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Ciclo de Debates sobre Petróleo e Economia

Decommissioning of Offshore Production Systems

Eduardo Hebert Zacaron Gomes

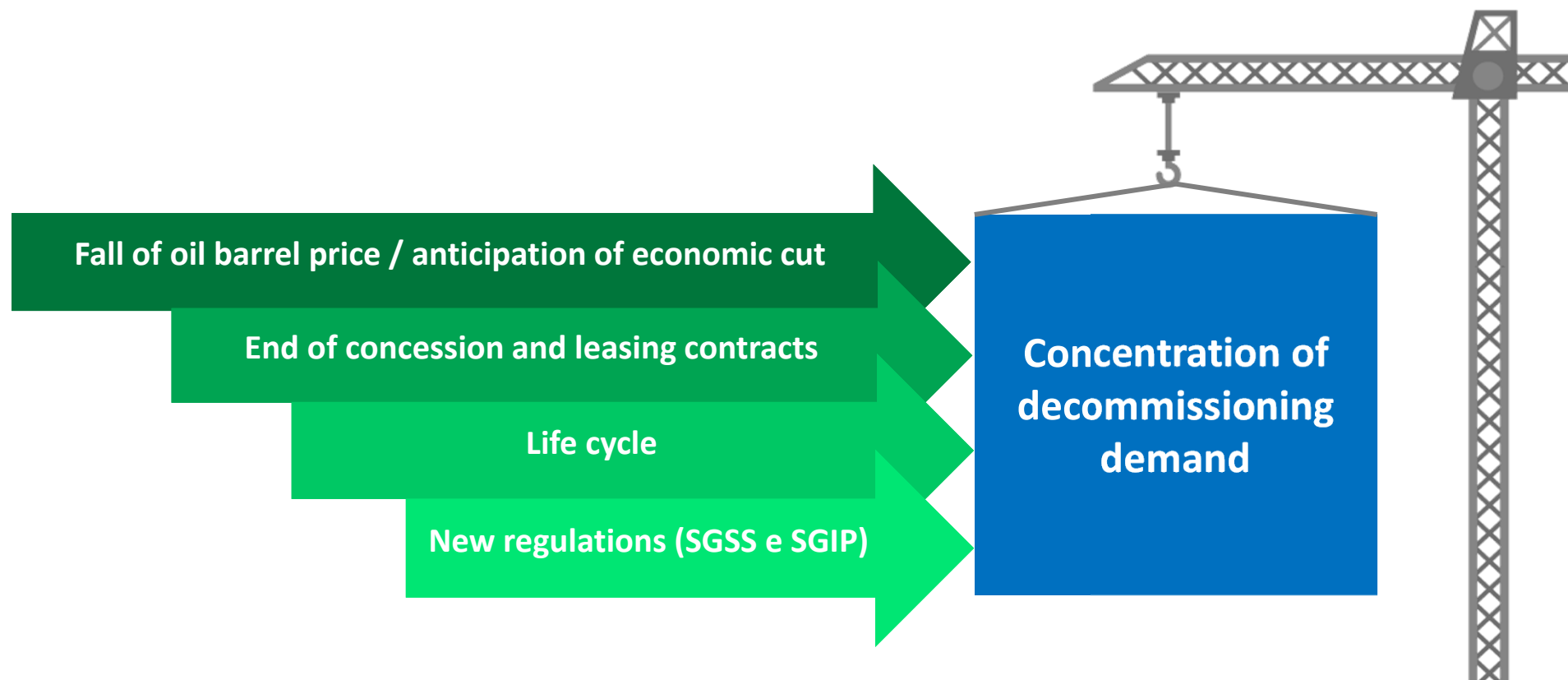
Rio de Janeiro – September 22, 2017

Agenda:

- Context
- National Outlook
- Decommissioning at Petrobras
- Main Areas
- Main Activities
- Challenges
- Well Abandonment
- Platform Deactivation
- Subsea System Decommissioning
- Some Initiatives and Actions
- Conclusions



Context:



National Outlook:

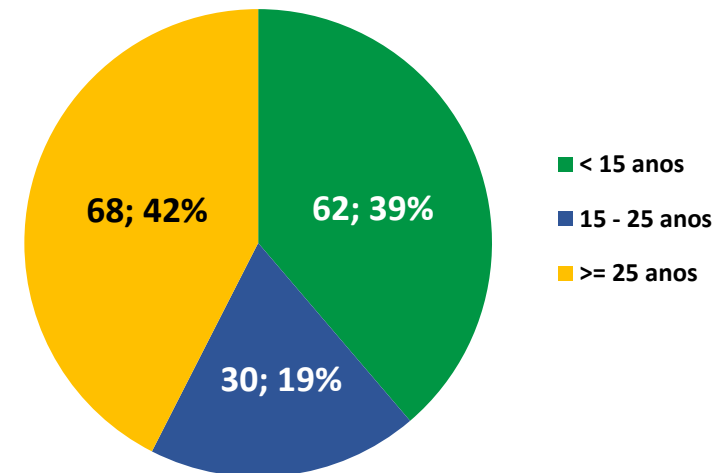
Highlights:

- *Nearly 160 offshore production installations (other 20 until 2022)*
- *More than a half of the installations has more than 25 years in operation*

Main regulatory framework:

- *Resolution ANP nº27/2006*
Facilities decommissioning guidelines
- *Resolution ANP nº43/2007 - SGSO*
Operational Safety Management System
- *Resolution ANP nº41/2015 - SGSS*
Subsea Safety Management System
- *Resolution ANP nº46/2016 – SGIP*
Well Integrity Management System

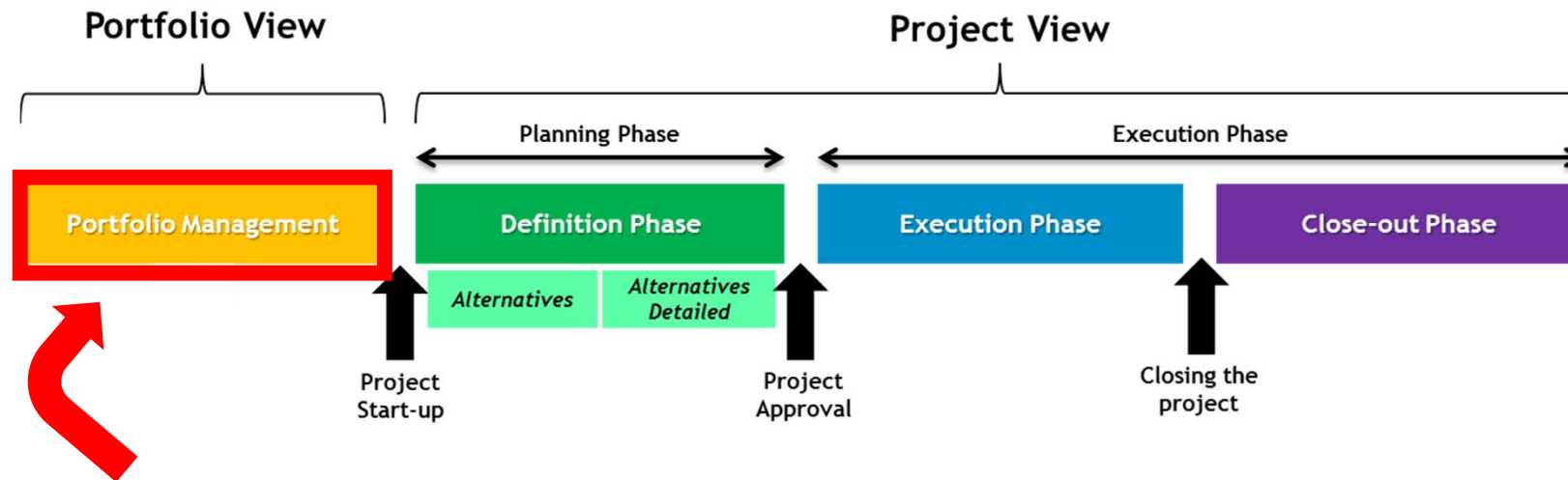
Age distribution of Brazilian offshore production installations:



Source: ANP presentation at FGV Energy Workshop of Decommissioning – set/2017



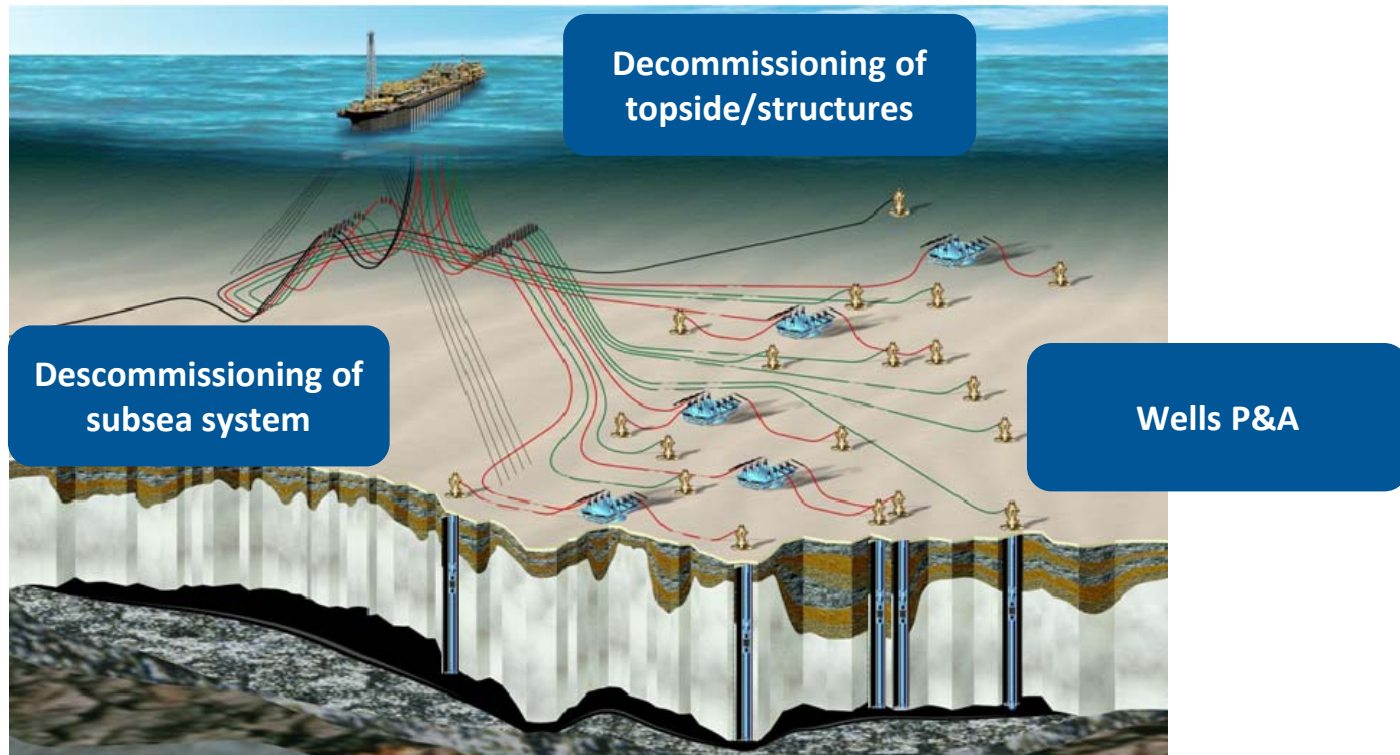
Decommissioning System at Petrobras:



Example of influence factors affecting portfolio management:

- Macroeconomic scenario;
- New exploratory opportunities;
- Facilities life extension;
- Revitalization / Field Redevelopment Projects;
- Extension of concession contracts;
- Decommissioning costs.

Main Areas:



- Different levels of information maturity for planning / evaluation of alternatives;
- Specific chronologies;
- Risk mitigation and gain of scale by separating the phases.

Main Activities:

Wells

Cleaning and flowline disconnection from X-trees
X-tree closure and monitoring
Permanent abandonment (P&A)

FPU's

CoP (Cessation of Production)
Topside cleaning & conditioning
Pull-out of risers, Disanchor and Towing

Fixed Platforms

Wells P&A
Topside cleaning & conditioning
Comparative assessment of jackets destination alternatives

Topside destination
Jacket destination
Environmental monitoring

Subsea Systems

Comparative assessment of subsea systems
decommissioning options:
full recovery, partial recovery or leave in-situ

Destination
Environmental monitoring



Challenges:

WELLS

- *Large number of P & A. Integrated risk-based portfolio management*
- *Definition, agreed with IBP, of guidelines with best practices on well abandonment and monitoring*
- *Reduce the cost of abandonment with new technologies, alternative techniques of abandonment, optimized logistics and specific business models*

PLATFORMS

- *Minimize the time between production ceasing and the towing of floating units from the location.*
- *Identify, treat and dispose waste from the production process and decommissioning.*
- *Optimize destination of topside and jackets of fixed units.*
- *Logistics for final destination.*

SUBSEA SYSTEM

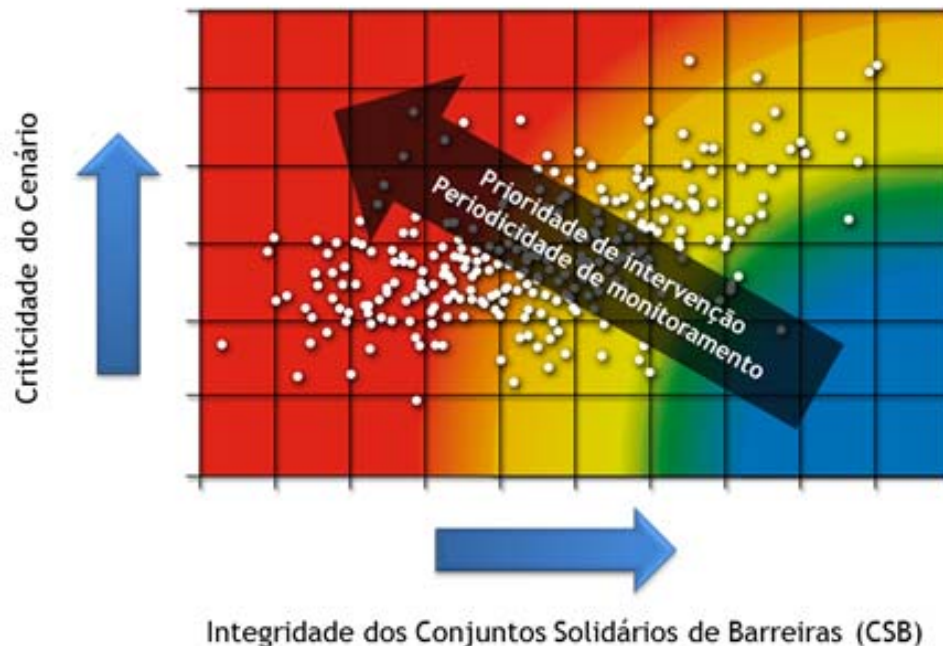
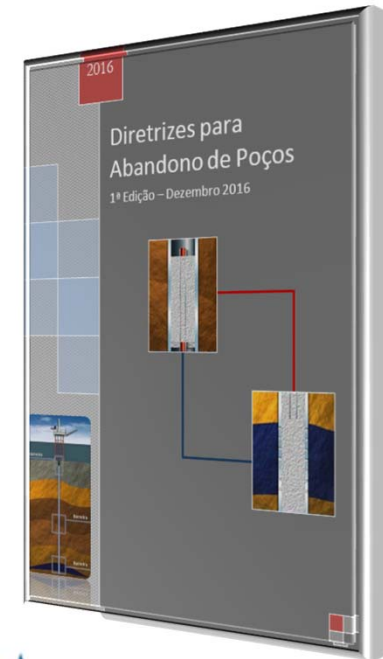
- *Definition of methodology of comparative assessment of alternatives, considering multiple criteria.*
- *Conduct case-by-case analysis to define the alternative that better balances environmental protection, operational risks and technical and economic feasibility.*

**OPERATIONAL RISK MANAGEMENT
STAKEHOLDER ENGAGEMENT
DECOMMISSIONING COST ESTIMATION**



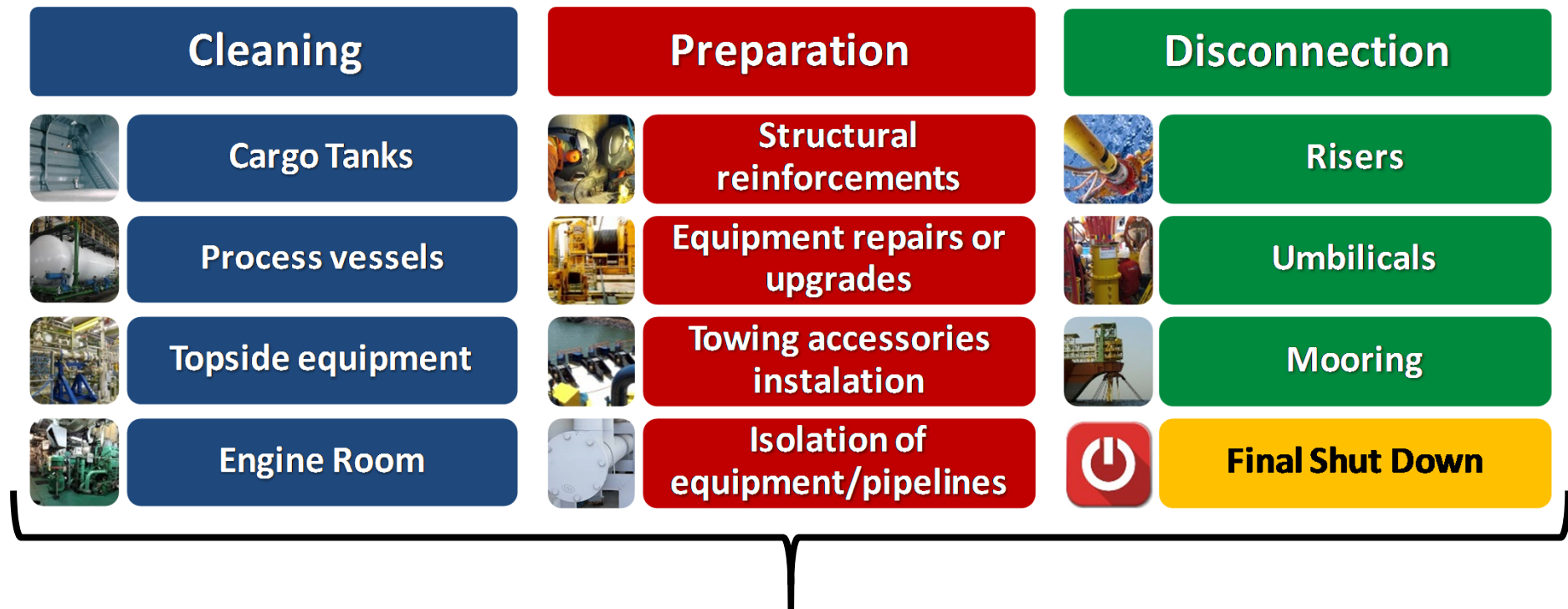
Well Abandonment:

Guidelines and Best Practices



Comitê de Poços do IBP

Platform Deactivation:



Most of them are part of the operational routine.

Subsea System:

Comparative Assessment

Resolution ANP nº41/2015 – SGSS (Subsea Safety Management System)

26.2 – Permanent Decommissioning Plan

26.2 – The Permanent Decommissioning should consider the legal, technical, economic, safety, environmental protection and industry best practices.

DECC Guidance Notes: Decommissioning of Offshore Oil and Gas Installations and Pipelines under the Petroleum Act 1998.



		DECOMMISSIONING OPTIONS											
ASSESSMENT CRITERIA	Matters to be considered	Complete removal to land			Partial removal to land			Leave wholly in place			Disposal at sea *		
		<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Safety	risk to personnel												
	risk to other users of the sea												
	risk to those on land												
Environmental	marine impacts												
	other environmental compartments (including emissions to the atmosphere)												
	energy/resource consumption												
	other environmental consequences (including cumulative effects)												
Technical	risk of major project failure												
Societal	fisheries impacts												
	amenities												
	communities												
Economic													
		<div>HIGH</div>			<div>MEDIUM</div>			<div>LOW</div>					

Subsea System:



Several comparative assessment methodologies and tools are used in other countries!



Guideline for Comparative Assessment in Decommissioning Programmes

What do we need?



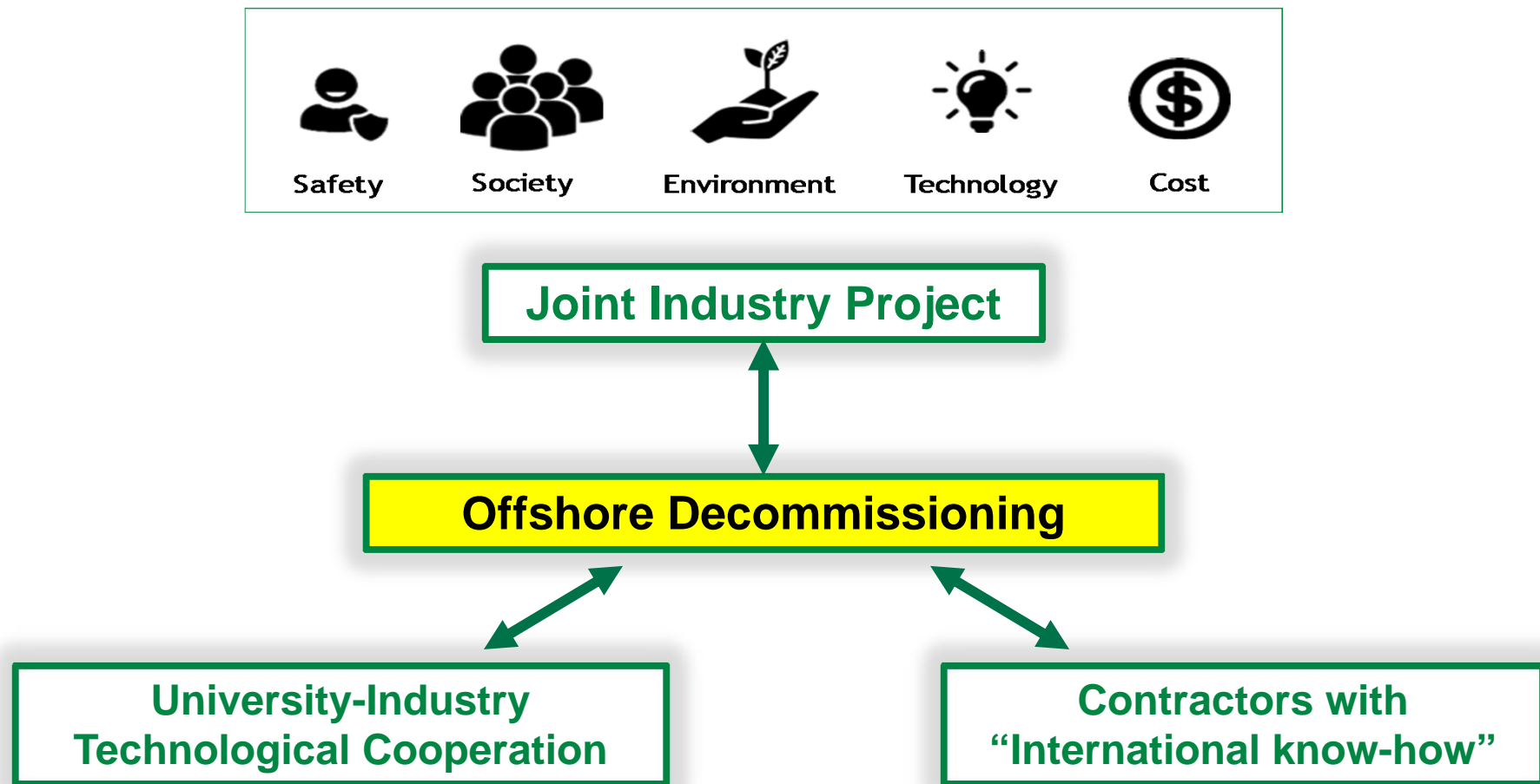
Technical Guidelines for Risk-Based Comparative Assessment of Alternatives for Decommissioning of Subsea Installations in Brazil

The elaboration of this document requires the participation of all stakeholders (regulatory bodies / agencies, industry, scientific community etc).



Some Initiatives and Actions:

Seek an approach between industry and regulators to develop solutions that balance environmental protection, operational safety and technical and economic feasibility.



Conclusion:

- Methodologies for comparative assessment of alternatives must be adapted to the Brazilian scenario and must consider all factors and stakeholders.
- Wells, platforms and submarine systems decommissioning projects have different chronologies and can be evaluated separately.
- Decommissioning requires differentiated operational solutions.
- Paradigms must be broken with risk analysis.
- The projects require long-term planning and execution and should be evaluated as early as possible in order to seek synergy and cost reduction.
- High decommissioning costs can make new projects unfeasible and anticipate the devolution of mature fields.



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Thank you!

Questions?

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