



**Notes regarding submitting comments on this Draft Work Product:**

**Comments are Due April 20, 2018.**

**Comments shall be no longer than 5 pages.**

**Comments should be submitted to [LDBPcomments@ebce.org](mailto:LDBPcomments@ebce.org)**

# **Integrated Resource Plan Methodologies**

*for*

***East Bay Community Energy***

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## INTRODUCTION

Integrated resource plans (IRPs) have stood as commonplace power resource planning documents for decades. They have informed the energy purchasing practices of investor-owned utilities (IOUs), publically-owned utilities (POUs), and more recently Community Choice Aggregators (CCAs). IRPs have traditionally focused on equipping utilities to achieve competitive energy costs and subsequent low rates for customers through a combination of short and long term power contracts filled from the wholesale market. These procurement decisions are often accompanied by energy risk management (ERM) policies that define how far in advance commitments to energy purchases are made to meet forecasted energy supply needs.

Until recently, IRPs have not been a regulated requirement for CCAs like EBCE. However, with California's focus on the mitigation of GHG emissions and the decarbonization of the State's energy system, IRPs have become a mandated requirement under SB350.<sup>1</sup> Crucial to SB350 is the increasing Renewable Portfolio Standard (RPS) requirements and energy efficiency goals designed to reduce carbon intensity within the energy system. As a result, SB350 (and the portfolio standards it creates) directly impacts the procurement decisions of portfolio managers and energy traders representing their respective LSEs in the wholesale energy market.

To date several IRPs have been developed for CCAs across California. As the CCA industry matures in California, there has been a notable increase in the level of attention given to the use of local distributed energy resources (DERs) to meet load requirements, as well as the innate ability of those resources to help meet RPS requirements and provide the flexibility necessary to respond in beneficial ways to wholesale market price volatility. With EBCE's commitment to the prioritization of local resource development, it is important for the organization to incorporate methodologies that support the integration of local energy resources into EBCE's IRP. An IRP tailored to consider the value of local resources can support EBCE's successful implementation of energy efficiency, demand response, energy storage, new generation, and innovative rate structures that can meet EBCE's energy requirements, while minimizing risk exposure and maximizing community benefit.

The purpose of this report is to provide the background and context for the emerging IRP requirements applicable to EBCE, and to outline an approach for leveraging the findings and recommendations of the Local Business Development Plan (LDBP) to meet these requirements. It is important to note that the LDBP scope of work *"does not involve the drafting of an actual integrated resource plan, as this work is being done through a different procurement process for general CCA technical services."*<sup>2</sup> This separate IRP development is underway presently, and this section of the LDBP is meant to support that effort.

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<sup>1</sup> <http://www.energy.ca.gov/sb350/>

<sup>2</sup> Excerpted from the East Bay Community Energy Local Development Business Plan RFP (page 21) <https://ebce.org/wp-content/uploads/LDBP-RFP-FINALCounty-letter.pdf>

## REGULATORY BACKGROUND AND SB 350

There is a significant body of state policies and regulations, including legislative bills and public utility code sections, and also state level planning documents that will affect EBCE’s IRP development. State activity in these areas has ramped up significantly in recent years in an attempt to spur clean energy development and support the achievement of aggressive statewide clean energy and climate protection goals. EBCE’s IRP development team will need to analyze the regulatory and economic environment that EBCE will be operating under during short-term, near-term, and long-term planning horizons, with the goal of understanding the larger system under which day-to-day business operations will take place and to inform strategic decisions for EBCE’s roll-out.

A listing of many relevant state regulations and plans is provided in the Appendix. This report will focus primarily on SB 350, the *Clean Energy and Pollution Reduction Act of 2015*, which has direct implications for EBCE’s IRP.

SB 350—signed into law on October 7<sup>th</sup> 2015—sets a goal of reducing GHG emissions 40% below 1990 levels by 2030. It contains ambitious energy efficiency and renewable targets designed to help achieve this goal, including a 50% renewable electricity procurement goal and a doubling of energy efficiency savings in the electricity and natural gas sectors by 2030.<sup>3</sup>

SB 350 is making utility IRPs a primary implementation mechanism to ensure the GHG goal is achieved. Under SB 350, IRPs must still balance supply with demand and address standard energy procurement needs and reliability as they have always done. However, they must now also demonstrate what the load-serving entity (LSE) is doing to meet the 2030 clean energy and GHG emissions targets. The CEC will be reviewing IRPs of all utilities with a load greater than 700 GWh/yr to ensure this is happening. EBCE will be well over this threshold and thus their IRP will be subject to CEC review.

## NEW IRP GUIDELINES

SB 350 added Section 9621 to the Public Utilities Code. PUC Section 9621<sup>4</sup> and the CPUC Decision 18-02-018<sup>5</sup> outline the requirements that all LSE’s (including CCA’s) must follow in writing and adopting their IRPs. The CPUC has emphasized a desire to be a collaborative partner to CCAs in this process, stating

*We absolutely intend to work cooperatively and collaboratively with the CCA LSEs, as we will with all LSEs, in ensuring that their plans meet the requirements of the statute and of this decision. We also will give due consideration to the priorities and policies of local governing boards of CCAs whose local objectives may differ, at least in emphasis, from the statewide requirements we adhere to. Though we note that the CCAs must still meet the statutory and regulatory requirements with the primary goals of GHG emissions reduction and electric system reliability.*<sup>6</sup>

<sup>3</sup> A concise summary of SB 350 is available at: <http://www.energy.ca.gov/sb350/>. The bill has other content not described above; this report focuses on the sections of the bill with direct IRP implications.

<sup>4</sup> <http://codes.findlaw.com/ca/public-utilities-code/puc-sect-9621.html>

<sup>5</sup> Adopted by the CPUC on February 18, 2018, see: <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M209/K771/209771632.PDF>

<sup>6</sup> CPUC Decision 18-02-018, pages 29-30

While the traditional IRP goals such as reliability, fair and equitable rates, and grid resilience are still present in the new requirements, there are many new clean energy requirements that now must be addressed in the IRP as well.

In summary, EBCE's IRP will have to:

- Show EBCE is on track to achieve:
  - GHG reductions 40% below 1990 levels by 2030
  - A 50% RPS by 2030
- Address the procurement of:
  - All energy efficiency and demand response resources that are cost effective, reliable, and feasible
  - Energy storage targets set by the CEC
  - Transportation electrification
  - A diversified procurement portfolio with short and long term products
  - Resource Adequacy (RA) requirements
- Ensure that EBCE:
  - Fulfills its obligation to serve its customers at just and reasonable rates
  - Minimizes impacts on ratepayers' bills
  - Ensures system and local reliability
  - Strengthens the diversity, sustainability, and resilience of the grid
  - Enhances distribution systems and demand-side energy management
  - Minimizes localized air pollutants and other greenhouse gas emissions with early priority on disadvantaged communities

In order to help LSE's down this new path, the CEC published IRP submission and review guidelines in August 2017.<sup>7</sup> This publication describes the content requirements of the IRP filing as well as the submission and review process.

### ***IRP Filing Contents***

At a high level, the IRP filing to the CEC will include the adopted IRP along with four standardized tables and all necessary supporting information. The IRP must look forward to at least 2030, though LSE's are also encouraged to address the post-2030 period.

The standardized tables will be a visual layout of key yearly totals through 2030. Line-by-line specifications are provided in the guidelines, but at a high level the tables will show energy and capacity demands, energy and capacity supply from each resource, RPS progress, and GHG emissions.

The supporting information refers to all analyses, studies, data, and other material that EBCE uses to create its IRP. This information substantiates the adopted IRP and the information in the standardized tables, and gives the CEC a means for auditing the IRP filing effectively.

CPUC Decision 18-02-018 provides a Standard LSE Plan (Attachment A of the Decision filing) to serve as a template for LSE IRPs. This template will be updated for each new submittal and review cycle.

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<sup>7</sup> <http://www.energy.ca.gov/sb350/IRPs/>

### **IRP Filing Review Procedure**

After the EBCE governing board adopts an IRP, EBCE should begin preparing the IRP filing that will be submitted to the CEC. This will involve creating the four standardized tables and compiling and organizing all supporting information. The filing is due by the next April 30<sup>th</sup> after the IRP is adopted (unless adopted in March, April, or May, in which case the filing is due within 90 days of adoption).

EBCE may select a contractor to prepare and submit the filing on its behalf. Confidentiality on certain portions of the filing may be requested.

The CEC reviews the filing through a two step process: 1) a completeness check to be conducted within 30 days, and 2) a full content review to be conducted within 120 days. A public posting and comment period is part of this review. If the CEC finds deficiencies in the IRP filing relative to PUC 9621 requirements, it will provide recommendations for correction.

EBCE must have a process for updating the IRP and associated IRP filing at least every 5 years.

## **LEVERAGING THE LDBP TO MEET NEW IRP REQUIREMENTS**

This section of the report will look at a few of the PUC 9621 clean energy requirements for IRPs and describe how the LDBP can be leveraged to help address these requirements.

It should be noted that the LDBP is specifically focused on *local* resources, and that PUC Section 9621 does not contain any local mandates. However, many of the PUC 9621 requirements will by nature have to be local – resources such as energy efficiency and demand response must be sourced at the end use location. For the PUC 9621 requirements that could be sourced remotely, such generation assets contributing toward the 50% RPS goal, we presume the IRP process which EBCE has separately contracted will address such scenarios. However, the authors will endeavor to show that there is significant room for local contributions even in these areas.

### **RPS Planning**

#### ***The Requirement***

PUC Code 9621 requires that the IRP “ensures procurement of at least 50 percent eligible renewable energy resources by 2030”<sup>8</sup> and that the procurement be consistent with the California Renewables Portfolio Standard Program.<sup>9</sup>

The RPS program has interim goals of 33% by 2020, 40% by 2024, and 45% by 2027. Eligible resources include solar photovoltaics, solar thermal, wind, biomass, geothermal, certain hydro facilities, fuel cells using renewable fuels, landfill gas, and municipal solid waste conversion.

#### ***Leveraging the LDBP***

As the Task 1 LDBP documents have demonstrated, there is significant potential for grid-side renewable resources in the County.

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<sup>8</sup> PUC section 9621, subdivision (b), paragraph (2)

<sup>9</sup> The RPS Program is defined in PUC Division 1, Part 1, Chapter 2.3, Article 16. The full text is available at [https://leginfo.legislature.ca.gov/faces/codes\\_displayText.xhtml?lawCode=PUC&division=1.&title=&part=1.&chapter=2.3.&article=16](https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PUC&division=1.&title=&part=1.&chapter=2.3.&article=16).

Among RPS-eligible technologies, solar photovoltaics (“PV”) has the largest potential. The *Solar Siting Survey Summary Report* previously published by the LDBP team assessed the technical siting potential for large scale solar (systems > 1 MW in size) in the County. This report identified over 660 MW of potential across 250 sites. Importantly, more than 30% of this potential is on parking lots and parking structures – for these sites, CEQA approval is not required and thus these projects are easier to develop. Though it is unlikely that all of this solar would be feasible to develop, to provide some perspective on the RPS contribution potential, 660 MW of solar capacity would produce between 10-15% of County-wide load.<sup>10</sup>

If this solar were to be counted toward RPS requirements, EBCE would need to consider the correct program structure. Net energy metering (NEM), the most common solar program for customers, generally does not involve the transfer of Renewable Energy Certificates (RECs) to the LSE, and thus could not be used for EBCE’s RPS compliance. However, if EBCE’s net metering program includes payment for excess generation at the end of a 12 month cycle, the RECs would typically transfer for that small portion of overall energy.

However, if a feed-in tariff (FIT) is pursued in addition to net energy metering, the feed-in-tariff rate could include the transfer of REC ownership to EBCE. The *Feed-in Tariff Design Recommendations* report previously published by the LDBP team discusses the approach to designing such a program. If EBCE wishes customer-sited solar to be a portion of its RPS compliance, it could consider feed-in tariff as a possible pathway to achieve this.

Beyond these customer-sited programs, there are many options for EBCE to procure renewable resources directly in order to count toward an RPS requirement. A traditional request for offer (RFO) process has been used by the 3 large investor owned utilities in California for long-term, utility-scale renewable energy contracts.<sup>11</sup> The renewable auction mechanism<sup>12</sup> (RAM) is another procurement program used by the IOUs to obtain projects which are typically smaller than the request for offer projects, but can come online much quicker. As part of the RFO or RAM process, EBCE could specify preference for local projects, perhaps by providing financial incentives for such projects.

Beyond solar PV, there are several additional resources that could be harness locally. The *LCOE Narrative* report previously published by the LDBP team highlights several of these resources and provides high level cost estimate comparisons.

It may also be helpful to compare the portfolios of other area load-serving entities to assess their renewable sources. The current energy mix of PG&E along with area CCAs is shown below:

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<sup>10</sup> Assumes an average energy yield of 1,500 kWh/yr from the solar for (660,000 kW \* 1500 kWh/kW/yr) = 990 GWh/yr and a total load of 7,500 GWh/yr for a load contribution of (990 / 7,500) = 13.2%.

<sup>11</sup> [http://cpuc.ca.gov/Utility\\_Scale\\_RFO/](http://cpuc.ca.gov/Utility_Scale_RFO/)

<sup>12</sup> [http://cpuc.ca.gov/Renewable\\_Auction\\_Mechanism/](http://cpuc.ca.gov/Renewable_Auction_Mechanism/)



**Table 1. Energy Supply Portfolio Comparison** (estimates as of July 2017 from various sources)

	Pacific Gas & Electric		MCE *100% solar available		PCE		SVCE		CPSF		RCEA		LCE	
	Default	Solar Opt-Up	Default	Opt-Up*	Default	Opt-Up	Default	Opt-Up	Default	Opt-Up	Default	Opt-Up	Default	Opt-Up
Biomass & Bio waste	4%		6%		3%	7%					15%	41%	14%	
Geothermal	5%		10%		3%	7%								
Renewable Hydroelectric	3%		7%		13%	26%							18%	
Solar Electric	13%	100%	5%	25%	3%	7%	25%	50%			5%	13%		
Wind	8%		36%	75%	28%	53%	25%	50%	40%	100%	17%	46%	4%	100%
Large Hydroelectric	12%		11%		30%		50%		38%		27%			
Natural Gas	17%								22%					
Nuclear	24%													
Unspecified Open Market Resources	14%		25%		20%						36%		64%	

As seen above, wind is currently the dominant renewable source for these LSEs. Many of these wind contracts are sourced from out of the area. It is likely this will be the case for some portion of EBCE’s energy mix as well, but the LDBP analysis shows that a significant portion of the RPS requirement could be met with resources from within the County.

Beyond just procuring the energy needed to meet the RPS requirement, EBCE will also have to demonstrate its compliance via the IRP filing to the CEC, which must include yearly progress on RPS and GHG reductions. It is recommended that EBCE confront the challenge of GHG measurement and impact reporting in the first year of operation, as outlined in the *Recommendations for Clear and Transparent Reporting Procedures* section of the LDBP. Qualification and analysis of the LDBP impacts on the statewide goals of GHG reduction should be prepared as soon as feasible for presentation in comments and proceedings at the Public Utilities Commission, Energy Commission, Air Resources Board, and legislature.

## Energy Efficiency and Demand Response

### *The Requirement*

PUC Code 9621 requires that the IRP shall address procurement for “Energy efficiency and demand response resources pursuant to section 9615”,<sup>13</sup> where section 9615 adds that “Each local publicly owned electric utility, in procuring energy to serve the load of its retail end-use customers, shall first

<sup>13</sup> PUC section 9621, subdivision (d), paragraph (1), subparagraph (A)

acquire all available energy efficiency and demand reduction resources that are cost effective, reliable, and feasible.”<sup>14</sup>

### ***Leveraging the LDBP***

The code makes quite a strong statement in regard to energy efficiency (EE) and demand response (DR), requiring load-serving entities to procure these products *before* procuring energy generation. The key is the condition that such resources be “cost-effective”. This clause is particularly important for demand response.

The *Demand Response Program Opportunities* report which has been previously published by the LDBP project team discusses several possible DR approaches. For DR, having load shed that is highly dispatchable is generally quite expensive relative to wholesale energy procurement costs. This is demonstrated in the *Task 2 LCOE* report from the LDBP team which is currently in draft form. When offering DR tariffs, the utility must pay a premium, typically through monthly incentive payments, to be able to request customer load shed on short notice. Our LCOE analysis showed these tariffs typically pay in the \$0.40-\$0.60/kWh range for load shed, and that figure assumes that a high number of events are called.

Less restrictive DR tariffs are more cost-effective. The PG&E Schedule Load Reduction Program<sup>15</sup>, a DR tariff in which the customer chooses pre-determined load shed times and there are no penalties for non-compliance, is such an example. This tariff pays only \$0.10/kWh for load shed. However, the load shed may not be considered to meet the “reliable” clause of PUC Code 9615, as participants are more likely not to meet their load shed goals on a given day.

Though these tariff options may not be considered a PUC-mandated portion of the EBCE’s IRP, they can still serve a valuable role in shaping the county-wide demand profile to more accurately align with times of peak renewable generation and away from times of peak energy procurement costs. This shaping function, which can be a foundational strategy for EBCE, is discussed in the LDBP Demand Response report.

In addition to these tariff options, our *Demand Response Program Opportunities* report discusses direct load control as another DR option. As that report discusses, many direct load control programs can be launched using partnerships with third parties who handle customer enrollment, provide the DR platform, and handle other aspects of program management. For that reason, this approach to DR may meet the consideration for “cost-effective”, and by nature direct load control is also a “reliable” offering. For this reason, these types of DR offerings may be most in keeping with the Code 9621 and 9615 requirements for DR offerings in load serving entity IRPs.

The Code requirements are more widely applicable for EE offerings, which are typically more cost effective than demand response. As demonstrated in the *Task 2 LCOE* report, empirical data from utility administered energy efficiency programs shows that residential efficiency savings cost around \$0.033/kWh on average, while commercial/industrial EE costs around \$0.055/kWh. These figures represent *total* costs; the LSE as a program administrator would share this cost with customers who are implementing the measures, leaving the typical program administrator cost at less than \$0.03/kWh for

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<sup>14</sup> PUC section 9615

<sup>15</sup> [https://www.pge.com/en\\_US/business/save-energy-money/energy-management-programs/demand-response-programs/scheduled-load-reduction.page](https://www.pge.com/en_US/business/save-energy-money/energy-management-programs/demand-response-programs/scheduled-load-reduction.page)

EE savings. As such, it is clear that LSE administered EE programs meet the “cost effective, reliable, and feasible” clause of Code 9615 and must be a primary consideration in the IRP process.

The *Energy Efficiency Assessment* report which has been previously published by the LDBP project team discusses many EE possibilities in the County. Section VIII of that report lays out a roadmap for EE program deployment, and much of that roadmap could be incorporated directly into EBCE’s IRP in conformance with PUC Code 9621 requirements.

The first 2 years would see EBCE support an existing network of EE Program Administrators who have established programs in Alameda County (East Bay Energy Watch, BayREN, and StopWaste). While support of these programs may not become a formalized part of the IRP, their proliferation will support the GHG reduction targets that are a consideration for IRP planning.

By the third year of operation, the EE roadmap laid out by the LDBP team recommends EBCE begin to implement revenue-based EE programming using its own retail revenues, targeting expensive parts of its load. In year four, it is recommended that the CCA apply to the CPUC to begin using ratepayer funds to roll out further energy efficiency offerings focused on hard-to-reach market segments that are not covered by existing programs. These in-house EE programs would become a key part of EBCE’s IRP.

## Energy Storage

### *The Requirement*

PUC Code 9621 requires that the IRP shall address procurement for “Energy storage requirements pursuant to Chapter 7.7”,<sup>16</sup> where Chapter 7.7 is a separate section of the PUC dedicated to energy storage systems. Chapter 7.7 does not lay out quantitative deployment targets, but does direct the CPUC to establish targets for all load serving entities<sup>17</sup>. It also directs utility boards to determine and adopt their own procurement targets and to consider energy storage for uses such as reducing peak demand, deferring generation, transmission, and distribution investment, and improving reliability. Chapter 7.7 also confirms that energy storage can be used to meet resource adequacy requirements.

Assembly Bill 2514 (AB2514)<sup>18</sup> of 2010, the first state law calling for grid-scale energy storage, was the original driving force behind these energy storage mandates. AB2514 eventually led to the California Energy Storage Roadmap<sup>19</sup> and the issuance of CPUC Order 15-03-011,<sup>20</sup> filed in March 2015, which established energy storage targets of 1% of peak load for all non-IOU load-serving entities (inclusive of CCA’s).

In short, EBCE will need to develop and have their board approve an energy storage procurement plan to meet 1% of peak load by 2020, with construction of these projects completed by 2023.

### *Leveraging the LDBP*

*Energy Storage Contracting Strategy*, a report previously published by the LDBP team, provides an action plan for meeting this 1% of peak load energy storage mandate. We estimate this to be approximately 14

<sup>16</sup> PUC section 9621, subdivision (d), paragraph (1), subparagraph (B)

<sup>17</sup> For details on the CPUC’s energy storage target setting proceedings, see: <http://www.cpuc.ca.gov/General.aspx?id=3462>

<sup>18</sup> [https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill\\_id=200920100AB2514](https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200920100AB2514)

<sup>19</sup> <https://www.ca.iso.com/informed/Pages/CleanGrid/EnergyStorageRoadmap.aspx>

<sup>20</sup> <http://docs.cpuc.ca.gov/SearchRes.aspx?DocFormat=ALL&DocID=149976766>

MW of energy storage capacity. The report finds that compliance is possible through a combination of residential and commercial programs, namely:

- 1 MW of behind-the-meter storage via CARE customer giveaways
- 5 MW via residential time-of-use rate pilots
- 3 MW via commercial time-of-use rate pilots and feed-in tariff adders
- 5 MW+ via collaborative procurements in the commercial sector

This report also lays out strategies for capital financing and credit enhancement, to aid in the contracting of energy storage resources, with a focus on the early years of operation when EBCE will not yet have an established credit history.

In addition to the guidance provided by the LDBP team in the *Energy Storage Contracting Strategy* report, sample energy storage procurement plans that have been adopted by utilities in compliance with AB2514, including those of Bay Area publicly owned utilities such as Silicon Valley Power and Alameda Power and Water, are available on the CEC’s website.<sup>21</sup>

Beyond just meeting state mandates, the LDBP team finds that energy storage systems can add significant value to EBCE in managing various market risks and intermittent local generation resources. The use of wind and solar to meet essential energy and power capacity needs will result in a severe exposure to problems of excessive intermittency and insufficient dispatchability. This can be addressed on a cyclical basis through portfolio balancing of energy and capacity contract swaps with other load-serving entities. Although the potential for dynamic energy swaps creates market-based virtual energy storage, the daily and hourly balancing of intermittent local renewables will be managed in part by physical energy storage assets.

Methods of energy storage planning fall into categories of co-located and generation-paired storage and standalone storage. In moving toward the use of local generation to satisfy regulatory requirements of energy and capacity, it will be necessary to mandate resource firming storage at many if not all local resource facilities. Firming the output of solar facilities against sudden drops due to passing cloud shadows will be an early methodology for storage integration because it requires a smaller and less capital-intensive storage system. Shaping intermittent local renewable power and energy over multiple hours will be approached over multiple IRP cycles as the cost of storage continues to decline and agency-led development becomes more feasible given increasing number of staff and the specialization of skills in a dedicated energy storage division of the agency. IRP efforts to integrate energy storage into EBCE’s portfolio should increase incrementally over the first ten years following the program launch.

## Grid Benefits and Locational Factors

### ***The Requirement***

PUC Code 9621 requires that the IRP shall meet the goals of PUC Code 454.52<sup>22</sup>, which among other items directs the load-serving entity to “ensure system and local reliability”<sup>23</sup> and to “strengthen the diversity, sustainability, and resilience of the bulk transmission and distribution systems, and local

<sup>21</sup> [http://www.energy.ca.gov/assessments/ab2514\\_energy\\_storage.html](http://www.energy.ca.gov/assessments/ab2514_energy_storage.html)

<sup>22</sup> Full text of 454.52 available at:

[http://leginfo.legislature.ca.gov/faces/codes\\_displaySection.xhtml?lawCode=PUC&sectionNum=454.52](http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=PUC&sectionNum=454.52).

<sup>23</sup> PUC Code 454.52, subdivision (a), paragraph (1), subparagraph (E)

communities.”<sup>24</sup> While grid operation will not be EBCE’s responsibility, it will play a role in shaping the energy demand and supply portfolio of the County, and thus its operations will impact congestion on the grid and associated reliability metrics.

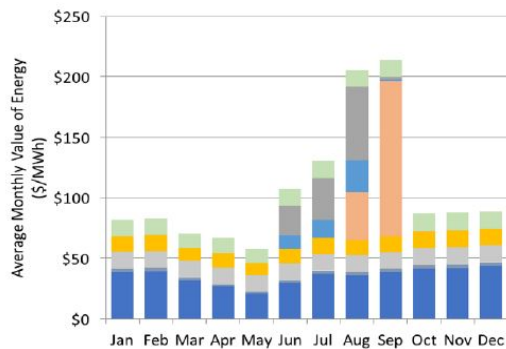
**Leveraging the LDBP**

Localized development of distributed energy resources will result in benefits that can directly address these Code 9621 requirements to strengthen the sustainability and resilience of the grid, while also reducing impacts on ratepayers and helping to achieve GHG reduction targets. The *Locational Value Factors* report which has been previously published by the LDBP team speaks to several of these benefits:

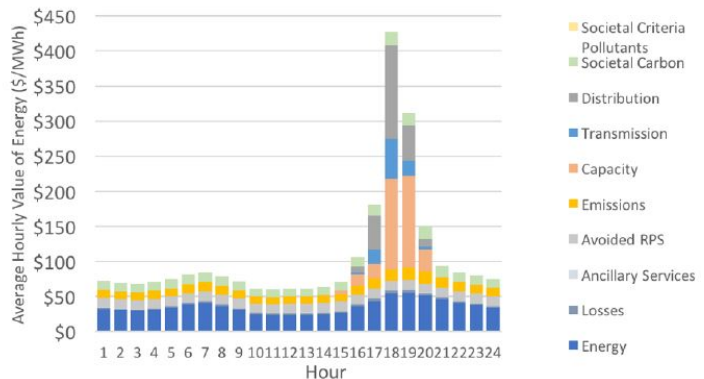
- Lower transmission and distribution system power losses
- Lower transmission capacity charges for customers
- Less use of the transmission system’s limited capacity
- Improved reliability and resilience via more rapidly restored service in local areas after outages

The CPUC’s Avoided Cost Model<sup>25</sup> quantifies the benefits of demand-side resources including energy efficiency, demand response, and distributed generation. These time and location specific (location is only broken down to regional areas in this tool) values can provide a guide for the cost-effective deployment of distributed resources in the County. In Alameda County, DER is found to have the highest average value during the late summer months, and with energy value typically peaking from 5p-7p:

Climate Zone (CZ) 12, Eastern Alameda County



Climate Zone (CZ) 12, Eastern Alameda County



These images taken from LDBP’s report *Locational Value Factors*, pages 6-7

The by-hour chart shows target hours for the deployment of both energy storage and demand response technologies, which can be located at the areas of greatest benefit, and the by-month chart shows the positive impact of solar PV, which produces most energy during months of high value and is the most prevalent distributed generation technology in the County.

The *LDBP Locational Value Factors* report quantifies potential DER cost savings in several categories including line losses, transmission access charges, and emissions. The report also identifies areas of local reliability constraint, including thermal overloads on the Grant-Oakland 115kV transmission line during

<sup>24</sup> PUC Code 454.52, subdivision (a), paragraph (1), subparagraph (F)

<sup>25</sup> <http://www.cpuc.ca.gov/General.aspx?id=5267>

certain contingency situations. A current PG&E proposal includes some DER mitigations to help alleviate this issue, though further DER growth in this area could reduce the need for planned PG&E upgrades at a potentially lower overall cost. The Oakland Clean Energy Initiative<sup>26</sup> RFO, a partnership between EBCE and PG&E, is seeking feedback on a plan to procure distributed energy, capacity, and reliability resources located in the County to help replace fossil generation and/or upgraded transmission lines. This is an example of a specific DER deployment strategy which could inform the EBCE IRP process.

This locational analysis carries over into another topic which EBCE will need to address in the IRP process, which is the PUC Code 454.52 mandate for load serving entities to “*minimize localized air pollutants and other greenhouse gas emissions, with early priority on disadvantaged communities identified pursuant to Section 39711 of the Health and Safety Code.*”<sup>27</sup> The LDBP’s *Locational Benefit Factors* report points to a high correlation between areas of high pollution, high health impacts, and high unemployment. Targeting DER investment in these locations can address the IRP requirement to minimize air pollutants and emissions in disadvantaged communities, while meeting the electric service needs of the area and providing GHG reduction benefits to help meet additional IRP obligations.

## **ADDITIONAL LDBP IMPLICATIONS FOR RESOURCE PLANNING**

### **Driving Cost Reductions in Local Resources**

Increased growth in the domestic natural gas supply due to plentiful Marcellus dry shale gas production in Pennsylvania, West Virginia, Ohio, and New York has led to cheaper fuel for gas-fired electricity generators, which has added to the pressure created by falling costs of renewable generation and driven further price reductions in electricity. In the event that falling prices in market electricity outpace current forecasted prospects the implementation of a successful local resource portfolio that can remain cost-competitive with wholesale power prices will require prime consideration by the agency’s resource managers as well as customer program managers.

In order to remain competitive the agency should be prepared to drive down the cost of local resources. This will require overcoming barriers relating to: capital costs, physical component costs, non-hardware costs (“soft costs”), market access and participation costs, and operational costs. The *Local Jurisdictional Approvals* report currently in development by the LDBP team highlights the opportunity for EBCE to leverage its influence to reduce permitting and approval processes for local solar projects in the County. Such a reduction in soft costs can make a big difference in attracting developers to the region.

Cost reductions can also be driven by the development of programs that incentivize local new generation and grow the local energy supply. Previously published LDBP reports on net metering and feed-in tariffs provide guidance for creating programs that can allow rapid and efficient deployment of distributed generation systems. The long-term policy certainty provided by such programs reduces overhead costs for project developers, particularly in financing and customer acquisition, and increases deployment.

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<sup>26</sup> [https://ebce.org/wp-content/uploads/Item-7-EBCE-Oakland-Clean-Energy-Initiative-RFO\\_Complete\\_FINAL.pdf](https://ebce.org/wp-content/uploads/Item-7-EBCE-Oakland-Clean-Energy-Initiative-RFO_Complete_FINAL.pdf)

<sup>27</sup> PUC Code 454.52, subdivision (a), paragraph (1), subparagraph (H)

## Siting and Management of Local Resources

Distributed generation in Alameda County has been dominated by behind-the-meter solar PV. This local generation has not been planned or coordinated across the region to-date, but rather has proceeded by personal motivation or needs of specific site owners. Most of this deployment has been through PG&E's net metering program, and represents unscheduled energy. Scheduling and shaping of generation to fit load is the role of the scheduling coordinator (SC). The SC is chiefly an outsourced role.

It will likely be required for EBCE to outsource schedule coordination of wholesale power transactions in the ISO market on behalf of the agency during the early years of operation. However, EBCE should additionally expect to develop a programmatic approach to outsourcing the coordination of the development of new generation. This applies to both controllable large-scale direct-tied assets, and to customer side resource development that cannot be scheduled.

Grid-side generation may be scheduled through some degree of agency control of the contracting terms in order to optimize the financial performance to the agency. It is likely that the development and operation of these assets will initially be outsourced, but the LDBP team recommends that EBCE employ a plan to move away from completely outsourced development planning toward an internally controlled process for development planning within the first few years of operations that incorporates cost avoidance for rate payers. Cost avoidance can be achieved through state and federal programs of distribution system upgrade deferral and transmission expansion deferral; these system costs are ultimately shifted to rate payers through transmission and distribution charges<sup>28</sup>. Although EBCE does not set or collect transmission and distribution costs from customers, the agency can serve the local community and energy market by seeking these methods to reduce these costs through strategic new generation siting, as discussed in the *Grid Benefits and Location Factors* section of this report.

Directing a regional plan for customer-sited new generation or operation of existing generation can be done through collaboration with member jurisdictions or via third-party providers. Regional management of customer-sited generation can be approached similarly to other public health and fire safety messages. For example, a public awareness campaign designed to motivate solar owners to clean dirt from rooftop PV may be able to reduce wholesale purchasing costs during peak times as well as engage community stakeholders.

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<sup>28</sup> PG&E's 2017 General Rate Case Application, available at <http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M154/K352/154352004.PDF>

## CONCLUSION

This report has provided background on the shifting priorities of Integrated Resource Plans in California, and has attempted to shed light on how the Local Development Business Plan can be leveraged to meet these new priorities.

EBCE's IRP will have to demonstrate progress toward the goal of a 50% RPS by 2030, while hitting interim targets, as well as the goal of a reduction in GHG emissions by 40% below 1990 levels by 2030. The LDBP is focused on both generation and demand management resources that will help meet these goals, with the added benefits of being locally sourced.

The IRP will also need to address the procurement of specific distributed resources which by nature must be located in the EBCE service territory, including energy efficiency, energy storage, and demand response. This report has highlighted each of these resources and demonstrated the ways in which they can be used to meet new IRP requirements. Separate LDBP team reports address each of these scenarios in more detail.

Additional IRP requirements, such as ensuring system stability and minimizing air pollutants in disadvantaged communities, can be informed by smart locational deployments of both distributed generation and demand side management. The LDBP team has provided reports on the locational value of these resources, as well as strategies for deployment, including recommendations for customer programs that can help these resources thrive.

This report does not provide an exhaustive list of the LDBP features that may in some way inform the IRP process, but rather focuses on key topics that must be addressed in the IRP filing to the CEC. Additional LDBP team work addresses areas such as procurement strategies, contracting models, and risk analysis that can also inform long term resource planning for EBCE.



## APPENDIX A: RELEVANT CALIFORNIA STATE LAWS AND POLICIES

### Laws and Regulations

- **Senate Bill (SB) X1-2, Renewables Portfolio Standard**

SB X1-2 expanded California’s Renewables Portfolio Standard (RPS) goals and requires retail sellers of electricity and local publicly owned electric utilities to increase their procurement of eligible renewable energy resources to 20 % by the end of 2013, 25 % by the end of 2016, and 33 % by the end of 2020.

Additional information: <http://www.energy.ca.gov/portfolio/>

Applicable Law: California Public Utilities Code § 399.11 et seq.

- **AB 758, Building Efficiency**

AB 758 requires the Energy Commission to collaborate with the California Public Utilities Commission and stakeholders to develop a comprehensive program to achieve greater energy and water savings in existing residential and nonresidential buildings. The Energy Commission developed a *Existing Buildings Energy Action Plan* in August 2015.

Additional information: <http://www.energy.ca.gov/ab758/>

Applicable Law: California Public Resources Code § 25943, California Public Utilities Code §§ 381.2 and 385.2

- **AB 1109, California Lighting Efficiency and Toxics Reduction Act**

AB 1109 places restrictions on the manufacture and sale of certain general purpose lights (i.e., lamps, bulbs, tubes, and other electric devices that provide functional illumination for indoor and outdoor use) that contain hazardous substances. It also requires the Energy Commission to adopt minimum energy efficiency standards for general purpose lights and to make recommendations to the Governor and Legislature regarding the continuation of reduced lighting consumption beyond 2018.

Additional Information: <http://www.energy.ca.gov/2014publications/CEC-500-2014-039/CEC-500-2014-039.pdf>

Applicable Law: California Health and Safety Code §§ 25210.9 et. seq., California Public Resources Code § 25402.5.4

- **AB 2514, Energy Storage Systems**

AB 2514 required the CPUC to determine targets for the procurement of viable, cost-effective energy storage systems by load-serving entities. The CPUC adopted the procurement targets in Decision 13-10-040, issued on October 17, 2013 (see the summary of Decision 13-10-040 in the “Policies/Plans” section below).

Additional information: <http://www.cpuc.ca.gov/general.aspx?id=3462>

Applicable Law: California Public Utilities Code §§ 2835 et. seq., and § 9620

- **SB X7-7, Water Conservation Act**

SB X7-7 requires the State to achieve a 20% reduction in urban per capita water use by December 31, 2020. It requires all retail urban water suppliers to increase water use efficiency and to establish urban water use targets.

Additional Information: <http://www.bsc.ca.gov/>; <http://www.energy.ca.gov/appliances/>

Applicable Law: California Code of Regulations, Title 20, Division 2, Chapter 4, Article 4, §§ 1601 et. seq.

- **SB 350, Clean Energy and Pollution Reduction Act of 2015**

SB 350 does the following: 1) expands California's RPS goals and requires retail sellers of electricity and local publicly owned electricity to increase their procurement of eligible renewable energy resources to 40 % by the end of 2024, 45 % by the end of 2027, and 50 % by the end of 2030; 2) requires the Energy Commission to establish annual targets for statewide energy efficiency savings in electricity and natural gas final end uses of retail customers by January 1, 2030; and 3) provide for transformation of the Independent System Operator into a regional organization. SB 350 also established California's 2030 greenhouse gas reduction target of 40 % below 1990 levels.

Additional information: [http://www.leginfo.ca.gov/pub/15-16/bill/sen/sb\\_0301-0350/sb\\_350\\_bill\\_20151007\\_chaptered.htm](http://www.leginfo.ca.gov/pub/15-16/bill/sen/sb_0301-0350/sb_350_bill_20151007_chaptered.htm)

Applicable Law: California Senate Bill 350 (2015)

- **California Energy Code**

The Energy Code is a component of the California Building Standards Code, and is published every three years through the collaborative efforts of state agencies including the California Building Standards Commission and the Energy Commission. The Code ensures that new and existing buildings achieve energy efficiency and preserve outdoor and indoor environmental quality through use of the most energy efficient technologies and construction.

Additional information: <http://www.energy.ca.gov/title24/>

Applicable Law: California Code of Regulations, Title 24, Part 6 and associated administrative regulations in Part 1

## Policies and Plans

- **Governor's Clean Energy Jobs Plan (2011)**

In June 2011, Governor Jerry Brown announced a plan to invest in clean energy and increase efficiency. The plan includes a goal of producing 20,000 megawatts (MW) of renewable electricity by 2020 by taking the following actions: addressing peak energy needs, developing energy storage, creating efficiency standards for buildings and appliances, and developing combined heat and power (CHP) projects. Specific goals include building 8,000 MW of large-scale renewable and transmission lines, 12,000 MW of localized energy, and 6,500 MW of CHP.

Additional information: [http://gov.ca.gov/docs/Clean\\_Energy\\_Plan.pdf](http://gov.ca.gov/docs/Clean_Energy_Plan.pdf)

- **Bioenergy Action Plan (2012)**

Various California state agencies developed the 2012 Bioenergy Action Plan to accelerate clean energy development, job creation, and protection of public health and safety. The plan recommends actions to increase the sustainable use of organic waste, expand research and development of bioenergy facilities, reduce permitting and regulatory challenges, and address economic barriers to bioenergy development.

Additional information: [http://resources.ca.gov/docs/Final\\_Bioenergy\\_Action\\_Plan\\_ARB\\_-\\_press\\_release\\_8-22-12.pdf](http://resources.ca.gov/docs/Final_Bioenergy_Action_Plan_ARB_-_press_release_8-22-12.pdf)

- **Integrated Energy Policy Report (Biennial)**

California Public Resources Code Section 25302 requires the Energy Commission to release a biennial report that provides an overview of major energy trends and issues facing the state. The IEPR assesses and forecasts all aspects of energy industry supply, production, transportation, delivery, distribution, demand, and pricing. The Energy Commission uses these assessments and forecasts to develop energy policies. The 2015 IEPR included a multi-agency hearing on drought response and provided recommendations for future research and analysis areas.

Additional information: <http://www.energy.ca.gov/energypolicy>

Applicable Law: California Public Resources Code § 25300 et seq.

- **CPUC Decision 18-02-018, “Decision Setting Requirements for Load Serving Entities Filing Integrated Resource Plans” (2018)**

The Decision represents the Commission’s implementation of PUC Code Section 454.51 and 454.52, enacted as part of SB 350. It established 2 year cycles of LSE IRP filings and Commission approval, and establishes many of the guidelines that must be followed in the IRP. It also provides a Standard LSE Plan which serves as a template for the IRP filing.

Additional information: <http://www.cpuc.ca.gov/General.aspx?id=6442451195>

- **CPUC Decision 13-10-040, “Decision Adopting Energy Storage Procurement Framework and Design Program” (2013)**

The Decision establishes policies and mechanisms for energy storage procurement, as required by AB 2514 (described above). The IOU procurement target is 1,325 megawatts of energy storage by 2020, with installations required no later than the end of 2024.

Additional information:

[http://www.cpuc.ca.gov/uploadedfiles/cpuc\\_public\\_website/content/about\\_us/organization/former\\_commissioners/peevey\(1\)/news\\_and\\_announcements/ferron\\_peevey\\_concurrence\\_storaged1310040.pdf](http://www.cpuc.ca.gov/uploadedfiles/cpuc_public_website/content/about_us/organization/former_commissioners/peevey(1)/news_and_announcements/ferron_peevey_concurrence_storaged1310040.pdf)

- **CPUC’s Energy Efficiency Strategic Plan (2008)**

The Energy Efficiency Strategic Plan creates a roadmap for achieving energy efficiency within the residential, commercial, industrial, and agricultural sectors. The plan was updated in January 2011 to include a lighting chapter.

Additional information: <http://www.cpuc.ca.gov/general.aspx?id=4125>

- **New Residential Zero Net Energy Action Plan 2015-2020**

The Residential New Construction Zero Net Energy Action Plan supports the California Energy Efficiency Strategic Plan’s goal to have 100 % of new homes achieve zero net energy beginning in 2020. The action plan provides a foundation for the development of a robust and self-sustaining zero net energy market for new homes.

Additional information: <http://www.californiaznehomes.com/>

- **California’s Existing Buildings Energy Efficiency Action Plan**

The Existing Buildings Energy Efficiency Action Plan provides a 10-year roadmap to activate market forces and transform California’s existing residential, commercial, and public building stock into high performing and energy efficient buildings. The Plan provides a comprehensive framework centered on five goals, each with an objective and a series of strategies to achieve it. Each strategy includes industry and/or

government implementation partners. Water related items are addressed in several of the strategies from the Existing Buildings Energy Efficiency Action Plan including but not limited to strategies 1.5, 2.2, 4.1, and 5.7 from the plan.

Additional Information:

[http://docketpublic.energy.ca.gov/PublicDocuments/15-IEPR-05/TN203806\\_20150310T093903\\_California%E2%80%99s\\_Existing\\_Buildings\\_Energy\\_Efficiency\\_Action\\_Plan.pdf](http://docketpublic.energy.ca.gov/PublicDocuments/15-IEPR-05/TN203806_20150310T093903_California%E2%80%99s_Existing_Buildings_Energy_Efficiency_Action_Plan.pdf)

- **CPUC – Water Energy Nexus Proceeding**

The CPUC recently authorized a series of pilot programs exploring whether energy savings may be realized through water conservation measures. Implicit in this approach is the concept that saving water saves energy. The CPUC’s Energy Division is currently analyzing whether an increase in energy efficiency portfolio emphasis on measures that maximize energy savings in the water sector – such as through leak loss detection and enhancement of water systems efficiency – may be warranted. The Energy Division is also currently considering how cost effectiveness should be analyzed for water/energy nexus programs. CPUC Rulemaking 13-12-011 grants the Petition for Rulemaking of the Division of Ratepayer Advocates requesting that the CPUC open a Rulemaking proceeding to develop a partnership framework between investor owned energy utilities and the water sector to co-fund programs that reduce energy consumption by the water sector in supplying, conveying, treating, and distributing water

Additional Information: <http://www.cpuc.ca.gov/general.aspx?id=4139>

- **Executive Order B-29-15**

Governor Brown’s Executive Order B-29-15 proclaims the severity of the drought conditions in California and directs the Energy Commission to invest in new technologies that will achieve water and energy savings and greenhouse gas reductions.

- **Executive Order B-30-15**

Governor Brown’s Executive Order B-30-15 established a new interim statewide greenhouse gas emission reduction target to reduce greenhouse gas emissions to 40 % below 1990 levels by 2030, to ensure California meets its target of reducing greenhouse gas emissions to 80 % below 1990 levels by 2050.

- **The Governor's State of Emergency Proclamation on Tree Mortality**

The declaration released on October 30, 2015, declared a state of emergency and sought federal action to help mobilize additional resources for the safe removal of dead and dying trees. It also states, “The California Energy Commission shall prioritize grant funding from the Electric Program Investment Charge for woody biomass-to-energy technology development and deployment, consistent with direction from the California Public Utilities Commission.”

Additional Information:

[https://www.gov.ca.gov/docs/10.30.15\\_Tree\\_Mortality\\_State\\_of\\_Emergency.pdf](https://www.gov.ca.gov/docs/10.30.15_Tree_Mortality_State_of_Emergency.pdf)

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