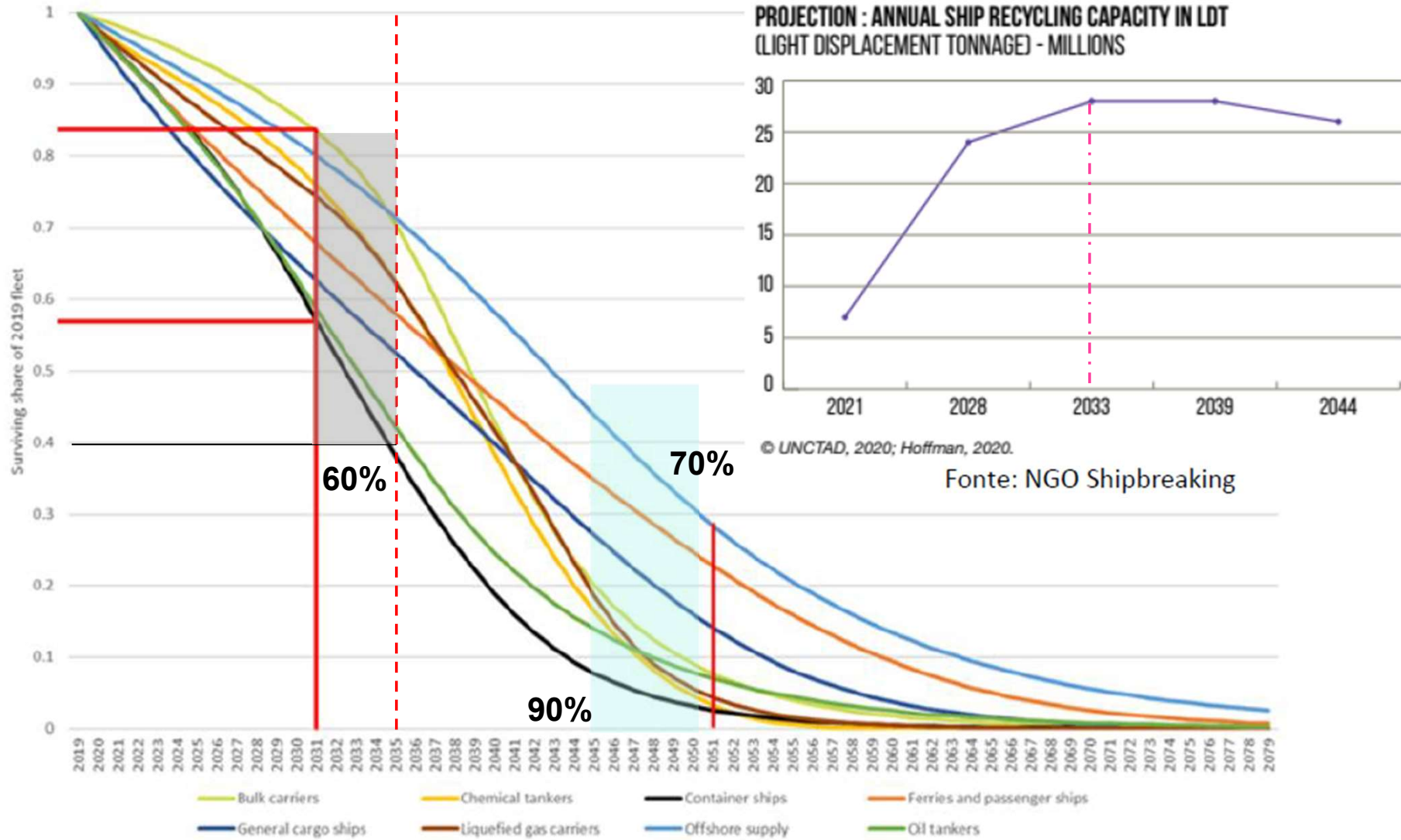


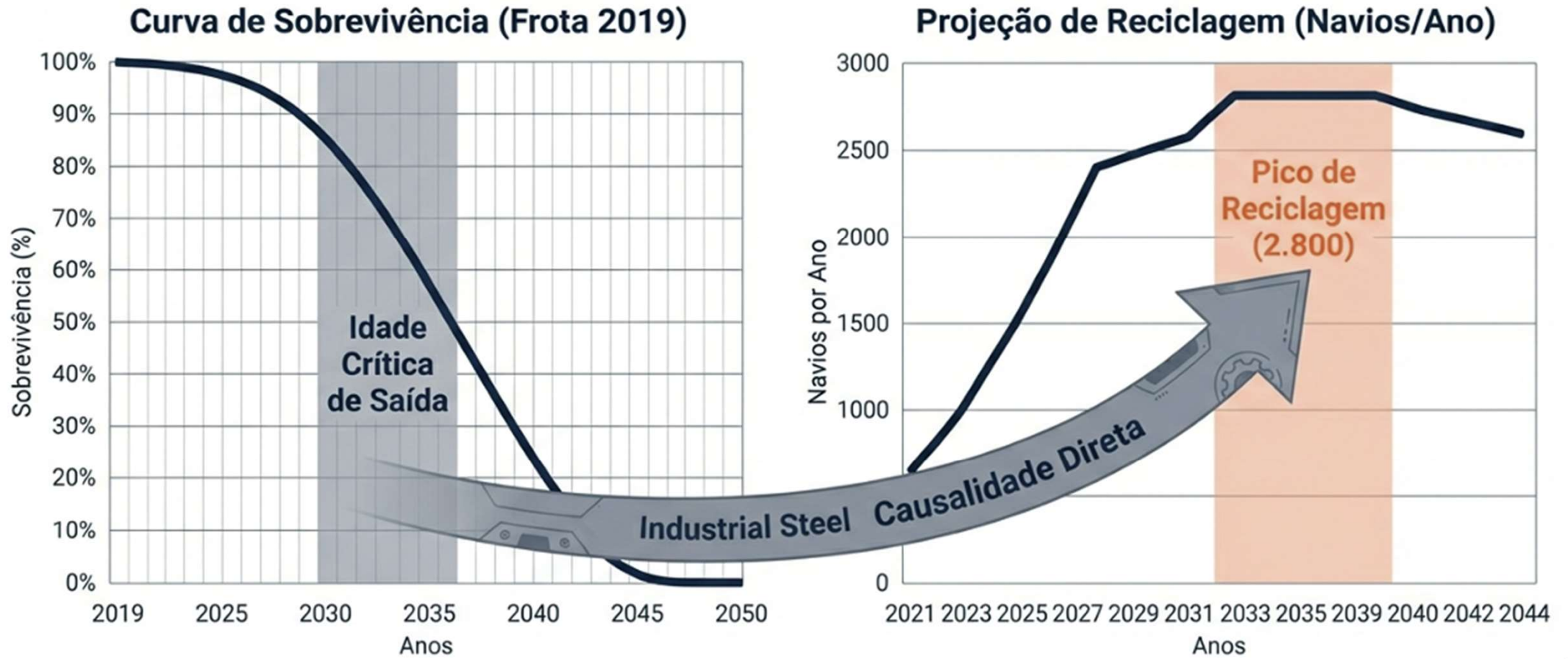
## Demandas para o mercado de reciclagem de plataformas e navios



# Demanda global de reciclagem



# O pico de reciclagem em 2033 é consistente com a retirada massiva da frota existente a partir de 2030.



# O Futuro da Reciclagem Naval:

## A Projeção da Demanda Global (2021-2044)

**Contexto:** O setor de reciclagem naval passará por uma transformação estrutural, saltando de 650 para 2.800 navios anuais, exigindo uma infraestrutura global capaz de processar múltiplas embarcações diariamente.



**650**  
Navios por Ano  
(6,5 Milhões LDT)

**2021**



### O Desafio Operacional Diário



**Restrição de Capacidade Global:** A curva serve como limite máximo para modelos de planejamento e seleção de processos.



# Panorama Global da Frota de FPSOs (Fevereiro 2026)

## A Frota em Números



**23**  
NOVAS  
UNIDADES  
ENCOMENDADAS



**182**  
UNIDADES  
EM OPERAÇÃO

Segundo Energy Maritime Associates (EMA).  
Variação de Metodologia:  
Faixa de 179-185 unidades  
(ScienceDirect)



**17**  
UNIDADES  
DISPONÍVEIS NO  
MERCADO GLOBAL

## Ciclo de Vida e Longevidade



**VIDA ÚTIL DE PROJETO: 20 a 25 anos**

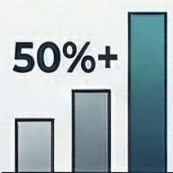
**VIDA DE SERVIÇO TÍPICA: 20 a 30 anos**  
Com manutenção adequada, até três décadas.

**ESTRATÉGIAS DE EXTENSÃO (Life Extension)**  
Programas de integridade, retrofit e processos formais para ampliação além dos 30 anos.

## O Desafio do Envelhecimento

Foco na integridade estrutural e segurança.

**50%+**



**METADE DA FROTA "SHIP-TYPE" TEM +30 ANOS**

Dados da ABS: Mais de 50% dos FPSOs do tipo navio ultrapassaram 30 anos.



**25% DA FROTA ULTRAPASSA 40 ANOS**

Um quarto das unidades superou significativamente a vida útil nominal original.



**NECESSIDADE DE PROGRAMAS DE INTEGRIDADE:** O envelhecimento acentuado torna inspeção e manutenção essenciais para segurança operacional e ambiental.

# Oportunidades ou Desafios?

Instalações capazes de reciclar navios contaminados com NO

PARTE A - Países Membros		
Nome do Estaleiro	País	Capacidade máxima (LDT)
Modern American Recycling Services Europe (M.A.R.S)	Dinamarca	200.000
Damen Verolme Rotterdam B.V.	Países Baixos	100.000
ADRS Decom Gulen	Noruega	75.000
AF Offshore Decom	Noruega	75.000

FPSO	Instalação
FPSO Curlew	AF DECOM
FPSO Banff	MARS
FPSO Petrojarl Foinaven	MARS
FPSO Zafiro Producer	MARS

Fonte : Elaborado pelo autor (2024).

Alocação teórica dos navios com PDI aprovado para descomissionamento

Cenário 1 até 2 anos		2024				2025				2026				2027				2028			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
MARS	CPX	Descontaminação		Desmontagem																	
MARS	FLU	Descontaminação		Desmontagem																	
AF DECOM	PFNIT					Descontaminação				Desmontagem											
DAMEN VEROLME	FPCST					Descontaminação				Desmontagem											
MARS	POLVO					Descontaminação				Desmontagem											
MARS	P-37					Descontaminação				Desmontagem											
MARS	P-47					Descontaminação				Desmontagem											

Fonte: o autor, 2024.

Ocupação teórica das Instalações		2026				2027				2028			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
MARS	Ocupado	[Ocupado]											
AF DECOM	Ocupado	[Ocupado]											
DAMEN VEROLME	Ocupado	[Ocupado]											

Fonte : Elaborado pelo autor (2024).

Marine Systems & Ocean Technology (2025) 20:19  
<https://doi.org/10.1007/s40868-025-00163-2>

## RESEARCH

### Occurrence of NORM in FPSO oil production units: impacts and decision-making factors for recycling destination after decommissioning

Guilherme Coltri Peres Ramos<sup>1</sup> · Newton Narciso Pereira<sup>2</sup>

Received: 25 October 2024 / Accepted: 8 January 2025  
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#### Abstract

The Brazilian oil and gas industry is undergoing significant transformations, with new production units emerging and older platforms being decommissioned. The Brazilian National Agency of Petroleum, Natural Gas, and Biofuels (ANP) anticipates substantial investments in decommissioning activities by 2026. This study focuses on the decommissioning of Floating Production Storage and Offloading units (FPSOs) in Brazil, examining economic, environmental, technical, and safety considerations. It references guidelines from the Basel Convention, the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships (HKC), and the European Ship Recycling Regulation (SRR 1257/2013), emphasizing the importance of adhering to international standards for safe and sustainable ship recycling. A key aspect of the research is the impact of Naturally Occurring Radioactive Materials (NORM) on the disposal of FPSOs operating in Brazil. The study evaluates the capabilities of facilities to recycle these units and highlights a limited number of facilities equipped to manage NORM-contaminated FPSOs. This limitation often forces shipowners to recycle FPSOs abroad in selected locations, exposing them to significant financial risks, unforeseen costs, and uncertainties in waste disposal processes. The findings underscore an urgent need for improvements in infrastructure and processing techniques at Brazilian shipyards to ensure the responsible management of NORM and to enhance the country's capacity to handle the decommissioning of NORM-contaminated FPSOs sustainably.

**Keywords** Oil and gas · Naturally occurring radioactive materials · Decommissioning · Recycling · Sustainability

#### 1 Introduction

The oil and gas industry in Brazil is undergoing a transformation with new production units coming into operation and the initiation of the decommissioning phase for old platforms. According to the National Agency of Petroleum, Natural Gas, and Biofuels (ANP), 33 Decommissioning Programs of Installations (PDI) have been approved, with four

more under review. This reflects an estimated investment of 1.11 billion USD from 2022 to 2026 for offshore exploration unit removal [1, 2]. The aging of these structures necessitates decommissioning, which involves managing waste generated and addressing technical, environmental, and economic challenges.

Decommissioning will become increasingly prevalent as many offshore oil production installations reach the end of their useful lives [3]. This aligns with [4], which highlights the global importance of decommissioning, primarily due to reservoir depletion. Financial challenges faced by countries or shipowners in decommissioning offshore installations are relevant and involve balancing operational costs and investment incentives, especially in mature fields [5]. This financial dilemma can yield financial gains, socioeconomic benefits, and environmental preservation [6].

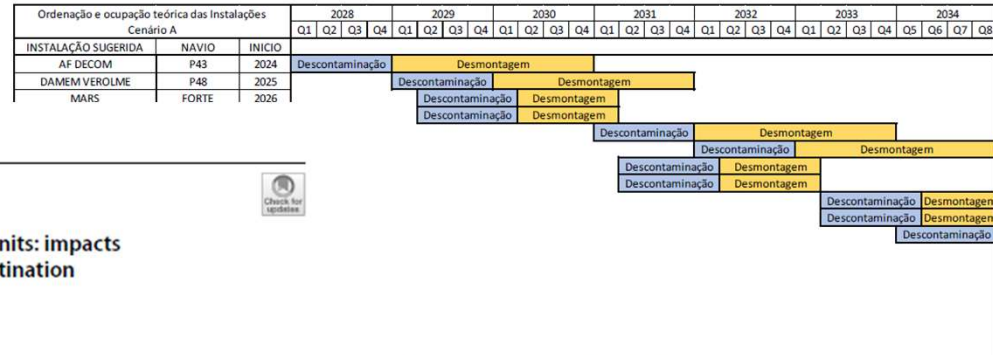
Due to the considerable number of stakeholders, it is crucial to evaluate multiple criteria economic, environmental, technical, social, and safety considerations for

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Published online: 10 February 2025



Fonte: Elaborada pelo autor (2024)

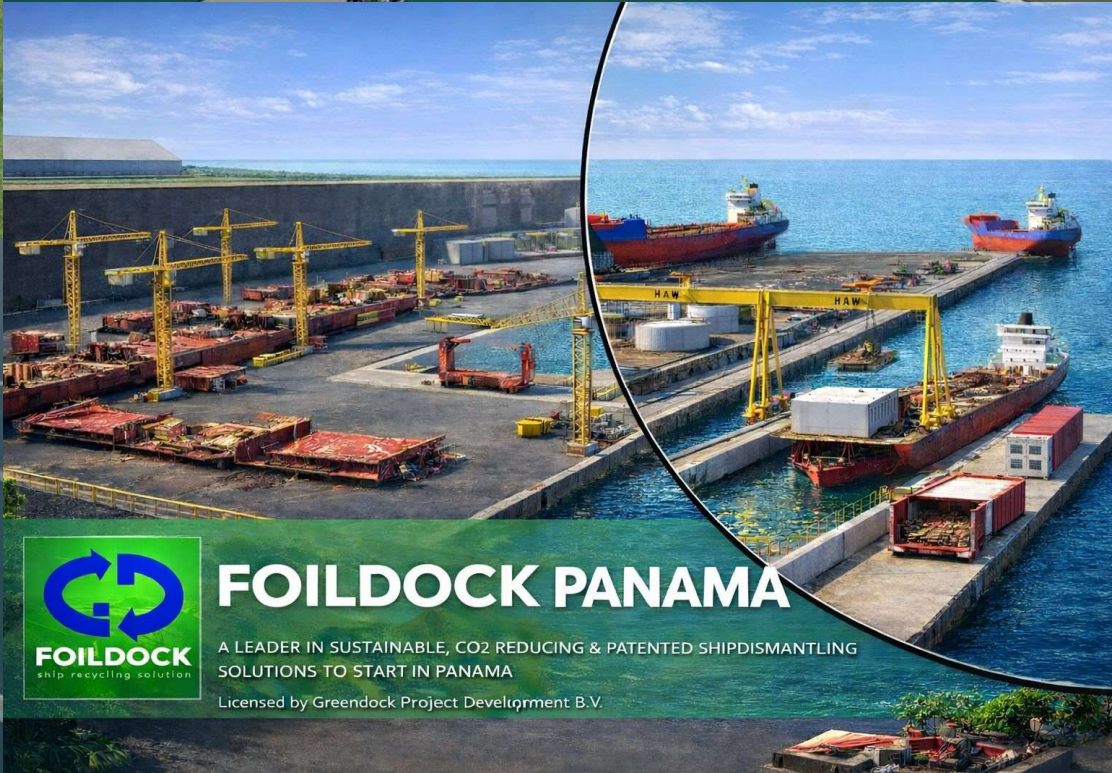


Fonte: Elaborada pelo autor (2024)

	Término do Contrato	Possibilidade de Janela	Tempo Aguardando
		2027	2035
	2028	2035	7
	2028	2035	7
O	2029	2037	8
	2029	2037	8
TIBA	2029	2037	8
	2029	2038	9

Fonte: Elaborada pelo autor (2024)

# Os países estão se mexendo!



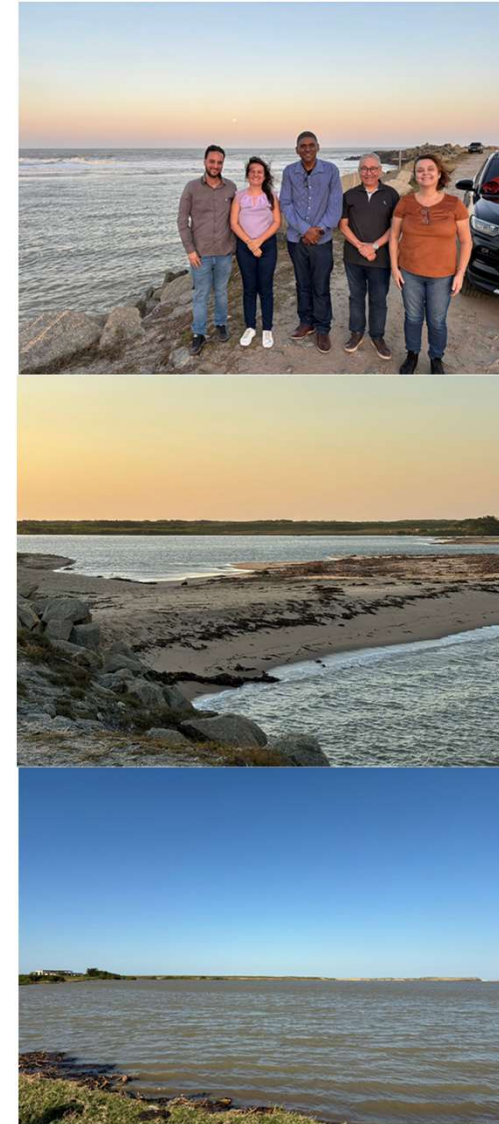
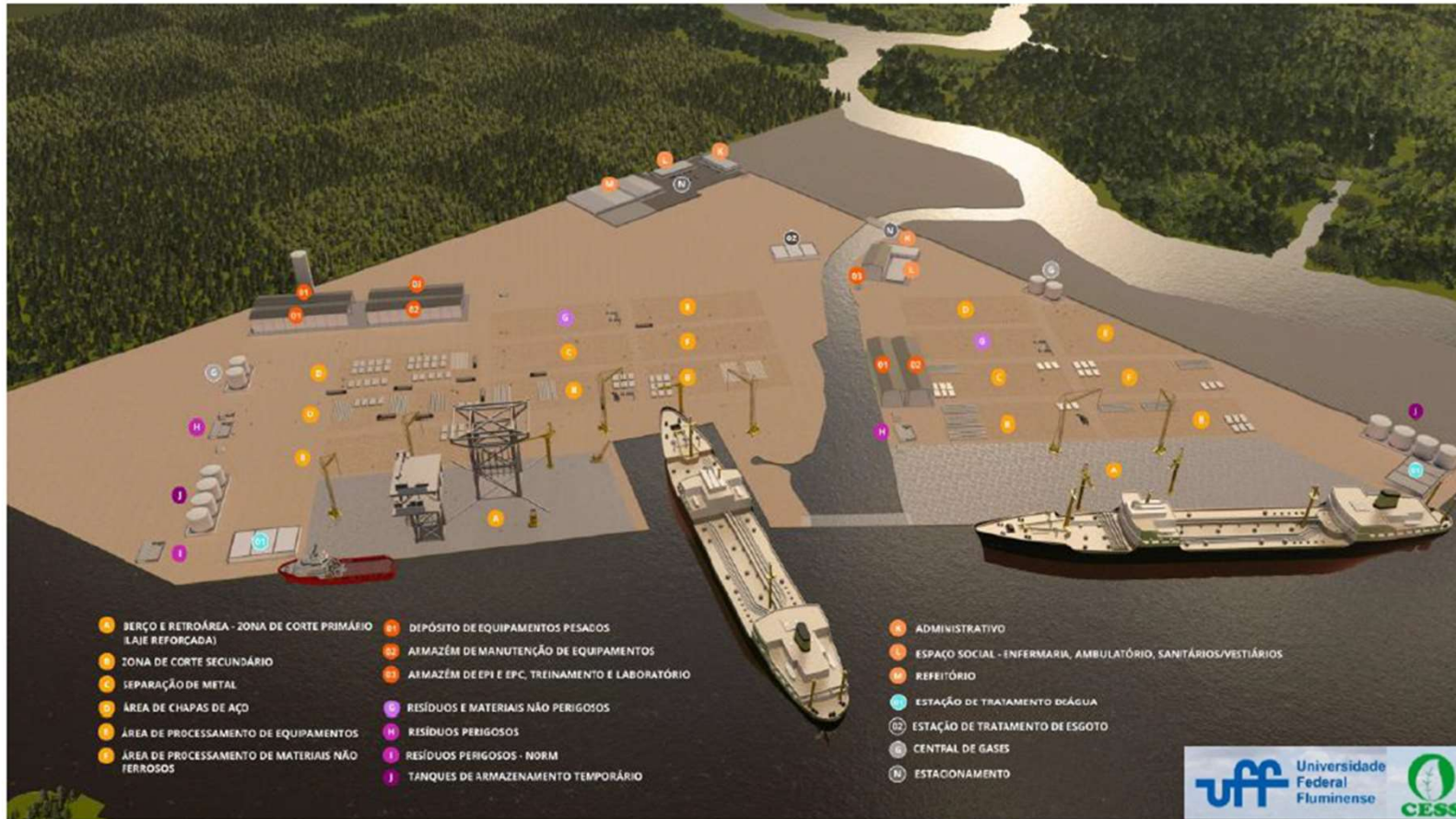
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# Brasil está se preparando!

A Instalação de Reciclagem de Embarcações em Barra do Furado



**Muito obrigado**

**Prof. Dr. Newton Narciso Pereira**

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