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Comments on Potential & Goals 2021 Study

Submitted by Recurve, Carmen Best 12/10/2019

Overview

California is at a critical time of transition. The Potential and Goals study for energy efficiency is an important link for meeting the state's decarbonization goals. However, the existing construct for establishing potential, setting goals, and implementing energy efficiency programs needs to be overhauled to meet these goals in an efficient, streamlined manner. California needs to recalibrate its myriad of historic policies and well-intentioned programs to ensure that all are properly valuing demand flexibility resources in order to support a reliable, decarbonized grid.

Recurve appreciates the opportunity to submit comments on the potential and goals analysis, and limits our comments to the resource acquisition components of the portfolio. As recognized in the staff white paper in 2018, not all resources are appropriate to consider in the Integrated Resource Plan. We wish to see a robust path for the competitive procurement of demand flexibility resources that can deliver value to the grid to enable market-based decarbonization at scale.

With some important modifications, energy efficiency has a new opportunity to support the grid as a demand flexibility resource. However, efficiency's position as "first in the loading order" must be earned - increasingly, the when and where demonstrates a resource's value. Value for efficiency and other resources should be determined using a common valuation structure applicable across resources and procured first at the local level, rather than statewide. Separately, efficiency that is intended to reach objectives beyond resource acquisition should be funded and valued on a different track.

The potential and goals study needs to evolve to meet these new objectives for energy efficiency as part of the demand flexibility paradigm through the following core changes:

1. Focus on quantifying the potential to reduce GHG emissions through changes in metered energy consumption (NMEC) and on a least cost basis compared to other resources, to align with the load forecast (IEPR) and with the IRP.
    - Include all demand-side opportunities for reducing GHG emissions
    - Integrate the EE / DR potential studies at a minimum
    - Include combined potential from EE + decarbonization programs (BUILD/TECH)
2. State Agencies, Load Serving Entities and other Program Administrators should be the primary audience for the analysis and consulted in its development.

- The California Public Utilities Commission (CPUC), the California Energy Commission (CEC), California Air Resources Board (CARB) and the California Independent System Operator (CAISO) are all responsible for meeting the state's decarbonization goals, and the potential analysis must provide a common view of the potential to cost-effectively reduce GHG emissions and enable a transparent means of tracking progress.
- Methods to identify potential should be consistently and transparently quantifiable at the local (REN, CCA, IOU) level to provide actionable information for deploying and tracking demand flexibility resources.
- Load serving entities and other program administrators should have the ability to plan and track their own portfolios to capture potential and not be dependent on the CPUC consultant analysts for fixed outputs.
- Specific locations and value of distribution system needs should be key inputs into the potential modeling if not already captured in the avoided cost calculator.

3. RENs, CCAs, and IOUs should propose their own goals based on identified potential and system needs and procure that potential at the least cost.
    - Return to a model in which program administrators propose the budget to capture the potential.
    - Modify the Energy Savings Performance Incentive (ESPI) to focus on incentives for least cost capture of greatest GHG potential.
    - Adopt a market procurement requirement rather than a cost-effectiveness test. Resource acquisition procured via auction and GHG reductions paid via performance is a path to ensure cost-effective impacts for ratepayers without the pitfalls of over-prescription.
4. Leverage centralized consumption data sets across agencies (CEC-CPUC) to avoid duplication of IT resources and enhance transparency, consistency and accessibility of the demand forecast IEPR (CEC) and the IRP (CPUC) as well as enable visibility for CAISO and CARB to track impacts of the interventions.

Answers to the specific questions posed by the CPUC Staff are provided in the following pages. We welcome comments and discussion on our recommendations.

Respectfully Submitted,

Carmen Best

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RECURVE

CPUC posed Questions for Consideration

1. What should be the primary objectives of the Potential and Goals study?

The primary objective of the potential and goals study should be to identify the potential for load serving entities and program administrators to capture the resource in their jurisdictions, and inform the load forecast including contributions to resource adequacy. It should do so in a consistent manner that is accessible to all stakeholders for their own planning purposes and grounded in changes in consumption.

The potential study should be geared toward supporting competitive markets for procurement of demand-side carbon reductions. Consumption-based analytics, including identification of heating and cooling loads, as opposed to technology-specific analytics, can be used to estimate potential for the load forecast (IEPR) and by the IRP to define long term planning needs.

The actual procurement of those resources should then be in the hands of load serving entities. Load serving entities and program administrators should have the ability to leverage third party aggregators to procure a wide range of technology-agnostic solutions to decarbonize the grid through demand side investments that complement grid operations. The potential study should provide the initial projections; metered changes in energy consumption should form the basis for tracking progress.

The primary audience for the potential analysis should be load serving entities, the California Public Utilities Commission (CPUC), the California Energy Commission (CEC), California Air Resources Board (CARB) and the California Independent System Operator (CAISO). In line with the joint accountability for decarbonization that these entities share, the potential analysis should provide a common view of the opportunity to cost-effectively reduce GHG emissions and a common view of progress. The Joint Agency Steering Committee (JASC) and the Demand Analysis Working Group should play a core role in ensuring this analysis is aligned with forecasting needs and tracking impacts across the agencies.

2. Topic-specific considerations: Do you agree with the considerations discussed at the workshop regarding the issues below? Why or why not? Please propose specific methodological improvements if you feel any are needed. Please refer to the Navigant-produced abstracts including the methodological considerations, key questions and data needs described for each topic.
    1. Energy efficiency-demand response analysis

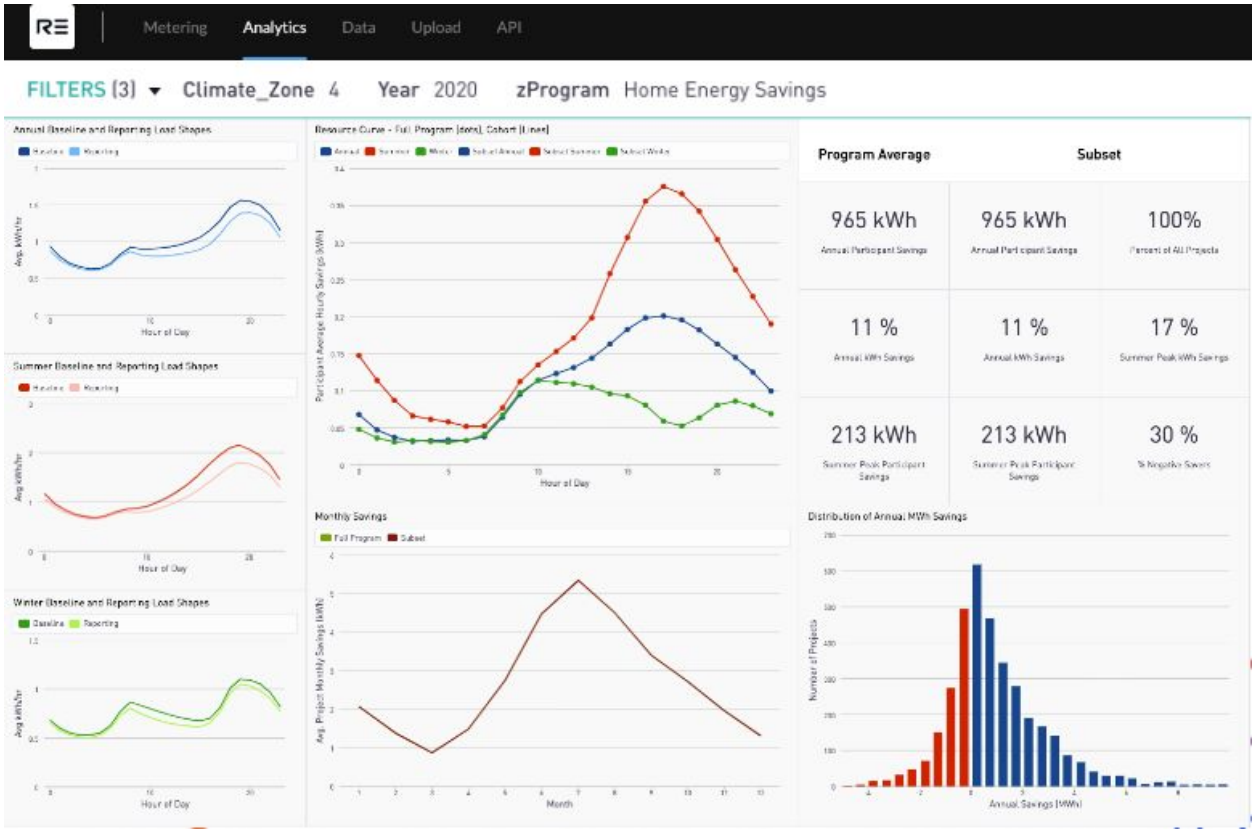
Energy efficiency, demand response, and strategic electrification should all be included in the process of identifying the potential for reduction in GHG based on changes in consumption. This integration is important to ensure that the outcomes are aligned for efficient deployment of these resources. Funds, public and private, must be deployed in a

complementary way to reach the desired outcome of a decarbonized grid within the timeframes expected. It is particularly important that strategic electrification is not isolated from the EE and DR potential given its potential to increase load at the "dirtiest" times of the day.

The potential to integrate existing studies (for EE and DR in particular) was evident at the CPUC workshop this fall. The presentation by Andrew Satchwell from LBNL, the well-documented demand response potential study, and the CEC-sponsored analyses of consumption trends shown by Recurve demonstrate these possibilities. The 2021 potential study should have a dedicated track for refining approaches to using hourly consumption data to analyze historic trends and impacts and target future integrated interventions based on consumption patterns and the value of future avoided costs. In particular, multiple recent studies[1] have shown that when programs are targeted at customers who exhibit specific usage characteristics that signal performance potential, savings (and cost-effectiveness) can be significantly improved. The current approach of assessing the average performance of a measure across a population therefore misses cost-effective potential that a program could achieve if focused on the customers most in need of the intervention.

In the 2021 potential analysis, the CPUC should conduct meter-based analysis of load reductions and time-sensitive savings from past programs to inform potential for long-standing programs. While these programs may not fully represent future designs, the scale of impacts at varying times of day are the best available data to inform the potential for demand impacts from demand-side interventions and provide valuable information for identifying targeted potential for the future. To establish an actuarial feedback loop for the future, the CPUC should require (and accommodate in reporting) submission of pre-post meter-based analysis, and actual load shapes (resource curves), for every utility, CCA and REN portfolio. (See the example below, which shows results of CalTRACK hourly measurements of a program's load impacts and the corresponding marginal avoided costs and emissions reductions.)

[1] a.) *Customer Targeting for Residential Energy Efficiency Programs: Enhancing Electricity Savings at the Meter*, A.M. Scheer, S. Borgeson, K. Rosendo, 2017; b.) *Energy Efficiency Program Targeting: Using AMI Data Analysis to Improve At-the-Meter Savings for Small and Medium Businesses*, S. Borgeson, A.M. Scheer, R. Kasman et. al. 2018; c.) *Customer Targeting via Usage Data Analytics to Enhance Metered Savings*, 2018 ACEEE Summer Study, A.M. Scheer, S. Borgeson, R. Kasman et al.


Metering
Analytics
Data
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FILTERS (3)
Climate_Zone 4
Year 2020
zProgram Home Energy Savings
Annual Baseline and Reporting Load Shapes
Summer Baseline and Reporting Load Shapes
Winter Baseline and Reporting Load Shapes
Hour of Day
Monthly Savings
Month
Program Average
Subset
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11 %
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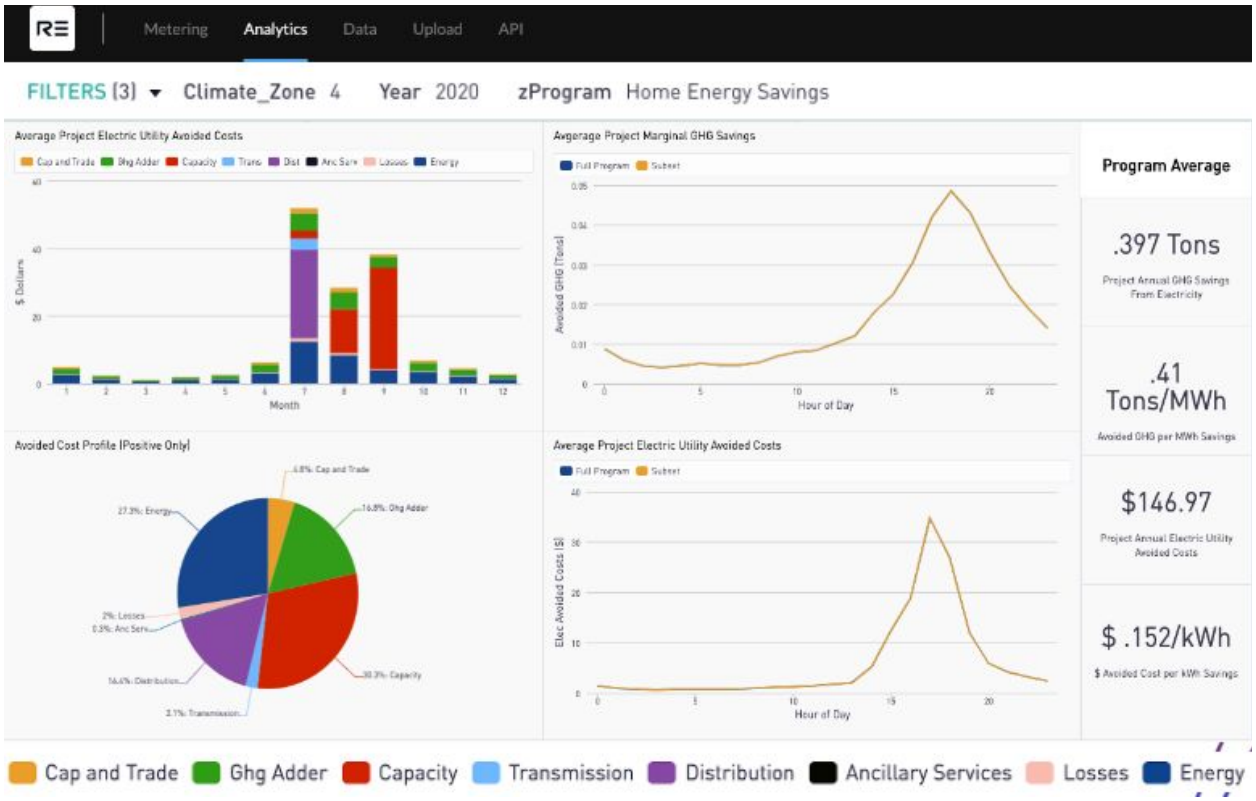
17 %
213 kWh
213 kWh
30 %
Distribution of Annual MWh Savings
Annual Savings (MWh)


Metering
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Upload
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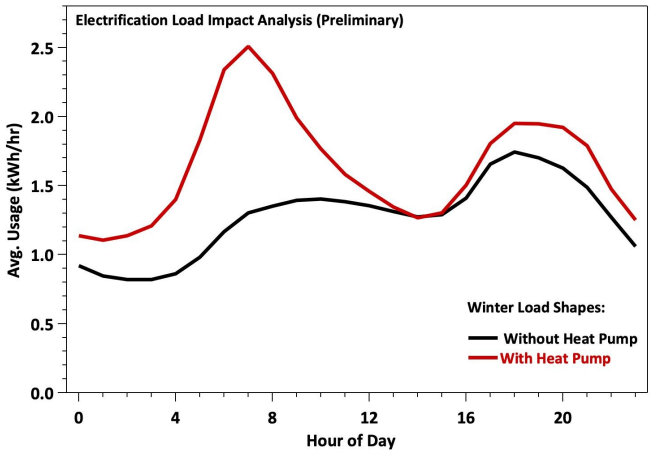
FILTERS (3)
Climate_Zone 4
Year 2020
zProgram Home Energy Savings
Average Project Electric Utility Avoided Costs
Month
Avegerage Project Marginal GHG Savings
Hour of Day
Program Average
.397 Tons
Project Annual GHG Savings From Electricity
.41 Tons/MWh
Avoided GHG per MWh Savings
$146.97
Project Annual Electric Utility Avoided Costs
$ .152/kWh
$ Avoided Cost per kWh Savings
Avoided Cost Profile (Positive Only)
Average Project Electric Utility Avoided Costs
Cap and Trade
Ghg Adder
Capacity
Transmission
Distribution
Ancillary Services
Losses
Energy

The **current construct of technical, economic and achievable potential should be replaced with a minimum demand flexibility procurement requirement** informed by a cross-resource potential analysis. Given that SB100 is riving toward 100 percent renewable grid, the technical potential for demand side resources could be reframed under the construct of a fully decarbonized grid. The Potential study would then identify short, medium, and long-term need for demand flexibility resources to make sufficient progress toward SB 100 targets. In this construct, a minimum procurement requirement could better reflect the practical need and timeline for demand flexibility resources relative to the alternatives for decarbonization. For example, to what degree is demand flexibility a more cost-effective and practical option compared to utility scale solar + storage? This question should be considered in both the short term and long term as demand flexibility will ultimately be required due to technical limitations of utility-scale alternatives.

2. Fuel Substitution

Fuel substitution must be considered in the context of the potential analysis. The new opportunity to put energy efficiency funds to fuel substitution further emphasizes the need to frame potential around GHG potential not just savings. It is also important that the opportunities for fuel switching are synchronized with general building electrification initiatives (BUILD and TECH), as opposed to creating another silo of customer interactions.

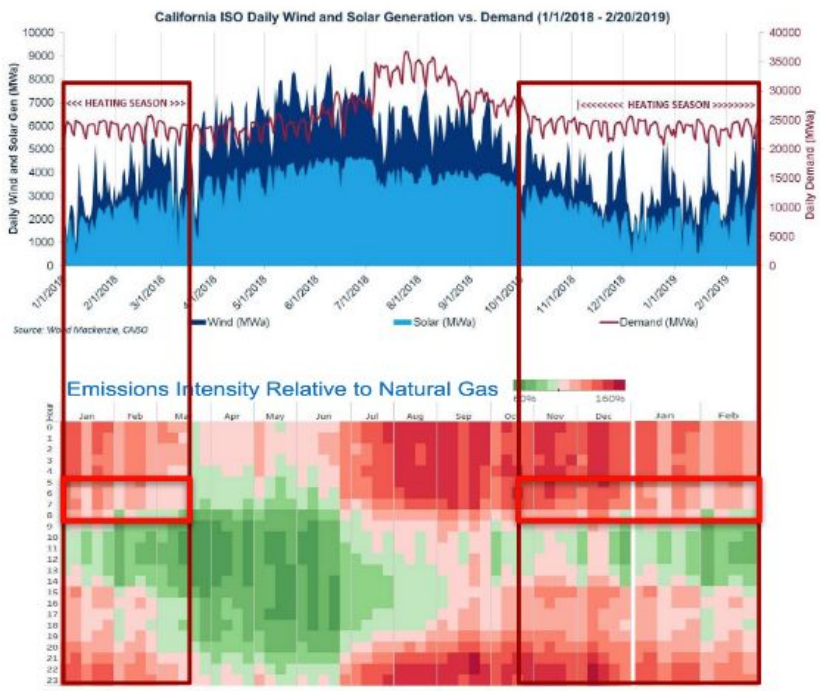


Electrification must be paired with effective demand flexibility to manage new system peaks and achieve cost-effective carbon reduction.

Accurately calculating metered reductions in GHGs across all fuels, plus quantification of grid avoided costs supports a common valuation principle that puts gas savings, electrification load impacts, and complementary demand flexibility all on the same footing.

Quantifying both decarbonization and grid avoided cost is essential, as the increased load from electrification will create new grid dynamics such as a winter morning peak and increased evening usage driven by heat pump space heating.

To fully decarbonize the grid, electrification must, therefore, be complemented by an increased supply of wintertime optimized renewables, energy storage, and behind the meter demand flexibility.



Tracking and procurement of demand flexibility at the meter will allow load serving entities and the CPUC to accelerate decarbonization through beneficial electrification combined with the full range of generation, storage, and load-balancing tools required to decarbonize the grid.

Metered pay-for-performance (P4P) is the programmatic mechanism by which load serving entities and the CPUC can cultivate markets, leverage AMI data, and integrate demand-side resources--all foundational elements of an electrification strategy built for long-term success. In short, the Potential and Goals study should contemplate holistic, integrated, performance-based programs (efficiency, demand response, and fuel switching) where metered load impacts and corresponding marginal GHG reduction are the objectiv

3. Data and analysis for RENs and CCAs (including which items are critical to be included in the Potential and Goals Study itself).

The potential study's primary audience should be load serving entities and the state agencies responsible for decarbonization goals. IOUs and CCAs clearly have direct responsibilities as load serving entities, and RENs have overlapping customer-bases for both CCAs and IOUs. Harmonizing operations across these entities requires a common access to data, transparent approaches, and the ability to optimize their own efforts while synchronizing across the jurisdictional boundaries.

The **potential analysis should be accessible to RENs and CCAs (and IOUs) to conduct their own analysis of optimizing potential**. This requires location-specific results for sector and building type bundles. The information should be aligned with the distribution system plans in their areas, and with an intent for opening local procurement opportunities and targeted programs in those locations.

RENs, CCAs, and IOUs should have access to the consumption data in a user friendly manner or analytic platform. This information would be foundational for transparent and data-driven

Business Plans, Budget Advice Letters, and local procurements, as well as the review of these plans by the CPUC and other stakeholders.

4. Industrial and/or agricultural market sector characterization and analysis

No Comment

3. Overall Methodology:
    1. What are the opportunities and challenges of a "top down" assessment of energy efficiency in comparison to the current "bottom up" widget-based approach? Please provide evidence to support your answer.

The "top down" consumption-based analysis is **better aligned with potential expected via SB350 and AB802 calling for normalized metered energy consumption (NMEC)** to guide the portfolios. As the need for integrated solutions becomes more urgent to meet decarbonization goals, the range of measure combinations and innovative market solutions surpass the assessment capabilities of a centralized planning model. Price signals and market-based deployment to capture decarbonization potential is more readily reflected in a top-down analytical framework and coupled with an on-going actuarial feedback loop.

In addition, this approach can **better align with the CEC forecast, which ultimately tracks and forecasts trends in consumption**. When derived from a site-specific calculation and rolled up in aggregate (rather than earlier top down approaches of statewide regression analysis) the outputs can be used in a myriad of planning applications from local procurements to assessing contributions to resource adequacy to the IRP - all with actual consumption data as the foundational analytical input and instrument.

As the range of possible interventions expands to reach the scale needed for decarbonization, a top-down method **provides the necessary simplicity and flexibility to adapt approaches over time**. Cross-jurisdictional synchronization is essential as the breadth of load serving entities expands. Aggregated analysis is compatible with tracking at any given jurisdictional level, down to the site and up to the state - and everywhere in between. This kind of analysis captures the range of possible impacts without overcomplicating the ideation of every technical intervention possible.

The current bottom-up, technology specific approach **is no longer in line with the state objectives to decarbonize or quantify changes in meter-based consumption**. The current approach is limiting opportunities for cross-technology solutions and carbon optimization. It also provides no incentive to market actors to deliver more than the deemed predefined value, even with an ex post savings incentive mechanism for the utilities.

2. If staff were to consider using "top down" methods to assess energy efficiency savings potential, how could the study transition? Please identify areas/topics

that could be incorporated in the 2021 study and areas/topics that may need further study and data collection.

There are three key elements to transition in the 2021 Potential study:

First - meter everything. Compile all of the hourly historic consumption data for 2019 and 2020 if it is not already available from the demand response potential study. Collaborate with the California Energy Commission to resurrect the 2014-15 analysis/interface for natural changes in energy consumption for year on year for non-participants and update to include hourly analysis capabilities of the OpenEEmeter.

Identify participants in energy efficiency programs and demand response programs in the data set, and also identify customers for IOU, REN and CCA jurisdictions.

Make the analytical tool(s) accessible to all stakeholders with proper screens for data privacy.

Second - integrate analysis of resources. Analyze meter-based past performance of programs, naturally occurring trends in consumption and GHG reductions, and identify the potential for time-valued impacts of energy efficiency and demand response based on current consumption. Use this as the basis for informing updates to the potential analysis.

Design an analysis for demand flexibility potential for carbon redux. It may be reasonable to conduct a demonstration in 2021 with a utility, CCA and REN with overlapping service territories that are already tracking meter-based consumption. Analyze the potential to reduce carbon through demand response, energy efficiency and strategic electrification and allow these entities to utilize the analysis in formulating updates to their business plans.

In addition to the analysis presented by Andrew Satchwell of LBNL at the workshop, two other studies recently released by LBNL on the time value of energy efficiency further illustrate the need for integrated valuation and may offer some interim strategies for integrated analysis.[2]

Third - establish a data feedback loop for future analysis. The CEC is projected to have a consistent flow of statewide AMI data ready for web access by next year. The CPUC can complement this data set by establishing (in collaboration with the CEC) submission of actual load shape changes (or resource curves) by all program administrator portfolios in 2021. These submissions should include impacts from EE, DR and strategic electrification interventions.

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[2] Frick, Natalie Mims, Ian M Hoffman, Charles A Goldman, Greg Leventis, Sean Murphy, and Lisa C Schwartz. ***Peak Demand Impacts From Electricity Efficiency Programs***. 2019. Report PDF

Frick, Natalie Mims, and Lisa C Schwartz. ***Time-Sensitive Value of Efficiency: Use Cases in Electricity Sector Planning and Programs***. 2019. Report PDF

3. Are there process changes or any additional rule-setting the CPUC must consider in order to support this transition?

The primary process change that the CPUC needs to consider is **taking quick action on developing a common valuation framework** for all behind the meter resources. This should not impede the transitions described above. It is essential to harmonize the myriad of policies intended to drive to a decarbonized future into a clear price signal and appropriate procurement mechanisms. California will not achieve our goals through the balkanized silos of our historic efforts.

A related process change would be to **recalibrate program administrator business plans for carbon optimization rather than cost-effective energy savings defined by the total resource cost test**. More incremental adjustments could include shifting to the program administrator cost test to better align the resources with their grid value and not penalize co-investments by participants or other entities.[3] It is imperative that the Commission modify its approaches to cost-effectiveness to enable market-based programs that can drive the necessary scale of investment needed to decarbonize the grid.

In addition, **moving to a meter-based paradigm** (and opening reporting opportunities for actual load shapes) will help reduce uncertainty from DEER load shapes in determining cost effectiveness. Based on Recurve internal analysis, using the DEER Res AC load shape, and 2025 avoided cost projections for Climate Zone 4 as a basis, shifting the hour by - 1 would reduce total avoided costs by -19%; but shifting the hour +1 would increase the avoided costs by + 7%. This high degree of sensitivity illustrates the uncertainty in using DEER load profiles and the need to report actual 8760 metered results. In addition, this analysis demonstrates the need for the Potential and Goals study to contemplate demand response and load shifting strategies as critical elements that energy efficiency programs must deploy in order to achieve cost-effectiveness, maximize grid value and achieve decarbonization targets.

4. Please identify any specific data sources that should be considered for incorporation into future potential and goals studies, and explain the value of incorporating each data source, either in addition to or as a replacement to an existing data source.

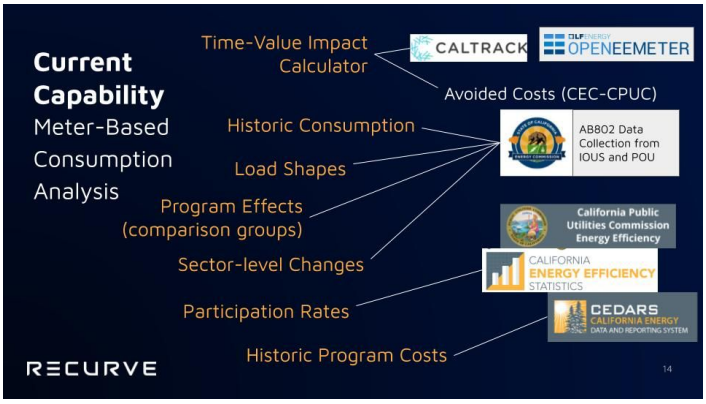
Most of the data sources that are needed to incorporate into the future potential and goals study are available but need to be integrated into the analysis:

- **Historic consumption data and program data** (CPUC/IOU); allows for tracking of naturally occurring changes in consumption as well as the meter-based influence of

[3] *Rethinking Cost Effectiveness to Meet the Needs of the Modern Grid*, https://www.recurve.com/blog/rethinking-cost-effectiveness-to-meet-the-needs-of-the-modern-grid

discrete interventions/programs that can start forming actuarial feedback loops to improve performance and target interventions.

- **Distribution resource plan data** (CPUC/IOU) supports targeting potential to constrained areas and include location appropriate value (if not already included in avoided cost calculators) to identify highest value economic potential.



- **Building Type / Geographic bundles:** Identifiers by zip code, service territory, NAICs, building type, rate class, program administrator eligible participant will help disaggregate the potential analysis to make it most useful to load serving entities to incorporate demand flexibility resource into their plans.

The following table provides an overview of the basic information "trade" that an alternative potential analysis would have compared to the current approach:

Status Quo:	**Market Optimized**
Measure-based choice analysis Technology adoption costs - driver - Savings goals - Measure-based - Portfolio default	Actuarial consumption analysis Marginal price of avoided alternative + Carbon goal + Meter-based / TSV + Procurement default
INPUTS: Cost-effectiveness Calculator Technology Adoption Rates DEER Work Papers Incremental Cost Participation Rates	INPUTS: Time-Valued Savings Calculator Load Shapes Program Effects Historic Consumption Sector-level Changes in consumption Historic Program Costs Participation Rates

4. Energy Efficiency – Integrated Resource Planning Incorporation Opportunities:
    1. Should staff consider optimization of energy efficiency in the Integrated Resources Planning (IRP) process in the 2021 Potential and Goals study? If yes, how? If not, why not?

With a valuation framework that is not rooted in the TRC, but instead allows program administrators and implementers to engage markets and leverage private capital, we strongly support inclusion of resource acquisition energy efficiency in the IRP planning process. The adjustments necessary for the common valuation across resources and an integrated meter-based potential analysis should be a top priority to enable inclusion as soon as possible.

2. The EE-IRP Staff Whitepaper identified areas where process modifications and further rule development may be necessary for optimization of energy efficiency in the IRP. Do you agree with staff's proposal? Why or why not?

RECURVE, formerly OpenEE, submitted detailed comments on the staff proposal in 2018 along with many other stakeholders. Our positions on the staff white paper have not changed. We agree with the staff proposal to integrate the potential analysis with the IRP as well as the need to separate the portfolio into the resource acquisition portions that are appropriate for the IRP from the many other objectives of the current energy efficiency portfolio.

3. What role should IRP optimization of energy efficiency resources play in the development of the Study and energy efficiency goal setting?

The **IRP optimization of demand flexibility resources, including energy efficiency, should be central to the potential study** and the deployment of resources by load serving entities to use demand flexibility as a true resource. This is a key pathway to scale demand flexibility as a meaningful resource, not a siloed effort with constrained funding and siloed implementation.

The primary objective for the potential study should be to identify potential for carbon optimization through demand flexibility to inform the IRP, IEPR (addressing both demand reductions and resource adequacy opportunities). This potential should be used to drive local procurements by identifying the least-cost opportunities for decarbonization at the margin.

5. The Evolving Energy Efficiency Portfolio:
    1. What policy-level changes (if any) should the CPUC begin to consider related to energy efficiency goal setting, to best align energy efficiency programs with the needs of California's clean energy future?

The Commission should pursue new comprehensive performance based regulations to recalibrate the myriad of policies toward tangible, traceable outcomes and enable harmonization of resources to decarbonize through market signals and engagement. Three key policy changes enable this transition:

1. Establishment of a **common valuation structure** that encourages private clean energy investment and allows for comparison of resources and integrated delivery solutions (discussed above).

2. An i**ntegrated approach for establishing potential** for demand flexibility (also discussed above).

3. **Integration of the incentives and targets around GHG reductions**. By returning to a model in which program administrators (utilities, CCAs and RENs) propose their own goals for optimizing GHG reductions. Their incentives for delivering would be based on the scale of reductions they can achieve and the associated marginal cost. The incentive structures could be incorporated into the general rate case as performance-based metrics or in the interim to modify the Energy Savings Performance Incentive structure to focus on these metrics.

Demand flexibility needs to be the focus for load serving entities to optimize their resources around decarbonization. California has too many silos for delivery that are already coming into conflict or operating at cross-purposes. We risk wasting significant amounts of ratepayer and other resources if the delivery mechanisms are not simplified and synchronized. Data infrastructure and analysis should be grounded in opportunities for changes in normalized metered energy consumption (NMEC).

2. What processes should the CPUC use to explore these changes?

The CPUC should put **common valuation on a fast track** in the IDER proceeding to have a meaningful comparison across resources that can also be used in the IRP and IPER. Workshops or staff white papers to explore alternatives could be a first step.

Integrated potential for all resources can begin in the 2021 Potential analysis with a dedicated track to consider methods for combined potential for energy efficiency and demand response. Include strategic electrification potential (via BUILD and TECH) in the potential analysis alongside EE and DR.

A re-assessment of **performance based regulations to harmonize all proceedings** may require legislation or higher level Commission action. In lieu of that longer term request, the CPUC could re-open the Energy Savings Performance Incentive structure (ESPI). The Commission could include a carbon intensity "kicker" in the incentive mechanism and simplify or remove other metrics that are focused on individual technology deployment. Greater incentives should be provided for the achievement of maximum potential, incorporating time-sensitive meter-based tracking (to support feedback loops), and demonstrating grid value.

6. What other topics related to the Potential and Goals Study need consideration leading to the 2021 P&G Study, aside from those discussed at the October workshop and in the

Navigant abstracts? Would you prioritize those topics above those discussed at the workshop? If yes, why?

Integration of BUILD and TECH in the potential analysis should be discussed and should be prioritized as part of a holistic potential analysis for decarbonization.

The Potential and Goals Study should also **address the urgency of inter-agency collaboration** among the CPUC, CEC, CAISO and CARB to develop a potential analysis that clearly integrates into forecasting, planning, resource adequacy, and decarbonization.

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