



PAST, PRESENT AND PERSPECTIVES FOR THE DEVELOPMENT OF UNDERGROUND NATURAL GAS STORAGE IN LATIN AMERICA

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Background

- Underground gas storage (UGS) is well developed in North America and Europe, and...
- Underground natural gas storage (UGS) is being developed in new regions, such as Asia, Oceania and **LATIN AMERICA**
- The gas sector in **LATIN AMERICA** has been consistently developing in the last decades, so...
- What is the importance of UGS?

Objectives

- Investigate underground natural gas storage development in **LATIN AMERICA**.
- To analyze how **LATIN AMERICA** will deal with UGS business, considering national gas industry characteristics of countries where UGS is highly developed.

Methodology

- LATIN AMERICAN projects, laws on UGS;
- LATIN AMERICAN Gas industry aspects: comparison to leading UGS countries;
- In order to suggest which Latin American nations this activity is more likely to be developed, or where it is more necessary.

Natural Gas Industry and UGS in Latin America

- Argentina
- Bolivia
- Brazil
- Chile
- Colombia
- Mexico
- Peru
- Venezuela

Argentina



Figure 2. Gas infrastructure and UGS locations in Argentina. Adapted from IAPG (2015).

Colombia

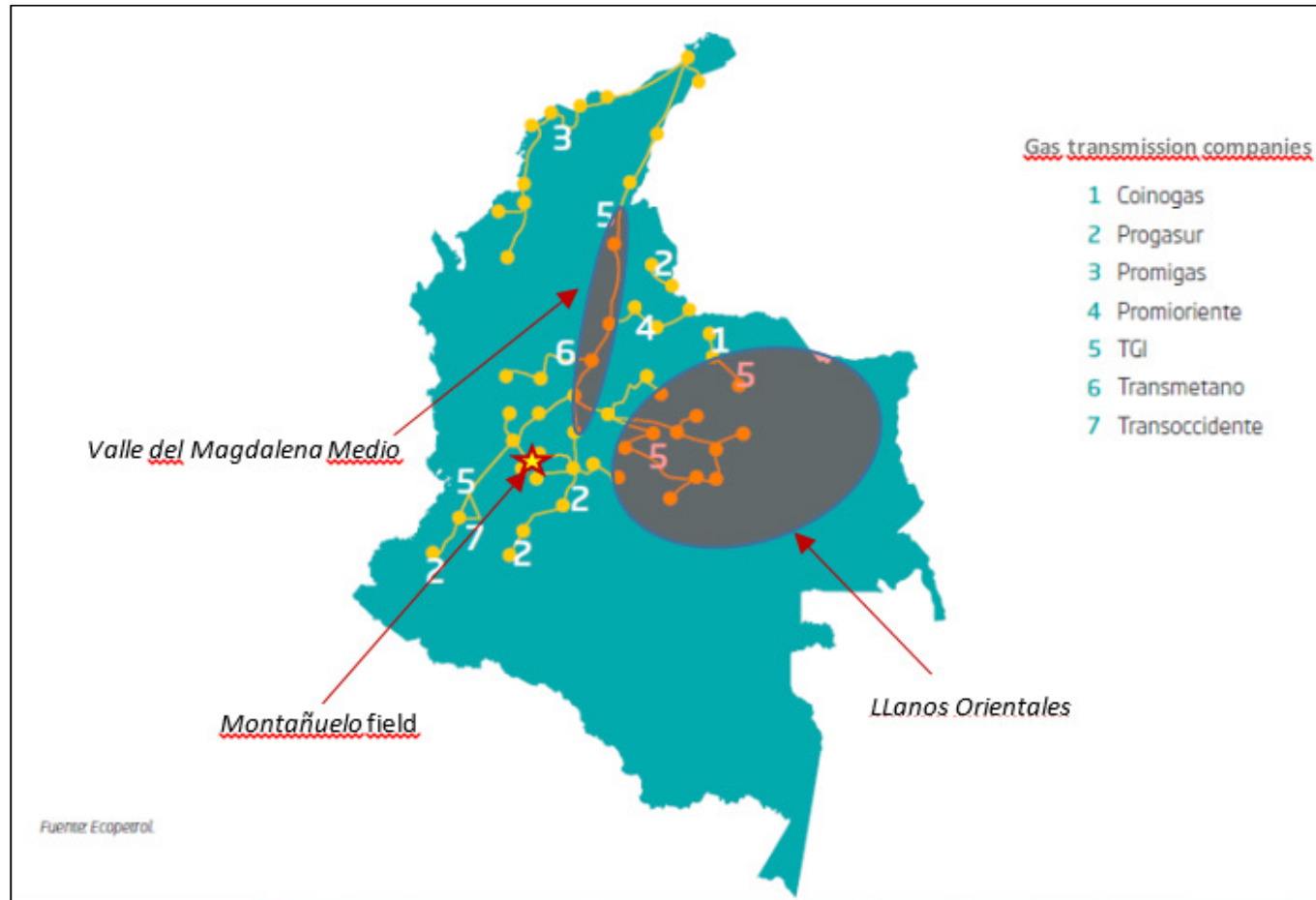


Figure 7. Colombian Gas Infrastructure, Llanos Orientales and Valle del Magdalena Medio basins, and Montañuelo field. Map from Promigas (2014),⁸ with author's adaptations

Bolivia, Chile, Peru & Venezuela

- No storage projects;
- Few researches identified.

Leading UGS Countries (gas industry aspects)

- United States of America (USA)
- Russian Federation (Russia)
- Ukraine
- Canada
- Germany
- Italy
- Netherlands
- France

Results and Discussion: Gas Industry Characteristics

- Gas Industry Characteristics of Latin American Countries compared to UGS leading countries;

very relevant

- ✓ Pipeline density (km/10³km²);
- ✓ (%) of NG demanded by residential and commercial sectors;

relevant


- ✓ Consumption of NG;
- ✓ Consumption of NG per capita (10³ m³ / inhabitant);
- ✓ Imports dependence;
- ✓ (%) of NG in total primary energy demand

less relevant


- ✓ Production of NG;
- ✓ (%) of natural gas demanded by the power generation sector.

Results and Discussion: Gas Industry Characteristics

- For each NG industry aspect, top 4 Latin America nations ranked;
- For each country, points (pts) were given based on the Top 4 rank and on the NG industry aspect (**very relevant, relevant and less relevant**).



Gas production	Pts × factor for less relevant aspect = total Pts
1 st Mexico	4 × 1 = 4
2 nd Argentina	3 × 1 = 3
3 rd Venezuela	2 × 1 = 2
4 th Brazil	1 × 1 = 1



Pipeline density	Pts × factor for very relevant aspect = total Pts
1 st Mexico	4 × 3 = 12
2 nd Colombia	3 × 3 = 9
3 rd Argentina	2 × 3 = 6
4 th Venezuela	1 × 3 = 3

Results and Discussion: Gas Industry Characteristics

Table 9. Results: countries where UGS is more required based on gas industry aspects

Country position	Total Pts.
1 st Argentina	41
2 nd Mexico	40
3 rd Colombia	18
4 th Chile	17
4 th Venezuela	17
6 th Bolivia	12
7 th Brazil	9
8 th Peru	6

Results and Discussion: Projects and Legal Framework

Table 10 – Summary of projects and existing legal frameworks on UGS in Latin America

Countries	UGS Projects	Legal Framework on UGS
Argentina	2 projects in specific locations (<i>Lulunta Carrizal</i> and the operational <i>Diadema</i>). Researches identified.	Natural Gas Act with no specific rules for UGS, but covering storage.
Bolivia	No projects . Debates identified.	Hydrocarbon Act with no specific rules for UGS.
Brazil	1 project in specific location (Santana Field, authorized by ANP). Researches and debates identified.	Gas Act with specific rules for UGS sitting and TPA.
Chile	No projects identified. Few researches or debates identified.	Natural Gas Services Act with no rules for UGS.
Colombia	No projects . Researches indicated regions for UGS development as well as a specific site (<i>Montañuelo</i> field).	Presidential Decree determined assessment on UGS viability to be conducted by governmental bodies.
Mexico	1 project under consideration involving several entities (<i>Campo Brasil</i> field). Researches identified.	Hydrocarbon Act covers storage, which is part of the gas system, and establishes unbundling dispositions.
Peru	No projects and no researches or debates identified.	Hydrocarbon Act with no specific rules for UGS.
Venezuela	No projects . Researches identified.	Gaseous Hydrocarbon Act covers storage, being possible to infer that geological storage is included.

Results and Discussion: Projects and Legal Framework

- Regarding existing UGS projects and legal frameworks, Argentina, Brazil, Mexico and Colombia are better ranked.

Conclusions: Past, Present and Future...

- Argentinian *Diadema* UGS facility, researches, debates and projects (such as the Brazilian and Mexican ones): PAST and PRESENT.
- Coherent methodology for determining where storage is relevant for Latin America (Argentina and Mexico): FUTURE
- The projects and legal frameworks gathered in this paper show that the region has been considering the UGS issue and has intensified debates: FUTURE.

Thank you!

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