



# Procurement and TEA Operational Activities Overview

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Presented to RCEA Board of Directors

April 17, 2017

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# Discussion Topics

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- RCEA procurement update and status
- TEA operational activities effective May 1<sup>st</sup>

# RCEA Procurement

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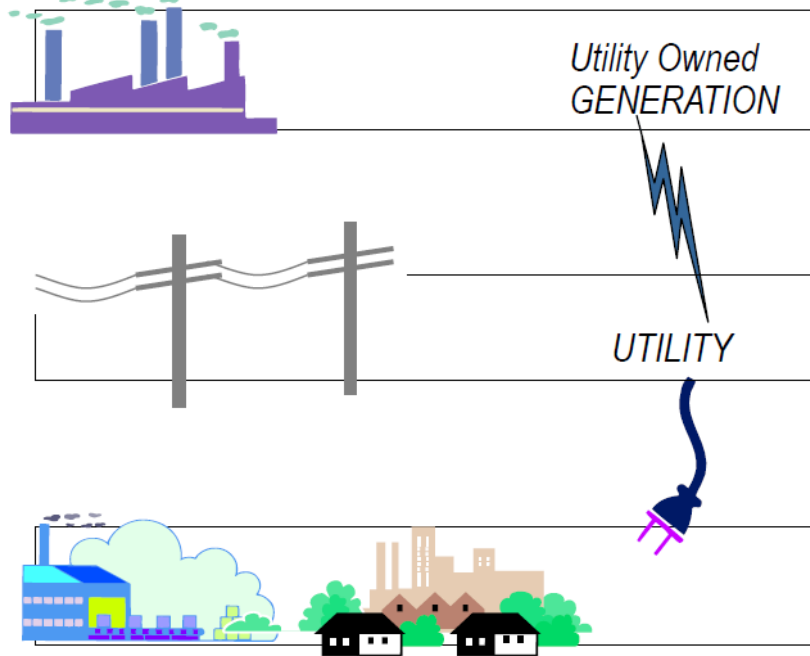
# RCEA Procurement

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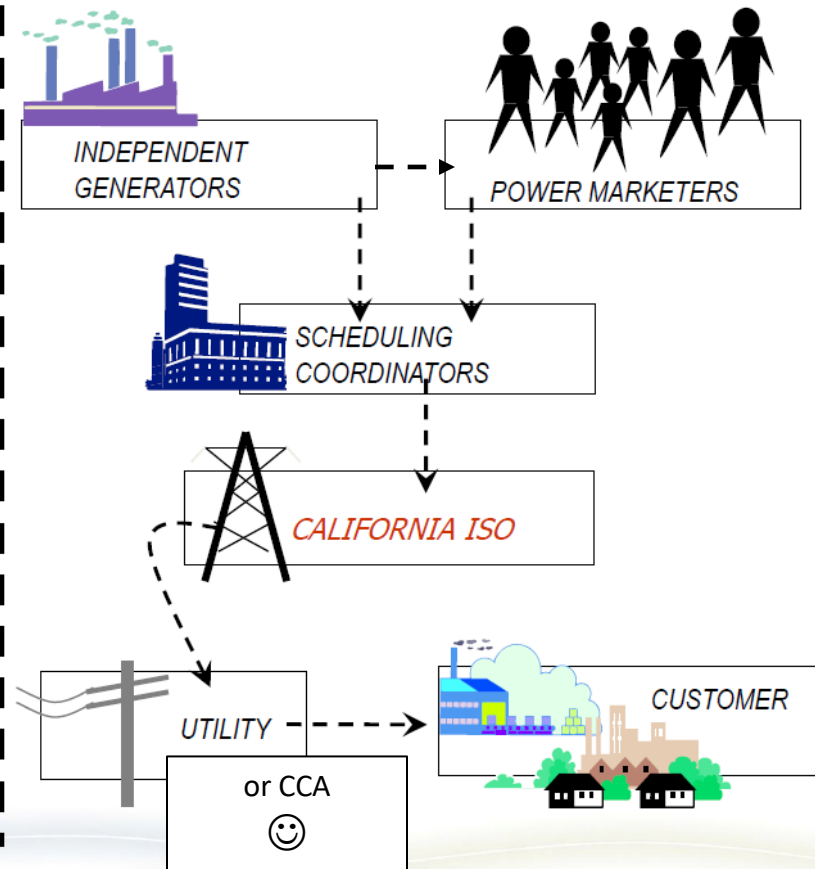
- Mandatory
  - Wholesale Market (CAISO)
  - Resource Adequacy (RA)
  - Renewable Portfolio Standard (RPS)
  - *Storage (needs to be under contract by 2020 w/ installation no later than 2024; volume requirement is 1% of 2020 peak)*
- Voluntary
  - Hedging for risk management (forward bilateral purchases)
  - Renewables beyond RPS requirements
  - GHG free or low carbon energy (i.e., large hydro)
  - Local generation
- Total Energy Supply = Energy + RPS + GHG free/low
- System Reliability Contribution = RA + Storage

# Evolution of Wholesale Power Market

*“Yesterday (and outside California today)”*

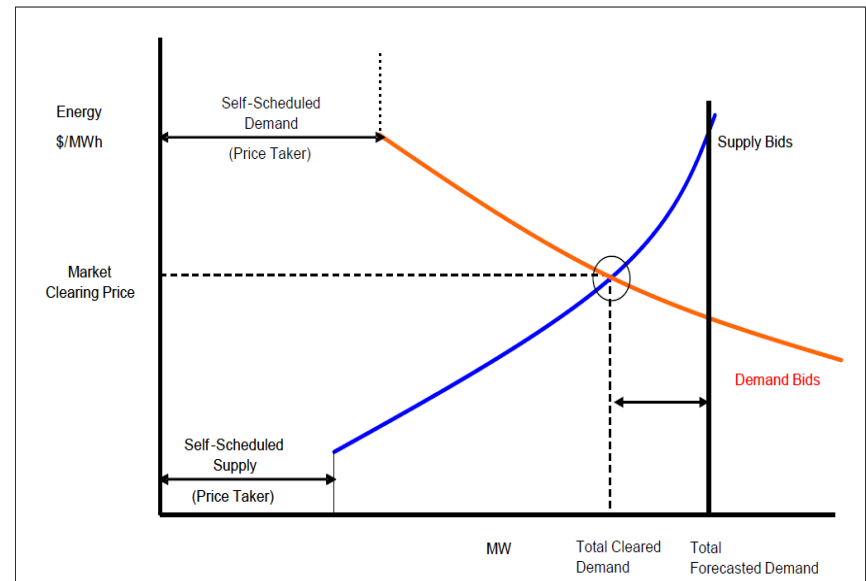


*“Today”*

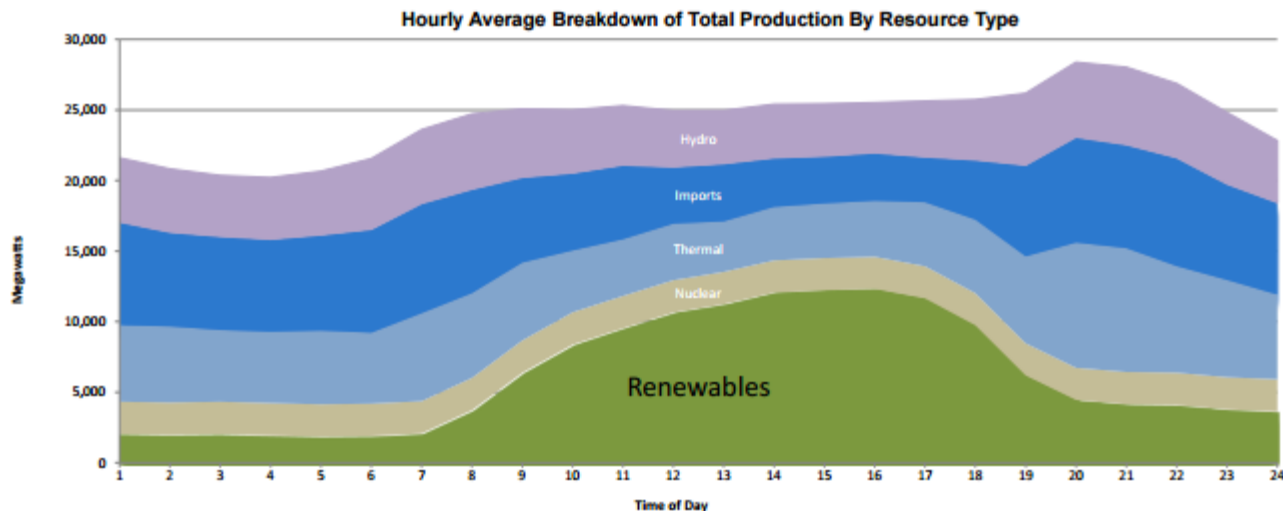


# CAISO Market

- Market participants submit demand and supply bids to the CAISO through a Scheduling Coordinator (SC) → TEA is the SC for RCEA
  - A Scheduling Coordinator is the entity that is financially and legally bound to CAISO
- CAISO runs a market optimization that determines market clearing prices and publishes results
- CAISO performs settlement function, sending invoices to market participants (credits or debits) that includes charges to cover its costs
- CAISO responsible for reliable operation of the grid (“keeping the lights on”); translation of reliability to market participants is done largely (although not entirely) through price signals



# CAISO Generation Mix – April 11<sup>th</sup>



This graph depicts the production of various generating resources across the day.

Previous Renewables Watch reports and data are available at <http://www.caiso.com/green/renewableswatch.html>

**During the middle of the day generation from natural gas, hydro and imports are displaced by renewable (solar PV) generation**

Source: <http://www.caiso.com/market/Pages/ReportsBulletins/DailyRenewablesWatch.aspx#curtailment>

# Standard Energy Products

Product	Hub	Begin Date	End Date	Strip	+/-	Sell	B Qty	Bid	Offer	Last	Settlement
Peak Futures	NP15 DA	17Nov16	17Nov16	Next Day	+	Hit	25	34.25	34.75	34.65	34.00
Peak Futures	NP15 DA	18Nov16	30Nov16	Bal Month		Hit	25	32.25	34.50		31.40
Peak Futures	NP15 DA	1Dec16	31Dec16	Dec16	+	Hit	25	36.25	37.00	37.25	36.90
Peak Futures	NP15 DA	1Jan17	31Jan17	Jan17		Hit	25	36.00	36.75		36.05
Peak Futures	NP15 DA	1Feb17	28Feb17	Feb17	+	Hit	25	34.00	35.50		35.15
Peak Futures	NP15 DA	1Mar17	31Mar17	Mar17	+	Hit	25	30.50	31.75		31.55
Peak Futures	NP15 DA	1Jan17	31Mar17	Q1 17	+	Hit	25	33.50	34.00		34.17
Peak Futures	NP15 DA	1Apr17	30Jun17	Q2 17	+	Hit	25	30.25	31.00		30.94
Peak Futures	NP15 DA	1Jul17	30Sep17	Q3 17		Hit	25	38.25	39.00		38.76
Peak Futures	NP15 DA	1Oct17	31Dec17	Q4 17		Hit	25	37.00	39.00		38.35
Peak Futures	NP15 DA	1Jan17	31Dec17	Cal 17	+				35.50		35.55
Peak Futures Spr	NP15 DA	1Dec16	31Jan17	Dec16/Jan17		Hit	25	-0.50	1.00		0.85
Peak Futures Spr	NP15 DA	1Jan17	28Feb17	Jan17/Feb17		Hit	25	0.50	2.75		0.90
Peak Futures Spr	NP15 DA	1Feb17	31Mar17	Feb17/Mar17		Hit	25	1.50	5.00		3.60
Peak Futures Spr	NP15 DA	1Jan17	30Jun17	Q1 17/Q2 17		Hit	25	1.75	3.75		3.23
Peak Futures Spr	NP15 DA	1Apr17	30Sep17	Q2 17/Q3 17		Hit	25	-8.75	-6.50		-7.82
Peak Futures Spr	NP15 DA	1Jul17	31Dec17	Q3 17/Q4 17		Hit	25	-0.75	2.00		0.41
Off-Peak Futures	NP15 DA Off-Peak	17Nov16	17Nov16	Next Day Off-Peak	+					26.50	25.60
Peak Futures Spr	NP15 DA/Mid C	1Dec16	31Dec16	Dec16		Hit	25	9.00	10.25		10.15
Peak Futures Spr	NP15 DA/Mid C	1Jan17	31Mar17	Q1 17		Hit	25	9.75	11.00		10.37
Peak Futures Spr	NP15 DA/Mid C	1Apr17	30Jun17	Q2 17		Hit	25	12.00	14.75		13.54
Peak Futures Spr	NP15 DA/Mid C	1Jul17	30Sep17	Q3 17		Hit	25	8.00	10.00		9.24
Peak Futures Spr	NP15 DA/Mid C	1Oct17	31Dec17	Q4 17		Hit	25	9.00	12.00		10.50
Peak Futures Spr	NP15 DA/Mid C	1Jan17	31Dec17	Cal 17					11.25		10.92



- **Peak product covers 6AM-10PM Monday through Saturday excluding certain holidays**
- **Off-Peak product covers all other hours**



# Resource Adequacy

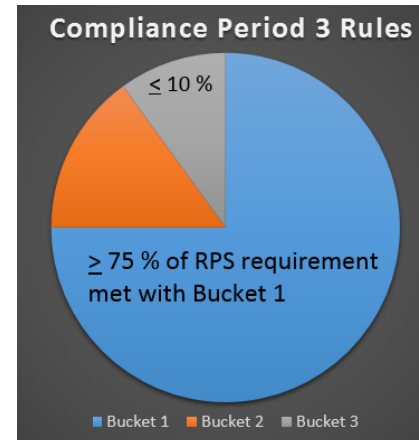
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- The Resource Adequacy Program is jointly administered by the CEC, CPUC, and the CAISO
- According to the CPUC, the RA Program has two goals:
  - *First, it provides sufficient resources to the California Independent System Operator to ensure the safe and reliable operation of the grid in real time.*
  - *Second, it is designed to provide appropriate incentives for the siting and construction of new resources needed for reliability in the future.*
- CCAs must procure RA based on their contribution to system needs as determined by the CPUC
  - TEA administers solicitations using its enabling agreements to ensure competitive prices
  - TEA prepares RA compliance filings for RCEA
- Generators providing RA are required to offer their generation into the DA market

# Renewable Portfolio Standard

- There are three “Buckets” for Renewable Energy Credits (RECs):
  - (1) Bucket 1 – bundled (*a.k.a. in-state*)
  - (2) Bucket 2 - firmed and shaped (*a.k.a. out-of-state*)
  - (3) Bucket 3 – unbundled
- Price structure is index plus \$/MWh premium for REC
  - \$14-\$15 for bucket 1
  - \$5-6/ for bucket 2
- RECs are transferred and retired in Western Renewable Energy Generation Information System (WREGIS)

Compliance Periods	Procurement Quantity Requirement
CP1 2011-2013	Average 20% each year
CP2 2014-2016	2014 retail sales * 21.7% 2015 retail sales * 23.3% 2016 retail sales * 25%
Compliance Period 3 2017-2020	2017 retail sales * 27% 2018 retail sales * 29% 2019 retail sales * 31% 2020 retail sales * 33%



# GHG Free Supply



Power Supply Source

Project	Product	State	Technology
H.W. Hill Landfill Gas Project	PCC1	WA	Landfill Gas
Dokie Wind Energy Project	PCC1	BC	Wind
Quality Wind Project	PCC1	BC	Wind
Cape Scott Wind	PCC1	BC	Wind
Meikle Wind Energy Project	PCC1	BC	Wind
Nippon Paper Co0Generation	PCC1	WA	Biomass
Mid-C Hydro - Priest Rapids and Wanapum dams	Carbon Free	WA	Hydro
Rocky Reach (Chelan County PUD)	Carbon Free	WA	Hydro
Mid-C Hydro - Rock Island (Chelan County PUD)	Carbon Free	WA	Hydro
Lake Chelan Hydroelectric Facility Mid-C Hydro	Carbon Free	WA	Hydro
Whitewater Hill (wind)	PCC1	CA	Wind
Harvest Wind	PCC1	WA	Wind
Re Tranquillity (solar)	PCC1	CA	PV
Cabazon (wind)	PCC1	CA	Wind
Geothermal 1, Units 1, 2 & 4	PCC1	CA	Geothermal
Ameresco Half Moon Bay	PCC1	CA	Landfill Gas
Priest Rapids/Wanapum Hydro Projects	Carbon Free	WA	Hydro
Colgate Powerhouse - Unit 1	Carbon Free	CA	Hydro
Colgate Powerhouse - Unit 2	Carbon Free	CA	Hydro
Henry M. Jackson Hydroelectric Project	Carbon Free	WA	Hydro
Wanapum Dam	Carbon Free	WA	Hydro
Priest Rapids Dam	Carbon Free	WA	Hydro
Rock Island Dam	Carbon Free	WA	Hydro
Rocky Reach Dam	Carbon Free	WA	Hydro
Boundary Dam	Carbon Free	WA	Hydro
Lucky Peak Dam	Carbon Free	ID	Hydro
Palm Springs Wind (San Geronio 1-5)	PCC1	CA	Wind
Longview Biomass	PCC1	WA	Biomass
Kittitas Valley, Wind	PCC1	WA	Wind
TBD	PCC1	TBD	TBD

Pacific Northwest Hydroelectric Generation

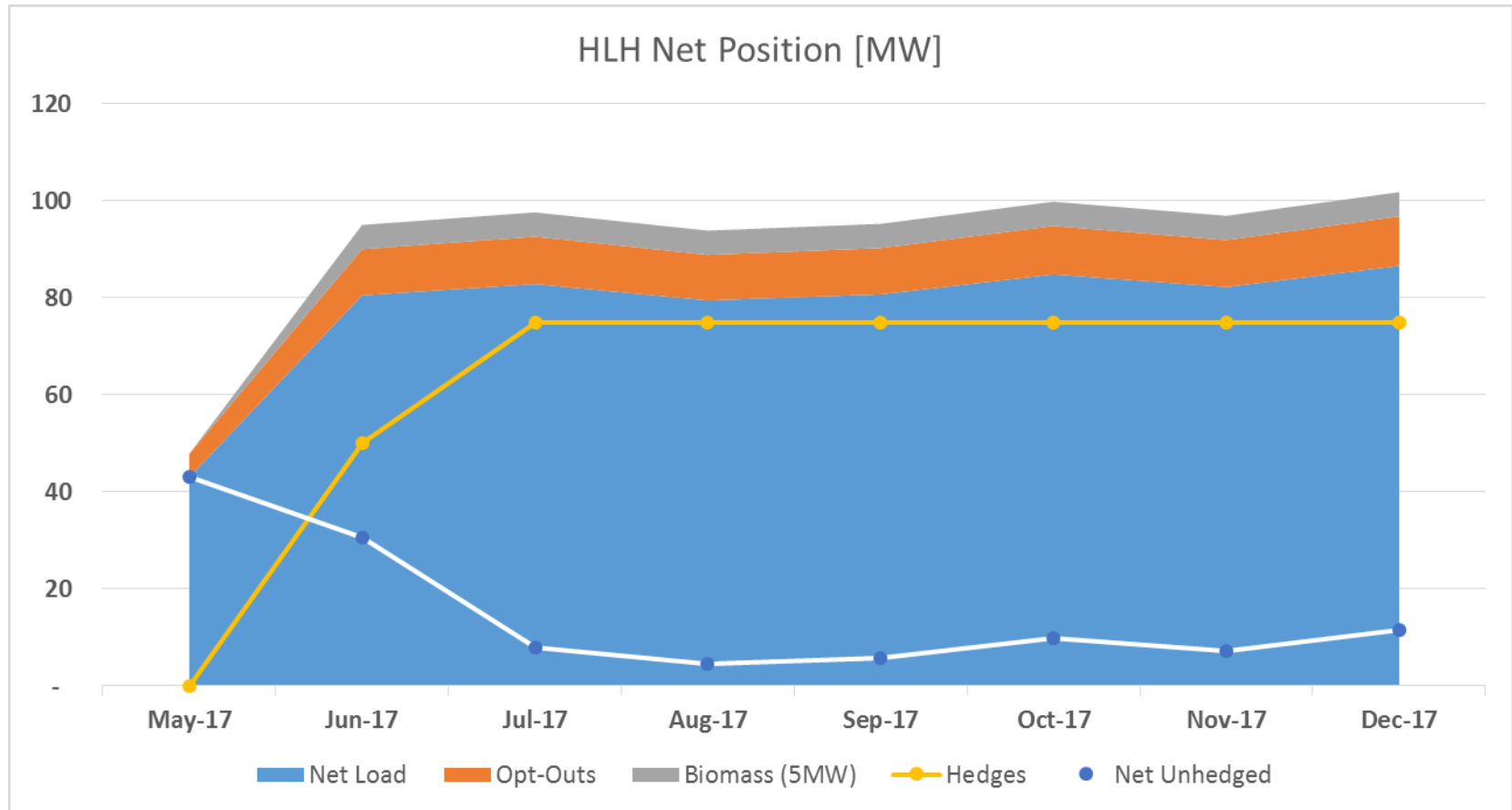


Pricing structure is index + \$/MWh premium (\$2-\$3)

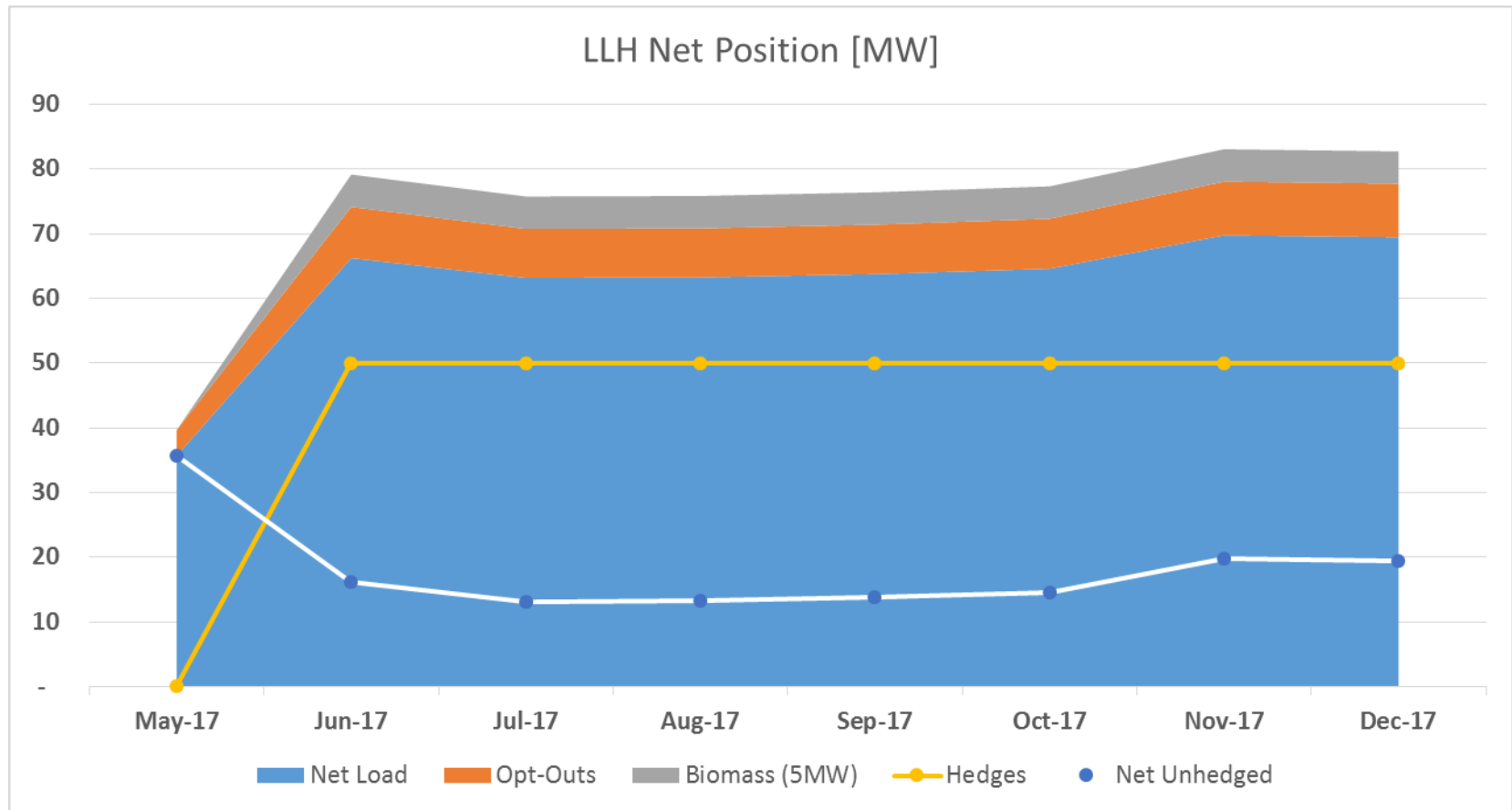
# 2017 Procurement Status

Item	Schedule / Notes
1. Energy	<ul style="list-style-type: none"> <li>Initial market procurement complete</li> <li>Assess residual requirements in June/July <ul style="list-style-type: none"> <li>Currently anticipate short-term hedges in response to market fundamentals</li> </ul> </li> </ul>
2. Renewable Energy Credits ("RECs")	<ul style="list-style-type: none"> <li>Initial market procurement complete</li> <li>HRC expected to provide ~50k Bucket 1 RECs <ul style="list-style-type: none"> <li>Currently planning for DG Fairhaven to provide other 20k</li> <li>May require incremental market purchase in 2H17</li> <li>Planning to procure up to 40% renewable</li> </ul> </li> </ul>
3. GHG Free Supply	<ul style="list-style-type: none"> <li>Anticipate procurement in April/May <ul style="list-style-type: none"> <li>Planning to procure up to 80% GHG free</li> </ul> </li> </ul>
4. Resource Adequacy ("RA")	<ul style="list-style-type: none"> <li>May and June procurement complete</li> <li>Jul-Dec procurement by end of April</li> </ul>
5. Congestion Revenue Rights ("CRRs")	<ul style="list-style-type: none"> <li>Load migration CRRs in late-May for June</li> <li>First monthly process will be June for July</li> </ul>

# Peak Hour (heavy load hours) Net Position w/ 5MW Biomass, 10% Opt-Outs & Proposed Hedges



# Off-Peak Hour (light load hours) Net Position w/ 5MW Biomass, 10% Opt-Outs & Proposed Hedges



# Preliminary 2018 Procurement Plan

Item	Schedule / Notes
1. Energy	<ul style="list-style-type: none"> <li>13.25 aMW from HRC equivalent to ~15% of energy <ul style="list-style-type: none"> <li><i>DG Fairhaven PPA TBD, would increase % supplied from local biomass</i></li> </ul> </li> <li>80% of energy requirements in October to align with setting of PCIA charge <ul style="list-style-type: none"> <li>Currently anticipate balance of energy requirements procured short-term</li> </ul> </li> </ul>
2. Renewable Energy Credits ("RECs")	<ul style="list-style-type: none"> <li>RPS and GHG free supply procurement in late-17 or early-18 <ul style="list-style-type: none"> <li>Discuss longer-term "Bucket 2" and GHG purchase at upcoming risk meeting</li> </ul> </li> </ul>
3. GHG Free Supply	<ul style="list-style-type: none"> <li>RPS and GHG free supply procurement in late-17 or early-18 <ul style="list-style-type: none"> <li>Discuss longer-term "Bucket 2" and GHG purchase at upcoming risk meeting</li> </ul> </li> </ul>
4. Resource Adequacy ("RA")	<ul style="list-style-type: none"> <li>Learn requirements in late-Q3 and procure late-Q3 and/or early-Q4</li> </ul>
5. Congestion Revenue Rights ("CRRs")	<ul style="list-style-type: none"> <li>Annual Auction process runs August through November <ul style="list-style-type: none"> <li>Historical load submittal in August</li> <li>Path nominations in September</li> <li>Results posted in November</li> </ul> </li> </ul>

# Energy Risk Management Policy Provides Framework for Procurement

## Risk Policies

- Risk reports
- Risk Management Team
- Delegation of authority to transact products

## Risk Measurement

- Develop detailed financial model of operating costs
- Explicitly model uncertainty of market prices
- Output variability of cash flow

## Risk Mitigation

- Analyze hedge scenarios; procure supply as desired

2017 Headroom

	\$/MWh	\$mm
PG&E Gen	\$ 96.82	\$ 40.00
RCEA Cost*		
Supply	\$ 45.98	\$ 18.99
O/H	\$ 8.20	\$ 3.39
PCIA+FF	\$ 25.82	\$ 10.67
10% Opt-Out	\$ -	\$ -
Headroom	\$ 16.83	\$ 6.95
\$4mm Reserves	\$ 9.68	\$ 4.00
Net of Reserves	\$ 7.15	\$ 2.95

January 2017 Board Meeting:  
• \$16.07/MWh  
• \$6.77 mm

January 2017 Board Meeting:  
• \$6.57/MWh  
• \$2.77 mm

\*Inclusive of 5MW biomass, 65% GHG free generation (includes biomass), 38% renewables, 2.7% rate discount vs. PG&E

Potential Expenditures	\$/MWh	\$mm
2.7% Gen Rate Reduction	\$ 2.61	\$ 1.08
5 MW Biomass [@\$83]	1.99	0.82
PG&E GHG - 5%	1.13	0.47
Effect of 1 in 4 Price Increase	1.14	0.47
<b>Subtotal</b>	<b>6.87</b>	<b>2.84</b>
<b>Net of Current Program Commitments</b>	<b>\$ 0.28</b>	<b>\$ 0.11</b>

January 2017 Board Meeting:  
• (\$0.11)/MWh  
• (\$0.04) mm



# TEA Activities Beginning May 1<sup>st</sup>

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## **Scheduling & Settlement**

- Maintaining credit facilities with CAISO
- Daily forecasting of the RCEA hourly loads
- Submit demand schedules to DA market
- Manage Inter-SC trades (ISTs) for system power transactions
- Effective June 1, serve as SC for HRC
  - Receive generation plans from HRC
  - Schedule HRC generation in DA market
  - Report unit outages to CAISO
- Import schedule, as required, including preparing e-tags (*if needed for GHG supply*)
- Manage annual and monthly RA submittals
- Settlement validation and dispute support for both CAISO and bilateral counterparties
- CAISO regulatory monitoring

## **Portfolio Management**

- Maintain financial model
- Maintain risk model
- Updated financial projections and risk reports
- Facilitate risk management team meetings
- Advise on hedging strategies
- Advise on Congestion Revenue Rights

# CAISO Settlement

## TEA receives 3 Settlement statement types from CAISO

- T+3/T+12/T+55
- T = Trade Date
- For example, the “initial” Settlement Statement for operating date 05/01/17 will be published to the CAISO Portal on 05/04/17.
- CAISO does not publish statements or invoices on weekends and NERC holidays.
- Invoices are published every Wednesday and include settlement statements published during the previous Monday to Sunday. They are due the following Tuesday by 10:00 am.
  - TEA will make its first payment to CAISO for RCEA on **05/09/17**



Note: All numbers are illustrative only

Line Item			\$	% of Total
Resource Adequacy Costs			62,600	4.2%
Renewable Portfolio Costs			116,250	7.8%
CA Energy Resources Surcharge			4,744	0.3%
HRC PPA Charge			421,716	28.2%
Hedge Cost paid to Counterparties (IST)			380,120	25.5%
CAISO	6301	IST Settlement	(380,120)	-25.5%
CAISO	6011	Day Ahead Energy	414,239	27.7%
CAISO	6475	Real Time UIE	5,854	0.4%
CAISO	CRR		4,097	0.3%
CAISO	4516	CC 4516 - GMC CRR Transaction Fee	1,726	
CAISO	4562	CC 4562 - GMC CRR Services Charge	238	
CAISO	6700	CC 6700 - CRR Hourly Settlement	(6,685)	
CAISO	6790	CC 6790 - CRR Balancing Account	7,513	
CAISO	6791	CC 6791 - CRR BA Accrued Interest Allocation	(10)	
CAISO	6798	CC 6798 - CRR Auction Transaction Settlement	(395,974)	
CAISO	6799	CC 6799 - CRR Auction Collateral Credit Settlement	397,288	26.6%
CAISO	All Other Charges		66,566	4.5%
CAISO	550	CC 550 - FERC Fee Monthly Settlement	1,156	
CAISO	701	CC 701 - Forecasting Service Fee	692	
CAISO	4512	CC 4512 - GMC Inter-Scheduling Coordinator Trade Transaction Fee	416	
CAISO	4515	CC 4515 - GMC Bid Transaction Fee	16	
CAISO	4560	CC 4560 - GMC Market Services Charge	2,246	
CAISO	4561	CC 4561 - GMC System Operations Charge	7,140	
CAISO	4575	CC 4575 - GMC Scheduling Coordinator ID Charge	1,000	
CAISO	4989	CC 4989 - Daily Rounding Adjustment Allocation	(147)	
CAISO	6046	CC 6046 - Over and Under Scheduling EIM Allocation	(55)	
CAISO	6090	CC 6090 - Upward Ancillary Services Neutrality Allocation	(137)	
CAISO	6194	CC 6194 - Spinning Reserve Obligation Charge Amount	2,552	
CAISO	6196	CC 6196 - Spinning Reserve Neutrality Allocation	510	
CAISO	6294	CC 6294 - Non-Spinning Reserve Obligation Settlement	211	
CAISO	6296	CC 6296 - Non-Spinning Reserve Neutrality Allocation	53	
CAISO	6457	CC 6457 - Declined Hourly Pre-Dispatch Penalty Allocation	(3)	
CAISO	6460	CC 6460 - FMM Instructed Imbalance Energy Settlement	8,727	
CAISO	6470	CC 6470 - Real Time Instructed Imbalance Energy Settlement	39,456	
CAISO	6474	CC 6474 - Real Time Unaccounted for Energy Settlement	4,293	
CAISO	6477	CC 6477 - Real Time Imbalance Energy Offset	(1,377)	
CAISO	6594	CC 6594 - Regulation Up Obligation Settlement	2,209	
CAISO	6636	CC 6636 - IFM Bid Cost Recovery Tier1 Allocation	1,022	
CAISO	6678	CC 6678 - Real Time Bid Cost Recovery Allocation	2,143	
CAISO	6694	CC 6694 - Regulation Down Obligation Settlement	2,091	
CAISO	6696	CC 6696 - Regulation Down Neutrality Allocation	(240)	
CAISO	6774	CC 6774 - Real Time Congestion Offset	(331)	
CAISO	6806	CC 6806 - Day Ahead RUC Tier 1 Allocation	870	
CAISO	6807	CC 6807 - Day Ahead RUC Tier 2 Allocation	631	
CAISO	6947	CC 6947 - IFM Marginal Losses Surplus Credit Allocation	(9,848)	
CAISO	6977	CC 6977 - Allocation of Transmission Loss Obligation Charge for RT Schedules Under Control Agreement	(1,069)	
CAISO	6985	CC 6985 - Real Time Marginal Losses Offset	(87)	
CAISO	7070	CC 7070 - Flexible Ramp Forecasted Movement Settlement	(311)	
CAISO	7076	CC 7076 - Flexible Ramp Forecast Movement Allocation	20	
CAISO	7077	CC 7077 - Daily Flexible Ramp Up Uncertainty Award Allocation	2,102	
CAISO	7078	CC 7078 - Monthly Flexible Ramp Up Uncertainty Award Allocation	821	
CAISO	7087	CC 7087 - Daily Flexible Ramp Down Uncertainty Award Allocation	130	
CAISO	7088	CC 7088 - Monthly Flexible Ramp Down Uncertainty Award Allocation	(17)	
CAISO	7256	CC 7256 - Regulation Up Mileage Cost Allocation	9	
CAISO	7266	CC 7266 - Regulation Down Mileage Cost Allocation	5	
CAISO	7896	CC 7896 - Monthly CPM Allocation	3,532	
CAISO	7989	CC 7989 - Invoice Deviation Interest Distribution	(2,198)	
CAISO	7999	CC 7999 - Invoice Deviation Interest Allocation	13	
Total			\$ 1,493,353	100%

- Actuals amounts shown are illustrative only
- Takeaway is the number of charge codes and costs and importance of settlement validation to overall operation.



Questions?

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