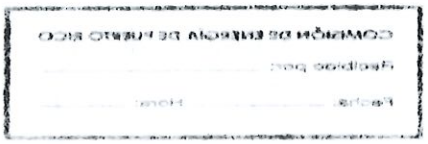
COMMONWEALTH OF PUERTO RICO
PUERTO RICO ENERGY BUREAU

PREB Workshop on Renewable Energy Credits (RECs)
Per Law 17 (2019) **PREB DOCKET: NEPR-MI-2019-00010**

COMMENTS OF THE SOLAR AND ENERGY STORAGE ASSOCIATION OF PEURTO RICO (SESA-PR)

SESA-PR thanks the Puerto Rico Energy Bureau (PREB) for hosting two full-day workshops in June 2019 on the topic of creating a market for Renewable Energy Credits (RECs) by way of rulemaking, as required by Law 17. SESA-PR offers these comments as suggestions to consider from the perspective of the industries that will be responsible for all aspects of manifesting new solar and storage systems of all scales on the island, billions of dollars of which will be necessary to meet the clear requirements of Law 17. A conversion from under 3% of Puerto Rico's power coming from renewable energy today to 20% by 2022 and 40% by 2025 will be the most rapid move away from fossil fuels and to renewables that has ever occurred worldwide. PREB's role in creating clear rules and enforcing them is a very serious one. We thank PREB for the opportunity to have participated in the June workshops, and to submit these written comments today in anticipation of draft rules being promulgated in the coming weeks.

The main focus of our suggestions is that PREB finish an expedited rulemaking process to establish the framework and pricing for a functioning REC market by the end of October of this year, so that REC payments for new utility-scale and distributed generation systems, sited at or near customer's homes and businesses, begin by January 2020. Such a swift timeline will be crucial for the industry's ability to meet the challenge of constructing more solar and storage per capita than has ever been done before, anywhere, in this short timeframe of the next 5 years.



About SESA-PR

SESA-PR is the Puerto Rico trade association representing companies who develop solar and energy storage systems at all scales on the island. Our member companies focus on marketing, design, manufacturing, financing, procurement, installation and maintenance of solar and/or energy storage systems. Founded in February 2018, SESA-PR is the local affiliate of the national Solar Energy Industries Association (SEIA).

SESA-PR's role in Law 17 is unique. We consolidated industry input on much of the language ultimately included in Law 17, and our members have a strong vested interest in all aspects of its implementation pertaining to solar and storage.

I. Understanding PREPA's historical role in the only failed RPS in the nation

In crafting strong rules for the creation of a well-functioning REC market, it's important to understand and avoid the mistakes made in recent history. Puerto Rico's legislature passed a Renewable Portfolio Standard (RPS) in 2010 requiring 12% of the island's power to come from renewable energy by 2015. Although in almost every other jurisdiction in the nation the RPS policy has resulted in a successful jump-starting of renewable energy, and compliance years ahead of schedule, a variety of factors added up to PREPA never attempting to demonstrate compliance with the law, and no entity assessing the legally required penalties as a repercussion. Although some large utility-scale solar and wind systems were constructed, billions of dollars worth of projects were legally committed to be developed that have not moved forward.

This near utter failure of compliance historically should be considered the default outcome looking forward with the requirements of this new, much more aggressive RPS. Although the legal requirement is with PREPA to develop more renewables, that outcome depends entirely on the strength of the rules PREB is developing, and on the non-hesitating

nature of the regulator to impose penalties for noncompliance. In fact, although every effort should be made to inspire PREPA to attain the requirements of Law 17, partial or complete noncompliance should be assumed. We encourage PREB to prepare for the collection and investment of Alternative Compliance Payments to be spent on REC-supported renewable energy construction with PREB's direct oversight.

It's worth noting that PREPA's leadership throughout the crafting of Law 17, and since, has been strongly supportive of the swift transition to renewables, and that the organization has been participatory in the PREB workshops and is currently taking a collaborative approach to the development of these important rules. With the utility being in the midst of bankruptcy while simultaneously being ordered to sell its entire transmission and distribution grid, the degree to which the utility will be taking a cooperative approach in the coming years is unpredictable. These factors only further reinforce the crucial role of PREB as the regulator to craft very strong, easily enforceable rules.

II. The Basic Math

It's imperative to require of PREPA regular, frequent, public publication of the amount of renewables installed on the island, both historically and looking forward, in order to determine progress toward compliance with the establish growth requirements. The most recently available data from the Energy is insufficiently old, but since for demonstration purposes, let's look at the numbers published in the eia.gov "Profile Analyses". It shows that as of June 30 2017, there was 88 Megawatts of distributed generation connected to their grid, across 8,500 customers[1] and 137MW of large-scale, for a total of 225MW. In July 2019, PREPA announced that number had

[1] https://www.eia.gov/state/analysis.php?sid=RQ

grown to 14,800 net metered customers[2], or a growth of 3,150 customer per year during that two-year period.

In June 2019, PREPA's IRP filing shows that there is a total of 172.75 MW of distributed generation solar interconnected to the grid (130MW of Distribution-level DG and 42.75MW of Transmission-level DG)[3].

According to PREPA's recently filed IRP[4], Appendix 1, there are 137MW of large-scale solar in operation or pre-operation today.

173 + 137 = around **300 MW of solar installed in Puerto Rico today**.

PREPA's IRP shows total electric sales are around 16,000 GWh per year. Assuming that each MW of solar produces 1,650 MWs her year

If we assume 5.5 sun-hours per day on average[5] and a derating factor of 25%, then each MW of solar produces 1,500 MWh of electricity per year.

Thus the current 300MW of solar is producing around 450 GWh of solar electricity each year. 450 / 16,000 = 2.8%, so 2.8% of Puerto Rico's power is currently coming from solar (1.62% from DG and 1.28% from large-scale).

Puerto Rico also gets about 1.44% of its power from wind and other renewables, meaning Puerto Rico is currently producing around 2.8 + 1.44 = 4.24% of its power from renewable energy.

If electricity demand remained flat at 16,000 GWh per year, then Law 17 would require 3,200 GWh of electricity to come from renewable energy by 2020 and 6,400 GWh by 2025 (40%). To purchase 3,200 GWh of RECs, that would be 3,200,000 RECs purchased per year by 2025; if REC prices were, say, $100 each, then the cost would be $320,000,000 to comply, or

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[2] https://newsismybusiness.com/14800-prepa-customers-benefiting-from-utilitys-net-metering-program/
[3] http://energia.pr.gov/en/integrated-resource-plan/
[4] http://energia.pr.gov/en/integrated-resource-plan/
[5] https://rredc.nrel.gov/solar/pubs/redbook/PDFs/PR.PDF

around $17 per month per residential customer, less the savings in fuel, transmission, and other costs which would be considerable and might even outweigh these costs. These costs may seem considerable, but the cost of noncompliance could be double this amount for the consumer.

Since we're at 4.24% already, by 2022 Puerto Rico would need to grow its share portion of renewable energy by 15.76%. If 15.76% more solar came online, that would mean an additional **1,700 MW of new solar would have to become operational by 2022**, and yet another **2,140 MW by 2025**, or a total of **3,830MW of new solar constructed on the island by 2025**.

III. REC Pricing

We suggest an approach of "beginning with the end in mind", realizing that setting the right framework and REC pricing today will actually lead to successful compliance with the percentages of renewable energy required by Law 17, as it has in so many jurisdictions across the country. There are a plethora of historical examples to pull from in the experience of utilities and regulators complying with RPS laws, and a variety of approaches that could work for Puerto Rico. Again, we thank PREB for the collaborative approach currently being taken as these important rules are developed.

Key to the success of the RPS will be setting the price of RECs at levels that will result in compliance with the percentage requirements of the RPS, and with any interim requirements PREB establishes in between the milestone compliance years required by Law 17. We encourage basing the pricing on case studies drawn from past experiences in Puerto Rico as well as in other jurisdictions. Setting the REC prices too low will result in under-compliance. While the possibility exists of setting REC prices to high resulting in over-compliance, this scenario would be easily correctible by adjusting REC prices downward at some point in the future.

Since Alternative Compliance Payments (ACPs) are 200% the cost of RECs, setting REC pricing at a high level would result in a cost savings to consumers even if it resulted in significant over-compliance. In an ideal scenario, ACPs will not ever have to be collected, as that would be the outcome of the steady market growth needed to result in predictable compliance levels.

For large-scale solar, there's been a precedent set of $35 RECs for most projects already in operation. The success of future utility-scale projects, including the completion of projects already agreed to by PREPA, will depend on overall contract pricing including RECs bundled with the energy purchased; ie large-scale development could happen with no RECs at all if the per kWh pricing is appropriate, technical roadblocks are collaboratively addressed, and PREPA becomes in a position where they're creditworthy so that a signed PPA is financeable. If we assume that all those other barriers are worked though, then the higher the REC price, the more projects will get built. For large-scale projects, if standard terms are developed for a per-kWh PPA price, then it's possible that a REC auction model could be effective. Alternatively, if predictable, bankable REC prices exist, then the per-kWh PPA prices could be negotiable and/or done via some type of an RFP process.

Given the much higher RPS targets of Law 17 compared to the requirements of the previous RPS in place at the time currently operational projects were contracted, it would follow that the REC pricing for projects constructed in the future would be at some level above $35.

For distributed net-metered generation, the customer is responsible for or financing all project costs, so the payment for RECs is the only cost incurred by the utility. To set effective pricing for these projects, it will be important to set goals for how much distributed generation (DG) development is desired as an outcome of Law 17 compliance, consider the possible extremes of low and high pricing, and make a prediction of market growth based on REC pricing.

One extreme would be what's currently the case, $0 being paid for RECs from DG systems. This "Business As Usual" case is currently producing around 250 net metering applications per month, according to PREPA, or 3,000 per year. If we assume a steady market with no REC payments, then by 2025 we would have 3,000 times 5 years = 15,000 new DG systems installed. If we then assume an average system size of 5kW, then we could predict 15,000 times 5kW = 75,000 kW, or 75 Megawatts of new construction to happen over the next 5 years (by the end of 2024).

The basic calculations above show that 3,830MW of new solar needs to be operational by the end of 2024 (to produce the requisite 40% of electricity consumed by 2025. The difference between the business-as-usual projection of 75MW and the legally required 3,830MW is startling. If the rate of installation over the past two years has been 15MW per year, then the rate of installation would have to increase a startling rate in the next two years, as the chart below shows:

Year	New MW installed	Total MW	Growth Rate	Law 17 Requires (Total MW)
2017	15	225		
2018	15	263		
2019	15	300		
2020	159	459	1060%	
2021	1,685	2,144	1060%	2,150
2022	758	2,903	45%	
2023	758	3,661	100%	
2024	758	4,420	100%	4,300
Total New 2019-2021	1,859			
Total 2019-2024	4,135			

While there's not a "DG Carve-Out" in the law requiring any specific % of the required RPS stairsteps to come from distributed generation, distributed generation is the only type of new renewables that has been constructed in recent years, and it's essentially the only type being constructed today. While much of the new RPS requirements may be met with new utility-scale installations, permitting requirements alone could prevent very many large-scale projects from coming online before the required amount of renewables is necessary to be installed by the end of 2021.

Suffice it to say that it's going to take a strong concerted effort to grow the amount of solar installed in Puerto Rico quickly in the short term, which will mean REC pricing sufficiently high to motivate as much as 10 times as much solar installed solar year-over-year for the next two years. This means not only that REC pricing needs to be sufficiently high, but also that PREPA needs to start purchasing RECs very soon. We recommend by no later than October 30th the rules be finalized by PREB, including establishing initial pricing and all forms necessary for customers to apply, applications be accepted in November and December, and REC payments begin no later than January 2020.

IV. Interim Targets

Law 773 (2019) amended Law 17 (2019) with the following sentence, modifying Article 2.3 of Law 82 (2010), in reference to the 20 / 40 / 60 / 100 % required minimum percentages of renewable energy required by 2022 / 2025 / 2040 / 2050 respectively.

El porciento requerido deberá cumplirse a más tardar al último año del periodo. No obstante, por cada uno de los años que componen un periodo, deberá reflejarse un progreso razonable, según sea determiando por el Negociado de Energía.

Or in English:

The required percentage must be fulfilled no later than the last year of the period. However, for each of the years that make up a period, reasonable progress must be reflected, as determined by the Energy Bureau.

This sentence requires the Energy Bureau to define, and enforce, "reasonable progress" in the years between the key benchmark years of 2022, 2025, 2040 and 2050.

While there may be various approaches to ensuring that "reasonable progress is reflected". One approach we suggest considering is to require specific % targets for the off-years, and enforce them with the exact same enforcement mechanism as is used for the main benchmark years established in the law. They key is to have some required percentage, and a clear, sufficiently strong set of repercussions happen if the utility doesn't hit the interim percentages required by PREB.

In establishing these interim targets, wide latitude could be granted by the Bureau in the early years. This could entail:

A. Allowing PREPA to comply with RECs owned by the State Energy Policy Office, which were granted to their office automatically for systems which received the Green Energy Fund.

B. Requiring that there be an offer to buy RECs generated by customers all the way back to 2015 (and not granted to the State Energy Policy Office). There are a number of these RECs that exist and are either tracked already or are trackable.

Goals for establishing this broad latitude with "REC Vintage" in the early years is that it may increase the chances of hitting the first milestone that's required by law: 20% renewable energy by calendar year 2022.

V. Estimation of production

For residential systems of a sufficiently small size, it's literally not worth the cost of the meter and the accounting, to pay for (or require the customer to pay for) the technology and paperwork of measuring actual electrons generated by these small systems. Instead, in taken in aggregate, there's a negligible margin of error in estimating production based on basic system design. Ie a 10kW system is gong to produce a certain amount of electricity, and therefore generate a certain number of RECs, each year, if installed directly south and tilted at latitude. Orientation changes, shading, and any other factors can be calculated with much precision using the free PVWATTs calculator available online from NREL[6].

Although the margin of error for an individual home might be significant (ie, how do you know that home isn't going to burn down two years from now, or something else might happen to reduce or stop solar production?). There's a plethora of data available about system performance, and these variances can be taken into consideration and result in a very small margin of error when hundreds, thousands, tens of thousands of systems are taken in the aggregate. Estimating system production for interconnected solar systems under 25kW would coincide with the 25kW threshold established for "automatic interconnection" in Law 17.

It's important to note that RECs are owned by the owner of the system generating the electricity, unless they're sold to some other entity. Similar to the practicality of sparing the expense and potential endless delays of requiring a special utility-grade meter to be installed on a customer's homes to measure every electron a solar array produces, it's also not generally best

[6] https://pvwatts.nrel.gov/

practices to compensate owners of small solar systems (say, under 25kW) on a monthly basis. Doing so would result in a large number of very small transactions happening. For example, a 5kW system would produce approximately 600 kWh in a month, generating 0.6 RECs. Cutting tens of thousands of checks every month to compensate homeowners for less than 1 REC per customer per month would, quite literally, not be worth the cost and potential delays and errors that could occur along the way.

If this sort of monthly compensation model is chosen for small systems, it should be very straightforward for solar installation companies to be able to give customers the option of selling the rights to their RECs to the solar installation company, so that the company can aggregate together hundreds or thousands of systems and sell them to PREPA as needed for compliance.

Another approach could be to estimate the output of an interconnected solar system over a period of years, perhaps 10 years, then require PREPA to go ahead and compensate customers up-front for the right to retire RECs over that entire timeframe. This would amount to an up-front incentive which would lower the initial installed cost of solar systems for the customer, while giving the utility a steady output of RECs to use for compliance purposes while enjoying the cost savings of not having to cut monthly or even yearly checks.

VI. No hesitation

Although there always exists the possibility that some other incentives for solar production at some point in time, Law 17 compliance is already in effect. We encourage PREB to move quickly in establishing a REC market, REC pricing, and launching a clear program by or before January 2020.

VII. Transparency of compliance monitoring

PREB rules should clearly establish strict, transparent reporting requirements showing REC pricing, RECs applied for and awarded, and if there are any limits to a pool of funds available for these programs, how many funds are available, and at what point they're anticipated to be depleted.

Thank you for the opportunity to submit these comments.

Respectfully Submitted,

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