Creating an ideal Community Solar program in California:

Effective pricing and value stacking for infill projects

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Current Clean Coalition position

- We support the CCSA's Net Value Billing Tariff (NVBT) as the most thought out and reasonable proposal for the structure of the next Community Solar program. **Additional information is necessary to complete the record.**
- We believe that modifications are necessary to ensure that the pricing and value stacking opportunities make all types of in-fill project feasible.
    - Note that ground mount projects are the cheapest, but built environment solar costs include carport, parking structure, and rooftop solar.
    - Adding requirements for paired storage is understandable, but it also brings up costs so the pricing must reflect additional costs.

Brattle Group: ***Due to their operating profile and location, rooftop CSS projects provide incremental value relative to more remote, ground-mounted projects in certain value streams***

–**Rooftop CSS projects** provide greater energy, capacity, and distribution value on a levelized basis

In summary, we find that rooftop CSS in urban/suburban areas could provide total incremental value ranging from **4.39 ¢/kWh (Low Case) to 9.05 ¢/kWh (High Case)** relative to remote, ground-mounted CSS

In addition to providing a higher dollar value, urban/suburban rooftop CSS projects are more likely to realize additional value streams including better land use, workforce and societal value, as well as quicker benefits due to faster project timelines.

Benefits of Local Solar and Solar+Storage

20-Year Benefits of Deploying Local Solar and Solar+Storage

10 MW solar

- **$10.9M** total economic stimulation
- **$8.6M** added wages
- **92** construction job-years
- **33.6** operations & maintenance job-years
- **$2M** site leasing income

20 MWh energy storage

- **$6.3M** total economic stimulation
- **$5.5M** added wages
- **64** construction job-years
- **17.6** operations & maintenance job-years

10 MW solar + 20 MWh energy storage

- **$17.3M** total economic stimulation
- **$14M** added wages
- **155** construction job-years
- **51** operations & maintenance job-years
- **$2M** site leasing income

- ❑ Unparalleled economic and environmental benefits.
- ❑ Added benefit of setting the stage for resilience, via a Community Microgrid.
- ❑ Land use benefits (saving California's pristine lands).
- ❑ Opportunity to use brownfield sites.
- ❑ Reliability benefits, including dispatchability (when paired with storage).
- ❑ Avoiding Transmission Access Charges (TAC)
- ❑ Avoiding the Power Charge Indifference Adjustment (PCIA)
- ❑ Quick project timelines.

Defining Local Solar

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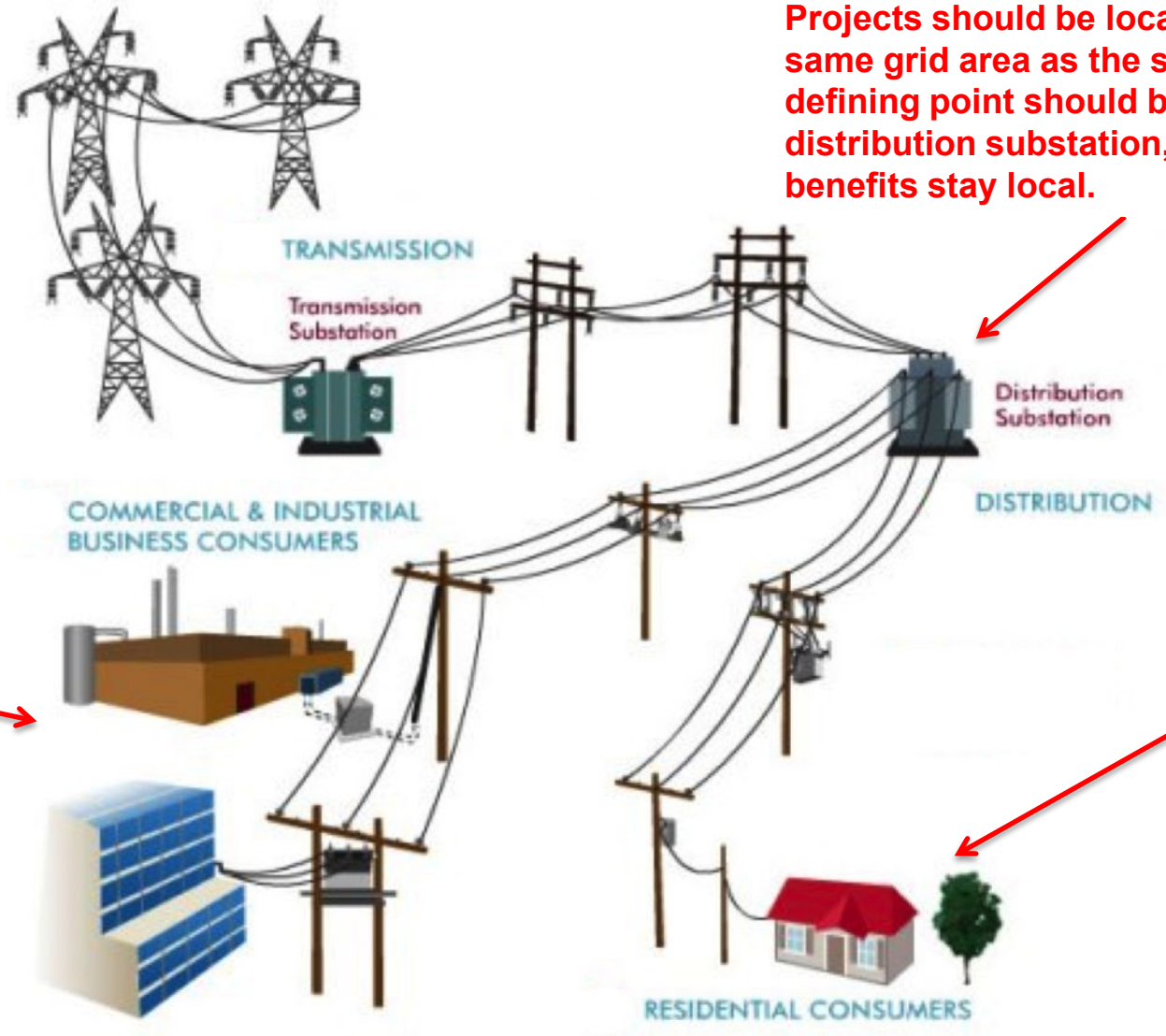
Projects should be located within the same grid area as the subscribers. The defining point should be the nearest distribution substation, ensuring that the benefits stay local.

Infill projects sited primarily on rooftops, parking lots, and parking structures.



Subscribers are primarily residential customers located in disadvantaged communities.

TAC rates as of January 2023

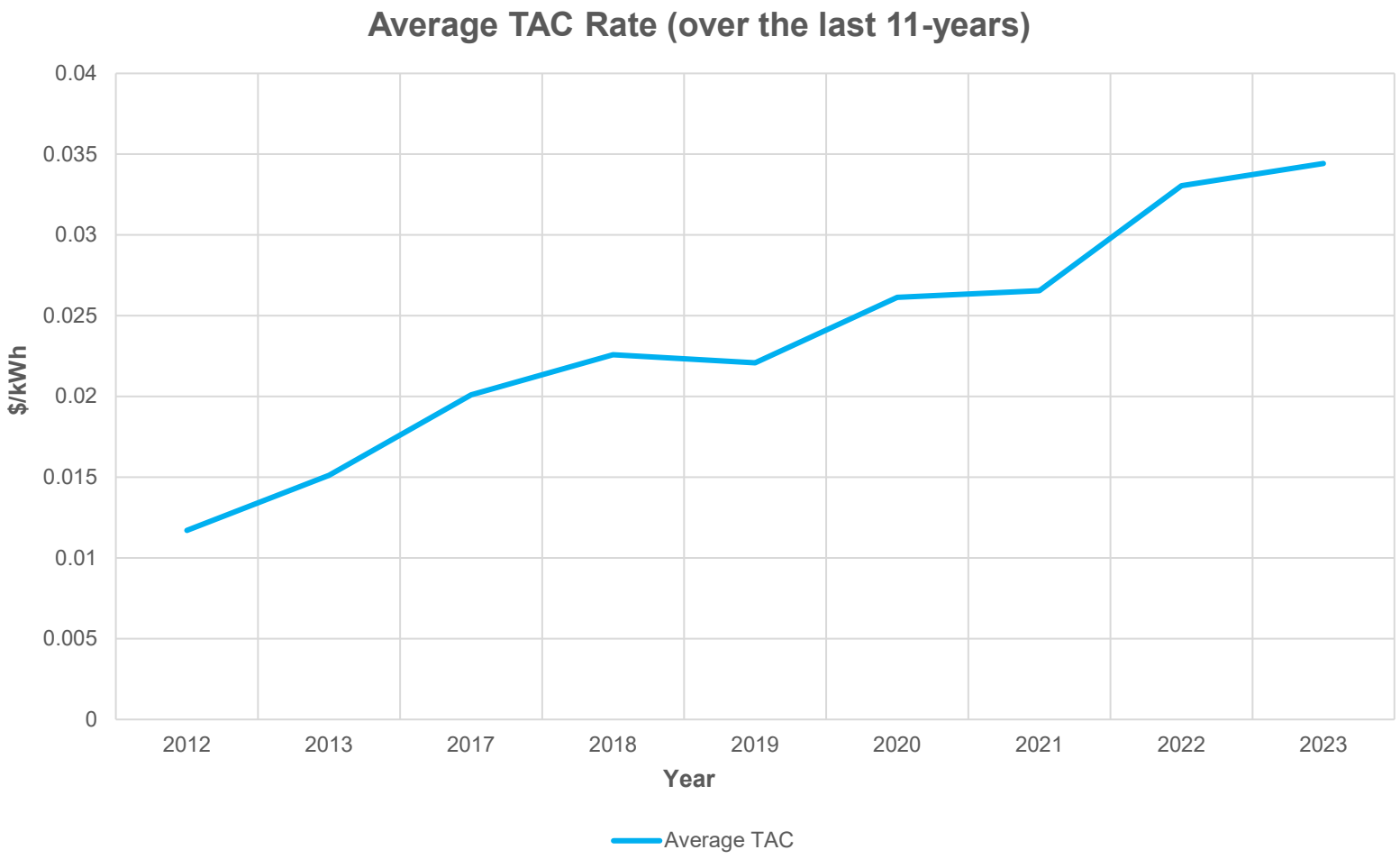
Transmission Access Charges (TAC) Rate for the Investor-Owned Utilities (as of 1 January 2023)

	PG&E	SCE	SDG&E
High Voltage TAC ($/kWh)	0.0095034 ($/kWh)	0.0136576 ($/kWh)	0.0317925 ($/kWh)
Low Voltage TAC ($/kWh)	0.0204047 ($/kWh)	0.0005741 ($/kWh)	0.0273127 ($/kWh)
Total TAC Rate ($/kWh)	**0.0299081 ($/kWh)**	**0.0142316 ($/kWh)**	**0.0591052 ($/kWh)**

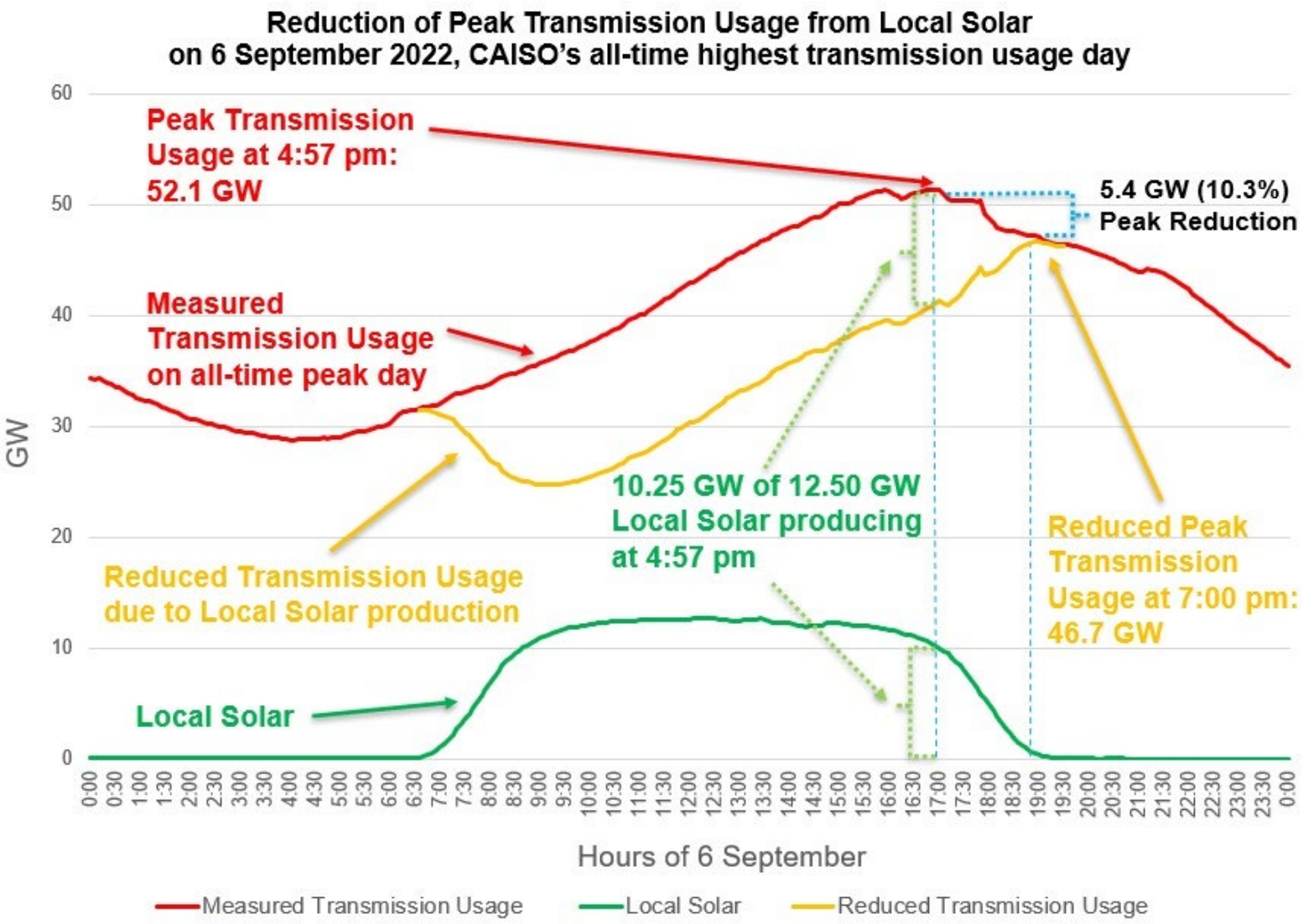
- Weighted Average TAC Rate: **0.02538202 $/kWh**
- Average TAC Rate: **0.03441497 $/kWh**

TAC rates over time

Transmission costs are the leading driver of rising electric rates and continue to rise significantly, as can be from the chart below, which shows the average TAC rate over the last 11 years.



Case study on the reliability benefits of Local Solar



Local Reliability and Resilience Benefits

- NEM projects are relatively small and can provide significant value to the grid when aggregated.
- On the other hand, each Community Solar+Storage project will provide value on its own, in terms of both reliability and adding community resilience.
  - Local solar+storage can fulfill Local RA requirements.
  - Each local solar or solar+storage projects sets the stage for the deployment of a Community Microgrid.
  - There is additional locational value to be captured beyond what is considered in the ACC.

Ideal pricing to match the Cost of Service (COS)

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Pricing for local solar needs to be sufficient to yield market response:

- Consider the COS for solar only
- Consider the COS for solar+storage (with a 4-hour battery requirement)
- Consider location-specific costs and interconnection costs in both cases.

Conclusions

1. There are additional values that should be considered by the Commission in addition to the proposed pricing. (This will be discussed more in the next slide).
2. There is a market benefit to moving quickly and implementing a new Community Solar program as soon as possible (assuming the program is well-designed).
    - California needs projects that are ready to move forward as soon as possible to take advantage of federal incentives. Some of these incentives (specifically the low-income adder to the ITC) will disappear over time and cannot be the final piece that makes the NVBT economically feasible. Other values adders need to be considered in the interim so that the program is economically viable as a standalone compensation structure.

Other value adders

The proposed value stack does not consider the full set of benefits of DER because it is limited to the values considered in the Avoided Cost Calculator (ACC).

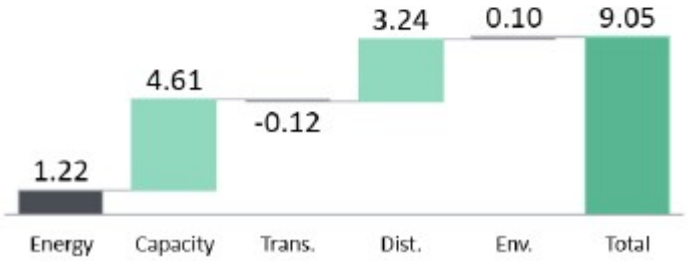
- No PCIA ($0.04439 based on SDG&E's 2023 residential vintage) should be allocated.
- No TAC (0.014-0.059$/kWh) should be allocated.
- Brownfield adders
- Dispatchability adder
- Built environment adder
- Disadvantaged Community adder

Incr. Value of Rooftop CSS, ¢/kWh

	SCE	SDG&E	PG&E
Low Case	6.33	4.39	4.80
High Case	9.05	6.26	6.76

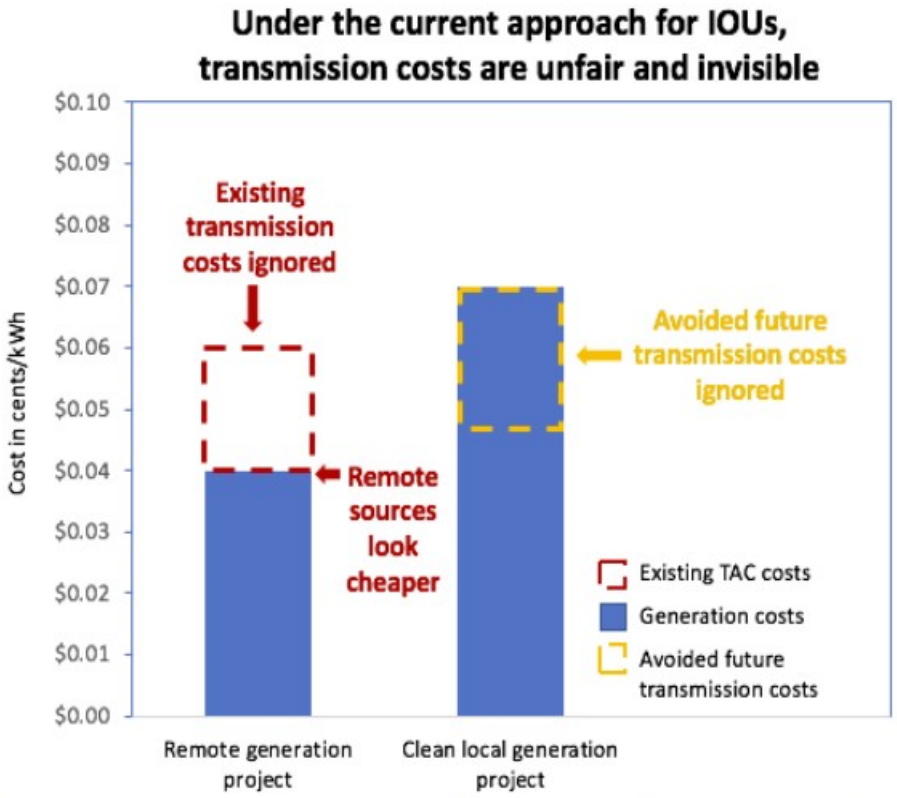
SCE Region, Low Case Incr. Value Stack

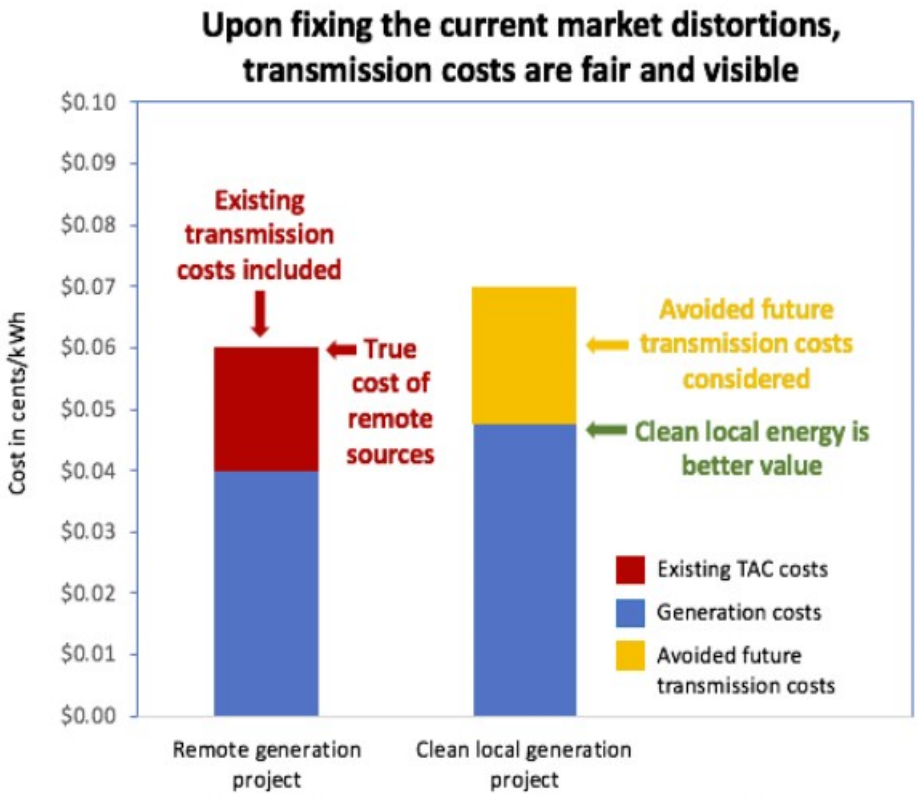
SCE Region, High Case Incr. Value Stack



Brattle Group Infill Value Stack Results

Avoiding Transmission Access Charges (TAC)





Existing transmission costs, assessed as TAC and currently averaging 2¢/kWh, should be added to the cost of remote generation that requires use of the transmission grid to get energy from where it is generated to where it is used, which is almost always on the distribution grid where people live and work. Future transmission investments, currently averaging 2.5¢/kWh in the evenings, can be avoided via dispatchable local generation, and that value should reduce the evaluated cost of local generation. When correctly considering ratepayer impacts of transmission costs, dispatchable local generation provides an average of 4.5¢/kWh of better value to ratepayers than is currently assumed in the majority of instances.

Infill community solar complements NEM

- Statute, PUC Section 2827.1.(a)(1): Customer-sited renewables must continue to grow sustainably.
  - Infill Community Solar projects will be essential to ensuring that this statute is met.
  - Following the deadline of the Net Billing Tariff (NEM 3.0), it is likely that the number of systems being deployed will be reduced.
- Statute, AB 2316, Section 1: Community Solar should provide similar value to NEM for customers that do not qualify for NEM (cannot host a solar system).
  - This requires a full accounting of DER benefits that ensures appropriate value is available to customers not eligible for NEM.

Value Stream	Land Use	Workforce & Societal	Grid Resiliency	Project Timelines
	• Solar installations in urbanized/industrial environments (e.g., parking lots, rooftops) reduces the likelihood that adverse environmental impacts will occur.	• Rooftop projects can provide greater societal value as employment opportunities in urban locations are more closely aligned with disadvantaged, low income population centres	• Grid-connected batteries, coupled with renewable technologies such as solar, have the potential to provide power in the event of a grid outage (if installed with appropriate islanding controls)	• The faster speed of development for rooftop vs ground mount because of faster interconnection and permitting will ensure the benefits of CSS are realized sooner for rooftop installations in urban locations
Advantage	**Rooftop**	**Employment – Equal** **Societal - Rooftop**	**Equal**	**Rooftop**

Image created by Brattle Group

Local solar+storage optimize the grid for ratepayer savings

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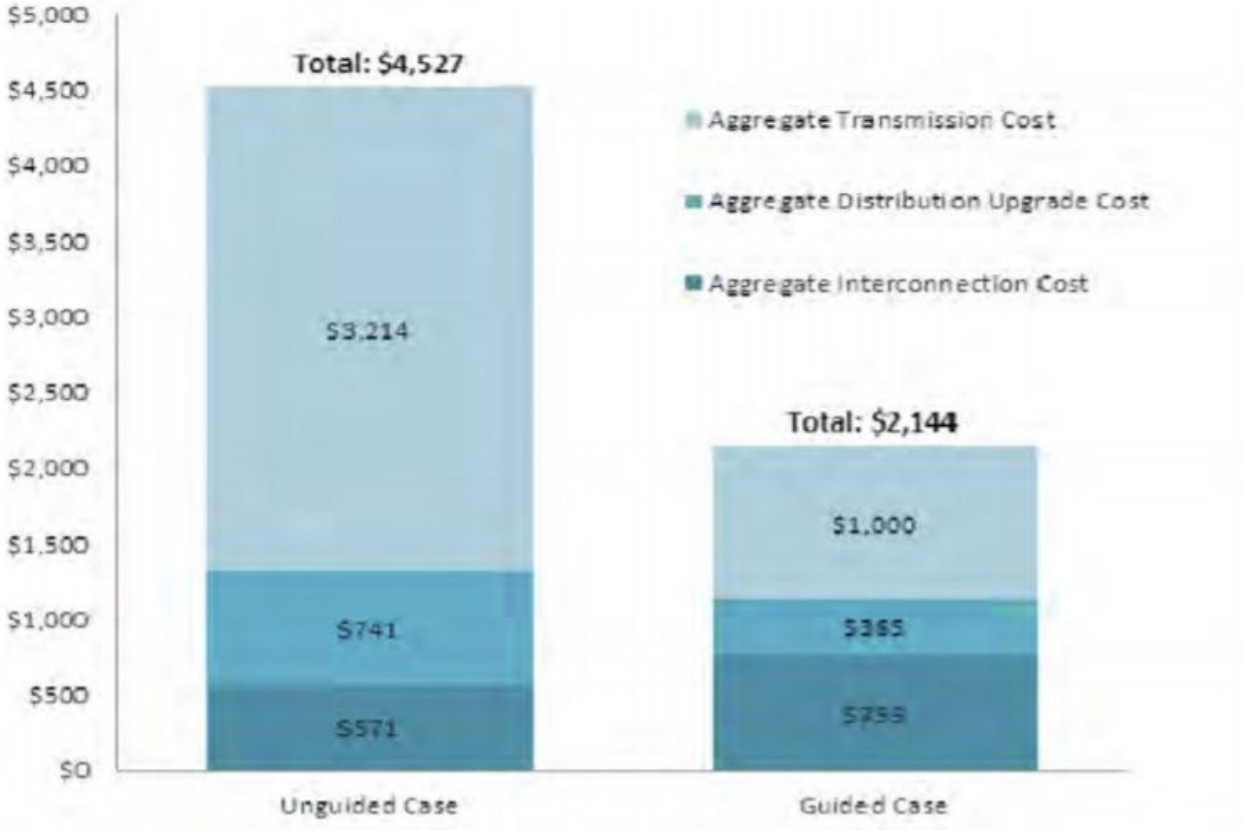
- Intelligently siting 4 GW of local solar would preempt over **$2.2 billion** in new transmission infrastructure investments — about **$20 billion** in ratepayer savings when considering O&M. (Southern California Edison study)
- Transmission costs are always borne by ratepayers, while distribution & interconnection costs are borne by solar project developers.

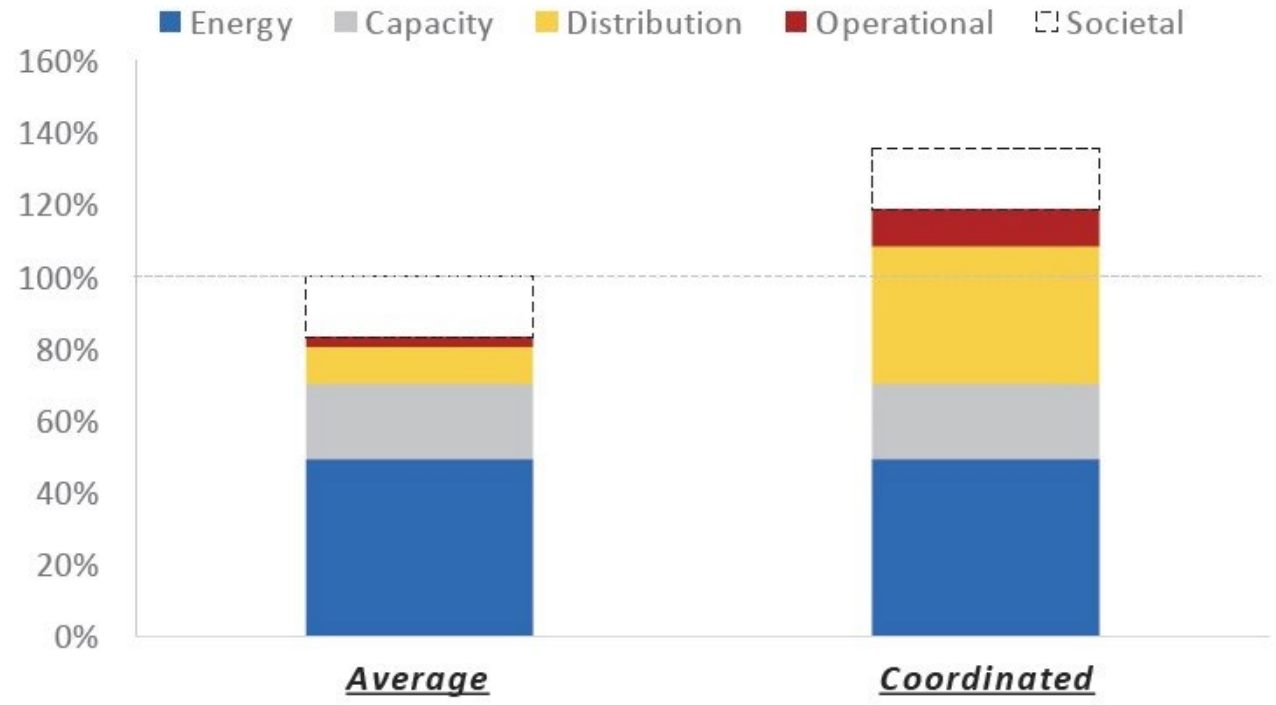


A DSO will increase the value from DER

Figure 5: Impact of DSO coordination of DERs on benefits to grid

Note: 100% indexed to average DER benefits

DIRECTIONAL



Aggregate average benefit of DERs

DSO manages DER procurement process and leverages for grid benefit

Southern California Edison, September 2016

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Comparing developer PPA rates with CCSA's proposed prices

Table 4. Export Credit Rates and Revenues from Sample Analyses of Rooftop Solar Project

	San Bernardino (SCE)	San Diego (SDG&E)	Fresno (PG&E)
1st year average Export Credit Rate, $/kWh	$0.2875	$0.3510	$0.2574
Simple Average Export Credit Rate, $/kWh	$0.3018	$0.3641	$0.2728
1st year revenue	$259,157	$301,792	$226,982
Total revenue	$6,239,524	$7,182,035	$5,524,138

CCSA's Proposed Prices for a
500 kW / 2 MWh rooftop solar+storage system

Table 3. Export Credit Rates and Revenues from Sample Analyses of Ground Mount Solar Project

	San Bernardino (SCE)	San Diego (SDG&E)	Fresno (PG&E)
1st year average Export Credit Rate, $/kWh	$0.2301	$0.2842	$0.2077
Simple Average Export Credit Rate, $/kWh	$0.2414	$0.2959	$0.2191
1st year revenue	$2,915,057	$3,329,376	$2,607,685
Total revenue	$70,203,583	$79,561,829	$63,214,640

CCSA's Proposed Prices for a
5 MW / 20 MWh ground mount solar+storage system

Completing the proceeding record

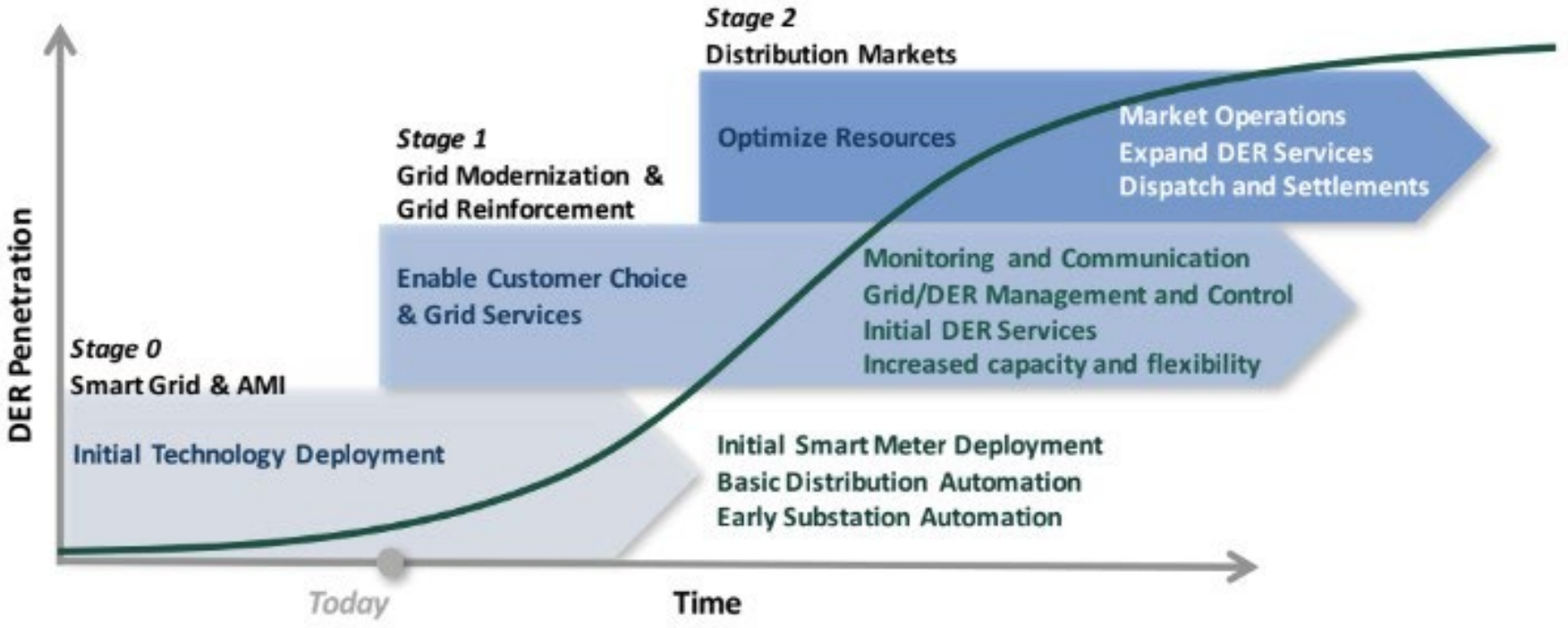
There are numerous issues that have not been fully addressed in the proceeding:

- Should pricing be changed to accurately reflect the COS for each type of deployment?
- Who will administer the programs? IOUs & CCAs or one third party?
- Will the Commission consider other configurations for storage beyond paired storage?
- What other project adders should be included?
- Will customers be auto-enrolled?
- How will the interconnection experience be addressed? Will projects solely use Rule 21 to interconnect quickly?

We advocate for another ruling to allow parties to focus on these small but important details once the underlying program structure/compensation is finalized.

Market Optimization to Enable a DSO

Figure 7: Potential development of markets over time[xv]



Ramping up system upgrades and modernization is necessary today to enable future benefits

The distribution grid of the future

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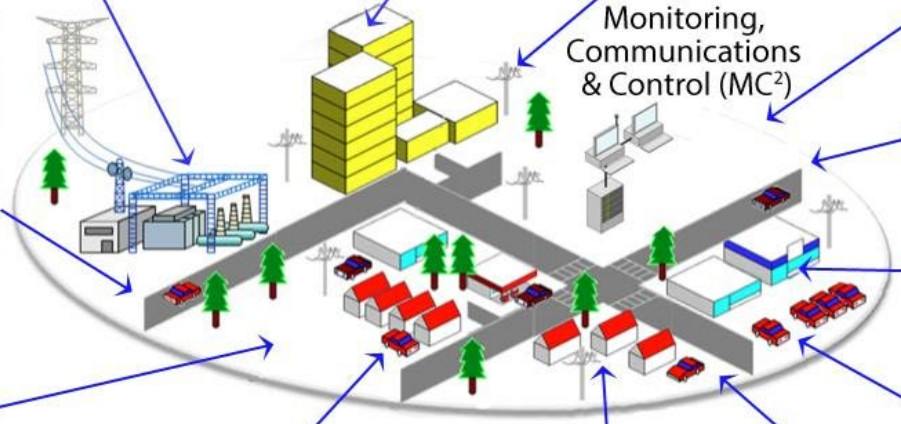
Grid Energy Storage

Distributed Generation

Switches & Power Electronics

Distributed Generation

Biopower Generation



Monitoring, Communications & Control (MC^2)

Energy Storage

Microturbine

Distributed Generation

Electric Vehicles (EV)

Home Energy System

Fuel Cells

Distributed Generation