



# Community Solar Consolidated Billing: An Exploration of Implementation and Alternatives

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Contract No. DE-AC36-08GO28308

**Technical Report**  
NREL/TP-6A20-90867  
December 2024



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## **Suggested Citation**

Sandler, Simon, Bentham Paulos, and Jenna Harmon. 2024. *Community Solar Billing: An Exploration of Implementation and Alternatives*. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A20-90867. <https://www.nrel.gov/docs/fy25osti/90867.pdf>.

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Golden, CO 80401  
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## NOTICE

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 U.S. Department of Energy Office of Energy Efficiency and Renewable Energy Solar Energy Technologies Office. The views expressed herein do not necessarily represent the views of the DOE or the U.S. Government.

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## Acknowledgments

The authors wish to thank the U.S. Department of Energy’s Solar Energy Technologies Office for funding and supporting this work. We also wish to thank numerous stakeholders for providing their expert perspective on the topic and making valuable contributions through interviews. Finally, we would like to thank the many reviewers whose comments strengthened this publication.

A list of stakeholders and reviewers is provided below. Note that the inclusion of these stakeholders and reviewers in the following list does not imply endorsement of the presented analysis by these individuals or their companies/organizations.

- Nick Birrell, Oracle Energy and Water
- Jonathan Rodriguez, Orange and Rockland Utilities, Inc.
- Karlee Foster, Orange and Rockland Utilities, Inc.
- Paul Cortese, Orange and Rockland Utilities, Inc.
- Sam Lauer, Energy Solutions
- Joe Abraham, Oregon Public Utility Commission
- Sarah Duffy, Illinois Power Agency
- John-Michael Cross, Minnesota Department of Commerce
- Alex Pasanen, Solstice
- Sawyer Morgan, New Jersey Board of Public Utilities
- Greg Leventis, Lawrence Berkley National Laboratory
- Kaifeng Xu, National Renewable Energy Laboratory
- Kimberly Shields, U.S. Department of Energy
- Jeremy J. Roberts, Green Button Alliance
- Susannah Shoemaker, National Renewable Energy Laboratory
- Christina Nunez, National Renewable Energy Laboratory
- Sara Fall, National Renewable Energy Laboratory.

## List of Acronyms

ACEEE	American Council for an Energy-Efficient Economy
BPU	Board of Public Utilities
CCA	community choice aggregator
CMD	Connect My Data
CSG	Community Solar Garden
DOE	U.S. Department of Energy
EAP	Energy Affordability Program
EIA	U.S. Energy Information Administration
HER	Home Efficiency Rebates
IID	Imperial Irrigation District
LIB	line item billing
LIHEAP	Low Income Home Energy Assistance Program
LMI	low- to moderate-income
NASEO	National Association of State Energy Officials
NCSP+	National Community Solar Partnership+
NCLC	National Consumer Law Center
NEADA	National Energy Assistance Directors Association
NISC	National Information Solutions Cooperative
NY PSC	New York Public Service Commission
OBF	on-bill financing
OBR	on-bill repayment
OBT	on-bill tariff
ORU	Orange & Rockland Utilities
PACE	Property Assessed Clean Energy
PAYS	Pay As You Save
PII	personal identifiable information
PRC	Public Regulation Commission
SAI	Solar Access Initiative
SREC	Solar Renewable Energy Credit
VDER	Value of Distributed Energy Resources
WAP	Weatherization Assistance Program

## Executive Summary

This report presents an analysis of the considerations, costs, and benefits surrounding the implementation of utility consolidated billing in community solar programs. The report also explores alternatives to achieve similar benefits in the absence of consolidated. Consolidated billing simplifies the billing process for customers by combining all charges and credits associated with electricity service and community solar subscriptions into a single bill. The potential benefits of consolidated billing implementation include increased transparency, improved customer experience, and, ultimately, increased retention rates and decreased subscriber acquisition costs.

Currently, community solar subscribers often receive two separate bills—one from the utility and one from a third-party community solar provider—potentially causing confusion. Consolidated billing seeks to resolve this by offering a unified bill, which, while beneficial to numerous stakeholders, presents administrative, technical, and financial hurdles that utilities and program administrators must address.

Key administrative challenges include varying billing structures across states and utilities, the need for stakeholder collaboration, and the management of complex and disparate customer data. Technical challenges revolve around the integration of billing software, requiring utilities to either update existing systems or adopt new platforms. The timeline for implementing consolidated billing varies significantly, with some utilities taking several years to deploy automated systems. Furthermore, estimated implementation costs vary widely, from hundreds of thousands to millions of dollars, depending on the utility's existing infrastructure and experience.

Also addressed in this report is the treatment of community solar payments when partial payment or nonpayment occurs under consolidated billing. There are some key decisions that must be made, such as whether community solar subscriptions will be treated the same as other utility payments and whether partial or nonpayment could lead to utility disconnection. We briefly review lessons learned from bill repayment programs, such as Pay As You Save, to provide context for decision makers and identify important factors for community solar billing.

The report also explores alternatives to utility consolidated billing, such as third-party consolidated billing, automatic bill crediting, and single accounting/dual billing, which aim to provide similar benefits without the full-scale adoption of utility consolidated billing. These alternatives could offer simpler and more immediate solutions for states and utilities facing implementation challenges.

Although consolidated billing offers significant benefits for community solar programs, particularly in customer understanding and satisfaction, its implementation is complex and requires careful consideration of administrative, technical, and financial factors. States and utilities can learn from the experiences of others to find the most suitable path forward.

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# 1 Introduction

The National Community Solar Partnership+ (NCSP+) has set a goal to enable 20 GW of community solar to power the equivalent of five million households and create \$1 billion in energy savings by the end of 2025 (U.S. Department of Energy [DOE] n.d.-a). This ambitious goal, representing a 700% increase in community solar deployment between 2020 and 2025, includes ensuring that low-income and disadvantaged communities have increased access to solar energy. Community solar can expand solar access to low-income families, renters, and multifamily building residents who have historically faced technical and financial barriers to accessing rooftop solar (Haynes 2024, O’Shaughnessy et al 2024). Although community solar provides an opportunity to reach such households, there are still significant barriers to successful deployment.

A previous report from the National Association of State Energy Officials (NASEO) explores the benefits of consolidated billing for the community solar customer experience (Fazeli 2023). The report dives into billing models and discusses state policies and regulations that address community solar billing arrangements and key considerations for states. It also touches on implementation challenges experienced. The report focuses on the topic of implementation and dives deeper into the details.

In many states, community solar subscriptions are provided by non-utility companies while customers continue to be billed for their electricity service by their utility. This can result in two separate bills and be confusing to customers. A single or “consolidated” bill can bring both bills together, providing the customer with a net cost or benefit on a single bill each month. This is most often provided by the utility, as directed by state utility regulations, but can also be provided by the community solar subscription manager if regulations allow (Fazeli 2023). Consolidated billing not only clearly conveys the consumer costs and benefits, but also assists with other billing concerns, like third-party payment information collection, keeping payment information current, and limiting payment default. It can also improve interactions with other on-bill energy assistance programs. Furthermore, consolidated billing has been shown to reduce customer turnover (often also referred to as churn). Data from a large national subscription manager, with extensive experience serving low- to moderate-income (LMI) households, shows that on projects where consolidated billing is deployed, the turnover rate decreased by 20% compared to projects without consolidated billing.<sup>1</sup> Reducing customer churn is important to keeping program administrative costs low, as customer acquisition is one of the highest administrative costs for project and subscription managers.

Although consolidated billing provides significant benefits, deploying it can be time consuming, technically and administratively complex, and potentially costly. States and program administrators across the country continue to explore the opportunities and obstacles of deploying consolidated billing as it is included in more community solar policies (Xu et al 2024).

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<sup>1</sup> The subscription manager requested that the data remain anonymous if included in the report.

Given this interest, and a request from the New Mexico Public Regulation Commission (PRC),<sup>2</sup> the NCSP+ Direct Technical Assistance program worked to compile resources that addressed the topic. This report discusses the technical, administrative, timeline, and cost considerations around deploying consolidated billing. Then, the report explores the role of the consolidated billing provider, the risk of partial or nonpayment as it affects multiple financial entities, and some workarounds to consolidated billing that provide similar benefits.

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<sup>2</sup> In the past, the New Mexico PRC has considered consolidated billing and chosen not to require it for regulated utilities in the state. The commission is actively working on improving the existing community solar program in New Mexico and is compiling recommendations for program refinement, which is expected to include more information and clarity on the topic of consolidated billing. For more information, see New Mexico Public Regulation Commission 2024.

## 2 Consolidated Billing Implementation Considerations, Costs, and Timelines

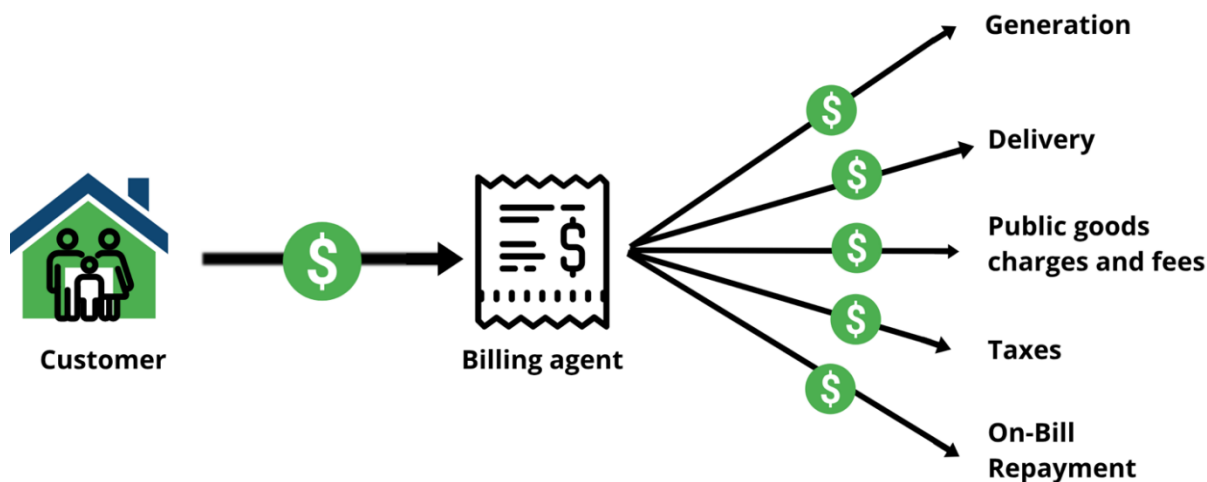
Consolidated billing provides customers with a clearer understanding of the costs and savings of their community solar participation but requires greater effort on the part of subscription managers, utilities, and program administrators. This section shares lessons from utilities and programs that have already deployed or are deploying consolidated billing in addition to interviews with utilities, utility billing software providers, and other stakeholders. The takeaways explore variations in implementation timelines and requirements, costs, progress, and successes and barriers.

### 2.1 Implementation Considerations

To date, consolidated billing policies in Oregon and New York are operational, while six other states require it but are at different stages in the process of deployment (see Xu et al 2024 for a summary of current state and community solar policies and low-income stipulations). In this section, we discuss the administrative and technical components of implementation amongst these eight states.

#### 2.1.1 Billing Roles

Although electricity market designs vary widely among U.S. states—from regulated monopolies to competitive retail markets with many actors involved—there are some common roles. Commonly, a single billing agent, such as a regulated distribution utility, manages the billing process with the customer, but distributes customer payments to a number of suppliers and other entities, as shown in Figure 1.



**Figure 1. How money flows from customer to end destination: Customers send a single payment to the billing entity, who then apportions the funds to the appropriate destination.**

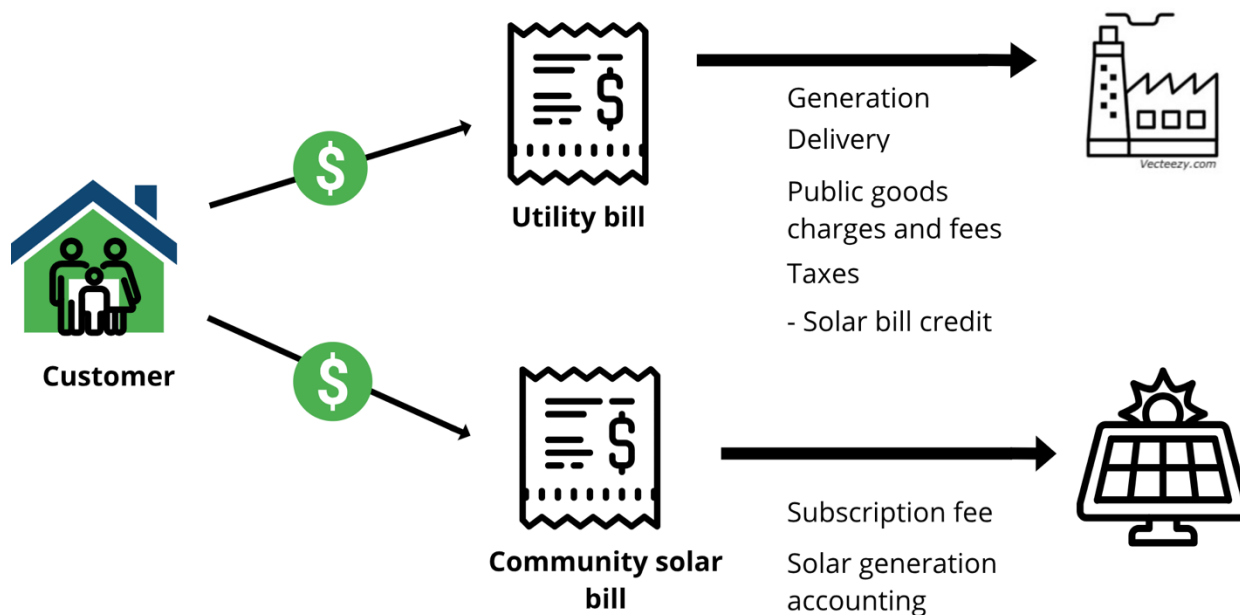
Billing arrangements that distribution utilities have with electricity retailers in states with competitive retail choice or community choice aggregators (CCAs) are not unlike those that utilities could or do have with community solar providers. Competitive retailers, CCAs, and community solar providers can all provide generation services, while utilities manage delivery. Funds are passed through to other entities for public goods charges (such as for energy efficiency

programs), for other fees (such as nuclear decommissioning funds), and for taxes paid to local governments.

Other items can be repaid via utility bills, including financing for energy efficiency improvements, an approach known as on-bill repayment (OBR) or on-bill financing (OBF). In this case, charges are included on the bill that are used to pay off the financing charge for the measures installed.

In states with competitive markets, the billing agent may be the competitive retail supplier, who then distributes payments to the distribution utility for delivery services. In traditional regulated markets, the utility will be the billing agent, who may pass funds to CCAs or community solar providers for generation services.

In a number of cases, community solar subscriptions are not managed by a central billing agent but instead are handled through separate bills from the community solar provider and the utility, as shown in Figure 2. In this scenario, the community solar subscription is charged on the bill from the community solar provider, but the solar credits are received separately on the utility bill.



**Figure 2. Dual billing for utility and community solar services**

This dual-billing setup can be confusing to customers, who are forced to calculate their total net charges themselves. It can also result in timing mismatches, as the community solar charges and credits may be billed at different times.

### 2.1.2 Administrative Considerations

The administrative considerations for implementing consolidated billing are dictated by variations in regional energy markets, state rules, utility type, and community solar program goals and requirements. Numerous stakeholders need to be involved, including utilities,

customers, project developers, subscription managers, program administrators, and regulators. Implementation of consolidated billing requires input and agreement on protocols and processes from some, if not all, stakeholders. Therefore, the perspective, role, and impact of each stakeholder should be reviewed when making decisions.

Utilities prioritize reliable billing and move cautiously when offering new programs or products. Deploying consolidated billing often requires additional billing features, staff time, testing, third-party coordination, financial processes, and regulatory filings, all from the utility. Utilities may find it beneficial to convene a working group or committee to ease communication and decision-making, as exemplified in New Jersey.<sup>3</sup>

Utility consolidated billing requires the utility to be an active participant in the flow of customer and project data to and from solar developers, subscription managers, program administrators, and the utility. Such data will include sensitive and personal identifiable information (PII), and data privacy laws must be adhered to. Numerous states and localities, including the District of Columbia, Illinois, Maryland, Minnesota, New Jersey, New Mexico, New York, and Oregon, have built consumer protections into their programs, many of which address data security. The National Consumer Law Center (NCLC) published a report offering guidance and best practices on consumer protections in community solar programs (Haynes 2024).

Oregon, for example, has documented in its program rules that data privacy and security must be included in the contract terms between customers and project managers (Oregon Public Utility Commission 2017). Furthermore, the program manual dictates the exact data points that are shared between the program administrator and the utility.<sup>4</sup> Oregon uses a third-party program administrator to securely transmit data between the project managers and the utilities, rather than having direct communication between each project and the utility. Illinois mandates in its Consumer Protection Handbook that PII can only be collected after signed consent from the consumer and that it must be destroyed after use (Illinois Power Agency 2024). Illinois further dictates what PII data may be used for income verification in its Approved Vendor Manual (Illinois Solar for All 2024).

Another consideration that affects utilities and customers is how customer classes are managed and how their respective bill credits are calculated. Each additional customer class can introduce complexity, as residential, commercial, and industrial customers often use different rate structures. Each rate may have a different community solar credit rate with specific utility charges included or excluded. Furthermore, programs deploy different methodologies for calculating credit rates. For example:

- **New York** adopted a Value of Distributed Energy Resources (VDER) methodology for community solar projects (New York Public Service Commission 2018).

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<sup>3</sup> The New Jersey Board of Public Utilities (BPU) is considering devoting staff capacity to develop their consolidated billing program by establishing a billing working group composed of representatives from the distribution utilities along with BPU staff, subscriber organizations, community solar developers, and other stakeholders. See New Jersey BPU 2023.

<sup>4</sup> Per Section 6.2.2 of the program manual, the data that may be exchanged is: current rate/tariffs, participant's name (first and last), meter number, account number, participant's address, last 12 months (or as many months as available) of consumption by month in kWh. See Oregon Community Solar Program 2023.

- **District of Columbia** uses a single credit rate for residential and commercial customers calculated monthly based on the actual cost of service (Pepco n.d.).
- **Oregon** uses a “resource value of solar” methodology that is set at the time of the project’s certification (Oregon Public Utility Commission 2019).
- **Illinois** uses a “price to compare” methodology where the credit is set based on what it would cost the utility to purchase that energy for the customer without any markup or profit (Plug In Illinois n.d.).

As is evident from the different methods listed above, credit rates may be fixed and apply to many customer classes or may vary by customer class and could change as often as every billing cycle. Customer classes may be further complicated when programs include different credit rates for LMI households. Some programs are dedicated purely to LMI residential customers, which simplifies billing, as all customers are on a similar rate; alternatively, LMI customers may be mixed into broader programs with non-LMI customers, requiring a distinction in credit rates within the same customer class.

### 2.1.3 Technical Considerations

The technical considerations of consolidated billing depend on whether the process will be automated or manual. This report focuses on an automated process, which necessitates that the billing software provide two-way data flows with third parties (non-utility), a process that is often called “pass through” billing. Utilities must evaluate their current billing software capabilities and limitations when deploying automated consolidated billing. In doing so, utilities should consider software needs for other utility programs that may be implemented in addition to consolidated billing, such as time-of-use rates, demand response programs, energy efficiency, and net metering (Stanton and Sklar 2020).

Utilities may already have operationalized or unrealized “pass through” billing capabilities, making consolidated billing deployment more accessible. States with competitive retail choice markets (21st Century Power Partnership 2017) are more likely to be better prepared for consolidated billing. This is because the distribution utility already acts as the central billing agent, sharing technical and financial data with third-party energy providers. The utility is often responsible for collecting and sharing consumption and cost data and payments with third-party energy suppliers, closely mimicking community solar consolidated billing.

However, utilities may be using billing software without any “pass through” capabilities, requiring an entirely new feature to be operationalized. One utility may prefer to update their current software, while another may find that consolidated billing in conjunction with other needs warrants switching to a new software altogether. There are over ~3,000 distribution utilities (across the United States (U.S. Energy Information Administration 2019), with a significant variation in the software vintage, capabilities, and platform utilized. Some utilities use software that is custom-built and 20 or more years old, whereas others use some of the largest software providers, which regularly update and add new features.<sup>5</sup>

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<sup>5</sup> A cursory search reveals that some common utility billing software providers include Oracle, SAP, Itineris, Harris, Hansen Technologies, Urjanet/Arcadia, Diversified Technology, Flux, Paymentus, and National Information Solutions Cooperative (NISC). MuniBilling, OpenGov Financials, and Muni-Link are software providers geared toward local governments that provide utility billing.

The technical capabilities required of a billing software and the utility for consolidated billing vary by program design. The utility is often responsible for accepting external data from community solar projects and/or subscription managers, pairing it with internal utility customer details, and then exporting the relevant technical and financial data back to third parties. Data points can include subscription size, energy generated, utility meter or account number, rate structure, customer type, subscription cost and credit, net savings, and final utility bill cost. The two-way flow of data necessitates a common data protocol that third parties can use. The data must be shared using a secure platform that does not jeopardize utility operations while limiting third-party access to unrelated or unnecessary data, especially PII.

Some programs have enabled a third party to act as program administrator and accept some of these responsibilities. In Oregon, the Public Utility Commission is the governmental entity that administers the community solar program, which is managed by a contractor, Energy Solutions. Energy Solutions compiles and formats data from community solar projects before sharing that data with the pertinent utility. Using a software platform operated by Energy Solutions, project and participant data is sent to and from the utility without any need for direct communication between the two. Energy Solutions is responsible for compiling the data from the projects and the utility on the software platform; however, data sent to and from the utility is conveyed via a separate secure server, negating the need for multiple third parties to integrate billing with utilities. Standard data formats were developed during the program design process, making it compatible with all utilities regardless of their billing software, according to direct communication in 2024 with the Oregon Public Utility Commission and Energy Solutions.

The technical and administrative considerations are clearly complex and numerous where consolidated billing is concerned. Each community solar program has its own aims and barriers informing what is necessary to create a successful program. Consolidated billing is only one component of a program, and billing considerations and their impact on cost and timeline for program rollout must be examined to ensure effective operations.

## **2.2 Timeline and Cost**

The combination of numerous administrative and technical considerations for community solar programs impact two key questions that are often at the forefront of consolidated billing: What will the cost be, and how long will it take? Due to the unique nature of each community solar program, the market it exists in, and the utility's billing software capabilities, providing general guidance on these two parameters is challenging.

### **2.2.1 Timeline**

Given the multiple administrative and technical considerations discussed in this report, developing and implementing a consolidated billing program for community solar may take months or years. Consolidated billing may be administered by a third party, like in the program in Oregon, but in New York, New Jersey, Illinois, Minnesota, and some municipal and cooperative utility territories, consolidated billing is or will be managed by the utility companies. Different utilities may be better prepared to administer consolidated billing and will need less time than others to begin operations. Additionally, the number of customers served may impact program rollout. Smaller utilities may be able to deploy consolidated billing in one phase, whereas larger utilities may need multiple phases to serve all customers.



Electric companies, public utilities commissions, project managers, and other stakeholders may all have differing ideas about what a reasonable timeline to deploy consolidated billing may be. For example, Xcel Energy in Minnesota was initially requested to have consolidated billing implemented by January 2024, less than a year after the new Community Solar Garden program was passed under HF 2310 (Minnesota Legislature Office of the Revisor of Statutes 2023). In their response, Xcel Energy proposed completing the necessary billing software upgrades 2 years after program rules were finalized, with an anticipated completion date of January 2026 instead of January 2024 (Xcel Energy 2023). Numerous stakeholders requested that Xcel keep to the original deadline of January 2024. Minnesota’s Public Utilities Commission ultimately decided on a January 2025 deadline as a compromise and required quarterly progress reports from the utility (Minnesota Public Utilities Commission 2023).

In New York, the proposed timeline for deploying consolidated billing varied by utility and was as high as 2.5 years. Deployment for all utilities was expected to be completed by 2021. Then, in 2022, New York Public Service Commission (NY PSC) staff found delays exceeding a year of the original deployment plans and thus required utilities to begin reporting on progress quarterly and to pay a “negative revenue adjustment mechanism” for delays (New York Public Service Commission 2022). Only one utility had successfully deployed consolidated billing at the time of this ruling, Orange & Rockland Utilities (ORU), whose own parent company, Con Edison, had not successfully done so at the time. As recently as 2024, some utilities were still completing the transition of all community solar projects to automated consolidated billing.

When ORU first deployed consolidated billing in New York, it operated an in-house software custom-built by utility IT personnel. Later, in October 2023, Con Edison finished transferring all billing to a new Oracle software platform, which was born from issues with legacy software that was unable to adapt to new programs and policies. According to direct communication with ORU in August 2024, it took Con Edison and ORU multiple years to decide on a new billing software provider before commencing development and completing implementation in 2023. Some utilities in New York adopted manual approaches to deploying consolidated billing to bridge the gap while software was operationalized.

When developing automated processes, utilities should look to lessons learned from other electricity markets and account for the time it takes to deploy software, including numerous tasks like defining communication protocols, data formatting and security, required data and billing schedules, software testing, and education and outreach (with both developers and customers).

### **2.2.2 Cost**

It was difficult to find information on the cost of developing and deploying consolidated billing, given the limited publicly available data and inconsistent metrics. The discussion below includes cost estimates we were able to collect.

The NY PSC has documented the estimated cost of deploying consolidated billing across its utilities, with a significant range in value (New York State Department of Public Service n.d.-a and n.d.-b). The lowest cost estimates expressed by utilities were in the hundreds of thousands of dollars, often just shy of \$1 million, and the upper-end costs were near \$10 million. In its initial ruling on consolidated billing in 2019, the NY PSC referenced the estimated cost from National Grid (a distribution utility), noting a cost of \$6 million in the first year followed by \$2.1 million



in each subsequent year (NY PSC 2019a). The proposal by National Grid showed that ~\$4.5 million of the \$6 million first-year costs were from marketing, while the IT system upgrade costs were less than \$1 million per year for all years, including the first year (NY PSC 2019b).

In Minnesota, Xcel Energy estimated a total cost of \$3.2 million, including all administrative and operational changes, to fully implement the new Community Solar Garden program), saying that the consolidated billing portion would only cost \$200,000 upfront and an additional \$50,000 annually for maintenance (Xcel Energy 2023).

Staff at the Oregon Public Utilities Commission and Energy Solutions retrospectively estimated in August 2024 that the cost to build the intermediary software platform for data sharing operated by the program administrator was in the range of \$1–\$3 million. Separately, Portland General Electric, one of the large Oregon utilities, estimated that the “Start-Up program costs for 2023 [are] about \$1.4 million... inclusive of \$50K annual internal administration costs, payments made to the Program Administrator, and payments to participants in the CSP.” Startup costs included numerous items associated with the program administrator and low-income facilitator as well as customer account information transfer and on-bill crediting and payment (Oregon Public Utility Commission 2022a).

In the limited cost information that we found, the amounts vary widely, but the cost to deploy consolidated billing software is often significant, even if the IT costs are not the largest component. The variation in cost is due in large part to differences in the current capabilities and vintages of utilities’ billing software as well as the utilities’ experience with deploying a similar billing scheme. The NY PSC acknowledged that each utility would have a different timeline for implementation and that it required significant work, even for utilities that were already familiar with integrating retail electricity choice (NY PSC, 2019a). Furthermore, many utilities in New York undertook manual processes while automated software solutions were developed, tested, and implemented, which increased overall costs. When creating a budget for consolidated billing, the following factors should all be considered, according to communication with ORU staff: scoping, coordination, software development and testing, annual IT costs, and staff salaries.

## 3 Addressing Payment Implications and Impacts

One important aspect of how consolidated billing is implemented and managed is the potential impact on consumers, especially when consumers fall behind on paying their utility bills. This section discusses how the rules around arrearages can impact utility service and community solar subscriptions when utility consolidated billing is deployed.

### 3.1 How Billing Roles Relate to Payment Problems

Whether dual or single billing is used for community solar subscriptions (as discussed in Section 2.1), billing agents must deal with partial payment, late payment, and nonpayment of bills. A billing system that manages multiple payment streams must manage repayment allocation, determining distribution of funds when customers are short or late on payment. A billing agent that is a monopoly distribution utility may seek to cover their electric charges first, before paying third-party charges such as OBF payments or community solar subscriptions. Requiring customers to pay the utility first can help protect against basic utility services being disconnected. However, this may not be true, notably in the case that a community solar subscription guarantees a saving, therefore reducing the total electricity bill (see the Illinois discussion in section 3.2.1). Utility arrearage and disconnection procedures tend to be closely regulated by utility commissions, and uncollectible bills are ultimately absorbed by other ratepayers.

However, paying the utility first increases the financial risk to non-utility parties, such as community solar providers and their lenders, which can result in higher interest rates or fees. For their part, third-party community solar providers may not have access to the regulatory protections that a monopoly utility enjoys, or to a large balance sheet for carrying debt, or the backstop of cost recovery in the rate base. As a result, their financiers may charge a higher lending cost to account for the risk, which is passed along to subscribers. A third party does not have the leverage of service disconnection to force a payment, as a utility does. If they are not paid, they are more likely to refer the debt to a collection agency, which can impact credit ratings and lead to wage garnishment and other measures.

Community solar projects owned and operated by regulated utilities can be more straightforward, with the utility managing finance capital, engaging with customers, and delivering or managing contractors to deliver the energy services. The utility may need to alter their billing systems to manage individual subscribers but need not engage with outside parties.

### 3.2 Arrearages and Disconnections

States or individual utilities have their own policies for managing arrearages, disconnection notices, and disconnections. Although a full review of those policies is beyond the scope of this report, we can discuss their implications for community solar subscriptions.

About 15 million American households suffer from a “severe” energy burden, defined by the American Council for an Energy-Efficient Economy (ACEEE) as greater than 10% of their income being dedicated strictly to energy bills (Congressional Research Service 2023). According to the U.S. Energy Information Administration’s (EIA’s) Residential Energy Consumption Survey, 10% of U.S. households (12.36 million households) got disconnection notices in 2020, down from 14% in 2015 (U.S. Energy Information Administration 2022). (This

drop could be due in part to state moratoria on utility shutoffs for several months in late 2020 in response to the COVID-19 pandemic. Approximately 88% of U.S. residential customers were covered by a moratorium for at least some portion of the pandemic.)

The National Energy Assistance Directors Association (NEADA) estimates that nationwide arrearages for electricity and heating bills combined increased from \$8.1 billion at the end of December 2019 to \$16.1 billion as of August 2022 (Congressional Research Service 2023). The peak may have been at the end of 2020, during the COVID-19 pandemic, with as many as 20% of U.S. households behind on utility payments. This amounted to \$32 billion in electric and gas utility bill arrearages (National Governors Association 2021). While a national database of disconnections does not apparently exist, researchers have estimated the number of disconnections at between 1.5 and 5.7 million per year during the pandemic (Congressional Research Service 2023).

### **3.2.1 How Select States Manage Partial and Nonpayment Under Consolidated Billing**

A couple of examples from states with active community solar programs indicate possible approaches to managing payment issues under consolidated billing.

In New Jersey, utilities pay community solar providers the full subscription fee first, regardless of subscriber payment. Utilities are entitled to full recovery of costs for community solar as well as recovery of unpaid bills of customers who remain in arrears, according to Sawyer Morgan, research scientist at the New Jersey Board of Public Utilities. The utility follows the same procedures for nonpayment if the customer is a community solar subscriber or not, including utility disconnection. If payments are never made, the utility is entitled to recover losses in rates. This means that utilities are solely responsible for pursuing nonpayments, not the community solar provider.

In Oregon, nonpayment issues are managed by the utility in a repayment hierarchy, with different rules for low-income and non-low-income customers. For non-low-income customers, “any partial payment that is received will be used to recover Utility costs and Program Fees (both Utility and Program Administrator fees) before it is applied to community solar subscription fees... Therefore, in the event of a partial payment or nonpayment by a non-low-income Participant, the Project Manager will not be paid in full for the given collection period, and outstanding subscription charges will carry over to future Utility bills until paid” (Oregon Community Solar Program 2023).

For low-income subscribers in Oregon, “the Utility will apply the bill credit to Community Solar subscription fees before any net savings are applied to normal Utility charges. Because a low-income Participant’s monthly bill credit will always be greater than their subscription charges, the Participant will always receive net savings from the most recent month’s generation and the Participant’s subscription fees will always be paid in full to the Project Manager regardless of whether the Participant pays their Utility bill in full” (Oregon Community Solar Program 2023). With a growing number of programs requiring customer savings through subscription or bill discounts (Xu, Nabirye, and Sandler 2024), this approach may have growing applicability.

In Illinois programs, the utility is paid first and developers are paid last. Consumer advocates in Illinois have argued for this approach to ensure that customers do not fall behind on utility bills leading to disconnection. Developers, on the other hand, have found this to be a notable challenge to getting financed and are hesitant to enter the market (Maryland Public Service Corporation 2024-a). Developers have further made the case that in markets where programs mandate subscription savings, like Illinois, subscriptions paid via consolidated billing should reduce the utility bill under all circumstances. In this case, ensuring a customer can stay enrolled by having the subscription bill portion paid first is beneficial to reducing the utility bill and thus helping a customer with partial payments or nonpayment indirectly (Maryland Public Service Corporation 2024-b).

Minnesota has operated their Community Solar Garden (CSG) program for 10 years, making it the longest-running program among U.S. states. They have never had consolidated billing but have been directed to start by January 2025. They report that nonpayment of CSG bills does not involve the utility, so it has no impact on utility service. If a CSG subscriber were to not pay their utility bill to the point where they were disconnected, then they would not be considered an Xcel customer while disconnected, and thus would not be able to earn CSG bill credits, according to CSG Program Administrator John-Michael Cross, who was consulted in August 2024.

### **3.2.2 A Precedent for Community Solar: On-Bill Financing or Repayment**

A model for managing credits and payments for third-party community solar providers—but with a longer track record—is on-bill financing (OBF) or on-bill repayment (OBR).<sup>6</sup> OBR has been used to finance energy improvements on utility bills for many years.

As of 2022, at least 110 utilities in 33 states offered some form of on-bill financing, including 76 member-owned cooperatives, 11 publicly owned utilities, and 29 investor-owned utilities (Wu 2022). Although most of these programs focus on energy efficiency, some utilities (mostly rural cooperatives) cover solar assets as well.

OBR comes in three forms, with different implications for nonpayment (State and Local Energy Efficiency Action Network 2014):

- **Line Item Billing (LIB)**—The utility bill is used as a tool for participating consumers to make payments to a third party. In the event that a participant fails to make principal and interest payments, financing charges are typically written off or removed from the utility bill, and financial institutions or the utility are free to seek recourse unrelated to a participant’s utility service based on the terms of their contract with the consumer. Disconnection of utility service is not allowed.
- **On-Bill Loan (or Lease) With Disconnection**—On-bill loans with disconnection rights are treated as consumer debt. A broad range of financial products (e.g., unsecured loans, leases) may be repaid on the consumer’s bill, and the threat of utility service termination may act as an inducement for the consumer to repay the loan. In the event that a

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<sup>6</sup> OBF can refer to financing supplied by the public, utility shareholders, or utility bill-payer capital, whereas OBR financing is supplied by third parties and is simply repaid on the utility bill. See State and Local Energy Efficiency Action Network 2014. Community solar financing can come from either source, but we will use OBR in this paper.

participating consumer fails to make financing payments, utilities typically use their normal collection protocols for utility bill delinquency, which may ultimately result in service termination.

- **On-Bill Tariff**—An on-bill tariff (OBT) is a charge that is associated with the utility meter rather than a debt of the consumer or property. The tariff structure is similar to an on-bill loan with disconnection, in that nonpayment of financing charges may lead to utility service termination. However, tying the charge to the utility meter is specifically designed to accomplish three key objectives: (1) automatic transfer of the tariff between consumers in the same property, (2) survival in foreclosure of a first mortgage on the property, and (3) off balance sheet treatment for nonresidential participants.

The most common on-bill tariff is Pay As You Save (PAYS), a program design trademarked by the Energy Efficiency Institute (State and Local Energy Efficiency Action Network 2017). PAYS uses a voluntary tariff to recover *utility* investment in energy efficiency on the customer's property, rather than a loan to the customer to pay for the project delivered by the utility or a third-party vendor.

In a review of PAYS programs offered by 23 utilities in 10 states from 2002–2021, the advocacy group Clean Energy Works found very low rates of nonpayment, with the highest rate of nonpayment at 0.36% from a consortium of rural electric cooperatives in Kentucky (Ferguson et al 2022). However, the evaluation did not determine to what extent the programs were serving low-income households and have reduced energy burdens or energy insecurity.

Bills for PAYS participants are not necessarily lower. Participants pay for the full cost of the measures installed (plus the utility cost of capital) via the bill charge, not merely the incremental cost of more efficient measures. The value of the energy savings in the utility programs reviewed covered the full cost of the upgrades about half the time.

A review of five utility PAYS programs by Lawrence Berkeley National Laboratory looked into the degree to which these programs were serving low-income customers. Although they lacked household-level demographic data, researchers found that many of the customers were in communities with levels of income and education below the national average and unemployment rates above the national average (Deason, Murphy, and Leventis 2024).

As an OBT, repayment of PAYS financing is not technically a loan payment but is instead part of the electric utility's tariff (State and Local Energy Efficiency Action Network 2017). Thus, nonpayment of the PAYS tariff can result in disconnection from utility services. Other forms of energy efficiency financing, such as Property Assessed Clean Energy (PACE) or energy savings agreements, are not repaid on utility bills, so they do not run the risk of triggering a utility disconnection.

A range of traditional financial products (e.g., unsecured loans, mortgages, leases) can be repaid on-bill, using the threat of utility disconnection as recourse in the event of participant default. In a 2014 review, Lawrence Berkeley National Laboratory reported that almost half of the 30 programs analyzed would disconnect energy service in the case of default (State and Local Energy Efficiency Action Network 2014). In some cases, the underlying security for a lease is the financial institution's right to reclaim leased equipment should the participant fail to make

lease payments. The threat of utility disconnection did not seem to result in a lower default rate than programs with no threat; average default rates were low in either case, at less than 2%.

The threat of disconnection can lower the cost of financing for third-party offerings. Lenders and their rating agencies include the risk of nonpayment in their financing decisions. Because payment default rates are much lower for utility bills than for unsecured consumer lending (such as credit cards), investors would rather see their investments secured by the threat of disconnection. Advocates for this approach “have argued that this feature is essential to convincing rating agencies to use utility bill repayment history in their risk analyses. Some proponents have gone further, arguing that the on-bill charge levied to fund [energy efficiency] improvements must be structured as a tariff which is undifferentiated from all other utility bill charges” (State and Local Energy Efficiency Action Network 2014).

The order of bill component payment can also affect lending. In the review of the 13 programs that shared data on payment priority in the event of partial payments from participants, one required payment of the on-bill charge first, six treated the on-bill charge equally to all other charges (i.e., pro rata), and six paid utility fees first (State and Local Energy Efficiency Action Network 2014).

For nonresidential customers, paying for community solar through an OBT may enable participants to treat the tariff as an operating expense rather than a loan. This is known as an “off balance sheet” obligation, in contrast to “debt,” which is part of a company’s balance sheet and determines their debt-to-equity ratio, a metric that is studied closely by investors and often capped by lenders (State and Local Energy Efficiency Action Network 2014). These customers may prefer to finance certain energy investments as an OBT to preserve their debt-to-equity ratio for other investment opportunities.

### **3.2.3 Applying On-Bill Repayment Lessons to Community Solar**

Applying experience from on-bill repayment programs to a community solar program depends on how exactly a community solar product is defined, and what context it exists in.

- If community solar projects are operated by third parties, distribution utilities in regulated states may seek to treat subscriptions as line items. These subscriptions are not afforded the regulatory protection of being incorporated into rates, but also not bearing the risk of disconnection. Nonpayment of a community solar subscription would result in the subscription being canceled and the third-party marketer seeking debt collection.
- If community solar subscriptions are considered to be energy procurement, in either a competitive retail choice market or a regulated utility market, they could be considered an integral part of the electricity service, not an add-on. Nonpayment of the bill would be considered nonpayment of the utility service, with standard utility collection and disconnection practices.
- If a community solar project is owned and offered by a regulated utility, the subscription could be considered a “green marketing” choice, or energy procurement.
- If the product offers the chance to buy a share of ownership in a community solar project, financed on the utility bill, then the product looks even more like OBR of an energy efficiency improvement. Whether it is offered by the utility or by a third party becomes the deciding factor in repayment rules.

### **3.2.4 Consumer Protection Critiques of On-Bill Repayment**

Consumer advocates have been highly critical of on-bill financing, or indeed any measures to reduce energy burdens for low-income households other than full-cost assistance (free to participants) from government or other sources.

The National Consumer Law Center (NCLC) cites a number of risks to low-income households from nonpayment of measures financed on utility bills, including (NCLC 2023):

- The risk of disconnection from utility services
- No guarantee of savings from the installed measures, and no way to compensate customers for shortfalls in performance
- Customers taking on additional debt
- Potential for predatory and aggressive marketing
- Undermining political support for zero-cost programs such as the Low Income Home Energy Assistance Program (LIHEAP) and Weatherization Assistance Program (WAP).

NCLC urges a number of remedies, such as directing customers only to zero-cost programs, not allowing utility disconnection or other ways to pursue nonpayment, prohibiting marketing of OBF programs, and instituting a blanket ban on the use of OBF for LMI rooftop solar installations. “Not only are the up-front partial costs high and the payback periods therefore longer for [rooftop solar and storage], but it is unfair to require a subsequent tenant to bear the cost of a solar array that typically degrades in performance over time” (NCLC 2023).

NCLC sees community solar as an opportunity to provide access to solar with greater consumer protections than rooftop solar. In a recent report, NCLC made the case for consolidated billing as one such protection by “reducing any payment confusion and increasing program access for low-income households who may lack credit cards, creditworthiness, or internet access” (Haynes 2024). Community solar subscriptions are also portable and cancelable, thus avoiding issues around transfer of ownership to subsequent tenants necessary for rooftop solar systems. Additional billing-related best practices, such as not requiring automatic bill payments connected to bank accounts or credit cards, can also improve access for low-income households.



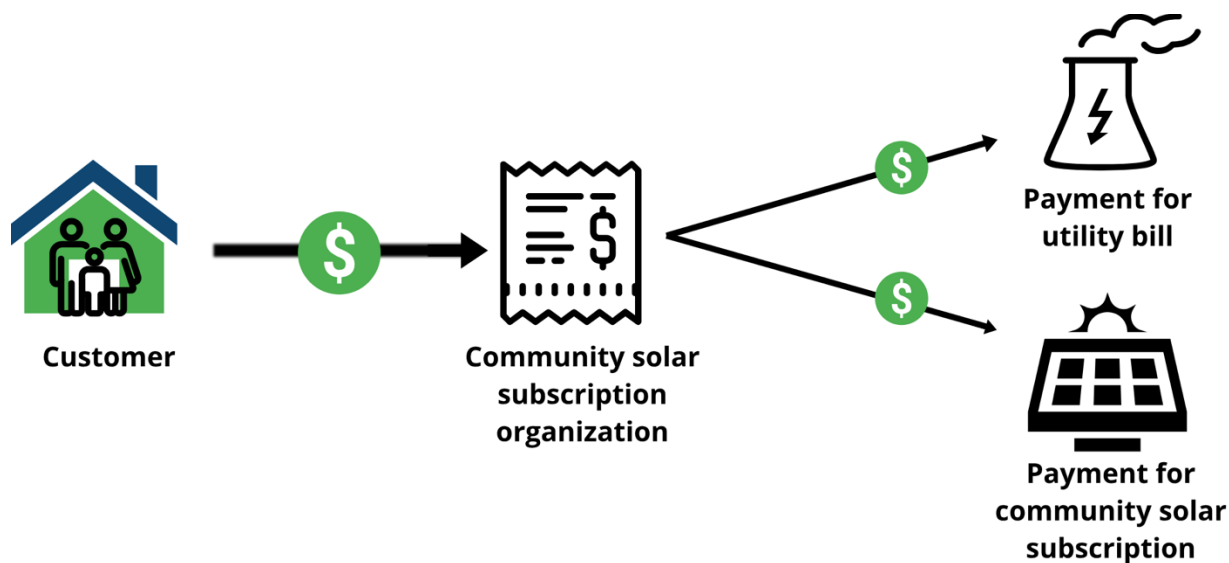
## 4 Alternatives and Workarounds

In this section, we consider alternatives to consolidated billing that can still deliver some benefits and protections to consumers, without the difficulty of changing utility billing software.

### 4.1 Third-Party or “Provider” Consolidated Billing

An alternative to utility consolidated billing is to have it instead provided by the community solar subscriber organization, also known as “provider consolidated” billing (Fazeli 2023). In such an arrangement, the community solar provider is given permission by the subscriber to access and pay their utility bill. The provider bills the customer and receives payment for both the utility bill and the community solar subscription, nets the payments and credits, and remits payment balances to the appropriate party (Figure 2).

This requires cooperation from the utility and approval by regulators, as well as customer willingness. Consumer protections would need to be in place to ensure that payments are handled correctly and accurately.



**Figure 3. How money flows in third-party consolidated billing**

Third parties such as Arcadia Energy (Arcadia Energy n.d.) and Common Energy (Common Energy n.d.) provide this service for their subscribers where available.

Provider consolidated billing does have potential downsides. Oregon chose to explicitly exclude provider consolidated billing in 2022, citing several concerns for low-income subscribers (Oregon Public Utility Commission 2022b). Concerns included the potential for lower service and protections compared to that required of utilities by the commission, unenrollment risks, requiring automatic and no partial payment, and requiring a credit card or banking account for enrollment.



## 4.2 No-Cost/Opt-Out Bill Crediting

Another alternative is to establish community solar programs that deliver bill credits to certain subscribers without charging any subscription fees. This approach is often used to serve income-qualified customers with additional energy assistance.

The District of Columbia (D.C.) offers this service to qualified customers via its Solar for All program (not related to the Greenhouse Gas Reduction Fund Solar for All program funded by the Inflation Reduction Act). Income-qualified customers accepted into the program pay no subscription charge and receive credits on their utility bill totaling approximately \$500 in annual savings. The Department of Energy and Environment in D.C. provides grants through the Solar for All program for organizations to build and operate community solar facilities throughout D.C. Projects also receive financial incentives via Solar Renewable Energy Credits (SRECs) (D.C. Department of Energy and Environment n.d.).

Another example is from National Grid’s New York utility, called the Energy Affordability Program (EAP) – Solar (National Grid n.d.). In this program, customers receiving energy assistance are automatically enrolled to be given an additional solar credit, based on the quantity of solar generation National Grid has in their community solar program each year (Figure 3). The utility was given approval in June to expand this strategy to their Massachusetts customers, as the Solar Access Initiative (SAI) (Massachusetts Department of Public Utilities 2024).



**Figure 4. How the Energy Affordability Credit - Solar works**

*Image from NYSERDA*

The Imperial Irrigation District (IID) in Southern California likewise distributes the energy from a 30 MW solar plant to upwards of 12,000 customers that qualify for energy assistance (IID 2019). The value appears as a bill discount, raising energy assistance levels by about 5% for each customer, with no other change in billing. The project was developed by Citizens’ Power, who agreed to “use its profits” from a \$100 million investment in the Sunrise Powerlink transmission project “to benefit low-income customers in IID’s service area.

Xcel Energy in Colorado offers no-cost community solar subscriptions to income eligible customers, with bill credits subtracted from their normal utility bill (Xcel Energy n.d.-a). While solar gardens must have at least 50% low-income residential subscribers, Xcel offers developers a bonus payment if they commit to 100% direct-billed subscribers with minimum savings (Xcel Energy n.d.-b).

### 4.3 Single Accounting/Dual Billing

If neither utility consolidated nor provider consolidated billing is possible, we present a workaround that aims to reduce confusion but does not change the billing and payment systems already in place, thus customers will continue to get separate bills for utility and community solar service. The advantage is that it can be executed without regulatory intervention or reprogramming utility billing software.

The approach uses the Green Button Connect My Data (CMD) protocol (Green Button Alliance n.d.-a). Green Button is a standard data sharing protocol supported by the nonprofit Green Button Alliance (Green Button Alliance n.d.-b). It allows customers to access their own consumption and billing data and share it with third parties. The Green Button initiative was officially launched in January 2012; to date, over 50 utilities and electricity suppliers have signed on. According to the U.S. Department of Energy (DOE), these commitments ensure that over 60 million homes and businesses will be able to securely access their own energy information in a standard format (DOE n.d.-b). The CMD protocol is not available everywhere, but a growing number of utilities have opted in, giving their customers better access to their own data.

In this approach, the customer still receives and pays two separate bills, one from the utility and one from the community solar provider. However, the community solar bill includes a summary of both bills and shows their net cost, as shown in Figure 4. This is achieved by having the customer use CMD to give a third party, the community solar subscription manager, access to their data. The subscription manager can then present the utility and community solar bills in the same place.

While this approach shows clear net accounting in a single document, it could cause confusion, as customers will still have to pay two separate bills and will see duplicative information on the community solar and utility bill. Marketers should test different designs and wording to provide clarity.

<b>Your Utility Bill</b>	
Connection charge	\$10.00
<b>Charges for Energy Used</b>	
Electricity consumed	1000 kWh
Utility rate	\$0.140/kWh
Subtotal	\$140.00
<b>Total</b>	<b>\$150.00</b>
<b>Your Community Solar Bill</b>	
Solar energy generated from your subscription	700 kWh
Community solar subscription rate*	\$0.120/kWh
<b>Total cost of subscription</b>	<b>\$84.00</b>
Community solar credit	
Electricity generated	700kWh
Community solar credit rate	\$0.14/kWh
<b>Total value of solar credits</b>	<b>-\$98.00</b>
<b>Bill summary</b>	
Utility charges	\$150.00
Value of solar credits	-\$98.00
<b>Net cost (utility charges - solar credits)</b>	<b>\$52.00</b>
Amount you pay to utility	\$52.00
Amount you pay to community solar provider	\$84.00
Your combined cost for the month	\$134.00
Your savings	\$16.00

**Figure 5. Single accounting for dual bills**

*Figure sourced and modified from Solar United Neighbors (n.d.)*

An additional benefit of the Green Button protocol could be in implementing DOE’s Home Efficiency Rebates (HER) program (Section 50121: Home Energy Performance-Based, Whole House Rebates) (DOE n.d.-c). The HER program requires state implementers to calculate energy savings from efficiency measures and the associated rebate. DOE issued data access guidelines in July 2023 for this purpose (DOE 2023). Because DOE considers Green Button to be an “easiest” option for complying with data requirements, it could lead to wider use of the protocol (DOE 2024).

## 5 Conclusion

This report outlines the complexities and opportunities associated with deploying consolidated billing for community solar programs. Although implementing consolidated billing offers significant benefits, such as simplifying billing processes and enhancing consumer understanding, success in implementation can be challenging. Challenges include the administrative and technical considerations that impact the timeline and cost of development and implementation.

Experiences from states like Oregon, New York, and Minnesota highlight the variation in deployment timelines, costs, and roles. Overall, successful implementation of consolidated billing requires careful planning, stakeholder collaboration, and adaptable software solutions to ensure efficient integration into existing utility systems and operations. By learning from the experiences of other programs, stakeholders can better navigate the path toward achieving streamlined consolidated billing that supports the growth of community solar, particularly in low-income and disadvantaged communities.

The billing agent, as the collector and distributor of funds, plays a key role in the success of consolidated billing. How community solar costs are distributed and who is paid first, second, and so on matters to all parties involved, especially when arrearages are considered, and utility disconnection is at risk. Although states with existing programs currently all seem to take a slightly different approach, experiences with other OBR programs have proven useful.

Most OBR programs reviewed reimbursed the on-bill charge equally to all other charges (pro rata) or paid utility fees first. OBR programs saw low rates of program default regardless of whether disconnection was at risk. Community solar programs must decide how the payments and reimbursement are treated under consolidated billing, with key factors including whether they are treated the same as other utility payments or as line items not afforded the same regulatory protections, and whether or not partial or nonpayment leads to disconnection.

Alternatives to utility consolidated billing include no-cost/opt-out billing programs where customers do not pay to be enrolled in the program and receive credits automatically. Third-party or provider consolidated billing uses the non-utility community solar provider as the billing agent, who compiles and bills for both the community solar and the utility bill. A final approach includes dual billing with improved communication on the community solar bill, which includes utility information via the Green Button CMD protocol.

The examples used within this report are not meant to critique or laud any utility, software, state, or program. Rather, the aim is to express the potential complexity of undertaking consolidated billing. Deploying automated consolidated billing software can help ensure the success of a community solar program in the long term by providing clarity to customers, project managers, and utilities alike. However, the complexities and costs of consolidated billing should be addressed at the outset to ensure a smooth and efficient transition. Learning from other utilities' implementation and accounting for community solar program goals should help stakeholders select the appropriate consolidated billing methodology and deployment plan.

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