This post is co-written by Naomi Caldwell (J.D. '24, UCLA School of Law).

Two recent posts explored community solar through the lens of its many potential benefits. (Part One on systemwide benefits and Part Two on local and individual benefits.) Today's post follows the money, exploring community solar compensation mechanisms.

The question of who makes money based on which attributes can vary according to the goals for the community solar program. Most community solar programs adopt a subscriber model so two main groups of people receive direct compensation: participants (often "subscribers") and project owners. Participant compensation matters because it determines whether the program will help relieve participants' energy burdens and whether the program reduces existing disparities the financial benefits of distributed generation. The financial benefit for participants depends on how their compensation nets their electric bill and the subscription fee they pay project owners. Compensation to project owners matters because it can shape incentives for owners to develop solar projects at all, to design and operate the project in particular ways, and to site projects in particular places where they can benefit the grid.

There are two general models for compensating electricity generators today—one for wholesale generation and one for the smaller-scale distributed resources, like rooftop solar. As the primary models in use, these approaches to compensating electricity generators often serve as reference points for conversations around community solar compensation.

On the wholesale side, electricity generators are compensated through a system of auctions. In restructured markets, like California, the Independent System Operator designs auctions to secure and compensate generators for electricity, of course, but also for additional values needed to keep the electric power system running well over time. System operators can run markets for certain operational flexibilities or the commitment to provide power when needed for a period of time, for example. Generators are compensated at the prices that emerge from these auctions. The auction rules, therefore, are crucial determinants of generator compensation at the wholesale level and send signals to generators about the kinds of services and operations that are valued.

Distributed generators have historically been compensated in a fundamentally different way. Compensation for distributed generation is generally pegged to a specific rate, typically either to the retail rate for electricity (net metering) or to a predetermined rate that can be designed to meet different policy goals (net billing).

These two broad approaches to compensation—one for bulk generators and another for distributed resources—reflect the historically different functions of bulk and individual generators. Bulk generators have traditionally supplied the power the keeps the grid running, so regulators tasked with ensuring just and reasonable rates have prioritized the least expensive generation, taking reliability into consideration (applying “security-constrained economic dispatch” processes). For the most part, these systems emerged before serious mind was paid to climate change.

Distributed generation, on the other hand, has (at least until recently) been treated primarily as a tool to increase renewable generation by incentivizing households to cover the upfront costs of rooftop solar installation. (The legislature’s very first finding in SB 656, the statute pursuant to which the California Public Utilities Commission (CPUC) created the first net metering tariff, was that “a program to provide net energy metering for eligible customer-generators is one way to encourage private investment in renewable energy resources…”) To be an effective behavioral incentive, compensation for distributed generation has had to be calibrated, not to an estimation of the value of the services provided, but to the amount that will encourage ratepayers to install rooftop solar arrays. Net metering has been the most common approach to distributed generation for this reason—setting compensation at the retail rate can substantially reduce bills, creating a clear incentive for people to install rooftop solar panels. And it’s been highly successful in doing so.

In California (controversially) and elsewhere, this approach has been shifting in recent years, as some jurisdictions have moved away from net metering and towards net billing. Net billing rates can be more finely-tuned to access whatever benefits a given jurisdiction seeks to prioritize—for better or worse. Here in California, the new net billing tariff was designed to encourage solar + storage, instead of just solar, for example.

Community solar adds medium-scale solar arrays to this already convoluted mix of compensation mechanisms and raises the question—what function should a community solar compensation mechanism be designed to fulfill? Should this compensation design look more like compensation for bulk generation or for rooftop solar, or more like distinct third category? Or perhaps more to the point, what kind of compensation mechanism would yield the greatest benefits when applied to community solar? If the goal is to extend the financial benefits of rooftop solar to renters and lower-income people, we might opt for an approach to compensation more like net metering, with compensation pegged to retail rates. If the goal is to maximize the climate and resiliency benefits to the grid, we might opt for a scheme that allows flexibility to attribute financial value to each of these benefits. The compensation mechanism is where a lot of the power of these programs resides, but naturally, also the debate, as different stakeholders prioritize different benefits that can be in tension with one another and with the constant need for affordable rates.

California's Recent Community Solar Proceeding

A key issue in a community solar proceeding at the CPUC earlier this year centered on the differences between several compensation schemes. The California debate gets wonky, but it provides a helpful illustration of the kinds of design choices for community solar compensation mechanisms.

While California leads the country in overall solar capacity, the state is way behind on community solar. This is a serious concern, not least because the absence of a viable program contributes to the disparity between households that can and cannot access rooftop solar. The recent CPUC proceeding considered (and ultimately rejected) a proposal for a new approach to community solar, called the Net Value Billing Tariff (NVBT). Proponents argued that the NVBT would build out California's community solar projects, adopting a model based on New York's community solar program. (New York is a national leader in community solar capacity, with more than two gigawatts of capacity.) Much of the proceeding focused on contrasting the proposed NVBT with New York's program and with California's current community solar program. Each model offers a slightly different approach to compensation and none fit cleanly into the standard models for bulk and distributed generation described above.

Compensation Based on Avoided Generation Procurement Costs

California's preexisting general market community solar program, the Green Tariff Shared Renewable Program, calculates bill credits based on a single metric: the utility's avoided generation procurement costs. This program allows customers to "pay for the difference between their current generation charge and the cost of 50-100 percent renewables." Customers receive bill credits from their utilities in exchange—whether these bill credits result in a financial gain for customers depends on the actual avoided costs and the total charged on a customer's electric bill. Regardless of whether customers net out, unfortunately, this model is inaccessible to lower-income ratepayers because it requires an upfront cost to participate (as the CPUC's recent community solar decision notes).

This approach doesn't fit neatly into either the wholesale or the distributed compensation approaches described above. In essence, this program gives ratepayers who can't install solar panels some agency over the systemwide generation portfolio—by paying a bit more, these customers can increase the state's renewable generation. This approach enhances consumer choice but leaves many other potential benefits of community solar on the table. Giving people greater agency to impact the collective generation portfolio is surely one benefit of distributed generation, but it falls short of actually lowering electric costs for participating households. Not only has the premium structure made California's community solar programs less accessible for lower income people, but the reimbursement rate is lower than the rate for rooftop solar under net metering regimes. This reinforces disparities between the financial benefits of distributed generation available to renters and low-income people versus to people that can install their own solar panels at home.

Compensation Based on the "Value of Solar"

Both the New York program and the rejected NVBT proposal take a different approach. Both calculate compensation using a "value stack." Value stack rates reflect multiple values provided by the community solar project. Put another way: the value stack makes explicit that the energy itself is not the sole and maybe not even the primary value provided by a community solar project. This approach is essentially a form of net billing, where the rate takes into consideration multiple values. Using the value stack to determine compensation for community solar subscribers is a quite literal reflection of the injection of new values into major electricity regulation policy.

The value stack model doesn't necessarily cut in favor of any particular benefit or outcome. Instead, the value stack model allows regulators to finely tune the program to meet specific needs. Unsurprisingly then, there are some differences between the design of the value stacks in New York's model and California's rejected NVBT plan.

New York's value stack includes energy, capacity, environmental, demand reduction, and locational system values. (The locational system value is an extra value that rewards projects sited in places that where they help relieve grid congestion.) The value stack for the rejected California NVBT included energy, capacity (including generation and transmission and distribution), and environmental values. The California proposal did not include demand reduction or location system values.

Programs can opt for different metrics for each value as well. New York's capacity value, for example, is pegged to the New York System Operator's capacity markets, but the California Independent System Operator doesn't operate a formal capacity market, so the NVBT proposal defined that value differently. The NVBT pegged several values in the stack to California's Avoided Cost Calculator, a metric used to determine the benefits of distributed resources—a move that aligns community solar compensation more closely with compensation for rooftop solar. The New York's value stack, on the other hand, applies to both behind-the-meter and front-of-the-meter resources. (New York does have a separate net metering program but it is being gradually phased out).

Proceeding Outcome

Despite agreeing with parties that the existing Green Tariff Shared Renewable Program has failed to accomplish essentially every goal evaluated in the proceeding, the Administrative Law Judge in the community solar proceeding rejected the NVBT proposal. The ALJ's rejection of the NVBT hinged on a characterization of NVBT projects as front-of-the-meter resources—those that feed directly into the grid instead of serving onsite needs first. Her decision argued that because NVBT projects could be sited anywhere, the benefits of those projects would be mediated differently than behind-the-meter resources, like rooftop solar panels. The implication, according to the decision, was that compensating NVBT projects using the same Avoided Cost Calculator used for behind-the-meter resources would inflate the value of community solar projects (particularly regarding reduced distribution and transmission costs), increasing costs for non-participating ratepayers.

The debate is technical and the ALJ’s analysis contested by the many parties that support of the NVBT. Some parties contend that NVBT resources are more accurately designated behind-the-meter resources, while others argue that the Avoided Cost Calculator is appropriate regardless of whether NVBT resources are behind- or front-of-the-meter. Even if aligning the compensation for community solar with the Avoided Cost Calculator inflates the actual value of those projects, it would also ensure that compensation is closer to the compensation for rooftop solar, reducing the disparities in benefits from distributed generation. Key debates on the compensation mechanisms often come back to which benefits a community solar program should prioritize and how competing benefits are balanced, both against each other and against other systemwide goals.

The decision expanded a community solar program for low-income participants that guarantees a 20% bill discount and introduced a new program, the Community Renewable Energy Program that is to dedicate 51% of its capacity to low-income subscribers. It remains to be seen whether the changes the CPUC did make will help California make up ground and finally develop projects that deliver on community solar’s many potential benefits.

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