Implementing GHG Planning Targets in the Integrated Resource Planning (IRP) Process

A CPUC Staff White Paper

Introduction

SB 350 requires the establishment of greenhouse gas (GHG) emission reduction targets[1] for the electricity sector and for individual load serving entities (LSEs) to meet in the CPUC Integrated Resource Planning (IRP) process. As explained in the August 2016 Staff Concept Paper on IRP, CPUC staff anticipates providing guidance in 2017 to filing entities regarding the GHG planning targets that the LSEs will use to inform their respective IRP plans. This white paper proposes objectives to guide implementation of GHG planning targets in the IRP process and presents four potential target-setting options. Questions are provided at the end of the document to solicit written feedback from parties.

Objectives

The five objectives listed below are recommended to be used to guide decision making regarding the implementation of GHG planning targets in the CPUC IRP process. In turn, the objectives may also serve as criteria for evaluating the various implementation options and determining the most optimal approach. These objectives are intended to complement and reinforce the guiding principles presented in the August 11th Staff Concept Paper and revised at the September 26th IRP Workshop.

1. GHG planning targets should be developed jointly by the CPUC, California Air Resources Board (CARB), and California Energy Commission (CEC) in a manner that is transparent and accessible to the public.
2. Any GHG target-setting methodology adopted should be applied in an equitable manner across all CPUC-jurisdictional entities that are required to file IRPs.
3. GHG reduction goals should be the primary drivers of investment and procurement authorized in the CPUC IRP process, while enabling each LSE to serve its customers reliably and at just and reasonable rates.
4. GHG planning targets should facilitate planning by providing clear metrics for LSEs to use in developing their IRPs.
5. Any GHG planning methodology adopted should not discourage LSEs from exploring transportation electrification and other types of fuel switching as potential solutions to reduce GHG emissions.

[1] Throughout this document, the term “target” may refer to a single number target or a range.

Background

SB 350 includes the following section:

> 454.52. (a) (1) Commencing in 2017, and to be updated regularly thereafter, the commission shall adopt a process for each load-serving entity, as defined in Section 380, to file an integrated resource plan, and a schedule for periodic updates to the plan, to ensure that load-serving entities do the following:
> (A) Meet the greenhouse gas emissions reduction targets established by the State Air Resources Board, in coordination with the commission and the Energy Commission, for the electricity sector and each load-serving entity that reflect the electricity sector's percentage in achieving the economywide greenhouse gas emissions reductions of 40 percent from 1990 levels by 2030.

In accordance with SB 350, the CPUC must adopt a process for all jurisdictional LSEs to file IRPs that meet the GHG reduction target for the electric sector established by CARB. The 2030 Target Scoping Plan Update is expected to provide a range of projected GHG emissions from the electricity sector in 2030, reflecting the economy-wide GHG emissions reduction goal of 40 percent from 1990 levels by 2030. There is broad interagency staff consensus that the Scoping Plan Update will be an appropriate venue for developing a GHG planning target for the electric sector for IRP purposes. SB 350 also requires publicly owned utilities (POUs) with annual demand exceeding 700 GWh[2] to file IRPs with the CEC. A total of 16 POUs must adopt IRPs and an updating process by January 1, 2019.

The process for calculating GHG planning targets will require close collaboration among the CPUC, CEC, and CARB to ensure that each agency is well-positioned to fulfill its statutory obligations for achieving the state's GHG reduction goals. CPUC staff has been working closely with CARB and CEC staff on a number of GHG-related issues that are critical to developing the final guidance that CPUC will provide to filing entities, including:

- Statewide methodology for 2030 GHG planning targets for the electric sector and retail electricity sellers.[3]
- Statewide methodology for tracking LSE adherence to GHG planning targets.
- Role of other GHG-related programs and mandates in achieving electric sector 2030 GHG planning targets.
- Potential for calculating standard marginal GHG abatement costs for various policy measures that could be used in IRP.

CARB is planning to release its draft Scoping Plan Update for public comment in early 2017, and in it CARB plans to indicate how the sector-wide target or range will be established. The Scoping Plan Update

[2] As determined on a three-year average commencing January 1, 2013.

[3] The term "retail electricity sellers" encompasses all entities that sell electricity at retail (including POUs) whereas "load serving entity" refers to retail sellers under CPUC jurisdiction (IOUs, ESPs, and CCAs).

containing the electric sector target for 2030 expressed in millions of metric tons of carbon dioxide emissions (MMTCO2e) is expected to be finalized and approved in spring 2017. A CPUC Decision on guidance for the IRP process, which will establish how GHG planning targets will be incorporated into modeling and planning activities for IRP, is expected to follow. How the sectoral targets may be translated to the LSE level for IRP purposes is the focus of this document.

Target-setting in IRP 2017

CPUC staff, in collaboration with ARB and CEC staff, is determining how the GHG planning targets provided in the Scoping Plan Update should inform those incorporated into the IRP process. It is expected that the electricity-sector target will be designed as a planning goal for IRP.[4] Specifically, staff proposes that IRP modeling will incorporate certain assumptions or constraints on cost, reliability, and GHG emission reductions, and the CPUC will generate multiple portfolios and select a single one to represent the Reference 40% by 2030 Plan (or "Reference System Plan"). The Reference System Plan would then be used to guide investment, resource acquisition, and programmatic decisions to reach the state's policy goals, in addition to informing the development of individual LSE IRPs (see Table 1 for more information about the creation and use of the Reference System Plan; see Appendix A for an illustration of the proposed CPUC IRP Analytical Framework). Additionally, the GHG planning targets contained in the Reference System Plan may be used as inputs or constraints in power system modeling work conducted by filing entities to develop their IRPs, and also as a metric for evaluating the plans filed with the CPUC.

Table 1. Two-Year IRP Process – Conceptual Analytical Framework

<table>
<tr><th>Year</th><th>Quarter</th><th>Analytical Phase</th><th>Description</th></tr>
<tr><td rowspan="3">1</td><td>Q1</td><td>1. Develop Assumptions</td><td>CPUC gathers inputs from sources, varies key inputs to create alternative futures to address uncertainties</td></tr>
<tr><td>Q2</td><td rowspan="2">2. Evaluate Reliability Needs</td><td rowspan="2">System and local needs identified by the CPUC are allocated among LSEs for inclusion in their Preferred Plans</td></tr>
<tr><td>Q3</td></tr>
<tr><td>Q4</td><td rowspan="2">3. Develop Reference System Plan</td><td rowspan="2">CPUC creates multiple portfolios and selects a single Reference System Plan; CPUC transmits guidance on how LSE plans should reflect the Reference System Plan</td></tr>
<tr><td rowspan="3">2</td><td>Q1</td></tr>
<tr><td>Q2</td><td rowspan="2">4. Develop Preferred LSE Plans</td><td rowspan="2">Each investor-owned utility (IOU), electric service provider (ESP), and community choice aggregator (CCA) develops its Preferred Plan based on the Reference System Plan</td></tr>
<tr><td>Q3</td></tr>
<tr><td>Q4</td><td rowspan="2">5. Evaluate and Approve LSE Preferred Plans</td><td rowspan="2">CPUC evaluates LSE plans and aggregates them to create a Preferred System Plan</td></tr>
<tr><td>3</td><td>Q1</td></tr>
</table>

[4] A distinction should be drawn between a GHG planning target and a GHG emissions cap. Whereas a planning target is used in planning activities to guide investment decisions, GHG emissions caps are binding requirements for actual emissions reductions from point-source emitters, such as generators, and are separate and distinct from the planning targets for retail sellers to be established in the IRP process.

Staff has identified four potential options that the CPUC, working with CARB and CEC, could pursue in implementing GHG planning targets in the IRP process. The five objectives described earlier in this paper should be used as criteria for evaluating each option. In reviewing the options, it is important to note that choosing one option in the short-term (i.e., for the IRP 2017-18 cycle) does not preclude pursuing a different option in the longer term. Finally, for each option there will need to be a process by which the projected GHG emissions of LSE plans may be aggregated and compared to those of the Reference System Plan, so that progress toward achieving the electric sector GHG reduction goal may be measured and tracked.

Options for Implementing GHG Planning Targets in the IRP Process

1. **Set specific absolute (mass-based) targets for each LSE**

Under this approach, the CPUC would establish LSE-specific mass-based planning targets (such as by a fraction of load served, projected sales, or similar) as a proportion of the electricity sector target provided in the 2030 Target Scoping Plan Update. In order to create specific targets for each LSE, the CPUC would need to divide up the projected emissions among all CPUC-regulated LSEs, as well as within in a given service territory. A proportion of the LSE's projected load or projected sales would be associated with some maximum allowable amount of emissions, with possible adjustments for the GHG impact of LSEs' existing portfolios and other factors. LSEs would then be obligated to meet the established target or interim targets in their IRPs, and the CPUC would evaluate each IRP to determine whether it has met the established criteria.

In practice, the calculation of individual LSE proportions could occur in parallel to CPUC's development of the Reference System Plan, which will be designed to meet the electricity sector target provided by ARB. Once the Reference Plan is developed and adopted, individual LSE targets would need to be established, and each LSE would begin developing its IRP using its assigned GHG planning target (or interim targets) as a modeling constraint.

In order to establish the individual LSE targets, the CPUC would have to choose a methodology for assigning the targets, taking into account historical load served, load projections including potential for opt-outs, historical emissions profiles, and projected resource mixes. Equity arguments would likely be raised associated with early or historical actions to reduce GHG emissions, resource potential within geographic areas, the impact of energy efficiency and other load-reduction measures (and which entity gets credit for them, which may be particularly problematic as customers change service providers), and/or credit for future actions such as electrification. These issues would be highly technical and contentious.

The LSE-specific targets would need to be adjusted with some frequency (e.g., each two-year IRP planning cycle) to account for circumstances occurring outside the LSE's control, such as load-shifting

among IOU, CCA, and DA providers[5] and other factors having a material impact on total demand. For example, if a new CCA forms in 2019 that accounts for 10% of the host utility's load, the CPUC may need to relieve the utility of 10% of its compliance responsibility and shift that responsibility to the CCA.

2. Use an emission-intensity (metric tons CO_2/MWh) based target for each LSE

Whereas Option 1 refers to the total quantity of GHG emissions being emitted, an emission-intensity-based approach compares the amount of emissions to energy use. In other words, each MWh of an LSE's projected load would be associated with some maximum allowable amount of emissions. Under this approach, the CPUC would calculate an emission-intensity necessary to achieve the sector-level target (as provided in the Scoping Plan Update), and each LSE would be assigned an emission-intensity based target. An LSE's target would be developed based in part on the carbon intensity of its existing resource portfolio and its load projections. Similar to Option 1, LSEs would then be obligated to meet the established targets in their IRPs, and the CPUC would evaluate each IRP to determine whether it has met the established criteria.

Like with Option 1, the CPUC may need to consider unique LSE circumstances during the apportionment of targets to ensure equitable treatment. Different LSEs will have different starting emission intensities and different opportunities (some more costly than others) to reduce emissions. For example, allowing one LSE to have a higher ratio of gas-fired generation or energy storage in its portfolio may be desirable because of local reliability needs within that LSE.

3. Allow LSEs the flexibility to demonstrate that their IRPs are compatible with the electricity sector target, as reflected in the 40% by 2030 Plan

Under this approach, the CPUC would choose not to assign LSE-specific GHG planning targets at the front end of the IRP process. It would generate a system-wide portfolio that reaches the GHG planning target for the electricity sector (i.e., the Reference System Plan), as with the previous options, and each LSE would use that portfolio as a benchmark for generating its IRP. Instead of receiving a specific target from the CPUC, LSEs would have the flexibility to determine how to design their IRPs to achieve the state's policy goals and meet other IRP requirements on their own terms. Each LSE would be required, however, to demonstrate how the recommended plan is sufficiently consistent with the Reference System Plan. For example, each LSE's plan might be required to demonstrate consistency with the proportional resource mix identified in the Reference System Plan.

In the absence of LSE-specific planning targets, the CPUC would need a process for determining whether the collection of LSE plans has met the sector-level target. The proposed two-year IRP Analytical Framework (see Table 1) could accommodate such a process. For example, the CPUC would develop the Reference System Plan in Year 1, then aggregate all submitted IRPs to generate the Preferred 40% by 2030 Plan (or "Preferred System Plan") in Year 2. The CPUC would then compare the Reference System Plan with the Preferred System Plan to determine whether they are sufficiently similar (e.g., whether

[5] The load of each ESP is particularly volatile as they compete for market share with each other and with incumbent utilities.

GHG emissions projected for 2030 in the latter falls within the GHG planning range of the former). Any significant deviations identified could be addressed through new procurement authorization. Those deviations could also inform the resource cost and feasibility assumptions made in the next Reference System Plan.

Like Option 2, this approach obviates the need for the CPUC to reexamine and reapportion targets based on any load shifting, because the burden would be on LSEs to explain in their IRP filings how those changes affect their GHG emissions. However, without a specific numerical target for each LSE, there would be less uniformity among individual LSE IRPs, and determining what would constitute a non-conforming plan would be subject to more judgment of CPUC staff and Commissioners. The Commission would likely need to create a set of criteria for determining whether a plan is approved or rejected or whether modifications are required in either planning or authorized procurement.

4. Calculate a proxy price of carbon necessary to achieve the electricity sector-level target

This option is similar to Option 3 in that it avoids the need to calculate LSE-specific targets. Instead, the CPUC would adopt a carbon planning price for IRP, and that price would be reflected in the CPUC-generated portfolio that reaches the GHG planning target for the electricity sector (i.e., the Reference System Plan). LSEs would then be required to use that price in their planning to demonstrate that they are acquiring resources to serve customers reliably, at least-cost, and at just and reasonable rates. Under this approach, the "true" cost of reaching the state's GHG reduction goal would be embedded in the cost of their preferred portfolios. Below are two possible methods for calculating the carbon planning price for IRP planning purposes:

A. *Carbon price as an IRP model output*. This method involves converting the electricity sector target from the Scoping Plan into a carbon price that reflects a marginal GHG abatement cost for the IRP process. There are at least two ways to derive this cost. The CPUC could use the sectoral target as a constraint in capacity expansion modeling to define the marginal abatement cost of achieving that target (i.e., the lowest possible GHG price that would encourage investment in the portfolio absent a specific requirement to meet the GHG planning target), which would serve as the carbon planning price in the Reference System Plan.[6] Alternatively, the marginal GHG abatement cost could be defined as a single average cost (i.e., averaged over the GHG abatement cost curve), allowing LSEs the flexibility to compare low-cost to high-cost investment options to achieve GHG reductions. In either case, the CPUC would require all LSEs to use the established GHG cost in developing their IRPs. LSEs would then design their plan to meet established reliability standards and other IRP requirements.

[6] For example, if achieving the electricity sector GHG reduction target requires a GHG-free resource that costs $100/MWh, and the least-cost alternative resource is $50/MWh and entails 0.5 tonne/MWh of GHG emissions, then a GHG price of $100/tonne would support investment in the GHG-free resource in the absence of an explicit GHG target (i.e., it would add $50/MWh to the cost of the least-cost resource, reflecting the cost of its emissions, thereby closing the gap to the cost of the GHG-free resource).

B. *Carbon price as an IRP model input*. This method involves developing a GHG abatement cost curve prior to establishing the Reference System Plan. The abatement cost could be developed in a number of ways, for example by studying the range of Cap and Trade allowance prices provided by CARB. Alternatively, the CPUC could utilize the social cost of carbon, which calculates the monetized damages associated with specified amounts of GHG emissions. A social cost metric has been a topic of discussion in the Integrated Distributed Energy Resources (IDER) proceeding (R.14-10-003), where parties are exploring potential paths forward for integrating the social cost of carbon and criteria pollutants into the cost-effectiveness analysis of distributed energy resources. Theoretically, the social cost of carbon could be incorporated into IRP modeling as an input, and that cost would be reflected in the resource mix needed to achieve the electricity sector-level target.

Under both methods (A) and (B), the resource mix identified in each LSE IRP could be used to derive a mass-based GHG planning target for that LSE. This LSE-specific target would reflect a plan that ensures reliability, and also results in rates that are just and reasonable.

Similar to Option 3, Option 4 avoids the need to calculate LSE-specific targets and make periodic adjustments in response to shifts in load. It also avoids the need for LSEs to individually plan toward achieving a specific GHG-reduction target and other SB 350 mandates, as all LSEs would be using the same carbon price range in developing their IRPs, and the carbon price would reflect the cost of achieving those mandates. Option 4 also has the potential to provide information about the relative cost-effectiveness of a range of GHG abatement options, including the incremental cost of specific resource programs. Like with Option 3, some judgment will be involved in determining what constitutes a non-conforming plan, and the Commission may need to create an additional set of criteria.

Monitoring and Reporting Progress

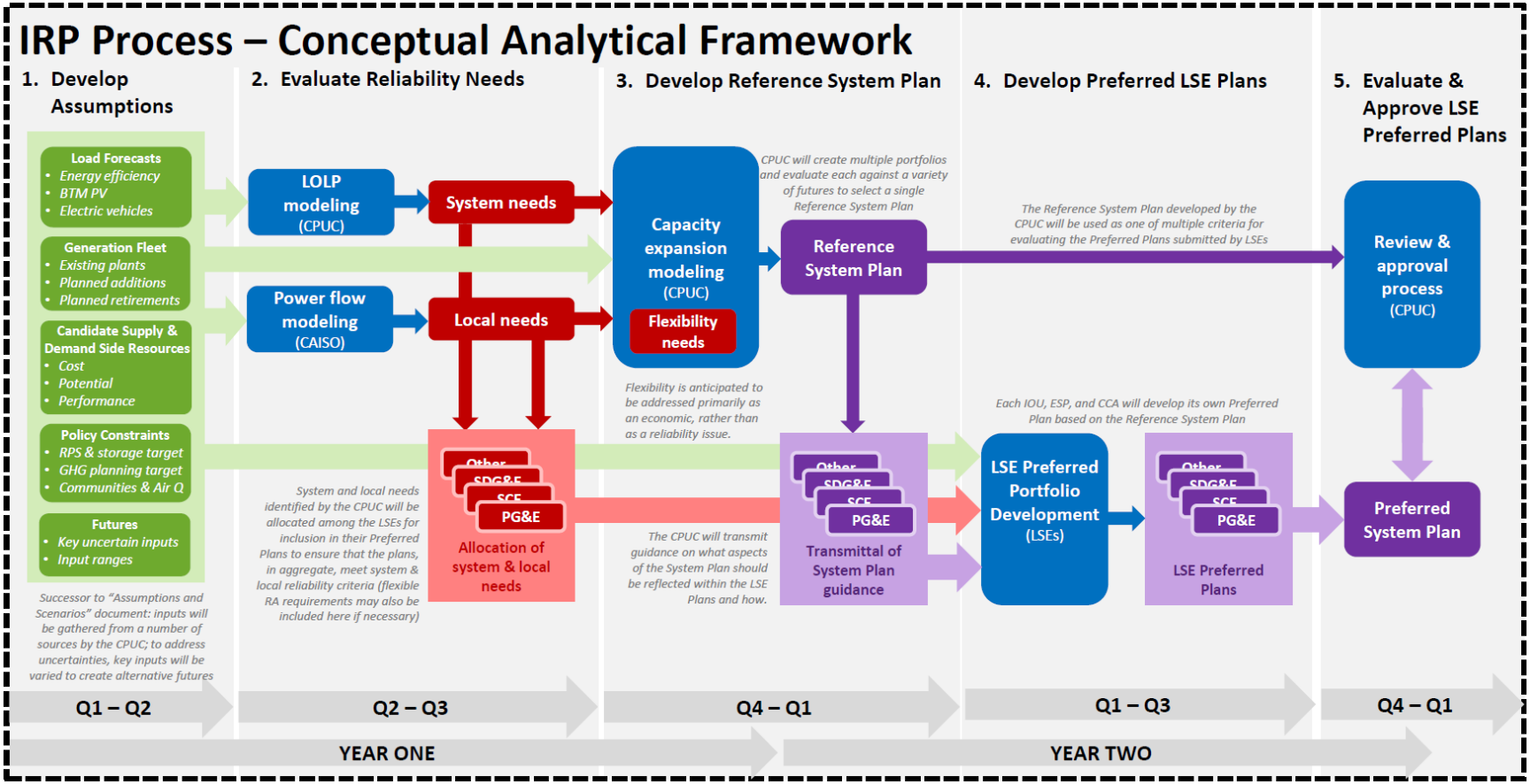
Regardless of the approach taken, the CPUC will need to evaluate IRPs based on whether they are capable of achieving GHG reductions consistent with the electric sector target. In addition, over multiple IRP cycles, the CPUC will need to be able to monitor whether actual procurement activities are moving the electric sector LSEs collectively towards the sector's GHG emissions target.[7] The CPUC may track GHG progress by relying on LSE reporting of emissions, and also including the estimated emissions from expected future procurement-based modeling results reported in their most recently filed IRP.

[7] Enforcement is outside the scope of this paper. Any enforcement of GHG planning targets would need to consider that different filing entities have different governing bodies, procurement processes, and statutory obligations.

Questions for Parties

1. Are the five objectives for GHG target-setting consistent with statutory, Commission, or other requirements for the IRP process? If not, please identify the objective, explain the inconsistency, and suggest how the inconsistency should be resolved.
2. Are there any additional objectives for GHG target-setting that should be included? If so, describe the objective and explain why it should be included.
3. Given the established criteria for evaluating the various GHG implementation options, as reflected in the objectives, which Option for GHG target-setting do parties prefer: 1, 2, 3, 4, or something else? Please provide your rationale with reference to the objectives, and provide as much detail as possible regarding any alternative approaches.
4. Is it necessary for the CPUC and CEC to divide the electric sector target between the two types of entities they regulate (LSEs and POUs)? Should the CPUC and CEC use the same methodology for calculating GHG planning targets for their respective regulated entities (LSEs and POUs)? Please explain your rationale and identify the methodology that best accomplishes that goal.
5. What electricity market, regulatory, and/or operational implementation issues may emerge under the chosen Option? Please identify potential solutions to the issues identified.
6. How should the CPUC determine adherence to GHG planning targets under the chosen Option? Is an ex-post reporting protocol necessary, and if so, should the CPUC rely on the GHG intensity reporting protocol that the CEC will develop pursuant to Assembly Bill 1110 (Ch. 656, Stats of 2016)?

Appendix A


IRP Process – Conceptual Analytical Framework
1. Develop Assumptions
2. Evaluate Reliability Needs
3. Develop Reference System Plan
4. Develop Preferred LSE Plans
5. Evaluate & Approve LSE Preferred Plans
Load Forecasts
Energy efficiency
BTM PV
Electric vehicles
Generation Fleet
Existing plants
Planned additions
Planned retirements
Candidate Supply & Demand Side Resources
Cost
Potential
Performance
Policy Constraints
RPS & storage target
GHG planning target
Communities & Air Q
Futures
Key uncertain inputs
Input ranges
Successor to "Assumptions and Scenarios" document: inputs will be gathered from a number of sources by the CPUC; to address uncertainties, key inputs will be varied to create alternative futures
LOLP modeling (CPUC)
Power flow modeling (CAISO)
System needs
Local needs
System and local needs identified by the CPUC will be allocated among the LSEs for inclusion in their Preferred Plans to ensure that the plans, in aggregate, meet system & local reliability criteria (flexible RA requirements may also be included here if necessary)
Other
SDG&E
SCE
PG&E
Allocation of system & local needs
Capacity expansion modeling (CPUC)
Flexibility needs
CPUC will create multiple portfolios and evaluate each against a variety of futures to select a single Reference System Plan
Reference System Plan
Flexibility is anticipated to be addressed primarily as an economic, rather than as a reliability issue.
The CPUC will transmit guidance on what aspects of the System Plan should be reflected within the LSE Plans and how.
Transmittal of System Plan guidance
The Reference System Plan developed by the CPUC will be used as one of multiple criteria for evaluating the Preferred Plans submitted by LSEs
Each IOU, ESP, and CCA will develop its own Preferred Plan based on the Reference System Plan
LSE Preferred Portfolio Development (LSEs)
LSE Preferred Plans
Review & approval process (CPUC)
Preferred System Plan
Q1 – Q2
Q2 – Q3
Q4 – Q1
Q1 – Q3
Q4 – Q1
YEAR ONE
YEAR TWO