



**Institute for Energy Economics  
and Financial Analysis**

# **Guyana Gas to Energy Project Is Unnecessary and Financially Unsustainable**

**Tom Sanzillo**, Director of Financial Analysis

**Cathy Kunkel**, IEEFA Energy Consultant

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## Key Findings

**The Guyana Gas to Energy Project will result in a substantially overbuilt electrical system.**

A new natural gas plant would be capable of generating far more electricity than Guyana Power & Light customers are likely to need over the coming decade.

ExxonMobil would gain the most from the Gas to Energy Project, through profits from pipeline construction, lending money to Guyana, and selling natural gas.

**Solar would cost less for taxpayers, reduce costs for ratepayers, generate more Guyanese jobs and put Guyana on a path toward meeting its climate goals of 100% renewable energy.**



# Executive Summary

Guyana’s proposed Gas to Energy project will use natural gas from the country’s offshore wells to produce electricity for 68% of Guyana’s population—those that are connected to the Demerara-Berbice Isolated System, owned and operated by Guyana Power & Light (GPL). The government has also promised to reduce GPL’s electricity rates by 50% as a consequence of the project.

This report finds:

- The new natural gas plant, combined with the current system and GPL’s additional plans for new power generation, will result in a substantially overbuilt electrical system, capable of generating far more electricity than GPL’s customers are likely to need over the coming decade.
- Although the details are not clear, the new infrastructure will cost more than \$2 billion and be financed by ExxonMobil and others, including possibly the U.S. Export-Import (Ex-Im) Bank.
- Guyana’s leaders have promised to cut the electricity rate by half by 2025, which will require subsidies from the Guyanese government.
- GPL’s future debt load is increasingly raising questions regarding its viability.
- To relieve this growing debt burden, the government of Guyana is likely to have to bail out the utility.
- Guyana has promised to move toward 100% renewable energy. The new Gas to Energy plan will prevent a substantial increase in solar energy.
- For less than the cost of the Gas to Energy project, solar energy can reach every Guyanese household. It will cost less to taxpayers, lower the cost of electricity to ratepayers, hire more Guyanese workers from local businesses and put Guyana on a path toward meeting its climate goals.

Figure ES-1: Gas Power Investment Structure

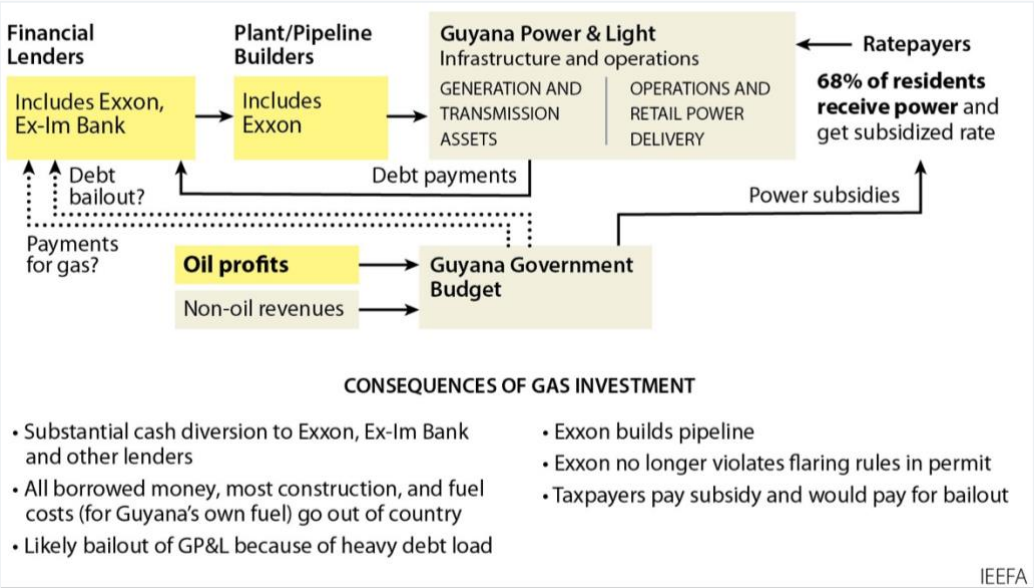
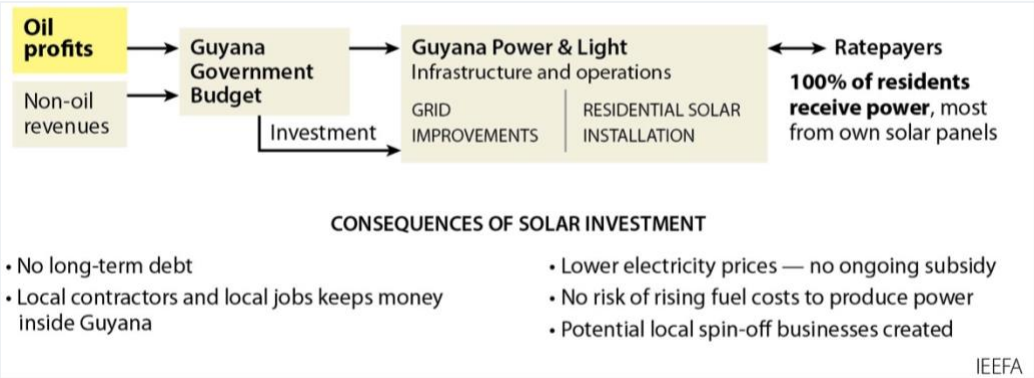


Figure ES-2: Solar Power Investment Structure



The overbuilding that results from the Gas to Energy project will undermine Guyana’s promise to meet its climate goals. The country will go into debt for no good reason, and the money borrowed will go to build gas infrastructure that will be financed largely by foreign financiers and built by largely foreign workers. To finance the Gas to Energy project, Guyanese officials will effectively take a substantial portion of Guyana’s future profit oil from the Payara and Liza offshore wells being drilled by an ExxonMobil-led consortium. Over the longer term, Guyanese taxpayers and ratepayers are likely to have to pay for the fluctuating prices of natural gas, notwithstanding public promises from the government that future gas supplies will be free.

The alternative—substantial investment in solar energy—will help Guyana meet its climate goals. An investment in rooftop solar panels for residents and businesses will employ local people and help small contracting businesses grow. Money borrowed or money from oil profits, will be spent locally. The benefits will also be in lower electricity prices and the electricity prices will not be tied to inflation caused by oil and gas price increases.

The Gas to Energy project is an example of money badly spent. A renewable energy plan that focuses heavily on rooftop solar is an example of money well spent.

## Transparency Impairment

*This report represents IEEFA's seventh analysis of Guyana's oil exploration and development project. Like each of the reports and several commentaries before it, this report would benefit from greater transparency by the government and the project operator. IEEFA tries to identify at various places in the report where enhanced transparency would be beneficial to greater public understanding. IEEFA welcomes any corrective commentary that adds new data or analysis.*

## Introduction

Guyana has emerged as a major oil producer in the last several years, after a long period of exploration and production covered under agreements dating back to 1999.<sup>1</sup> One of the consequences of the rapid growth of offshore oil production is the decision by the government of Guyana to pursue a large-scale natural gas power project, utilizing associated gas produced as a byproduct of oil development. The government has claimed that this Gas to Energy project, which will displace petroleum for power generation, will allow Guyana Power & Light (GPL) to cut its rates in half.<sup>2</sup> More recently, Vice President Bharrat Jagdeo stated that Guyana would “practically have the electricity [from the Gas to Energy project] for free.”<sup>3</sup>

This report examines the costs and financing for the Gas to Energy project and puts the project in the context of GPL's 10-year plan for expansion of its generation capacity. IEEFA finds that:

- GPL's planned investments are based on unrealistic assumptions about future electricity sales. The investments will result in underutilized infrastructure and stranded costs for the government of Guyana.
- GPL will require significant public subsidy to carry out its massive expansion plans while meeting the government's target of cutting GPL's rates in half.
- The Gas to Energy project will preclude the goal of transitioning Guyana's electricity generation to renewable energy.
- In contrast, a less costly capital investment in rooftop solar and storage could put Guyana much further along the path towards reliable, renewable and lower-cost power.

<sup>1</sup> Stabroek News. [Minor Changes made to 1999 agreement ExxonMobil - Trotman](#). March 4, 2017.

<sup>2</sup> Oil Now. [All you need to know about Guyana's Gas-to-Energy project \(Updated\)](#). June 27, 2023.

<sup>3</sup> Kaieteur News. [VP Jagdeo boasts of 'free gas' from Exxon, future benefits of Local Content while refusing to renegotiate lopsided oil contract](#). August 7, 2023.

Indeed, Guyana could provide every home in the country with a solar and battery system for less than the cost of the Gas to Energy project. Greater reliance on rooftop solar for both residential and business consumers would also decrease Guyana's dependence on international political dynamics, including reliance on foreign corporations like Hess, ExxonMobil and the China National Offshore Oil Corporation (CNOOC).<sup>4</sup>



Guyana could provide every home in the country with a solar and battery system for less than the cost of the Gas to Energy project.

## Background on Guyana's Electricity Sector

The largest electric utility in Guyana is Guyana Power & Light (GPL), a state-owned power company that owns generation, transmission and distribution systems and serves about 85% of Guyana's population.<sup>5</sup> GPL's assets are divided into two systems—the Demerara-Berbice Isolated System (DBIS) and the Essequibo Isolated Systems, which itself comprises four isolated systems. The DBIS accounts for the vast majority (96%) of GPL's sales, while serving about 80% of GPL's customers, or 68% of the population of Guyana.<sup>6</sup>

Outside of GPL, some smaller populations are served by other state-owned electric companies, all of which are owned by the Hinterland Electrification Company.<sup>7</sup> One of the larger is the town of Linden, served by the Linden Electric Co., which buys power from a mining corporation that owns an 18-megawatt (MW) power plant. GPL plans to incorporate the town of Linden into the DBIS grid within the next few years.

About 7.5% of Guyana's population, or some 60,000 people, lack access to electricity.<sup>8</sup> Some households in rural parts of Guyana that are not connected to the grid have access to limited amounts of electricity via diesel generators or very small off-grid solar systems.<sup>9</sup> These unserved or

<sup>4</sup> IRENA. *A New World: The Geopolitics of the Energy Transition*. 2019.

<sup>5</sup> Inter-American Development Bank. *Guyana Utility Scale Solar Photovoltaic Program: Non-reimbursable Investment Financial Proposal*. June 15, 2022.

<sup>6</sup> Guyana Power and Light. *GPL Development and Expansion Programme 2023-2027 ("GPL Development")*. December 31, 2022. p. 91 and p. 93. We estimate that the DBIS system serves about 80% of GPL's population based on the GPL Development Plan's statement that in November 2022, GPL served 218,870 customers, and the Brugman report's forecast that the DBIS system alone would serve about 176,000 customers by 2022. The GPL Development Plan does not include a breakdown of customers served for the DBIS versus Essequibo systems.

<sup>7</sup> Hinterland Electric Company. *About HECI*. Last visited September 4, 2023. Specifically, these companies are Linden Electric Company, Kwakwani Utilities, Lethem Power Company, Matthews Ridge Power & Light, Mahdia Power and Light, Port Kaituma Power and Light, and Mabaruma Power & Light.

<sup>8</sup> World Bank. *Access to electricity (% of population – Guyana, 2020)*. Last accessed June 4, 2023.

<sup>9</sup> For example, a 2015 government project provided 65W solar panels to approximately 6,000 households (Hinterland Electrification Company. *News: More Hinterland Households Get Solar Electricity*. August 15, 2015).



underserved groups include the Amerindian population that comprises approximately 10.5% of the population of Guyana.<sup>10</sup> In 2022, the Guyana Energy Agency announced an initiative to provide 150 watts (W) of solar power (sufficient to power lamps and a fan, and to charge devices) to 30,000 homes, starting in 2023.<sup>11</sup>

This report focuses particularly on GPL, since it is GPL's customers in the DBIS grid who would be the beneficiaries of the electricity produced by the proposed Gas to Energy project.<sup>12</sup>

Energy planning by GPL appears to be conducted through annual five-year "Development and Expansion" plans. Typically, utility resource planning involves capacity expansion modelling, evaluating the costs and risks of a range of future scenarios to arrive at a preferred plan over a time horizon of at least 10 years (more commonly 20, given the long-lived nature of utility assets).<sup>13</sup> The International Renewable Energy Agency (IRENA) notes that best practice resource planning takes place in a regulatory forum, with ample opportunity for stakeholder participation.<sup>14</sup> Such a process is not, and to our knowledge, has never been conducted by GPL.

The Guyana Public Utilities Commission (PUC) has regulatory jurisdiction over GPL, as well as water and telecommunications utilities; GPL is the only regulated electric utility. According to its enabling statute, the PUC can approve, modify or reject GPL's development and expansion plans. The law does not require hearings or any public participation in the development or evaluation of the plans. The PUC also has the power to determine whether electric rates are just and reasonable, and can investigate whether any particular utility expenditure is just and reasonable. Any change in GPL's electric rates must be filed with the commission, and the commission can decide whether to hold a hearing to investigate the reasonableness of the rates.<sup>15</sup>

Electricity generation in Guyana is almost entirely (97%) based on fuel oil and diesel.<sup>16</sup> GPL currently owns 214 MW of available generating capacity, of which 80% runs on fuel oil and 20% on diesel, as shown in the following figure.<sup>17</sup>

<sup>10</sup> International Work Group for Indigenous Affairs. [The Indigenous World 2023: Guyana](#). Last visited September 4, 2023.

<sup>11</sup> Guyana Energy Agency. [2022 Annual Report](#).

<sup>12</sup> [GPL Development](#), p. 22.

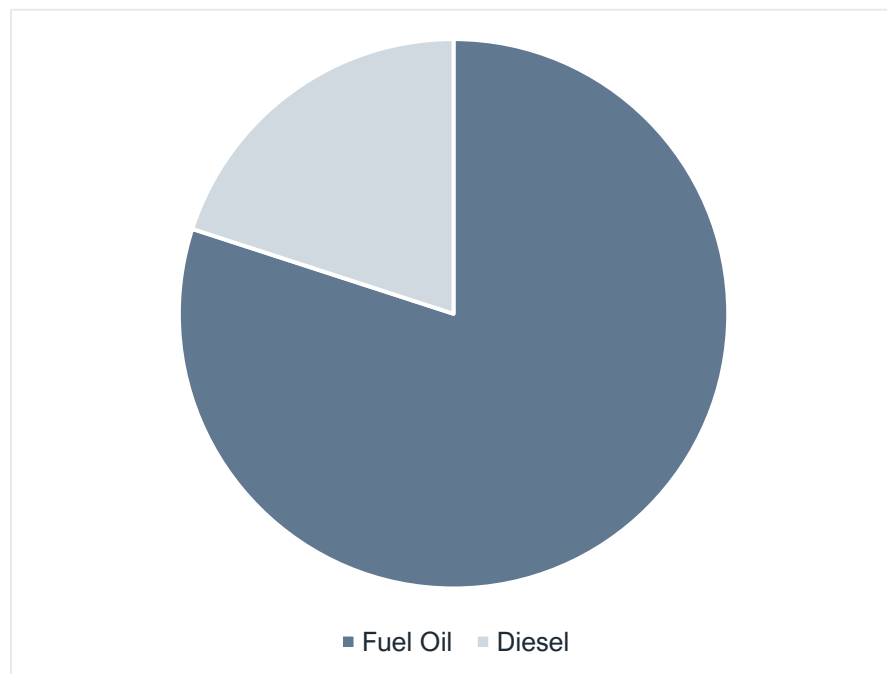
<sup>13</sup> IRENA. [Insights on Planning for Power System Regulators](#). June 2018.

<sup>14</sup> [Ibid.](#)

<sup>15</sup> Official Gazette of Guyana. [Public Utilities Commission Act of 2016](#). August 5, 2016.

<sup>16</sup> Government of Guyana. [Guyana's Low Carbon Development Strategy 2030](#). July 2022. ("[Guyana LCDS](#)")

<sup>17</sup> [GPL Development](#), p. 100.

**Figure 1: Current GPL Generation Capacity by Fuel**

Source: *GPL Development and Expansion Programme, 2023-2027*.

The first grid-scale solar project, a 1.5-MW project, was commissioned earlier this year,<sup>18</sup> and there are plans for 33 MW of additional projects (across three sites) for 2024.<sup>19</sup>

There is additionally 7.5 MW of distributed solar capacity connected to the GPL grid, of which 4.2 MW are government-owned systems and 3.3 MW are privately owned.<sup>20</sup> Nevertheless, because of the lack of reliability of the grid and the lack of economic incentives to connect a system (no feed-in tariff, for example), there is little reason to connect a rooftop solar system to the GPL grid.<sup>21</sup>

Guyana's 2030 Low-Carbon Development Strategy does not contain explicit goals for renewable energy, but does call for greater investment in renewable energy (including hydropower) so that "by 2030, energy use can increase five-fold with greenhouse gas emissions staying approximately flat."<sup>22</sup> Guyana's commitments under the Paris Agreement included a transition to 100% renewable energy by 2025, conditioned on outside financial support.<sup>23</sup> And Guyana's Green State Development

<sup>18</sup> Kaieteur News. [Guyana's first 1.5 MW solar photovoltaic farm commissioned at Bartica](#). April 2, 2023.

<sup>19</sup> [GPL Development](#), p. 63.

<sup>20</sup> [GPL Development](#), p. 50.

<sup>21</sup> Personal communication, Alfred Bhulai, May 19, 2023.

<sup>22</sup> [Guyana LCDS](#), p. 47.

<sup>23</sup> Government of Guyana. [Guyana's Revised Intended Nationally Determined Contribution](#).

Strategy, developed in 2019, calls for “near-100% renewable and clean energy sources for electricity generation” by 2040.<sup>24</sup>

Guyana’s power sector also suffers from severe problems with reliability and power quality.<sup>25</sup> According to grid reliability metrics filed with the Guyana Public Utilities Commission, in 2022 GPL’s system had a System Average Interruption Duration Index (SAIDI) of 5,100 minutes and a System Average Interruption Frequency Index (SAIFI) of 90 events.<sup>26</sup> For comparison, the U.S. average distribution system SAIDI and SAIFI in 2021 (the most recent year for which data is available) were 440 minutes and 1.4 events.<sup>27</sup> The Guyana Public Utilities Commission observed in 2022 that “GPL continually fails to attain the majority of its operating standards and performance targets ... even though many of these targets are way below the industry norms.”<sup>28</sup>

GPL further notes that “reliability issues coupled with power quality resulted in having an approximate total installed capacity of about 100 MW of self-generators.”<sup>29</sup> These appear to largely be commercial and industrial customers generating some or all of their own electricity via diesel generators. GPL’s system is also characterized by technical and non-technical losses of generated electricity amounting to 25%; losses in the United States, for example, are about 5%.<sup>30</sup>

## Proposed Gas to Power Project Would Utilize Offshore Natural Gas to Significantly Expand GPL’s Generation Capacity

On June 27, 2016, Guyana signed a production-sharing agreement with subsidiaries of ExxonMobil, China National Offshore Oil Company and Hess (“ENH”),<sup>31</sup> with ExxonMobil subsidiary Esso Exploration and Production Guyana Limited as the operator charged with the day-to-day activities of oil exploration and production operations.<sup>32</sup> The contract area is 26,800 square kilometers and extends more than 300 kilometers in width, all the way from the border with Venezuela to the border

<sup>24</sup> Government of Guyana. [Green State Development Strategy](#). May 2019.

<sup>25</sup> See, for example: Guyana Standard. [Recent fires caused by electricity fluctuations a two-fold issue – Fire Service Official](#). February 14, 2023.

<sup>26</sup> Guyana Public Utilities Commission. [SAID Data](#). Last visited September 4, 2023.

<sup>27</sup> U.S. Energy Information Administration. Form EIA-861. [Annual Electric Power Industry Report, Table 11.1 U.S. Reliability Metrics of U.S. Distribution System](#). Last visited September 4, 2023.

<sup>28</sup> Guyana Public Utilities Commission. [In the Matter of the Guyana Power and Light](#). Order No. 1 2023.

<sup>29</sup> [GPL Development](#), p. 71.

<sup>30</sup> Energy Information Administration. [Frequently Asked Questions](#). 2022.

<sup>31</sup> Petroleum Agreement (the “[Agreement](#)”) Between the Government of the Cooperative Republic of Guyana and Esso Exploration and Production Guyana Limited (for purposes of this paper, “[ExxonMobil](#)”), CNOOC Nexen Petroleum Guyana Limited, and Hess Guyana Exploration Limited. (See: The Agreement, Article 1.1, Definitions). The corporate consortium will be referred to as “ENH” for the purposes of this paper, and the companies will be identified individually when being discussed individually. The Guyanese government and ENH will be referred to as “the parties” to the agreement. The details of the agreement and early implementation issues are covered in a series of IEEFA reports and commentaries (see Appendix 3).

<sup>32</sup> [Agreement](#), Liabilities and Indemnities, Article 2.2 (a).

with Suriname.<sup>33</sup> Guyana is ranked 17<sup>th</sup> in the world for proven oil reserves.<sup>34</sup> The 2016 agreement updated an earlier agreement between Guyana and Esso executed in 1999.<sup>35</sup>

The recent, rapid increase in oil production in Guyana has led to the proposal that the natural gas produced as a byproduct of oil could be used for electricity production in Guyana. To operationalize this proposal would require a new offshore natural gas pipeline and new natural gas-fired power generation capability, given that natural gas is not currently used in Guyana's power sector. The government of Guyana commissioned three feasibility studies between 2017 and 2019 to consider the transportation and use of natural gas for power generation.<sup>36</sup> These studies emphasized the environmental and financial benefits of switching from heavy fuel oil to natural gas for power generation.

Using natural gas for domestic power generation could also solve ExxonMobil's problem with flaring. Originally, ExxonMobil had agreed as a condition of its environmental permits and as part of its environmental impact assessments for the Liza 1 and Liza 2 fields, that the gas associated with oil production would be re-injected into the fields, not flared. The company invested in technology that it claimed would allow it to achieve zero flaring. However, as of 2021, more than 15 billion cubic feet of natural gas had been flared, and the government of Guyana had imposed only minor financial penalties.<sup>37</sup> ExxonMobil is currently being sued over the ongoing flaring.<sup>38</sup> GPL has estimated that the amount of gas projected to be flared in 2023 could generate 1,007 gigawatt-hours (GWh) of electricity,<sup>39</sup> or about one-third of the output of the proposed new natural gas plant. The company struggled to meet the emissions target established under its initial permit.<sup>40</sup> The Gas to Energy project should eliminate flaring and Exxon's liability (expense, fines and penalties) for failing to install the technology necessary to meet permit standards.

The proposed Gas to Energy project plans to construct a 300MW combined cycle natural gas plant that would supply power into the DBIS grid.<sup>41</sup> The project is to be sited in the Wales Development Zone, and gas will be transported via 218 kilometers (km) of offshore pipelines, plus 25 km of

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<sup>33</sup> ExxonMobil. [ExxonMobil announces Redtail discovery offshore Guyana](#). September 8, 2020.

<sup>34</sup> Oil Now. [Guyana is number 17 for largest oil reserves in the world](#). June 19, 2022.

<sup>35</sup> [Agreement](#), Definitions, Article 1.1.

<sup>36</sup> Guyana Ministry of Natural Resources. [Desk Study of the Options, Cost, Economics, Impacts, and Key Considerations of Transporting and Utilizing Natural Gas from Offshore Guyana for the Generation of Electricity](#). June 8, 2017; Guyana Ministry of Natural Resources. [Feasibility Study for Guyana's Offshore Natural Gas Pipeline, NGL separation and LPG production plant, and Related Electricity Infrastructure](#), August 22, 2018; Guyana Ministry of Natural Resources. [Gas to Power Feasibility assessment in Guyana](#), June 2019.

<sup>37</sup> IEEFA. [Exxon-led consortium tramples on zero-gas flaring goals in Guyana](#). February 15, 2022. See also: Stabroek News. [Flaring fee paid by ExxonMobil is pittance compared to its earnings – Adams](#), August 4, 2022.

<sup>38</sup> In the Matter of Sinikka Henry, Sherlina Nageer and Andrisk Thorington v. Guyana Environmental Protection Agency, High Court of the Supreme Court of Judicature of Guyana, [2021- HC-DEM CIV FDA](#).

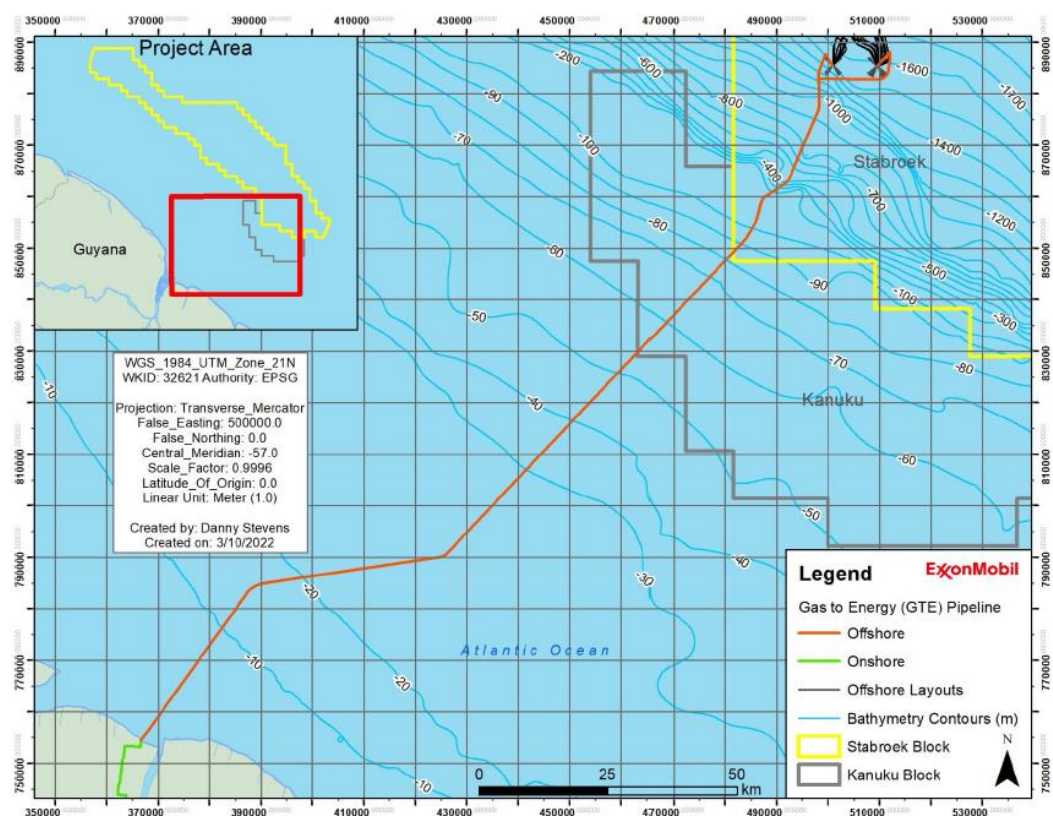
<sup>39</sup> [GPL Development](#), p. 59.

<sup>40</sup> IEEFA. [A fistful of protests, as Guyana continues to rubber-stamp ExxonMobil drilling permits](#). September 26, 2022.

<sup>41</sup> GPL's Development & Expansion Plan does not provide a specific configuration for the plant, but the 2019 feasibility study proposed using 10 aeroderivative gas turbines to reach a combined output of 300 MW. (K&M Advisors. [Contract No. C-GY-T1147-P001 for the Provision of Consultancy Services for the Gas to Power Feasibility Assessment in Guyana: Final Report](#). June 2019. p. 18).

onshore pipeline to the project site. The pipeline will have the capacity to transport 50 million cubic feet per day (50 MMcf/d) from the offshore Liza field, and will be able to deliver a minimum volume of no less than 10 MMcf/d.<sup>42</sup> The following figure shows the map of the project area provided by ExxonMobil in its environmental impact assessment for the pipeline.<sup>43</sup>

**Figure 2: Map of the Project Area Provided by ExxonMobil in its Environmental Impact Assessment for the Pipeline**



Source: Esso EI.

The gas produced offshore is “wet gas,” meaning that it contains a relatively high proportion of natural gas liquids (compounds such as propane, butane, etc., that are heavier than methane, or “dry gas”). The government of Guyana proposes to construct a fractionation plant that will separate the natural gas liquids from the dry gas, with the dry gas to be burned in the power plant and the natural gas liquids sold separately. It is worth noting that the 2017 feasibility assessment found that the

<sup>42</sup> Esso exploration and Production Guyana Ltd. [Environmental Impact Assessment, Gas to Energy Project, Volume I](#), p. EIS-10 to 12. (“Esso EIA”).

<sup>43</sup> [Esso EIA](#), p. EIS- 11.

volume of natural gas liquids that would be produced from 50 MMcf/d of natural gas would be more than six times the current market demand in Guyana.<sup>44</sup>

In short, the project consists of four components: The pipeline,<sup>45</sup> the fractionation plant, the power plant, and the grid upgrades needed to inject the additional power into the DBIS grid. Neither the government of Guyana nor ExxonMobil has been transparent about the details of the cost or financing of the project.<sup>46</sup> Much of the information that follows has been pieced together from news reports.

IEEFA estimates that the total capital investment of the Gas to Energy project is approximately \$2 billion USD (\$417 billion GD).<sup>47</sup> This includes:

- \$1 billion USD for the offshore and onshore pipelines.<sup>48</sup> This part of the project is to be constructed and operated by ExxonMobil and paid for in annual installments by the government of Guyana over 20 years. According to press reports, taxpayers will be paying \$55 million annually for 20 years to Exxon, for a total of \$1.1 billion.<sup>49</sup> The contractual details of the pipeline agreement between ExxonMobil and the government of Guyana have not been made public. As a result, it is unclear which party bears the cost of delays and/or cost overruns.
- \$781 million USD for the construction of the natural gas power plant and natural gas liquids (NGL) plant. This includes the cost of the \$759 million engineering, procurement and construction contract announced by the government in December 2022 for the construction of the plants,<sup>50</sup> as well as an additional \$22 million contract for management consulting services for the project.<sup>51</sup> The contracts have not been made public.
- \$175 million USD for grid upgrades. We estimate this cost based on the statement in the Guyana 2023 budget that the total “Gas to Power” project capital cost for the government (that is, excluding the pipeline) is \$199,212 million Guyanese dollars, or \$955.5 million USD.<sup>52</sup>

<sup>44</sup> The 2017 study considered 30 MMcf/d of natural gas and found that separating out the natural gas liquids would provide a volume more than four times Guyana’s consumption. (Guyana Ministry of Natural Resources. [Desk Study of the Options, Cost, Economics, Impacts, and Key Considerations of Transporting and Utilizing Natural Gas from Offshore Guyana for the Generation of Electricity](#). June 8, 2017).

<sup>45</sup> A lawsuit in the High Court of the Supreme Court of Judicature of Guyana seeks to quash the Environmental Protection Agency’s award of an environmental permit to Esso for its share of the Gas to Energy project. (Vanda Radzik and Elizabeth Deane Hughs vs. Environmental Protection Agency, 2023-HC-DEM-CIF-FDA-456).

<sup>46</sup> The publicly available documents that contain financial projections related to the project include: The Government of Guyana’s [2023 Budget; GPL Development, Esso EIA](#) for the pipeline and natural gas liquids plant; and several feasibility studies and other documents published on the website of the [Guyana Department of Natural Resources](#), the most recent of which is from 2021.

<sup>47</sup> The government has, from time to time, offered an explanation of costs but it is not supported by the necessary documentation expected from a substantial project. See, for example: Oil Now. [Guyana Prime Minister Pegs Cost of Gas to Energy project at U.S. \\$ 1.8 billion](#). January 22, 2023.

<sup>48</sup> This is the price quoted by the head of Guyana’s Gas to Energy Taskforce in press reports. Oil Now. [Government to pay Exxon U.S. 55 million each year to recover cost for gas pipeline](#). February 15, 2023. We note that the Environmental Impact Assessment produced by ExxonMobil in April 2022 provides a price of \$1.3 billion for both the pipeline and the NGL plant.

<sup>49</sup> Oil Now. [Government to pay Exxon U.S. 55 million each year to recover cost for gas pipeline](#). February 15, 2023.

<sup>50</sup> Guyana Chronicle. [Understanding Energy Guyanas gas to energy contract signed](#). December 17, 2022. See also: Lindsayca. [Press Release](#). November 11, 2022.

<sup>51</sup> Construction Digital. [India’s EIL awarded U.S. 22 million contract for Guyanese NGL Plant](#). November 11, 2022.

<sup>52</sup> [Guyana Budget 2023](#). Exchange rate of GYD/USD: \$208.50, p. 100.

Subtracting the \$781 million for the power plant and NGL plant leaves \$175 million for the grid upgrades.

The environmental impact assessment, produced by ExxonMobil in April 2022, says that the company is building the pipeline and the NGL plant.<sup>53</sup> News reports from November and December 2022 said that the government of Guyana signed an engineering, procurement and construction (EPC) contract with Lindsayca/CH4, a joint venture, to construct both the gas plant and the NGL plant. The contractual agreements have not been made public.

How will the government of Guyana finance its portion of the capital expenditures? The 2023 budget states that USD\$646 million is to be financed by foreign loans and the remainder financed directly by the Guyanese government.<sup>54</sup> Guyana has applied to the U.S. Export-Import (Ex-Im) Bank for the loan,<sup>55,56</sup> which has not yet approved funding.<sup>57</sup>

The government has not provided further detail on how it will finance the remaining \$309.5 million of its share of capital costs. In this paper, we assume that these costs, as well as Guyana's annual share of pipeline costs, will be borne by Guyana Power and Gas, a new state-owned company set up by the government of Guyana to manage the natural gas liquids plant and the power plant.<sup>58</sup> We assume that Guyana Power and Gas will enter into a contract with GPL to sell the resulting electricity and recover its capital and operational costs.

According to media reports, the government of Guyana states that the natural gas that will be delivered to Guyana for this project will be free for the entire duration of the project. ExxonMobil's position is less certain.<sup>59</sup> A review of the 2016 production sharing agreement raises questions. The contract does give the government of Guyana the right to excess natural gas "free of charge" if ExxonMobil has decided not to utilize the gas.<sup>60</sup> This would appear to refer to the "associated" gas (gas produced as a by-product of oil production) which is currently being flared. GPL estimated that in 2022, the amount of flared gas would have produced 987 GWh, and would produce 1.007 GWh of

<sup>53</sup> [Esso EIA](#), p. EIS-1.

<sup>54</sup> [Guyana Budget 2023](#), Volume 3, page 54.

<sup>55</sup> Guyana's Gas to Energy Project is considered a Category A project and is expected to complete an Environmental Social Impact Assessment. Ex-Im Bank. [Ex-Im Bank: Pending Transactions](#). Last visited September 4, 2023.

<sup>56</sup> Given Guyana's risk profile, Ex-Im Bank financing is likely to be costly. Ex-Im Bank financing essentially provides insurance to a commercial bank so that the lender can take on what would otherwise be a riskier emerging market loan; the cost of this insurance is added to the principal of the loan. The U.S. Ex-Im Bank ranks countries based on their credit risk on a scale from 1 (least risk) to 7 (most risk), and Guyana is currently rated as a 5. With this rating, a direct, long-term loan insurance product is not even available to Guyana. The Ex-Im bank would have to upgrade Guyana to a 4 to qualify. With such a rating, the "exposure fee" that would be added to the \$646 million principal is significant, from 20% to 24% for a 10–12-year loan, assuming the insurance covers 100% of the principal. Ex-Im Bank, [Long Term Fee Calculator](#), last visited September 4, 2023. That is, even though the government of Guyana would be able to get a lower interest rate with Ex-Im bank insurance coverage, it would be paying that interest rate on a "grossed-up" principal of \$775 to \$800 million, not \$646 million. For example, if Guyana is able to obtain a loan at 5.5% interest, in terms of annual debt service, that would be equivalent to an interest rate of about 9.5% on the original principal of \$646 million.

<sup>57</sup> Kaituer News. [Guyana applies to US to borrow GYD\\$134B for Gas-to-Energy project](#). April 16, 2023.

<sup>58</sup> Newsroom.gy. [Government sets up special purpose company to manage gas-to-energy project](#). January 14, 2023.

<sup>59</sup> Kaituer News. [Exxon Boss contradicts Jagdeo on free gas claim](#). February 10, 2023.

<sup>60</sup> [Agreement](#). Article 12.1(d).

electricity in 2023.<sup>61</sup> This implies about 20 MMcf/d of gas flared in those two years, which is less than the 50 MMcf/d that the Gas to Energy project is planning. The lack of clarity related to the contractual obligations of all parties leaves the impression that the gas project serves to reduce ExxonMobil's regulatory exposure vis-à-vis flaring.

According to the 2016 contract, additional gas that would be produced, beyond the associated gas, would be subject to a production sharing agreement similar to that which governs the oil.<sup>62</sup> That means that the government of Guyana could get a share of the "profit gas" that it could elect to take in kind or in cash. Electing to take the gas in-kind would mean forgoing a potential revenue stream to the government. In addition, the contract stipulates that if domestic natural gas demand in Guyana is greater than the government's share of profit gas, then ExxonMobil would be required to sell the remaining volume to Guyana at market rates to meet the domestic demand.<sup>63</sup>

In summary, IEEFA's analysis of the available information regarding the financing of the Gas to Power project yields the following conclusions:

- In total, the Gas to Energy project will require approximately \$2 billion in capital investment, to be split between ExxonMobil and Guyana. The government is pursuing a U.S. Ex-Im Bank loan for part of its share.
- Very little information is publicly available on the cost of the natural gas pipeline or the arrangement between Guyana and ExxonMobil to pay for the pipeline. In particular, it is unclear which party bears the risks of delays and construction cost overruns.
- It is not clear how Guyana plans to pay for its portion of the capital needed; the exposure to the government and to GPL needs to be presented more clearly.
- The amount of gas currently being flared is less than the amount of natural gas promised for the Gas to Energy project. The provisions of the 2016 contract between ExxonMobil and the government of Guyana indicate that, beyond the associated gas, the government of Guyana would forego a revenue stream or pay ExxonMobil for additional gas. If there is a separate agreement between the government of Guyana and ExxonMobil guaranteeing free gas for this project, such contract is not, to our knowledge, publicly available.

In the next two sections, we evaluate the impact of the Gas to Energy project on GPL's electrical system and its finances.

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<sup>61</sup> [GPL Development](#), p. 59.

<sup>62</sup> [Agreement](#), Article 11.4.

<sup>63</sup> [Agreement](#), Article 17.2(a).

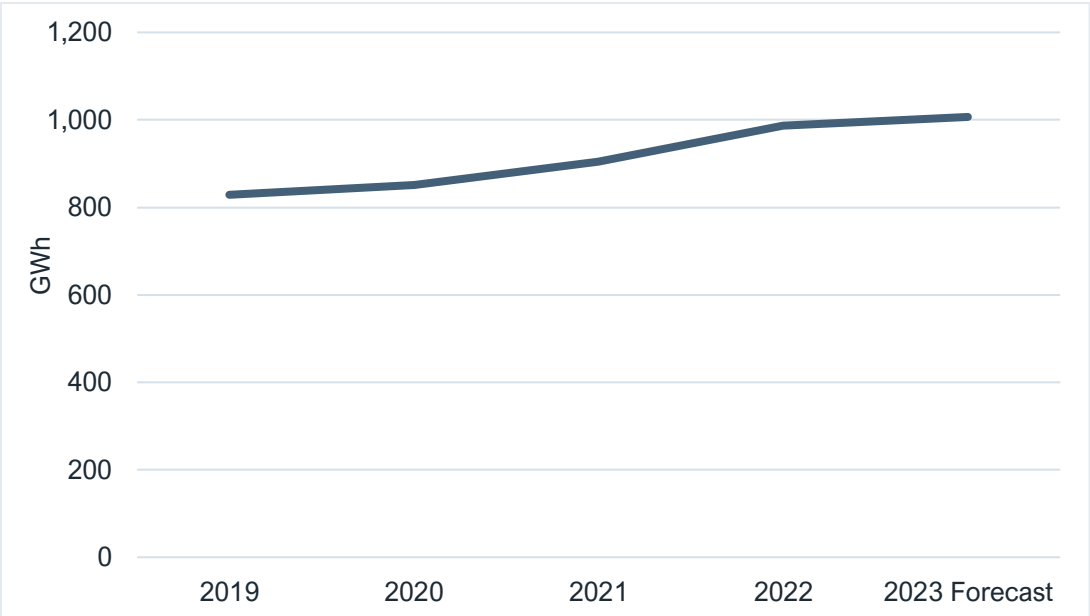


## The Gas to Energy Project Will Overbuild the System, Creating Unnecessary Electric Generation Capacity

The main justification that the government of Guyana has provided for the Gas to Energy project is that electrical sales in the DBIS grid are going to grow rapidly over the next decade and additional generation capacity is needed.<sup>64</sup> We find this claim to be highly overstated. In fact, as this section will show, when the new natural gas plant is added to other planned expansions of the DBIS grid, it is very likely that the gas plant will end up being underutilized and that GPL will be left with a significant stranded asset. This overbuilding based on fossil fuels will also crowd out any transition to renewable energy.

Between 2010 and 2017, GPL’s annual electrical sales grew at 4.3%. GPL’s total electricity generation grew at a slightly lower rate of 3.7% annually, implying some progress at reducing losses (so that a lower amount of generation could meet the same level of sales).<sup>65</sup> More recently, generation in the DBIS grid has been growing at an average of 5% per year, as shown in Figure 3.<sup>66</sup>

**Figure 3: DBIS Generation (2019-2023)**



Source: GPL Development and Expansion Programme, 2023-2027.

In its 2023 Development and Expansion Programme, GPL forecast that sales in the DBIS will grow at an annual rate of 16.4% from 2022 through 2027 and an annual rate of 9.4% from 2027 to 2032, or

<sup>64</sup> GPL Development, p.59.

<sup>65</sup> Guyana Ministry of Natural Resources. Update Expansion Study - Final Revised Report - Brugman. June 5, 2018.

<sup>66</sup> GPL Development, p. 60.

an overall average annual rate of 12.9%. This results in a more than tripling of sales from 2022 through 2032.<sup>67</sup> Although this would represent unprecedented growth, this sales forecast in the 2023 Development and Expansion (DE) Programme actually represents a reduction over the forecast presented the prior year in the 2022 Development and Expansion Programme. The 2022 Programme's forecast resulted in a nearly seven-fold increase in sales for the DBIS grid over the same period, between 2022 and 2032, resulting in projected sales in 2032 that were 2.65 times higher than projected in the 2023 programme.<sup>68</sup> This forecast was published in November 2021, and the government issued the request for qualifications for the construction of the 300MW gas plant and NGL facility the following month. The government took key steps towards the building of the plant based on a forecast of future electricity demand that was significantly reduced the subsequent year. Despite GPL's publishing a 2023 forecast that cut projected sales for 2032 by more than half, the government of Guyana did not revise its plans for the Gas to Energy project.

We note also that in 2020, an independent consultant to the government provided 20-year load forecasts of 3% per year and 5% per year, far lower than either of the recent forecasts provided by GPL.<sup>69</sup>

GPL bases its forecasts of extremely rapid electricity demand growth on assumed future gross domestic product (GDP) growth resulting from offshore oil development. Yet even before ExxonMobil's major discovery of offshore oil in Guyana, GPL had a history of overestimating future electricity demand. Figure 4 shows previous GPL forecasts of electricity demand versus actual demand.

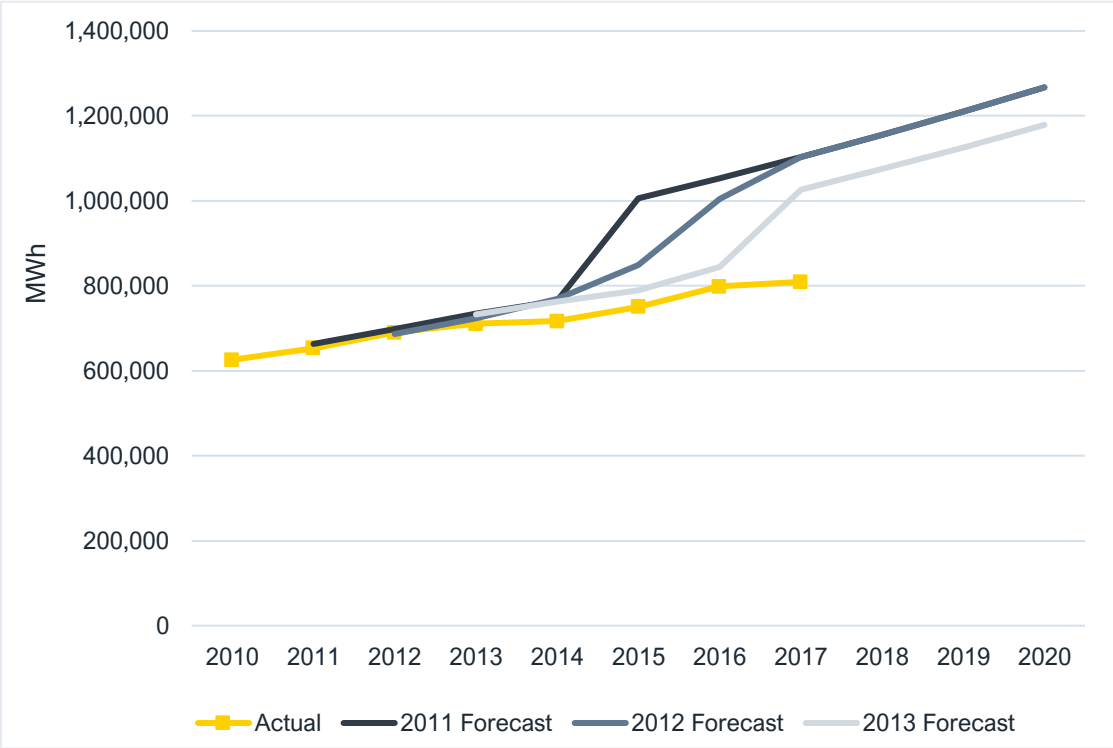
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<sup>67</sup> [GPL Development](#), p. 93 and p. 96. In these calculations, we are including Linden sales because of GPL's stated plan to incorporate Linden into the DBIS grid. We also note that the forecast of generation in DBIS and Linden is 13% annually from 2022 to 2032, indicating no forecasted improvement in losses.

<sup>68</sup> GPL Development and Expansion Programme 2022-2026, p. 63-64. (It is unclear from the text whether this sales forecast is for all of GPL or only the DBIS system, but given that the DBIS system accounts for 96% of GPL's sales, the conclusion remains unchanged).

<sup>69</sup> Guyana Ministry of Natural Resources. [Oil and Gas Master Plan Update Final Report](#), p. 18.

Figure 4: Actual Gross Generation Versus GPL’s Forecast Gross Generation



Source: GPL Development and Expansion Programme, 2011-2015; GPL Development and Expansion Programme, 2012-2016; GPL Development and Expansion Programme, 2013-2017; Brugman, *Update of the study on system expansion of the generation system*, 2018.

In addition to the gas plant, GPL is planning several new power generation projects in the DBIS system over the next several years. GPL’s plans include 85 MW of new oil-fired generation in 2023, 25 MW of utility-scale solar projects in 2024 and 2026, and the 165MW Amalia Falls hydropower project around 2030. GPL’s current generation capacity in the DBIS system is approximately 191 MW.<sup>70</sup>

To analyze whether this planned generation is actually needed, we consider both a low and a high load forecast. The low load scenario created by IEEFA assumes load growth in the DBIS system of 5% annually, based on recent history.<sup>71</sup> The high load scenario is GPL’s 2023 load forecast, which shows 12.9% average annual growth.<sup>72</sup> Both scenarios assume a continuation of GPL’s current level of losses (25%). If GPL were able to substantially reduce losses, this would reduce the amount of generation needed; however, if GPL goes forward with its plans to overbuild generation capacity, it is probable that this will crowd out the investments needed to improve the grid and reduce losses.

<sup>70</sup> GPL Development, p. 14.  
<sup>71</sup> We include Linden, as per GPL’s stated plan to connect Linden to the DBIS grid.  
<sup>72</sup> GPL Development, p. 93 and p. 96 (aggregating the forecasts for DBIS and Linden).

Adding in all of GPL's proposed new capacity, including the proposed 300MW gas plant, we analyse both the low and high load forecasts through 2032, the same period considered by GPL.

The following two graphs show the results of this analysis.

Figure 5 shows the total installed capacity in the DBIS system (in MW) with the forecasted peak electricity demand (MW).<sup>73,74</sup> Figure 6 shows the theoretically available electricity generation vs. forecasted loads (GWh). The figures show a significant overbuild:

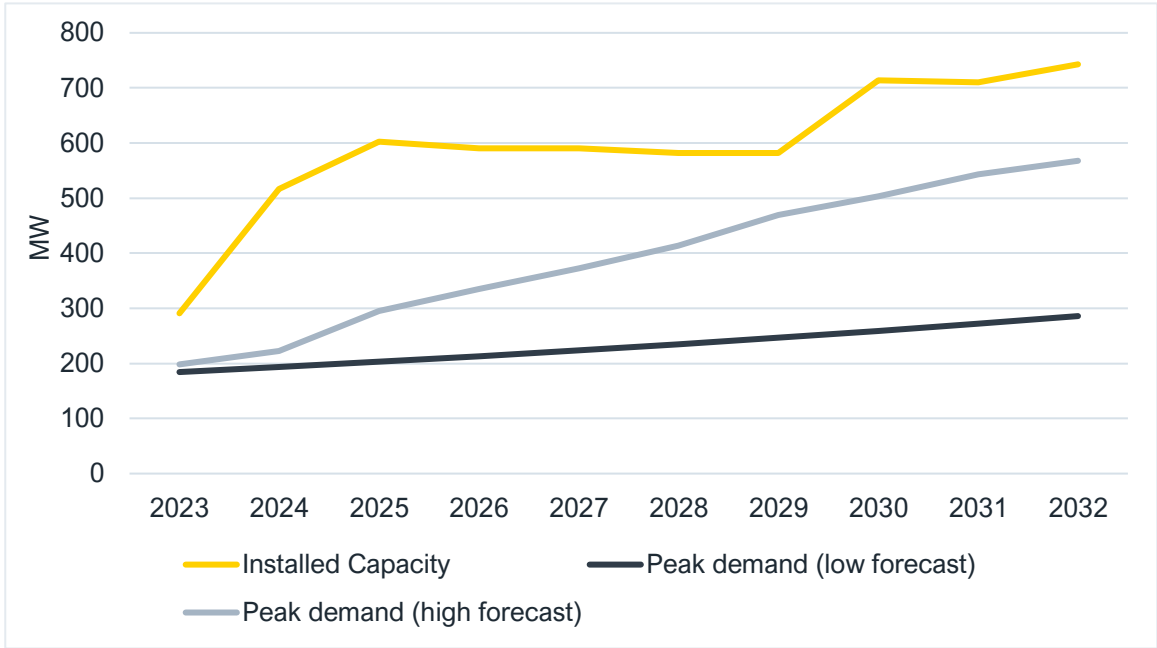
- Figure 5 plots the growth in capacity (existing plus new assets) against the expected peak demand for low and high load forecasts. The system will have the ability to generate far more electricity than is needed through the forecast period for either the low or high load projection.
- Figure 6 plots the theoretically available electricity against the low and high load scenario. In the low load scenario, the natural gas plant alone is more than enough to supply projected load, without running the existing oil plants, new oil plants, or proposed new hydro plant. In this scenario, the gas plant operates at 56% of capacity, on average. This implies that it would require only 30 MMcf/d, on average.
- For the high forecast scenario, the full use of the new natural gas capacity would render obsolete some of the existing capacity and all but eliminate the need for new capacity—crowding out any plans for new renewable investments.
- In either scenario, GPL's generation remains dominated by fossil fuel generation (natural gas and oil) for the coming decade. The planned utility-scale solar projects would provide less than 3% of generation in the low load scenario, and less than 2% of generation in the high load scenario.
- The size of the reserve margin demonstrates the significant overbuild resulting from the currently planned buildout. A well-planned utility typically builds in a 15% reserve margin (the amount of installed capacity vs. projected peak load).<sup>75</sup> The reserve margin resulting from the planned buildout ranges from 58% to 196% in the low-load scenario and from 24% to 132% in the high-load scenario.

<sup>73</sup> The reductions in installed capacity reflect retirements of older existing oil-fired units.

<sup>74</sup> When planning an electrical system, the amount of total installed capacity must be more than the peak demand (the highest possible consumer usage at a given point in time) to ensure that electricity is available on a 24/7 basis.

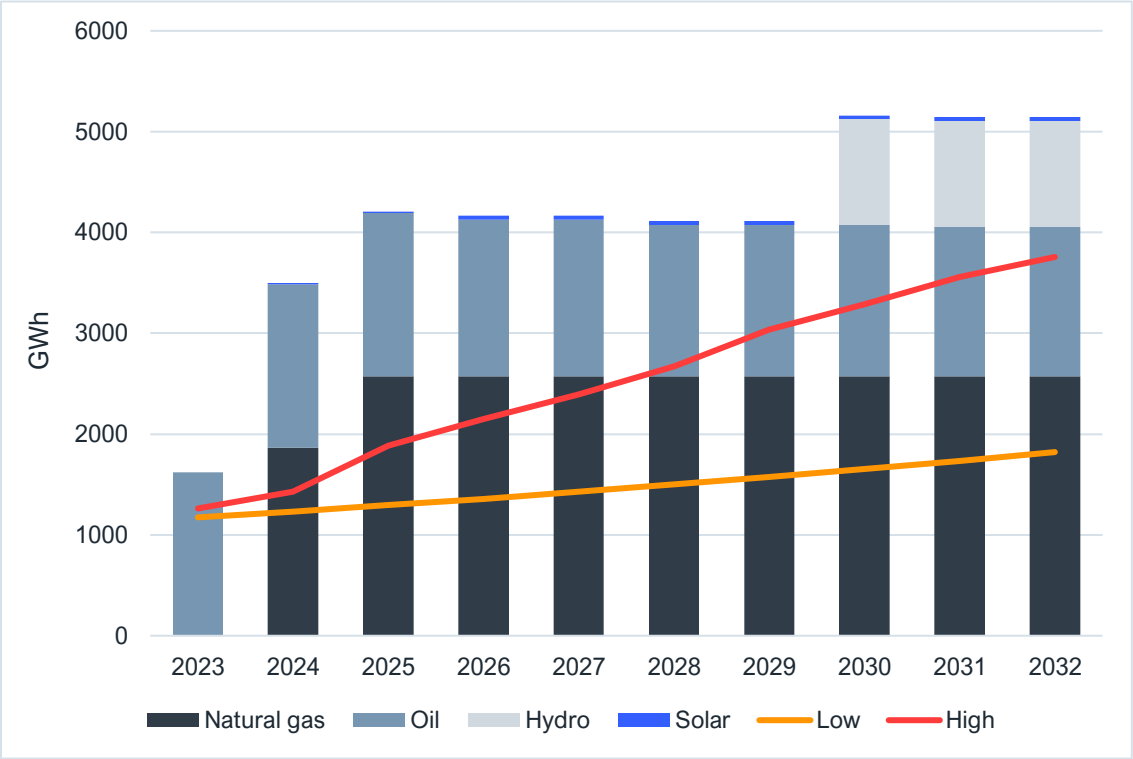
<sup>75</sup> Reserve margins are included in electrical systems to protect against unexpected failures in the system. See [North American Reliability Corporation, Reliability Assessment](#), 2022, p. 36. An excessively high reserve margin reflects overbuilding, a factor that places upward pressure on electricity prices for residents and businesses. In this case, where the government of Guyana will most likely subsidize the rate, the excess will be paid for by taxpayers. Overbuilding in this instance is a clear example of waste.

Figure 5: Installed Capacity and Peak Demand



Source: IEEFA analysis using data from GPL Development and Expansion Programme, 2023-2027.

Figure 6: Theoretically Available Generation Versus Load



Source: IEEFA analysis using data from GPL Development and Expansion Programme, 2023-2027.

IEEFA expects the actual demand growth to be much closer to the low-load scenario than to the high-load scenario (i.e., GPL's current forecast).

GPL's load forecast (the high-load scenario) appears to be overly high, taking into consideration (1) its radical departure from the recent past, on the basis for the low-load scenario; (2) GPL's historic tendency to overestimate its future sales; and (3) the GPL forecast assumption that 100 MW of load that is currently supplied by self-generation (largely diesel) will migrate to the grid because of investments that GPL will make to improve the reliability of the grid. This is unlikely to occur.

Given the financial implications of the overbuild that GPL is undertaking (see next section), we find it unlikely that GPL will invest sufficiently in reliability improvements. Eliminating the self-generators (assuming that they do not migrate to the DBIS grid) would reduce the high-load forecast by about 10% in 2032.

In short, constructing the Gas to Energy project represents an extremely risky bet that sales will increase enough and fast enough to absorb the oversupply. And Figure 6 above demonstrates clearly that even if GPL's high-load forecast is accurate, the utility will still be stuck with stranded costs from new generation assets that are not fully utilized.<sup>76</sup> This will make it very difficult for GPL to pay off its obligations based on revenues from actual demand of electricity.

As Figure 6 shows, the new natural gas plant is highly unlikely to operate at full capacity in its initial years of operation, if ever. Because no details have been released on the financial agreement between ExxonMobil and the government of Guyana for the delivery of natural gas to the plant, it is unknown what contractual risk the government is assuming if it does not use all of the 50 MMcf/d that the pipeline is being built to deliver.

In the following section, we investigate the impact that GPL's overbuilding has on electric rates, GPL's finances, and the government of Guyana's finances.

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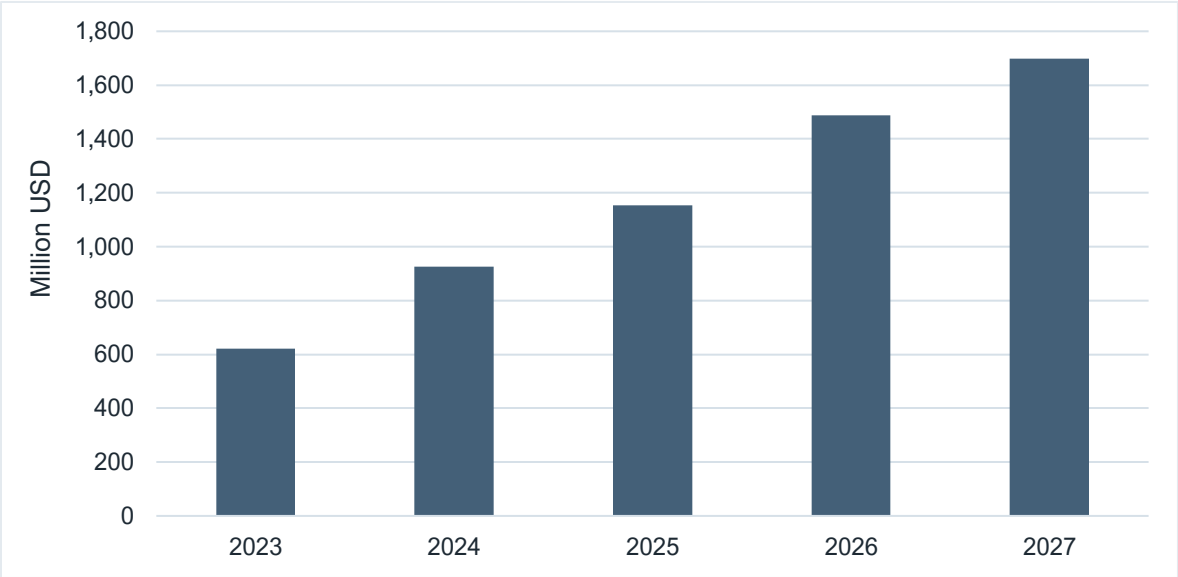
<sup>76</sup> By "stranded costs," we refer to investments that GPL will have made that will not be able to generate sufficient revenue to recoup their costs.

## GPL Is Poised to Go Significantly Into Debt to the Central Government to Build the Gas Plant and Subsidize Electricity Prices—a Formula That Is Wasteful

Although GPL is wholly owned by the government of Guyana, it is a publicly owned corporation that maintains its own books and records and generates its own revenues through electric rates that theoretically should be set to cover operational expenses, including debt service. GPL can and does finance capital projects by taking on debt, including loans from the central government.

GPL’s financial projections in the 2023 Development & Expansion Programme show the utility going substantially into debt through 2027 (the last year of the financial projection). GPL’s debt to the government of Guyana is projected to nearly triple over five years, from US\$621 million in 2023 (G\$129.5 billion) to US\$1.7 billion in 2027 (G\$354.5 billion), as shown in the following figure.<sup>77</sup>

**Figure 7: Cumulative GPL Indebtedness to Government of Guyana**



Source: GPL Development and Expansion Programme, 2023-2027.

It is worth noting that GPL’s previous five-year plan, for 2022-26, resulted in cumulative indebtedness to the Guyanese government of US\$716 million by 2026 (G\$149 billion), less than half forecast in the current year’s plan. The 2022 plan included a slightly more rapid buildout of capacity (adding 20% more generation than the 2023 plan), but is based on a sales forecast that is substantially higher (65% higher in 2027).<sup>78</sup> In addition, the 2022 plan does not include the political pledge embedded in

<sup>77</sup> GPL Development, p. 40 (converted to USD).

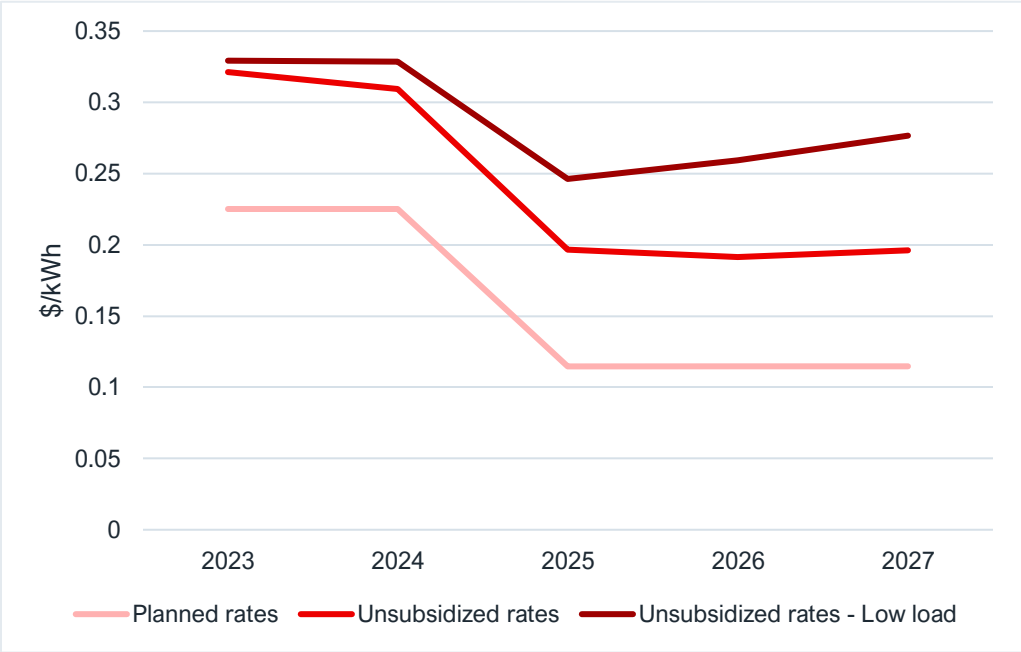
<sup>78</sup> The GPL Development and Expansion Programme 2023-2027 forecasts 2027 sales in GPL plus Linden of 1944 GWh (p. 90), whereas the 2022 Development and Expansion Plan forecasts 2027 sales for GPL of 3,201 GWh (p. 63).

the current plan to cut electric rates in half. The combination of lower sales and lower rates in the 2023 plan’s forecast implies significantly less revenue to cover the buildout of the generation system and other costs.

The Guyana Public Utilities Commission expressed “some reservations” about the debt levels projected in the previous 2022-2026 five-year plan, noting that **“these debts may prove unsustainable for the company.”**<sup>79</sup> The current plan has more than doubled the level of indebtedness.

The following figure shows GPL’s planned electricity rates, vs. the electric rates that would actually be needed to cover costs.<sup>80</sup> According to GPL’s own projections, GPL (via loans from the government of Guyana) would be subsidizing about a third of the cost of electricity. If sales do not materialize as GPL has forecast, rates would need to be even higher, or the subsidy from the central government even greater, to cover electrical system costs.

**Figure 8: Forecast Electricity Rates**



Source: IEEFA analysis using data from GPL Development and Expansion Programme, 2023-2027.

GPL’s financial projections do not provide much visibility into how the Gas to Energy project is accounted for in rates (or, indeed, whether all of the costs of the project, such as Guyana’s annual payment for the pipeline, are included in GPL’s forecast expenses). It is evident that the 2023 plan

<sup>79</sup> Guyana Public Utilities Commission. [Annual Report, 2021](#), p. 28.

<sup>80</sup> Based on projected rates, sales, revenues and expenses available in the [GPL Development and Expansion Programme 2023-2027](#).



shows GPL going into debt at a much faster rate than previously anticipated, overbuilding its generation system and providing electricity at rates that do not cover costs.

GPL also has no plan for paying off its central government loans. GPL's financial projections for 2024-2027 reflect paying a very nominal level of interest (an interest rate of less than 1%) on its central government loans. GPL states that it "has negotiated with the Ministry of Finance the extension of the moratorium on servicing the majority of the current outstanding debt until the year 2026. Discussion is ongoing to extend this moratorium to all of the remaining debt."<sup>81</sup>

If GPL is successful in convincing the government of Guyana to extinguish its outstanding debt, the government will essentially be providing a US\$1.4 billion to US\$2 billion subsidy to GPL over the next five years.<sup>82</sup> This is more than the costs to the government of Guyana for the Gas to Energy project through 2027, which we estimate at US\$900 million.<sup>83</sup> As indicated above, this \$900 million cost includes four years of annual pipeline payments at \$55 million per year; four years of loan payments on the Ex-Im bank loan (assuming it is approved); and \$309.5 million in upfront capital costs from the government of Guyana.<sup>84</sup> The subsidy from the government of Guyana to GPL exceeds the actual capital costs of the Gas to Energy project over these years.

To keep rates as artificially low as promised, additional outlays are necessary from the government of Guyana. As noted above, the planned rates do not cover expenses whether or not GPL sees either the high- or low-load scenario. The level of subsidies to cover GPL's legacy debt, the new Gas to Energy project, and rate reductions will place a burden on Guyana's annual budget, even with the enhanced revenues from "profit oil."

The government bailout of GPL in the form of paying off GPL's indebtedness will directly or indirectly come from its oil profits from the Liza and Payara wells. The natural gas infrastructure is unnecessary. The financial beneficiaries include:

- GPL lenders (including ExxonMobil);<sup>85</sup>
- Companies involved in the building of the natural gas infrastructure (including ExxonMobil);
- ExxonMobil and its Guyanese partners (since the flaring problem is eliminated and the consortium will benefit from the sale of natural gas (although the terms and conditions of that sale have not been announced).

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<sup>81</sup> [GPL Development](#), p. 36.

<sup>82</sup> The principal of the new government loans to be incurred from 2023 to 2027 is \$1.4 billion. However, if these loans were 10-year loans at 7% interest (the interest rate that GPL indicates it would otherwise be charged, according to p. 36 of the 2023 Development & Expansion Programme), the net present value of the loans would be \$2 billion.

<sup>83</sup> This includes four years of payments on the pipeline (\$55 million per year for four years), four years of loan payments for the Ex-Im Bank loan, which we assume to be a 12-year loan at 3.5% interest with a 26.9% exposure fee, and \$309.5 million in upfront capital costs to the government of Guyana.

<sup>84</sup> We assume this to be a 12-year, \$646 million loan at 3.5% interest with a 26.9% exposure fee.

<sup>85</sup> ExxonMobil has made it clear that Guyana will be paying the company back for its investment in the pipeline. [Kaiteur News, Exxons Boss Contradicts Jagdeo on free gas claim](#), February 10, 2023.

## Solar Provides a Less Financially Risky and Less Costly Alternative

Distributed (rooftop) solar provides an alternative to the Gas to Energy project that can be built out in small increments to avoid overbuilding the generation system. Rooftop solar and storage also has the advantage of providing reliable power, rather than depending on GPL's unstable grid.

Rooftop solar is also a more efficient use of resources than centralized generation, in the sense that all of the power generated can be consumed rather than losing 25% to GPL's grid. Investing in rooftop solar would also allow Guyana to move towards meeting its climate goals, in contrast to the Gas to Energy project, which forecloses that possibility for a generation.

In this section, we provide a high-level answer to the question: How much rooftop solar and storage could Guyana obtain for the same level of investment proposed for the Gas to Energy project? This is a high-level estimate because there is not a well-developed solar market in Guyana, solar cost data is limited, and very little information (including load factors) is available for commercial and industrial customers.

For residential customers of GPL, current average monthly electricity consumption is 171 kilowatt-hours (kWh), projected to grow to 320 kWh by 2027. A rooftop solar and storage system consisting of 2.8 kilowatts (kW) of solar panels and 10 kWh of battery storage would be more than sufficient to meet this level of current and projected consumption, producing approximately 368 kWh per month.<sup>86</sup> We estimate that such a system would cost approximately US\$7,800,<sup>87</sup> and would generate power at approximately 15 cents/kWh,<sup>88</sup> less than the cost of GPL's current rates (20 cents/kWh for residential customers) or of a diesel generator.<sup>89</sup>

For thousands of households outside of GPL's grid, some of whom today have no access to this electricity, this would represent significant progress. For those connected to GPL's grid, it would represent a substantial improvement in reliability and resiliency.

We estimate that there are approximately 230,000 households in Guyana.<sup>90</sup> Providing each with a 2.8kW solar system with 10 kWh of battery storage would cost approximately US\$1.8 billion, less than the total investment for the Gas to Energy project.

This plan presumes that oil profits derived from the Liza and Payara wells and any other oil and gas producing assets under contract in Guyana are used directly to pay for the planning and installation

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<sup>86</sup> We assume that many customers are currently also using diesel generators to supplement the electricity from GPL.

<sup>87</sup> This is based on cost estimates provided by Alfred Bhulai, including equipment costs reported here. Stabroek News. [Solar Power for households remains viable option my energy bill is now lower](#). April 25, 2023. An installation cost of 25% and 10% for contingencies is added.

<sup>88</sup> This levelized cost calculation also takes into consideration the cost of equipment replacement during the useful life of the solar panels.

<sup>89</sup> Global Petrol Prices. [Guyana](#). August 2023. Based on 2023 diesel prices in Guyana of approximately \$1.18 USD per liter.

<sup>90</sup> Assuming a population of 805,000 and an average of 3.5 persons per household. Global Data Lab. [Guyana](#). Last visited September 4, 2023. World Bank. [Population-Guyana](#). Last visited September 4, 2023.

of solar panels in Guyanese homes and businesses. This direct financing mechanism excludes the need for large EPC contractors, large international construction firms, large numbers of imported specialized, engineering labor, and banking and financing instruments requiring interest and fees and other costs that result in large disbursements of dollars to out-of-country financial interests.

On the DBIS grid, providing a rooftop solar and storage system to every household would eliminate slightly more than 50% of the current systemwide sales. This would preclude the need to make the massive investments in centralized generation that GPL has planned, even acknowledging the time that would be required for this transition to occur. If we consider a scenario in which the installations of residential rooftop solar and storage systems are deployed over a period of 14 years,<sup>91</sup> it is likely that GPL would be able to meet its remaining load for the next decade through existing resources plus the new oil-fired units that GPL plans to install in 2023, assuming load growth of 7% per year (or less), consistent with or higher than the recent past.

One of the other important economic benefits is that investments in rooftop solar keeps money made in Guyana circulating in Guyana. Over time, with thousands of families getting rooftop panels, new businesses that buy and sell panels and perform local installation services can grow.<sup>92</sup> It takes labor to install solar panels, which would result in more jobs.<sup>93</sup> The cash that is invested in rooftop solar tends to stay in communities and is spent locally.<sup>94</sup> This is in stark contrast to dollars borrowed and paid using international lenders, and large centralized fossil fuel plants built by engineers and experts usually not from Guyana.<sup>95</sup>

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<sup>91</sup> This is a conservative scenario based on the last four years of rooftop solar adoption in Puerto Rico, which faces an electrical system which has high rates and poor reliability. However, a full commitment by the government of Guyana to this strategy could likely result in faster uptake.

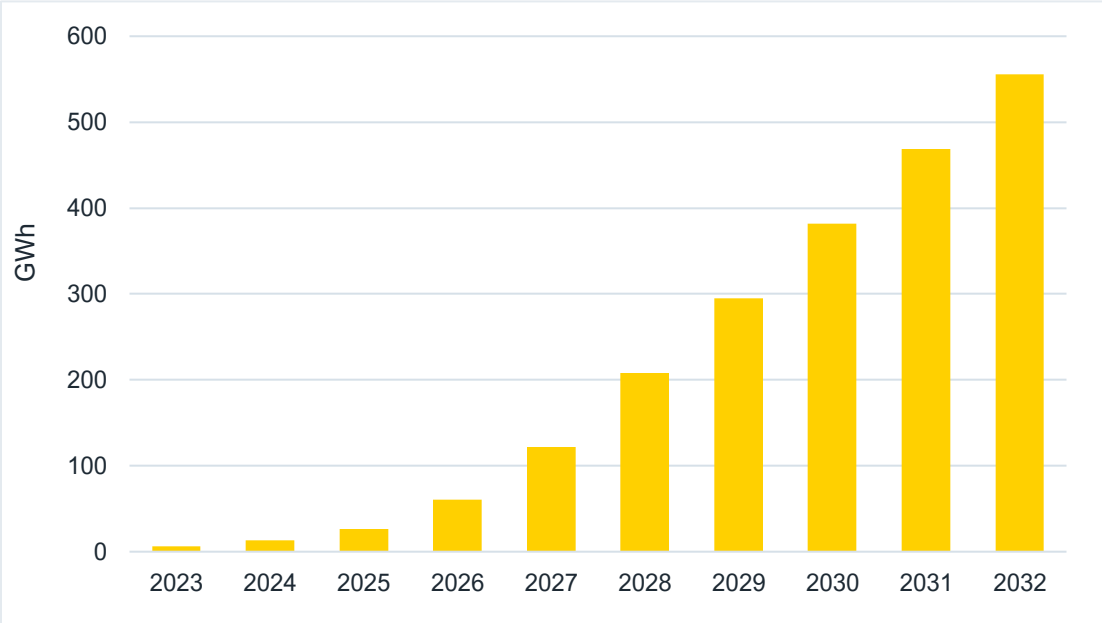
<sup>92</sup> IEEFA. [IEEFA: Puerto Rico can provide resiliency to 100% of homes through solar expansion. March 10, 2021.](#)

<sup>93</sup> Daily Herald. [Environment on suburbs' payroll: Local governments are hiring more people to focus on sustainability.](#) Aug. 21, 2022.

<sup>94</sup> National Renewable Energy Laboratory. [Energy, Economic, and Environmental Benefits of the Solar America Initiative.](#) August 2007.

<sup>95</sup> Basic economic mapping tools generally show that money created by new businesses in localities tends to improve the labor market opportunities and general economic activity of the locality. A host of input-output tools exist that can assist any government interested in this analysis. University of Wisconsin-Madison. [Local regional economic analysis.](#) Last visited Sept. 4, 2023.

Figure 9: Rooftop Solar Production in DBIS System



Source: IEEFA projection of solar buildout.

Providing a solar and battery storage system to every household in Guyana would put Guyana on track to meet its renewable energy goals. Electricity outside the DBIS system would be 100% renewable by 2032, and a process for all residential users Guyana-wide would be established. Based on system uptake, we estimate 100% of residential use from rooftop solar and storage is possible by 2035-40. The infrastructure, market mechanisms and financing will be in place to take Guyana to 100% renewable energy based on the country’s willingness to mobilize its industrial and commercial base to do so. This is in sharp contrast to the Gas to Energy project, in which electricity generation in the DBIS region would be provided by more than 97% natural gas and oil, and provide electricity for only 68% of the country’s population. In addition, no investment would be made to transition away from diesel outside of the DBIS system.

## Conclusion

### The Proposed Guyana Gas to Energy Project Is Unnecessary to Keep the Lights on and Financially Unsustainable for Taxpayers

Guyana is poised to embark on the path of rapidly overbuilding the electricity generation system that serves about two-thirds of its population. The centerpiece of this overbuild is the proposed Gas to Energy project, which will bring natural gas from offshore oil development to be burned in a new 300MW power plant. The government of Guyana claims that the project will meet a need for greater electricity while significantly reducing power costs. This project is on top of other new power generation investments that Guyana Power & Light plans to make in the coming decade.

We find Guyana Power & Light's forecast of electricity sales very likely overstated. Even if the forecast is correct, the expansion plans will still result in an overbuilding of capacity, leaving GPL with stranded assets. It is also likely that the gas power plant will be underutilized.

Moreover, GPL's own financial projections show the utility will rely on the central government to subsidize rates to achieve the targets that the government has promised. Specifically, GPL plans to take on an additional USD\$1.4 billion in debt to the government of Guyana by 2027—debt which it has no plans and apparently no capacity to repay—to finance its overbuilding and subsidize rates.

By significantly overbuilding fossil fuel generation, we find that GPL will crowd out the possibility of renewable energy. Through the end of the forecast period of 2032, renewable energy will account for less than 3% of generation.

We believe that Guyana should choose a different path. We estimate that the amount of capital investment poised to be spent on the Gas to Energy project would be more than enough to provide reliable power to every household in Guyana via rooftop solar and storage systems. These systems would produce power at a lower cost than GPL's current rates and the cost of diesel generators relied on in the rest of the country. This would also put Guyana on the path to both national energy security and meeting its climate commitments under the Paris Agreement.

## Appendix 1: Key Questions Regarding the Gas to Power Project

This report has been limited by the lack of public information and transparency, both on GPL's electrical system and on the Gas to Power project. This appendix provides some key questions that would allow this analysis to be further refined:

- What are the terms of the pipeline agreement between ExxonMobil and the government of Guyana? What is the estimated capital cost of the project? Are the annual payments from the government of Guyana subject to adjustment for inflation or other factors? Which party bears the risk of delays or cost overruns in construction? Is there a transparent accounting for ExxonMobil's profits as a builder of the pipeline and lender to Guyana for the money to build it?
- How is Guyana's decision to build the Gas to Energy plant related to ExxonMobil's attempts to solve its flaring problem?
- Is there an agreement between ExxonMobil and the government of Guyana that all of the natural gas supplied for this project will be free? If not, what is the basis for the government's assertion that it will be able to obtain 50 MMcf/d of free natural gas annually for the duration of the project?
- What are the financial consequences, if any, to the government of Guyana if not all 50 MMcf/d of natural gas is used?
- What are the anticipated terms of the Ex-Im deal?
- What alternative financing is the government of Guyana considering if the U.S. Ex-Im loan is not approved?
- What is the current reliability of GPL's grid, as measured by the SAIDI and SAIFI metrics? Has GPL quantified the level of investment needed to meet SAIDI and SAIFI levels comparable to the United States or other more reliable grids?
- Has GPL quantified the level of investment needed to reduce losses to less than 10%?
- How much will the government of Guyana have to spend to reduce rates by half?

In addition, all contracts related to the Gas to Energy project, including for construction of the pipeline, NGL plant and natural gas power plant and any contracts between Guyana Power and Gas and Guyana Power & Light, should be made publicly available.

## Appendix 2: Key Terms

This appendix provides definitions and explanations of key terms used in the report for a non-technical audience.

**Gas-to-Power project:** The proposed collaboration between ExxonMobil and Guyana to bring natural gas produced from offshore oil development to shore via pipeline, separate the natural gas liquids from the dry gas, and burn the dry gas in a proposed new 300MW power plant to generate electricity that will be injected into the DBIS grid.

**Wet Gas and Dry Gas:** The composition of natural gas varies depending on the field from which it is extracted. In general, natural gas is classified as “wet” or “dry.” Dry gas contains at least 85% methane, the principal component of natural gas. Wet gas contains greater fractions of heavier hydrocarbons, such as ethane, propane, and butane.

**Natural Gas Liquids:** The heavier components of wet gas—for example ethane, propane, and butane—that can be removed and sold separately, leaving dry gas that can be used for power generation.

- **Kilowatt (kW):** A measurement of the capacity of a power generation facility that represents the maximum amount of power it can produce at any instant in time.
- **Megawatt (MW):** One thousand kilowatts.
- **Kilowatt-hour (kWh):** A measurement of the amount of power produced by a generator over time. For example, a 5kW generator operating at full capacity for one hour produces 5 kWh of electricity. A 5kW generator operating at full capacity for 10 hours produces 50 kWh of electricity.
- **Megawatt-hour (MWh):** A thousand kilowatt-hours.
- **Gigawatt-hour (GWh):** A million kilowatt-hours.
- **Capacity factor:** A measure of the utilization of a power plant that is equal to the amount of power actually produced by the plant over a given period of time, divided by the amount of power it theoretically could have produced had it operated at its maximum capacity during the entire period.
- **SAIDI (System Average Interruption Duration Index):** A standard measure of transmission and distribution system reliability, related to the duration of outages. Not provided by GPL.
- **SAIFI (System Average Interruption Frequency Index):** A standard measure of transmission and distribution system reliability, related to the frequency of outages. Not provided by GPL.

## Appendix 3: Related Research

List of previous IEEFA reports related to Guyana offshore oil development.

- IEEFA. [Clean-up costs for wells in Guyana, another loophole to benefit ExxonMobil and partners.](#)
- IEEFA. [IEEFA report findings: 2016 petroleum agreement between Guyana, ExxonMobil, et al.](#)
- IEEFA. [Guyana's first oil-dependent budget: Exxon drills oil and Guyana digs a fiscal hole.](#)
- IEEFA. [Guyana's tax giveaway: Guyana pays ExxonMobil, Hess and CNOOC's annual income taxes.](#)
- IEEFA. [Lack and ring-fencing provision means Guyana won't realize oil gains before 2030s, if at all.](#)
- IEEFA. [Guyana's oil deal: promise of quick cash will leave country shortchanged.](#)



## About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. [www.ieefa.org](http://www.ieefa.org)

## About the Authors

### Tom Sanzillo

Tom Sanzillo, director of financial analysis for IEEFA, is the author of numerous studies on the oil, gas, petrochemical and coal sectors in the U.S. and internationally, including company and credit analyses, facility development, oil and gas reserves, stock and commodity market analysis and public and private financial structures. Sanzillo has experience in public policy and has testified as an expert witness, taught energy industry finance and is quoted frequently in the media. He has 17 years of experience with the City and the State of New York in senior financial and policy management positions. As the first deputy comptroller for the State of New York Sanzillo oversaw the finances of 1,300 units of local government, the annual management of 44,000 government contracts, and over \$200 billion in state and local municipal bond programs as well as a \$156 billion global pension fund.

### Cathy Kunkel

Cathy Kunkel is an Energy Consultant at IEEFA.

Cathy also served as an IEEFA Energy Finance Analyst for 7 years, researching Appalachian natural gas pipelines and drilling; electric utility mergers, rates and resource planning; energy efficiency; and Puerto Rico's electrical system. She has degrees in physics from Princeton and Cambridge.

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