

SWP POWER PORTFOLIO OVERVIEW-2017 TO 2050

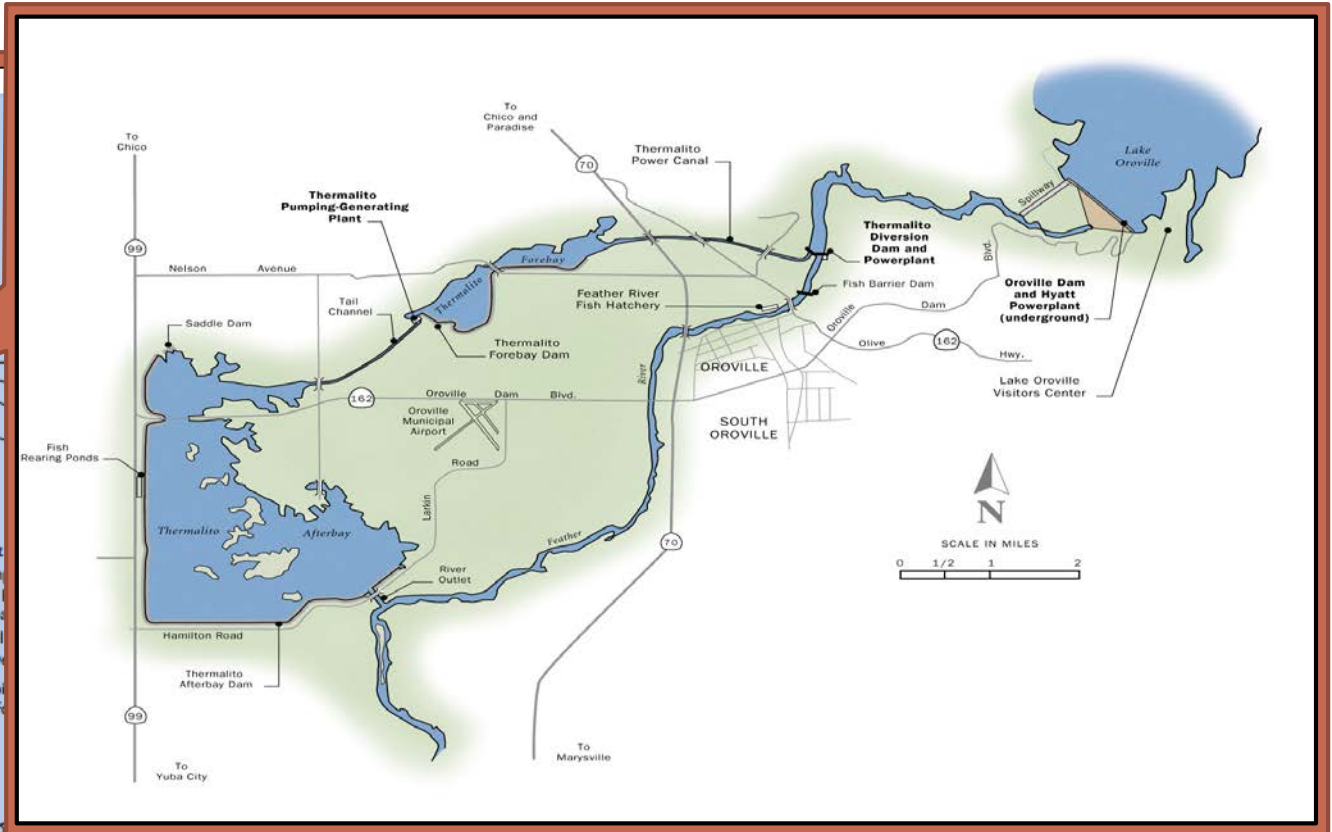
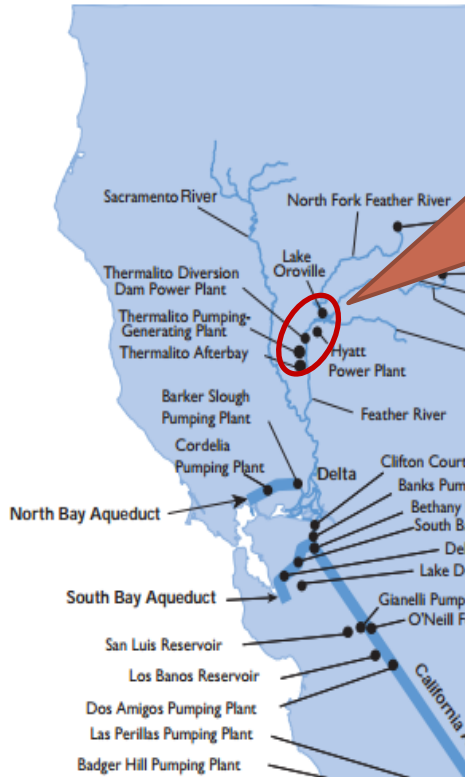
Nov 15, 2017

SWP OVERVIEW

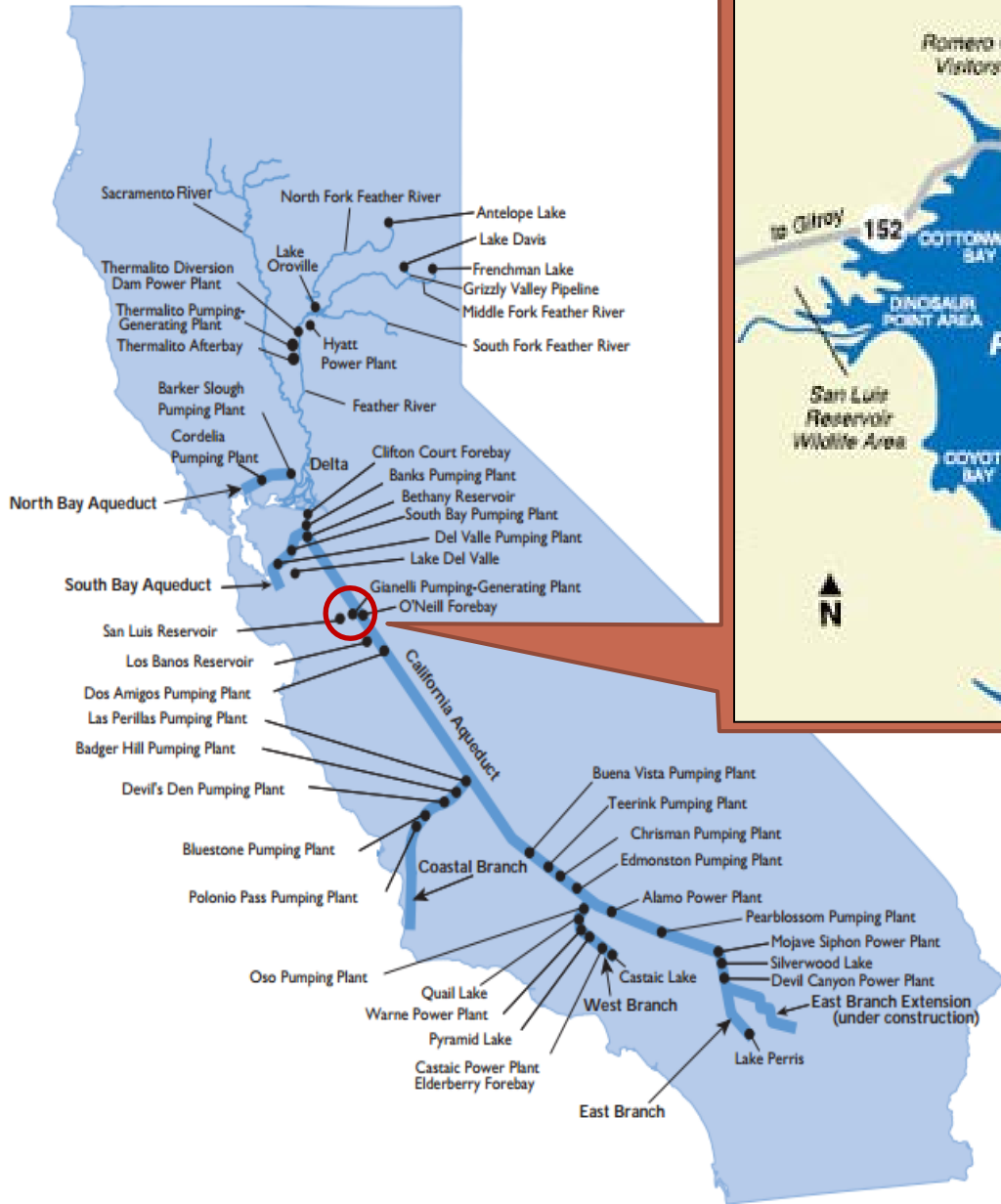
- SWP delivers an average of 2.6 million acre-feet of water annually
- Is the largest state owned conveyance water system in the United States
- Maximum pumping capacity of the SWP is 2,600 (MW)
- SWP Consumes 6 to 9.6 million MWh of electricity per year
- SWP is the 3rd largest generator of clean hydropower in CA.
- Generates 4 to 7 million MWH of clean electricity per year
- SWP produces approximately 14% of CA's hydropower.

State Water Project





Lake Oroville



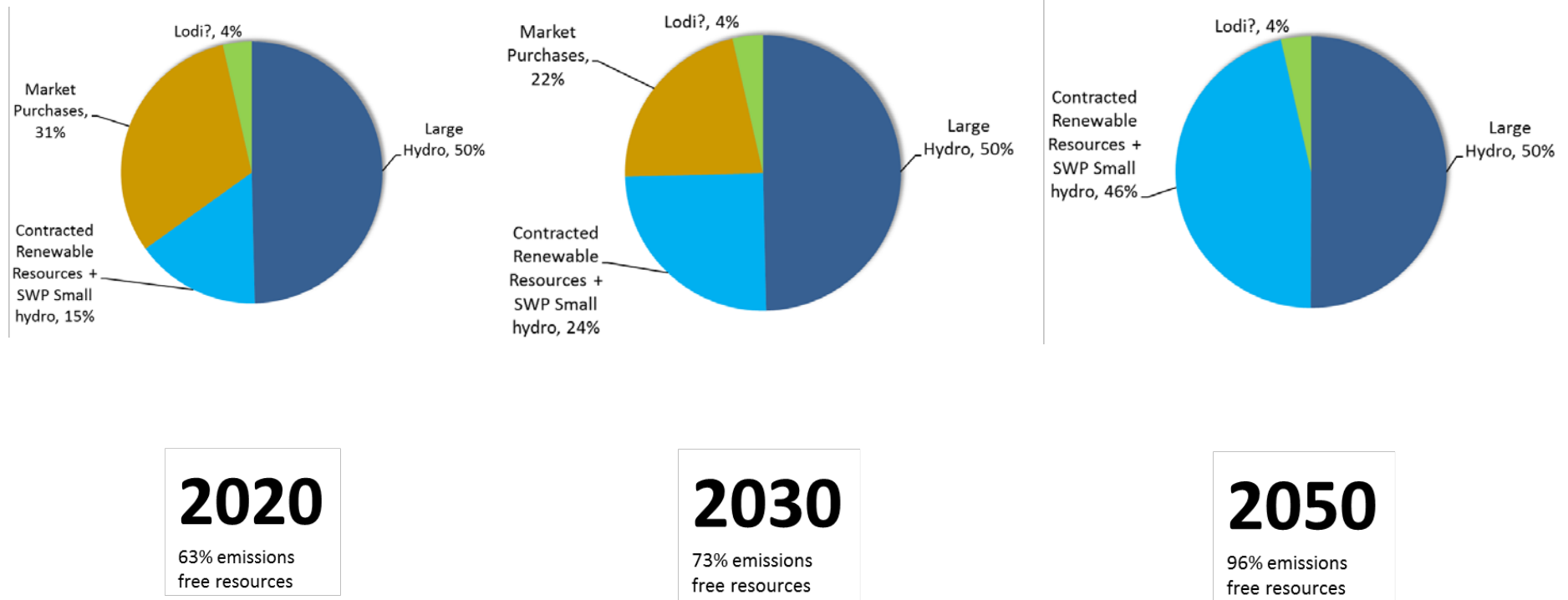
San Luis Reservoir

SWP GENERATING FACILITIES

Power Plant	DWR's Share of Capacity (MW)
Hyatt	645
Thermalito (currently not operational due to fire damage)	114
Thermalito Diversion Dam	3
Gianelli (Joint development with US Bureau of Reclamation)	222
William Warne	67
Castaic (Joint development with the Los Angeles Department of Water and Power) Capacity varies with water delivery	214
Alamo	15
Mojave Siphon	29
Devil Canyon	235
Total Capacity	1,544

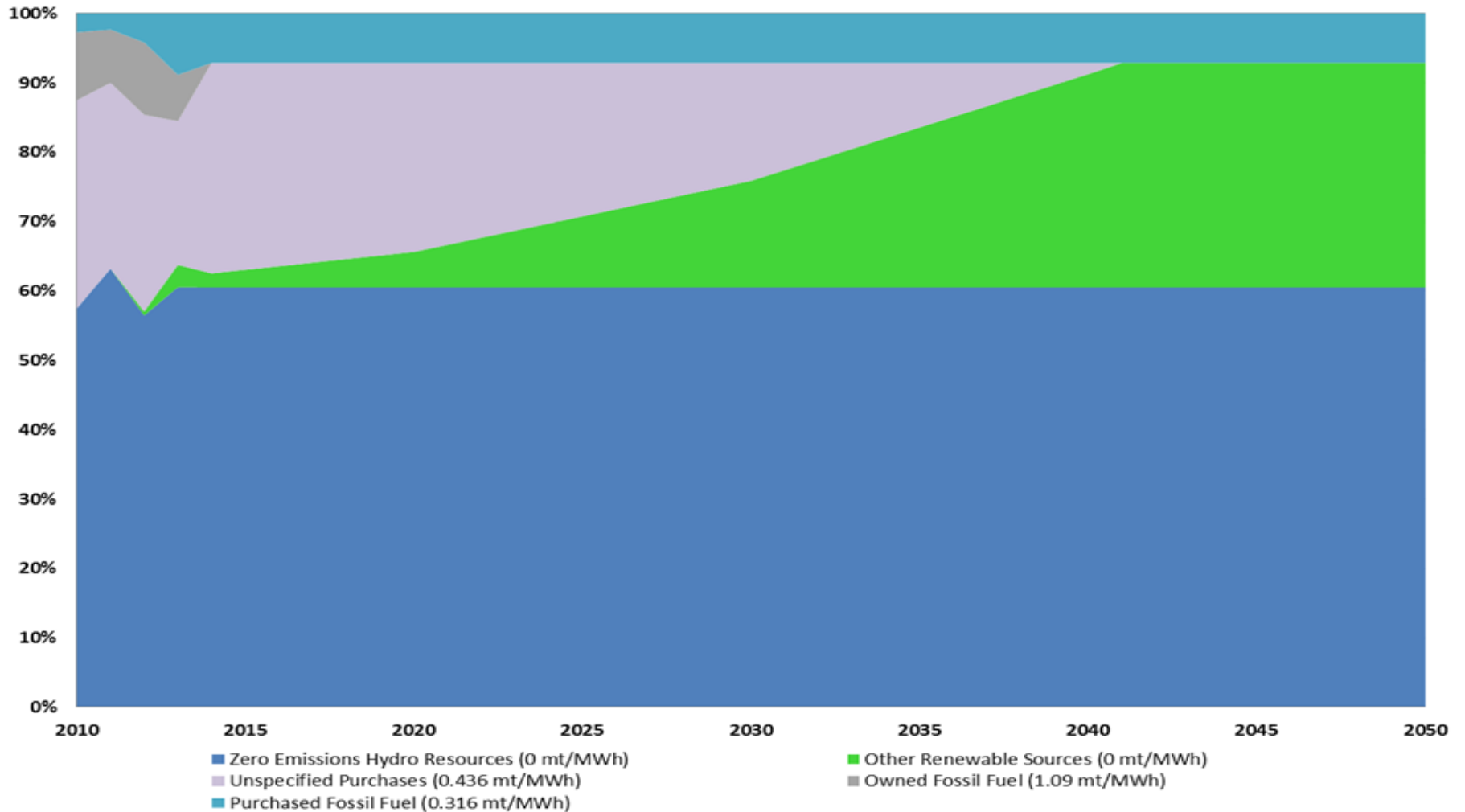
SWP POWER PORTFOLIO CURRENT AND FUTURE RESOURCE MIX

■ SWP Power Portfolio Evolution 2017-2050



DWR POWER PORTFOLIO 2010-2050

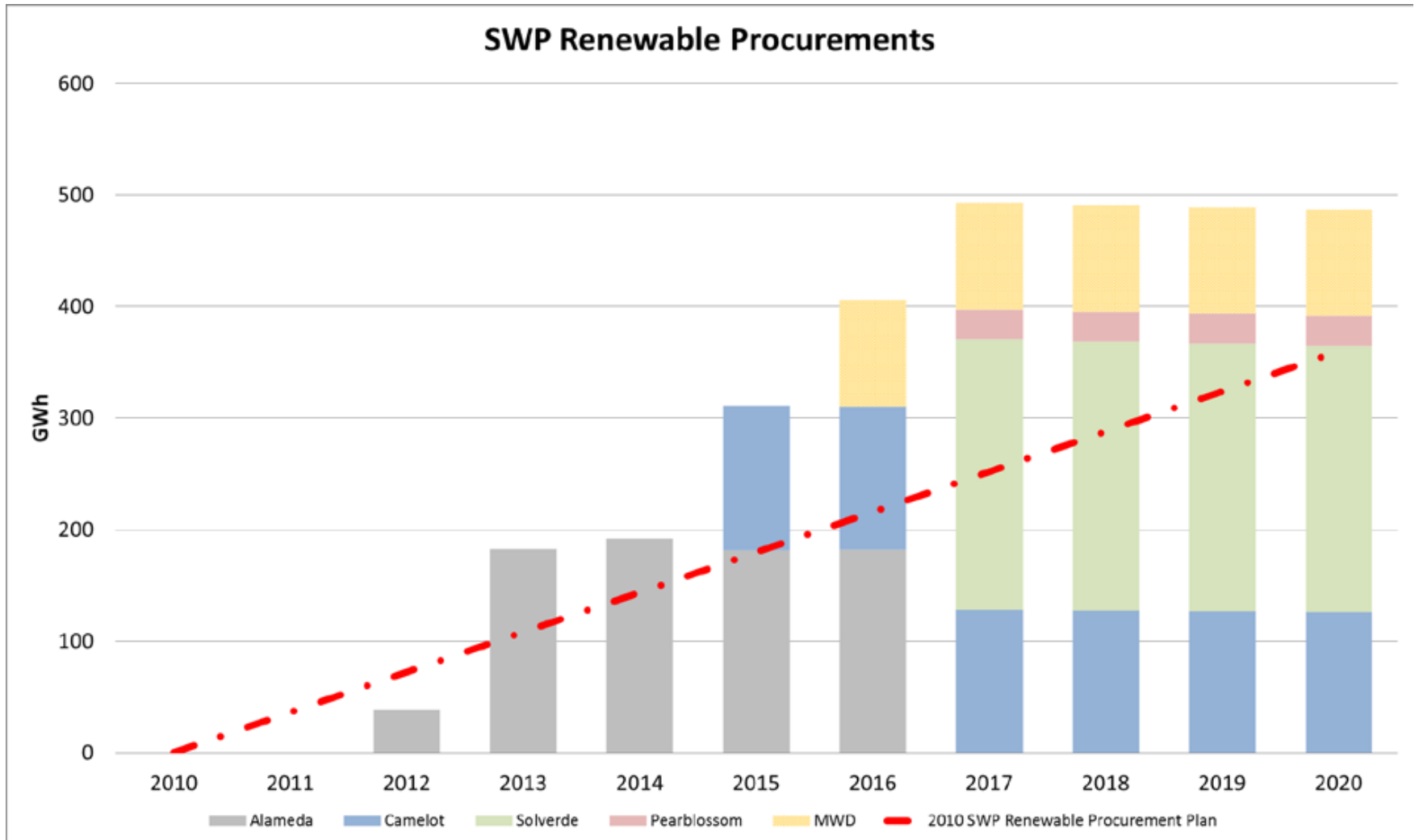
DWR Power Portfolio 2010-2050



RENEWABLE AND CLEAN ENERGY CONTRACTS

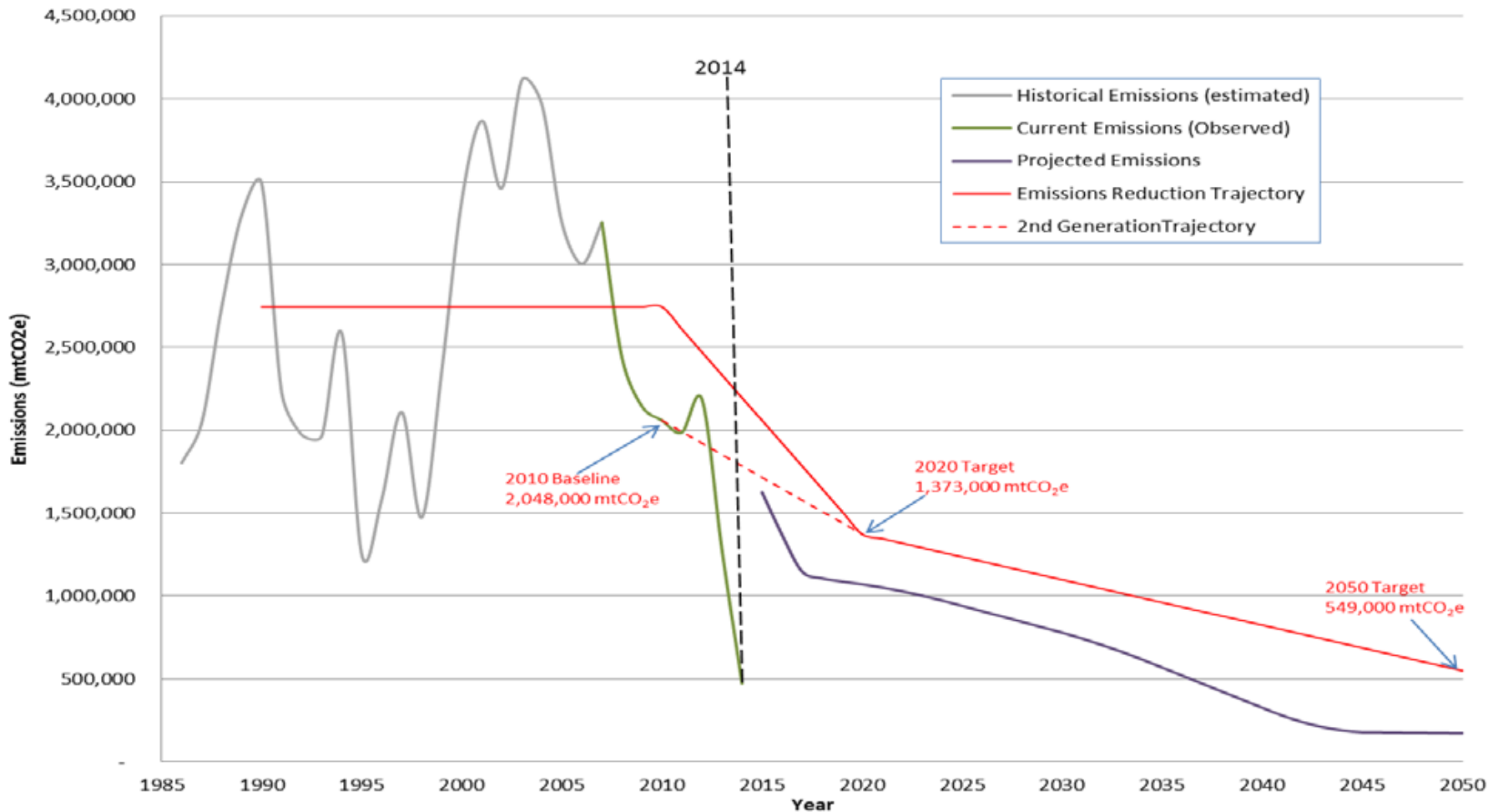
Power Plant & Fuel Type	DWR's Share of Capacity (MW)	DWR's Share of Energy (GWh)	Contract Status
Pine Flat (hydro)	165	431	Active
MWD Phase 1 (small hydro)	30	128	Active
Lodi Energy Center – Combined Cycle Combustion Turbine (natural gas)	99	422	Active
Dominion - Camelot (solar)	45	130	Active
sPower – Solverde 1 (solar) COD in Dec 2016	85	240	Active
SunPower – Pearblossom (solar) COD in Dec 2016	9.5	28	Active
MWD (small hydro) 2016-2020	51.4	95	Active
Total (Active Contracts)	485	1474	

SWP RENEWABLE PROCUREMENTS



SWP RENEWABLE PROCUREMENTS

DWR Total Emissions (Historic, Current, Future)



DWR Retail Energy Reduction Track - Purpose

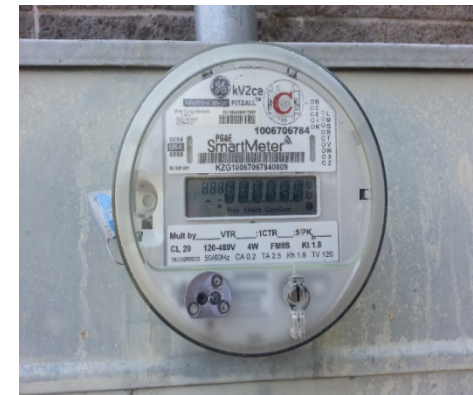
- **Meet Executive Order B-18-12**

“Reduce grid-based retail energy purchases by 20% by 2018 based on a 2003 baseline”

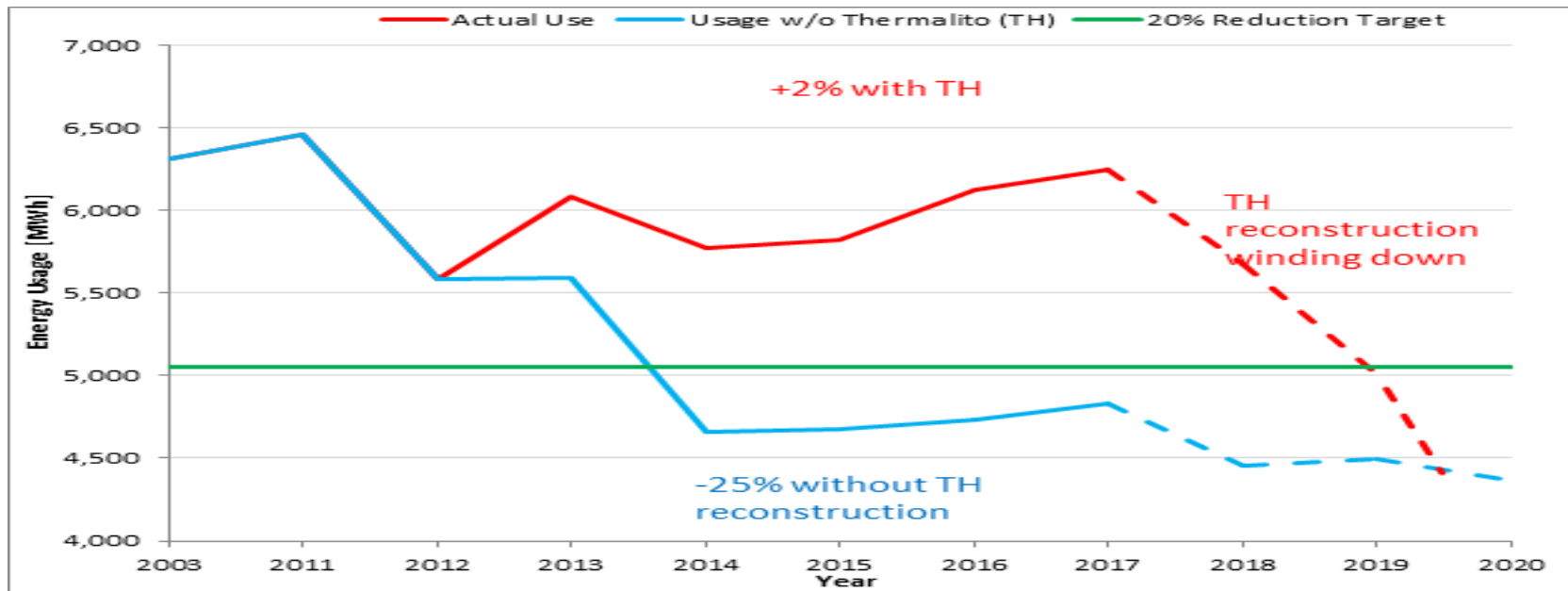
- Electrical and natural gas equivalents
- Excludes
 - Wholesale energy
 - Leased buildings

“Achieve ZNE for 50% of the square footage of state-owned building area by 2025”

- *Renewable Energy*
- **Reduce GHG emissions**



DWR RETAIL ENERGY REDUCTION STATUS



Completed Projects

- HVAC and control systems upgrade through ARRA
- Automated Demand Response - Seven sites participating
- HVAC controls, Upgraded thermostat, Alternate peak-hour costs
- Lighting fixtures upgrade through PG&E

Next Steps

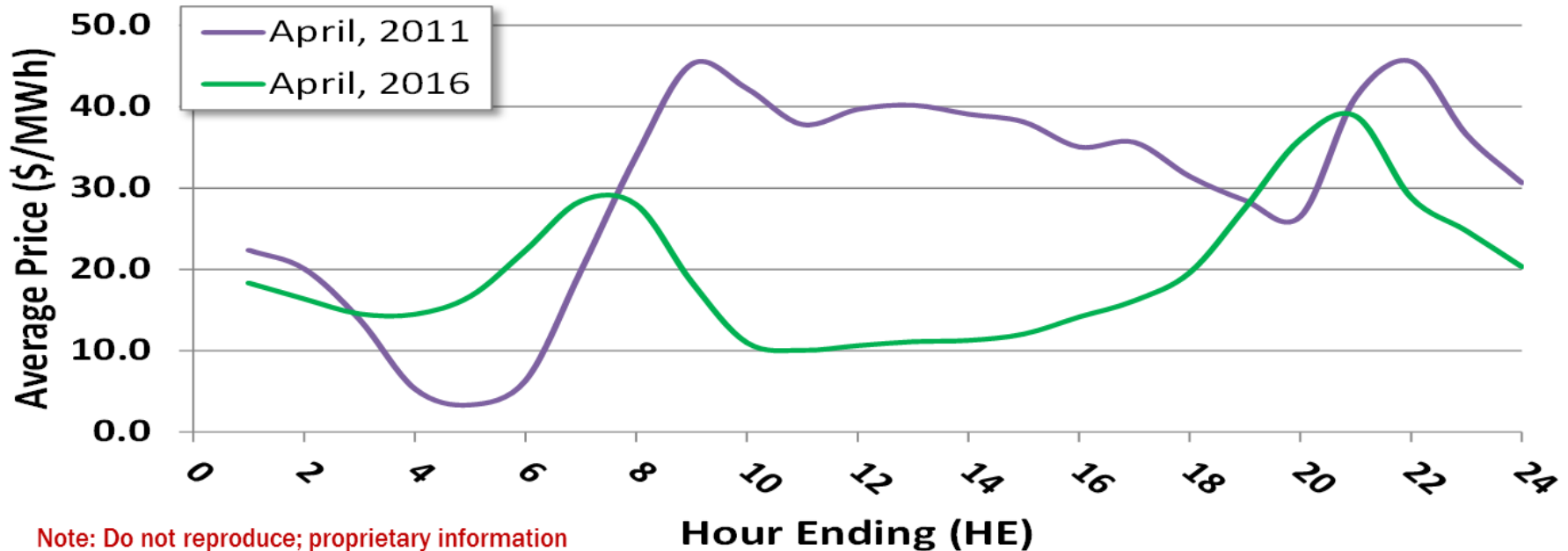
- Upgrade Lighting through SCE's Direct Install Program
- Upgrade HVAC Units
- Install Solar Generation Projects

SWP POWER MARKET ACTIVITIES

- SWP offer flexibility into CAISO market, utilizing pump load to offset renewable penetration.
- SWP offers demand response into CAISO market through Participating Load Agreement.
- SWP schedules pump load and generation resources through Day Ahead market, generation resources provide Ancillary Services.
- Collaborating with CAISO to explore economical bid of pump load into the real-time market to aid in reliability services and respond to intermittent renewable resources.
- SWP exploring capital investments and system retrofits through integrating variable drives to DWR own pumping plants and adding additional storage along the aqueduct to enhance flexibility.

EVOLVING ENERGY PRICES

Average Hourly Energy Price for April
CAISO SP-15 Region



2011

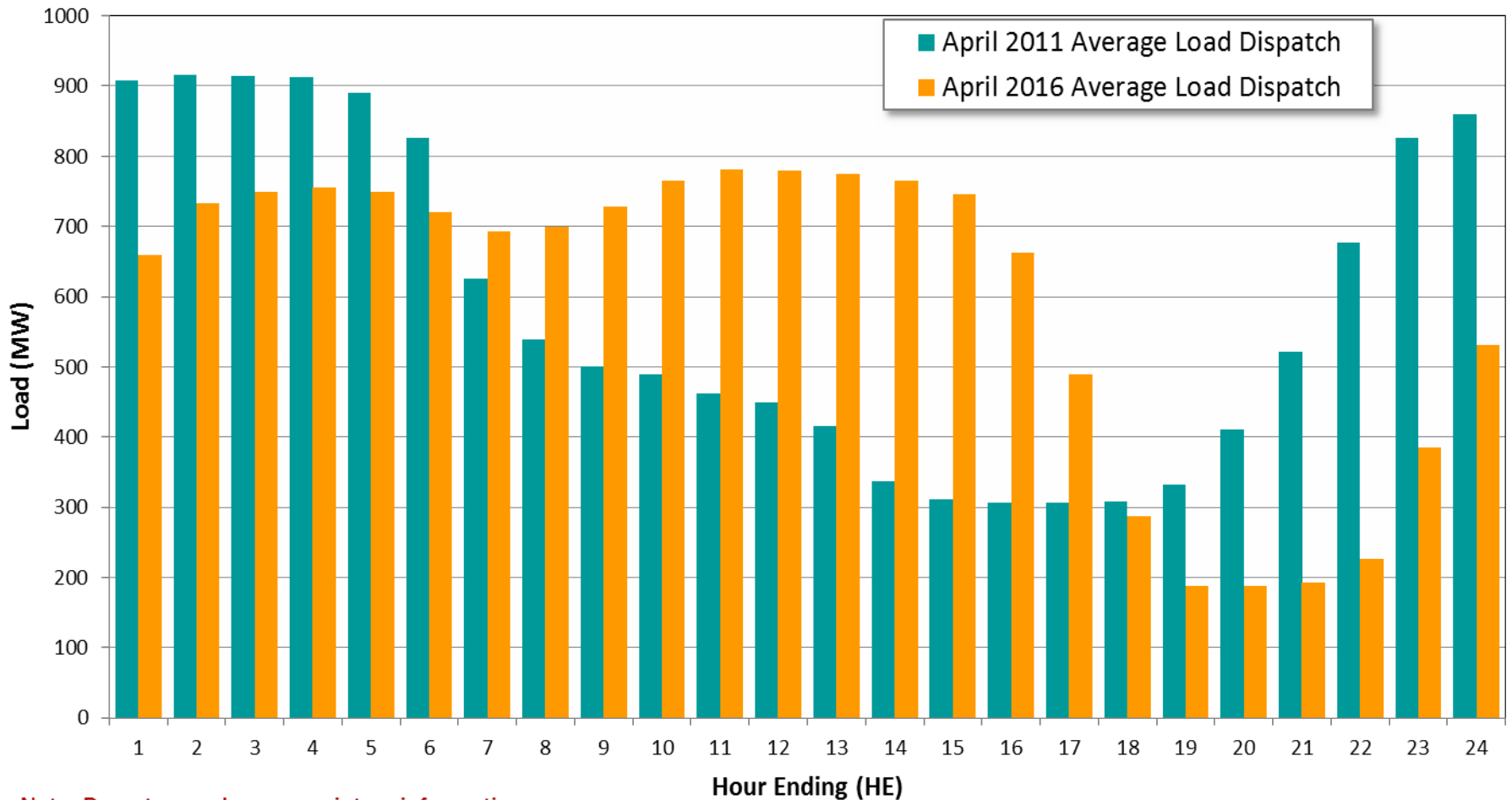
- Costly solar hours
- Reduction in solar hours prices greatly effects dispatch

2016

- Cheap solar hours
- Reduction in solar hours prices has little effect on dispatch

SWP LOAD SHIFTING TO SOLAR HOURS

Edmonston and Valley String Actual Load Dispatch



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