



Transmission Access Charges (TAC)

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Distributed Generation (DG) = Wholesale DG and Retail DG export (often referred to as NEM export)

Project Size

50+ MW

500 kW

5 kW

Central Generation

Serves Remote Loads



Wholesale DG
Serves Local Loads



Retail DG

Serves Onsite Loads



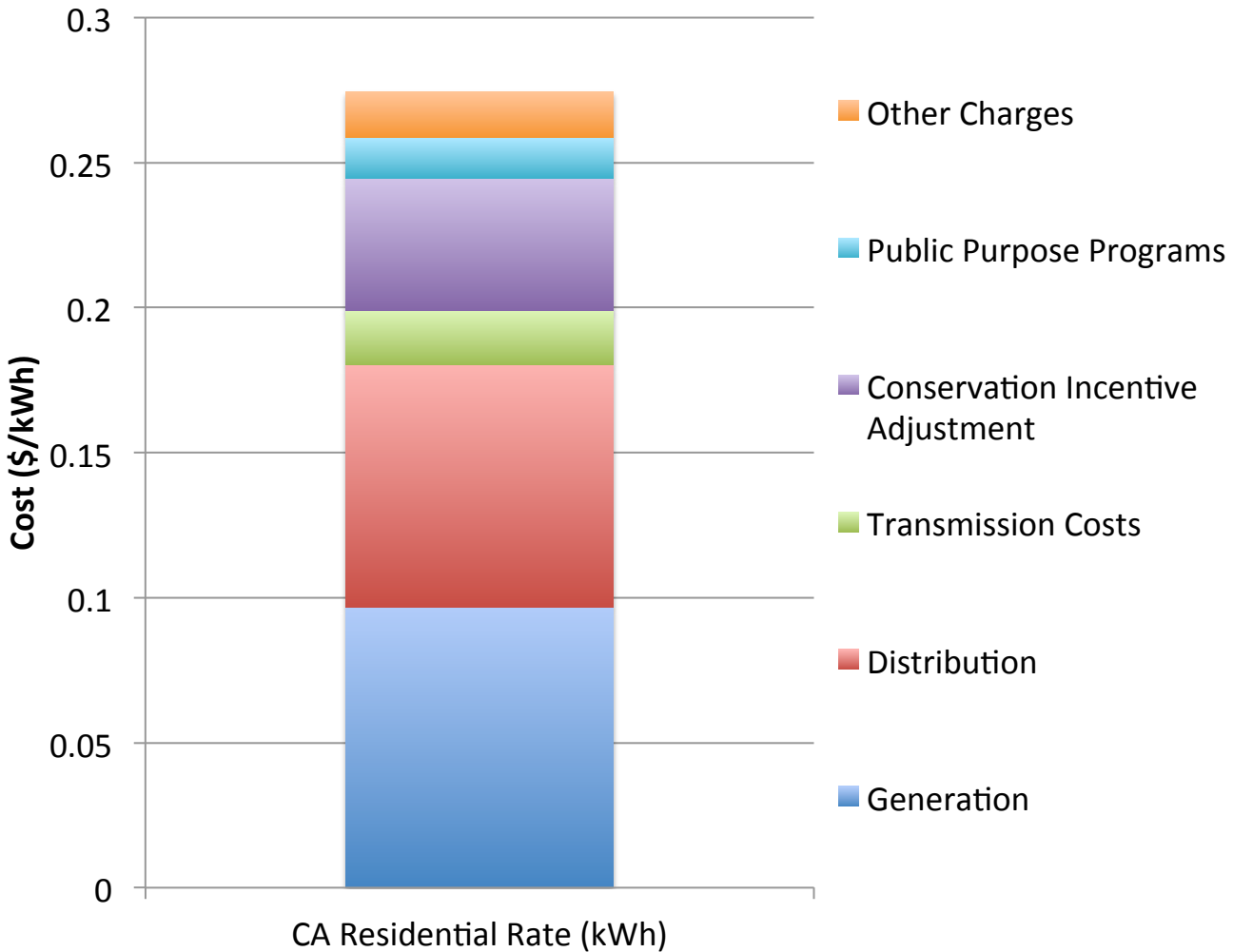
Behind the Meter

Distribution Grid

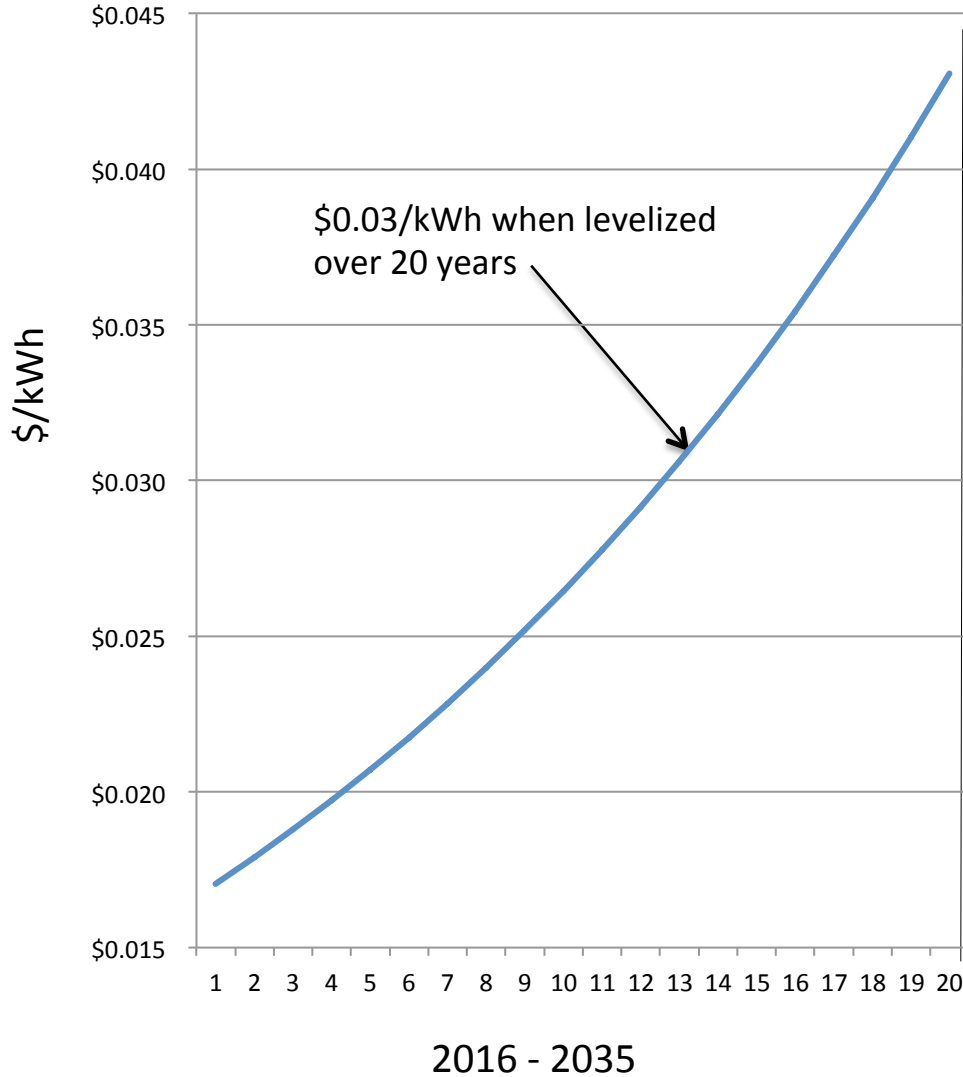
Transmission Grid



PG&E Residential Services Rates (Sept. 2016)



Forecasted PG&E Total TAC Rate



— Business As Usual (BAU)

The 20-year levelized TAC is about 3 cents/kWh, which is roughly 50% of the current wholesale cost of new energy contracts in California!

- Transmission Access Charges (TAC)
 - Per kWh fees for using the CAISO-controlled transmission grid.
 - There are Low Voltage (LV) and High Voltage (HV) TAC.
- Customer Energy Downflow (CED)
 - Energy that flows across customer meters from the distribution grid.
 - Incorrect metering basis for assessing TAC.
- Transmission Energy Downflow (TED)
 - Energy that downflows across defined transmission interfaces points
 - Two existing points: HV-to-LV and LV-to-distribution.
 - Third potential point would result from CAISO expansion: Super HV-to-HV.
 - Correct metering basis for assessing TAC.
- Participating Transmission Owner (PTO)
 - Entity that owns part of the CAISO-controlled Transmission grid.
 - TAC correction is needed in PTO utility service territories (IOUs).
 - Non-PTO utilities (municipal utilities) are already handled correctly for TAC.

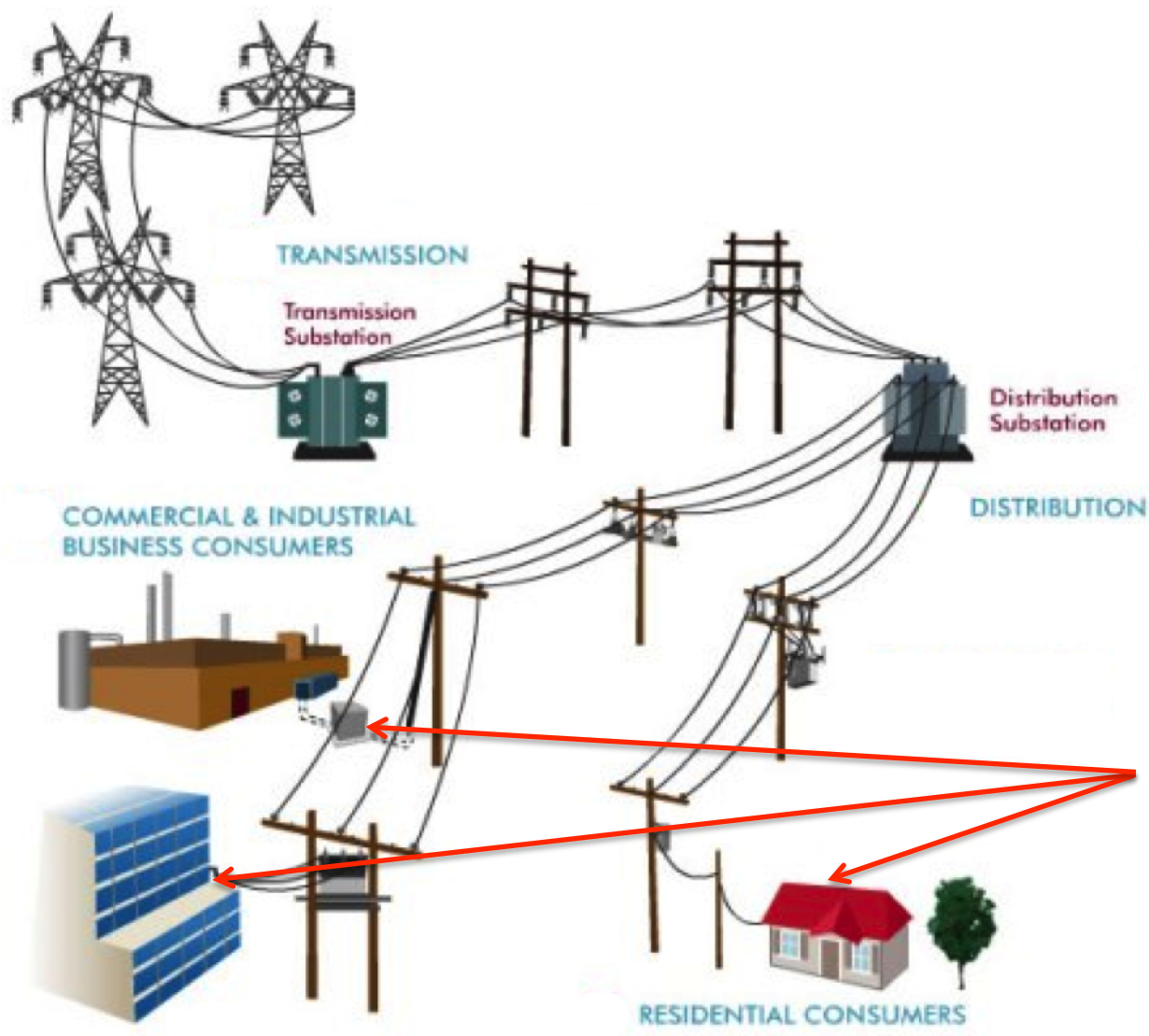
Problem: In PTO utility service territories, distributed generation (DG) energy is subject to Transmission Access Charges (TAC) despite not being delivered through transmission. This distorts the value of DG, disadvantages DG in procurement decisions, shifts costs from transmission-sourced energy to DG, and leads to excess demand for new transmission capacity that lead to billions of dollars in unnecessary investment.

Solution: Align the TAC treatment for PTO utilities with the “Usage Pays” principle utilized in non-PTO utilities TAC system by changing the TAC wholesale billing determinant from Customer Energy Downflow (CED) to Transmission Energy Downflow (TED).

Expected Effect: Correcting the TAC market distortion on local renewables would:

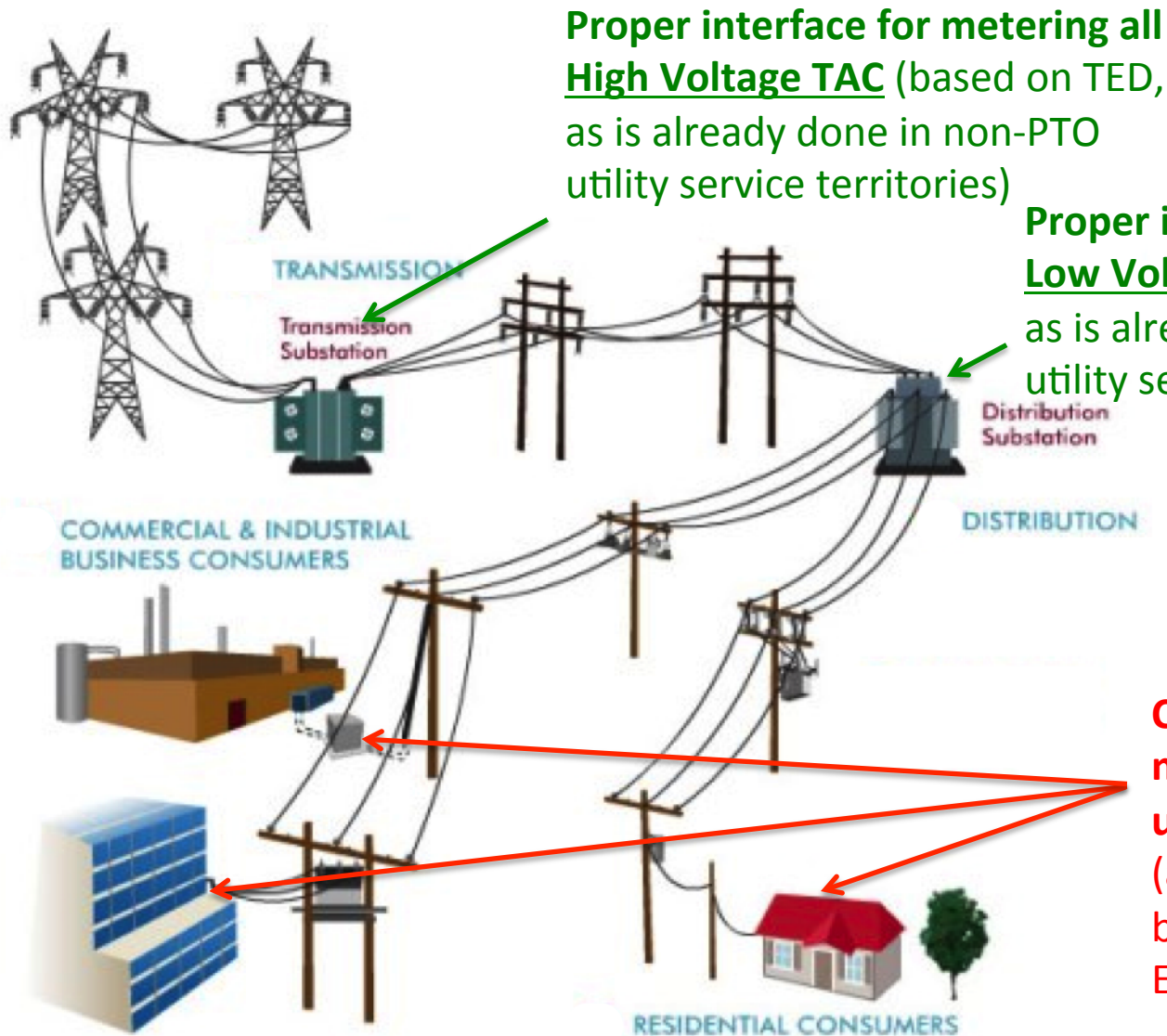
- Provide value to DG through avoided TAC, making them more competitive in procurement decisions
- Increase the deployment of distributed energy resources (DER) and slow the growth of (or even decrease) TAC rates over time
- Save billions of dollars in delayed or avoided transmission investments
- Increase consistency, transparency, fairness, and alignment with FERC Order 1000

TAC metering fix is needed



Current interface for metering TAC in PTO utility service territories (at customer meters based on Customer Energy Downflow)

TAC metering fix is needed



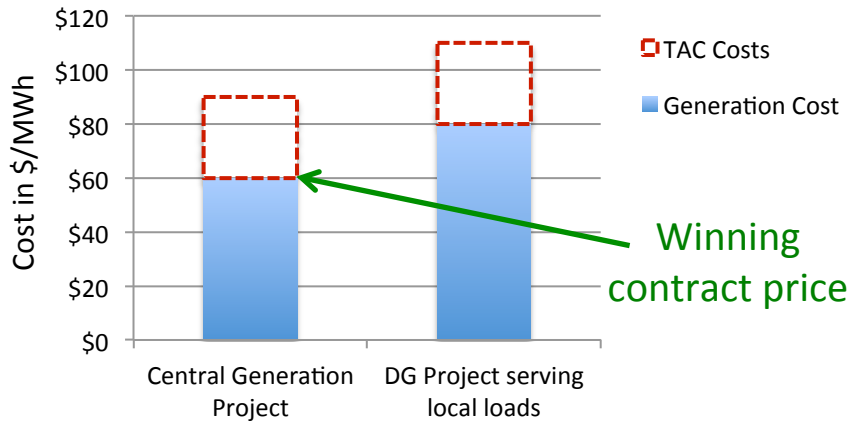
Proper interface for metering all High Voltage TAC (based on TED, as is already done in non-PTO utility service territories)

Proper interface for metering all Low Voltage TAC (based on TED as is already done in non-PTO utility service territories)

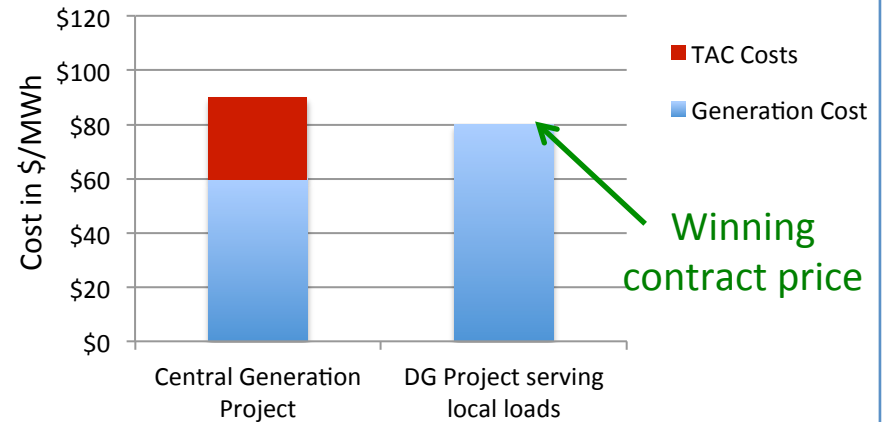
Current interface for metering TAC in PTO utility service territories (at customer meters based on Customer Energy Downflow)

The TAC fix corrects Least Cost Best Fit (LCBF) distortion

LCBF under Distorted TAC Assessment System

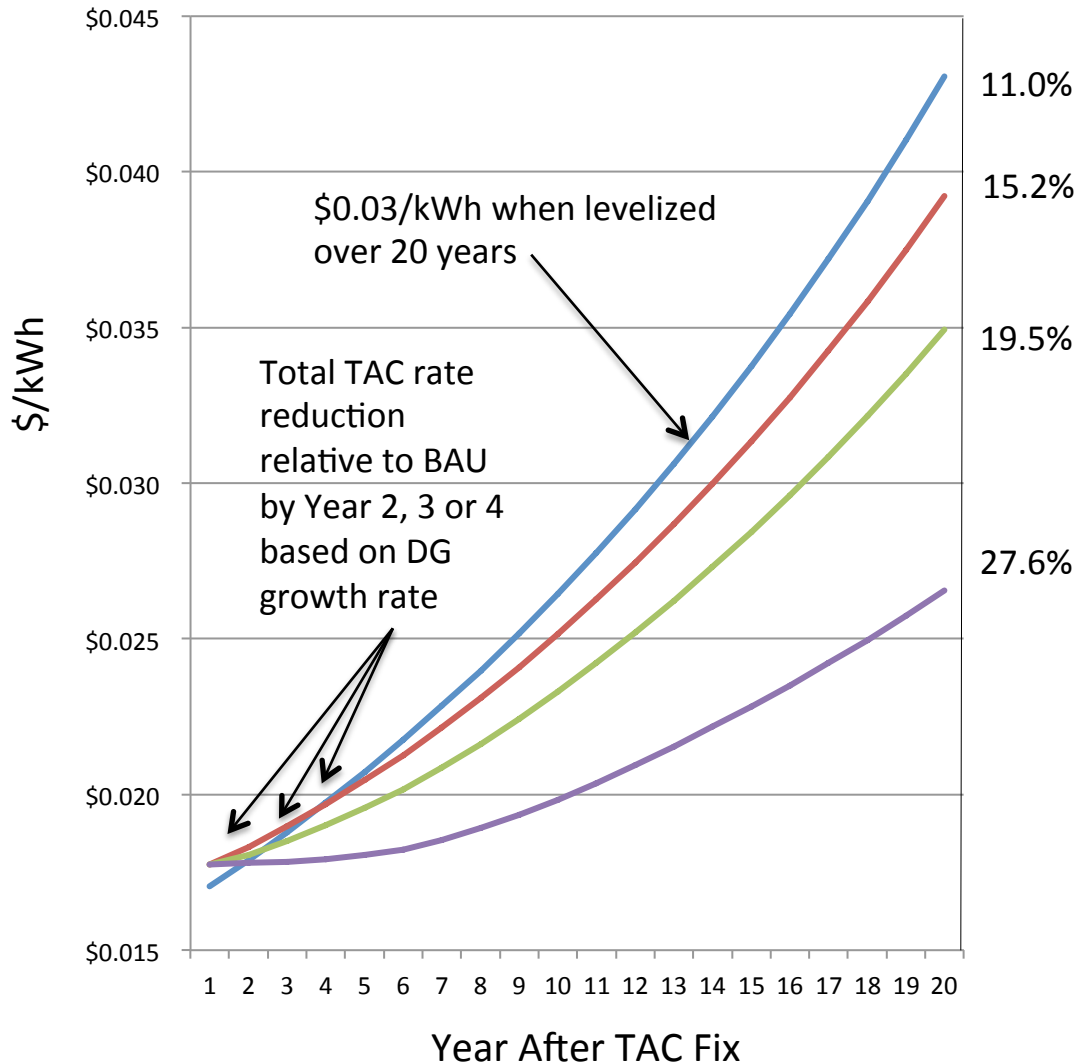


LCBF under Corrected TAC Assessment System



- Current TAC assessment unfairly increases the cost of local distributed generation (DG) even though it almost never uses the transmission system
- Fixing the TAC market distortion makes local generation more competitive
- Over time, more local generation will be built, making transmission upgrades less necessary, and decreasing overall system costs

Forecasted PG&E Total TAC Rate



Notes & Assumptions

- All 3 scenarios assume generation from new DG never exceeds new CED

Year 20 share of total CED served by DG

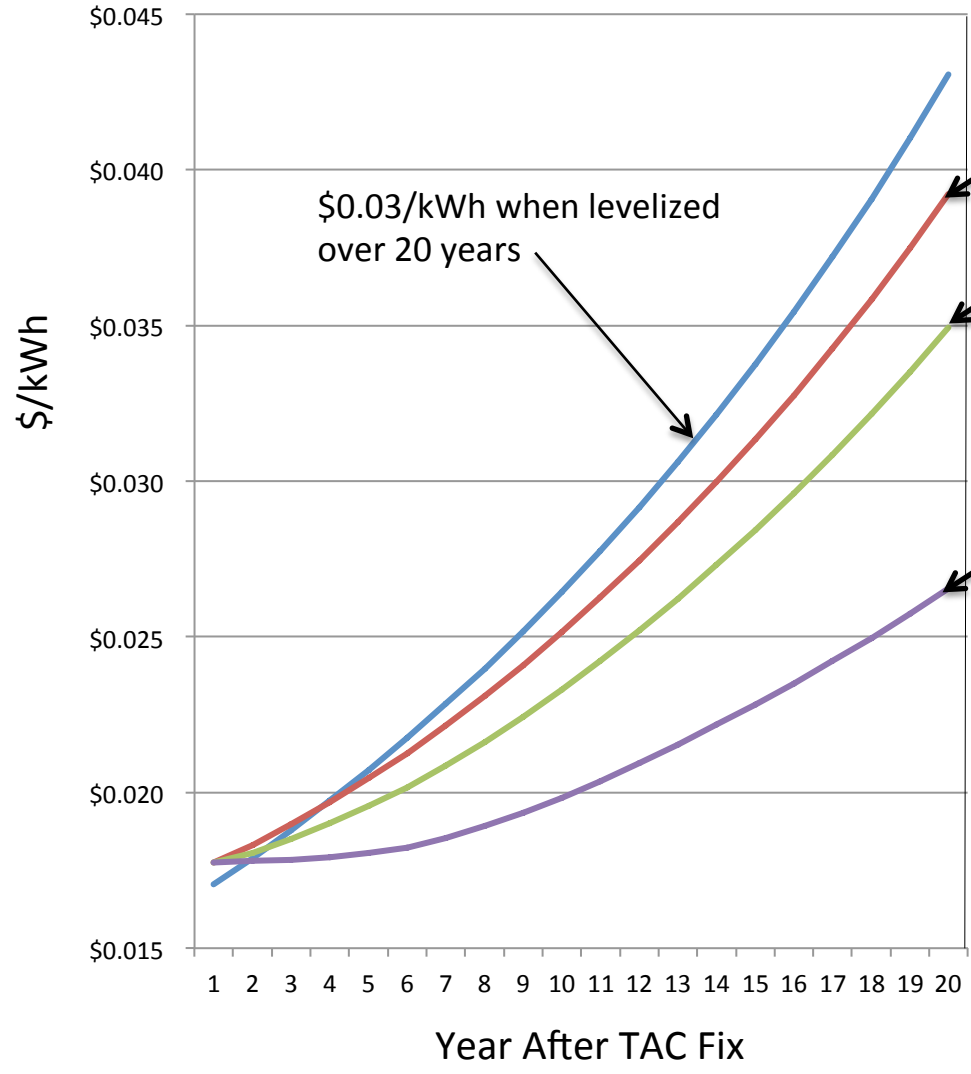
- Business As Usual (BAU)
- Post-TAC fix Scenario 1: Total DG added per year 1.5x of BAU
- Post-TAC fix Scenario 2: Total DG added per year 2x of BAU
- Post-TAC fix Scenario 3: Total DG added per year 3x of BAU

11.0%
15.2%
19.5%
27.6%

\$0.03/kWh when levelized over 20 years

Total TAC rate reduction relative to BAU by Year 2, 3 or 4 based on DG growth rate

Forecasted PG&E Total TAC Rate



\$6.7 billion savings vs. BAU

\$13.5 billion savings vs. BAU

\$26.3 billion savings vs. BAU

Ratepayer avoided TAC costs over 20-year period in the 1.5x, 2x, and 3x BAU DG scenarios

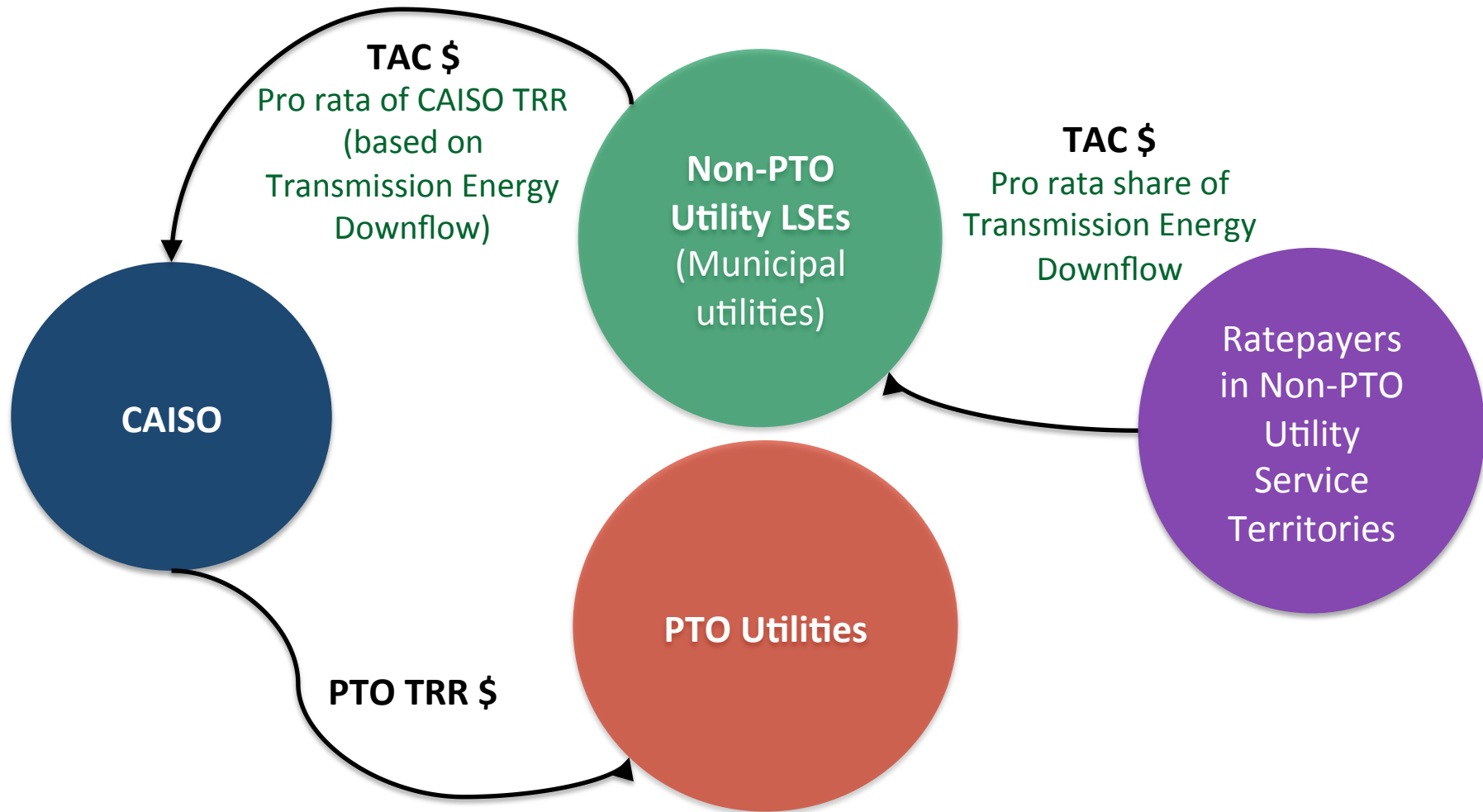
Cost effect example: immediate

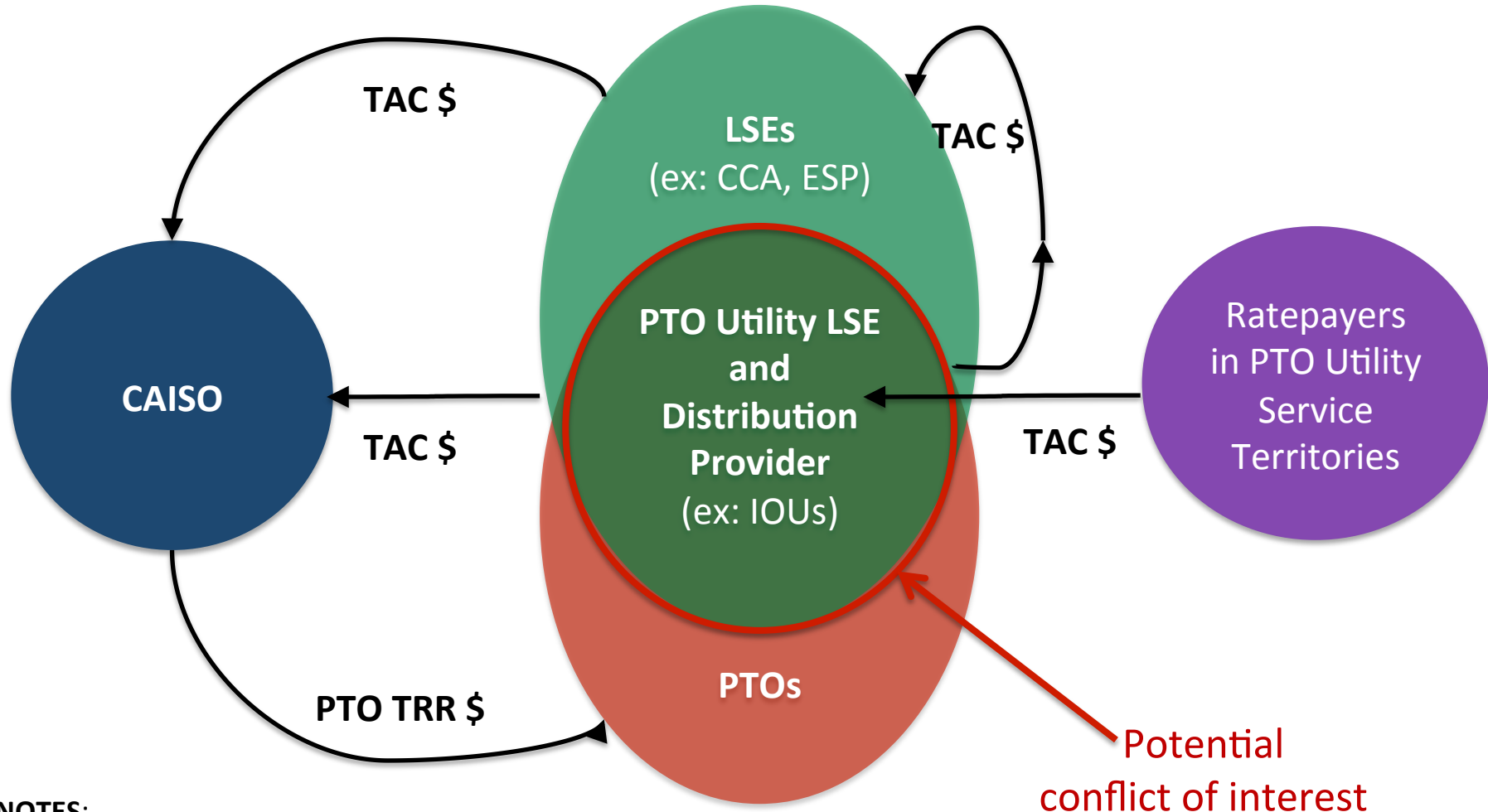
2016 Scenario	IOU	CCA	ESP	Total	Notes
LSE Customer Energy Downflow (CED, in GWh)	70	30	10	110	<i>Current TAC wholesale billing determinant</i>
% of Total CED	64%	27%	9%	100%	<i>Share of total TAC basis (now)</i>
TRR (in thousands)	NA	NA	NA	\$1,650	<i>Total Transmission Revenue Required</i>
TAC Rate per kWh (now)	\$0.0150	\$0.0150	\$0.0150	\$0.0150	<i>TRR/CED</i>
TAC payment (in thousands)	\$1,050	\$450	\$150	\$1,650	<i>TAC Rate x CED</i>
DG (GWh)	1.4	0.6	0	2	<i>2% is the highest percentage of DG in any PTO utility service territory today</i>
Share of total LSE CED served by DG	2%	2%	0%	2%	
TED (GWh)	68.6	29.4	10	108	<i>Proposed TAC basis</i>
% of TED	64%	27%	9%	100%	<i>Share of total TAC basis (proposed)</i>
TRR (in thousands)	NA	NA	NA	\$1,650	<i>Remains unchanged</i>
TED-based TAC Rate (per kWh)	\$0.0153	\$0.0153	\$0.0153	\$0.0153	<i>TRR/TED</i>
TED-based TAC payments (in thousands)	\$1,048 (-\$2)	\$449 (-\$1)	\$153 (+\$3)	\$1,650	<i>New TAC Rate x TED</i>

Cost effect example: long term (2 x BAU DG)

2035 Scenario	IOU	CCA	ESP	Total	Notes
LSE Customer Energy Downflow (CED; in GWh)	70	30	10	110	Current CED and TAC basis
% of Total CED	64%	27%	9%	100%	Share of total TAC basis (now)
TRR (projected 2035, in thousands)	NA	NA	NA	\$5,740	Total Transmission Revenue Requirement
TAC Rate per kWh (projected 2035)	\$0.052	\$0.052	\$0.052	\$0.052	TRR/CED
TAC payment (in thousands)	\$3,653	\$1,565	\$522	\$5,740	TAC Rate x CED
DG (GWh)	8.00	12.00	0.00	20.00	18% energy sourced below T-D interface
Share of total LSE CED served by DG	11%	40%	0%	18%	<i>Increased to 2 x BAU case</i>
TED (GWh)	62.00	18.00	10.00	90.00	Proposed TAC basis
% of TED	68.9%	20.0%	11.1%	100.0%	Share of total TAC basis (proposed)
TRR (in thousands)	NA	NA	NA	\$4,470	<u>Reduced</u> (due to deferred need for new capacity)
TED-based TAC Rate per kWh (projected 2035)	\$0.0497	\$0.0497	\$0.0497	\$0.0497	TRR/TED; TRR is reduced to DG meeting share of load growth
TED-based TAC payments (in thousands) Savings	\$3,079 (-\$573)	\$894 (-\$671)	\$497 (-\$25)	\$4,470	New TAC Rate x TED (and change from business-as-usual)

TAC stakeholder cash flows for ratepayers in non-PTO utility service territories

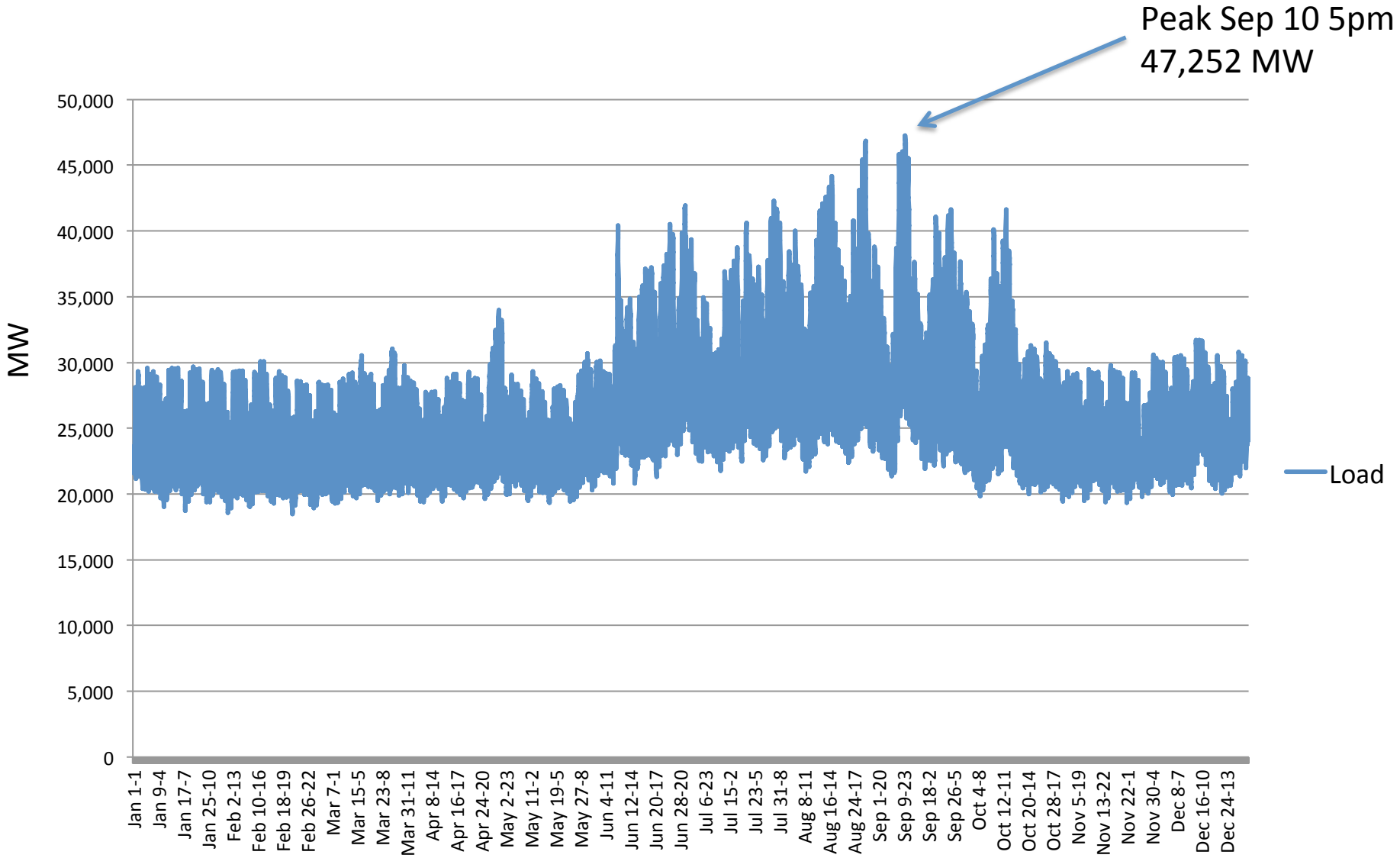




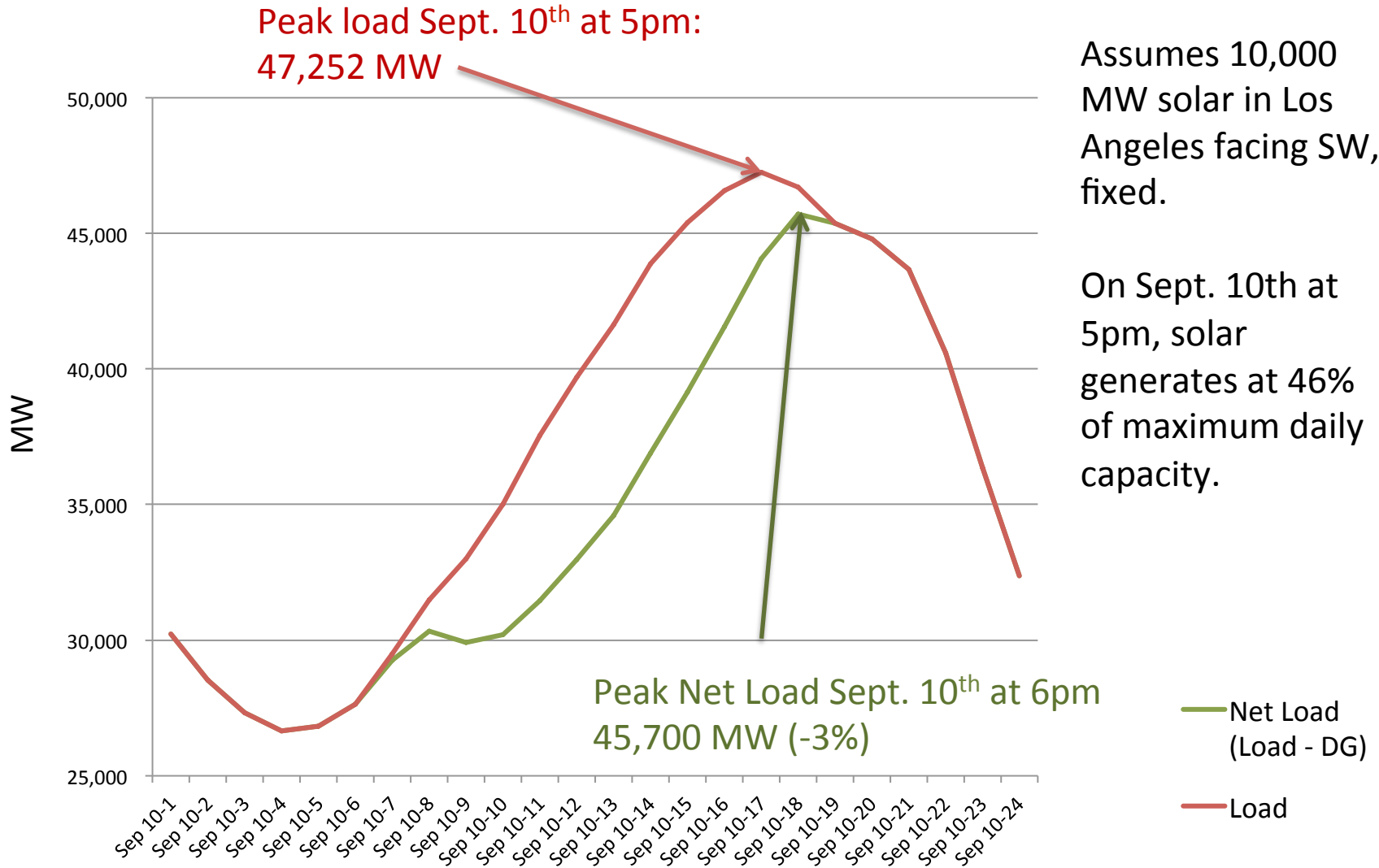
NOTES:

- (i) TAC \$, or TAC payments, are based on pro rata share of Customer Energy Downflow
- (ii) TAC (Rate) is based on $CAISO\ TRR \div Customer\ Energy\ Downflow$

CAISO 2015 load peaked Sep 10, 5pm



Solar does reduce CAISO peak load



The TAC Fix is backed by a broad range of organizations



- Educating CAISO and stakeholders on the issue
- Building a coalition of supporters
- Finding the right forum (delay from CAISO) and getting timely attention for this issue
- Overcoming conflicting interests
- Legislative alternatives

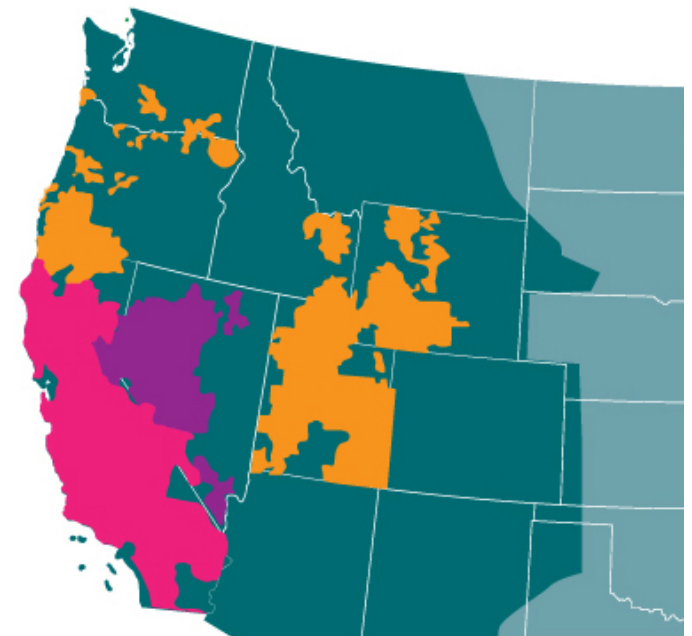


Image source: CAISO

For more information on the TAC Campaign, visit www.clean-coalition.org/tac or email katie@clean-coalition.org

Endorse the TAC Campaign

- Contact Daryl Michalik, Executive Director of the Dynamic Grid Council daryl@dynamicgridcouncil.com



Add your voice directly by filing your own comments to CAISO and key influencers