

An Overview of Global Decommissioning- Opportunities and Challenges

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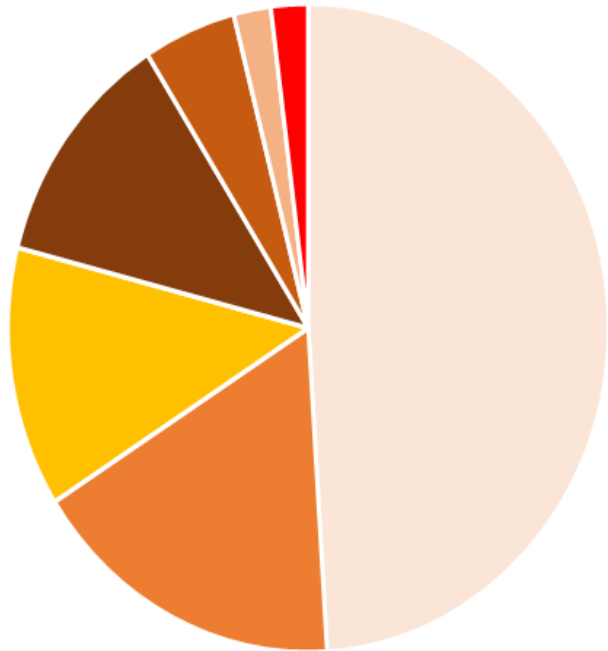


State of Play



- Globally emphasis is on maximising economic recovery (MER)
- Uptick in life extension projects (IOR, EOR and redevelopments) but also seeing an uptick in decommissioning activity
- Globally the cost of decommissioning is expected to be worth over USD\$200 billion; areas of opportunity will include offshore APAC, Brazil, GCC and West Africa in future
- New areas for decommissioning present their own unique sets of challenges; mainly regulatory and legislative in nature
- Standalone decommissioning projects on the rise; also seeing decommissioning as part of redevelopment programmes in Europe, APAC and the GCC

Decommissioning spend breakdown



- Well plug and abandonment
- Operator costs
- Removals
- Subsea infrastructure and pipelines
- Topside, equipment and pipeline prep
- Platform recycling
- Site remediation and monitoring

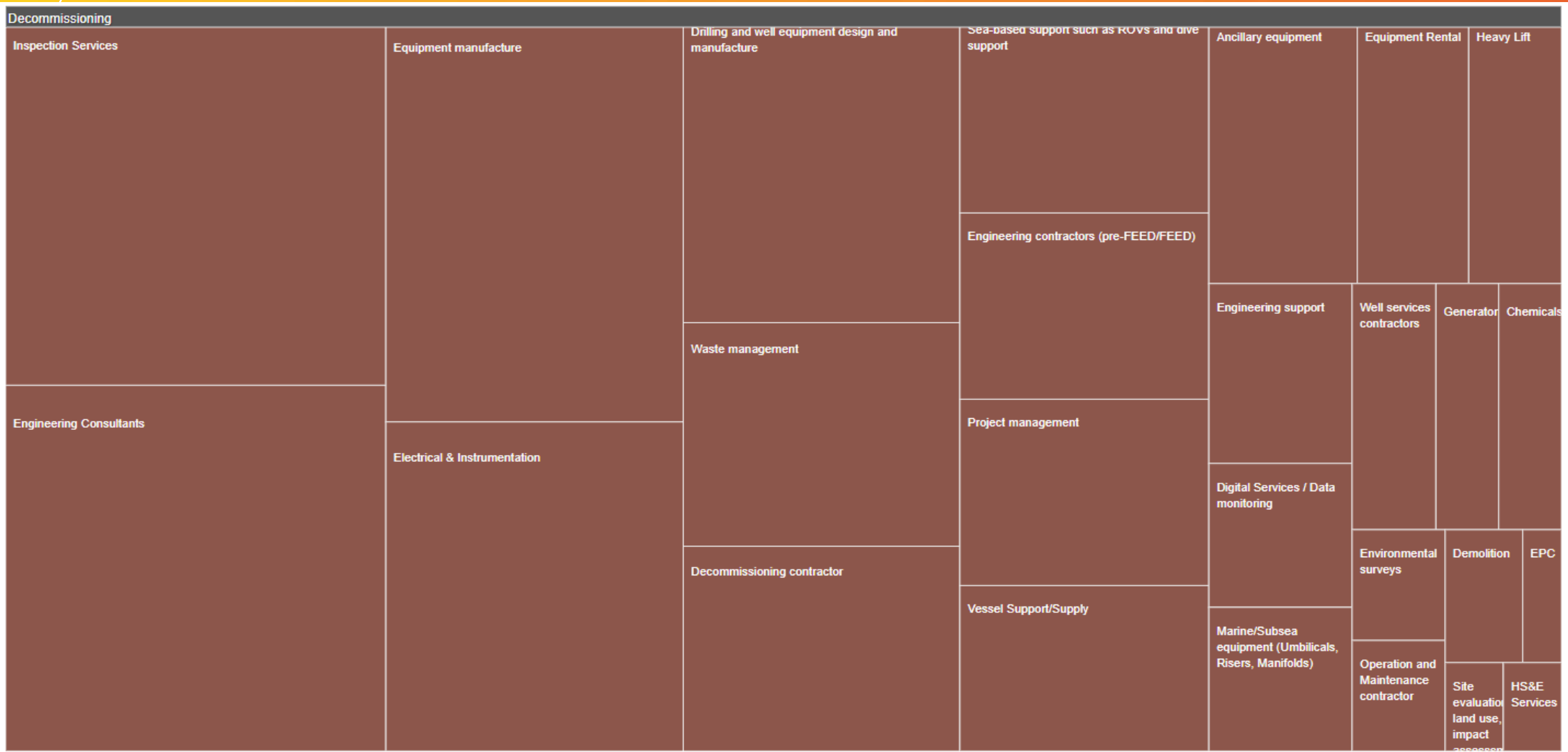
Decommissioning Service	% of overall spend
Well plug and abandonment	49
Removals	13
Topside, equipment and pipeline prep	5
Operator costs	17
Subsea infrastructure and pipelines	12
Platform recycling	2
Site remediation and monitoring	2

UK excels at: subsea, topsides, late life asset management, inspection services and technology

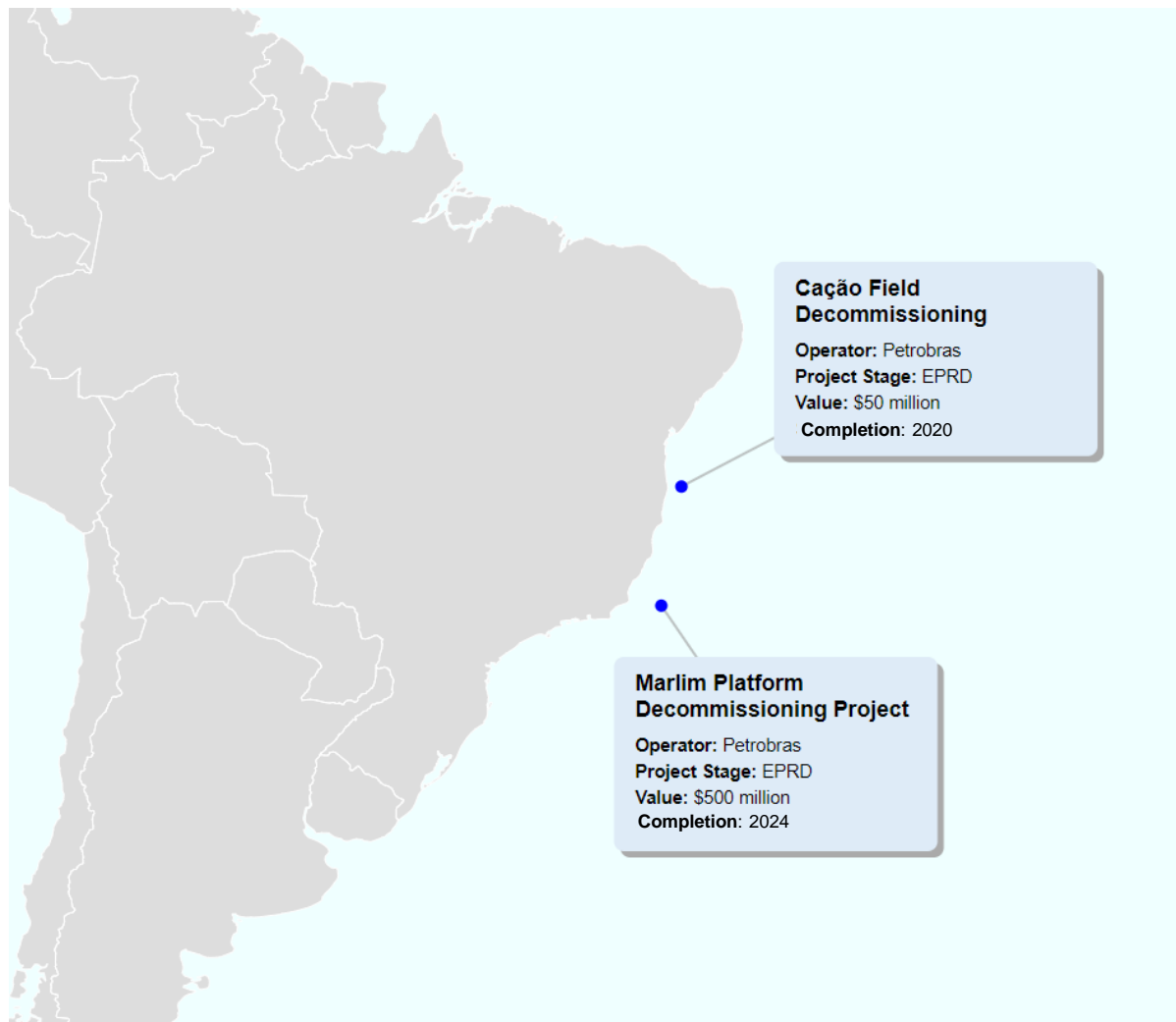
UK Decommissioning Capabilities



Source:
EICSupplyMap



Decommissioning Brazil - Opportunities



- Brazilian market is thought to be worth \$12.6 billion between 2020 to 2040
- 15 to 20 offshore structures in the pipeline for decommissioning by the end of 2020

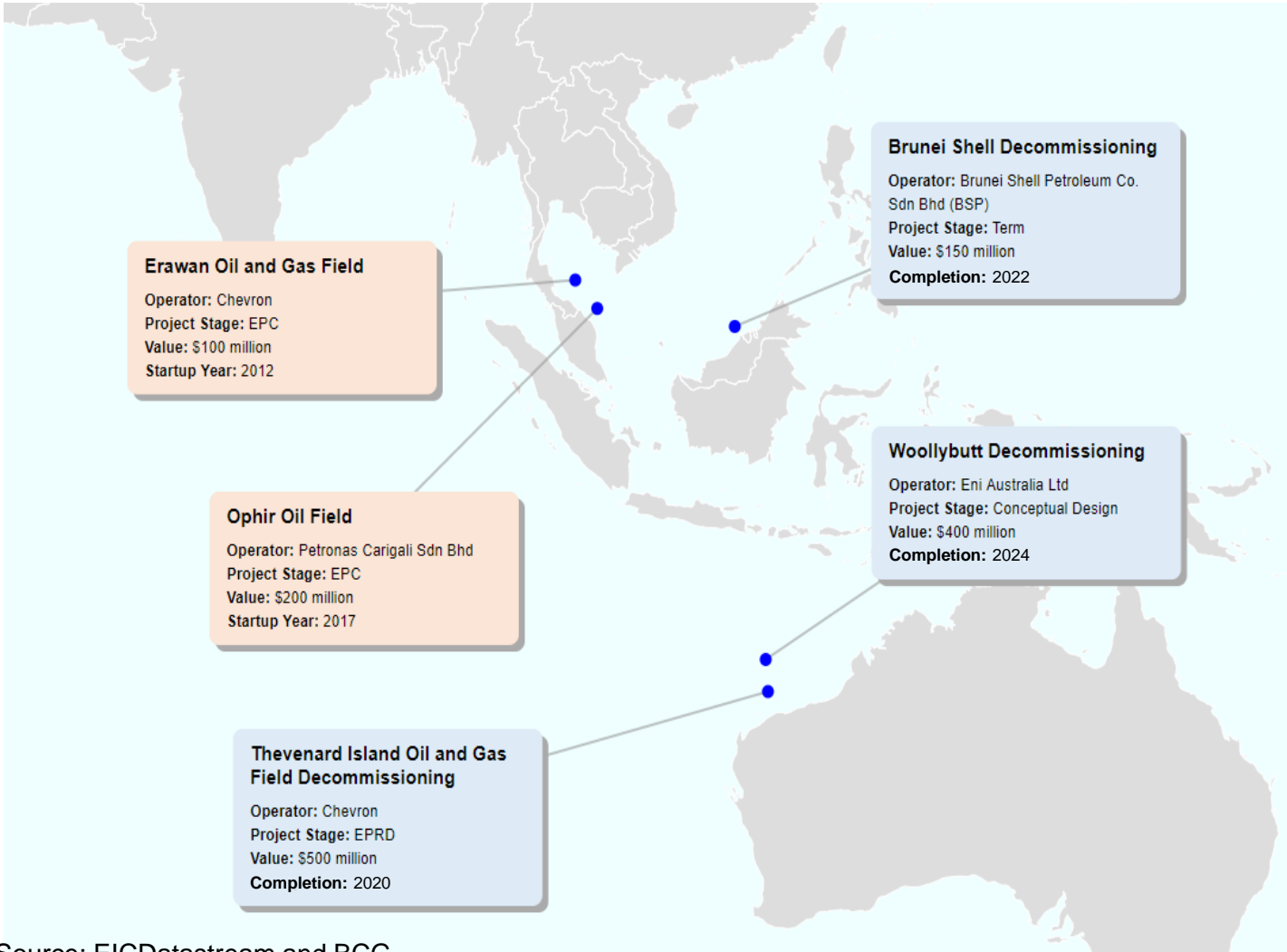
Asset name	Infrastructure to be decommissioned
Bicudo	P-7 semi-sub platform
Linguado	P-12 semi-sub platform
Pirauna	P-15 semi-sub platform
Marlim	P-33 FPSO
Espadarte	Cidade do Rio de Janeiro FPSO
Piranema	Piranema Spirit FPSO



Decommissioning Brazil - Challenges

- Decommissioning regulations are a work in progress; technical aspects and broader liability aspects still require development
- Sales of mature assets in the region are complicated
- Lack of isolation for decommissioning funds; generates risk that guarantees may not be useful at the time of a company's insolvency
- Investment in decommissioning postponed by redevelopments- obscures the decommissioning timeline for projects; Campos Basin
- Social issues; the choice between dismantling a platform versus rig-to-reef could cause the spread of invasive coral species
- Demand in the sector from only one player- Petrobras

Decommissioning APAC - Opportunities



- **Australia-** \$24 billion over next 30 years
- **Malaysia-** Petronas intends to spend around \$2 billion over the next 5 to 10 years
- **Thailand-** around 450 platforms; of these over 18% have been in operation for more than 20 years
- **Indonesia-** over 630 offshore platforms; over 900 pipelines; over 60 subsea systems; over 1,400 wells
- **Brunei-** around 214 offshore platforms; 1,407 wells; 5,500 km of pipelines

Decommissioning APAC - Challenges

Each country in the region has its own unique set of challenges:

- Decommissioning liabilities in Thailand are confused; Erawan and Bongkot assets
- Lack of clear decommissioning regulations in Indonesia, lack of appetite from Pertamina, lack of infrastructure information/out of date infrastructure information
- Lack of clear project pipeline for Malaysia despite spending pledge
- Decommissioning regulations in Australia are untested on a large-scale project
- Environmental legislation in several APAC countries is not clear



Future of the decommissioning industry

- Worth around \$200 billion over the next 20 years; inevitable
- Lessons learned in mature areas can carry over into frontier markets
- Transparency, clarity, early engagement, cost control and planning are all key
- The name of the game is cost reduction
- New technologies will help with reducing costs especially in the well P&A space
- Potential for operators and contractors who specialise in decommissioning as opposed to case-by-case
- Potential for the utilisation of ready-to-be decommissioned assets for CCUS?