Global Oil and Gas Update

March 2020

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Energy Industries Council

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  - Decommissioning – UK and globally
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- Summary

Introduction to the EIC

- Not-for-profit energy trade association, established in 1943
- For companies supplying goods and services to global energy industries
- Help our members identify where global business opportunities exist and to assist them in making connections with key operators and contractors
- Services that we provide include:
  - Market intelligence – EICDataStream, EICAssetMap, EICSupplyMap, Reports, Newsbriefs
  - National Events – EIC Connect, Business Presentations, Export Showcases
  - Overseas Events – Delegations, Exhibitions
  - Global network of offices – Dubai, KL, Houston and Rio
- Approximately 60 staff in UK and overseas
- Over 700 members active in various energy sectors

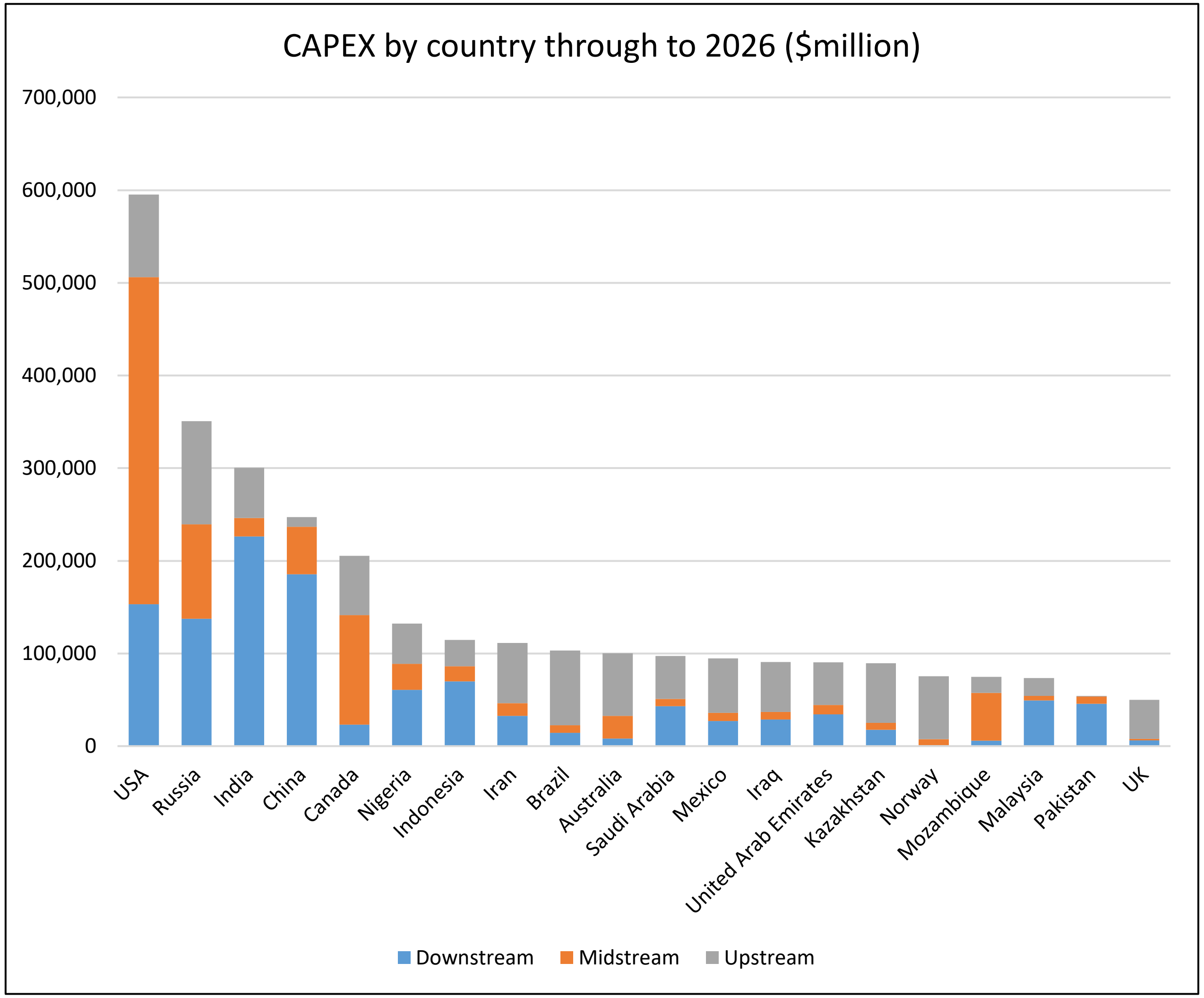
Current state of play – Oil and Gas

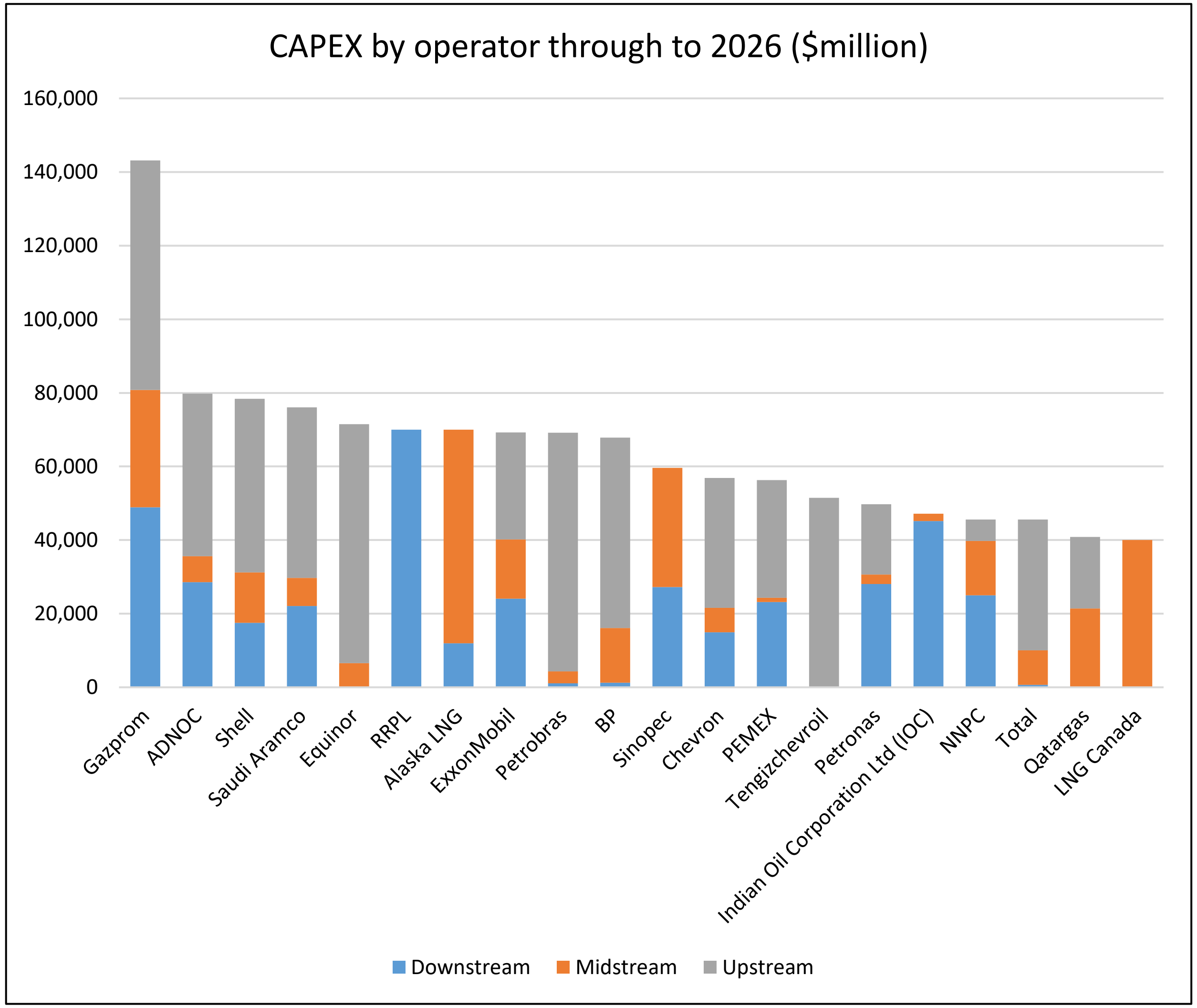
- Energy Transition – impacts all parts of the O&G industry, Operator, EPC through to SME.
  - Major operators – now referring to selves as Energy companies, not Oil & Gas
  - SME's will be asked to show how they are reducing Carbon Emissions as part of future tendering process. Could this inadvertently see the increase use of local suppliers vs overseas suppliers in the future?
  - Emergence of new sectors including Hydrogen/CCUS
  - Stranded oil in the future? Gas generally seen as the transition fuel……..oil still has an important role to play.
  - O&G supply chain has an important role to play with synergies across sectors. North Sea will be a breeding ground for new technologies

Current state of play – Oil and Gas

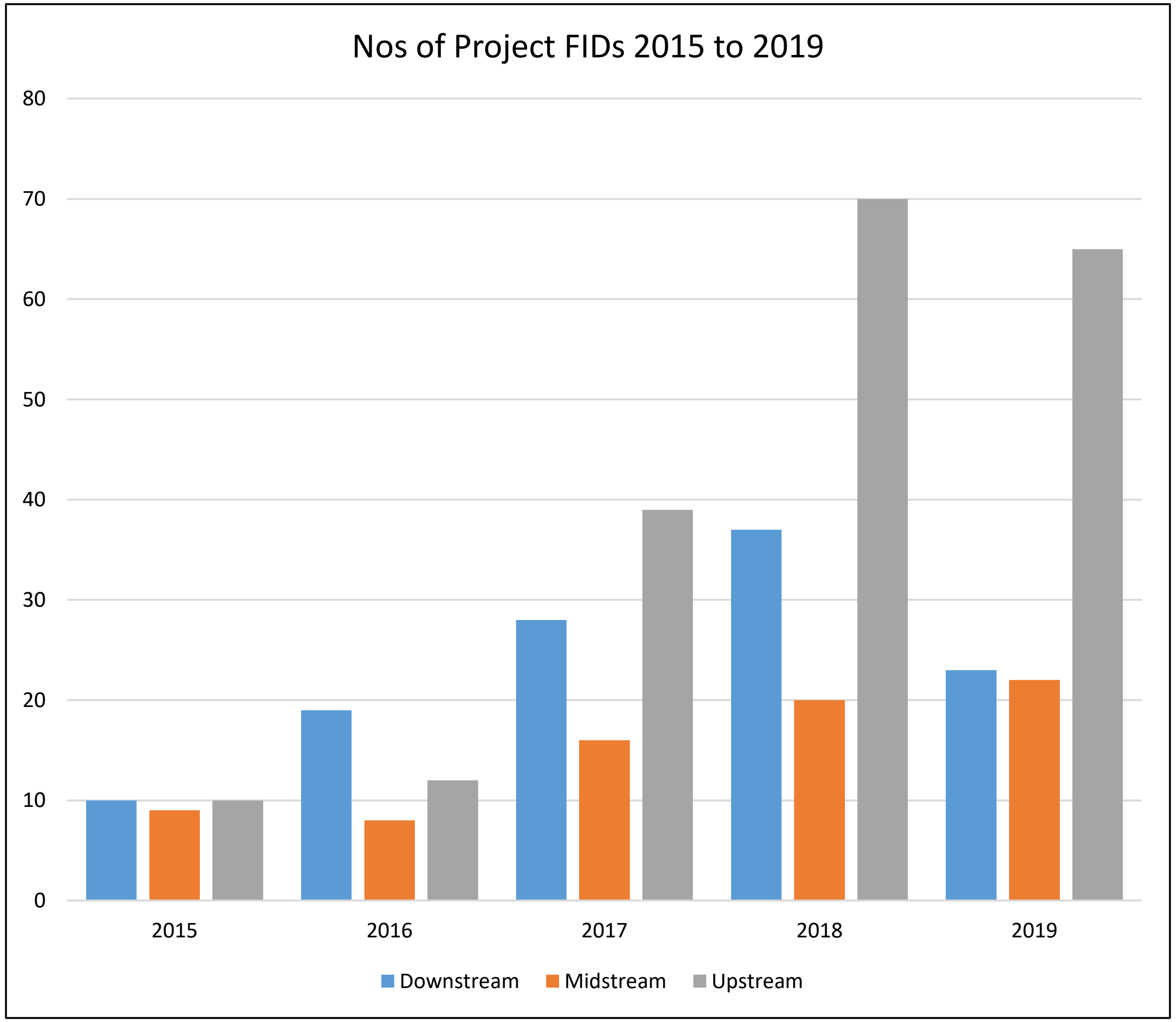
- Oil price volatility remains – geopolitics; global demand projections; US-China tensions; global economic slowdown……and now Covid-19……and now oil price crash
- Disciplined capital expenditure remains. Major projects are moving forward.
- Energy majors have mentioned possibility of an EPC cost and capacity crunch in 2020…….impact of Covid-19 on projects/contracts rumour or fact?
- Subsea players see reduced backlog but rising levels of early engagement and tendering. Pipeline of opportunities seen to be positive. Offshore campaign increase 2020/21
- Rise of decommissioning opportunities in mature basins – reduction of costs and embracing of new technology
- Mergers & Acquisitions - majors continuing to sell up non-core assets, ExxonMobil

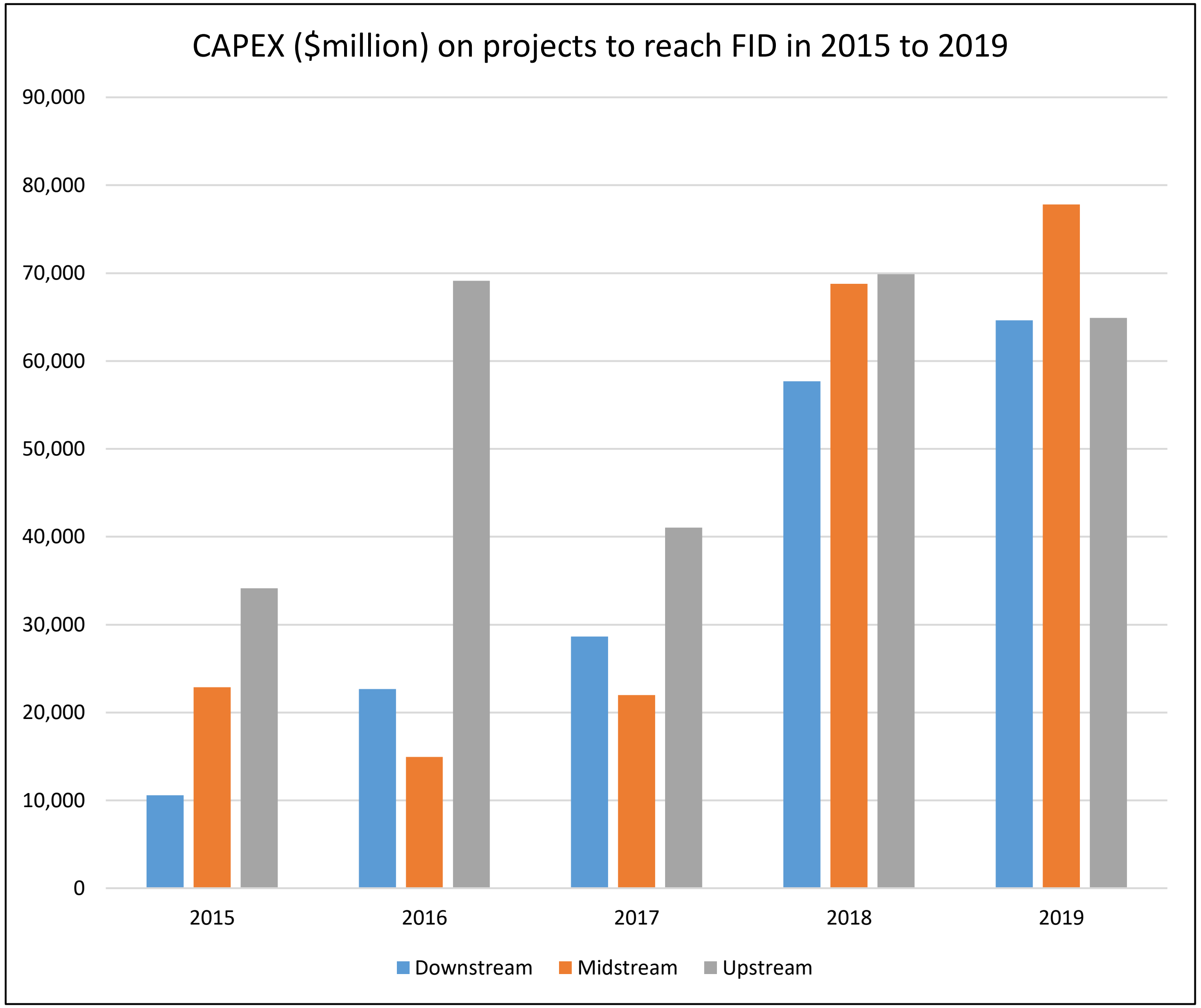
Oil and gas project CAPEX ($Billion) - country and operator 2020/2026



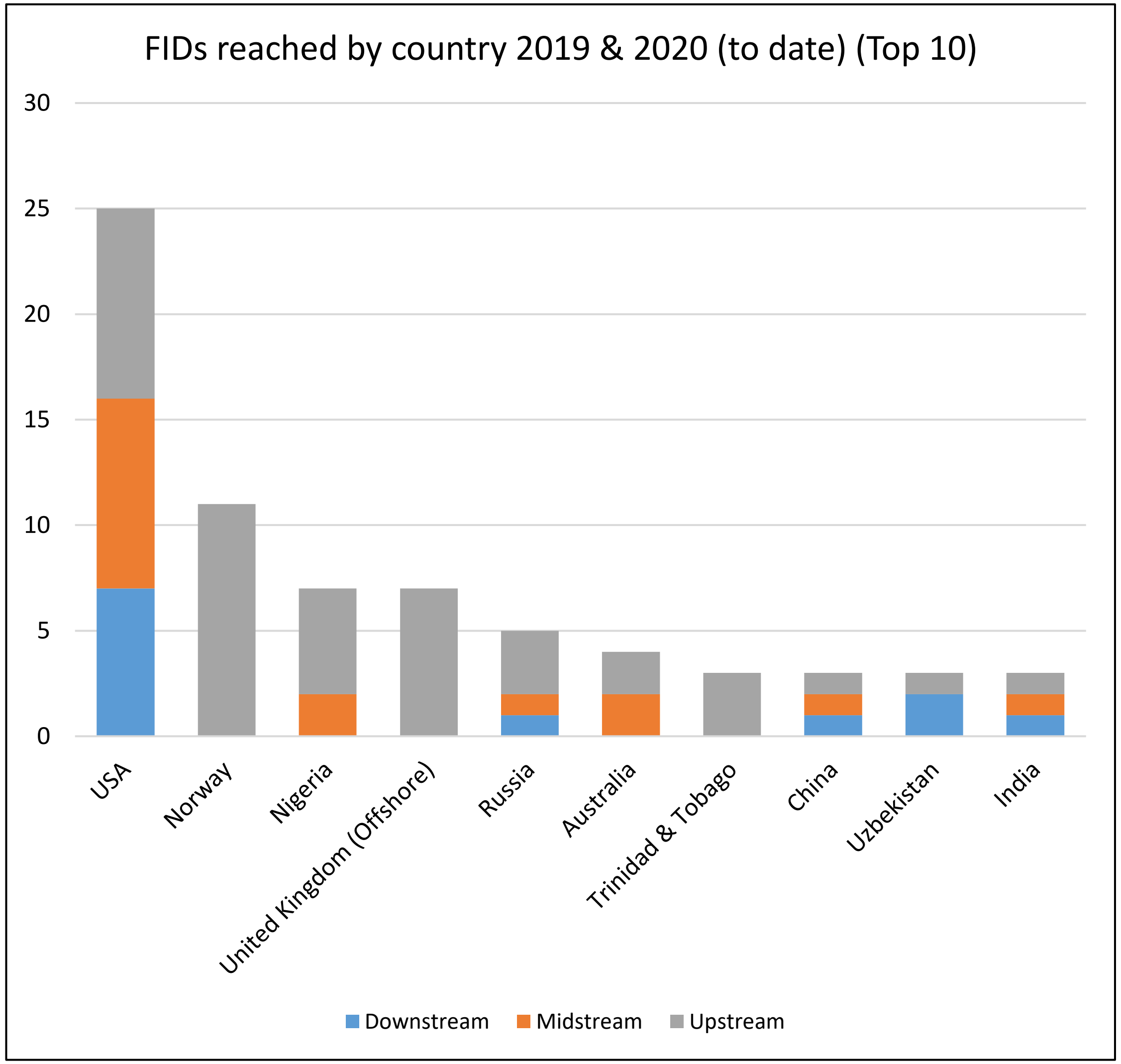


Project FIDs – 2015 to 2019



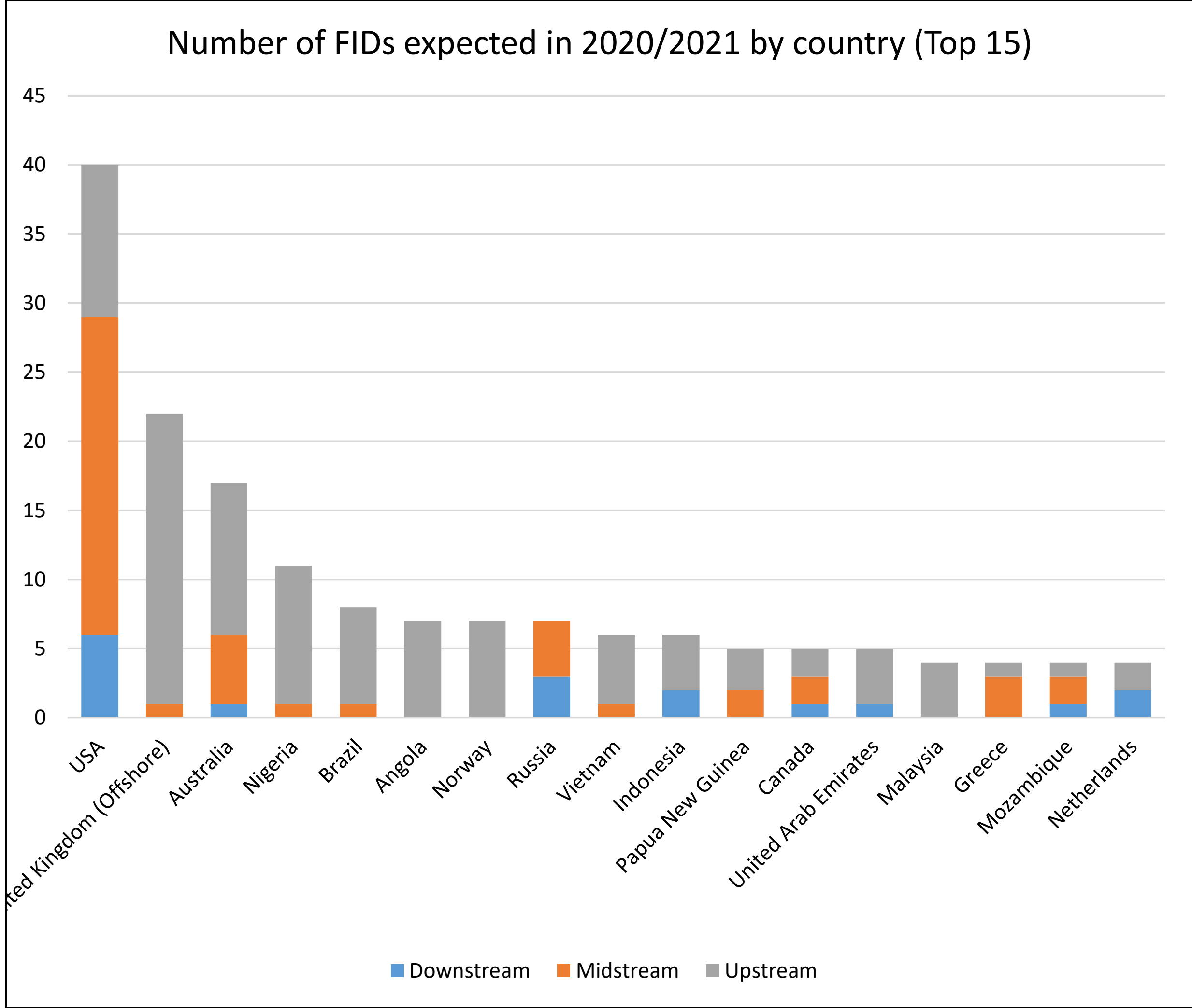


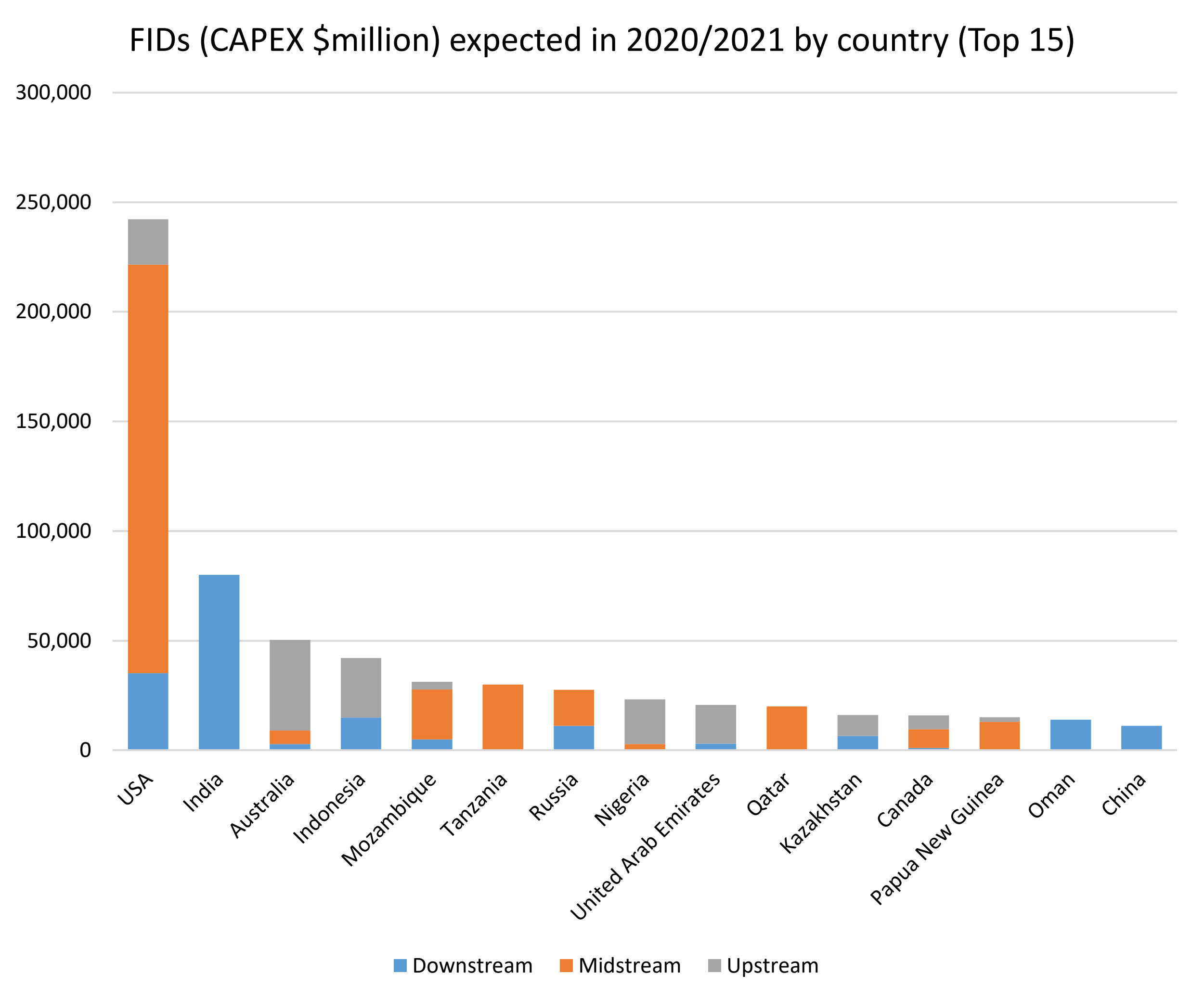
Project FIDs – Countries and projects (2019)



Project Name	Country	CAPEX $million
Amur Gas Processing Plant	Russia	22,400
Arctic LNG-2	Russia	21,000
Mozambique LNG Project (Phase 1)	Mozambique	15,000
Golden Pass Products LNG Expansion Liquefaction Plant & Export Pipeline	USA	10,000
Gulf Coast Growth Ventures Project (GCGV) - San Patricio PetChem Facility	USA	7,300
Sitra Refinery - Upgrade	Bahrain	6,300
Pachpadra (Barmer) Refinery and Petrochemical Complex - Rajasthan	India	6,061
Azeri Central East Project	Azerbaijan	6,000
Liza Oil Field (Phase 2)	Guyana	6,000
VG Calcasieu Pass LNG Export Plant	USA	5,800
Anchor uHPHT Field Development - Phase 1	USA	5,700
Sebastopol Refinery	Colombia	5,000
NLNG: Train 7 - Bonny Island	Nigeria	4,500
Sangomar Field Development (formerly SNE Development) Phase I	Senegal	4,200
Area 1 - Golfinho-Atum Development	Mozambique	4,000
Assa North/Ohaji South Gas Plant	Nigeria	3,500
Alberta Propane Dehydrogenation and Polypropylene Plant	Canada	3,428
OML 13 Cluster Development (7CGDP)	Nigeria	3,150
Beaumont Refinery Expansion - Third Crude Distillation Unit ("Crude C")	USA	3,000
Mero Oil & Gas Field (Phase 2 - Sepetiba FPSO)	Brazil	3,000

Project FID potential – 2020/21

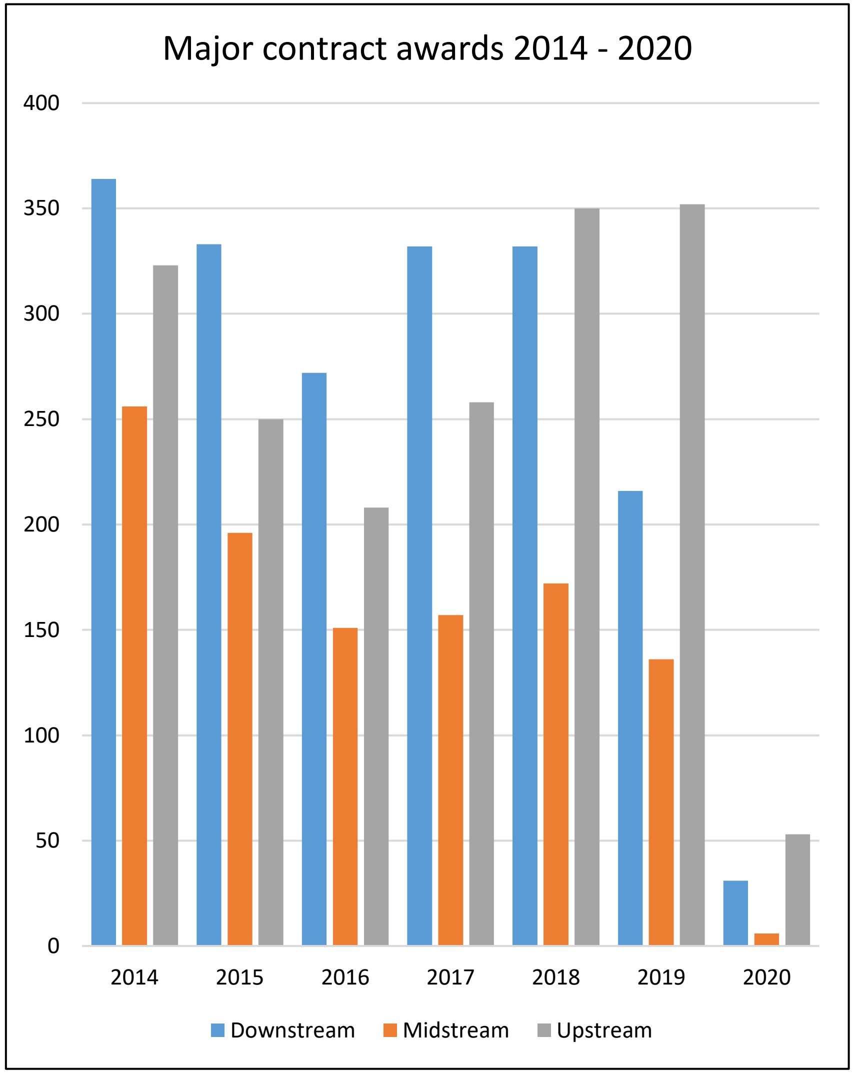


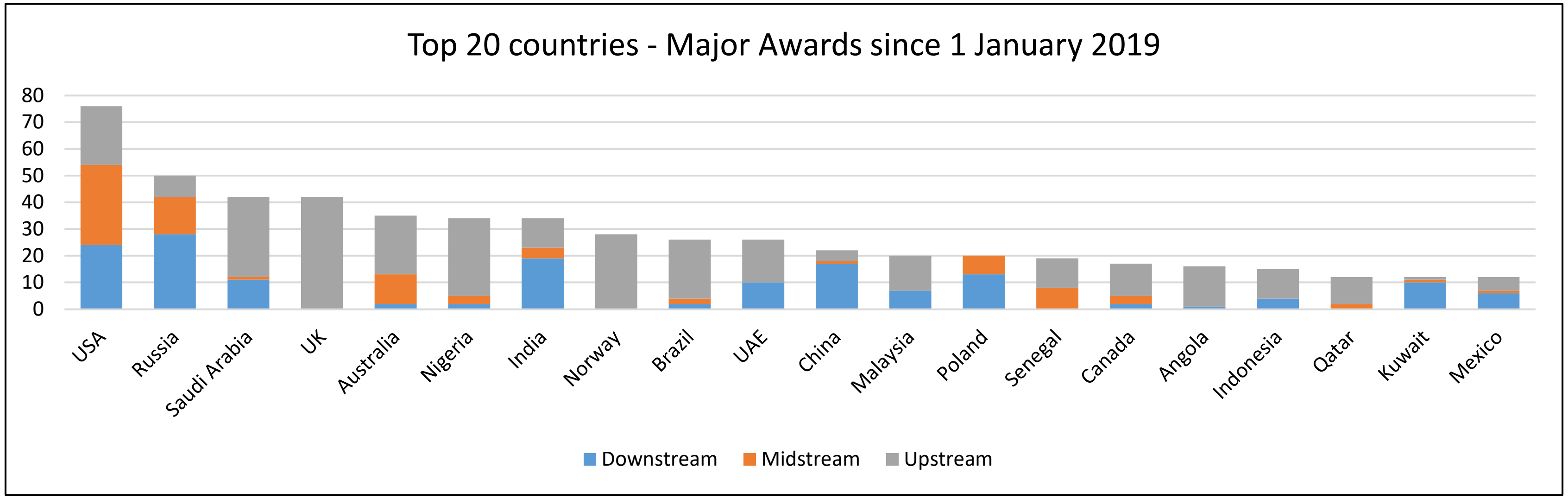


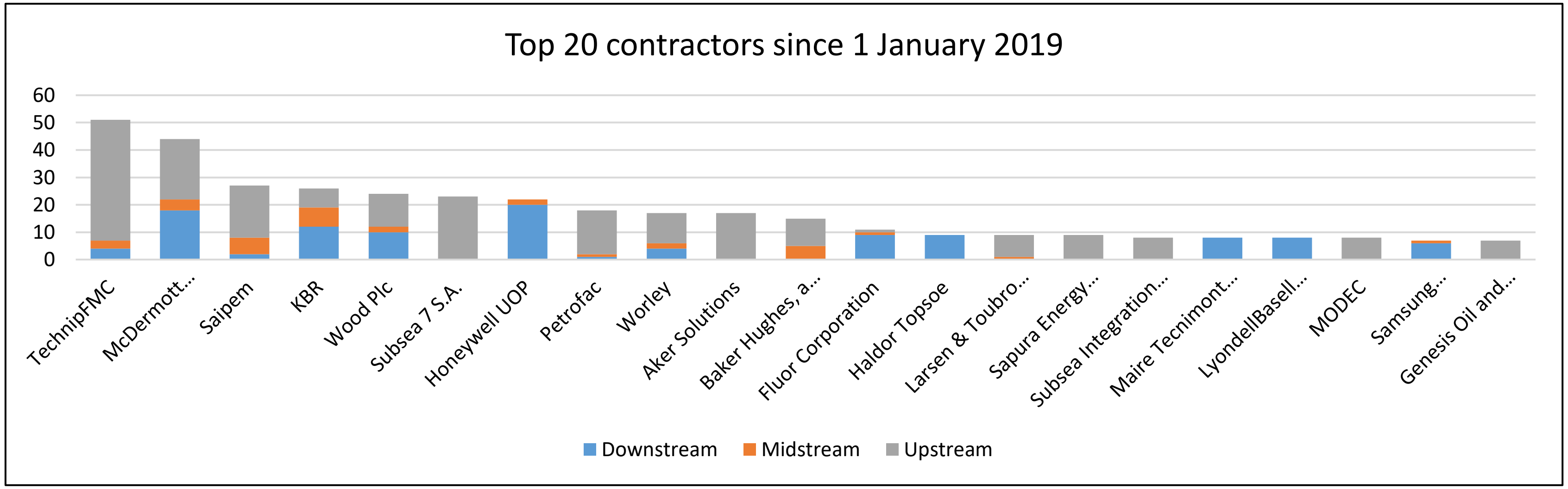
Project FID potential – 2020/21 – key projects

Project Name	Operator	Country	Sector	Estimated CAPEX ($million)	Estimated FID
Maharashtra Grassroots Refinery and Petrochemical Complex	Ratnagiri Refinery and Petrochemicals Ltd	India	Downstream	70,000	H2 2021
Abadi Gas Field (Masela)	Inpex	Indonesia	Upstream	20,000	Q4 2021
Ras Laffan - Qatargas - NFE - LNG Four Liquefaction Trains	Qatar Gas	Qatar	Midstream	18,000	Q4 2020
Browse Upstream Development (Torosa, Brecknock & Calliance Fields)	Woodside	Australia	Upstream	15,000	H2 2021
Abu Dhabi North West Development - Hail and Ghasha Sour Gas Development	ADNOC	United Arab Emirates	Upstream	15,000	H1 2020
Main Pass Energy Hub (MPEH) LNG Export Terminal	Global LNG Services AS	USA	Midstream	15,000	H1 2021
Lake Charles LNG Liquefaction Plant - Trunkline LNG Export	Shell	USA	Midstream	12,300	H2 2020
Rovuma LNG Liquefaction Plant	Mozambique Rovuma Venture	Mozambique	Midstream	12,000	H1 2020
Bonga Southwest & Aparo Oil Fields - OML 118, OML 132 & OML 140	Shell	Nigeria	Upstream	10,000	H2 2020
Jordan Cove LNG Liquefaction Plant	Jordan Cove Energy Project LP	USA	Midstream	10,000	H1 2020
Cameron LNG Liquefaction Plant Expansion (Trains 4 and 5)	Cameron LNG	USA	Midstream	10,000	H2 2021
Port Arthur LNG Liquefaction Facility (Sempra)	Sempra Energy	USA	Midstream	10,000	H2 2020
Belmont County Ethane Cracker	PTTGC	USA	Downstream	10,000	H1 2020
Corpus Christi LNG Liquefaction Plant, Train 4 and 5	Cheniere Energy	USA	Midstream	10,000	H2 2020
Port Arthur LNG Liquefaction Facility Expansion (Sempra)	Sempra Energy	USA	Midstream	10,000	H1 2021
Port Arthur Integrated Petrochemical and Chemical Complex	Motiva Enterprises LLC	USA	Downstream	9,720	H2 2021
Duqm - DRPIC Petrochemicals Complex	DRPIC	Oman	Downstream	9,000	H2 2020
Elk-Antelope LNG Liquefaction Project (Papua LNG)	Total	Papua New Guinea	Midstream	8,000	H1 2021
Payara Oil Field	ExxonMobil	Guyana	Upstream	6,500	H1 2020
Indonesia Deepwater Development (Gendalo, Gehem and Gandang Fields)	Chevron	Indonesia	Upstream	6,000	H2 2020

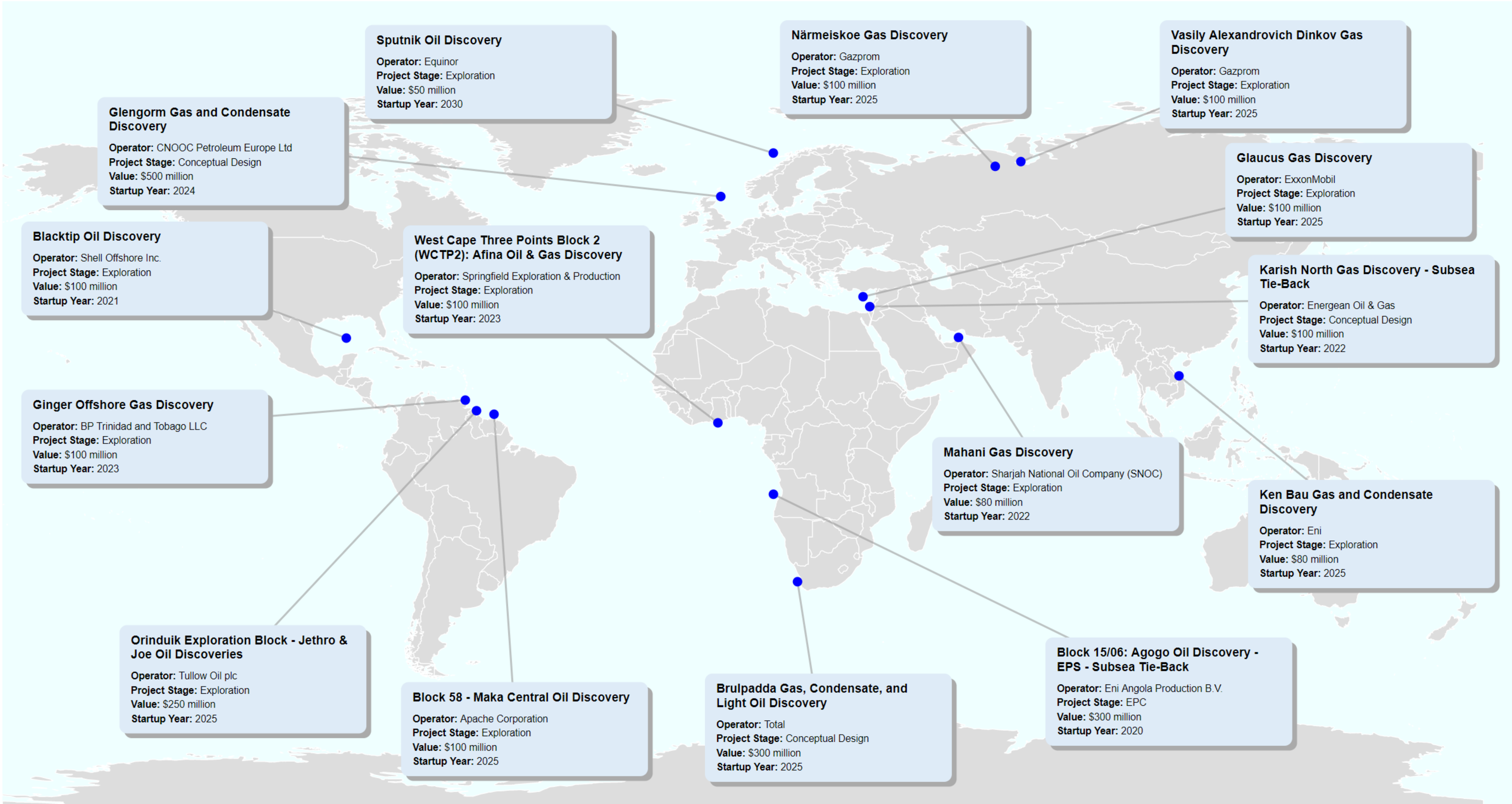
Current state of play – Contract activity 2019



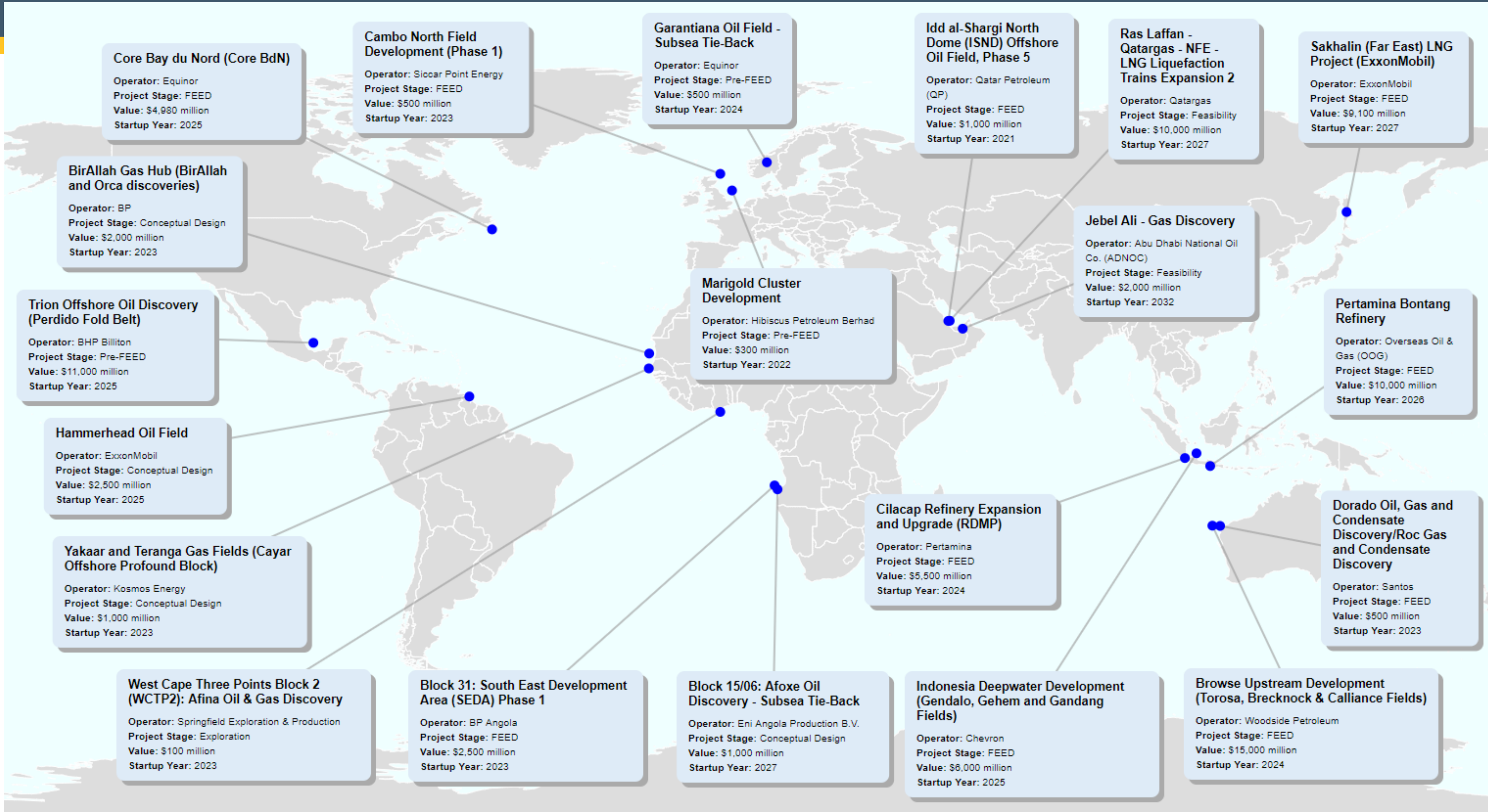




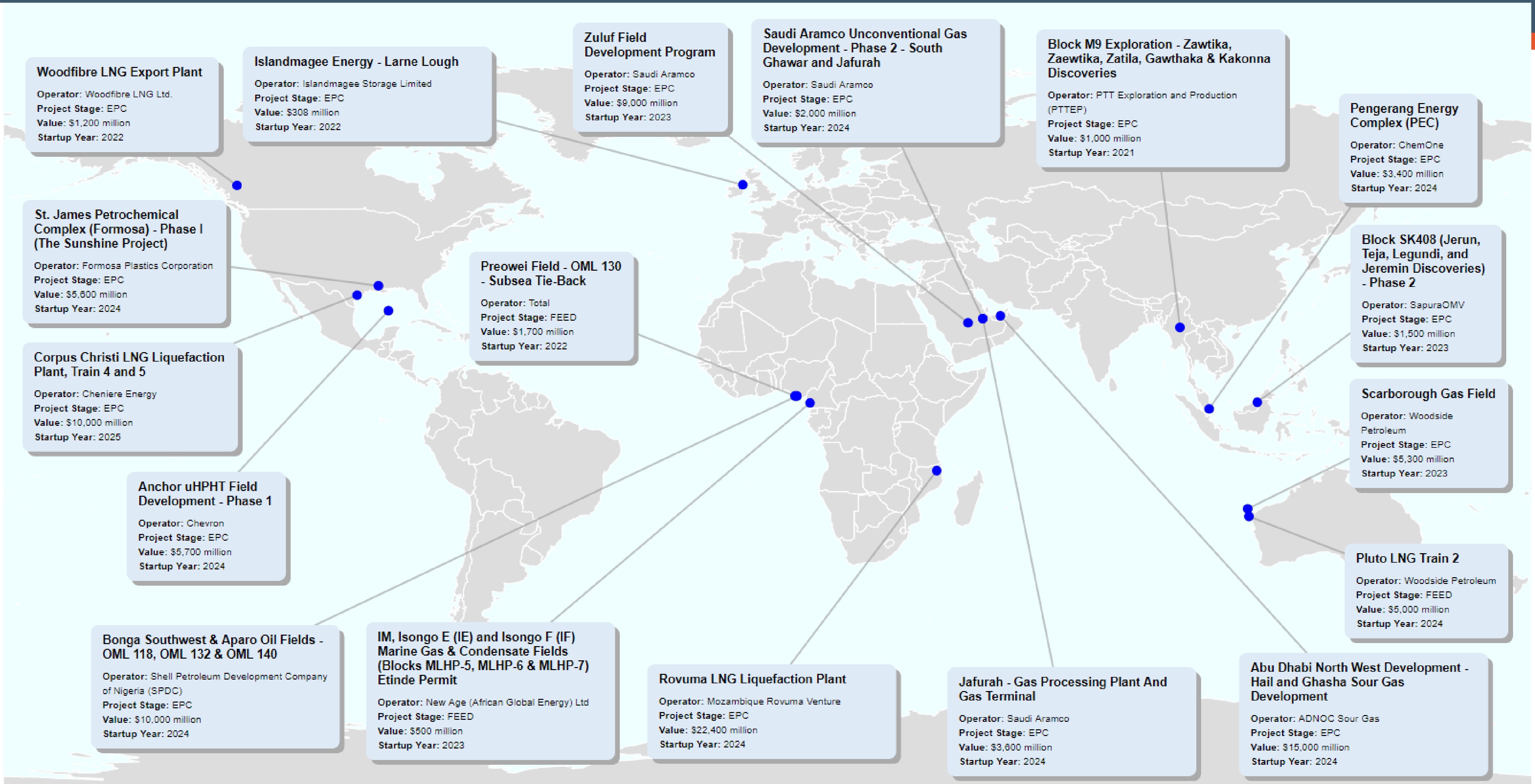
Upstream – 2019/20 discoveries



Early Stage Projects



Late Stage Projects



Woodfibre LNG Export Plant
Operator: Woodfibre LNG Ltd.
Project Stage: EPC
Value: $1,200 million
Startup Year: 2022

Islandmagee Energy - Larne Lough
Operator: Islandmagee Storage Limited
Project Stage: EPC
Value: $308 million
Startup Year: 2022

Zuluf Field Development Program
Operator: Saudi Aramco
Project Stage: EPC
Value: $9,000 million
Startup Year: 2023

Saudi Aramco Unconventional Gas Development - Phase 2 - South Ghawar and Jafurah
Operator: Saudi Aramco
Project Stage: EPC
Value: $2,000 million
Startup Year: 2024

Block M9 Exploration - Zawtika, Zaewtika, Zatila, Gawthaka & Kakonna Discoveries
Operator: PTT Exploration and Production (PTTEP)
Project Stage: EPC
Value: $1,000 million
Startup Year: 2021

Pengerang Energy Complex (PEC)
Operator: ChemOne
Project Stage: EPC
Value: $3,400 million
Startup Year: 2024

St. James Petrochemical Complex (Formosa) - Phase I (The Sunshine Project)
Operator: Formosa Plastics Corporation
Project Stage: EPC
Value: $5,600 million
Startup Year: 2024

Preowei Field - OML 130 - Subsea Tie-Back
Operator: Total
Project Stage: FEED
Value: $1,700 million
Startup Year: 2022

Block SK408 (Jerun, Teja, Legundi, and Jeremin Discoveries) - Phase 2
Operator: SapuraOMV
Project Stage: EPC
Value: $1,500 million
Startup Year: 2023

Corpus Christi LNG Liquefaction Plant, Train 4 and 5
Operator: Cheniere Energy
Project Stage: EPC
Value: $10,000 million
Startup Year: 2025

Scarborough Gas Field
Operator: Woodside Petroleum
Project Stage: EPC
Value: $5,300 million
Startup Year: 2023

Anchor uHPHT Field Development - Phase 1
Operator: Chevron
Project Stage: EPC
Value: $5,700 million
Startup Year: 2024

Pluto LNG Train 2
Operator: Woodside Petroleum
Project Stage: FEED
Value: $5,000 million
Startup Year: 2024

Bonga Southwest & Aparo Oil Fields - OML 118, OML 132 & OML 140
Operator: Shell Petroleum Development Company of Nigeria (SPDC)
Project Stage: EPC
Value: $10,000 million
Startup Year: 2024

IM, Isongo E (IE) and Isongo F (IF) Marine Gas & Condensate Fields (Blocks MLHP-5, MLHP-6 & MLHP-7) Etinde Permit
Operator: New Age (African Global Energy) Ltd
Project Stage: FEED
Value: $500 million
Startup Year: 2023

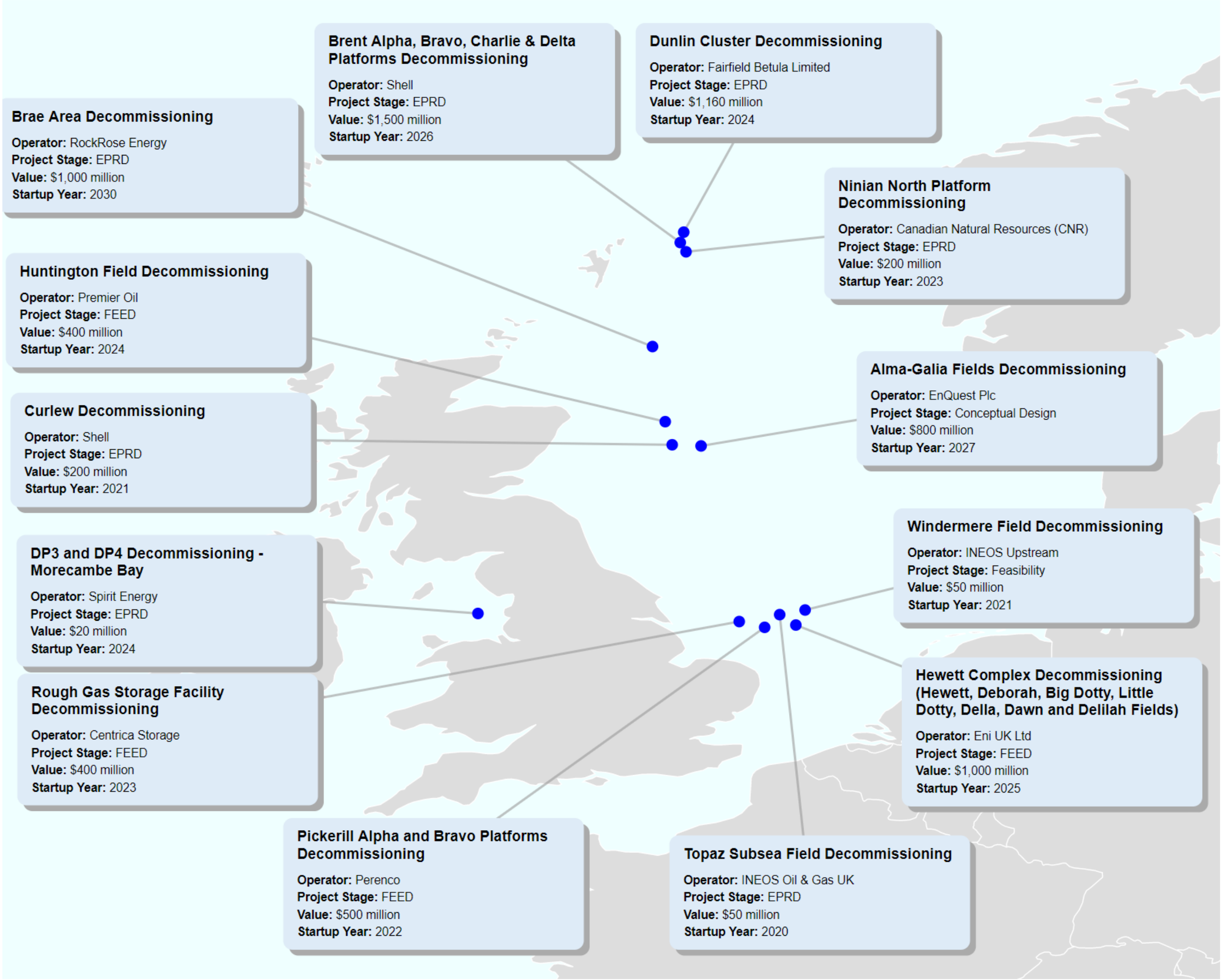
Rovuma LNG Liquefaction Plant
Operator: Mozambique Rovuma Venture
Project Stage: EPC
Value: $22,400 million
Startup Year: 2024

Jafurah - Gas Processing Plant And Gas Terminal
Operator: Saudi Aramco
Project Stage: EPC
Value: $3,600 million
Startup Year: 2024

Abu Dhabi North West Development - Hail and Ghasha Sour Gas Development
Operator: ADNOC Sour Gas
Project Stage: EPC
Value: $15,000 million
Startup Year: 2024

Decommissioning overview – UK

- Operators to spend between £45 billion and £77 billion on decommissioning in the UKCS
- Well plug and abandonment 49% of total spend
- Aim to reduce cost of decommissioning by 35%
- Clear regulation allows for efficient decommissioning alongside early engagement with key players
- Evolution of supply chain offering
- Investing in new technology to reduce cost, specialist centres developed to support this



Decommissioning overview – Global

- Arabian Gulf - Over 1,000 structures and 3,000 wells in the Arabian Gulf which will be over 30 years old and in need of decommissioning by 2038. No regulation currently in place. In its infancy, Ramboll active to date.
- A-PAC – Over 2,600 platforms and 35,000 wells in the APAC region and that decommissioning could cost well over £77.7 billion. Over 380 fields in the APAC region are expected to cease production by 2028. Around 833 installations in the region are at or over 20 years old. Key markets, Brunei, Indonesia, Thailand, Australia and Malaysia.
- Latin America - The decommissioning pipeline in Latin America is estimated to contain over 700 structures and over 4,000 wells due to cease production by 2038. Brazil is the main market.

CCUS – UK Developments

Consensus that CCUS is essential to meet net zero

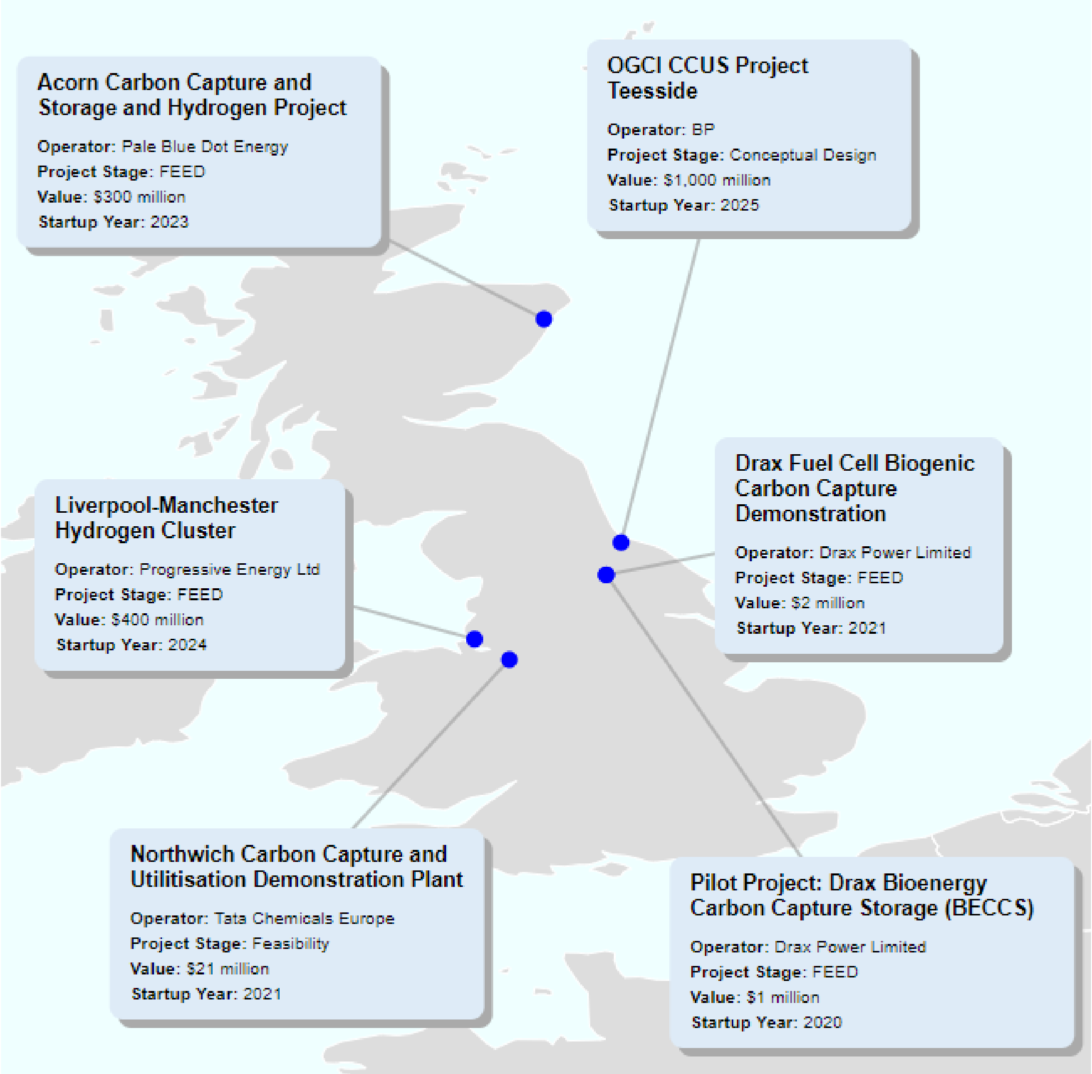
- Decarbonisation of power and heavy industry
- Enables production of low carbon hydrogen at scale for heat and transport sectors

UK government funding made available for CCUS projects

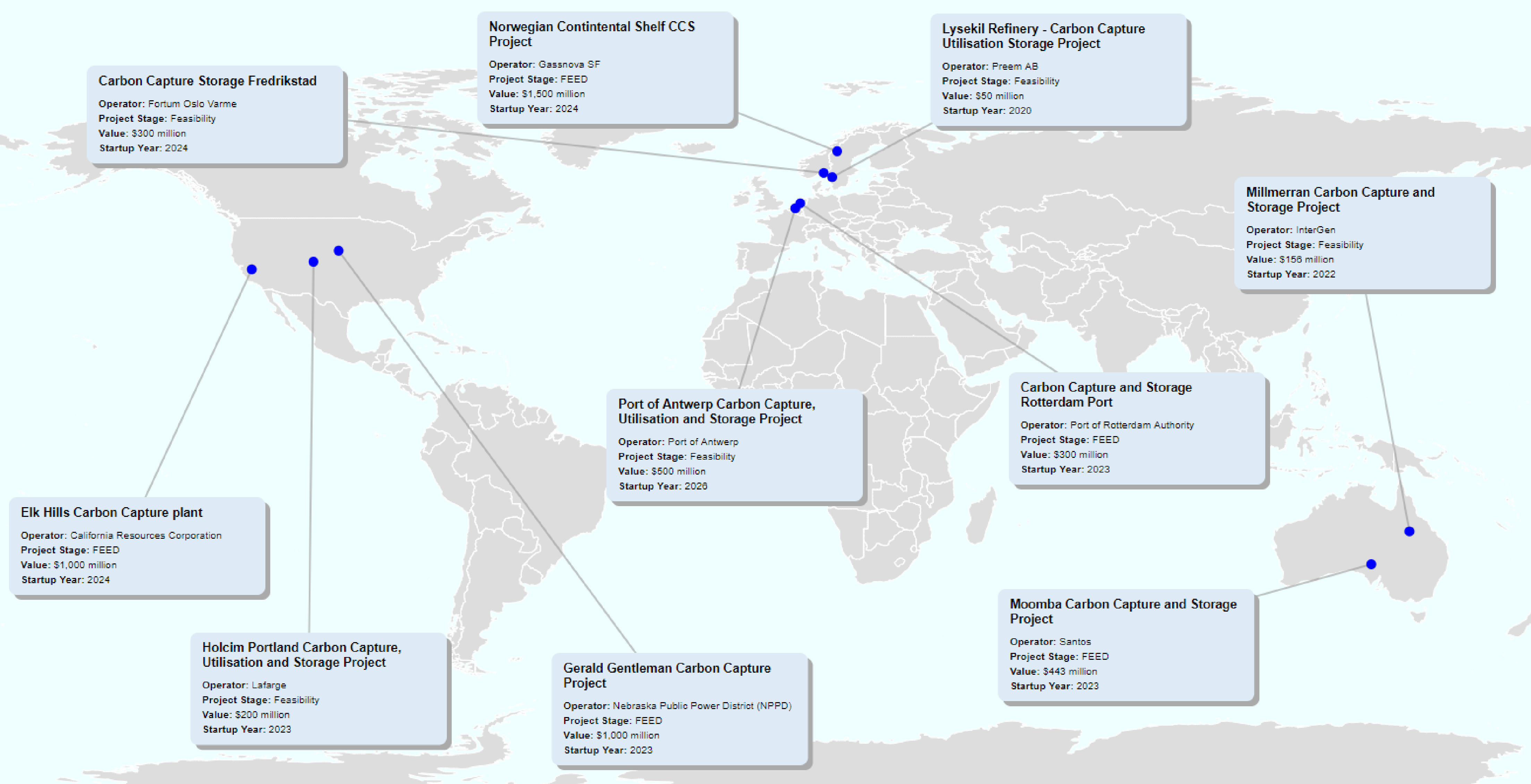
- Assist projects moving through feasibility, pre-FEED and FEED as well as into pilot demonstration

BEIS consultation on business models for CCUS and re-use of oil and gas assets for CCUS projects ended in September 2019. Key issues:

- T&S infrastructure, funding (RAB/CfD), cross-chain risks
- Decommissioning liability, period of suspension prior to decommissioning to consider assets for re-use?



CCS/CCUS – Global Developments



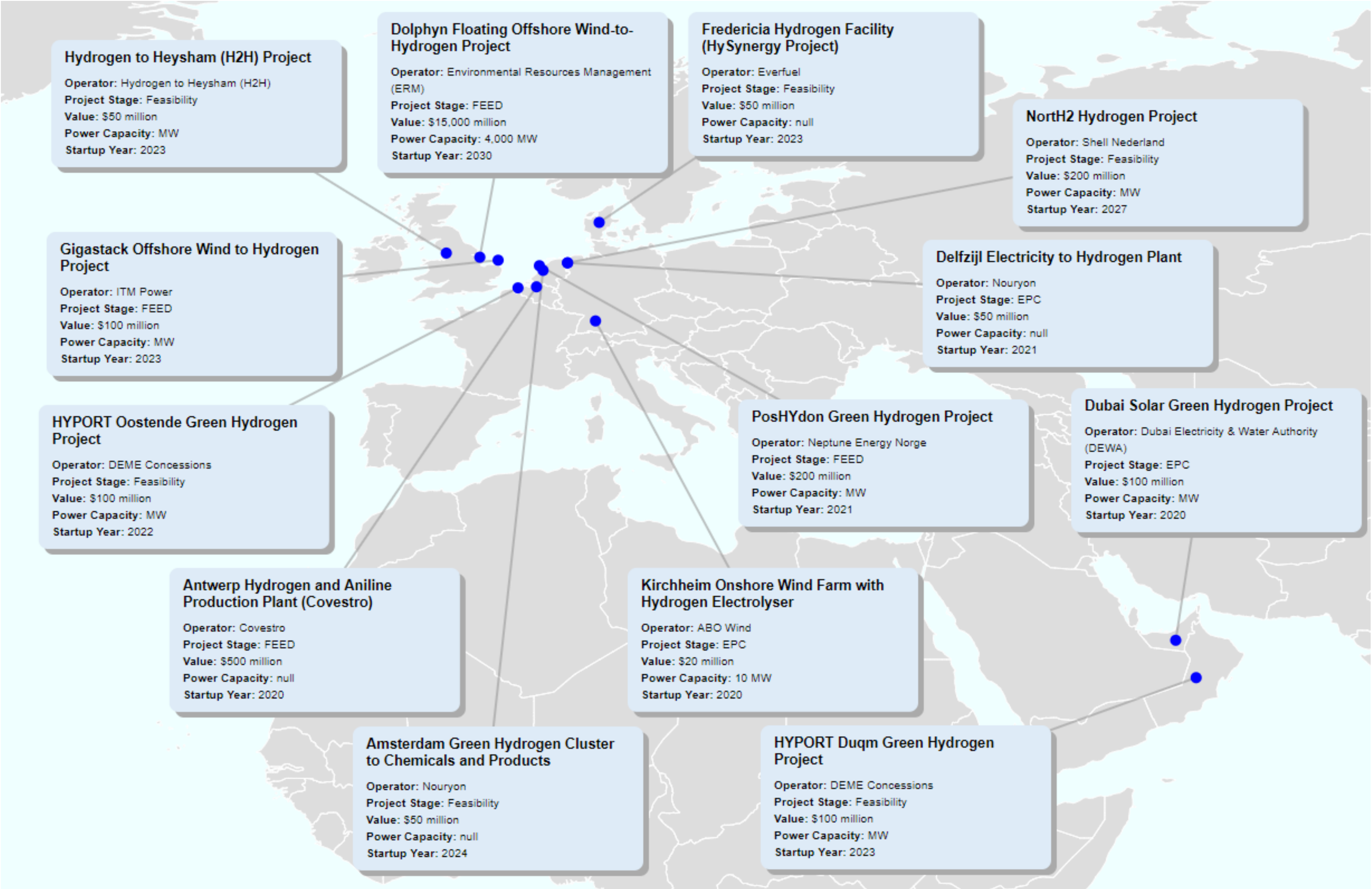
Hydrogen – Global Developments

Blue Hydrogen

- produced from natural gas, usually via steam-reforming, with carbon capture storage (CCS). Blue hydrogen has the potential of large-scale, CO2-lean hydrogen production with proven, high TRL technologies

Green Hydrogen

- hydrogen that not only meets the low-carbon threshold but is generated using renewable energy sources such as solar or wind.



Final thoughts

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