



Innovarpel 2025

TECHNICAL DAYS

**DIGITAL TRANSFORMATION
& INDUSTRIAL CYBERSECURITY**
IN THE OIL&GAS INDUSTRY

arpel  60
YEARS

JUNE, 24 & 25
Rio de Janeiro, Brazil

Operationalization of Gas Transportation in Brazil's New Gas Market

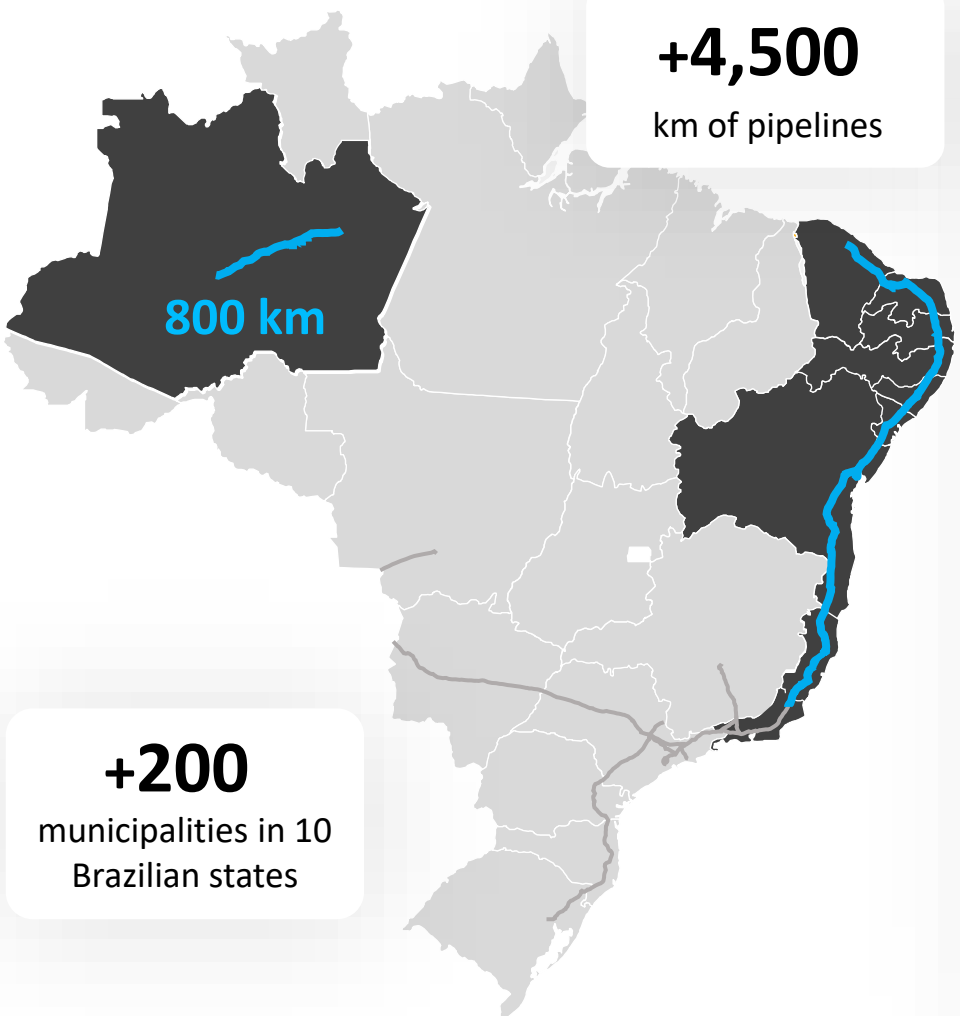
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Operational Performance Engineer – TAG

Bernardo Duque

Business Development Manager - Midstream - Brazil and Southern Cone Latin America

Main Characteristics of Assets - TAG



01

INTERCONNECTION
POINT

with NTS – Nova
Transportadora do
Sudeste

15

ENTRY
POINTS

including 3 LNG
terminals

91

EXIT
POINTS

+ 5
expanding

11

COMPRESSOR
STATIONS

+ 1 in
development

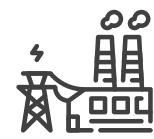
- 4,500 km of pipelines representing 47% of the country's natural gas transportation infrastructure. 3,700 km in Brazil's coastal region, crossing
- 800 km in the Amazon, on a stretch linking the Urucu oil region to Manaus (AM)
- We transport gas to the Northeast and North of the country, guaranteeing security of supply and a diverse portfolio of offers for the end market



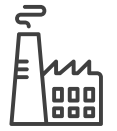
10 CDLs



3 Refineries

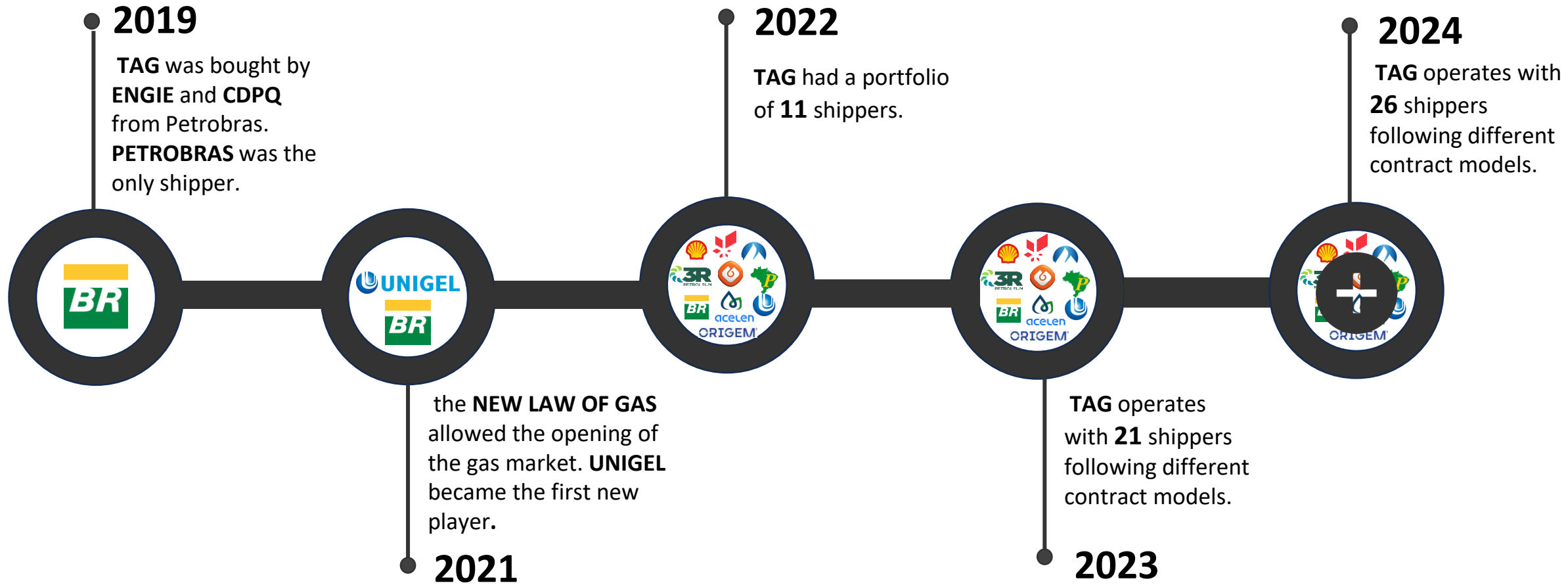


8 Thermals

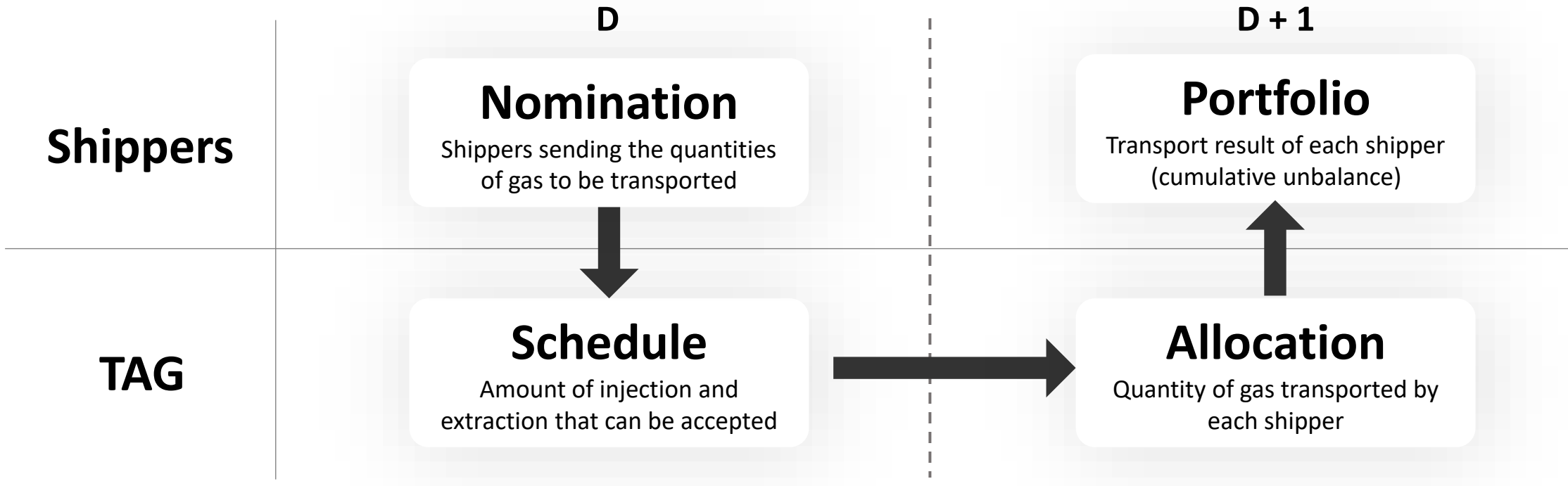


2 FAFENS

Timeline of Opening up the Gas Market



Gas Transport Processes



Gas Transport Processes – Nomination/Scheduling



Shipper's Nomination

Shippers send the gas transportation nominations to TAG.

- **Daily:** Nomination until 15:30 and finalized at 18:00, applying from 00:00 the following day.
- **Intraday:** Nomination until 14:30 and finalized at 16:30, applying from 17:00.



Operational and Commercial Analysis

Validation of the matching processes between shipper nominations:

- Physical capacity of entry and exit points;
- Daily Contracted Quantity per shipper;
- Analysis of shipper imbalances;
- Transportation network imbalances.



Transport Scheduling Report

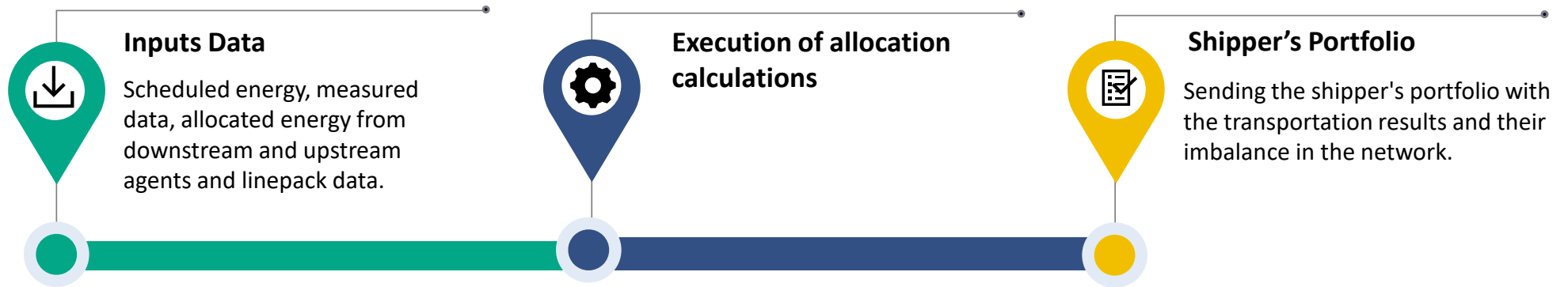
Sending the daily and intraday Transport Schedule Report to each shipper.

- **SINIEF Model:** Nomination in Brazil is done by routes, the shipper must inform which entry point will send to which exit point;
- The entry point and exit point can be from different shippers.



Gas Transport Processes - Allocation (Shipper's Portfolio)

- Consists of the process that identifies how each shipper's movement was on a given transportation day;
- Allocation per path is done using SINIEF schedule. Divide the allocated value by the given path;

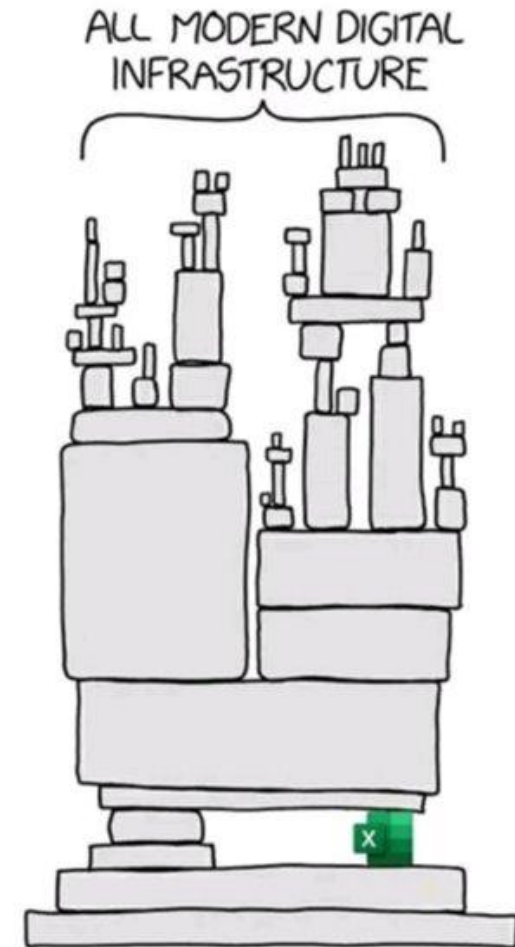


Motivation

- Increase in the number of shippers and the different products, contracts and possible routes;
- Receive and centralize transport requests (nominations);
- Improve the process of analyzing nominations and carrying out scheduling;
- Reduce human error in processes;
- Process these requests automatically through to pre-billing stage;
- Optimize our customers' experience.

By enhancing these processes through the implementation of the PLT, we will be laying the groundwork for:

- Regulatory Alignment & Developing New Products;
- Interoperability & Integration;
- Demand Forecasting & Data Analytics;
- Customer-Centric Digital Platforms.



Schedule and Allocation

Before

- TSO receive the nominations by e-mail;
- TSO inform shippers when the nominations do not match or shippers make an invalid nomination;
- The entry of a new contract requires the manual creation of valid contracts (new possibilities) for nomination and allocation in Excel;
- Upstream and downstream agents were able to allocate the wrong values;
- Nomination, scheduling and transportation allocation processes in Excel;
- Manual adaptation of reports and the need to send them by e-mail.

➤ **Delays in generating reports in the schedule and allocation processes**

➤ **Failure to read some data**

After

- Entry of all nominations into the system by shippers;
- Shippers are automatically informed if the nomination is matching other shippers or if shippers make wrong nominations;
- Including the contract in the system already enables all points in the nomination possibilities;
- Upstream and downstream agents can only enter measured values for points;
- Reports are generated without human interference and are made available in the system.

➤ **Schedule and allocation reports generated before the time limit**

➤ **Application of rules set out in the contract**

➤ **Reducing human error**

Schedule in Pipeline Transporter (PLT)

Nomination entry: Using a csv file, informing the lines that contain information not accepted by the system.

Three levels: "Matching Nomination", "No Counterparty Nomination" and "Mismatching Nomination".

Nomination > Shippers > Daily Nomination Transport Request

START DATE: 2/20/2025 | END DATE: 2/20/2025 | NETWORK: MALHA INTEGRADA | ECONOMIC GROUP: All | NOMINATION CYCLE: All | NOMINATION TRANSACTION TYPE: All | Search

+ Add | Export | Notify | Choose File | Upload | File Template | Shipper Imbalance

Nomination Cycle	Action	Contract	Flow	Entry Shipper (CE)	Real Origin	Entry Point (PE)	Exit Shipper (CS)	Exit Point (PS)	Final Destination (DF)	Start Of Transportation (IT)	End Of Transportation (FT)	Matching Contract	GDN Requested	EA Authorized EXC	DSQ Imbalance
TIMELY		CONTRACT A		SHIPPER A	TECAB (TECAB >> GASCAV)	TECAB (TECAB >> GASCAV)	SHIPPER D	LINHARES	ESGAS	TECAB (TECAB >> GASCAV)	LINHARES	No Counterpart Nomination	4,226	3,774	0
TIMELY		CONTRACT A		SHIPPER A	TECAB (TECAB >> GASCAV)	TECAB (TECAB >> GASCAV)	SHIPPER D	SÃO MATEUS	ESGAS	TECAB (TECAB >> GASCAV)	SÃO MATEUS	No Counterpart Nomination	528	472	0
TIMELY		CONTRACT A		SHIPPER A	TECAB (TECAB >> GASCAV)	TECAB (TECAB >> GASCAV)	SHIPPER D	VIANA	ESGAS	TECAB (TECAB >> GASCAV)	VIANA	No Counterpart Nomination	24,297	21,703	0
TIMELY		CONTRACT A		SHIPPER A	TECAB (TECAB >> GASCAV)	TECAB (TECAB >> GASCAV)	SHIPPER D	VÁLVULA 10	ESGAS	TECAB (TECAB >> GASCAV)	VÁLVULA 10	No Counterpart Nomination	5,000	0	0
TIMELY		CONTRACT A		SHIPPER A	TECAB (TECAB >> GASCAV)	TECAB (TECAB >> GASCAV)	SHIPPER D	UTE CHESF	BAHIAGAS	TECAB (TECAB >> GASCAV)	UTE CHESF	No Counterpart Nomination	0	25,000	0
TIMELY		SHIPPER B		SHIPPER B	POJUCA II (UPGN SANTIAGO)	POJUCA II (UPGN SANTIAGO)	SHIPPER D	UTE CHESF	BAHIAGAS	POJUCA II (UPGN SANTIAGO)	UTE CHESF	Matching nomination	0	0	130,000

Sends an e-mail notifying the counterparty.

Exports an excel file with the screen information.

Nomination entry: Within the system, the possible options are available.

- No Counterpart Nomination
- No Counterpart Nomination
- Mismatching Nomination
- Mismatching Nomination
- Matching nomination

Allocation in Pipeline Transporter (PLT)

Upstream/Downstream agent

Allocation > Upstream Agent Allocation

AGENT: AGENT A POINT: TECAB (TECAB >> GASCAN) START DATE: 2/10/2025 END DATE: 2/01/2025 Search

Save Cancel Export Choose File Upload File Template

Date	Point Code	Point Name	Agent Name	Flowcal Volume(m³)	Flowcal PC (kcal/m³)	Flowcal Energy(m³@400 kcal/m³)	Shipper Name	Agent Quantity Assigned	System Quantity Assigned
2/10/2025	E-ES-4246	TECAB (TECAB >> GASCAN)	AGENT A	4,000,274.5708	0,270,8958	4,000,000,2170	SHIPPER A	1,223,802,3072	1,223,802,3072
2/10/2025	E-ES-4246	TECAB (TECAB >> GASCAN)	AGENT A	4,000,274.5708	0,270,8958	4,000,000,2170	SHIPPER B	88,204,1174	88,204,1174
2/10/2025	E-ES-4246	TECAB (TECAB >> GASCAN)	AGENT A	4,000,274.5708	0,270,8958	4,000,000,2170	SHIPPER C	880,787,1444	880,787,1444
2/10/2025	E-ES-4246	TECAB (TECAB >> GASCAN)	AGENT A	4,000,274.5708	0,270,8958	4,000,000,2170	SHIPPER D	1,724,148,5588	1,724,148,5588
2/16/2025	E-ES-4246	TECAB (TECAB >> GASCAN)	AGENT A	4,220,194,3865	0,221,7014	4,193,474,4031	SHIPPER A	1,107,104,8713	1,107,104,8713
2/16/2025	E-ES-4246	TECAB (TECAB >> GASCAN)	AGENT A	4,220,194,3865	0,221,7014	4,193,474,4031	SHIPPER B	178,228,5000	178,228,5000
2/16/2025	E-ES-4246	TECAB (TECAB >> GASCAN)	AGENT A	4,220,194,3865	0,221,7014	4,193,474,4031	SHIPPER C	724,071,8214	724,071,8214
2/16/2025	E-ES-4246	TECAB (TECAB >> GASCAN)	AGENT A	4,220,194,3865	0,221,7014	4,193,474,4031	SHIPPER D	2,140,001,4495	2,140,001,4495
2/20/2025	E-ES-4246	TECAB (TECAB >> GASCAN)	AGENT A	881,170,7400	0,260,8665	883,370,2170	SHIPPER A	384,084,9329	384,084,9329
2/20/2025	E-ES-4246	TECAB (TECAB >> GASCAN)	AGENT A	881,170,7400	0,260,8665	883,370,2170	SHIPPER B	78,844,9088	78,844,9088
2/20/2025	E-ES-4246	TECAB (TECAB >> GASCAN)	AGENT A	881,170,7400	0,260,8665	883,370,2170	SHIPPER C	362,441,4725	362,441,4725
2/20/2025	E-ES-4246	TECAB (TECAB >> GASCAN)	AGENT A	881,170,7400	0,260,8665	883,370,2170	SHIPPER D	8,000	8,000

Shipper's Portfolio

> Relatórios > Relatórios

RELATÓRIO

Portfólio procurar

1 / 3

TAG

Gestão de Portfólio :
 Carregador : AG
 Mês : fevereiro 2025
 UNIT : m3@400 kcal/m3

Nome da rede	Pointe	01/02/2025	02/02/2025	03/02/2025	04/02/2025	05/02/2025	06/02/2025	07/02/2025	08/02/2025	09/02/2025	10/02/2025
MALHA INTEGRADA	CACIMBAS (UTOC)	0	0	-18	-4	-4	-4	-53	-54	-54	-71
	GUAMARE I (CARBOR)	0	0	46	11	15	15	125	125	125	157
	GUAMARE II (NORDESTAD)	0	0	0	0	0	0	0	0	0	0
	POJUCA II (UPON SANTAGAD)	0	0	-32	-5	-5	-5	-43	-46	-46	-43
	TECAB (TECAB >> GASCAN)	0	0	2	0	0	0	2	2	2	2
Desagregado de portfólio		2	2	2	2	2	2	2	2	2	2
Nome											
CACIMBAS (UTOC)	Estoque Inicial	0	0	0	-18	-4	-4	-4	-52	-54	-54
	Entrada Física	0	0	0	0	0	0	0	0	0	0
	Entrada Virtual	100,000	100,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	100,000
	Saída Física	100,000	100,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	100,000
	Saída Virtual	0	0	0	0	0	0	0	0	0	0
	Gás de Utilidade do Sistema JARDIM	0	0	0	0	0	0	0	0	0	0
	Gás Combuatível	0	0	0	0	0	0	0	0	0	0
	Perdas Operacionais	0	0	0	0	0	0	0	0	0	0
	Est GNC Negativo	0	0	0	0	0	0	0	0	0	0
	Est GNC Positivo	0	0	0	0	0	0	0	0	0	0
Estoque Final	0	0	-18	-4	-4	-4	-52	-54	-54	-71	
Compra	0	0	0	0	0	0	0	0	0	0	
Venda	0	0	0	0	0	0	0	0	0	0	

Overview

Main Challenges

- International collaboration with an American supplier
- Implementation of contractual rules not yet applied
- Brazilian market specific characteristics (customizations)
- Internal teams with partial dedication to the project

1

Customer Training

- Dedicated test environment
- Video tutorials and frequent Q&A sessions
- Q&A hot topics website
- Intuitive platform with automatic validations

2

Phased Go-lives

- Previous internal go-live for process stabilization
- Local support with Emerson specialists
- Reinforced team, on call, in the first two weeks
- Main issues solved without impacting customers

3

Next Steps

- Evolve the solution, developing improvements on interfaces and processes already in operation
- Web services to enable API integration with our clients
- Optimized data extractions

Thank you

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