



COMMUNITY ADVISORY COUNCIL MEETING

July 10, 2018

Today's Agenda

1. Welcome and Introductions
2. Clerk to Call Meeting to Order
3. Roll Call, Installation and Council Member Oath of Offices
4. Community Advisory Council Introductions
5. Consideration of Late Additions and/or Deletions to Consent and Regular Agendas
6. Public Comment For Items Not on the Agenda

REGULAR AGENDA

7. Selection of Chair and Vice Chair (*Action Item*)
8. Approve Community Advisory Council Meeting Schedule (*Action Item*)
9. Energy Industry Overview (*Discussion Item*)
10. Legislative and Regulatory Overview (*Discussion Item*)
11. Adjournment to Next Community Advisory Council Meeting

AGENDA ITEM #7: SELECTION OF CHAIR AND VICE CHAIR

Recommendation: Community Advisory Council Members will nominate and vote to appoint a Chair and Vice Chair.

AGENDA ITEM #8: APPROVE COMMUNITY ADVISORY COUNCIL MEETING SCHEDULE

Recommendation: Staff recommends Community Advisory Council (CAC) hold meetings on the fourth Tuesday, Wednesday, or Thursday of the month at one of three times:

1. 10:00 am (lunch served following meeting)
2. 2:00 pm (snacks available)
3. 6:00 pm (light dinner served before meeting)

Additionally, staff recommends the CAC go dark in July which will coincide with the same schedule as the Policy and Operations Board meetings.

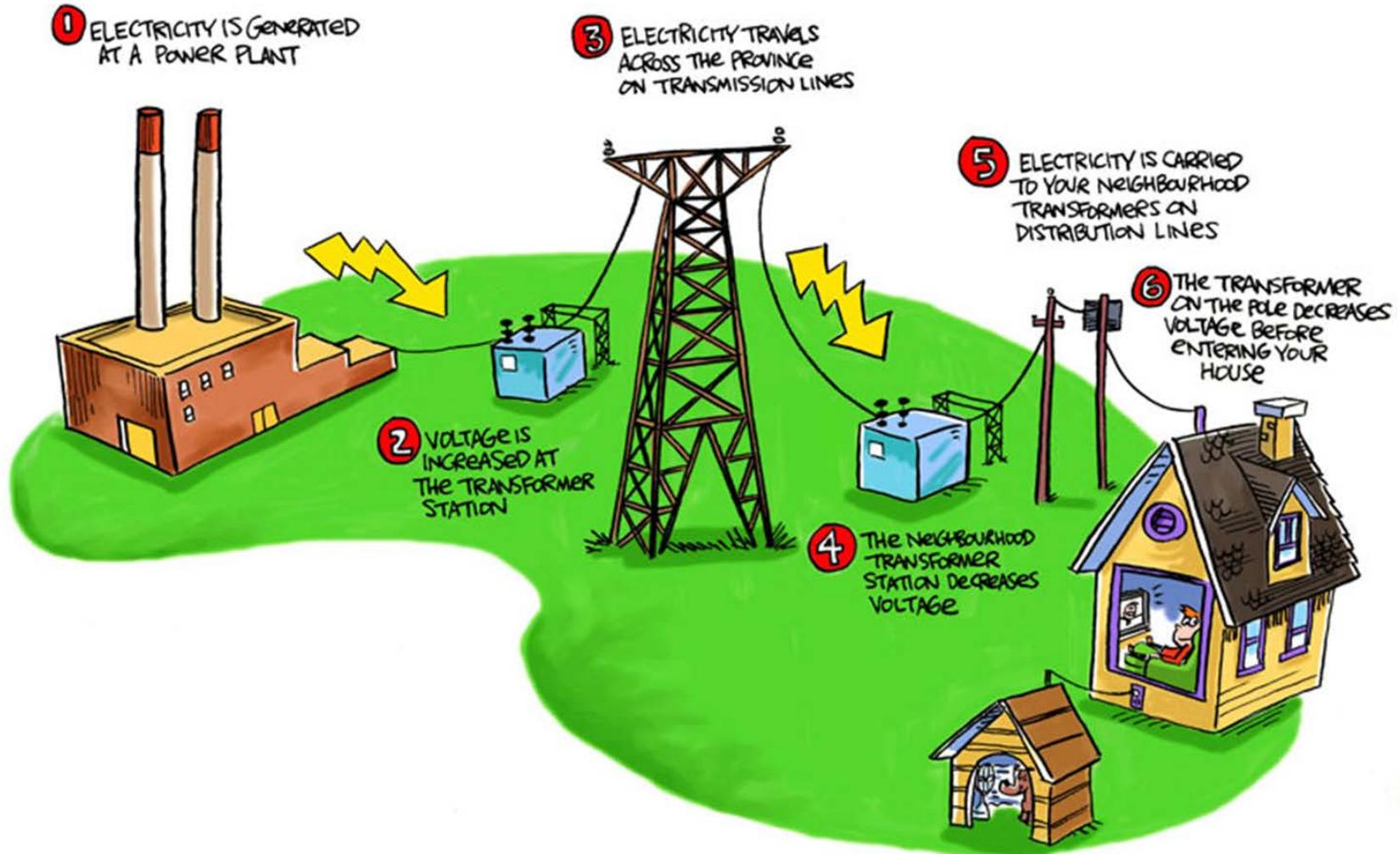
AGENDA ITEM #9: ENERGY INDUSTRY OVERVIEW

Recommendation: Receive presentation and discuss.

How “The Grid” Works: Key Terminology

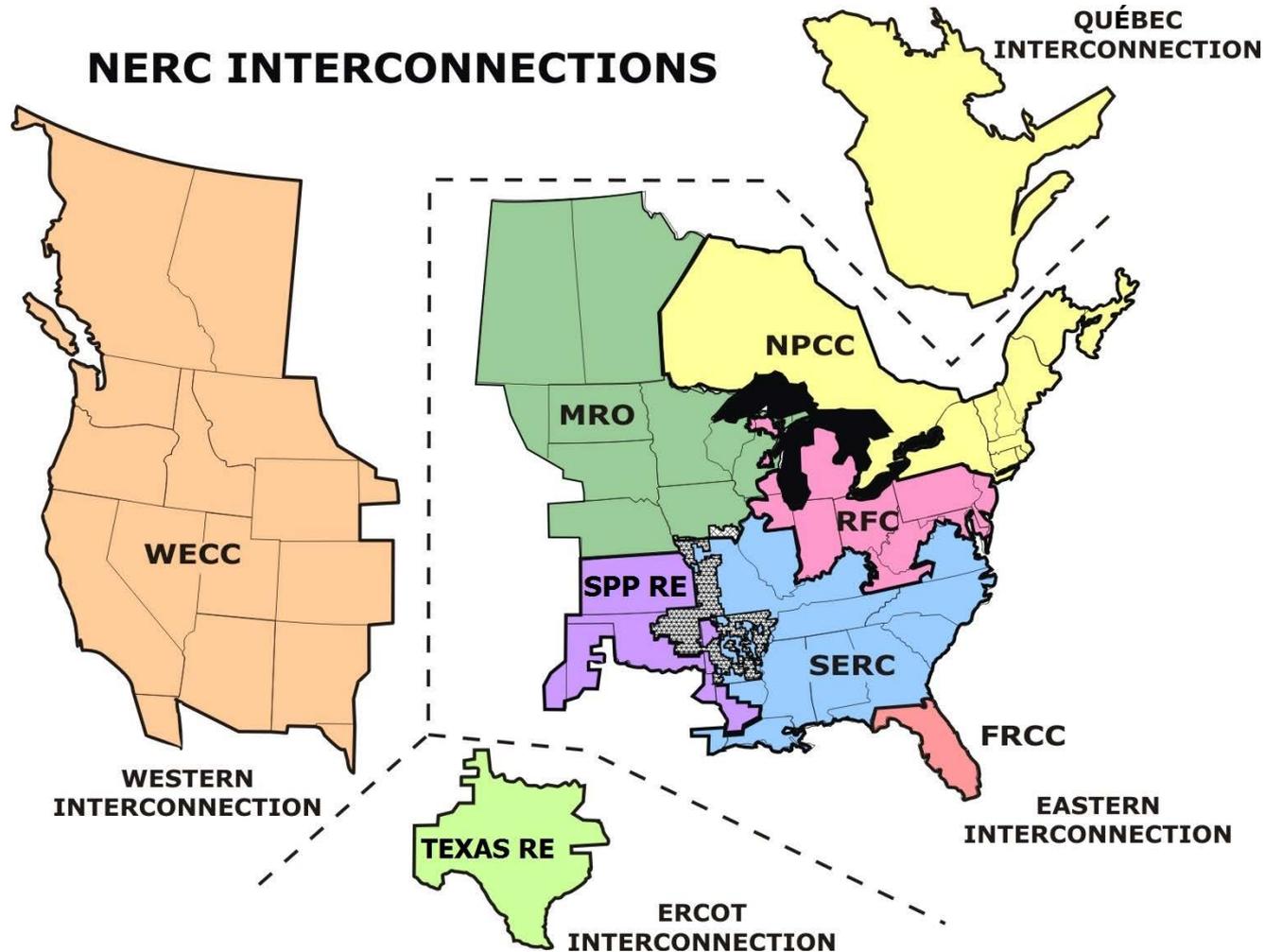
- **Electric energy: a unique commodity used to power many devices and systems**
 - Must be used or stored immediately
 - Supply and demand must remain balanced to avoid infrastructure failures and safety issues
 - Consumption is measured in kilowatt hours (“kWh”; retail); megawatt hours or gigawatt hours (“MWh” or “GWh”; wholesale)
 - $1 \text{ GWh} = 1,000 \text{ MWh} = 1,000,000 \text{ kWh}$
- **Capacity: the potential to produce electric energy**
 - Generating capacity may be deployed to serve customer energy requirements or remain idle to address system contingencies
 - Capacity is measured in kilowatts (kW), megawatts (MW) and gigawatts (GW)
 - When comparing the relative size of electric generators, a higher capacity rating indicates the potential to produce more electric energy
 - 1 MW of fully operating capacity over one hour will produce 1 MWh

How "The Grid" Works: Utility Infrastructure



How "The Grid" Works: National Oversight

NERC = North American Electric Reliability Corporation

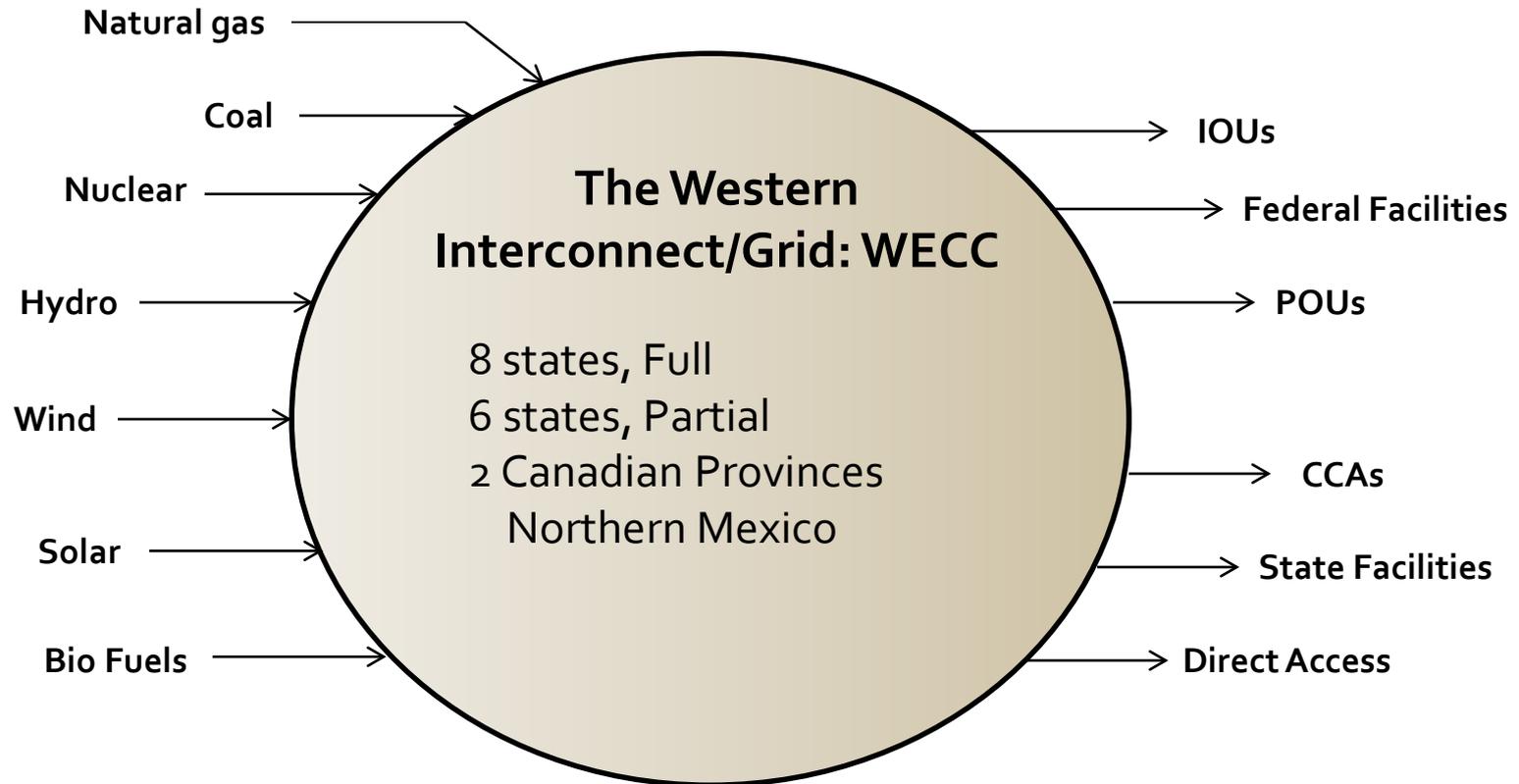


An Interconnected Grid

- **The Western U.S. is electrically interconnected**
- **In the electric utility industry, the Western U.S. (or Western Interconnection) is referred to as WECC, or the Western Electricity Coordinating Council**
 - WECC is a non-profit organization focused on grid reliability
 - One of eight (8) NERC Regional Entities (reliability regions) with delegated authority originating from the FERC
 - Extends from Canada (Alberta and British Columbia) to Mexico (Baja California), and includes all/portions of 14 U.S. states
- **Energy produced within the Western U.S. may flow anywhere within the WECC**
- **Think of WECC as a big swimming pool: generators fill the pool; users draw from the pool... the electrons in the pool are indistinguishable from one another!**
- **Contracts and Renewable Energy Certificates (RECs) are the key mechanisms used to create ownership distinctions amongst the electrons**

Producers and Users

Producers = Sources = Generators = Supply
Users = Sinks = Electric Loads



Regulatory Overview – Who Does What?

The Electric Utility Industry is highly regulated with numerous compliance obligations imposed on its participants, including CCAs

- Federal Regulation
 - FERC: Federal Energy Regulatory Commission (transmission and reliability, etc.)
 - NERC: North American Electric Reliability Standards (regional grid reliability and related compliance)
- Regional: WECC, or Western Electricity Coordinating Council (regional reliability)
- State Regulation
 - CPUC: California Public Utilities Commission
 - CEC: California Energy Commission
 - CARB: California Air Resources Board
 - CAISO: California Independent System Operator

California Regulatory Agencies - Electric

California Public Utilities Commission: (CPUC):

Regulates the investor owned utilities (i.e., PG&E, SCE, and SDG&E), but also regulates capacity reserve and RPS (Renewable Portfolio Standards) compliance of CCA's.



California Energy Commission (CEC): Primary energy policy and planning agency in California – areas of focus include long-term forecasting, planning for energy emergencies, generator permitting and certification as well as promoting energy efficiency and renewable technologies.

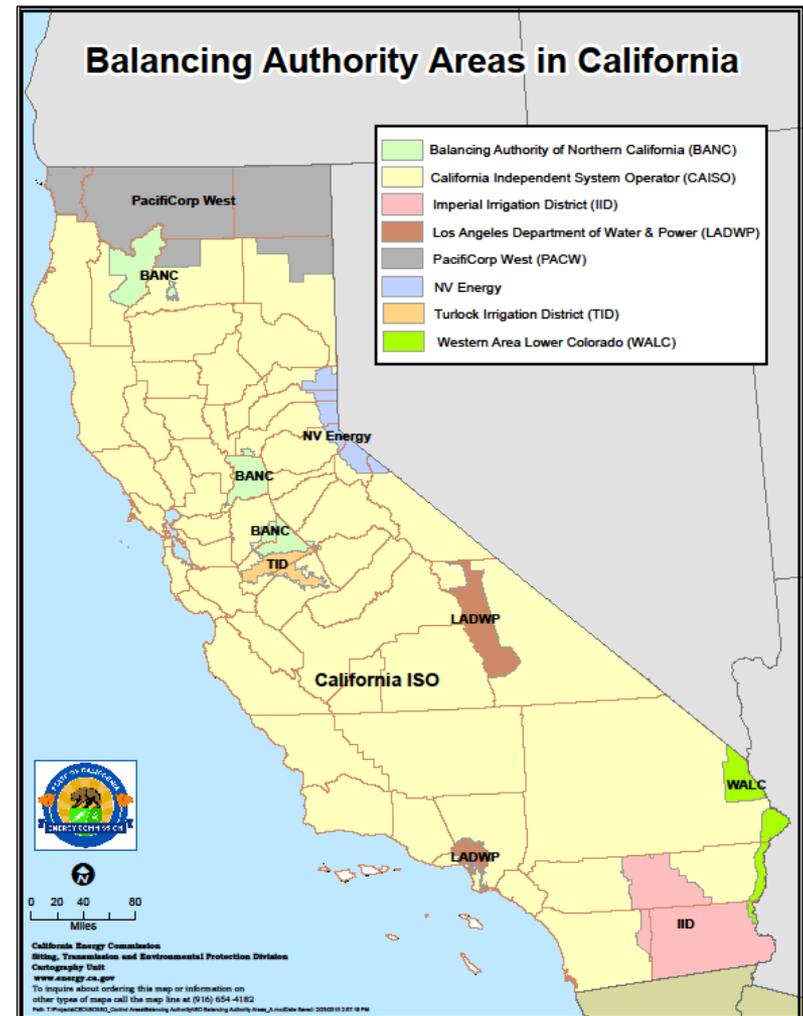


California Air Resources Board (CARB): Objectives are to maintain healthy air quality and to promote approaches for compliance with air pollution rules and regulations. Administers Mandatory Reporting Requirement for GHG emissions.



How “The Grid” Works: CA Operations

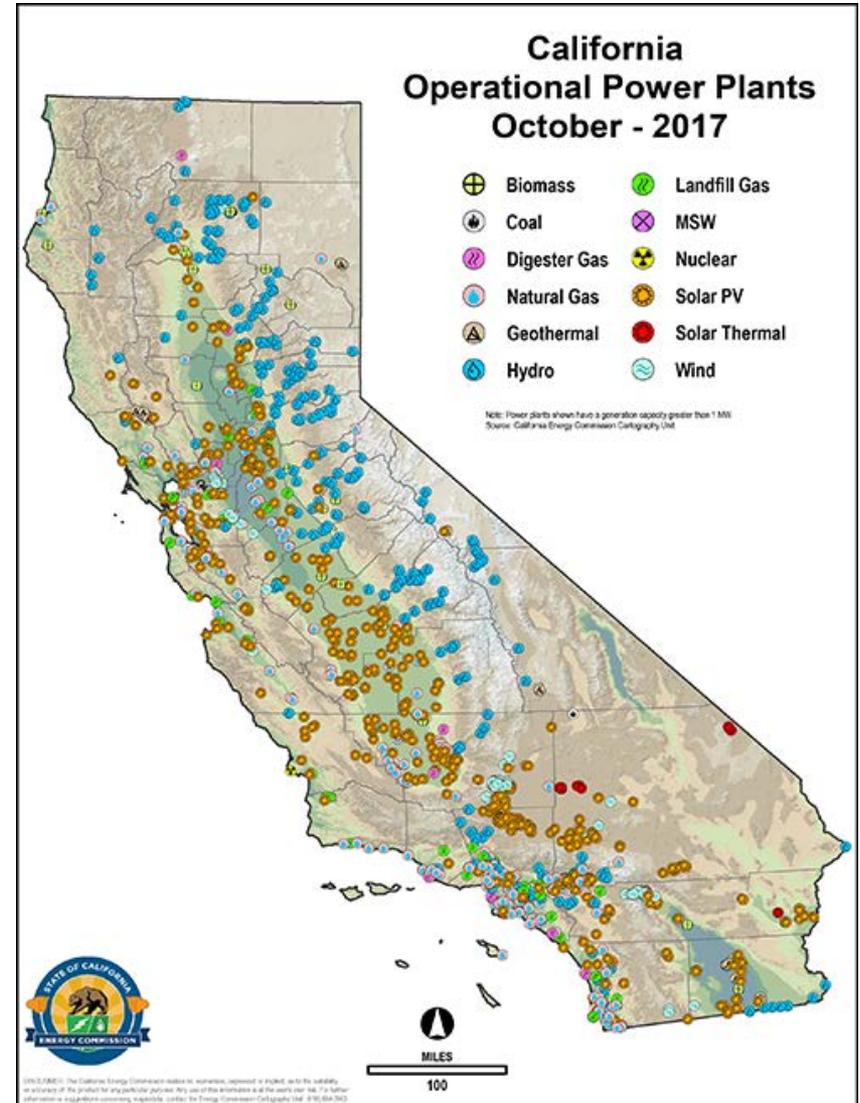
- Balancing Authorities are responsible for real-time balancing of supply (generating resources) and demand (load) to ensure grid reliability.
- Eight Balancing Authorities in California, with the largest being the California Independent System Operator (CAISO).
- CAISO imbalance market extends beyond CA – movement toward regionalization.



Who Generates Power within California?

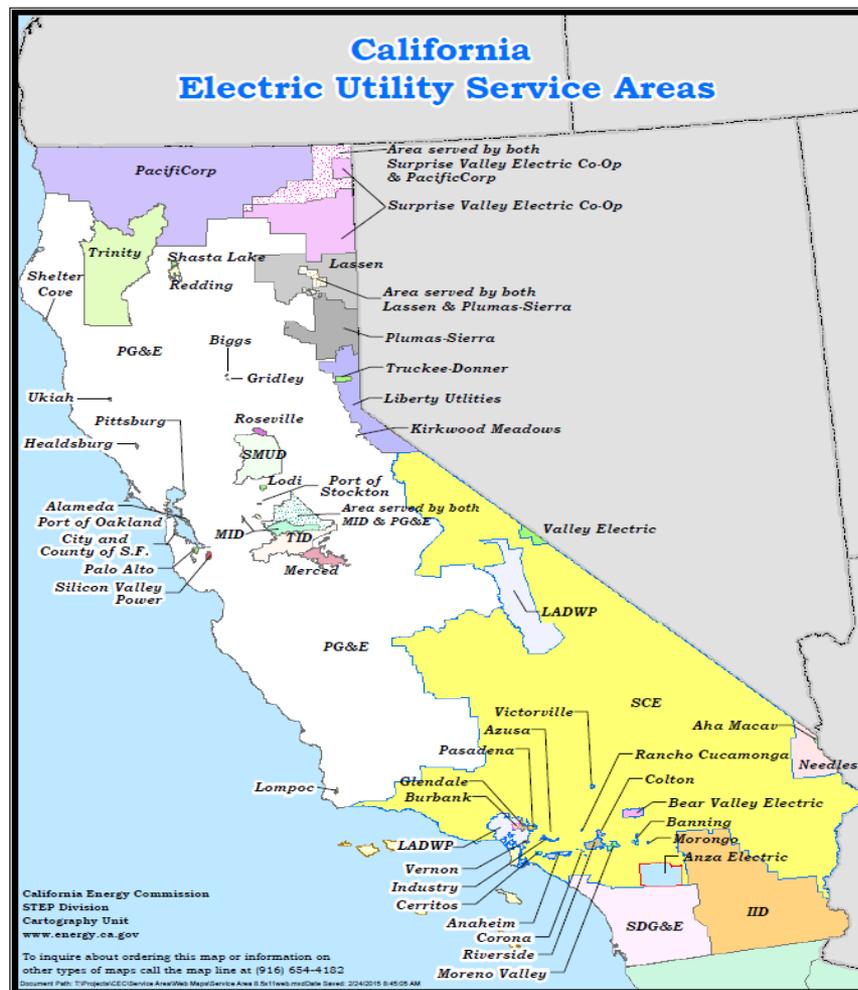
- Over 1,000 electric generating units > 1 MW.
- ≈80,000 MW of generating capacity.
- ≈54% of capacity is natural gas.
- ≈68% of CA's energy is produced in-state.
- ≈ 15% is imported from NW.
- ≈ 17% is imported from SW.
- ≈ 27% of CA's generating capacity uses renewable fuel sources.

*2016 Data from CEC



Who Delivers Power within California?

- Distribution Utilities connect end-user to the transmission grid via distribution systems.
- 75% of electricity used in CA is delivered by investor owned utilities: PG&E, SCE and SDG&E.
- Public sector utilities deliver remaining 25%.



Energy Products & Services for CCAs

Electric Energy: unspecified, price hedged

Renewable Energy: procured to meet RPS mandates, CCA policy for exceeding mandates and customer tailored products.

Other Specified Energy Products: GHG-free energy (typically large hydro); generally procured to meet internally defined policy objectives.

Resource Adequacy Capacity: procured to meet reserve capacity requirements.

Scheduling Coordinator Services (“SC” services): SCs schedule forecasted hourly load, report usage, and settle transactions with the CAISO.

Renewable Energy Products

Various contracting mechanisms/products are permissible under RPS rules, subject to specified minimums/maximums:

Bucket 1 – Located in-state or dynamically scheduled into CA (RECs delivered contemporaneously with electric energy)

Bucket 2 – Firmed/shaped imports into CA (REC and energy quantities are balanced annually)

Bucket 3 – Unbundled RECs (RECs are sold separately from energy)

Renewable Energy Compliance



California's Renewables Portfolio Standard (RPS) specifies renewable energy procurement obligations through 2030 (SB 350, 50%).

Load Serving Entities, including CCAs, must demonstrate that specified proportions of annual electricity sourced were procured from qualifying renewable energy technologies.

Compliance is demonstrated annually by ownership of renewable energy certificates or "RECs".

Power Portfolio Accounting

- Once delivered to the grid, electrons are indistinguishable from one another
- There is no way to physically track “green” vs. “brown” electrons
- Accounting for electric power is “attribute based”
- Owners of product attributes can make claims with regard to renewable energy content and environmental impacts
- RECs, e-tags and contract documents are typically referenced to substantiate such claims
- Annual disclosure of energy purchases is administered through the CEC’s Power Source Disclosure Program (which includes Power Content Label reporting)

California Power Content (2016)

| Fuel Type | California In-State Generation (GWh) | Percent of California In-State Generation | Northwest Imports (GWh) | Southwest Imports (GWh) | California Power Mix (GWh) | Percent California Power Mix |
|------------------------------|--------------------------------------|---|-------------------------|-------------------------|----------------------------|------------------------------|
| Coal | 324 | 0.16% | 373 | 11,310 | 12,006 | 4.13% |
| Large Hydro | 24,410 | 12.31% | 3,367 | 1,904 | 29,681 | 10.21% |
| Natural Gas | 98,831 | 49.86% | 41 | 7,120 | 105,992 | 36.48% |
| Nuclear | 18,931 | 9.55% | 0 | 7,739 | 26,670 | 9.18% |
| Oil | 37 | 0.02% | 0 | 0 | 37 | 0.01% |
| Other | 394 | 0.20% | 0 | 0 | 394 | 0.14% |
| Renewables | 55,300 | 27.90% | 11,710 | 6,952 | 73,961 | 25.45% |
| Biomass | 5,868 | 2.96% | 659 | 25 | 6,553 | 2.26% |
| Geothermal | 11,582 | 5.84% | 96 | 1,038 | 12,717 | 4.38% |
| Small Hydro | 4,567 | 2.30% | 229 | 1 | 4,796 | 1.65% |
| Solar | 19,783 | 9.98% | 0 | 3,791 | 23,574 | 8.11% |
| Wind | 13,500 | 6.81% | 10,725 | 2,097 | 26,321 | 9.06% |
| Unspecified Sources of Power | N/A | N/A | 26,888 | 14,937 | 41,825 | 14.39% |
| Total | 198,227 | 100.00% | 42,378 | 49,963 | 290,567 | 100.00% |

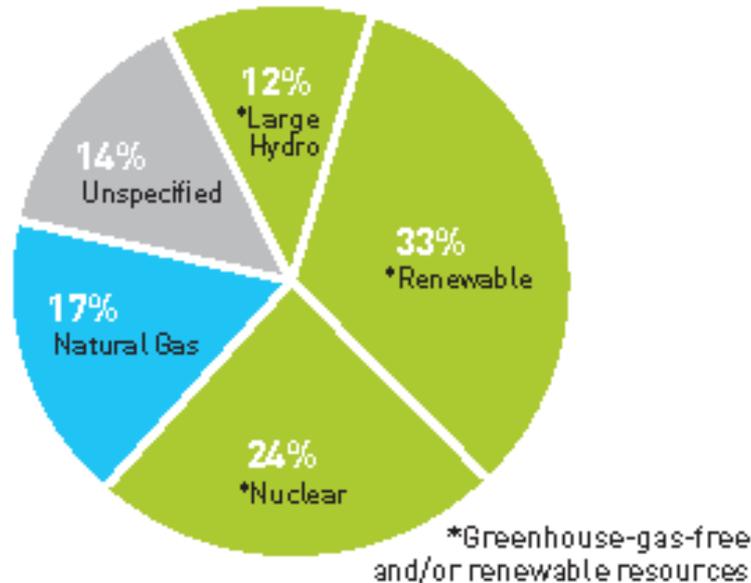
Source: California Energy Commission: http://www.energy.ca.gov/almanac/electricity_data/total_system_power.html

PG&E Power Content - 2016

Actual 2016 Power Content Label for PG&E, as reported to the California Energy Commission.¹

2016 POWER MIX

PG&E-owned generation and power purchases



| ENERGY RESOURCES | PG&E 2016 POWER MIX (Actual) | 2016 CA POWER MIX ² (For Comparison) |
|--|------------------------------|---|
| Eligible Renewable: | 33% | 25% |
| • Biomass and waste | 4% | 2% |
| • Geothermal | 5% | 4% |
| • Small hydroelectric | 3% | 2% |
| • Solar | 13% | 8% |
| • Wind | 8% | 9% |
| Coal | 0% | 4% |
| Large Hydroelectric³ | 12% | 10% |
| Natural Gas | 17% | 36% |
| Nuclear | 24% | 9% |
| Other | 0% | 0% |
| Unspecified⁴ | 14% | 14% |
| TOTAL | 100% | 100% |

¹ The figures above may not sum to 100 percent due to rounding.

² Percentages are estimated annually by the California Energy Commission based on electricity sold to California consumers during the previous year.

³ A significant amount of energy generated by PG&E comes from clean, large hydroelectric power stations which do not qualify as an eligible renewable resource under California law.

⁴ Beginning in 2010, transactions not specifically traceable to specific generation sources are designated as "unspecified" in accordance with Public Utilities Code Section 398.2 (d).

Approximately 69% of PG&E's energy supply was deemed GHG-free in 2016.

For information about PG&E's clean energy solutions, please visit pge.com/cleanenergy or call 1-800-743-5000.

For information about California's power mix or for general information about the Power Content Label, contact the California Energy Commission at 1-844-421-6229 or <http://www.energy.ca.gov/pcl>.

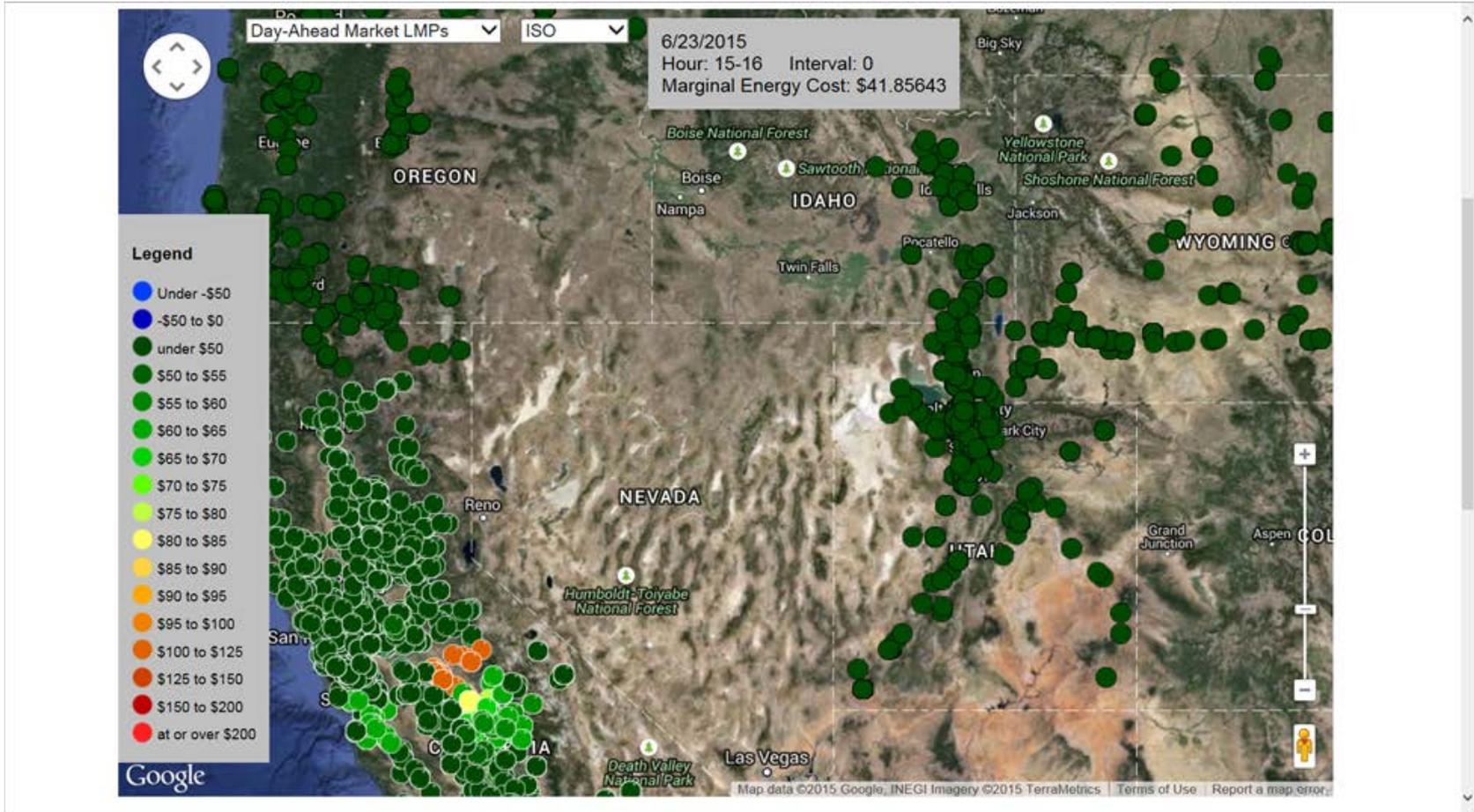
Source: Pacific Gas & Electric Company

California Centralized Wholesale Energy Market

The CAISO manages CA's centralized energy market

- Resources and loads are scheduled with the CAISO
- Scheduling Coordinators, or "SCs", directly interface with the CAISO regarding such schedules
- Users of energy (also known as "loads" or "sinks") are charged by the CAISO when energy is used
- Producers of energy (also known as "generators" or "sources") are paid when energy is produced
- The CAISO is responsible for settling such charges and payments via an ongoing cycle (the accuracy of information tends to improve over time, resulting in the refinement of charges/credits)
- SCs must post collateral to protect against payment defaults: larger potential imbalances trigger larger collateral postings
- Bilateral contracts may be used to promote cost/rate stability (by mitigating the effects of volatile market prices)

CAISO Electricity Market – Nodal Pricing

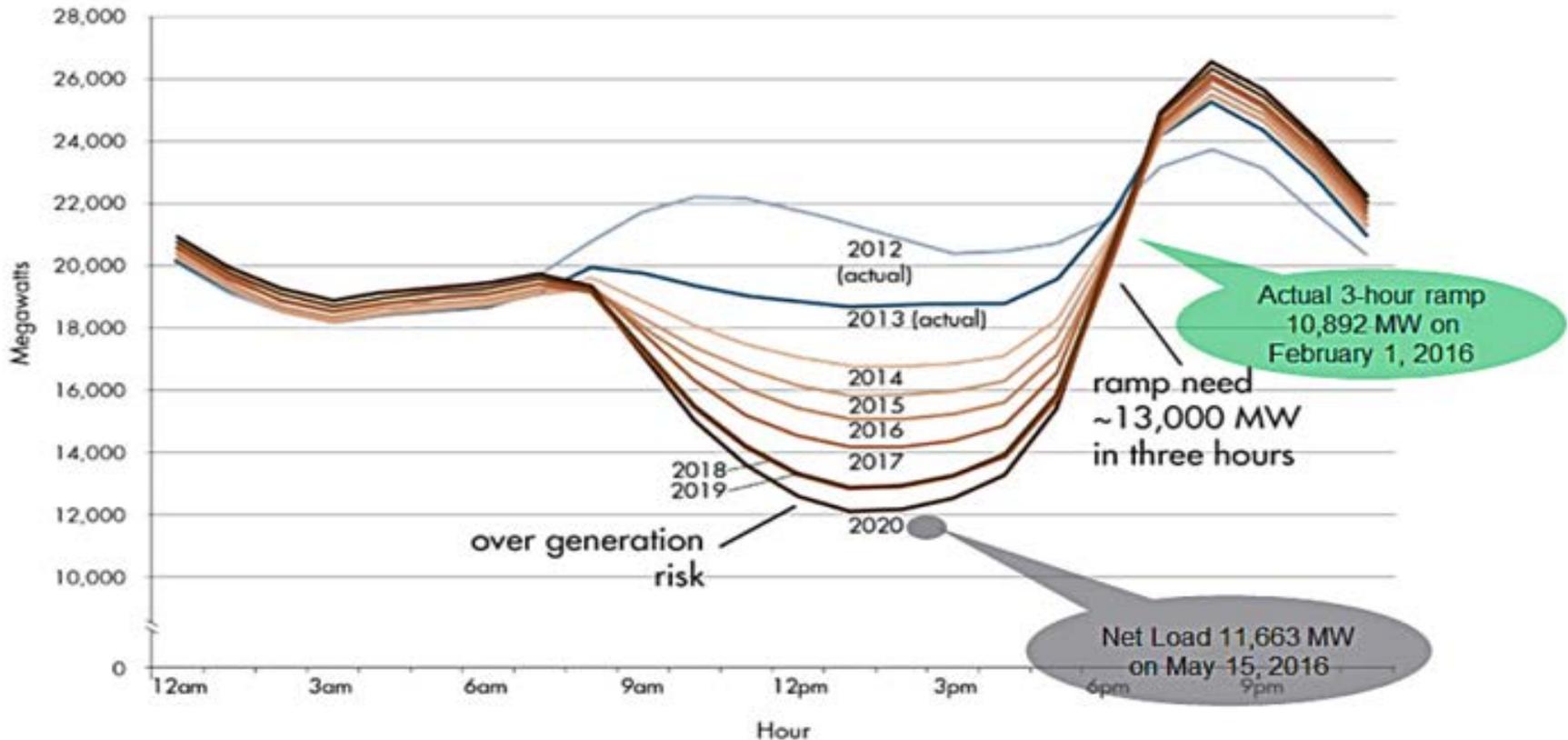


Source: California Independent System Operator

The Effect of Policy Changes

- California's Renewable Energy Policy and evolving clean resource preferences have contributed to significant market changes
- Load, net of solar and wind generation, has changed significantly over the past 5 years
- Increasing RPS mandates and voluntary renewable energy procurement continue to re-shape Net Load
- Net energy usage and related pricing now peaks much later in the day (later afternoon/early evening) when compared to historical trends
- The graphical representation of California's Net Load has been termed the "Duck Curve"

The CAISO Duck Curve: Too Much of a Good Thing



PLEASE NOTE: Click on slide to view a related video.

Current CA Renewable Energy Statistics*

- 30% RPS-eligible renewable energy procurement.
- In 2017 67% of California's renewables will be supplied by solar (36%) and wind (31%).
- Geothermal (17%), biomass (9%) and small hydro (7%) comprise other renewable generating technologies.
- California has added $\approx 10,460$ MW of large-scale (>20 MW) renewables since January 2011.
- $\approx 27,800$ MW of renewable capacity within state as of 10/31/17.
 - 17,210 MW of large-scale renewables
 - 10,520 MW of small-scale renewables (5,900 MW behind-the-meter PV)

**Source: California Energy Commission (December 2017); statistics exclude unbundled RECs.*

Recent Renewable Energy Statistics (CAISO) & Market Impacts

- 9,910 MW – Maximum year-to-date solar production (all-time max)
- 4,990 MW – Maximum year-to-date wind production (also all-time max)
- 11,390 MWh – Wind generation curtailed during the month of November 2017
- Conditions of over-generation occur when net demand (usage) is unexpectedly low
 - Certain baseload resources cannot be operated in a flexible manner (ramped down), which necessitates the curtailment of other resources
 - The spring season often demonstrates conditions of over-generation
- Negative prices will occur to discourage incremental energy deliveries during times of over-generation

Recent Renewable Energy Statistics (CAISO) & Market Impacts (*continued*)

- Time-of-Use (TOU) changes have been initiated within utility tariffs to:
 - More accurately reflect when net peak demand is occurring on the grid;
 - Create incentives for surplus energy production when it is most desirable on the grid; and
 - Redefine rates during each time-of-use period to better align with the value of related energy purchases/deliveries
- Mandated TOU rates (NEM 2.0 requires TOU participation).
- NEM Net Surplus Compensation rate is low ≈ 2.7 cents/kWh.
- TOU periods may continue to evolve in consideration of grid dynamics (shifting later in the day)
- Certain rate options have been discontinued for new customers (E-6, as an example)

Greenhouse Gas Reporting

Reporting of GHG portfolio emissions to retail customers has been voluntary; no single accounting methodology is universally adopted or required.

Common approaches have been to deem renewable energy, hydro-electric energy and nuclear energy as carbon-free.

Treatment varies among retailers in GHG emissions reporting for geothermal, biofuel generation, and unbundled RECs.

QUESTIONS?

AGENDA ITEM #10: LEGISLATIVE AND REGULATORY OVERVIEW

Recommendation: Receive presentation and discuss.

Legislative Advocacy - 2018

- SB 100 (DeLeon): Accelerating the RPS & 100% Carbon free by 2030
 - CalCCA one of the first supporters. CCAs are already well on their way to achieving these statewide goals. Bill passed out of Assembly U&E Committee 6-27-18.
- AB 813 (Holden): Multistate Regional Energy Market
 - Has potential to reduce GHGs in the West, as long as CA has sovereignty over energy imports. CalCCA supports but is not actively lobbying the bill. To be considered at Senate Appropriations Committee in August.
- SB 1136 (Hertzberg): Resource Adequacy Requirements
 - CCA's are participating in conversations w/author on how to reshape the state's failing RA regulations. To be considered at Senate Appropriations Committee in August.
- SB 1088 (Dodd) now SB 901: Safety, reliability & Resiliency planning for IOUs
 - Legislators indicated support for CalCCA amendments, however, new SB 901 amended July 2 and referred to a new Conference Committee on Wildfires. Committee will meet in August.

Legislative Advocacy – 2018

Threats & Concerns

- AB 893 (Garcia) Baseload carve out bill for geothermal
 - CalCCA opposed given high costs Geothermal procurement and cost allocation across all LSEs. Passed out of Assembly Appropriations Committee 7-3-18.
- SB 1347 (Stern): Energy Storage procurement mandates
 - CalCCA supportive of storage system deployment, but working on cost recovery language so CCA customers don't have to pay twice.
- SB 237 (Hertzberg): Reopening of Direct Access
 - Eliminates the DA cap and phases in DA over 3 years. Concerned about cost shift from commercial to residential customers and impact on low income customers. Potential to backslide on decarbonization, concerned about transparency and public oversight. To be considered at Assembly Appropriations Committee in August.
- Looming threats:
 - Centralized Procurement
 - Increased PUC regulation on CCAs

Power Source Disclosure and AB1110

- AB 1110 (Ting) modifies the Power Source Disclosure program by requiring reporting and disclosure of the GHG emissions intensity associated with the electricity serving retail customers
- CEC AB 1110 implementation rulemaking will impact reporting beginning in 2020 for the 2019 reporting year
- May result in GHG emissions being reported for geothermal, biofuel generation, unbundled RECs, and Firmed and Shaped (i.e., Bucket 2) renewable energy purchases

Key Regulatory Developments

- PCIA (R.17-06-026): Consider alternatives to the Power Charge Indifference Adjustment
- IRP (R.16-02-007): Addresses new IRP requirements associated with SB 350, as well as long-term procurement planning policies. Adopts “Clean Net Short” methodology to measure GHG emissions at point of consumption instead of stationary sources.
- Energy Storage (A.18-03-001, A.18-03-002 consolidated): Commission is considering the 2018 energy storage plans
- Green Tariff Shared Renewables (R.14-07-002): Net Energy Metering Successor Tariff
- Resource Adequacy (R.17-09-020): CalCCA lead on Track 2 testimony to be filed July 10. Focus on multi-year RA obligation and idea of central procurement authority.

Other Regulatory Developments

- Petition for Modification of the CCA Code of Conduct: Request to eliminate current limitations imposed on utilities to reframe from “lobbying” against CCA programs. Awaiting Proposed Decision.
- “Green Book” Announcement: Changes to the Retail Choice Regulatory Framework. Comments submitted June 11 and June 22 En Banc. Next step will be final report with recommendations.
- CCA Bond Requirements: Methodology for setting the CCA Bond, which is intended to cover the costs of involuntary re-entry fees of CCA customers to bundled IOU service. Final Decision issued.
- Tree Mortality Nonbypassable Charge: Scoping memo published. CalCCA minimizing participation.
- Implementation of AB 1110: Considers modifications to the Power Source Disclosure Program. Still awaiting staff proposal to begin formal CEC process.
- Low Carbon Fuel Standard: CARB is considering LCFS amendments expected to be adopted in 2018. CCAs participating in proceeds due to impact to transportation electrification and electric vehicle efforts.

QUESTIONS?

THANK YOU!