



Community Solar Subscription Credit Considerations and Case Study

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National Renewable Energy Laboratory

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Introduction

Together New Orleans (TNO) requested technical assistance through the US Department of Energy's (DOE's) National Community Solar Partnership (NCSP). The National Community Solar Partnership is a coalition of community solar stakeholders working to expand access to affordable community solar to every U.S. household and enable subscribers and their communities to realize meaningful benefits, such as reduced energy burden, increased resilience, community ownership, and equitable workforce development. TNO asked for a subject matter expert from NCSP to review the Entergy New Orleans (ENO) proposed revised Rate Schedule, CSGF - Community Solar Generating Facilities, in their compliance filing from January 12th, 2024, pursuant to resolution R-23-507¹ of docket UD-18-03². TNO requested that the proposed methodology for subscription credits for applicable residential and non-residential rate schedules be reviewed to determine the expected credit rate. The aim behind the analysis is to provide TNO and engaged stakeholders with an informed understanding of the proposed rate schedule before making decisions on the appropriate rate design for community solar (CS) subscriptions.

Designing and modeling a CS subscription credit can be a complex process. Depending on the program design, utility data may be necessary for model inputs and assumptions. Accurate data inputs and assumptions are key to ensuring that a model is as representative of real market conditions as possible. What follows is an exploration of CS subscription credit rate calculation considerations using the CS program in New Orleans as a case study.

The discussion and factors explored in this report can be informative for other programs in markets across the U.S. While the underlying modeling approach may be transferable to other markets, actual data, program details, and the conclusions drawn may not be transferable and additional research should be undertaken before applying the case study findings of this report in other circumstances.

¹ https://cityofno.granicus.com/MetaViewer.php?view_id=7&clip_id=4706&meta_id=660334

² <https://council.nola.gov/committees/smart-and-sustainable-cities-committee/dockets/community-solar-projects-rulemaking-proceeding/>

Case Study – Credit Rate Calculations

In resolution R-23-507 of docket UD-18-03 the New Orleans City Council determined that the existing CS program in New Orleans would be amended to include numerous rule changes. A key component of these rule changes included that, per section VIII.E of the Community Solar Rules,

The CSG per kWh credit rate for all Subscribers that do not qualify as a Low Income Subscriber will be the full retail rate, including all rider schedules that would be applicable to the Subscriber on a per kWh basis. The CSG per kWh credit rate for Low-Income Subscribers shall be the full retail rate, including all applicable rider schedules that would be applicable to the Low-Income Subscriber on a per kWh basis, plus 2.0 cents/kWh.³

In a compliance filing from ENO on January 12th, 2024, a revised Rate Schedule (CSGF—Community Solar Generating Facilities) was proposed by ENO. Furthermore, ENO asked for the City Council to provide guidance on how non-residential customers will be credited as the applicable rates include a demand charge which is not based on a per kWh basis (as discussed in their filing under section 3.b). Therefore, ENO asked if the subscription credit rate should include or exclude consideration of demand charge costs.

Based on the filing language, it appears that the previous credit rate and proposed credit rate for residential (Low Income and non-Low Income) customers uses the “Schedule NEM (Net Metering)” rate as the methodological basis by which to build the CS credit rate. This proposal includes the note that ...

credits under Schedule NEM apply solely to the volumetric energy portion of the customer’s bill; the customer still pays the applicable customer charge, non-bypassable riders, and franchise fees calculated under their bill. This is the case for both residential and non-residential customers who participate under Schedule NEM.

ENO states that this methodology for NEM is approximately the same as full residential retail rate, as dictated by the Community Solar Rules, since most charges for residential customers are recovered volumetrically. ENO then notes that while the NEM methodology basis works for residential customers, the current NEM rules are not inclusive of demand charges for non-residential customers, meaning that such customers would not receive a full retail rate credit.

ENO proposes two approaches for non-residential customers. Option 1, in which non-residential customers are credited via the volumetric portion of their rate schedule, per the current credit rate methodology approved by the city council but any demand charges are excluded from the subscription credit calculation. Option 2, in which a new method will be defined for non-residential customers that is inclusive of the demand charge portion of the rate, more accurately approximating full retail rate for those customer classes. For both options, the residential customers are treated the same and

³ https://cityofno.granicus.com/MetaViewer.php?view_id=7&clip_id=4706&meta_id=660334

appear to be credited under the same methodology as in previous rules where the net metering schedule is applied.

To evaluate the impacts of these two options, the following modeling approach was undertaken to connect data to the above proposals with the aim of informing the decision-making process for all stakeholders involved. The following models are the interpretations of the currently approved and listed tariffs, rate schedules, and riders as provided on ENO's website for residential⁴ and business⁵ customers. As discussed later in this document, any corrections to modeling assumptions and the interpretation of the tariff language may affect the findings and are best clarified by the relevant utility who provides the customers' bills.

The core modeling method utilized a comparative approach to calculate a representative CS credit rate. A customer's bill was first calculated without a CS subscription and then a second bill was calculated using the customer's new energy use, and demand where applicable⁶, after reducing it by the CS subscription production. The difference between the two bills was then divided by the CS subscription energy production to determine the \$/kWh credit.

$$CS \text{ Credit Rate } \left[\frac{\$}{kWh} \right] = \frac{Customer's \text{ Total Bill} - \frac{CS \text{ subscription } [\$]}{out} - Customer's \text{ Total Bill with CS subscription } [\$]}{CS \text{ Subscription Energy Production } [kWh]}$$

The customer's bill with and without a CS subscription and bill reduction is calculated in the process of determining the credit rate. This method is like net metering in the sense that the customer would see their bill reduced equally for every kWh of energy produced by their subscription.

This approach was applied to the residential rate for non-low income (non-LI) and low income (LI) customers (Res-25 rate schedule⁷) and then applied separately to a small commercial customer (SE-25 rate schedule⁸) with and without demand charges included. The key results for all four scenarios modeled are displayed in tables 1

⁴ https://www.energy-neworleans.com/your_home/tariffs/

⁵ https://www.energy-neworleans.com/your_business/tariffs.aspx

⁶ For non-residential customers, the bill with a CS subscription included was determined both as if the subscription reduced the sites demand and as if it did not reduce the demand. Therefore, the bill reduction and credit rate will reflect a different amount depending on how much the demand is or is not reduced.

⁷ https://cdn.energy-neworleans.com/userfiles/content/price/tariffs/enol_elec_res.pdf?_gl=1*py5woh*_gcl_au*MTczMzU3Nzg2OS4xNzA3OTI2NDA4*_ga*MTU0NTU0NDQ1MC4xNzA3OTI2NDA4*_ga_8YKL3FLBBC*MTcwODk2NzI0OC4xMy4xLjE3MDg5Njc4OTAuNjAuMC4w*_ga_H0JW6TJK3Y*MTcwODk2NzI0OS4xMy4xLjE3MDg5Njc4OTEuMC4wLjA.&_ga=2.264285387.538208259.1708967250-1545544450.1707926408

⁸ https://cdn.energy-neworleans.com/userfiles/content/price/tariffs/enol_elec_se.pdf?_gl=1*q3pufu*_gcl_au*MTczMzU3Nzg2OS4xNzA3OTI2NDA4*_ga*MTU0NTU0NDQ1MC4xNzA3OTI2NDA4*_ga_8YKL3FLBBC*MTcwODk2NzI0OC4xMy4xLjE3MDg5Njc5MzkuMTEuMC4w*_ga_H0JW6TJK3Y*MTcwODk2NzI0OS4xMy4xLjE3MDg5Njc5MzkuMC4wLjA.&_ga=2.122660047.538208259.1708967250-1545544450.1707926408

through 4 below. A small commercial customer rate was used to represent non-residential customers and further discussion and the resulting applicability to other non-residential rate schedules will be discussed at greater length below.

Table 1 Modeling results for calculating an example residential non-LI customer bill with and without a CS subscription

Non-Low Income

Total Energy Consumption	500 kWh
Subscription size (kWh)	250 kWh
CSG Credit Rate	\$ 0.140130
Bill without Community solar	\$ 79.87
Bill with Community Solar	\$ 44.84
Bill Reduction	\$ 35.03
% reduction	-43.86%

Table 2 Modeling results for calculating an example residential LI customer bill with and without a CS subscription

Low Income

Total Energy Consumption	500 kWh
Subscription size (kWh)	250 kWh
CSG Credit Rate	\$ 0.160130
Bill without Community solar	\$ 79.87
Bill with Community Solar	\$ 39.84
Bill Reduction	\$ 40.03
% reduction	-50.12%

A review of the residential rate schedules, riders, and tariffs, appeared to reveal that all applicable costs, with the exception of a fixed customer charge, were directly or indirectly related to the volumetric portion of the bill. The example bills shown in tables 1 and 2 using the methods described above were based on a customer with a 500 kWh monthly consumption and a CS subscription that correlates with 250 kWh of generation. Using these assumptions, an expected result emerges showing that LI customers will receive a slightly greater bill reduction due to the additional 2 cents/kWh credit as dictated by the CS rules.

Table 3 Modeling results for calculating an example non-residential customer bill with and without a CS subscription where demand reduction is included in the credit rate

With Demand Reduction

Total Energy Consumption	1000 kWh
Billing Demand	25 kW
Subscription size (kWh)	500 kWh
Demand Reduction	10 kW
CSG Credit Rate	\$ 0.367790
Bill without Community solar	\$ 396.86
Bill with Community Solar	\$ 212.96
Bill Reduction	\$ 183.89
% reduction	-46.34%

Table 4 Modeling results for calculating an example non-residential customer bill with and without a CS subscription where demand reduction is excluded from the credit rate

Without Demand Reduction

Total Energy Consumption	1000 kWh
Billing Demand	25 kW
Subscription size (kWh)	500 kWh
Demand Reduction	0 kW
CSG Credit Rate	\$ 0.140096
Bill without Community solar	\$ 396.86
Bill with Community Solar	\$ 326.81
Bill Reduction	\$ 70.05
% reduction	-17.65%

For non-residential customers, represented by a small commercial customer in table 3 and 4, two trends appear again. The analysis provided was based on a customer with 1,000 kWh of energy consumption and 25 kW in demand consumption. The CS energy subscription component was for 500 kWh regardless of demand considerations, and the associated demand reduction component, where applicable, was assumed to be 10 kW.⁹ Again, all costs that were volumetrically driven were included in the calculations, and, in the demand inclusive analyses, demand charges were included.

⁹ The energy and demand consumption modeled is taken arbitrarily and meant purely to be used as a baseline consumption that is applicable to the small commercial customer rate schedule. The energy and demand reduction associated with the CS subscription is representative only as well as actual demand reduction will vary by a consumers use patterns and its relationship to the solar production.

One trend identified is the impact that the exclusion of demand charges from the CS credit rate has on the bill reduction. Excluding demand charges from the credit rate provides subscribers with a significantly decreased bill reduction, on the order of ~60% less savings than if the demand charge is included in the credit rate.

The analysis provided has limitations that are worth noting. First, the results provided are based on an example customer with set energy and demand consumption. Changes in customer demand consumption and theoretical demand reduction from a CS subscription will be the primary driver of bill cost and bill reduction in most cases. Therefore, customers with different load profiles will see largely different bills regardless of a CS subscription. Furthermore, the potential bill reduction from a CS subscription when including demand charges will vary between customers, and between bills for the same customer, since the savings associated with the demand reduction portion of a CS subscription depends on how much power the solar system is producing at the same time the customer is consuming energy. For example, if a customer produces its largest power demand in a billing cycle during hours when the solar system is not producing anything, the customer will effectively not see any demand savings.

Second, the small commercial customer rate schedule is only one non-residential customer type. Other non-residential rate schedules include Large Electric Service (Schedule LE-25¹⁰) and Large Electric High Load Factor Service (Schedule LE-HLF-9¹¹), both of which have a greater demand charge cost (\$/kW) than the small electric rate schedule. Due to a larger demand charge it can be expected that the exclusion of demand charges from a CS subscription credit would produce even lower bill reductions that are further from “full retail rate”.

The analysis provided is not inclusive of all scenarios that may arise across various rate schedules, which is especially true for customers which may have less common consumption patterns, such as extremely low or high energy use for residential customers, and non-residential customers with high energy, low demand, or high demand, low energy consumption. Furthermore, as outlined broadly in the next section, confirmation of the exact CS subscription credit rate methodology will enable validation or updates to the analysis provided. Confirmation of the methodology via a clarification of the exact applicable customer charges, non-bypassable riders, and franchise fees which would not be included in a residential customer credit rate with an example calculation would prove valuable. Similarly, for non-residential customers, an explanation of how demand charges would be included or excluded under the proposed

¹⁰ https://cdn.energy-neworleans.com/userfiles/content/price/tariffs/enol_elec_le.pdf?_gl=1*vfjww*_gcl_au*MTczMzU3Nzg2OS4xNzA3OTI2NDA4*_ga*MTU0NTU0NDQ1MC4xNzA3OTI2NDA4*_ga_8YKL3FLBBC*MTcwODk2NzI0OC4xMy4xLjE3MDg5NjgyMTYuMjkuMC4w*_ga_H0JW6TJK3Y*MTcwODk2NzI0OS4xMy4xLjE3MDg5NjgyMTYuMC4wLjA.&_ga=2.198600683.538208259.1708967250-1545544450.1707926408

¹¹ https://cdn.energy-neworleans.com/userfiles/content/price/tariffs/enol_elec_le_hlf.pdf?_gl=1*1u1fzrs*_gcl_au*MTczMzU3Nzg2OS4xNzA3OTI2NDA4*_ga*MTU0NTU0NDQ1MC4xNzA3OTI2NDA4*_ga_8YKL3FLBBC*MTcwODk2NzI0OC4xMy4xLjE3MDg5NjgyMTguMjkuMC4w*_ga_H0JW6TJK3Y*MTcwODk2NzI0OS4xMy4xLjE3MDg5NjgyMTguMC4wLjA.&_ga=2.198600683.538208259.1708967250-1545544450.1707926408

methods by ENO would help provide clarity into proposed credit rates in relation to retail rate for rate schedules in this customer class.

It is worth reiterating that the analysis provided herein is based on the best available interpretation of the ENO tariff, its rate schedules, and riders. The analysis uses example customers and bills. If the analysis is deemed to hold errors or inaccuracies, these are best clarified and corrected by the entity that will ultimately deploy and operate the program, in this case that party being ENO.

Rate Schedule Design Considerations

The case study above provides insight into the complexity of modeling and applying a CS subscription credit rate. When designing a program and dictating the methodology behind the credit rate there are some topics that are worth considering to inform the process and provide clarity to all stakeholders and parties involved. Below is a list of questions, considerations, and topics that may be useful to address:

- When will subscription credits be applied to a customer's bill?
 - Ensuring customers receive their credits in a timely manner and in alignment with their consumption makes understanding a complex billing structure easier.
- How will the subscription credit appear on the bill?
 - Making it obvious and clear to a non-technical person what their subscription credit is and what formula it is based on can provide transparency, which is important to conveying program benefits.
- How are rate schedule components, tariffs, and riders are applied to the credit calculation?
 - It may be valuable to address each individual schedule, tariff, and rider and provide an explanation of their applicability, which may be especially useful when application of the tariffs and riders is not uniform across rate schedules.
- Request an example bill in the filing to exemplify the calculation methodology proposed and show the example customer bills cost with and without a subscription.
 - This helps bring light to potential customer savings and what rate schedule, tariffs, and riders are driving the savings.
 - This could be performed for all applicable rate types and customers to show the difference in calculation methodology and savings by customer class and rate schedule.
 - Providing explanations and examples of edge cases—such as minimum bills when a customer's subscription offsets the majority or all consumption in a set billing period—can provide further insight and help define rules for roll over credits and necessary cost recovery mechanisms.

Conclusion

Determining the appropriate CS subscription credit rate is a complex process. Numerous approaches for setting the rate exist and the analysis discussed here

illuminates the complexity of the process as well as some of the many considerations that may be helpful to address or answer as a part of it.

Modeling for the case study of the new rules and proposed rate schedule in New Orleans shows that providing additional details and definition to a proposed rate schedule are helpful in ensuring all stakeholders are well-informed and can make an educated decision based on the proposal. Additionally, when considering the inclusion or exclusion of demand charges in the CS credit rate for non-residential customers, the exclusion provides customers with a significantly smaller bill reduction than with the inclusion of those charges. The case study provides a good example for other communities considering rate design and could help demonstrate the factors that may be key to defining the credit rate, including factors such as:

- How and when will the credit appear on the bill
- What components of a rate, rider, or tariff apply to the credit
- How the credit will be calculated and whether it varies by customer class and rate schedule
- What will be excluded from the credit rate.

Using this information to help guide the rate design process will hopefully prove useful to stakeholders of all types and make for well-informed rules for all community solar programs.

Appendix – Modeling Assumptions

- The value used for the Purchased Power Recovery Rider (PPCR) and Fuel and Purchased Power Cost rider (PAC-8) in the analysis were based on an average of all the rate specific costs available in the rider rather than a specific month's value to provide a realistic expectation for costs and credits on average.
- Taxes were excluded from the analysis and all values are provided pre-tax as different individuals have different tax rates.
- The applicable schedules, riders, and tariffs that had non-zero values included in the calculations for the residential customer were Res-25, EFRP-7, PPCR, FAC-8, EECR-1, SSCR, SSCRII, SSCO, SSCO II, MISO-1, R-3.
 - The rates and calculation methodology were confirmed as best as possible use an [example bill](#) provided by ENO.
- The applicable schedules, riders, and tariffs that had non-zero values included in the calculations for the non-residential customer were SE-25, EFRP-7, PPCR, FAC-8, EECR-1, SSCR, SSCRII, SSCO, SSCO II, MISO-1, R-3.