

RESEARCH PAPER



Darkness Visible: A Financial Analysis of
the Puerto Rico Electric Power Authority
June 2010

No light; but rather darkness visible
Served only to discover sights of woe,
Regions of sorrow, doleful shades, where peace
And rest can never dwell, hope never comes
That comes to all, but torture without end
Still urges, and a fiery deluge, fed
With ever-burning sulphur unconsumed.

—JOHN MILTON,
Paradise Lost (1667)

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Executive Summary

This is CNE's third look, since 2005, at the electricity sector in Puerto Rico. Some of the highlights in this report include the following:

- **Financial losses continue.** For fiscal years 2009, 2008, and 2007, PREPA incurred losses before contributed capital of \$163 million, \$323.7 million, and \$96.9 million, respectively.
- **Insolvency is a risk in the short term.** As of June 30, 2009 and December 31, 2009, PREPA had unconsolidated net assets (on a stand-alone basis, excluding subsidiaries) of negative \$9.8 million and negative \$109.9 million, respectively. This means that as of each of those dates PREPA's core operating company was technically insolvent, on a balance sheet basis, because its total liabilities exceeded its total assets.
- **PREPA is implementing a financial stabilization plan to address these issues.** The plan consists of several actions intended to reduce costs, increase liquidity, and cut back its dependency on fuel oil. The principal elements of the cost reduction plan include (1) reducing the number of employees through attrition and the elimination of temporary and vacant positions; (2) reducing expenses associated with its retirees' health care benefits; and (3) reducing overtime and miscellaneous expenses.
- **Electricity sales stall, but revenues jump.** Electric energy sales, measured in gigawatt hours, decreased from 19,887 gWh in 2003 to 18,516 gWh in 2009. This decrease represents a negative growth rate of 1.18%. At the same time, revenues from sales of electric energy grew at a CAGR of 8.02%. Thus, between 2003 and 2009 electricity consumption declined by 1.2% per year, but electricity bills increased at an annual rate of 8%.
- **Industrial clients have declined significantly.** The number of industrial clients declined from 1,668 in 2005 to 898 in 2009, a reduction of 770 industrial clients, or 46%.
- **Capital expenditures have been trimmed.** The proposed capital expenditure program in the amount of \$1.7 billion for the next five fiscal years is significantly lower than the previous one, which totaled some \$2.8 billion. Capital expenditures have been refocused on improving the reliability of the generation system and the efficiency of the transmission and distribution system. In addition, a significant portion of the capital spending on generation will be used for substituting older oil-fired generation units with more efficient generation units fired with fuels "other than oil."
- **Energy losses continue unabated.** Energy lost or unaccounted for increased from 2,754 gWh in 2003 to 3,247 gWh in 2009, an increase of 493 gWh or 17.9%. These losses amounted to almost 15% of total electricity production in 2009, a rate that is 3.7 times the average loss rate for government-owned utilities in the United States. PREPA claims to be working on a new plan to reduce losses due to theft.

- **Net assets decreased** by \$147.5 million (79.0%), \$284.7 million (60.4%), and \$39.8 million (7.8%) as a result of operations during fiscal years ended June 30, 2009, 2008, and 2007, respectively.
- **Operating income increased.** For the fiscal year ended June 30, 2009 operating income was \$362.6 million, which represents an increase of 100% over fiscal year 2008; this increase is due mostly to a significant reduction in expenses related to PREPA's Other Post-Employment Benefits for its retirees.
- **Operating expenses decreased** by \$541 million, or 12.9%, for the fiscal year ended June 30, 2009, when compared to the previous fiscal year.
- **Cash flow has improved.** Cash generated from operating activities increased by \$458.51 million, from \$114.24 million in June 2008 to \$572.75 million in June 2009. This increase in operating cash flow was due to a reduction in cash paid to suppliers and employees, which in turn was due mostly to a \$384 million reduction in fuel costs.
- **PREPA remains a highly leveraged company:** its leverage ratio, measured as total assets divided by total equity, was 223.91 in June 2009, a significant increase from the 49.45 reported in June 2008; its long-term debt ratio was 99.33% in June 2009, which is slightly higher than the 97.21% reported in June 2008; and its debt-equity ratio was 99.55% in June 2009, which is also higher than the 97.98% reported in June 2008.
- **Profitability remains elusive.** PREPA's return on equity for fiscal year 2009 was a negative 78.99%, substantially worse than the negative 60.4% return obtained for fiscal year 2008.
- **Accounts receivable from government and municipalities increased** from \$357 million in 2008 to \$471 million in 2009, an increase of \$114 million, or 31.95%. However, PREPA claims that "during the first seven months of fiscal year 2010, the central government paid all its past due accounts owed as of June 30, 2009 and had an outstanding balance of less than \$28 million."
- **Credits, subsidies, special rates, contributions in lieu of taxes, and energy losses are a dead weight on PREPA.** In 2008 these items totaled \$995 million; about 22% of the revenues generated that year.
- **PREPA continues to substantially underperform its U.S. counterparts** in terms of operation and maintenance expenses per kWh sold and in terms of operation and maintenance expense per customer. PREPA also reports higher administrative and general and sales expenses per customer when compared with mainland public power producers. These higher ratios seem to be indicative of the existence of a relatively larger administrative and support staff at PREPA.
- **PREPA has plans to reduce its dependence on oil.** It seeks to convert several existing oil-fired units to natural gas and perhaps add new coal-based generation.
- **In our opinion, adding new coal generation capacity is not a good option for Puerto Rico,** because: (1) coal is the dirtiest of the fossil fuels and it is currently

the cheapest only because its price does not include the costs of negative externalities it generates; (2) financing could be difficult to obtain on reasonable terms; (3) there are significant regulatory risks at the federal level; and (4) coal ash presents a serious disposal problem in a small island such as ours.

- **If Puerto Rico is to become a leader in the green energy field** and to generate significant economic activity and employment in this sector, **then it needs to think big and out of the box.** Every country wants to get into the green energy game; everybody is offering incentives of every kind. If Puerto Rico wants to attract big investments in this sector it will have to differentiate from everyone else. One way to do this would be to establish a cap-and-trade system in Puerto Rico.
- **There has been significant action at the federal level, in both the legislative and executive branches, regarding the regulation green house gases.** While it is difficult at this time forecast the final form of the laws, rules and regulations that may eventually be enacted or adopted, it is reasonable to assume that any such regulatory action could have a **material adverse effect** on PREPA's operations. Thus, PREPA would be well advised to (1) reduce its dependence on fuel oil; (2) decrease its overall carbon footprint; and (3) move towards and adopt renewable fuel technology for the generation of electricity.
- **Generation from renewable sources is unlikely to come on line in the short term.** PREPA states that it has entered into power purchase agreements with developers of renewable energy projects with the long-term goal of increasing the use of renewable energy. The introduction of new generating capacity using renewable energy sources, which we understand may be difficult to implement, should be a top priority, even if the short-term impact on price is modest, because (1) it would help stabilize costs; and (2) it helps PREPA to prepare for compliance with future limitations on greenhouse gases.
- **It is highly unlikely that PREPA will be able to significantly reduce the cost of electricity in the near future,** because (1) it depends on oil for 68% of its electricity generation; (2) it is required to grant several credits, subsidies and special rates to some of its clients; (3) it is subject to a rate covenant under the 1974 Trust Agreement, which requires PREPA to fix, charge and collect reasonable rates and charges so that revenues of the system will be sufficient (a) to pay current expenses and (b) to provide an amount at least equal to 120% of the aggregate principal and interest requirements for the next fiscal year; (4) it is required to make substantial contributions in lieu of taxes; (5) it loses close to 15% of its generation, mostly due to theft; and (6) it has significantly higher administrative, accounting, and customer support costs relative to its peers.
- In sum, PREPA needs to undergo a **radical restructuring** if it is to become a positive net contributor, instead of a hindrance, to Puerto Rico's economic growth over the next few years.

I. Introduction

This is the third paper published by the Center for the New Economy (CNE) analyzing the financial and operating conditions of the Puerto Rico Electric Power Authority (PREPA). This focus on the electricity sector reflects our belief that the availability of high quality, reliable, and cost efficient electric power is of strategic importance for the future economic development of Puerto Rico.

Recent events have only further highlighted this strategic imperative as we have seen: oil prices climb to an all-time high price of \$147 per barrel; thousands of manufacturing jobs leave Puerto Rico due, at least in part, to high energy costs; and electricity consumers being hit with double-digit increases in their monthly power bill precisely as Puerto Rico is undergoing the worst recession in decades.

In addition, the last couple of years have witnessed the emergence of a consensus on the damage caused by climate change and the need to curb emissions of greenhouse gases (GHG) over the next thirty or forty years. In 2008, all candidates to the U.S. presidency announced their intention to implement a strict cap and trade system in the United States to limit and then lower GHG emission levels; while financial institutions announced they will submit financing requests for coal-based power plants to a heightened level of due diligence. In 2009, the United States House of Representatives approved legislation setting national caps on GHG emissions, while the EPA is currently considering establishing emission controls or emission standards regarding GHGs.

All of this means that PREPA, as the largest emitter of GHGs in the island, will be forced to fundamentally rethink its business model—currently 99 per cent based on fossil fuels—within the next decade or so.

This paper is divided roughly in two parts. In the first part, we update our previous analysis of PREPA's finances and operations. PREPA, unfortunately, continues to operate as a self-regulated monopoly with the capacity to fully pass all its costs to its customers, with no incentives whatsoever to streamline its operations. In the second part, we provide an analysis of several recent developments in the Puerto Rico energy sector, including PREPA's announced strategy to diversify its fuel sources as well as of some legislative developments to promote the use of renewable energy sources in Puerto Rico.

Finally, a brief note on methodology. For this report we have relied primarily on data from two sources. First, we have used data set forth in the Official Statements issued by PREPA in connection with its offerings of (a) \$822,210,000 Power Revenue Bonds, Series XX, dated March 26, 2010; (b) \$320,175,000 Power Revenue Bonds, Series YY, dated April 22, 2010; and (c) \$631,160,000 Power Revenue Bonds, Series ZZ, dated April 22, 2010.

The content of each of the Official Statements is subject to certain disclosure and antifraud provisions of the federal securities laws and regulations. In particular, Rule 10b-5, issued pursuant to section 10(b) of the Securities Exchange Act of 1934, as

amended, provides among other things that *“it shall be unlawful for any person... (b) to make any untrue statement of a material fact or to omit to state a material fact necessary in order to make statements made, in light of the circumstances under which they were made, not misleading...in connection with the purchase or sale of any security.”* Therefore, we assume the content of each of the Official Statements is true, accurate, and complete in all material respects.

Second, we have extracted financial information from PREPA’s official audited financial statements for the years ended June 30, 2009 and 2008, which we also assume are true, accurate, and complete in all material respects.

The analysis and interpretation of such data is, of course, our own.

II. Analysis of the Puerto Rico Electric Power Authority

Electricity Consumption Trends – Between June 30, 2003 and June 30, 2009, the average number of clients served by the Authority increased from 1,401,301 to 1,458,636. This increase represents a modest compound annual growth rate (CAGR) of 0.67%.

Electric energy sales to those customers, measured in gigawatt hours, decreased from 19,887 gWh in 2003 to 18,516 gWh in 2009. This decrease represents a negative growth rate of 1.18%. During this period, despite the slight increase in customers, PREPA's total electric energy sales decreased, largely due to the ongoing recession in Puerto Rico.

Table 1
PREPA Clients, Electricity Sales, Revenues, and GNP
Fiscal Years Ended June 30,

	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>CAGR</u>
Average Number of Clients	1,401,301	1,419,602	1,438,699	1,450,227	1,452,529	1,449,211	1,458,636	0.67%
% Change Prior Year	-	1.31%	1.35%	0.80%	0.16%	-0.23%	0.65%	
Electric Energy Sales (gWh)	19,887	20,260	20,507	20,620	20,672	19,602	18,516	-1.18%
% Change Prior Year	--	1.88%	1.22%	0.55%	0.25%	-5.18%	-5.54%	
Electric Energy Revenues (\$MM)	\$2,508.758	\$2,600.268	\$3,038.110	\$3,708.938	\$3,670.966	\$4,350.515	\$3,986.181	8.02%
% Change Prior Year	--	3.65%	16.84%	22.08%	-1.02%	18.51%	-8.37%	
GNP(\$MM)	\$47,479.5	\$50,708.7	\$53,752.4	\$56,732.3	\$59,520.5	\$61,527.0	\$62,758.9	4.76%
% Change Prior Year	--	6.80%	6.00%	5.54%	4.91%	3.37%	2.00%	
Energy Revenues/GNP	5.28%	5.13%	5.65%	6.54%	6.17%	7.07%	6.35%	

Source: PREPA
Official Statement;
PR Planning Board;
CNE Analysis

As shown on Table 1 above, PREPA's revenues in connection with sales of electric energy grew at a CAGR of 8.02%. Electric energy revenues, therefore, increased while the rate of growth of electricity sales (in gWhs) during this period was negative. The higher growth rate in revenues, relative to the decline in energy sales, is explained to a large extent by the increase in the cost of fuel and power purchased by the Authority, both of which are passed on to clients through a separate charge included in electric service rates.

Putting these statistics in the context of the Puerto Rican economy, we note that the rate of growth exhibited by PREPA's revenues was 1.68 times higher than the 4.76% growth rate of Puerto Rico's GNP (in nominal terms) during the period under analysis. Furthermore, PREPA's 16.84%, 22.08%, and 18.51% revenue growth rates during 2005, 2006, and 2008, respectively, were substantially higher than the 6.00%, 5.54%, and 3.37% nominal growth rates of Puerto Rico's GNP during those same years.

Total PREPA energy revenues during the period under analysis consistently accounted for around 6% of Puerto Rico's GNP, which gives an indication of the relative size and importance of the Authority in the context of the Puerto Rican economy. In this regard, it is important to note that PREPA charged its commercial clients, which account for only 8.87% of its clients, a total of \$1,897,022,000 in 2009, an amount equal to 47.58% of PREPA's revenues and to 3.02% of total Puerto Rico GNP during that year. This statistic lends credibility to some of the complaints voiced by representatives of the commercial sector in Puerto Rico regarding the high cost of electricity.

In addition, it is important to note that the number of PREPA's industrial clients has declined from 1,668 in 2005 to 898 in 2009, a reduction of 770 industrial clients, or 46%. While it would be incorrect and unfair to lay the blame for this decrease solely on high energy costs, the magnitude of the reduction is certainly cause for concern and graphically depicts the rapid de-industrialization of the productive base of the Puerto Rican economy.

Residential Consumption – Residential clients accounted for 90.82% of total clients, 34.39% of energy sales and 34.47% of energy revenues during fiscal year 2009.

During the period between fiscal year 2003 and fiscal year 2009, the average number of residential clients increased by 54,381, from 1,270,371 to 1,324,752. This increase represented a CAGR of 0.70%, which is essentially the same as the 0.67% compound annual growth rate in the overall average number of clients during that period. The fact that 90 per cent of clients accounted for only 35 per cent of revenues is explained in large part by the subsidies the Authority is statutorily required to provide to certain qualifying clients. We will take a look at these subsidies later on.

During the period under analysis energy sales to residential clients decreased by 912 gWh, from 7,280 gWh in 2003 to 6,368 gWh in 2009. This decrease represented a CAGR of -2.21%, which is significantly lower than the -1.18% compound annual growth rate of total electric energy sales during that period.

During that same period, electric energy revenues from residential clients increased by \$506.6 million, from \$867.68 million in 2003 to \$1,374,344,000 in 2009. This increase represented a CAGR of 7.97%, which is essentially the same as the 8.02% growth rate of total energy revenues during the period under analysis. Thus, while residential electricity consumption declined by 2% per year, electricity bills increased by 8% annually, due in part to higher fuel and purchased energy costs.

Revenues from the residential client segment were one of the leading drivers of revenue growth. Furthermore, as we show on Table 2 below, the 7.97% growth rate in residential revenues was 1.52 times the 5.21% CAGR of total personal consumer expenditures in Puerto Rico during the 2003-2009 period. In other words, consumer spending for electric power grew at one and a half times the rate of overall consumer spending during this six year period.

Table 2
Electric Energy Revenues and Personal Consumption
Fiscal Years Ended June 30,

	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>CAGR</u>
Electric Energy Revenues (\$MM)	\$2,508.758	\$2,600.268	\$3,038.110	\$3,708.938	\$3,670.966	\$4,350.515	\$3,986.181	8.02%
% Change Prior Year	--	3.65%	16.84%	22.08%	-1.02%	18.51%	-8.37%	
Residential % Change Prior Year	\$867.684	\$897.965	\$1,066.419	\$1,284.641	\$1,272.389	\$1,498.576	\$1,374.344	7.97%
	--	3.49%	18.76%	20.46%	-0.95%	17.78%	-8.29%	
Personal Consumption Expenditures (\$MM)	\$40,973.4	\$43,396.0	\$46,535.4	\$49,467.8	\$51,949.3	\$54,561.0	\$55,564.6	5.21%
% Change Prior Year	--	5.91%	7.23%	6.30%	5.02%	5.03%	1.84%	
Residential Electricity Costs/PCE	2.12%	2.07%	2.29%	2.60%	2.45%	2.75%	2.47%	

Source:
PREPA Official
Statement; PR
Planning Board;
CNE Analysis

Projected Generation Capacity and Load Growth – In general, demand for energy in Puerto Rico is related to the level of economic activity in Puerto Rico, energy costs and weather conditions. PREPA bases its projection of future load growth on various economic models developed by private consultants and uses the highest growth scenario as its base case for planning the additional generating capacity needed by the system. Table 3 below sets forth the five-year generating capacity and peak load projections used by PREPA in its most recent bond offerings.

Table 3
Projected Generation Capacity and Load Growth
Fiscal Years Ending June 30,

(in MW, except percentages)	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>CAGR</u>
Dependable Capacity	5,365	5,865	5,839	5,839	5,839	5,786	5,786	1.27%
Peak Load	3,546	3,529	3,223	3,190	3,175	3,206	3,248	-1.45%
Reserve Margin	1,819	2,336	2,648	2,681	2,696	2,580	2,538	5.71%
Dependable Reserve Margin %	51.30%	66.19%	82.16%	84.04%	84.91%	80.47%	78.14%	

Source: PREPA Official Statement

PREPA expects its dependable capacity to increase by 421 MW, from 5,365 MW in 2008 to 5,786 MW in 2014. Peak load growth, however, is expected to decrease by 1.45% per year due mostly to the recessionary state of the Puerto Rican economy, which is expected to last for at least two more years. Therefore, the dependable reserve margin is expected to increase significantly, from 51.3% in 2008 to 78.14% in 2014.¹ This means there is no need for net new additional generation capacity in the near future.

Capital Expenditures – During the five fiscal year period ending June 30, 2014, the Authority plans to make \$1.7 billion in capital expenditures, of which \$598.7 million, or 35.32%, will be spent in production plant; \$469.13 million, or 27.60%, will be spent in transmission facilities; \$397.02 million, or 23.35%, will be spent in distribution facilities; and \$235.07 million, or 13.83%, will be spent in other plant and equipment.

Of the total \$1.7 billion in capital expenditures, \$1.67 billion, or 98.10%, will be financed with borrowed funds, while \$32.23 million, or 1.90%, will be financed with internally generated funds. This financing structure is in explicit contravention of the recommendation made by PREPA’s Consulting Engineers in 2008, who recommended

¹ PREPA, *Official Statement of the Puerto Rico Electric Power Authority*, prepared in connection with the public offering of \$822,210,000 of Power Revenue Bonds, Series XX, March 26, 2010, p. 33.

that PREPA increase the internal funding level for its capital expenditures to approximately 25%.

The proposed capital expenditure program for the next five fiscal years is significantly lower than the previous one, which totaled some \$2.8 billion. Capital expenditures have also been refocused away from the historical trend of capacity expansion towards improving the reliability of the generation system and the efficiency of its transmission and distribution system. In addition, a significant portion of the capital spending on generation will be used for substituting older oil-fired generation units with more efficient generation units fired with fuels “other than oil.”

Table 4
Projected Capital Improvement Program
Fiscal Years Ending June 30,

(\$000) Capital Improvements	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>Total</u>	<u>%</u>
Production plant	\$128,014	\$104,005	\$90,250	\$115,001	\$161,500	\$598,770	35.22%
Transmission	\$117,151	\$82,537	\$85,697	\$78,715	\$105,032	\$469,132	27.60%
Distribution	\$75,322	\$74,246	\$75,519	\$89,937	\$81,998	\$397,022	23.35%
Other	\$29,513	\$39,212	\$48,534	\$66,347	\$51,470	\$235,076	13.83%
Total	<u>\$350,000</u>	<u>\$300,000</u>	<u>\$300,000</u>	<u>\$350,000</u>	<u>\$400,000</u>	<u>\$1,700,000</u>	<u>100.00%</u>
<u>Financing Sources</u>							
Internal Funds	\$ --	\$20,204	\$7,912	\$2,705	\$1,419	\$32,240	1.90%
Borrowed Funds	\$350,000	\$279,796	\$292,088	\$347,295	\$398,581	\$1,667,760	98.10%
Total	<u>\$350,000</u>	<u>\$300,000</u>	<u>\$300,000</u>	<u>\$350,000</u>	<u>\$400,000</u>	<u>\$1,700,000</u>	<u>100.00%</u>

Source: PREPA Official Statement

Energy Lost and Unaccounted for – One of most worrisome trends we uncovered through our analysis of PREPA operations is the increase in the amount of energy lost and unaccounted for. As shown in Table 5 below, net electric energy generated and purchased has decreased from 22,641 gWh in 2003 to 21,763 gWh in 2009, a decrease of 878 gWh, or 3.88%. At the same time, however, electricity losses and energy

unaccounted for increased from 2,754 gWh in 2003 to 3,247 gWh in 2009, an increase of 493 gWh or 17.9%.

To put these losses in perspective, PREPA's total energy *lost and unaccounted for* in 2009 was about equal to the total amount of energy *produced* in Nicaragua (3,286 gWh) or in Albania (2,888 gWh). Indeed, the amount of electricity PREPA lost during 2009 alone exceeded the amount *produced* in 91 out of 213 countries and territories around the world.²

Table 5

Energy Lost and Unaccounted For								
Fiscal Years Ending June 30,								
	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>% Change</u>
Net electric energy generated and purchased (gWh)	22,641	23,015	23,378	23,754	24,062	22,924	21,763	-3.88%
Losses and unaccounted for (gWh)	2,754	2,755	2,871	3,134	3,390	3,322	3,247	17.90%
% lost and unaccounted for	12.16%	11.97%	12.28%	13.19%	14.09%	14.49%	14.92%	
Average revenue per kWh (\$)	\$ 0.1261	\$ 0.1283	\$ 0.1481	\$ 0.1799	\$ 0.1776	\$ 0.2219	\$ 0.2153	70.74%
Monetary value of energy losses	\$ 347,279,400	\$ 353,466,500	\$ 425,195,100	\$ 563,806,600	\$ 602,064,000	\$ 737,151,800	\$ 699,079,100	101.30%

Source: PREPA
Official Statement;
CNE Analysis

It is significant that this increase in energy lost and unaccounted for occurred during a period when net electric energy generated and purchased by PREPA decreased by 3.8%. Furthermore, energy losses amounted to almost 15% of total electricity production in 2009, a rate that is 3.7 times the average loss rate for government-owned utilities in the United States. How can a business be successful if it loses 15% of its product between the production line and delivery to its customers?

The monetary value of this energy lost and unaccounted has jumped from \$347 million in 2003 to \$699 million in 2009, an increase of \$352 million, or 101.30%. Part of this increase has been driven by the increase in the price of oil, which produced a 70.7% increase in the average cost of every kWh sold by PREPA during the period under study.

² United States Central Intelligence Agency, *World Factbook 2010*, Rank Order Table – Electricity Production.

Nonetheless, the rate of energy losses is worrisome for various reasons.

First, it is indicative of worsening operating conditions, especially in the transmission and distribution network. Second, these energy loss rates are what economists call dead weight losses, or, simply put, massive social waste. The estimated aggregate value of energy lost and unaccounted for during the period between 2003 and 2009 is \$3.72 billion. Finally, it begs the question of who bears these losses in the final instance. Given that PREPA is a self-regulated monopoly the answer is that these losses are passed on to the consumer in one way or another.

To be fair to PREPA we note that it is implementing a theft reduction program that combines the “use of smart grid technologies and an increase in unannounced door-to-door inspections” in order to reduce losses due to theft.³ PREPA expects its theft recovery initiatives to produce \$50 million in annual incremental revenues for fiscal years 2011 through 2014.

Financial Performance – How effectively has PREPA utilized its status as a government-authorized monopoly? The answer to this question has two dimensions: the first is financial, in specific, what has been PREPA’s financial performance. The second, concerns the efficiency with which PREPA carries out its operations. In this section we will focus on financial performance and will take up the analysis of operations in the next section.

At first glance, it appears that PREPA’s financial performance for fiscal year 2009 was slightly better than it was for the previous year. Nonetheless, PREPA reported a net loss for the third straight year and its financial performance remains quite below par, especially for a self-regulated monopoly. According to the Authority’s Management’s Discussion and Analysis included in its audited financial statements for the fiscal year ended June 30, 2009, the following were among PREPA’s financial highlights for that year:

- Net assets decreased by \$147.5 million (79%), \$284.7 million (60.4%), and \$39.8 million (7.8%) as a result of operations during fiscal years ended June 30, 2009, 2008, and 2007, respectively.
- Operating income for the fiscal year ended June 30, 2009 was \$362.6 million, which represents an increase of 100% over fiscal year 2008.
- Operating expenses decreased by \$541 million, or 12.9%, for the fiscal year ended June 30, 2009; increased \$871.7 million, or 26.3%, and decreased by \$3.6 million, or 0.1%, for the fiscal years ended June 30, 2008 and 2007, respectively, when compared to the previous fiscal year.

In short, PREPA, which is a vertically-integrated, self-regulated monopoly with the market power and the legal authority to recover all its costs from its customers, reported

³ PREPA, *Official Statement*, *supra* n. 1, p. 6.

yet another net loss on a GAAP basis, in this case in the amount of \$147.5 million, for the fiscal year ended June 30, 2009.

Perhaps more worrisome is the disclosure that as of June 30, 2009 and December 31, 2009, PREPA had unconsolidated net assets (on a stand-alone basis, excluding the Authority's subsidiaries) of negative \$9.8 million and negative \$109.9 million, respectively. This means that as of each of those dates PREPA's core operating company was technically insolvent, on a balance sheet basis, because its total liabilities exceeded its total assets.⁴

Analyzing PREPA's financial statements we find that its financial performance was deficient in almost every area during fiscal year 2009:

- Total assets decreased \$449.99 million, or 4.87%, from \$9,231,596,000 in 2008 to \$8,781,605,000 in 2009.
- Total liabilities decreased \$302.53 million, or 3.34%, from \$9,044,914,000 in 2008 to \$8,742,386,000 in 2009.
- The equity (net assets) of the Authority decreased \$147.46 million, or 78.99%, from \$186,682,000 in 2008 to \$39,219,000 in 2009.
- Operating revenues decreased \$359.49 million, or 8.24%, from \$4,362,209,000 in June 2008 to \$4,002,713,000 in June 2009. However, operating income increased \$181.53 million, or 100%, from \$181,066,000 in 2008 to \$362,604,000 in June 2009. This increase in operating income is due almost entirely to a reduction in PREPA's other post-employment benefit expenses in connection with the health insurance plan for its retirees.
- Net interest expense increased \$13.89 million, or 4.45%, from \$312,269,000 in June 2008 to \$326,165,000 in June 2009.

Table 6 below shows some selected financial indicators of the Authority:

⁴ PREPA, *Official Statement*, supra n. 1, at p. 19. In general, business insolvency is measured in two ways. First, a business is said to be "cash flow insolvent" if it is unable to pay its obligations as they become due. Second, a business is said to be "balance sheet insolvent" if its liabilities exceed its assets, that is, if it has negative equity. A company can be cash flow insolvent but balance sheet solvent if it holds a relatively high amount of illiquid assets that cannot be immediately converted into cash if the need arises. Conversely, a company can be balance sheet insolvent but still be cash flow solvent if it has sufficient cash to meet its obligations as they become due. In neither case is insolvency synonymous with legal bankruptcy, which is a determination made by a bankruptcy court when it issues a judgment or decree of bankruptcy declaring that a person against whom a petition in bankruptcy has been filed, or who has filed a voluntary petition, be ordered and adjudged to be bankrupt.

Table 6**PREPA Selected Financial Indicators****Fiscal Years Ended June 30,**

(in \$000, except percentages)	<u>2009</u>	<u>2008</u>	<u>Change</u>	<u>% Change</u>
Current Assets	\$1,507,513	\$1,619,122	-\$111,609	-6.89%
Total Assets	<u>\$8,781,605</u>	<u>\$9,231,596</u>	-\$449,991	-4.87%
Current Liabilities	\$1,586,217	\$1,414,904	\$171,313	12.11%
Long-Term Debt	<u>\$5,775,827</u>	<u>\$6,515,536</u>	-\$739,709	-11.35%
Total Liabilities	<u>\$8,742,386</u>	<u>\$9,044,914</u>	-\$302,528	-3.34%
Net Assets (equity)	<u>\$39,219</u>	<u>\$186,682</u>	-\$147,463	-78.99%
Operating Revenues	\$4,002,713	\$4,362,209	-\$359,496	-8.24%
Operating Income	\$362,604	\$181,066	\$181,538	100.26%
Net Interest Expense	<u>\$326,165</u>	<u>\$312,269</u>	\$13,896	4.45%
Change in Net Assets	<u>(\$147,463)</u>	<u>(\$284,726)</u>	\$137,263	48.21%
Operating Cash Flow	<u>\$572,751</u>	<u>\$114,241</u>	\$458,510	401.35%
Selected Financial Ratios				
Return on Assets	2.03%	0.30%	--	--
Return on Equity	-78.99%	-60.40%	--	--
Operating Income/Operating Revenues	9.06%	4.15%	--	--
Profit Margin Ratio	-3.68%	-6.53%	--	--
Leverage Ratio	223.91	49.45	--	--
Current Ratio	0.95	1.14	--	--
Quick Ratio	0.59	0.55	--	--
Operating Cash Flow/Current Liabilities	36.11%	8.07%	--	--
Long-Term Debt Ratio	99.33%	97.21%	--	--
Debt-Equity Ratio	99.55%	97.98%	--	--

Source: PREPA Audited Financial Statements 2009; CNE Analysis

The bottom line result was that the Authority's net income for 2009 was negative \$147.46 million, a significant improvement from the negative \$284.72 million reported

for 2008. In other words, the amount lost as a result of operations during fiscal year 2009 decreased by \$137 million.

Looking at the cash flow, we find that the amount of cash generated from operating activities increased by \$458.51 million, from \$114.24 million in June 2008 to \$572.75 million in June 2009. This increase in operating cash flow was due to a reduction in cash paid to suppliers and employees, which in turn was due mostly to a \$384 million reduction in fuel costs.

The increase in operating cash flow is a positive development because PREPA remains a highly leveraged company:

- Its leverage ratio, measured as total assets divided by total equity, was 223.91 in June 2009, a significant increase from the 49.45 reported in June 2008;
- Its long-term debt ratio, measured as total long-term debt divided by total long-term debt plus equity, was 99.33% in June 2009, which is slightly higher than the 97.21% reported in June 2008; and
- Its debt-equity ratio, measured as total liabilities divided by total liabilities plus equity, was 99.55% in June 2009, which is also higher than the 97.98% reported in June 2008.

In terms of profitability, PREPA's return on assets for fiscal year 2009, defined as net income plus interest expense divided by total assets, was 2.03%, up from 0.30% for fiscal year 2008. In addition, its return on equity for fiscal year 2009, defined as net income divided by equity (net assets) at the beginning of the fiscal year, was a negative 78.99%, substantially worse than the negative 60.4% return obtained during fiscal year 2008.

PREPA's operations were slightly more effective in generating income during fiscal year 2009 when compared to operations for fiscal year 2008. Its profit margin, measured as net income (change in net assets) divided by total revenues, improved from negative 6.53% in June 2008 to negative 3.68% in June 2009.

In terms of liquidity, as of June 30, 2009, PREPA's current liabilities exceeded current assets by \$78.70 million, for a current ratio, defined as current assets divided by current liabilities, of 0.95, slightly worse than the 1.14 registered in June 2008. At the same time, cash flow from operations was sufficient to cover 36.11% of current liabilities in June 2009, a significant improvement from the 8.07% coverage of current liabilities registered in June 2008.

How does the Authority's financial performance compares with that of other U.S. public utilities? Table 7 below sets forth this comparison using a set of ratios developed by the American Public Power Association (APPA). The APPA publishes a yearly compilation of selected financial and operating ratios for over 400 public power systems in the United States. The most recent edition of this publication was published on March 2009 and contains data for 2007.

Table 7**Comparison of PREPA's Financial Performance with U.S. Public Utilities****2007**

	U.S.	
	<u>Median</u>	<u>PREPA</u>
Revenue per kWh (cents per kWh)		
All Customers	7.30	17.76
Residential Customers	8.00	17.57
Commercial Customers	7.80	18.70
Industrial Customers	6.00	15.24
Debt to Total Assets	0.32	0.86
Operating Ratio	0.86	0.82
Current Ratio	2.23	0.93
Net Income per Revenue Dollar	\$0.069	-\$0.010
Uncollectible Accounts per Revenue Dollar	\$0.002	\$0.024

Source: American Public Power Association --

Selected Financial and Operating Ratios of Public Power Utilities, 2007 Data; CNE Analysis

During 2007 PREPA reported significantly higher revenues per kWh when compared to the median revenues reported by U.S. public utilities. However, PREPA was substantially less profitable than its counterparts in the United States. That year, the Authority reported a loss of \$0.01 per each revenue dollar while the median government-owned power producer in the United States reported 6.9 cents of net income per revenue dollar.

PREPA was also significantly more leveraged when compared to U.S. power producers, as its ratio of debt to total assets in fiscal year 2007 was 86%, or 2.7 times the 32.0% debt to total assets ratio reported by the median U.S. power producer. The Authority was also significantly less liquid than its U.S. counterparts, as its current ratio, measured as current assets to current liabilities, was only 0.93, which is substantially less than the 2.23 times short-term coverage reported by the median U.S. power producer. Finally, PREPA had significantly higher uncollectible accounts in relative terms, as it reported 2.4 cents out of every revenue dollar as uncollectible, while the median U.S. power producer reported only 0.2 cents out of every revenue dollar as uncollectible during 2007.

If we look at PREPA's operating ratio, defined as the ratio of total electric operation and maintenance expenses to total electric operating revenues, we find that PREPA needs only 82% of its revenues to cover the costs of its electric operations, in comparison with

86% for the median U.S. government-owned power producer. This means that a higher portion of PREPA's revenues (18%) goes to pay for non-operating expenses, notably interest and contributions in lieu of taxes.

Table 8

PREPA Cash, Accounts Receivable and Payable

Fiscal Years Ended June 30,

(in \$000, except percentages)	<u>2009</u>	<u>2008</u>	<u>% Change</u>
Cash from Customers	\$3,955,522	\$4,095,297	-3.41%
Cash paid to suppliers and employees	(\$3,382,771)	(\$3,981,056)	-15.03%
Net Cash Flow -- Operating Activities	\$572,751	\$114,241	401.35%
Accounts Receivable			
Government & Municipalities	\$471,400	\$357,257	31.95%
Residential, Industrial & Commercial Clients	\$545,150	\$611,773	-10.89%
Recoveries FAC under (over) billed	\$25,189	\$5,487	359.07%
Unbilled Services	\$150,742	\$230,578	-34.62%
Commonwealth Subsidy	\$18,980	\$18,980	0.00%
Miscellaneous accounts and others	\$25,938	\$22,021	17.79%
Subtotal	\$1,237,399	\$1,246,096	-0.70%
Allowance for Uncollectible Accounts	(\$163,556)	(\$143,756)	13.77%
Recovery from insurance companies	\$50,229	\$167,733	
Accrued Interest on Investments	\$2,785	\$2,773	0.43%
Other Non-Current Receivables	(\$108,061)	(\$101,734)	6.22%
Net Accounts Receivable	\$1,018,796	\$1,171,112	-13.01%
Accounts Payable and Accrued Liabilities	\$820,851	\$854,882	-3.98%

Source: PREPA 2009 Audited Financial Statements; CNE Analysis

If we analyze PREPA's cash, accounts receivable and accounts payable we find the following:

- As we noted above, PREPA's cash flow from operations increased by \$458 million, or 401.35% between 2008 and 2009.
- Accounts receivable from government and municipalities increased from \$357 million in 2008 to \$471 million in 2009, an increase of \$114 million, or 31.95%.

However, PREPA claims that “during the first seven months of fiscal year 2010, the central government paid all its past due accounts owed as of June 30, 2009 and had an outstanding balance of less than \$28 million, which is the average of two months.”⁵

- Accounts receivable from residential, industrial, and commercial clients decreased by \$66 million, or 10.89%, from \$611 million in 2008 to \$545 million in 2009.
- The allowance for uncollectible accounts increased by \$19 million, or 13%, from \$143 million in 2008 to \$163 million in 2009.
- Net accounts receivable decreased by \$153 million, or 13%, from \$1.171 billion in 2008 to \$1.018 billion in 2009.
- Accounts payable and other accrued liabilities decreased from \$854 million in 2008 to \$820 million in 2009, a decrease of \$34 million, or 3.98%.

Therefore, during fiscal year 2009, PREPA, in contrast with previous years, generated relatively more cash; took less time to actually recover amounts owed to it by its clients; and took less time to pay its suppliers than in 2008.

In summary, PREPA reported its third straight loss in 2009, but the amount of the loss declined significantly when compared with 2008. In terms of its financial position, PREPA became more leveraged and less liquid when compared to fiscal year 2008. In addition, PREPA’s financial performance in terms leverage, liquidity and profitability remains substantially below that of its U.S. counterparts.

Operating Performance – In this section we analyze how PREPA’s operating performance compares and contrasts with that of other utilities in the United States. Table 9 below sets forth the U.S. median for nine operating ratios for public power producers and compares PREPA’s performance against these standards.

According to this analysis, PREPA’s operations are substantially less efficient than the operations of its U.S. counterparts and it underperforms in almost every area of operations under consideration.

In terms of customers served by each non-generation employee, we find that each non-generation worker at PREPA serves an average of 197 customers. This average is only 59% of the 333 customers served by each non-generation employee at the median U.S. public power producer. This low ratio could be indicative of a large presence of non-power producing workers at PREPA.

With respect to operations and maintenance (O&M) costs, we find that PREPA’s O&M costs, on a per kWh basis, are 2.28 times higher than the median O&M expense in the United States. If we breakdown total O&M costs into pure O&M costs (excluding expenses related to power production and supply) per customer and total power supply

⁵ PREPA, *Official Statement*, supra n. 1, at p. 6.

expense per kWh sold, we find that PREPA is inefficient in both power production and in the maintenance of its operations.

Table 9

Comparison of PREPA's Operational Performance with U.S. Public Utilities

2007

	U.S. Median	PREPA	PREPA/ U.S
Customers per Non-Generation Employee	333	197	59.12%
Total O&M Expense per kWh Sold	\$0.064	\$0.146	227.89%
Total O&M Expense per Customer*	\$343	\$504	146.81%
Total Power Supply Expense per kWh Sold	\$0.0540	\$0.1170	216.61%
Purchased Power Cost per kWh	\$0.0520	\$0.0881	169.48%
Accounting, Customer Service & Sales Exp. per Cust.	\$48.00	\$75.29	156.85%
Admin. & General Exp. Per Customer	\$125.00	\$146.32	117.05%
Energy Loss %	3.99%	14.09%	353.10%
System Load Factor	56.00%	76.22%	136.10%

Source: American Public Power Association --

Selected Financial and Operating Ratios of Public Power Utilities, 2007 Data;

CNE Analysis; *Excluding Power Supply Expense

PREPA's total O&M expense (excluding power supply costs) per customer equals \$504 per customer, which is 1.47 times higher than the \$343 per customer spent on operations and maintenance by the median U.S. power producer.

In terms of total power supply expense per kWh sold, we find that PREPA's fuel, purchased power and other production costs amounted to 11.7 cents per kWh sold, which was 2.16 times higher than the median total power supply expense per kWh sold in the United States. These two ratios indicate that PREPA's production and maintenance processes are relatively inefficient. The inefficiency in production is due in large part to PREPA's outmoded generation technology and its dependency on oil; while the inefficiency in pure O&M expenses (excluding power supply costs) are explained in large part, as we demonstrate below, by relatively high administrative and customer service expenses.

In terms of purchased power costs per kWh, we find that PREPA's costs, on a per kWh basis, equaled 8.8 cents, which was 1.69 times higher than the 4.3 cents per kWh that the median U.S. power producer paid in 2007. This higher cost is explained, in part, by the

fact that there are only two significant power producers other than PREPA in Puerto Rico and both of them are contractually required to sell only to PREPA.

With respect to administrative expenses, we find that PREPA's accounting, customer service and sales expenses per customer were \$75.29 per customer, which was 1.57 times higher than the \$48 per customer spent by the median U.S. power producer. In addition, administrative and general expenses per customer at PREPA were \$146 per customer, or 1.17 times the \$125 per customer spent by the median U.S. publicly-owned utility.

These two ratios could be indicative of overstaffing in the administrative and support areas of the Authority, which are not directly related to power generation, transmission and distribution. In order to address these concerns, PREPA is implementing a plan "to reduce the number of employees through a combination of attrition from voluntary retirement and the elimination of temporary and vacant positions."⁶ According to PREPA it expects to achieve "additional headcount reductions" of approximately 250 employees per year during period between 2010 and 2013.

In terms of energy losses, we find that PREPA's energy loss ratio of 14.09% is 3.5 times higher than the median energy loss ratio in the United States. This higher energy loss ratio can be only partially explained by the use of older technology as many U.S. public power producers, specially the smaller ones, also use substantially old equipment, while transmission losses are low in Puerto Rico relative to the U.S. as electricity in Puerto Rico is not transmitted over thousands of miles as it is in the United States.

The most plausible explanation, then, for this higher energy loss ratio is to be found in metering and billing losses as well as losses attributed to the theft of electricity. As we noted above, PREPA is implementing a theft reduction program that combines the "use of smart grid technologies and an increase in unannounced door-to-door inspections" in order to reduce losses due to theft.⁷ PREPA expects its theft recovery initiatives to produce \$50 million of annual incremental revenues for fiscal years 2011 through 2014.

Finally, in order to be fair to PREPA, we must note that, due to the absence of significant seasonal variations in demand in Puerto Rico, it operates with a relatively high load factor, which is usually measured as the ratio of the system average load to peak system demand. Using the APPA's methodology, we find that in 2007 the PREPA operated with a system load factor of 76.2%, which is 1.36 times higher than the 56% system load factor reported as the median in the United States. This relatively higher system load factor means that the Authority has much less flexibility in scheduling maintenance. Accordingly, the Authority must have greater total reserve capacity than other utilities in the United States to cover instances of generating unit outages (scheduled and unscheduled, partial or total).⁸

⁶ PREPA, *Official Statement*, *supra* n. 1, p. 6.

⁷ *Id.*

⁸ *Id.* at p. 21.

In our view, while operating a system with a higher load factor may explain some of PREPA’s higher production and maintenance costs, it cannot, however, account for its significantly higher administrative and general expenses per customer or for its higher energy loss ratio. It is evident that there are substantial inefficiencies in both areas.

In summary, PREPA’s workers are relatively less productive than their counterparts in the United States, in terms of customers served per employee. In addition, PREPA substantially underperforms its U.S. counterparts in terms of O&M expenses per kWh sold and in terms of O&M expense per customer. PREPA also reports higher administrative, accounting, customer service, general and sales expenses per customer when compared with mainland public power producers. These higher ratios seem to be indicative of the existence of a relatively larger administrative and support staff at PREPA.

Electric Service Rates – PREPA’s electric service rates consist of (i) basic charges, made up of demand, client and energy related charges, (ii) fuel adjustment charges to recover the cost to the Authority of fuel oil; and (iii) purchased power charges to recover cost to the Authority of power purchased from EcoEléctrica and AES-PR.

Table 10

Basic, Fuel Adjustment, and Purchased Energy Charges
Fiscal Years Ended June 30,

(\$000)	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>CAGR</u>
Basic Charges	\$1,134,794	\$1,140,277	\$1,157,262	\$1,165,961	\$1,183,862	\$1,131,535	\$1,071,967	-0.94%
Fuel Adjustment	\$994,406	\$970,972	\$1,329,073	\$1,868,542	\$1,778,198	\$2,473,227	\$2,161,604	13.82%
Purchased Energy	\$379,558	\$489,019	\$551,775	\$674,435	\$708,906	\$745,753	\$752,610	12.09%
Total	\$2,508,758	\$2,600,268	\$3,038,110	\$3,708,938	\$3,670,966	\$4,350,515	\$3,986,181	8.02%

Source: PREPA
Official
Statement

In this sense, PREPA operates essentially under a cost of service (COS) regulatory regime, with the important caveat that it is not held accountable to an independent regulator. Under COS regulation, suppliers are allowed to recover all their costs, plus a regulated “normal” rate of return on their investment. In the long run this type of regulatory regime takes away all incentive to minimize costs, as all costs are eventually passed-through to the consumer.

The purpose of the fuel and purchased energy charges is to allow PREPA to recover the fuel costs associated with the generation of energy, as well as the costs associated with

purchasing electricity from the co-generators. There are, however, several problems with these charges.

First, in most jurisdictions the fuel adjustment charge is used only “in periods of highly fluctuating fuel costs.”⁹ In Puerto Rico, however, the fuel adjustment charge is a permanent and automatic feature of PREPA’s billing structure. This rate structure “alters the incentives of the regulatee, causing enhanced inefficiency and higher production costs a la Averch-Johnson effect on fuel as it encourages its own use.”¹⁰

In our view, PREPA’s tariff structure discourages the implementation of efficiency and conservation measures in Puerto Rico. PREPA, like other big utilities, makes more money when it sells more electricity. As a result its natural inclination is to encourage customers to use more electricity. In order to provide the right incentives for consumption, the Government of Puerto Rico should consider a policy solution to this problem devised by the California Public Utilities Commission (CPUC).

The policy is known as “decoupling”, because it severed the link between consumption and utility revenues, and it works as follows. In California, the CPUC would first set a revenue target for utilities by calculating how much money they needed to make to recover their fixed costs, plus an approved rate of return. Second, the CPUC estimated how much power it expected the utility to sell. Third, the CPUC then established an energy price that would allow the utility to meet its revenue target at the expected level of sales. If the utility sold more power than it needed to meet its target, the difference was returned to customers. If it sold less, rates were increased to make up the difference. In September 2007, the state utility regulators shifted the incentives for utilities further towards conservation by allowing them to split the savings with customers whenever energy use falls below state targets. This revised policy became known as “decoupling-plus.”

According to Ralph Cavanaugh, senior attorney at the Natural Resources Defense Council, decoupling “rendered utilities indifferent to sales...they could not make more money by selling more; they did not lose money by selling less.”¹¹ Decoupling-plus went one step further by providing utilities an affirmative incentive to sell less power rather than more. These policies are largely credited with making California one of the leaders in energy efficiency and conservation in the United States.

Second, each of the fuel adjustment and purchased power formulas includes an additional 11% surcharge. Legislation currently in effect requires that 11% of PREPA’s gross

⁹ Lowell E. Alt Jr., *Energy Utility Rate Setting*, (2006), p. 89.

¹⁰ James C. Bonbright, Albert L. Danielsen, and David R. Kamerschen, *Principles of Public Utility Rates*, 2nd edition, (Public Utilities Reports, Inc., Arlington, Virginia, 1988), p. 369. The Averch-Johnson thesis states that traditional regulation biases a regulated firm toward more capital-intensive modes of production. The reason is that the cost-plus nature of the regulation distorts incentives in the use of capital and other inputs because with a guaranteed fixed rate of return on capital it has an extremely powerful reason to choose excessively capital-intensive production processes or for building peak-load capacity whose unit costs far exceed what a competitive firm may offer.

¹¹ Ronald Brownstein, “The California Experiment” in *The Atlantic*, October 2009.

electric energy sales be set aside to fund all government rate subsidies programs, to pay contributions in lieu of taxes to the municipalities, to finance PREPA's Capital Improvement Program and for other legal purposes.

The amount due for contributions in lieu of taxes payable to the municipalities is calculated pursuant to the following formula:

1. PREPA will pay the greater of:
 - a. Twenty per cent of PREPA's Adjusted Net Revenues (calculated in accordance with the 1974 Trust Agreement), less the cost of government rate subsidies;
 - b. The total cost of the actual annual electric power consumption of the municipalities; or
 - c. The prior five-year moving average of the contributions in lieu of taxes paid to the municipalities collectively.
2. If PREPA does not have sufficient funds available in any year to pay these contributions in lieu of taxes, then the difference will be accrued and carried forward for a maximum of three years.

According to PREPA's disclosure in the Official Statement dated March 26, 2010, the contributions in lieu of taxes (CILT) are "intended to compensate the municipalities for forgone tax revenues." In theory, PREPA has the legal right to collect from the municipalities the amount they owe PREPA for their electric energy consumption. In practice, PREPA offsets such bills against the CILT. For example, for fiscal year 2009, the total amount of CILT due to the municipalities, based on the value of power consumed by municipalities, was \$187.7 million. Of this amount, the CILT paid to the municipalities was \$113 million, which was credited by reducing the outstanding municipal accounts receivable balances by this amount. The remaining balance of CILT for fiscal year 2009 (\$74.6 million) is being carried forward for payment over the next three years.¹²

Why are municipalities still subsidized this way, even after giving the municipalities a share of the sales and use tax in 2006, is a mystery. It is also extremely unfair. Why, for example, should a resident of Ponce subsidize electricity used in Fajardo? It could be reasonably argued that *some* municipalities may need this kind of subsidy, but increasing everyone's electricity bill to do so appears to be a terribly inefficient way of achieving this policy objective.

Finally, PREPA uses the fuel adjustment and purchased energy charges to comply with the rate covenant imposed by the Authority's bondholders. According to the trust indenture summary included as Appendix I to PREPA's most recent Official Statement, "the Authority covenants that it will at all times fix, charge and collect reasonable rates and charges for the use of the services and facilities furnished by the System so that

¹² PREPA, *Official Statement*, *supra* n. 1, p. 41.

Revenues will be at all times sufficient to pay the Current Expenses of the System and to provide an amount at least equal to 120% of the aggregate Principal and Interest Requirements for the next fiscal year on account of all outstanding Power Revenue Bonds.” This rate covenant sets a floor, essentially a lower limit; on how low can PREPA lower its rates, regardless of changes in generation technologies or savings generated by efficiency gains.

Given that (1) the Base Rate charged by PREPA has not changed since 1989; (2) the annual growth rate of revenues generated by Base Rate charges is actually negative for the period between 2003 and 2009; and (3) PREPA’s debt service obligations increase every year, the only way it can satisfy the debt service coverage requirement for an ever increasing debt burden is through the fuel adjustment and purchased energy charges.

This debt service requirement is one key to understanding PREPA’s operations. According to the March 26, 2010 Official Statement, total sinking fund payments for principal and interest due during fiscal year 2010 amount to \$380.62 million, while the amount of net revenues available equals \$662.89 million. Thus, the debt service coverage ratio currently equals 1.74, significantly above the 1.20 required by the 1974 Trust Agreement.

For fiscal year 2010, this difference between 1.20 and 1.74 in debt service coverage equals \$206 million. According to the Official Statement, PREPA forecasts coverage to be 1.61, 1.59, 1.53, and 1.52 for fiscal years 2011 through 2014, respectively. It appears that while the contractual requirement is for PREPA to maintain a debt service coverage ratio of 1.2x, the rating agencies put pressure on PREPA to maintain coverage of at least 1.5x. For example, a recent analysis of PREPA’s credit published by Fitch Ratings, states that the main credit concerns “center on the system’s large capital improvement plan, above-average leverage, and an increasing debt service schedule that relies on operating efficiencies to improve funds available for debt service and *maintain debt service coverage at 1.50x*”¹³.

This raises the question of who is really benefiting from PREPA’s current structure. Bondholders are certainly doing well, as they are getting additional security for their bonds to which they are not contractually entitled. On the other hand, the people of Puerto Rico are stuck with paying higher electricity rates than they should be paying in order to maintain the ratio at 1.5 or above.

Bankers will be quick to point out that the higher debt service coverage should result in lower interest rates being paid by PREPA. In our view, however, while that statement is probably true, the real question is whether the amount of money saved by PREPA due to lower interest payments is greater than the excess amounts paid by consumers every year in order to maintain the additional debt service coverage. Given our experience with PREPA, we really doubt that is the case.

¹³ Fitch Ratings, *Fitch Rates Puerto Rico Electric Power Authority’s Series BBB, CCC, and DDD ‘BBB+’; Outlook Stable*, 14 May 2010.

Credits, Subsidies, Special Rates, Contributions in Lieu of Taxes, and Waste – PREPA is required, pursuant to applicable Puerto Rico laws, rules, and regulations, to provide subsidies, credits, and special rates to certain clients, and as we analyzed above, to pay contributions in lieu of taxes. PREPA’s management has asserted, rightly in our view, that all these requirements limit their ability to run the company and generally weaken PREPA’s financial position.

On table 11 below we set forth a summary of those subsidies, credits, and special rates. At a minimum those privileges should be subject to a cost/benefit analysis to determine if it is efficient to keep them in place. In addition, we have included the amount paid as CILT and the monetary value of energy lost and unaccounted for. All these items could be changed either by legislative action, in the case of the subsidies and CILT, or by PREPA, in the case of energy losses and theft. The potential amount of savings is significant. In 2008, subsidies, CILT, and waste totaled \$995 million; about 22% of the revenues generated that year.

Table 11

Subsidies, Contributions in Lieu of Taxes, and Waste at PREPA -- FY 2008

<u>Description</u>	<u>Clients</u>	<u>Dollar Cost</u>	<u>Average per Client</u>
Subsidies, Credits, and Special Rates			
Residential Fuel Subsidy	280,919	\$24,300,000	\$86.50
Lifeline and Public Housing Subsidy	183,000	\$18,100,000	\$98.91
Hotel Subsidy Program	186	\$6,700,000	\$36,021.51
Charitable Organizations Subsidy	2,846	\$3,400,000	\$1,194.66
Life Preservation Subsidy	2,924	\$3,100,000	\$1,060.19
Agricultural Subsidy	1,367	\$666,000	\$487.20
Rural Electrification and Irrigation	-	\$6,800,000	\$-
Cooperative Water Companies	8	\$3,300	\$412.50
Credit for Direct Debit Payments	3,230	\$132,310	\$40.96
Credit for Small Businesses	23	\$7,100	\$308.70
Special Rate for Manufacturing	12	\$7,000,000	\$583,333.33
Total	474,515	\$70,208,710	\$147.96
Contributions in Lieu of Taxes		\$188,300,000	
Waste			
Energy lost and unaccounted for*		\$737,151,800	
Grand Total		\$995,660,510	
Electric Energy Revenues		\$4,350,515,000	
Subsidies, CILT and Waste/Total Revenues		22.89%	

* 3.322 billion kWh @ 22.19 cents per kWh

Source: URS Thirty-Fifth Annual Report on the Electric Property of PREPA, June 2008 and CNE analysis

III. Recent Developments in the Puerto Rico Electricity Sector

There have been several important developments since we published our last analysis of PREPA's finances and operations. In this section we analyze some of these developments and identify some opportunities in, and threats to, the island's electricity sector.

A. Worsening Financial and Operating Conditions at PREPA

During the past three years PREPA has faced substantial operating losses, a significant decline in demand for electricity, volatile fuel oil costs, and reduced liquidity. For fiscal years 2009, 2008, and 2007, PREPA incurred losses before contributed capital of \$163 million, \$323.7 million, and \$96.9 million respectively. As a result of these losses, PREPA's consolidated net assets have decreased from \$471.4 million as of June 2007 to \$39.2 million as of June 2009.

Furthermore, as we noted above, as of June 30, 2009 and December 31, 2009, PREPA had unconsolidated net assets (on a stand-alone basis, excluding the Authority's subsidiaries) of negative \$9.8 million and negative \$109.9 million, respectively. This means that as of each of those dates PREPA's core operating company was technically insolvent.

These operating losses are explained in large part by the decline in the demand for electricity in Puerto Rico. During fiscal years 2008 and 2009, PREPA's energy sales decreased by 5.2% and 5.5% respectively. This decline in energy demand, in turn, is a product of (1) Puerto Rico's protracted recession and (2) increases in rates charged to clients due to high oil fuel costs and PREPA's dependence on fuel oil for close to 69% of its power generation.

During this period PREPA also experienced a material deterioration of its liquidity. According to PREPA, one of the factors driving this reduction in liquidity was the increase in accounts receivable, in particular accounts receivable from the government of Puerto Rico, and PREPA's practice of offsetting the municipalities electric consumption receivables against the CILT. From June 2007 to June 2009, accounts receivable from the central government and public corporations increased to \$346 million, or 28.4%.

To its credit, PREPA has implemented a financial stabilization plan to address these issues. The plan consists of several actions intended to reduce costs, increase liquidity, and cut back its dependency on fuel oil. The principal elements of the cost reduction plan include (1) reducing the number of employees through attrition and the elimination of temporary and vacant positions; (2) reducing expenses associated with the retiree's health care benefits; and (3) reducing overtime and miscellaneous expenses.

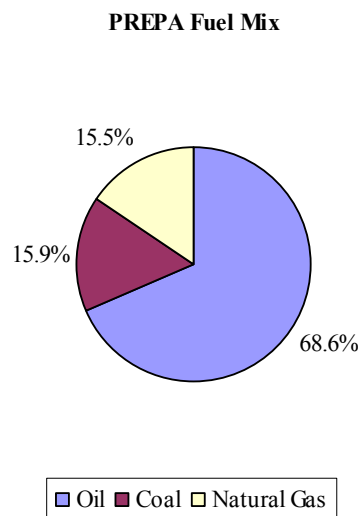
In terms of liquidity, PREPA claims to have made significant progress in collecting on accounts receivable from the government. As we mentioned above, PREPA claims that during the first seven months of fiscal year 2010, the central government paid all its past

due accounts owed as of June 30, 2009. In addition, PREPA has implemented a theft reduction program, which it expects to result in annual incremental revenues of \$50 million.

At this point it is too early to evaluate the results of PREPA's financial stabilization program, but it is certainly a positive development given the deteriorated financial condition of the company.

B. Fuel Mix

As shown on the chart below, approximately 69% of PREPA's energy sales are generated by oil-fueled units. The other 31% of PREPA's energy sales are generated by two private power producers that have long-term contracts with PREPA, namely, AES, which uses coal, and EcoEléctrica, which uses natural gas.



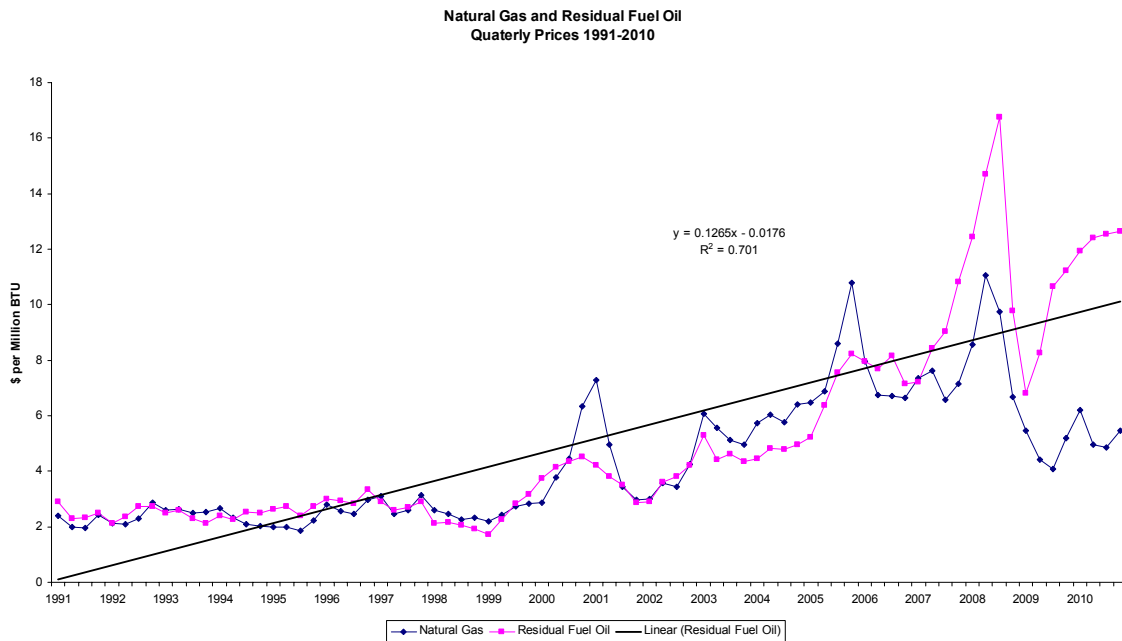
PREPA is aware that its dependence on residual fuel oil has resulted in overall increases and significant volatility in the cost of energy to its customers. In order to reduce this dependency, PREPA is considering (1) converting existing oil-fired facilities to allow them to use natural gas and (2) developing new coal-burning facilities.

In our view, natural gas is the best short-term option available to PREPA for lowering the cost of electricity in Puerto Rico and reducing its carbon footprint. Natural gas is the cleanest of the three principal fossil fuels and traditionally has been cheaper than oil.¹⁴

However, as we show on the chart below, during the last twenty years the price of natural gas for electricity generation and the price of residual fuel oil delivered to power producers have been significantly correlated. In some instances, the dollar cost per million BTU of natural gas has exceeded the dollar cost per million BTU of residual fuel oil. Thus, while natural gas is cleaner and cheaper (most of the time) when compared to

¹⁴ Al Gore, *Our Choice: A Plan to Solve the Climate Crisis*, (Melcher Media: New York, NY, 2009), p.52

residual fuel oil, its price is not necessarily less volatile than the price of fuel oil. Indeed, the peaks and troughs in the price of natural gas closely track the residual oil price trend.



Source: Energy Information Administration, U.S. Department of Energy

In addition, we note that natural gas is (1) a fossil fuel, (2) a principal source of world-wide CO₂ emissions, and (3) not found in Puerto Rico (so it would have to be imported). So, while natural gas is a good option to lower energy costs in Puerto Rico in the short-term, it cannot be *sole* basis for a long-term solution to Puerto Rico’s energy problem.

On the other hand, the development of significant new coal-burning generation capacity in Puerto Rico should be subject to close scrutiny for several reasons. First, coal is the dirtiest of the fossil fuels and it is currently the cheapest only because its price does not incorporate the negative externalities (the social costs) it generates. While there have been significant technological developments to lower sulfur dioxide and nitrous oxide emissions produced by burning coal, the fact remains that burning coal is one of the largest sources of world-wide CO₂ emissions. Carbon capture and sequestration (CCS) technology shows some promise in dealing with this problem, but CCS technology is currently in the early stages of research and development and not yet commercially available.

Second, it could be difficult to obtain financing on reasonable terms. The expectation that Congress will impose national limits on carbon emissions prompted several U.S. financial institutions in February of 2008 to adopt guidelines, known as the Carbon Principles, to assess carbon-related environmental risk in the financing of new electricity generation. These guidelines, currently adopted by Bank of America, Citibank, Credit Suisse, JPMorganChase, Morgan Stanley, and Wells Fargo, require that when those institutions evaluate the financing of new fossil fuel generation they “assess project economics and financing parameters” through an “Enhanced Due Diligence Process to

identify potential risks posed by the recognized cost of CO₂ emissions and to seek to address those risks in the financing.”

At a minimum these procedures require bankers and their lawyers to ask potential borrowers some probing questions about carbon-related environmental risk and liability. Thus, we can expect to see some energy projects, at least those at the margin, failing to obtain bank and/or capital market financing due to environmental concerns. More importantly, the adoption of these guidelines marks the beginning of fully pricing environmental externalities into the cost of electricity production. Eventually all power producers will have to make radical changes to their business models.

Third, in June 2009 the U.S. House of Representatives approved the American Clean Energy and Security Act by the narrow margin of 219 to 212. This comprehensive bill, now under consideration in the Senate, seeks to create clean energy jobs, achieve energy independence, and reduce global warming pollution. Its passage in the House was a historic milestone, as it was the first time the United States seriously considered legislation at the federal level to address the multi-dimensional challenge of climate change.

The legislation, known as Waxman-Markey after its sponsors, is long and complicated. Among other things, the bill:

- (1) designates carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, perfluorocarbons, nitrogen trifluoride, and hydrofluorocarbons as greenhouse gases;
- (2) requires electric utilities to meet 20 per cent of their electricity demand through renewable energy sources and energy efficiency by 2020;
- (3) promotes investment in renewable energy technologies, carbon capture and sequestration, electric and other advanced technology vehicles, and basic scientific research and development;
- (4) mandates new energy-saving standards for buildings and appliances, as well as promoting efficiency in the industrial sector; and
- (5) reduces carbon emissions from major U.S. sources by 17 per cent by 2020 and over 80 per cent by 2050 compared to 2005 levels.

At the heart of the bill is a cap-and-trade program, a market-based system that caps emissions of GHGs at a certain level and requires large polluters to limit their emissions by reducing their emissions; by holding allowances, or permits, for each metric ton of greenhouse gases that they emit; or by acquiring offset credits for their emissions. In practice, establishing a market price for GHGs will increase the cost of using carbon-based energy, which will in turn reduce demand. The overall cap will decrease over time, forcing emitters to drastically cut back on their emissions or to acquire ever more expensive permits; for example, the Congressional Budget Office estimates the price of allowances to emit one metric ton of GHGs will increase from \$15 in 2011 to \$26 in 2019.

While, the U.S. Senate has not yet acted on this legislation, PREPA should be preparing now to deal with these kinds of restrictions in the near future. In our view, adding new coal generation capacity in Puerto Rico seems to be contraindicated in light of potential regulatory changes at the federal.

There is also the problem of coal ash. Burning several tons of coal a year generates several tons of coal ash, which have to be disposed of in some way. Coal ash contains heavy metals like arsenic, lead, mercury and selenium, which are considered by the Environmental Protection Agency to be a threat to water supplies and human health. According to the *New York Times*, “numerous studies have shown that the ash can leach toxic substances that can cause cancer, birth defects, and other health problems in humans”.¹⁵ In 2000, the EPA came close to designating coal ash as a hazardous waste, but decided, at the last minute, not to do so.

Given all these risks and that Puerto Rico is a small island with limited physical capacity for new waste disposal facilities, it appears to us that coal is not a viable option for Puerto Rico.

Finally, PREPA has publicly stated it has entered into power purchase agreements with developers of renewable energy projects with the long-term goal of increasing the use of renewable energy. The introduction of new generating capacity using renewable energy sources, which we understand may be difficult to implement, should be a priority, even if the short-term impact on price is modest, because (1) it would help stabilize electricity costs; and (2) it helps PREPA to prepare for compliance with future limitations on greenhouse gases.

C. Legislation and Regulation Initiatives in Puerto Rico

The government of Puerto Rico has taken several actions that it hopes will lower electricity costs in Puerto Rico over the short to medium term. Among these we find Act 73 of May 28, 2008, the Economic Incentives Act, which provides, among other things, tax credits for (i) developing new energy generation capacity, from both traditional and alternative sources, in Puerto Rico and (ii) tax credits against Puerto Rico income tax for certain industrial consumers equal to a percentage of the payments made to PREPA for the net consumption of energy related to business operations.

In addition, the Economic Incentives Act also mandated the introduction of wheeling by January 2, 2010. Under a wheeling system, PREPA would be required to make available its transmission and distribution network to third party generators in exchange for a fee. PREPA did not meet the deadline established in the law and is currently “studying the implementation” of a wheeling system.¹⁶

¹⁵ Shaila Dawan, “Hundreds of Coal Ash Dumps Lack Regulation”, *New York Times*, January 7, 2009; see also Shaila Dawan, “Coal Ash Spill Revives Issue of its Hazards”, *New York Times*, December 25, 2008.

¹⁶ PREPA, *Official Statement*, *supra* n.1, p. 23 and p. 41.

In sum, the impact of the Economic Incentives Act on the electricity sector in Puerto Rico has been limited so far, in part due to the failure of the government to issue the required regulations and in part due to stonewalling tactics by PREPA.

Independent Regulatory Commission

On June 18, 2009, the Puerto Rico House of Representatives approved House Bill 1184 by a vote of 45 to 0. Bill 1184 seeks to create a Puerto Rico Public Utilities Commission to regulate the provision of telecommunication, energy, and water and sewer services in Puerto Rico. The Government Oversight Committee of the Puerto Rico Senate, however, issued a negative report on House Bill 1184 recommending that the bill not be approved by the Senate.

The Senate Committee based its negative recommendation on a shallow reading of the case law concerning the constitutional prohibition against the impairment of contracts set forth in Section 7, Article II of the Puerto Rico.

Legislative meddling with contracts is generally limited by the U.S. constitution, which asserts that no state shall pass any law impairing the obligation of contracts; and by the Puerto Rico constitution, which states in its bill of rights that no laws impairing contractual obligations shall be enacted.

The leading modern federal case on contractual impairment is *Home Building & Loan Association v. Blaisdell* (1934), where the U.S. Supreme Court upheld a Minnesota law enacted during the Great Depression that authorized state courts, for the duration of the economic emergency declared to exist by the state legislature, to suspend mortgage foreclosures on homes and farms.

However, the 1977 case of *United States Trust Co. of New York v. New Jersey* limits the applicability of *Blaisdell*. In the *U.S. Trust* case, the U.S. Supreme Court invalidated a state law as violating the contracts clause for the first time in nearly 40 years. Justice Blackmun, writing for the majority, suggested that a law impairing the state's own obligations was subject to less deference than legislation interfering with private contracts.

Cases where the government's own obligations are being impaired are to be subject to something approaching "strict scrutiny"; according to Blackmun such laws must be "reasonable and necessary to serve an important public purpose" in order to pass muster under the contracts clause. However, in applying this standard, "complete deference to a legislative assessment of reasonableness and necessity is not appropriate because the State's self-interest is at stake." So the Courts have substantial discretion to determine what is reasonable and necessary and what constitutes an important public purpose or state interest in cases where government's own obligations are being impaired.

At the local level, it appears a contracts clause was included in the Puerto Rico constitution as an afterthought. José Trías Monge, in the third volume of his

constitutional history of Puerto Rico, states that the clause was included despite of its “scant judicial value” because (1) it was deemed to have a positive psychological effect on the investment climate in the island; (2) its elimination would require “providing complicated explanations to Congress”; and (3) the “minorities” participating in the convention had repeatedly and strongly insisted on its inclusion. Thus, according to Trías, “it was decided, as in many other occasions, to choose the less risky alternative and include a clause whose true utility it is difficult to discern, but which in unskilled hands had the potential for inflicting damage on social justice programs.”

The Supreme Court of Puerto Rico addressed the impairment clause issue in its recent opinion (2 February 2010) in the case of *Dominguez v. Government of the Commonwealth of Puerto Rico*, which upheld the constitutionality of Act 7 of March 9, 2009, declaring a fiscal emergency in Puerto Rico. In that case the Puerto Rico Supreme Court essentially adopted the analysis developed by Justice Blackmun in the *U.S. Trust* case:

- (a) First, the Court needs to determine whether a valid contractual obligation exists;
- (b) Second, if a valid contractual obligation exists, then the Court has to determine whether the contractual obligation is or will be impaired by the legislative action;
- (c) Third, if the impairment exists, then the Court has to determine whether it is substantial; and
- (d) Fourth, if the impairment is substantial, then the Court must analyze its validity under one of two possible standards:
 - (i) If the contractual obligation involves two private parties, the Court must determine if the government intervention is *rationally related* to the furtherance of a *legitimate* state interest; or
 - (ii) If the contractual obligation involves the government or a public agency, then the legislation is subject to more careful judicial scrutiny and the Court must determine whether the government’s intervention is *reasonable and necessary* (instead of merely rationally related) to further an *important* (instead of a simply legitimate) state interest.

The Senate Committee’s negative report simply took for granted PREPA’s argument that a regulatory board, with powers to set rates and tariffs, would *ipso facto* constitute a substantial impairment of PREPA bondholders’ rights and that such impairment would, implicitly, not be reasonable and necessary to further the clearly important state interest in promoting economic development.

In our view, this is a specious argument because the legislation can be drafted to avoid the impairment issue. To eliminate this issue, it is only necessary to include a clause in the bill to require the regulatory board to take into account and safeguard the interests of the bondholders in carrying out its regulatory powers pursuant to the law. If drafted this way, the impairment clause would not be triggered because the board would not be

allowed to act in impairment of bondholder rights. Furthermore, even if we take the Senate's analysis at face value for purposes of this argument, it is not clear to us that an independent regulatory board would not be a reasonable and necessary means to further the important state interest in economic development.

Given that this “problem” has a relatively simple solution; it seems to us the real underlying issue here is the lack of political will to establish an independent regulator over PREPA. We note, however, that as long as PREPA's board of directors has absolute power to regulate the electricity sector in Puerto Rico there will be no progress in achieving such important policy objectives as (1) significantly lowering the cost of energy in Puerto Rico; (2) reducing Puerto Rico's dependence on oil; (3) promoting investment in alternative sources of energy; and (4) generating economic growth from developing green technologies.

Green Energy

Recently, the Fortuño administration has presented two bills to foster the development and use of green energy sources in Puerto Rico. House Bill 2610 seeks to create the Puerto Rico Green Energy Incentives Act, which among other things, establishes a Green Energy Fund to promote investment in this field. House Bill 2611 seeks to establish a set of Renewable Portfolio Standards (RPS) applicable to power producers in Puerto Rico.

In our view, these bills, which are currently under consideration by the Puerto Rico legislature, constitute a step in the right direction but fall short of what Puerto Rico needs to become a leader in this field. For example, HB 2610 only allocates \$20 million per year (increasing to \$40 million by 2016) to promote investment, research and development in green energy technologies; while HB 2611 only requires that 15% of energy produced in Puerto Rico be derived from alternative or renewable sources by 2020. HB 2610 is essentially a timid first step, in comparison with what is being done in Europe and California, not to mention Asia, to promote renewable energy technologies; while HB 2611 sets a rather low bar for renewable energy generation.

If Puerto Rico is to become a leader in the green energy field and to generate significant economic activity and employment in this sector, then it needs to think big and out of the box. Every country wants to get into the green energy game; everybody is offering incentives of every kind. If Puerto Rico wants to attract big investments in this sector it will have to differentiate from everyone else.

One way to do this would be to establish a cap-and-trade system in Puerto Rico. Under this system, the Puerto Rico legislature would set a legal and steadily declining limit on the emission of greenhouse gases in the island. The allowances would be divided up among emitters, or auctioned by the government to raise revenues—or a combination of both. Polluters who emit more will need to pay for the extra pollution by buying extra pollution rights from those firms able to generate reductions. Conversely, those firms that can reduce their emissions of greenhouse gases will profit by selling their surplus allowances in the open market. The beauty of this system is that instead of forcing

polluters to pay certain prices or to back certain technologies, the cap-and-trade system mandates only the pollution limit, and then lets the market to decide which technology is the cheapest, most efficient way of achieving that goal.

California has established a state-wide cap-and-trade system that is widely credited with channeling there billions of dollars in new investment in green technologies, because the market for pollution allowances sets a price for GHG emissions. This price provides business firms with the benchmark they have to beat in order for their technology to be commercially viable.¹⁷

In addition to setting a Puerto Rico cap-and-trade system, we recommend that government set an ambitious set of Renewable Portfolio Standards. For example, an aggressive, but in our view achievable, energy portfolio mix for the year 2020/21 would be to double the use of natural gas to 34%; cut the use of residual fuel oil by half to 33%; promote the development of renewable sources by requiring the generation of 25% of Puerto Rico's energy from renewable sources; and cut the use of coal by half to 8%.

ARRA Funds

Finally, our overview of recent developments would be incomplete without mentioning the federal funding made available to the Puerto Rico Energy Affairs Administration (EAA) through the American Recovery and Reinvestment Act (ARRA) for several energy initiatives. According to the EAA, Puerto Rico is eligible for up to \$119 million from three programs administered by the U.S. Department of Energy. These programs are: (1) the State Energy Program, through which Puerto Rico obtained \$37.0 million; (2) the Weatherization Assistance Program, through which Puerto Rico received \$48.9 million; and (3) the Energy Efficiency and Conservation Block Grants, through which Puerto Rico received \$9.6 million and certain municipalities are eligible to receive an additional \$24.4 million.

While the amount allocated to these programs, which finance mostly conservation and efficiency initiatives, is relatively small in scale, these initiatives provide the right incentives to encourage efficiency and conservation, two areas in which Puerto Rico has traditionally lagged.

D. Initiatives at the Federal Level

In addition to Waxman-Markey legislation and the funding made available to states through the ARRA programs, the federal government has also been active in the energy field through the EPA. Between 2007 and 2009 the EPA analyzed whether to regulate greenhouse gas emissions in the United States. On December 7, 2009, the EPA issued the final "endangerment" and "cause and contribute" findings that are the statutory prerequisites to issuing regulations under the Clean Air Act.

¹⁷ Fred Krupp, *Earth: The Sequel. The Race to Reinvent Energy and Stop Global Warming*, (W.W. Norton & Company: New York, 2009), p. 42.

At the time of writing, the EPA has not made any announcements regarding its intention to establish emission standards or controls regarding GHGs from electric generating units. However, the EPA is expected to phase-in permit requirements and regulation of GHGs for “large stationary sources” beginning in calendar year 2011.¹⁸

In sum, there has been significant action at the federal level regarding GHGs. While it is difficult at this time forecast the final form of the laws, rules and regulations that may eventually be enacted or adopted, it is reasonable to assume that any such regulatory action could have a material adverse effect on PREPA’s operations. Thus, PREPA would be well advised to (1) reduce its dependence on fuel oil; (2) decrease its overall carbon footprint; and (3) move towards and adopt renewable fuel technology for the generation of electricity.

IV. Policy Recommendations

We live at a time of incredible advances in the electricity sector. At this point in Puerto Rico’s economic development path it is imperative we discard anachronistic modes of thinking and consider bold initiatives in this area. In order to jumpstart that process, we make the following policy recommendations:

- A. *Eliminate the Requirement to Make Payments in Lieu of Taxes* – Imposing this obligation on PREPA, which raises electricity prices for every user in the island, is simply irrational. These payments, which go mostly to pay subsidies for municipalities, are not justified now that municipalities get a share of the sales and use tax. In addition, at a time when the people of Puerto Rico face increases in the cost of living, the elimination of this abusive practice would result, *ceteris paribus*, in a reduction of 11% in the average electricity invoice.
- B. *Establish an Independent Regulatory Commission* – The creation of an independent regulatory commission is one of the most important steps to improve PREPA’s performance. This commission would, among other things: (1) safeguard the best interests of the Puerto Rican consumer; (2) establish, review, and revise electricity tariffs at least on an annual basis; (3) approve PREPA’s capital investment plans; (4) promote the transition to renewable energy technologies at PREPA; and (5) oversee the overall operations of the company.
- C. *Provide the Correct Set of Incentives* – As long as PREPA remains a government monopoly insulated from competition it will be necessary to regulate it so that it operates in an efficient manner. The current regulatory structure, which allows PREPA to pass along all its costs to the consumer, is a recipe for inefficiency and waste. In order to provide the right incentives, the Government of Puerto Rico should consider a establishing a decoupling or decoupling-plus policy solution. The objective is to render PREPA at least indifferent to sales with decoupling, if not to enlist it outright in the conservation cause with decoupling-plus. In the alternative, the government

¹⁸ The EPA’s authority to regulate GHGs would be largely pre-empted by Waxman-Markey were it to become law.

of Puerto Rico should try implementing performance-based regulation. The most common form of performance-based regulation in the monopoly context is known as “price cap” regulation. With price caps, the regulator sets an initial price and then specifies in advance how that price would change during a period of years, according to a formula known as CPI-X, taking into account inflation (which would increase prices) and expected productivity gains (which would reduce costs). The regulated firm is then free to decide how best to cut costs and innovate to make money, taking market prices as given. Because prices are fixed in advance, rather than falling if costs fall, any dollar the regulated firm saves, it keeps. This restores the incentive to be efficient that conventional cost-of-service regulation impedes.¹⁹

- D. *Consider establishing a cap-and-trade system in Puerto Rico* – Under this system, the Puerto Rico legislature would set a legal and steadily declining limit on the emission of greenhouse gases in the island. The allowances would be divided up among emitters, or auctioned by the government to raise revenues—or a combination of both. Polluters who emit more will need to pay for the extra pollution by buying extra pollution rights from those firms able to generate reductions. Conversely, those firms that can reduce their emissions of greenhouse gases will profit by selling their surplus allowances in the open market.
- E. *Establish Aggressive Renewable Portfolio Standards* – For example, an aggressive, but in our view achievable, energy portfolio mix for the year 2020 would be 34% natural gas; 33% fuel oil; 25% renewable sources; and 8% coal.
- F. *Consider amending the 1974 Trust Agreement to lower the required debt service coverage* – This requirement limits PREPA’s ability to pass-through savings to its customers.
- G. *Require PREPA to Source All its New Power Generation Needs in the Private Sector* – PREPA should, as a matter of public policy, stop building new generation capacity. All new installed capacity should be owned and operated by private firms which enter into long-term contracts with the Authority.
- H. *Implement Measures to Increase Transparency in the Management of the Authority* – Too much of what happens at PREPA is conducted behind closed doors. Management should be required to open to public scrutiny the Authority’s capital investment plans, its technology selection processes, and its strategic planning. In addition, PREPA should be subject to public disclosure rules, such as publishing a quarterly report on its operations and financial performance.
- I. *Develop Benchmarks to Increase Accountability* – Since there are no shareholders at PREPA, the agency is not held to account for its performance to anybody. It is imperative that PREPA be subject to a rigorous set of

¹⁹ Timothy J. Brennan, Karen L. Palmer, and Salvador A. Martínez, *Alternating Currents: Electricity Markets and Public Policy*, (Washington, DC: Resources for the Future Press, 2002), p. 84.

performance benchmarks in areas such as generation costs per kWh; availability and forced outage rates; and client service (time to process and address complaints), among others.

V. Conclusions

PREPA has lost money over the last three years, it faces a significant decline in the demand for electricity as well as a prolonged recession in Puerto Rico. In addition it continues to operate under significant financial, legal, and structural constraints. Among these we find the following:

- It depends on oil for 68% of its electricity generation;
- It is required to grant several credits, subsidies and special rates to some of its clients;
- It is subject to a rate covenant under the 1974 Trust Agreement, which requires PREPA to fix, charge and collect reasonable rates and charges so that revenues of the system will be sufficient (a) to pay current expenses and (b) to provide an amount at least equal to 120% of the aggregate principal and interest requirements for the next fiscal year;
- It is required to make substantial contributions in lieu of taxes;
- It loses close to 15% of its generation, mostly due to theft; and
- It has significantly higher administrative, accounting, and customer support costs relative to its peers in the United States.

In our view, it is highly unlikely that PREPA will be able to significantly reduce the average cost per kWh sold in the near future, even after the introduction of some generation from renewable sources and wheeling, as long as all of the above continue to be true. In other words, in order to significantly reduce electricity costs in Puerto Rico it is *necessary* to eliminate or modify at least some, if not all, the constraints set forth in the bulleted list above.

Simply put, PREPA needs to undergo a *radical restructuring* if it is to become a net contributor to economic growth in Puerto Rico over the next few years.

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