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Evaluating Environmental Accountability in India's Natural Gas Sector: An Analysis of the PNGRB Act and Environmental Regulations

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ABSTRACT

The natural gas sector in India plays a pivotal role in the country's energy landscape, contributing to economic growth and energy security. However, the rapid expansion of gas infrastructure, including pipelines and distribution networks, has raised significant environmental concerns. This paper critically analyzes the Petroleum and Natural Gas Regulatory Board (PNGRB) Act, 2006 in the context of environmental accountability, exploring its interaction with key environmental laws such as the Environment (Protection) Act, 1986, and related regulatory frameworks. It also evaluates the effectiveness of existing legal mechanisms, such as Environmental Impact Assessments (EIA), in mitigating environmental risks. Using case studies of major pipeline projects, this paper highlights the legal gaps and challenges in enforcing environmental regulations within the natural gas sector. The study further explores the role of the National Green Tribunal (NGT) and other regulatory bodies in addressing environmental violations linked to natural gas projects. It identifies key shortcomings in the PNGRB Act concerning environmental oversight and proposes legal reforms to strengthen environmental accountability. The paper concludes by offering recommendations for integrating environmental sustainability into the regulatory framework, aiming to balance India's energy needs with environmental protection goals.

Keywords: EIA (Environmental Impact Assessments), NGT (National Green Tribunal), MoEFCC (Ministry of Environment, Forest and Climate Change, & (and).

I. INTRODUCTION

India's natural gas sector is a key component of its energy strategy, playing a crucial role in the country's transition toward cleaner energy and reduced reliance on coal. With policies aimed at increasing the share of natural gas in the energy mix, the government has rapidly expanded infrastructure, including pipelines, storage facilities, and distribution networks. Central to the regulation of this sector is the Petroleum and Natural Gas Regulatory Board (PNGRB) Act,

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2006, which governs the licensing, operation, and management of natural gas infrastructure. However, the PNGRB Act primarily focuses on economic regulation, safety, and consumer protection, with limited provisions for addressing environmental impacts.

Natural gas infrastructure projects—such as pipeline construction, gas production, and transportation—pose significant environmental risks, including air and water pollution, land degradation, biodiversity loss, and the potential for accidents like gas leaks. These environmental challenges raise concerns about the adequacy of existing regulatory frameworks to ensure environmental accountability in the natural gas sector.

India's environmental laws, including the Environment (Protection) Act, 1986, and the Environmental Impact Assessment (EIA) Notification, 2006, are designed to mitigate the environmental risks of large-scale infrastructure projects. However, the intersection between the PNGRB Act and these environmental laws is often fragmented, leading to gaps in enforcement and accountability.

This paper aims to critically analyse the environmental accountability within India's natural gas sector, with a specific focus on the PNGRB Act's interaction with environmental laws. By examining case studies and assessing the role of the National Green Tribunal (NGT), this study will explore the limitations of the current regulatory framework and propose recommendations for integrating environmental sustainability into the regulation of natural gas infrastructure.

II. CONCEPTUAL FRAMEWORK

This conceptual framework examines the relationship between India's natural gas sector, governed by the **Petroleum and Natural Gas Regulatory Board (PNGRB) Act, 2006**, and the country's environmental law framework. It aims to assess the environmental accountability of natural gas infrastructure, focusing on the interaction between regulatory mechanisms for energy infrastructure and environmental protection laws.

1. Natural Gas Sector and Regulatory Framework (PNGRB Act, 2006)

The natural gas sector encompasses upstream (exploration and production), midstream (transportation and storage), and downstream (distribution) activities. The **PNGRB Act** regulates these aspects, with a primary focus on economic regulation, safety, and consumer protection. However, the Act offers limited provisions for environmental accountability, raising concerns over its adequacy in addressing the environmental risks posed by infrastructure development.

2. Environmental Impacts of Natural Gas Infrastructure

Natural gas infrastructure projects pose significant environmental risks, including:

- Air and Water Pollution from gas extraction, flaring, and pipeline leaks.
- Biodiversity Loss and Land Degradation from pipeline construction, particularly in ecologically sensitive areas.
- Accidents and Environmental Hazards from leaks or explosions, threatening ecosystems, and communities.

3. Relevant Environmental Laws

India's environmental law framework, including the **Environment (Protection) Act, 1986**, and the **Environmental Impact Assessment (EIA) Notification, 2006**, governs the environmental clearances and standards for infrastructure projects. These laws are designed to mitigate risks, yet enforcement is often inconsistent, with significant gaps in addressing long-term environmental impacts in the natural gas sector.

4. Interaction Between PNGRB Act and Environmental Laws

There is a limited alignment between the PNGRB's regulatory role and environmental laws. While natural gas projects require environmental clearances, the PNGRB Act lacks robust provisions to ensure compliance with environmental standards, creating a gap in accountability. The Act focuses primarily on economic aspects, leaving environmental regulations to other bodies such as the **Ministry of Environment, Forest, and Climate Change (MoEFCC)**, often leading to fragmented enforcement.

5. Judicial Oversight and Case Studies

The **National Green Tribunal (NGT)** has increasingly intervened in cases related to environmental harm caused by natural gas infrastructure, highlighting the shortcomings of existing regulations. Case studies of major pipeline projects, such as the **Kochi LNG pipeline**, illustrate the challenges in balancing energy infrastructure development with environmental protection. These case studies show that environmental considerations are often sidelined in favor of rapid infrastructure expansion.

6. Recommendations for Strengthening Environmental Accountability

To ensure sustainable development, the framework proposes:

- **Enhancing Environmental Provisions in the PNGRB Act:** Incorporating mandatory environmental audits and stricter enforcement of environmental standards.

- **Improving Coordination Between Regulatory Bodies:** Strengthening collaboration between the PNGRB and environmental authorities to ensure environmental risks are fully considered in project approvals.
- **Strengthening Enforcement Mechanisms:** Reinforcing the EIA process and improving compliance monitoring to mitigate the environmental impacts of natural gas infrastructure.

III. MEASURES TAKEN TO MITIGATE THE ENVIRONMENTAL ISSUES

The “**Vision 2030**” of the **Natural Gas Infrastructure** for the **PNGRB (Petroleum and Natural Gas Regulatory Board)** aims to cover the policy issues which have been hovering over India for a long time and can be fixed only if immediate initiatives are being taken up. The **clause 4.3.1** covers the issues in the Indian scenario and addresses key **policy issues** related to the natural gas market in India.

1. **Efficient Usage of Gas:** The policy aims to encourage the free-market trading of natural gas to attract investment and improve infrastructure. The creation of a trading platform for natural gas will help with price discovery and meet the needs of both suppliers and consumers. The goal is to increase market depth, which can then channel investments into better utilization of infrastructure.
2. **Infrastructure Status:** The proposal advocates giving the gas pipeline sector "infrastructure status" to make it more attractive for investments. This includes offering fiscal incentives like tax benefits and viability gap funding for projects that are less economically feasible, especially in remote areas.
3. **Strategic Storage Development:** Given the growing share of natural gas in India’s energy mix, strategic reserves or storage facilities are seen as crucial for ensuring supply security. These reserves would act as a buffer against supply disruptions, whether due to geopolitical tensions or natural disasters. The proposed storage options include underground caverns, **RLNG (Regasified Liquefied Natural Gas)** terminals, and surplus pipeline capacity. The idea is to protect the economy from unexpected crises by maintaining an adequate supply.
4. **Environmental and Social Impact Assessments (ESIA):** The report places a strong emphasis on conducting **Environmental and Social Impact Assessments** for pipeline projects to mitigate the risks of environmental damage and social disruption. Key practices include using more eco-friendly methods for laying pipelines, like tunneling

through mountains, horizontal drilling beneath riverbeds, and minimizing the disturbance of ecosystems through re-vegetation. There is also a suggestion to set up accredited ESIA agencies with proven expertise to evaluate and approve these projects.

5. **Incentives for Remote Area Projects:** Vision 2030 encourages the government to offer financial incentives to develop gas infrastructure in less economically viable areas. This includes the use of **Viability Gap Funding (VGF)**, which supports projects that are critical for national development but may not be profitable enough for private investors to undertake. The provision of fiscal benefits, such as tax exemptions for certain pipeline projects, is also recommended.
6. **Promotion of Combined Cooling, Heating, and Power (CCHP):** One policy aims to promote the use of CCHP systems, which are more energy-efficient than conventional power generation methods. These systems reduce the need for new generating capacity and use natural gas more efficiently, particularly in urban and industrial settings. Encouraging CCHP aligns with the goal of reducing energy consumption while optimizing resource use.

These measures are designed to bolster India's natural gas infrastructure, facilitate market growth, and ensure environmental sustainability, all while attracting investment in the sector. These points, combined with the earlier suggestions, underscore the comprehensive approach of Vision 2030 in making India's natural gas infrastructure more robust, efficient, and sustainable.

The **Petroleum and Natural Gas Regulatory Board (PNGRB) Act, 2006** establishes a framework for regulating India's petroleum and natural gas sector, primarily focusing on economic, operational, and safety standards. Although the Act is not specifically an environmental law, it contains provisions that indirectly address environmental protection, particularly in the event of accidents or disasters. Key sections of the Act set safety, disaster management, and operational protocols to mitigate environmental damage from natural gas infrastructure.

1. Section 11 – Functions of the Board

Section 11 outlines the **PNGRB's responsibilities**, including setting technical and safety standards for natural gas pipelines and infrastructure. While the Act's primary concern is safety, these measures help prevent environmental harm by reducing the risk of accidents such as gas leaks and pipeline ruptures. The PNGRB's oversight in enforcing these standards ensures operators take necessary precautions to minimize environmental risks.

2. Section 19 – Authorization of Entities

Section 19 grants the PNGRB the authority to **license entities** to build, operate, and expand natural gas pipelines. Before issuing licenses, the Board evaluates whether the entity has implemented adequate safety and risk mitigation measures, including environmental considerations. This process ensures that natural gas infrastructure development incorporates environmental safeguards, such as preventing land degradation and pollution during construction and operation.

3. Section 24 – Public Safety and Environmental Protection

Section 24 explicitly addresses **public safety and environmental protection** by requiring operators to develop **disaster management plans**. These plans outline protocols for responding to emergencies such as gas leaks or explosions, focusing on both public safety and environmental damage control. This includes immediate containment, pollution mitigation, and environmental restoration efforts in the aftermath of a disaster. Section 24 ensures operators are prepared to handle disasters with strategies that minimize environmental harm.

4. Section 25 – Regulations and Standards

Section 25 empowers the PNGRB to establish **technical and safety regulations** for natural gas infrastructure. These regulations cover areas such as pipeline construction, maintenance, and operation, which help prevent accidents that could lead to environmental degradation. The Board's standards include protocols for monitoring emissions, preventing leaks, and controlling spills, all of which indirectly protect the environment.

5. Section 28 – Penalties and Liabilities

Section 28 sets out **penalties for non-compliance** with safety standards and disaster management protocols. If an operator violates safety regulations or fails to implement proper environmental safeguards, they can be held **liable for damages** resulting from environmental harm. These penalties provide a strong deterrent, encouraging operators to adhere to safety standards and prioritize environmental protection to avoid legal and financial repercussions.

Although the **PNGRB Act, 2006** is not primarily an environmental law, it includes several key provisions that address environmental risks associated with natural gas infrastructure. Sections 11, 19, 24, 25, and 28 establish safety standards, enforce regulations, and impose penalties that help mitigate the environmental consequences of accidents. By ensuring operators follow stringent safety measures and develop disaster management plans, the Act plays an important role in preventing and managing environmental damage, even though its primary focus is on

the economic and operational regulation of the natural gas sector.

IV. CASE LAWS

1. Foreshore Co-operative Housing Society Ltd. & Ors. v. Union of India & Ors.²

This case involved disputes over land acquisition and environmental impacts concerning the construction of an LNG terminal in Kochi. Residents and environmental groups raised concerns about the terminal's impact on coastal ecosystems. The case reached the NGT, which called for a more rigorous examination of the environmental risks posed by the terminal and its associated infrastructure, including pipelines regulated by the PNGRB. The case demonstrated the need for environmental accountability in natural gas infrastructure development, especially in ecologically sensitive areas.

2. Essar Oil Limited v. Halar Utkarsh Samiti³

Although this case primarily focused on the oil sector, it is relevant for natural gas projects due to its emphasis on environmental clearance. The Supreme Court of India upheld the requirement for comprehensive EIAs before large-scale energy projects could proceed. This case reinforced the importance of aligning energy infrastructure development with environmental protection measures under both the EIA Notification and the Environment (Protection) Act.

V. CONCLUSION

This research paper has critically examined the environmental accountability within India's natural gas sector, with a focus on the Petroleum and Natural Gas Regulatory Board (PNGRB) Act, 2006, and its interaction with environmental laws. While the PNGRB Act primarily aims to regulate economic, technical, and safety aspects of natural gas infrastructure, it also plays a vital role in indirectly safeguarding the environment by mandating disaster management plans, safety protocols, and enforcing penalties for non-compliance. However, the Act lacks comprehensive environmental provisions and relies on fragmented coordination with India's broader environmental regulatory framework.

Natural gas infrastructure, such as pipelines and storage facilities, carries significant environmental risks, including air and water pollution, biodiversity loss, and land degradation. The PNGRB Act, through sections like Section 11 (Functions of the Board), Section 19 (Authorization of Entities), Section 24 (Public Safety and Environmental Protection), Section 25 (Regulations and Standards), and Section 28 (Penalties and Liabilities), establishes

² 2012 SCC Online NGT 239

³ (2004) 2 SCC 392

mechanisms to prevent and mitigate environmental harm. However, these provisions are primarily aimed at safety, leaving gaps in addressing the long-term environmental impacts of infrastructure projects.

Moreover, the lack of integration between the PNGRB Act and environmental laws such as the Environment (Protection) Act, 1986, and the Environmental Impact Assessment (EIA) Notification, 2006, limits the effectiveness of environmental governance in the sector. Judicial interventions, such as those by the National Green Tribunal (NGT), highlight these regulatory gaps and the need for better enforcement and accountability.

To enhance environmental accountability in the natural gas sector, this paper recommends strengthening the PNGRB Act by incorporating specific environmental provisions, improving coordination between the PNGRB and environmental agencies, and reinforcing compliance with existing environmental laws. By addressing these gaps, India can ensure that its growing natural gas infrastructure aligns with sustainable development goals, balancing energy expansion with environmental protection.

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