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POU Integrated Resource Plans Renewable Energy Workshop

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Powering forward. Together.

SMUD

Presentation Objectives

- SMUD Overview
- How is SMUD planning to achieve the 2030 50% RPS goal?
- What obstacles does SMUD anticipate in achieving a 50% RPS portfolio?
- Regulatory Suggestions

SMUD Overview

- Fifth Largest California Utility
  - 3,300 MW Peak
  - 11,000 GWh Sales

- Publicly-Owned; Governed by a Seven Member Elected Board

- Board Adopted Environmental Goals
  - 33% Renewable by 2020
  - 50% Renewable by 2030
  - 1.5% Efficiency Savings Annually
  - 34% Reduction of GHG emissions by 2020
  - 90% Reduction of GHG emissions by 2050

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How is SMUD planning to achieve the 2030 50% RPS goal?

- SMUD is on path to achieve the 2020 33% RPS; additional renewables will be needed beginning in the mid-2020's to achieve 50% by 2030.
  - SMUD's IRP process will help guide procurement decisions.
  - As we work toward 2030, SMUD plans on continuing:
    - Procurement/development of utility scale renewable projects.
      - Use compliance category flexibility in meeting RPS obligations.
    - Promoting Energy Efficiency in accordance with SMUD policy and EE goals to be set under SB350.
    - Expansion of DERs.
    - Promoting voluntary green pricing programs such as Greenergy and SolarShares®.
    - Promotion of low income/disadvantaged community focused programs (EE/Solar PV).
  - Transmission flexibility and EIM participation will support SMUD in achieving the 2030 goal.
  - SMUD will evaluate a storage target for 2020 in 2017 pursuant to AB2514.

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Utility Scale Renewable Projects

Technology	Estimated COD	Capacity (MW)	Location
Geothermal	2017	30	Southern California
Biomass	2017	6.9	California (TBD)
Hydro	2018	3.5	Northern California
Solar PV	2018	60	Central Valley
Wind	2019	200	Southwest
Wind	2021 – 2022	60	Northern California
Solar PV	2019 – 2022	20 – 90	Northern/Central CA

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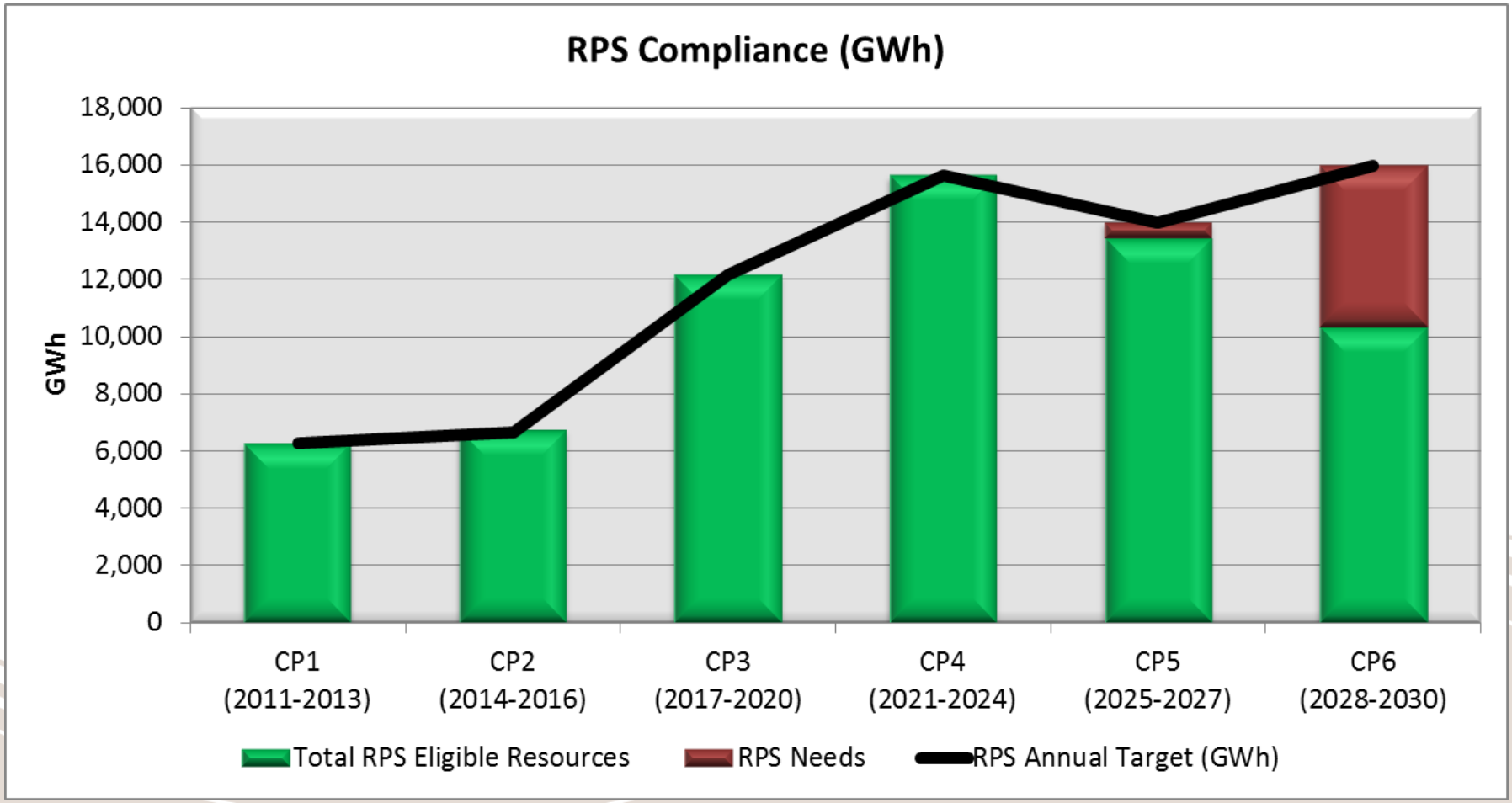
SMUD's RPS Compliance Forecast



What obstacles does SMUD anticipate in achieving a 50% RPS portfolio?

Impacts of Renewables/DERs:

- Peak loads are expected to be about flat while Energy loads are expected to decline (net of EE/PV/EV).
- Increasing levels of solar PV causes peak load shift, increases ramping needs and over-generation in low load periods.
- Distribution system upgrades may be needed to prevent local voltage issues caused by clustering of rooftop PV systems.
- Planning to meet peak load can be difficult when DER adoption is largely up to consumers.

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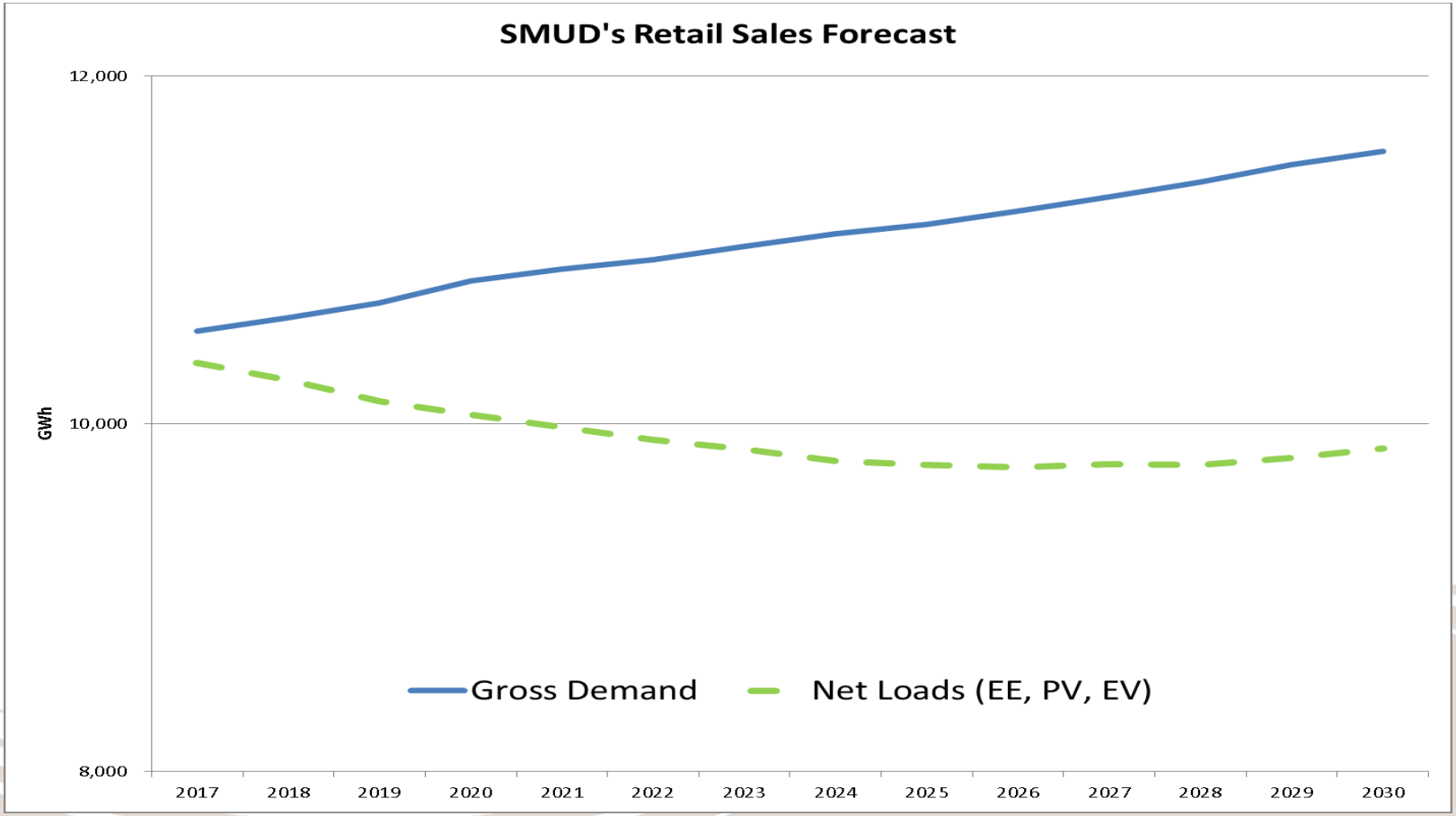
Gross Load vs Net Load (EE, PV, EV)



2016 Draft Load Forecast.

How can SMUD mitigate these potential obstacles?

- SMUD's current system has a high degree of flexibility and we do not anticipate needing significant new capacity resources for at least the next decade.
- Curtailing Solar PV will be key when penetration is high:
  - Smart invertors could help integrate PVs.
- Energy Storage can help manage over generation caused by solar PV however costs are prohibitive at this point.
- Advances in Distribution Management Systems (DMS) and Distributed Energy Resource Management Systems (DERMS) will help optimize the use of Storage and Solar PV.
- EIM participation will provide access to more balancing resources for integrating renewables.
- SMUD is evaluating a transmission project that would allow greater access to regional markets.
- SMUD is considering adopting planning guidelines consistent with AB 327 that evaluate DER resources versus traditional distribution system upgrades.

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Regulatory Suggestions

- Regulatory certainty and flexibility allows confidence in resource decisions and reasonable costs.
- Continued RPS credit for voluntary green programs.
- Allowing more certified biogas to contribute to RPS/GHG goals and improve reliability.
- IRP reporting requirements should be loosely defined allowing POUs to comply using their preferred method.
- Consistency between CEC IRP GHG planning targets and ARB regulation.
- High admin costs of collecting/certifying RECs from residential SB-1 PV systems leaves approx. 60k RECs/year unrealized for SMUD.

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Summary

- SMUD is positioning itself to meet the 50% 2030 RPS.
- Obstacles may be seen with high penetration of intermittent resources and lack of visibility of B-t-M distributed generation.
- SMUD's system has a high level of flexibility which will be able to handle intermittency issues for some time.
  - EIM and Transmission plans will add to this flexibility.
- Smart Inverters and Energy Storage along with DERMS will lend to optimized use of these DERs.
- SMUD asks for regulatory certainty, flexibility, and consistency as the CEC develops regulations under SB350.

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Questions?