



# All-Party Meeting on the Proposed Integrated Resource Planning Process and Reference System Plan



California Public Utilities Commission  
November 2, 2017



# INTRODUCTION

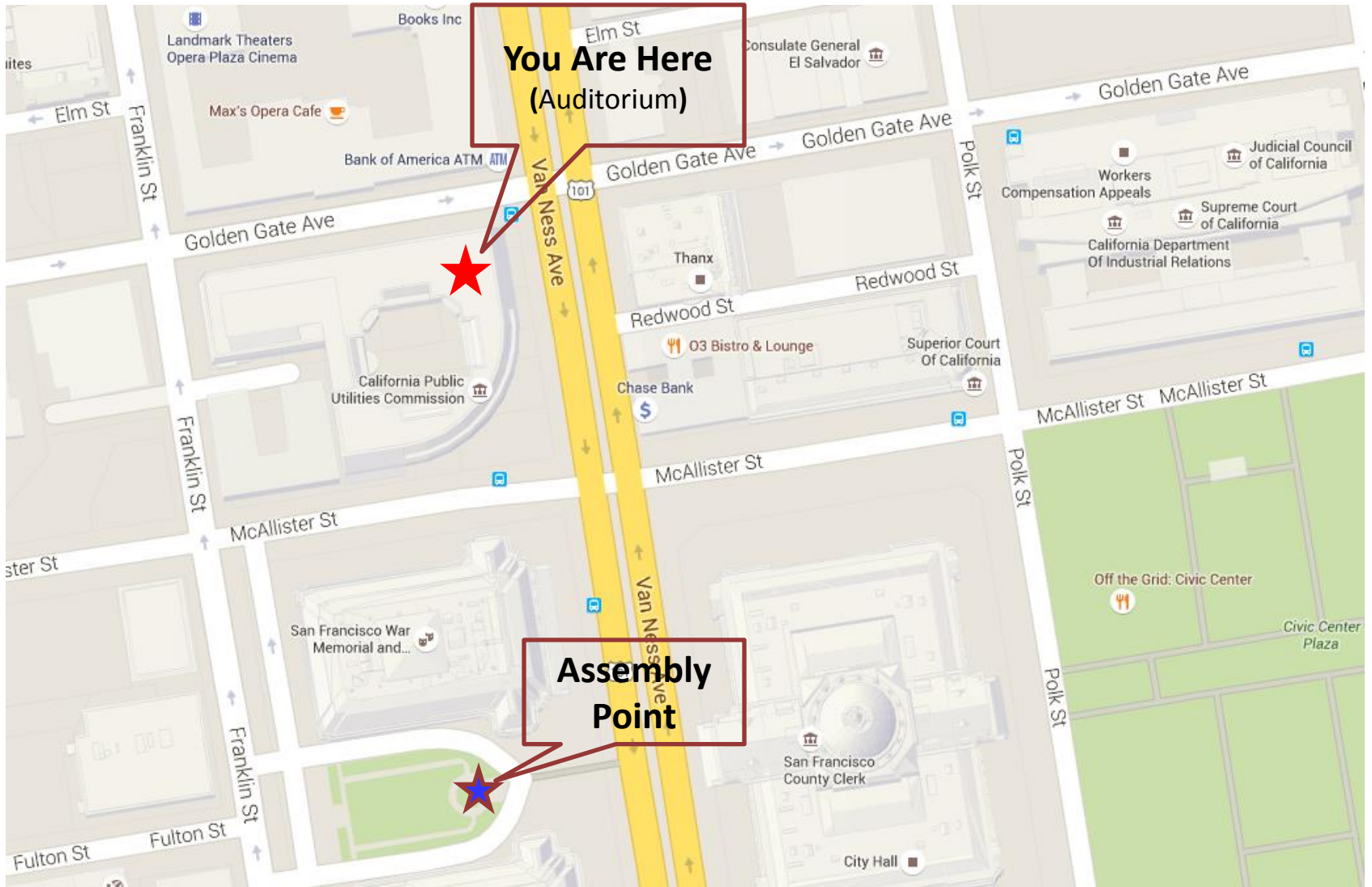
# Introduction

- Housekeeping
  - Staff introductions
  - Informal meeting, not on the record
  - Safety information and logistics
- Meeting purpose and agenda

# Safety and Emergency Information

- In the event of an emergency, please proceed out the exits.
- We have four exits: Two in the rear and one on either side of the speakers.
- In the event that we do need to evacuate the building:
  - Our assembly point is the Memorial Court just north of the Opera House.
  - **For the Rear Exits:** Head out through the courtyard, and down the front steps. Continue south on Van Ness Ave, and continue toward the Memorial Court.
  - **For the Side Exits:** Go out of the exits and you will be on Golden Gate Avenue. Proceed west to Franklin Street. Turn south onto Franklin Street, and continue toward the Memorial Court.

# Evacuation Map



# Call-in Information

*WebEx:* <https://van.webex.com/van/j.php?MTID=m8e4cc764b2ec755d5e73ff23bf1a397e>

*Meeting number:* 741 124 106

*Meeting password:* !Energy1

*Call-in:* 1-866-830-2902

*Passcode:* 2453758

- Remote callers will be placed in listen-only mode by default. Please submit any questions via the WebEx chat.
- We have dedicated time for Q&A following each presentation; we will prioritize questions from people present in the Auditorium.
- Please state your name and organization when asking a question.

# Other Information

## Wi-Fi Access

- login: guest
- password: cpuc92917

## IRP Website

- <http://www.cpuc.ca.gov/irp/>
- All staff work products are available for download

## Restrooms

Out the Auditorium doors and down the far end of the hallway.

# Purpose of Meeting

- To provide an opportunity for the Commissioners to discuss among themselves and with parties the proposed IRP process, Reference System Plan, and recommended Commission policy actions prior to release of the Proposed Decision expected in December 2017.



# Agenda Overview

- |      |                                                   |               |
|------|---------------------------------------------------|---------------|
| I.   | Introduction and Housekeeping                     | 9:30 – 9:40   |
| II.  | Proposed IRP Process and Ref. System Plan 2017-18 | 9:40 – 10:25  |
| III. | Recommended GHG Planning Price for IDER           | 10:25 – 10:55 |
| IV.  | Proposed Path to Future All-Resource Planning     | 11:00 – 12:30 |
|      | LUNCH                                             | 12:30 – 1:30  |
| III. | Procurement Impacts on DACs and Fossil Plants     | 1:30 – 2:15   |
| IV.  | Potential Near-term Procurement of Renewables     | 2:15 – 3:00   |
- Staff will begin each session with a brief overview of current proposals to elevate key issues and questions for discussion.
  - Commissioners and parties will each have separate opportunities to discuss each topic.



# **PROPOSED IRP PROCESS AND REFERENCE SYSTEM PLAN FOR 2017-18**

# Purpose of Integrated Resource Planning (IRP)

- California's goal is to reduce statewide greenhouse gas (GHG) emissions 40% below 1990 levels by 2030.
- The electric sector currently represents 19% of total statewide GHG emissions.
  - In 1990, the electric sector represented 25% of the statewide total.
- The purpose of IRP is to ensure that the electric sector is on track to help California achieve its statewide 2030 GHG target at least cost while maintaining the reliability of the grid.
- In IRP 2017-18, Staff propose to use a capacity expansion model called RESOLVE to identify optimal portfolios of resources that will achieve electric sector GHG reductions, reliability needs, and other policy goals at least-cost under a variety of possible future conditions.

# Statutory Basis of IRP at CPUC

The Commission shall...

PU Code Section 454.51

**Identify a diverse and balanced portfolio of resources... that provides optimal integration of renewable energy in a cost-effective manner**

PU Code Section 454.52

**...adopt a process for each load-serving entity...to file an integrated resource plan...to ensure that load-serving entities do the following...**

- Meet statewide GHG emission reduction targets
- Comply with state RPS target
- Ensure just and reasonable rates for customers of electrical corporations
- Minimize impacts on ratepayer bills
- Ensure system and local reliability
- Strengthen the diversity, sustainability, and resilience of the bulk transmission and distribution systems, and local communities
- Enhance distribution system and demand-side energy management
- Minimize air pollutants with early priority on disadvantaged communities

# Proposed Two-Year IRP Process

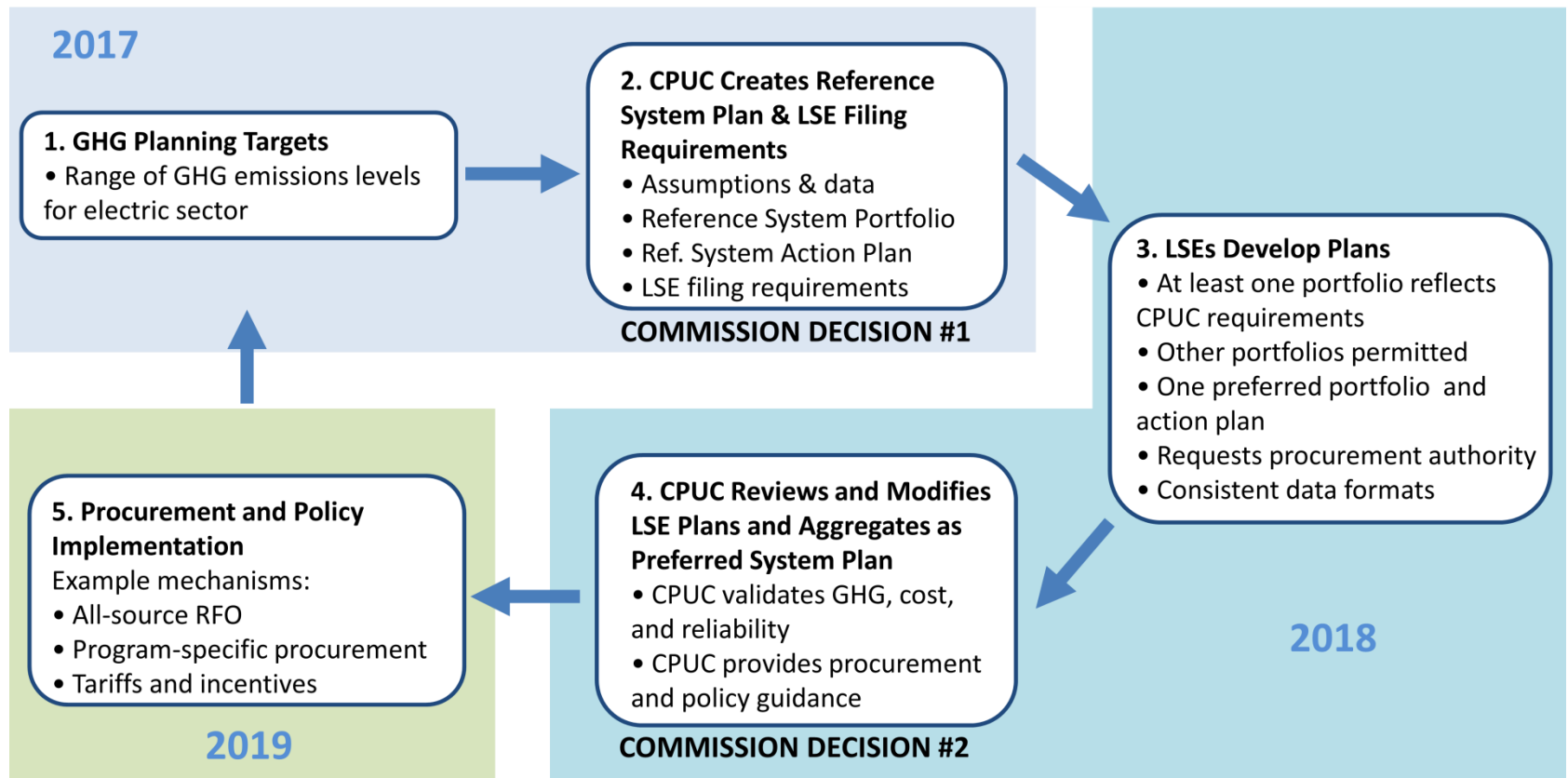
## Goals

- Identify solutions that benefit the entire system and accommodate load-serving entity (LSE)-specific constraints and opportunities
- Identify short-term actions (1-3 years) needed to meet long-term goals (10+ years)

## Key Steps Include:

- CPUC Develops and Adopts **Reference System Plan** that includes:
  - A GHG Planning Target for the electric sector consistent with the statewide target of 40% below 1990 levels by 2030
  - A Reference System Portfolio of resources that represents a least-cost, least-risk pathway to achieving the recommended GHG planning target
  - A GHG Planning Price representing the marginal cost of GHG abatement
  - Commission policy actions to ensure that IRP guidance informs other CPUC proceedings and results in adequate resource procurement
- LSEs Submit Individual Integrated Resource Plans (i.e., **LSE Plans**)
  - LSEs provide at least one portfolio that uses the GHG Planning Price
  - LSEs identify any procurement needs and request procurement authorization
- CPUC Reviews and Aggregates LSE Plans and Adopts **Preferred System Plan**
  - CPUC aggregates LSEs' preferred portfolios to compare with the Reference System Plan
  - CPUC may authorize procurement, tariff changes, program changes, etc., as needed
  - CPUC provides guidance to other resource proceedings and to CAISO for the TPP and CEC for IEPR

# Proposed Two-Year IRP Process

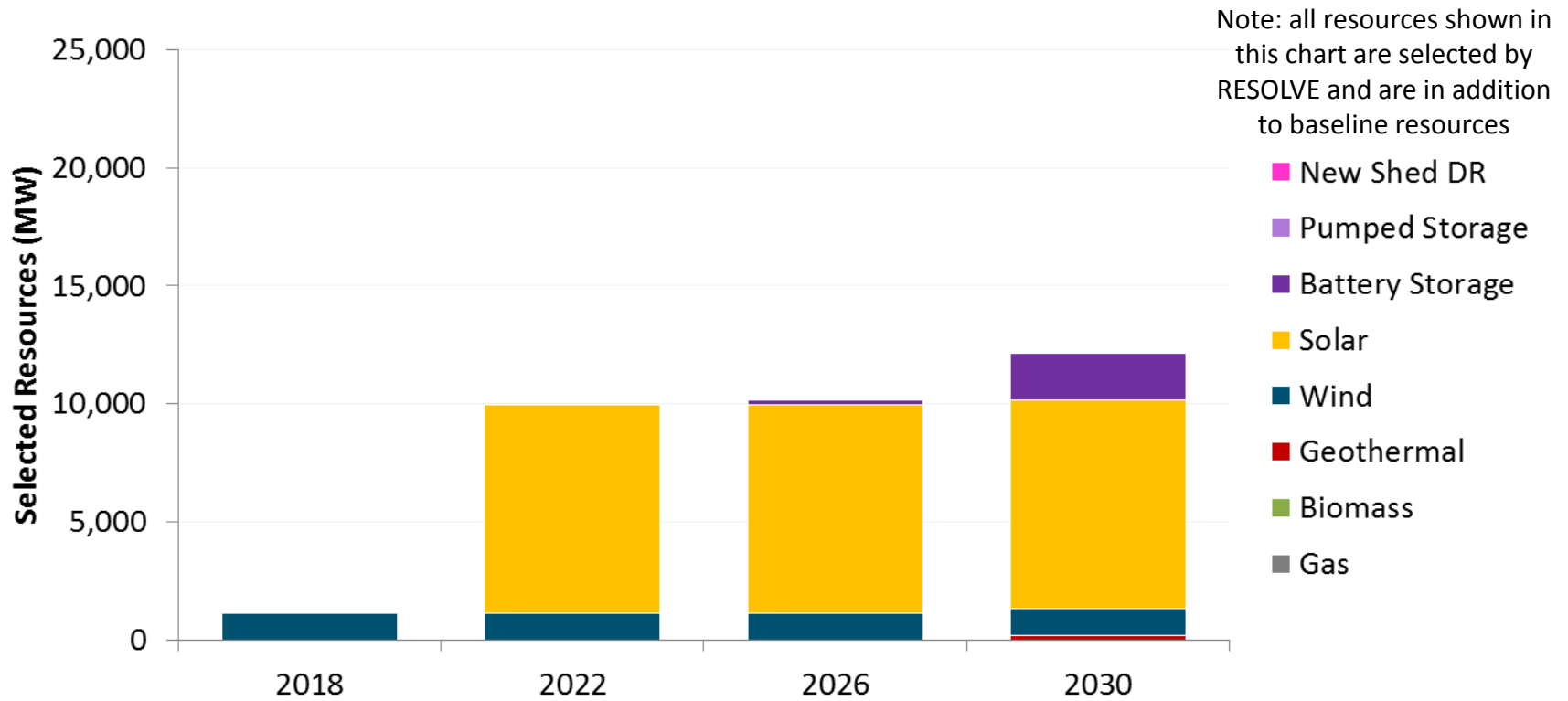


# GHG Planning Target for the Electric Sector in IRP

- **Recommended GHG Planning Target for IRP: 42 MMT by 2030**
  - A 42 MMT statewide target means that emissions from the statewide electric sector will total 42 million metric tons (MMT) in 2030, a decline of 61% from 1990 levels of 108 MMT for the sector.
  - 42 MMT statewide electric sector planning target for IRP is consistent with a straight-line trajectory of emissions reductions to meet California's goal to reduce statewide emissions 80% below 1990 levels by 2050
  - A 42 MMT target by 2030 represents a 50% decrease in electric sector emissions from 2015 levels.
  - 42 MMT target results in lower overall costs and financial risk than a 30 MMT target in 2030.
  - Differences in 2038 GHG planning targets studied and load forecasts on the path to 2050 do not affect the composition of 2030 resource portfolios, which implies there are risks associated with reducing electric sector emissions too aggressively in the near term.
  - Current CPUC policies alone may not be aggressive enough to meet the 2030 GHG Planning Target at lowest cost.

# Recommended Reference System Portfolio

- Recommended Portfolio of Additional Resources to Meet 42 MMT Planning Target**
  - Model selects ~9 GW of new utility-scale solar; 1,100 MW in-state wind; and 2,000 MW battery storage in addition to baseline that reflects existing policies
  - Total incremental cost is \$239 million/year, equivalent to approximately a 1% increase in system average rates by 2030

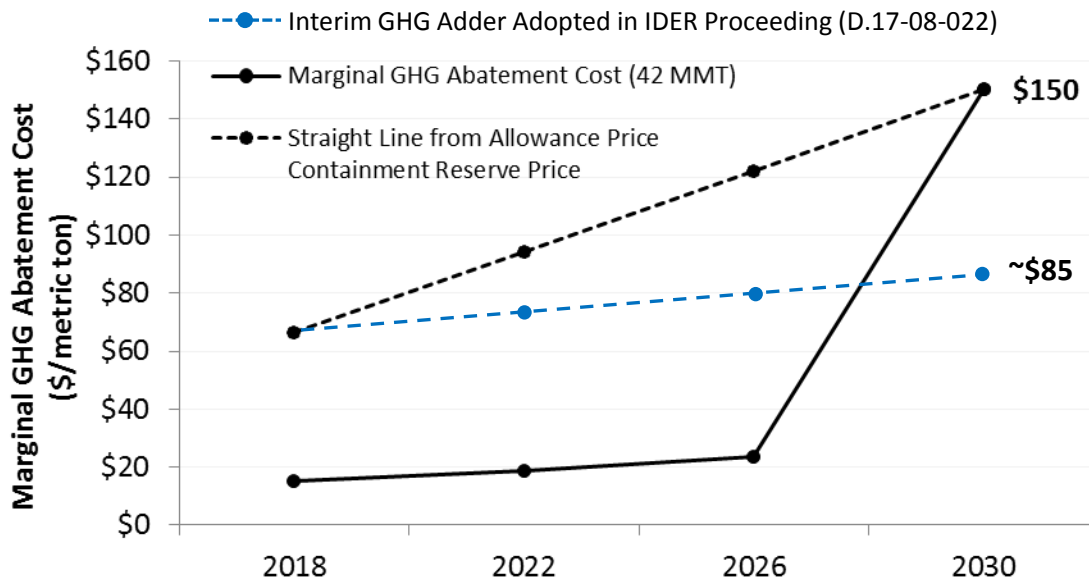


A portion of the need for short-duration services represented by battery storage resources in the chart above could be met by “Shimmy DR” resources, which were not modeled explicitly here but may have resource potential up to 300 MW. The timing of the need for short duration services is based on a calculation of load-following reserve requirements outside of RESOLVE. There may be cost benefits to earlier procurement than shown here.



# GHG Planning Price

- **Recommended GHG Planning Price for IRP 2017-18: \$150/MT in 2030**
  - Represents the CAISO system-wide marginal GHG abatement cost associated with achieving the 42 MMT planning target for the electric sector
  - The GHG Planning Price is an outcome of RESOLVE modeling, which constrains GHG emissions at the system level on an annual basis
  - LSEs would use the GHG Planning Price to develop their own portfolios and benchmark against resources in the Reference System Portfolio and an LSE-specific GHG Emissions Benchmark



Staff proposes using a straight line from the current GHG allowance price containment reserve price (~\$66/metric ton) to the 2030 GHG Planning Price value

# Policy Actions to Implement the Reference System Portfolio

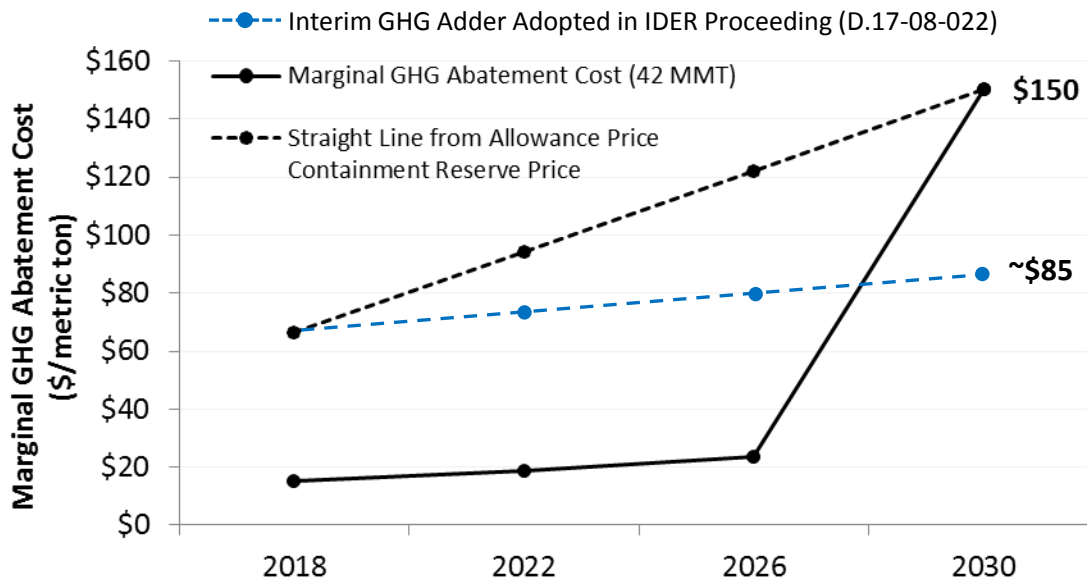
- Staff recommends the Commission take the following near-term policy actions to ensure that IRP guidance informs other proceedings and results in adequate resource procurement to achieve 2030 GHG reduction goals
  1. Consider increasing required renewable procurement
  2. Further study out-of-state (OOS) wind resources
  3. Use the GHG Planning Price in Integrated Distributed Energy Resource (IDER) proceeding
  4. Develop a Common Resource Valuation Methodology (CRVM)
  5. Study natural gas fleet impacts



# **RECOMMENDED GHG PLANNING PRICE AND APPLICATION IN IDER**

# Recommended GHG Planning Price

- Staff recommends the GHG Planning Price corresponding to the Reference System Portfolio: \$150/metric ton in 2030.
- For years before 2030, and to transition from the current GHG adder used in the IDER Proceeding, a straight line from the current GHG Allowance Price Containment Reserve price to the 2030 GHG Planning Price value would be reasonable



Staff proposes using a straight line from the current GHG allowance price containment reserve price (~\$66/metric ton) to the 2030 GHG Planning Price value

# Using the GHG Planning Price in IRP

- At a minimum, LSEs should use the GHG Planning Price to determine when and whether investments in GHG-free resources would reduce costs
  - Add the GHG planning price to the marginal cost of GHG-emitting resources
  - If the LSE adds a resource and it lowers total cost (including capital, fuel, variable, GHG allowance, etc.), then the resource would be justified
- LSEs may choose to make investments for reasons other than cost reduction (e.g., environmental goals, risk avoidance, etc.)

# Recommended Policy Action for IDER

## **Policy considerations:**

- IRP has the ability to produce price curves that reflect the system-wide marginal resource abatement cost associated with achieving certain targets, such as GHG or RPS targets
- Other proceedings can use marginal abatement prices provided by IRP in their planning, valuation, and procurement processes

## **Recommended policy actions:**

- IRP should adopt marginal abatement prices that can be used by the IDER proceeding
- IRP should determine how the GHG Planning Price should flow into IDER cost-effectiveness methodologies
- Staff should identify specific data needs and timing of information flows between IDER and IRP



# PROPOSED PATH TO FUTURE ALL-RESOURCE PLANNING

# Energy Efficiency

## **Conclusions:**

- GHG Planning Target has significant effect on future value, shape, and magnitude of avoided costs associated with EE
- Inputs used in current IRP analysis may understate EE costs

## **Action Items:**

- Refine work plan for determining whether EE Potential & Goals process can be integrated with IRP Reference Plan development in 2019
- Examine opportunities for alignment with other connected processes such as IEPR forecast and SB 350 targets
- Assess potential impacts of new price signals that may originate from IRP and EE providers' ability to respond to those signals



# Behind-the-Meter PV

## Conclusions:

- Increasing quantities of BTM PV increase total resource cost across all scenarios
- The total resource cost of rooftop solar is higher than utility-scale solar
- Location-specific distribution and certain transmission deferral benefits not considered in RESOLVE

## Action Items:

- Consider use of the Total Resource Cost (TRC) test vs. other cost-effectiveness tests, and proper venue to determine appropriate methodology
- Establish coordination work plan for alignment with DRP and NEM Successor Tariff Revisit

# Demand Response

## Conclusions:

- “Shed” DR resources do demonstrate value at the local level, but additional “shed” resources do not demonstrate value at system level
- Advanced “shift” demand response may offer a cost-effective option to increase flexibility of the electric system
- “Shimmy” DR resources could meet some portion of system needs

## Action Items:

- DR proceeding should evaluate how IRP results should affect DR targets and program budgets post-2022
- Refine work plan for determining whether EE Potential & Goals and DR potential study processes can be integrated with IRP Reference Plan development in 2019
- Continue to pursue steps to make “shift” and “shimmy” DR resources a reality

# Electric Vehicles

## Conclusions:

- Flexible EV charging reduces the amount of renewable generation and energy storage selected to meet GHG Planning Targets
- Financial benefit of flexible charging grows with increasing penetrations of renewables (or increasingly stringent GHG targets)

## Action Items:

- Explore prioritization of investments in EV charging infrastructure that facilitates charging flexibility
- Coordinate with CEC and CARB to further refine state forecasts for EVs
- Investigate opportunities to electrify the transportation sector to take advantage of the GHG and air emissions benefits associated with an increasingly clean electric grid and provide benefits to disadvantaged communities

# Energy Storage

## **Conclusions:**

- Optimal levels of battery and pumped storage depend on GHG target, and may vary from LSE to LSE
- Increased renewable penetration and need for short-duration balancing services results in significant need for additional battery storage
- Addition of pumped storage is likely a sub-optimal solution in Reference System Portfolio

## **Action Items:**

- Establish workplan to capture all distribution- and customer-level values of energy storage for future IRP cycles

# Discussion Questions

## Energy Efficiency

- How should IRP consider EE resources in future IRP cycles? What effects would potential changes in EE's treatment in IRP have on the EE proceeding?
  - Should IRP try to model EE on a level playing field with supply-side resources?

## BTM PV

- How can IRP modeling results inform future net energy metering redesign?

## Demand Response

- Are the IRP results related to DR actionable? What additional information might the DR proceeding need from IRP?

## Electric Vehicles

- What information can IRP provide to help inform our decisions about what EV charging infrastructure and behavior provide the most value?

## Energy Storage

- What steps should we take to ensure that future IRP cycles capture all the different values and services that energy storage can provide to the grid?



# **PROCUREMENT IMPACTS ON DISADVANTAGED COMMUNITIES AND FOSSIL PLANTS**

# Observations Regarding Air Pollutant Impacts

- The vast majority of electric sector emissions result from CCGTs, because they run more hours of the year.
- New renewables selected by RESOLVE primarily displace CCGT use during daytime hours.
- As the electric sector GHG Planning Target becomes more stringent, new renewables and storage displace more CCGT use outside of daytime hours.
- The largest opportunity to reduce air pollutants from the electric sector is by reducing the use of CCGTs.

# Natural Gas Fleet Impacts

- Modeling results showed that building new gas was never part of the least-cost solution for meeting reliability needs
- All cases studied assumed that most existing gas resources continued to be available
- Additional analysis is needed to better understand likely gas plant retirements and gas plant attributes that can provide the most value to the grid in 2030



# Common Resource Valuation Methodology (CRVM)

- Effectively leveraging the IRP planning results requires a clear linkage between planning and procurement activities
- CRVM would ensure that resource valuation methodologies for IRP and procurement are aligned, both for supply and demand-side resources
- CRVM development should attempt to capture benefits to disadvantaged communities to the extent appropriate
- CRVM development should also attempt to capture qualitative benefits such as resource diversity, grid resiliency, and strengthened local communities

# Questions for Discussion

- How should the Commission identify which plants have the most negative impact on DACs and whether they are truly needed for reliability?
- Should the Commission try to encourage the retirement of plants that are negatively affecting DACs?
- If the Commission pursues near-term procurement of zero-emission resources, natural gas utilization will decline overall, but modeling indicates these resources may be needed for reliability. Can these plants survive economically?



# **NEAR-TERM PROCUREMENT OF ADDITIONAL RENEWABLE ENERGY**

# Out-of-State Wind (OOS)

- IRP results identify potential opportunities and benefits of procuring out-of-state wind
- IRP modeling results suggest that incremental cost to ratepayers of procuring 3,000 MW of high capacity factor out-of-state (OOS) wind in the 2018-2022 timeframe would be relatively small (\$4 MM/yr)
- Risk Hedging Value: Although this value has not been quantified, diversification of energy resources can act as a low-cost insurance policy against various risks
  - High solar costs (including potential tariffs on solar PV technology)
  - Increased renewable integration costs, such as storage costs
  - High loads due to electrification

# Potential for Near-Term Procurement of Additional Zero Emission Energy

- Modeling results suggest potential statewide economic benefits of near-term procurement if tax incentives expire
  - The Reference System Portfolio includes 1,100 MW of wind in 2018 and 9,000 MW of solar PV in 2022
  - Postponing this zero emission procurement until after 2022 has a potential cost of \$143 MM/yr (levelized 2016 dollars) statewide.
- Modeling and accounting do not account for risks including:
  - Chance that tax incentives could be extended
  - Possibility of increased solar PV costs due to supply chain disruptions or a solar tariff

# Discussion Topics

- Questions for consideration regarding OOS wind:
  - Is the risk hedging value of procuring out-of-state wind sufficient to justify the additional cost (\$4-\$104 MM/yr)?
  - Does the Commission need additional information about the cost of OOS generation/transmission before making a decision? If so, what process/proceeding is most appropriate for gathering more information?
- Issues to consider when evaluating the need for and risks of near-term procurement
  - Resource Availability and Cost
  - Market Power
  - Cost Allocation
  - Regulatory Flexibility and Off-Ramps
  - Sequencing and Reliability Analysis
  - Appropriate Procedural Venue