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To: Rob Brundrett (The Ohio Manufacturers' Association)

From: John Seryak, PE

Community Solar, Virtual Net Metering, and Ohio's House Bill 450

Key Points

- House Bill 450 (HB450) would create community solar and virtual net-metering law for up to 3,000 MW of solar.
- Virtual net metering is new to Ohio law. It would be applied to any community solar project subscriber's electricity use.
- HB450's virtual net-metering offsets electric generation, transmission, and distribution costs.
- As written, virtual net-metering could create up to \$340 million per year in transmission and distribution cost shifting to non-subscriber electricity customers, including small and mid-sized manufacturers, if all the community solar is built and fully subscribed.
- Community solar subscribers are not guaranteed to see bill savings. And, it is feasible the full \$340 million in cost-shifting ends up as profit for solar developers or the subscriber organizations.

Summary

HB450, as introduced, allows for community solar projects of up to 3,000 megawatts (MW) of solar facilities, including 1,000 MW for distressed sites, such as brownfields, and 2,000 megawatts (MW) of non-distressed sites. The solar facilities are limited to sizes of 45 MW if located on a distressed site, or 10 MW if on a non-distressed site. Customer subscribers of the community solar projects have some size limitations. No single customer can subscribe to more than 40% of a project's output. And, the remaining 60% of subscribers must be no larger than 40 kW in subscription. Granted, since a typical residential solar system is about 5-10 kW, some subscribers could be good-sized businesses.

A key provision of concern in HB450 is its virtual net metering provision, which we estimate would create up to \$340 million per year in cost shifting to non-participating ratepayers, including small and mid-sized manufacturers, if the full 3,000 MW of community solar is built. However, this provision, and others, could be modified to alleviate the cost shifting.

In the remainder of this memorandum, we describe community solar, virtual net metering, show our estimate of the virtual net-metering cost-shifting, and cover other concerns as well as potential remedies.

Community Solar - How it Works and Intended Beneficiaries

Community solar initiatives stem from customers who desire solar systems at their home or business, but are unable to install the systems for specific reasons, such as:

- **Shaded facility** - The home or business is shaded by trees or neighboring structures, and thus is not a good candidate for on-site solar due to shading.
- **Tenant** - The resident or business is a tenant, and does not have permission to modify the building.
- **Unable to access capital** - The resident does not have adequate access to capital, and cannot afford the up-front cost of a solar system or will not be approved a loan by a bank.

Community solar arose to provide the benefits of solar to these customers who face clear barriers to implementing solar at their home or business. The benefits of solar to customers are generally recognized as the environmental attribute, utility bill savings, local investment, and equity ownership of the solar system. For example, a home-owner with access to capital and a sunny rooftop can install solar today, and, after some period of years will have lower utility bills, a higher home value due to owning a solar system, and can claim they are solar powered. From this perspective, solar ownership can be viewed as an investment vehicle that builds equity for its owner, similar to building equity through a home mortgage versus rent. However, solar system installation, and the associated tax credits and subsidies solar systems receive, largely occur in middle to upper-income areas. Thus, the clear market gap is tenants and residents that do not have capital or will not be approved loans for solar systems, ie, low-income and underserved residents. Community solar is of growing popularity as a policy tool to address the inequitable distribution of rooftop solar systems and the accompanying taxpayer subsidies.

The key mechanism to community solar is providing a subscription to the project. While the subscription typically includes energy sales, it may also include an ownership share of the project itself. In states where a customer cannot shop for electricity, a bill credit is commonly included to offset the customer's electricity generation costs.

Community solar policies may or may not include "virtual net metering". And, virtual net metering can be constructed to offset just electric generation costs, or electric generation, transmission, and distribution costs.

Key Information

- Community solar is typically intended for shaded homes, renters, and low-income residents.
- Benefits can include environmental attributes, bill savings, or ownership shares in the solar system.
- Competitive market options exist for renters and shaded homes, but not for low-income residents.
- Virtual net-metering constructs can vary in design.

The US National Renewable Energy Laboratory provides an excellent primer on community solar policies¹, including that virtual net-metering credits are typically for generation costs only.

Net-Metering, Virtual Net-Metering, and The Cost of Virtual Net-Metering

Ohio law currently allows net metering of customer-sited generation projects under Ohio Revised Code (ORC) 4928.67. HB450 would allow community solar subscribers to receive virtual net metering², which is not currently allowed under Ohio law.

How Net Metering Works

Net-metering provides that a customer with on-site generation be charged for electricity on its net electricity use. For a simplified example, if a home with rooftop solar uses 1,000 kWh in a month at night when the solar system is not operating, but the home exports 800 kWh to the grid from its solar production during daytime hours, then under net-metering, that home would be charged the net consumption of 200 kWh for the month. Importantly, the home owner with net-metering would save on its electric generation, transmission, and distribution charges, the full cost of electrical energy, or about \$0.115 /kWh. The home owner can save on transmission and distribution costs because it did not fully rely on those systems to deliver it electricity.

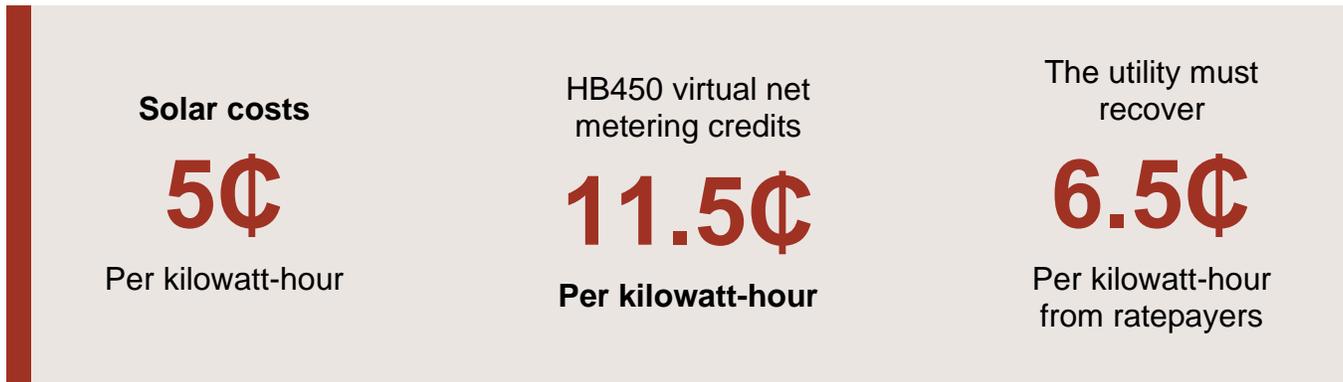
How Virtual Net Metering Works

According to the US National Renewable Energy Laboratory (NREL), virtual net metering "allows customers to receive bill credits for generation from an off-site solar energy system. Some form of virtual net metering must exist for community solar to work properly so that multiple customers can offset their electricity loads from a system located elsewhere." Note that by NREL's definition, virtual net metering would allow for only an offset of the generation component of a solar system. The generation component of residential customer's electricity is about \$0.05 /kWh. Notably, this type of virtual net-metering construct, which only credits for generation, is critical for states with vertically-integrated, monopoly generation. In Ohio, such generation crediting can occur via commercial retail electric suppliers without a law change, and is commonplace with business customers.

HB450 applies Ohio's customer-sited net-metering language, meant for behind-the-meter generation, to off-site generation. In doing so, the electric distribution utility must thus credit a community solar customer for, say, \$0.115 /kWh (generation, transmission, distribution) instead of \$0.05 /kWh (just generation). In essence, the community solar customer isn't paying for grid services it is utilizing. As a result, the electric distribution utility would stand to lose \$0.065 /kWh it is required to collect to cover its costs of distribution, and purchasing transmission. However, Ohio law makes the utility whole for these losses, and the utility is allowed to collect the balance of distribution and transmission costs from other ratepayers. Thus, this cost would be shifted to ratepayers.

¹ Community Solar | State, Local, and Tribal Governments | NREL, <https://www.nrel.gov/state-local-tribal/community-solar.html>

² Section 4928.852 of HB450



A customer that uses 1,000 kWh/month could purchase a 1,000 kWh subscription to fully offset their utility costs with community solar.

The Cost of Virtual Net Metering that Includes Transmission and Distribution Credits

HB450 allows for up to 3,000 MW of community solar projects, all of which would benefit from virtual net-metering that offsets generation, transmission, and distribution costs. A solar system in Ohio produces about 20% of its nameplate capacity in energy. Thus, the total energy the community solar projects would produce is about:

$$3,000 \text{ MW} \times 1,000 \text{ kW/MW} \times 8,760 \text{ hours/year} \times 20\% \text{ capacity factor} = 5,256,000,000 \text{ kWh/year}$$



To estimate how much distribution and transmission costs would be credited to community solar subscribers, and thus shifted to other ratepayers, we used AEP Ohio's current cost of transmission and distribution to residential customers, which is \$0.064 /kWh, according to their online tariff³. The generation output of the community solar projects multiplied by the cost of distribution and transmission

³ <https://www.aepohio.com/company/about/rates/>

electricity is the amount of potential maximum cost shifting to non-participating customers, and would be about:

$$5,256,000,000 \text{ kWh/year} \times \$0.065 / \text{kWh} = \sim \$340 \text{ million/year}$$

Solar system production and utility distribution and transmission costs will vary from project to project, and subscriber to subscriber. However, this ballpark analysis shows the significant order of magnitude of cost shifting that could occur under HB450.

Beneficiaries of Virtual Net Metering, As Drafted

Typically, the financial beneficiaries of virtual net-metering are intended to be the community solar subscribers. After all, as we discussed, community solar originated to serve customers who otherwise couldn't install rooftop solar for a variety of reasons. However, in HB450 this is not guaranteed, as the bill is silent on how a subscriber will be charged. Thus, while a subscriber could save its all-in cost of electricity at \$0.115 /kWh through virtual net metering, it could also be charged \$0.115 /kWh by the subscriber organization, and have no net bill savings. That a community solar subscriber could somehow not save money on their bill is conceived of in the HB450 draft, as it requires the PUCO to review "whether bill savings were achieved by the subscribers".

According to the oft-cited Lazard's 2021 Levelized Cost of Energy⁴, the cost of unsubsidized community solar ranges from \$0.059/kWh to \$0.091 /kWh. Because community solar projects would still be eligible for federal tax incentives, these solar projects may sell electricity for around \$.04 to \$0.06 /kWh after federal subsidies.

Thus, the subscriber organization, or the solar facility, could feasibly sell community solar to subscribers at \$0.115 /kWh, while their costs may only be \$0.05/kWh, and they could pocket the margin as profit. It is possible that the full \$340 million/year cost shift would go to solar project developers or subscriber organizations.

However, a community solar project may still be viable if its subscribers are only credited for the generation component of their bill, since community solar costs per kWh are very close to a residential customer's current generation costs, both being around \$0.05 /kWh. Thus, a virtual net metering policy that only credits for generation may not create significant cost shifting to other ratepayers.

Other Concerns

There are myriad other concerns with HB450, as drafted, which we list below.

Key Information

- Under HB450, projects could charge subscribers far above market costs for solar.
- But, community solar costs could be offset by generation credits alone.
- Effectively, \$340 million/year could be transferred to developers from ratepayers.

⁴ Lazard's Levelized Cost of Energy Analysis—Version 15.0, <https://www.lazard.com/media/451881/lazards-levelized-cost-of-energy-version-150-vf.pdf>

- Utility administration fees unclear - HB450 allows "an electric distribution utility to recover reasonable costs associated with administrating the community solar project program". However, the "subscriber organization" is likely to undertake most of the administrative costs for community solar projects. It should be clarified whether the electric distribution utility can be a "subscriber organization", and if not, a narrower definition of allowable cost recovery should be sought.
- Solar renewable energy credit ownership unclear - Solar renewable energy credits (sRECs) are a valuable part of any solar project. Subscribers to a community solar project are likely to understand their electricity as "solar power". However, HB450 is silent on if the subscribers would receive the project's sRECs. If subscribers did not receive the sRECs, the project would likely be in violation of Federal Trade Commission (FTC) rules on environmental benefit claims⁵.
- Solar facility ownership and subscriber model unclear - Many community solar projects are intended to transfer equity share in the solar facilities to subscribers, though this is not a requirement for community solar. Transfer of ownership with community solar is why a community solar project's customers aren't called customers, but instead are called subscribers. HB450 refers to a subscriber's "shares" at several points. While it may be clear that this refers to "shares of output" to some, because community solar is often intended as a wealth building vehicle for under-served communities, whether a subscriber can receive an ownership share in the solar facility or not should be clarified.
- Subscriber size allowance is exceedingly large - HB450 allows many subscribers (not less than 60%) to have electricity use up to 40 kW. The remaining subscription could be allocated to a single subscriber. As previously discussed, community solar is intended to benefit residential customers and small businesses with barriers to implementing rooftop solar. A residential customer rooftop system would only be 5-10 kW. In comparison, a 40% subscription of a 45 MW system would better fit a corporate entity. However, when combined with HB450's potential to create lucrative solar contracts, this would create an uneven playing field for corporations that are already investing in solar or wind projects without the benefit of virtual net metering.
- Possible cross-utility subsidization - While HB450 limits community solar subscribers to customers of electric distribution utilities, the solar project itself could be interconnected to the "electric transmission grid, or an electric distribution system, serving the state". This could allow customers of one utility to subsidize a solar project that creates system benefits to customers of another utility. Of special concern is if "electric distribution system" would include municipal or rural electric cooperative (coop) electric distribution systems. If so, these municipal or coop systems and their customers would have significantly lower electric transmission and capacity costs. The transmission costs would be shifted to other customers on the same transmission system, but served by a regulated investor-owned utility. Because of this transmission cost reduction to an electric distribution system, solar developers of community-solar sized projects, say 10-50 MW, are presently keenly interested in interconnecting to municipal and coop electric systems.
- HB450 is not technology agnostic - HB450 is specific to solar as a technology. Customers desiring solar, though, may also find other local or no-to-low carbon power resources just as desirable. For example, a community wind project would have a nearly identical set of barriers, pros, and cons as a

⁵ Environmental Claims: Summary of the Green Guides | Federal Trade Commission (ftc.gov), <https://www.ftc.gov/tips-advice/business-center/guidance/environmental-claims-summary-green-guides>

solar project. Thus, a "community power" policy could be considered as technology agnostic alternative to "community solar", creating a fairer playing ground.

- Solar facility size caps are arbitrary - Solar facility size is limited to 45 MW for facilities on distressed property, and 10 MW for all other solar facilities. These seem like arbitrary limits. It's not clear why the solar facility size needs capped, as solar facilities are less expensive, generally, the larger they are.

Potential Modifications

The main concerns with HB450 are the magnitude of the distribution and transmission cost shifting, and if subscribers would benefit from community solar with bill savings. The clearest remedy would be to modify the virtual net-metering provision of HB450 to apply to generation credits only, which would eliminate the shifting of distribution and transmission costs to non-subscribing ratepayers.

Also, because viable solar options exist in the market for most customers, policymakers should consider who the intended beneficiaries are of a community solar policy and project. If the policy is intended to address the market gap of low-income resident access to solar, then HB450 would benefit from clear qualifying criteria for subscribers, address if subscribers are intended to accrue equity through shares of the solar system, and ensure that any cost-shifting of distribution and transmission costs flows to the intended low-income resident recipients. In such a case, policymakers should consider the allowed scale of the community solar projects, and the resulting cost to ratepayers.