period is always closely anchored to the recent programmatic accomplishments and shouldn't be expected to be different from these recent accomplishments. To escape this circular reference – where the potential study simply follows recent savings claims and achievements – the potential study needs to thoroughly investigate what additional avenues should be explored by utility programs and how these new additional measures should be captured by programs in the near-term.
- This research task, to determine what additional measures that aren't currently included in the programmatic offerings, is critical to make the potential study informative. If Navigant found that there are no additional measures that programs can offer across all sectors, then the study should clearly state that. Once the study identifies additional measures that programs can offer, or existing measures that programs should invest more resources in, the study should research market condition for these measures integrate these findings into its market adoption forecast. The only newer measures, in NRDC's initial review, are in the behavior, retro-commissioning, and operational (BRO) measure category. All these newer measures were researched and included as a part of the previous study update and have been simply reproduced in this study.

B. Low-Income Market Potential Estimates Are Meaningless; Low-Income Technical Potential Should Inform Low-Income Sector Goals Through a Low-Income Specific Proceeding

Market potential estimates for the low-income (LI) sector should not be calculated through the same algorithm applied to determine market potential for the residential and commercial sectors. This is because parameters that drive customer adoption for resource programs (such as measure payback period, marketing, measure adoption willingness, or word-of-mouth influence) do not apply to LI programs. LI programs directly communicate with LI

customers and offer measures at no cost to qualifying participants. NRDC has repeatedly suggested that precious resources shouldn't be spent on developing a market adoption model for the LI sector.

Moreover, the Navigant study incorrectly constrained measures applicable to the LI sector to only measures historically offered by energy service assistance (ESA) programs.[1] NRDC recommends that the Commission develop statewide technical potential for LI customers for all measures applied to non-LI residential sector. This comprehensive technical potential estimate should help Commission and stakeholders to collectively determine common sense energy savings goals and budgets for the LI sector through the appropriate Commission proceeding.

C. More Research is Required to Determine Industrial Sector Energy Savings Potential; Industrial Sector Potential Estimates Vary Significantly in Each Study Iteration

Although the industrial sector is responsible for approximately 30% of electricity consumption in IOU service territory in California,[2] the potential study estimates programmatic market potential in the industrial sector to be only ~9% of total programmatic potential in 2020. This inconsistency deserves further scrutiny. Per NRDC's initial investigation, the savings potential in the industrial sector is particularly sensitive to assumption updates in each study iteration which are likely derived from recent programmatic accomplishments. This is illustrated by the significant differences in industrial sector market potential estimates from study to study; the average incremental net-energy savings market potential for the years 2020 through 2022 was 112 GWh in the 2015 Study,[3] 159 GWh in the 2018 Study,[4] and 72 GWh in the 2019 PG Study.[5]

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[1] California Public Utilities Commission, Appendix-A in *Administrative Law Judge's Ruling Inviting Comments on Draft Potential and Goals Study* (filed May 1st,2019), 55

[2] NRDC acquired energy consumption data by sector from the California Energy Commission's website energy consumption database: http://www.ecdms.energy.ca.gov/elecbyutil.aspx. The total energy consumption for all sectors in California was approximately 84 TWh in 2017; the reported energy consumption in the industrial sector is approximately 25 TWh.

[3] See tab "Total Incr Potential" in the 2015 Study Results Viewer.

[4] See tab "Total Incr Potential" in the 2018 Study Results Viewer.

[5] See online tab "Market Potential" in the 2019 Study Results Viewer.

NRDC was not able to find any specific reasons for these giant variations in energy savings potential estimates in any of Navigant's reports. Navigant's reports do not indicate a major change in methodology or data across these studies. Some decrease in market potential is expected due to programmatic achievements and evolving baselines, but this extreme pattern requires explanation. Navigant should, at minimum: (1) publish the analysis conducted to develop industrial sector savings estimates for stakeholder review; (2) be transparent regarding the certainty of these estimates; (3) conduct a review of how other jurisdictions determine potential for the industrial sector; and (4) provide recommendations on what data and resources are necessary to conduct an improved analysis.

D. Technical Issues with the Existing Navigant Model

Weather Sensitive Measures Are Modeled Incorrectly

The Navigant analysis first aggregates a measure's climate sensitive savings to determine average- IOU level energy savings and then conducts economic and market potential analysis using this average savings estimate. Energy savings for weather sensitive measures vary significantly (sometimes by a factor of 5)[6] by climate zone, but the incremental cost for the measure stays the same. This leads to unrealistic estimates of cost-effectiveness and customer payback, both important parameters in determining market potential, for weather sensitive measures. Energy savings potential modeling for these measures should take this savings variation into account to be able to develop a more accurate estimate of energy savings potential for weather sensitive measures.

NRDC understands that modeling measures at the climate zone level may be too onerous, we thus (again) recommend that Navigant break-up each aggregated IOU level climate sensitive measure into two measures: one representing the coastal climate zones and one representing inland climate zones. These two sets of measures should then be modeled separately as a part of the technical, economic, and market potential analysis.

[6] NRDC looked up savings for Energy Impact ID "RE-HV-ResAC-45to65kBtuh-19S" in Single Family homes above pre-existing conditions. Savings per unit in DEER currently are 40 kWh/ unit for CZ1 and 206 kWh/ unit for CZ13.

Erroneous Economic Potential Results Should Be Investigated

All the technical potential for a measure translates to economic potential if that measure is assessed to be cost-effective in a given year. NRDC's review of Navigant's measure level results indicates a troubling trend. Approximately 1,400 (~33%) of the total gas and electric measures considered by Navigant have an economic potential that is a fraction (instead of being equal to technical potential if the measure is cost-effective or being zero if the measure isn't cost-effective) of the technical potential in year 2020. Some measures even have negative economic potential savings even though they have positive technical potential savings. Moreover, some measures have economic potential estimates that are much greater (by a factor of 20) of the technical potential estimates.

These trends are concerning for multiple reasons: Firstly, although the economic potential model is separate from the market potential model, both models share common inputs. So, these errors may promulgate to the market potential model as well. Secondly, economic potential estimates determine the upward bound of the market potential; so, it is essential to have an accurate economic potential estimate to be able to forecast market potential. Finally, the difference between economic and market potential is important to understand what additional potential could be captured if programmatic efforts were expanded. Therefore, an accurate estimate of economic potential is necessary.

These errors exist for small savers as well as for high impact measures. Three prominent examples are summarized in Figures 1 through 3 below. These figures have been constructed using data in the publicly published measure level results spreadsheet.[7]

Figure 1. Technical and Economic Potential Savings for a High Impact Lighting Measure for the year 2020 in the Navigant Study

Utility	Measure	Building Type	Savings Type	Technical Potential	Economic Potential - Reference Scenario
SCE	Res | LED Lamp with Adv Ltg Ctrls (Basic High -16.5 W Indoor)	Res - Single Family	Electric Energy (GWh/year)	109	109
SDG&E	Res | LED Lamp with Adv Ltg Ctrls (Basic High -16.5 W Indoor)	Res - Single Family	Electric Energy (GWh/year)	36	36
PG&E	Res | LED Lamp with Adv Ltg Ctrls (Basic High -16.5 W Indoor)	Res - Single Family	Electric Energy (GWh/year)	140	9

Figure 1 shows incorrect economic potential savings for a cost-effective high impact lighting measure. The economic potential is erroneously shown to be 6% of technical potential in

[7] "2019 PG Measure Level Results Database" available at https://www.cpuc.ca.gov/General.aspx?id=6442461220

PG&E service territory. The economic potential for the same cost-effective measure is correctly equal to technical potential in SCE and SDG&E service territories.

Figure 2 shows the error in economic potential estimates for a cost-effective high impact HVAC measure; this economic potential is a very small fraction of the technical potential for all IOUs. If the measure is truly cost-effective, then the technical potential should equal the economic potential in all cases. Else the economic potential for this measure should be zero.

Figure 2. Technical and Economic Potential Estimate for a High Impact Residential HVAC Measure for the year 2020

Utility	Measure	Building Type	Savings Type	Technical Potential	Economic Potential - Reference Scenario
SCE	Res | Variable Capacity Space Conditioning System	Res - Single Family	Electric Energy (GWh/year)	1,867	74
SDG&E	Res | Variable Capacity Space Conditioning System	Res - Single Family	Electric Energy (GWh/year)	264	11
PG&E	Res | Variable Capacity Space Conditioning System	Res - Single Family	Electric Energy (GWh/year)	1,082	45

Finally, Figure 3 presents an example of a measure that has positive technical potential but negative economic potential.

Figure 3. Technical and Economic Potential Estimate for a Commercial HVAC Measure for the year 2020

Utility	Measure	Building Type	Savings Type	Technical Potential	Economic Potential - Reference Scenario
PG&E	Com | Geothermal Heat Pump	Com - Office (Large)	Electric Demand (MW)	1.23	-0.16
SCE	Com | Geothermal Heat Pump	Com - Office (Large)	Electric Demand (MW)	1.94	-0.17

Individually some of these anomalous results could be considered as one-off errors. Considered together, these results are concerning and undermine the confidence in the model's estimates.

III. Answers to Questions in the Ruling

A1. Commission staff proposed five scenarios that attempt to capture a reasonable range of energy efficiency potential for 2020-2030. Which scenario – either in the Navigant study or an alternative recommendation – is most appropriate to inform 2020 – 2030 goals? Justify your recommendation.

The Commission should select Alternate Scenario 1. Alternate Scenario 1 represents a future through which utility programs maximize energy savings while (1) operating in a business-as-usual manner, and (2) maintaining a portfolio level cost-effectiveness ratio greater than 1.25. This scenario also best conforms to P.U. Code sections 454.55(a)(i) and 454.56(a),

which require the Commission to identify all potentially achievable cost-effective energy efficiency savings and establish utility energy efficiency targets based on this assessment.

A2. Do you recommend alternative values for any of the inputs or modeling used in the Navigant study? If so, specify the particular input or modeling (with section or page references, if applicable) and your recommendation for alternative values. Justify your recommendation and provide references. In particular, we invite responses regarding the following specific assumptions used in the Navigant study:
a. Do you agree with the cost assumptions used in the Navigant study? Explain why or why not, and (if applicable) provide references to alternative sources of information for specific cost assumptions used in the Navigant study.

The 2010-2012 WO017 Ex Ante Measure Cost Study Final Report ("ITRON Cost Study")[8] is the basis for technology costs for most deemed measures in the Database for Energy Efficiency Resources (DEER) and this study. The central objective of the ITRON Cost Study was to determine the incremental cost of measures attributable solely to efficiency increase through hedonic price modeling. The resulting incremental cost estimates thus exclude the impact that non-energy/ non-efficiency features have on the incremental costs of energy efficient equipment.

The study authors should ensure that incremental costs applied for all measures are consistent in meaning. As it stands, the incremental costs for a subset of the measures represents the incremental cost of solely efficiency increase while others represent the full difference in measure price. This difference in incremental cost meaning results in the potential model incorrectly favoring some measures over the other. Moreover, the study authors should critically examine which incremental cost – cost of efficiency increase or total incremental cost – should drive measure adoption.

[8] http://www.calmac.org/publications/2010-2012_WO017_Ex_Ante_Measure_Cost_Study_-_Final_Report.pdf

A2b. Do you agree with the assumptions used in the BROs section of the Navigant study? Explain why or why not, and (if applicable) provide specific references to alternative sources of information for specific assumptions used in the Navigant study. In particular:
i. HERs represent a significant amount of incremental electric savings in 2020. Do you agree with the assumptions used to forecast HERs energy savings in this study?
ii. The Navigant study includes new items in BROs forecasting, which indicate significant savings potential. Do you agree with the building benchmarking and universal audit tool assumptions used to calculate BROs savings?

NRDC does not have a response to this question at this time.

A2c. Whole Building rebate programs represent a significant portion of potential savings. Whole Building rebate programs encompass elements from multiple technology types and construction measures. Do you agree with the assumptions used in the Whole Building section of the Navigant study? Explain why or why not, and (if applicable) provide specific references to alternative sources of information for specific assumptions used in the Navigant study.

NRDC does not have a response to this question at this time.

A2d. Do you agree with the assumptions used in the Low-Income section of the Navigant study? Explain why or why not, and (if applicable) provide specific references to alternative sources of information for specific assumptions used in the Navigant study.

The methodology presented by Navigant to calculate the technical potential in the Low-Income (LI) sector is a good first step. However, the data that inform the assumptions have not been released for public review. It is thus impossible to provide a pointed response to this question.

A3. Should the Commission adopt goals that include energy savings potential from the low-income sector? Explain why or why not.

The LI sector's energy savings goals should not be determined through the market potential estimates calculated in this Navigant Study. Technical potential estimates for all applicable measures in the LI sector should inform the development of common-sense goals for the LI sector through the LI specific proceeding. Market potential estimates obtained through the

application of the current market potential model is meaningless for the LI sector because the model does not correctly represent the mechanism by which LI programs operate. Please refer to Section II.B of these comments for further details.

A4. In D.10-04-029, the Commission adopted a different process for crediting savings from comparative energy use (e.g., HERs) programs, prohibiting the utilities from submitting workpapers for ex ante numbers to project savings for these programs; instead, savings from these programs can only be credited after the Commission verifies them. Results from HERs program impact evaluations have been consistently high for the past several (approximately seven) years. Should the Commission continue to evaluate home energy report behavior programs that have had consistent evaluation results for several years?

The Commission should stop evaluation HER programs if they are certain that reliable ex-ante savings can be determined through analysis of existing evaluation reports. To meet this end, the Commission should ask its ex-ante team to conduct an analysis of HER evaluations to determine whether these reliable ex-ante estimates can be developed. As the nature of participants in HER programs is expected to evolve, the ex-ante team would have to carefully determine scalable per-unit savings for HERs.

A5. What are the impacts of reduced energy savings goals, if adopted by the Commission? Should reduced energy savings goals result in smaller portfolio budgets, going forward? Explain why or why not, and (if applicable) how much smaller.

NRDC does not have a response to this question at this time.

A6. Given the changes in potential for 2020, should there be any changes to the required components of annual budget advice letters (ABALs) due from the PAs in September 2019, and/or to the process or criteria for reviewing the September 2019 ABALs (Sections 7.2 and 7.3 of D.18-05-041)? Explain why or why not. Any recommendations in response to this question should focus on new ideas and not repeat recommendations previously made and that the Commission has already dismissed.

NRDC does not have a response to this question at this time.

IV. Conclusion

NRDC appreciates this opportunity to comment on this Ruling and looks forward to working with the CPUC and stakeholders to further improve the PG Study.

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Respectfully submitted,

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