

Indonesia's Downstream Coal Plans Add Up to a Black Hole

DME Is Economically and Financially Unfeasible

Executive Summary

While global leaders were focused on building confidence in new net-zero commitments at the November COP26 meeting in Glasgow, the American industrial gas company Air Products & Chemicals (APD) was busy signing memoranda of understanding (MOUs) reportedly worth as much as US\$15 billion to develop coal gasification projects in Indonesia.^{1 2}

The high-profile signing ceremony with Indonesian President Joko Widodo and a group of leading ministers on the sidelines of the Indonesia-UAE Investment Forum in Dubai, was surprising to outside observers in light of government commitments to reduce the use of coal. This very public push for high-value investments from APD may prove an awkward fit with the challenges that they and their Indonesian counterparts are facing, as they try to make the numbers work on two deals announced earlier.

**Air Products signed
four MOUs for coal
gasification projects
in Indonesia estimated
at US\$15 billion.**

But to seasoned observers of APD, the company's interest in downstream coal projects in Indonesia is old news, because the company has been in negotiations on two projects with an estimated value of US\$4.1 billion over the last two years. These are a proposed \$2.1 billion project with state-owned enterprise (SOE) Tambang Batubara Bukit Asam (PTBA) to build a coal gasification plant in Sumatra to produce methanol and subsequently dimethyl ether (DME),³ announced in January 2020,⁴ and a proposed \$2 billion coal to methanol project in Kalimantan, with the privately owned Bakrie Group, announced in May 2020.⁵

These two projects come at a time when cash-rich APD is eager to deploy capital to large-scale international projects to generate reliable cash flows and help the company position itself as a "clean energy" leader in emerging markets. For

¹ Petromindo. [Air Products signs investment deals with four RI firms](#). November 8, 2021.

² Nikkei. [Indonesia-signs-15bn-deal-with-U.S.-company-to-turn-coal-into-chemicals](#). November 6, 2021.

³ IEEFA. [Proposed DME Project in Indonesia \(D\)oes Not \(M\)ake Economic Sense](#). November 2020.

⁴ Bukit Asam. [Menteri BUMN dukung penuh PTBA lakukan gasifikasi batu bara](#). January 30, 2020.

⁵ Air Products. [Air Products to Invest \\$2 Billion for Landmark Coal-to-Methanol Project in Indonesia](#). May 14, 2020.

Indonesia's cash-hungry policymakers, APD's coal gasification technology is a trifecta that will stoke demand for low-rank coal reserves, boost foreign investment, and displace subsidized liquified petroleum gas (LPG) imports.

This mix of business and policy goals has triggered a looming policy conflict because it may be impossible to satisfy the needs of all parties at the table. APD's business model thrives only with a low risk, guaranteed return. Unfortunately, the Indonesian corporate and SOE counterparties prefer everyone else—APD or consumers—to bear much of the market risk. Meanwhile, the Ministry of Finance is supportive only if coal gasification can knock out other imported fuel products without high subsidies.

Despite the many optimistic statements made about the downstream coal transactions, it may be hard for all these parties to realize their dreams. Based on IEEFA's analysis, project funding may rest on terms and conditions that no side can easily offer, much less guarantee. Moreover, the raft of subsidies offered to kickstart the projects may dampen the Ministry of Finance's enthusiasm, as the value of subsidies "saved" through lower fuel imports may be less than imagined.⁶

Coal supplier PTBA's goal is to reduce the stranded asset risk for the 2.8 billion-tonne Tanjung Enim coal deposit.

This report updates IEEFA's November 2020 analysis of the prospects for one of the projects previously announced, a proposed US\$2.1 billion project in Sumatra to build a coal gasification plant to produce methanol and subsequently dimethyl ether (DME) by coal SOE PTBA.⁷ DME would then be used as a direct substitute for Indonesia's LPG imports. Although statements made in public seminars by PTBA, Pertamina, the Ministry of Mineral and Energy Resources (MEMR)⁸ and in a CNBC Indonesia interview with the PTBA CEO⁹ indicate that some activity is occurring, it is not clear yet whether the project will come to fruition.

In this report, IEEFA lays out several key points regarding the PTBA DME project:

Stakeholder Preferences: IEEFA understands the key objectives of each of the parties in the DME project to include the following:

Coal supplier PTBA: to reduce the stranded asset risk for the 2.8 billion-tonne Tanjung Enim coal deposit.

⁶ Petromindo. [PTBA has yet to agree on coal price for gasification project](#). November 16, 2021.

⁷ IEEFA. [Proposed DME Project in Indonesia \(D\)oes Not \(M\)ake Economic Sense](#). November 2020.

⁸ Dunia Energi. [Durnia Energi Webinar - DE Talk: Mengukur Nilai Keekonomian Hilirisasi Batu bara dan Perubahan Tren ke Energi Bersih](#). March 9 2021.

⁹ CNBC Indonesia. [Bulan lagi PTBA mulai garap proyek gasifikasi batu bara](#). January 27, 2021.

The DME plant operator APD: a fixed return over a 15- to 20-year period to pay for the costs of building the plant.

The DME buyer Pertamina: to sell the DME at a profit.

IEEFA also looks at the government through MEMR's priority of using DME to reduce heavily subsidized LPG imports, and the Ministry of Finance's concern about DME subsidies for the consumer.

PTBA: It would benefit PTBA to reduce the stranded asset risk of the Tanjung Enim coal deposit.

APD: APD's business model is to cut out all commodity price risks and guarantee its returns. However, this low-risk business model may prove difficult to implement in the case of PTBA's DME project. IEEFA's view is that APD is very unlikely to take on any pricing risk, either on coal inputs or the price of DME sold to the purchaser (Pertamina, Indonesia's dominant energy SOE).

Pertamina: It would benefit Pertamina to obtain a price that is profitable and cheaper than LPG imports. IEEFA notes it is difficult to calculate a price for Pertamina. The difficulty in calculating a price for the DME is that coal, LPG and oil prices all move in the same direction. The substitution benefits of replacing DME with LPG are limited when all prices tend to move together. According to IEEFA, the DME price has been cheaper than LPG for 15 months over the last 20 years—only 6% of the time.

IEEFA examines two DME pricing scenarios where coal is either supplied at cost-plus-15% from PTBA, or at market price. Under both scenarios, APD has a 15% markup on the DME. The breakeven LPG price for DME substitution is US\$858/tonne for the cost-plus-coal scenario of US\$1,098/tonne for coal at market price. The LPG price has exceeded US\$858/tonne for 15 months over 20 years and has not exceeded US\$1,098/tonne for at least 20 years.

Air Products' business model is to cut out all commodity price risks and guarantee its returns.

A Ministry of Finance Concern: The Ministry of Finance is focused on the potential subsidy cost of DME for Indonesians.¹⁰ Similar to LPG subsidies where the price of LPG to the Indonesian consumer is capped at US\$300/tonne, IEEFA concludes a subsidy is required for the DME due to its high production cost of US\$601/tonne, which includes a 15% DME production margin for APD.

The 1.4 million tonnes of DME to be produced by the DME plant can substitute for 980,000 tonnes of LPG. IEEFA first calculates the cash outflow for the Indonesian

¹⁰ International Institute for Sustainable Development. [LPG subsidy reform Indonesia](#). May 2021 page 6.

government for buying LPG at market price and charging only the subsidized US\$300/tonne price for cash inflow. At a price of US\$500/tonne for LPG, IEEFA calculations show the cash outflow to subsidize 980,000 tonnes of LPG is US\$196 million. This compares to the total LPG subsidy bill of US\$559 million at the current LPG price of US\$870/tonne.

For DME, IEEFA uses a lower DME price using coal input at cost plus (instead of market price) which gives a DME price of US\$601/tonne. Since DME contains 70% of the energy content of LPG, IEEFA has calculated a subsidized price of US\$210/tonne,¹¹ which IEEFA believes is acceptable to consumers (Appendix). This DME pricing mechanism and subsidized price involves an annual cash expenditure of US\$547 million on 1.4 million tonnes of DME.

Conclusion: Unable to Justify Economic Case for Substitution of LPG

IEEFA concludes that the savings only work for the Indonesian government when the LPG price is more than US\$858/tonne, which has only happened for 15 months during the last 20 years.

The DME project in its current form would not be able to justify any savings from the substitution of LPG imports, except for a limited period. It is also unable to satisfy all four major stakeholders simultaneously.

¹¹ IEEFA. [Proposed DME Project in Indonesia \(D\)oes Not \(M\)ake Economic Sense](#). November 2020.

Table of Contents

Executive Summary	1
Indonesia's High Profile Transition Bets	6
The Rationale for the DME Project.....	9
Stakeholder Preferences?.....	10
PTBA Preference: Reducing Stranded Asset Risk	11
APD Preference: A Successful Low-Risk Business Model.....	14
APD's DME Project Only Works With Cheap Coal.....	15
Pertamina Preference: A Profitable Purchase Price – But Calculations Are Difficult	18
Two Breakeven LPG Prices of US\$858/t and US\$1,098/t.....	21
What Ministry of Finance Is Concerned About: Subsidies for the DME Plant	22
Conclusions: Difficult to Justify DME.....	24
Appendix: Adjusted LPG Prices and DME Match Price.....	26
About the Author.....	27

Indonesia's High Profile Transition Bets

Over the past 12 months, Indonesia has pivoted to address new global market realities that threaten its energy-intensive development model. As a major coal producer and exporter, this has huge implications for the country's post-COVID recovery and the development of a credible carbon emissions pathway to support the country's status as the leader of the G20 in 2022.

This has put the spotlight on high-profile efforts to promote energy projects, like the ones involving Air Products & Chemicals (APD), which signed four memoranda of understanding (MOUs) with Indonesian companies—three coal gasification and one blue ammonia project. These projects were signed in November 2021 at the Indonesia-UAE Investment Forum in Dubai.¹² National Investment Coordinating Board (BKPM) Chairman Bahlil Lahadalia and APD CEO Shefi Ghasemi signed the MOUs. President Joko Widodo and key ministers witnessed the signings.

Table 1: MOUs Signed by APD on 4 Nov 2021 for Indonesian Projects

Indonesian Company	Project Type	Value (US\$ bn)
Batulicin Enam Sembilan	Coal to DME	
Indika Energy	Coal to DME	
PTBA	Coal to Methanol	
Butonas Petrochemical	Blue Ammonia	
Total		15.0

Source: *Petromindo and Katadata.*

During the last two years, APD has also been involved in two other proposed coal gasification projects in Indonesia—a coal-to-methanol project in Kalimantan and a DME project in Sumatra. At the core of APD's strategy is a growing international pipeline of large-scale gasification and hydrogen projects.

These two projects are worthy case studies of whether their strategy can address the complex market realities of Indonesia's rapidly transitioning energy market.

The first project, currently in APD's "major project" list, is a coal-to-methanol plant in Bengalon, East Kalimantan.¹³ PT Bakrie Capital will supply the coal, and APD will invest about US\$2 billion to build, own and operate the plant to produce methanol for Bakrie. The facility will use almost six million tonnes of coal to produce nearly two million tonnes of methanol per year. The project is expected to be completed in 2025. PT Bakrie Capital has committed to buy the methanol for sale within

¹² Nikkei. [Indonesia-signs-15bn-deal-with-U.S.-company-to-turn-coal-into-chemicals](#). November 6, 2021.

¹³ Air Products. [Create Shareholder Value Q4 FY2021 Earnings Conference Call](#). November 4, 2021.

Indonesia.¹⁴

The second project in Sumatra is a US\$2.1 billion DME plant to convert six million tonnes of coal annually to 1.4 million tonnes of DME and to reduce LPG imports by 980,000 tonnes per year. The project is in conjunction with Indonesian SOE coal miner Tambang Batubara Bukit Asam (PTBA) and the national oil company Pertamina. The project was listed as a national strategic project in November 2020.¹⁵

In a signal of the political significance associated with the project, the Minister for SOEs, Erick Thohir, made a well-publicized working visit to the United States during Ramadan in May 2021 and witnessed the signing of a cooperation agreement between the CEOs of PTBA, Pertamina and APD.^{16 17} Despite APD's active negotiating posture, the company has been more restrained in disclosing any details on the progress of the deals on their website or in their corporate announcements. As a result, market information on the PTBA project has only come from the Indonesian side.

The Sumatra project is a US\$2.1 billion DME plant to convert six million tonnes of coal annually to 1.4 million tonnes of DME and to reduce LPG imports by 980,000 tonnes per year.

Given the scale of the PTBA project and the potential market impact on consumers and the subsidy budget, the lack of transparency around the Sumatra project is surprising. This project is notable, since there appears to be no firm agreement on key project fundamentals, including the funding, pricing, or purchase offtake. For example, APD and PTBA are unable to agree on the price of coal sold to the plant.¹⁸ This information gap is a red flag because APD's strategy highlights a preference for low-risk project structures.

Based on the announcement of the Bakrie Group methanol project, APD favors a "tolling" model in which the sale and price of the methanol produced is guaranteed by the buyer. This will ensure that any commodity price risk will not backfire on APD. This will help APD manage the cash flow since APD operates a build-operate-transfer (BOT) model and will pay for the upfront capital expenditures (capex). Given APD's silence on the PTBA project's deal fundamentals, the DME project may still be some distance from the finish line if the three sides have not agreed on how to structure pricing and operations.

¹⁴ Air Products. [Air Products to Invest 2 billion in Landmark Coal-to-Methanol Project in Indonesia](#). April 14, 2020.

¹⁵ PTBA. [Gasifikasi batu bara PTBA jadi proyek strategis nasional](#). November 30, 2020.

¹⁶ VOI. [Erick Thohir reports from the us this trip focuses on energy health and investment cooperation](#). May 11, 2021.

¹⁷ PTBA. [Coal Proyek gasifikasi batu bara guna pangkas impor lpg](#). May 11, 2021.

¹⁸ Petromindo. [PTBA has yet to agree on coal price for gasification project](#). November 16, 2021.

This report will focus on the DME project from PTBA, since it has the most public details available. We start with the rationale for the project and take a five-part approach that looks at what each stakeholder's preferences are from the project:

1. **Stakeholder Preferences:** IEEFA outlines the preferences for each of the three parties in the DME project. IEEFA also looks at the top government priority of using DME to reduce heavily subsidized LPG imports and the Ministry of Finance's concern whether DME needs to be subsidized to the consumer.

For the three parties in the DME project, IEEFA believes coal supplier PTBA prefers to reduce the stranded asset risk for the 2.8 billion tonne Tanjung Enim coal deposit. The DME plant operator APD in line with the strategy disclosed in their annual report prefers a fixed return over a 15- to 20-year period to pay for the DME plant capex.¹⁹ IEEFA believes the DME buyer, Pertamina, would prefer to sell the DME at a profit.

2. **PTBA:** to reduce the stranded asset risk of the 2.8 billion tonne Tanjung Enim coal deposit.
3. **APD:** APD's business model is to cut out all commodity price risks and effectively guarantee returns. However, this low-risk business model may prove difficult to implement in the case of PTBA's DME project. IEEFA believes APD is unlikely to take on any pricing risk either on the cost of coal inputs or the price of DME sold to the buyer, which in this case is Pertamina, Indonesia's dominant energy SOE.
4. **Pertamina:** a purchase price that is profitable and cheaper than LPG imports. IEEFA notes that it is challenging to calculate a price for Pertamina. The difficulty in calculating this price for the DME is that coal, LPG, and oil prices move in the same direction. From a purchase price perspective, this means that the substitution benefits of replacing DME with LPG are limited when all prices tend to move in tandem. According to IEEFA, the DME price has been lower than LPG for 15 months of the last 20 years.
5. **What the Ministry of Finance Is Concerned About:** The Ministry of Finance is focused on the potential costs of a DME subsidy for Indonesian consumers. Similar to LPG subsidies where the price of LPG to the Indonesian consumer is capped at US\$300/tonne, IEEFA concludes a subsidy is required for the DME due to its high production cost of

**Pertamina prefers
a purchase price that
is profitable and cheaper
than LPG imports.**

¹⁹ Air Products. [2021 Annual Report](#). November 18, 2021. Page 69.

US\$601/tonne, which includes a 15% DME production margin for APD. This 15% is derived from the lower end of net income margin range of 16-22% for 1Q2019-4Q2021 for APD as disclosed in their annual report.²⁰

The Rationale for the DME Project

The conversion of coal into liquid or gas hydrocarbon form through processing (coal downstreaming) has been the focus of active policy discussion in Indonesia over the past four years. It was discussed as early as December 2017 when PTBA, fertilizer company Pupuk Indonesia and petrochemical company Chandra Asli signed a Head of Coal Downstream Agreement. PTBA announced a coal downstream plant at the Bukit Asam Coal-Based Special Economic Zone in March 2019.²¹

As the regional coal market matures and demand for low-rank coal has declined, SOEs like PTBA have been forced to identify domestic sources of demand that can prevent assets from becoming stranded. The focus on downstream coal uses also gained currency with top Indonesian policymakers in the Jokowi government, who have embraced many capital-intensive resource processing projects on the theory that this might help the economy.

The DME plant will use six million tonnes of “unburnable” coal to produce 1.4 million tonnes of DME and replace 980,000 tonnes of LPG imports.

Interested parties within the government and the coal sector developed a plan to develop a market for DME. The upside to the Indonesian economy from the costly coal gasification product would come from the potential for import substitution. IEEFA believes reducing the LPG import bill was the government's main reason for pursuing the DME project.

The downstream plant is projected to consume six million tonnes of coal annually. The Ministry of Energy and Mineral Resources (MEMR) has said the DME project would unlock “value” by displacing established LPG supplies and burning otherwise unburnable coal. The DME project would produce 1.4 million tonnes of DME, which would replace 980,000 tonnes of LPG, which is currently sold at the heavily subsidized price of US\$300/tonne.

This begs numerous questions about the project's economics, the policies guiding it, and APD's role as the key investor and technology provider. IEEFA previously published a report on the project's lack of credible fundamentals.²²

²⁰ Air Products. [2021 Annual Report](#). November 18, 2021. Pages III-IV.

²¹ PTBA. [Pencanangan industri hilirisasi tanjung enim](#). December 8, 2017.

²² IEEFA. [Proposed DME Project in Indonesia \(D\)oes Not \(M\)ake Economic Sense](#). November 2020.

Stakeholder Preferences

There are four stakeholders in the DME project:

- PTBA, which will supply six million tonnes of coal annually to the DME plant
- APD, which will build and operate a DME plant producing 1.4 million tonnes annually
- Pertamina, the buyer for the DME produced
- Indonesia's Ministry of Finance

Table 2: Summary of Each Party's Possible Preferences for DME Project

	PTBA	APD	Pertamina
Coal Mine Capex	Paid by PTBA Avoid stranded asset		
Coal Pricing	Sell coal at profit to pay off capex	Input price adjusted in DME purchase price	
DME Plant Capex		Paid by APD with purchase agreement in place	
DME Purchase Price		Based on production cost plus fixed return	Can sell DME at profit
Ministry of Finance			DME cheaper than LPG Subsidy as small as possible

Source: Petromindo and IEEFA estimates.

In IEEFA's understanding, the preferred scenario for each party is:

PTBA: To avoid the stranded asset risk for the Tanjung Enim coal deposit, PTBA will expand coal capacity with an agreement to sell the coal to the DME plant in place. If the coal can be supplied at the higher of either the production cost plus a margin or the market price, PTBA can pay for the upfront capex.

APD: APD has a risk-averse model in which it does not take on any commodity price risk and gets a fixed return. APD would simply take the coal input price from PTBA and add a fixed profit when calculating the sale price to Pertamina.

However, this is not as simple as at a recent webinar, Director General of Mineral and Coal at the Ministry of Energy and Mineral Resources, Ridwan Djamaluddin stated, "To this day, PTBA and Pertamina and Air Products have not yet agreed on

the price of coal for the gasification (project)."²³

Pertamina: Pertamina hopes the DME purchase price is lower than the LPG price. If the DME price is too high, Pertamina would request a subsidy from the Ministry of Finance.

Ministry of Finance: The Ministry of Finance hopes that the DME price will be lower than the LPG price. IEEFA notes that a U.S. company would initially own the DME plant, so there would be an outflow of currency to an external party—similar to the cost of purchasing LPG.

PTBA Preference: Reducing Stranded Asset Risk

The SOE Minister's lack of a post-announcement follow-up may reflect the project's complicated fundamentals and the financial constraints on the key players. The first issue is the source of the coal for the DME project. PTBA's largest mine under operation is the Tanjung Enim mine in South Sumatra, with a reserve base of 2.8 billion tonnes and resources of as much as five billion tonnes.²⁴ However, the coal quality and location pose economic challenges.

Problems with the quality and implied economic value of the coal stand out. The calorific value of the coal at Tanjung Enim is around 5,000 kilocalories per kilogram (kcl/kg)(50% of total 2020 PTBA sales) or 4,800kcl/kg (22% of total 2020 sales) GAR (Gross as Received – the energy measured when a buyer receives the coal).²⁵ This coal is in between the Indonesian Coal Index 4 (ICI 4) coal price benchmark specification of 4,200kcl/kg and the Australian Newcastle benchmark specification of 6,300 kcl/kg.

There is a shrinking market for low quality coal – something that could weigh heavily on PTBA.

For a coal-rich country like Indonesia, which is beginning to move away from its coal-heavy development trajectory, there are questions about whether new development of this type of low-rank coal is merited. There is a shrinking market for low-quality coal—something that could weigh on PTBA, given its large reserves. Coal output at Tanjung Enim for 2020 was 24.2 million tonnes, down 14% from the 2019 output of 28.1 million tonnes.²⁶ At 2019 production rates, the reserve base will last approximately another 99 years.

The cost of getting the Tanjung Enim coal to market will be quite high. The deposit is located inland, and there is no river system to barge the coal out. That means the

²³ Petromindo. [PTBA has yet to agree on coal price for gasification project](#). November 16, 2021.

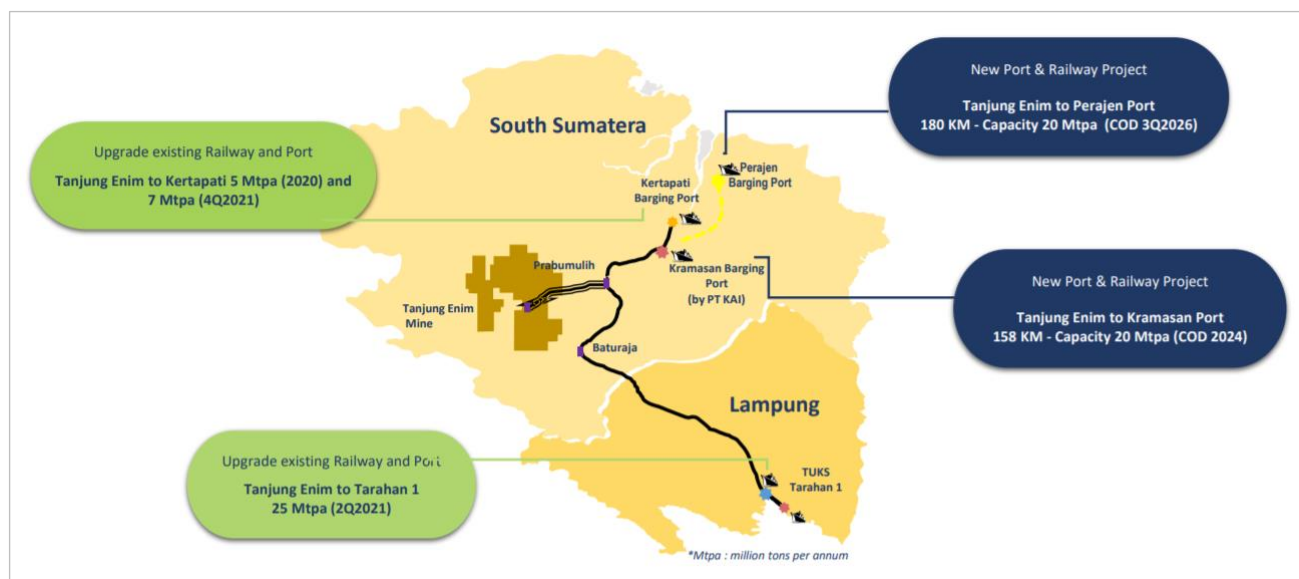
²⁴ PTBA. [Annual Report 2020](#). May 24, 2021. Page 77.

²⁵ Ares Asia. [Coal trading glossary](#).

²⁶ PTBA. [Annual Report 2020](#). May 24, 2021. Page 18.

only likely transport option would be a railway built by a Chinese contractor and PTBA.

Figure 1: Tanjung Enim Mine, Current and Projected Railways and Ports



Source: PTBA.

Currently, PTBA has railway connections to Kertapati and Tarahan, but both ports require more investment. According to PTBA's 2021 first-half corporate presentation, the company plans to upgrade both ports from its current capacity of 32 million tonnes to 72 million tonnes by 2026.²⁷

Efforts to find domestic demand for Tanjung Emin's coal have been underway for years. As of July 2021, PTBA had completed 88% of the 1,200 megawatts (MW) Sumsel-8 mine mouth power plant.²⁸ IEEFA estimates the plant could use as much as 2.4 million tonnes of coal annually. When combined with the six million tonnes of coal for the DME plant, this would mean that with the expanded port capacity, the mine mouth plant and the DME facility, PTBA would use 80.4 million tonnes, giving the Tanjung Enim deposit a life of 35 years.

²⁷ PTBA. *Corporate Presentation 1H 2021*. September 6, 2021.

²⁸ PTBA. *Corporate Presentation 1H 2021*. September 6, 2021.

Table 3: PTBA Current and New Port Capacity, Mine Mouth Coal Power and DME Plant Coal Usage, Completion Dates (m tonnes, MW, km)

Supply/Demand	Capacity (mt)	Date	Capacity (MW or mt)	Rail Distance (km)
Ports to Move Coal				
Tarahan	25.0	2Q 2021		
Kertapati	7.0	4Q 2021		
Current Capacity	32.0			
New Port Capacity				
Kramasan	20.0	2024		158.0
Perajen	20.0	3Q 2026		180.0
New	40.0			
Total	72.0			
Facilities to Create Demand Onsite				
Mine Mouth Plant				
Sumsel-8	2.4	4Q 2021	1,200	
Downstream Plant				
DME	6.0	2024		
Total	80.4			

Source: PTBA 1H21 Corporate Presentation, IEEFA estimates.

Given the scale of investment required to support greater exploitation of the Tanjung Enim mine, any plans dependent on coal supplies from the mine may face financing challenges and investor questions about the ability of PTBA to increase coal output by 150% by 2026. There is also the issue of funding the build-out of 338 kilometres of railway through a tropical forest.

The supply and demand outlook for PTBA's Sumatra mine raises obvious questions about the economic rationale for APD's proposed DME project. Based on available data, IEEFA believes that policymakers may be responding to a situation where one of two major reasons for a downstream DME project appears to be the desire to avoid having the Tanjung Enim deposit become a stranded asset. The DME project would also provide a substitution for the LPG imports, although an IEEFA analysis shows that the economic case cannot be justified. The mine-mouth plant alone cannot fully utilize the coal deposit or allow PTBA to recoup associated development costs.

In all likelihood, with the economic case for DME tenuous at best, the risk of Tanjung Enim being a stranded asset remains high.

APD Preference: A Successful Low-Risk Business Model

APD's business model is to cut out all commodity price risks and effectively insulate returns. While PTBA is motivated to capture the benefits of any coal price increase, they are similarly eager to use long-term fixed contracts to hedge their downside risk. However, APD's low-risk business model may prove difficult to implement for PTBA's DME project.

In its 2021 annual report, APD outlines its business model for its industrial gases and industrial gases equipment business. IEEFA considers the DME plant to be in the company's industrial gases and on-site gases business. The APD business model has three key characteristics:²⁹

Gases are produced and supplied by large facilities built by APD.

The gas sale contracts generally have 15- to 20-year terms.

The contracts contain fixed monthly charges and/or minimum purchase requirements, with price escalation provisions generally based on external indices.

APD also adds that it "mitigates energy and natural gas price risk contractually through pricing formulas, surcharges and cost pass-through arrangements."³⁰ This supports our view that APD is unlikely to take on any pricing risk either on the cost of coal inputs or the price of DME sold to Pertamina, Indonesia's dominant energy SOE. This business model would make sense from APD's point of view. By paying for the upfront capex of US\$2.1 billion, it would need to ensure a return on its investment over the 15- to 20-year operating life of the asset.

This supports our view that the most likely scenario would be APD's purchase of the coal at a price set by PTBA, with a fixed profit margin on the total cost of DME produced. This results in a scenario where a subsidy will be required to ensure the DME sales price meets the requirements of APD's risk-averse business model.

To illustrate how this scenario would shape the terms required by the three counterparties, we summarised the financing and cash flow preferences for each party below:

²⁹ Air Products. [2021 Annual Report](#). November 18, 2021. Page 69.

³⁰ Air Products. [2021 Annual Report](#). November 18, 2021. Page 69.

Table 4: Summary of Each Party's Financing and Cashflow Preferences for DME Project

	PTBA	APD	Pertamina
Coal Mine Capex	Paid by PTBA		
Coal Pricing	Higher of cost plus 15% or market price	Input price adjusted in DME purchase price	
DME Plant Capex		Paid by APD with purchase	
Plant Operation	Buy back option if profitable	15-20 year purchase at cost plus price	Buy back option if profitable
DME Purchase Price		Based on production cost plus fixed return- no risk	

Source: CNBC Indonesia and IEEFA estimates.

In our baseline scenario above, the purchaser, Pertamina, must absorb the production cost of the DME plus a profit margin for APD, the provider of capital and operator of the facility. This production cost depends on the coal input price. We believe PTBA will pass on its pricing preferences to other parties. IEEFA expects PTBA to ask for the coal market price or coal production cost plus a profit margin, whichever is higher at the time. APD, in turn, will seek a coal cost pass-through, with Pertamina bearing the full commodity price risk.

In an additional wrinkle, PTBA and Pertamina have said both will consider taking a stake in the DME plant after it becomes profitable.³¹ However, its profitability will depend on the willingness of Pertamina to absorb PTBA's coal costs and pay APD a fixed profit margin for the DME.

APD's DME Project Only Works With Cheap Coal

When IEEFA published our initial critical analysis of DME projects in November 2020, the LPG price was subdued at US\$365/tonne vs. the current US\$870/tonne price for LPG. At today's price, IEEFA examines whether the DME project can be viable in the Indonesian market.

Our analysis highlights one awkward limiting factor. Even at today's high LPG price, the coal must be supplied at or near cost for the DME project to be viable. IEEFA estimated PTBA's coal production cost to be US\$37/tonne in November 2020, while the production cost during the first half of 2021 rose to US\$42/tonne.³² This compares to statements by PTBA's CEO disclosing their plan to sell the coal at US\$50/tonne to the DME plant.³³ As highlighted above, the Director General of the MEMR has said PTBA, Pertamina, and Air Products have not yet agreed on the price

³¹ CNBC Indonesia. [Setelah 2025 PTBA bisa punya saham 40 di proyek gasifikasi](#). December 7, 2020.

³² PTBA. [Corporate Presentation 1H 2021](#). September 6, 2021.

³³ CNBC Indonesia. [Bulan lagi PTBA mulai garap proyek gasifikasi batu bara](#). January 27, 2021.

of coal for the gasification project.³⁴

To illustrate the impact of coal costs on the viability of the DME project, we have analyzed three scenarios with different coal input costs in the table below:

1. **IEEFA report numbers from November 2020:** The total losses for the DME project after financial expenses are US\$475 million. We have included a 15% mark-up profit for APD in this loss calculation.
2. **Current LPG price, but coal is supplied at cost plus 15%:** The total losses for the DME project after financial expenses are US\$64 million.
3. **Current LPG price, but coal at market price:** The total losses of the DME project after financial expenses are US\$159 million. The current price of Newcastle benchmark coal is US\$180/tonne for 6,300kcl/kg. The PTBA coal is around 5,000kcl/kg, and we use a cost of US\$80/tonne.

We explain the items in Table 5 in detail:

1. **LPG/DME prices:** The Saudi Aramco LPG price in November 2020 was US\$365/tonne. The price for November 2021 is now US\$870/tonne. As DME contains 70% of the energy content of LPG, we multiply the LPG price by 70% to arrive at a DME price.
2. **Non-coal DME production costs:** This is the per tonne, non-coal cost of DME. We derived US\$300/tonne estimate from 2017 through the first half of 2021 for listed DME producer China Lanhua of US\$230 to US\$386/tonne. For the first-half of 2021, the non-coal production cost for Lanhua was US\$304/tonne.³⁵
3. **Cost of one tonne of coal:** For November 2020, the production cost for PTBA was US\$37/tonne. For the first half of 2021, the production cost was US\$42/tonne and we have added a 15% return to derive a price of US\$48.3/tonne. This is broadly in line with the PTBA CEO's January 2021 statement, setting a US\$50/tonne benchmark price.³⁶ Under the market scenario, the current price of Newcastle benchmark coal is US\$180/tonne for 6,300kcl/kg. The PTBA coal is around 5,000kcl/kg and we use a price of US\$80/tonne.
4. **Cost of 4.6 tonnes of coal:** We have multiplied one tonne of coal above by 4.6 since it requires 4.6 tonnes of coal to produce one tonne of DME.
5. **APD profit margin:** We have added in the APD profit margin of 15% to derive total DME cost.
6. **DME profit/loss per tonne:** Under the November 2020 scenario, the loss per tonne of DME is US\$285. Under cost-plus for November 2021, the profit

³⁴ Petromindo. [PTBA has yet to agree on coal price for gasification project](#). November 16, 2021.

³⁵ Shanxi Lanhua Sci-Tech Venture 600123.SS. [1H21 Financial Report](#). August 24, 2021.

³⁶ CNBC Indonesia. [Bulan lagi PTBA mulai garap proyek gasifikasi batu bara](#). January 27, 2021.

is US\$8.5/tonne. For the coal market price scenario, the loss is US\$59/tonne of DME.

- Finance cost:** We assume debt funding of US\$2 billion at 3.8%. After finance expenses of US\$76 million, all three scenarios lose money.

Table 5: DME Project Financial Position Nov 2020 vs. Current (US\$ millions, 000 tonnes, US\$/tonne)

Savings	Unit	at Nov 2020	Nov 2021 Cost Plus	Nov 2021 Market
LPG/DME Prices				
LPG price Saudi contract propane	US\$/tonne	365.0	870.0	870.0
Substitute DME price (30% discount)	US\$/tonne	255.5	609.0	609.0
DME Production Cost				
DME non coal production cost	US\$/tonne	300.0	300.0	300.0
Cost of one tonne coal	US\$/tonne	37.0	48.3	80.0
Cost of 4.6 tonnes coal	US\$/tonne	170.2	222.2	368.0
Total DME cost including coal	US\$/tonne	470.2	522.2	668.0
Total DME cost plus 15% APD margin	US\$/tonne	540.7	600.5	768.2
DME After Financial Cost				
DME profit/(loss) per tonne	US\$/tonne	-285.2	8.5	-59.0
DME produced	000 tonne	1,400.0	1,400.0	1,400.0
Total DME losses pre finance	US\$ m	-300.6	52.9	-82.6
Finance cost US\$2bn @3.8%	US\$ m	-76.0	-76.0	-76.0
Total DME Losses Post Finance	US\$ m	-475.3	-64.1	-158.6

Source: PTBA, IEEFA estimates.

This analysis highlights how sensitive assumptions about the viability of the DME project are to different input cost assumptions, and assumptions about volatile energy commodity market prices. In IEEFA's view, the real issue is distributing the risks and benefits from the commodity price cycle.

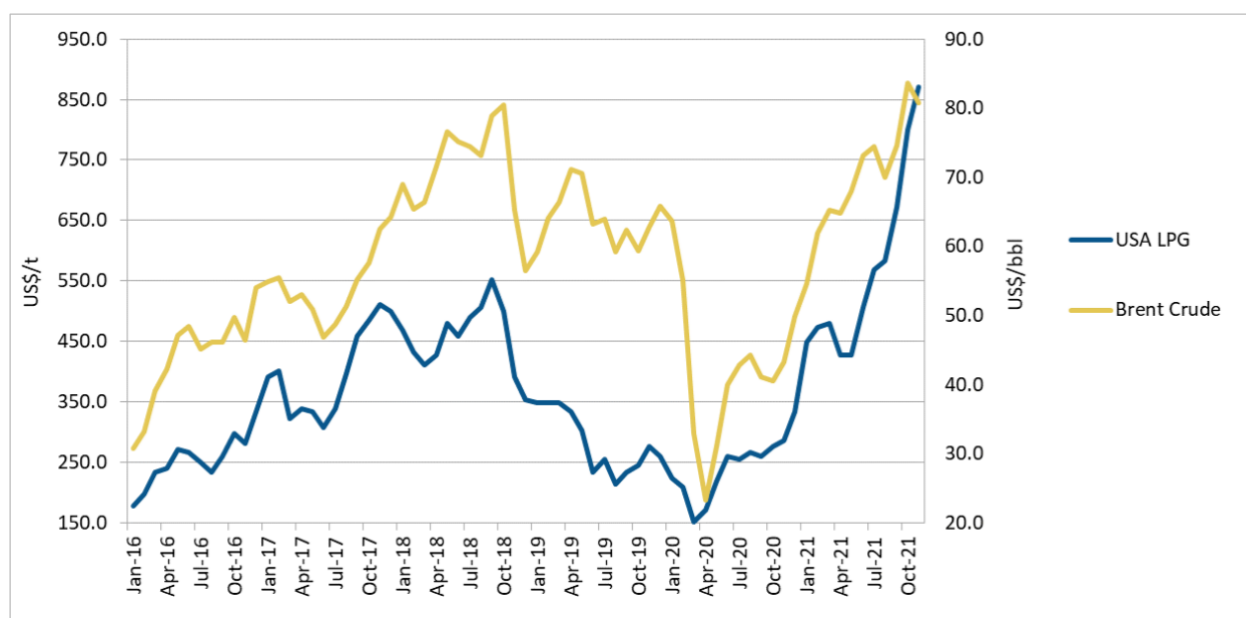
IEEFA believes it is unrealistic to expect that the coal supplier PTBA will fix the cost of coal delivered to the DME plant operator at cost-plus-15% over the whole period of its supply to the DME plant. The coal market price of US\$80/tonne is US\$32/tonne higher than the cost-plus-15% price of US\$48/tonne. When multiplied over the total annual supply of six million tonnes, this would represent lost revenue totalling US\$192 million for PTBA. In effect, by locking in a cost-plus-15% pricing for 12 months when the market coal price is US\$80/tonne, the coal supplier PTBA would subsidise the DME plant operator for US\$192 million.

Pertamina's Preference: A Profitable Purchase Price – But Calculations are Difficult

The final piece of the puzzle is calculating the purchase price and assessing the policy implications of the cost of producing DME plant vs. the cost of subsidizing imported LPG. The bad news for Pertamina is that the economic case for substitution is tenuous at best and has **only worked 6%** of the time over the last 20 years.

The difficulty in calculating a purchase price for the DME is that coal, LPG, and oil prices all move in the same direction. From a purchase price perspective, this means the substitution benefits of replacing DME with LPG are limited when all prices move together.

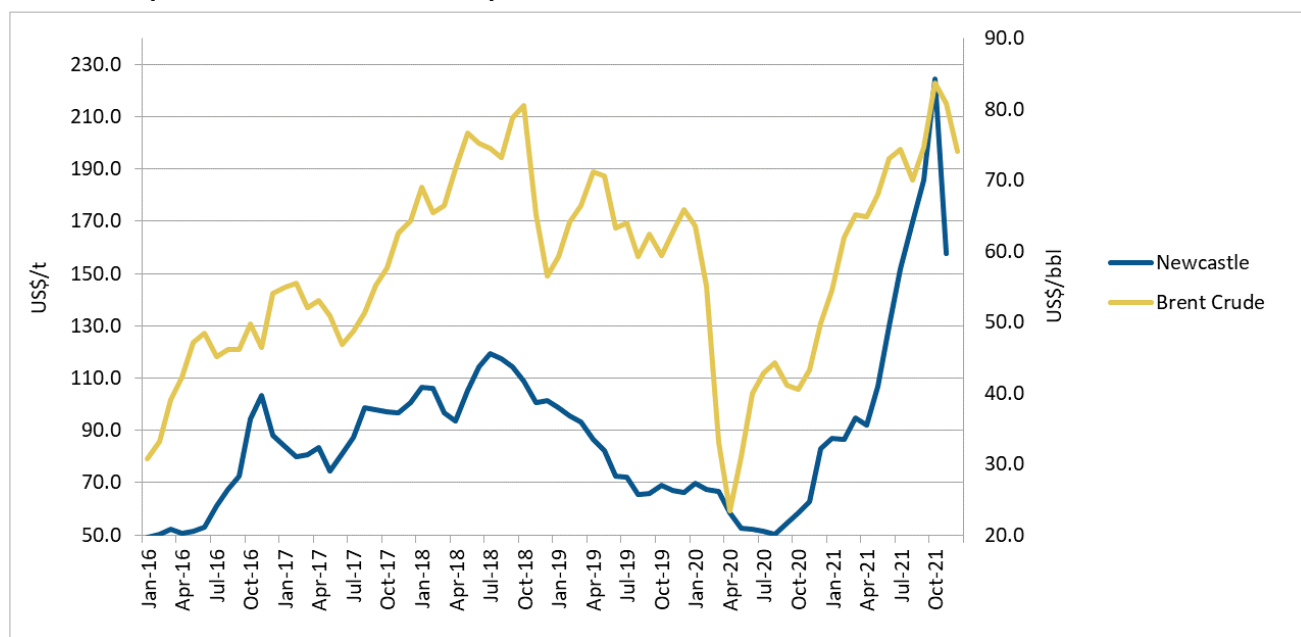
Figure 2: USA Texas LPG Spot Price and Brent Crude Monthly Price Jan 2016-Nov 2021 (US\$/tonne, US\$ /barrel)



Source: Indxmundi website time series, IEEFA estimates.

The coal price also tends to move in line with the oil price. As discussed below, this makes it difficult to set the purchase price.

**Figure 3: Newcastle Coal Price and Brent Crude Monthly Price Jan 2016-
Dec 2021 (US\$/tonne, US\$/barrel)**



Source: Indexmundi website time series, IEEFA estimates.

IEEFA's analysis shows that the purchase price is extremely difficult to calculate since there are two moving parts—the cost of coal required for DME processing and the price of the DME to the buyer. In the tables below, we have highlighted two scenarios:

- PTBA supplies coal at a fixed 15% markup to DME plant; and
- PTBA supplies coal at market price

Under both scenarios, we assume that APD will require a 15% markup on the cost of producing DME. The purchaser Pertamina will have to compare the DME purchase price against the market price of LPG.

**Table 6: Substitute DME Prices, Purchase Prices and Comparisons
(US\$/tonne)**

Savings	Unit	Nov-20	Jun-21	Nov-21
LPG/DME Prices				
LPG price Saudi contract propane	US\$/tonne	430.0	530.0	870.0
Substitute DME price (30% discount)	US\$/tonne	301.0	371.0	609.0
DME Production Cost Coal at Cost Plus				
DME non coal production cost	US\$/tonne	300.0	300.0	300.0
Production cost PTBA for coal	US\$/tonne	42.0	42.0	42.0
Cost to DME after 15% markup	US\$/tonne	48.3	48.3	48.3
Cost of 4.6 tonnes coal	US\$/tonne	222.2	222.2	222.2
Total DME cost including coal	US\$/tonne	522.2	522.2	522.2
DME purchase price (cost plus 15%)	US\$/tonne	600.5	600.5	600.5
DME purchase price vs substitute price	US\$/tonne	299.5	229.5	-8.5
DME Production Cost Coal at Market				
DME non coal production cost	US\$/tonne	300.0	300.0	300.0
Market price of PTBA coal	US\$/tonne	27.1	55.9	80.0
Cost of 4.6 tonnes coal	US\$/tonne	124.6	257.1	367.9
Total DME cost including coal	US\$/tonne	424.6	557.1	667.9
DME purchase price (cost plus 15%)	US\$/tonne	488.3	640.7	768.1
DME purchase price vs substitute price	US\$/tonne	187.3	269.7	159.1

Source: IEEFA estimates.

The key terms are as follows:

Substitute DME price: 70% of the Saudi LPG price to reflect the equivalent energy content of DME. This is effectively a market DME price pegged to the LPG price (see Appendix).

Production cost of PTBA coal: Based on PTBA's 2021 first half results presentation, this is US\$42/tonne.³⁷

Market price of PTBA coal: This is based on 43% of the monthly Newcastle price at November 2020, June 2021 and November 2021, reflecting the discount for the lower energy content to the benchmark of 6,300kcl/kg gross as received.

This analysis confirms that at the current price of US\$870/tonne, the purchase price will be lower than the substitute price of DME. This would mean there is an economic case for DME replacing LPG imports. However, this does not take into account the financial costs of building the DME plant. We calculate the breakeven substitute prices.

³⁷ PTBA. [Corporate Presentation 1H 2021](#). September 6, 2021.

Two Breakeven LPG Prices of US\$858/t and US\$1,098/t

The analysis above shows that at a specific LPG substitute price, even with a 15% markup on DME production cost, the substitute price is equal to the market LPG price equivalent. We calculate two breakeven scenarios for each of the input coal price scenarios.

- PTBA supplies coal at a fixed 15% markup to the DME plant. Under this scenario, the DME purchase price is US\$601/tonne, and the breakeven LPG price is US\$858/tonne.
- PTBA supplies coal at market price. Under this scenario, the coal is supplied at US\$80/tonne, the DME purchase price is US\$768/tonne, and the breakeven LPG price is US\$1,098/tonne.

Table 7: Substitute DME Prices, Breakeven LPG Price Estimate (US\$/tonne)

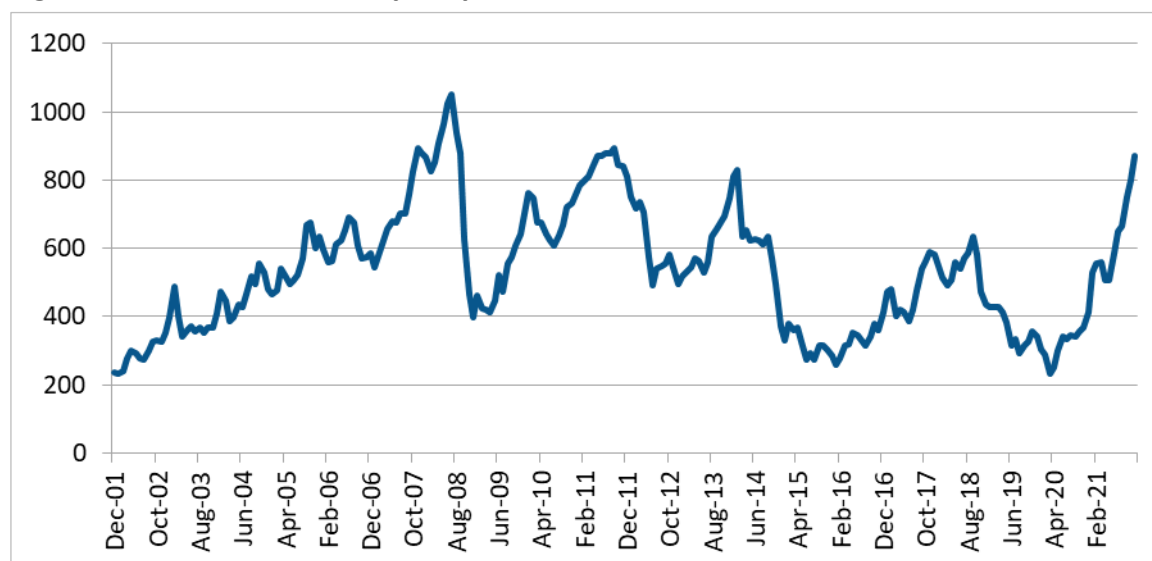
Savings	Unit	Breakeven Cost Plus	Breakeven Market Coal
LPG/DME Prices			
LPG price Saudi contract propane	US\$/tonne	858.0	1,097.5
Substitute DME price (30% discount)	US\$/tonne	600.6	768.3
DME Production Cost Coal at Cost Plus			
DME non coal production cost	US\$/tonne	300.0	
Production cost PTBA for coal	US\$/tonne	42.0	
Cost to DME after 15% markup	US\$/tonne	48.3	
Cost of 4.6 tonnes coal	US\$/tonne	222.2	
Total DME cost including coal	US\$/tonne	522.2	
Purchase price (cost plus 15%)	US\$/tonne	600.5	
Purchase price vs substitute price	US\$/tonne	-0.1	
DME Production Cost Coal at Market			
DME non coal production cost	US\$/tonne		300.0
Market price of PTBA coal	US\$/tonne		80.0
Cost of 4.6 tonnes coal	US\$/tonne		367.9
Total DME cost including coal	US\$/tonne		667.9
Purchase price (cost plus 15%)	US\$/tonne		768.1
Purchase price vs substitute price	US\$/tonne		-0.2

Source: IEEFA estimates.

In the next step, we look at the LPG price over the last 20 years to calculate how often it exceeds the breakeven price of US\$858/tonne and US\$1,098/tonne. As detailed in the Appendix, we use the publicly available time series for US monthly Texas spot propane (LPG) price and added US\$80/tonne to adjust for the Saudi Arabia LPG price (the source of Indonesian imports). We conclude that the monthly LPG price only exceeded US\$858/tonne a total of 15 times, over 20 years. This

includes the current November 2021 price of US\$870/tonne. Until November 2021, the LPG price had not exceeded US\$1,098/tonne since January 2002.

Figure 4: Estimated LPG import price Jan 2016-Nov 2021 (US\$/tonne)



Source: Indexmundi, IEEFA estimates.

IEEFA stresses that between January 2002 and November 2021, there have been only 15 months (6% of the period) where the LPG has exceeded the DME substitute price. This is for the case when the coal input cost is fixed at production cost plus 15% for PTBA. The DME substitute price includes a 15% markup for the DME plant operator APD. Since January 2002, the LPG price has never reached US\$1,098/tonne, which is the breakeven price when using a market price for the coal input cost. The economic case for substitution is tenuous at best.

Ministry of Finance Concern: Subsidies for the DME Plant

The question is whether the fundamentals of DME are aligned with market conditions in Indonesia. Any answer to this question must consider the Ministry of Finance's expectations of savings on LPG subsidies. The International Institute for Sustainable Development (IISD) has studied Indonesia's energy subsidies and estimated that the total 2021 LPG subsidy may be worth as much as US\$2.6 billion.³⁸ In Indonesia, the LPG is sold to the consumer in 3 kilograms (kg), 7kg and

The question is whether the fundamentals of DME are aligned with market conditions in Indonesia.

³⁸ International Institute for Sustainable Development. *LPG subsidy reform Indonesia*. May 2021.

50kg cylinders. The most heavily subsidized LPG is the 3kg which is sold at Rp4,250 per kg or US\$0.30 per kg.

In the case of the DME project, IEEFA believes the emphasis is to replace the most heavily subsidized 3kg cylinders (Rp4,250 per kg) to alleviate the subsidy bill as opposed to the less subsidized 12kg (Rp5,950/kg) and 50kg (Rp7,455/kg) cylinders.

IEEFA has taken a cashflow approach and applied it specifically to the DME project in discussing and understanding the subsidy.

We explain the items in the table in detail for the LPG subsection:

1. **LPG cash outflow:** The Saudi Aramco LPG price in November 2021 is US\$870/tonne. It will cost Indonesia US\$870/tonne to buy one tonne of LPG. We have provided a range of prices for US\$500 to \$900/tonne.
2. **LPG cash inflow:** The LPG sold in 3 kilogram cylinders is heavily subsidized at Rp 4,250, which is equal to US\$0.30/kg or US\$300/tonne.³⁹ This subsidy has been in place and has remained constant since 2008.⁴⁰ This means that after paying US\$870/tonne cash outflow, Indonesia receives US\$300/tonne when it sells to the consumer at the subsidized price. The Government is out of pocket US\$570/tonne.
3. **Cash outflow:** This is the cashflow difference between the price paid to import the LPG from Saudi Arabia and the LPG subsidised price on a per tonne basis.
4. **Total Government outflow:** The 1.4 million tonnes from the DME plant will replace 980,000 tonnes of LPG. We multiply the cash outflow per tonne of LPG with 980,000 to calculate the total cash bill for Indonesia.

We explain the items in the table in detail for the DME subsection:

1. **DME cash outflow:** IEEFA has used the lower DME price, which uses a lower coal input of cost-plus-15%. The lower DME price of US\$601/tonne includes a 15% markup for APD.
2. **DME cash inflow:** Since DME contains 70% of the energy content of LPG, we multiply the LPG price by 70% to arrive at a DME price (see Appendix). The LPG sold in 3 kg cylinders is heavily subsidized at Rp 4,250 which is equal to US\$0.30/kg or US\$300/tonne, so the equivalent DME prices should be US\$210/tonne. This means that after paying US\$601/tonne cash outflow, Indonesia gets US\$210/tonne from the consumer.
3. **Cash outflow:** This is the cash flow difference between the price paid for

³⁹ Energypedia. [Fuel Prices Indonesia](#). 1 May 2011.

⁴⁰ International Institute for Sustainable Development. [LPG subsidy reform Indonesia](#). May 2021.

DME and the inflow after charging the subsidised DME price on a per-tonne basis.

4. **Total Indonesia outflow:** The 1.4 million tonnes from the DME plant will replace 980,000 tonnes of LPG. We multiply the cash outflow per tonne of DME with 1.4 million tonnes to calculate the total cash bill for the government of Indonesia.

Table 8: Cost “Savings” from Purchasing Less LPG and Subsidies (US\$/tonne, US\$ millions)

Total Bill for the GoI	Unit					Breakeven	
LPG							
DME Cash outflow	US\$/tonne	500.0	600.0	700.0	800.0	870.0	900.0
DME Cash inflow (subsidised price)	US\$/tonne	300.0	300.0	300.0	300.0	300.0	300.0
Cash outflow (including subsidy)	US\$/tonne	-200.0	-300.0	-400.0	-500.0	-570.0	-600.0
Total LPG units replaced by DME	000 tonnes	980.0	980.0	980.0	980.0	980.0	980.0
Total Indonesia outflow	US\$ m	-196.0	-294.0	-392.0	-490.0	-558.6	-588.0
DME Production Cost Coal at Cost Plus							
DME Cash outflow	US\$/tonne	600.5	600.5	600.5	600.5	600.5	600.5
DME Cash inflow (subsidised price)	US\$/tonne	210.0	210.0	210.0	210.0	210.0	210.0
Cash outflow (including subsidy)	US\$/tonne	-390.5	-390.5	-390.5	-390.5	-390.5	-390.5
Total DME units produced	000 tonnes	1,400.0	1,400.0	1,400.0	1,400.0	1,400.0	1,400.0
Total Indonesia outflow	US\$ m	-546.7	-546.7	-546.7	-546.7	-546.7	-546.7

Source: IEEFA estimates.

Under the DME scenario, the government of Indonesia will be losing US\$547 million. This US\$547m in losses will only be exceeded by the cash outflow on LPG when the price of LPG is above the breakeven point of US\$858/tonne. IEEFA stresses that the DME involves a cash payment, so the LPG and DME prices should be compared as an outflow from the government of Indonesia. IEEFA's conclusion is that the savings only work when the LPG price is above a certain level.

Conclusions: Difficult to Justify DME

In conclusion, IEEFA's major findings for each of the stakeholders are:

PTBA: The stranded asset risk for Tanjung Enim remains high as the financial returns for the DME project are unlikely to work.

APD: Its risk-free return model is not a good fit for the DME project. Once the commodity price risk and 15% APD DME production markup is passed on to the buyer of the DME, the price for DME is not competitive against LPG.

Pertamina: Based on APD's return and pricing requirements, the DME is only cheaper than LPG when the LPG price is US\$858/tonne or higher. This has only happened for 15 months in the last 20 years or 6% of the period.

Ministry of Finance: For the 1.4 million tonnes of DME, the ministry faces a total cash outflow bill of US\$547 million. This is from buying the 1.4 million tonnes of DME at US\$601/tonne and selling it at a similar subsidized price of LPG of US\$210/tonne.

IEEFA concludes that the DME project has no economic case in its current form, unless under rare circumstances where LPG prices exceed US\$858/tonne, which has only happened for 15 months during the last 20 years.

The DME project in its current form would not result in any savings from the substitution of LPG imports, except for a limited period. It will be unable to satisfy all four major stakeholders simultaneously.

Appendix: Adjusted LPG Prices and DME Match Price

For Tables 5,6,7 and throughout the report, we calculated an adjusted LPG price and a DME match price. The methodology is outlined below.

- **Adjusted LPG price:** Indonesia imports LPG from Saudi Arabia based on the monthly LPG marker. This price is not publicly available except in media announcements. Saudi Aramco's November announced propane price was US\$870/tonne and we have used this as reference price to LPG.⁴¹ The monthly Texas spot propane (LPG) price is publicly available as a time series.⁴² As of August 2021, the Saudi Arabia price was US\$80/tonne higher.⁴³ We adjusted the historical Texas LPG price by adding US\$80/tonne to get a time series for the Indonesia import price.
- **DME match price:** DME contains 70% of the energy of LPG. DME is not a widely traded commodity. Other than the half-yearly price received by Lanhua, DME prices are not publicly available. Also, the Lanhua DME price may not be as relevant to Indonesia due to the inland location and limited energy alternatives. In order to estimate a more likely time series for Indonesia, we applied a 30% discount to the adjusted LPG price.

⁴¹ Argus Media. [Global LPG posted prices hit multiyear highs](#). November 1, 2021.

⁴² Indexmundi.com. [Texas Propane Prices](#). November 2021.

⁴³ Aljazira Capital. [Oil and Petrochemicals Monthly Report](#). August 2021.

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

About the Author

Ghee Peh

Financial Analyst Ghee Peh has worked in investment research since 1995, including at Jefferies, BNP Paribas, and UBS. He has covered Asian coal, cement, and metal companies. gpeh@ieefa.org

This report is for information and educational purposes only. The Institute for Energy Economics and Financial Analysis ("IEEFA") does not provide tax, legal, investment, financial product or accounting advice. This report is not intended to provide, and should not be relied on for, tax, legal, investment, financial product or accounting advice. Nothing in this report is intended as investment or financial product advice, as an offer or solicitation of an offer to buy or sell, or as a recommendation, opinion, endorsement, or sponsorship of any financial product, class of financial products, security, company, or fund. IEEFA is not responsible for any investment or other decision made by you. You are responsible for your own investment research and investment decisions. This report is not meant as a general guide to investing, nor as a source of any specific or general recommendation or opinion in relation to any financial products. Unless attributed to others, any opinions expressed are our current opinions only. Certain information presented may have been provided by third-parties. IEEFA believes that such third-party information is reliable, and has checked public records to verify it where possible, but does not guarantee its accuracy, timeliness or completeness; and it is subject to change without notice.