

# PIVOTREE

## Small-Field Offshore Development Concept

DEVEX UK 2024

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**PIVOT**TREE



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## Headwinds & Tailwinds

- **Regulatory & Environmental Pressures**
- **Market Volatility**
- **Technological Disruption**
- **Operational Challenges**
- **High Energy Demand**
- **Investments in Offshore Projects**
- **Improvements in Efficiency**
- **Technological Advancements**

## Conclusion

- **Access to capital is getting more difficult and complex**
- **Large long-life developments are less attractive**
- **Exploration is slow and risky**
- **Time to production is key**
- **Exploit small known accumulations at speed**

## Overcoming Headwinds

- **Environmental Compliance:** Adopt practices that minimize environmental impact and comply with regulatory requirements. This can also be a market differentiator, appealing to stakeholders increasingly concerned with sustainability.
- **Optimise Operations:** Focus on operational excellence through streamlined processes and cost control. This involves everything from logistics and procurement to the deployment of efficient drilling techniques.
- **Leverage Technology:** Invest in technology that increases efficiency and reduces costs. Digital tools like AI for predictive maintenance or advanced seismic imaging can enhance decision-making and operational efficiency.
- **Strategic Partnerships:** Form strategic alliances to share risks, costs, and technologies. This could include joint ventures with other operators to pool resources and expertise, or partnerships with tech companies to access innovative solutions.

# The need for “small oil”

## Problem

In a world with an ongoing, increasing need for oil & gas, new methods and technology are required to reduce cost and risk, while bringing forward production.

## Solution

A fully self-supporting, re-deployable, floating minimum facility suitable for the mid-water and beyond, using field-proven technologies and sub-components, to unlock uneconomic resources.

## Value

1. Unlocks marginal and stranded resources,
2. Allows early production to support field development, and
3. Creates “floating” tiebacks to extend sunset assets.

Everything has to go right to get a field producing profitably. The fewer risks in development you are exposed to the greater the chance of success.

## How can it go wrong over the lifecycle?

- Exploration: No reservoir, small reservoir or “geological success”.
- Design: FEED may determine that a field development with the reserves identified is not commercial (e.g. Browse, Equus, Sunrise)
- Construction: Construction risk, construction delay, material selection (e.g. Macondo, Gorgon, Ichthys, Montara)
- Installation: Transport risk, installation risk, weather delay (e.g. Goodwyn, Montara, Ichthys)
- Operation: Oil price, labour costs, maintenance costs, plant availability, fuel costs, chemical costs (every project in operation!)
- Abandonment: Environmental release, weather delay, stuck equipment, NORMs



### Historical cost estimates are too low

Underestimation bias prominent in the beginnings of projects. As much as 21% on average.



### Estimates of reservoir size are too high

As much as 31% on average.



**Pivotree reduces the severity of this bias** through reduced CAPEX and OPEX, and speed to deployment.





## Introducing PIVOTREE

An innovative, floating, field development concept for predominantly liquids-based hydrocarbon reservoirs too small to support a standalone development, but too far from existing facilities to tie back or in water too deep for a low-cost fixed platform.

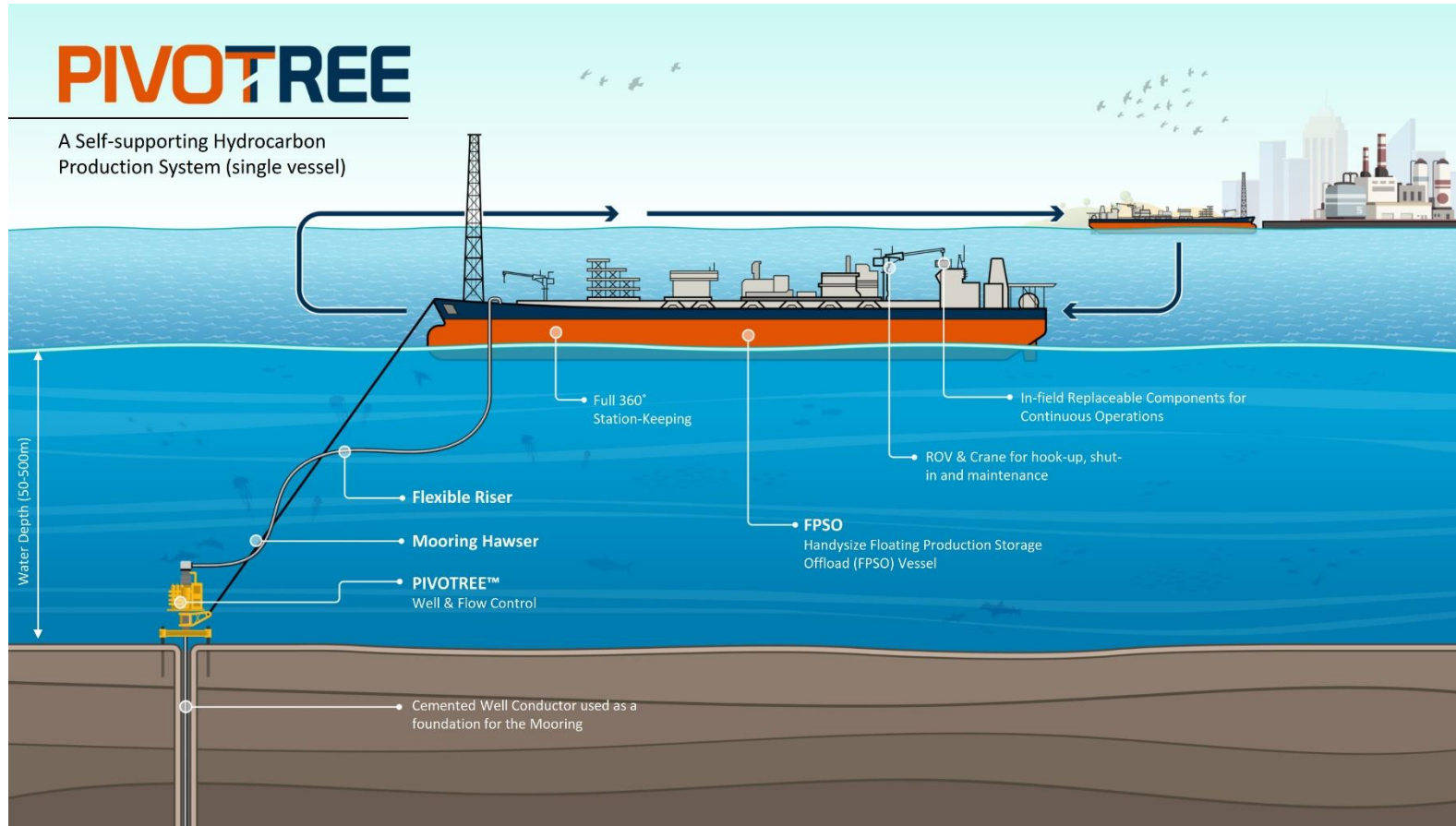




# A New Small Oilfield Development Concept

Fully featured production with all the safety features of the largest subsea systems.

**PIVOTREE**



## Two key elements:

1) the PIVOTREE production and mooring “tree”:

a modified subsea Xmas Tree (XT) provides pressure containing, flow control system for the well and hosts the flexible riser and swivel assembly. Below the XT, the Mooring Permanent Guide Base (MPGB) provides 360° rotational mooring.

2) a Handysize FPSO:

A floating, production, storage and offload vessel (FPSO) supports surface separation and processing facilities that are modularised components typical of any floating offshore production facility. The FPSO integrates an ROV and crane(s) to allow production control, chemical delivery and inspection and intervention.

## General operation:

Produce in suitable weather conditions, fill the FPSO, shut in production, disconnect, and sail to a receiving facility to offload. In the event of extreme weather, the FPSO will shut in, disconnect and move off station.

# Key Features & Benefits

Fully featured production with all the safety features of the largest subsea systems.

The logo for PIVOTREE, featuring the word "PIVOT" in orange and "TREE" in blue, with a stylized graphic of curved lines in blue, orange, and white above the text.

- **Replaces Spread-Mooring & Turret:** 360 degree station-keeping without the need for anchors, chains, and costly modifications to the vessel hull.
- **Simultaneously provides production control:** no other subsea elements required to produce a single well.
- **Seamless installation:** installed at well completion with minimal commissioning. Connection of the mooring line and riser occurs when the Handysize FPSO arrives in field.
- **Self-supporting:** intervention, maintenance, storage and offtake capabilities eliminate need for service vessels, pipelines and FSO vessels.
- **No installation step:** no need to install other subsea elements or pipe-lay.
- **Lowest physical footprint:** minimal environmental impact and reduced abandonment cost and risk. Decommissioning is limited to P&A of the well.
- **Safe and reliable operation:** designed in accordance with relevant international codes and standards, and a comprehensive, multi-layered safety and failure prevention system.
- **Redefines “minimal facilities”:** no other subsea elements required to produce a single well. 40-70% less CAPEX than other mid-water concepts and lower OPEX.
- **Reduces time to first oil:** less than half the time of other mid-water concepts. 18 months to first oil, post FID.
- **Designed for Reuse:** 15-year service life, operating cost in the lowest quartile for offshore production. DRILLEX and ABEX become the major cost of subsequent deployments.
- **Net Zero Options:** third-party technologies are available to eliminate routine flaring, create value-added products from associated gas, and capture vessel CO2 emissions.



# Pivotree – the Core Innovation

Fully featured production with all the safety features of the largest subsea systems deployable.



## X-Tree Components



# Risk Mitigation

Safety in operation is of paramount concern.



**95% of the PIVOTREE built on proven technology**

## Preventative Mitigations

- Smaller FPSO design / selection (max 50,000 DWT)
- Designed to all international codes and standards
- Independently validated by static and dynamic modelling
- Independently certified (DNV)
- Highly engineered and rigorously tested pre-deployment
- Outriggers enhance lateral stability
- X-Tree refurbished between deployments
- Mooring Assembly, Hawser and Riser replaced for each deployment

## Fail-Safe Operations

- 24/7 fatigue monitoring to maintain operations within safe limits (in development).
- Operating window designed to local conditions (based on site-specific geotechnical and met-ocean).
- Temporary mooring – Sail away in severe met-ocean conditions.
- Fail-to-safe
  - Standard subsea tree automatic fail-safes
  - Mooring hawser snap threshold prevents tree damage
  - Riser dry breakaway couplings
- Deck mounted crane and workclass ROV on-hand for all all maintenance and intervention needs.
- XT subcomponents are replaceable in-field.

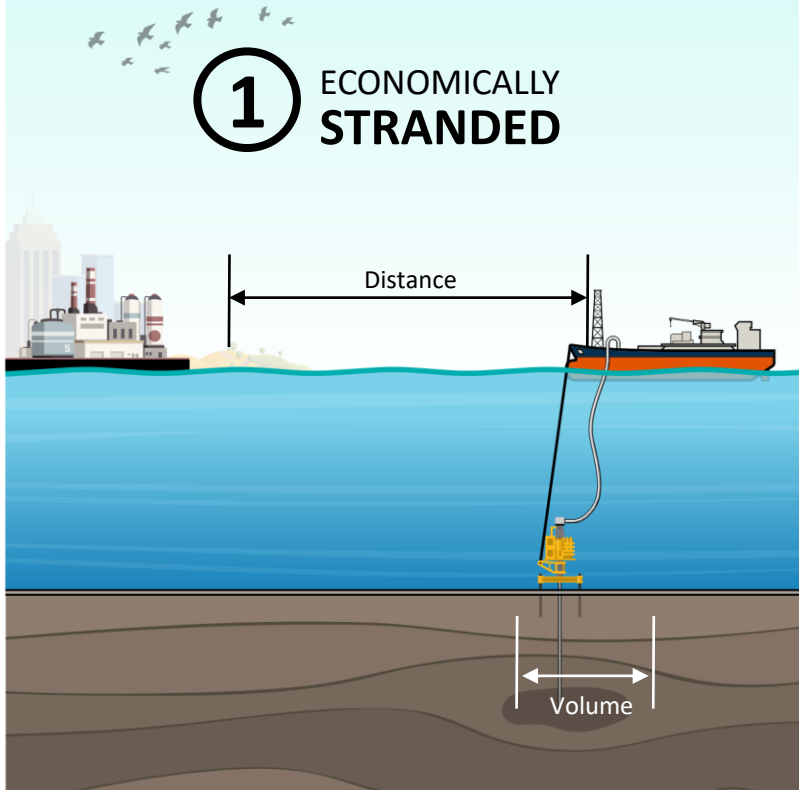


# Unlocking Stranded Value





# 1 ECONOMICALLY STRANDED



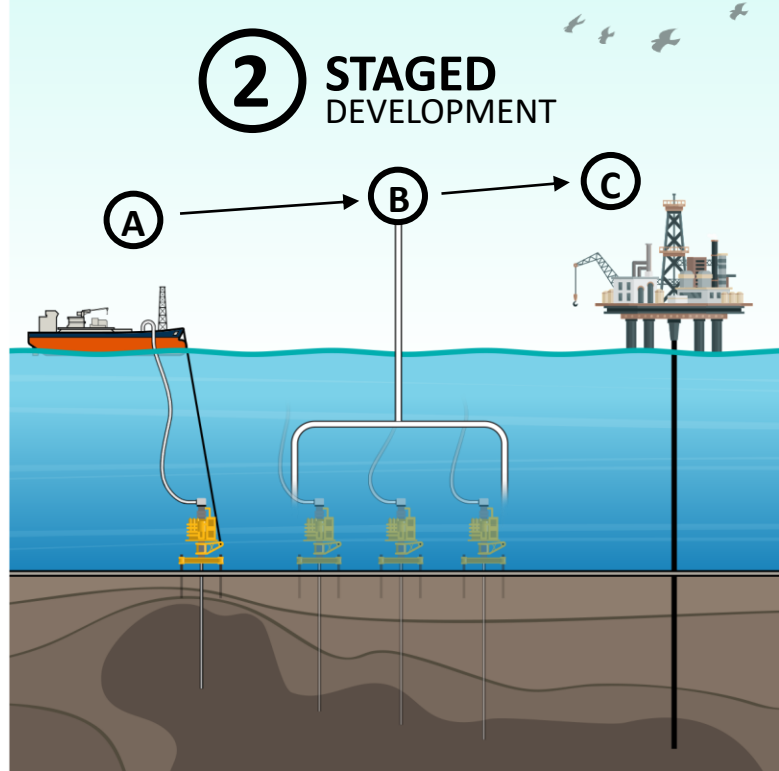
Stranded due to either:

- a) being geographically isolated or
- b) the total costs (CAPEX + OPEX + ABEX) required for a traditional development solution makes the project uneconomic.

# PIVOTREE

3 x System Use-Cases

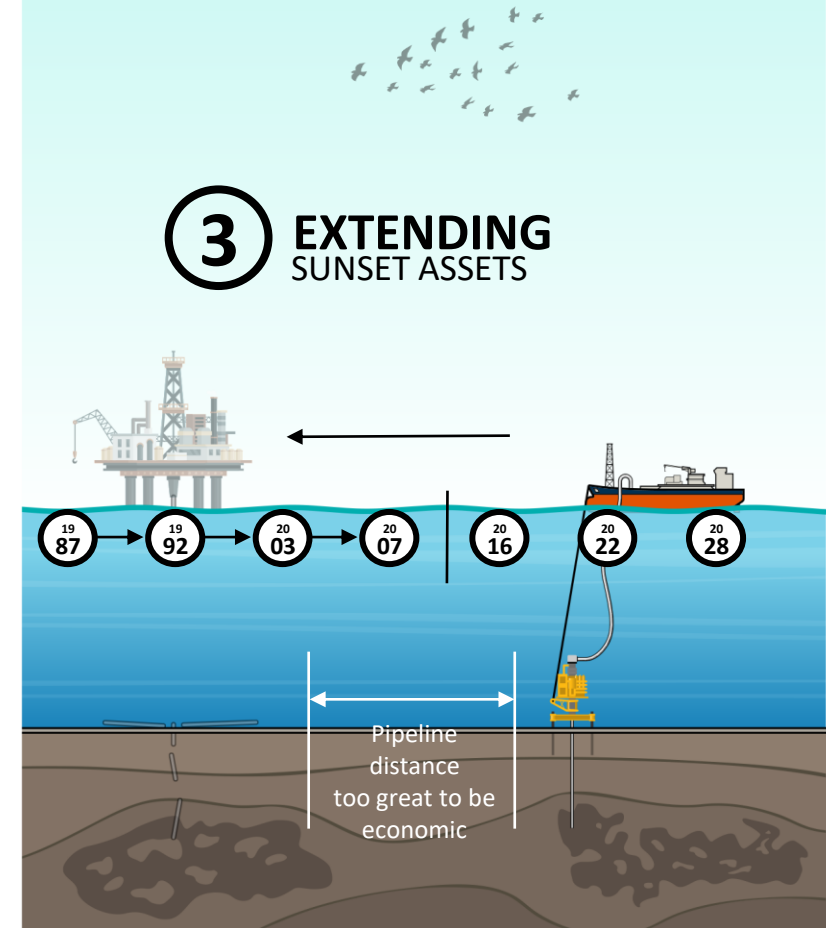
# 2 STAGED DEVELOPMENT



Pivotree offers a rapid low cost means to generate early cash flow as a precursor to a full field development.

Alternatively, where the field fails to meet expectations, it can be produced using multiple deployments.

# 3 EXTENDING SUNSET ASSETS



Pivotree can extend the life of aging assets and defer decommissioning costs.

“Floating Tiebacks” can be used to develop adjacent fields too far and/or too small to tie back via pipeline, transporting cargoes to the aging facility to boost its production.




# Value Proposition & Case Studies

The only solution to unlock economically stranded and marginal oil and gas fields in the mid-water.



## Faster to First Oil

- Installed at well completion
- No additional installation time
- Only two long-lead items:
  - Pivotree x-tree – 14 months
  - FPSO vessel – 15 months

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Activity	Regulatory (OPP, EP, SC)																	
	Engineering				Drilling Engineering													
	Long Lead Items Procurement																	
	Pivotree™ Procurement																	
	Vessel Procurement																	
	Topsides Fabrication																	
											Shipyards Works							
											Drilling Procurement							
											Drilling							
											Sailing							
										Hookup & Commissioning								
																	First Oil 	

- Pivotree can achieve first oil 18 months post FID.

## Lower CAPEX, OPEX, ABEX

- Redefines minimal facilities – Pivotree is the only subsea element – no manifolds, subsea flowlines, umbilicals, etc.
- No subsea pipeline to offtake.
- No spread-anchors, chains or turret mooring.
- Self-supporting smaller vessel reduces OPEX.
- Power from associated gas reduces OPEX.
- P&A cost only; lowest abandonment cost, time and risk of any development concept.

## Agile Investment Profile

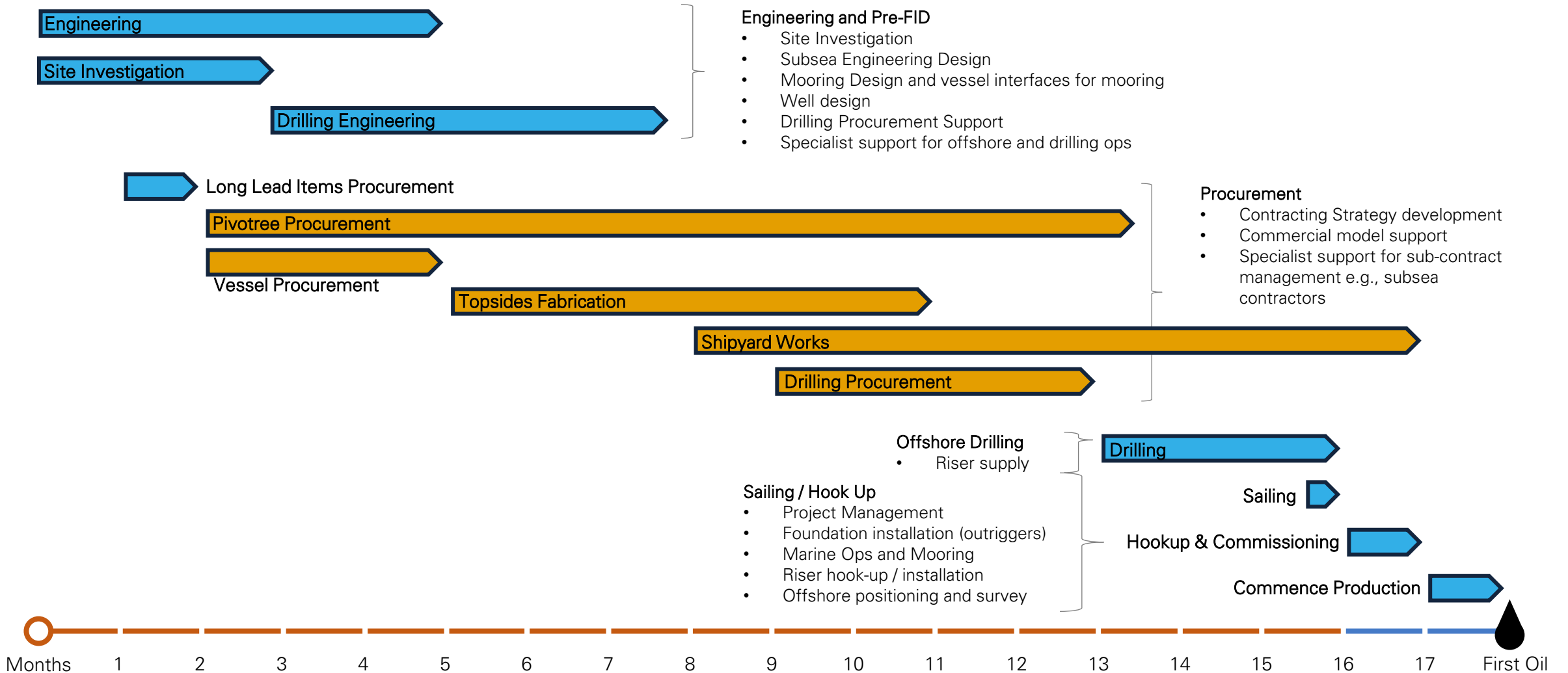
- Short duration projects; targeting small fields produced in 3 – 5 years.
- Pivotree x-tree designed for reuse over 15 years
- Capital repayment on first deployments over 9 MMbbls (@USD\$50/bbl)
- Subsequent deployments produce profit oil after 3 MMbbls (@50/bbl)
- Suitable for vessel leasing to further reduce CAPEX

## Customer Case Study

- Pivotree supporting a private Australian company to in its bid to secure four fields in the recent 33<sup>rd</sup> UK oil and gas acreage release.
- The company plans to deploy the Pivotree Harvester System on all fields secured.
- A Mooring Guide Base will be installed on appraisal wells that have been constructed to serve as producers.
- Should the reservoir prove to be sizeable, Pivotree will be deployed to produce early income to fund a multi-well development. In the event of a P90 result, Pivotree will be deployed to produce the field profitably.
- This same strategy is being investigated by an Australian listed company with two fields in the Northwest Shelf of Western Australia. The appraisal well will be positioned to produce a known accumulation if the target field is dry.

# Deployment Timeline

Faster deployment than any other mid-water development concept. First Oil in 18 months from FID.





An aerial photograph of an offshore oil field at sunset. The sky is a mix of orange, pink, and blue. Numerous oil rigs and support vessels are visible in the water, with their lights reflecting on the surface. A long pier or walkway extends across the water. The overall scene is industrial and serene.

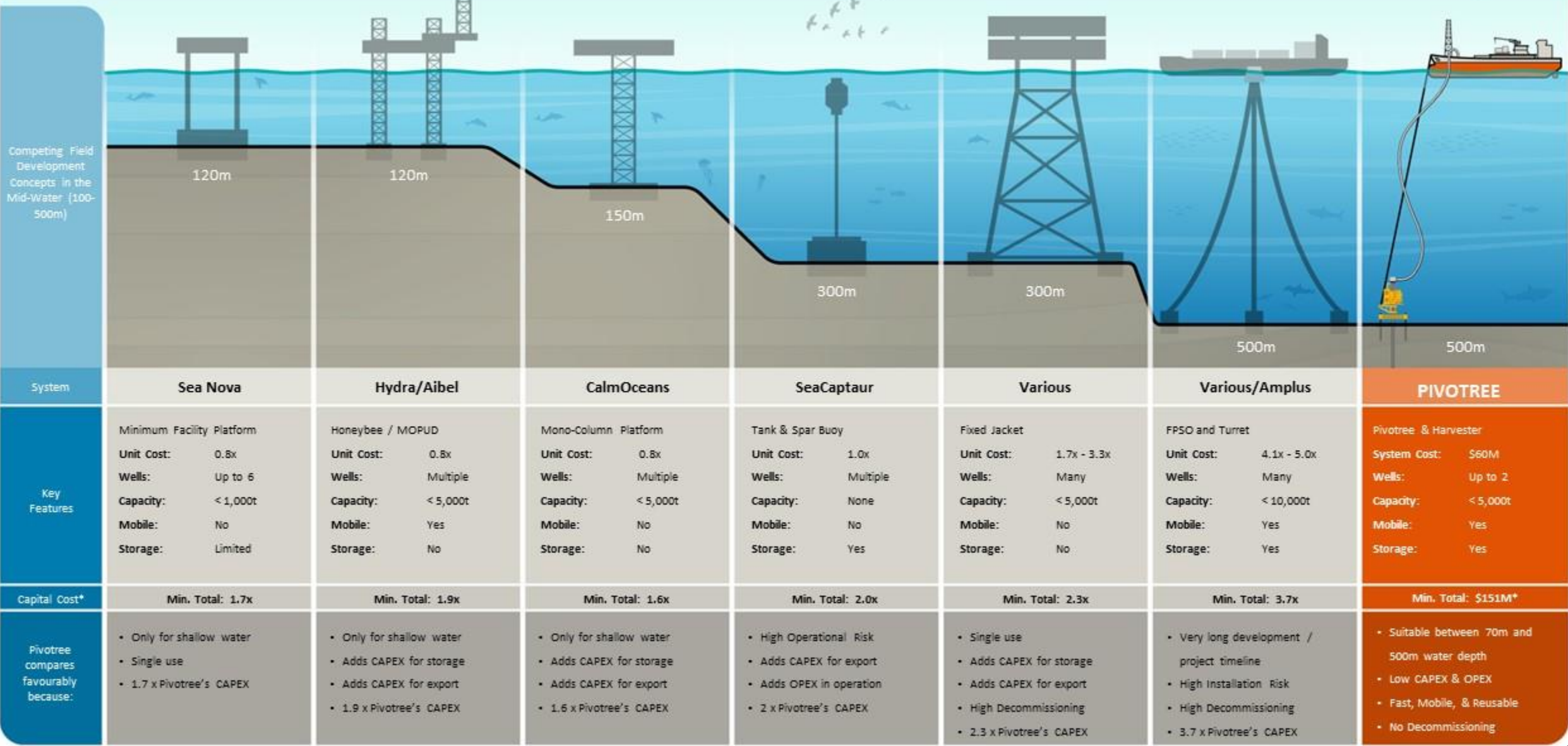
# A Market Step-Change



# PIVOTREE

## Unique Development Concept

Highest utility development solution, with lowest cost and lowest risk





# PIVOT TREE

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