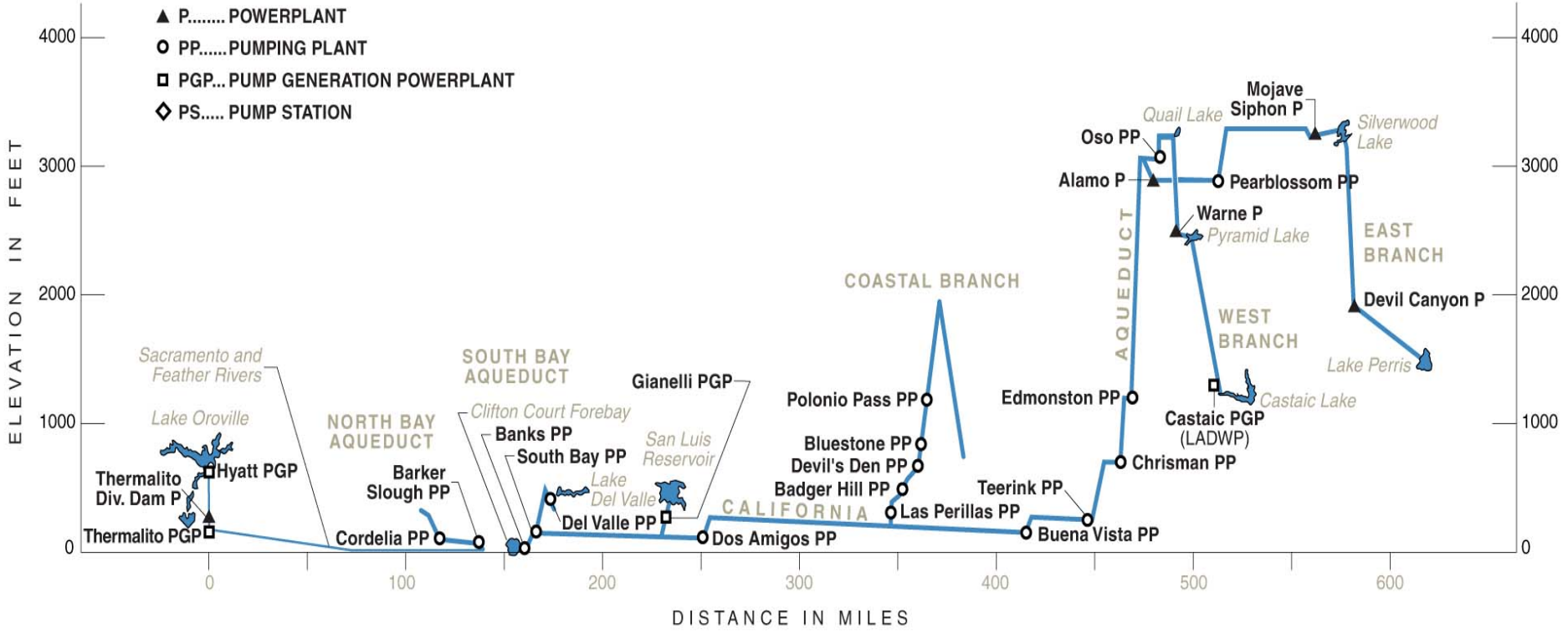
State Water Project Power and Energy Issues

Briefing to the California Water Commission
November 14, 2012

Topics

- SWP Energy Profile
- Benefits SWP Provides to the Electrical Grid
- Energy Legislation and Administration Policies
- DWR Actions to Reduce Greenhouse Gas Emissions
  - Switching from coal to cleaner natural gas resources
  - Acquiring renewable energy resources
  - Developing small hydro
  - Refurbishing pumps and generators for energy efficiency
- Cap and Trade Market for Greenhouse Gas Emissions

SWP PROFILE


▲ P..... POWERPLANT
○ PP..... PUMPING PLANT
□ PGP... PUMP GENERATION POWERPLANT
◇ PS..... PUMP STATION
ELEVATION IN FEET
4000
3000
2000
1000
0
DISTANCE IN MILES
0
100
200
300
400
500
600
Sacramento and Feather Rivers
Lake Oroville
Thermalito Div. Dam P
Hyatt PGP
Thermalito PGP
NORTH BAY AQUEDUCT
Barker Slough PP
Cordelia PP
SOUTH BAY AQUEDUCT
Clifton Court Forebay
Banks PP
South Bay PP
Lake Del Valle
Del Valle PP
San Luis Reservoir
Gianelli PGP
CALIFORNIA AQUEDUCT
Dos Amigos PP
Polonio Pass PP
COASTAL BRANCH
Bluestone PP
Devil's Den PP
Badger Hill PP
Las Perillas PP
Teerink PP
Buena Vista PP
Edmonston PP
Chrisman PP
Oso PP
Quail Lake
Mojave Siphon P
Silverwood Lake
Alamo P
Pearblossom PP
Warne P
Pyramid Lake
EAST BRANCH
Devil Canyon P
WEST BRANCH
Lake Perris
Castaic Lake
Castaic PGP (LADWP)

SWP Energy Profile

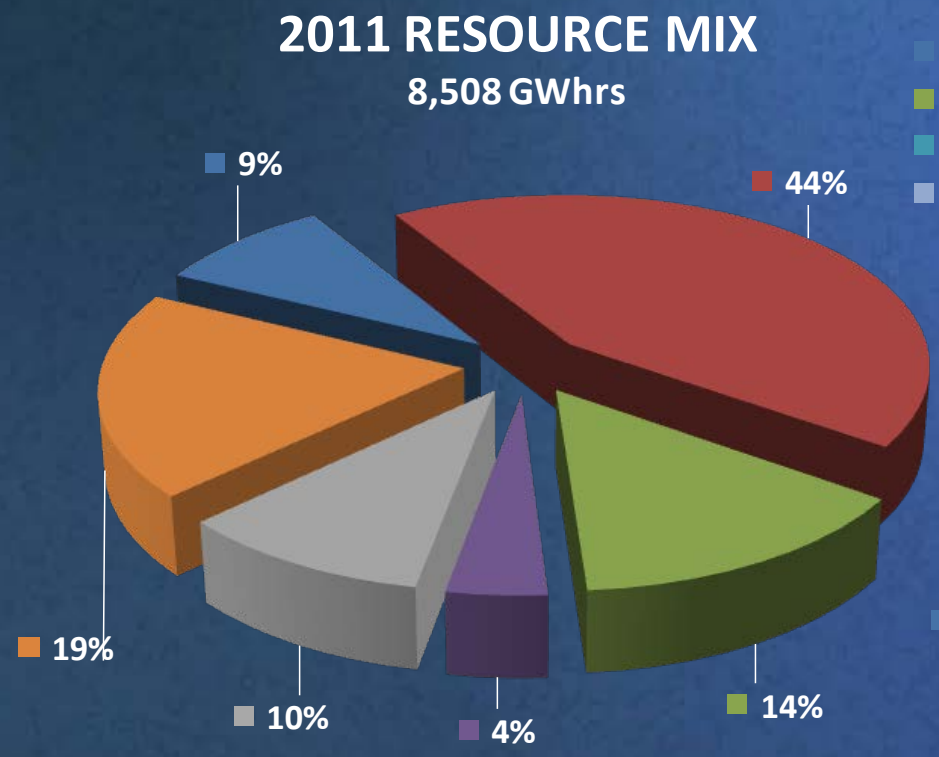
GENERATION

- SWP is the third largest generator of clean hydropower in CA
- 40% to 60% of SWP needs
- Produces about 14% of California's hydropower

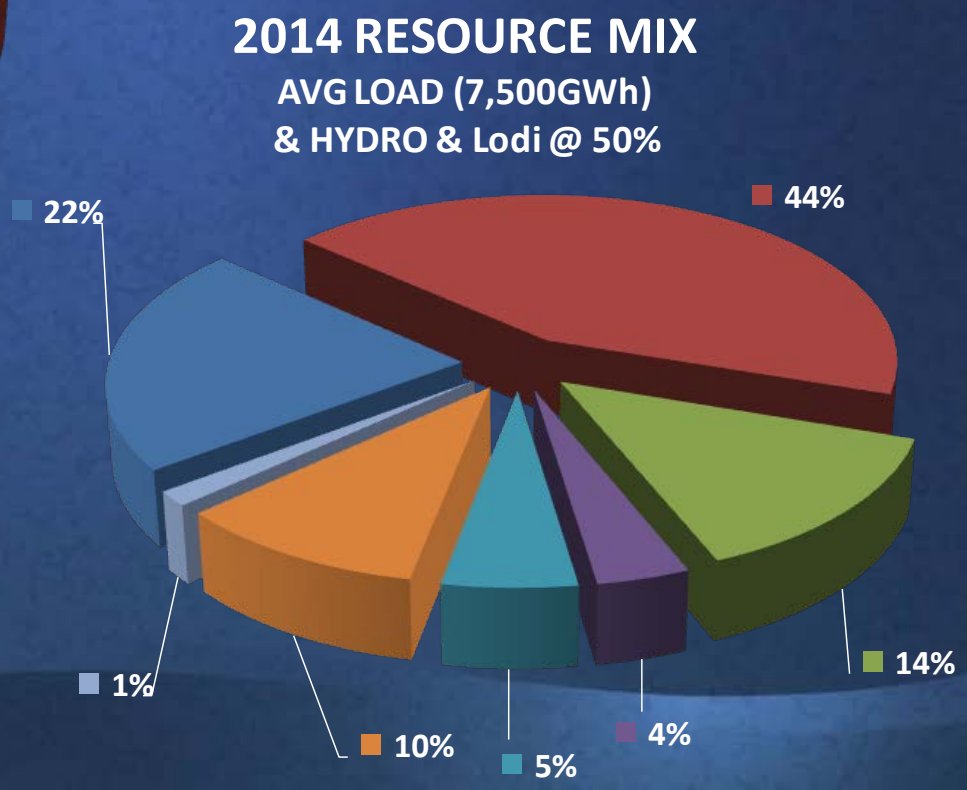
PUMPING

- 4% of electrical grid load
- 6th largest CA electrical utility
- Only about 9% size of PG&E

SWP Energy Portfolio Comparison



CAISO Market Purchases
DWR Hydro
Contract Hydro
Small Hydro
Lodi
Contract Power Purchases
Estimated Renewables
RG4



Benefits to California's Electrical Grid

- SWP's off-peak pumping = fewer plants are cycling up and down
- Less on-peak pumping reduces the stress on the grid
- Agreements with electrical grid operators to drop load
- Limitations:
  - Delta restrictions
  - Aging equipment

Legislation and Administration Energy Policies

Assembly Bill 32
- Cap and Trade
- Reporting

Renewable Procurement Standard

Governor Executive Orders

New Legislation No new coal

DWR Climate Action Plan

GO & Legislative Reports

Who is Interested?

THE SACRAMENTO BEE sacbee.com

The Climate Registry

California Energy Commission
STAFF REPORT

The California ENERGY COMMISSION

DEVELOPING RENEWABLE GENERATION ON STATE PROPERTY

Installing Renewable Energy on State Buildings and Other State-Owned Property

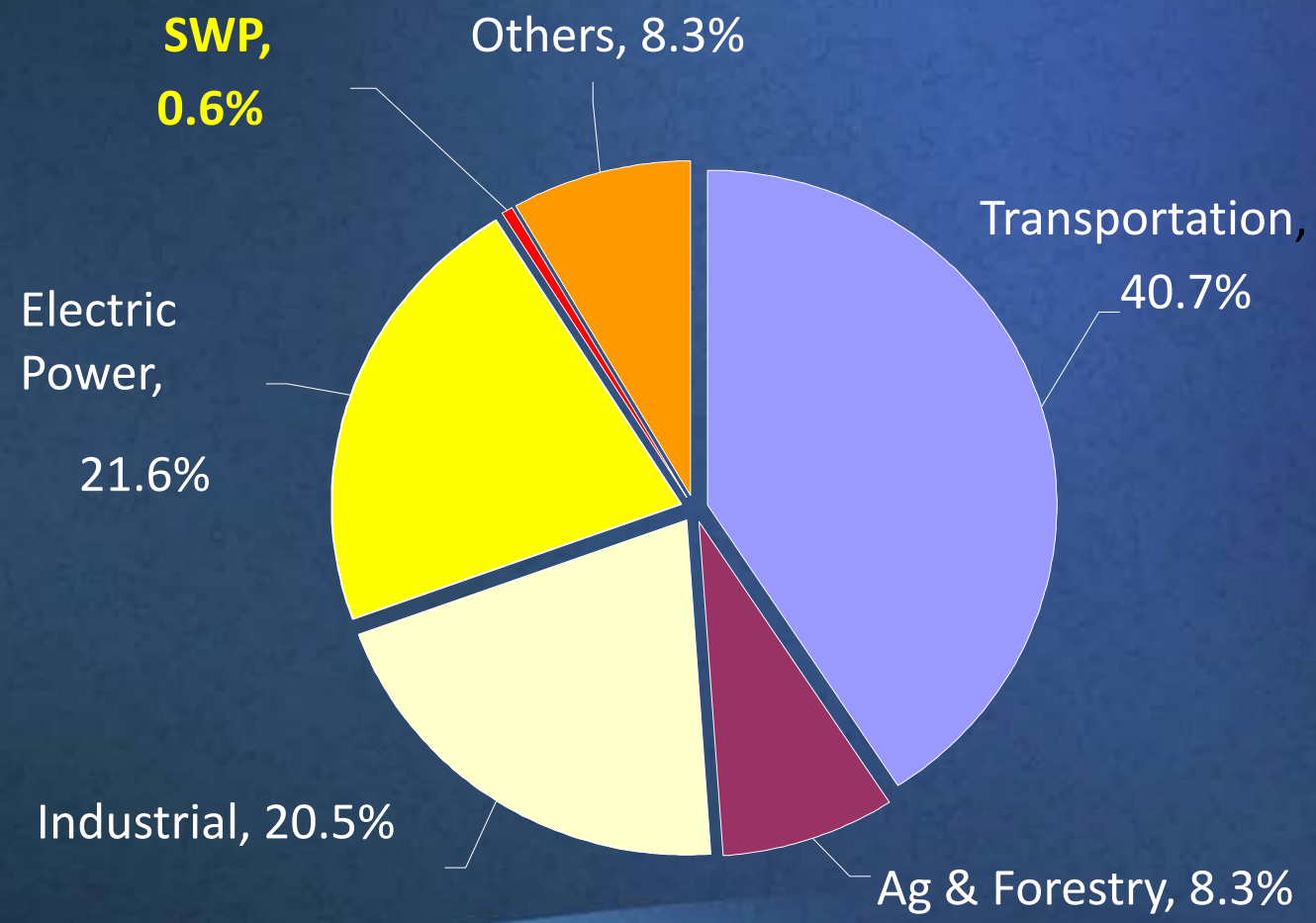
APRIL 2011
CEC-150-2011-001

CALIFORNIA natural resources AGENCY

SEAL OF THE GOVERNOR OF THE STATE OF CALIFORNIA
CALIFORNIA REPUBLIC
XXXIX

California Environmental Protection Agency
Air Resources Board

2004 Greenhouse Gas Emissions within California by Source

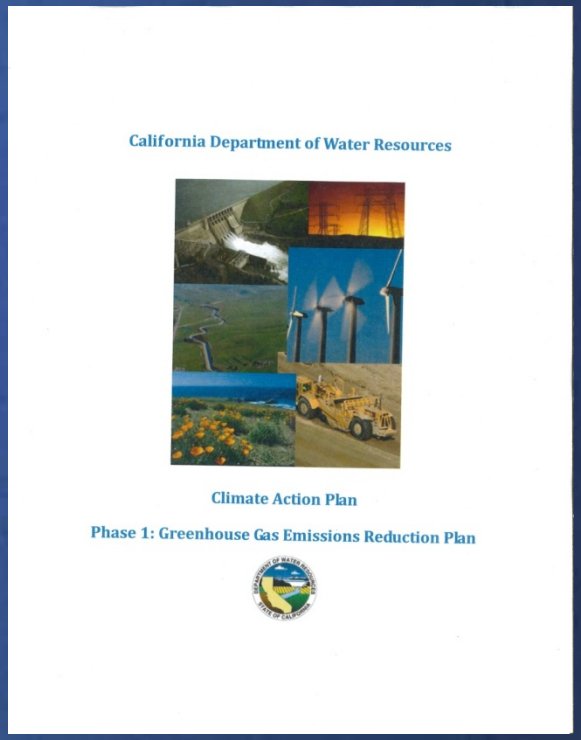


Greenhouse Gas Emissions Reporting

- 2007 – 2009: California Climate Action Registry. Verified
- 1 of only 5 state agencies reporting to achieve this status
- 2010 & 2011 : The Climate Registry. Reported and independently verified.
- Annual reporting of energy use to Air Resources Board

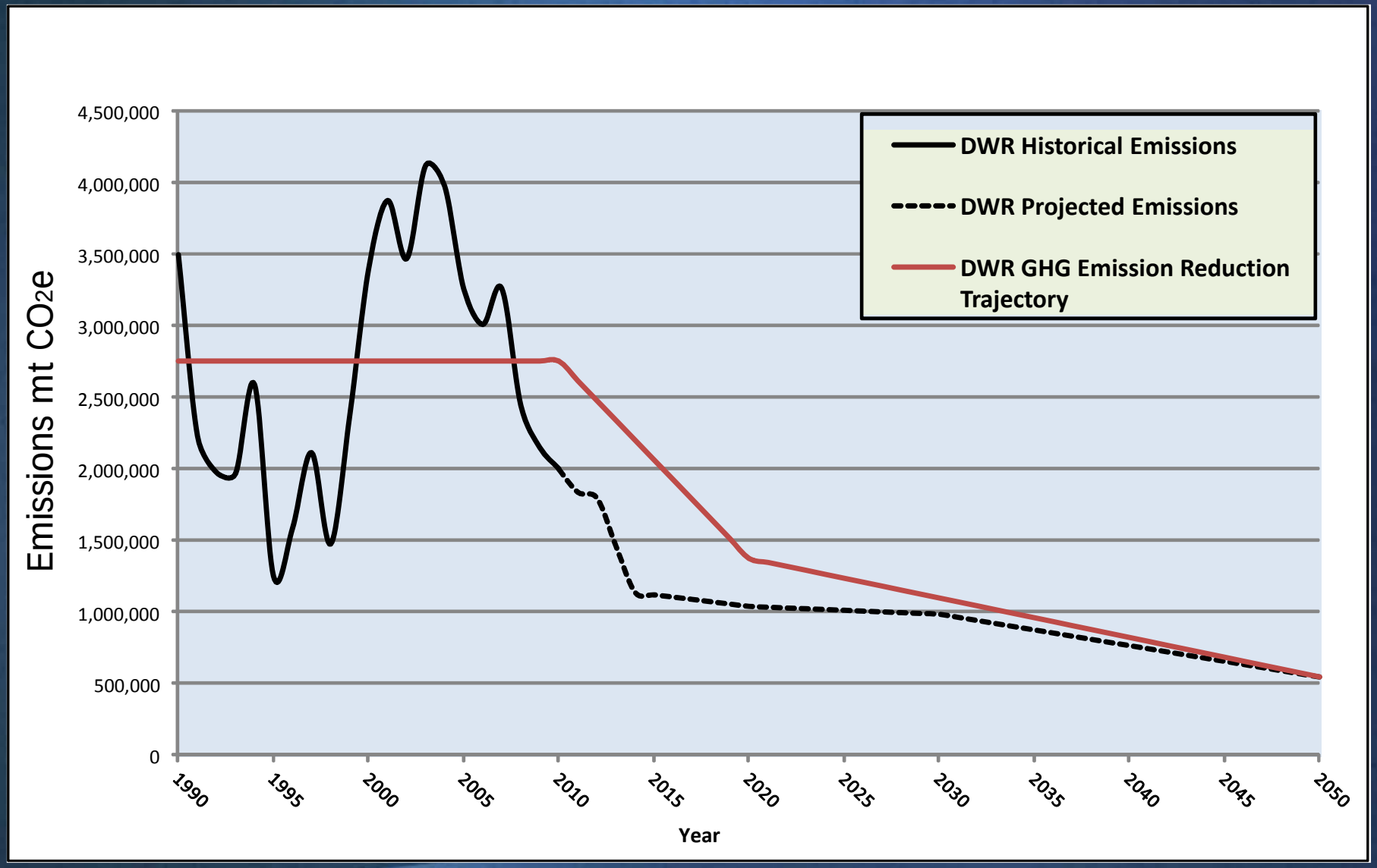
Greenhouse Gas Emission Reduction Targets

- 50% reduction below 1990 levels by 2020
- Better than AB 32 goal of meeting 1990 levels by 2020
- 80% below 1990 levels by the year 2050



Memorialized in DWR's Climate Action Plan May 2012

Emission Reduction Timeline



How to Accomplish

- Contract for coal fired generation terminates
  - July 2013
  - More than double the market emissions rate
- Lodi Energy Center
  - State of the art emissions design / control
  - About 16% lower emissions rate than market
- Renewable Energy
  - Zero emissions
  - Large hydro has zero emissions but not certified renewable

Termination of Coal-Fired Resource

- Four units at the Reid Gardner Facility in Nevada
- SWP has 67.8% equity ownership of Unit 4 (a 275 MW unit)
- Expires July 25, 2013

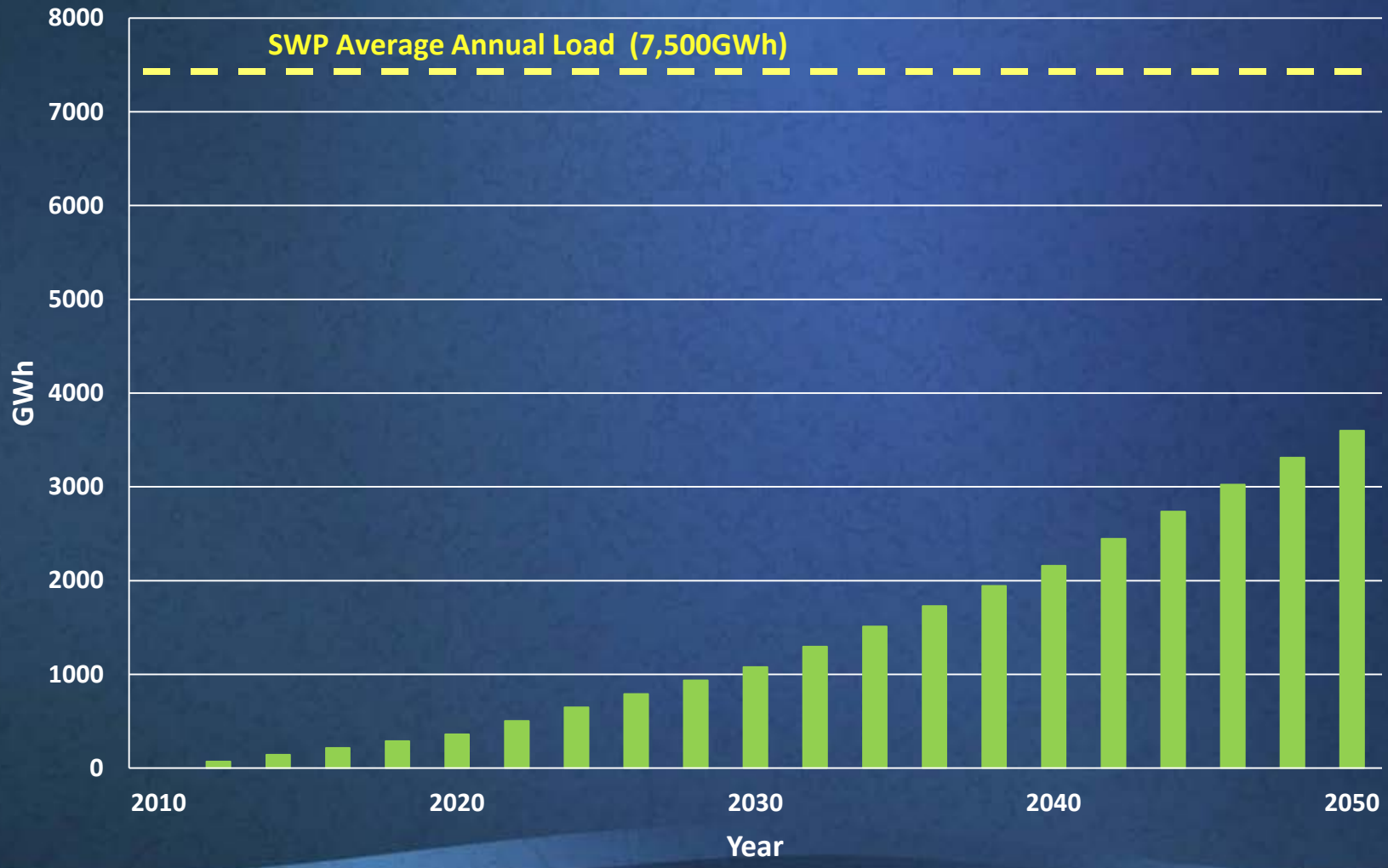
LODI ENERGY CENTER

280 MW Combined Cycle Natural Gas Power Plant

- Highly efficient
- 13 Public Participants
- DWR share 99 MW
- 33% of facility
- $140 Million DWR investment
- First start Oct 2012

- Fast start technology Ramp up and down quickly
- Help provide firming power for renewable energy

SWP Progressive Renewable Procurements



Why Progressive Procurement?

- Already below 1990 emissions levels
- Allows time for:
  - Technology improvements to preserve reliability, increase output & reduce costs
  - Initially intense competition with utilities
  - Legislative and policy decisions
  - Transmission build out

New Renewable Energy Contract

- Alameda Municipal Power
  - 33.6 MW: 5.3 landfill 28.3 geothermal
  - 4 years & 2.5 months started 10/15/12
  - Operating since mid-1980's
  - Pay only for energy received

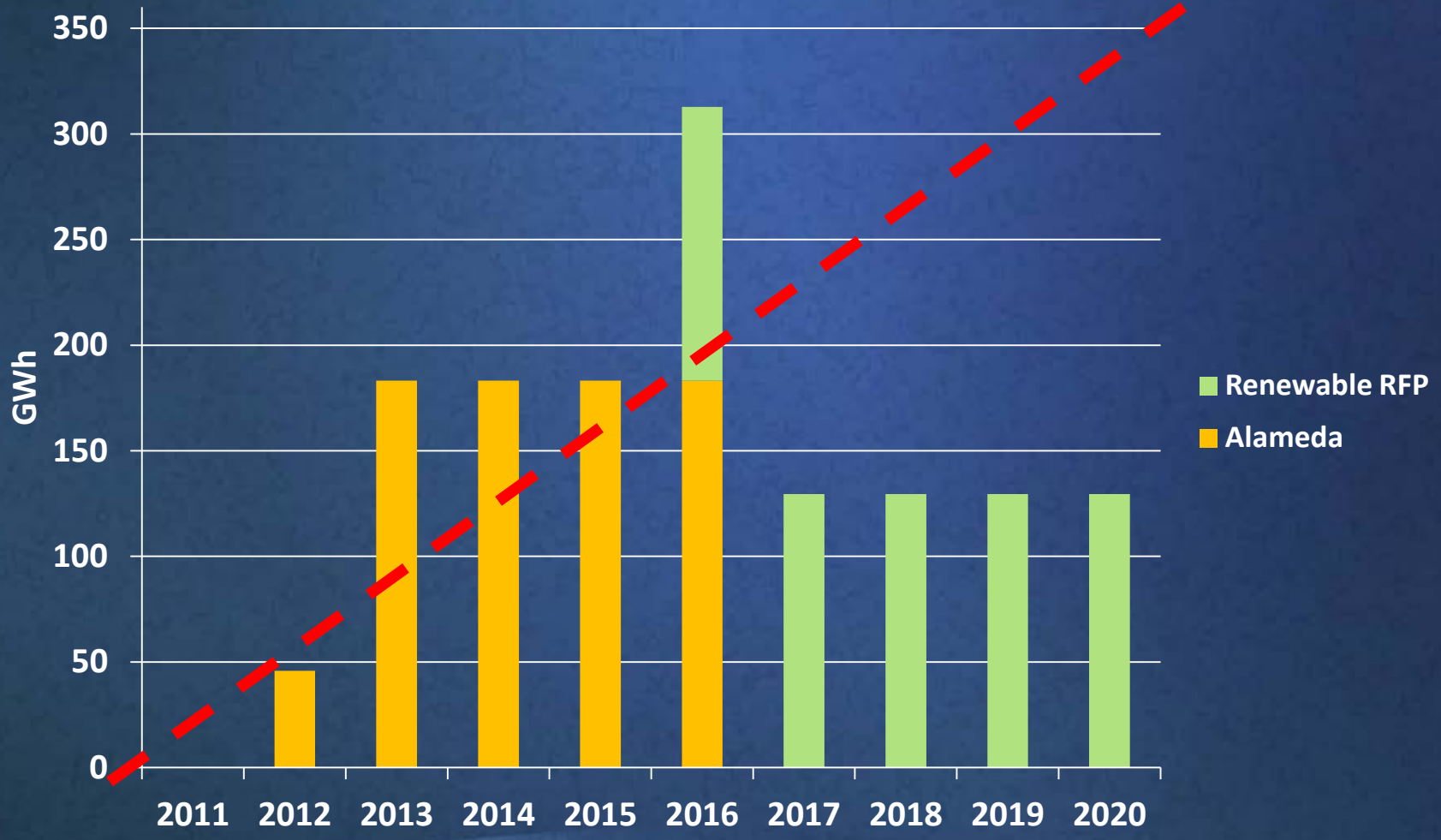
ALAMEDA MUNICIPAL POWER
A Department of the City of Alameda

A PUBLIC AGENCY
NCPA
NORTHERN CALIFORNIA POWER AGENCY

Potential contracts

- New Solar
  - Delivery in 2014-2016
  - 20 to 25 year term
  - 45 to 80 MW
- Existing hydro from reservoir releases
  - 64 MW carbon free large hydro
  - Up to 53 MW small hydro
  - JPA of irrigation districts
  - Similar to SWP's load profile

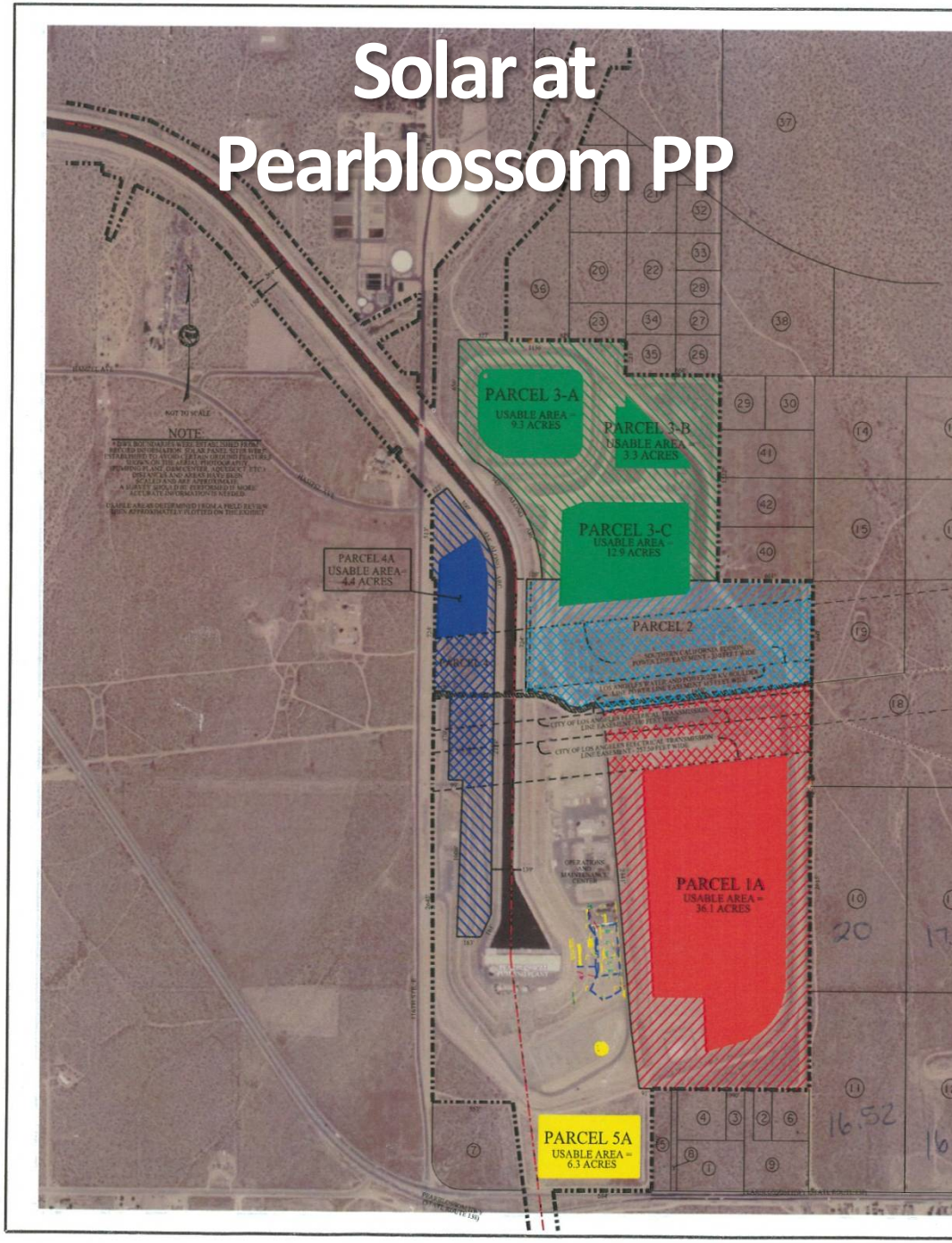
Renewable Acquisition



Mandate to Develop on State Property

- 10 MW
- Higher elevation
- 68 acres
- Secured site
- No endangered species
- Interconnection application made
- On line 2015

Solar at Pearblossom PP



Small Hydro in the SWP

- 2nd Unit at

Alamo Power Plant

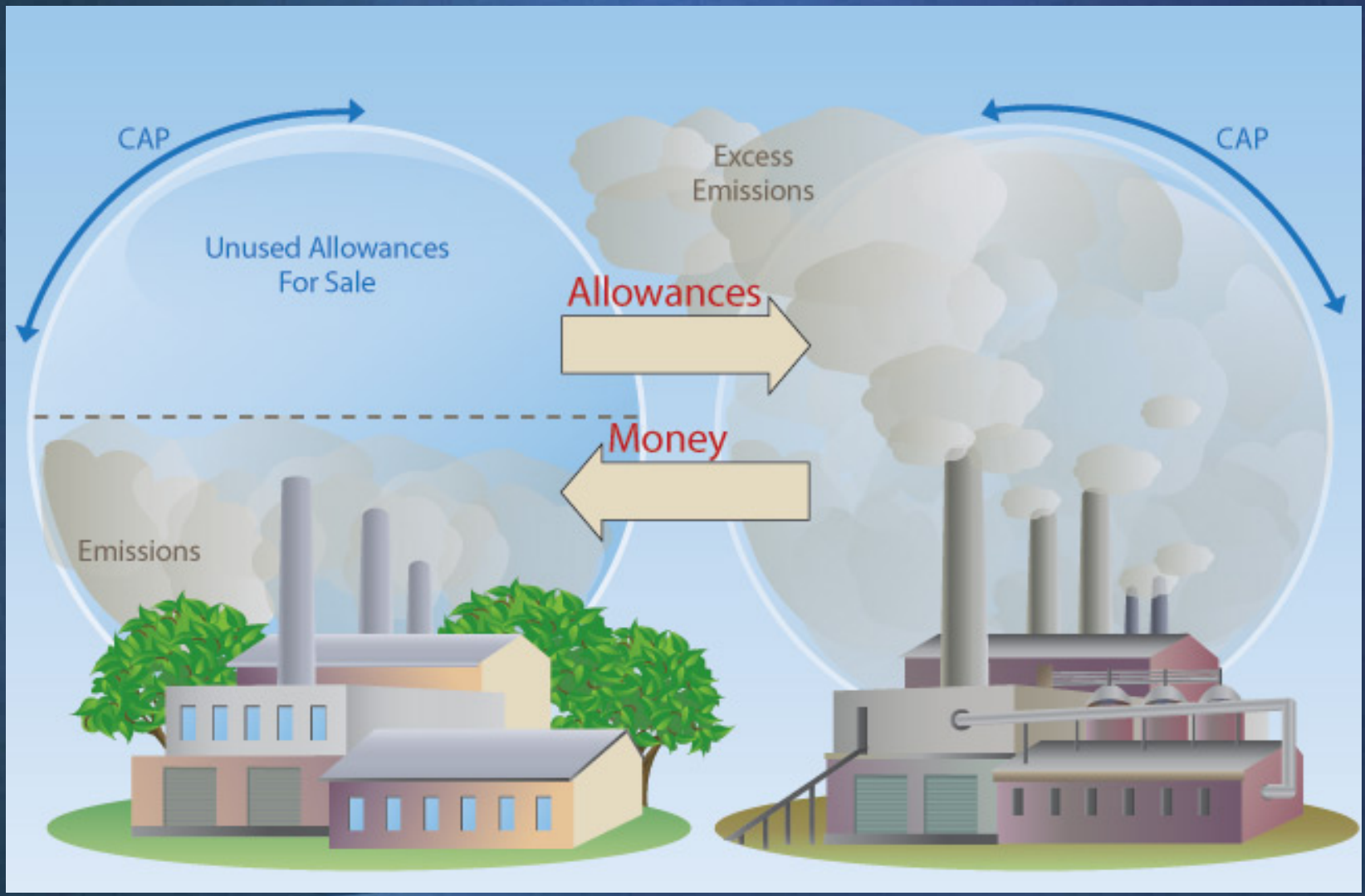
  - 12 to 17 MW
  - Cost study underway
  - Operational 2016

- SWP System-Wide Small Hydro Study
  - 2013 - Identify sites / perform fatal flaw analysis
  - 2014 – Prioritize sites, feasibility studies
  - River outlet at Thermalito Afterbay

Edmonston Pump Replacement Project

- Decreased power use – 40,000 MWh annually
- Energy savings equivalent to a 24-acre solar farm

Cap and Trade – Greenhouse Gas Emissions



Greenhouse Gas Emissions Auction

- 1 allowance = 1 MT CO2e
- 90% allocated free to retail load serving utilities
- SWP specifically named in the regulation
- SWP will NOT receive any free emission allowances

- Floor price of $10 per allowance
- Soft ceiling of $50 per allowance

Cost and Use of Allowances

- Allowances reduced by 2% per year thru 2020
- SWP Direct and Indirect Costs estimated to be $30 in 2013

- Use of allowances:
  - Still being developed
  - Renewables?
  - Energy efficiency?
  - Rebates?

Summary of Actions

- SWP has a greenhouse gas emissions policy that will meet or exceed all AB-32 milestones
- SWP provides strong public benefits to the California electrical grid
  - Switching from coal to cleaner natural gas resources
  - Acquiring renewable energy resources
  - Developing small hydro
  - Refurbishing pumps and generators to improve energy efficiency

Questions?

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