

25th world gas conference
“Gas: Sustaining Future Global Growth”

Escobar LNG

A Challenging Regas Enterprise on Parana River

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PART 1

- Gas Industry in Argentina
 - *Producing Basins*
 - *Main Gas Pipelines*
 - *Energy Matrix*

PART 2

- Escobar LNG Project
 - *Location*
 - *Characteristics*
 - *STS Operation*
 - *Peak Shaving Operation*
 - *Last year operational data*

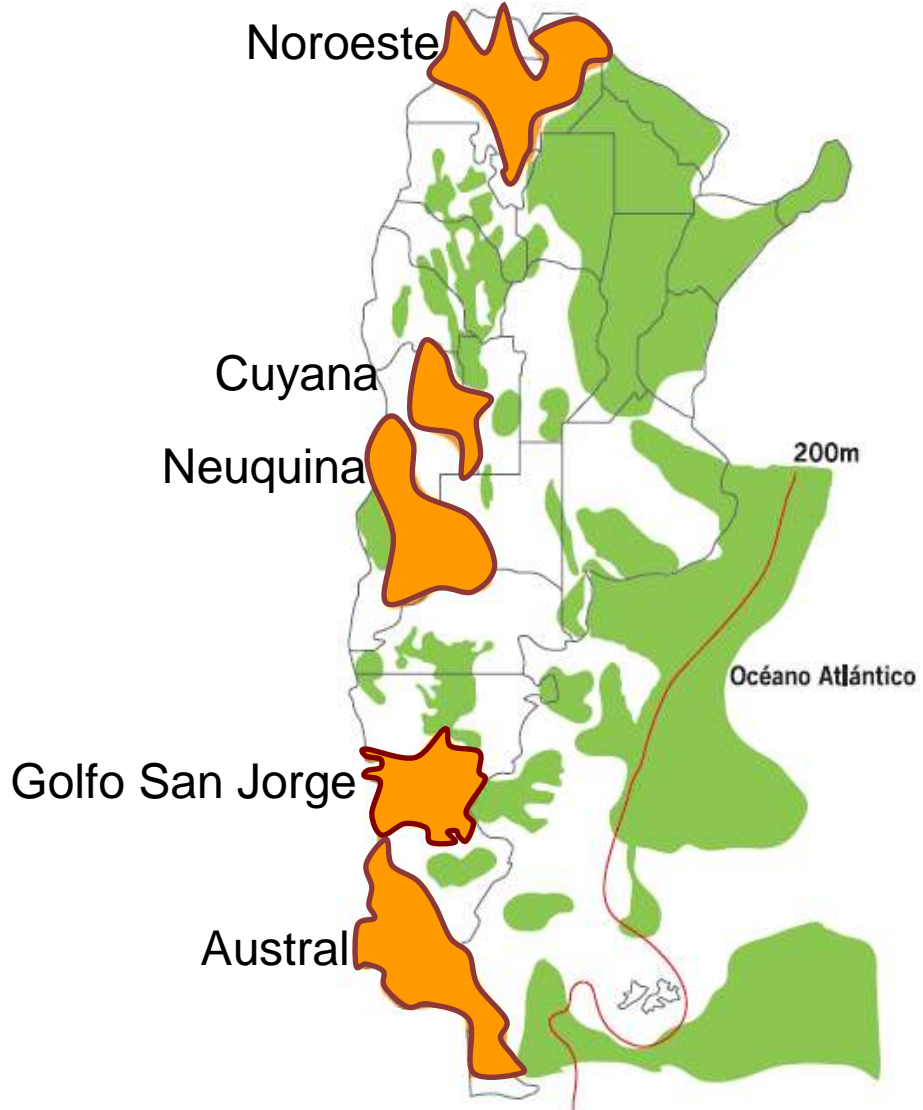
CONCLUSIONS



- The first major LNG experience in Argentina was conducted in 2008, with Bahía Blanca Regas Operation.
- After that successful operation, the Escobar Project was encouraged, and the facilities were completely finished in 8 months.
- The uniqueness of Escobar enterprise lies in the following aspects:
 - A need for lightering or partial cargos, because of draft limitations.
 - High frequency of “Ship to Ship” operations.
 - Peak Shaving service for the City of Buenos Aires.
 - Extreme Flexibility for gas injection to main pipelines.

Gas Industry in Argentina

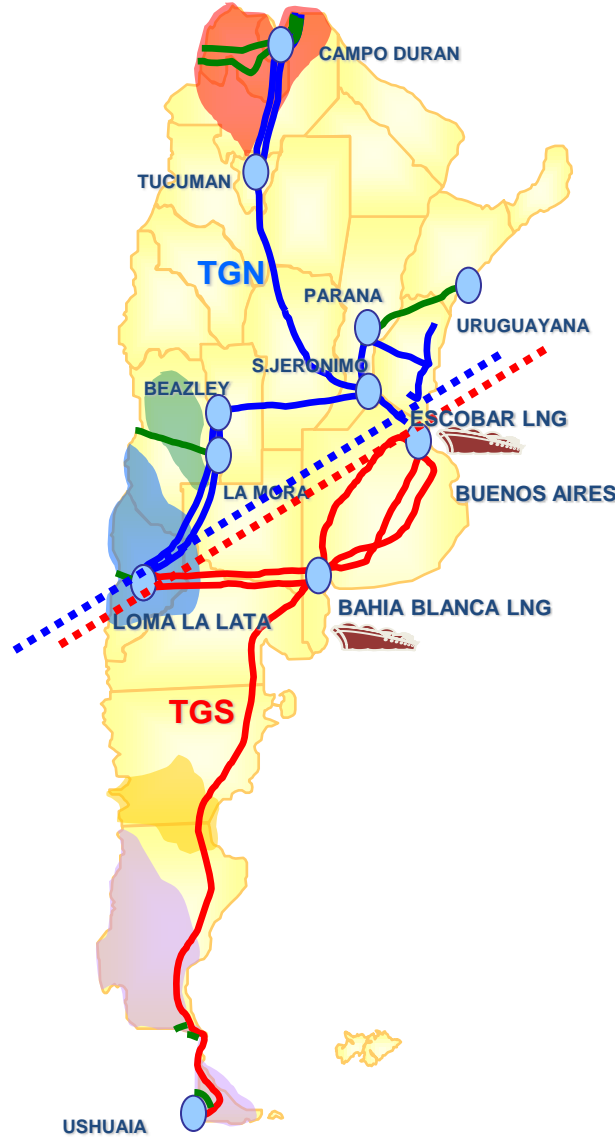
Producing Basins



Sedimentary Basins		
Productive Basins	590.400 Km ²	32%
Unproductive Basins	1.254.600 Km ²	68%
Total Basins		
1.845.000 Km²	1.254.600 Km ²	68%
Onshore Basin:	1.449.000 Km ²	79%
Offshore Basin (up to 200m):	1.449.000 Km ²	21%

Gas Industry in Argentina

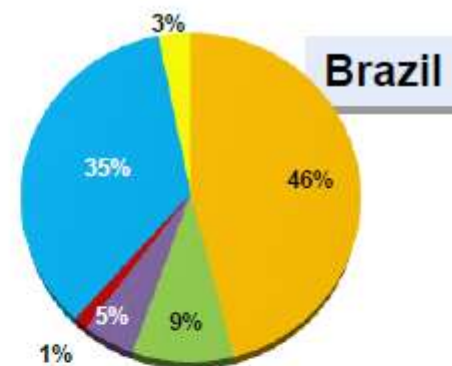
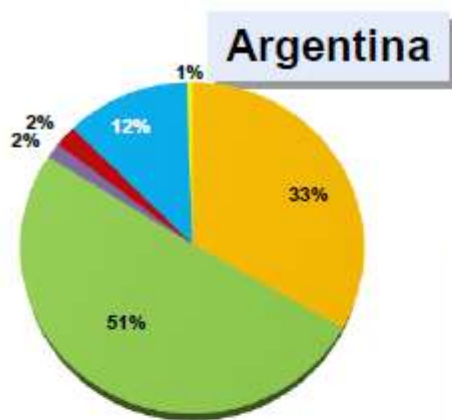
Main Gas Pipelines



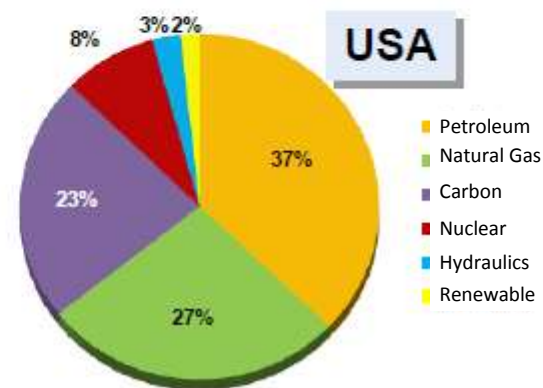
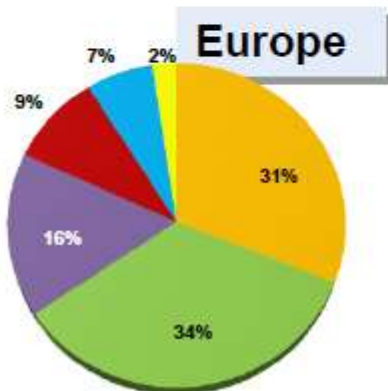
Argentina Gas Transmission System
Maximum Capacity

Noroeste B.	26.0 MMm ³ /d
Neuquina B.	69.0 MMm ³ /d
San Jorge B.	8.5 MMm ³ /d
Austral B.	31.0 MMm ³ /d
TOTAL	134.5 MMm³/d

2010



Comparison
Oil and gas share within the primary supply:
Argentina: 84%,
Brazil: 55%,
Europe: 65%, and
USA: 64%.



- Petroleum
- Natural Gas
- Carbon
- Nuclear
- Hydraulics
- Renewable

ESCOBAR LNG

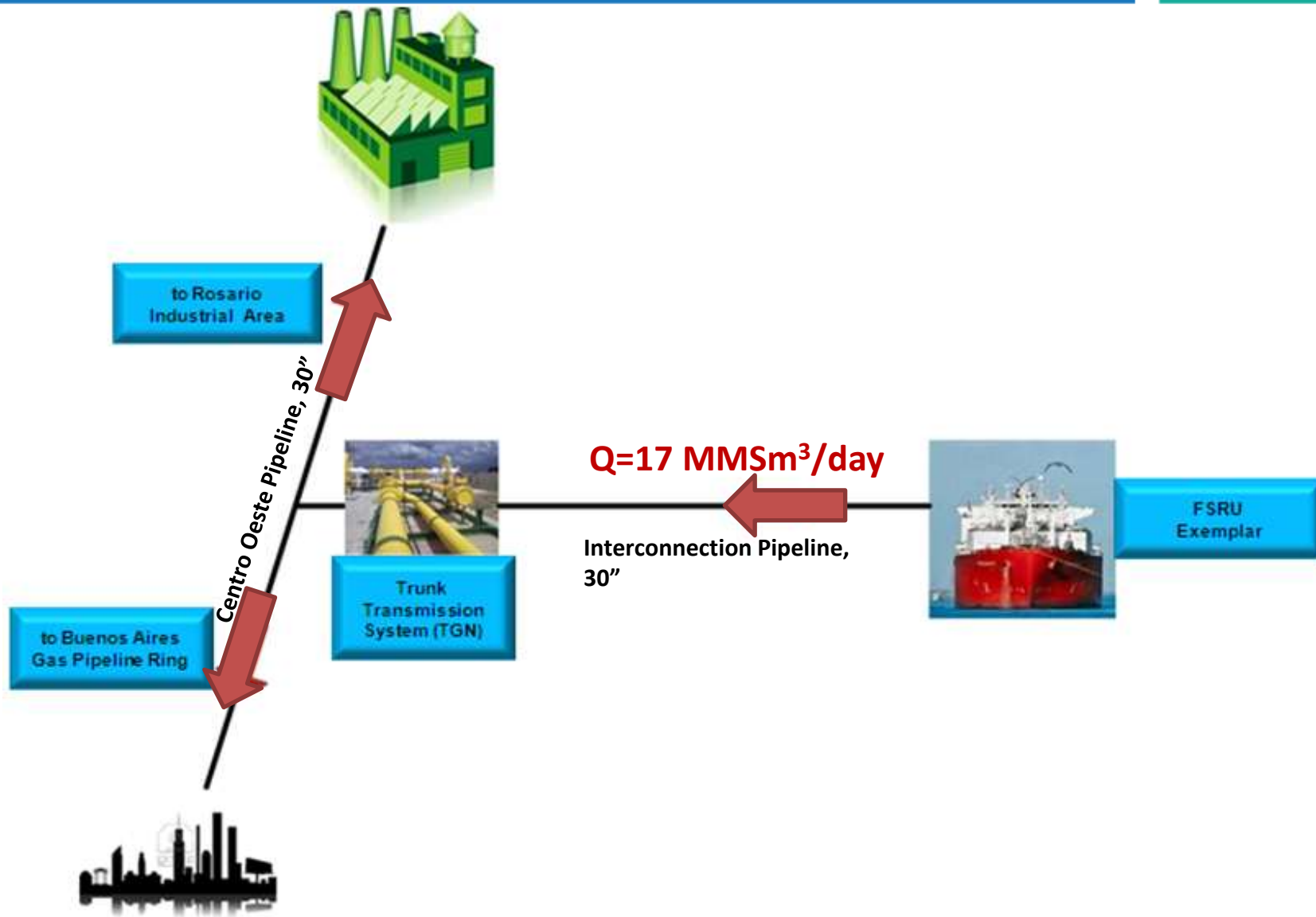
- 1- LNG Carriers transport LNG to regas area at Escobar Port
- 2- Regasification
- 3- Regasified Natural Gas deliver
- 4- Natural Gas injection into Main Pipeline



YPF PART 2 - Escobar LNG Project

Port Aerial View





FSRU can operate 3 different processes at the same time:

1. Receiving LNG product (at -160°C)
2. Regasifying it
3. Delivering gas to the pipeline at high pressure.

Available for Regas	Daily Nomination	Duration of load
<i>MMSm³ NG</i>	<i>MMSm³ /day</i>	<i>Days</i>
87.5	17.0	5
	10.0	9

LOA: 291 m

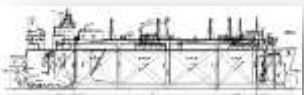
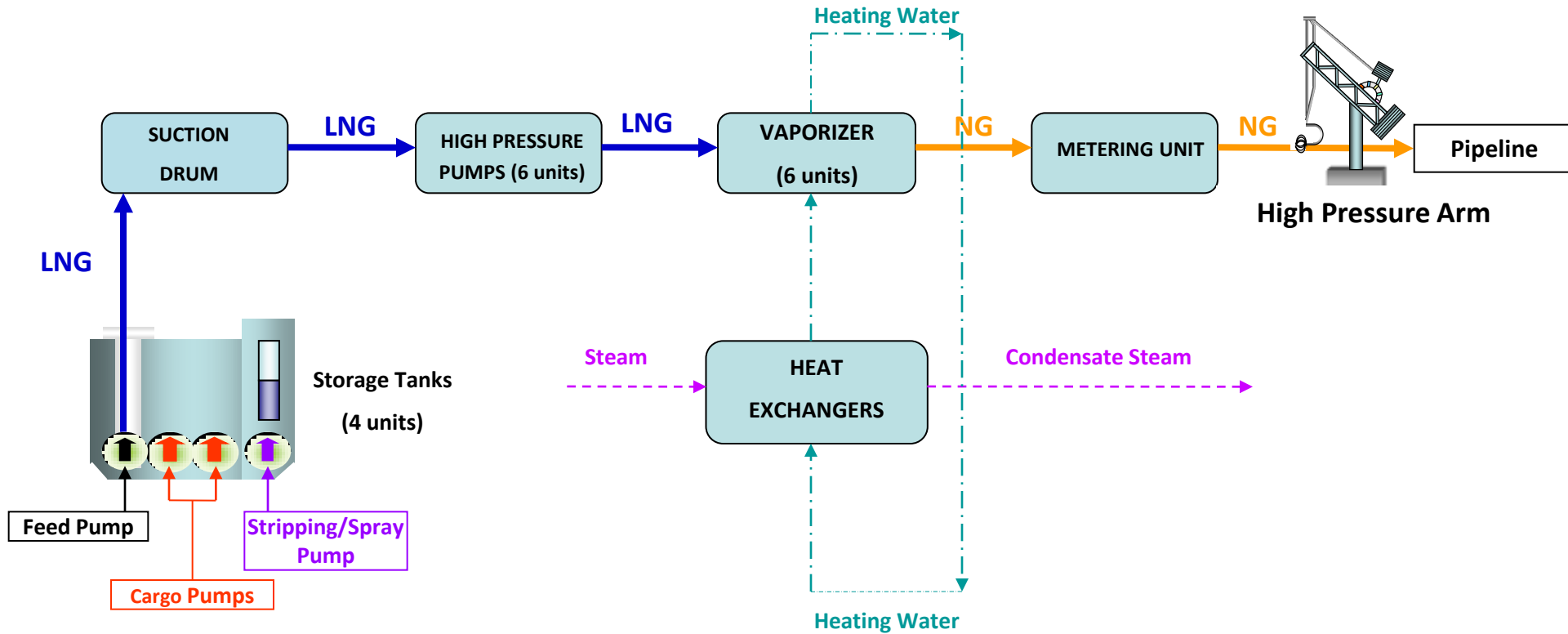
Storage Capacity: 150,900 m³ LNG

BREADTH: 43.4 m

98,5% Storage Capacity: 148,637 m³ LNG

DRAFT: 11.6 m

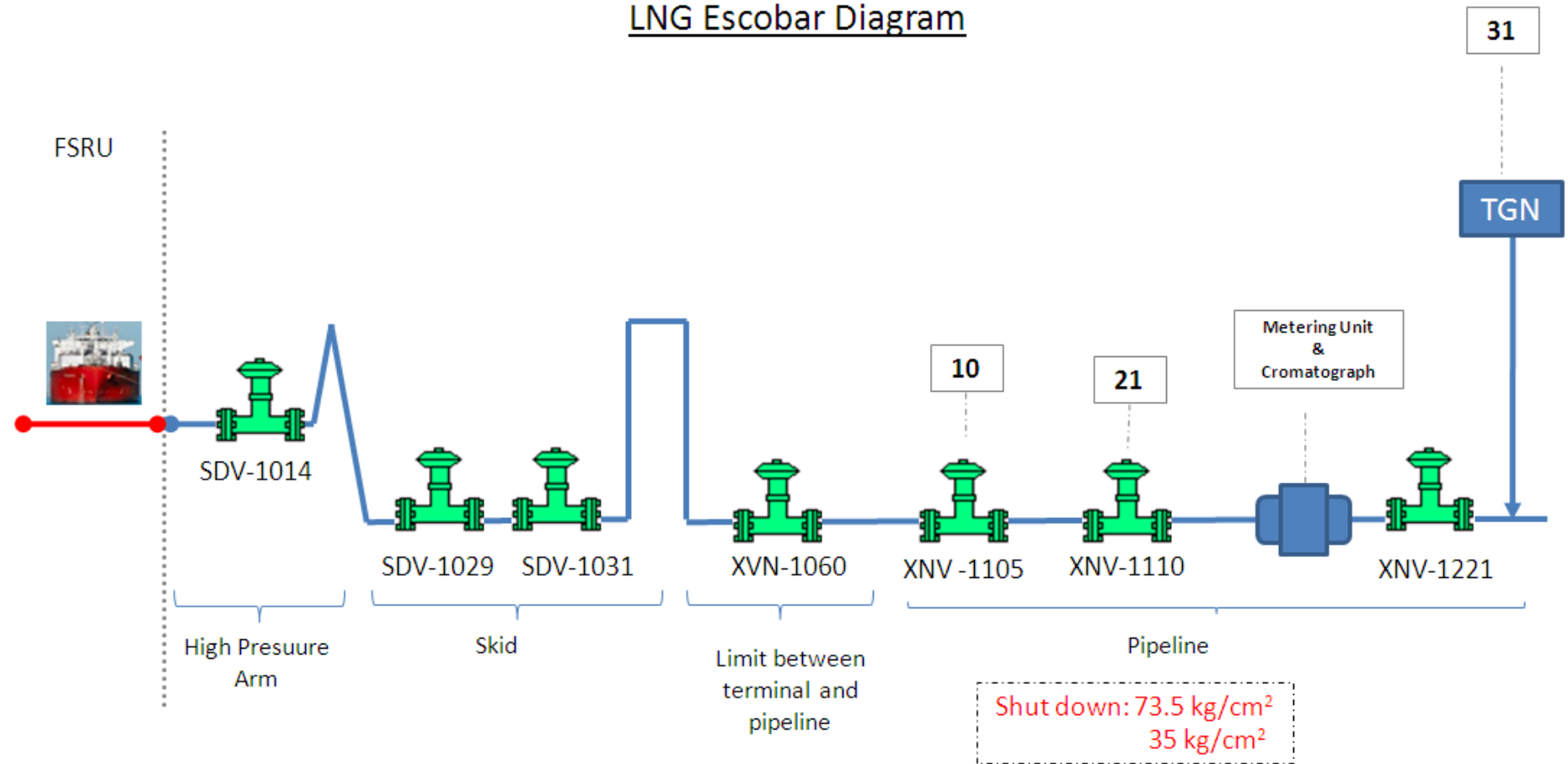
YPF Regas Process Layout



YPF High Pressure Un-loading Arm



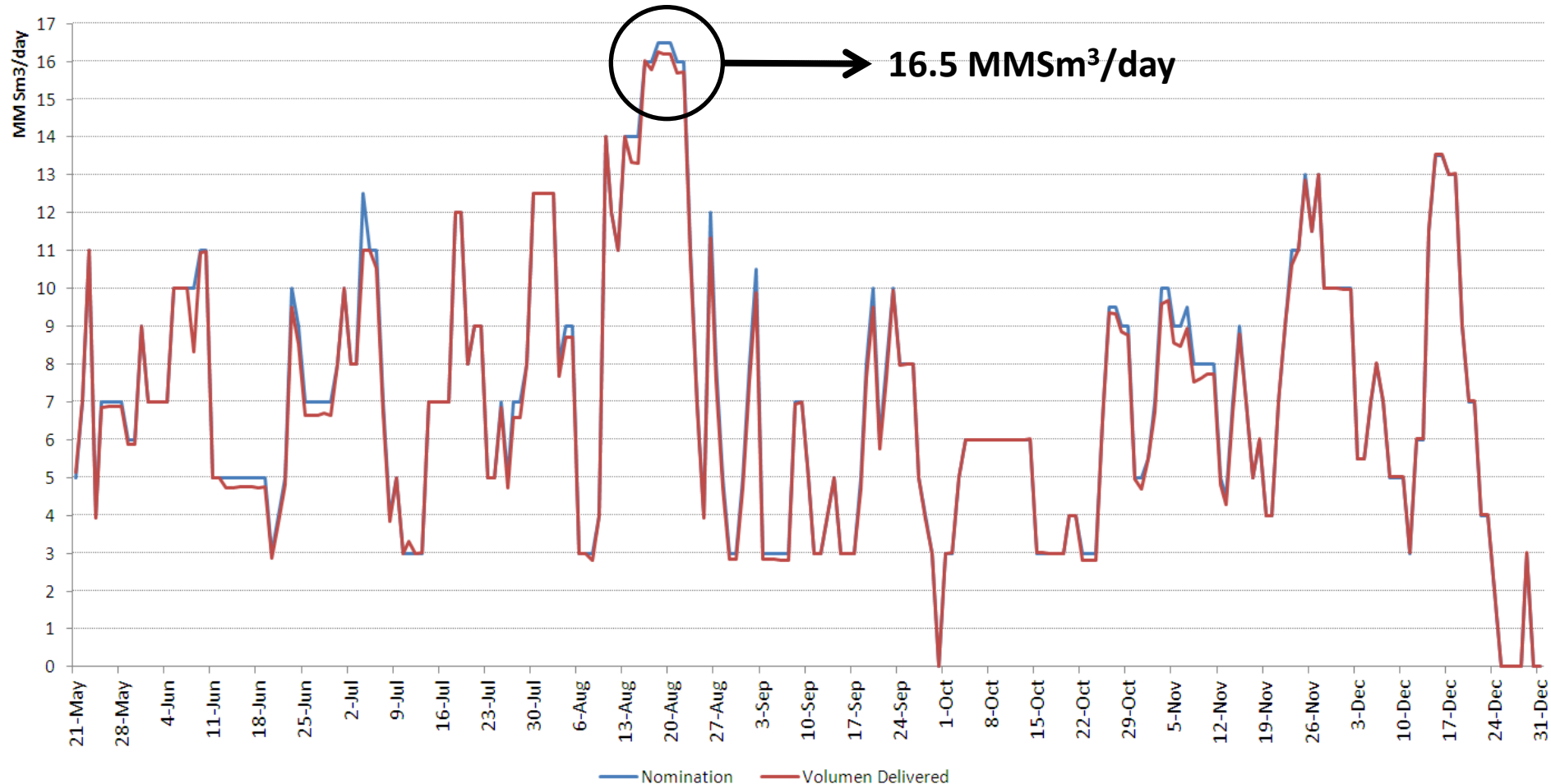
LNG Escobar Diagram



YPF Daily Nomination - Flexibility

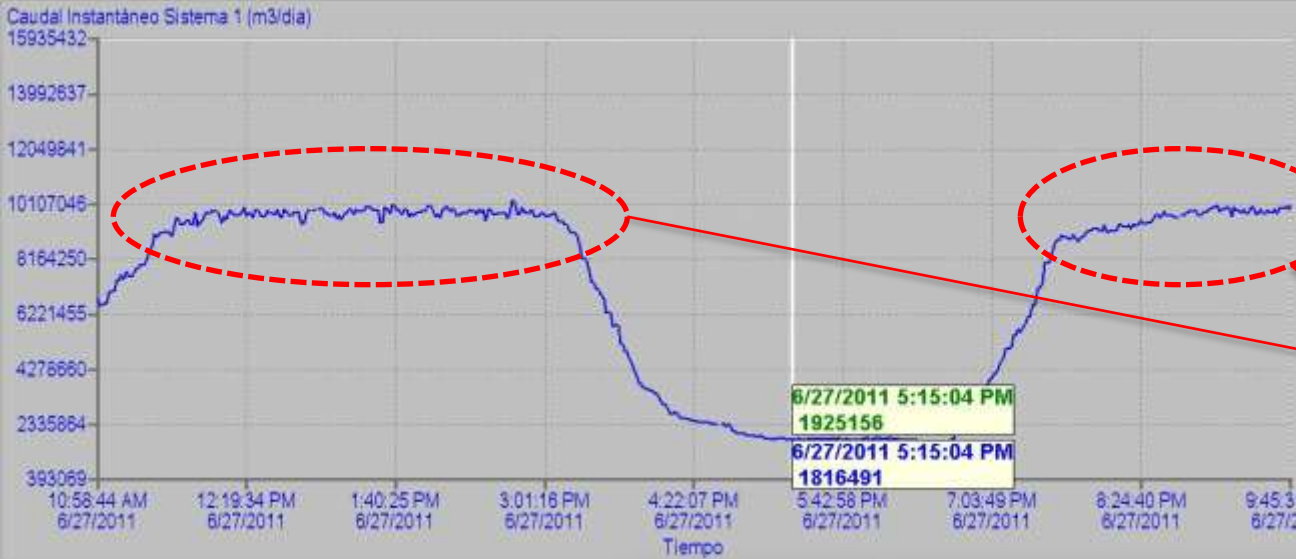
Gas Nomination vs. Send Out to Pipeline

- As can be seen in the chart below, Escobar LNG Operation has shown relevant flexibility, allowing compliance with the daily rescheduling from the Dispatching Centre.

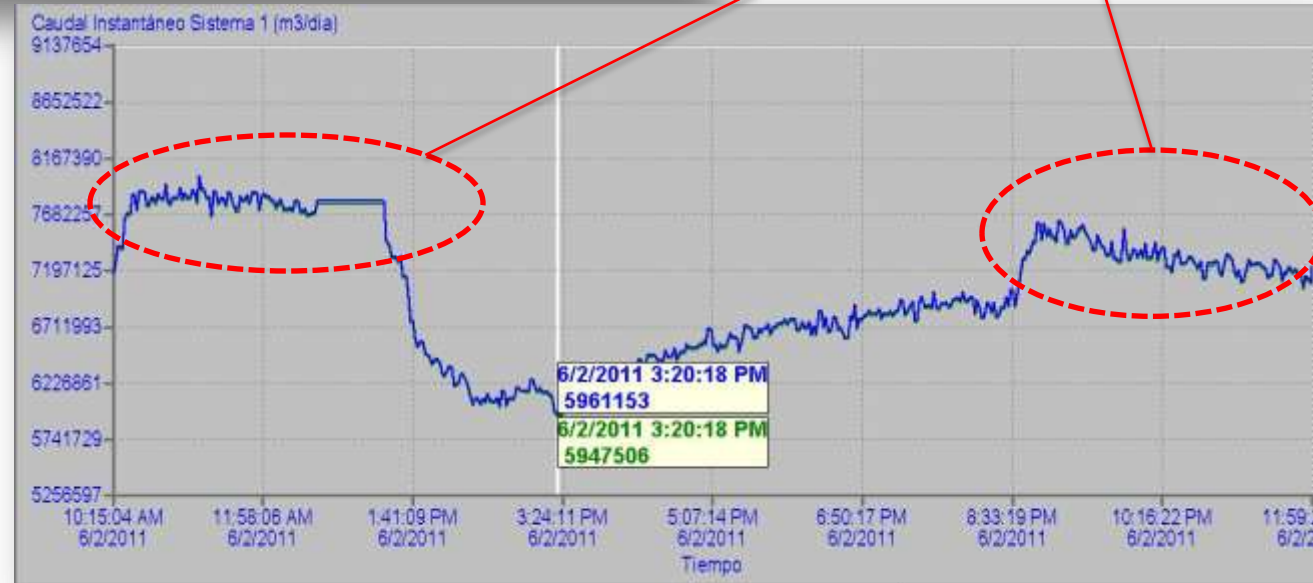


YPF Peak Shaving Operation

Flow-rate Charts



PEAK SHAVING SERVICE



YPF Operating Data 2011

LNG Regas / TOTAL LNG Transferred / BOG



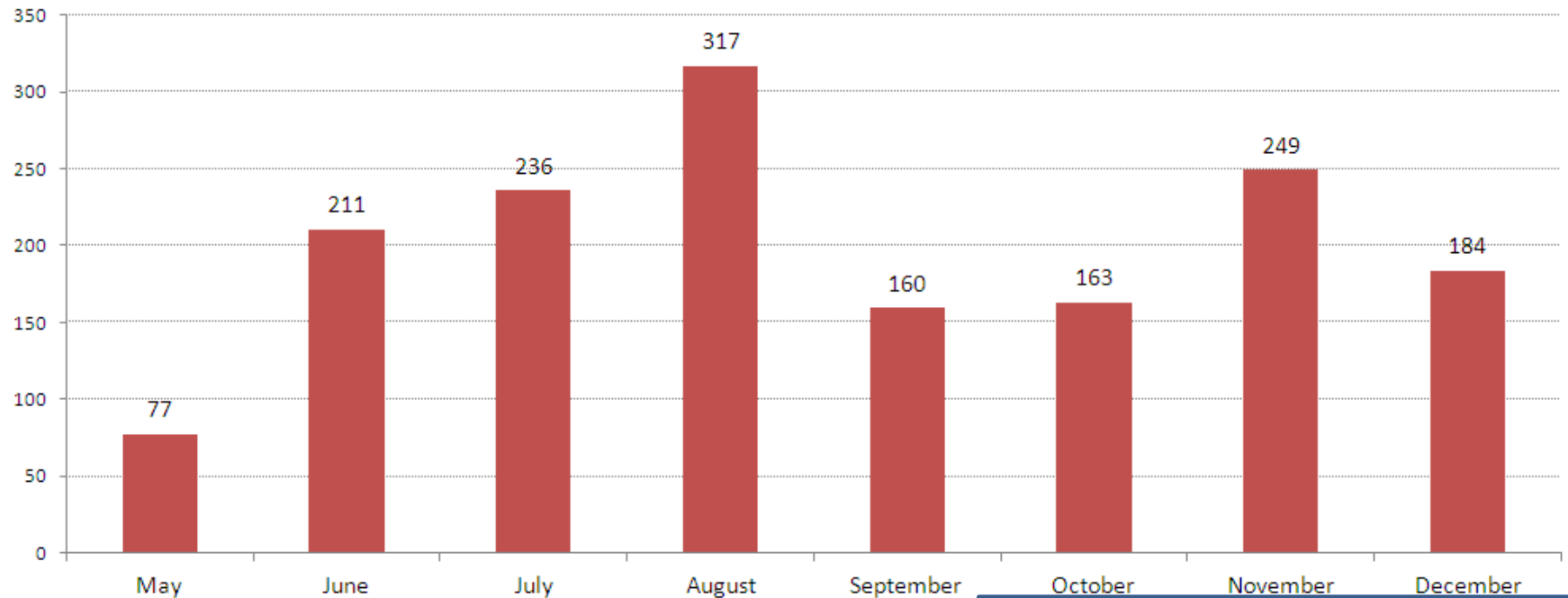
2011 Total NG Injected

1,600 MMSm³ @ 9,300 Kcal/m³

Natural Gas Injected to Pipeline

2011

MMSm³/day @ 9,300 Kcal/m³

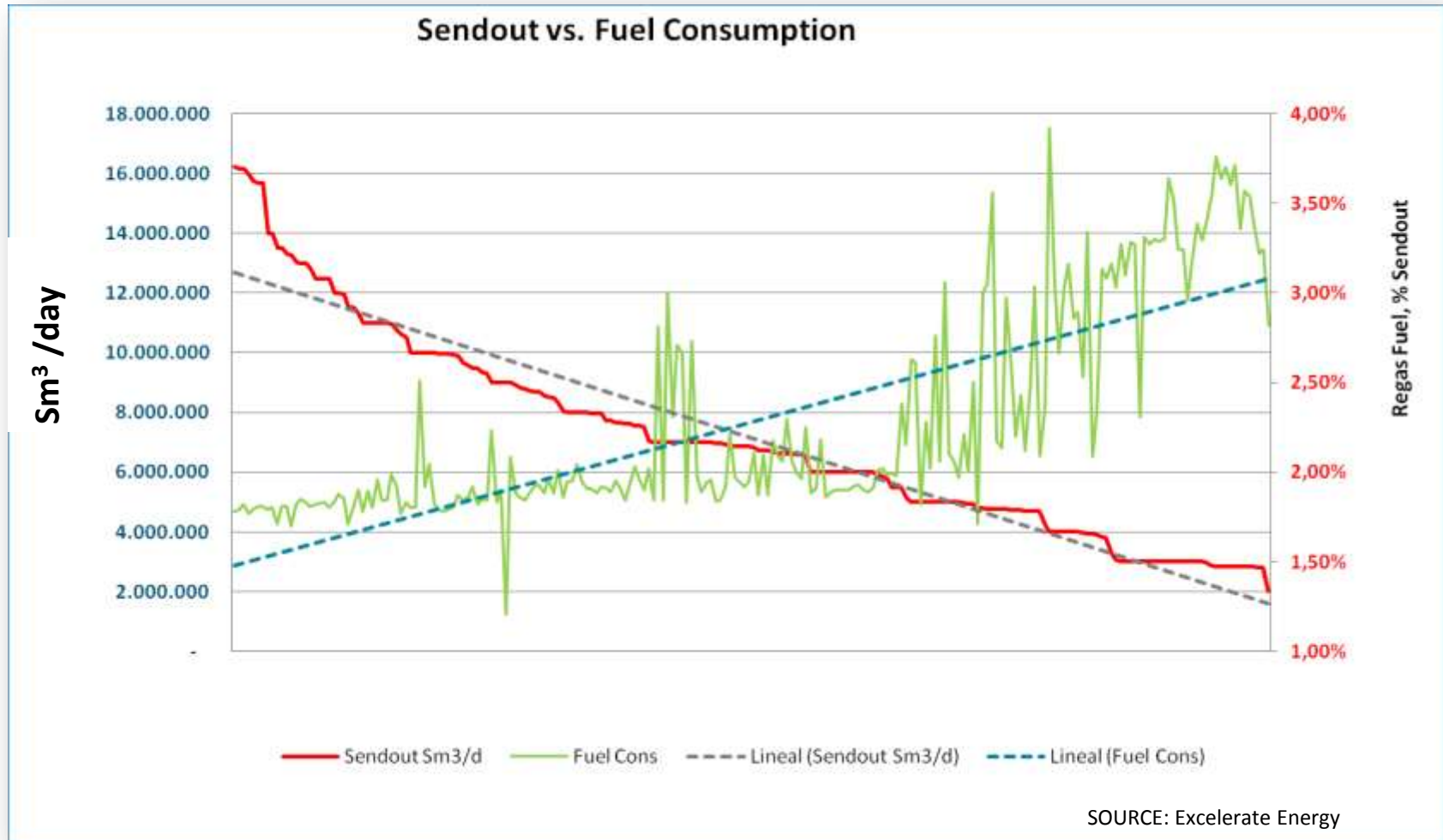


Receiving Average 1 Cargo per Week

2011 Daily Average NG Injected

7.5 MMSm³ @ 9,300 Kcal/m³

- BOG % increase with low Send-Out Flow Rate, meaning a less efficient operation



- Supply at the Escobar terminal is limited by the depth of the River Plate, so the ships must arrive at the port with a partial load.



YPF STS Operations

Approach Maneuver

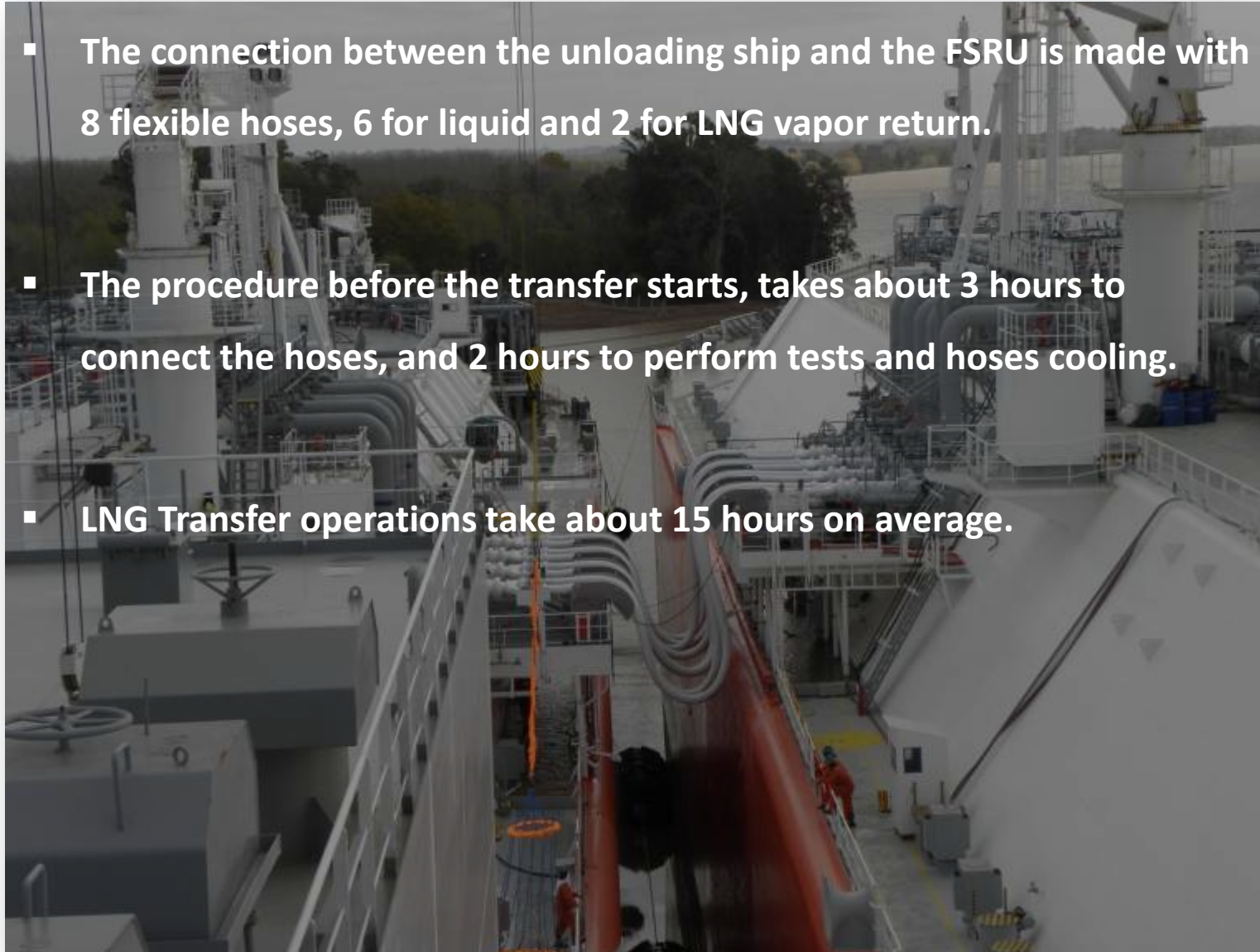


YPF STS Operations

General Aspects



- The connection between the unloading ship and the FSRU is made with 8 flexible hoses, 6 for liquid and 2 for LNG vapor return.
- The procedure before the transfer starts, takes about 3 hours to connect the hoses, and 2 hours to perform tests and hoses cooling.
- LNG Transfer operations take about 15 hours on average.



- Escobar LNG shows an immense adaptability to a **wide range of operating conditions** (2.0 to 17.0 MMSm³/day).
- The experience gained at the Escobar Terminal has proved to be highly efficient performing both, **base and peak shaving services**.
- **60 STS have been successfully carried out** along 12 months operation.
- The **operating capacity of Escobar and Bahía Blanca terminals is currently 34 MMSm³/day**, which represents 25% of the total gas consumption in Argentina.

