How fixing distorted transmission cost allocation will unleash Distributed Energy Resources (DER) and save ratepayers billions

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- Questions will be answered during the Q&A portion of the webinar
- Contact Josh for webinar questions: josh@clean-coalition.org
Doug Karpa, J.D. Ph.D.
Policy Director

Dr. Karpa has several years’ experience as both a public interest advocate and in private practice working for renewable energy clients on utility scale solar projects.

Ph.D. Ecology and Evolution, Harvard University
J.D., Berkeley Law School (Boalt), U.C. Berkeley
B.S., Biological Sciences, Stanford University
1. Why you should care about distorted Transmission Access Charges (TAC)
2. What TAC are
3. Which TAC formula is best
4. Why bad rate designs costs ratepayers billions of dollars in unnecessary transmission spending
5. How to fix these problems
6. Next steps in California
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3. Which TAC formula is best
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6. Next steps in California
Transmission costs will explode... unless constrained

THE EXPLOSION IN TRANSMISSION INVESTMENT OVER THE PAST DECADE

Customer load forecast to grow at an accelerated rate in the next decade.¹
How fast transmission costs grow depends on how much load is met with remote transmission-connected resources.

¹California Energy Commission California Energy Demand 2018-2030 Revised Forecast
How much of a difference could *rational* Transmission Access Charges make?

**PG&E Total TAC Rate Forecast**

**TAC savings over 20 years:**

- **Business as Usual (BAU)** (results in 12.4% of load met by local renewables after 20 years)
  - $23.5 billion TAC savings vs BAU (17.3% local renewables)

- Faster growth of distribution-connected and behind the meter resources = **lower transmission costs**

- **$38.5 billion TAC savings vs BAU** (22.2% local renewables)

- **$63.9 billion TAC savings vs BAU** (31.5% local renewables = 68.5% transmission connected resources which continue to support TRR for existing transmission)
2- Combating climate change needs Wholesale Distributed Generation

Poorly designed transmission charge tariffs impede cost effective renewables and **penalize** Load Serving Entities that reduce their impacts on the grid.

**Wholesale Distributed Generation** is a missing piece of the climate change puzzle in California.
Communities need resilience transmission cannot provide

Ventura and Santa Barbara

Thomas Fire 2017

85,000 customers lose power from a “transmission emergency” from “loss of critical infrastructure.” Fires grow because of power failure at water pumps.

In an overly transmission-reliant system, losing a single transmission link can **bring the whole grid down.** In a distributed system, **no single piece can crash the whole grid.**
In 2003, a single offline generator and some overgrown trees in Akron cuts power to **55 million people**.

This does not happen in a distributed architecture.
1. Why you should care about distorted Transmission Access Charges (TAC)

2. **What TAC are**

3. Which TAC formula is best

4. Why bad rate designs costs ratepayers billions of dollars in unnecessary transmission spending

5. How to fix these problems

6. Next steps in California
What are TAC?

TAC pays rent to transmission owners for owning the transmission grid.

HIGH VOLTAGE TRANSMISSION GRID
(Managed by CAISO)

LOW VOLTAGE TRANSMISSION GRIDS
(managed mostly by various utilities)

DISTRIBUTION GRIDS
(managed mostly by utilities)
These charges are typically charged based on energy use. Energy comes to customers from three sources:

- Transmission charges can be charged on three buckets.*
The three energy sources have very different use and impacts on the transmission system:

REMOTE generation ("central" generation)
- Needs hundreds or thousands of miles of the grid to reach customers

Wholesale DISTRIBUTED generation (In Front of the Meter)
- Needs local wires to reach customers

Behind the meter retail DG needs no transmission to reach customers
Transmission charges on each bucket should reflect these differences.

No transmission charges

Transmission charges in some places, but not others

Transmission charges

Transmission charges are charged inconsistently across California
Two key measures of transmission use

**Transmission Energy Downflow**
Only energy from remote generation* crosses the Transmission-Distribution Substation.

**Customer Energy Downflow**
Energy crossing the customer meter is a **mix of remote and distributed generation**.
California uses **two different formulas** to charge customers rents:

Your bill depends on ...

**whether your utility owns the transmission grid.**

**Formula 1: Bill for transmission use:**
- Non-participating muni utilities*
  - measure transmission use at end of transmission grid
  - based on transmission energy downflow.

**Formula 2: Bill for all energy:**
- Transmission-owning utilities
  - Measure transmission use down at the customer meter.
  - Based on all energy: a mix of transmission use and local energy
1. Why you should care about distorted Transmission Access Charges (TAC)
2. What TAC are

3. **Which TAC formula is best**

4. Why bad rate designs costs ratepayers billions of dollars in unnecessary transmission spending

5. How to fix these problems

6. Next steps in California
The $63,900,000,000 question*

So, which Formula is better?

*This is how much it costs ratepayers… if we choose the wrong formula
Rate designs must meet federal standards established by the Federal Energy Regulatory Commission.
FERC ORDER No. 1000/ CAISO standards

1. Historical cost drivers
2. Current beneficiaries and benefits
   - FERC “affirmatively require[es] costs of transmission facilities to be allocated to beneficiaries…”
3. Economic distortions:
   - “Transmission pricing should promote good decision-making and foster efficient expansion of transmission capacity…” - CAISO
Factor 1: Historical cost drivers

• Does DG displace transmission?
• Which System reflects those savings?
What drives transmission spending?

CAISO’s Four Drivers of Transmission investment

1. Peak load
2. Policy
3. Economic resource access
4. Reliability

Local energy reduces transmission needs for each driver of transmission spending.
Making Clean Local Energy Accessible Now

Four Drivers of Transmission investment—1. Peak Load

Some transmission spending is to meet peak transmission load.

CAISO 2015 Load Conditions

Peak Sept. 10 at 5pm: 47,252 MW
Four Drivers of Transmission investment— 1. Peak Load

What happens if you move generation to the distribution grid?

Peak load Sept. 10\textsuperscript{th} at 5pm: 47,252 MW
Four Drivers of Transmission investment— 1. Peak Load

PV DG Production reduces **peak TRANSMISSION load**

Assumes 10,000 MW solar with a fixed SW-facing Los Angeles profile.

On Sept. 10th at 5pm, solar generates at 46% of maximum daily capacity.

Solar+storage would improve this peak mitigation.

Peak Net transmission Load Sept. 10th at 5pm:
Without DG: 47,252 MW

Peak Net transmission Load Sept. 10th at 6pm
With DG: 45,700 MW (-3%)
Four Drivers of Transmission investment— 1. Peak Load

Sept 1, 2017, CAISO near record peak
Total demand (net DER) and contribution of Transmission level Solar & Wind

In the real world, DG cut peak TRANSMISSION demand by 6%
Some transmission spending has been to meet renewable goals

- Aggregated wholesale distributed generation can be Renewable Portfolio Standard (RPS)-eligible resources.
- Policy goals are likely to make up a substantial portion of new transmission investment.
  - Renewable Energy Transmission Initiative (RETI) 2.0 report estimates at least $5 billion in new transmission build will be required to meet the 50% RPS by 2030
  - Operations and maintenance costs increase that cost by 5x $25b over 50 years
  - Plus financing costs (return on equity)
Four Drivers of Transmission investment — 3. Economics

Some transmission spending is to reach cheaper resources

DG is often the more economic resource.....

<table>
<thead>
<tr>
<th>Year</th>
<th>ReMAT Average Contract Price</th>
<th>RPS Average Contract Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>$0.078</td>
<td>$0.074</td>
</tr>
<tr>
<td>2015</td>
<td>$0.073</td>
<td>$0.069</td>
</tr>
<tr>
<td>2016</td>
<td>$0.070</td>
<td>$0.062</td>
</tr>
</tbody>
</table>

Data sources: 2014-16 RPS via CPUC; 2014-16 Renewable Market Adjusting Tariff (ReMAT) via PG&E, SCE ReMAT web sites. NOTE: 2017 SCE ReMAT contracted price was 4.5c/kWh as of May. The most recent offer price was 4.1c/kWh.
Four Drivers of Transmission investment—3. Economics

.... once the costs of delivery are included


NOTE: 2017 SCE ReMAT contracted price was 4.5c/kWh as of May. The most recent offer price was 4.1c/kWh.
1. Transmission isn’t accessing cheap resources if procurement models misidentify the cheapest resource.

2. DG reduces peak transmission load locally
   - DG frees up transmission capacity, creating opportunities for more cost-effective delivery of remote energy.
   - DG can reduce congestion and line losses costs.
Four Drivers of Transmission investment—4. Reliability

Some transmission spending is to meet reliability needs. Ventura and Santa Barbara Thomas Fire 2017

85,000 customers lose power from a “transmission emergency” from “loss of critical infrastructure.”

Fires grow because of power failure at water pumps.
### Four Drivers of Transmission — 4. Reliability

<table>
<thead>
<tr>
<th>Solar + Storage Alternative</th>
<th>Moorpark-Pardee Transmission line</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nameplate (MW)</strong> (solar)</td>
<td>240</td>
</tr>
<tr>
<td><strong>Additional storage (MWH)</strong></td>
<td>825</td>
</tr>
<tr>
<td><strong>2019 Installed Cost</strong></td>
<td>$487,359,169</td>
</tr>
<tr>
<td><strong>30-year O&amp;M, RoE, and Depreciation Costs</strong></td>
<td>$360,000,000</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td>$847,359,169</td>
</tr>
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</table>

This is **NOT** the right comparison!

This is **ALSO NOT** the right comparison!
## Four Drivers of Transmission — 4. Reliability

### DER reduces reliability costs by 80%

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</tr>
<tr>
<td>30-year O&amp;M, return, and depreciation Costs</td>
<td>$360,000,000</td>
<td>$175,950,000</td>
</tr>
<tr>
<td>Total Cost</td>
<td>$847,359,169</td>
<td>$220,950,000</td>
</tr>
<tr>
<td>Energy Cost (per MWH)</td>
<td>$70</td>
<td></td>
</tr>
<tr>
<td>MWH/ year</td>
<td>384,000</td>
<td></td>
</tr>
<tr>
<td>30 year energy (MWH)</td>
<td>11,520,000</td>
<td></td>
</tr>
<tr>
<td>Total Energy Value</td>
<td>$806,400,000.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>Total Ratepayer Cost</td>
<td>$40,959,169.08</td>
<td>$220,950,000.00</td>
</tr>
</tbody>
</table>
Making Clean Local Energy Accessible Now

Four Drivers of Transmission investment — 4. Reliability

Cui bono?
Factor 1: Historical cost drivers

Does DG displace transmission? YES

• Which formula reflects how DG shapes transmission investment decisions?
Which formula better reflects the actual historical cost drivers?

<table>
<thead>
<tr>
<th></th>
<th>Transmission-reliant Load Serving Entity</th>
<th>Local Energy-reliant Load Serving Entity</th>
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<tbody>
<tr>
<td>Customer load</td>
<td>50 GWh</td>
<td>50GWh</td>
</tr>
<tr>
<td>Load growth</td>
<td>+10 GWh</td>
<td>+10 GWh</td>
</tr>
<tr>
<td>Local DG deployment</td>
<td>0</td>
<td>20 GWh</td>
</tr>
<tr>
<td>Load “growth”</td>
<td>+10 GWh</td>
<td>-10 GWh</td>
</tr>
<tr>
<td><strong>Transmission Load</strong></td>
<td><strong>60 GWh</strong></td>
<td><strong>40 GWh</strong></td>
</tr>
<tr>
<td>Total Transmission load (TED)</td>
<td></td>
<td>100 GWh</td>
</tr>
<tr>
<td>Net Transmission growth</td>
<td></td>
<td>0 GWh</td>
</tr>
<tr>
<td>Total Customer Energy Downflow</td>
<td></td>
<td>120 GWh</td>
</tr>
<tr>
<td>Transmission Planning contribution</td>
<td>60%</td>
<td>40%</td>
</tr>
</tbody>
</table>

### 1: Historical embedded cost drivers

#### Which system better reflects the actual historical cost drivers?

<table>
<thead>
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<th>Transmission-Reliant LSE</th>
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<td>Customer load</td>
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<td></td>
<td>120 GWh</td>
</tr>
<tr>
<td>Transmission Planning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>contribution</td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Formula 1 – Transmission</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy Downflow billing</td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Formula 2 – All Customer</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy Billing</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td><strong>Net mitigation penalty/ subsidy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>17% subsidy</strong></td>
<td><strong>25% penalty</strong></td>
</tr>
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</table>
The $63,900,000,000 question

So, which system is better?

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<thead>
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<td>Aligned with Cost Drivers?</td>
<td></td>
<td></td>
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<td>Beneficiaries?</td>
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<tr>
<td>Economic market distortions?</td>
<td></td>
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</table>
Without allocating costs to those who are actually using the transmission grid, “cost allocation methods ... may fail to account for the benefits associated with new transmission facilities and, thus, result in rates that are not just and reasonable or are unduly discriminatory or preferential.”

-FERC Order No. 1000
A few years later, both LSEs have seen growth of 10GWH; One LSE mitigates that growth, the other does not.

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<th>Transmission-Reliant LSE</th>
<th>Local Energy-Reliant LSE</th>
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<tr>
<td>Customer load, a year later</td>
<td>70 GWh</td>
<td>70 GWh</td>
</tr>
<tr>
<td>Load DG energy</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>Transmission sourced energy</td>
<td>70 GWh</td>
<td>40 GWh</td>
</tr>
<tr>
<td><strong>Transmission Load</strong></td>
<td>70 GWh</td>
<td>40 GWh</td>
</tr>
<tr>
<td>Total Transmission Load</td>
<td>110 GWh</td>
<td></td>
</tr>
<tr>
<td>Net Transmission growth</td>
<td>10 GWh</td>
<td></td>
</tr>
<tr>
<td>Total Customer Load</td>
<td>140 GWh</td>
<td></td>
</tr>
<tr>
<td>Relative transmission use</td>
<td>64%</td>
<td>36%</td>
</tr>
<tr>
<td>Formula 1: Transmission use billing</td>
<td>64%</td>
<td>36%</td>
</tr>
<tr>
<td>Formula 2: All Energy Billing</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td><strong>Net mitigation penalty/ subsidy</strong></td>
<td><strong>22% subsidy</strong></td>
<td><strong>38% penalty</strong></td>
</tr>
</tbody>
</table>

2: Current beneficiaries
The energy system provides other services

- These services are not transmission-specific services.
- Unjust and reasonable to charge LSE customers the same charge if they are not getting these services from transmission to the same degree.
The $63,900,000,000 question

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Formula 1: Transmission energy downflow billing

Formula 2: Customer Energy Downflow billing
DG is often the more economic resource…..


NOTE: 2017 SCE ReMAT contracted price was 4.5c/kWh as of May. The most recent offer price was 4.1c/kWh.
Making Clean Local Energy Accessible Now

3: Market distortions & perverse incentives

…. once the costs of delivery are included


NOTE: 2017 SCE ReMAT contracted price was 4.5c/kWh as of May. The most recent offer price was 4.1c/kWh.
3: Market distortions & perverse incentives

- Transmission Energy Downflow (TED)-based TAC will allow the costs of the transmission delivery system to be incorporated into procurement decisions.
- Where local energy is cheaper, including delivery, these will be procured
- Where transmission-sourced energy is cheaper, including delivery these will be procured
• Procurement costs include both costs of generation and delivery.
• Existing LCBF methodologies can incorporate this cost information without additional regulatory changes.
3: Market distortions & perverse incentives

Hypothetical 50 MW procurement

- System 2: CED-based TAC, delivery costs ignored

Capacity available at price points - No delivery costs

50 MW capacity procured:

- 47 MW central Generation, 3 MW Distributed
- @7 cents per kWh or lower (+2 cents/ kWh TAC)
Hypothetical 50 MW procurement

- System 1: TED-based TAC, delivery costs included
- Same bids +2 cents/kWh charge for transmission sourced offers

50 MW capacity procured:
42.5 MW central Generation, 7 MW Distributed @9 cents per kWh or lower (+no additional TAC added)
3: Market distortions & perverse incentives

Which formula delivers the lowest overall costs?

<table>
<thead>
<tr>
<th>Formula</th>
<th>Transmission – sourced</th>
<th>Distribution grid- sourced</th>
<th>Average price per kWh including TAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formula 1: TED-Based TAC</td>
<td>42.5 MW</td>
<td>7.5 MW</td>
<td>$0.0781</td>
</tr>
<tr>
<td>Formula 2: All-energy TAC</td>
<td>47 MW</td>
<td>3 MW</td>
<td>$0.08125</td>
</tr>
</tbody>
</table>

**TED-Based TAC**

- Results in more DG winning procurement contracts
- Results in lower overall costs to ratepayers
- How much more DG results depends on the overall distribution of bids.
### The $63,900,000,000 question

<table>
<thead>
<tr>
<th></th>
<th>System 1: Transmission use billing</th>
<th>System 2: All energy billing</th>
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<td></td>
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**Formula 1: TED – based TAC wins on all three factors**
So what?
Agenda

1. Why you should care about distorted Transmission Access Charges (TAC)
2. What TAC are
3. Which TAC formula is best

4. Why bad rate designs costs ratepayers billions of dollars in unnecessary transmission spending

5. How to fix these problems
6. Next steps in California
Transmission costs will explode... unless constrained

**THE EXPLOSION IN TRANSMISSION INVESTMENT OVER THE PAST DECADE**

Investment In Transmission Infrastructure by Major Utilities (1996-2016)

- UNDERGROUND LINES AND DEVICES
- OVERHEAD CONDUCTORS AND DEVICES
- POLES AND FIXTURES
- TOWERS AND FIXTURES
- STATION EQUIPMENT
- RTO INFRASTRUCTURE
- STATION EQUIPMENT

Source: SunRun, data from the U.S. EIA
Impacts of TED-based TAC on TAC growth rate

Forested PG&E Total TAC Rate

Business As Usual (BAU)

$0.03/kWh when levelized over 20 years

BAU
(Current baseline trends would result in 12.4% of load met by local renewables after 20 years)

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.

CAISO projects a 5% real growth rate in TAC
Historically, TAC rates have grown between 9% and 11%
DER reduces existing and future transmission costs

DER deployment can reduce the need for future transmission grid investment.

- Growth of local solar puts plans for $115 million transmission project on hold, 12/2016, Fresno Bee:
- $192 million in PG&E transmission projects cancelled due to energy efficiency and local solar, 5/2016, Greentech Media:
- Efficiency, DERs saving $2.6B in avoided transmission costs, CAISO says, 3/2018, Utility Dive
How much transmission spending could accelerated DG growth avoid?

**Forecasted PG&E Total TAC Rate**

<table>
<thead>
<tr>
<th>Year after TAC Fix implementation</th>
<th>TAC rate ($/kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.015</td>
</tr>
<tr>
<td>2</td>
<td>0.020</td>
</tr>
<tr>
<td>3</td>
<td>0.025</td>
</tr>
<tr>
<td>4</td>
<td>0.030</td>
</tr>
<tr>
<td>5</td>
<td>0.035</td>
</tr>
<tr>
<td>6</td>
<td>0.040</td>
</tr>
<tr>
<td>7</td>
<td>0.045</td>
</tr>
<tr>
<td>8</td>
<td>0.050</td>
</tr>
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</table>

**TAC savings over 20 years:**

- **BAU** (results in 12.4% of load met by local renewables after 20 years)
  - $0.03/kWh when levelized over 20 years
  - $23.5 billion TAC savings vs BAU (17.3% local renewables)
  - $38.5 billion TAC savings vs BAU (22.2% local renewables)

- **63.9 billion TAC savings vs BAU** (31.5% local renewables = 68.5% transmission connected resources which continue to support TRR for existing transmission)
Hunters Point Economic Benefits from 50 MW DER

$200M in private investment + Operations & Maintenance over 20 years
local economic benefits:

Economic Benefits

$200M: Added regional economic stimulation
$100M: Added local wages, near-term plus annual
1,270 Job-Years: New near-term regional employment
520 Job-Years: New ongoing regional employment
$10M: Site leasing income for property owners
$5.8M: Added construction-related state sales taxes

Source: NREL JEDI calculator. Based on average installed cost of $2.75/W(dc) before taxes & incentives using PG&E rates/region.
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## Answering the $63,900,000,000 question

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<tr>
<th>FERC FACTOR</th>
<th>System 1: Transmission use billing</th>
<th>System 2: All energy billing</th>
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<td><strong>Aligned with Cost Drivers?</strong></td>
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</tr>
</tbody>
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Use the winning Formula 1: TED – based TAC
The Clean Coalition Proposal, part 1:

Step 1: Use Formula 1: TED-Based TAC:

Recover the costs of the high voltage (HV) transmission grid with

- a fee

- on energy crossing the transmission grid.

HV Transmission Revenue Requirement:

money to be recovered to pay for the transmission grid

T-D TED: the energy flowing across the transmission grid

<table>
<thead>
<tr>
<th>HV Transmission Revenue Requirement</th>
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<tbody>
<tr>
<td>HV TAC Rate</td>
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<tr>
<td>(costs associated with facilities operating &gt;200kV)</td>
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<tr>
<td>T-D TED</td>
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The Clean Coalition Proposal

• This proposal involves:
  • No change in the TRR reporting process
  • No change in TRR
  • No change in operations
  • No change in TAC formula*

• Only a change in where energy is measured

*Additional features such as demand charges can be added, provided they are based on TED.
Answering the $63,900,000,000 question

Use the winning Formula 1: TED – based TAC

- Formula 1 TED-based TAC wins based on Rate Design considerations alone, regardless of impacts on procurement.
- Formula 1 TED-based TAC also wins if the change can shape procurement.
Realizing the $64 billion savings requires price signals to reach procurement departments.

Non-PTO Municipal Utilities already TED.

Investor Owned Utilities’ Least-Cost-Best-Fit automatically incorporates price signals if TAC formula changes

Community Choice Aggregators see no price signal of any kind.

This is a problem
Understanding TAC Billing

Step 1: Load Serving Entities procure energy for their customers

Wholesale Distributed Generation
Remote Generation
Understanding TAC Billing

Step 2: CAISO and investor-owned utilities (IOU) bill ONLY IOUs and Municipals for TAC CCAs never see any bills for TAC.
Understanding TAC Billing

**Problem:**

1. CCAs never see the bill for transmission, so they can procure remote resources without regard to the transmission costs.
2. This drives up transmission costs for ALL ratepayers.
3. Without a price signal, CCAs create demand for transmission that is paid for by someone else.

This is a market distortion inherent in California’s TAC rate design.
Agenda

1. Why you should care about distorted Transmission Access Charges (TAC)
2. What TAC are
3. Which TAC formula is best
4. Why bad rate designs costs ratepayers billions of dollars in unnecessary transmission spending
5. How to fix these problems

6. Next steps in California
Two potential Solutions (from many)
Solution 1: bill CCAs for their share of TAC

Wholesale Distributed Generation

Remote Generation
Two potential Solutions (from many)

Solution 2: IOUs credit CCAs for their WDG procurement

Wholesale Distributed Generation

Remote Generation
Clean Coalition proposal for next steps

**Clean Coalition proposal for SB 692 (Allen)“bill concept”**

1. California recognizes that DER play a key role in cost-effectively meeting climate goals and restraining the growth of transmission costs.
2. California policy to have procurement include the costs of delivery.
3. A joint CPUC/CAISO/IOU/CCA stakeholder process to develop a consensus solution.
4. If that fails, implement TED-based TAC and LSE TAC billing.

*Not final, not yet formally analyzed or approved!*

Me, out on a limb.
What you can do

1. Give us better ideas!
2. Support SB 692 (Allen) as it moves forward.
3. Talk to your IOU, CCA, CAISO, and CPUC to spur a solution!
The TAC Fix is backed by a broad range of organizations.
Questions?

Additional Information:
visit www.clean-coalition.org/tac
or email doug@clean-coalition.org
DER provide essential reliability services.

• Energy storage can provide frequency and voltage stability services under varying real load conditions.¹,²
  • Solar+Storage can provide real power
  • Automated DR can manage load profiles
  • Advanced inverters can provide reactive power for voltage support if needed.
  • DERs also provide resiliency by adding diversity to the generation portfolio.