COMMONWEALTH OF PUERTO RICO
ENERGY COMMISSION

IN RE: INTEGRATED RESOURCE PLAN FOR THE PUERTO RICO ELECTRIC POWER AUTHORITY	ORDER NO. CEPR-AP-2015-0002 SUBJECT: Integrated Resource Plan for the Puerto Rico Power Authority

ICSE-PR BRIEF SUBMITTAL ON PROCEDURAL AND SUBSTANTIVE ISSUES

TO HONORABLE COMMISSION:

Now comes the ICSE-PR represented by appearing Counsel and respectfully alleges and prays:

I. Introduction

A competitive sustainable economy is critical for the vitality of Puerto Rico. Puerto Rico requires reliable electric service at economically efficient rates that are competitive and reflect minimized costs of an integrated system of production, transmission, and delivery. That requires an Integrated Resource Plan ("IRP") that is based on reasonably well-forecasted demand for service and makes efficient use of independent third-party investment and other beneficial energy market options. PREPA has not yet presented such an IRP and it appears that PREPA's current proposals are not viable. None would allow competitive rates, none would serve the public interest of Puerto Rico, and none should be approved without necessary modifications. In the interests of due process and collaboration for good IRP procedure, the specifics of those modifications should be determined through a continuation of this proceeding. Supplemental proceedings should focus on developing an IRP that best serves all of PREPA's ratepayers and the public interest of Puerto Rico, which is not the case of the current proposal.

Even granting that PREPA has faced (like the ICSE-PR and other Intervenors) an aggressive schedule for this proceeding, PREPA's IRP proposals lack even the most fundamental elements of a reasonably prudent IRP including the following:

- The evidentiary record is not clear about which IRP proposal is being considered by the Commission at this time due to contradictory statements by PREPA about several scenarios (portfolios and futures) and sensitivity analyses contained in PREPA's filings and elsewhere in the record.
- PREPA has not provided a reasonable demand forecast based on reasonable assumptions about likely future PREPA rates and other relevant factors;

- PREPA has not provided a robust short-term five-year action plan, as part of a proper IRP generation expansion plan, to comply with federal environmental regulation, EPA MATS and local High Efficiency regulation as in Act 57 of 2014;
- PREPA has failed to provide reasonable plans for fuel cost hedging or other risk management plans that reasonably account for PREPA's expected future financial condition, including expected PREPA rates;
- PREPA has not developed either a reasonable wheeling tariff or any concrete plans for implementing and maintaining fair and efficient open access reforms pursuant to Act 57 of 2014;
- PREPA's IRP proposals are not sensitive to Puerto Rico's current economic environment; and
- PREPA has not explained how its IRP proposals reflect and properly account for PREPA's audited financial statements.

PREPA's lack of consideration of alternative retail rate paths over the short-term future horizon is a significant failing that undermines the integrity of any of PREPA's IRP proposals. The omission weakens other critical elements of PREPA's proposals that depend on assumptions about those price paths. After all, such price paths will inevitably drive future energy consumption patterns, which will determine the financial feasibility of PREPA's expansion plans and PREPA's ability to repay debt.

This is an issue that looms particularly large in the background of this proceeding. As PREPA noted while explaining the "context and approach" of its original IRP proposal in the Executive Summary of the IRP proposal dated August 17, 2015, "PREPA's forbearance agreement with its creditors requires a business plan that will be in part based on the IRP" (Volume I, page 1-2). Thus, with no consideration of expected future retail rates and associated demand forecasts underlying any IRP proposal in this proceeding, there is great uncertainty about the ability of PREPA to maintain the customer base and revenues needed to fund and perform major necessary capital investments and other capital cost assumptions included in, or implied by, any of the IRP proposals.

PREPA has not developed workable plans for expanding open access to the electric system and for allowing competitive supply from independent generation using effective and efficient "wheeling" tariff provisions and other wholesale energy market approaches required by Act 57 of 2014, like those applied in Regional Transmission Organizations ("RTOs") and Independent System Operators ("ISOs") under the jurisdiction of the Federal Energy Regulatory Commission ("FERC"). Just issuing a Request for Proposal (RFP) at the time of PREPA's choosing for limited projects does not constitute PREPA transitioning to a competitive open-access regime that best serves the public interest for Puerto Rico. That's especially true when, as discussed below, PREPA's various IRP filings contain contradictions about supply options that PREPA is considering.

Capital expenditures will are ~~be~~ required to ensure PREPA's system delivers affordable and reliable electric service into the future, while meeting environmental requirements. Still, despite what PREPA's IRP filings might show, different supply plans (including the timing of retirements and upgrades) have different capital expenditure requirements for PREPA across

generation, transmission, and distribution facilities, where costs of the investment borne by consumers are largely driven by the overall required capital expenditure (e.g., transmission, transportation, and generation) and the financing costs of that capital expenditure (e.g., by PREPA or alternative suppliers).

Importantly, in order to minimize the costs of expenditures needed for safe and reliable electric service, the Commission should give due consideration to competitive private investment options facilitated by open access rules and policies provided by Law 57. That means the development of an appropriate IRP for PREPA should be administered in a non-discriminatory manner that allows full participation by all interested and effected parties, including independent generation developers taking advantages of "wheeling" provisions of PREPA's tariff pursuant to Law 57.

Unfortunately, as previously mentioned, wheeling rules and regulations provided by Act 57 to foster competitive energy markets have not been established in spite been legally required for years. Accordingly, PREPA needs action plans for a quick, orderly, and full transition to an open access regime with non-discriminatory resource planning (including demand-side options) and transmission planning that considers private investment options.

It is very important for PREPA and the Commission to address this deficiency by working with interested parties to define a non-discriminatory bidding process that would deliver competitive outcomes and not unduly and inefficiently favor self-build options for PREPA which might be less competitive. Without credible plans for moving towards a competitive open-access regime, PREPA's IRP proposals are even less likely to ensure the lowest reasonable competitive rates that would foster a competitive sustainable economy for Puerto Rico.

Any reasonable IRP that the Commission approves for PREPA should facilitate timely compliance with the EPA's MATS regulations, and compliance with CPP regulations only as applicable to Puerto Rico. PREPA's IRP should not be unduly shaped by potential future rules that are not final, other than to the extent that current choices should strive to maintain flexibility to meet different expected or possible outcomes.

In the interest of maintaining transparency and flexibility across different potential supply plan options, every three years, the Commission and PREPA should conduct resource and transmission adequacy studies for rolling near-term test periods that should be long enough (e.g., five years) to give PREPA and the Commission sufficient time to appropriately manage material changes in policies, technologies, or other relevant factors. In fact, the Commission could require PREPA to provide annual updates for areas of the IRP for which more granular oversight may be necessary in order to appropriately balance the needs of the system with cost considerations as environmental compliance requirements and other factors come into better focus.

With regard to environmental compliance cost considerations, as an example, more flexible supply planning as part of IRP development could allow PREPA to rely on distributed generation and retail installation of renewables in the near-term. PREPA's system could then be enhanced optimally over the longer-term with larger scale renewable resources provided by

PREPA directly or by independent private investors and developers, as appropriate, in order to efficiently meet environmental standards or renewable energy requirements.

Through this type of IRP proceeding and system planning, PREPA and the Commission would be able to develop the most efficient electric system, rather than simply building from PREPA's current assets. That approach would provide substantial flexibility in meeting policy mandates or unexpected challenges that might arise, thereby allowing electric service to be provided at the lowest reasonable competitive rates that foster lasting economic growth in Puerto Rico.

So, for these and other reasons explained below, the Commission should not contemplate approving any IRP for PREPA at this time. Instead, the Commission should continue this proceeding in order to develop an appropriate IRP that positions PREPA to modernize in a flexible and prudent manner. Going forward, the Commission should gather and duly consider germane facts and arguments, including Intervenors' views, using a reasonable procedural schedule that allows Intervenors to fully participate and the Commission to carefully consider the views of PREPA, Intervenors, and other parties on controversial and complicated issues that will affect generations to come in Puerto Rico. That way, the Commission would help ensure that PREPA charges the lowest possible competitive rates for safe, reliable, and environmentally sound electric service, thereby putting Puerto Rico on course for a competitive sustainable economy.

II. Summary of Findings

Based on the ICSE-PR's participation in this IRP proceeding conducted by the Puerto Rico Energy Commission ("Commission"), including participation in discovery, participation by phone in the December 22, 2015 Clarification Conference Call, participation in the April 6, 2016 Technical Conference, and after evaluating orders, motions, and other information issued by the Commission, the Puerto Rico Electric Power Authority ("PREPA") and other Intervenors, the ICSE-PR concludes the following:

- The evidentiary record is not clear about which IRP proposal is being considered by the Commission at this time due to contradictory statements by PREPA about several scenarios (portfolios and futures) and sensitivity analyses contained in PREPA's filings and elsewhere in the record.
- PREPA has not provided a reasonable demand forecast based on reasonable assumptions about likely future PREPA rates and other relevant factors;
- PREPA has not provided a robust short-term five-year action plan, as part of a proper IRP generation expansion plan, to comply with federal environmental regulation, EPA MATS and local High Efficiency regulation as in Act 57 of 2014;
- PREPA has failed to provide reasonable plans for fuel cost hedging or other risk management plans that reasonably account for PREPA's expected future financial condition, including expected PREPA rates;
- PREPA has not developed either a reasonable wheeling tariff or any concrete plans for implementing and maintaining fair and efficient open access reforms pursuant to Act 57 of 2014;

- PREPA's IRP proposals are not sensitive to the economic environment; and
- PREPA has not explained how its IRP proposals reflect and properly account for PREPA's audited financial statements.

Based on these findings, in order to best serve the public interest of Puerto Rico, at this time, the Commission should disapprove any of PREPA's IRP proposals, or disapprove the relevant proposal with recommendations for a revised IRP for PREPA to submit for review in a continuation of this proceeding, as discussed below.

III. None of the IRPs filed by PREPA to date, in any combination, is viable; and the evidentiary record is otherwise too deficient for the Commission to reasonably approve any IRP for PREPA at this time.

In its December 4, 2015 Order, the Commission indicated that it had "...identified multiple deficiencies in the IRP proposal, which prevent the Commission from considering and approving an IRP that represents the least-cost alternative to manage resources, promotes the public policy of energy efficiency and conservation, ensures an adequate management of demand, and complies with pertinent environmental regulations" (page 1). Similarly, the ICSE-PR's initial and supplemental interrogatories dated December 14, 2015, and February 29, 2016, respectively, identified additional flaws in PREPA's IRP proposal and the evidentiary record at the time. Below, the ICSE-PR highlights even more deficiencies in PREPA's IRP proposal, however the proposal is defined from the current record.

It is important that PREPA and the Commission understand the deficiencies explained below because they will need to be addressed and remedied in continued IRP proceedings that the Commission should convene after disapproving any IRP for PREPA. Aside from analysis that can and should be performed collaboratively with interested parties, it should be noted that some analysis needed to fill major gaps in the evidentiary record can be performed adequately only with information that only PREPA could and should provide. Thus, in future proceedings, the Commission should ensure that PREPA reasonably provide information sought by Intervenors, including analysis that could and should be provided by PREPA.

a. The evidentiary record is unclear about which IRP or IRPs the Commission considers to be the subject of the Commission's approval decision.

It is not entirely clear which IRP proposal the Commission considers relevant for any decisions on the merits in this proceeding. PREPA has made several IRP filings and has presented other significant information about its supply plan recommendations.

PREPA originally filed a draft IRP proposal for Commission review dated July 7, 2015. To address deficiencies identified by the Commission, PREPA filed a revised draft IRP proposal (i.e., PREPA filed Volumes I-IV on August 17, 2015, and Volume V on September 30, 2015), which PREPA and this brief refer to as the "Base IRP."

Then, in response to the Commission's Order on IRP Compliance and Intervenors Comments on December 4, 2015 ("December 4 Order"), as amended by the Commission's February 9, 2016 Order on PREPA's Motion to Reconsider Regarding the December 4, 2015 Order as Modified by the January 15, 2016 Order in Docket No. CEPR-AP-2015-0002, which temporarily relieved PREPA from storage evaluations previously required by the December 4 Order) and other Commission efforts to improve PREPA's proposal, PREPA filed on April 1, 2016, a document titled "Supplemental Integrated Resource Plan" ("April 1 Supplemental IRP"), which included sensitivities for demand response and renewable standards compliance, as well as additional analysis. Most recently, in response to the Commission's April 12, 2016 Order on Portfolio Runs, PREPA filed another document dated April 19, 2016 that is also titled "Supplemental Integrated Resource Plan" ("April 19 Supplemental IRP"),[1] which included production cost modeling using reduced fuel price forecasts.

The Base IRP describes PREPA's current supply and demand situation as follows:

> "PREPA supplies the majority of the electricity consumed in Puerto Rico. PREPA's system includes generation plants, transmission and distribution systems. It owns and operates approximately 4,638 megawatts (MW) of fossil fuel fired generation and 60 MW of hydroelectric generation. To supplement its own capacity, PREPA purchases power from two cogenerators under Power Purchase Operating Agreements (PPOAs) for a total capacity of 961 MW. In addition, PREPA contracts 173 MW from six existing renewable projects. Also there are 60 MW installed distributed generation (DG) in the subtransmission (38 kV) and distribution (13.2 kV and below) systems.
>
> "PREPA's load has declined from its historical system peak of 3,685 MW in FY 2006 to 3,159 MW in FY 2014. The most recent peak observed on October 2, 2014 at the 21st hour was 3,030 MW" (page x, footnote omitted).

As for future demand, PREPA assumes that it will be mostly constant. Indeed, the following statement largely sums up the demand expectations described in the Base IRP, "The system peak as presented in the forecast prepared by PREPA is very stationary" (Volume III, page 1-28).

In order to meet this distinctly stable expected demand, the Base IRP puts forth a recommended "Supply Portfolio 3" (or "P3"). According to the Base IRP (Vol I, Section 7), P3 focuses on large combined cycle builds to serve net base load (load less renewable generation) to replace existing generation units in order to improve system efficiency and better integrate renewable resources.

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[1] PREPA is unnecessarily and confusingly using the same URL, http://www.aeepr.com/Docs/Ley57/PREPA%20Supplemental%20IRP%20-%20Draft%20for%20PREC%20review.pdf, for the April 19 version of PREPA's "Supplemental IRP" as it used for the April 1 version.

More specifically, PREPA would add one new F Class combined cycle unit at Palo Seco to replace Palo Seco 3 or 4 around 2021, two H Class combined cycle units to replace Aguirre steam units 1 and 2, and two H Class combined cycle units to replace Costa Sur steam units 5 and 6. PREPA also would retire or put on limited use much of its existing generation fleet on some schedule to be determined after the Commission approves an IRP for PREPA. Specifically, PREPA aims to phase out the following: Costa Sur units 3 and 4, Palo Seco units 1 and 2, San Juan units 7 and 8, San Juan units 9 and 10, Palo Seco 3 or 4. P3 also would include eight (8) (per Base IRP, Volume I, Table 4-2) existing renewable projects of approximately 173 MW capacity, and 37 future renewable projects with a total capacity of 883 MW. Also included is the projected Distributed Generation ("DG") of 322 MW by the end of the study period, 2035.

Table 3-1 in the Base IRP (Volume I, page 3-3) summarizes PREPA's current fleet and proposed changes:

Table 3-1: Existing PREPA Generation Resources (see notes below)

	Generation Units	Capacity (MW)	Fuel	Heat Rate (btu/kWh)	FOM ($2015/kW-year)	VOM ($2015/MWh)
MATS Affected Units	Aguirre 1 ST	450	No. 6 fuel oil	9,600	30.57	2.15
	Aguirre 2 ST	450	No. 6 fuel oil	9,700	30.57	2.15
	Costa Sur 3 ST	85	No. 6 fuel oil	10,480	8.45	3.60
	Costa Sur 4 ST	85	No. 6 fuel oil	10,480	8.45	3.60
	Costa Sur 5 ST	410	Natural gas No. 6 fuel oil	9,750	34.31	2.60
	Costa Sur 6 ST	410	Natural gas No. 6 fuel oil	9,970	34.31	2.60
	Palo Seco 1 ST	85	No. 6 fuel oil	10,200	45.94	5.30
	Palo Seco 2 ST	85	No. 6 fuel oil	10,200	45.94	5.30
	Palo Seco 3 ST	216	No. 6 fuel oil	9,730	44.34	4.72
	Palo Seco 4 ST	216	No. 6 fuel oil	9,730	44.34	4.72
	San Juan 7 ST	100	No. 6 fuel oil	10,470	46.78	2.80
	San Juan 8 ST	100	No. 6 fuel oil	10,470	46.78	2.80
	San Juan 9 ST	100	No. 6 fuel oil	10,280	46.78	2.69
	San Juan 10 ST	100	No. 6 fuel oil	10,260	46.78	2.69
Combined Cycle, Gas Turbine and Hydro Units	Aguirre 1 CC	260	Diesel	11,140	21.60	6.48
	Aguirre 2 CC	260	Diesel	11,140	21.60	6.48
	San Juan 5 CC	200	Diesel	7,630	26.15	2.12
	San Juan 6 CC	200	Diesel	7,850	26.15	2.12
	Cambalache 1 GT	83	Diesel	11,550	23.32	5.27
	Cambalache 2 GT	83	Diesel	11,550	23.32	5.27
	Cambalache 3 GT	83	Diesel	11,550	23.32	5.27
	Mayaguez 1 GT	50	Diesel	9,320	10.15	6.11
	Mayaguez 2 GT	50	Diesel	9,320	10.15	6.11
	Mayaguez 3 GT	50	Diesel	9,320	10.15	6.11
	Mayaguez 4 GT	50	Diesel	9,320	10.15	6.11
	Gas Turbines	378	Diesel	14,400	25.33	19.27
	Hydro	60	Water	N/A	27.54	0.00
IPP units	AES Coal Plant	454	Coal	9,790	75.97	6.91
	EcoEléctrica Plant	507	Natural Gas	7,500	180.68	0.00
Total		5,659				

Note:

(1) The maximum capacities considered in the PROMOD models are based on information provided by PREPA. These capacities are smaller than the nominal capacities in the case of the San Juan 5&6 CC (nominal capacity of 220 MW each), Aguirre CC 1&2 (nominal capacity of 296 MW each), the Mayagüez GT (nominal capacity of 55 MW each) and the hydro generation (nominal capacity of 100 MW). The total nominal capacity of existing PREPA generation resources is 5,839 MW.

(2) Costa Sur 5&6 ST units burn natural gas and No. 6 fuel oil in a dual fuel firing scenario. Costa Sur 5 burns 80 percent of natural gas and 20 percent of No. 6 fuel oil and Costa Sur 6 burns 75 percent of natural gas and 25 percent of No. 6 fuel oil. These two units are currently in MATS compliance.

(3) Costa Sur 3&4, Palo Seco 1&2 and San Juan 7&8 are designated as limited use during FY 2015-2019 for a heat input capacity factor of less than 8 percent evaluated over two years. These six units may be retired by December 31, 2020.

(4) Palo Seco 3&4 will be either retired or designated as limited use after the new generation units at Palo Seco come on line.

Source: PREPA, Siemens PTI, Pace Global

PREPA chose to recommend P3 based on assessments using four sets of assumptions reflecting different future scenarios ("Futures 1-4"}. As discussed in the Base IRP (Volume I, Section 6), PREPA favors Future 1 (or "F1") is the base case with a gas port at Aguirre coming on line by July 1, 2017 and with limited access to capital. PREPA considers Future 2 to be a pessimistic case that assumes that Aguirre Offshore Gas Port (AOGP) does not happen, and Future 3 to be an optimistic case that assumes that, in addition to AOGP bringing gas to the South by July 1, 2017, gas will be available to the North by July 1, 2022. Future 3 assumes improved access to capital allowing PREPA to accelerate changes in its fleet. Finally, Future 4 is designed to be similar to Future 1, but assumes the twice as much impact from DG and slightly lower net load.

The Base IRP acknowledges that PREPA has obligations under Act 57, as amended in Act 4 of 2016, Section 6.29 (a),, which requires PREPA to ensure that at least sixty percent (60%) of the electric power generated in Puerto Rico based on fossil fuels (gas, coal, oil, and others) is "high-efficiency", as such term is defined by the Commission, within a term not to exceed five (5) years after July 1, 2014 (i.e., July 1, 2019).

The Base IRP also notes that steam electric units are subject to opacity rules and an EPA consent decree regarding opacity. In addition, because EPA's Mercury and Air Toxins Standards (MATS) remains in effect, P3 would have PREPA continue to "modernize its power system and achieve permanent, consistent compliance with the Clean Air Act" (Base IRP, page 7-10). All of PREPA's existing 14 steam units (approximately 2,900 MW of capacity) are subject to MATS compliance mandated by EPA. Table 7-5 in the Base IRP (Volume I, page 7-12) shows PREPA's MATS compliance strategies and assumptions of each of the 14 steam units, which are the same across the Supply Portfolios and Futures used in the Base IRP.[2]

Table 7-5: MATS Affected Units and Compliance Strategies

Steam Units	Rated Capacity (MW)	Fuel	In Compliance	Limited Use (8%)	Gas Conversion	Retirement	Comment
Costa Sur 5	410	NG/No. 6 fuel oil	X				Already complies with MATS
Costa Sur 6	410	NG/No. 6 fuel oil	X				Already complies with MATS
Aguirre 1	450	No. 6 fuel oil			100% Gas		Gas contingent on AOGP
Aguirre 2	450	No. 6 fuel oil			100% Gas		Gas contingent on AOGP
Costa Sur 3	85	No. 6 fuel oil		X			Designated as limited use unit
Costa Sur 4	85	No. 6 fuel oil		X			Designated as limited use unit
Palo Seco 1	85	No. 6 fuel oil		X			Designated as limited use unit
Palo Seco 2	85	No. 6 fuel oil		X			Designated as limited use unit
San Juan 7	100	No. 6 fuel oil		X			Designated as limited use unit
San Juan 8	100	No. 6 fuel oil		X			Designated as limited use unit
San Juan 9	100	No. 6 fuel oil				X	Retire by Dec 31, 2020
San Juan 10	100	No. 6 fuel oil				X	Retire by Dec 31, 2020
Palo Seco 3	216	No. 6 fuel oil		X			Designated as limited use unit
Palo Seco 4	216	No. 6 fuel oil		X			Designated as limited use unit
Total Capacity	2,892		820	972	900	200	

Note:

(1) Costa Sur 5 burns 80 percent of natural gas and 20 percent of No. 6 fuel oil and Costa Sur 6 burns 75 percent of natural gas and 25 percent of No. 6 fuel oil.
(2) Limited use units will have a heat input capacity factor or less than 8 percent measured over two years.
(3) Costa Sur 3&4, Palo Seco 1&2, San Juan 7&8 will be designated as limited use during FY 2016-2019 and will be retired by December 31, 2020.
(4) San Juan 9&10 steam units (with a total capacity of 200 MW) will be either retired or declared limited use by December 31, 2020.
(5) Palo Seco 3&4 will be replaced or designated as limited use by December 31, 2020.

Source: PREPA, Siemens PTI, Pace Global

[2] Detailed MATS compliance is discussed in Volume IV of the Base IRP.

The April 19 Supplemental IRP provides additional information about PREPA's supply planning at this time. As explained in the Supplemental IRP,

> "Based on the Commission's requirement, the Supplemental IRP provides an assessment of a modified Portfolio 3 based on a modified Future 1 (base case with AOGP coming on line by July 1, 2017) and Future 2 (a pessimistic case assuming that AOGP does not happen). The primary modification of the two Futures includes lower demand from EE and higher RPS target levels" (page 1-3).

Specifically, the Supplemental IRP analysis assumes that, starting in 2017, EE expansion initially reduces load at an annual rate of reduction of 0.2 percent, where the assumed rate of reduction increases by 0.2 percent annually through 2024, and starting in 2025 stays at 1.5 percent per year. EE is assumed to cost PREPA only 4.5 cents per kWh (2014 dollars) and to have a load shape that is identical to the overall aggregate load requirement for PREPA. (See Supplemental IRP, page 3-3.) Table 3-1 (page 3-3) and Table 3-2 (page 3-4) show the modified demand and sales projections using the above mentioned EE assumptions:

Table 3-1: Modified Demand Forecast with Energy Efficiency

			Peak Demand			Energy (GWh) - Generation		
FY Year	Yearly Reduction	Factor	Original	New	Delta	Original	New	Delta
2016	0	100%	2,969	2,969	0	20,492	20,492	0
2017	0.20%	100%	2,967	2,961	6	20,483	20,442	41
2018	0.40%	99%	2,964	2,946	18	20,464	20,341	123
2019	0.60%	99%	2,968	2,932	35	20,488	20,243	245
2020	0.80%	98%	2,932	2,874	58	20,209	19,808	401
2021	1.00%	97%	2,920	2,833	87	20,120	19,523	597
2022	1.20%	96%	2,907	2,787	120	20,030	19,203	827
2023	1.40%	95%	2,909	2,749	159	20,042	18,945	1,097
2024	1.50%	93%	2,910	2,710	201	20,053	18,672	1,382
2025	1.50%	92%	2,912	2,671	241	20,065	18,402	1,663
2026	1.50%	90%	2,913	2,632	282	20,076	18,136	1,940
2027	1.50%	89%	2,915	2,594	321	20,087	17,874	2,213
2028	1.50%	88%	2,917	2,556	360	20,097	17,615	2,483
2029	1.50%	86%	2,918	2,519	399	20,108	17,359	2,748
2030	1.50%	85%	2,920	2,483	437	20,118	17,108	3,010
2031	1.50%	84%	2,921	2,447	474	20,128	16,859	3,268
2032	1.50%	83%	2,922	2,411	511	20,138	16,615	3,523
2033	1.50%	81%	2,924	2,376	548	20,147	16,373	3,774
2034	1.50%	80%	2,925	2,342	584	20,156	16,135	4,021
2035	1.50%	79%	2,927	2,308	619	20,166	15,900	4,265

Table 3-2: Modified Sales Forecast with Energy Efficiency

	Energy (GWh) - Sales			
FY Year	Original	Factor	New	Delta
2016	16,853	0.82	16,853	0
2017	16,846	0.82	16,812	34
2018	16,829	0.82	16,728	101
2019	16,850	0.82	16,648	201
2020	16,772	0.83	16,439	333
2021	16,695	0.83	16,200	495
2022	16,618	0.83	15,931	686
2023	16,628	0.83	15,718	910
2024	16,638	0.83	15,491	1,146
2025	16,648	0.83	15,268	1,380
2026	16,657	0.83	15,048	1,610
2027	16,667	0.83	14,830	1,836
2028	16,676	0.83	14,616	2,060
2029	16,685	0.83	14,404	2,280
2030	16,693	0.83	14,196	2,498
2031	16,702	0.83	13,990	2,712
2032	16,710	0.83	13,787	2,923
2033	16,718	0.83	13,587	3,132
2034	16,726	0.83	13,389	3,337
2035	16,734	0.83	13,195	3,540

Source: Siemens PTI

The expected demand and sales reductions from the assumed higher levels of EE reduces the required amounts of renewable generation needed to achieve Renewable Portfolio Standard ("RPS") compliance, particularly after the bulk of PREPA's fleet is replaced by 2025. So, the Supplemental IRP models a revised supply portfolio called "P3M" that modifies the P3 Base Case RPS compliance path with reduced renewable generation targets until the end of 2025, at which time the modeling assumes the originally intended path, in order to achieve 20% renewable penetration by 2035. (See page 5-1.) For the Supplemental IRP, PREPA and Siemens also assessed the impact of a reduced fuel price assumptions, using forecast that PREPA provided the Commission on March 21, 2016. (See Section 9.)

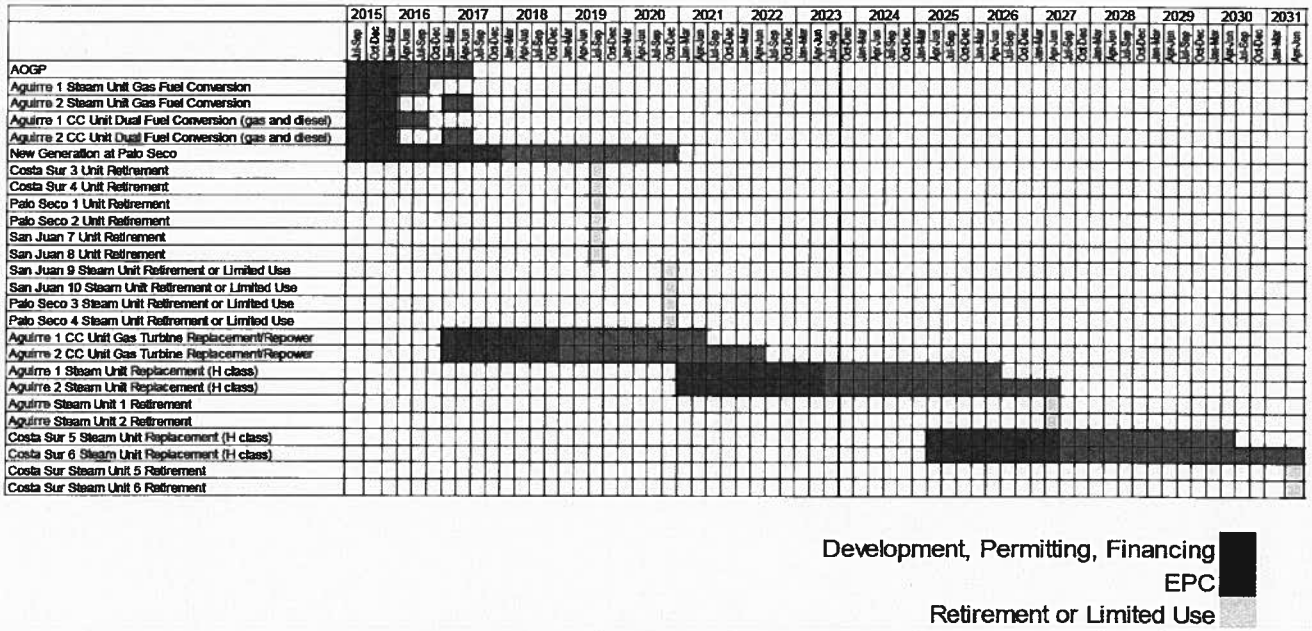
Based on these new assumptions and analyses in the Supplemental IRP, PREPA recognizes that its P3 proposal can be modified to reduce generation investments, and that such a modified supply portfolio could perform well at lower costs than P3; however, the replacement of Aguirre and Costa Sur Units is required to control the curtailment and achieve the reduced RPS targets, and AOGP is justified even with assumed lower fuel prices. (See pages 2-1 and 2-2.) Despite these acknowledgements, it should be noted that the Supplemental IRP refers to Portfolio 3 under Future 1 assumptions ("P3F1") as PREPA's "Preferred Resource Plan" (page 10-1).

It also should be noted that the Supplemental IRP indicates (Section 9.2) that PREPA expects to issue RFPs for the following generation projects during the first five years:

1. New generation at Palo Seco
2. Aguirre CC gas turbine replacement
3. New Generation at Aguirre

Lastly, the Supplemental IRP also includes action plans, as presented in Table 10-3 below, where the dates are based on the Base IRP that PREPA filed in 2015 and will be updated "once the IRP is approved and its conditions known" (page 10-4).

Table 10-3: Action Plan Based on P3F1 in Base IRP



Source: PREPA, Siemens PTI, Pace Global

Notwithstanding the previous comment, there are questions about which of the several sensitivity analyses and related information presented in the Supplemented IRP are relevant in this proceeding. Especially for purposes of the ICSE-PR's participation in the continuation of this IRP proceeding as the ICSE-PR recommends, it is difficult for the ICSE-PR and possibly other parties to know how Intervenors should treat various pieces of information that PREPA has provided in this proceeding thus far, and the importance that it will be given in the Commission's analysis and final decision. Distinctions between or among PREPA's various IRP filings could be or become material.

For example, it's not clear if PREPA is recommending supply portfolio P3 or the modified supply portfolio P3M. The April 19 Supplemental IRP refers to P3F1 as PREPA's "Preferred Resource Plan" (page 10-1). In contrast, however, PREPA's presentation at the April 6, 2016 Technical Conference titled "Puerto Rico Electric Power Authority: Integrated Resource Plan 2016 – 2035" ("April 6 Presentation") explains on page 31, titled "Portfolio Selection: Portfolio 3 Further

Developments," that Portfolio 3 was hence modified creating the now-recommended Portfolio 3M, which proposes up to 3 x SCC 800 in the north (or equivalent)" (emphasis added). That page also seems to suggest that PREPA has adopted the new demand projections from the Supplemental IRP.

Also, during the April 6 Technical Conference, PREPA suggested it would need about 250 MW of energy storage capacity capable of providing ancillary services like operating reserves. PREPA also stated a willingness to conduct RFPs for EE and fuel procurement. Those are statements worth formally memorializing in writing somehow in this proceeding, for example, so that developers can begin preparations.

Based on these considerations, at a minimum, if the ICSE-PR or any other Intervenor makes comments that are mistaken about the proper focus of this proceeding, then PREPA or the Commission should rectify the situation as soon as possible with all necessary clarifications. Generally speaking, only PREPA knows what PREPA is proposing, but Intervenors should at least know what the Commission is willing to consider relevant for its decision-making.

b. Intervenors have had limited and difficult access to the evidentiary record.

Compounding the confusion in the evidentiary record discussed above, this proceeding has had limited discovery. It has been limited because of PREPA's unresponsive answers, including unsubstantiated claims of overly restricted access due to claimed confidentiality. Unfortunately, PREPA has given no indication that it will change its behavior unless and until the Commission requires PREPA to make available all reasonably requested information in a reasonably timely manner. The Commission should develop procedures for determining the relevance, feasibility, and status of discovery requests and Commission data requests, and those procedures should determine what constitutes reasonable timeliness with regard to discovery dispute resolutions and discovery response deadlines.

For the interrogatory questions, answers and related documentation that should be readily available to Intervenors, the Commission has not provided Intervenors with easy access to that information. The Commission should make as available as possible Intervenors' interrogatories and PREPA's responses – e.g., through the Commissions internet webpage. This would allow all parties to avoid unnecessary work associated with confusing and inefficient duplication of effort, particularly where Intervenors seek common information, and it would help Intervenors' abilities to identify discrepancies in PREPA's answers or other information that could be of probative value.

As discussed below, the Base IRP as well as the Supplemental IRP(s) are fatally flawed for a number of reasons. Still, the confusion created by these problems with the evidentiary record is distracting and exacerbates the harm from preventing Intervenors from effectively and efficiently participating in this proceeding. The ICSE-PR urges the Commission or PREPA to take all necessary actions to provide Intervenors full and easy access to the evidentiary record.

c. Inexcusably, PREPA failed to develop any demand study that carefully considered the impact of expected future PREPA rates.

As the ICSE-PR has previously noted in this proceeding (e.g., ICSE-PR's Supplementary Interrogatory and Request for Information, pages 2-3), the evidentiary record for this proceeding lacks of any reasonable demand study. That is because PREPA has yet to provide information about its planned or expected future retail rates. The problem applies to PREPA's original projections of future load remaining at stable levels comparable with current levels of consumption, as well as the revised diminishing demand forecast reflecting increasing Energy Efficiency impact assumptions that PREPA provided in its Supplemental IRP filing(s), as directed by the Commission. That is, both demand projections lack any reasonable consideration of ways in which consumers (whether or not they are currently official PREPA customers) reasonably could react to PREPA's future retail rates. Thus, the Commission should disapprove any IRP proposal at this time.

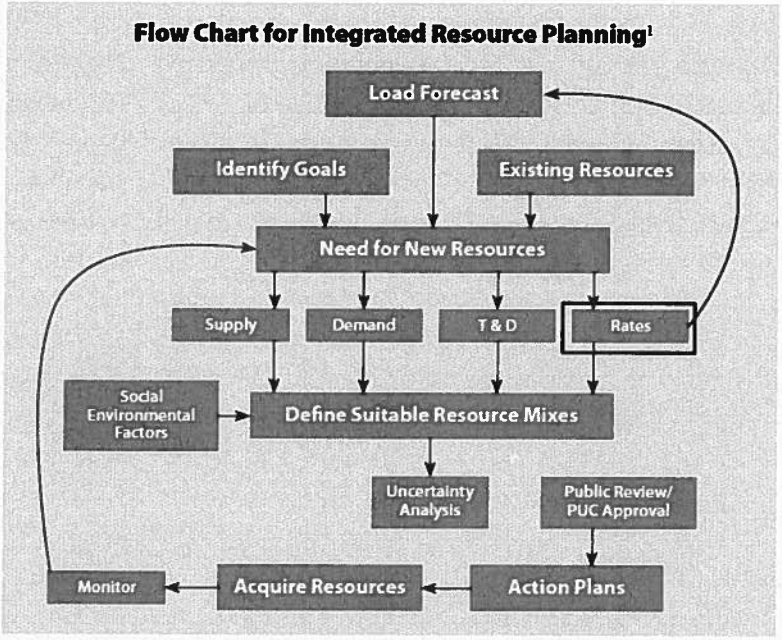
It is commonly expected that IRP demand forecasts are based on reasonable future rate estimates so that resource needs and expansion plans can be appropriately timed and sized. Not surprisingly, then, for the opening of the first section of a comprehensive and thoughtful report,[3] titled *Best Practices in Electric Utility Integrated Resource Planning: Examples of State Regulations and Recent Utility Plans (2013)*, which "is intended to be helpful to policymakers, public utility commissions and their staff, ratepayer advocates, and the general public as they each consider the ways in which utility resource planning can best serve the public interest," (page 1) authors Rachel Wilson and Bruce Biewald explain the key elements of good IRP process as follows (with emphasis added):

> An integrated resource plan, or IRP, is a utility plan for meeting forecasted annual peak and energy demand, plus some established reserve margin, through a combination of supply-side and demand-side resources over a specified future period. Steps taken in the creation of an IRP include:
>
> - **forecasting future loads,**
> - identifying potential resource options to meet those future loads,
> - determining the optimal mix of resources based on the goal of minimizing future electric system costs,
> - receiving and responding to public participation (where applicable), and
> - creating and implementing the resource plan.

[3] Rachel Wilson and Bruce Biewald, "Best Practices in Electric Utility Integrated Resource Planning: Examples of State Regulations and Recent Utility Plans," 2013, prepared by Synapse Energy Economics, Inc. for the Regulatory Assistance Project, with funding provided by the Southern Alliance for Clean Energy. https://www.raponline.org/document/download/id/6608.

Figure 1 shows these steps in a flow chart.

Figure 1



Source: Wilson and Biewald (2013), page 4, with red added for ease of reference below.

As shown in the above list of key IRP process steps and in the accompanying flowchart (Figure 1), the first step and perhaps the most critical element of any acceptable IRP process is the demand forecast. As Wilson and Biewald explain further:

> A company's load forecast (annual peak and energy) is one of the major determinants of the quantity and type of resources that must be added in a utility's service territory over a given time period, and has always been the starting point for resource planning. Projections of future load should be based on realistic assumptions about local population changes and local economic factors[4] and should be fully documented. (Original footnote omitted.)

Puerto Rico's future demand for power, in terms of capacity to meet peak demand and in terms of energy consumption, is delimited by the demand forecast. Inappropriate forecast values lead either to excessive expenditure on supply, resulting in higher-than-necessary rates for consumers, or to inadequate supply expenditure, creating the potential for service outages and disruption of economic activity. Given the critical nature and use of the demand forecast, it is imperative that the analysis done in support of the forecast be both rigorous and comprehensive.

[4] For application in this case, the "local economic factors" mentioned should no doubt include assumptions about PREPA's rates, expressed in terms of expected dollar levels or in terms of shares of ratepayer income or spending, for example.

When done effectively, a demand forecast can provide insight into the primary drivers of electrical consumption as well as estimates of the quantitative relationships underlying future electricity needs.[5] In contrast, when done prosaically, the demand forecast unreasonably restricts the consideration of possible future needs.

The demand forecasting approach of PREPA's Base IRP is one of construction by assumption. That is, the peak demand is "constructed" by adding up the separate portions of peak demand that are associated with each customer class. For each such customer class, an assumption is made regarding the relationship of energy-to-peak demand. To a large extent, the approach is an accounting derivative in that it seeks to account for each contribution to some peak demand, and each of which are then simply added up. While such an approach has merit, it is important to point out that even small mistakes in the estimation process can lead to large changes in the resulting estimate of peak demand, however defined.

An alternative approach often used to forecast peak demand is to develop a direct estimate of the relationship of historical changes in peak demands to the proximate causes: weather, economic conditions, and so forth. As affirmed in the above flowchart (Figure 1) by the rightmost arrow extending from the red-highlighted box labeled "Rates" to the box at the top of the flowchart labeled "Load Forecast," expected future rates should be among the assumptions regarding economic conditions that should be used to forecast the electricity demand or "load" (i.e., amount of demand expressed in terms of energy production capacity (MW) or energy usage (MWh)) that any reasonable IRP for PREPA should strive to serve reliably and efficiently.

In stark contrast, as indicated in its responses to the ICSE-PR's data requests, PREPA has not conducted such a direct estimation forecast.[6] In fact, as shown in PREPA's response to the first question ("Question 1") in the ICSE-PR's December 14 Interrogatory, PREPA has not even tried to account for the impact of new rates that PREPA reasonably expects to charge in the future.

ICSE-PR's Question 1: Please provide and explain the energy tariff rate assumptions (in ¢/kWh) that were used to support, or that are implied by, the peak and hourly forecasted demand and usage assumed by the proposed IRP. Please provide any related analyses or workpapers.

PREPA's response to this question in its February 18, 2016 Responses to Interrogatory and Request for Information (in reference to the ICSE-PR's December 14 Interrogatory) ("February 18

[5] In an IRP proceeding in Colorado, for example, resource need projections went from 1000 MW in mid-2010 to under 300 MW in October 2011 after taking into account the impacts of economic recession and the success of demand-side management and solar programs. Wilson and Biewald (2013), page 28.

[6] That is unfortunate, because a comparison of the results of such a direct estimation-forecast procedure with the results of the construction-based approach presented in Siemen's IRP report would provide additional information and a useful check on PREPA's demand assumptions. Further, if confidence can be place on some direct estimation model, then it could be used for other demand forecasting as part of developing an optimal IRP in this proceeding.

Response") begins with the following admission: "There are no energy tariff rate assumptions presented in this IRP" (page 2). PREPA's very direct answer fully exposes a fundamental flaw that undermines the reasonableness of PREPA's Base and Supplemental IRPs.

As mentioned above, the Supplemental IRP contains demand projections based on new Energy Efficiency assumptions. But those projections do not consider key factors affecting demand for PREPA's services using direct estimation of future demand based expected future rates. So, none of the demand forecasts in this proceeding properly accounts for important factors that are reasonably expected to impact the price- or income-elasticity of demand, or the overall level of demand – factors like the expected rates, terms, and conditions expected to be included PREPA's future tariffs, including "wheeling" and other open access provisions. Further, none of the demand forecasts in this proceeding properly account for the impacts of likely future (off-system) distributed generation options or population changes in Puerto Rico.

Also noteworthy are Questions 37-39 from the ICSE-PR's initial interrogatory, which ask PREPA to provide any analyses, studies, or workpapers, associated with PREPA's allocated Cost of Service studies for Fiscal Year 2013, for the years covered by the proposed IRP (i.e., Base IRP), and for any other Fiscal Years, respectively.

PREPA's February 18 Response objects to each of these questions as irrelevant (page 74), but each of them is indeed very relevant. For example, if all of PREPA's costs are assumed to be allocated to a single class of ratepayers, then electricity demand is likely to plummet for that customer class, and PREPA's IRP would need to account for that lower demand. The allocation of costs of service is intimately related to rate design, tariff rate assumptions, and the resulting demand for electricity across customer rate classes. ICSE-PR understands that this proceeding is not a rate proceeding; however, any reasonable IRP decision cannot ignore the intricate relationship between future capital expenditures of the magnitude PREPA is proposing and customers' future energy usage decisions based on future rates that reflect those expenditures. After all, the revised demand forecasts in the Supplemental IRP recognize the relationship between energy demand and the addition of cheap energy efficiency as a resource option, and PREPA did not object to providing that information.

It is imperative that PREPA's IRP be built around reasonable demand projections based on reasonable tariff rate assumptions. These admissions alone render unreliable any demand forecasts contained in PREPA's filings that purport to support PREPA's Base IRP (or the Supplemental IRPs for that matter). Simply put, PREPA's demand forecasts are not based on any expected future retail rates and can't be trusted. After all, demand for PREPA's electric service, as with other goods and services, is primarily a function of price. Without any price assumptions, any related demand assumptions are specious, because without compulsory purchases, future voluntary demand for PREPA's electric service will depend on PREPA's rates, as well as other factors including but not limited to PREPA's customers' incomes, locations, or the commercial value of the goods and services that can be created or enabled by PREPA's electric service.

Meanwhile, the lack of a reasonable demand forecast will undermine any of PREPA's projections for Demand Side Management ("DSM") and Energy Efficiency ("EE") programs, as

well as customer self-supply through Distributed Generation ("DG"). DSM, EE, and DG participation rates are significantly dependent on the prices of electric service, by rate class, that different types of customers (e.g., residential, commercial, or industrial customers) can avoid through those programs.

This proceeding has featured some prominent Commission interest in the potential impacts of EE on PREPA demand. While that is a valid consideration, as explained below, the projected impacts reported in the proceeding thus far have been based on unrealistic assumptions, and (further) leave the evidentiary record without reasonable demand forecasts.

As directed by the Commission, the demand projections in the Supplemental IRP(s) assume a cost for PREPA of 4.5 cents per kWh (in 2014 dollars) for EE, and that the load shapes of PREPA customers that would provide the demand reductions through EE reflect the overall aggregate load requirement for PREPA. The baseline of 4.5 cents per kWh for EE yielded significant projected demand reductions, as well as reductions in PREPA's system needs. Those projected demand reductions should not be surprising given the 4.5 cents/kWh EE cost assumption is relatively low by cursory inspection. Indeed, that cost rate is low enough to deserve at least the scrutiny of Levelized Cost of Energy (LCOE) comparisons with the competing resources in the supply portfolio.

LCOE is most commonly used for evaluating the cost of energy delivered by projects utilizing different generating technologies. Specifically, it is used to rank options and determine the most cost-effective energy source, and, PREPA and the Commission should use additional proceedings to use the metric to develop a reasonable IRP for PREPA. Beyond that ranking, further analysis would be necessary to determine optimal size(s) of any EE resources included in any IRP for PREPA. Further study also could support PREPA's need for designing efficiency policies and programs, such as setting energy savings goals, as well as suggest ways to efficiently incorporate EE into the IRP process, including EE funding levels.

It is common to consider three broad categories of efficiency potential:

- *Technical Potential* – an ideal scenario which sums all EE measures that are technically feasible;
- *Economic Potential*—the fraction of the technical potential that is cost-effective; and
- *Achievable Potential* – the fraction of the economic potential that is attainable given actual program infrastructure and both societal and market limitations.

PREPA should be required to determine all of those potentials for each of EE programs considered in additional IRP proceedings, in order to determine the value of EE as a resource option for PREPA, which may increase depending on PREPA's ability to fund generation expansion. Along those lines, PREPA and the Commission also should develop the non-discriminatory procedures for competitive bidding that PREPA should use to identify economic EE programs.

Still, even for all of that EE analysis, without reasonable assumptions regarding future prices of PREPA's electric service as part of PREPA's tariff rates, PREPA cannot in any reasonable way, "co-optimize any expected renewable energy load shape and demand response programs," as directed on by the December 4 Order (page 3). Further, without reasonable tariff rate assumptions, PREPA cannot reasonably assess any future opportunities for EE programs across residential, commercial, and industrial rate classes, much less cost-effective programs sought by the Commission. For example, even at current rate levels, some PREPA customers may have already explored EE programs just to reduce energy costs, thereby reducing the amount of potential new EE that might be available. The extent of this situation cannot be known without addition careful analysis.

Lastly, the need for demand forecasts that take into account expected future prices for PREPA's services is especially evident in light of the limited information that PREPA has provided in this proceeding regarding its plans for future rate hikes, interim and otherwise. Outside this proceeding, PREPA has indicated plans for rate hikes in a presentation dated June 1, 2015, titled "PREPA's Transformation: A Path to Sustainability" ("June 1 Report"),[7] and more recently in its April 7, 2016 request for the Commission to verify its position regarding issuing the restructuring order needed to begin imposing transition charges (Docket No. CEPR-AP-2016-0001).

In PREPA's June 1 Report, PREPA's forecasted "[p]ro forma rate required to cover current cost base" is shown to be about 29.2 cents/kWh, which is significantly higher than the "[c]urrent rate" of 21.4 cents/kWh (slides 25 and 26). As for securitization, if the Commission does not take appropriate steps to minimize the costs of PREPA's debt securitization enabled by Act 4 of 2016, such as hiring an expert advisor as has been done in many states have done for utility securitizations,[8] then the securitization could fail to deliver as much cost savings as PREPA expects, which would further contribute to upward rate pressure. That could happen, for example, if the investment rating of one of PREPA's new bonds isn't good enough or the investors that are otherwise attracted demand more assurances.[9]

In addition, considering that PREPA's securitization plans have not yet been mentioned as part of any PREPA supply plans, it is reasonable to expect that PREPA's future overall rates will be high enough to motivate consumers to explore DG options, then the fourth future scenario (labeled "F4") presented in PREPA's IRP proposal could be more relevant than assumed in PREPA's IRP proposal. If so, then the lack of attention paid to expectations of large DG expansion could bias PREPA's currently proposed supply plans towards over-reliance on centralized power generation.

For the above reasons, the lack of any study of the expected impact to demand for PREPA's service (and the resulting impact to PREPA's system needs) of PREPA's actual proposed

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[7] http://www.gdb-pur.com/documents/PREPARecoveryPlan6-1-15.pdf

[8] For example, Arkansas, California Florida, Louisiana, Michigan, New Jersey, Ohio, Pennsylvania, Texas, West Virginia, and Wisconsin.

[9] For discussion of securitization costs, see, e.g., http://www.raponline.org/docs/RAP_IssuesLetter-Securitization.pdf.

future rate hikes is a particularly major and egregious flaw in the evidentiary record. This lack of legitimate demand analysis in this proceeding is especially frustrating when PREPA has been recently publicly signaling future rates to the Commission and the public that could reflect significant rate increases for all PREPA customers that are large enough to cause a material demand reduction. The Commission should direct PREPA to work with Intervenors to develop credible demand studies that can be used to develop a reasonable IRP for PREPA.

d. PREPA lacks plans for timely compliance with federal environmental regulations.

With regard to environmental regulatory compliance, PREPA has identified critical cost drivers to be the EPA's Mercury and Air Toxics Standards ("MATS"; 40 CFR 63, Subpart UUUUU), proposed Clean Power Plan ("CPP"; 40 CFR 60, Subpart UUUU)),Greenhouse Gas Standards (GHG Standards; 40 CFR 60, Subpart TTTT), New Source Performance Standards (NSPS; 40 CFR Part 60 Subparts A, Da, GG, and KKKK), and the New Source Review/Prevention of Significant Deterioration (NSR/PSD) requirements for new major sources and major modifications to existing major sources. Of particular concern to the ICSE-PR is that PREPA does not propose to comply with MATS in a timely manner.

The Base IRP (Volume IV) recognizes that MATS is in force until such time that is vacated by the courts. Unfortunately, as the Base IRP shows in Table 2-7, all the supply portfolios examined "show planned compliance/exemption with respect to MATS by fiscal year 2024, which is **beyond the MATS compliance deadlines**" (Volume IV, page 2-15, emphasis added); and the proposed accelerated gas conversions by 2017 are costly and distracting from high-efficiency goals for PREPA's generation fleet.

Table 2-7: Summary of MATS, CPP, and GHG Compliance

Case	MATS Compliance	CPP Compliance	GHG New Source Standard
P1F2	N/A	N/A	N/A
P2F2	Compliant/Exempt starting in FY2023	Compliant	Compliant
P3F2	Compliant/Exempt starting in FY2022	Compliant	Compliant
P1F3	Compliant/Exempt starting in FY2021	Compliant	Partially-compliant*
P2F3	Compliant/Exempt starting in FY2021	Compliant	Partially-compliant*
P3F3	Compliant/Exempt starting in FY2021	Compliant	Partially-compliant*

* All units comply except Aguirre CC 1&2 repowered, which are non-compliant with respect to the GHG standards. These portfolios can readily achieve compliance as described in Section 2.5, Compliance Strategy.

Any reasonable IRP for PREPA should not violate applicable federal environmental regulations for as long as PREPA proposes to violate MATS. The Commission should require PREPA to comply with MATS in a timelier manner to be developed as part of additional IRP proceedings; or if not feasible, to present a short term five (5) year action plan that provide both

high-efficiency and MATS compliance, avoiding future upgrades or replacement of generation units.

Meanwhile, the CPP compliance strategies in the PREPA's IRP proposals are based on current interpretations of a CPP rule that was finalized relatively recently on October 23, 2015. On February 9, 2016, the Supreme Court stayed implementation of the Clean Power Plan pending judicial review. Furthermore, the EPA stated (Federal Register Vol 80 No. 205), "Because the EPA does not possess all of the information or analytical tools needed to quantify the BSER for the two non-contiguous states with affected EGUs (Alaska and Hawaii) and the two U.S. territories with affected EGUs (Guam and Puerto Rico), we are not finalizing emission performance rates in those areas at this time, and those areas will not be required to submit state plans until we do" (See IRP report, Vol. IV, pages 1-9). At this point it is not clear how the EPA CPP rules will be applied to Puerto Rico. Thus, CPP mechanics, timelines, and cost implications are not yet fully understood. Accordingly, the Commission and parties of this proceeding would benefit from better understanding how CPP compliance and other EPA regulation compliance uncertainties are accounted for in PREPA's proposed IRPs.

e. PREPA failed to provide reasonable fuel cost hedging plans or other risk management plans that reasonably account for PREPA's potential future financial conditions, including expected sales and revenues.

PREPA hasn't adequately explained how it is currently managing and how it prospectively intends to manage prominent types of input cost risks such as construction delays, hedging strategies (e.g., interest rate swaps, fuel hedging instruments – or the lack thereof), and other common business and operational risks facing an island utility like PREPA in its current and expected financial conditions. In fact, more generally, the future scenarios (portfolio/future combinations) that have been considered do not adequately explore relevant scope and depth of costs and risks facing PREPA, nor do they help evaluate the cost effectiveness of near term infrastructure and capital investment decisions.

For example, consider the following question and response:

ICSE-PR's Question 29: Please provide and explain assumptions on delivered fuel prices – separated into transport, storage (if any) and underlying fuel costs to include any transactions meant to hedge the fuel price (e.g., swaps, options) as part of the proposed IRP. Please provide any related analyses or workpapers.

PREPA's Answer 29 only generally describes fuel cost adders, and says nothing about PREPA's future fuel cost hedging plans. Hedges such as swaps and options have strict credit requirements that could put considerable financial strain on PREPA's ability to maintain its system and provide safe, reliable service.

Thus, it is very important for PREPA to provide the requested information in order to assess the appropriateness of PREPA's IRP with regard to the use and cost of various fuels needed for electric generation. Without proper hedging strategies, consumers not only could end up paying for larger capital costs anticipated in the IRP, but consumers could also end up paying unexpectedly higher variable costs due to improperly hedged fuel prices.

The Commission recognized the importance of fuel costs in its April 12, 2016 Order on Portfolio Runs ("April 12 Order") requesting PREPA to prepare production cost model runs utilizing revised fuel price forecasts. Fuel costs impact supply portfolio costs and IRP action plans, thus any reasonable IRP for PREPA should include PREPA's plans for managing fuel price risk (among other material risks). At the very least, PREPA should annually share its hedging strategy with the Commission, outlining the efforts taken and future options for protecting consumers from unexpected changes in fuel costs and other risks.

Finally, with regard to other risks, the Base and Supplemental IRPs fail to adequately consider risks posed by debt recovery that may be included in PREPA's future rates or other types of securitization or transition charges. That debt cost recovery could interfere with PREPA's ability to finance its proposed system upgrades and deserves much more attention than it has received in this proceeding for the Commission to be able to reasonably approve any IRP at this time.

This lack of adequate risk management planning certainly calls into question PREPA's plans to rely heavily on existing thermoelectric plants that burn oil and how PREPA will manage oil price risks. Despite any historical comparability in the level of natural gas and oil prices, it can be reasonable to carefully consider different hedging strategies across fuels. Indeed, a recent audit of PREPA's financial statements noted, in particular, "The 2015 consolidated budget increased by $166.5 million (3.7 percent) when compared to the consolidated budget approved for fiscal year 2013-2014, mainly due to an increase in projected fuel oil prices per barrel from $94.96 for 2013-2014 to $108.48 for 2014-2015, representing a 14.2 percent increase" (page 26).[10]

Thus, if, for example, debt recovery efforts through the currently proposed securitization charges put upward pressure on PREPA's future rates, it would be especially important for the Commission to disapprove any IRP proposal at this time and pursue cost-saving changes in PREPA's plans. Depending on careful fuel price analysis including reasonable hedging options that might exist for PREPA and other factors, more reliance on gas-fired generation and other clean and efficient resource options could reduce PREPA's risks and costs.

f. PREPA has not planned central generation expansion, upgrades, and retirements based on reasonable demand forecasts, distributed

[10] Ernst & Young, Financial Statements, Required Supplemental Information and Supplemental Schedules: Puerto Rico Electric Power Authority [A Component Unit of the Commonwealth of Puerto Rico] Years Ended June 30, 2014 and 2013 with Report of Independent Auditors, http://www.aeepr.com/INVESTORS/DOCS/Financial%20Information/Annual%20Reports/Financial%20Statements,%20Required%20Supplementary%20Information%20and%20Supplemental%20Schedules%202014.pdf

generation forecasts, and other relevant factors like reasonable standards for high-efficiency generation.

The lack of reasonable assumptions for demand for PREPA's electric service also undermines the integrity of any central station build-out plans as part of PREPA's IRP. As the Commission rightly suggests in the directive in the December 4 Order for PREPA to provide information about central build-out options, such options should be based on reasonable assumptions about DSM, EE, and DG participation, as well as PREPA's demand response programs. Without reasonable tariff rate assumptions, however, such demand-side activity cannot be reasonably projected, and central generation build-out cannot be planned properly. In this regard, it is important to note that the demand projections in the Supplemental IRP might have reflected Commission-directed assumptions about Energy Efficiency adoption and usage, but those assumptions themselves were not based on careful demand studies. And without reasonable generation build-out plans, transmission and energy storage expansion cannot be planned properly.

Additionally, the amount of demand-side activity on PREPA's system is mutually related to the technical and financial feasibility of PREPA's expansion plans, which, as discussed below, depend on PREPA's willingness and ability to transition in an orderly manner to open access under Law 57, beginning with effective and efficient wheeling rules as required by Law 57, with input from market participants and other interested parties. It is unfortunate, then, that PREPA's IRP proposals do not include clear plans for a future wheeling tariff and the expected implications of open access operations. Thus, in addition to PREPA's incomplete and unresponsive answers to discovery questions, the lack of full, well-informed participation by private investors and independent power suppliers also deprives the Commission and Intervenors of information that is necessary (albeit not sufficient) for developing an optimal IRP with an efficient competitive central generation build-out.

Also, as discussed above, expected consumer demand impacts of PREPA's forecasted retail rates could have significant impacts on projected system needs and the optimal overall supply portfolio. That is especially true when consumers can credibly consider self-supply or other reductions in consumptions of PREPA's electric services, as they can now with Distributed Generation (DG) technologies. The inadequate attention paid to DG or other newer technologies like energy storage is thus another serious flaw in the proposal that should be remedied with more input from developers and investors through open, non-discriminatory planning processes. Assuming consumer demand for PREPA's electric service can be reasonably expected to diminish materially because of PREPA's future retail rates, the Commission and PREPA and interested parties should consider through additional proceedings an IRP that involves materially less generation capacity net expansion than PREPA is currently proposing.

As PREPA's April 6 Presentation noted, because PREPA serves an island, PREPA requires relatively higher reserve margins even if its reliability criteria are less stringent that the US mainland (page 12). And inflexibilities of PREPA's existing generation fleet make it very difficult to integrate renewable generation (page 11). Thus, PREPA should consider DG and other possible resources that are quick-start and fast-ramping.

Finally, the existing or new generation that is included in any IRP for PREPA should reasonably meet high-efficiency standards prescribed by law. Under Act 57 of 2014, as amended by Act 4 of 2016, PREPA must ensure that, within five (5) years from July 1, 2014, at least sixty percent (60%) of the electricity generated in Puerto Rico from fossil fuels (gas, coal, petroleum and others) is generated in a highly efficient manner, as defined by the Commission. There is a current Commission proceeding (Docket No. CEPR-MI-2016-001) that will define the term Highly Efficient Fossil Generation. Accordingly, any reasonable IRP for PREPA should abide by the Commission's decisions enabling the high-efficiency standard of Act 57, and doing so could require significant changes to PREPA's IRP proposal.

For example, assume the Commission reasonably decides that units with Heat Rate values over 8,000 Btu/kWh would not be considered highly efficient. Given the current demand load of about 3,000 MW presented in the Base IRP, for example, and starting with PREPA's proposed P3 supply portfolio under Future 1 assumptions (i.e., the P3F1 scenario), given that only EcoEléctrica (about 500 MW) and San Juan 5 and 6 (about 200 MW each) have Heat Rate values under 8,000 Btu/kWh (see Table 3-1 above), it appears that roughly an additional 875 MW of highly efficient generation capacity would be required for PREPA's recommended supply portfolio to reasonably comply with the requirements of Act 57. And if the Commission adopts a stronger standard, then PREPA would need to replace even more capacity in its plans.

Not considering the Act 57 requirements for High Efficient Fossil Generation is a fundamental flaw that undermines the reasonableness of the Base IRP as well as the Supplemental IRPs. Further, that omission, along with other flaws in PREPA's generation expansion plans, leave the Commission and Intervenors without any complete IRP to evaluate.

g. PREPA has not made meaningful open access preparations.

Consistent with the Commission's request in its December 4 Order for information about PREPA's central build-out plans, reasonable consideration of likely or potential independent private investment in Puerto Rico's energy delivery infrastructure is crucial to the Commission approving an IRP that best serves the public interest of Puerto Rico. That point was emphasized by PREPA's presentation at the Technical Conference on April 6.

That presentation notes that PREPA has limited ability to finance expansion projects in the short- to medium-term, including as a counterparty on a Power Purchase and Operating Agreement (page 5). That concern presupposes that PREPA will be responsible for building the facilities suggested by an IRP. Depending so heavily on PREPA financing would affect expansion timing, perhaps causing additional costs from delays.

That presentation also notes that controlling multiple parallel projects is challenging for PREPA. This is another reason for PREPA to relinquish some of the responsibilities to third parties through RFPs.

Thankfully, PREPA acknowledges in its answer to the ICSE-PR's Question 21.b that the IRP can be viewed as "... a planning benchmark against which actual proposals advanced by private parties can be compared." Still, rational private investors – i.e., the types of investors, including independent power suppliers, that could bolster a competitive and sustainable economy for Puerto Rico – are unlikely to invest or even show any interest in investing in Puerto Rico's energy delivery system without PREPA having an IRP based on solid, documented assumptions regarding PREPA's system, particularly with regard to the level and nature of future demand for electric service in Puerto Rico.

Importantly, as previously mentioned, private investment in needed grid improvements will require PREPA to be ready and equipped to provide open access, beginning with a wheeling tariff. PREPA's preparations for open access, beyond PREPA's willingness to consider proposals for private investment, require more attention and discussion with input from potential developers and investors that offer cost-effective alternatives to PREPA's proposed IRPs, especially with regard to generation and transmission expansion. The Commission must have this information – along with credible estimates of demand for electric service in Puerto Rico, as explained above – in order to truly test the viability of PREPA's IRP. If expected costs are significantly lower with private investment and access to capital is obtained, then much more attention needs to be given to alternative expansion plans.

Feedback from actual potential investors, developers, or other market participants would best prepare PREPA and the Commission for needed changes to support open access under Law 57, and those changes should then be factored into an optimal IRP for PREPA. After all, private investment easily could be more cost-efficient and could significantly reduce the costs of near- and longer-term grid expansion plans. The lack of sufficient information from PREPA and other relevant parties regarding PREPA's (and the Commission's) open access readiness (e.g., for billing and settlements) is a deficiency in PREPA's IRP proposal, and a reason why the Commission should not approve the current version.

h. PREPA has failed to discuss its audited financial statements.

Lastly, in addition to the deficiencies in PREPA's IRP proposal that have already been discussed, PREPA has failed to provide other information the ICSE-PR has sought that is necessary for properly formulating demand assumptions, including any analysis and workpapers related to the audited financial statements sought in the fourth question in the ICSE-PR's December 14 Interrogatory:

ICSE-PR's Question 4: Please provide any audited Financial Statements that support the tariff used to project energy demand and usage for the proposed IRP. Please provide any related analyses or workpapers.

PREPA's Answer 4 simply refers to PREPA's Answer 1, which says nothing about how financial statements, audited or otherwise, were used to support the tariff assumptions (e.g., rates, terms, and conditions for different types of PREPA service) that could be used to form reasonable demand studies to assess PREPA's system needs. PREPA should respond fully to this

question because audited financial statements can provide information that is crucial in several ways for developing a reasonable IRP, and thus it is important to know whether or how PREPA used audited financial statements.

For example, the information is necessary for verifying PREPA's internal cost allocations. In addition, the actual cost information gleaned from the financial statements serves as an important comparative reference for future costs implied by the proposed IRPs. Further, the information allows for an important check on the extent to which PREPA is currently following good utility practices, which will help identify the areas in which PREPA reform efforts should focus.

In sum, without PREPA providing or assisting in the production of the information and analysis sought in the above questions that the ICSE-PR has asked in this proceeding, it will be difficult, if not practically impossible, to develop solid assumptions about future tariff rates, which are critical for credibly forecasting demand, which is critical for developing an IRP for PREPA that is fair and efficient. The Commission should convene additional proceedings to develop a fair and efficient IRP for PREPA, so that Puerto Rico can enjoy the benefits PREPA reforms under Law 57.

IV. Any IRP for PREPA should be sensitive to the economic harm caused by rising PREPA rates.

As mentioned above, PREPA intends to raise retail rates as part of its sustainability plan, which includes developing an IRP. Thus, it is reasonable to expect PREPA's rates to soon rise to nearly 30 cents/kWh for some customers. For an economy that is so heavily dependent on manufacturing, high future electric rates could be especially harmful – and Puerto Rico's economy is fragile at the moment. For example, as Ernst & Young's recent PREPA audit highlights, "Puerto Rico's economy in fiscal year 2013 reached a real growth of 0.3%, compared to fiscal year 2012" (page 26).

Rising retail rates would hamper economic growth for Puerto Rico while likely reducing both usage of PREPA's services and overall demand for PREPA's services. Worse, these mutually related negative impacts would likely spiral towards the demise of PREPA and Puerto Rico's economy.

Electricity demand reductions would effectively leave fewer or smaller customers remaining to shoulder the cost burdens of PREPA's future expenditures. This could put PREPA on a fiscal death spiral with expenditures turning into stranded costs to be borne by future ratepayers who will likely be facing other economic challenges as Puerto Rico finds its footing heading into an uncertain future.

High (and rising) prices for PREPA's services create financial hardships for ratepayers and their families, hamper the competitiveness of Puerto Rican businesses and industries, and harm the Puerto Rican economy. The Commission should take care to ensure that any IRP for PREPA produces economic benefits that outweigh the economic harm of rising rates.

V. Conclusion

Considering the severe flaws in the current IRP and the Commission's decision options under Regulation 8594, it would be reasonable for the Commission either to simply disapprove PREPA's current IRP proposal, or to disapprove it with specific recommendations for a revised IRP that PREPA could resubmit. Alternatively, PREPA could voluntarily withdraw its current IRP proposal and work with Intervenors and the Commission to identify supply needs based on credible demand studies, with appropriate urgency.

a. Procedural Recommendations

In terms of what would follow the disapproval or withdrawal of PREPA's current IRP proposal, it is very important for PREPA and the Commission to allow reasonable opportunity for independent resource investment (demand- and supply-side) driven by wholesale energy market forces to shape future electric system expansion. The cost-savings and other relative efficiencies of this approach will best serve the public interest for Puerto Rico.

There are many approaches used in the US that the Commission could follow for the additional IRP proceedings the ICSE-PR recommends.[11] At a minimum, however, the Commission should convene a pre-hearing conference of the Intervenors to formally (on the record) discuss and determine an appropriate supplemental procedural schedule. Short of that, the Commission should adopt a procedural process that firmly supports due process for all parties and demonstrably achieves the lowest reasonable base costs and revenue requirements for PREPA.

In addition, if the Commission has timeliness concerns, then the Commission could reasonably disapprove PREPA's current IRP proposal and immediately begin additional proceedings aimed at developing an IRP that allows competitive wholesale energy market forces to shape future electric system expansion and allow competitive energy prices. Further, if timeliness matters for such proceedings, then the Commission should consider independent supply options, including, but not limited to highly efficient gas-fired generation, EE, and DG. Those competitive supply options easily could be easier and faster to choose and implement, especially if PREPA has challenges funding needed expansion.

Of course, reasonable demand studies easily could project significant changes in energy consumption in Puerto Rico, including off-grid DG options that might reduce PREPA's customer base, which could frustrate PREPA's debt recovery plans and create or exacerbate PREPA's challenges funding needed expansion. On the bright side, however, reductions in PREPA's system needs could allow more expedited IRP procedures for PREPA.

For the reasons explained above, PREPA's current IRP proposal, however defined from the record, is not viable, would not allow competitive rates, would not serve the public interest

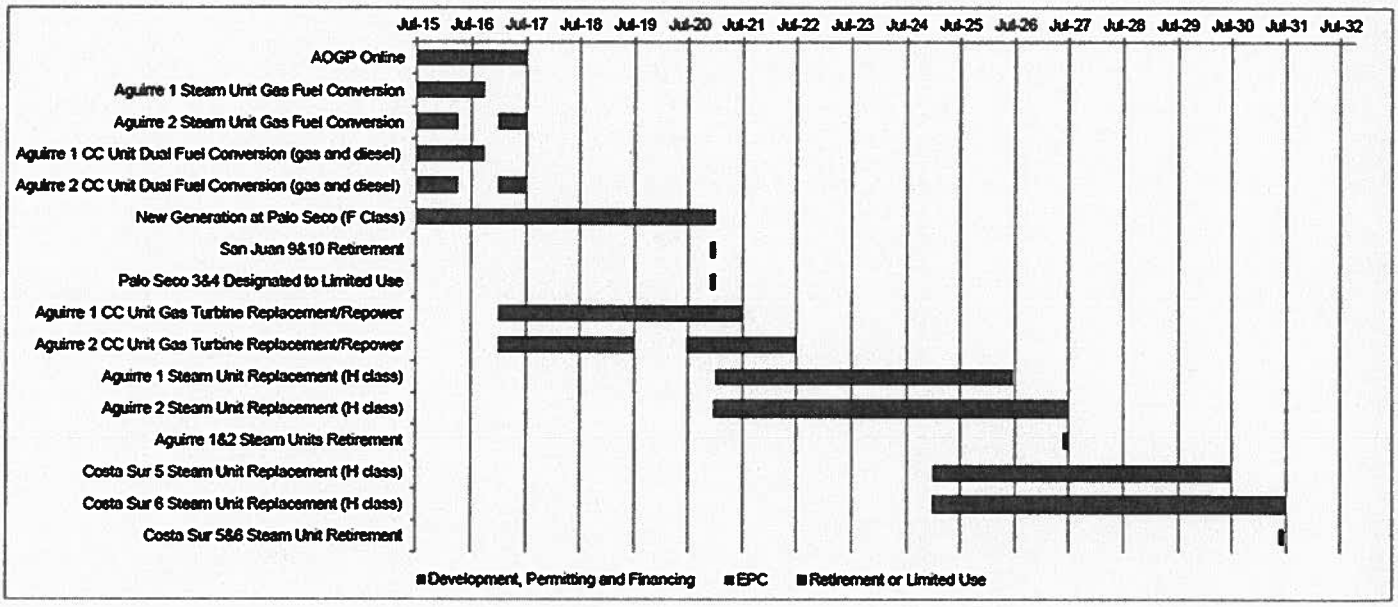
[11] For example, see http://www.raponline.org/featured-work/resource-planning

of Puerto Rico, and should not be approved without necessary modifications. In the interest of due process and in accordance Regulation No. 8594, the ICSE-PR recommends that the Commission disapprove the current proposal or disapprove it with recommendations.

b. Technical Recommendations

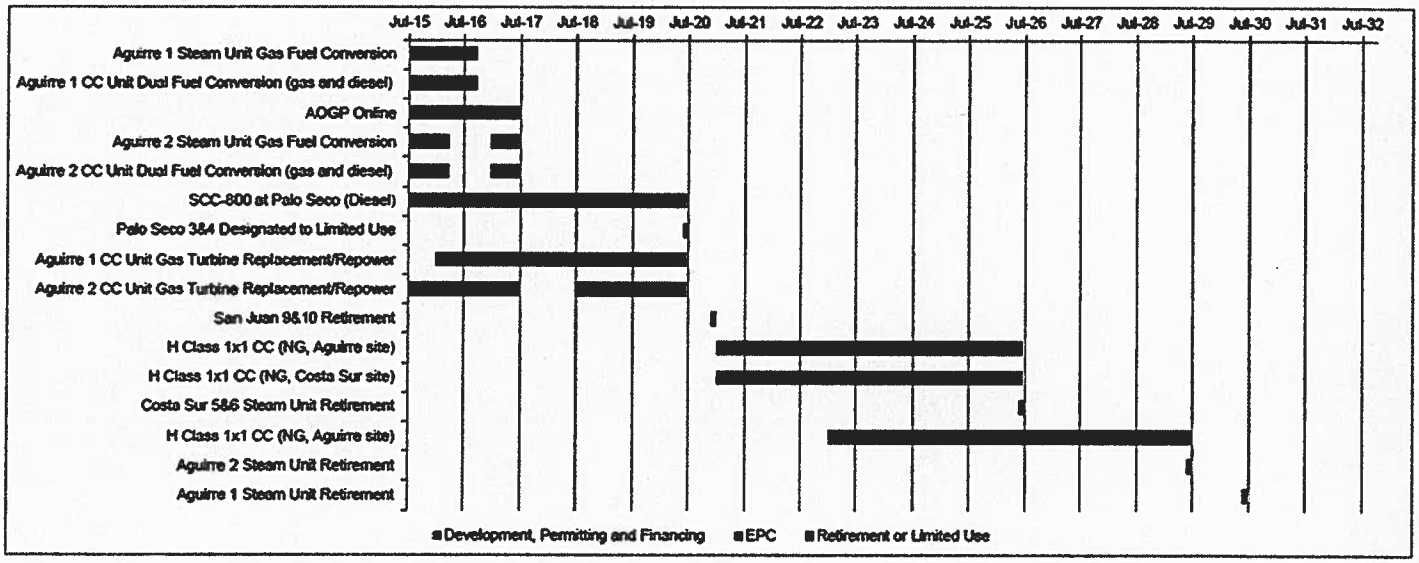
PREPA has provided a generation expansion and upgrade schedule that is not viable given the current urgency of compliance with local and federal regulations. The presented completion dates for replacement of existing low efficiency, non-environmentally compliant thermoelectric units extends through 2031 with the replacing of units at the Costa Sur plant. And within the plan, there are only two units replaced before 2021, at Palo Seco and Aguirre CC 1. For example, the Base IRP shows the following for P3F1:

Figure 8-26: P3F1 Schedules and Capital Costs



The alternative Portfolio Future Scenario, P3MF1M, although more aggressive upfront, also falls short, postponing the replacement of one each Aguirre and Costa Sur units to year 2026 and one Aguirre unit by 2029, as shown below:

Figure 8-3: P3MF1M Schedules



Because of the above expansion schedule problems, and as stated above, the Commission should disapprove or disapprove with recommended changes any IRP that PREPA is proposing at this time. Supplementary IRP proceedings should consider ways to modernize and make more competitive and efficient Puerto Rico's electrical system, while also meeting federal environmental regulations like the EPA's MATS and CPP, as applicable. In order to ensure the process and resulting IRPs are flexible enough to allow competitive rates even while meeting EPA regulations, PREPA and the Commission should focus on shorter-term planning that can be done with more certainty and with less risk of over-supply.

For example, In light of PREPA's immediate need to comply with EPA regulations and the potential for material near-term reductions in demand for PREPA services, PREPA and the Commission should focus the next supplementary IRP proceedings on ensuring PREPA's compliance with current federal environmental regulations within five (5) years; plus considering ways to optimally shift away from the current low efficient old and inefficient power generation infrastructure also within the next 5 years.

As shown in Table 1-1 of the Base IRP Volume II, the replacement of the Palo Seco plant by a new efficient 359 MW unit has been contemplated in this proceeding. So too have new natural gas combined cycle units for the Aguirre and Costa Sur Plant.

Table 1-1: Overview of Scenarios and Portfolios from a generation location point of view

	Year	Short Term (2020)				Long Term (2035)						
	Portfolio	1&2	3	2	3	1	2	2	2	3	3	3
	Futures	1,3&4	1,3&4	2	2	1,3&4	1&4	3	2	1&4	3	2
North	Palo Seco SCC-800 (Duct Fired)	210		210		210	210	216	210			
North	Palo Seco 1x1 F-class		359		359					359	369	359
North	S J Repowering	400	400	400	400	400	400	400	400	400	400	400
North	San Juan 1x1 F-class or H Class			359	359			369	359		393	359
South	Aguirre 1&2	900	900	900	900	1085						
South	Costa Sur 5&6	820	820	820	820	1005						
South	Aguirre 1&2 CC Unit Gas Repower	263	263	255	263	263	263	263	255	263	263	255
South	Aguirre 1x 1x1 F-class or H Class						369				393	359
South	Aguirre 2x 1x1 F-class or H Class						738	738	717	787		
South	Costa Sur 2x 1x1 F-class or H Class						738	738	738	787	787	787
South	AES & EcoElectrica	961	961	961	961	961	961	961	961	961	961	961
	Total North	610	759	969	1117	610	610	985	969	759	1162	1117
	Total South	2944	2944	2936	2944	3315	3070	2701	2672	2798	2404	2361
	Grand Total	3555	3703	3905	4061	3926	3681	3686	3640	3556	3567	3478

Further, as explained above, if reasonable industry standards are used to define Highly Efficient Fossil Generation, then in accordance with Act 57, a minimum of 875 MW produced by highly efficient units would have to be included. The combination of such new high-efficiency generation and MATS compliance plans could total nearly 1,200 MW and fit well with PREPA's proposed changes at the Aguirre and Costa Sur sites.

Therefore, despite the flaws in PREPA's IRP proposal and the evidentiary record, out of a good faith desire to serve the public interest of Puerto Rico, the ICSE-PR recommends the following upgrades in the Puerto Rico electric system to be completed in the first five (5) years of any IRP the Commission approves for PREPA:

1) Expediting natural gas infrastructure development, including the Aguirre Offshore Gas Port and duct infrastructure that connects the Costa Sur and Aguirre plants, as originally intended by PREPA prior to interest in the Aguirre Gas Port;
2) Immediately implementing high efficiency fossil generation requirements, as required by Act-57, and as explained in previous sections of this document; by the completion of the Commission's proceeding to establish the High Efficiency Fuel Generation Definition. This could allow immediate economic construction of new high efficient generation infrastructure, required by year 2019; and for the immediate replacement of obsolete units in Costa Sur and Aguirre Plants; and
3) Immediately replacing generation units driven by environmental regulation compliance. This could allow immediate economic replacements of units in the Palo Seco Plant.

The proceedings should also examine the extent to which the new gas infrastructure and the expedited units replacement mentioned above could provide for full and efficient RPS

Compliance of 15% (under Act 82 of 2010) by as soon as 2020. Otherwise, PREPA should at least be directed to show significant progress within five (5) years, with annual status reports to the Commission.

Indeed, a carefully crafted expansion plan would enable PREPA to make significant progress in five (5) years. The plan should be determined through non-discriminatory IRP procedures that facilitate robust open access and wholesale energy markets. If circumstances require it, Intervenors like ICSE-PR and others acting in good faith for the public interest could help facilitate reasonably expedited procedures that focus on adding critical information and analysis missing from the evidentiary record of this proceeding thus far. For example, if PREPA were to work with Intervenors to carefully study expected future demand, and if key supply-related information from this proceeding remains constant, then, after careful review during a continuation of this proceeding, the above-mentioned considerations could confirm the need for around 1,200 MW of new, environmentally compliant, and highly efficient generation capacity. When added to existing capacity from EcoElectrica (about 500 MW) and San Juan Units 5 and 6 (about 400 MW total), PREPA would have about 2,100 MW of high-efficiency generation capacity.

Remaining capacity needs could total about 900 MW, or could be less, or could be reasonably expected to fall over time with a projection that could be managed through proper IRP procedures. Regardless, proper IRP procedures would allow those needs to be filled flexibly and competitively with some combination of DG, EE, other demand-side options, additional high efficiency generation (with appropriate start-up and ramping capability), or some limited use of other existing generation. Such additional proceedings and resulting five-year expansion plan for PREPA could thus appropriately balance the interests of PREPA, consumers, and potential investors and developers, thereby fostering a competitive sustainable economy for Puerto Rico.

WHEREFORE: It is respectfully requested that this Board receives this brief and take appropriate actions according to same.

I H EREBY CERTIFY that the foregoing was sent via certified mail, return receipt requested to and via email to: Nelida Ayala Jimenez, Esq. General Counsel, Puerto Rico Electric Power Authority, PO Box 36928, San Juan, Puerto Rico 00936-3928; n_ayala@aeepr.com, Copy was sent via regular mail to the following parties:

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RESPECTFULLY SUBMIITED.

In San Juan, Puerto Rico, on April 28, 2016.

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