# The Proposed Lamu Coal Plant

*The Wrong Choice for Kenya*

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## Executive Summary

Building the proposed Lamu coal plant in Kenya, a three-unit, 981-megawatt (MW) facility, would be a costly error for the country, locking it into a 25-year power purchase agreement (PPA) that would force electricity consumers to pay more than $9 billion, even if Lamu doesn't generate any power, as long as it is available for dispatch.

The project, first proposed in 2015 as part of a government initiative to build new baseload capacity to replace aging diesel-fired generation and serve planned future economic growth, has been overtaken by events, particularly lower-than-projected demand growth, lower forecasted generation from Lamu and higher anticipated costs for imported coal. These developments have undercut the plant's financial viability and should prompt the Kenyan government to cancel the project.

The planned $2 billion coal plant, currently scheduled to enter commercial service in 2024, is being built by Amu Power Company Limited, a single-purpose entity 51 percent owned by Centum Investments, a Kenyan investment firm, with the remainder held by Gulf Energy. The construction contract for the plant was awarded to Power Construction Corporation of China and Sichuan Electric Design and Consulting Company in 2016.[1]


However, construction has not yet started, and as will be demonstrated in this report, there is ample justification to cancel the entire project. Using data from the October 2016 Lahmeyer International report, *Development of a Power Generation and Transmission Master Plan, Kenya, 2015-2035*,[2] and Kenya's *Updated 2017-2037 Least Cost Power*

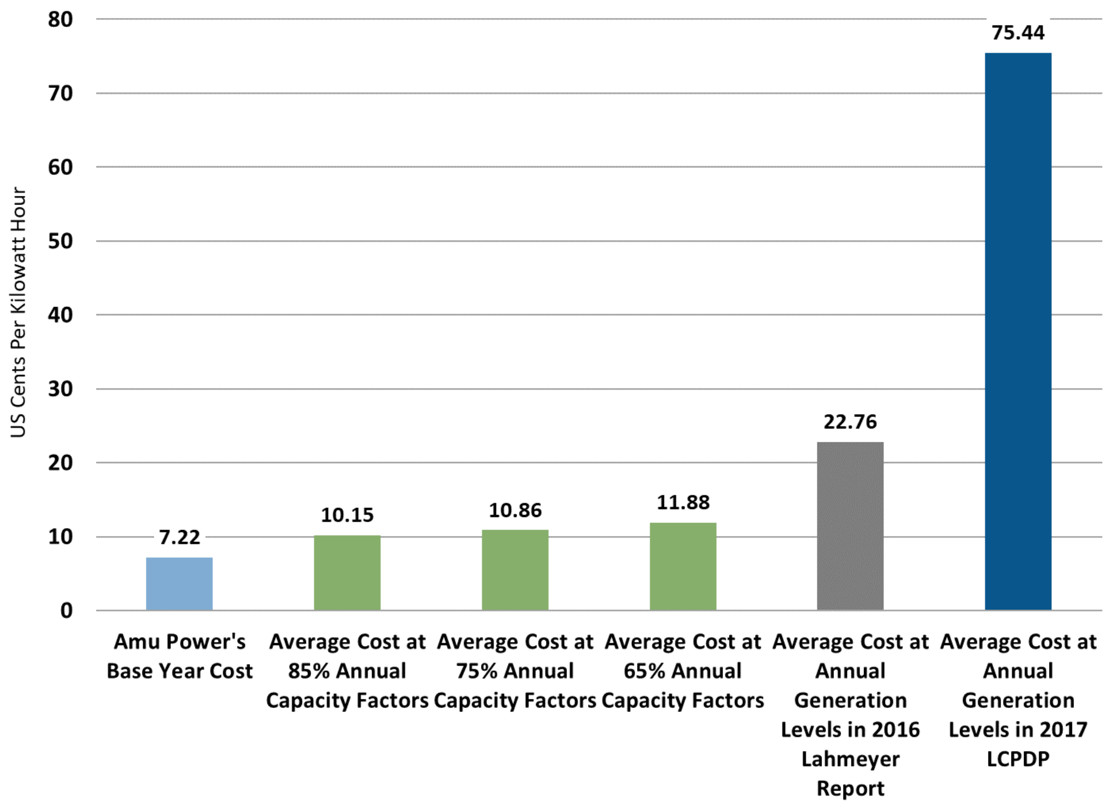
[1] Lamu Coal-Fired Plant Power Purchase Agreement, at page 24.
[2] Kenya Regulatory Commission. Power Generation and Transmission Master Plan, Kenya Long Term Plan 2015-2035 Vol. I – Main Report. October 24, 2016.

*Development Plan*[3], released in June 2018, we show that the assumptions used by the coal plant's developers no longer hold true and that building the facility would burden consumers with costly power for years to come. In addition, the project would make it difficult, if not impossible, for Kenya to meet its Paris climate change treaty obligations.

In particular, we find:

- The existing 25-year PPA would force Kenya to pay at least $360 million in annual capacity charges, even if no power is generated at the plant.
- Amu Power's claims for the cost of Lamu-generated electricity are unrealistically low, based on outdated costs for the imported coal that will be burned and on overly optimistic assumptions about how much electricity the plant will generate.
- Using more realistic assumptions about future Lamu generation and coal costs, electricity from the plant could cost as much as US 75 cents (76 Kenya Shillings) per kilowatt-hour (KWh), on average, during the years 2024 to 2037—more than 10 times what the plant's proponents have claimed.

## Average Cost of Power from Lamu Coal Plant




[3] Republic of Kenya. Updated Least Cost Power Development Plan Study Period: 2017-2037, June 2018.

- This estimate does not include costs for port upgrades that would be required to bring coal to the plant, nor construction of the transmission infrastructure needed to distribute the power; the costs of these projects would add significantly to Lamu's overall impact on electricity consumers and taxpayers.

- The government's own analysis demonstrates that, when using the most likely demand growth scenarios, Kenya's abundant renewable resources render no new coal generation necessary in the country until 2029, at the earliest.

- The plant would slow development of Kenya's plentiful renewable energy resources and make compliance with its greenhouse gas reduction obligations under the Paris Agreement difficult.

# Introduction

Our analysis in this report is drawn heavily from Kenya's *Updated 2017-2037 Least Cost Power Development Plan* (2017 LCPDP) which was prepared by the country's Energy Regulation Commission (ERC), a semi-autonomous unit of the Ministry of Energy, and released in mid-2018, and the October 2016 Lahmeyer International report, *Development of a Power Generation and Transmission Master Plan, Kenya, 2015-2035, (Lahmeyer report)* that was prepared for the Ministry of Energy and Petroleum.

The 2017 LCPDP considered three generation expansion plans. In two, the fixed-system plan and the fixed medium-term plan, the model used was required to add all three units of Lamu to the grid in 2024. In its third plan, the model had the option of deciding whether adding Lamu in that year was part of an optimized least-cost plan.

It is significant that in this third scenario, the only one in which it had a choice, the model chose not to add any of the three Lamu units in 2024. This least cost, optimized generation expansion plan, in fact, did not add any coal-fired generation until 2029. Even then, the first unit added was at Kitui, not Lamu. The first 327MW Lamu unit was not added until 2034, with a second projected online in 2036. In this least-cost scenario, the third unit at Lamu was not deemed necessary during the 2017-2037 time frame.

The 2017 LCPDP also recommended that (1) the PPAs for large power plants like Lamu should be renegotiated "to introduce operation flexibility and minimize energy costs" and (2) construction of Lamu should be phased and the project redesigned to include smaller units of 150 MW each to minimize required reserves.[4]

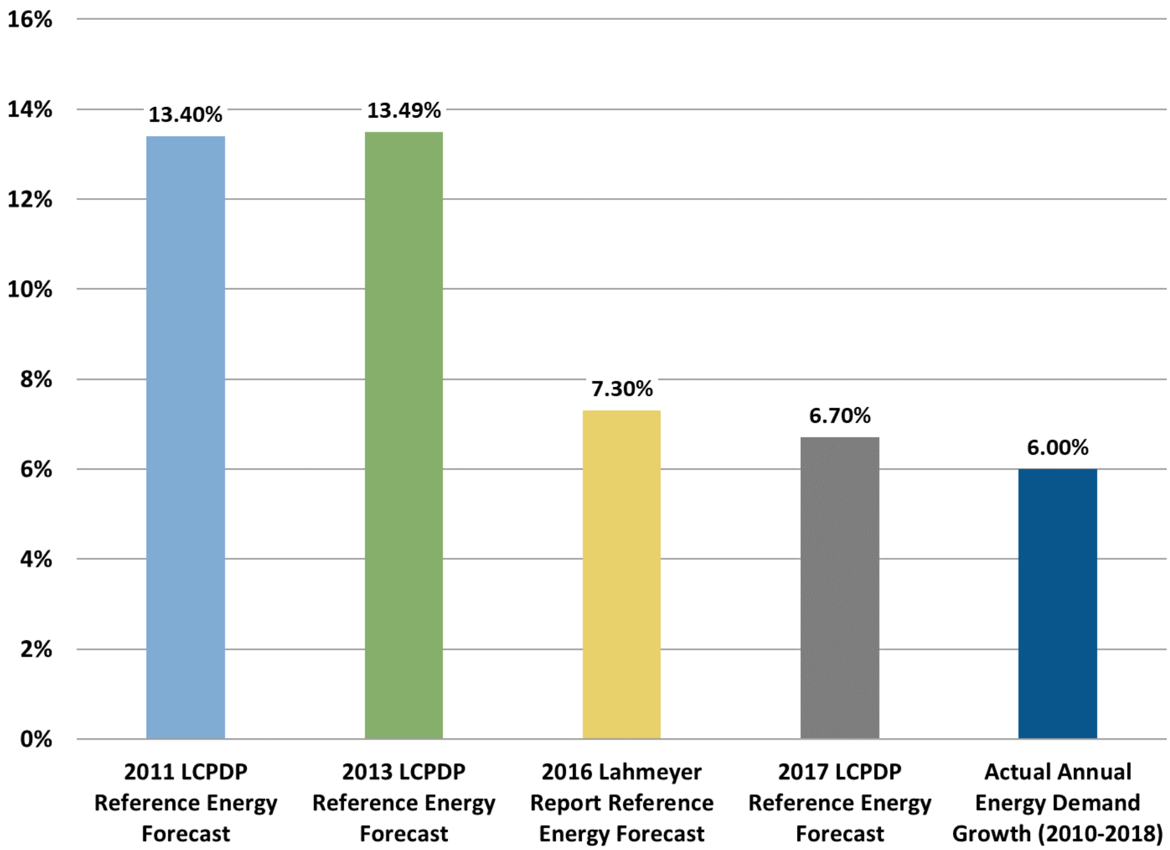
[4] 2017 LCPDP, at page 156.

# Key LCPDP Findings

## *Recent Load Growth Does Not Justify Adding a New Coal Plant Until the Late 2020s, At the Earliest*

When the tender for Lamu was invited, they were based on the 2011 Least Cost Power Development Plan, which projected extremely high load growth for the period 2011-2031, with energy demand forecast to grow at an average annual rate of 11.9 percent to 15.3 percent, and peak demands increasing from 1,227 MW in 2010 to as high as 22,985 MW in 2031.[5] However, as shown in Figures 1 and 2, actual load growth has been far slower than predicted in 2011, and subsequent forecasts in 2015 and 2017 have been much lower.

**Figure 1: Kenya's Average Annual Energy Demand Load Growth, Projected Versus Actual**




*Sources: 2011-2031 Least Cost Power Development Plan (LCPDP), at page 79; 2013-2033 LCPDP, at pages 11-12, Lahmeyer report, at page 2, and 2017 LCPDP, at pages 45-46.*

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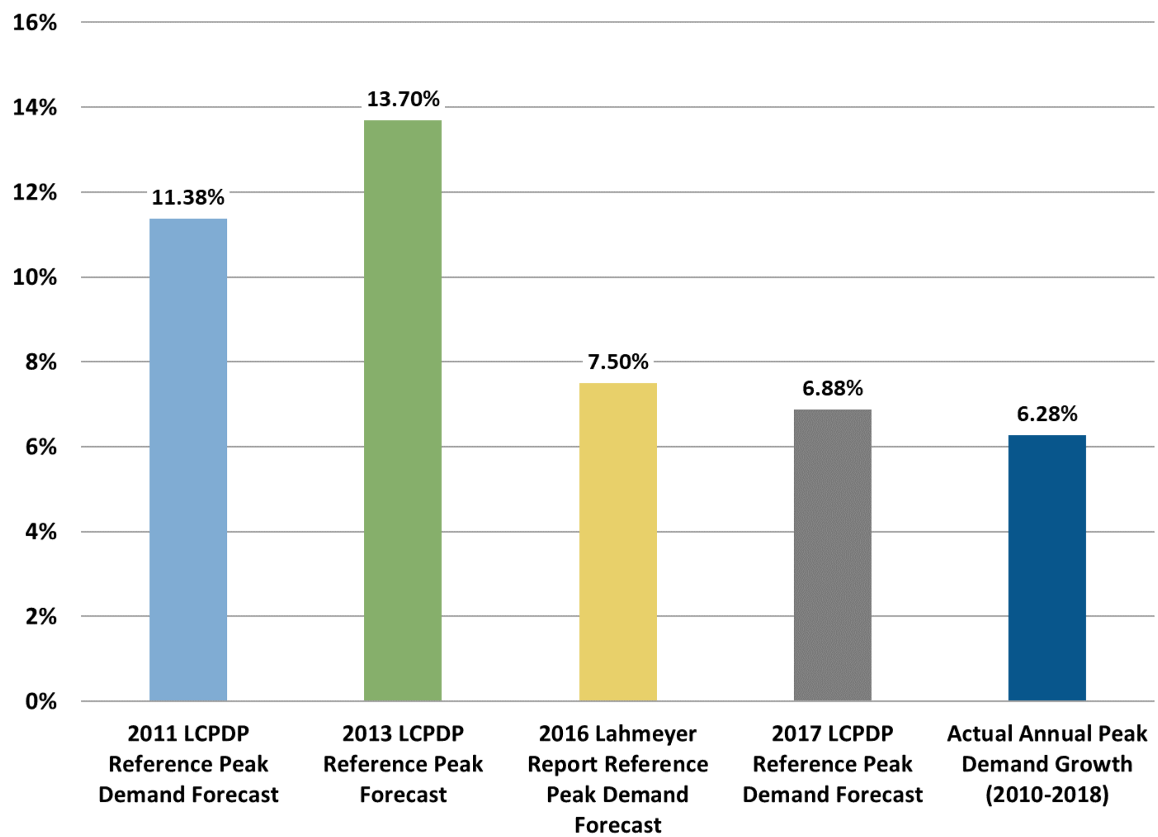
[5] Ibid, at pages 78 and 79.

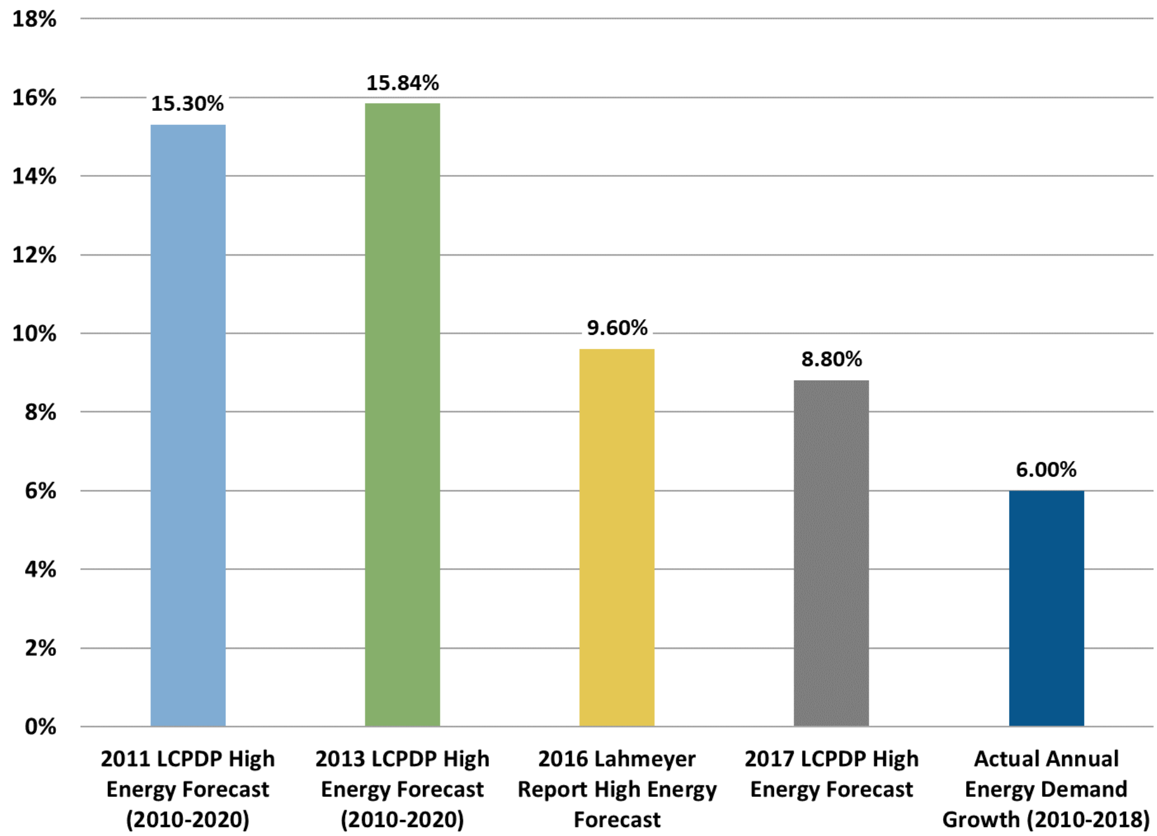
## Figure 2: Kenya's Average Annual Peak Demand Load Growth, Projected Versus Actual




*Source: 2011-2031 LCPDP, at page 75; 2013-2033 LCPDP, at pages 11-12, Lahmeyer report, at page 2, and 2017 LCPDP, at pages 45-46.*

As can be expected, the "High" load forecasts from the 2011 LCPDP turned out to be even more exaggerated compared to actual load growth, as shown in Figure 3.

**Figure 3: Kenya's Average Annual "High" Energy Demand Load Growth, Projected Versus Actual**




*Sources: 2011-2031 Least Cost Power Development Plan (LCPDP), at page 79; 2013-2033 LCPDP, at pages 11-12, Lahmeyer report, at page 2, and 2017 LCPDP, at pages 45-46.*

Actual energy and peak demand load growth has been much lower than predicted in 2011 because forecasted high rates of growth in Kenya's gross domestic product (GDP) and the planned Vision 2030 projects did not materialize. The Lahmeyer report also identified a number of serious flaws in the 2011 (and the 2013) electricity demand forecasts:

> *Previous electricity demand forecasts for Kenya (presented under the LCPDP) regularly overestimated demand (when compared to the actual demand growth in the medium term period). They also exceed by far the forecasted growth rates of similar African countries. They were also higher than actual growth of countries, which showed strong economic development in the past (similar to what Kenya is aiming at). Only very few countries in the world have shown such sustained high consumption growth rates as it has been forecasted for Kenya in the past.*[6]

[6] Lahmeyer report, at page 3.

The Lahmeyer report considered the in-service dates for the three Lamu units, 2021, 2022, and 2023, as fixed. However, it also concluded that if the commissioning years for Lamu could be re-evaluated, its simulation analyses indicated that the coal plant "would only be needed for the overall power system towards the end of the study period while geothermal plants would be brought forward to replace this capacity."[7] The end of the study period was 2035. Consequently, the Lahmeyer report recommended that the Lamu project, and coal in general, should be further evaluated.[8]

The 2017 LCPDP also considered the commissioning year for Lamu as fixed at 2024 in two of the three scenarios it examined. However, in the remaining scenario, an optimized expansion plan, the model was allowed to determine the best year in which new units, including Lamu, should be added to the grid. In this optimized plan, the first coal unit would not be added until 2029, and it would be located at Kitui, not Lamu. The first unit at Lamu would not be built until 2034.[9]

Other studies also have concluded that Lamu is not needed until long after 2024, if at all. For example, a modelling analysis on sustainable pathways for the Kenyan power sector by the Renewable and Appropriate Energy Laboratory from the University of California at Berkeley found that coal is not a cost-effective strategy. In the scenarios in which geothermal development was not constrained, no coal plants were deployed in the entire 2020-2035 study period.[10] Even in those scenarios in which geothermal development was constrained, the earliest year coal is built is 2030, with 2035 the most common deployment period.

Similarly, Hindpal S. Jabbal, former chairman of Kenya's Energy Regulatory Commission, has concluded that even with annual growth in electric demand of 8.5 percent, the country's entire demand through 2030 "can be met economically by renewable energy resources, including hydro imports from Ethiopia, with a lot of geothermal and wind capacity still untapped."[11] Therefore, "there is no place for a coal plant at Lamu to be installed for the next 15 years."

## *If Built, Lamu Would Be Grossly Underutilized From 2020 to 2037, If Not Longer*

Both the Lahmeyer report and the 2017 LCPDP concluded that if Lamu is built, the plant would be grossly underutilized through the middle of the 2030s, if not longer, generating far less electricity than Amu Power has claimed would be the case.

For example, the Lahmeyer report warned: "Due to the large amount of geothermal capacity with nearly zero operating costs as well as further must-run capacity

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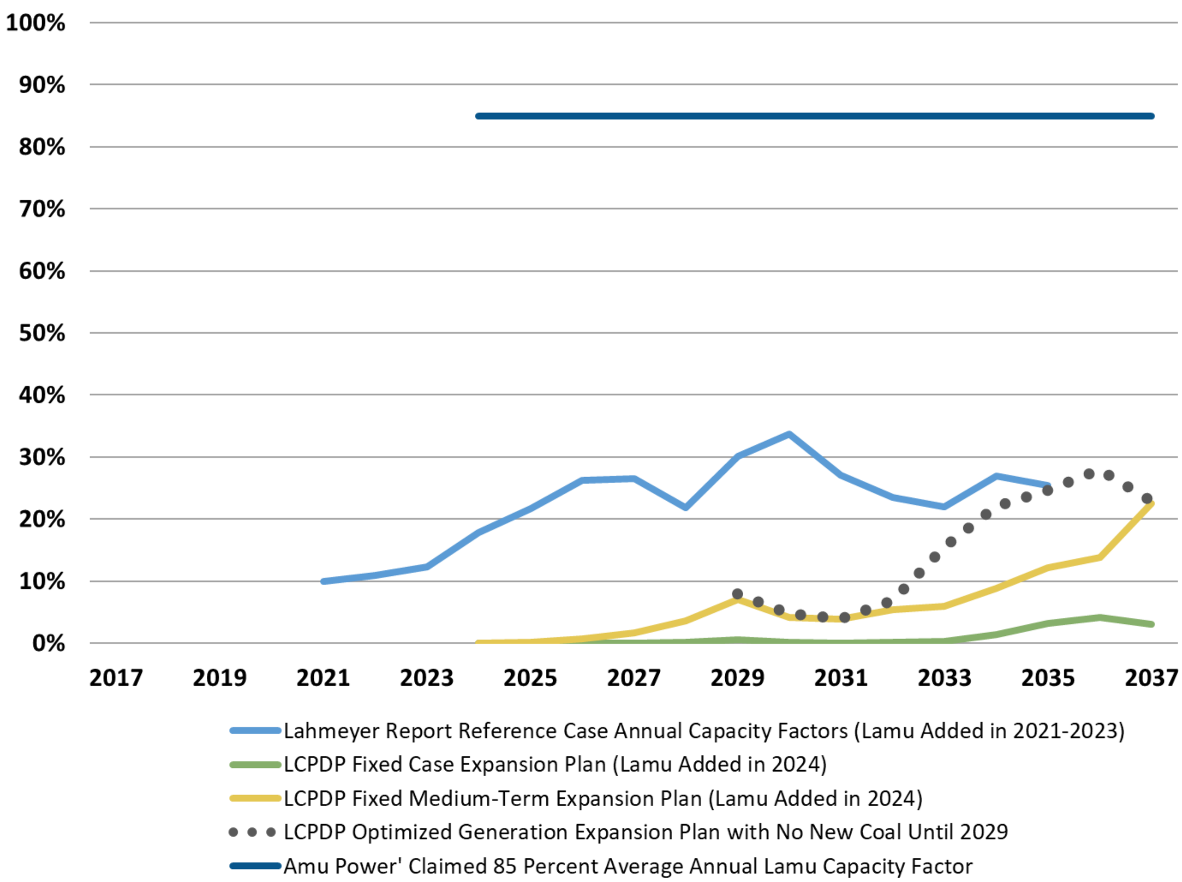
[7] 2017 LCPDP, at page 6.
[8] Lahmeyer report, at page 182.
[9] 2017 LCPDP, at page 154.
[10] Sustainable Low-Carbon Expansion for the Power Sector of an Emerging Economy: The Case of Kenya. Nkiruka Avila, Juan Pablo Carvallo Bodelon, Daniel Kammen and Brittany Shaw. August 31, 2017.
[11] *Objection to the Granting of a License by the Energy Regulatory Commission for the 3X350 MW Coal Plant at Lamu*. October 25, 2016.

(HVDC, RE sources) in the system, the utilisation of coal units is comparatively low during the entire study period. The capacity factor varies between 13 and 34%."[12] (emphasis in original)

The 2017 LCPDP agreed with the Lahmeyer report's conclusion that the capacity factors for geothermal, hydro and coal plants show "that some plants, especially the Lamu coal plant, will be grossly underutilized,"[13] and noting that "the use of coal at the Lamu plant will be significantly lower than previously projected."[14] The LCPDP attributed the limited generation of electricity at Lamu through 2037 to what it termed "unfavourable costs."[15]

These findings are illustrated in Figure 4.

### Figure 4: Projected Annual Coal Plant Capacity Factors from the 2016 Lahmeyer Report and the 2017 LCPDP

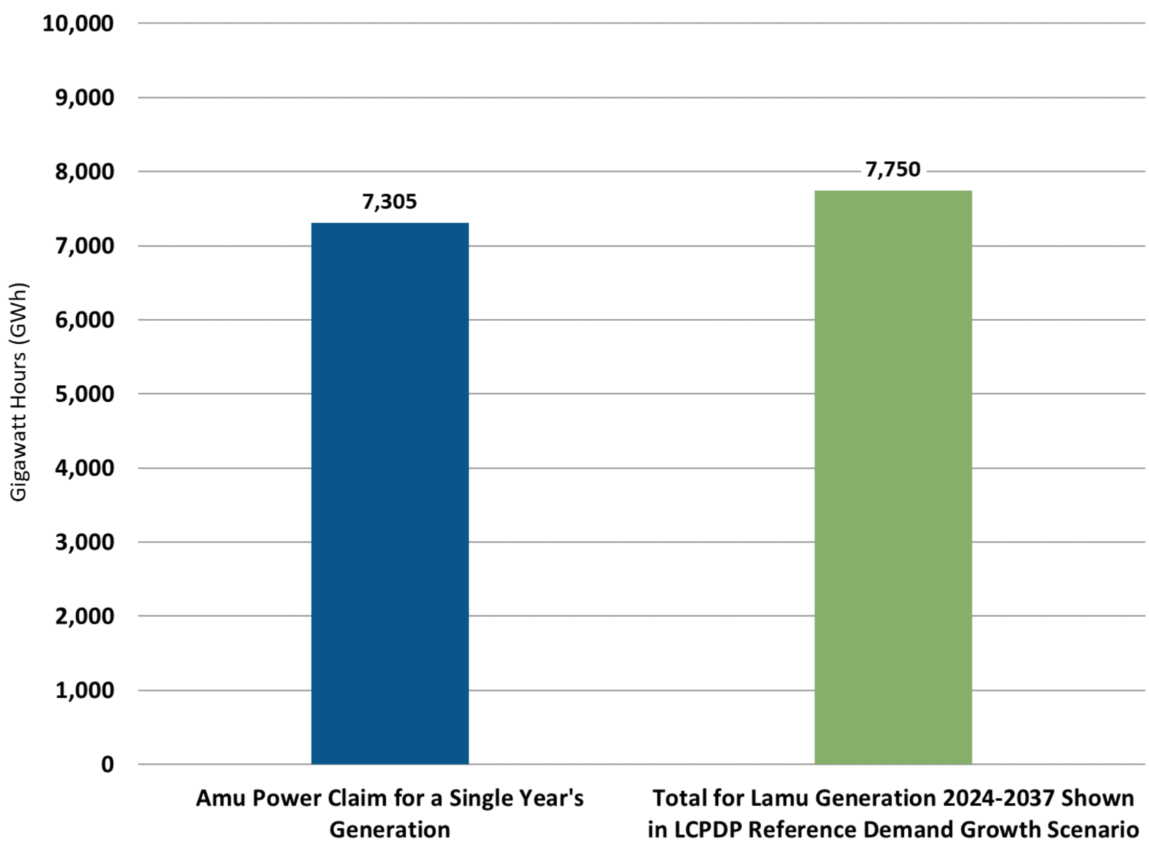



*Sources: Lahmeyer report, at pages 191-192 and 2017 LCPDP, at pages 109, 124 and 135.*

[12] Lahmeyer report, at page 182.
[13] 2017 LCPDP, at pages 153 and 154.
[14] Ibid, at page 220
[15] Ibid.

This means that the LCPDP projects that Lamu will generate only marginally more electricity during the fourteen years 2014 to 2037 than Amu Power has claimed it would produce, on average, in a single year. This is shown in Figure 5.

**Figure 5: Projected Lamu Generation– Amu Power Claims Versus 2017 LCPDP**




*Sources: Power Purchase Agreement attached to Amu Power Company Application to the Energy Regulatory Commission for a grant of a license for Lamu and the 2017 LCPDP, at page 135.*

Clearly, both the Lahmeyer report and the 2017 LCPDP show that Lamu will not operate as a baseload or an intermediate plant between 2020 and 2037. The low coal capacity factors shown for the plant are more indicative of peaking unit operation.

These low expected capacity factors would have a major impact on the cost of the plant's electricity, since the capital costs would be spread over less output, significantly increasing the per unit cost. This issue is discussed in detail in the following section.

## *Power From Lamu Would Cost Much More Than Its Proponents Claim*

In its application to build Lamu, Amu Power said electricity from the plant would costs just US 7.2 cents per KWh. This has been a major selling point for the facility, but a close look at the data shows it to be highly optimistic.

First, the Lamu PPA includes a take-or-pay clause requiring that annual capacity charges, which start at $360 million, be paid to the plant's owners, regardless of whether the plant is actually dispatched, as long as the plant is available for dispatch.[16]

Second, a portion of this annual capacity charge is escalable, as it is linked to the U.S. consumer price index (CPI) and will increase over time as the CPI rises.[17] The CPI is already 8 percent higher than it was in 2014, and is expected to climb another 10 percent by 2024, when the plant is scheduled to come online. Further increases would likely occur after the plant enters into commercial service.

Third, Amu Power's 2014 proposal includes a provision also linking the plant's energy charge to increases in the U.S. CPI.[18]

Fourth, Amu Power based its US 7.2 cents per KWh electricity cost projection on coal prices that are now out-of-date. In its application, Amu Power projected that coal for the plant could be imported for $50 per metric ton (mt). In contrast, the government's LCPDP expects imported coal costs to average $100/mt in 2020 and rise to $108/mt in 2040.[19] In other words, Lamu's fuel costs will be double what the company estimated in its 2014 proposal.

Finally, the company's electricity price estimate depends on the plant operating at extremely high capacity factors, levels that, as shown above, the plant is unlikely to reach.

As noted earlier, both the Lahmeyer report and the 2017 LCPDP, conclude that, if built, Lamu will be grossly underutilized through 2037, generating far less electricity than Amu Power and the plant's supporters claim. Accounting for (a) this lower generation, (b) higher fuel costs and (c) escalation of the annual capacity charges and operating and maintenance expenses (O&M), the true costs of Lamu's electricity during the years 2024 through 2037 could average as high as US 22 to US 75 cents per KWh—3 to 10 times the company's 2014 projection (see Figure 6).

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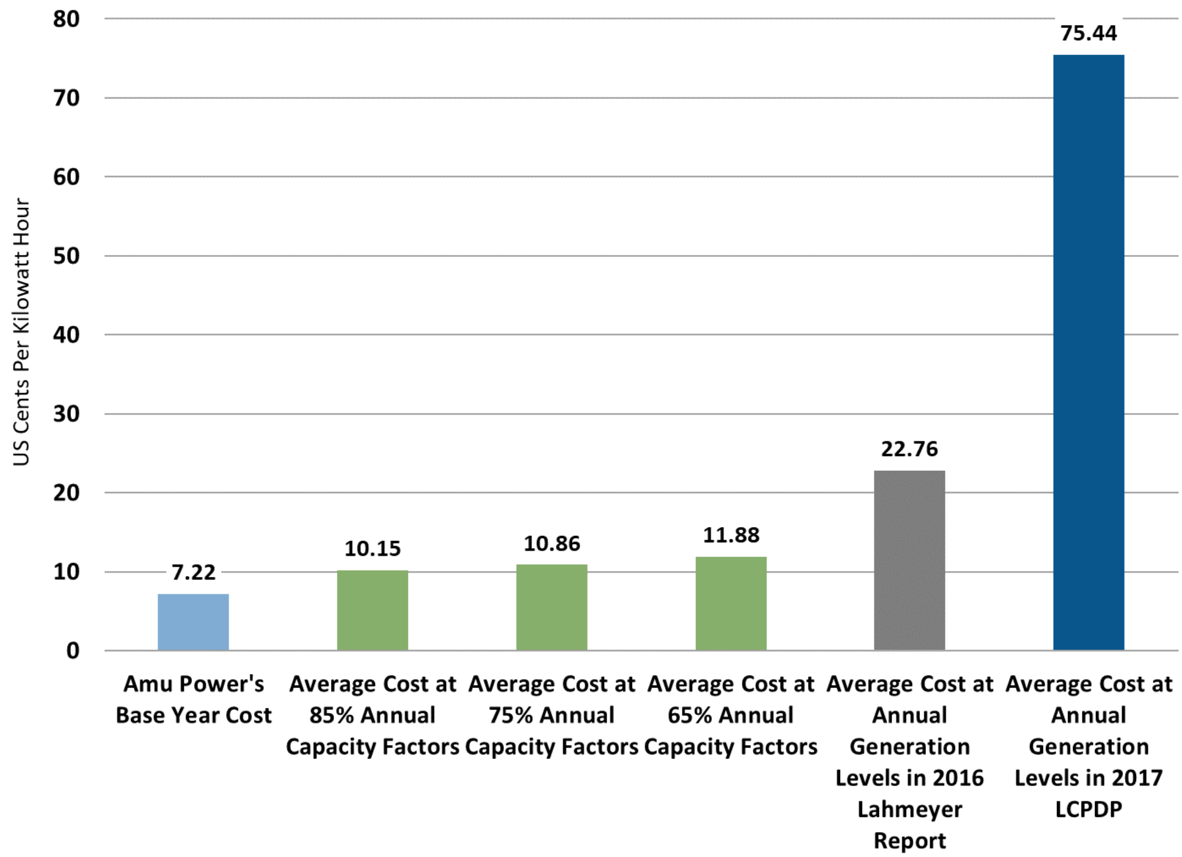
[16] Lamu Coal-Fired Plant Power Purchase Agreement, at pages 154-155.
[17] Ibid, at page 154.
[18] Ibid., at page 148.
[19] At page 73.

**Figure 6: Average Cost of Power from Lamu Coal Plant**

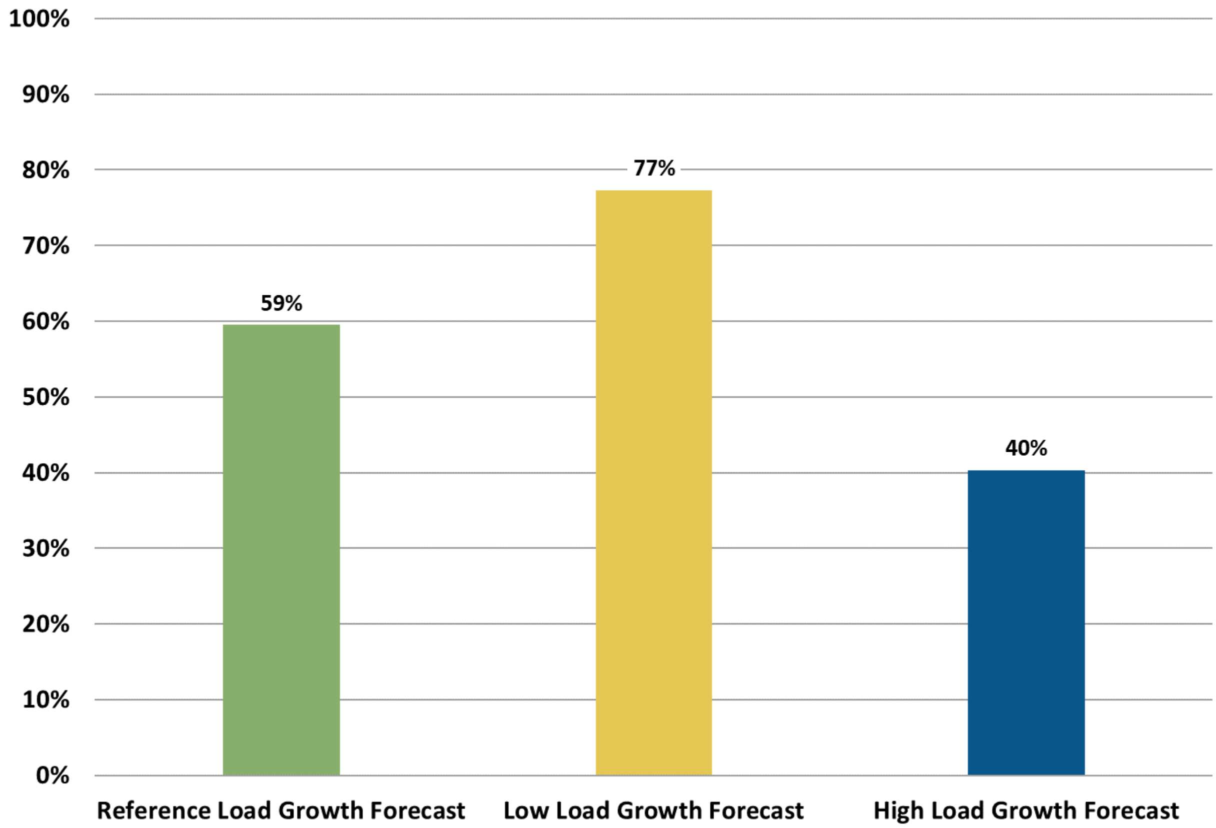



*Source: IEEFA analysis based on cost and generation data taken from Amu Power Company application for a license to build Lamu and the 2017 LCPDP, at page 135.*

## *Building Lamu Will Mean Higher Costs for Electric Consumers Even Before the Plant Is Operating*

The LCPDP only provides the impact of adding Lamu on retail tariffs through 2024. However, even this limited data shows that adding Lamu will lead to significantly higher tariffs—even before the plant goes into service in 2024, as illustrated in Figure 7.

**Figure 7: Projected Percentage Increase in Retail Tariffs From 2018 to 2024 If Lamu Is Built**

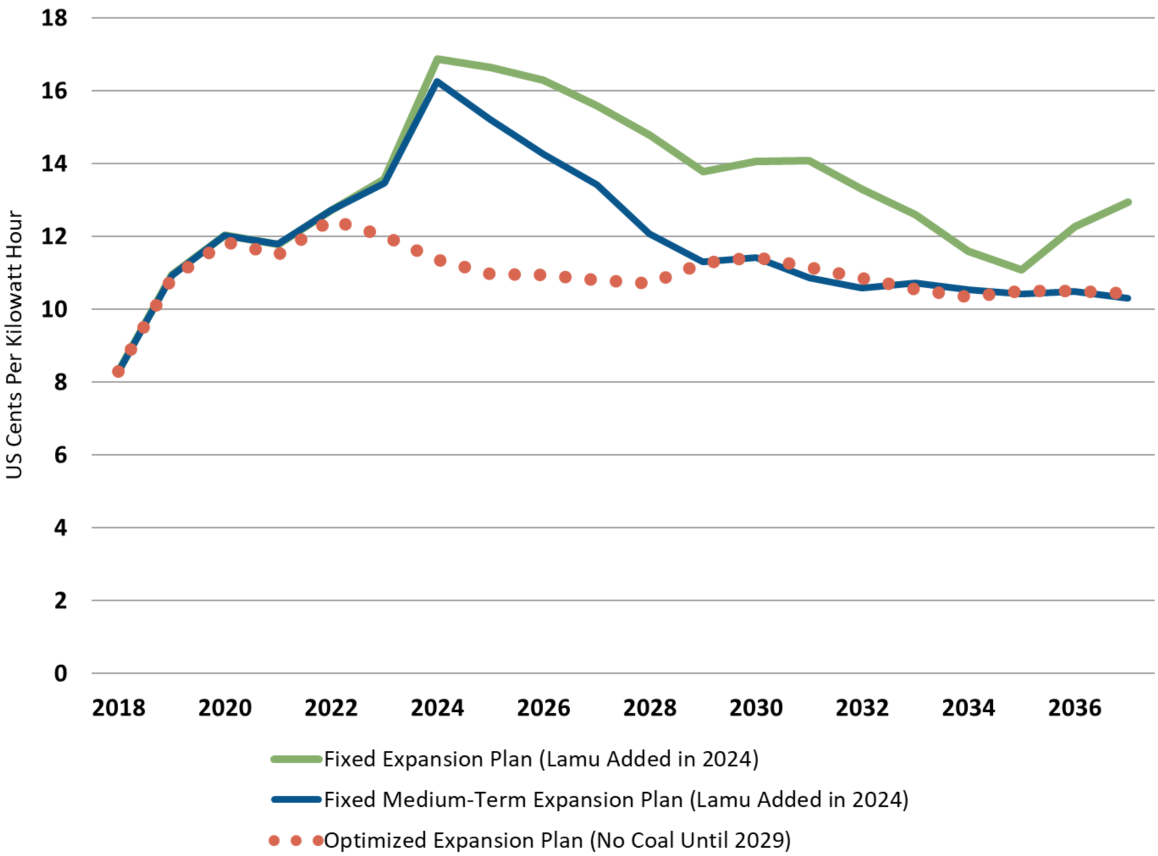



*Source: IEEFA analysis based on data in 2017 LCPDP, at ages 203, 209, and 214.*

## *System Levelized Electricity Costs Also Will Be Substantially Higher If Lamu Is Added in 2024*

Figure 8 shows that Lamu also would result in significant increases in Kenya Power's systemwide levelized electricity costs (LEC). The graph, which uses the reference demand growth scenario from the LCPDP, shows that Kenya Power's LEC will be substantially higher under the two expansion plans that add Lamu in 2024 than in the optimized plan, which does not include any coal until 2029.

**Figure 8: System LEC Comparison- 2017 LCPDP Reference Demand Forecasts**




*Sources: 2017 LCPDP, at pages 108, 121 and 144.*

The optimized expansion plan, without Lamu in 2024, also is the lowest cost in both the low and high demand growth scenarios in the 2017 LCPDP.

## *Kenya's Abundant Renewable Resources Render New Coal Capacity Unnecessary*

Lamu is clearly one option for adding generating capacity in Kenya, but it would be inflexible and costly. A better alternative, both cleaner and cheaper, would be to take full advantage of the nation's plentiful and largely untapped renewable energy resources.

The latest LCPDP outlines a range of renewable energy resources in Kenya, including:

- low production cost geothermal resources, with a resource potential estimated at 10,000 MW along the Rift Valley.[20]

[20] 2017 LCPDP, at page 55.

- "considerable hydropower potential estimated in the range of 3000-6000 MW," of which only 750 MW is currently exploited.[21]

- "great potential for the use of solar energy" due to its high levels of solar insolation.[22]

- significant potential wind resources.[23]

The cost of renewable energy sources plummeted between 2009 and 2017, with solar photovoltaic and onshore wind turbine prices falling by 74 percent and 34 percent, respectively.[24] And prices are expected to continue to fall dramatically due to economies of scale and improving efficiencies.[25] Energy storage costs have also been declining faster than expected.[26]

For example, Zambia recently awarded six solar PV projects, totalling 120 MW. The lowest successful bid was US 3.999 cents per KWh, and the weighted average of all six successful projects was US 4.41 cents per KWh.[27]

Wind and solar resources have other substantial benefits in addition to their declining investment costs.

- Displacing, and thereby slowing down the depletion of geothermal resources.

- Diversifying Kenyan's fuel mix by reducing its dependence on geothermal and conventional fossil fuels.

- Contributing to a more decentralized power supply.

- Creating job opportunities in the manufacturing and service industries.

- With no fuel costs and low or negligible variable non-fuel costs, wind and solar represent far less risk of price volatility.

Unlike coal, wind and solar resources do not have major negative environmental impacts, such as stack emissions, nor do they require large expenditures for coal ash management.

In addition, although solar resources do not produce electricity during evening peak periods, they can displace hydro generation during daytime hours, thereby saving the hydro resource to generate at night.

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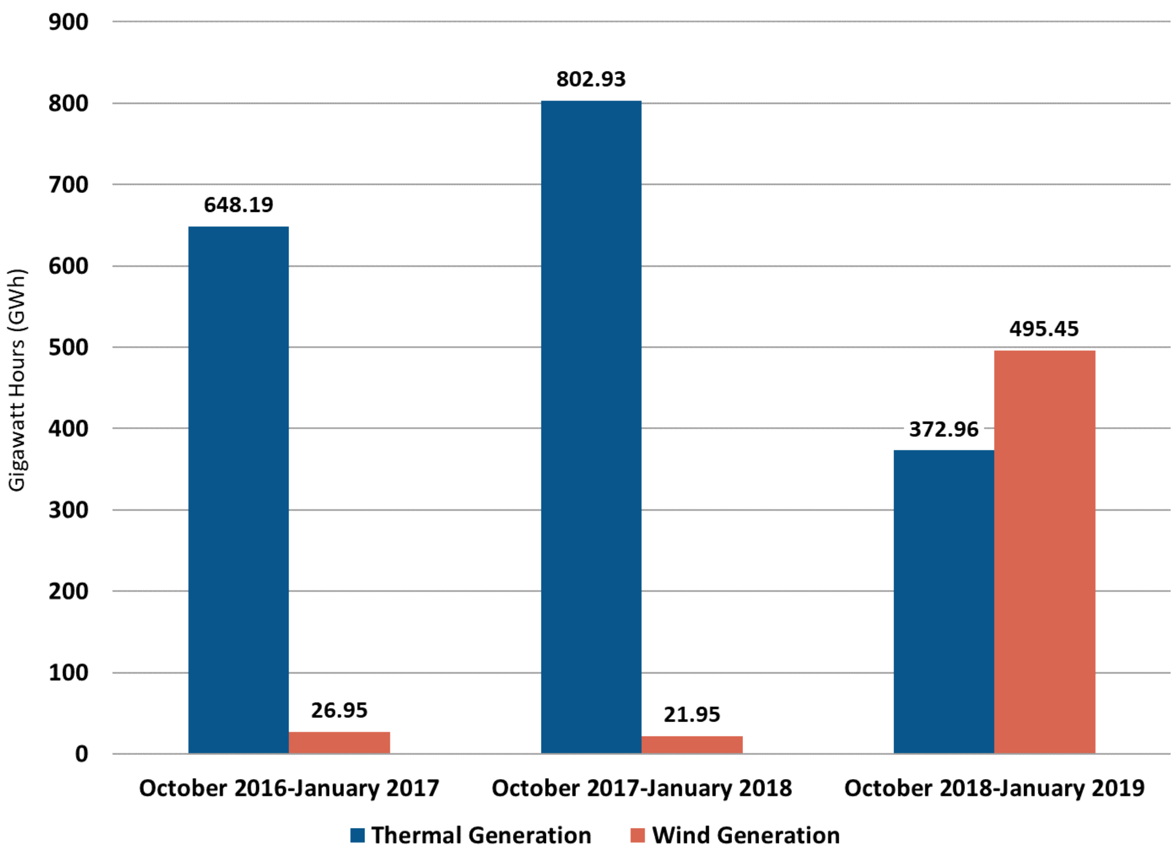
[21] Ibid., at page 57.
[22] Ibid., at page 62.
[23] Ibid., at pages 50-61.
[24] International Monetary Fund, *2018 World Economic Outlook*, Chapter 3, at pages 93-94.
[25] *Global Renewables Focus*, Moody's, September 18, 2017, at page 3.
[26] Ibid.
[27] ESI Africa. GET FiT Zambia awards 120MW(AC) in a solar PV tender. April 5, 2019.

Finally, one of the key reasons often cited in support of Lamu is that Kenya needs to replace aging and expensive diesel generation. However, wind and solar resources also can displace generation from thermal resources. In fact, since the new 310MW Lake Turkana Wind Farm came online at the end of September 2018, it has displaced, at lower cost, a significant amount of generation that had previously been produced by dirty thermal units, as shown in Figure 9.

## Figure 9: Increased Wind Generation Already is Displacing Production from Thermal Units




*Source: Kenya National Bureau of Statistics, Monthly Leading Economic Indicators, Table 15(a), for the period October 2016 through January 2019.*

Further, Kenya has transmission interconnections with Ethiopia and Uganda, which are developing their own renewable resources that might be available for import. Kenya Power already has a 25-year PPA with Ethiopian Electric Power through which it will receive 400 MW of firm power with related energy at a cost of US 7 cents per KWh.[28] As this PPA also has a take-or-pay clause, Kenya Power will have to pay for this power, even if it is displaced by electricity from Lamu.

[28] 2017 LCPDP, at pages 68 and 69.

While the price of power from Lamu can be expected to increase over time, renewable energy costs have declined significantly in recent years, and are likely to continue dropping in coming years. In essence, the choice boils down to committing to an expensive 25-year PPA for potentially unneeded, polluting coal-fired generation or pursuing cleaner, less expensive renewable generation that can be brought online quickly, in smaller increments and on an as-needed basis.

## *Given the Significant Uncertainty in Future Electric Demands, Smaller and Flexible Capacity Additions Are More Prudent Investments than Lamu*

There is great uncertainty in demand growth (both peak load and energy). This can be seen by looking at how much past forecasts have diverged from actual demand growth, as shown in Figures 1 through 3, or by considering the wide divergence in the high, reference and low demand growth scenarios in more recent forecasts, as shown in Tables 1 and 2 below.

**Table 1: Projected 2035 Energy Demands in the 2016 Lahmeyer Report and the 2017 LCPDP**

| | 2016 Lahmeyer Report | 2017 LCPDP |
|---|---|---|
| | (Gigawatt Hours) | |
| Low Demand Growth | 28,153 | 25,297 |
| Reference Demand Growth | 38,478 | 34,691 |
| High Demand Growth | 58,679 | 50,595 |

**Table 2: Projected 2035 Peak Loads in the 2016 Lahmeyer Report and the 2017 LCPDP**

| | 2016 Lahmeyer Report | 2017 LCPDP |
|---|---|---|
| | (Megawatts) | |
| Low Demand Growth | 4,788 | 4,763 |
| Reference Demand Growth | 6,683 | 6,638 |
| High Demand Growth | 10,219 | 9,790 |

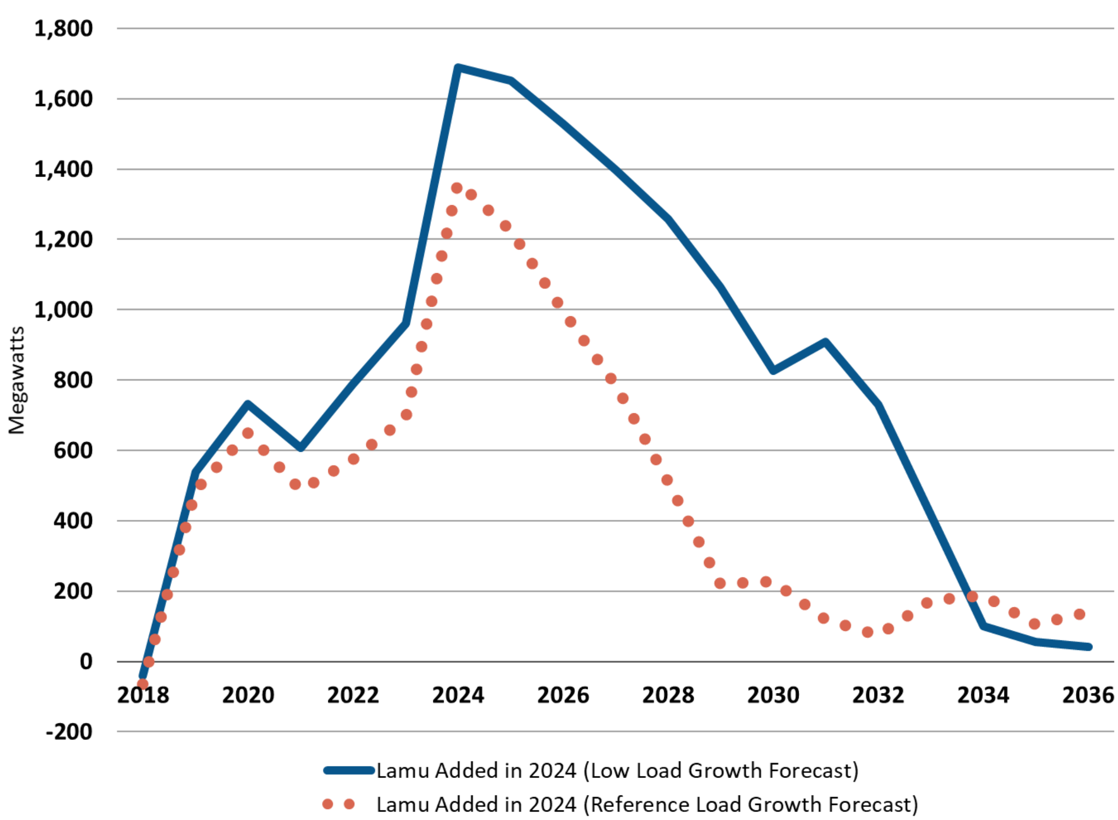
*Sources for Tables 1 and 2: Lahmeyer report, at page 2 and 2017 LCPDP, at pages 45 and 46.*

In each forecast, the energy demand and peak load in the high growth scenarios are just about double those in the low-growth scenarios. Given this great uncertainty in future peak and electric energy demands over the mid-to-long term, it would be prudent for Kenya to adopt a flexible resource plan that allows for the addition of new capacity in smaller increments. Such an approach would ensure that Kenya Power and its customers are not burdened with substantial amounts of expensive excess capacity if projected load growth does not develop, while also enabling the addition of new capacity in smaller increments if needed. This is especially true given that consumers will be required to pay the annual capacity charges in the Lamu PPA regardless of how much electricity the plant actually generates, as long as it is available for dispatch. Adding Lamu's 981 MW of coal-fired capacity all at once in 2024 would be neither a flexible nor low-cost solution.

## *Lamu Will Create Significant Excess Generation Capacity and Energy for Years*

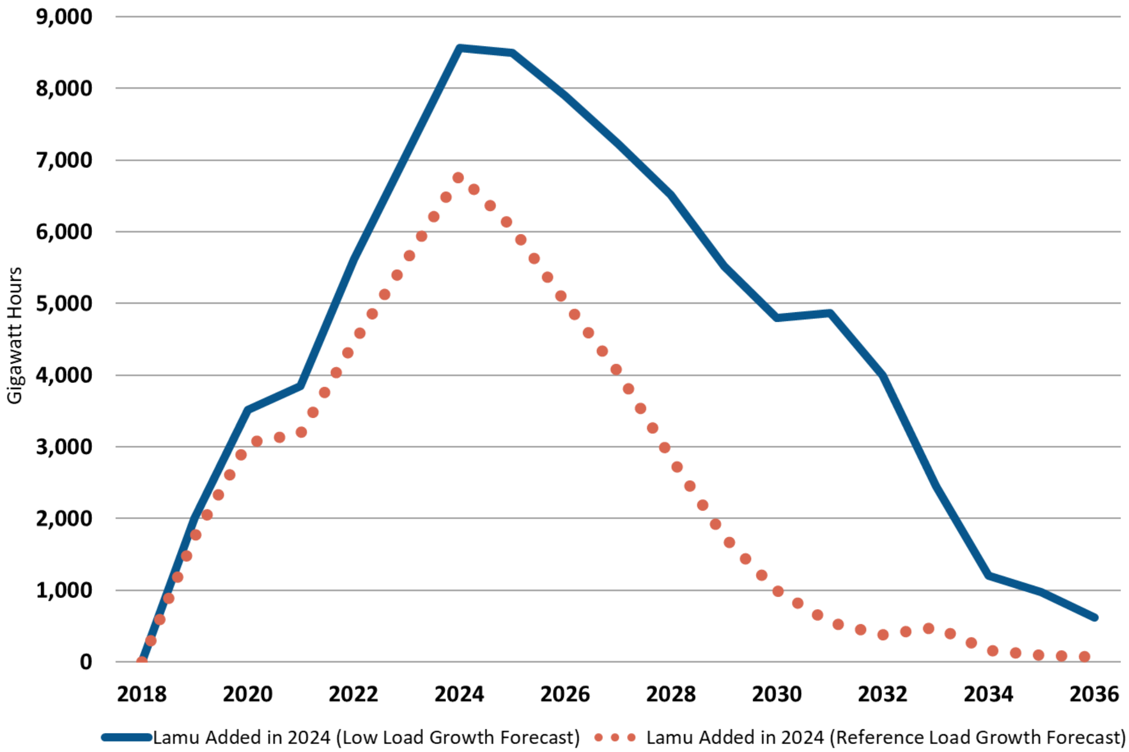
Adding all 981 MW of the proposed Lamu coal plant in 2024 would create significant excess capacity and energy for years. Specifically, as Figures 10 and 11 illustrate, in 2024 Kenya would have more than 1,300 MW of excess generating capacity and almost 7,000 GWh of excess energy. And that is for the reference case; in the low-growth scenario, the excess capacity and wasted energy figures would be significantly higher and persist longer.

**Figure 10: Projected Excess Capacity with Lamu Online in 2024**




*Source: 2017 LCPDP, at pages 132 and 137.*

## Figure 11: Projected Excess Energy with Lamu Online in 2024



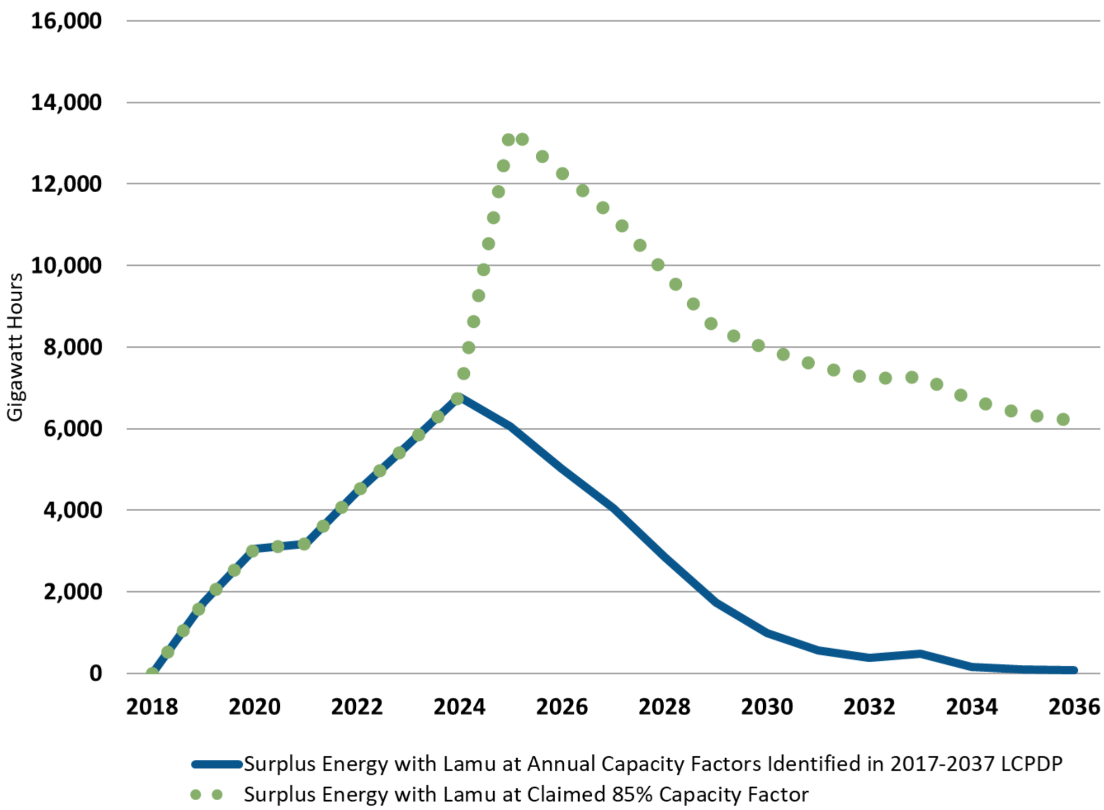

*Source: 2017 LCPDP, at pages 132 and 137.*

The excess energy would require Kenya Power to bring the system into balance by spilling or wasting energy from existing generation resources. The 2017 LCPDP noted that the excess energy that would potentially be spilled would include "hydro, geothermal, wind and solar," and include the energy that would be provided under the take-or-pay contract with Ethiopia."[29]

As discussed earlier, because of the high capital charges associated with the Lamu plant, it is also possible that it would run at a higher capacity factor than estimated in the 2017 LCPDP, which, in turn, would require spilling or wasting even greater amounts of renewable energy. This is shown in Figure 12.

[29] 2017 LCPDP, at page 97.

## Figure 12: Estimated How Much Excess Energy There Would Be if Lamu Is Dispatched at an 85 Percent Capacity Factor




*Source: IEEFA analysis based on the annual Lamu capacity factors in the 2017 LCPDP, at page 132, and an assumed 85 percent annual capacity factor.*

There also appears to be little likelihood that Kenya would be able to export a significant portion of this excess energy as other countries in eastern Africa have embarked on major programs to expand their renewable generating capacity. For example:

- Ethiopia is increasing its power generating capacity from 4,180 MW in 2014/2015 to 17,208 MW by 2019/2020. This includes 13,817 MW planned for hydro, 1,224 MW wind, 300 MW solar, and 577 MW geothermal.
- Tanzania is planning to add a 2,115 MW hydro plant that would more than double the country's generating capacity.[30]
- Kenya already imports electricity from Uganda.

[30] Kenya Business Daily. Egyptians picked to build 2,115 MW TZ hydro plant. December 13, 2018.

## *Building Lamu Will Make It Difficult, If Not Impossible, to Meet Kenya's Climate Change Goals*

The 2017 LCPDP concludes that building and operating Lamu would not prevent Kenya from meeting its greenhouse gas reduction targets adopted in connection with the Paris climate change agreement, which call for Kenya to reduce its annual GHG emissions 30 percent by 2030 when compared to a baseline of anticipated emissions growth. However, that conclusion rests on the assumption that Lamu and other coal plants in Kenya will operate at extremely low capacity factors in the future. Specifically, the LCPDP concluded: "Emissions [in the reference demand growth scenario] remain very low as the use of coal at the Lamu plant will be significantly lower than previously projected, due to unfavourable costs."[31]

But this means that Kenya Power and its customers will be stuck paying at least $360 million annually for very little electricity as, under the PPA, the annual capital charges must be paid regardless of whether the plant is dispatched, as long as it is available to be dispatched. As shown in Figure 6, this would lead to very high per kilowatt-hour costs of power from Lamu. For this reason, we believe political pressure to lower these costs would result in Lamu being dispatched more often, displacing lower-cost and cleaner renewable alternatives—and leading to a significant increase in the country's GHG emissions.

In turn, this would make it significantly more difficult, if not impossible, for Kenya to comply with its Paris Agreement obligations[32] A far better, and less-expensive, option would be to avoid building Lamu in the first place, as is demonstrated in the optimized generation expansion plan in the LCPDP.

# Conclusion

As the evidence shows, the planned 981MW Lamu coal plant would be a poor investment for all involved—except for the few companies backing the proposal and the Chinese firm contracted to build it.

For starters, assuming reasonable rates of future demand growth, the government's latest least cost power plan shows clearly that the Lamu plant would lead to significant excess generating capacity in Kenya and sharply increase electricity rates for consumers.

In addition, given the structure of the take-or-pay contract held by the developers, building Lamu almost certainly would result in higher coal-fired electricity generation and less dispatch of the nation's clean and inexpensive geothermal resources. The plant would also slow the development of readily available, clean and increasingly low-cost geothermal, wind and solar resources.

[31] Ibid, at page 220.
[32] Ibid.

Third, building and running Lamu would significantly increase Kenya's GHG emissions and complicate its efforts to comply with its obligations under the Paris Agreement.

Finally, the plant would stand in direct opposition to President Uhuru Kenyatta's 2018 pledge to move the country to 100 percent renewable energy in the near future.

Taking these concerns into account, the analysts preparing the 2017 LCPDP concluded that Lamu, if built, should at least be constructed in phases, with units sized at 150 MW to reduce the risk of over-capacity.

Instead of building Lamu with smaller units, we believe Kenya should cancel the project entirely. The 2016 Lahmeyer report and the 2017 LCPDP's optimized least cost scenario demonstrate conclusively that no new coal capacity is needed in the country at least until 2029, and maybe even later. Cancelling the project would save Kenyan ratepayers billions of dollars and give the country's nascent solar and wind power developers a chance to build capacity on a level playing field instead of competing against Lamu's onerous take-or-pay contract.

# About IEEFA

The Institute for Energy Economics and Financial Analysis conducts research and analyses on financial and economic issues related to energy and the environment. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

# About the Author

## David Schlissel

David Schlissel, Director of Resource Planning Analysis for IEEFA, has been a regulatory attorney and consultant on electric utility rate and resource planning issues since 1974. He has testified as an expert witness before regulatory commissions in more than 35 states and before the U.S. Federal Energy Regulatory Commission and Nuclear Regulatory Commission. He also has testified in state and federal court proceedings concerning electric utilities. His clients have included regulatory commissions in Arkansas, Kansas, Arizona, New Mexico and California. He has also consulted for publicly owned utilities, state governments and attorneys general, state consumer advocates, city governments, and national and local environmental organizations. Schlissel has undergraduate and graduate engineering degrees from the Massachusetts Institute of Technology and Stanford University. He has a Juris Doctor degree from Stanford University School of Law.