



# PERMITTING & SAFETY DIGITALIZATION BEST PRACTICES WITH BRASKEM

LEONARDO MARQUES  
TIMOTHY F. THOMPSON



PROMETHEUS  
GROUP | **USER**  
**CONFERENCE**

# TIMOTHY F. THOMPSON (TIM)

- CORPORATE HES
- 13 YEARS WITH BRASKEM
- 35+ YEARS HES LEADERSHIP EXPERIENCE, PRIMARILY PETROCHEMICAL
- EXPERTISE IN PERSONAL AND PROCESS SAFETY, HUMAN RELIABILITY
- PROGRAM MANAGER FOR HES DIGITAL PORTFOLIO
- CERTIFIED SAFETY PROFESSIONAL



# LEONARDO MARQUES (LEO)

- LEADER OF BRASKEM'S RIO DE JANEIRO HES TEAM IN BRAZIL
- 5 YEARS WITH BRASKEM, 2 IN HES
- 15 YEARS PRODUCTION AND OPERATIONS IN CHEMICAL COMPANIES
- MECHANICAL ENGINEER, MBA, PROCESS SAFETY
- PROJECT MANAGER FOR THE EPAS MVP AND RJ'S ROLLOUT STRATEGY



# BRASKEM'S EPAS



## **Braskem**

Who's Braskem, numbers, and worldwide presence



## **Braskem's Overall Mobility Roadmap**

What's our overarching strategy and where ePAS is situated in it



## **Braskem's ePAS**

Impact on Braskem's daily operations



## **Building a Business Case**

Premises and tips on building a successful business case on ePAS



## **Lessons Learned**

The DOs and DON'Ts, from a customer's perspective



# WE ARE A **GLOBAL** *company*

We operate on **four continents**  
(North America, South  
America, Europe and Asia) to be  
even closer to our clients.

Braskem 

  
INDUSTRIAL  
UNITS

  
OFFICES

  
INNOVATION  
CENTERS

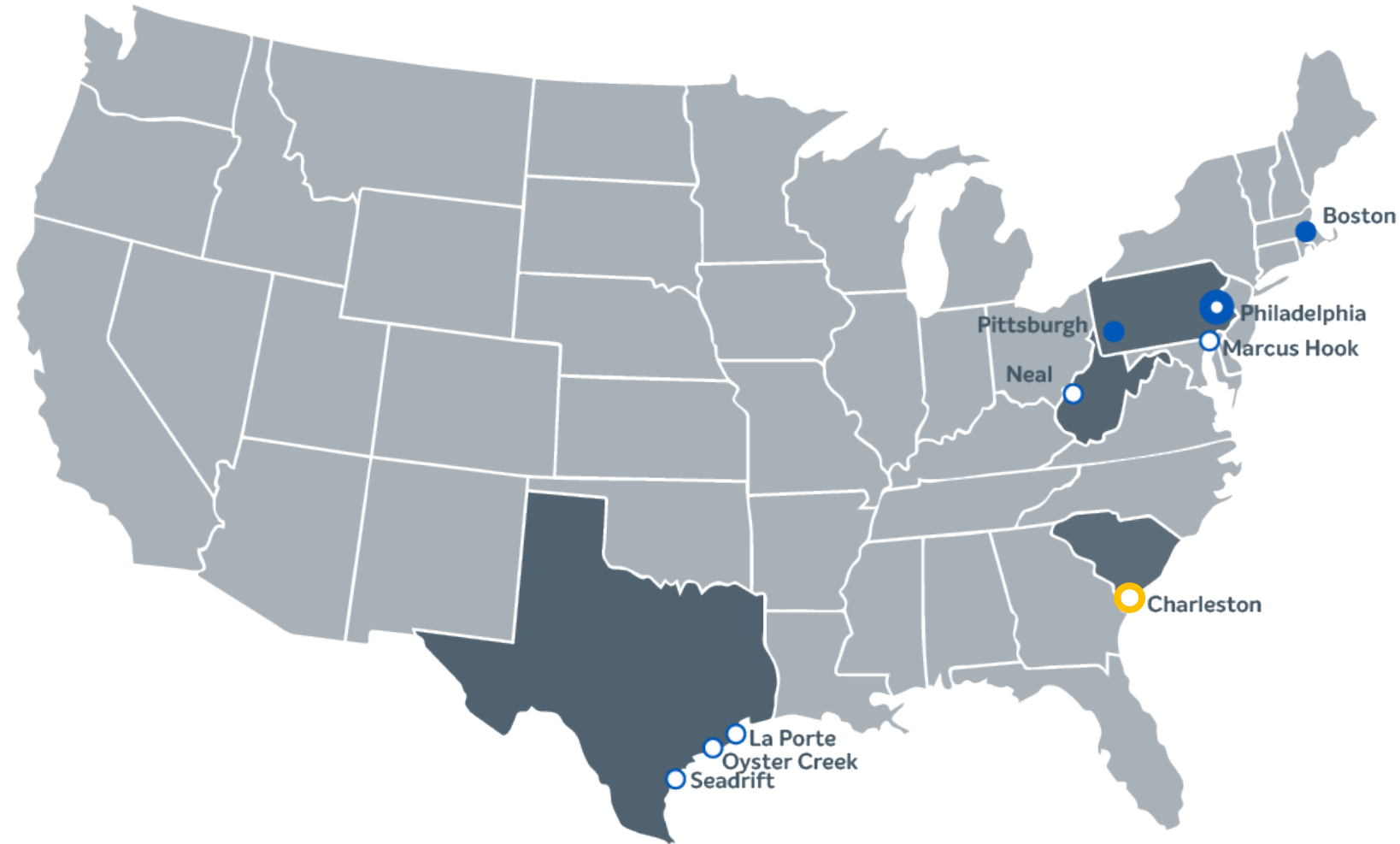
# A GLOBAL COMPANY

## 40 industrial units

*around the world*



# U.S. INDUSTRIAL AND COMMERCIAL FOOTPRINT



# 793

## U S T E A M M E M B E R S

Braskem America is the market leader in North American polypropylene business with global supply chain integration.


Six polypropylene operating sites in the United States with capacity to produce 4.4 Billion lbs/year including new 992 MM lbs/year unit with a Sept 2020 start up.

Since inception in 2010, Braskem America has invested \$1.2 billion in capital toward company growth and development in the U.S.

 Innovation & Technology Center

 Headquarters

 Manufacturing Units

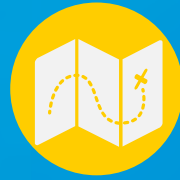
 Global Export Hub

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# Digital HES Strategy in a nutshell

Part of our strategy is to define leading KPIs that help us to identify if we are advancing towards our vision!

Mission

“Transition to a future where the **human contribution to work is optimized, protected, and sustainable**“

Vision

“Create a **sustainable and incident free work environment** through human reliability, safety, and environmentally driven digital solutions. “

Strategy

- (i) **Reduce human exposure to risk**, (ii) **Identify and prevent hazardous situations**, (iii) **Improve competency and knowledge**, (iv) **Adherence to Procedures/processes**



*Think Big, Start Small  
and Scale Fast!*

Most of our **current roadmap is finishing MVPs** or Proving their concept in smaller scale. As soon as finished we **will focus on sailing fast**



# Adherence to Procedures/Processes

Access, efficiency, application

## Objective

Use of technology to ensure adherence to processes and procedures avoiding and identifying deviations that could lead to exposure

## Key results

Number of deviations identified through auditing



## Current Bets

### E-Permit (w/ Maintenance Mobility (MVP))

Improve quality and efficiency of work permitting and energy isolation process

### Mobile Procedures

Provide access to procedure and information in the field in real-time

# BRASKEM'S OVERALL MOBILITY ROADMAP

OUR GOAL IS A GLOBAL PLATFORM THAT INTEGRATES MAINTENANCE PROCESS, ENHANCING EFFICIENCY, PRODUCTIVITY AND SAFETY

## PHASE I

### MOBILE MANAGEMENT

- » Notification Management
- » WO Management
- » Material (inventory) Management for WO
- » Access to documents
- » Forms (checklists; procedures)



### PLANNING

- » Improved planning interface
- » Auto task list management
- » Auto BoM management
- » Optimize material search for planning



### PERMITTING\* - Brazil Pilot

- » Automatic creation of Permit from Order data and Planning
- » Integration of training, qualifications & documents
- » Improved Auditing Data



ePAS' focus

## POTENTIAL FUTURE PHASES

### TURNAROUND MANAGEMENT

- » Integration of systems for comprehensive planning
- » Integrated work execution field updates
- » Integrated materials and cost tracking



### MAINTENANCE SCHEDULING

- » Optimize scheduling process
- » Integration to operation schedule
- » Resource utilization (work management / skill management / training)



## CROSS PHASE



### ANALYTICS

- » Dashboards
- » Manual / Auto Data Extraction



### VISUAL WORK PRIORITIZATION

- » PMC



### MASTER DATA

# MAINTAIN A GLOBAL VISION BUT WITH LOCAL IMPLEMENTATION LEADERSHIP, STARTING SMALL AND SCALING QUICKLY



Desire to align on **global platform**.



Implement **minimum scope** of platform on a **specifically defined geographic footprint**.



Allow regions to **select portions of the platform & implement** in a coordinated way at their pace, according to budget and interest



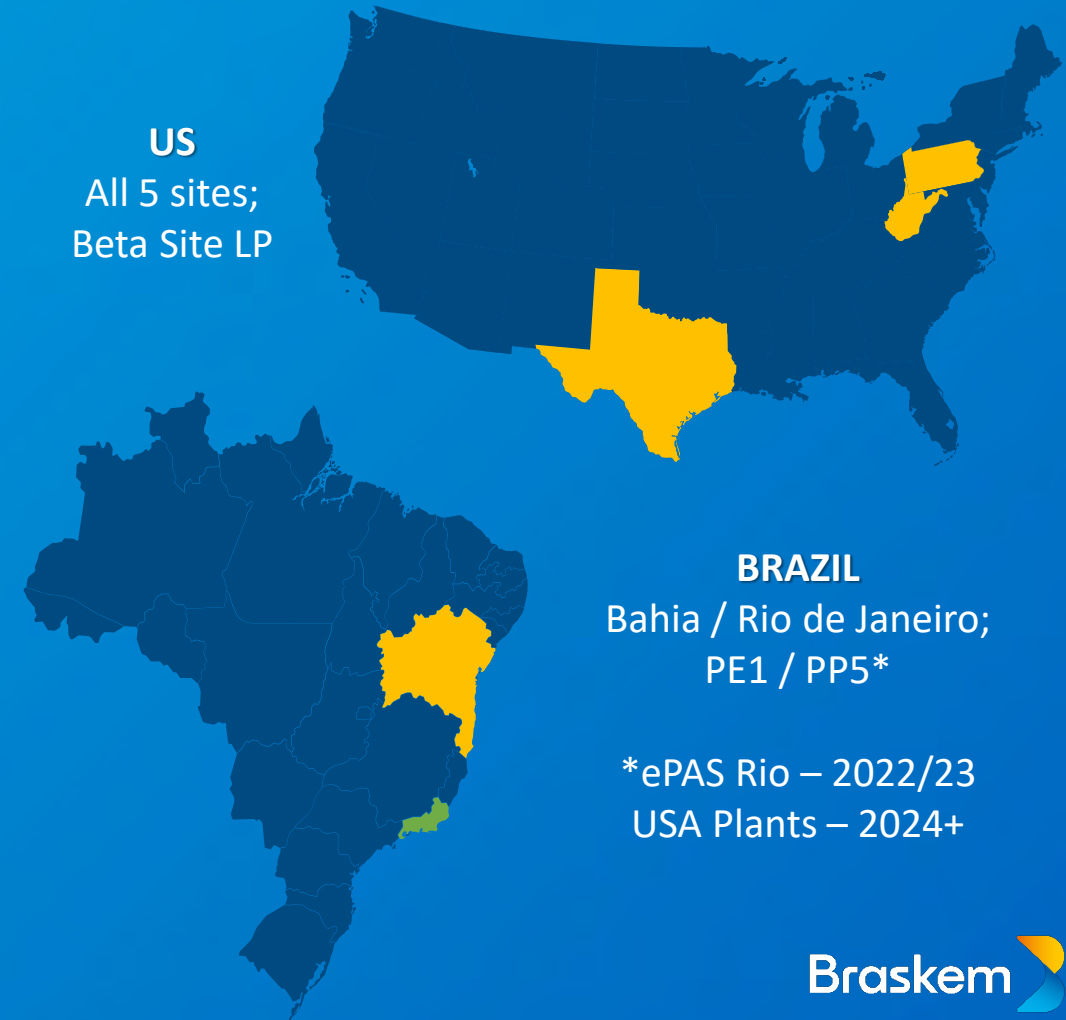
**New regions** can add the existing scope; Regions expand to other modules with justification.

*\* Expansions managed by IT and **local resources** with Corporate Maintenance and Reliability, EHS & Digital coordination*

*\* **Local/Regional implementation and rollout strategy**, based on available resources and schedule*

## MVP Geographical Scope

- MVP in Progress
- MVP Concluded



# IMPROVE HUMAN RELIABILITY AND PRODUCTIVITY THROUGH A MORE USER FRIENDLY, INTEGRATED AND AUTOMATED PERMITTING PLATFORM

## HUMAN RELIABILITY



*Standardized process flow; Greater visibility of the work*



*More reliable and easier auditing*



*Reduction of human errors*



*Better control and targeting of the Maintenance team*



*Enhanced compliance*

## PRODUCTIVITY

*Connected Process – Planning, Procedures, Forms*



*Most fields will be automatically / prefilled during planning phase*



*Electronic Work Permit will take less time to be issued*  
*Activities prioritization (risk analysis, environmental monitoring, explosiveness, etc.)*



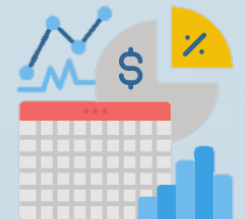
*Reduction of manual work & Reduction in efforts (evaluation and analysis)*



*Higher agility due to fewer items to be checked (integrations)*



*Programmed work: Productivity improvement*  
*Reduce wait in queue*



*Dashboards & KPIs Management improvement;*  
*Future AI potential*

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## EPAS CATEGORIES

At Braskem, we use the following Work Permit categories, according to the work to be performed and the risks involved.

Each of these have their own form, hazards, control measures and relationships – and their respective module on ePAS.

One key feature is the ability to import forms from preexisting ones and integrate to the SAP platform\*



Cold Work Permit



Hot Work Permit



Lock Out / Tag Out – LOTO



Confined Space Entry

The image shows a screenshot of two forms from the ePAS system. The top form is a LOTO (Lock Out / Tag Out) form with the ID DCX-PP5-LOTO-23-2254 and the status 'Liberado'. A blue arrow points from this form to the bottom form, which is a PTF (Permit to Perform) form with the ID DCX-PP5-PTF-23-2272 and the status 'Para Revalidação'.

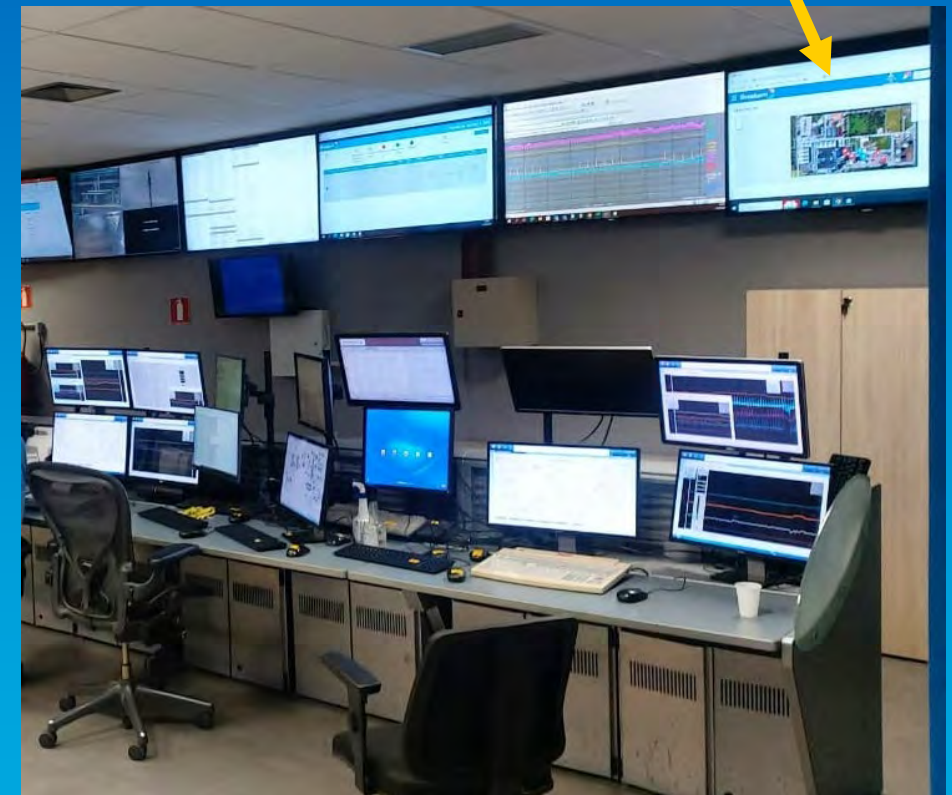
## EPAS DAY TO DAY

How it started...



Field Work Permit Board

How it's going



Control Room Work Permit Digital Map

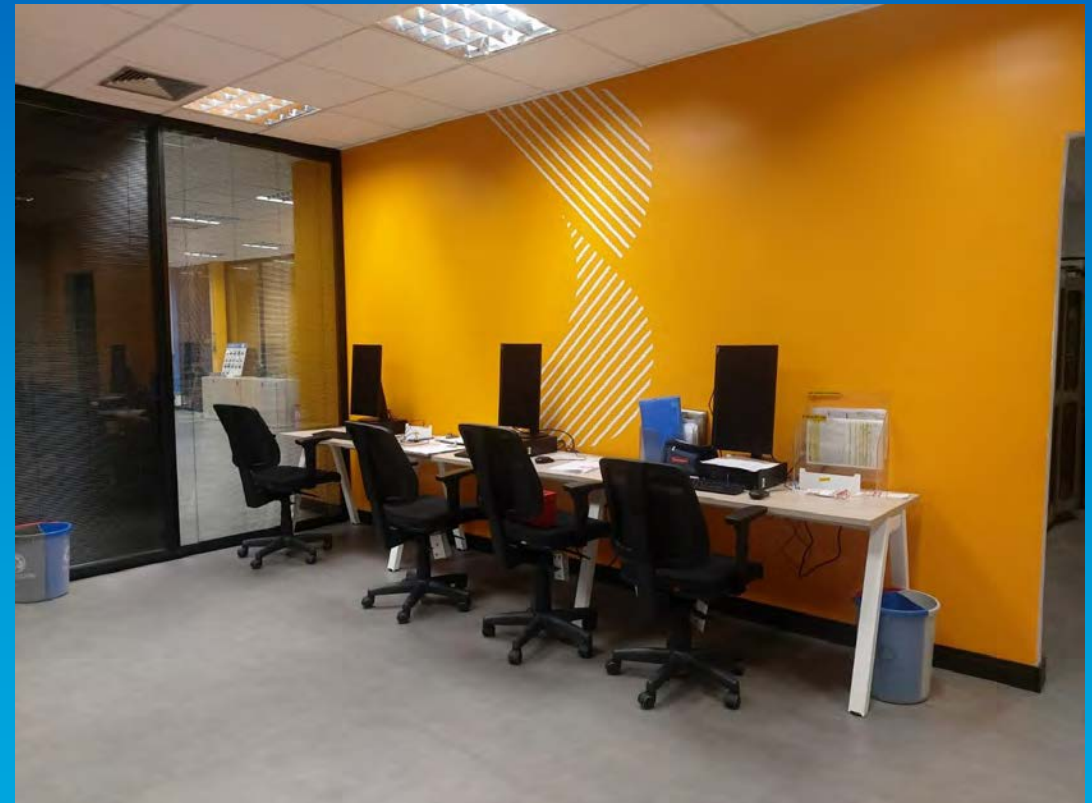


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How it started...



How it's going

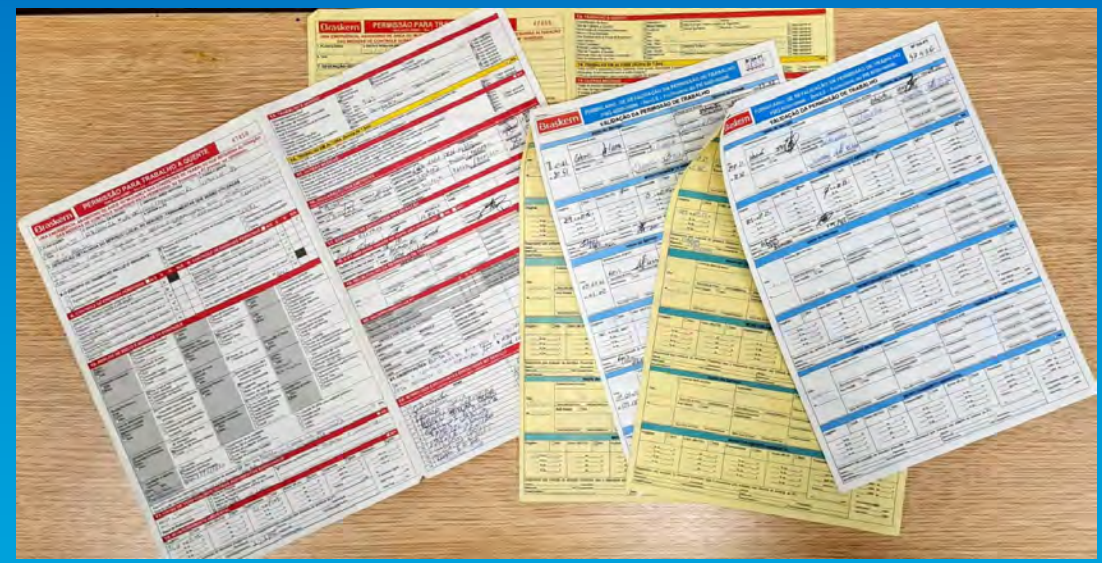


First permits being transposed from paper to PC

Current permit issuing station

# EPAS DAY TO DAY

How it started...



How it's going



Example of a usual hot work permit with (all) its forms

Smart form printing

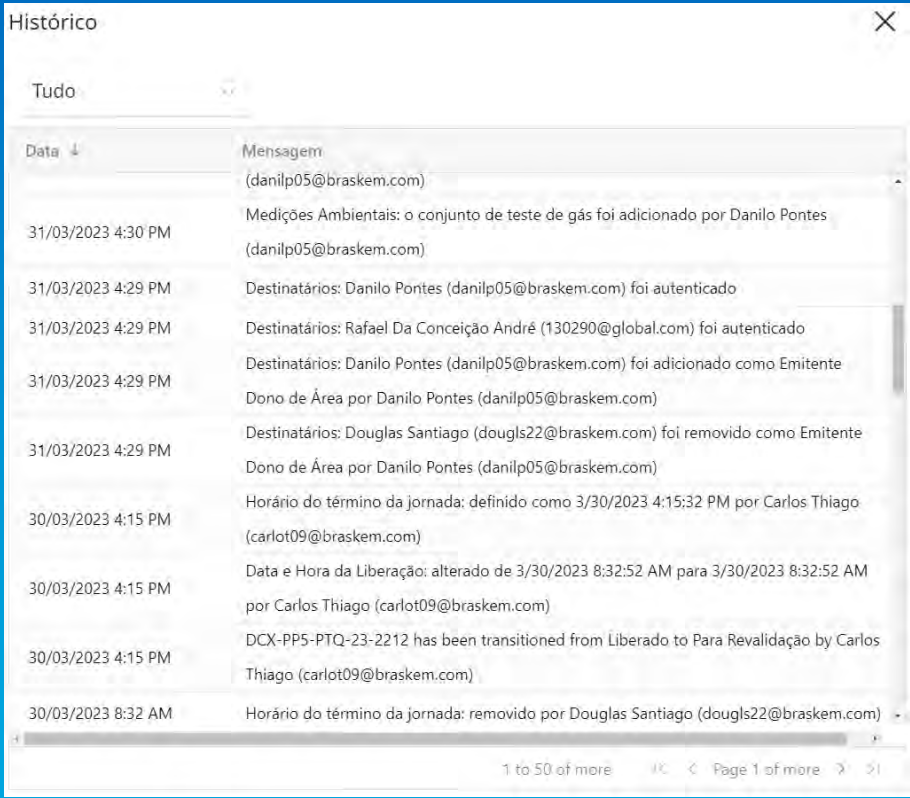
## EPAS DAY TO DAY

### How it started...



Trying to audit a physical paper trail and get information out of a mountain of data

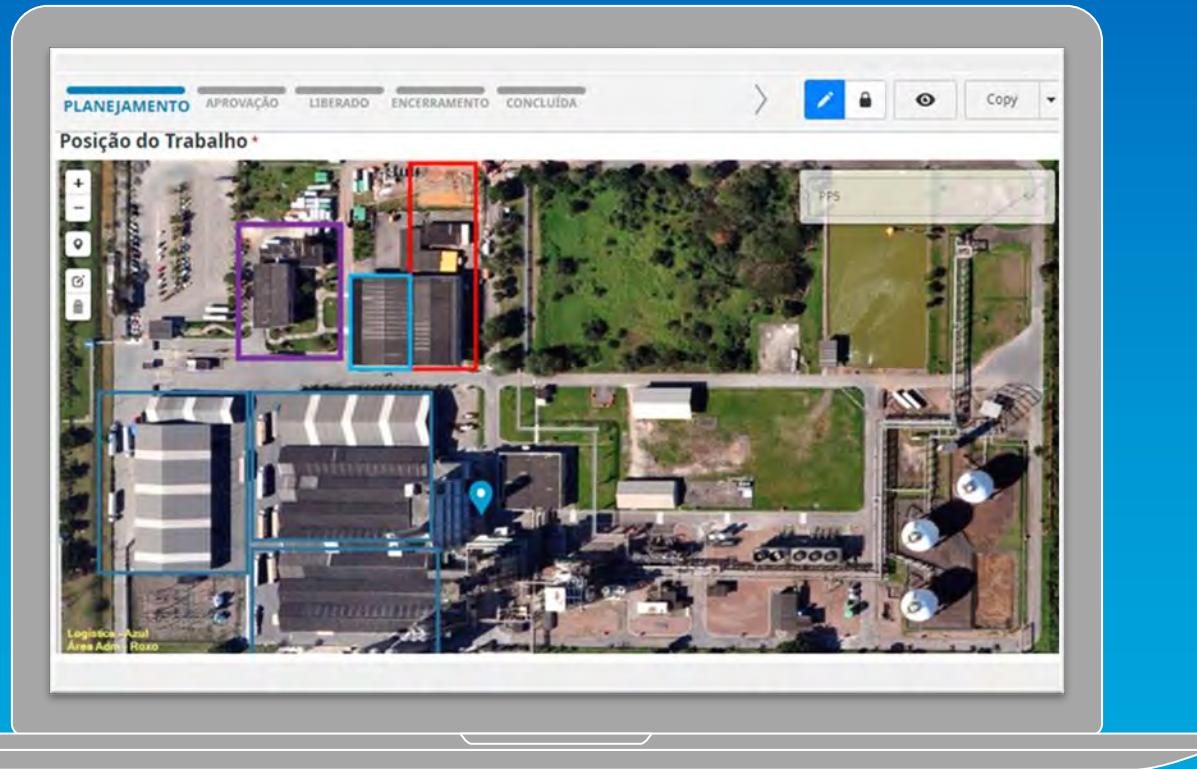
### How it's going



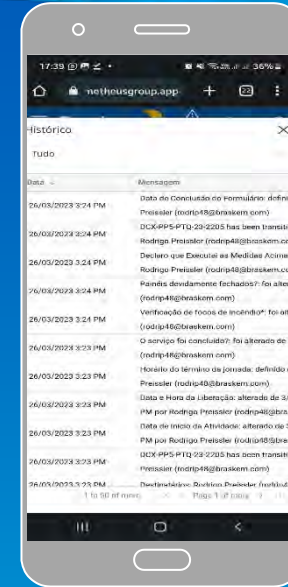
Digital History  
API  
PowerBI integration



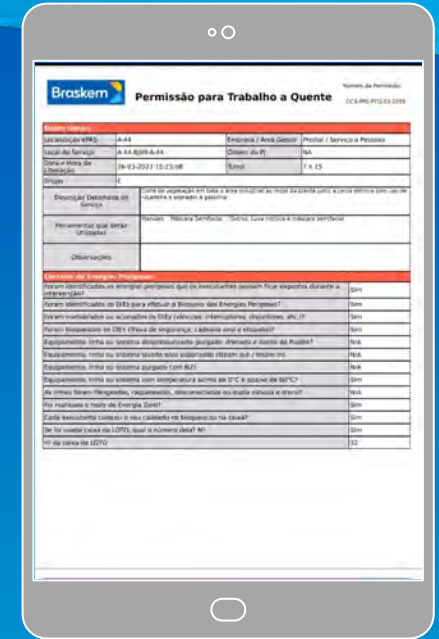
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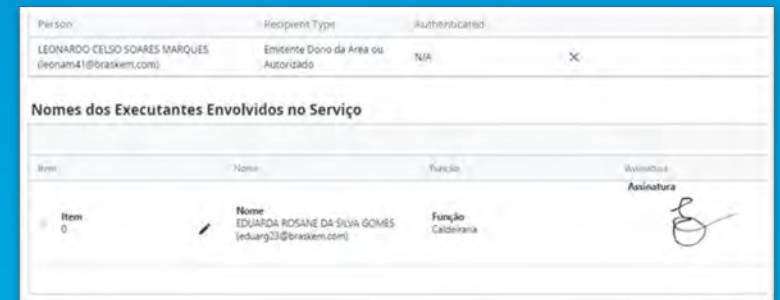
Real-time positioning of all work permits issued



Digital history for ALL actions taken



Smart printed/pdf layout



Physical or digital signatures

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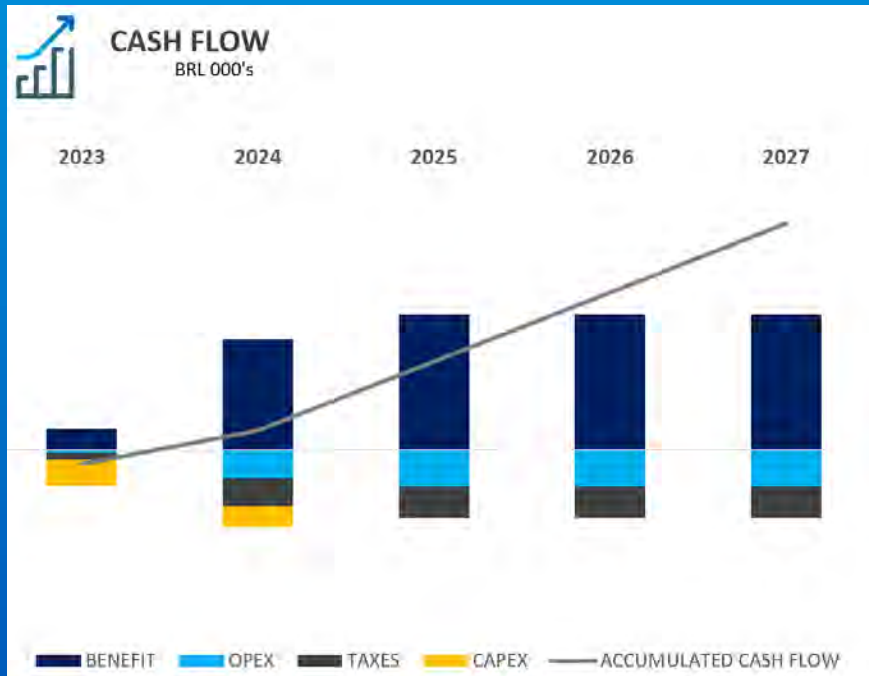
# BUILDING A BUSINESS CASE

## Hard Benefits – Premises

- Hard captures centers around the synergy between Maintenance Mobility and ePAS, such as:
  - Shortened Work Permit issuing and managing time
  - Increased maintenance and operations productivity
  - Reduced labor costs on field and planning assistants
  - Greatly increased workplace safety (insurance evaluation)

## Soft Benefits – Premises

- Increased Operator, Planner and Craft crew availability
- Digital trail and data output for PowerBI and other analytical tools
- Cross-referencing training database to worker and operators' qualification equates greater safety and fewer productivity loss occurrences
- Risks and measures being interlocked, as well as other “smart” features virtually eliminates mistakes when filling out the Work Permit forms
- Online, real-time Work Permit auditing, as well as after the fact, are all possible by leaders and HES
- Enhanced compliance and liability management with all cloud-based registry and history for each step



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# Tips and Tricks: The DO's and DON'Ts



## What worked out great:

- **Local involvement**. This is a BIG change from how operators and craftsmen have operated for years. Shopfloor buy-in is essential (and, in our case, greatly added to the final solution's implementation)
- **Using PCs/Laptops** for issuing and managing WPs and mobile devices for front line changes, closures, picture taking and registering
- Using Prometheus' **local training** and onsite/offsite **hypercare** before and after Go-Live, but also using field subject ambassadors as **local focal points**
- Wi-Fi is great... but it also works fine without it. Evaluate the **cost-benefit** for your solution

## What we're doing different next time around:

- Not EVERYTHING needs to be **digital**. Evaluate print logistics vs device investment for your location
- Trying to do **too much at once**. It's ok to roll out update patches after the Go-Live. In fact, it's been a great interaction avenue with end-users' feedback
- SAP interface is only as good as your **data availability**
- Ensure your HES personnel is as **familiar with the tool** as the end-users are, as with anything else HES related
- Share and track both your company's and Prometheus' **project timeline** see eye to eye and have frequent (weekly, if at all possible) follow-ups. Those well spent 30 minutes can go a long way





# THANK YOU FOR YOUR INTEREST! OPEN Q&A

FOR MORE INFORMATION, PLEASE REACH US AT:

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