Reply Comments of Together New Orleans in CNO Docket UD-18-03

July 9, 2023

<u>**By Electronic Mail**</u>
Ms. Lora Johnson, CMC
Clerk of Council
Room 1E09, City Hall
1300 Perdido Street
New Orleans, LA 70112

In Re: *Resolution and Order Establishing a Docket and Opening a Rulemaking Proceeding to Establish Rules for Community Solar Projects,* CNO Docket UD-18-03

Dear Ms. Johnson:

Please find enclosed Together New Orleans' Reply Comments on Proposed Changes to Community Solar Rules in the above-referenced docket. TNO is submitting this filing electronically and will deliver physical copies at your instruction.

If you have any questions, please do not hesitate to contact me.

Sincerely,

A DiLaura

Alaina DiLaura
Together New Orleans

CC: Office Service List (UD 18-03)

Before the Council of the City of New Orleans

In Re: RULEMAKING PROCEEDING TO ESTABLISH RULES FOR COMMUNITY SOLAR PROJECTS DOCKET NO. UD-18-03

REPLY COMMENTS OF TOGETHER NEW ORLEANS

Together New Orleans ("TNO") hereby submits Reply Comments pursuant to Council Resolution R-23-130 regarding proposed changes to Community Solar rules. TNO appreciates the opportunity to engage Entergy New Orleans LLC ("ENO"), the Alliance for Affordable Energy ("AAE"), Madison Energy Investments ("MEI"), ProRate Energy ("PRE"), the City Council, Council advisors and others around the opportunity to establish a stronger policy foundation for an important program for our community.

Introduction and Summary of TNO analysis

TNO's objectives for participation in this docket are to contribute to understanding why, after five years, New Orleans' community solar rules have not resulted in any community solar projects, and to inform improvements to those rules so that community solar can begin to play a role in easing the energy cost burden for New Orleans households.

To inform these objectives, TNO commissioned two pieces of expert analysis:

- economic modeling to determine the viability of community solar at different solar credit price points, conducted by the National Renewable Energy Laboratory ("NREL") on behalf of TNO, and
- a value-of-solar analysis for New Orleans conducted by Gabel Associates.

Informed by those reports, TNO's positions can be summarized as follows:

1) Community solar rules have not resulted in any community solar developments because aspects of the rules themselves have rendered development economically unviable.
2) The primary problem in the current rules is the price ascribed to the solar bill credit for market-rate subscribers, which has averaged $0.06977 /kWh. At that price, according to economic modeling by NREL, a development never would recoup its costs, experiencing a negative rate of return of - 14.95%.
3) Secondary problems in the current rules further damage the economics of potential projects, including a 2MW cap on development size, a contract length of 10 years and the lack of any means by which renewable energy credits (RECs) obtain value. According to the NREL modeling, addressing those secondary problems improves the viability of development, but doing so without addressing the value of the solar credit still would leave development unviable.
4) The minimum price for the solar credit required for community solar development to be viable at a baseline threshold, according to the NREL's economic modeling, is $0.10056 /kWh.

5) The current, lower price ascribed to the solar credit, according to a value-of-solar analysis conducted for the docket by Gable Associates, is artificially low. The formulation used to derive it leaves out several components of the energy's value. That formulation includes avoided energy costs, but it does not include the full value of capacity costs and it leaves out the value of avoided transmission and distribution capacity costs and emissions costs.

6) The actual value of the energy produced by community solar, according to the Gabel Report, is $0.1485 / kWh, including only direct, energy-related benefits. Including societal benefits as well, such as the cost of carbon and economic impact, would add an additional $0.1818 / kWh to the value of solar.

7) To strengthen the Community Solar program, Council should increase the price ascribed to the solar credit to reflect the full value of energy-related benefits, with a price floor of at least $.10056 /kWh, below which development becomes unviable.

<u>**TNO responses to ENO**</u>

1) Claim of "No new evidence"

In its comments submitted in June 2023, ENO asserts that the parties seeking rule changes have not put forward any new arguments or evidence to support their claims. "Intervenors seeking changes to the Rules," ENO claims, "have not come forward with any new evidence or arguments to justify their position. … Indeed, the intervenors have not provided the Council with any basis to revisit its ruling."

This claim is inaccurate.

Interveners in this docket have amassed an extraordinary body of evidence and analysis, most of it new to this phase of the docket, which demonstrates with clarity and specificity how the failure of New Orleans' community solar program to produce community solar projects relates directly and causally to problems in the design of the program's rules.

At a technical conference on April 25 2023, TNO provided substantial evidence showing that the primary factors rendering community solar projects unviable were components of the program rules themselves – specifically its low solar credit rate, short contract period (10 years), small maximum project size (2MW) and the absence of any policy mechanism such as a local carve out by which renewable energy credits (RECs) obtain meaningful value for developers.

The Coalition for Community Solar Access ("CCSA"), Alliance for affordable Energy ("AAE"), Madison Energy ("MEI"), ProRate ("PRE") and others have put forward similarly detailed arguments, including new evidence in most or all cases, demonstrating that the failure to-date of community solar in New Orleans is a direct outgrowth of policy design.

2) ENO claim about why community solar development has not occurred

ENO that the lack of any community solar developments occurring under the program's rules "is not dispositive of a flaw in the Rules," but is "a result of financial risks that developers appear to be trying to pass on to ENO's customers."

This claim ignores the very problem this docket is meant to address – namely, that the community solar rules themselves, in their current form, render community solar development economically unviable.

At the April technical conference, CUNO staff suggested that economic modeling to evaluate the viability of a community solar development under different policy assumptions and credit rates would make a meaningful contribution to the docket. TNO submitted a request for technical assistance to that effect to the National Community Solar Partnership, a U.S. Department of Energy initiative led by the Solar Energy Technologies Office, seeking "to obtain an unbiased and third-party perspective on how developer subscription rates impact project viability."

TNO's request for technical assistance was approved by US DOE in May 2023, with the National Renewable Energy Laboratory ("NREL"), one of the foremost labs nationally for energy modeling and analysis, serving as the lead entity on the project. Simon Sandler, a Markets and Policy Research Analyst with NREL, conducted economic modeling using NREL's System Advisor Model (SAM). NREL delivered the final report of its findings to TNO on July 6, 2023, which is summarized here and included in full below.

NREL's modeling evaluated the economic viability of a community solar development in New Orleans under four different policy scenarios:

- Scenario 1: a baseline scenario under the current program rules;
- Scenario 2: a reform scenario which leaves the value of the solar credit unchanged, but makes nearly all the changes under consideration in the docket (expanding the cap on capacity size from 2MWac to 5 MWac, extending the maximum contract duration from 10 to 20 years, increasing the target low-income percent from 30% to 40% and shifting REC ownership to the developer)
- Scenario 3: a reform scenario with the same changes as Scenario 2, but setting the solar credit at the value needed for a development to recoups its costs with no return (i.e. NPV = $0).
- Scenario 4: a reform scenario with the same changes as Scenario 2, but setting the solar credit at the value needed for the development to achieve a minimum standard of economic viability (modeled as a 10% IRR over 20 years).

Scenarios

SCENARIO 1: Baseline - existing program rules
Uses existing rules passed by City Council under Resolution R-19-111

SCENARIO 2: Adopts proposed rule changes, with existing credit value
Includes proposed rules updates to increase project size cap to 5 MW, extend contract to 20 years, and provide developer with REC ownership. No change to value of solar credit.

SCENARIO 3: NPV breakeven - minimum credit value to recoup costs (no return)
Value of solar credit for market class (non-LMI) is increased until development IRR = Discount Rate (a.k.a. NPV = 0)

SCENARIO 4: Viability threshold -- minimum credit value for viability
Value of solar credit for market class (non-LMI) is increased until development IRR = 10% (utility guaranteed rate of return)

The NREL model evaluated the economic viability of each scenario, as summarized below.

Scenario 1, Existing rules:

SCENARIO 1 - Result

System Characteristic	
System Capacity	2 MWac (2.4 MWdc)
Annual AC energy in Year 1	4,228,700 kWh
DC capacity factor in Year 1	20.10%
Energy yield in Year 1	1,762 kWh/kW

Financial Details	
Net capital cost	$4,628,910
CAPEX Rate	$1.93/Wdc
REC revenue in Year 1	$0
NPV Net present value	**-$1,901,936**
IRR Internal rate of return	**-14.95%**
Subscription Rate ($/kWh)	
LMI	$0.08925
Market	$0.05582
Subscription Credit ($/kWh)	
LMI	$0.11156
Market	$0.06977

- Under prevailing program rules, while providing both customer classes a 20% savings on their subscription, a developer will fall short of recouping project costs and obtain no profit from the project.
- If a private developer is unable to recoup costs and secure a profit large enough to cover the risk of project development, projects are unlikely to materialize.

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Under Scenario 1, community solar projects never recoups their costs, facing substantial negative Internal Rates of Return (IRR) of - 14.95% over the 10-year life of the project.

NREL' on Scenario 1: “If a private developer is unable to recoup costs and secure a profit large enough to cover the risk of project development, projects are unlikely to materialize.”

Scenario 2: No change to solar credit, other proposed changes adopted:

SCENARIO 2 - Result

System Characteristic	
System Capacity	5 MWac (6 MWdc)
Annual AC energy in Year 1	10,571,650 kWh
DC capacity factor in Year 1	20.10%
Energy yield in Year 1	1,762 kWh/kW

Financial Details	
Net capital cost	$11,572,277
CAPEX Rate	$1.93/Wdc
REC revenue in Year 1	$211,433
NPV Net present value	**-$1,861,806**
IRR Internal rate of return	2.50%
Subscription Rate ($/kWh)	
LMI	$0.08925
Market	$0.05582
Subscription Credit ($/kWh)	
LMI	$0.11156
Market	$0.06977

- Using the proposed rules, including extending the project contract, increasing the LMI customer mix, and adding REC income, the project still provides a net negative cashflow for the developer with a negative NPV.
- The fact that the project economics under proposed rules do not provide a financial advantageous cashflow for the developer means project development likelihood still appears low.

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Under Scenario 2, community solar projects still provide a net negative cash flow for the developer with a negative Net Present Value (NPV).

NREL on Scenario 2: "The fact that the project economics under proposed rules do not provide a financial advantageous cashflow for the developer means project development likelihood still appears low."

Scenario 3, NPV breakeven:

SCENARIO 3 - Result

System Characteristic	
System Capacity	5 MWac (6 MWdc)
Annual AC energy in Year 1	10,571,650 kWh
DC capacity factor in Year 1	20.10%
Energy yield in Year 1	1,762 kWh/kW

Financial Details	
Net capital cost	$11,572,277
CAPEX Rate	$1.93/Wdc
REC revenue in Year 1	$211,433
NPV Net present value	**$336**
IRR Internal rate of return	8.86%
Subscription Rate ($/kWh)	
LMI	$0.08925
Market	$0.08062
Subscription Credit ($/kWh)	
LMI	$0.11156
Market	$0.09674

- Under proposed rules, to make the developer whole by obtaining a NPV of ~$0 (aka an IRR=discount rate), while providing customers a 20% savings on their subscription, would require increasing the market subscription rate ~44% to ~$0.081/kWh, correlating to a subscription credit of ~$0.097/kWh.
- A NPV of $0 does not provide market conditions that are likely to support project development since a developer will simply recoup costs with no effective profit.
- Scenario 3 provides a floor from which to compare additional scenarios which are more advantageous to project development.

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Under Scenario 3, the community solar project is able to cover its costs, but with a Net Present Value of $0, meaning no effective return on investment.

NREL on Scenario 3: "A NPV of $0 does not provide market conditions that are likely to support project development since a developer will simply recoup costs with no effective profit. Scenario 3 provides a floor from which to compare additional scenarios which are more advantageous to project development."

Scenario 4, minimum solar credit for project viability:

SCENARIO 4 - Result

System Characteristic	
System Capacity	5 MWac (6 MWdc)
Annual AC energy in Year 1	10,571,650 kWh
DC capacity factor in Year 1	20.10%
Energy yield in Year 1	1,762 kWh/kW

Financial Details	
Net capital cost	$ 11,572,277
CAPEX Rate	$1.93/Wdc
REC revenue in Year 1	$211,433
NPV Net present value	$239,072
IRR Internal rate of return	10.00%
Subscription Rate ($/kWh)	
LMI	$0.08925
Market	$0.08380
Subscription Credit ($/kWh)	
LMI	$0.11156
Market	**$0.10056**

- To ensure a developer receives a 10% IRR with the same conditions as scenario 3 would require increasing the market subscription rate even further to ~$0.084/kWh, correlating to a subscription credit of ~$0.10/kWh.
- This scenario still guarantees all subscribers a 20% subscription savings while making development more likely.
- The subscription rate assumes the developer secures REC payments, a 30% ITC payment, and can completely fill all subscriptions in year 1 through 20.
- Any lower REC payments or unsubscribed portion of the project will degrade economics and either reduce project likelihood or require revenue to be made up through another avenue.

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Under Scenario 4, community solar projects achieve a bare minimum threshold for viability, with the development covering its costs and achieving an IRR over 20 years of 10%.

The credit value in Scenario 4 is $0.10056/kWh, a 44% increase over existing rules for market-rate subscribers.

NREL on Scenario 4: "The 10% IRR was based on regulated utility guaranteed rate of return; however, this value is conservative as a developer is exposed to greater risk than a regulated utility, which has guaranteed return on their investments."

What NREL's modeling makes clear is that the primary problem in the current community solar rules is the price ascribed to the solar credit for market-rate subscribers, which is too low for development to become viable. Secondary problems in the current rules further damage the economics of potential projects, including a 2MW cap on development size, a contract length of 10 years and the lack of any means by which renewable energy credits (RECs) obtain value. Addressing those secondary problems is important, and doing so will improve the viability of community solar development. But doing so without addressing the value of the solar credit still would leave development unviable.

The minimum price for the solar credit required for community solar development to be viable at a baseline threshold, according to the NREL's economic modeling, is $.10056 /kWh.

3) ENO claim that community solar would require cross-subsidy

A central component of ENO's opposition to rule changes is its contention that ratepayers will be required to cross-subsidize community solar projects. In its June 2023 filing, ENO quantified this claim for a scenario in which community solar is developed to the maximum allowable level (55 MW-AC of projects). ENO's formula for quantifying the degree of subsidy is:

cost of bill credit – value of solar = subsidy by ratepayers

TNO engaged Gabel Associates, a firm with thirty years of experience conducting analysis of wholesale and retail energy markets, to conduct a value-of-solar analysis for the docket, including an evaluation of the methodology used to determine the value of the solar bill credit under the existing rules and an independent analysis of the value-of-solar for the docket. A preliminary version of the Gabel Report was included in TNO's June 2023 comments. The full report, which provides specific valuations to each component of the solar value stack, is included in these comments.

The Gabel Report presents an evaluation of the solar bill credit implemented under the existing rules, showing that the current bill credit framework fails to capture the full value stack of benefits community solar provides. The report quantifies the value left out of the solar bill credit as follows:

Direct Benefits

Benefit Type	Full Value Stack (¢/kWh)	CNO Bill Credit (¢/kWh)	CNO Shortfall (¢/kWh)
Energy Merit Order Price Impacts	4.01	-	4.01
Capacity Merit Order Price Impacts	0.45	-	0.45
Avoided Energy Costs	3.79	3.79	-
Avoided Capacity Costs	3.42	2.22	1.20
Avoided T&D Costs	3.20	-	3.20
Subtotal	**14.85**	**6.00**	**8.85**

This undervaluation in the valuation of the energy produced by community solar is relevant to ENO's claim of a cross-subsidization by ratepayers. ENO's calculations of that subsidy are inflated because rely on an artificially low valuation of the solar energy produced. Under-valuing the benefits of the energy results in an artificial inflation of the net cost borne by ratepayers. ENO's quantification of the cross-subsidy, in other words, mirrors the same methodological problem that undervalued the solar bill credit in the first place, namely, the artificially low value ascribed to the energy being produced by community solar.

Once the solar energy is valued properly, a very different picture emerges about community solar and cross-subsidization under the current rules, which is quantified in table 1, below. Instead of ratepayers being asked to subsidize community solar, as ENO claims, the table below demonstrates the actual scenario. Prospective community solar developments are being asked to subsidize ENO – which is why no such developments have come to pass.

Table 1

	ENO Calculations						TNO Calculations			
Month	CSG Output (kWh)*	Total Bill Credits	Weighted Average Bill Credit (c/kWh)**	Energy Value	Capacity Value	Weighted Average Value (c/kWh)	Difference (Bill Credits - Value) - ENO	Weighted Average Value (c/kWh) - Gabel	Total energy value - Gabel	Difference (Bill Credits - Value) - Gabel
June 2021	10,237,068	$ 705,072	6.89	$ 347,881	$3	3.40	**$ 357,188**	14.85	1,520,205	**(815,133)**
July 2021	9,713,123	$ 712,422	7.33	$ 384,058	$3	3.95	**$ 328,361**	14.85	1,442,399	**(729,977)**
August 2021	9,551,568	$ 726,286	7.60	$ 393,811	$3	4.12	**$ 332,472**	14.85	1,418,408	**(692,122)**
September 2021	9,411,855	$ 691,342	7.35	$ 451,430	$3	4.80	**$ 239,909**	14.85	1,397,660	**(706,318)**
October 2021	9,076,521	$ 676,476	7.45	$ 512,114	$3	5.64	**$ 164,359**	14.85	1,347,863	**(671,387)**
November 2021	7,475,391	$ 558,071	7.47	$ 361,683	$3	4.84	**$ 196,385**	14.85	1,110,096	**(552,025)**
December 2021	6,192,114	$ 459,346	7.42	$ 236,290	$3	3.82	**$ 223,053**	14.85	919,529	**(460,183)**
January 2022	6,115,654	$ 443,424	7.25	$ 228,033	$3	3.73	**$ 215,388**	14.85	908,175	**(464,751)**
February 2022	7,520,071	$ 528,679	7.03	$ 298,353	$3	3.97	**$ 230,323**	14.85	1,116,731	**(588,052)**
March 2022	9,362,849	$ 637,445	6.81	$ 409,864	$3	4.38	**$ 227,578**	14.85	1,390,383	**(752,938)**
April 2022	10,136,757	$ 656,115	6.47	$ 682,027	$3	6.73	**$ (25,915)**	14.85	1,505,308	**(849,193)**
May 2022	11,068,883	$ 765,462	6.92	$ 930,753	$3	8.41	**$ (165,294)**	14.85	1,643,729	**(878,267)**
June 2022	10,237,068	$ 877,731	8.57	$ 945,676	$876	9.24	**$ (68,821)**	14.85	1,520,205	**(642,474)**
July 2022	9,713,123	$ 887,279	9.13	$ 871,902	$876	8.98	**$ 14,501**	14.85	1,442,399	**(555,120)**
August 2022	9,551,568	$ 911,797	9.55	$ 931,008	$876	9.75	**$ (20,087)**	14.85	1,418,408	**(506,611)**
September 2022	9,411,855	$ 895,034	9.51	$ 727,493	$876	7.73	**$ 166,665**	14.85	1,397,660	**(502,626)**
October 2022	9,076,521	$ 886,962	9.77	$ 521,508	$876	5.75	**$ 364,578**	14.85	1,347,863	**(460,901)**
November 2022	7,475,391	$ 760,580	10.17	$ 408,657	$876	5.47	**$ 351,047**	14.85	1,110,096	**(349,516)**
December 2022	6,192,114	$ 624,316	10.08	$ 547,406	$876	8.84	**$ 76,034**	14.85	919,529	**(295,213)**
January 2023	6,115,654	$ 607,238	9.93	$ 188,369	$876	3.08	**$ 417,993**	14.85	908,175	**(300,937)**
February 2023	7,520,071	$ 684,841	9.11	$ 175,405	$876	2.33	**$ 508,560**	14.85	1,116,731	**(431,890)**
March 2023	9,362,849	$ 752,890	8.04	$ 270,027	$876	2.88	**$ 481,987**	14.85	1,390,383	**(637,493)**
April 2023	10,136,757	$ 928,045	9.16	$ 255,540	$876	2.52	**$ 671,629**	14.85	1,505,308	**(577,263)**
May 2023	11,068,883	$ 1,005,414	9.08	$ 360,241	$876	3.25	**$ 644,297**	14.85	1,643,729	**(638,315)**
2021	61,657,640	$ 4,529,014	7.35	$ 2,687,267	$21	4.36	**$ 1,841,726**	14.85	9,156,160	**(4,627,146)**
2022	105,861,854	$ 8,874,823	8.38	$ 7,502,681	$6,147	7.09	**$ 1,365,995**	14.85	15,720,485	**(6,845,662)**
2023	44,204,214	$ 3,978,428	9.00	$ 1,249,582	$4,380	2.83	**$ 2,724,466**	14.85	6,564,326	**(2,585,898)**
	211,723,708	**$17,382,267**	**8.21**	$ 11,439,530	**$10,549**	**5.41**	**5,932,190**	**14.85**	**31,440,971**	**-14,058,704**

Attachment 1:

Economic modeling of community solar, National Renewable Energy Laboratory, July 2023

(Conducted as part of the U. S. Department of Energy's technical assistance to Together New Orleans)

Attachment 2:

Value-of-solar analysis from Gabel Associates, "Setting the Solar Bill Credit: How to Unlock the Full Value Potential of Community Solar in New Orleans," July 2023

NREL
Transforming ENERGY

National Community Solar Partnership Technical Assistance

Together New Orleans

Simon Sandler,
Markets and Policy Research Analyst
July 2023

Photo by Dennis Schroeder, NREL 55200

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Definitions

- **Community Solar (CS):** Any solar project or purchasing program, within a geographic area, in which the benefits of a solar project flow to multiple customers such as individuals, businesses, nonprofits, and other groups.
- **Subscription Cost:** Money paid by a subscribing customer to the project developer for their respective portion of the solar project.
- **Subscription Credit:** Money credited to a subscribing customer, by the electric utility, on their electricity bill.
- **Subscription Savings:** The net difference between the subscription cost and subscription credit.
  - (Credit – Cost = Savings)
- **Bill Savings:** The net reduction (+ or -) of the subscribing customers electric bill after subscription credits are applied and the subscription cost is accounted for.
  - (Electric Bill without CS subscription – Electric Bill with CS subscription + Subscription Cost = Bill Savings)
- **Subscriber Class:** The rate class that the subscribing customer belongs to which dictates Subscription Credit they will receive.
  - Low and Moderate Income (LMI) & Market (Non-LMI) are the only two subscriber classes discussed in this presentation.
- **Subscriber Mix:** The relative proportion of project that is subscribed to by each subscriber class.
  - E.g. 75% LMI and 25% Market
- **Net Present Value (NPV):** The present value of a cash flow that is dependent on the interval of time and discount rate, and accounts for the time value of money to provide a comparable basis for evaluating projects.
  - All NPVs presented are from the perspective of the project developer/financier.
- **Internal Rate of Return (IRR):** A metric used in financial analysis to estimate the profitability of potential investments and one that makes the NPV of all discounted cash flows equal to zero.
  - All IRRs presented are from the perspective of the project developer/financier.

Background & Methodology

Background

- In 2019, New Orleans City Council passed Resolution R-19-111, Resolution and Order Establishing Rules For Community Solar Projects, enabling community solar in the city of New Orleans.
- Entergy New Orleans (ENO) is the regulated utility operating in the New Orleans, which is regulated by the City Council rather than by the state Public Service Commission (PSC).
- The City Council docket, UD-18-03 Community Solar Projects Rulemaking Proceeding, under which the CS enabling legislation and rules were passed, remains open currently to consider program rule modifications.
- Together New Orleans, a coalition of congregations and community-based organizations in the greater New Orleans area, is an active intervener in the current docket addressing CS programmatic rules.
- Together New Orleans submitted a TA request to the NCSP aiming to obtain an unbiased and third-party perspective on what developer subscription rate compensation would make project development more viable.
  - This TA requests comes in light of the current CS market, where no projects have been developed since the passage of Resolution R-19-111 in 2019.

New Orleans Community Solar Program Summary

Plant MW Limit	2 MW (proposal to raise to 5 MW)
Program MW Limit	Less than or equal to 5% of the Utility's annual peak in MW for the first three years of the program.
Requirements	At least 3 customers, no customer with more than 40% share. In the same service territory as generator.
Subscriber Compensation	Market customer (non-LMI): Based on avoided capacity and energy costs. Avoided energy is based on hourly LMP weighted by the modeled output of a PV system in New Orleans. Avoided capacity is 0.5 * CONE (Cost of New Entry). LMI customers: Value is full retail for the "currently effective Low-Income Subscriber's customer class tariff" (i.e. at the retail of LMI discounted rates).
LMI requirements	LMI customers qualify if they are 50% of AMI or person eligible for a program with that income limit. (Median household income was $45,594 in 2021) A LMI facility has at least 30% LMI subscribers. Half the program is reserved for LMI facilities.

Methodology

1. Define scenarios & goal
2. Compile scenario assumptions
3. Run models – Using NREL's System Advisor Model (SAM)
4. Compile and compare results
5. Present findings, takeaways, and limitations

Modeling Considerations

An additional list of assumptions are compiled in the appendix of this report; this section addresses some of the key considerations and decisions made to perform the modeling at hand.

- Subscription Rate
  - The subscription rate was calculated by reducing the predetermined subscription credit by 20% to generate a 20% savings based on the NCSP target of providing a bill savings of 20% to all customers.
    - As discussed in the considerations, unable to calculate a bill savings, a 20% subscription savings was used as a stand in for modeling.
  - Subscription credits were calculated using Entergy New Orleans (ENO) published data from their CS website
    - Market rate was calculated using the most recent avoided cost published.
    - LMI rate was based on the average of all values published from historical years.
- Investment Tax Credit (ITC)
  - The investment tax credit, which was recently bolstered by the Inflation Reduction Act, was assumed to be 30% as a default. Eligibility for ITC adders and bonuses are undetermined at this point and were therefore excluded as a default.
- Renewable Energy Credits (REC)
  - RECs are inherently hard to project due to market variation and depending on market location and type. A simple default of $2/MWh was assumed across the life of the project where applicable using best engineering judgment. This value is assumed to be slightly conservative based on current trends and historical prices for voluntary REC prices, which have risen recently. Compliance REC prices, which are most likely to apply to the current models tend to be higher, however the necessary relevant market values are lacking to make the necessary modeling assumptions.

Scenarios

Scenarios

SCENARIO 1: Baseline - existing program rules

Uses existing rules passed by City Council under Resolution R-19-111

SCENARIO 2: Adopts proposed rule changes, with existing credit value

Includes proposed rules updates to increase project size cap to 5 MW, extend contract to 20 years, and provide developer with REC ownership. No change to value of solar credit.

SCENARIO 3: NPV breakeven - minimum credit value to recoup costs (no return)

Value of solar credit for market class (non-LMI) is increased until development IRR = Discount Rate (a.k.a. NPV = 0)

SCENARIO 4: Viability threshold -- minimum credit value for viability

Value of solar credit for market class (non-LMI) is increased until development IRR = 10% (utility guaranteed rate of return)

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Using the existing rules as published on the New Orleans City Council Website under UD-18-03: Community Solar Projects Rulemaking Proceeding (and the available information from the Entergy New Orleans Community Solar webpage) a base model was developed from which to build from.

<u>Notable Assumptions</u>

- Project size – 2MWac
- PV Capital cost
  - $1.93/Wdc installed
- Contract length 10 years
- Project customer mix 70/30*
  - 70% Market
  - 30% LMI
- Investment tax credit (ITC)
  - 30%
- Renewable energy credit (REC)
  - $0/MWh (no payment)

*The customer mix was determined based on the guidance from the rules that the CS program aims to reserve half of the program capacity for projects that meet a 30% threshold for LMI customer mix

SCENARIO 1 - Result

System Characteristic	
System Capacity	2 MWac (2.4 MWdc)
Annual AC energy in Year 1	4,228,700 kWh
DC capacity factor in Year 1	20.10%
Energy yield in Year 1	1,762 kWh/kW

Financial Details	
Net capital cost	$4,628,910
CAPEX Rate	$1.93/Wdc
REC revenue in Year 1	$0
NPV Net present value	**-$1,901,936**
IRR Internal rate of return	**-14.95%**
Subscription Rate ($/kWh)	
LMI	$0.08925
Market	$0.05582
Subscription Credit ($/kWh)	
LMI	$0.11156
Market	$0.06977

- Under prevailing program rules, while providing both customer classes a 20% savings on their subscription, a developer will fall short of recouping project costs and obtain no profit from the project.
- If a private developer is unable to recoup costs and secure a profit large enough to cover the risk of project development, projects are unlikely to materialize.

{/9b!wLO M - Discussion

- Even if the entire Scenario 1 project was based on LMI customers only (no market subscribers) and the LMI subscription rate and credit were equal ($0.11156), meaning the subscriber had no guaranteed savings, the project would still yield an IRR of -2.15%.
- This is due in in part to a short contract with only 10 years guaranteed.
- Assuming a 100% LMI subscriber class is unrealistic unless the program is designed to provide developers with some risk reducing measure. This was included for comparative purposes.
- Similarly, NCSP aims to provide customers with bill savings, especially for LMI customers and thus supports subscriptions which provide a net customer savings between subscription rate and credit (unlike the theoretical scenario presented on this slide).

SCENARIO 2: Rule changes, w/ existing credit value - assumptions

The base model was updated to adopt proposed rules under consideration per UD-18-03. Specifically, project capacity size cap, contract duration, customer mix, and REC ownership were updated.

Assumption modifications from base

- Project size – 5MWac
- Contract length 20 years
- Customer mix 60/40*
  - 60% Market
  - 40% LMI
- Investment tax credit (ITC)
  - 30%
- Renewable energy credit (REC)
  - $2/MWh

* The customer mix was determined based on the guidance from the rules that the CS program aims to reserve half of the program capacity for projects that meet a 40% threshold for LMI customer mix and the NCSP target that 40% of benefits flow to disadvantaged communities per the Justice40 Initiative.

SCENARIO 2 - Result

System Characteristic	
System Capacity	5 MWac (6 MWdc)
Annual AC energy in Year 1	10,571,650 kWh
DC capacity factor in Year 1	20.10%
Energy yield in Year 1	1,762 kWh/kW

Financial Details	
Net capital cost	$11,572,277
CAPEX Rate	$1.93/Wdc
REC revenue in Year 1	$211,433
NPV Net present value	**-$1,861,806**
IRR Internal rate of return	2.50%
Subscription Rate ($/kWh)	
LMI	$0.08925
Market	$0.05582
Subscription Credit ($/kWh)	
LMI	$0.11156
Market	$0.06977

- Using the proposed rules, including extending the project contract, increasing the LMI customer mix, and adding REC income, the project still provides a net negative cashflow for the developer with a negative NPV.
- The fact that the project economics under proposed rules do not provide a financial advantageous cashflow for the developer means project development likelihood still appears low.

SCENARIO 3: NPV breakeven - assumptions

Scenario 2 was modified with the aim of identifying the market subscriber class subscription credit required to drive project economics to equal a net present value of $0.

A $0 NPV occurs when the internal rate of return = the Discount Rate

Assumption modifications from Scenario 2

- Project size – 5MWac
- Contract length 20 years
- Customer mix 60/40
  - 60% Market
  - 40% LMI
- Investment tax credit (ITC)
  - 30%
- Renewable energy credit (REC)
  - $2/MWh

SCENARIO 3 - Result

System Characteristic	
System Capacity	5 MWac (6 MWdc)
Annual AC energy in Year 1	10,571,650 kWh
DC capacity factor in Year 1	20.10%
Energy yield in Year 1	1,762 kWh/kW

Financial Details	
Net capital cost	$11,572,277
CAPEX Rate	$1.93/Wdc
REC revenue in Year 1	$211,433
NPV Net present value	**$336**
IRR Internal rate of return	8.86%
Subscription Rate ($/kWh)	
LMI	$0.08925
Market	$0.08062
Subscription Credit ($/kWh)	
LMI	$0.11156
Market	$0.09674

- Under proposed rules, to make the developer whole by obtaining a NPV of ~$0 (aka an IRR=discount rate), while providing customers a 20% savings on their subscription, would require increasing the market subscription rate ~44% to ~$0.081/kWh, correlating to a subscription credit of ~$0.097/kWh, a ~39% increase in the subscription credit.
- A NPV of $0 does not provide market conditions that are likely to support project development since a developer will simply recoup costs with no effective profit.
- Scenario 3 provides a floor from which to compare additional scenarios which are more advantageous to project development.

SCENARIO 4: Minimum credit for baseline viability - assumptions

Scenario 2 was modified with the aim of identifying the value of the market subscriber class subscription credit required to drive project economics to equal an IRR of 10%.

This IRR was based on regulated utility guaranteed rate of return; however, this value is conservative as a developer is exposed to greater risk than a regulated utility, which has guaranteed return on their investments.

Assumption modifications

- Project size – 5MWac
- Contract length 20 years
- Customer mix 60/40
  - 60% Market
  - 40% LMI
- Investment tax credit (ITC)
  - 30%
- Renewable energy credit (REC)
  - $2/MWh

SCENARIO 4 - Result

System Characteristic	
System Capacity	5 MWac (6 MWdc)
Annual AC energy in Year 1	10,571,650 kWh
DC capacity factor in Year 1	20.10%
Energy yield in Year 1	1,762 kWh/kW

Financial Details	
Net capital cost	$ 11,572,277
CAPEX Rate	$1.93/Wdc
REC revenue in Year 1	$211,433
NPV Net present value	$239,072
IRR Internal rate of return	10.00%
Subscription Rate ($/kWh)	
LMI	$0.08925
Market	$0.08380
Subscription Credit ($/kWh)	
LMI	$0.11156
Market	**$0.10056**

- To ensure a developer receives a 10% IRR with the same conditions as scenario 3 would require increasing the market subscription rate even further to ~$0.084/kWh, correlating to a subscription credit of ~$0.10/kWh.
- This scenario still guarantees all subscribers a 20% subscription savings while making development more likely.
- The subscription rate assumes the developer secures REC payments, a 30% ITC payment, and can completely fill all subscriptions in year 1 through 20.
- Any lower REC payments or unsubscribed portion of the project will degrade economics and either reduce project likelihood or require revenue to be made up through another avenue.

Considerations

- The scenarios modeled assumed a customer class breakdown/mix to qualify the project as an LMI facility per the CS rule requirements. A developer will consider the tradeoff between increased potential subscription rate payments from LMI customers (under current rules) which comes with an increased acquisition/retention cost and risk to determine the ideal customer mix. The customer mix will differ from that exactly modeled, however comparative results from the modeling performed will remain valid.
- Subscription savings does not equal bill savings. A bill savings is not guaranteed for market customers even in scenarios 1 through 4 where a subscription savings is modeled since the subscriber's utility rate is unknown. The 20% subscriber savings was deployed as a best practice in place of being able to verify a bill savings.
- A topic not addressed in the modeling here is upfront subscription payments. All subscription costs were assumed to be monthly ongoing costs with no payment at the outset. Some programs or projects include an upfront payment by subscribers to assist with project finances at early stages. Front loaded subscription costs will increase the value to both the project developer and owner as future money is worth less than current money in finance terms. However, an upfront payment can often be a barrier to entry for subscribers, especially for LMI customers, which makes upfront payment inclusion a tradeoff between customer enrollment and project finances.
- Technical model parameters affect the financial outcome, especially system generation. If the solar system produces less energy than predicted, project cashflow will be negatively affected. The model assumes a standard 1-axis tracking solar array located in New Orleans. Without site specifics, more precise production modeling is impossible. A generic model is acceptable since the work performed is representative and not specific. Values presented should be used for education purposes and as guiding principals rather than inflexible and exact predictions.

Findings

- Current and proposed rules provide a developer inadequate cashflow for project development.
- An increased subscription credit, thus allowing for an increased subscription rate, may help provide developers with adequate cashflow to finance projects.
- Under current program rules, a developer is incentivized to charge LMI customers with a higher subscription rate than market customers.
  - The incentive arises since a developer hoping to attract customers by providing a set subscription savings can charge LMI customers more while still providing the same percent savings when compared to market customer due to higher subscription credit rate for LMI customers.
- Subscription credits can be set by correlating them to retail rates and then back calculating what subscription rates to consider that will also create an advantageous cashflow for project development.
- Bill savings can only be calculated and/or guaranteed if the subscription credit is linked to the retail rate and subscription costs are less than the subscription credits.
- A balance between customer savings and developer profit is important to ensure the program is attractive to both customers and developers.
  - Without this balance projects are unlikely to be developed and/or built projects will struggle to attract customers reducing future development likelihood.

Assumptions & Disclaimer

Assumptions

- Location (Lat/Long): 29.9537, -90.0777 [TMY weather file used from NSRDB]
- Nameplate Capacity: 2,400 kWdc (2,000 kWac) & 6,000 kWdc (5,000 kWac)
- DC/AC ratio: 1.2
- Ground Coverage Ratio (GCR): 1.3
- Tracking: 1-axis
- Azimuth: 180°
- Annual AC degradation rate: 0.5%
- Capital cost: 1.93 $/Wdc
- Operation & Maintenance cost: 15.5 $/kWdc-yr
- Lease cost: $70,000/yr
- Federal and State income tax rate: 21% and 5.7%
- Sales tax rate: 4.45%
- Inflation Rate: 2.5%
- Real discount rate: 6.2%
- Debt-Service Coverage Ratio (DSCR): 1.3
- Interest Rate: 5%
- REC Price: $2/MWh

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Disclaimer

This work was authored in part by the National Renewable Energy Laboratory, operated by Alliance for Sustainable Energy, LLC, for the U.S. Department of Energy (DOE) under Contract No. DE-AC36-08GO28308. Funding provided by the U.S. Department of Energy Office of Energy Efficiency and Renewable Energy, Solar Energy Technologies Office. The views expressed in the article do not necessarily represent the views of the DOE or the U.S. Government.

CONFIDENTIAL/SUBJECT TO NDA

July 7, 2023

SETTING THE SOLAR BILL CREDIT:

HOW TO UNLOCK THE FULL VALUE POTENTIAL OF COMMUNITY SOLAR IN NEW ORLEANS

PREPARED FOR TOGETHER NEW ORLEANS

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Liability

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Table of Contents

1 EXECUTIVE SUMMARY

Gabel Associates, Inc. (Gabel) has agreed to provide Together New Orleans with an independent analysis (Report) of the Council of City of New Orleans' (CNO) Resolution No. R-22-76 (Resolution) and estimates of the full range of benefits provided by community solar. These estimates of benefits provide a basis for setting the solar Bill Credit in way that is fair to customers, allows the Community Solar Program to ,move forward in an effective manner and prevents subsidies of the program. The Resolution amended the City's Community Solar Rules relating to the development of a Community Solar Bill Credit (Bill Credit).

This analysis builds on a prior report provided to Together New Orleans on June 16, 2023, and sets out a quantification of Bill Credits based on recognized principles of energy market economics. The June 16 report provided an overview of the Bill Credit and the need to value the full range of benefits community solar provides. This report provides estimates of multiple community solar benefits and shows that the current Bill Credit drastically undervalues the full range of benefits community solar provides. Some of these benefits are not recognized by the City's current tariff or the analysis submitted by Entergy New Orleans submitted on June 16, 2023.

The analysis underlying this report is based on Gabel's expertise and thirty years of experience in addressing electricity market issues as well as its review of how similar Bill Credits have been evaluated and implemented throughout the United States. The firm has testified extensively on such issues throughout the United States.

A key element to the success of community solar projects is for the incumbent utility to provide a Bill Credit that provides a stable and appropriately valued price signal to invest in community solar projects. The Bill Credit indicates the utility bill savings realized by participating customers. To the extent the price for the energy (or subscription fee) from the community solar project is less than Bill Credit, the customers will realize savings. Importantly, the Bill Credit should reflect the full value of community solar to ensure that the entire range of benefits from the project are properly captured and does not result in any cross-subsidization from other ratepayers. If the Bill Credit is set unnecessarily low (that is, less than the benefits the solar power yields), participating customers will not realize savings that are sufficient to allow for project development, and the City will not experience economically justified levels of community solar growth.

This Report presents an evaluation of the Bill Credit implemented under the Resolution, showing that the current Bill Credit framework fails to capture the full value stack of benefits community solar provides. The Bill Credit was designed to provide a clear, streamlined path towards the development of community solar, aiming to improve the quality of life for citizens and businesses through clean and sustainable technology. However, the current approach significantly undervalues both the direct and broader benefits that flow from community solar.

Notably, the Bill Credit method in the Resolution does not fully account for the *direct* benefits community solar provides in avoiding generation capacity costs, the merit order benefits whereby community solar reduces power costs for all customers, or the *direct* benefits relating to community solar's ability to avoid transmission and distribution capacity costs.

Lastly, the Bill Credit fails to account for any *societal* benefits, which include avoidable greenhouse gas emissions and air pollutant externalities and incremental financial benefits resulting from the higher jobs and local economic growth resulting from building community solar resources in place of traditional generation resources. Reducing ground-level emissions in an urban area like New Orleans is particularly important as these areas and the health of residents are more severely impacted by poor air quality.

To more adequately capture the value stack of community solar, we propose the following improvements to the Bill Credit:

1. Replace the Avoided Capacity Cost Component Reference Resource: The CNO should revise the reference resource from a Natural Gas Combustion Turbine (NGCT) peaker to a Natural Gas Combined Cycle (NGCC). An NGCC provides a more accurate representation of the kind of resource likely to be displaced by community solar. Due to their more efficient operating process, NGCCs are more frequently developed as the "next fossil build", rather than NGCTs, which operate for limited hours with higher emission rates.
2. Reflect the "merit order benefits" of community solar. Merit Order effect is a widely recognized impact in power markets. Because solar energy has a no variable operating cost (as there is no fuel cost), when solar energy is injected into the grid it has the effect of displacing the highest variable cost of generation on the grid. Because the highest source sets the price energy price for the grid in any hour, this has the effect of reducing the market clearing energy price in the grid. This, in turn, reduces the price paid for energy and capacity by all customers. The merit order effect is recognized as a standard approach in analysis of energy prices. Excluding its impact, setting the Bill Credit unreasonably low undervalues the Bill Credit and the benefits generated by community solar.
3. Incorporate Avoided Transmission and Distribution Capacity Costs: The Bill Credit should include avoided transmission and distribution costs. By reducing strain on the grid, community solar installations can save significant resources and expenditures that would otherwise be required for transmission and distribution infrastructure upgrades. These cost savings should be included in the Bill Credit to reflect the savings solar provides to the grid. To the extent battery storage is part of the project these values are even greater.
4. Account for Avoided Emissions and Air Pollutants Costs: Community solar contributes to significant reductions in greenhouse gas emissions including carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O); and air pollutants such as nitrogen oxides (NOX), sulfur oxides (SOX), and particulate matter (PM). By incorporating the value of these environmental benefits into the Bill Credit, the CNO can make the value stack of community solar projects more complete and reflective of societal benefits, thereby encouraging investment in such projects. Reflecting the reductions in emissions and particulates is especially relevant in urban environments like New Orleans, which are disproportionately impacted by poor air quality and its negative effect on the health of its residents.
5. Recognize Incremental Economic Benefits: The Bill Credit should account for the additional economic benefits from improved grid reliability and local economic growth. Enhanced grid reliability can lead to fewer service interruptions, thereby reducing costs and increasing

productivity and economic output. Local construction of community solar projects can also stimulate economic growth and create jobs, which are beneficial to the community. Including these economic benefits in the Bill Credit can further incentivize the development of community solar projects.

This Report addresses the common misconception that a full value stack Bill Credit would be a form of subsidy. A Bill Credit based on the full value stack of benefits from community solar should not be considered a subsidy as the value stack represents the actual benefits community solar can provide. Rather than providing financial aid to make an unviable activity viable, a full value stack Bill Credit serves to correct a market distortion where the true value of community solar power is unrecognized. Including these benefits in a Bill Credit promotes fair competition, enhances transparency in pricing, and supports sustainable economic development, thereby aligning with the aims of the CNO. In short, a properly set Bill Credit merely monetizes the benefits which solar provides, assigns them to the participating customers who are paying for the solar project, and does not require non-participants to subsidize community solar.

Finally, this Report illustrates the magnitude difference between the Council's Bill Credit and the full value stack of benefits provided by community solar by quantifying the estimated direct and societal benefits of community solar. This analysis measures the merit order price impacts for energy and capacity; avoided costs of generation energy and capacity; avoided costs of transmission and distribution system capacity and line losses costs; avoided emissions costs; local economic value added from building community solar resources instead of utility-scale resources; and the ratepayer economic value of avoided power outages and improved system reliability. Accordingly, the Council should re-set the bill credit calculation framework to fully account for all community solar's direct and societal benefits.

Direct Benefits

Benefit Type	Full Value Stack (¢/kWh)	CNO Bill Credit (¢/kWh)	CNO Shortfall (¢/kWh)
Energy Merit Order Price Impacts	4.01	-	4.01
Capacity Merit Order Price Impacts	0.45	-	0.45
Avoided Energy Costs	3.79	3.79	-
Avoided Capacity Costs	3.42	2.22	1.20
Avoided T&D Costs	3.20	-	3.20
Subtotal	**14.85**	**6.00**	**8.85**

Societal Benefits

Benefit Type	Full Value Stack (¢/kWh)	CNO Bill Credit (¢/kWh)	CNO Shortfall (¢/kWh)
Avoided Emissions Costs	16.27	-	16.27
Avoided Economic Losses from Improved Reliability	1.90	-	1.90
Local Economic Value Added	0.01	-	0.01
Subtotal	**18.18**	**-**	**18.18**

Total Benefits

Benefit Type	Full Value Stack (¢/kWh)	CNO Bill Credit (¢/kWh)	CNO Shortfall (¢/kWh)
Direct Benefits	14.85	6.00	8.85
Societal Benefits	18.18	-	18.18
Overall Total	**33.03**	**6.00**	**27.03**

Our analysis shows that **the full value stack of community solar benefits equals ¢33.03/kWh, which is nearly 82% higher than the Bill Credit value calculated consistent with the Council's current framework**. Even if societal benefits are not recognized, a bill credit based on direct ratepayer benefits should be set at ¢14.85/kWH. It is clear that the current Bill Credit calculation framework significantly undervalues the benefits community solar can provide which, in turn, leads to a Bill Credit that is unreasonably low. Accordingly, the Council should re-set the Bill Credit approach to fully recognize the benefits of community solar. This will not cause a subsidy of community solar as it only reflect the benefits caused by community solar and does not require the Program to be underwritten by non-participating customers.

For example, in the context of wholesale power markets, "merit order" refers to the ranking or sequence in which sources of electrical power are dispatched based on their cost of production. The cheapest source of power is dispatched first, then the next cheapest, and so on. This ranking includes all possible power sources, such as coal, natural gas, nuclear, wind, solar, etc. Each power source's placement on the merit order is determined by their marginal cost, i.e., the cost to produce an additional unit of power.

The merit order usually starts with renewable energy sources like wind and solar because, after the initial investment in infrastructure, their marginal cost is close to zero – there is no fuel to be paid for once the solar panels are built. After renewables, traditional power plants like nuclear and hydro are dispatched, followed by coal and then natural gas plants, which usually have the highest marginal cost.

In power markets, the price for electricity is often set by the last (or most expensive) source of power dispatched – this is sometimes referred to as the marginal or market-clearing price. During periods of high demand, if a higher-cost power plant is needed to meet the additional system demand because lower-cost resources are unavailable, the price for all electricity sold in that period would be set at the marginal cost of the more expensive resource. And because community solar has zero variable production costs, adding more community solar to the power grid will force higher marginal cost resources out of the energy market supply stack – thereby creating immediate and sustained downward pressure on market prices as lower cost marginal resources set the market-clearing price.

2 INTRODUCTION

Gabel Associates, Inc. (Gabel) has agreed to provide Together New Orleans with independent analysis (Report) of the Council of City of New Orleans' (CNO) Resolution No. R-22-76 (Resolution). This Resolution amended the City's Community Solar Rules relating to the development of a Community Solar Bill Credit (Bill Credit).

This report is based on Gabel's expertise and thirty years of experience in addressing electricity market issues as well as its review of how similar Bill Credits have been evaluated and implemented throughout the United States.

2.1 Gabel Associates, Inc.

Gabel is a well-established energy consulting firm that provides economic, regulatory, and technical analysis and advice to a wide range of energy clients. The firm has been providing analysis of wholesale and retail energy markets and projects for close to 30 years – this includes the analysis of avoided costs and detailed energy price modeling. We also provide a host of analytical and support services for power resources throughout the United States.

Gabel lives in both the world of energy market transactions (having undertaken project development for over 300 renewable and fossil-fuel generation projects and executed energy transactions for hundreds of thousands of accounts) and in the world of regulatory and policy analysis. We provide regulatory support on complex matters and expert testimony at the regional transmission organization (RTO), State, and Federal Energy Regulatory Commission (FERC) level, including before the Public Service Commission of Louisiana.

Gabel has provided extensive analysis in various jurisdictions related to the value of energy provided by renewable and non-renewable resources, including valuations of both direct energy values as well as environmental, societal, direct, indirect, and induced economic impact for a wide range of resources including solar, wind, offshore wind, as well as fossil resources.

Gabel is also deeply involved in the development of regulations and project development for community solar in New Jersey. We have participated in New Jersey's proceedings related to community solar for the past five years and have also consulted on the development of projects in New Jersey, which are being developed to serve only low and moderate income (LMI) customers.

2.2 Together New Orleans

Together New Orleans is a broad-based coalition of congregations and community-based organizations in the greater New Orleans area, with the capacity to address community problems large and small. The coalition is deliberate about crossing the lines of race, religion, neighborhood, and political affiliation. Together New Orleans is a non-partisan organization that works on issues affecting families and communities in New Orleans. Together New Orleans's primary objectives include:

- build relationships across New Orleans's communities, based on trust and a willingness to listen;
- equip members and leadership with skills and practices to get results, and
- achieve change on concrete issues, as part of Together New Orleans's common call to justice.

Together New Orleans is part of the Industrial Areas Foundation (IAF), the nation's oldest and largest broad-based organizing network. There are more than 65 IAF organizations around the country, including projects in Alexandria, Baton Rouge, the Louisiana Delta, Monroe, and Shreveport-Bossier.

3 VALUE OF SOLAR OVERVIEW

The "Value of Solar" (VOS) is a term used to represent the full range of economic value that solar power generation provides to the electricity grid and society as a whole. It is a framework used to determine fair compensation or Bill Credits for solar energy exported to the grid by solar power system owners. The Value of Solar can take into account various factors, including the environmental benefits, energy generation, and the grid-related services provided by solar power systems. The specific methodology and factors considered in calculating the Value of Solar can vary depending on the region, local regulations, and the utility company involved. It is often determined through collaborative efforts involving utility companies, regulatory agencies, solar industry stakeholders, and consumer advocates. The Value of Solar is used as a basis to establish fair compensation mechanisms that allow solar power system owners to receive Bill Credits or payments for the electricity they generate and export to the grid. These mechanisms aim to ensure that solar power system owners are appropriately compensated for the value they provide to the electricity system and society.

3.1 Value of Solar Components

The Value of Solar reflects the full "Value Stack" of economic and environmental benefits made possible by building and operating solar power plants:

1. Direct Benefits
    a. Avoided generation energy costs;
    b. Avoided generation capacity costs;
    c. Avoided transmission capacity costs;
    d. Avoided distribution capacity costs;
    e. Energy merit order price impacts; and
    f. Capacity merit order price impacts.
2. Societal Benefits
    a. Avoided greenhouse gas emissions (CO_2, CH_4, N_2O) social costs;
    b. Avoided air pollutants (NO_X, SO_X, PM) costs;
    c. Incremental economic benefits resulting from improved system reliability; and
    d. Incremental economic benefits resulting from local construction.

Avoided generation energy costs are the customer bill savings realized by not having to procure energy from traditional sources, such as coal or natural gas, which are usually more expensive and less sustainable than community solar. When a community deploys a shared solar power system, the cost to generate electricity is primarily based on the initial capital expenditure and minimal fixed operational expenses. After the system is deployed, however, the 'fuel' – sunlight – is free. This is in contrast to conventional power plants, which rely on expensive fossil fuels. Therefore, community solar can "avoid" the need to generate costly power from polluting resources.

Avoided generation capacity costs are the expenses that a utility or grid operator avoids by not having to invest in, operate, and maintain additional power generation infrastructure by procuring an equivalent amount of generation capacity from community solar projects. The term "capacity" here refers to the maximum output that a power plant or a power system can produce. In the context of community solar power, this refers to the value that is created by reducing the need for additional or upgraded traditional power plants like coal, gas, or nuclear, which are often expensive to build, run, and maintain. When community solar projects generate electricity, they feed it back into the grid. This supply of power decreases the overall demand that the utility or grid operator needs to meet. As a result, the utility does not have to rely as much on traditional power plants or invest in building new ones to meet peak demands. When the need for traditional power plants decreases, the associated costs of these plants – capital costs, operation and maintenance costs, and even decommissioning costs at the end of their life – are also avoided. This is a saving for the utility, and depending on the regulatory context, these savings may also be passed on to consumers in the form of lower energy bills.

Avoided transmission and distribution capacity costs reflect the reduced need for investments in constructing and maintaining transmission and distribution infrastructure. With community solar, power is generated closer to the point of use, typically within the same community or region. This reduces the need for extensive investments in transmission lines, substations, transformers, and distribution lines, thereby lowering the associated capacity costs that would otherwise have been incurred. The cost savings are referred to as "avoided" because they represent expenses that utilities would otherwise have to incur in order to expand and maintain the grid infrastructure necessary to accommodate increasing demand or replace aging infrastructure.

Avoided emissions and pollutants costs reflect the economic savings resulting from using clean power from community solar resources instead of emitting power from traditional thermal resources. Greenhouse gas emissions, including carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O), are major contributors to climate change, and opting for solar power reduces our impact on global warming. The EPA's social cost of carbon assigns a monetary value to the long-term damage caused by greenhouse gas emissions, considering factors like reduced agricultural productivity, health effects, property damages, and changes in energy system costs.[1] Avoided air pollutants, such as nitrogen oxides (NOX), sulfur oxides (SOX), and particulate matter (PM), emitted by traditional energy generation, also have negative effects on human health and the environment. The savings in health and environmental costs associated with these pollutants are calculated based on factors including medical treatment expenses, lost workdays, and environmental degradation costs. These avoided costs highlight the economic and social advantages of community solar, which not only generates electricity but also contributes to mitigating climate change, improving public health, protecting the environment, and promoting environmental justice – especially in communities near traditional power plants.

Incremental economic benefits from improved system reliability refer to the increased economic value communities gain when transitioning from a centralized grid to local solar energy generation. Community solar projects bolster energy security, reducing the risk of power outages by creating redundancy in power sources and often being paired with energy storage for load shifting. These improvements are crucial as

[1] National Center for Environmental Economics, Office of Policy, Climate Change Division, Office of Air and Radiation, U.S. Environmental Protection Agency. (2022, September). Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances. Accessed at: https://www.epa.gov/system/files/documents/2022-11/epa_scghg_report_draft_0.pdf

power disruptions can lead to significant economic costs, such as lost business revenue, damaged equipment, and productivity loss. Therefore, community solar not only reduces energy costs and has environmental benefits but also increases system reliability, providing an additional layer of economic benefits.

Incremental economic benefits resulting from local construction refer to the financial and job growth benefits that communities gain when local resources are utilized to construct community solar projects. This process stimulates local economies by creating jobs, often in areas such as construction, electrical work, and project management, and circulates money within the community. When comparing different types of generators on a dollar-per-kilowatt of installed capacity, building small-scale behind-the-meter solar projects like community solar systems can generate more jobs and local economic growth than larger, traditional resources.[2] Additionally, these projects can lead to the development of local skills and capacities, further benefiting the local economy. Therefore, community solar projects not only offer energy and environmental advantages but also spur local economic growth, providing a multi-faceted benefit.

[2] Testimony of Adrian J. Kimbrough on behalf of the Maryland-DC-Virginia Solar Energy Industries Association, Commonwealth of Virginia, State Corporation Commission, In the matter of the 2020 RPS Proceeding for Virginia Electric and Power Company, Case No. PUR-2020-00134, January 4, 2021, pgs. 32-35.

4 COMMUNITY SOLAR BILL CREDIT OVERVIEW

The Council of the City of New Orleans (CNO or Council) serves as the legislative body of the city, responsible for enacting laws and regulations to protect the public's health, safety, and welfare. This includes utility regulation, which sets the Council apart from many other cities in the United States. While state Public Service Commissions typically handle utility regulation, the Council has the authority to regulate electric and gas utilities within the city. This unique role allows the Council to ensure the provision of reliable and affordable utilities to the residents of New Orleans by advancing initiatives such as the introduction of a community solar Bill Credit through Resolution No. R-22-76.

Community solar refers to a shared solar energy project that allows multiple individuals or businesses to benefit from a single solar installation. It promotes renewable energy adoption by providing a more accessible and affordable option for individuals who may not have the resources or suitable conditions for installing solar panels on their own roofs. This expands the reach of solar energy, reducing dependence on fossil fuels and contributing to the fight against climate change. Community solar also helps to democratize the benefits of solar power by allowing renters, low-income households, and those living in multi-unit buildings to participate in and benefit from clean energy generation. Furthermore, community solar projects often create local jobs, stimulate economic growth, and enhance energy resiliency within communities. They foster collaboration and engagement among community members, encouraging a sense of shared responsibility and promoting a sustainable future. Overall, community solar plays a crucial role in accelerating the transition to clean energy by making solar power accessible, inclusive, and economically viable for a wider population, while fostering community involvement and sustainability.

CNO's implementation of a community solar Bill Credit serves multiple purposes. It aligns with the Council's commitment to clean and sustainable technology, supports the development of solar energy projects, and provides ratepayers with a means to invest in renewable energy while receiving credits on their energy bills. By establishing clear rules and a streamlined process, the council aims to facilitate the widespread adoption of community solar in the city of New Orleans.

4.1 Community Solar Bill Credit Components

Under Resolution No. R-22-76, the Community Solar Bill Credit, the local utility will apply credits to the monthly utility bill of each community solar subscriber. The calculation of these credits incorporates two key variables: avoided energy costs and avoided capacity costs, both quantified in dollars per kilowatt-hour ($/kWh).

The avoided energy costs component is based on the average of the preceding calendar year's Locational Marginal Prices (LMP), specific to the utility. The LMPs for each hour are weighted according to the projected hourly output of a standardized 1-kWdc fixed array solar photovoltaic system.

The avoided capacity costs component is based on the Midcontinent Independent System Operator's (MISO) Cost of New Entry (CONE) value for the planning year that matches the month in which the credit is issued. The formula for calculating the avoided capacity cost is as follows:

- Avoided Capacity Cost = (CONE $/kW-yr * Solar Resource Adequacy Percentage) / Annual Estimated Energy kWh.

In this formula, CONE represents the estimated cost of building a new natural gas combustion turbine (NGCT) peaker within MISO's Local Resource Zone 9 for the relevant planning year. The Solar Resource Adequacy Percentage refers to the proportion of the solar project's installed capacity that can be relied upon to contribute to system peak demand. Lastly, the Annual Estimated Energy represents the energy output, measured in kWh, from a 1 kWdc solar PV installation in New Orleans, as determined by the National Renewable Energy Laboratory’s PVWatts Calculator, using a standard fixed array system with a tilt and orientation typical for New Orleans.

4.2 Community Solar Bill Credit Deficiencies in the Council’s current approach

The City of New Orleans has taken a commendable step by implementing the Community Solar Bill Credit to promote the development of community solar and encourage the use of clean and sustainable technology. However, it is important to recognize that the current Bill Credit does not fully capture the vast array of benefits that solar power offers. The primary deficiencies of the Bill Credit include the following:

1. Bill Credit Deficiencies Relating to Direct Benefits
    a. It does not fully capture avoided generation capacity costs
    b. It does not capture any avoided transmission capacity costs
    c. It does not capture any avoided distribution capacity costs
    d. It does not capture any energy merit order price impacts
    e. It does not capture any capacity merit order price impacts
2. Bill Credit Deficiencies Relating to Societal Benefits
    a. It does not capture any avoided greenhouse gas emissions costs
    b. It does not capture any avoided air pollutants costs
    c. It does not capture any incremental economic benefits resulting from improved reliability
    d. It does not capture any incremental economic benefits resulting from local construction

First, the Bill Credit does not fully capture avoided generation capacity costs resulting from community solar because the avoided capacity cost formula understates the reference resource costs. The costs are understated for two reasons: (1) they are based on a cheaper but less representative new build Natural Gas Combustion Turbine (NGCT) peaker rather than a costlier but more representative new build Natural Gas Combined Cycle (NGCC); and (2) the Bill Credit formula cuts the costs in half by applying a proxy solar reliability adjustment factor.

The capacity costs are understated because the reference resource is based on an NGCT peaker, which is unrepresentative of the type of resource which would most likely be displaced by a new community solar installation. New NGCCs are the most likely resource to be displaced because they are more economically viable and much more widely used than NGCTs.[3] Although NGCTs may be cheaper to build than the most likely alternative, NGCCs, new NGCTs are less common than new NGCCs. For example, NGCCs comprise approximately 80% of all new NGCTs and NGCCs built over the past ten years across the United States.[4] Additionally, NGCTs typically operate sporadically and in different periods compared to solar. NGCCs, on the other hand, operate more regularly and during periods that are better aligned with those in which solar operates, offering a better comparison for solar's capacity value. Shifting the reference from NGCT to NGCC would offer a more equitable and representative valuation of the benefits community solar can provide to New Orleans.

Second, the Bill Credit does not capture any avoided transmission or distribution costs, which undermines the appropriate valuation and effectiveness of the Bill Credit. Transmission and distribution infrastructure is a vital part of any power grid, and by not accounting for the savings associated with reducing strain on this infrastructure, the Bill Credit undervalues the full range of benefits community solar provides. The absence of avoided transmission and distribution capacity costs from the credit calculations distorts the Bill Credit's price signal and the attractiveness of community solar projects as a viable generation option to develop going forward, thus counteracting CNO's objectives of streamlining the path to community solar development and efficient use of clean technology in New Orleans.

Third, the Bill Credit does not capture any merit order price impacts. In the context of wholesale power markets, "merit order" refers to the ranking or sequence in which sources of electrical power are dispatched based on their cost of production. The cheapest source of power is dispatched first, then the next cheapest, and so on. This ranking includes all possible power sources, such as coal, natural gas, nuclear, wind, solar, etc. Each power source's placement on the merit order is determined by their marginal cost, i.e., the cost to produce an additional unit of power. The merit order usually starts with renewable energy sources like wind and solar because, after the initial investment in infrastructure, their marginal cost is close to zero – there is no fuel to be paid for once the solar panels are built. After renewables, traditional power plants like nuclear and hydro are dispatched, followed by coal and then natural gas plants, which usually have the highest marginal cost.

In power markets, the price for electricity is often set by the last (or most expensive) source of power dispatched – this is sometimes referred to as the marginal or market-clearing price. During periods of high demand, if a higher-cost power plant is needed to meet the additional system demand because lower-cost resources are unavailable, the price for all electricity sold in that period would be set at the marginal cost of the more expensive resource. And because community solar has zero variable production costs, adding more community solar to the power grid will force higher marginal cost resources out of the energy market supply stack – thereby creating immediate and sustained downward pressure on market prices as lower cost marginal resources set the market-clearing price.

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[3] *See* The Brattle Group, *PJM CONE 2026/2027 Report*, April 21, 2022, pg. v. Accessed at: https://www2.pjm.com/-/media/library/reports-notices/special-reports/2022/20220422-brattle-final-cone-report.ashx

[4] U.S. Department of Energy, Energy Information Administration, Form EIA-860 (2022). Accessed at https://www.eia.gov/electricity/data/eia860/

Fourth, the Bill Credit does not capture any avoided emissions costs or air pollutants cost, a glaring oversight that could limit the potential for the New Orleans' Community Solar Rules to fully achieve its objectives. The current design of the Bill Credit only incorporates avoided energy costs and avoided capacity costs, leaving out crucial elements that quantify the broader societal benefits of clean, solar power. By excluding these costs, the policy fails to fully reflect the value of the environmental advantages of renewable solar energy. The avoided emissions costs are substantial and include known and measurable costs related to the environmental damage and health impacts from traditional fossil fuel energy sources. Additionally, the absence of air pollutants costs in the Bill Credit fails to account for the reduction in harmful pollutants like nitrogen oxides (NOx), sulfur oxides (SOx), and particulate matter (PM) emissions that are achieved through the use of solar energy. These omissions underestimate the full value of solar power and may inadvertently discourage investments in community solar projects, potentially undermining the Council of City of New Orleans' goal of supporting the efficient use of clean and sustainable technology to improve the quality of life for local citizens and businesses.

Fifth, the Bill Credit does not capture any incremental economic benefits from community solar, which could impede the City of New Orleans' aim to fully leverage clean, sustainable technology and bolster local quality of life. While the Bill Credit takes into account avoided energy and capacity costs, it leaves out the substantial economic benefits linked to enhanced grid reliability and local construction of community solar projects. This overlooks the value of having a resilient energy system, which can lead to lower costs due to fewer service interruptions, as well as the economic stimulation provided by local construction. Projects in community solar not only create jobs but also infuse capital into the local economy, catalyzing a virtuous cycle of development. Additionally, the framework underestimates the local environmental benefits of community solar power, such as the reduction of greenhouse gas emissions and air pollutants.

In essence, the Community Solar Bill Credit, in its current form, does not fully capture the broad value stack of solar power, and thus does not provide adequate incentives for the increased adoption necessary to achieve CNO's objectives. This under-recognition may impede the growth and development of community solar projects in New Orleans and limit their potential positive impact on local citizens and businesses.

4.3 Community Solar Bill Credit Recommendations

To truly reflect the holistic value that community solar brings, we suggest the following improvements to the existing Community Solar Bill Credit (CSBC):

1. Direct Benefits Recommendations
    a. Replace the Avoided Capacity Cost Component Reference Resource: The CNO should revise the reference resource from a Natural Gas Combustion Turbine (NGCT) peaker to a Natural Gas Combined Cycle (NGCC). An NGCC provides a more accurate representation of the kind of resource likely to be displaced by community solar. NGCCs operate in a

more regular pattern and during similar periods to solar, making them a more suitable comparison to calculate solar's capacity value.

   b. Incorporate Avoided Transmission and Distribution Capacity Costs: The Bill Credit should consider the avoided transmission and distribution costs. By reducing strain on the grid, community solar installations can save significant resources that would otherwise be required for transmission and distribution infrastructure upgrades. Including these cost savings in the Bill Credit would make community solar projects more attractive and financially viable.
   c. Incorporate Merit Order Price Impacts for the estimated energy and capacity market price impacts resulting from higher levels of community solar generation. Community solar can reduce the market price for both energy and capacity, as solar displaces higher cost generation, resulting in reduced market clearing prices.

2. Societal Benefits Recommendations
   a. Account for Avoided Emissions and Air Pollutants Costs: Community solar contributes to significant reductions in greenhouse gas emissions and air pollutants. By incorporating the value of these environmental benefits into the Bill Credit, the CNO can make the value stack of community solar projects more complete, thereby encouraging investment in such projects. These values have been extensively studied and quantified at a national, regional and international level and these recognized values should be reflected in the Bill Credit valuation.
   b. Recognize Incremental Economic Benefits: The Bill Credit should account for the additional economic benefits from improved grid reliability and local economic growth. Enhanced grid reliability can lead to fewer service interruptions, thereby reducing costs. Local construction of community solar projects can stimulate economic growth and create jobs, which are beneficial to the community. Including these economic benefits in the Bill Credit can further value the development of community solar projects.

By implementing these recommendations, the Council of City of New Orleans can ensure that the Community Solar Bill Credit fully captures the broad value stack of solar power. This would provide a more comprehensive and attractive incentive for community solar development, thereby supporting the city's goals of clean, sustainable technology use, improved local quality of life, and robust economic growth.

4.4 A Bill Credit Based on the Full Value Would Not be a Subsidy

Incorporating the full value stack of benefits from community solar should not be considered a subsidy. Before elaborating on this point, it is necessary to first understand what a subsidy is.

In the context of electric utility ratemaking, a subsidy is typically defined as a financial contribution by one customer class (e.g., residential, commercial, industrial, etc.) to offset costs caused by another customer class. This can occur through rate structures where the costs are not equally distributed based on the actual usage or cost of service for each customer class.

A Bill Credit that incorporates the full value stack of benefits from community solar is not a subsidy because it would only compensate participating customers for the benefits their solar power provides to other customer classes. Unlike subsidies, which are often needed to make an otherwise unviable activity viable, a Bill Credit for solar power aims to provide a more accurate reflection of its value. Community solar generates tangible and quantifiable benefits, such as reducing the strain on transmission and distribution networks, reducing energy and capacity prices through the merit order effect, enhancing grid reliability, and stimulating local economic growth through job creation. It also provides significant environmental benefits, including reducing greenhouse gas emissions and air pollutants.

5 SOLAR VALUE STACK ESTIMATES

To correct for the Bill Credit deficiencies outlined above, we estimated the $/MWh values associated with the following solar value stack benefits:

1. Direct Benefits
    a. Energy Merit Order Price Impacts;
    b. Capacity Merit Order Price Impacts;
    c. Avoided generation energy costs;
    d. Avoided generation capacity costs; and
    e. Avoided transmission & distribution capacity costs.
2. Societal Benefits
    a. Avoided emissions (CO_2, CH_4, N_2O, NO_x, SO_2, PM) costs;
    b. Incremental economic benefits resulting from improved system reliability; and
    c. Incremental economic benefits resulting from local construction.

This section summarizes our analysis methodology and results.

5.1 Energy Merit Order Price Impacts

Energy merit order price impacts refer to the potential change in energy market prices that occur as total system demand falls. For example, as community solar generates power and serves its customers all "behind the meter", total system demand for energy supplied by the grid will fall. This, in turn, will push more expensive generators out of the energy market supply stack, thereby resulting in a lower overall market clearing price that can impact customers throughout the grid.

Importantly, the Council does not account for this component in its Bill Credit calculation. This omission is of critical significance because it fails to recognize the real and tangible benefits resulting from community solar's inherent ability to reduce system demand and energy market prices. By ignoring this merit order component, the CNO undervalues the benefits provided by community solar.

We estimate the bill credit value for this component using a multivariate linear regression analysis, which is an accepted statistical process for estimating the relationships among multiple variables. The variables we evaluated include historical monthly MISO system demand, Henry Hub natural gas spot prices, and around-the-clock monthly LMPs corresponding to the Louisiana Hub. The calculated regression coefficient, which represents the reduction in price for every MWh of demand reduced, was then multiplied by the forecasted 2024 average MISO Zone 9 load. The result was then divided by the forecasted annual generation output of a hypothetical 1 kW-dc community solar array located in New Orleans.

Our results indicate a value of **4.01¢/kWh** for this component, which amounts to approximately 27% of the direct benefits value stack and 12% of the total value stack. This significant discrepancy between our results and the CNO's valuation suggests that CNO's current methodology severely undervalues the full economic impact of community solar, thereby failing to incentivize its adoption to the extent warranted by the benefits it can deliver.

5.2 Capacity Merit Order Price Impacts

Capacity Merit Order Price Impacts refers to the economic benefit accrued from reducing *peak* demand for electricity by replacing the need for grid-supplied power with behind-the-meter community solar power. This reduction in peak demand decreases the amount of supply which would otherwise be procured through MISO's forward capacity market, thereby putting downward pressure on market-clearing prices and translating into savings that can be passed on to consumers through lowered electricity bills.

The City of New Orleans' (CNO) current approach to this component of the solar value stack is to assign it a value of 0.00¢/kWh, completely disregarding the known and measurable benefits associated with this component of the solar value stack. This approach is unreasonable because it fails to acknowledge and appropriately value the economic benefits conferred by community solar through its ability to reduce capacity market prices and ratepayer demand charges. This oversight could potentially undercut the development of community solar in the area, which not only limits the adoption of sustainable energy sources, but also hinders opportunities for cost savings in the long run.

It is important to note that MISO recently implemented changes to its capacity market construct, moving from annual performance mechanism to a seasonal performance mechanism. Although MISO publishes market data which can be used to perform a capacity merit order analysis under the current construct, the recency of the market rule change and timing of this filing make performing such an analysis infeasible. As a result, and due to limited publicly available proxy data for this component, we relied on a capacity merit order price impact benchmark from a 2013 report by Synapse Energy on the Avoided Energy Supply in New England. Although the publication date and geographic scope of this analysis may limit the transferability of this estimate to New Orleans, it highlights the known and measurable benefit provided by community solar in reducing the need to procure capacity from more expensive resources. After collecting the proxy data, we then escalated the value to 2023 dollars using CPI data from the Bureau of Labor Statistics and further multiplied the result by CNO's solar resource adequacy percentage of 50%, as prescribed in CNO Resolution No. R-22-76.

Our calculations resulted in a capacity merit order value of **0.45¢/kWh**, accounting for 3% of the direct benefits value stack and 1% of the total solar value stack. These results indicate that the capacity merit order adds a material, yet currently unrecognized, value to the solar value stack. By overlooking this component, the CNO can undermine the economic viability and attractiveness of community solar, hampering efforts towards sustainable and affordable energy in New Orleans.

5.3 Avoided Energy Costs

Avoided generation energy costs refer to the savings that a utility company or an electric grid accrues when it reduces the amount of electricity it needs to generate or purchase because of the presence of a distributed energy resource such as a solar power system.

The Council of the City of New Orleans (CNO) currently accounts for avoided energy costs in the Bill Credit. It bases the avoided energy costs on the average Locational Marginal Prices (LMP) from the previous year. The LMPs, specific to the utility in question, reflect the varying prices of electricity depending on location and time, and are weighted according to the projected hourly output of a standardized 1-kWdc fixed array solar photovoltaic system.

In our analysis, we estimated the bill credit for the avoided energy costs component using historical hourly LMPs for the Louisiana Hub over a 12-month period ending in May 2023. We then weighted these prices using the expected generation output from a hypothetical 1kWdc community solar array located in New Orleans from the National Renewable Energy Laboratory's PVWatts tool. Based on these data, we calculated an avoided energy cost value of **3.79¢/kWh**. This value comprises 26% of the total direct benefits and 11% of the total overall benefits.

5.4 Avoided Capacity Costs

Avoided generation capacity costs refer to the savings that utilities experience by not having to construct new power plants due to the reduced demand made possible by community solar generation. In effect, the avoided capacity costs reflect the capital costs that would be spent on building and maintaining a new power plant that would otherwise be needed to serve load.

In the case of the current Bill Credit calculation framework, it's evident that the Council does not fully account for this aspect of the solar value stack. The current Bill Credit calculation framework is based on an NGCT peaker, which significantly understates avoided capacity costs because NGCT peakers are less expensive yet less representative than the likely type of generator which would be built to serve new load, a new NGCC plant.

The CNO's approach for this component is unreasonable because it does not fully capture the true economic value of community solar. By basing the Bill Credit on the NGCT, which is less representative of the typical resources on the grid than the NGCC, the formula fails to acknowledge the greater savings community solar can bring by displacing the need for more costly NGCC power plants.

To address this, we calculated the avoided generation capacity costs using the methodology prescribed in R-22-76[5] by multiplying MISO's 2023/2024 CONE estimate for Zone 9, which is the MISO zone in which New Orleans is located, by the solar resource adequacy percentage and then dividing this product bythe annual estimated energy of a hypothetical 1kWdc community solar array located in New Orleans. We then escalated this value by multiplying it by the ratio of new NGCC costs to new NGCT costs using data from the Energy Information Administration's (EIA) 2023 Annual Energy Outlook, Table 55 (Overnight Capital Costs for New Electricity Generation Plants).

Our results showed a value of **3.42¢/kWh**, which equals about 23% of the direct benefits value stack and 10% of the total value stack. In stark contrast, CNO's estimate for this component using the methodology as prescribed in R-22-76 equates to just 2.22¢/kWh. This is 1.20¢/kWh lower than the full value listed

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[5] See pages 24-25

above and suggests that the CNO's current approach undervalues the benefits of community solar and supports the need for a revision of the Bill Credit formula.

5.5 Avoided T&D Costs

Avoided Transmission and Distribution (T&D) costs reflect the expenditures that utilities circumvent due to the behind-the-meter production of electricity through community, thereby minimizing the need to upgrade infrastructure or build new transmission and distribution lines as frequently as would otherwise be required but for the community solar resource. Additionally, community solar-supplied energy can also reduce transmission and distribution line losses, or the dissipation of energy as heat during electricity transmission, provides an additional benefit which should be accounted for.

The Council does not attribute any value to avoided T&D costs in their solar value stack analysis. This approach completely disregards a key direct benefit provided by community solar in reducing overall system costs and improving affordability for consumers.

To estimate the Bill Credit for this component, we relied on proxy data for avoided T&D capacity and line losses costs from several recent studies relating to the value of solar. Specifically, we utilized data from reports published by Idaho Power, the Maryland Public Service Commission, the New Hampshire Department of Energy, and the Connecticut Department of Energy and Environmental Protection. Although additional studies examining this issue are publicly available, we chose to rely, instead, on the selected reports outlined above because they were published more recently and are expected to be more representative of the current value of solar.

The results of our analysis indicate an average avoided T&D cost of **3.20¢/kWh**, which translates to 22% of the direct benefits value stack and 10% of the total solar value stack. These findings suggest that CNO's current estimate falls dramatically short of the accounting for community solar's direct benefits. Incorporating these costs into the Community Solar Bill Credit would more accurately reflect the true value of community solar and provide a more equitable and sustainable framework for ratepayers in New Orleans.

5.6 Avoided Emissions Costs

Avoided emissions costs refers to the monetary savings accrued by not emitting certain pollutants into the atmosphere. The Council does not include avoided emissions costs in its calculation of the Community Solar Bill Credit, meaning the Council assigns a value of 0.00¢/kWh for this societal benefit.

The CNO's approach is unreasonable for two main reasons. First, it fails to recognize the intrinsic value of reducing harmful emissions by shifting towards cleaner, renewable energy sources. The failure to account for these avoided costs in the form of environmental and health benefits gives an incomplete picture of the total value provided by community solar and effectively subsidizes polluting generation resources, which cause the social and environmental harms without requiring any compensation to ratepayers to ensure that these harms are properly accounted for. Secondly, the omission doesn't align with the broader goal of combating climate change, a challenge where every bit of emission reduction counts.

For purposes of this analysis, we evaluated the avoided economic and social costs associated with the following pollutants: CO_2, CH_4, N_2O, NO_x, SO_2, and $PM_{2.5}$. We quantified the emission rates (in tons/MWh) for each pollutant using data from the EPA's eGRID system. We then estimated the displaced emissions, which reflect the emissions avoided by deploying a hypothetical 1kWdc community solar array in New Orleans. We then assigned costs to these emissions using data from EPA's "Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review" and "Estimating the Benefit per Ton of Reducing Directly-Emitted PM2.5" reports. We then escalated these costs to the current dollar year using CPI data from the Bureau of Labor Statistics. Lastly, we multiplied the displaced emissions by the emissions cost rates and divided this product by the 1kWdc community solar array generation output.

Our calculations yield a bill credit for avoided emissions of **16.27¢/kWh**, which constitutes 90% of the societal benefits value stack and 49% of the total solar value stack. These results suggest that the CNO's current valuation method substantially undervalues the Community Solar Bill Credit by not considering the environmental benefits of community solar. By including avoided emissions costs in the calculations, community solar's true value can be reflected more accurately, promoting its further development and adoption.

5.7 Local Economic Value Added

Local economic value added refers to the economic benefits, often in terms of job creation, local investment, and tax revenue, that are realized when energy projects like community solar are implemented in a particular locality. Compared to utility-scale solar, community solar projects often involve local contractors and suppliers, creating more jobs and funneling money directly into the local economy.

Currently, the Council does not factor in this local economic value added in their solar value stack for community solar. The Council's approach fails to account for the considerable local economic impacts that community solar projects generate. By ignoring this value, they undervalue the true benefits of community solar, which could impact the financial feasibility of such projects and potentially slow their adoption rate in the local area.

To estimate the bill credit for this component, we gathered data from the expert testimony we provided on this issue in separate but related proceeding involving the 2020 RPS Proceeding for Virginia Electric and Power Company before the Commonwealth of Virginia, State Corporation Commission. We note that reliance on this benchmark was necessary for purposes of this analysis due to the resource-intensive nature of the modeling involved as well as the relatively compressed timeline of this submission. The data we relied on to estimate the bill credit for this component includes the local economic value added, measured on a $/kW basis, from building residential solar instead and utility-scale solar resources. Because the value added from residential solar is higher than that for utility-scale solar – due to the more localized and involved nature of building residential solar resources – the difference between these two values can represent a reasonable approximation of the net value added by community solar. After subtracting the higher residential solar value added from the lower utility-scale solar value added, we then escalated the net difference to 2023 dollars using CPI data from the Bureau of Labor Statistics.

Because the value added metric reflects upfront, year one, value attributable to building a new power plant, it is necessary to levelized the value over the course of the expected operating life to ensure that the value is not overstated on an annual basis. To do this, we calculated a levelized payment using the discount rate and useful life assumptions from MISO's 2023/2024 CONE report. Finally, we divided this levelized amount by the forecasted generation output of a hypothetical 1kwdc community solar array in New Orleans based on data from NREL PVWatts to arrive at a $/kWh valuation.

Our results indicated a value of **0.01¢/kWh** for local economic value added. While this equals only 0.06% of the societal benefits value stack and 0.03% of the total solar value stack, it still reflects a known and measurable benefit that should be captured in the Bill Credit to ensure that it full accounts for the benefits community solar provides.

5.8 Avoided Economic Losses from Improved Reliability

Avoided economic losses from improved reliability refers to the economic benefits accrued from reducing or eliminating power outages. These savings come about because a more reliable power supply—like that provided by distributed community solar projects—can lessen the frequency, duration, and impact of such outages on ratepayers because community solar can reduce the strain on transmission and distribution equipment by reducing congestion and the need for grid-supplied power.

The Council's current Bill Credit framework does not include this component in its calculation of the solar value stack, and therefore does not account for the related benefits in their Community Solar Bill Credit. It assigns an estimated value of 0.00**¢**/kWh, effectively ignoring the potential cost savings from improved system reliability brought about by community solar.

To estimate the transmission share of the bill credit for this component, we first calculated the annual average transmission equipment-related outage hours for the SERC region using data from the the National Energy Reliability Corporation's (NERC) Transmission Availability Data System. We note that it was necessary to rely on SERC-level data for this initial step because more granular data was unavailable. To identify the estimated impacts applicable to Louisiana, we multiplied the total SERC equipment-related outages by Louisiana's share of total SERC net generation using data from EIA's Annual Electric Power Industry Report. Next, we calculated the estimated supply-related outages share of total outages using proxy data from EIA's Form 861, Annual Electric Power Industry Report.[6] Reliance on this proxy data was necessary because the NERC data does not separately identify supply-related outages. Using supply-related outages instead of total outages results in significantly fewer total outages but is more representative of the types of outages which can be avoided by community solar supply. Lastly, we multiplied the estimated Louisiana equipment-related outages by the proxy supply outage percentage.

[6] See Table 11.2 Reliability Metrics Using IEEE of U.S. Distribution System by State, 2021 and 2020

To estimate the distribution share of the bill credit for this component we used the average of reported 2020 and 2021 distribution outages, including only events related to loss of supply, as provided in EIA's Form 861, Annual Electric Power Industry Report.[7]

To estimate the avoided economic losses associated with improved system reliability, we summed the total transmission and distribution supply-related outage hours from the prior steps. This produces the total annual avoidable power outage hours. We then divide this total by the total hours in a year, assumed to be 8760. Lastly we multiplied this ratio by MISO's Value of Lost Load (VOLL), as reported in its FERC Electric Tariff, Schedule 28. The VOLL represents the price customers would be willing to pay to avoid a power interruption. Multiplying the annualized hourly outage ratio by the MISO VOLL results in the implied economic value of avoided power outages (i.e, improved system reliability).

Our findings show that the value for Avoided Economic Losses from Improved Reliability is **1.90¢/kWh**, which comprises 10% of the societal benefits value stack and 6% of the total solar value stack. This contrasts sharply with the CNO's estimate of $0.00/MWh, signifying that the CNO significantly undervalues the benefits of community solar in its current model. These results highlight the need for the CNO to include a higher value for this component in the Community Solar Bill Credit, demonstrating how community solar not only provides environmental benefits, but also improves the reliability of the energy system and reduces associated economic losses.

5.9 Total Solar Value Stack

Based on this analysis, the total estimated solar value stack Bill Credit equals **33.03¢/kWh**. This is 27.03¢/kWh greater than the estimated Bill Credit value using the current calculation framework, implying that the CNO Bill Credit fails to account for nearly 82% of the full solar value stack benefits:

[7] See Table 11.2 Reliability Metrics Using IEEE of U.S. Distribution System by State, 2021 and 2020

Direct Benefits

Benefit Type	Full Value Stack (¢/kWh)	CNO Bill Credit (¢/kWh)	CNO Shortfall (¢/kWh)
Energy Merit Order Price Impacts	4.01	-	4.01
Capacity Merit Order Price Impacts	0.45	-	0.45
Avoided Energy Costs	3.79	3.79	-
Avoided Capacity Costs	3.42	2.22	1.20
Avoided T&D Costs	3.20	-	3.20
Subtotal	**14.85**	**6.00**	**8.85**

Societal Benefits

Benefit Type	Full Value Stack (¢/kWh)	CNO Bill Credit (¢/kWh)	CNO Shortfall (¢/kWh)
Avoided Emissions Costs	16.27	-	16.27
Avoided Economic Losses from Improved Reliability	1.90	-	1.90
Local Economic Value Added	0.01	-	0.01
Subtotal	**18.18**	**-**	**18.18**

Total Benefits

Benefit Type	Full Value Stack (¢/kWh)	CNO Bill Credit (¢/kWh)	CNO Shortfall (¢/kWh)
Direct Benefits	14.85	6.00	8.85
Societal Benefits	18.18	-	18.18
Overall Total	**33.03**	**6.00**	**27.03**

6 CONCLUSION

The current formulation of the Community Solar Bill Credit, established under Resolution No. R-22-76 by the Council of City of New Orleans, does not adequately capture the full range of benefits derived from community solar power. In its current form, the Bill Credit only considers avoided energy and partial capacity costs, while other crucial factors such as avoided transmission and distribution capacity costs, emissions costs, air pollutants costs, and the broader economic benefits are left out of the calculation.

This narrow scope of considerations undermines the effectiveness of the Bill Credit as a tool for incentivizing the adoption of community solar power, and in turn, can hinder the City's progression towards the efficient use of clean, sustainable energy. It is critical for the local utility, regulators, and policymakers to recognize that the value of community solar extends far beyond mere avoided energy costs. Its impact on environmental health, system reliability, local economic growth, and sustainability should all be taken into account when shaping policies and setting incentives.

To illustrate the magnitude difference between the Council's Bill Credit and the full value stack of benefits provided by community solar, we quantified the estimated direct and societal benefits of community solar. This analysis measured the demand reduced price effects for energy and capacity; avoided costs of generation energy and capacity; avoided costs of transmission and distribution system capacity and line losses costs; avoided emissions costs; local economic value added from building community solar resources instead of utility-scale resources; and the ratepayer economic value of avoided power outages and improved system reliability. **Our analysis shows that the full value stack of community solar benefits equals 33.03¢/kWh**, which is nearly 82% higher than the Bill Credit value calculated consistent with the Council's current framework. **Even if societal benefits are not recognized, a bill credit based on direct ratepayer benefits should be set at 14.85¢/kWH**. It is clear that the current Bill Credit calculation framework significantly undervalues the benefits community solar can provide. It should be re-set to capture these benefits community solar creates and assign them to the Bill Credit.

To more accurately represent the holistic and full value of community solar, we propose key improvements to the existing Bill Credit calculation. This includes changing the reference resource from a Natural Gas Combustion Turbine to a Natural Gas Combined Cycle, incorporating avoided transmission and distribution capacity costs, recognizing merit order impacts, accounting for avoided emissions and air pollutants costs, and recognizing the incremental economic benefits of community solar.

By doing so, the City can create a Bill Credit that fully reflects the "value stack" benefits of community solar, making it a more attractive and economically viable choice. This, in turn, will support the City of New Orleans' objective of harnessing clean, sustainable technology to improve the quality of life for local citizens and businesses. Community solar has the potential to drive a paradigm shift in our energy landscape, and it is essential that our regulatory frameworks evolve to fully acknowledge and incentivize this promising development.

Table 1

	ENO Calculations							TNO Calculations		
Month	CSG Output (kWh)*	Total Bill Credits	Weighted Average Bill Credit (c/kWh)**	Energy Value	Capacity Value	Weighted Average Value (c/kWh)	Difference (Bill Credits - Value) - ENO	Weighted Average Value (c/kWh) - Gabel	Total energy value - Gabel	Difference (Bill Credits - Value) - Gabel
June 2021	10,237,068	$ 705,072	6.89	$ 347,881	$3	3.40	$ 357,188	14.85	1,520,205	(815,133)
July 2021	9,713,123	$ 712,422	7.33	$ 384,058	$3	3.95	$ 328,361	14.85	1,442,399	(729,977)
August 2021	9,551,568	$ 726,286	7.60	$ 393,811	$3	4.12	$ 332,472	14.85	1,418,408	(692,122)
September 2021	9,411,855	$ 691,342	7.35	$ 451,430	$3	4.80	$ 239,909	14.85	1,397,660	(706,318)
October 2021	9,076,521	$ 676,476	7.45	$ 512,114	$3	5.64	$ 164,359	14.85	1,347,863	(671,387)
November 2021	7,475,391	$ 558,071	7.47	$ 361,683	$3	4.84	$ 196,385	14.85	1,110,096	(552,025)
December 2021	6,192,114	$ 459,346	7.42	$ 236,290	$3	3.82	$ 223,053	14.85	919,529	(460,183)
January 2022	6,115,654	$ 443,424	7.25	$ 228,033	$3	3.73	$ 215,388	14.85	908,175	(464,751)
February 2022	7,520,071	$ 528,679	7.03	$ 298,353	$3	3.97	$ 230,323	14.85	1,116,731	(588,052)
March 2022	9,362,849	$ 637,445	6.81	$ 409,864	$3	4.38	$ 227,578	14.85	1,390,383	(752,938)
April 2022	10,136,757	$ 656,115	6.47	$ 682,027	$3	6.73	$ (25,915)	14.85	1,505,308	(849,193)
May 2022	11,068,883	$ 765,462	6.92	$ 930,753	$3	8.41	$ (165,294)	14.85	1,643,729	(878,267)
June 2022	10,237,068	$ 877,731	8.57	$ 945,676	$876	9.24	$ (68,821)	14.85	1,520,205	(642,474)
July 2022	9,713,123	$ 887,279	9.13	$ 871,902	$876	8.98	$ 14,501	14.85	1,442,399	(555,120)
August 2022	9,551,568	$ 911,797	9.55	$ 931,008	$876	9.75	$ (20,087)	14.85	1,418,408	(506,611)
September 2022	9,411,855	$ 895,034	9.51	$ 727,493	$876	7.73	$ 166,665	14.85	1,397,660	(502,626)
October 2022	9,076,521	$ 886,962	9.77	$ 521,508	$876	5.75	$ 364,578	14.85	1,347,863	(460,901)
November 2022	7,475,391	$ 760,580	10.17	$ 408,657	$876	5.47	$ 351,047	14.85	1,110,096	(349,516)
December 2022	6,192,114	$ 624,316	10.08	$ 547,406	$876	8.84	$ 76,034	14.85	919,529	(295,213)
January 2023	6,115,654	$ 607,238	9.93	$ 188,369	$876	3.08	$ 417,993	14.85	908,175	(300,937)
February 2023	7,520,071	$ 684,841	9.11	$ 175,405	$876	2.33	$ 508,560	14.85	1,116,731	(431,890)
March 2023	9,362,849	$ 752,890	8.04	$ 270,027	$876	2.88	$ 481,987	14.85	1,390,383	(637,493)
April 2023	10,136,757	$ 928,045	9.16	$ 255,540	$876	2.52	$ 671,629	14.85	1,505,308	(577,263)
May 2023	11,068,883	$ 1,005,414	9.08	$ 360,241	$876	3.25	$ 644,297	14.85	1,643,729	(638,315)
2021	61,657,640	$ 4,529,014	7.35	$ 2,687,267	$21	4.36	$ 1,841,726	14.85	9,156,160	(4,627,146)
2022	105,861,854	$ 8,874,823	8.38	$ 7,502,681	$6,147	7.09	$ 1,365,995	14.85	15,720,485	(6,845,662)
2023	44,204,214	$ 3,978,428	9.00	$ 1,249,582	$4,380	2.83	$ 2,724,466	14.85	6,564,326	(2,585,898)
	211,723,708	$17,382,267	8.21	$ 11,439,530	$10,549	5.41	5,932,190	14.85	31,440,971	-14,058,704

Attachment 1:

Economic modeling of community solar, National Renewable Energy Laboratory, July 2023

(Conducted as part of the U. S. Department of Energy's technical assistance to Together New Orleans)

Attachment 2:

Value-of-solar analysis from Gabel Associates, "Setting the Solar Bill Credit: How to Unlock the Full Value Potential of Community Solar in New Orleans," July 2023

CERTIFICATE OF SERVICE

Docket No. UD-18-03

I hereby certify that I have served the required number of copies of the foregoing pleading

upon all other known parties of this proceeding individually and/or through their a attorney of record or other duly designated individual, by:

__X__ electronic mail, ____ facsimile, _____ hand delivery, and/or by ______ depositing with the overnight mail carrier, or the United States Postal Service, postage prepaid.

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