

# Newly Sanctioned Gas Reserves in Southeast Asia Risk 1.5°C Target

## Summary

At least 19 new fields, having estimated reserves of over 540 billion cubic meters (BCM) of gas, reached or are expected to reach final investment decisions (FID) between 2022 and 2025 in Southeast Asia, according to Global Energy Monitor's Global Oil and Gas Extraction Tracker (GOGET).

The reserves of these new fields equate to around 15% of the region's total proven gas reserves in 2020.

Over 75% of these in-development fields are located in Malaysia and Vietnam. Not only would the proposed new gas exploration run afoul of [scientific consensus](#) that no new oil and gas fields can be developed while keeping global heating below 1.5°C, but the potential lifespans of some proposed fields extend beyond the [net-zero timeframe](#) set by many of these countries.

## Existing gas production and reserves

With a population [growth](#) of around 10% over the past 10 years, the Southeast Asia region is home to around 660 million people. To cater to the needs of a growing population, the region has seen a drastic expansion in the economy and, consequently, the energy sector over the past decade. Between 2000 and 2020, the total energy supply in the region [increased by more than 80%](#). During this period, fossil fuels made up over 90% of the growth in energy demand. Gas consumption grew by more than 80% and maintained a 20% share in the region's energy mix. Most of the gas consumption is attributed to the electricity and industry sectors, with a combined share of over 70%.

Southeast Asia has significant gas reserves but is [expected](#) to become a net-importer of gas by 2025. According to the 2023 Energy Institute [Statistical](#)

[Review of World Energy](#) (previously produced by bp), in 2020, the proved reserves of the region were 3.6 trillion cubic meters (tcm), accounting for nearly 22% of Asia Pacific's proven gas reserves.<sup>1</sup> Indonesia held 35% of Southeast Asia's proven gas, Malaysia held 25%, and Vietnam held 17.9%. Myanmar, Brunei, and Thailand's proven reserves accounted for 12%, 6.2%, and 4% respectively.

As of 2022, Malaysia, Indonesia, and Thailand were Southeast Asia's top gas producers, according to the 2023 Statistical Review. As a whole, the countries in the region extracted 201 billion cubic meters (bcm) of gas, of which Malaysia extracted 41%, Indonesia 29%, and Thailand 13%. The International Energy Agency (IEA) current policies scenario (STEPS) shows Southeast Asia's annual production [growing by 50 bcm between 2030 and 2050](#) with Indonesia

1. "Proven" reserves refer to known gas fields that can reasonably be extracted under current technology and economic conditions, the country-level proven reserves numbers above do not include gas in new fields.

and Malaysia continuing to produce a majority of the region's gas. Indonesia accounts “for most of the growth” due to new fields. By the middle of the century, the IEA expects production to be about 145 bcm per year higher than what would be expected in its [1.6 degree](#) “Sustainable Development” Scenario.<sup>2</sup>

At current production rates, according to the 2023 Statistical Review, the region's largest producers, Malaysia, Indonesia, and Thailand, could continue to extract at current levels through 2040, 2037, and 2024, respectively. Hence the significance of new projects to these countries.

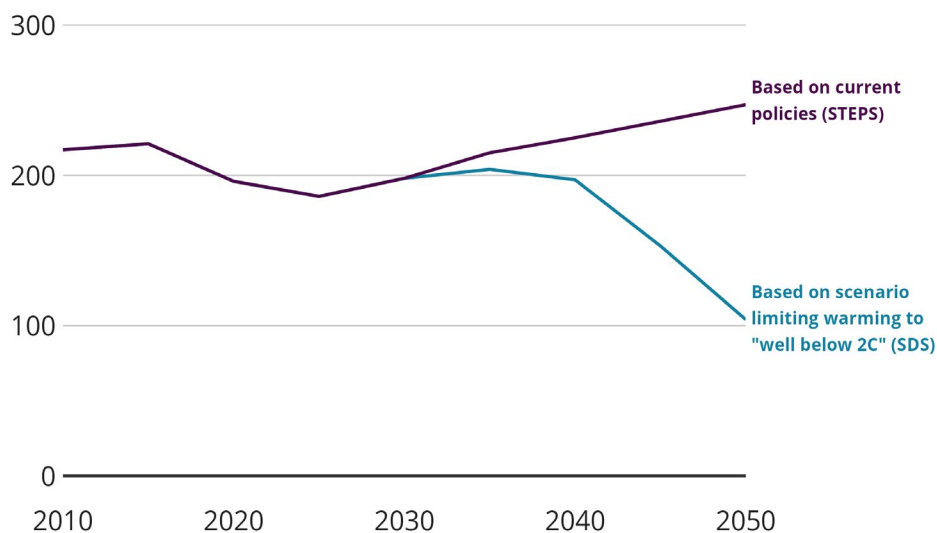
**Table 1: Gas reserves and production of Southeast Asian countries**

Country	2020 Proven Reserves (TCM)	2022 Production (BCM)
Indonesia	1.25	57.7
Malaysia	0.91	82.4
Vietnam	0.65	7.8
Myanmar	0.43	16.9
Brunei	0.22	10.6
Thailand	0.14	25.6
<b>Total</b>	<b>3.6</b>	<b>201.1</b>

Source: 2023 Energy Institute Statistical Review of World Energy

## Projected gas production in Southeast Asia

Production projections for gas in Southeast Asia, billion cubic meters (bcm)



Source: International Energy Agency (IEA)



2. In the IEA's SDS scenario “CO2 emissions drop to zero around 2070 and there are rapid reductions in non-CO2 emissions. The 1.5°C level is exceeded in the early 2030s and the rise in temperature peaks at just under 1.7°C around 2050.” The IEA states, with a 50% confidence variable, that warming in 2100 would be 1.6°C. At 33-66% confidence, temperatures range from 1.4 – 1.7°C.

## New developments risk the 1.5 °C degree target

Between 2022 and 2025, Southeast Asian countries sanctioned or are expected to sanction extraction of gas from at least 19 new fields, according to GOGET. These fields have estimated recoverable gas reserves of over 540 bcm, more than the 2020 proven reserves of the entire European Union.<sup>3</sup> The vast majority, 75%, of these newly sanctioned reserves are held within projects in Malaysia and Vietnam. Two Vietnamese mega projects, Block B and Ca Voi Xanh account for 37% of the reserves from new projects in the region, while Malaysia's three largest projects account for another 38%.

GOGET defines a field as moving from the “discovered” phase to the “in-development” status when a project is sanctioned for development, often marked by a company announcing it has reached a “final investment decision” (FID). The 19 fields shown below all reached or are expected to reach FID between 2022 and 2025.

In 2021, the IEA released its [Net Zero by 2050 roadmap](#), which stated “beyond projects already committed as of 2021, there are no new oil and gas fields approved for development in our pathway.” In a 2022 report, the International Institute for Sustainable

Development analyzed multiple pathways to limiting warming to 1.5°C and found “not only is there no need for new fields, but most importantly [there is no room for new fields to be developed](#) if we are to limit warming to 1.5°C.” As fields which were not committed to extraction as of 2021, all of the fields covered in this report fall under the definition of new fields, and therefore, developing them is incompatible with limiting warming to 1.5°C.<sup>4</sup>

In addition to the incompatibility with global pathways limiting warming to 1.5°C, extraction from many of these fields is expected to continue past the [net-zero/carbon neutrality timeframes](#) set by the countries where they are based. According to the IEA, Thailand, Vietnam, and Malaysia have targets to achieve net zero emissions or carbon neutrality by 2050, while Indonesia has a target to reach net zero emissions in 2060. Rosmari-Marjoram, for example, reached FID in 2022 and is expected to start extracting in 2026 and then continue to do so [through 2060](#), according to GlobalData, 10 years after Malaysia, where the project is based, is supposed to hit its carbon neutrality goal. Given the [emissions associated with gas projects](#), continued production will make reaching carbon neutrality more difficult.

## Country-level insights

### Malaysia

Between 2022 and 2025, Malaysia is expected to sanction extraction from projects with the most gas reserves in the region. Across six fields, new gas reserves from the country total 226.3 bcm.

The largest of these fields is Petronas' Kasawari gas field. Located offshore 130 km to the northwest of Miri, the field was discovered in 2011. The Malaysian

national oil company expects to start extracting gas from the field this year and [ship it via pipeline](#) to the Petronas Bintulu LNG Complex where it will be liquefied at [Malaysia LNG Terminal Train 9](#). The project is being developed in two phases, the first of which reached FID in 2019 and the second in 2022. Phase one is targeting a 2023 production start. Phase two, which incorporates carbon capture and storage (CCS)

3. 2020 Proven Reserves of the EU27 per 2023 Statistical Review: 400 bcm

4. The IISD report caveats this by adding it is possible for new fields to be compatible with limiting warming to 1.5°C, if old fields were also retired early. But, as a lead author of the IISD report told Carbon Brief, this is extremely rare, and preventing any new fields from opening up avoids stranded asset risks.

targeting an area of the field with [higher carbon dioxide content](#), is expected to start up in “late 2025,” according to Upstream Energy. Petronas considers the CCS portion of the project a “catalyst in achieving end-to-end CCS capability development within Petronas and the first step in unlocking Malaysia’s potential as a regional CCS solutions hub.” The field as a whole has reserves of 84 bcm, according to GOGET.<sup>5</sup>

Malaysia's second largest project in terms of recoverable gas reserves is Shell’s Rosmari-Marjoram. The twin deepwater sour gas fields were discovered in 2014, 220 km off the coast of Bintulu. Shell announced the project had reached FID in 2022 with gas extraction expected to start “[towards the end of](#)” 2026. Sarawak Shell Berhad, a subsidiary of the oil major Shell, is the project's operator with 80% equity,

## Vietnam

According to the Gas Exporting Countries Forum’s Global Gas Outlook 2050, Vietnam is “chasing domestic demand with [growing gas production](#).” Its reserves from new fields ranks it second in this briefing with 198.1 bcm coming from one megaproject and one field.

The Block B project consists of the Kim Long, Ac Quy, and Ca Voi gas fields. The fields were discovered in 2002 by Unocal but are now owned by Vietnamese national oil company PetroVietnam (66%), Thailand’s PTTEP (26%), and the Mitsui Group (8.5%). The project is located about 200 km south of Phu Quoc Island. The “[long delayed](#)” project was announced in 2016, [expected to be sanctioned](#) in 2017, but then was suspended in 2018. In October of 2022, Petrovietnam [announced](#) the re-tendering of the main offshore production platform. Project partners [were](#) expected to reach FID [this year](#) and then begin production in 2025. However, some analysts have [cast doubt](#) on the likelihood of development. If the field becomes

while Petronas holds 20%. Plans call for the gas to be transported via pipeline to Bintulu where it will be processed and eventually contribute to the Petronas LNG Complex feedstock. Rosmari-Marjoram is expected to produce through 2060, ten years after Malaysia’s carbon neutral target year. Shell states that the emissions from the project will be reduced “by using renewable energy to power Rosmari-Marjoram.” The project is anticipated to extract 65 bcm of gas.

SapuraOMV’s 59 bcm Jerun field is noteworthy but outside of the scope of this briefing, as it reached FID in April of 2021. Other Malaysian fields covered include the Lang Lebah and Limbayong gas fields. Details on those fields can be found in the table below.

operational, it would [supply gas](#) to the [O Mon gas-fired power complex](#). According to Energy Tracker Asia, the project “raises risks for all parties involved – from developers and investors to the Vietnamese government”.

Ca Voi Xanh is the second largest Vietnamese gas project in GOGET with a potential FID between 2022 and 2025 with 88.1 bcm of gas reserves. Discovered in 2011, like Block B, Ca Voi Xanh has faced numerous delays, facing “issues such as regulatory approvals and gas sale agreements” according to Energy Voice, noting that some analysts have [removed it from their forecasts](#). Companies involved in the project had [targeted FID in 2020](#), but that did not come to fruition. As of 2023, involved parties were working to [reach FID this year](#). If the project progresses, gas would flow through an 80 km pipeline and be processed outside Danang city before becoming feedstock for gas power plants. Analysts expect production to begin “[not earlier than 2030](#).”

5. GOGET does not distinguish between the two phases; therefore, all reserves and the 2022 FID are reflected here. If it is assumed that phase one is 60% of the reserves and phase two targets 40%, the reserves of Kasawari for the purpose of this report would be 33.6 bcm, Malaysia’s 2022-2025 new gas field reserves would be 175.8 bcm (bumping it behind Vietnam for most reserves), and the total new gas reserves for the region would be 490.9 bcm.

Eni's Ken Bau field holds an estimated 226 bcm of initial gas in-place. Discovered in 2019, with production expected to begin in 2028, the field is almost within

the scope of this briefing. However, no expected FID year could be found, so it was not included in the analysis.

## Further developments proposed in Southeast Asia

GOGET includes data on other fields expected to reach FID between 2022 and 2025 in Southeast Asia below, including Brunei's largest gas project, with an FID between 2022-2025, the Kelidang Cluster, Indonesia's Tuna, and Myanmar's Mahar. Details on those fields are listed in the annex.

Furthermore, it is worth noting that this report excludes discussion of significant fields because they fall outside of the scope or because an FID date could not be identified. For instance, the Abadi field in Indonesia has reserves of 360 bcm. FID has been pushed back multiple times from [2022 initially](#) to "[the latter half of the 2020s](#)" as of 2023 — pushing it outside of this briefing's scope. Another Indonesian

field, Gendalo-Gehem is expected to start extracting from its 44.7 bcm of reserves by 2027, but an FID year has not been found, so it also is not included in this analysis.

In the Philippines, the Department of Energy's "[Upstream Oil and Gas Roadmap 2017-2040](#)" lists an objective of increasing the country's gas reserves to about 164 bcm by 2040.<sup>6</sup> In a 2021 report, the Center for Energy, Ecology, and Development stated that the government's plans call to increase gas production 28 times higher in 2040 than 2020, coming from [seven gas fields](#). These fields do not have known expected FID years, nor start dates, so they were excluded from this briefing.

## An opportunity to plot a different (1.5 °C complaint) path

Multiple pathways for limiting warming to 1.5°C show no room and no need for new gas fields. Despite this, the scale of new gas field reserves in SE Asia that are likely to be or have been sanctioned for extraction between 2022 and 2025 is significant. It is important to note that the scope of this report excludes some noteworthy fields that further exacerbate the picture drawn here.

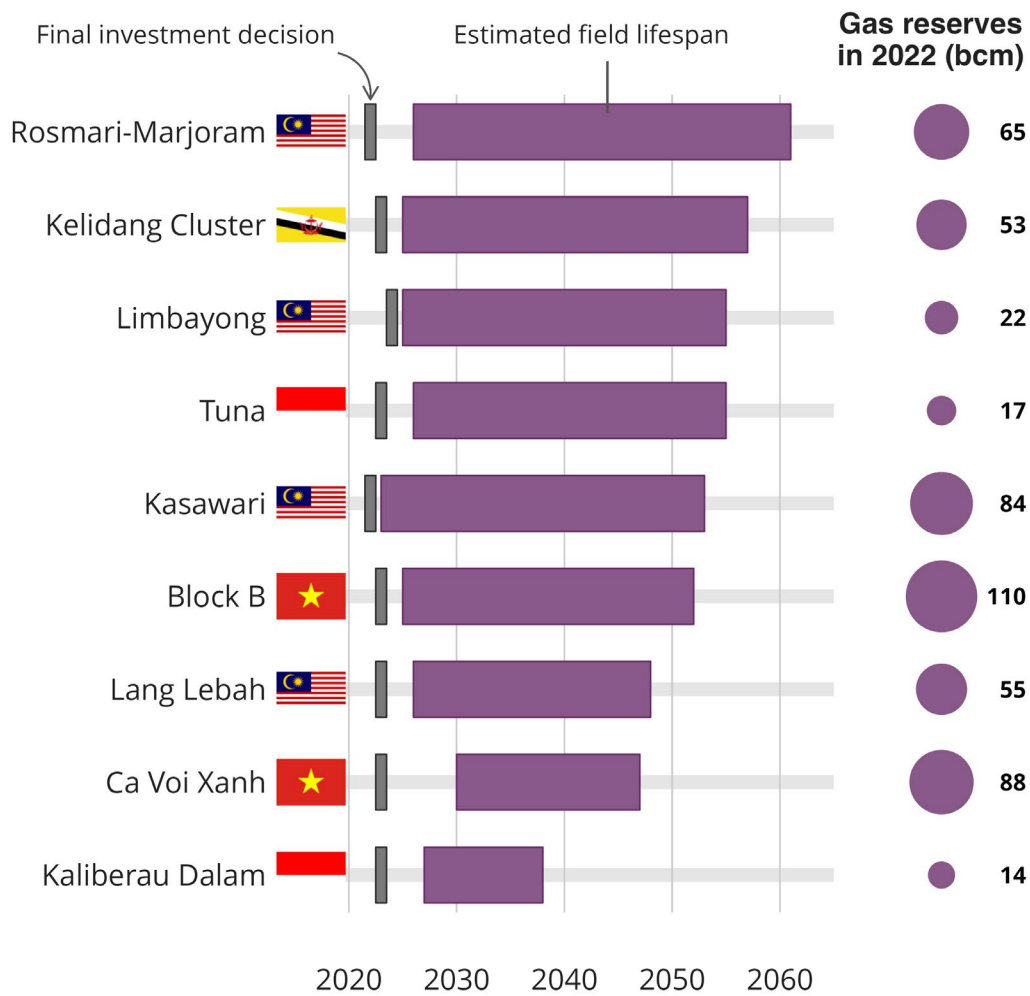
Development of these new projects increases the likelihood of exceeding the Paris target. IEA analysis shows production from the region is expected to climb between 2030 and 2050 to a level much higher than what is in the Sustainable Development Scenario. There is no denying that energy demand is increasing across Southeast Asia as populations increase, but the region must find sustainable ways

to meet their energy needs. As existing reserves gradually deplete, the SE Asian nations should use this opportunity to help achieve climate goals by redirecting their investments from further fossil fuel extraction and production toward clean energy.

6. Medium term goal (2019-2022) is to increase gas reserves to 4.67 tcf and long term (2022-2040) goal is to increase gas reserves to 5.87 tcf. 1 billion cubic feet = 0.028 bcm.

## Gas field lifespans in Southeast Asia

Estimated gas reserves and production lifespans for selected fields in Southeast Asia

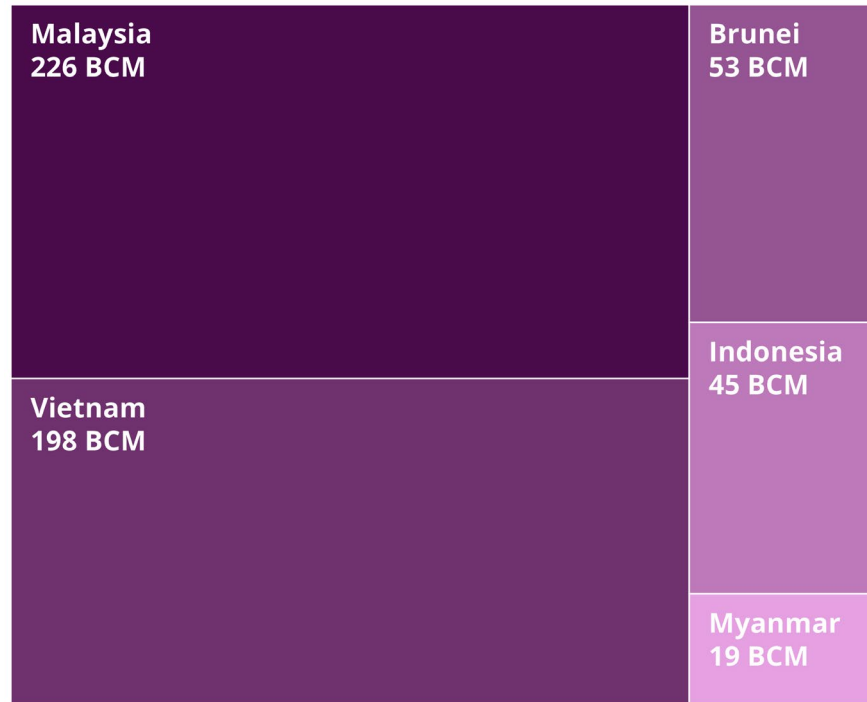


Source: Global Oil and Gas Extraction Tracker, Global Energy Monitor



## New gas reserves in Southeast Asia

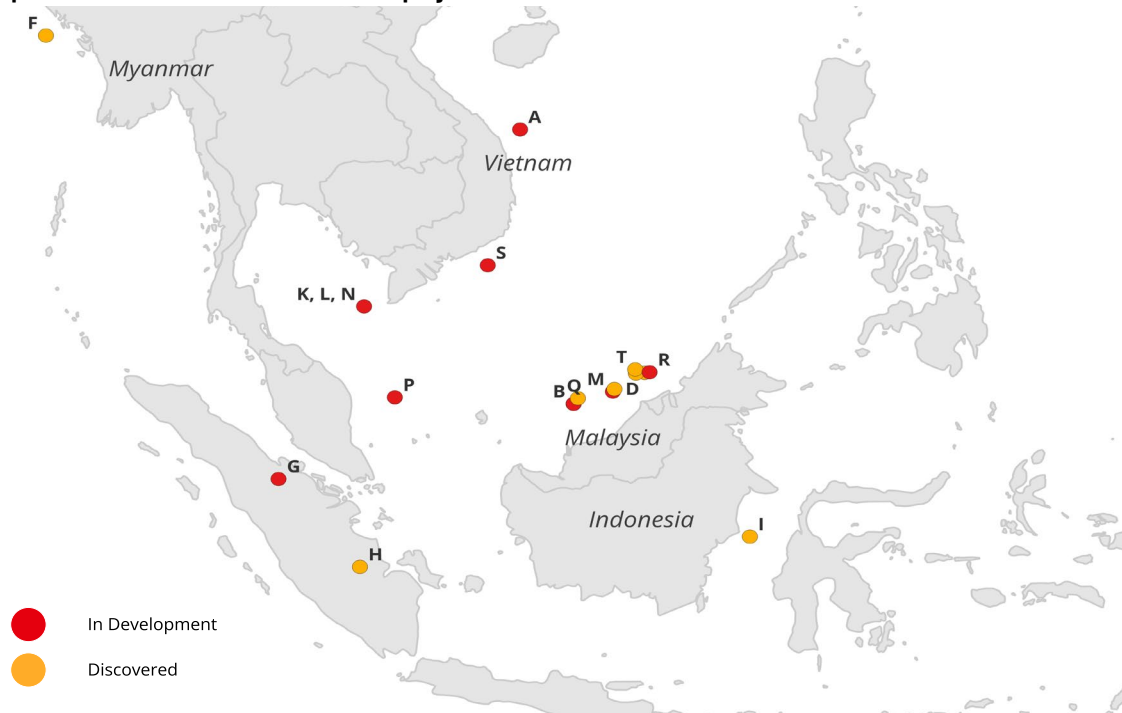
Country level reserves of new gas fields reaching final investment decision between 2022-2025



Source: Global Oil and Gas Extraction Tracker, Global Energy Monitor



Map 1: Locations and statuses of select projects in Southeast Asia



**Appendix 1: Projects reaching FID or starting up between 2022 and 2025**

Unit Name	Project	Country	Map Location	Operator	Owners (combined)	FID Year	2022 Gas Reserves (BCM)
Block B	Block B	Vietnam	K, L, N	PetroVietnam	PetroVietnam; 65.88%, Mitsui & Co; 25.60%, PTT Exploration and Production Public Company Limited (PTTEP); 8.50%, Vietnam Electricity (EVN)	2023	110
Ca Voi Xanh	Ca Voi Xanh	Vietnam	A	ExxonMobil	PetroVietnam Exploration Production Corporation; 36.00%, ExxonMobil; 64.00%	2023 (expected)	88.1
Kasawari	MLNG Train 9	Malaysia	M	Petronas Carigali	Petronas Carigali; 100.00%	2022	84.1
Rosmari-Marjoram	Rosmari-Marjoram	Malaysia	B	Sarawak Shell Berhad	Shell; 80.00%, Petronas Carigali; 20.00%	2022	64.9
Lang Lebah	Lang Lebah	Malaysia	C	PTTEP HK Offshore Ltd	PTTEP HK Offshore Ltd.; 42.50%, KUFPEC Malaysia (SK-410B) Ltd.; 42.50%, Petronas Carigali; 15%	2023	54.9
Kelidang Cluster	Kelidang Cluster	Brunei	D, T	Petronas	ConocoPhillips; 6.30%, Petronas; 45.00%, Murphy Oil; 30.00%, Mitsubishi Corporation; 6.30%, Shell plc; 12.50%	2023 (expected)	53
Limbayong	Limbayong	Malaysia	E	Petronas Carigali	Petronas Carigali; 100.00%	2024 (expected)	22.4



Mahar	Greater Shwe	Myanmar	F	Posco International	Posco International; 51.00%, Myanmar Oil and Gas Enterprise; 15.00%, ONGC; 25.50%, Korean Gas Corporation (KOGAS); 8.50%	2024 (expected)	18.7
Tuna	Tuna	Indonesia	G	Harbour Energy	Harbour Energy; 50.00%, Zarubezhneft JSC; 50.00%	2023	17
Kaliberau Dalam	Sakakemang	Indonesia	H	Repsol	Repsol; 45.00%, Petronas; 45.00%, Mitsui Oil Exploration Company Limited (MOECO); 10.00%	2023 (expected)	14.2
Maha	Bontang LNG	Indonesia	I	Eni S.P.A.	Eni S.P.A.; 40.00%, Neptune Energy; 30.00%, Pertamina; 30.00%	2023 (expected)	14.1
Marjoram	Rosmari-Marjoram Gas Project	Malaysia	B	Shell	Shell; 85.00%, Petronas Carigali; 15.00%	2022	-
Rosmari	Rosmari-Marjoram Gas Project	Malaysia	B	Shell	Shell; 85.00%, Petronas Carigali; 15.00%	2022	-
Ac Quy	Block B Gas	Vietnam	K	PetroVietnam	PetroVietnam; 65.88%, Mitsui & Co; 25.60%, PTT Exploration and Production Public Company Limited (PTTEP); 8.50%, Vietnam Electricity (EVN)	2023	
Ca Voi	Block B Gas	Vietnam	L	PetroVietnam	PetroVietnam; 65.88%, Mitsui & Co; 25.60%, PTT Exploration and Production Public Company Limited (PTTEP); 8.50%, Vietnam Electricity (EVN)	2023	-

Kim Long	Block B Ga	Vietnam	N	PetroVietnam	PetroVietnam; 65.88%, Mitsui & Co; 25.60%, PTT Exploration and Production Public Company Limited (PTTEP); 8.50%, Vietnam Electricity (EVN)	2023	-
Keratau	Kelidang Cluster	Brunei	D	Petronas	ConocoPhillips; 6.30%, Petronas; 45.00%, Murphy Oil; 30.00%, Mitsubishi Corporation; 6.30%, Shell plc; 12.50%	2023 (expected)	-
Kelidang North East	Kelidang Cluster	Brunei	T	Petronas	ConocoPhillips; 6.30%, Petronas; 45.00%, Murphy Oil; 30.00%, Mitsubishi Corporation; 6.30%, Shell plc; 12.50%	2023 (expected)	-
Gansar	PM12	Malaysia	P	Petronas Carigali	PETRONAS	2022	*
Salam	Salam-Patawali	Malaysia	Q	ConocoPhillips	ConocoPhillips; 50.00%, Petronas; 50.00%	2023 (expected)	*
Geronggong - Jagus East	Gumusut-Kakap-Geronggong-Jagus East	Brunei	R	Brunei Shell Petroleum	Shell plc; 50.00%, Government of Brunei; 50.00%	2022	*
Su Tu Trang 2b	Su Tu Trang	Vietnam	S	Cuu Long Joint Operating Company	PetroVietnam; 50.00%, Perenco; 23.30%, Korea National Oil Corporation; 14.30%, SK Innovation; 9.00%, Geopetrol International Inc.; 3.50%	2022 (expected)	*
*	No publicly available reserve figure found						
-	Reserves covered at a higher (e.g. project or block) level						

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