RIGS TO REEF SCENARIO IN MALAYSIA

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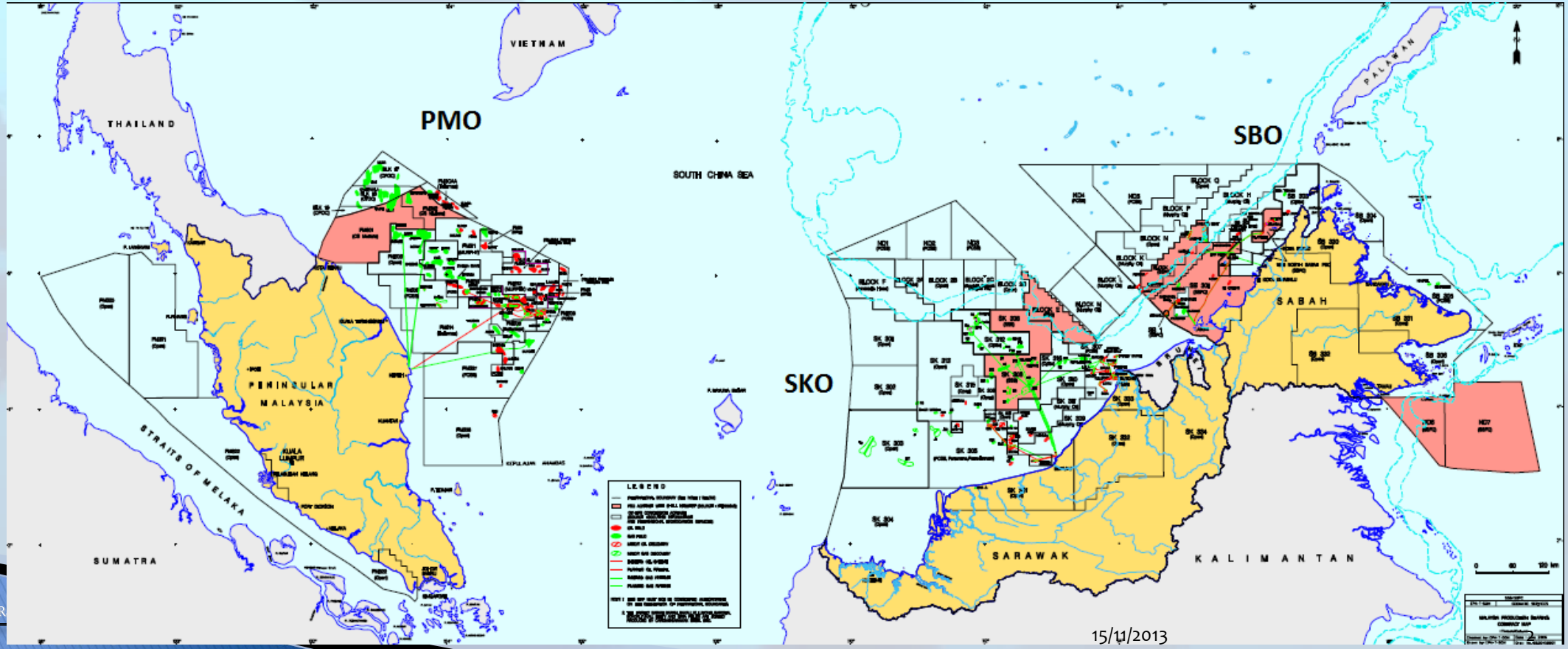
engineering future...

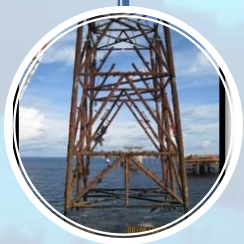
Overview of Decommissioning in Malaysia

- 300 fixed platforms (rigs), 60% exceed design life of 25 years
- In shallow water between 50-70m



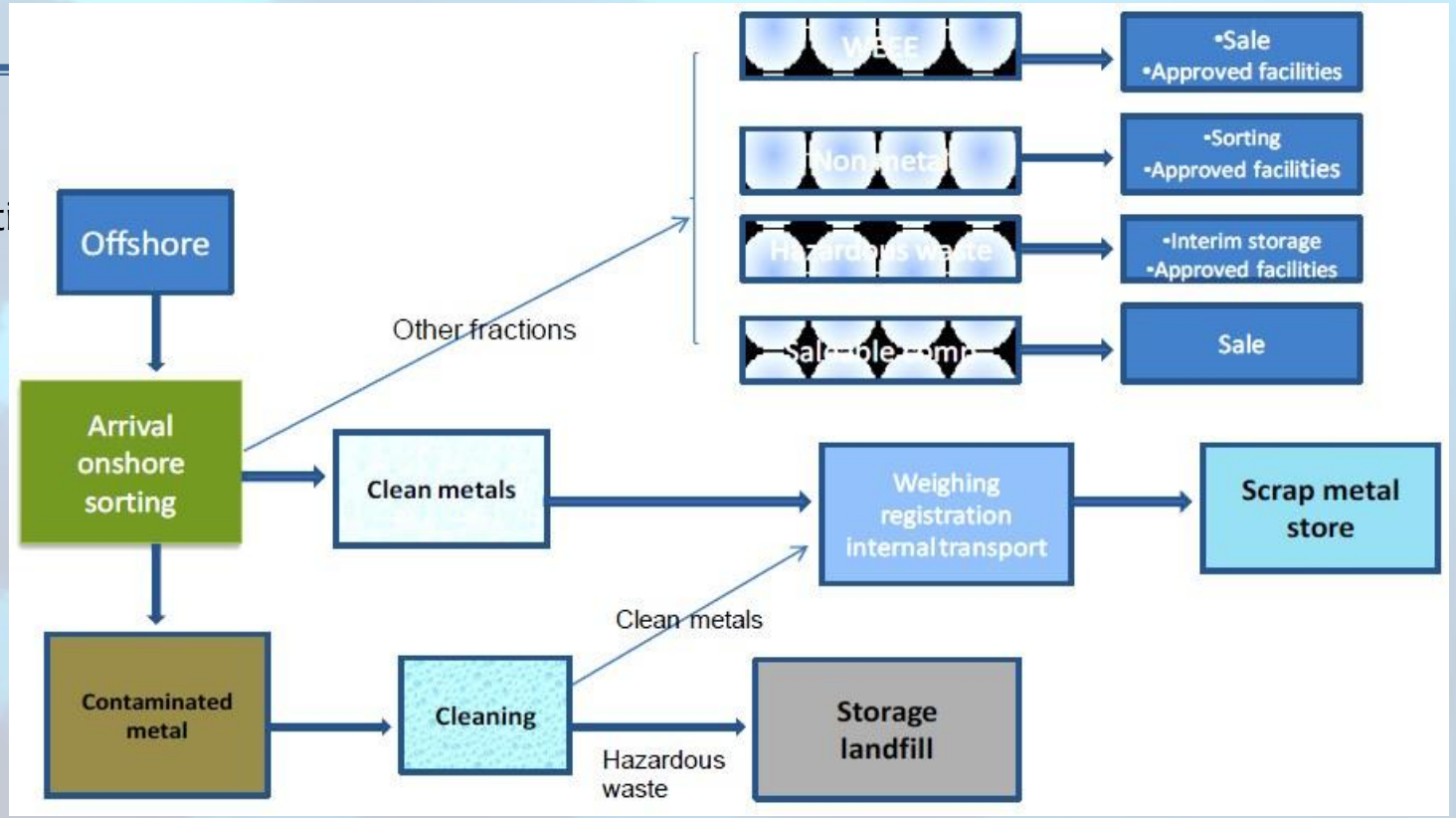
Options for Decommissioning

Fixed platform



Complete removal

Parti



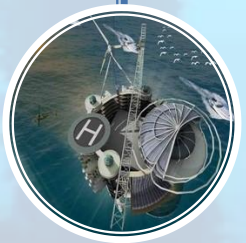
Options for Decommissioning

Fixed platform

Complete removal

Partial removal

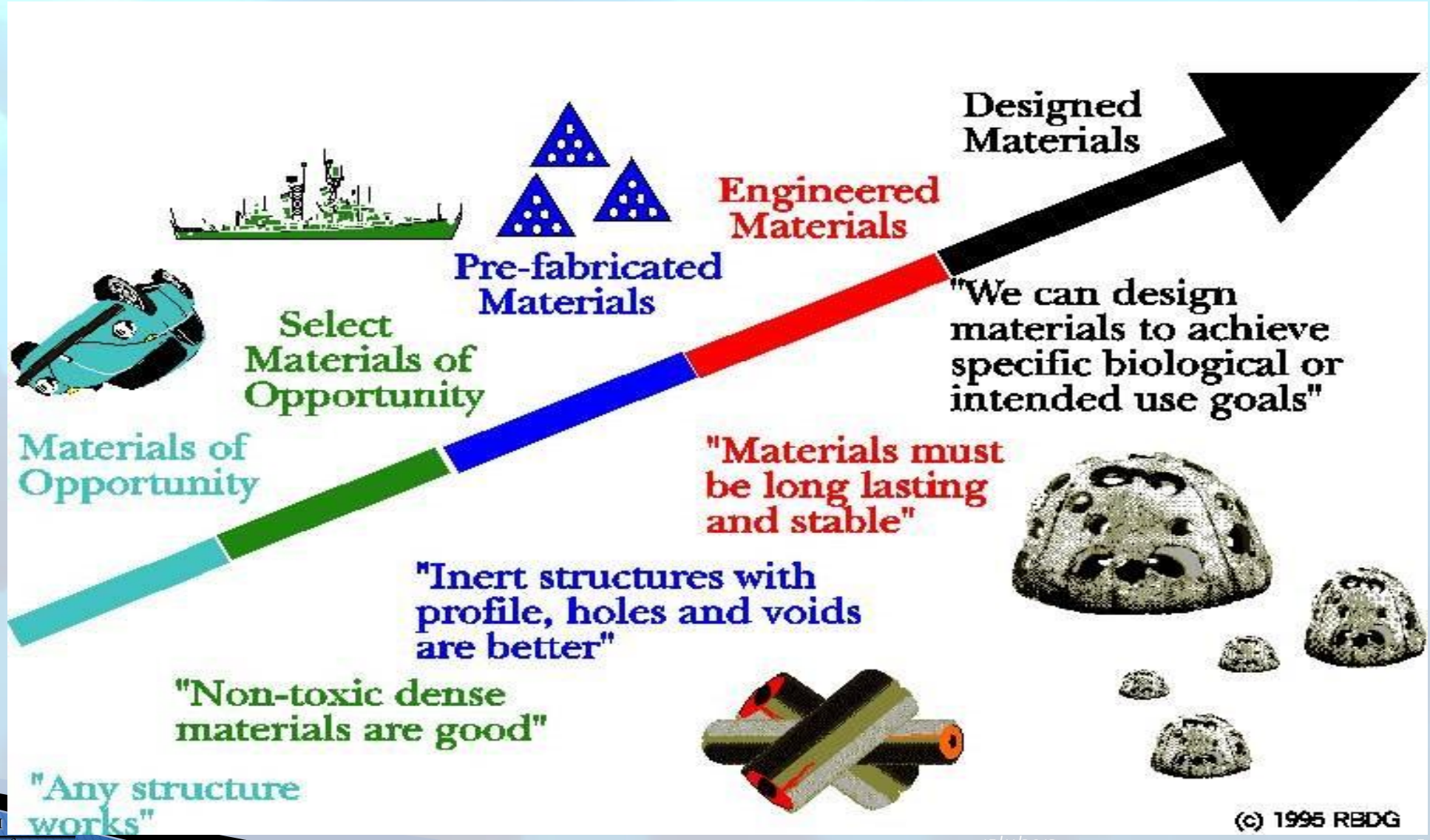
Leave in-situ



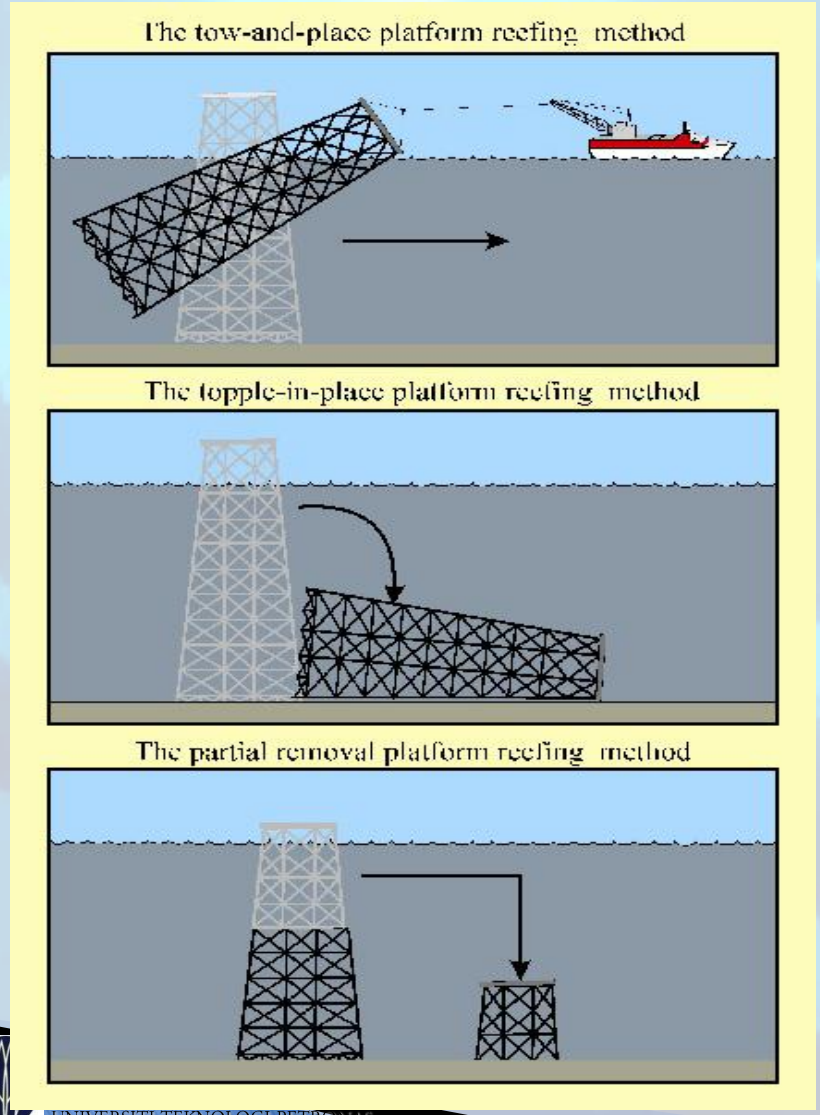
Weather stations
research facilities
seastead

RIGS TO REEF

What does it take to do RTR??



Method of RTR



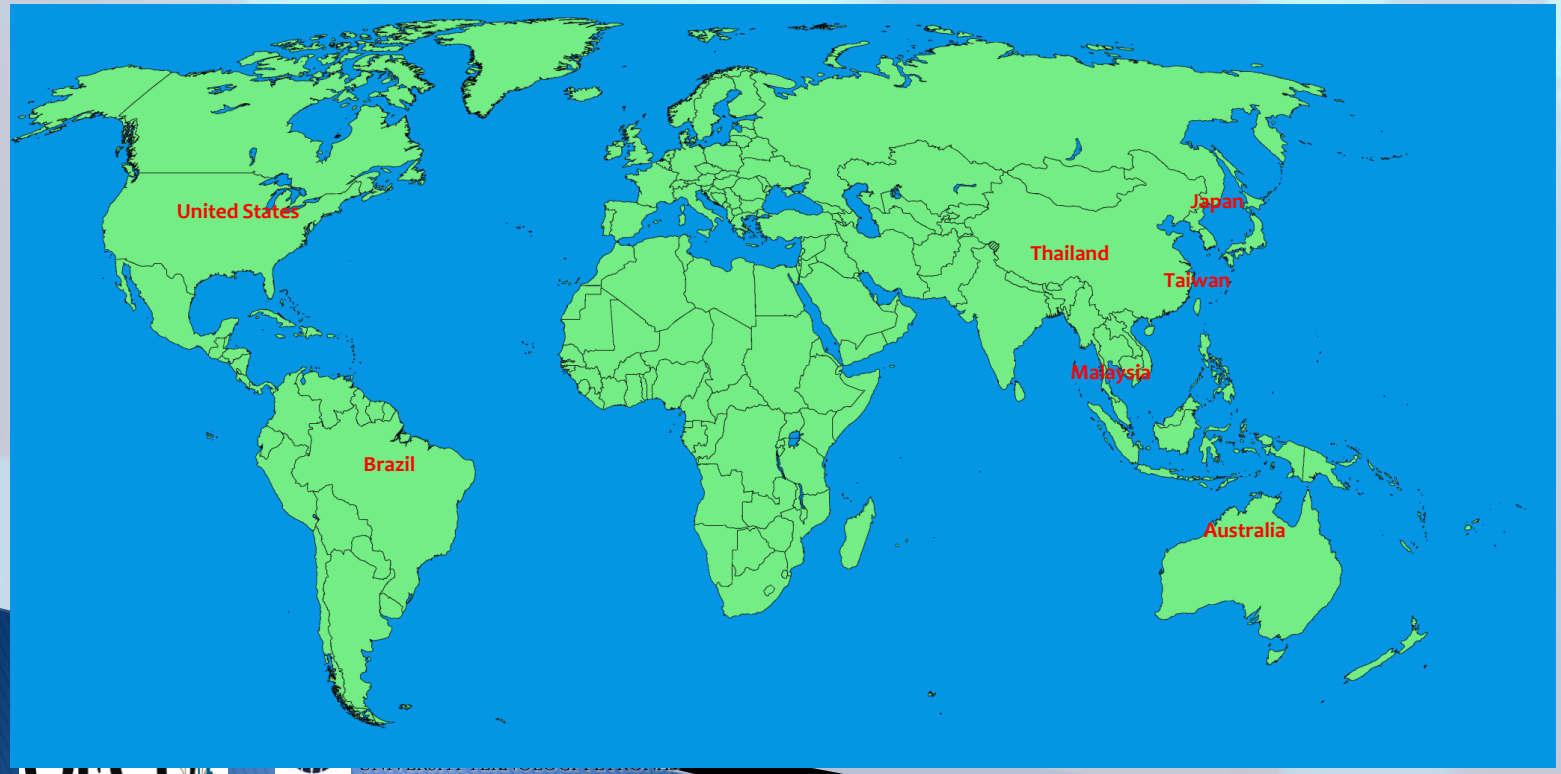
- The rig is submerged and converted into artificial reef
- Cost in towing and cutting
- Divers cutting the jacket legs below the mud line
- Expensive , labor intensive n time consuming

- The remaining portion of the platform is completely submerged and converted into artificial reef
- Cost in cutting
- Lower costs and time savings.

- Remove a certain portion of the platform
- Remaining part of the platform is completely submerged and left at the drilling site and converted into artificial reefs
- Remains in place and continues to provide beneficial habitat for a large number of pelagic.
- Cost in cutting
- Reduces the removal costs and risks for divers (Jan Culbertson, 2004)

RTR as Sustainable Decommissioning Option

- It has been done!
- Malaysia has done it before!



Texas, USA	35 reefed platforms
Louisiana, USA	83 reefed platforms
Florida, USA	1st established RTR program. Unknown numbers
Alabama, USA	Artificial reefs from tanks, barges, bridge rubble, etc.
California, USA	260 reefed platforms
Japan	Artificial reefs from concrete, steel, etc.
Australia	Artificial reefs from ships, tires, geotextile.

Sustainable Decommissioning Options

- Why SD agenda?
- SD for O&G Companies/Operators
- Government's commitment to SD

O&G Stakeholders' Expectations

Components	Expectations
Economic	• Provide higher return • Security of investment • Development of local capabilities • Safe product • Prudent use of resources
Social	• Development of local communities • Fair employment • Business integrity & transparency • Uphold human rights
Environment	• Green products • Minimal impact to HSE

Government's commitment to SD

- 17th Dec 2009, Copenhagen
- Up to 40% GHG emission intensity of GDP by 2020
- As national oil company, its our commitment too!

O&G Company: Moving towards SD

2012 2017 2023

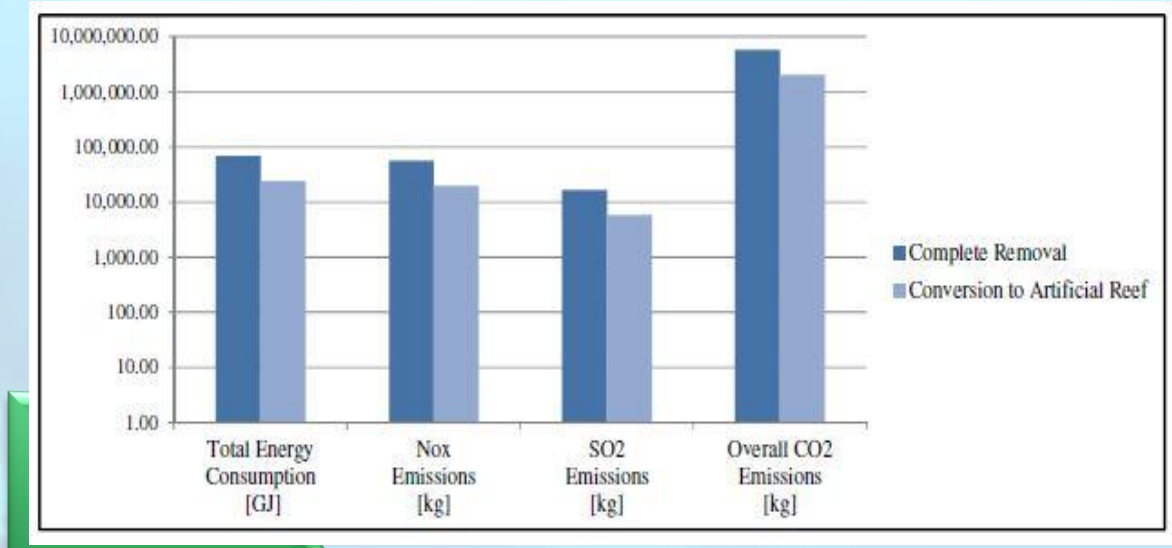
O&G Company: Moving towards SD

- Engage stakeholders to understand their values/needs
- Biodiversity and social performance are 2 of the 7 SD focus areas

O&G Company: Moving with SD agenda

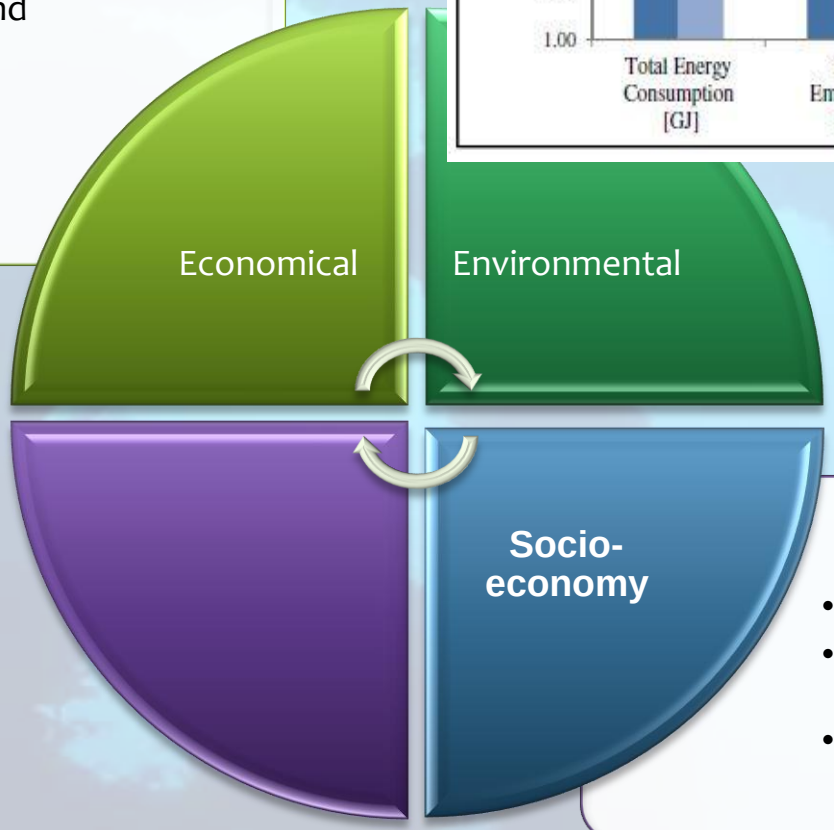
- Social performance
  - Align with global indicators i.e. human rights, communities needs
  - Finding ways to co-exist: committed to be a socially responsible business entity
- Biodiversity
  - Responsible management of biodiversity
  - Embark on biodiversity-related CSR
  - **RTR as a sustainable decommissioning option**

SD Benefits of RTR



Comparison: Complete Removal and Conversion to Artificial Reef Using EIO Method (Gorges, Wan Abdullah Zawawi 2013)

- The platform structure and discarded removal steel parts will be fully used (Jiang *et al.*, 2011)
- RTR only incur cost in cutting and/or towing



- Food security
- Impact of big size ARs to traditional fishers income
- Larger AR, attract more habitat, produce more fish and coral species

Benefits of RTR

- Food security
  - Malaysia has lost 92% of its fishery resources due to overfishing.
- Eco-tourism
  - Malaysia eyes 50 marine parks by 2020. Coral depletion due to bleaching
- Recreational fishing industry
- Savings for both industry and artificial reef
- Removal of platform = removal of marine growth and associated community

Legal Boundaries for RTR in Malaysia?

- International guidelines prescribe a case-by-case approach where the coastal state may allow an offshore installation, or part thereof to remain on the seabed, focusing on impact of decommissioning to maritime navigation, environmental protection and other uses.

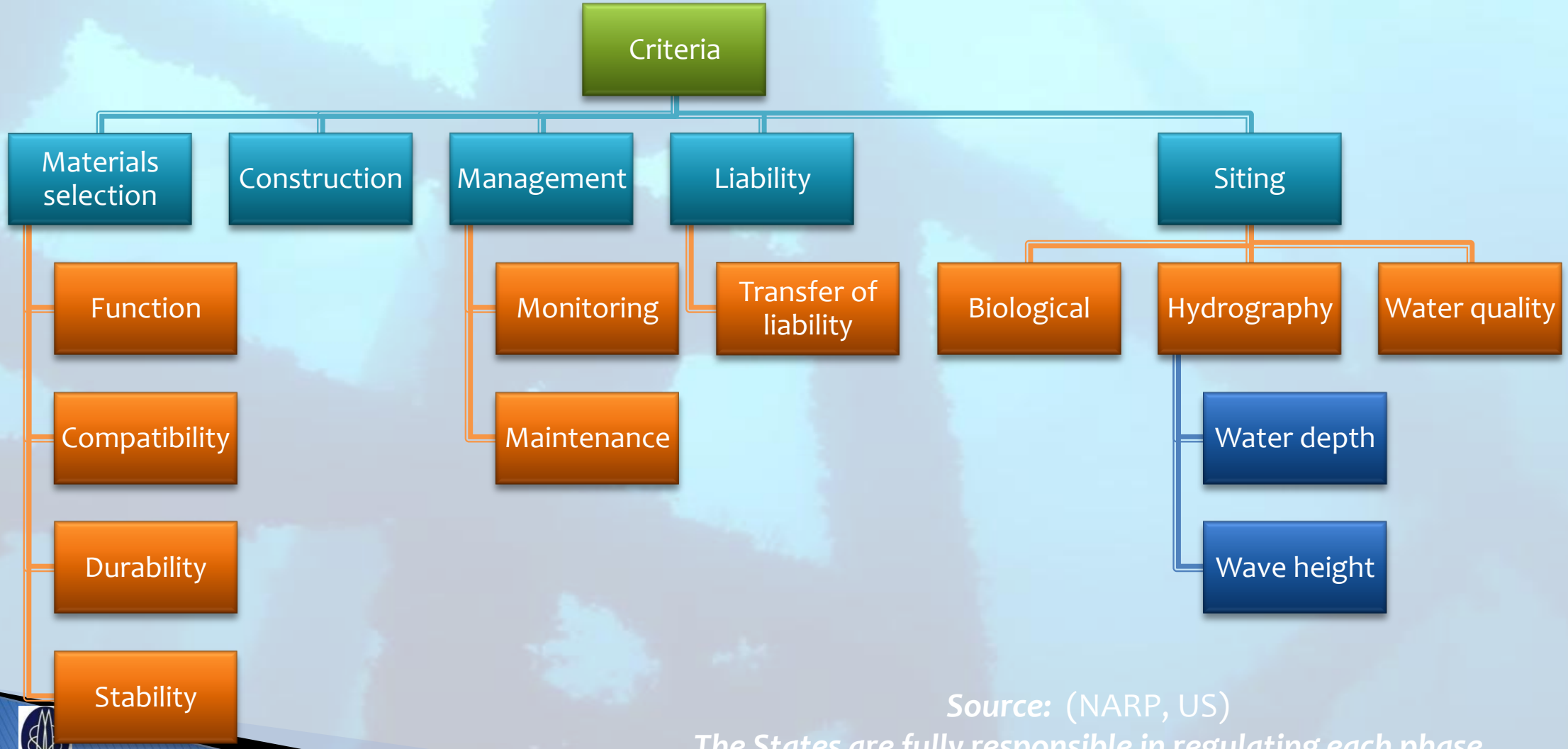
- On RTR - IMO Guidelines indicated that where living resources can be enhanced by the placement on the seabed of material from removed installations, such material should be located well away from customary traffic lanes, and other relevant standards for the maintenance of maritime safety (Paragraph 3.3).

Legal Boundaries for RTR in Malaysia (cont..)

- It gives the States the flexibility to find other alternative uses.
- Similarly, regional and industrial guidelines recommends complete removal but allows provision for other alternatives of decommissioning.

Of Course, Not All Platforms Qualify As An Artificial Reef

Criteria for Reefing a Rig



Source: (NARP, US)

The States are fully responsible in regulating each phase

Jackets: size and types

- Fixed offshore structures are conventionally constructed from medium grade structural steels, with yield strengths typically in the range of 350MPa. This value covers most fixed offshore structures globally.
- The types of platforms in Malaysia range from manned, unmanned, wellhead and central processing platforms, with the heaviest jacket weighing 9990 MT – mostly X braces for new jackets.

How strong are the jackets?

- Where are the weak parts where fatigue will be first felt?
  - Critical fatigue locations : Weld points / joints – due to geometric parameters, distortion of joint and non uniform distribution of stress
- Operating experience of platforms has shown that the number of occurrences of fatigue cracks is not as high as would be expected considering the conservatism in the fatigue design process and implicit conservatism in the S-N curves.

Fatigue monitoring

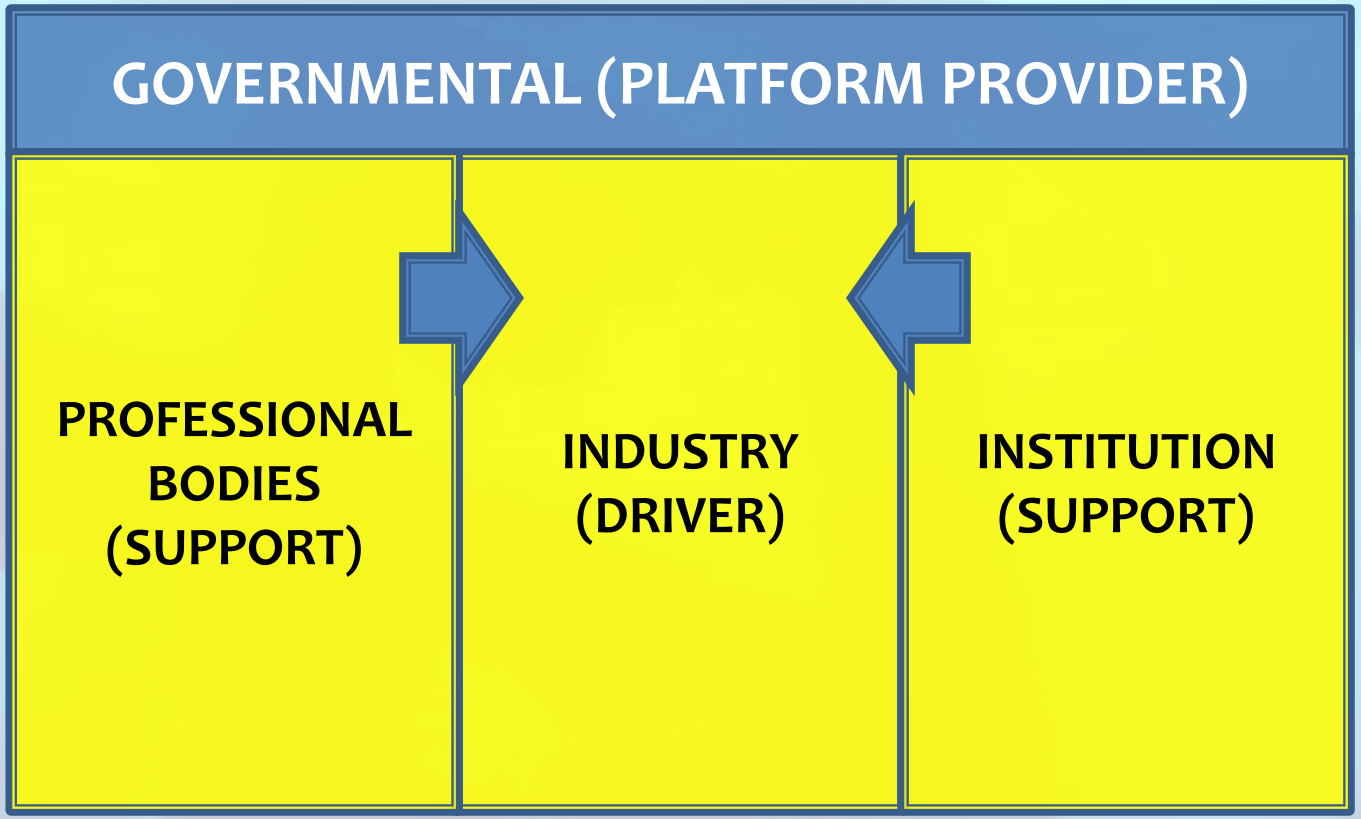
- Fatigue is monitored through visual inspections of fatigue cracks.
- Fatigue cracking may occur in platforms of any vintage due to fabrication defects, installation damage, and at improperly designed appurtenance connections (caissons, sumps, J-tubes, etc).
- Therefore, during the platform design stage, to account for uncertainties, some conservative choices are customarily made, as follows;
  - All joints shall be designed for a nominal fatigue life of twice the design service life of the platform
  - For inaccessible joints, eg. joints enclosed by plates/tanks, the fatigue life shall be designed with safety factor of 4 instead of 2 at the discretion of the client
  - For marginal platforms designed for reuse, safety factor of 4 may be applied at the discretion of the client

Is there a local need?

- Following the success of BARAM – 8, Sarawak state department has actively been seeking engagement with stakeholders.
  - Department of Marine Fisheries, Sarawak has assumed ownership/liability at new reef site.
  - Strong support from key stakeholders; mainly local fishermen
  - Keen interest in expanding number of RTR

Local Initiatives for RTR

The effort has to be a multi-partite as it is interdisciplinary in nature



Initiatives & Enablers

The Government

1. Platform Providers – **integration and consolidation** of working ministries to provide systematic platform
2. Determination of **favorable growth policies**
3. **Provision of Economic Drivers** – i.e *A total of RM24.4 million was earmarked for building artificial reefs under the 9th Malaysia Plan. The Fisheries Department is looking at another RM25 million to build more artificial reefs in Malaysian waters to restore fishery resources.*
4. WHO? **NOD MOSTI, DOF, DOE, MECC, EPU, etc**

Initiatives & Enablers

The Industry

MOGSC CTWG *Multi-prong approach*	**Standard bearers for Malaysia O&G industry**
	Achieved by: • **Contractor Database** • **Core Competency Training Program**
	How? **Leverage on existing government & institutional accreditation on technical expertise – ensure competent human resources**

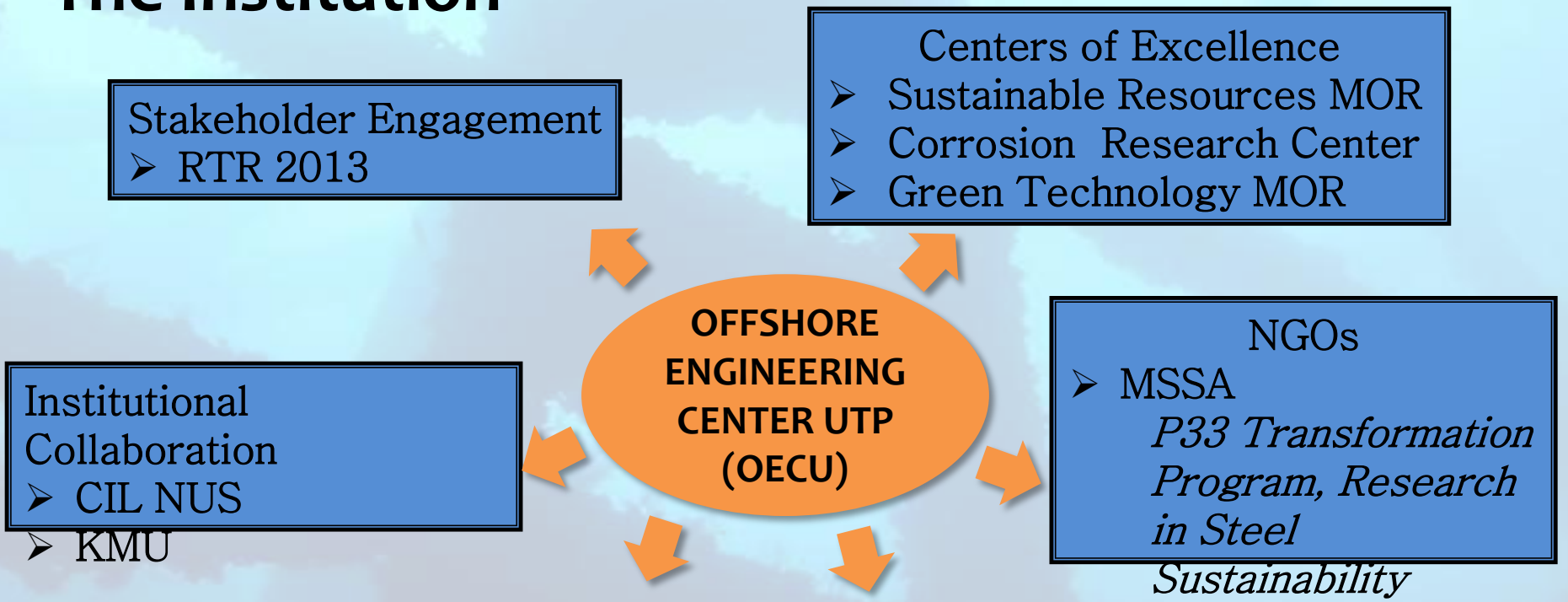
Initiatives & Enablers

The Industry

MSSA *Transformation Initiative*	**Promotion of new and appropriate use of technology and research in structural steel industry**
	Achieved by: • **Engaging active steel consultancies** • **Engaging stakeholders from the industry & public**
	How? **Leverage on** • **The Government – Policies, stakeholders' needs** • **Institutions – Technical expertise & research**

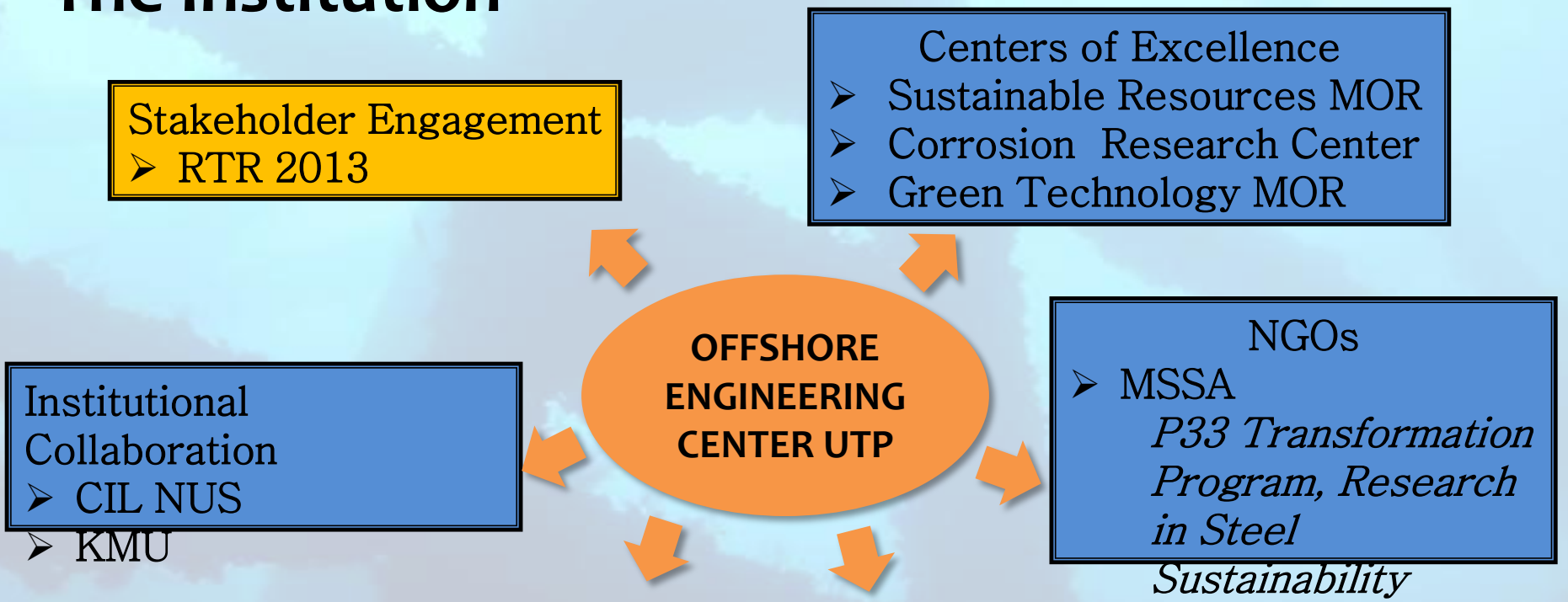
Initiatives & Enablers

The Institution



Initiatives & Enablers

The Institution



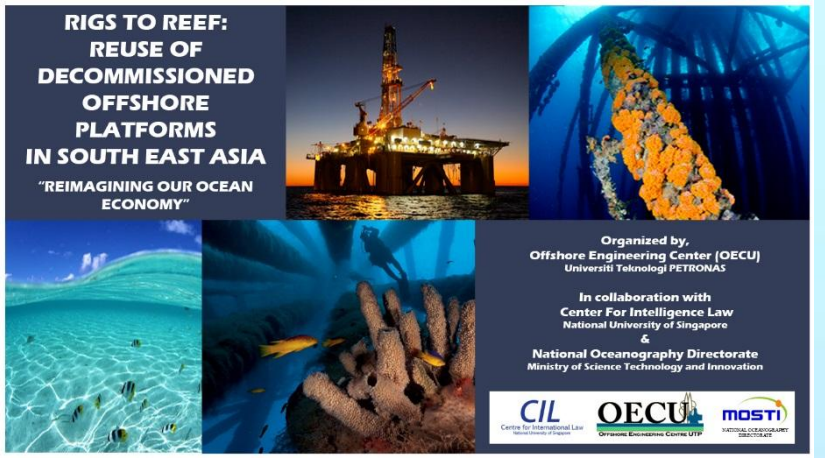
RTR 2013, Malaysia

- The workshop is the first platform that brought together various stakeholders
- The objective is to explore ideas and concerns with regards to various interests/values by different stakeholders.

MIMA: http://www.mima.gov.my/mima/exploring-the-potential-of-introducing-rigs-to-reefs-project-in-malaysian-waters/

RTR'13: 19th Sept 2013, KL jointly organized by OECU UTP, NOD MOSTI & CIL NUS

Identified Way Forward



Develop policies that recognizes RTR benefits (multiple stakeholders)

Establish a one stop center for PETRONAS to reach to the RTR program

Identify research and studies necessary for continuous optimization of design and application of RTR

Create extensive awareness Among multiple stakeholders

Good opportunity to address food security

CONCLUSION

- There is no law specifically prohibiting RTR. RTR maybe a viable and preferable option in some sea areas. To further explore, focus is needed on
  - Paradigm Shift on alternative reuse of old offshore platforms
  - Supportive Policy
  - Widespread Awareness
  - Leveraging on collaborative synergies

- RTR could be more economical, environmentally feasible and safer compared to the conventional AR which have to be fabricated first.
- Each RTR should be planned on a case by case basis for fit-for-purpose implementation.
- Public awareness is crucial.
- Cooperative initiatives between the Government, Institutions and private bodies should be initiated immediately.

THANK YOU……

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RTR scenario in Malaysia

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