Putra Heights One Year On:

Unanswered Questions Remain.

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About RimbaWatch

RimbaWatch is an environmental think-tank conducting research and advocacy on climate-related issues in the Maritime Southeast Asian region.

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About Greenpeace Malaysia

Greenpeace works to expose environmental abuse and champion solutions that safeguard the future of our planet.Our vision is a greener, healthier and more peaceful planet, one that can sustain life for generations to come.

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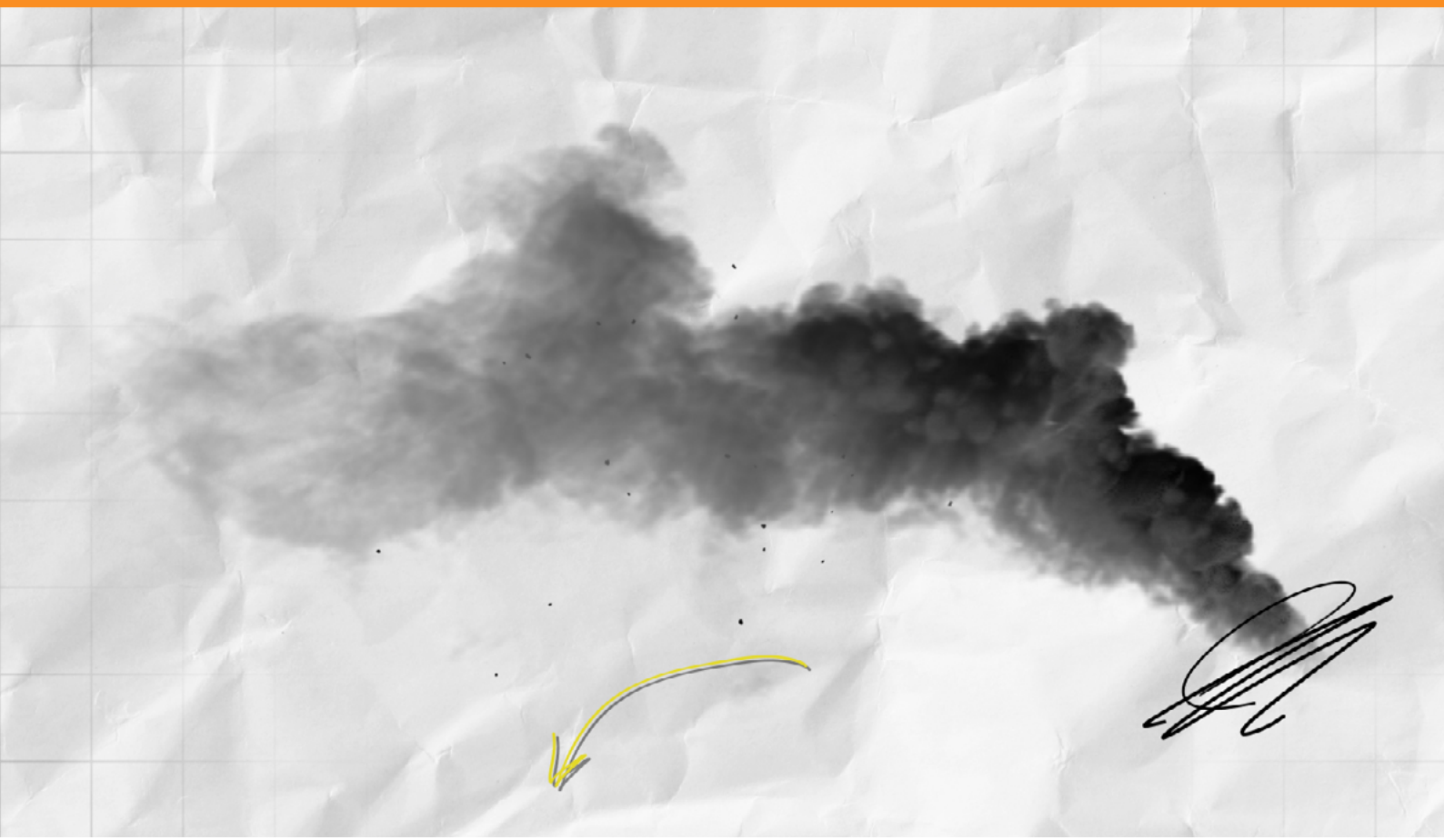

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Executive Summary

On 1 April 2025, an explosion and fire occurred along the Peninsular Gas Utilisation (PGU) Phase II high-pressure gas pipeline in Putra Heights, Selangor. The blast produced a flame column estimated at 20–30 storeys high, destroyed or damaged over 500 homes and hundreds of vehicles, injured more than 110 people, and forced the evacuation of more than 600 households. The incident created an eight-metre-deep crater and burned for over seven hours before being extinguished.

The Parliamentary Special Select Committee (PSSC) on Infrastructure, Transport and Communications concluded in October 2025 that the explosion was caused primarily by long-term soil subsidence beneath the pipeline. According to the PSSC, soft and waterlogged ground conditions led to 24.3 cm of soil settlement and 15.9 cm of pipeline displacement, weakening a welded joint through repeated cyclic loading until a gas leak ignited. The Committee found no evidence of sabotage, over-pressurisation, construction interference, or operator negligence, and classified the matter as requiring "no further action."

However, one year after the disaster, unanswered questions remain.

This policy brief identifies critical governance, regulatory and safety gaps not adequately addressed in the PSSC report:

1 Pipeline Siting and Zoning

Evidence suggests that the PGU Phase II pipeline was zoned, and ultimately constructed, through areas already allocated, and in some cases already developed, for residential use under the Rancangan Struktur Daerah Petaling Jaya dan Sebahagian Daerah Klang (RSDPSDK) structure plan at the time of the pipeline's construction. The siting of a 36-inch, high-pressure fossil gas transmission pipeline through dense urban areas raises serious concerns about planning decisions and inter-agency coordination at the time of approval.

2 Buffer Zones

Malaysia lacks a unified legal framework mandating minimum safety buffer zones for high-pressure gas pipelines. The existing 30–50 metre Right-of-Way (RoW) appears to function as the sole buffer, regardless of population density. International best practice, including standards aligned with ASME B31.8 and U.S. High Consequence Area (HCA) definitions, would suggest buffer distances exceeding 200 metres for a pipeline of this size and pressure. The absence of buffer zones calibrated to Potential Impact Radius (PIR) calculations leaves tens of thousands of residents exposed.

3 Community Awareness and Emergency Preparedness

Interviews conducted with residents indicate low awareness of the pipeline's presence and inadequate communication of safety protocols. While PETRONAS Gas Berhad (PGB) is known to conform to ASME B31.8 integrity management standards, publicly available records do not demonstrate that PGB provided communication of emergency preparedness materials to the public to the extent recommended by ASME.

4 Environmental and Risk Assessment Gaps

It remains unclear whether Environmental Impact Assessments (EIAs) or Quantitative Risk Assessments (QRAs) were conducted for the PGU Phase II pipeline or adjacent residential developments, despite legal requirements under the Environmental Quality Act 1974 and its 1987 Order. Malaysia's EIA framework historically did not mandate QRAs for pipelines, and transparency regarding past approvals remains limited.

5 Monitoring and Regulatory Oversight Failures

Although PGB employs advanced monitoring technologies, including SCADA systems, cathodic protection, drone surveillance, predictive analytics tools, and In-Line Inspection (ILI), a 243 mm soil movement went undetected. Technologies such as InSAR are capable of detecting millimetre-scale subsidence, leading to questions on how such a significant soil movement was not addressed.

6 Climate and Public Health Impacts

Approximately 400 million standard cubic feet of gas were released. Assuming full combustion, the explosion likely resulted in over 27,000 tonnes of CO_2 emissions, equivalent to the annual emissions of nearly 7,000 internal combustion engine vehicles. The PSSC did not assess the climate implications or short-term public health impacts of sudden high greenhouse gas concentrations in a dense urban environment.

7 Lessons from Previous Incidents

The Sabah-Sarawak Gas Pipeline experienced repeated leaks and subsidence-related failures between 2014 and 2022, leading to partial decommissioning in early 2025. The recurrence of subsidence-related failure in Putra Heights suggests that lessons from prior incidents were insufficiently integrated into monitoring protocols for high-consequence urban areas.

8 Continued Infrastructure Expansion Without Reform

Construction of the 36-inch TULIP pipeline continues despite similar siting and subsidence concerns, including development near residential zones and peat soils. Transparency regarding its EIA, buffer zones, and risk assessments remains limited.

The Putra Heights explosion indicates that systemic weaknesses in Malaysia's pipeline governance framework exists, including fragmented regulatory responsibilities, insufficient safety buffers, inadequate community engagement, limited transparency in risk assessment, and continued expansion of fossil fuel infrastructure without commensurate reform.

Given this, we recommend that the following measures are implemented:

- **Establishment of a Royal Commission of Inquiry (RCI) with statutory investigative powers.**
- **Strengthen the Energy Commission as the lead agency for pipeline safety, with a mandate to require mandatory buffer zones aligned with Potential Impact Radius (PIR) calculations.**
- **Independent, publicly available pipeline safety audits.**
- **Mandatory community safety communication protocols.**
- **Strengthened advertising regulations to prevent greenwashing.**
- **A legislated phase-out of fossil fuel production and accelerated renewable energy deployment.**

Glossary

Acronym	Explanation
API 1163	American Petroleum Institute Standard 1163
ASME B31.8	American Society of Mechanical Engineers B31.8
CH4	Methane
CIMAH	Control of Industrial Major Accident Hazards Regulations 1996
CO2	Carbon Dioxide
DOSH	Department of Occupational Safety and Health
EC	Energy Commission
EIA	Environmental Impact Assessment
EQA	Environmental Quality Act 1974
HCA	High Consequence Area
ILI	In-Line Inspection
InSAR	Interferometric Synthetic Aperture Radar
MBSJ	Majlis Bandaraya Subang Jaya
MCMC	Malaysian Communications and Multimedia Commission
PGB	PETRONAS Gas Berhad
PGU	Peninsular Gas Utilisation pipeline
PIG	Pipeline Inspection Gauge
PIR	Potential Impact Radius
PrAn3G	Predictive Analytics for Third-Party Threats and Geohazards
PSSC	Parliamentary Special Select Committee
QRA	Quantitative Risk Assessment
RCI	Royal Commission of Inquiry
RoW	Right-of-Way
RSDPSDK	Rancangan Struktur Daerah Petaling Jaya dan Sebahagian Daerah Klang (Petaling Jaya and Part of Klang District Draft Structure Plan)
SSGP	Sabah-Sarawak Gas Pipeline
TPES	Total Primary Energy Supply

Introduction

On 1 April 2025, a section of Malaysia's Peninsular Gas Utilisation (PGU) Phase II pipeline ruptured in Putra Heights, Selangor, triggering one of the most serious onshore gas infrastructure incidents in the country's recent history. The explosion and fire, which burned for over seven hours and produced a flame column visible at a distance, damaged more than 500 homes, injured over 110 individuals, displaced hundreds of families, and left a massive crater at the site of the failure.

In October 2025, the Parliamentary Special Select Committee (PSSC) on Infrastructure, Transport and Communications tabled its findings, concluding that the primary cause of failure was long-term soil subsidence beneath the pipeline. According to the Committee, gradual ground settlement weakened a welded joint, resulting in gas leakage and ignition. The incident was classified as geotechnical in nature, with no evidence of sabotage, over-pressurisation, or operator negligence.

While the PSSC report provides a strictly geotechnical explanation of the mechanical failure, it leaves broader governance and public health and safety questions insufficiently addressed. This policy brief examines these unanswered questions one year after the incident. Drawing on spatial analysis, review of legislation, international best practice standards, and documented community testimony, it evaluates whether existing regulatory frameworks governing pipeline siting, monitoring, community engagement and environmental oversight are fit for purpose.

Methodology

This policy brief is based on publicly available materials reviewed as of 26 March 2026, including the PSSC report, legislation, public statements, interviews, and secondary sources. It advances analysis and policy recommendations in the public interest. Where matters remain disputed or subject to ongoing proceedings, they are identified as such and should not be read as findings of civil or criminal liability. This report advances questions, analysis, and policy recommendations arising from the Putra Heights incident. It does not seek to replace the role of the courts, regulators, or statutory investigators in determining legal liability.

Adopting a mixed-method approach combining document analysis, spatial review, regulatory assessment, and secondary data evaluation to examine the Putra Heights pipeline explosion and its broader governance implications, this brief focuses on identifying potential weaknesses in corporate and regulatory governance and accountability rather than re-assessing geotechnical faults, and the methodology reflects this approach.

Firstly, a detailed review was conducted of the Parliamentary Special Select Committee (PSSC) report tabled in October 2025, alongside relevant Malaysian legislation including the Environmental Quality Act 1974, Gas Supply Act 1993, Gas Supply Regulations 1997, Town and Country Planning Act 1976, and associated subsidiary acts and regulatory instruments.

Industry standards referenced by the pipeline operator, including ASME B31.8 and API 1163, were also examined, along with best-practice from the European Union, to assess consistency between claimed compliance and observed practices.

Secondly, historical planning documents, including the Rancangan Struktur Daerah Petaling Jaya dan Sebahagian Daerah Klang (RSDPSDK), were reviewed to evaluate zoning decisions and the spatial relationship between the pipeline Right-of-Way (RoW) and residential development. Comparative analysis was undertaken against international regulatory frameworks, particularly High Consequence Area (HCA) definitions and Potential Impact Radius (PIR) methodologies used in the United States, which are also cited by industry standards such as ASME B31.8.

Thirdly, spatial population data from the Global Human Settlement Layer (GHSL) were analysed to estimate the number of residents living within 200 metres of the PGU Phase II pipeline in the Klang Valley.

Finally, secondary data sources including peer-reviewed research, satellite-based subsidence monitoring literature (e.g., InSAR applications), industry disclosures, and publicly reported incident histories were examined to contextualise monitoring capabilities and prior issues. Additionally, this report relies on seven interviews conducted by Greenpeace Malaysia with selected individuals affected by the incident between 11-26 December 2025.

Images: *Vehicles destroyed by the explosion and fire which occurred along the PGU Phase II high-pressure gas pipeline in Putra Heights, Selangor, impacting the community physically and economically.*

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Summary of the Parliamentary Special Select Committee (PSSC) on Infrastructure, Transport and Communications Findings

The 2,600km Peninsular Gas Utilization (PGU) pipeline is Malaysia's longest high-pressure fossil gas transmission system, operated by PETRONAS Gas Berhad to supply sales gas to power plants, petrochemical complexes and industries across Peninsular Malaysia, as well as for export to Singapore and Thailand. The PGU pipeline comprises multiple sections and loops, namely: PGU I (Kerteh to Teluk Kalong), PGU II (Teluk Kalong to Segamat; Segamat to Kapar; Segamat to Plentong), PGU III (Meru to Lumut; Lumut to Gurun; Gurun to Pauh), Loop 1 (Kerteh to Segamat) and Loop II (Segamat to Meru), completed at different intervals between 1984 and 2001. The PGU network uses high-tensile steel line pipes, typically with nominal diameters in the range of 24 to 36 inches for the main transmission sections, designed to operate under high pressure in the order of 3,400–6,900 kPa to transport large volumes of gas (Zulkifli, 2016).

On 1 April 2025 at approximately 8:00 a.m., a major explosion and fire occurred along a section of the main pipeline at Jalan Putra Harmoni, Putra Heights. The incident produced a flame ball estimated at 20–30 storeys high. Emergency response teams acted swiftly, deploying 78 firefighters while PGB shut four key valves to isolate the affected section and release residual gas. Residents in the surrounding area were evacuated, while the fire burned at temperatures exceeding 1,000° and was fully extinguished after approximately 7 and a half hours. The explosion caused extensive destruction within a 325 metre radius. A total of 511 homes were affected and 399 vehicles damaged, while more than 110 individuals sustained injuries, primarily severe burns and respiratory complications from inhaling smoke. The blast also created a huge crater at 'ground zero' measuring roughly 8 metres deep, 70 metres wide, and 80 metres long.

In March 2023, the Dewan Rakyat approved the establishment of 10 Parliamentary Special Select Committees (PSSC), empowered with a mandate to oversee bills and policies and investigate matters under various ministries. Following the incident, the Parliamentary Special Select Committee on Infrastructure, Transport and Communications was appointed as the investigating body of the Putra Heights explosion.

This PSSC is led by its Chair, YB Tuan Haji Ir. Yusuf bin Abd Wahab (Tanjong Manis), with the following members: YB Datuk Seri Ir. Dr. Wee Ka Siong (Ayer Hitam), YB Datuk Matbali bin Musah (Sipitang), YB Tuan Ganabatirau a/l Veraman (Klang), YB Tuan Tan Hong Pin (Bakri), YB Tuan Ir. Ts. Zahir bin Hassan (Wangsa Maju), YB Ir. Ts. Hj. Khairil Nizam bin Khirudin (Jerantut), YB Datuk Wan Saifulruddin bin Wan Jan (Tasek Gelugor) and YB Tuan Haji Ahmad Fadhli bin Shaari (Pasir Mas). The PSSC also appointed ex-officio permanent representatives from relevant ministries for advisory purposes.

To conduct their investigation, the PSSC brought together various government agencies, including Jabatan Mineral dan Geosains Malaysia (JMG), Jabatan Keselamatan dan Kesihatan Pekerjaan (JKKP / DOSH), Polis Diraja Malaysia (PDRM), Jabatan Kerja Raya (JKR), Jabatan Bomba dan Penyelamat Malaysia (JBPM), Bahagian Khidmat Pengurusan, SUK Negeri Selangor and Lembaga Pembangunan Industri Pembinaan Malaysia (CIDB); along with Petronas Gas Berhad (PGB). These agencies provided technical presentations based on their own internal investigations, including lab findings, forensic reports and geotechnical analyses.

The report of the Parliamentary Special Select Committee (PSSC) on Infrastructure, Transport and Communications, which was tabled on 6 October 2025 in the Malaysian Parliament, determined that the failure was primarily geotechnical in nature rather than operational. The Committee found no evidence of sabotage, excessive internal pressure, construction interference or operator negligence; the pipeline was operating within safe pressure limits at 58 bar. Instead, soft, loose, and water-logged subsurface soil reduced ground bearing capacity, leading to long-term settlement of 24.3 cm and pipeline movement of 15.9 cm. These conditions generated repeated cyclic loading that weakened a welded joint, resulting in a gas leak that was ignited through metal friction. Broader geological, hydrological and land-use changes further accelerated soil degradation and contributed to the failure, according to the report.

PSSC Investigation: What is Missing?

KEY QUESTION 1

Who Allowed, and When Was, a Pipeline Constructed Through a Residential Area?

Context

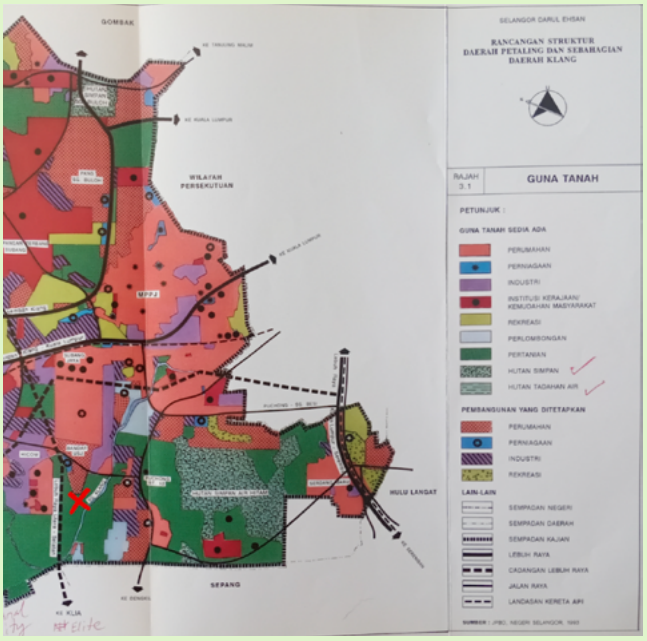
The PSSC investigation did not make any mention of the role of gazetted land allocation plans under the Structure Plan for the Petaling District, either at the time of pipeline construction or after, in siting dense residential land-uses adjacent to the pipeline. This is despite the prevalence of alleged improper zoning in public discourse examining the explosion, as evidenced by several news articles highlighting the issue[1] [2] [3]. With regards to this zoning, two questions arose in this public discourse: 1) How were houses zoned near the pipeline and; 2) Why was the buffer zone inadequate in securing public safety in incidents such as this?

Evidence

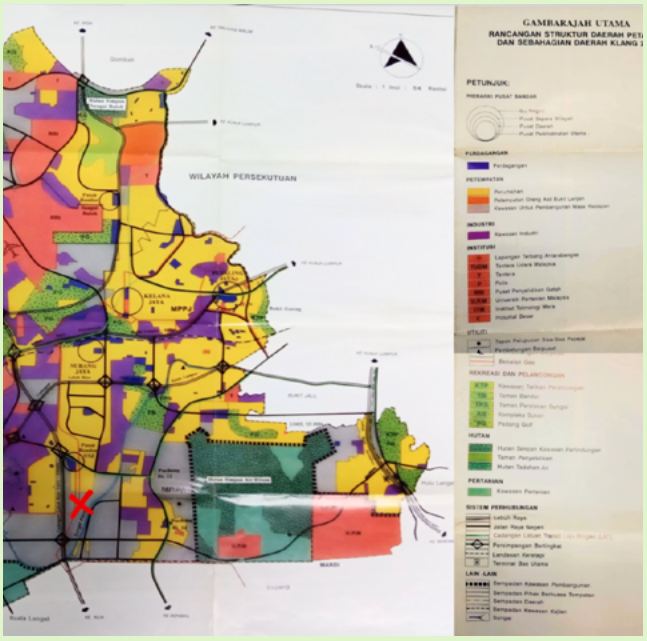
Before the expansion of urban development in the area, Putra Heights was part of the Seafield Estate; an oil palm plantation. In 1996, the Rancangan Struktur Daerah Petaling Jaya dan Sebahagian Daerah Klang (RSDPSDK) 1988-2010, prepared by the Majlis Perbandaran Shah Alam, was gazetted[4]. However, the RSDPSDK was already in draft by 1989, and was publicly displayed between 17 October and 16 November 1989. The construction of Phase II of the Peninsular Gas Utilisation (PGU) project, the section of the pipeline that crosses Putra Heights, began in July 1988[5] and was inaugurated in 1991[6].

The RSDPSDK, which therefore predates the inauguration of the pipeline, and which was drafted during the construction of the pipeline, clearly shows two things. Firstly, a significant portion of Subang Jaya already comprised of suburban residential areas in 1988, prior to the pipeline being constructed through those exact areas. Secondly, the RSDPSDK already provided for a gas pipeline RoW as of 1988. This RoW passed through areas allocated for both existing and future residential developments. Box 1 identifies the exact location of the Putra Heights explosion, marked as a red X, as planned for future residential development along the pipeline's right-of-way (ROW) zoning, at the time of the pipeline's construction.

Box 1



Gunatanah Semasa, 1988



Gunatanah Cadangan, 2010

Conclusion

The RSDPSDK demonstrates, therefore, that residential areas preceded much of the pipeline's later construction traversing through USJ and Subang Jaya. For the location of the Putra Heights explosion specifically, the surrounding area had already been allocated for residential development in conjunction with provided pipeline ROW zoning. This contradicts certain claims that the pipeline was built first and it was the fault of the relevant authorities for zoning residential areas near the pipeline after the fact. Rather, at the time PGB laid that particular section of pipeline through what was then still oil palm plantation, elsewhere in USJ/Subang Jaya that same pipeline was traversing older residential areas with similar RoW widths allocated as what was eventually provided at the incident area.

Further, PGB laid that section of pipeline through what was, before the time the pipeline was laid, already allocated for future residential development.

Malaysia's current framework allows critical safety decisions, such as buffer zones and monitoring requirements, to be determined by operators rather than enforced through unified legal standards. This creates inconsistent safety practices and exposes communities to avoidable risks.

KEY QUESTION 2

What is the Safety Buffer Zone and Why Did it Not Adequately Protect Communities?

Context

The analysis in this question raises governance and regulatory questions based on the materials reviewed. It should not be read as a concluded finding of legal breach, negligence, or misconduct by any named person or entity.

Regarding the question of a buffer zone as identified in Section 1 of Key Question 1, requirements for buffer zones around gas pipelines seem to differ depending on the authority or operator referred to. News reports suggest that Malaysia's Planning Guidelines for Infrastructure and Utilities sets a buffer zone of 30m from high-pressure gas pipelines[7]. Despite repeated attempts, these Guidelines could not be accessed on PlanMalaysia's website. Meanwhile, a statement by Selangor Menteri Besar cites an alleged PGB requirement for a 60 feet (18.3m) buffer zone[8]. The PSSC report, which only makes a single mention of a buffer zone in the context of the approval of 10 units of shoplots adjacent to the pipeline, cites a 40m buffer according to an uncited Majlis Perbandaran Subang Jaya guideline. While it is unknown whether the above Guidelines and requirements interpret a buffer zone as an additional area beyond the RoW, it appears likely that both terms are equivalent in the Malaysian context. Further, the PSSC report neither analyzes the adherence of developments surrounding the pipeline with cited buffer zones, nor does it assess the efficacy of the cited buffer zones.

Evidence

It is clear that there is no unifying regulatory framework in Malaysia which explicitly sets a legal requirement for a minimum buffer zone or RoW width for high-pressure gas pipelines.

While there is no consensus within international petroleum or development standards on a single minimum buffer zone for high-pressure gas pipelines, popular industry standards such as ASME B31.8: Gas Transmission and Distribution Piping System, which PGB claims to adhere to[9], requires operators to define different location classes of pipelines accounting for the performance of the pipeline, existing and future population and development in surrounding areas, and to site the pipeline accordingly. It is unclear from a review of publicly available records whether the "Planning Guidelines for Infrastructure and Utilities", PGB's 18.3m or the MPSJ 40m buffer zones account for surrounding populations in setting these figures, or if they include requirements for setting higher buffer zones depending on different location classes of infrastructure.

Regarding the adherence of developments surrounding the pipeline with cited buffer zones, Box 2 identifies the diameter of the ROW at three different locations along the PGU Pipeline. This suggests that a roughly 30m-50m ROW is consistent across the

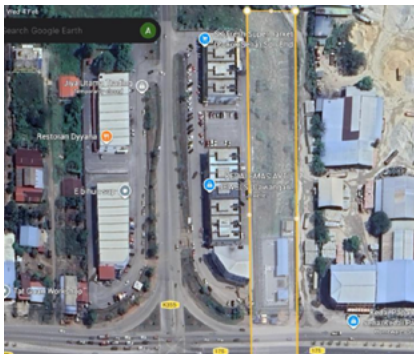
Box 2

ROW at Pokok Sena, Kedah

ROW at Putra Heights, Selangor

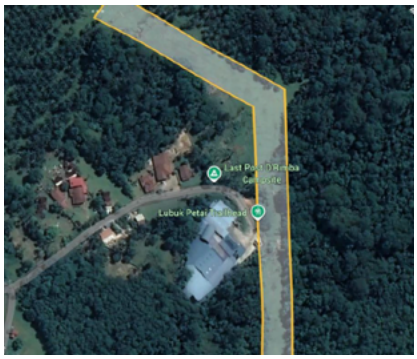
ROW at Rembau, Negeri Sembilan

Box 3



ROW at Pokok Sena, Kedah

ROW at Putra Heights, Selangor



ROW at Rembau, Negeri Sembilan

pipeline. However, Box 3 identifies commercial, residential and industrial properties directly fronting the 30-50m ROW with no additional buffer zone near these three different locations, which implies that the RoW width is the buffer zone.

Therefore, while a 30-50m ROW seems to be adhered to throughout the pipeline, this particular review does not identify safety buffer zones beyond this 30-50m, and these figures are in itself inadequate for a pipeline of the operating pressure and diameter of the PGU Pipeline, as will be explained below. In fact, this ROW appears similar in practice to the 'rizab dua rantai' of 40m also commonly applied to high tension electric lines, which has a different risk profile to high-pressure gas pipelines[10] [11].

To refer to best practice in pipeline siting from other jurisdictions, in the United States, a 2002 ruling issued by the Department of Transportation Research and Special Programs Administration[12], specifically outlined what location classes

count as "high consequence areas" (HCAs), where the consequences of a pipeline accident would cause significant harm to people and property. This ruling, which defined HCAs as "facilities with persons who are mobility-impaired, confined, or hard to evacuate, and places where people gather for recreational and other purposes" and "a building that is occupied by twenty (20) or more persons on at least five (5) days a week for ten (10) weeks in any twelve (12)-month period" requires pipeline operators to establish a "corridor of protection" from the pipeline of 300ft-1000ft, depending on the pipeline's diameter and operating pressure. According to this ruling, an equivalent pipeline with the specifications of the PGU Phase II sited through a residential area in the United States would require a buffer of at least 201m, which is 11 times the alleged PGB requirement as cited by the Menteri Besar of Selangor.

Another industry method is to align buffer zones with the Potential Impact Radius (PIR) of a gas pipeline, which is a conservative screening tool for identifying high-consequence areas, applicable to both buried and aboveground pressurized pipelines. As defined by United States Minimum Federal Safety Standards for the Transportation of Natural and Other Gas by Pipeline[13] and **as explicitly instructed in the ASME B31.8 Standard**[14], the PIR is calculated by the following formula:

"*formula r = 0.69* (square root of (p*d2)), where 'r' is the radius of a circular area in feet surrounding the point of failure, 'p' is the maximum allowable operating pressure (MAOP) in the pipeline segment in pounds per square inch and 'd' is the nominal diameter of the pipeline in inches.*"

Therefore, for the PGU Phase II pipeline, which has a radius of 36 inches and a maximum operating pressure of 1,000PSI, the potential impact radius is 785 feet, or 240m; 13 times PGB's alleged requirements.

Conclusion

The lack of a unifying regulatory framework in Malaysia which explicitly sets a legal requirement for a minimum buffer zone beyond the ROW for high-pressure gas pipelines allows different authorities and operators to set their own buffer zones, and it is unknown if any of these refer to industry standards, such as ASME B31.8. While the PGU ROW seems to adhere to a 30-50m minimum ROW diameter, this is likely inadequate when accounting for high consequence areas and a potential impact radius of up to 240m, calculated in adherence to definitions and formulas adopted in the United States and in the ASME B31.8 standard. Under modern-day DOSH requirements, PGB's technical staff would need to be trained in ASME B31.8 (this is described in Question 5). However, publicly available records reviewed for this policy brief does not demonstrate how PGB, in practice, categorised higher risk categories for urban areas, and if they adjusted their internal pipeline monitoring protocols (i.e geopigging) accordingly. Further, any risk assessment conducted by them does not indicate, from our analysis, significantly higher buffer zones in densely populated urban areas such as Putra Heights (Box 2 indicates that the ROW diameter outside Rembau, a semi-rural area, and Putra Heights, a dense urban area, are similar), nor did it result in establishing accessible safety protocols for communities to the full ASME requirements in high consequence areas, as is explored in the next question.

KEY QUESTION 3

Why Was the Community Caught Off-Guard?

Context

Interviews conducted by Greenpeace Malaysia with landowners and tenants (LaT) along the ROW in Putra Heights after the explosion indicates that local awareness of the location and siting of the pipeline, along with appropriate safety protocols, was low.

Some LaT interviewed were not aware of the existence of the gas pipeline in the first place. LaTs indicated that they had not received any communication from PGB in the years prior to the explosion, and in the hours immediately after the explosion, on relevant safety protocols for local communities. Interviews indicated a broad sense of confusion and chaos during the explosion event, often not knowing what the source of the explosion was, not having adequate evacuation routes which further contributed to injuries and loss of property, and no instruction on what to do or not to do (i.e. to not light matches, breathe the air, start an engine which may cause sparks), or where to congregate safely after.

Evidence

There is no consensus within international petroleum or development standards on a single minimum community safety protocol for LaTs residing near high-pressure gas pipelines. However, PGB claims to adhere to ASME B31.8[9], stating that "*every pipeline under the PGU network is designed, built, and maintained to meet globally recognised codes*", including the above standard.

ASME B31.8 states that "*the operator shall develop and implement a communications plan in order to keep appropriate company personnel, jurisdictional authorities, and the public informed about their integrity management efforts*" and that "*communications should be conducted as often as necessary to ensure that appropriate individuals and authorities have current information about the operator's system and their integrity management efforts. It is recommended that communications take place periodically and as often as necessary to communicate significant changes to the integrity management plan.*"

The standard defines the necessary external communications for landowners and tenants residing along the RoW specifically as the following:

1. Company name, location, and contact information.
2. General location information and where more specific location information or maps can be obtained.
3. Commodity transported.
4. How to recognize, report, and respond to a leak.
5. Contact phone numbers, both routine and emergency.
6. General information about the pipeline operator's prevention, integrity measures, and emergency preparedness, and how to obtain a summary of the integrity management plan.
7. Damage prevention information, including excavation notification numbers, excavation notification center requirements, and who to contact if there is any damage.

The standard further states that "*it is expected that some dialogue may be necessary between the operator and the public in order to convey the operator's confidence in the integrity of the pipeline, as well as to convey the operator's expectations of the public as to where they can help maintain integrity. Such opportunities should be welcomed in order to help protect assets, people, and the environment.*"

Meanwhile, the Occupational Safety and Health Act 1994 subsidiary regulation, Occupational Safety and Health (Control of Industrial Major Accident Hazards Regulations, or CIMAH) Regulations 1996 P.U. (A) 39/1996, imposes requirements on industrial activities involving "hazardous substance", of which fossil gas meets the requirements under Schedule 1.

This regulation requires that:

"*It shall be the duty of a manufacturer who has control of an industrial activity to which this Part applies to ensure that persons outside the site who are likely to be in an area which, in the opinion of the Director General, is likely to be affected by a major accident occurring at the site, are supplied in an appropriate manner with at least the information specified in Schedule 3 without their having to request for it.*"

Noting that the term manufacturer is used to denote the operator of the industrial activity, Schedule 3 specifies the following:

"*(a) Name of manufacturer and address of site of industrial activity*
(b) Identification by position held of person giving the information
(c) Confirmation that the site is subject to these Regulations and that the report referred to in subregulation 15(1) has been submitted to the Director General.
(d) An explanation in simple terms of the activity undertaken on the site.
(e) The common names or the generic names of the general danger classification of the substances and preparations involved on the site which could give rise to a major accident with an indication of their principal hazardous characteristics.
(f) General information relating to the nature of a major accident hazard including its potential effects on the population and the environment.
(g) Adequate information on how the population concerned will be warned and kept informed in the event of an accident.
(h) Adequate information on the actions the population concerned should take and on the behaviour they should adopt in the event of an accident.
(i) Confirmation that the manufacturer is required to make adequate arrangements on the site, including liaison with the emergency services, to deal with accidents and to minimise their effects.
(j) A reference to the off-site emergency plan drawn up to cope with any off-site effects from a major accident. This shall include advice to co-operate with any instruction or request from the emergency services at the time of a major accident.
(k) Details of where further relevant information can be obtained subject to the requirements of confidentiality laid down in any national legislation"

Based solely on our review of public records, the only safety protocols readily publicly accessible are signs directly on the RoW which identify it as a high-pressure gas pipeline, identify PGB as the operator, include the PGB hotline and which prohibit certain activities, such as building, digging or parking vehicles, on the RoW. There is no indication that points 2, 4 and 6 from the ASME list above which would include key information on what to do if a pipeline leaks, are available on webpages, or were communicated directly with LaTs of Putra Heights in the years preceding the explosion, or that there were any organised dialogue efforts or seminars between PGB and local residents beyond ad-hoc engagements to respond to individual complaints, if any.

This differs from common industry practices. For example, other major oil and gas pipeline operators, including ExxonMobil[15], TC Energy[16] and Shell[17] have comprehensive information packages freely available on their websites identifying emergency preparedness procedures for living near pipelines (see box 4). At a domestic scale, it is clear that PETRONAS does prepare information packages, according to CIMAH 1996 regulations as above, for other infrastructure, such as the BASF-PETRONAS Chemicals facility in Gebeng, Pahang (see box 5); however such packages could not be found for the PGU pipeline.

Box 4

Environmental management

We are committed to achieving and maintaining excellence in environmental care throughout our operations.

The community can assist by recognising the signs of a release. Signs of a release of a fuel or gas product from a pipeline include:

- By sight: Liquid on the ground, water bubbling or being blown into the air, vapour cloud, discoloured or abnormally appearing soil, an oily sheen on water surfaces, fire or explosion, dead vegetation
- By sound: Unusual noise such as hissing or roaring
- By smell: Unusual petroleum or chemical smell.

If a release occurs or you think there may be a release:

- Immediately and safely leave the area and move upwind of the release
- Call emergency services on 000 and contact ExxonMobil Australia at the number listed on the pipeline warning sign
- Do not touch, breath or make contact with the release
- Do not light a match, start any engine, use a phone or light switch or do anything close to the release which may create a spark
- Do not drive into a leak or vapour cloud area
- If you have concerns about your own health, contact your doctor immediately
- Do not attempt to operate any of the valves on the pipeline. It could worsen the situation.

Excerpt from ExxonMobil, 'Living and Working Near Pipelines', n.d

Box 5

ACTION TO BE TAKEN BY PUBLIC & NEIGHBOURING PLANTS	
ACTION	**DISCRIPTION**
PUBLIC	
Calm	Do not panic
Alert	Always be cautious
Assembly Point	Wait at the place determined by the authorities until further instructions
Cooperation	Give fully cooperation to the instructions given by the authorities
Prohibited	Do not approach or come close to the emergency site
	Do not call to get any information from BPC ICS & PTF
NEIGHBOURING PLANTS PERSONNEL	
Wait	BPC will inform through existing communication channels
Prohibited	Do not contact or approach BPC ICS & PTF
Attention	Provide full cooperation if requested by BPC or the authorities

EMERGENCY CONTACTS		
AGENCY	**DISTANCE TO PLANT (KM)**	**TELEPHONE**
Pusat Tindakan Kecemasan BPC	0	5555
JBPM Gebeng	11.4	09 5837977
JBPM Kuantan	31.3	09 5732978
KPC Fire Department	4	09 5863882
Hospital - HTAA	33.1	09 5133333

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INTERNAL BPC TASK INFORMATIONS	
ITEMS	**DESCRIPTION**
Emergency Response Team at site	The team consists of a marshal and five trained fire-fighting personnel
Emergency Management Team at Site	The team comprises of BPC ICS & PTF staff, who are in charge of managing emergency and providing on-site support
ERP	BPC ICS & PTF Emergency Response Plan
Alarm	Fire alarms and emergency alarms are installed throughout BPC ICS & PTF plant. The alarm is connected to BPC ICS & PTF Emergency Response Centre and JBPM Gebeng Station
Fire Fighting equipment	Fire fighting equipment are provided throughout BPC ICS & PTF areas such as water tanks, fire hydrants, fire hoses, fire extinguishers

OTHERS	
ABBREVIATION	
BPC	BASF PETRONAS Chemicals Sdn Bhd
CEFS	Central Emergency Fire Services
ERP	Emergency Response Plan
ICS	Integrated Chemical Site
JBPM	Jabatan Bomba & Penyelamat Malaysia
KPC	Kuantan Port Consortium
PTF	Port Tank Farm

THIS INFORMATION ABOVE IS ISSUED BY
Aik Meam Tan Managing Director BASF PETRONAS Chemicals Sdn Bhd Email: info.services@basf-petronas.com.my Phone Number: +603 7612 1088 Year: 2025

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BASF PETRONAS CHEMICALS

INFORMATION TO PUBLIC

BASF PETRONAS CHEMICALS SDN. BHD.
JALAN GEBENG 2/1
KAWASAN PERINDUSTRIAN GEBENG
26080 KUANTAN
PAHANG DARUL MAKMUR

OCCUPATIONAL SAFETY AND HEALTH REGULATIONS

(Control of Industrial Major Accident Hazards)

CIMAH 1996

Page 1/6

Excerpt from BASF PETRONAS CHEMICALS, 'Information to Public', n.d

Conclusion

The conclusion below raises governance and regulatory questions based on the materials reviewed. It should not be read as a concluded finding of legal breach, negligence, or misconduct by any named person or entity.

While PGB has committed to strengthening public communication and emergency preparedness around the Right-of-Way (RoW) after the explosion[18], the publicly available record does not demonstrate how PGB had communicated emergency preparedness to the full ASME standard in dense urban areas surrounding the PGU RoW prior to the explosion. Further, this gap differs from common industry practice by other major pipelines operators as listed above, and is also inconsistent with what PETRONAS has practiced for other types of infrastructure defined under CIMAH. One year following the explosion, despite running a public relations campaign to improve their image (see Question 5), our review did not find a publicly-accessible PGB webpage, or infographic on social media, or indeed any official information on the internet on safety protocols for those living near PGB gas pipelines in Malaysia.

KEY QUESTION 4

Was an Environmental Impact Assessment Conducted?

Context

To date, no public statements by the PSSC, nor Selangor authorities or any other authoritative body, have made any reference to an environmental impact assessment related to the explosion.

The Environmental Quality Act (EQA) came into force in 1974, however environmental impact assessments (EIAs) only became legally prescribed through the Environmental Quality (Prescribed Activities) (EIA) Order, 1987. Clause 12(b) of the Order prescribes EIAs for "construction of offshore and onshore pipelines in excess of 50 kilometres in length", and Clause 7 of the same Order requires EIAs for "housing development covering an area of 50 hectares or more".

ALL PHOTOS BY GREENPEACE

Images: *A resident of Kampung Sungai Baru, Putra Heights, walking through the ruins of his house which was destroyed in the explosion.*

Evidence

Given Clause 12(b) and Clause 7 of the EQA EIA Order, 1987, along with the timing of it coming into force (a year before construction of the PGU Phase II pipeline commenced), it is clear that the PGU Phase II pipeline likely required such an EIA. Further, a similar requirement likely applied to the UEP Subang Jaya township, which includes Putra Heights, which spans 726 hectares and commenced construction after 1988, based on news articles at the time[19].

The full text of the then-applicable EIA Guidelines, first drafted in 1979 and reviewed in 1987, is not available, and therefore it is unknown the extent that any risk assessment would have been included in such an EIA. What is known, is that by 1989, risk assessments being a gap in Malaysia's EIA framework had already been recognised in academia[20]. Further, there exists a Control of Industrial Major Accident Hazards Regulations 1996, which mandates Quantitative Risk Assessments (QRAs), which is a formal, systematic, and numerical approach to evaluating the risks associated with hazardous industrial processes, including gas transportation in pipelines. However, this mandate for QRAs succeeds the development of the pipeline, meaning that it is unclear if a QRA was conducted as part of the planning and approvals process for the PGU Phase II Pipeline[21]. Further, the 1996 Regulation does not explicitly include pipelines as a scheduled activity under the jurisdiction of the Regulation, and its parent act the Occupational Safety and Health Act 1994, is focused on the safety of employed persons rather than the general public. To-date, the updated EIA Guidelines do not mandate a QRA for any activity, let alone pipelines or other fossil-fuel related infrastructure.

Conclusion

It remains unclear from a review of public records if either PGB or UEP submitted EIAs for their respective developments, despite the high likelihood that these developments required an EIA under the 1987 EQA EIA Order. This makes it difficult to ascertain the extent thatwhether PGB, UEP or MPSJ considered the proximity of a high-pressure gas pipeline to residential developments in planning and approval processes. Further, it is unclear how a QRA was ever conducted as part of the planning and approvals for the PGU Phase II Pipeline, and Malaysia's EIA framework did not historically, nor at present, mandate QRAs for any type of project.

KEY QUESTION 5

Whose Responsibility Was it to Monitor Soil Subsidence?

Context

The PSSC concluded that the April 2025 Putra Heights Explosion was ultimately caused by soil subsidence occurring since the pipeline was laid, resulting in the 24.3 cm of soil subsidence resulting in the pipeline shifting by 15.9cm. Fatigue and stress on the pipeline, and eventual failure, followed. This subsidence was attributed to water accumulating in the soil underneath the pipe, which caused the pipe to fail "despite meeting technical specifications". Therefore, the cause of the explosion was ultimately attributed to natural causes, without negligence, and the case was classified as "no further action". To date, no public statements by the PSSC, nor Selangor authorities or any other authoritative body, have made any reference to which body is responsible for monitoring pipeline integrity in Malaysia in regards to soil subsidence. Given Malaysia's widespread peat, coastal, and soft soil conditions, the risks identified in Putra Heights are unlikely to be isolated and may reflect broader vulnerabilities across the national gas pipeline network.

Evidence

There is a wide range of federal legislation related to petroleum, planning, environmental and workplace safety, along with industry standards and internal corporate processes, which are supposed to delegate responsibility for monitoring pipeline integrity. These are reviewed below.

Petroleum-related Legislation

The Petroleum Development Act 1974[21] vests PETRONAS with all ownership, rights, privileges and benefits related to the exploration and production of oil and gas in Malaysia, whether it is onshore or offshore. Section 7 of the Act provides the Prime Minister with the authority to make regulations for the purpose of carrying into effect the provisions of this Act, including regulations related to downstream activities and development relating to petroleum.

Part V of the **The Petroleum (Safety Measures) Act 1984**[22] governs the transport of petroleum via pipelines, but vests authority over gas pipelines to Gas Supply Act 1993.

The Gas Supply Act 1993[23] "provides for the licensing of the supply of gas to consumers through pipelines and related matters, the supply of gas at reasonable prices, the control of gas supply pipelines, installations and appliances with respect to matters relating to safety of persons and for purposes connected therewith." Part III of the Act provides that the Energy Commission will carry out functions and duties including: "to protect the public from dangers arising from the distribution of gas through pipelines or from the use of gas supplied through pipelines" and "to investigate any accident or fire involving any gas pipeline or installation".

The Act further provides an authorized officer with the right to inspect and examine any pipeline or installation or part thereof for the purposes of discharging any of his duties or carrying out any of his functions under this Act or any regulation made thereunder. The Act gives this officer the power to require the rectification of the defect, discontinue gas supply and remove or seal any pipeline or part thereof, if a defect is found.

The Gas Supply Regulations 1997[24] provides the Director-General with the right to suspend or revoke a license if a gas installation is found to be unsafe.

Part VI of the Regulations requires that "a gas installation shall be maintained in good and efficient working order to ensure safety of persons and safety shall be observed at all times so as to prevent danger from arising", and that "the duty to ensure the safety standards required under subregulation (1) shall be on the responsible person". A responsible person is defined "in relation to any premises, means the licensee or consumer, or an occupier of the premises, or where there is no consumer or occupier, the owner of the premises or any person authorized by the consumer or occupier to be in charge of the gas pipeline or gas installation in the premises."

Environmental Legislation

As described above, the **Environmental Quality Act 1974 requires EIAs** for "construction of offshore and onshore pipelines in excess of 50 kilometres in length", and "housing development covering an area of 50 hectares or more".

Health and Safety Legislation

The Occupational Safety and Health Act 1994[25], or OSHA 1994, requires that employers need to conduct a risk assessment in relation to the safety and health risk posed to any person who may be affected by his undertaking at the place of work.

The OSHA 1994 subsidiary regulation, **OCCUPATIONAL SAFETY AND HEALTH (CONTROL OF INDUSTRIAL MAJOR ACCIDENT HAZARDS) REGULATIONS 1996 P.U. (A) 39/1996**, imposes requirements on any industrial activity involving "hazardous substance", of which fossil gas meets the requirement under Schedule 1 and is explained above in Key Question 3. Importantly, under the regulation, a "manufacturer who commits an offence against any of the provisions of these Regulations for which not corresponding penalty is provided by the Act shall, on conviction, be liable to a fine not exceeding fifty thousand ringgit or to a term of imprisonment not exceeding two years or to both."

The Petroleum (Safety Measures) Act 1984's subsidiary regulation, **PETROLEUM (SAFETY MEASURES) (TRANSPORTATION OF PETROLEUM BY PIPELINES) REGULATIONS 1985 P.U.(A) 85/1985**, in Part 5 (1), requires that: "*No person shall install or caused to be installed any pipeline unless he or his authorised representative has obtained a written permission from the Approving Authority.*"

The Department of Occupational Safety and Health's Guidelines on Registering as a Competent Firm (Petroleum Contractors) (2018), outlines the requirements for pipeline operators to receive such written permission. Part 4.1.4 specifically references training in ASME B31.4, ASME B31.8, ASME B31.3 ASME B31.1, MS 830 dan MS 930 in the requirements for technical staff.

Planning Legislation

The Local Government Act 1976[26] defines the powers of local authorities to regulate, for example, markets and cemeteries. While pipelines meet the definition of a "building" under the 1976 Act, there is little in the Act regulating the responsibility of ensuring building health and safety, outside of certain contexts such as the aforementioned markets.

The Town and Country Planning Act 1976[27] establishes local planning authorities, which "*regulate, control and plan the development and use of all lands and buildings within its area*". Beyond providing authorities with the powers to develop the local plans as discussed in Question 2, it requires those erecting a building to submit detailed development proposal reports which includes a land use analysis and its effect on the adjoining land and layout plans, which measures for the protection and improvement of its physical environment. The Act further gives any "authorised person" the power to enter upon or into any land or building for the purpose of "*making any inquiry, inspection, measurement, or survey, or taking the levels of the land or building" or to "ascertaining whether any development has been commenced, undertaken, or carried out in contravention of this Act or the rules made thereunder*".

Industry Standards

As discussed above, after the explosion, PGB claimed to be in adherence to industry standards such as ASME B31.8 and API 1163. ASME B31.8 outlines clear standards for pipeline operators in relation to designing, building, maintaining and monitoring pipelines accounting for geohazards, specifically referring to unstable soil. For example, ASME B31.8 outlines best practices for pipeline In-Line Inspections (ILI) to detect deformation and other defects.

Similarly, API 1163 provides performance requirements for In-Line Inspection (ILI) systems throughout their lifecycle, aiming to ensure accurate and reliable data for pipeline integrity management.

Accordingly, PETRONAS have developed a comprehensive suite of Technical Standards, aligned with ASME and API standards, related to monitoring pipeline integrity. This includes 11.31.02 Pipeline Pig Trap Systems, 11.33.02 Pipeline Leak Detection System and 11.35.03 Specifications And Requirements For Pipeline In-Line Inspection[28].

Following the April 2025 Explosion, PETRONAS[29] clarified that, "to execute comprehensive inspection and maintenance activities", PETRONAS has "*periodic internal pipeline inspection programmes using Pipeline Inspection Gauge (PIG) technology*", "*installed Cathodic Protection (CP) system and supported by soil and slope movement regular monitoring*", "*state-of-the-art technologies such as SCADA (Supervisory Control & Data Acquisition), Pipeline Leak Detection System (PLDS), close-circuit-camera TVs (CCTV) and Distributed Acoustic System (DAS)*", "*ground and aerial surveillances via drones by qualified operators, which enable us to provide rapid response to any abnormalities*". Further, PETRONAS has developed monitoring products under the Pipeline of the Future (POTF) packages, such as PrAn3G Predictive Analytics for Third-Party Threats and Geohazards Predictive, which uses drone aerial surveillance data to identify third-party encroachment threats and geohazards along pipeline right-of-way[30].

Conclusion

The following is interpreted from the above review of legislation, industry standards and internal corporate processes, noting that this interpretation is intended to raise governance and regulatory questions based on the materials reviewed. It should not be read as a concluded finding of legal breach, negligence, or misconduct by any named person or entity.

The Environmental Quality Act 1974 likely required both PGB and UEM to conduct EIAs prior to project development, for approval from the Department of Environment. The Town and Country Planning Act 1976 provided the local planning authority with the powers to approve the local plan for both the pipeline and surrounding residential developments, accounting for "its effect on the adjoining land and layout plans" and protection of the surrounding physical environment.

Under the **PETROLEUM (SAFETY MEASURES) (TRANSPORTATION OF PETROLEUM BY PIPELINES) REGULATIONS 1985**, DOSH is likely responsible for ensuring that the contractors that laid the pipeline were compliant with ASME standards. Under **The Gas Supply Regulations 1997**, as the owner of the pipeline, **PGB appears responsible for maintaining the facility in good and efficient working order to ensure** *safety of persons and safety shall be observed at all times so as to prevent danger from arising*. This is supported by the comprehensive suite of Technical Standards developed by PETRONAS related to pipeline monitoring, as well as the adherence of PETRONAS to several industry standards related to pipeline integrity, and their usage of various technologies related to pipeline integrity monitoring, which indicates that PGB is the body with the most technical and practical expertise in pipeline monitoring. Similarly, under the **OCCUPATIONAL SAFETY AND HEALTH (CONTROL OF INDUSTRIAL MAJOR ACCIDENT HAZARDS) REGULATIONS 1996**, PGB was responsible for complying with relevant DOSH regulations.

Under the **Gas Supply Act 1993**, the Energy Commission appears to be responsible for ensuring the public was protected from dangers related to gas pipelines, and in this context is responsible for inspecting pipelines for defects and investigating accidents or fires. Further, under the **Town and Country Planning Act 1976**, any authorised person from the local planning authorities could inspect the pipeline. **The Gas Supply Regulations 1997** further provides the Director General with the right to suspend licenses if facilities are unsafe.

Therefore, this reading of the above legislation indicates that both PGB and the Energy Commission are likely responsible for monitoring the pipeline in accordance with PETRONAS technical standards and other industry standards, with the Energy Commission and local planning authorities likely having the jurisdiction to inspect the pipeline for safety. Meanwhile, DOSH is likely responsible for ensuring that PGB was competent in ASME standards and DOSH regulations and guidelines, which would have included the provision of disaster risk management information to the public prior to the explosion.

The remaining question, then, is given the 24.3 cm of soil subsidence resulting in the pipeline shifting by 15.9cm, and given that PGB had developed numerous technical standards and

technologies to monitor pipelines, how was such a shift in the pipeline, equivalent to nearly 1/5th its total diameter, left undetected?

To give an example, while a specific threshold of movement which constitutes a minimum monitoring range is not defined under the ASME or API standards, Interferometric Synthetic Aperture Radar (InSAR) technologies, which enable measurement of ground deformation at a global scale every few days, are able to detect deformations down to 2mm[31]. While PGB does not specifically cite InSAR technologies in relation to the Putra Heights pipeline or PGU monitoring, public records suggests it has been applied to monitoring the Sabah-Sarawak Gas Pipeline using technology developed by TRE Altamira, who claim to be able to detect millimeter-scale deformities[32]. Therefore, given that this technology exists, has been applied to gas pipeline monitoring in Malaysia before and is effective to a 2mm scale, how was a 243mm movement in soil not detected? This also applies to tools such as PrAn3G, which was supposed to use drone footage to predict geohazards, which would include soil subsidence, along the pipeline right-of-way.

Images: *A total of 511 homes were affected and 399 vehicles damaged in the explosion and fire caused by the PGU II pipeline rupture in Putra Heights, Selangor on 1 April 2026.*

ALL PHOTOS BY GREENPEACE

OTHER CRITICAL QUESTION 1

What Were the Impacts Of the Explosion on the Climate and Public Health?

Producers and industrial consumers of fossil gas have advertised it as a low-emissions, clean energy source; often portraying it as the 'cleanest-burning fossil fuel'. Fossil gas is not a climate-friendly energy source. The IPCC has established that fossil gas is the third most carbon-intensive method of generating energy, with lifecycle emissions which are more than 10 times higher than those of renewables[33]. Further, recent independent peer-reviewed research found that the emissions of fossil gas overtake those of coal if gas infrastructure has a leakage rate of just 0.2%[34], whether this is leaked unintentionally through infrastructure or intentional releases such as flaring. This is largely due to the fact that fossil gas leakage consists mostly of methane, a pollutant that is over 80 times more potent than carbon dioxide across a 20-year period. Ongoing surveys and observations are finding that methane leaks in fossil fuel infrastructure are far more frequent and intense than previously assumed and officially reported[35].

Accordingly, the PSSC did not make any mention of the impacts this explosion event had on Malaysia's emissions inventory, despite the high methane composition of fossil gas, and the negative impacts that such greenhouse gas emissions can have on local public health through, for example, ground-level ozone[36].

Occupational Safety and Health Department (DOSH) Petroleum Safety Division director Husdin Che Amat said some *400 million standard cubic feet worth of gas was released*, based on information obtained from the Fire and Rescue Department[47].

The methane composition of natural gas is between 70-90%. If gas is leaked from a pipeline without being ignited, this composition remains, so the emissions are roughly 70-90% methane. However, when gas is combusted, a chemical reaction occurs where methane reacts with oxygen to produce carbon dioxide and water, releasing heat and light ($CH_4+2O_2 \rightarrow CO_2+2H_2O$). Therefore, the methane combusts and mostly turns into CO_2; and very little methane is actually emitted. The PSSC does not disclose the composition of gas that was combusted, and what was leaked prior or after the combustion. Therefore, the estimate calculated below assumes that 100% of gas released was combusted.

According to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories[38], the default emissions factor for the stationary combustion of "natural gas" in the energy industry is 1kg of CH_4 per TJ, and 64200kg of CO_2 per TJ. 400 *million standard cubic feet worth of gas* is equivalent to 422 TJ. Therefore, the explosion resulted in 0.4t of CH_4 and 27,092t CO_2 from the combustion event.

ALL PHOTOS BY GREENPEACE

The calculation above estimates that the likely emissions from the explosion are 27,092t CO_2 and 0.4t CH_4. This figure is in itself significant, as it comprises CH_4 levels equal to the average annual emissions of 6,773 ICE vehicles in Malaysia[39] were released to the atmosphere needlessly. However, more pertinently, the PSSC did not assess whether the sudden concentration of high-levels of greenhouse gases in Putra Heights resulted in local public health impacts. For example, exposures to high concentrations of CO_2, and other combusted by-products can lead to headaches, cognitive decline, and respiratory issues[40]. It is concerning that the public health impacts of the sudden concentration of CO_2 and other greenhouse gases estimated to be equivalent to those of nearly 7,000 vehicles within a dense urban environment was not addressed by the PSSC.

Images: *As a result of the fire and explosion, more than 110 individuals sustained physical injuries and trauma, primarily severe burns and respiratory complications from inhaling smoke.*

OTHER CRITICAL QUESTION 2

Reputational Damage Control or Educating the Public on Pipeline Safety Protocols?

In the months following the explosion, a review of public records indicates that, PGB engaged in efforts to improve their reputational damage in Malaysian print media. A non-exhaustive list of articles is displayed below in Box 6:

Box 6

Article Title	Link	Issue
Petronas upholds high maintenance standards, pipelines built to last 50 years 2 April 2025	https://www.bernama.com/en/general/news.php?id=2408514	**Headline and content worded as promotional material for PGB**
PGB to Rebuild Confidence 6 July 2025	https://www.nst.com.my/news/nation/2025/07/1240631/pgb-rebuild-confidence?tblci=GiDZZkYGN5B9kYzo-qokUS8ktx1riYb5o2XGX-FBQ89XhdiDyw-z0o6rS68YuDg4VyMOuJWg#:~:text=In%20a%20timely%20move%2C%20managing,ongoing%20safety%20and%20reliability%20regime.%22	**No byline, subheadings and phrasings reflect press release rather than journalistic format and clearly worded as promotional material.**
Beyond the Pipeline: The Unseen Standards Behind Gas Safety in Malaysia 29 August 2025	https://www.thestar.com.my/news/nation/2025/08/29/beyond-the-pipeline-the-unseen-standards-behind-gas-safety-in-msia	**No byline, subheadings and phrasings reflect press release rather than journalistic format and clearly worded as promotional material.**
Petronas Gas rules out wider pipeline risks after Putra Heights incident 1 September 2025	https://www.nst.com.my/business/corporate/2025/09/1268606/petronas-gas-rules-out-wider-pipeline-risks-after-putra-heights	**Subheadings and phrasings reflect press release rather than journalistic format and clearly worded as promotional material.**

As indicated in Box 6 above, these articles are worded as promotional material for PGB. For example, in "***Petronas upholds high maintenance standards, pipelines built to last 50 years***", the article stated "*it is highly unlikely for a pipeline to explode on it's own, especially given Petronas' stringent maintenance standards*". In "**PGB to rebuild confidence**", it is written "*in a world increasingly dependent on energy security, pipelines are not relics of risk, but lifelines of continuity*" and "*one of the clearest reflections of PGB's values is its swift and sustained community response, initiated without waiting for blame to be assigned*".

In "**BEYOND THE PIPELINE: THE UNSEEN STANDARDS BEHIND GAS SAFETY IN M'SIA**", the article states "*Because gas safety is not just about what lies beneath. It's about what stands above–responsibility, resilience, and the silent promise that every time we switch on a light or power a factory, someone, somewhere, has already done the work to keep us safe.*"

Under the Malaysian Code of Advertising Practice, "*advertisements should be clearly distinguishable as such, whatever their form and whatever the medium used. When an advertisement appears in a medium which contains news, editorial or programme matter it should be so designed, produced and presented that it will be readily recognized as an advertisement.*"

From our reading, the articles above do not clearly distinguish themselves from general news or editorial content and does not identify itself as an advertisement, which appears inconsistent with the Code of Advertising Practice. We also note that, one year on from the explosion, there is still no public webpage on any PGB or associated website with community safety protocols for those living near gas pipelines.

OTHER CRITICAL QUESTION 3

Why Were Lessons Not Learnt from the Sabah-Sarawak Gas Pipeline?

Pipeline leaks, ruptures and fires have occurred on PGB pipelines in the past. Within Malaysia, the Sabah-Sarawak Gas Pipeline (SSGP), operated by them, experienced five publicly-known incidents between 2014 and 2022, leading to its partial decommissioning in January 2025. These incidents are listed as below:

Box 7

Year	Incident	Source
2014	The SSGP reportedly exploded. Villagers in nearby settlements could feel the heat from the massive fire.	https://intranet.dosh.gov.my/ms/archive-news/2014-01/1263-blast-rips-sabah-sarawak-gas-pipeline
2014	The SSGP experienced a leak. Communities also reported an explosion but this was denied by PETRONAS and further information is not available.	https://www.thestar.com.my/news/nation/2018/01/10/gas-leak-at-petronas-sabah-sarawak-pipeline-in-lawas/
2019	A gas leak occurred at Long Segaman in Lawas.	https://www.offshore-energy.biz/fire-breaks-out-at-petronas-gas-pipeline-in-sarawak-one-fatality-reported/
2020	SSGP caught fire approximately 4 km from Long Selulong, Ulu Baram.	https://www.offshore-energy.biz/petronas-sabah-sarawak-gas-pipeline-fire-under-control/
2020	One man was killed and three others were injured in an explosion along the SSGP, with subsidence reportedly cited as the main cause.	https://www.offshore-energy.biz/fire-breaks-out-at-petronas-gas-pipeline-in-sarawak-one-fatality-reported/ https://www.pipeline-journal.net/news/petronas-decommission-troubled-sabah-sarawak-gas-pipeline

After these repeated issues, PGB announced on February 4th 2025 that a section of the SSGP, running between Lawas and Bintulu, would be decommissioned, stating "*after a thorough review of the viability of this specific section of the SSGP, amid the* ***repeated challenges of inclement environmental factors*** *which have emerged and continue to escalate after several years into its operation,* ***impacting the integrity and safety of the surrounding area***[41]".

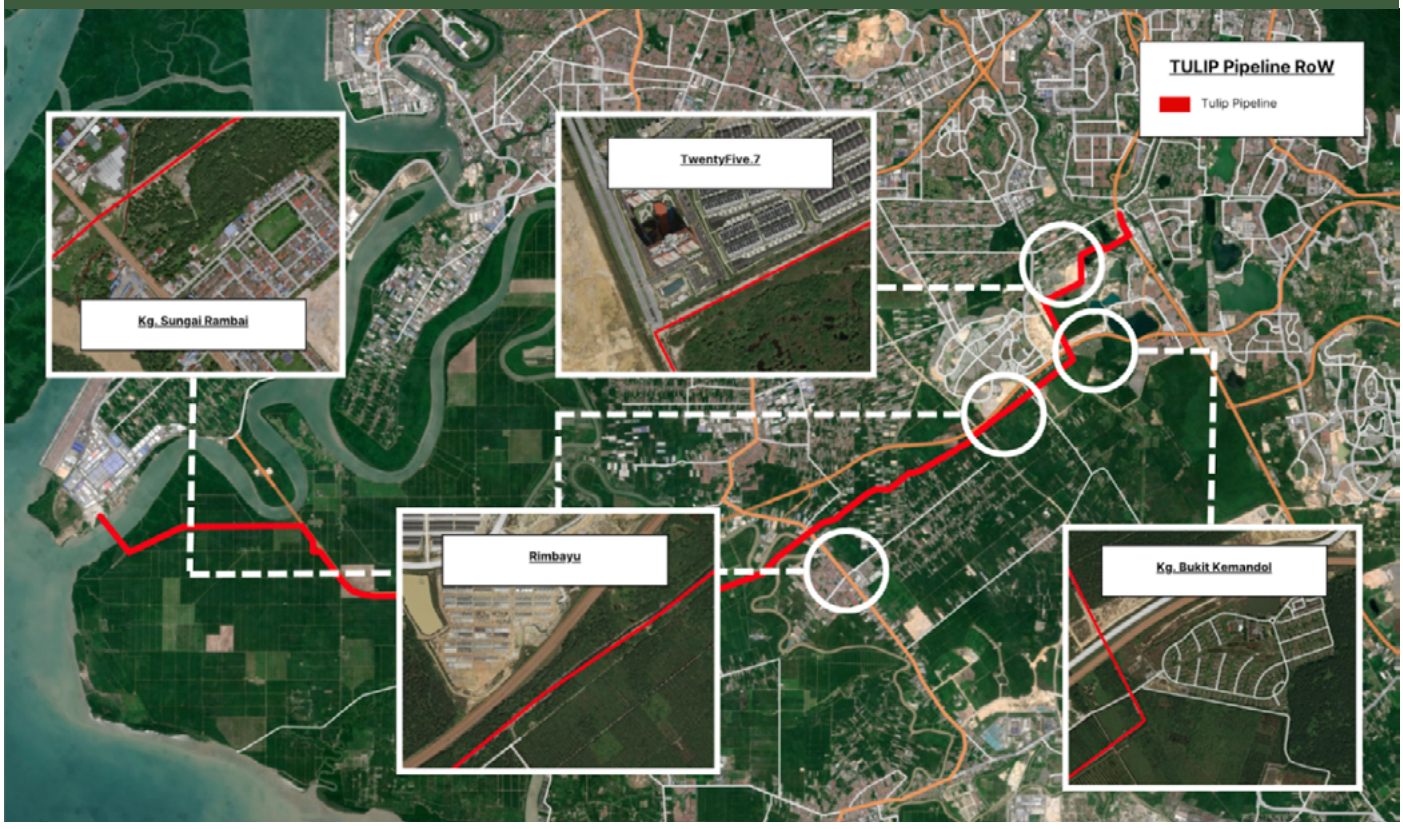
It is clear, therefore, that PGB's pipelines have been sited in areas with high-risk for subsidence in the past, and that PGB has the capacity to monitor and act on subsidence with the safety of surrounding communities in mind. Given this, a review of public records does not indicate how "environmental factors" were identified in Putra Heights before the explosion occurred, and does not indicate if a stringent monitoring system was established for a high consequence area such as the Klang Valley, given PGB's at-the-time ongoing engagements with subsidence monitoring in Sarawak.

TULIP Pipeline
Lessons Learnt or *Ignored*?

In 2021, PGB announced the development of a RM541.07m 42km-long 36 inch high-pressure gas pipeline project to channel gas from the main Peninsular Gas Utilisation (PGU) pipeline to the 1200MW Pulau Indah power plant, which would require a supply of at least 137 million standard cubic feet of gas per day[42]. Even after the Putra Heights explosion, the pipeline, officially named the NPS36 Pulau Indah Lateral Pipeline but often abbreviated as the TULIP pipeline, continues to be under construction. However, some concerns remain.

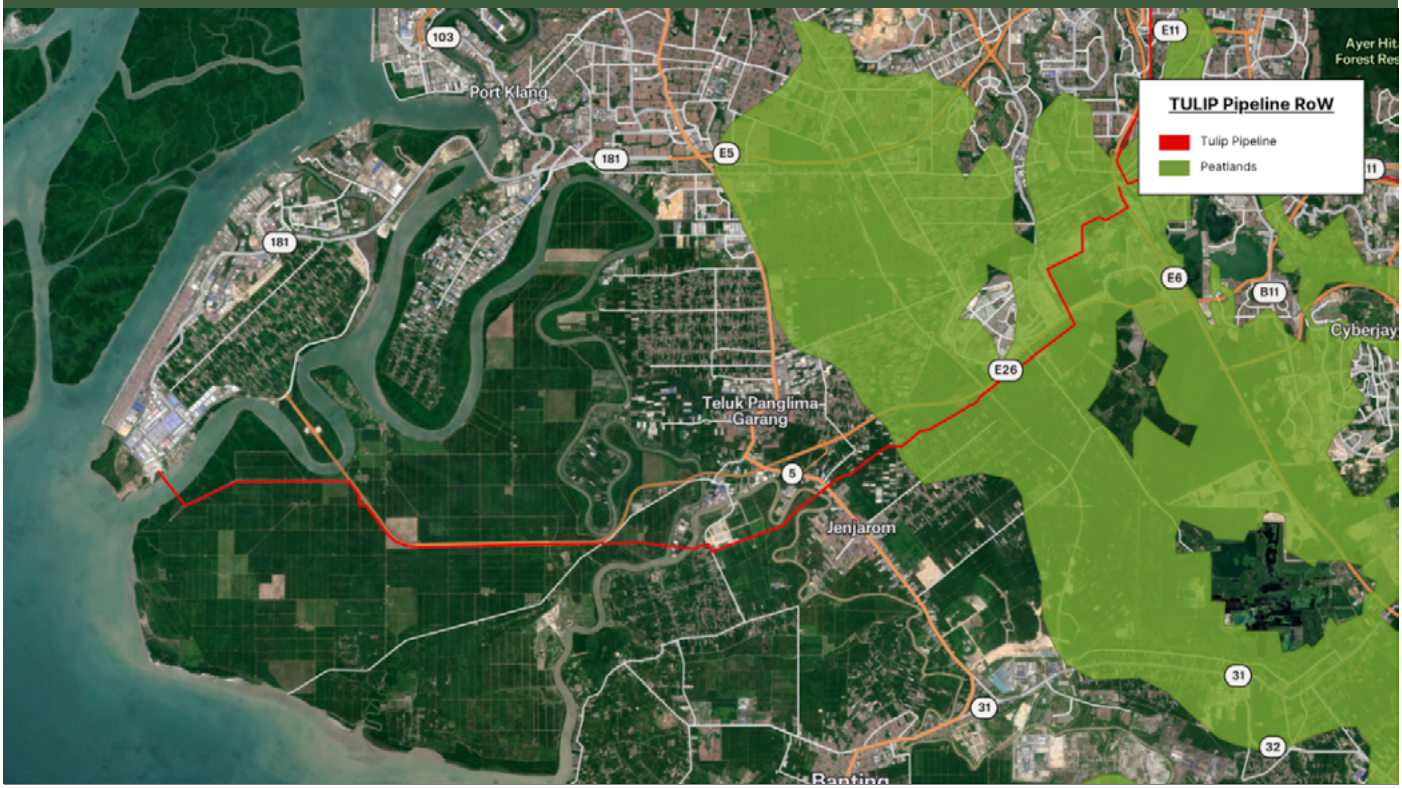
Firstly, the TULIP pipeline, as was the PGU Phase II Pipeline, involves a 36-inch high-pressure gas pipeline built through existing and proposed residential, commercial and industrial areas without a large buffer zone, as displayed in Box 7 below. For example, our spatial analysis indicates there are some areas in Saujana Putra where the RoW of the TULIP pipeline is only 20m from the front gates of houses in a major existing residential development, and where the RoW itself is less than 30m wide - lower than the MBSJ policy as outlined in Key Question 2.

Box 8



Secondly, a significant section of the pipeline is being built on areas identified by global datasets as having, either currently or historically, peat soils[43]. Historically, the peatlands of Selangor were waterlogged, wetland ecosystems and the drainage of peatlands for built structures can result in high levels of soil subsidence[44]. This is displayed below in Box. 9.

Box 9



Thirdly, there is little transparency of the TULIP project. While an EIA has been submitted and approved, it did not receive a public consultation process, and no component of the EIA is publicly available, nor is it listed on any publicly-available EIA database. Review of public records suggests that the project does not have its own webpage on PGB's website, and there is no publicly-available official map of the project, or of any community safety protocols communicated to local residents. As noted multiple times above, there is still no PGB webpage on community health protocols.

Finally, while there was significant public discourse following the Putra Heights explosion on the role of third-party operators not receiving the requisite approvals to construct works near the PGU's RoW, the opposite occurred for the TULIP pipeline. In March 2024, Works Minister Alexander Nanta Linggi expressed concern in a Facebook post over allegations that PETRONAS had begun works on the TULIP pipeline under the PLUS highway without required permits or approval[45]. Following this post, PLUS released a press statement confirming that a third-party contractor had indeed conducted these works without their approval and that corrective action had been taken[46].

While it is unknown how PGB undertook adjustments to the project following the Putra Heights explosion, the repeated operational issues on the SSGP, the recent explosion of the PGU Phase II Pipeline and the continuation of the TULIP project underscores that several regulatory and procedural issues across multiple government agencies and PGB itself persist, highlighting the need for significant and immediate reforms related to fossil fuel infrastructure in Malaysia.

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Images: *The fire, which burned at temperatures exceeding 1,000° and was only fully extinguished after approximately seven and a half hours, caused extensive damage to property.*

Recommendations

Based on analysis of spatial population data from the Global Human Settlement[47], we estimate that 53,918 people live within a 200m radius of the PGU Phase II Pipeline in the Klang Valley alone. Given that past safety assurances were insufficient to guarantee the safety of residents near the PGU Phase II Pipeline, this figure underscores the urgent need to improve the governance of fossil fuels and associated infrastructure in Malaysia through the following actions:

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1 Establish a Royal Commission of Inquiry

a. Civil society has raised concerns regarding the transparency and independence of Parliamentary Select Committees, which is a key challenge in achieving its ability to independently provide scrutiny and oversight over national issues[48]. A Royal Commission of Inquiry (RCI) under the Commissions of Enquiry Act 1950 would have statutory powers to subpoena witnesses, compel the production of documents, and examine evidence under oath.

b. For the RCI to specifically investigate any potential negligence of any party responsible for zoning, constructing, operating and monitoring the PGU Phase II Pipeline, such as Subang Jaya City Council, the Energy Commission, Petronas Gas Berhad, the Department of Occupational Safety and Health, and others.

2 Clarify The Energy Commission as the Agency to Monitor Pipeline Safety

a. Part III of the Gas Supply Act 1993 provides that the Energy Commission (EC) will "protect the public from dangers arising from the distribution of gas through pipelines or from the use of gas supplied through pipelines" and "investigate any accident or fire involving any gas pipeline or installation". Based on this, the Government of Malaysia must clarify the EC as the agency responsible for ensuring pipeline safety. This must include:
   i. The EC establishing minimum pipeline safety standards based on industry and regulatory best practice, which explicitly includes the establishment of buffer zones based on Potential Impact Radius (PIR) formula as cited in ASME B31.8 Standard.
   ii. The EC establishing an independent assurance system for the operation of pipelines according to this safety standard, including independent, periodical audits which are publicly available.
   iii. For the EC to conduct a comprehensive review of safety measures of gas pipelines across Malaysia, which would include:
      1. Reviews of the quality of environmental impact assessments and local zoning plans.
      2. Calculations of Potential Impact Radius (PIR) and identification of areas where the RoW does not meet buffer zone requirements based on the PIR.
      3. Re-zoning by PlanMalaysia of all areas surrounding gas pipeline RoWs to buffer zones, according to PIR calculations as above.
      4. Re-routing of existing pipelines only to meet PIR requirements.
   iv. For the EC to oversee improvements in PGB's community engagements, including external communications related to safety and disaster mitigation for landowners and tenants residing along the RoW.
   v. For the EC to spearhead amendments to existing legislation, such as:
      1. The Control of Industrial Major Accident Hazards Regulations 1996, to cover all industrial infrastructure, including pipelines
      2. The Occupational Safety and Health Act 1994 to include provisions requiring safety measures to be adopted for nearby communities and other offsite populations outside the current scope of the 1994 Act.
      3. The EIA Guidelines to include minimum requirements for buffer zones according to PIR calculations, and further physics-based technical risk assessment and mitigation analyses, aligned with the Seveso III Directive.

3 Improve Advertising Regulation

a. Promotional material for PGB published in Malaysian media in the months following the explosion were indistinguishable from standard editorial content, justified PGB's non-responsibility for the explosion even before the PSSC report was tabled, and promoted the safety of PGB's pipelines immediately after the PGU's explosion. The Malaysian Communications and Multimedia Commission must develop a legally-mandated Greenwashing Code, which:
   i. Identifies specific types of misleading environmental claims to ban from local advertising, including making false or exaggerated environmental claims;
   ii. Requires advertisements or promotional materials to be explicitly identified as such, and distinguishable from general editorial content;
   iii. Bars companies responsible for environmental damage from speculating on the causes of the damage before official investigations are published;
   iv. Legally requires advertisements and promotional materials to conform to the Code and to provide for the MCMC with powers to levy substantial fines for breaches of the Code.

4 Phase-Out Fossil Fuel Production

a. Fossil fuel energy production emits harmful pollutants, exacerbates climate change, endangers communities and public health and is increasingly expensive compared to renewables, driving public energy costs and jeopardizing energy security. Malaysia must enshrine targets to phase-out all fossil fuel energy production by 2050 in legislation such as the upcoming Climate Change Act, with specific actions including:
   i. Independent assessment and quantification by competent bodies of methane leaks from fossil gas infrastructure, including pipelines.
   ii. Early coal power plant phase-out by 2030 and phase-out of gas power plants by 2050, with a ban on construction of all new coal and gas capacity commencing in 2026, and target for renewables to comprise of 100% of the total primary energy supply (TPES) by 2050.
   iii. Full phase-out of inefficient subsidies, including phasing out all blanket fuel subsidies and retain only narrowly targeted support where it demonstrably benefits the most vulnerable, such as targeted energy credits tied to their needs.

5 Rapid Renewables Development

a. To translate this renewables ambition into delivery, Malaysia must deploy targeted policy levers that directly address regulatory, financial and institutional bottlenecks, including:
   i. Adopting a National Grid Development Roadmap that explicitly aligns grid investment with renewable targets. This should prioritise:
      1. Smart grid deployment, demand response and digital system operators.
      2. Utility-scale energy storage, including batteries and pumped hydro.
      3. Planned reinforcement of renewable-rich zones.
      4. Cross-border interconnections under the ASEAN Power Grid.
   ii. Market reform for competitive, bankable contracts, including:
      1. Introducing transparent and standardised pricing for grid access and ancillary services.
      2. Expanding competitive auctions to provide long-term price certainty.
      3. Enabling corporate PPAs with clear wheeling rules and credit support mechanisms, reducing reliance on bilateral negotiation with incumbents.
   iii. Implementing an economy-wide carbon pricing mechanism whether tax-based or cap-and-trade aligned with the National Policy on Climate Change 2.0. This must include explicit carbon price signals to correct market distortions, shift capital toward renewables and storage, and discourage new fossil investments without relying solely on administrative bans.
   iv. Strengthening the independence of regulators and system operators, separating grid planning from generation ownership. This can include aligning GLC mandates, especially TNB and PETRONAS, with measurable climate and renewable integration targets to reduce conflicts between corporate strategy and national policy.

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