

# flexlife

## Umbilipipe; A standardised, low cost tieback for small pool exploitation

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- **Overview**

- The Umbilipipe System comprises a reusable, standardised, integrated tie-back bundle containing a composite pipeline wound with all necessary umbilical elements within a single component. It also contains uniform, modularised, multi-slot manifolds capable of simple component changeout in situ, enabling specific field architecture design and infrastructure modification as the asset matures.

- **Value Added**

- Umbilipipe is applicable to 80% of small pools with tieback distance of  $\leq 40$ km, equating to 1.85 mmboc or an additional \$120bn of revenue. Estimated CAPEX saving of 60% over 5 projects, estimated at a saving of £255 million. Designed for re-use, in line with 'TieBack of the Future' circular economy goals.

- **Current Status**

- Phase I – Concept Commercialisation is complete. Flow assurance data looks very promising and CAPEX reduction objectives look realistic.



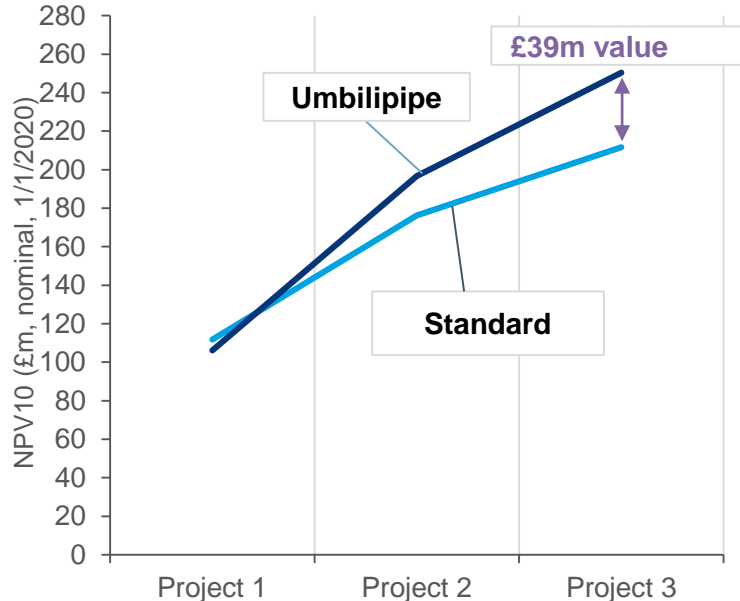
# Key Technical Benefits

- Significant reduction in vessel time for both lay and recovery
  - Single lay operation with no trenching requirement
- Suitable for Light Construction Vessel installation and recovery
  - Max lift weight 150 tonnes
- Non metallic construction
  - Suitable for aggressive production fluids (e.g. sour service)
- Significant reduction in engineering requirement
  - Full engineering design basis shall be applicable for follow on projects
  - Engineering on subsequent projects limited to route specific system adaptation and manifold component selection
- Strong potential to adapt production characteristics as reservoir matures
  - Ability to configure gas lift and water injection functionality as peak production threshold passes
  - See Analysis Matrix Table (Total = 135 flow and fluid options)

Umbilique Production Cores	Fluids	Flowline lengths	Inlet Temperature		Total Standard Liquid Flowrate	Total Standard Gas Rate (High Gas Case)
			[°C]	[°C]		
3	5	2	-	-	3,000	3
		10			7,500	7.5
		25			15,000	15
5	5	2	-	-	5,000	5
		10			12,500	12.5
		25			25,000	25
		2			7,000	7
7	5	10	-	-	17,500	17.5
		25			35,000	35

Flow Assurance Analysis Matrix

## Cumulative NPV10: Umbilipipe vs standard subsea solution



## How does Umbilipipe create value?

62% reduction in subsea costs when re-used

Quicker turnaround time between projects

Reduced decommissioning costs

Multiple OPEX savings

An estimated £39m of additional value could be created by using Umbilipipe across the three projects



- Risks
  - Permits
    - Partnership can assist in developing pipeline safety regulations
  - Technology readiness
    - System components are field proven, many to TRL 9
    - System components fully compliant with appropriate industry standards
    - Strategy in place to advance required components
  - Lead time
    - System field trials 18 months after operator commitment
    - Full system supply 6 months thereafter
  - Reuse study
    - Standardised nature of system enables robust integrity by means of IM planning, embedded instrumentation and coupon assessment
    - Reliability during repeated reuse requires to be verified

Item	Project TRL	Industry TRL
Flow Assurance	9	9
Pipe	8.X	8.X
Umbilical Elements	9	9
Umbilical Pipe	2	9
Manifold	9	9
Manifold Component Changeout	2	Changeout – 9 Design for change out - 6
Manifold Components	3 to 9	3 to 9
Installation	2	9
Tie-in	9	9
Recovery	2	9

- Concept Commercialisation phase
  - Completed on schedule and under budget
- Stage gate for Front End Engineering & Design, FEED
  - Clear understanding of objectives and the means of achieving these
- Do you have a field development which we could evaluate for you?
- Do you have existing development prospects which have sub-optimal economics when considering existing tieback solutions?

