

Western EIM Regional Issues Forum

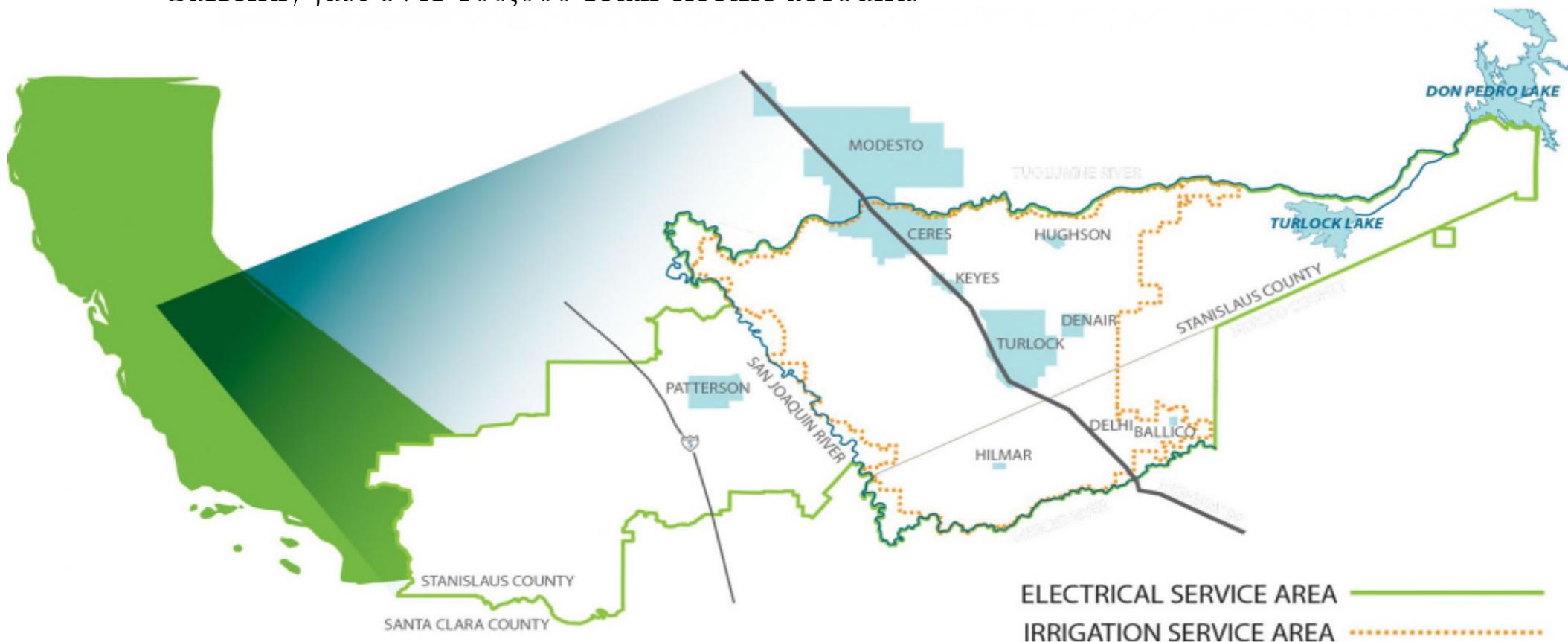
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Dan Severson

Energy Markets Department Manager

About TID

- 1st Irrigation District in California (by 1 Week)
- Established in 1887
- 5 Member locally elected Board of Directors
- Publically Owned, Not for Profit, 453 Employees
- Provides Irrigation Water to over 4,500 growers and 145,000 acres
- Started providing power in 1923
- Currently just over 100,000 retail electric accounts

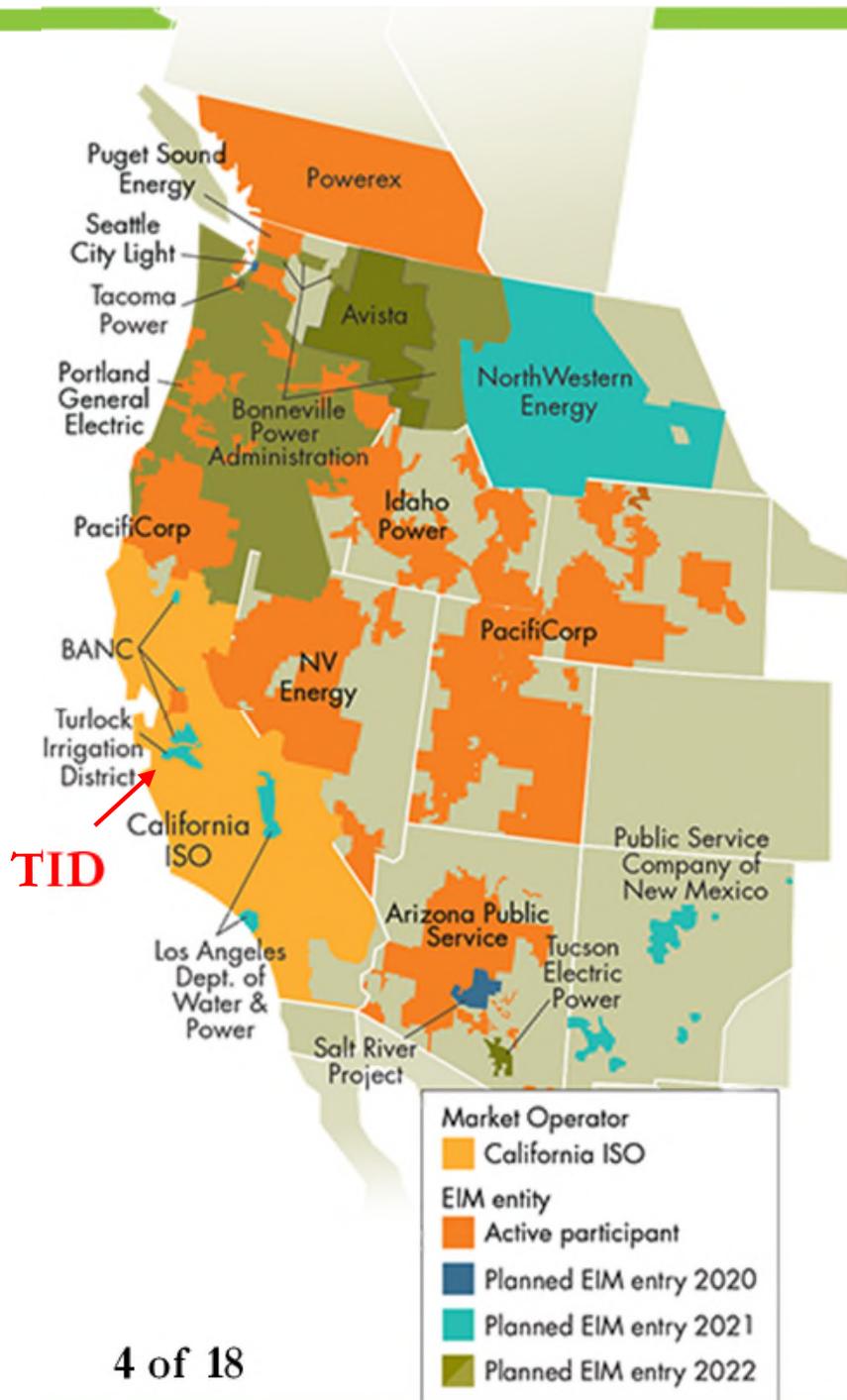


Power Profile

- Independent Balancing Area (2005)
- Diverse portfolio of Natural Gas, Hydro, Solar, Wind, Geothermal, and Biomass
 - 522 MW Thermal (Internal)
 - 203 Large Hydro (Internal)
 - 15 MW Small Hydro (Internal)
 - 137 MW Wind (External)
 - 54 MW Solar (External)
 - 8 MW Geothermal (External)
 - 1.2 MW Biomass (External)
- Peak Load of 600 MW
- 30% RPS Eligible and over 50% Carbon Free



EIM Balancing Areas



- Interconnections with BANC, CAISO
- Roughly 600 MW Transfer Capability to both BA's



EIM Participation Considerations

■ **Loss of Trading Partners**

- ❑ As EIM participation increases, the hour ahead markets are becoming less liquid
- ❑ Less trading partners equates to increased costs
- ❑ In the near future, EIM is looking to expand to a Day Ahead Market, which could further reduce liquidity

■ **Reduction in Purchased Power and Fuel Costs**

- ❑ Provides access to a larger network of energy providers in the CAISO without paying the export fees
- ❑ **Increased Revenue from Sales**
- ❑ **Increased Purchased MWh**

Cost Savings Components

- Components of TID Production Cost Savings
 - ❑ EIM provides access to CAISO market within the hour (Purchases and Sales)
 - ❑ EIM provides access to CAISO without incurring CAISO export fees
 - ❑ EIM eliminates the need to withhold from the market due to forecast uncertainty (transactions are automatic)
 - ❑ TID's thermal fleet can be optimized to take advantage of short term price spikes (A2PP, WEC incremental)

EIM Cost-Benefit Study

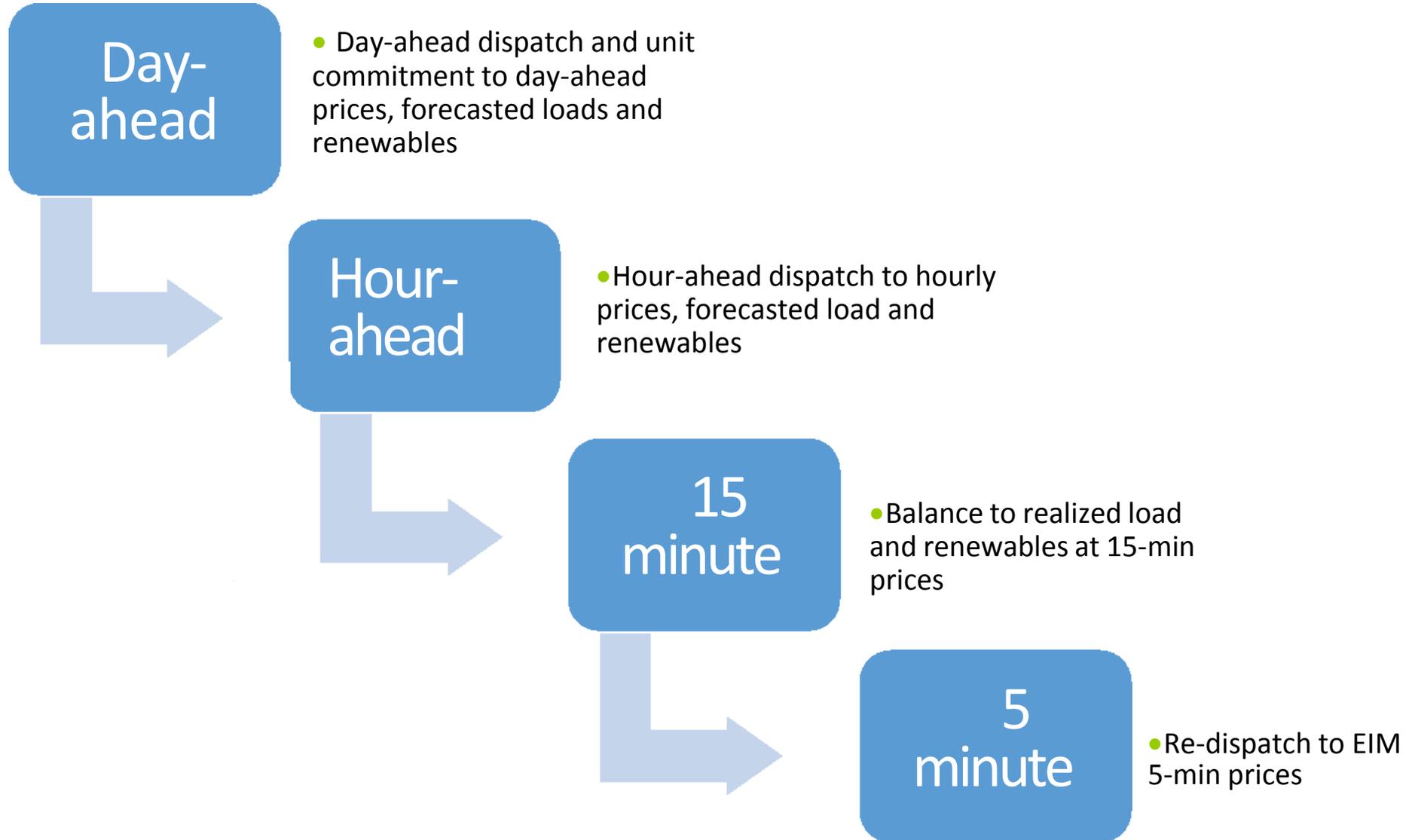
■ 2016 Cost-Benefit Study

- TID hired UtiliCast to do GAP assessment
- Staff conservatively estimated the Production Cost benefits.
- Payback was estimated at 3 years
- TID did not choose to go forward due to uncertainties about how the EIM market would develop

■ 2018 Cost-Benefit Study

- Ascend Analytics performed an in-depth Production Cost Study to determine benefits of joining EIM
- UtiliCast provided an update to GAP analysis

Multi-pass model structure to allow imperfect information and sub-hourly dispatch for different cases



Production Cost Modeling Results

Costs



	Generation (\$MM)	Purchases (\$MM)
Non-EIM 15-Min Only	↓ 1.9	↑ 1.6
Full EIM	↓ 7.1	↑ 7.8

Revenues

Sales (\$MM)
↑ 0.7
↑ 5.1

Total (Costs)

Total (\$MM)
↓ 1.0
↓ 4.4

Quantity



	Generation (GWh)	Purchases (GWh)
Non-EIM 15-Min Only	↓ 73	↑ 69
Full EIM	↓ 217	↑ 255

Quantity

Sales (GWh)
↓ -3
↑ 37

Production Cost Modeling (2017 & 2022)



		Production Costs (\$MM)	
		2017	2022
Non-EIM 15-Min Only	↓ 1.0	↓ 1.8	
Full EIM	↓ 4.4	↓ 7.6	

EIM GAP Analysis Results

- EMS Energy Imbalance Market module
- Hardware
- Software
- Training
 - Power Control Center
 - Trading and Scheduling
 - Settlements
 - IT
 - Management
- Personnel
 - 1 Additional Settlements Analyst

Cost-Benefit Study ~2 Year Payback

Cost Projection in (\$MM)		
	Start-Up Costs	Annual Costs
CAISO Fees	0.09	
Software Hardware	1.47	0.31
Consulting/Legal	1.77	0.02
Internal Labor	2.03	0.15
Contingency	0.20	0.15
Production Cost Savings		(4.40)
15 Minute Benefit Offset		1.00
Total	5.56	(2.77)



Update/Timeline

- March 26, 2019
 - TID Board of Directors approved Resolution No. 2019-12 Authorizing TID Participation in the Western Energy Imbalance Market
- April 2019
 - TID hired Utilicast to lead TID EIM Project Implementation
- May 13th, 2019
 - Signed Implementation Agreement with the CAISO
- May 28th, 2019
 - TID Internal Stakeholder EIM Project Kickoff Meeting
- June 14th, 2019
 - TID/CAISO Kickoff Meeting

Project Schedule



- Replacement of EMS System biggest risk to project timeline
- TID just selected software vendor. Contract process to start next week
- Current recruitment for Settlements Analyst

Links



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