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Analysis of Colombia's Gas Market: A Strategic Imperative for the Energy Future (Extended Report)

Introduction

Colombia is at a critical juncture in its energy transition, facing an imminent natural gas deficit that threatens its energy security and economic stability. This extended report delves deeper into the current state of the gas market in the country, presenting a more comprehensive and updated strategy designed to secure future supply through the optimization of existing infrastructure, the promotion of robust local production, and the guarantee of strategic Liquefied Natural Gas (LNG) imports. The overarching goal is not only to close the supply gap but also to foster sustainable economic growth and an orderly, equitable energy transition.

The Challenge: A Growing Gap

The current situation of Colombia's gas market is characterized by an alarming decline in proven reserves and persistent demand, projecting a significant and widening structural deficit.

- **Declining Reserves:** As of the end of 2024, Colombia's proven natural gas reserves have fallen to their lowest level since 2007, standing at just **2.064 trillion cubic feet (Tf3)**, equivalent to **5.9 years of consumption**. This represents a **13% decrease** from the 6.1 years recorded at the end of 2023. This downward trend clearly signals the urgent need for new supply sources and accelerated development of existing discoveries.
    - *Reference:* [1.1] Colombia gas crunch sparks energy security alarm - BNamericas
    - *Reference:* [1.2] Colombian oil reserves will grow by 0.74% between 2024 and 2024, but gas stocks will decrease - Energy News
- **Deficit Projection:** It is estimated that the country will face a gas deficit exceeding **10%** in the coming year, with the risk of this gap widening to as high as **20%** in pessimistic scenarios if robust measures are not taken. The Gas Market Operator (GMO) explicitly warns that current infrastructure cannot bridge this gap beyond 2025, putting industries at risk of shutdowns. Industrial consumers are already bracing for significant price increases, with gas prices expected to rise by up to **90% by 2026** due to reliance on costlier LNG imports.
    - *Reference:* [2.1] Colombian firms brace for gas crunch as deficit seen widening - World Oil
    - *Reference:* [2.2] M&P's Colombian Gas Play: A Strategic Bet on a Tightening Market - AInvest

The Strategy: A Comprehensive Response

To address the escalating gas deficit challenge, Colombia has articulated a multifaceted strategy based on three fundamental pillars:

1. Optimizing Infrastructure and Efficiency

Colombia's existing gas infrastructure is not merely a component of its energy system; it is the **indispensable backbone** for ensuring gas and energy sustainability. Optimizing this network is paramount to guaranteeing the quality, safety, and efficiency of gas transportation, and it plays a critical role in supporting both domestic production and the integration of vital imports. Without robust infrastructure, the entire energy security framework is compromised.

- **Increased Efficiency:** The implementation of advanced technologies, such as Variable Speed Drives (VSD) in compression stations, can reduce energy consumption by up to 6%, significantly improving the operational efficiency of the network. This directly translates to more gas delivered with less waste, enhancing sustainability.
- **Reduced Emissions:** Operating with clean gas and minimizing gas flaring contribute to reducing the sector's carbon footprint, aligning with national and international sustainability goals. Efficient infrastructure minimizes leaks and unnecessary venting, which are significant sources of methane emissions.
- **Enhanced Security:** Supervisory Control and Data Acquisition (SCADA) systems and predictive monitoring improve the reliability and safety of the gas transportation network, minimizing disruptions. A resilient infrastructure is crucial for maintaining a stable domestic energy supply and reducing reliance on potentially volatile foreign energy imports.
    - *Reference:* [3.1] Colombia Lost Its Gas Self-Sufficiency, Says Energy Sector Leader - ColombiaOne

Key Infrastructure Components and Planned Expansions: Enabling Supply and Transition

The various components of gas infrastructure are not isolated elements but interconnected systems vital for the entire energy value chain. Their strategic development is critical for both current supply and the long-term energy transition.

- **Gas Pipeline Network:** This vast network connects production centers with consumption points. Its expansion, modernization, and bidirectional capabilities are crucial for efficient distribution, allowing gas to flow from new domestic fields to demand centers and from import terminals to the national grid.

  - **VIM – Interior via Jobo-Vasconia Pipeline:** A new pipeline connecting Magdalena Medio to the national system, with a proposed capacity of **400 MMcfd**, aiming for **100 MMcfd by Q4 2027** and full capacity by **Q1 2030**.
  - **Bogotá to SNT via Mariquita/Vasconia:** Connecting Bogotá to the main pipeline system with a capacity of **215 MMcfd** by **Q1 2030**.
  - **Barranquilla-Ballena Two-Way Pipeline:** A project by Promigas to invest **330 billion pesos (approx. US$75mn)** to transport up to **170 MMcfd** starting in **August 2027**. This bi-directional capacity is vital for optimizing gas flow from different sources.
  - *Reference:* [4.1] The projects driving Colombia's gas infrastructure expansion - BNamericas
  - *Reference:* [4.2] Fueling the future: Colombia's top oil and gas projects in 2025 - BNamericas
- **Compression Stations:** These facilities maintain the necessary pressure for the continuous flow of gas through pipelines, optimizing transport capacity and ensuring gas reaches end-users efficiently.
- **Treatment Plants:** Where raw gas is processed to eliminate impurities and ensure it meets quality standards before being injected into the national grid. This ensures the gas is suitable for various applications, from industrial use to residential consumption.
- **Regasification Terminals:** These are essential for LNG imports, where liquefied gas is converted back to its gaseous state for distribution into the national pipeline network. They are a critical link to international markets, providing flexibility and a backup source during domestic supply shortfalls.
  - **Pacific Gas Import Infrastructure (Buenaventura):** A new regasification plant and storage in Buenaventura, plus a pipeline to Yumbo, with **400 MMcfd regasification capacity** and **170,000m³ LNG storage**. Expected startup is **Q1 2030** (58 months post-investor selection). Ecopetrol expects its first facility in Buenaventura to come online in **Q2 2026**.
  - **Gas Import Infrastructure in La Guajira:** A new regasification facility and connection to the SNT with **250 MMcfd regasification capacity** and **120,000m³ LNG storage**. Expected startup is **Q1 2026**. A floating LNG plant off La Guajira with **200-300 MMcfd capacity** is also being considered.
  - *Reference:* [4.1] The projects driving Colombia's gas infrastructure expansion - BNamericas
  - *Reference:* [4.2] Fueling the future: Colombia's top oil and gas projects in 2025 - BNamericas
  - *Reference:* [4.3] An integral component of Colombia's energy security - JOSÉ CASTRO

The optimization of existing infrastructure has allowed for **85% of current capacity to be optimized**, representing improved utilization and greater network efficiency. This is a testament to the fact that investing in and maintaining existing assets is as crucial as developing new ones for long-term sustainability.

Infrastructure's Broader Impact on Sustainability:

- **Economic Stability and Industrial Supply:** Reliable gas infrastructure ensures a continuous and stable supply of energy to industries, preventing shutdowns and supporting economic growth. Gas accounts for a significant portion of industrial energy consumption and is crucial for various processes, including the production of fertilizers and plastics.
  - *Reference:* [5.1] Colombia - Oil and Gas Exploration and Production Equipment - trade.gov
  - *Reference:* [5.2] Natural gas supply - Colombia - Countries & Regions - IEA
- **Supporting Renewable Energy Integration (Bridge Fuel):** Gas-fired power plants, supported by robust gas infrastructure, offer flexibility and can be quickly ramped up or down to compensate for the intermittency of renewable energy sources like solar and wind. This "bridge fuel" role is vital for maintaining grid stability as Colombia increases its renewable energy capacity, ensuring a smooth and reliable transition.
  - *Reference:* [6.1] Mobilizing Clean Energy Investments in Colombia: Community Solutions to Help Accelerate Financing - World Economic Forum
  - *Reference:* [6.2] Foreign Investment Fuels Colombia's Green Energy Revolution - brazilenergyinsight.com
  - *Reference:* [6.3] Executive summary – Colombia 2023 – Analysis - IEA
- **Addressing Energy Poverty:** Expanding gas distribution networks, especially in rural and underserved areas, is a direct pathway to reducing energy poverty. Providing access to natural gas for cooking and heating can significantly improve the quality of life for millions, replacing less efficient and more polluting alternatives like firewood or LPG cylinders.
  - *Reference:* [3.1] Colombia Lost Its Gas Self-Sufficiency, Says Energy Sector Leader - ColombiaOne

2. Boosting Local Production

The development of new gas fields is fundamental to reversing the decline in reserves and ensuring long-term supply, despite government policies that have halted new exploration contracts since 2022 and increased tax burdens, exacerbating the decline in drilling activity.

- **Onshore Projects:** Initiatives like Sinu-9 and projects by Canacol Energy aim to maximize production from existing and new fields, offering a more immediate supply to the national market. M&P's acquisition of a 61% stake in Sinu-9 gives it operational control over **110.2 bcf of 2P reserves**. The company plans a **six-well drilling campaign**

starting October 2025**, with infrastructure upgrades by **Q4 2025** expected to expand production capacity to **24 MMcfd net**.

- *Reference:* [2.2] M&P's Colombian Gas Play: A Strategic Bet on a Tightening Market - AInvest
- *Reference:* [4.2] Fueling the future: Colombia's top oil and gas projects in 2025 - BNamericas

- **Offshore Projects:** Massive discoveries in the Caribbean, such as Sirius and Gorgon, have the potential to significantly boost national reserves. However, their development is complex and requires longer production timelines.
    - **Sirius (ex-Uchuva):** Ecopetrol and Petrobras have completed testing of the Sirius 2 well, confirming gas volumes of **more than 6 trillion cubic feet (Tcf)**. Commercial-scale production is targeted for **2029**. Total investment is forecast to reach around **US$5 billion**, with approximately **US$1.2 billion** earmarked for the exploration phase and **US$2.9 billion** for the production development stage. This project has the potential to triple Colombia's gas reserves.
        - *Reference:* [7.1] Ecopetrol and Petrobras complete Sirius 2 gas appraisal - BNamericas
        - *Reference:* [7.2] Colombia to Start Exploitation of Sirius-2 Offshore Gas Well in 2029 - ColombiaOne
    - **Gorgon and Others (Kronos-1, Purple Angel, Fuerte Sur):** Ecopetrol is moving forward with these strategic resources despite Shell's recent exit from some offshore blocks. The maturation of the Gorgon development project and socio-environmental viability are targeted for **mid-2029**, with production expected between **2031 and 2032**. Ecopetrol is actively seeking new partners for these ventures.
        - *Reference:* [4.2] Ecopetrol to proceed with natural gas drilling in Colombian waters despite Shell's exit
        - *Reference:* [8.1] Ecopetrol Advances Caribbean Gas Projects After Shell Exit - Tiger Brokers
    - **Papayuela:** A prospect near Sirius, also in the GUA-OFF-0 block, which Ecopetrol believes could meet up to **80% of the country's natural gas demand** in the coming years. Its development is estimated to take **five to seven years**, with a potential production of up to **800 MMcfd**.
        - *Reference:* [4.2] Fueling the future: Colombia's top oil and gas projects in 2025 - BNamericas
- **White Hydrogen Discovery:** In a groundbreaking development, Colombia has confirmed the presence of **natural hydrogen** in its subsoil, the first such discovery in Latin America. This positions the country as an early player in what could become a global shift toward cleaner and more sustainable energy sources. Initial research suggests a possible continuous natural recharge of the reservoir.
    - *Reference:* [6.4] Colombia Confirms Subsoil Hydrogen Discovery, a First in Latin America - ColombiaOne

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3. Securing LNG Imports

Given the immediate deficit and the long development times for offshore projects, Liquefied Natural Gas (LNG) imports have become an indispensable strategic bridge to ensure energy security.

- **Import Growth:** Colombia's gas imports increased by **166.4% in the second half of 2024**, reaching an average of **214.1 million cubic feet per day (MMcfd)**, compared to 80.3 MMcfd in 2023. Total annual LNG imports reached **94.33 Bcf in 2024**, a significant increase from 36.30 Bcf in 2023. The main providers are Trinidad and Tobago and the U.S.
    - *Reference:* [9.1] As Production Declines, Colombia's Gas Imports Skyrocket - ColombiaOne
    - *Reference:* [9.2] Colombia to receive LNG imports following record year - LNG Journal
- **Regasification Capacity Expansion:** The existing regasification capacity at the SPEC LNG terminal in Cartagena is currently 400 MMcfd and is projected to increase to **530 MMcfd by 2027**, requiring an investment of **US**80−US**90 million**. Additionally, new projects are contemplated that will add an extra 660 MMcfd, further strengthening the country's import capacity.
    - *Reference:* [4.2] Fueling the future: Colombia's top oil and gas projects in 2025 - BNamericas
    - *Reference:* [4.1] The projects driving Colombia's gas infrastructure expansion - BNamericas

Key Projects: Pillars of Future Supply

Several projects are crucial for the future of gas supply in Colombia, with distinct timelines and contributions:

- **Sinu-9 (Onshore):** This project, operated by M&P (with a 61% stake), is connected to the existing network and is already in production since November 2024. With proven (3P) reserves of **340.8 bcf** and an initial production capacity of **16-40 MMcfd**, it offers a vital short-term response to the deficit. M&P aims to increase production capacity to **24 MMcfd net by Q4 2025** through infrastructure upgrades and a **six-well drilling campaign starting October 2025**.
    - *Reference:* [2.2] M&P's Colombian Gas Play: A Strategic Bet on a Tightening Market - AInvest
    - *Reference:* [4.2] Fueling the future: Colombia's top oil and gas projects in 2025 - BNamericas

- **Sirius (Offshore):** Considered Colombia's largest gas discovery, with confirmed gas volumes of **more than 6 Tcf**(trillion cubic feet). Ecopetrol and Petrobras have successfully completed testing of the Sirius 2 well. Phase 1 production is estimated at **470 MMcfd**, with an operational timeline targeting **2029-2030**. The total investment for Sirius is projected at approximately **US$5 billion**.
    - *Reference:* [7.1] Ecopetrol and Petrobras complete Sirius 2 gas appraisal - BNamericas
    - *Reference:* [7.2] Colombia to Start Exploitation of Sirius-2 Offshore Gas Well in 2029 - ColombiaOne
- **Gorgon and Others (Offshore):** These strategic resources, including discoveries like Kronos-1 and Gorgon 1 & 2 in the Col-5, Purple Angel, and Fuerte Sur blocks, are being advanced by Ecopetrol despite Shell's recent exit. The maturation of the Gorgon development project is targeted for **mid-2029**, with production expected between **2031 and 2032**. Ecopetrol is actively seeking new partners to develop these significant resources for long-term demand.
    - *Reference:* [4.2] Ecopetrol to proceed with natural gas drilling in Colombian waters despite Shell's exit
    - *Reference:* [8.1] Ecopetrol Advances Caribbean Gas Projects After Shell Exit - Tiger Brokers

Timeline for New Production: Colombia's gas supply strategy presents a clear timeline for the arrival of new production, highlighting a critical "supply gap" period:

- **2024:** Sinu-9 begins production, offering immediate relief.
- **2025-2028:** A crucial "Supply Gap" period where LNG imports will be indispensable to compensate for the lack of new large-scale domestic production.
- **2029:** Sirius is expected to begin operations, marking a significant turning point in the country's self-sufficiency.
- **2031-2032:** Projects like Gorgon and other offshore initiatives are projected to start production, further consolidating long-term supply.

Overall Vision: Holistic Impact

The comprehensive implementation of this strategy for the gas sector will generate benefits that transcend merely securing supply, contributing to a broader national development agenda:

- **Energy Security:** The diversification of supply sources (onshore production, offshore, and LNG imports) will create a more resilient energy system, significantly less vulnerable to climatic fluctuations, geopolitical events, or disruptions in a single supply chain. This ensures continuous energy availability for all sectors.

- **Economic Growth:** The multi-million dollar investments required for exploration, production, and infrastructure development will generate substantial employment opportunities across various sectors, boost local industry through increased demand for goods and services, and ensure competitive energy prices for the productive sector, fostering overall economic expansion.
- **Sustainable Transition:** Natural gas, being a cleaner-burning fossil fuel compared to coal and oil, will act as a crucial bridge in Colombia's energy transition. It will enable the country to reduce greenhouse gas emissions by displacing more polluting energy sources and will provide the essential flexible backup necessary for the increasing integration of intermittent renewable energies (like solar and wind) into the national energy matrix, ensuring grid stability. Furthermore, the recent discovery of natural hydrogen in the subsoil presents a long-term opportunity to diversify the energy matrix towards potentially zero-emission alternatives.
    - *Reference:* [6.4] Colombia Confirms Subsoil Hydrogen Discovery, a First in Latin America - ColombiaOne

Conclusion

Colombia's energy future depends on proactive, strategic, and agile management of its natural gas market. The combination of optimizing existing infrastructure, aggressively boosting domestic production from both onshore and offshore fields, and guaranteeing strategic LNG imports is fundamental to overcoming the current deficit and ensuring a stable, secure, and affordable gas supply. This strategy not only addresses an immediate and critical challenge but also lays the groundwork for sustainable economic development and a responsible energy transition towards a cleaner and more diversified energy future for Colombia.

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