



**Institute for Energy Economics  
and Financial Analysis**

# **Calcasieu Pass LNG: Unreliable Operations Result in Excessive Pollution and Profits**

**Trey Cowan, Oil & Gas Analyst**

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## Key Findings

**Calcasieu Pass LNG, the fledgling project of Venture Global LNG, was built with a modular design approach that shortened construction time but resulted in a lengthy and troubled commissioning process.**

The commissioning period, which has been continuing for more than 18 months, has harmed the local community because the project has caused excessive air pollution.

Long-term contract customers (offtakers) for the liquified natural gas (LNG) project have been disadvantaged because during the long commissioning period the LNG can be sold on the higher-priced spot market rather than at contractual rates.

With three other LNG projects in the queue also using modular construction, regulators should ensure that Venture Global bears the risk of its decisions, instead of the community.



## Executive Summary

Liquefied natural gas (LNG) projects increase greenhouse gas emissions from the upstream extraction and transport of natural gas to the facility and the ultimate market use of the gas, but they can also release harmful pollution.

In the case of Venture Global's Calcasieu Pass LNG project, a design approach intended to reduce construction costs has led to pollution emissions that have resulted in air permit violations and heightened public health risks. At the same time, problems with the project have extended the commissioning period even as the company has launched exports on the spot market.

The lost opportunity for contract-rate profits for the LNG facility's long-term customers is a factor that potential offtakers should consider regarding projects that plan to take a similar approach to construction.

This report explains how the Calcasieu Pass LNG project and also subsequent Venture Global projects following the same construction design pose issues for both community residents and corporate customers.

## A Closer Look at Calcasieu Pass LNG's Rapid Construction and Extended Commissioning

Venture Global's Calcasieu Pass LNG project used a modular design consisting of multiple small liquefaction trains that were constructed in Italy and shipped to Louisiana for installation. The design was billed as a cheap and efficient means of building export terminals. Although construction was completed quickly, the project has suffered from an extended and troubled commissioning process resulting from significant design flaws and problems related to its modular design and rapid construction. Flaring and emissions violations during commissioning have stoked community opposition to the project.<sup>1,2</sup> Also, Venture Global's customers have complained that the company is exploiting loopholes to sell LNG on a spot market at higher prices, rather than supplying it under long-term, cheaper contract prices.<sup>3</sup>

The development process for an export LNG terminal can be sorted into two parts: Pre-FID and post-FID activities. "FID" is an abbreviation for "final investment decision." It is the official announcement by a company that it has lined up the capital requirements necessary to fund construction and intends to build the project.

<sup>1</sup> Louisiana Illuminator. [Environmental groups seek federal intervention for Calcasieu Pass LNG terminal they deem polluter](#). May 26, 2023.

<sup>2</sup> The Advocate. [Venture Global LNG faces potential fines for accidental releases at Calcasieu Pass terminal](#). July 20, 2023.

<sup>3</sup> Reuters. [Shell, BP pursue arbitration claims against Venture Global LNG](#). July 12, 2023.

During the pre-FID process, companies sign up long-term customers, address local issues, and obtain financing and regulatory approvals. Also, a front-end engineering design (FEED) study is done to determine the technical requirements and overall project costs. As part of the Federal Energy Regulatory Commission (FERC) permit application process, the agency will issue an environmental impact statement for the project that spells out how the project must mitigate the impact of its construction and operation on public health and the environment.

After the final investment decision is made, engineering, procurement and construction (EPC) of the project occurs. When construction is finished, the project's developers request a feedstock permit from FERC that allows the plant to accept feed gas for the liquefaction train, which converts natural gas into LNG by cooling it to almost -260 degrees Fahrenheit. The first delivery of feed gas marks the beginning of the commissioning phase.

During the commissioning phase of an LNG plant, the operator can test equipment and rectify unforeseen issues with the plant's operations. Under its sale and purchase agreements, the contractual obligation between the LNG export terminal and an offtaker (i.e., contractual client) do not begin until commissioning is complete. This means that until commissioning is complete, LNG companies can sell commissioning cargoes on the international spot market rather than delivering them to buyers who had contracted capacity at the plant. Once an operator has met all the requirements for commercial operations, it will request FERC's permission to begin commercial operations, and will then deliver LNG cargoes to its contracted buyers.

**Rapid Construction.** When Calcasieu Pass LNG shipped its first cargo more than a year ago, Venture Global LNG boasted that its innovative construction design represented a stark departure from most earlier LNG export terminal designs. The new design was a key factor in how the company was able to get from FID to production so quickly.<sup>4</sup> Rather than carrying out all the construction at the export terminal site—like most previously built U.S. LNG terminals—Calcasieu Pass LNG used a modular design, with a significant portion of its facility fabricated in an Italian factory and then shipped to the site for assembly.<sup>5</sup>

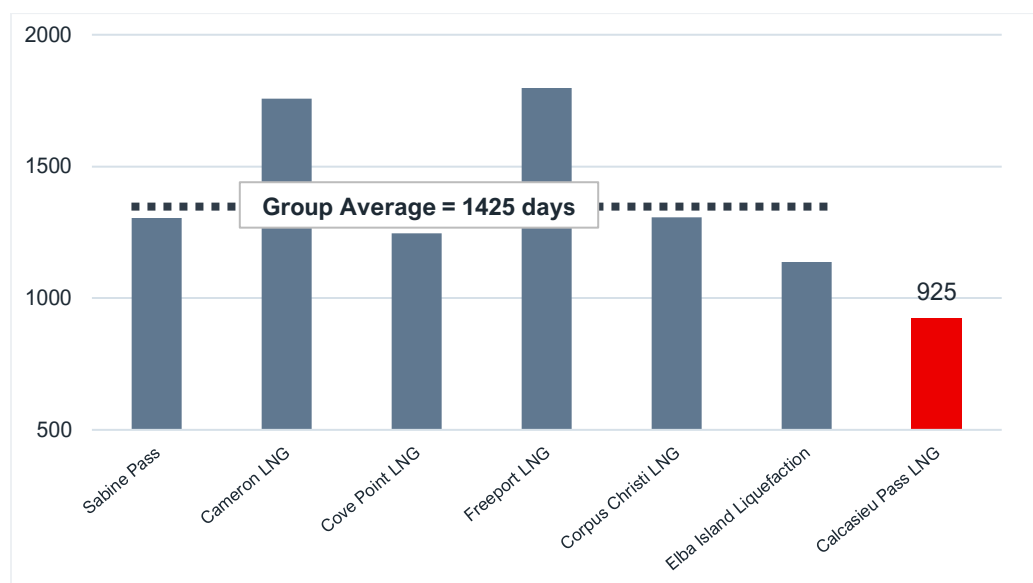
The unique design enabled Venture Global to build Calcasieu Pass within 30 months—a much shorter construction phase than the average for the six previous terminals built by other developers, where construction took about four years.<sup>6</sup>

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<sup>4</sup> JERA. [Venture Global LNG and JERA Announce Departure of Inaugural Commissioning Cargo from Calcasieu Pass](#). March 2, 2022.

<sup>5</sup> Venture Global LNG. [Venture Global Calcasieu Pass Announces Arrival of First Factory-Fabricated Liquefaction Trains](#). November 10, 2020.

<sup>6</sup> JERA. *op. cit.*

**Figure 1: Time Between Commercial Construction Inception and First Cargo**

Source: Company reports.<sup>7</sup>

**Extended Commissioning.** Calcasieu Pass LNG’s rapid construction reduced construction costs and yielded quick revenues for Venture Global. But Calcasieu Pass LNG still suffers from leaks and excessive flaring due to design flaws. More than 18 months after construction was completed, the company is still trudging through a commissioning phase, working through all the issues that arose from its quick construction.<sup>8</sup>

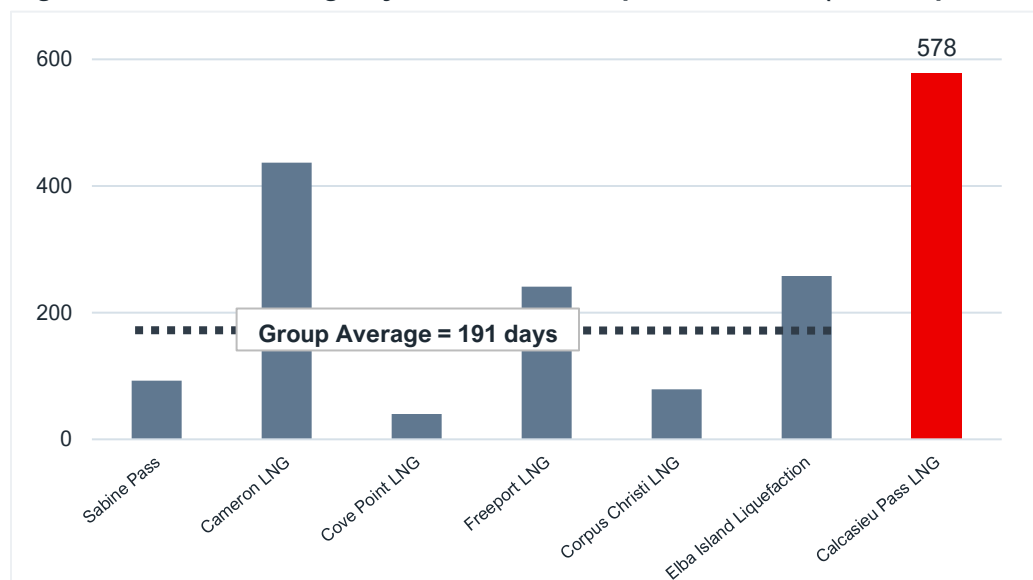
What is taking so long? Venture Global LNG reported in a March 28, 2023, letter to FERC that the lengthy commissioning phase for its Calcasieu Pass LNG export terminal was due to “daily corrective, testing, and rectification work ... because of its modular, midscale design and on-site power generation (among other reasons).”<sup>9</sup>

As illustrated in Figure 2, the lengthy ongoing commissioning of Calcasieu Pass LNG is unprecedented and could likely span three years before commercial operations start—almost three times the average of other U.S. LNG export terminals.

<sup>7</sup> Cheniere. [Cheniere Partners' Board of Directors Made Positive Final Investment Decision \("FID"\) for First Two Liquefaction Trains](#). July 2012. See also Cheniere. [Cheniere reaches FID for Corpus Christi liquefaction project](#). May 2015. See also PRNewswire. [Dominion Begins Construction Activities For Cove Point LNG Export Project](#). October 2014. See also Freeport LNG. [Corporate History](#). Website accessed September 2023. See also PRNewswire. [Final Investment Decision Reached For Cameron LNG Liquefaction-Export Project](#). August 2014. See also LNG Industry. [Kinder Morgan to commence Elba Liquefaction project construction on 1 November 2016](#). October 2016. See also Venture Global LNG. [Venture Global Announces Final Investment Decision and Financial Close for Calcasieu Pass LNG](#). August 2019.

<sup>8</sup> S&P Global Commodity Insights. [A year later, Calcasieu Pass still commissioning as expansions get boost, foundation customers wait](#). March 21, 2023.

<sup>9</sup> Venture Global Calcasieu Pass, LLC. [Commissioning Update to FERC](#). Docket CP15-550-000. March 28, 2023.

**Figure 2: Commissioning Days for U.S. LNG Export Terminals (as of September 30, 2023)**

Source: U.S. Department of Energy.<sup>10</sup>

Ironically, the lengthy commissioning process has been a financial boon for Venture Global. Despite excessive emissions and flaring, Calcasieu Pass has been able to operate through most of its commissioning period and has sold more than 170 LNG commissioning cargoes into international spot markets. Due to elevated LNG prices, these sales have yielded substantially higher profits for Venture Global than the company would have received if it had completed commissioning sooner and sold cargoes to its contractual counterparties.

<sup>10</sup> Energy Information Administration. [U.S. Liquefaction Capacity](#). Accessed September 2023.

## Calcasieu Pass LNG’s Speedy Construction Has Resulted in Pollution Risks for the Community

Getting to commissioning so quickly by departing from past construction design practices has exacerbated pollution and reputational risks for the company. Both the community and the company’s clients are bearing adverse impacts from the operation of Calcasieu Pass LNG export terminal during the prolonged commissioning period.

Communities in Cameron Parish, La., where the Calcasieu Pass LNG export terminal is located, are suffering from pollution resulting from Venture Global LNG’s construction decisions. The community has raised concerns about pollution and emissions from the LNG facility, and the company itself reported instances where emissions exceeded allowable amounts to the Louisiana Department of Environmental Quality (LDEQ).<sup>11</sup>

Records show that Venture Global Calcasieu Pass LNG frequently violated its air permits in 2022. The LDEQ sent a Consolidated Compliance Order and Notice of Potential Penalty to Calcasieu Pass LNG in June that listed 139 volatile organic compound (VOC) infractions and 47 hazardous air pollutant (HAP)/toxic air pollutant (TAP) emissions incidences, all of which exceeded permitted levels.<sup>12</sup>

Venture Global Calcasieu Pass LNG has singled out its design flaws as an explanation for excessive pollution at the terminal. The “cause(s) of the deviation” listed in its report about 2022 operations puts blame squarely on design flaws.<sup>13</sup> It stated:

“As described in a letter dated February 5, 2022, the hot oil heaters are a designed solution for the facility and since initial startup, they have experienced unexpected outages beyond the control of CP. The outages were caused primarily (but not exclusively) by a design issue associated with the furnace assembly whereby heated flue gas was misdirected onto several heater instruments, resulting in the instruments overheating which caused the hot oil heater to trip.”<sup>14</sup>

The company’s description of the cause for deviation was repeated several times on the form.

The extended commissioning is plaguing the community with pollution far in excess of levels permitted by the state—pollution with toxic emissions that do not affect the air quality or health of Venture Global LNG’s executive team, which is headquartered in suburban Washington, D.C.

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<sup>11</sup> Louisiana Illuminator. [Environmental groups seek federal intervention for Calcasieu Pass LNG terminal they deem polluter](#). May 26, 2023.

<sup>12</sup> Louisiana Department of Environmental Quality (LDEQ). [Consolidated Compliance Order & Notice of Potential Penalty Enforcement Tracking No. AE-CN-22-00367](#). June 29, 2023.

<sup>13</sup> LDEQ. [Revised 1st Half of Reporting Year 2022 Title V Semiannual Monitoring Report](#). March 30, 2023.

<sup>14</sup> *Ibid.*



Venture Global took the risks by choosing a modular terminal construction design—risks that have given way to excessive pollution levels in Cameron Parish.

## Calcasieu Pass LNG’s Prolonged Commissioning Period Has Provided the Company Access to Higher Spot Prices While Frustrating Its Long-term Clients

The long commissioning period under way at Calcasieu Pass LNG export terminal has frustrated Venture Global customers with long-term contracts, who are not receiving shipments. Since Venture Global is not bound by contractual commitments during the commissioning process, it has been selling cargoes on the spot market.

Despite heat recovery steam generator failures, reliability test failures of the power island, and other “reliability challenges” mostly attributed to Calcasieu Pass LNG’s modular construction design, the terminal exported 128 cargoes during its first year of commissioning at an average of 1.1 billion cubic feet per day.<sup>15</sup>

RBN Energy pegged the average number of commissioning cargoes sold at one to three cargoes per newly built train for Venture Global LNG’s predecessors.<sup>16</sup>

As of May 2023, the company had shipped 177 cargoes while undergoing commissioning. The value of the shipments was estimated to be more than \$15 billion by Reuters,<sup>17</sup> and output from the terminal has ramped up to almost full capacity since October 2022.

If its current pace continues, Calcasieu Pass LNG will likely ship at least 200 cargoes more than the average number of commissioned cargoes sold by its peers before commercial operations are launched.

The shipments represent a reputational risk spawned by Venture Global LNG’s fast construction of Calcasieu Pass LNG. Because they are classified as commissioning cargoes, the sales have occurred on the spot market. These short-term cargo sales are much more lucrative than the profits Venture Global will recognize once commercial contracted operations begin.

The value proposition appears to have soured for the project’s contracted offtakers, and the situation is likely to continue. Commercial operations originally expected in 2022 for fulfilling the offtaker contracts now appear to be delayed until late 2024.<sup>18</sup>

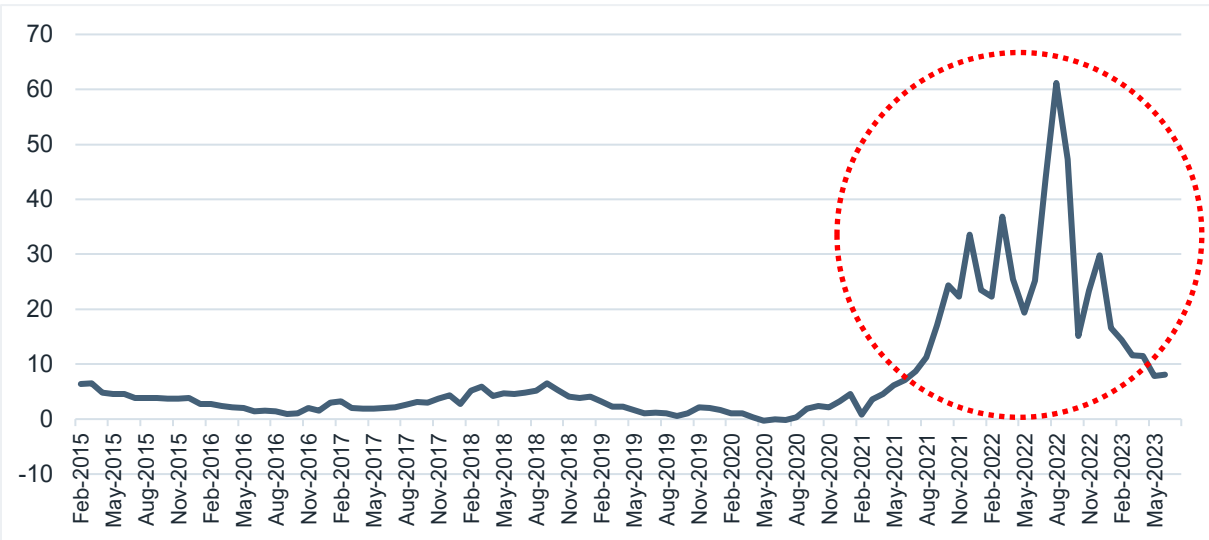
<sup>15</sup> Department of Energy. [LNG Monthly 2023](#). August 15, 2023.

<sup>16</sup> RBN Energy. [King Creole Part 3 Venture Global Becomes LNG Leader as Calcasieu Pass Commissioning Drags On](#). August 16, 2023.

<sup>17</sup> Reuters. [Venture Global LNG blasts complaints over lack of LNG cargoes](#). August 7, 2023.

<sup>18</sup> Bloomberg. [Venture Global Delays Contracted LNG Shipments Until End of 2024](#). July 13, 2023.

Figure 3: Monthly Global Natural Gas Prices Less Henry Hub Prices (\$/mmBtu)



Source: EIA and International Monetary Fund as presented by St. Louis Federal Reserve.

Figure 3 depicts the monthly spreads between global average and Henry Hub average natural gas prices. The offtakers entered into long-term contracts with Calcasieu Pass LNG, accepting the risk that future differences between their purchase price and the eventual selling price are volatile. The offtakers were willing to lock in future supplies under long-term contracts because they expect periods of high profitability will overshadow the times marked by poor (or possibly negative) returns. The duration circled in red in Figure 3 is an example of a time when offtakers would generally make outsized returns.

Calcasieu Pass LNG, on the other hand, made long-term contracts to lock in more stable income streams and foisted the risk of lower natural gas prices onto its offtakers through take-or-pay arrangements. The lengthy commissioning phase has provided Calcasieu Pass LNG with the rewards from the price spike in 2022 without the commensurate long-term risk.

**Table 1: Long-Term Contract Clients of Calcasieu Pass LNG**

Number	Date	Company	Amendment
1	1/19/2016	Shell NA LNG LLC	2/28/2018
2	9/25/2017	Edison S.P.A.	
3	4/30/2018	Galp Energia E&P B.V.	
4	5/17/2018	BP Gas Marketing Limited	
5	8/14/2018	Repsol LNG Holding, S.A.	
6	9/28/2018	Polskie Gornictwo Naftowe   Gazownictwo S.A.	9/2/2021
7	11/14/2018	Venture Global Commodities, LLC	
8	9/18/2021	China International United Petroleum & Chemicals Co., Ltd.	
9	12/9/2021	CNOOC Gas and Power Singapore Trading & Marketing Pte. Ltd.	6/20/2022

Source: DOE Office of Fossil Energy and Carbon Management.

Calcasieu Pass entered the commissioning phase at a time of record-setting natural gas prices due to Russia's war on Ukraine and undersupplied conditions from constrained production following the worst effects of COVID-19 on energy demand. If Calcasieu Pass LNG were fully commissioned, then the excess profits due to higher global natural gas prices, as illustrated by the larger spreads, would not go to Venture Global but instead would benefit its contracted customers.

A 20% profit margin for the spot market cargo sales is not out of the realm of possibility. Combining this assumption with the Reuters estimate of \$15 billion in sales implies Venture Global LNG's profits from Calcasieu Pass could top \$3 billion through May 2023. For point of reference, Cheniere LNG (the first and largest U.S. LNG exporter) reported \$2.6 billion in net income during 2022.

Long-term contract holders Shell, BP, Edison SpA, and Repsol SA have all cried foul over the company's conduct, with the first three separately filing arbitration cases against Venture Global.<sup>19</sup> Repsol took a different route by asking FERC to grant it intervenor status.<sup>20</sup> FERC ruled against Repsol and subsequently denied the company's request for a rehearing, noting time had long expired for Repsol to make its request.<sup>21</sup>

Venture Global has maintained it has not breached its long-term contracts.<sup>22</sup> Although Venture Global may have suffered reputationally from its lengthy commissioning of Calcasieu Pass, the company is profiting handsomely.

<sup>19</sup> Reuters. [BP to defend its rights in dispute with Venture Global LNG: other clients weigh options](#). August 1, 2023.

<sup>20</sup> FERC. [Motion for Leave to Intervene Out of Time of Repsol LNG Holding, SA](#). April 25, 2023.

<sup>21</sup> FERC. [Notice Denying Late Intervention](#). May 3, 2023.

<sup>22</sup> Reuters. [Venture Global LNG blasts complaints over lack of LNG cargoes](#). August 8, 2023.

## The Future Does Not Look Brighter for the Community—and Similarly Situated Communities May Also Be at Risk

Venture Global has applied not only for renewal but also for modifications of Calcasieu Pass LNG air permits.<sup>23</sup> It is asking LDEQ to raise the limits on its hazardous and toxic emissions.<sup>24</sup> In the meantime, the company expects to remain in commissioning through much of 2024, as it works out reliability challenges and addresses the pollution problems that spurred LDEQ to issue a compliance order considering fines for excessive emissions.<sup>25</sup>

Correspondence between LDEQ and Venture Global Calcasieu Pass LNG regarding its infractions do not appear too worrisome for the company, given the cordial tone between all parties.<sup>26</sup> And although the community is alarmed by the pollution and excessive flaring from the LNG export terminal buildout, the state has not indicated it will reject increasing emissions limits.

We are also concerned about other projects Venture Global has in development that are standardized around the mid-scale modular liquefaction technology used in Calcasieu Pass. Such projects include the 20 million tons per annum (MTPA) Plaquemines LNG facility currently under construction; the 20 MPTA CP2 LNG terminal nearing FID; and the 20 MPTA Delta LNG under consideration.<sup>27</sup> They pose similar risks due to their construction designs. In its amended application for Plaquemines LNG, Venture Global asserted that it had learned from the problems at Calcasieu Pass LNG in both construction and operations, but that remains to be seen.<sup>28</sup>

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<sup>23</sup> LDEQ. [Application for the Renewal and Significant Modification of Title V Permit and Major Modification of the Prevention of Significant Deterioration Permit](#). March 17, 2023.

<sup>24</sup> American Press. [Venture Global Release 'Preventable, Unauthorized'](#). July 25, 2023.

<sup>25</sup> LDEQ. [Consolidated Compliance Order & Notice of Potential Penalty Enforcement Tracking No. AE-CN-22-00367](#). June 29, 2023.

<sup>26</sup> LDEQ. [Email Correspondence](#). June 21, 2023.

<sup>27</sup> Amounts refer to nameplate liquefaction capacity.

<sup>28</sup> Department of Energy. [Application of Venture Global Plaquemines LNG for Limited Amendment to Existing Authorization](#). March 11, 2022.

## Underwhelming Oversight by LDEQ

LDEQ asserts its vision is “to be a respected steward of the State’s environment,” and the agency’s mission is “to provide service to the people of Louisiana through comprehensive environmental protection in order to promote and protect health, safety and welfare.”<sup>29</sup> The goal is laudable but has no meaning unless it is translated into agency action.

Concerns have been raised that the LDEQ is failing to achieve its mission. Last year, for example, a Louisiana judge vacated the permits of FG LA LLC (Formosa Plastics) after finding that LDEQ failed to conduct a meaningful cost-benefit analysis and thus “failed to act with ‘diligence, fairness and faithfulness’ as its constitutional duty requires when making a decision that affects environmental resources (here the very air people living near the FG LA site will be forced to breathe).”<sup>30, 31</sup>

Although LDEQ has notified Calcasieu Pass LNG of potential fines for violations of its permit in 2022, all related to operations during commissioning, we are concerned that the penalties may not be sufficiently stringent. Lack of strong penalties will not likely change the company’s processes for commissioning its next three projects. The company’s recent conduct regarding the Calcasieu Pass LNG appears to indicate that shipping cargoes takes priority over controlling its emissions.

Allowing Calcasieu Pass to continue to operate in a manner that neglects the health, safety, and welfare of the public is unacceptable. Arbitrary and capricious “stewardship” by LDEQ that serves industry instead of the public could lead to further litigation. It is not outside the realm of possibility that LDEQ could face some court-supervised monitoring, considering the complaints on other matters that compelled the EPA’s Office of Environmental Justice and External Civil Rights to send a letter of concern to LDEQ and Louisiana Department of Health last year.<sup>32,33</sup>

In our view, if LDEQ grants a renewal permit for the Calcasieu Pass LNG the action will have a striking resemblance to rewarding failure.

<sup>29</sup> LDEQ. [About LDEQ](#). Accessed October 5, 2023.

<sup>30</sup> 19<sup>th</sup> Judicial District Court Parish of East Baton Rouge. [Rise St. James v. LDEQ](#). 2022.

<sup>31</sup> This decision is currently on appeal.

<sup>32</sup> EPA. [Letter of Concern](#). October 12, 2022.

<sup>33</sup> EPA closed its investigation of the complaints administratively in June 2023, without making final findings under civil rights laws or taking actions, but noted in part that it is seeking to pursue matters relevant to one area of complaint in other ways and that the future of the matter in another complaint is uncertain due to litigation. EPA. [Letter to LDEQ re administrative closure of complaints](#). June 27, 2023.

## Conclusion

Long-term offtakers for the Calcasieu Pass LNG project like BP, Shell, Repsol and Edison SPA are disadvantaged during the extended commissioning of the facility, since potential supplies are being sold without the offtakers receiving the profits. This should serve as a caution to potential offtakers for other LNG projects where similar complications may arise.

With respect to the social contract with the public, the conditions in the case of the Venture Global Calcasieu Pass LNG export terminal appear unjust. The community relies on regulators to step in to prevent environmental risks and protect the public's interests. IEEFA hopes to see stronger action by LDEQ, EPA, and FERC to protect the public. As it stands right now, the community is absorbing the brunt of the environmental issues that Venture Global LNG has created.

## About IEEFA

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## About the Author

### Trey Cowan

Trey Cowan is a finance professional with 30 years of experience focused primarily on providing commentary & analysis to capital markets and upstream oil & gas management teams. Prior to his current position, Mr. Cowan was an analyst with S&P Global (Platts Analytics) where he focused on U.S. upstream drilling activities and fundamental energy trends. Mr. Cowan is a Texas licensed CPA and holds an MBA in Finance from Vanderbilt University.

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