

IMPACT OF US LNG ON LATIN AMERICAN AND CARIBBEAN GAS DEMANDS



Ana María Jaller-Makarewicz

Energy Consultant and Trainer for Jallmak Energy and IFE

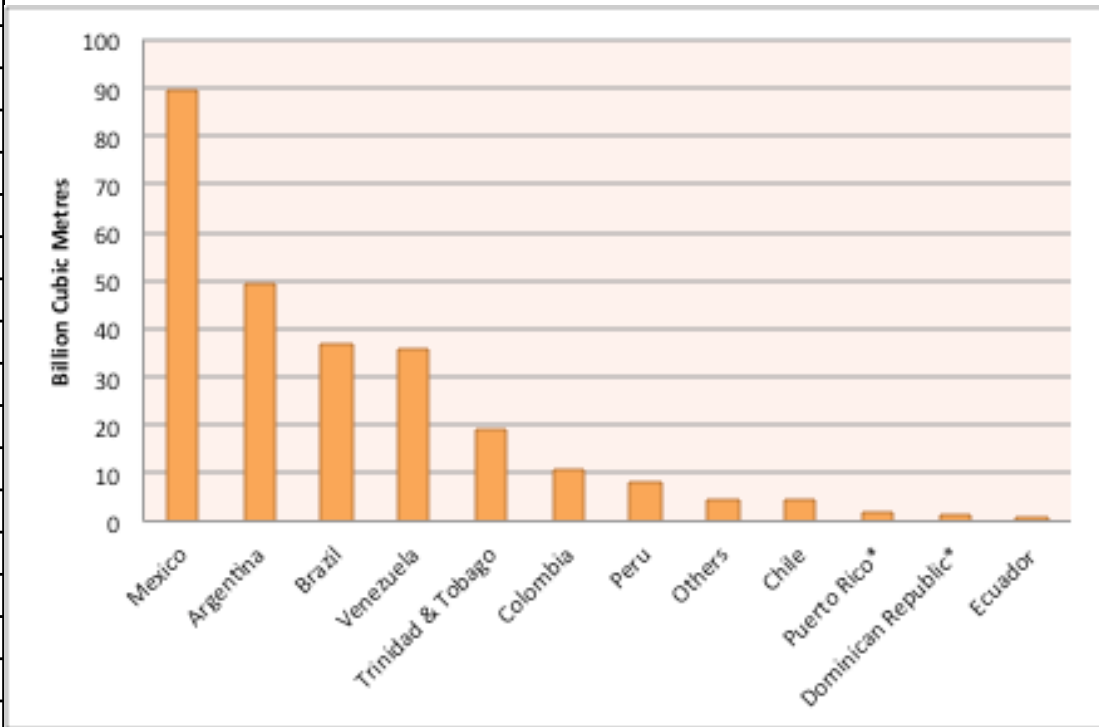
LNGgc London, 19th September 2017

Natural Gas Consumption LATAM and Caribbean 2016

NATURAL GAS CONSUMPTION 2016	
	Billion cubic metres
Mexico	89.5
Argentina	49.6
Brazil	36.6
Venezuela	35.6
Trinidad & Tobago	19.1
Colombia	10.6
Peru	7.9
Others	4.5
Chile	4.5
Puerto Rico*	1.7
Dominican Republic*	1.2
Ecuador	0.6
Total LATAM AND CARIBBEAN	261.4
Percentage of the world	7.4%
TOTAL WORLD	3,542.9

Source: BP statistical review

* Jallmak calculation



Schematic representation of the gas flows on the continent, 2016

Source: Oxford Institute for Energy Studies "South American Gas Market and the role of LNG"



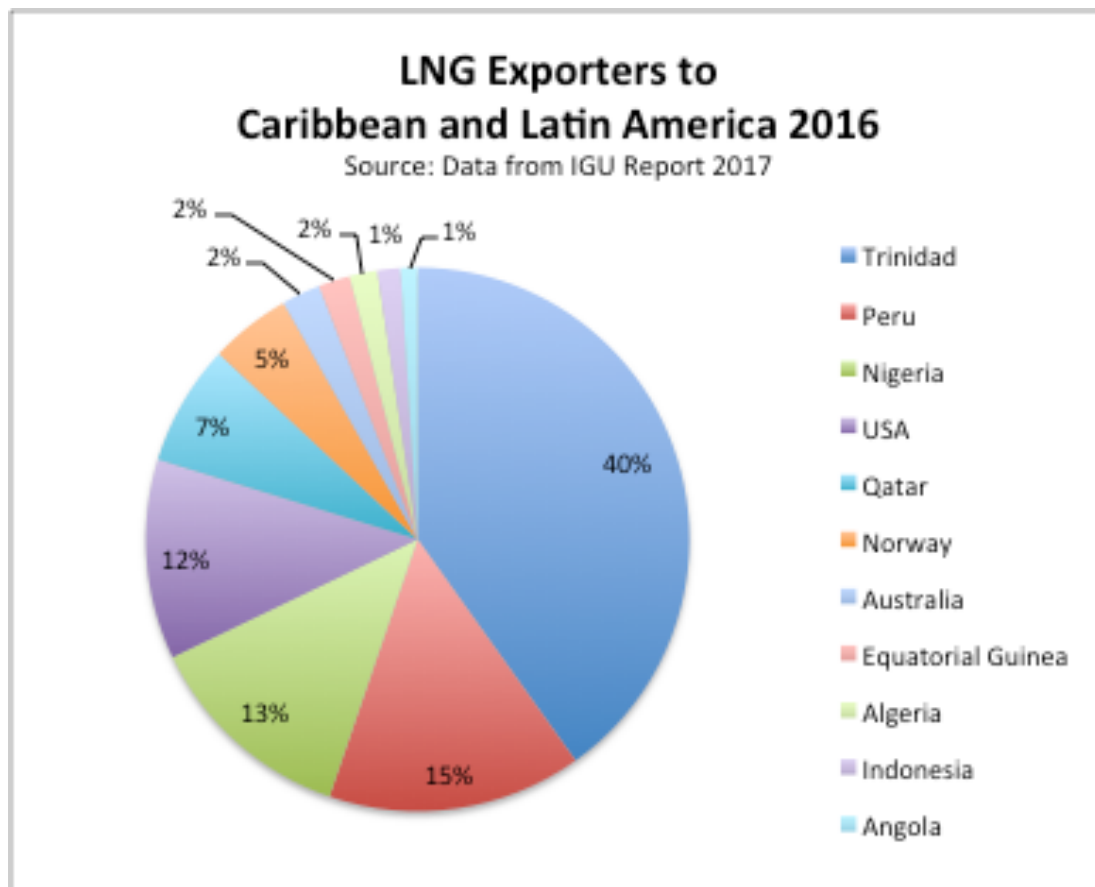
- Small natural gas demand
- Hasn't been an attractive market for traditional LNG exporters
- Power and industrial sectors have greatly relied on diesel and fuel oil
- Slowly converting some of its power generation to be powered by natural gas from imported **LNG**, as it has been happening in Jamaica.



- **US natural gas** boom has generated interest in the Caribbean region and the Americas to develop natural gas projects.
- **Key LNG importers** are **Argentina, Brazil, Chile, Mexico, Dominican Republic and Puerto Rico.**
- Started importing small volumes of LNG in **2016: Barbados, Colombia and Jamaica**
- Plans to build small-scale LNG receiving terminals: **Curacao, Panama and El Salvador.**

LNG exporters to the region- 2016

- **Trinidad and Tobago**: biggest exporter of LNG to South and Central America in 2016, followed by **Peru, Nigeria and USA**.
- Approximately half of Mexico's LNG imports came from Peru.

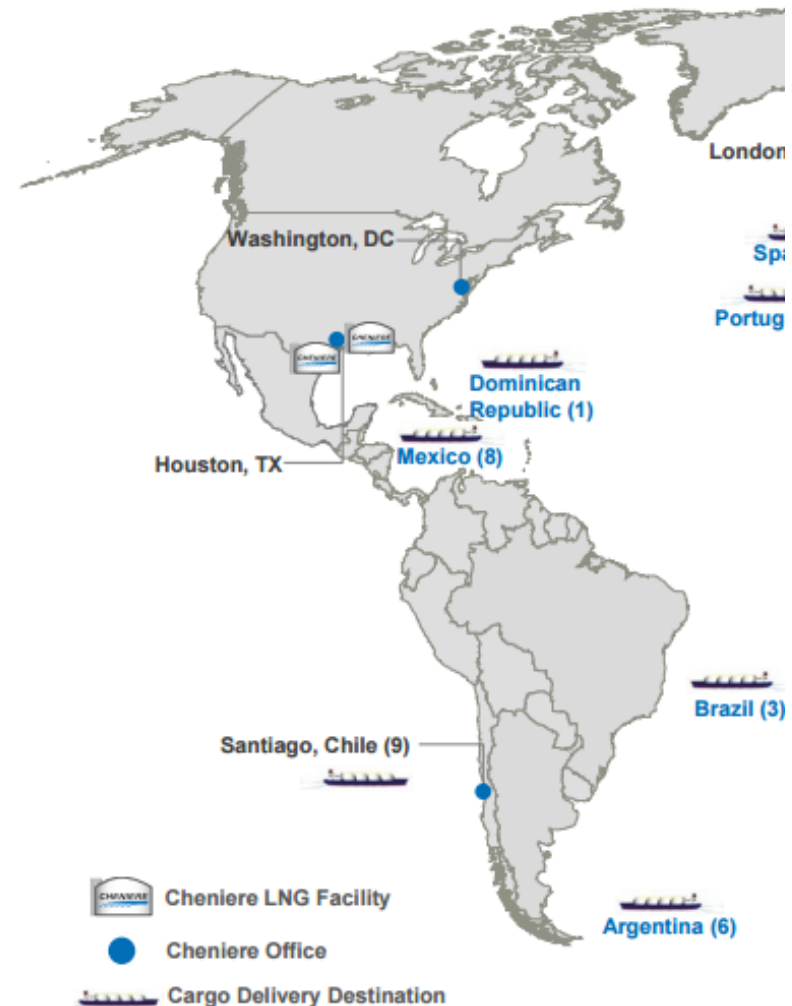


2016 U.S LNG Exports by Vessel, By Country

Rank	Country	MMcf/d	Rank	Country	MMcf/d
1	Chile	80.3	11	Kuwait	19.3
2	Mexico	75.1	12	Portugal	10.1
3	China	47.1	13	Egypt	9.9
4	India	46.2	14	United Arab Emirates	9.3
5	Argentina	45.5	15	Italy	9.1
6	Japan	30.4	16	Dominican Republic	8.0
7	South Korea	27.8	17	Spain	8.0
8	Jordan	27.0	18	Barbados	0.3
9	Brazil	25.1		TOTAL	502.4
10	Turkey	23.9			

Source: EIA, NGI's Daily Gas Price Index calculations

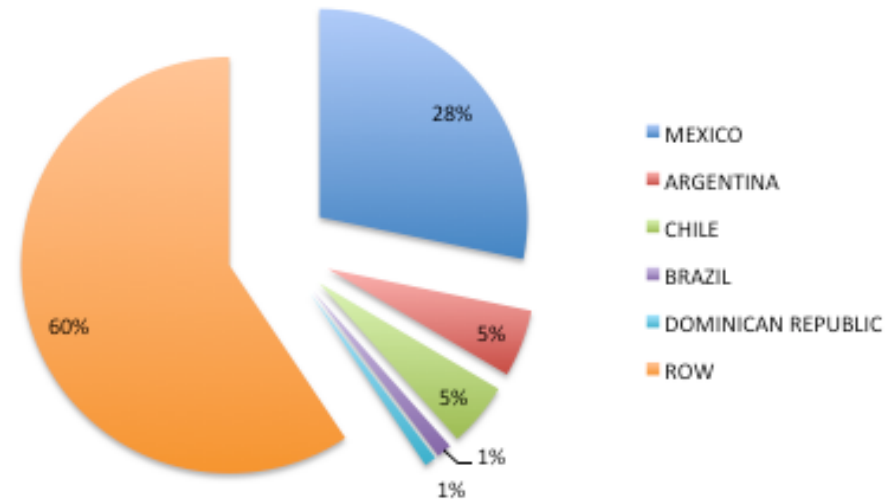
47% of US LNG exports went to Caribbean and Latin American countries



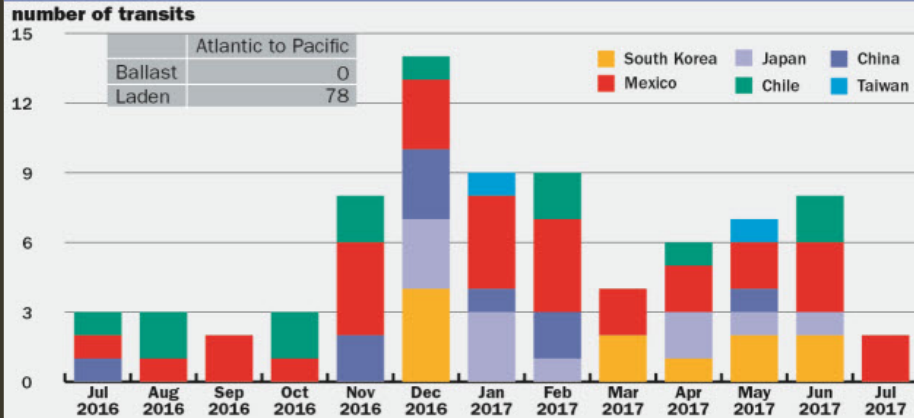
Source: LNG Q4 Investor Presentation

- 40% of US LNG exports to LATAM and Caribbean
- Mexico:
 - Major importer of US LNG with 28% of traded volume and
- Argentina 6th importer
- Chile 7th
- Brazil 14th
- Dominican Republic 22nd

COUNTRY OF DESTINATION	VOLUME, Mcf NG	NO. SHIPMENTS
MEXICO	87,661,177	26
ARGENTINA	16,276,094	5
CHILE	15,452,472	5
BRAZIL	3,675,755	1
DOMINICAN REPUBLIC	2,933,786	1
TOTAL LATAM	125,999,284	38
REST OF THE WORLD	184,438,861	56
GRAND TOTAL	310,438,145	94

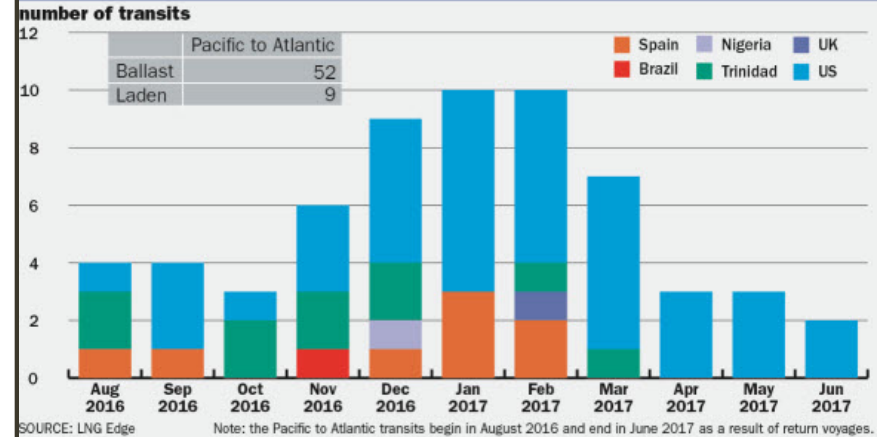


ATLANTIC TO PACIFIC PANAMA CANAL TRANSITS (JULY 2016-JULY 2017)



- Most of the volumes were delivered into the Latin American markets
 - **Chile's** Quintero LNG and Mejillones LNG terminals
 - **Mexico's** west coast terminal of Manzanillo

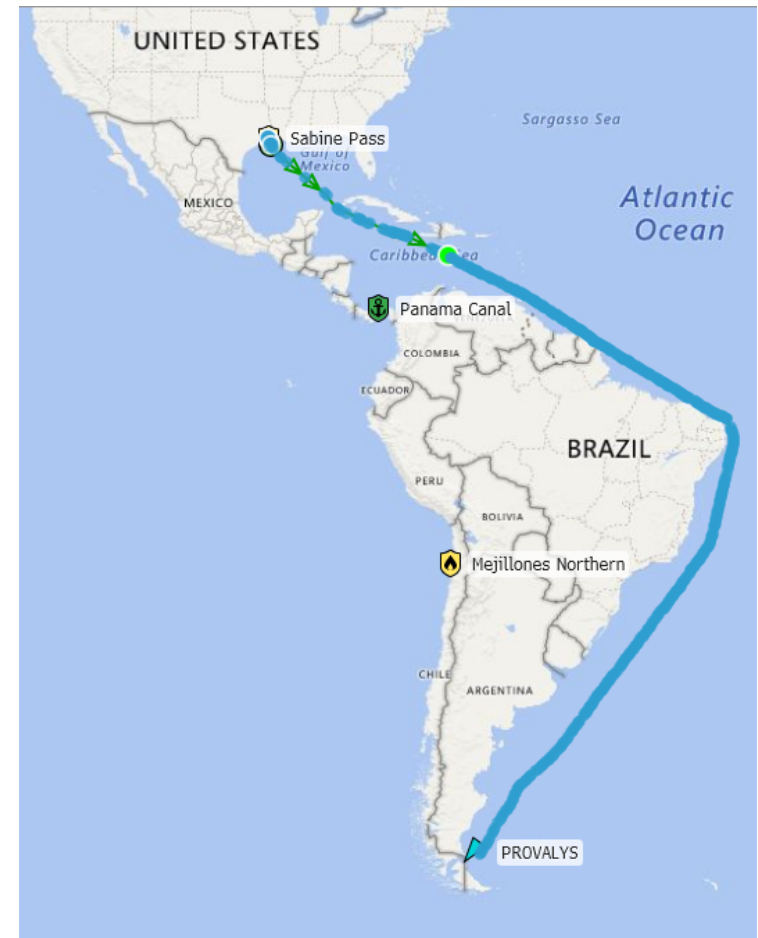
PACIFIC TO ATLANTIC PANAMA CANAL TRANSITS (AUGUST 2016-JUNE 2017)



- 61 vessels travelled from the Pacific to the Atlantic
- 52 of them ballast and
- 9 laden, all from Peru LNG.

Not all the trades transit Panama Canal

- As stated by Bloomberg on 17th August 2017, since the start of the year, **4 ships from Sabine Pass and 9 vessels from Qatar took longer routes** to deliver their cargoes
- Tanker Provalys left Louisiana for Chile in July 2017 and sailed around South America instead of through the Canal
- <https://www.bloomberg.com/news/articles/2017-08-17/smarter-gas-tankers-earning-more-taking-scenic-routes-amid-glut>



- All receiving terminals in **Argentina and Brazil use FSRUs.**
- FSU was a **solution in Chile** while building permanent terminals on land
- 2016 First terminal in **Colombia (El Cayao), uses Hoegh Grace FSRU**
 - 2.6 million metric tons of gas, mainly to power plants in north and centre of Colombia
- **Jamaica uses Golar Arctic FSU**
 - Feeds LNG to a 120 MW plant and a proposed 190 MW



Excelsior LNG. Bahía Blanca. Argentina



Hoegh LNG, Hoegh Grace, Cartagena



Concept of Caribbean Hub

- Larger receiving terminal distributing smaller cargoes of LNG to neighbouring nations.
- Montego Bay in Jamaica is capable of receiving small ships/vessels that can transfer LNG ship-to-ship from an FSU and transport it to an onshore regasification terminal.
- AES LNG terminal in Dominican Republic has completed modifications to re-export small volumes of LNG initially in ISO tanks to neighbouring countries.
- Panama could be also considered to be an LNG hub due to its location.

Chile, Argentina, Bolivia and Peru have developed SSLNG projects

1. Argentina has developed small-scale liquefaction facilities to supply Buenos Aires Ferry.
2. Chile, Bolivia and Peru have developed virtual pipelines to bring gas to remote areas that are not connected to the network.
3. In Colombia and other countries CNG virtual pipelines are common, but are evaluating possibility of using LNG virtual pipelines instead.
4. Caribbean islands could be potential LNG remote demand.



LNG TERMINALS



SOURCE
GIIGNL - Annual Report
2017 Edition

ARGENTINA – Expansion terminal capacity GNL Escobar

- Nominal regasification capacity of the **GNL Escobar** terminal has been increased from 5.1 Bcm/y to 6.1 Bcm/y.

BRAZIL – New FSRU end 2017

- Golar Power has entered into a 25-year agreement to charter *Golar Nanook*, a new-build FSRU to be delivered in November 2017.

CHILE – Expansion of Mejillones and Quintero, Transshipping

- In July 2016, **GNL Mejillones** received approval from the authorities to expand the terminal's capacity to 350 MMcf/d in 2018 and received approval for transshipments
- **Quintero** terminal capacity expansion to 5 MTPA, replacement of one existing 1000 m³ tank by a 160000 m³ tank and the addition of ship reloading capacity, including small scale ships.

COLOMBIA – Received first LNG cargo November 2016

- In November, Colombia received its first commissioning cargo at the FSRU *Höegh Grace* at the port of **Cartagena**.
The vessel will enable Colombia to import up to 3.75 MTPA of LNG.

DOMINICAN REPUBLIC – Added reloading capacity

- In December 2016, AES Andres completed the works for making the **Punta Caucedo** terminal bi- directional by adding a reloading capacity to load vessels larger than 10,000 m³

JAMAICA – Received first LNG cargo in 2016

- FSU Golar Arctic leased for two years, used to store and deliver LNG via small-scale vessels. The first cargo was delivered to Jamaica in October 2016 and commercial operations are reported to have started in November.

PANAMA – New terminal in 2018

- AES LNG jetty in Costa Norte (Caribbean) expected completion in 2018.

PUERTO RICO – Postponed Aguirre Gasport

- FSRU: Excelerate Energy and the Puerto Rico Electric Power Authority (PREPA) deferred construction of the offshore **Aguirre Gasport**

URUGUAY – Gas Sayago FRSU under construction

- Gas Sayago signed a 20-year charter with MOL to hire a 263,000 m³ FSRU currently under construction.

THANK YOU

Ana Maria Jaller-Makarewicz

Jallmak Energy Ltd

www.jallmak.com

anamaria@jallmak.com

Daniel Seldon

IFE-Training

www.ife-training.com

Daniel.Seldon@informa.com