

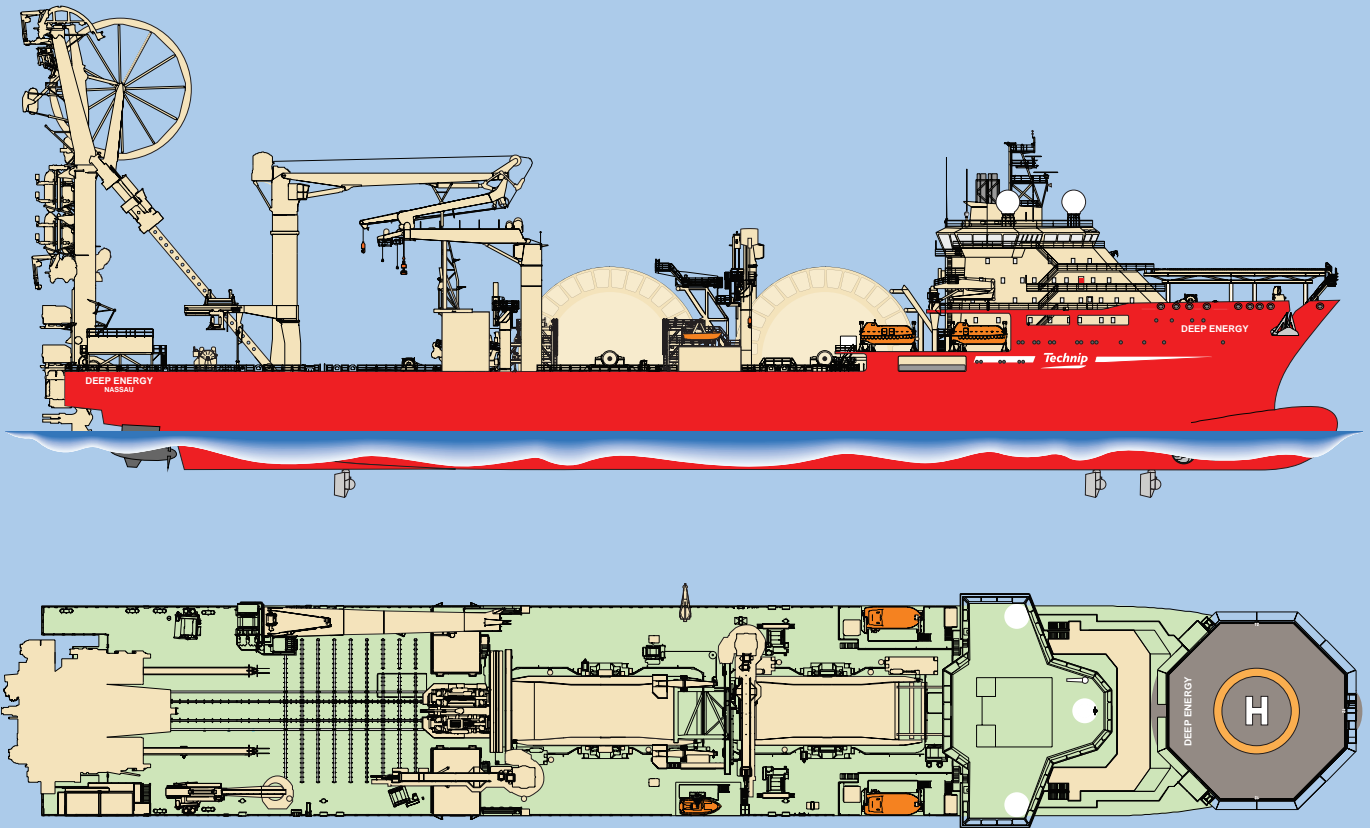


Deep Energy

A fast, capable pipelay vessel designed to support a wide range of subsea projects



Deep Energy



The Deep Energy is Technip's latest state-of-the-art pipelay vessel, following in the proud tradition of our industry leading vessels, Deep Blue and Apache II.

Deep Energy is the fastest and one of the largest and most capable pipelay vessels ever built. She supports subsea developments in shallow to ultra-deep waters of up to 3,000 m.

Specifically designed to operate on North Sea, Atlantic basin and inter-continental projects, her service speed of 19.5 knots enables fast transit between work sites, which increases vessel availability to clients.

The Deep Energy is a DP class 3 vessel primarily designed to handle subsea installation of reeled rigid pipe of up to 18" (460mm) outer diameter.

She is capable of a normal operating dynamic top tension of 450 Te and is equipped with a highly efficient Pipe Line End Termination (PLET) handling system. During her first Gulf of Mexico campaign, Deep Energy successfully completed installation of flexibles, rigid pipe and umbilicals, including PLETs and in-line structures.



Track Record

CLIENT	PROJECT	SCOPE OF WORK	WATER DEPTH	YEAR
Enbridge	Walker Ridge gas gathering system (GoM)	EPCI contract for 270 km of SCRs and pipelines and installation of subsea equipment. Deep Energy installed 45 km of 10.75" fusion bonded epoxy rigid pipe.	1,700 m - 2,130 m (5,500 ft - 7,000 ft)	2013
Murphy	Dalmatian (GoM)	EPCI contract for a 38 km flowline, 34 km pipe-in-pipe flowline with associated PLETs and jumpers, main subsea control umbilical, infield umbilical, and associated equipment. Deep Energy installed 7.9 km of 6" OD infield umbilical and 35 km of 6" OD platform to field umbilicals.	530 m - 1,800 m (1,800 ft - 6,000 ft)	2013
Anadarko	Lucius (GoM)	EPCI contract for flexible flowline, multiple flexible gas lift jumpers; main gas lift and infield umbilicals; subsea distribution units and associated cabling. Deep Energy installed 18 km of 6" OD dynamic umbilical, 3 km 6" OD infield umbilical, 1.7 km 18" OD flexible flowline.	2,070 m - 2,260 m (6,800 ft - 7,500 ft)	2013-2014
Marathon	Bøyla (Norway)	EPIC contract for all activities necessary to complete construction of the subsea system for the Bøyla field development and connect it to the existing Alvheim subsea facilities. Deep Energy installed a 33 km, 12" plastic lined, water injection rigid pipeline, a 6" Gas Lift Pipeline, as well as a 27 km, 16/11" pipe-in-pipe production pipeline.	120 m (400 ft)	2014

A state-of-the-art pipelay vessel ideal for a wide range of subsea projects



At Evanton spoolbase



Spooling rigid pipe

Pipelay equipment

The Deep Energy pipelay system is designed based on Technip's extensive knowledge of pipelay operations gained from many years experience with the Deep Blue, Apache and Apache II.

Reel laying

The pipelay system is designed around a tiltable tower at the vessel stern. The tower's range of laying angles varies between 90° and 30° to allow laying of both rigid reel lines from 4" to 18" and flexibles/umbilicals (up to 24" outer diameter) in water depths from 16 m to 3,000 m.

In addition, the Deep Energy is fitted with twin horizontal axis reels of 2,800 Te capacity for pipe storage. Each reel is fitted with a spooling gantry with spooling carriage and travelling roller boxes which provide sufficient side force to align the pipe correctly during spooling operations.

For rigid pipe, the maximum dynamic tension capacity is 450 Te, provided by two 175 Te quad track tensioners in the ramp, working in co-operation to provide a render capability up to a maximum of 350 Te, plus the pipe reel providing a further 100 Te capacity.

The maximum dynamic tension capacity for flexible pipe is 300 Te and for umbilicals it is 200 Te.

Innovative PLET handling system

Deep Energy is equipped with a specially designed Pipe Line End Termination (PLET) Handling System which is able to efficiently convey and deliver PLETs, In-Line Tees (ILT), Riser Base Gas Lift Skids (RBGL) and Riser Hang-Off Flex Joints, up to 50 Te weight, from the deck storage area into the tower.

Work stations are provided on two levels in the ramp which rotate so that the floor is automatically level at any chosen ramp angle. Each of the upper levels is in two parts that can be withdrawn to provide space for the insertion of a PLET into the firing line. The work stations are arranged in a sliding frame that can be vertically adjusted within the ramp structure.

A hang-off module with a pipe clamp (designed for 500 Te dynamic load), allows the pipe to be cut and in-line structures or terminations to be introduced into the pipeline via the PLET handling system.

Abandonment & Recovery systems

The vessel is fitted with Primary and Secondary A&R systems, having dynamic tension capacities of 500 Te and 200 Te respectively. The primary and secondary A&R attachment points for rigid pipelay are below the lower tensioner via sheaves that are deployed to align with the rigid pipe "firing line". The primary system has a reduced capacity of 300 Te for flexlay from the upper position.

The A&R winches installed beneath the weather deck are fitted with wires* as shown below:

- 500 Te Traction and storage winch equipped with a 3,725 m / 122 mm diameter LR wire.
- 200 Te Traction and storage winch equipped with a 3,000 m / 76 mm diameter LR wire.

* Factor of safety <3 at maximum load.



500 Te traction winch



Aft pipelay control room

Crane and deck winches

Deep Energy is outfitted with a variety of cranes to meet all operational requirements:

- 1 x 150 Te active heave compensated knuckle boom crane located to service both the aft working area and pipelay tower. NB: the crane foundation can accommodate the option to install a 400 Te crane.
- 2 x 30 Te telescopic boom cranes located to work each of the pipe storage reels and adjacent deck areas.
- 2 x 5 Te knuckle boom cranes located forward, for stores handling.

In addition to the A&R winches, a full suite of winches is provided to support pipelay operations:

- 2 x 60 Te Constant Tension initiation winches with 2,000 m of 52 mm LR wire located aft deck (port side). Also utilized for A&R of umbilical products.
- 1 x 50 Te (aft reel) & 1 x 100 Te (fwd reel) lead string constant tension winches (to initiate pipe first end onto reels and to transfer second end to aligner during pipelay).

- Assorted 5, 10, and 20 Te winches to assist with deck handling activities.

Remotely Operated Vehicles (ROVs)

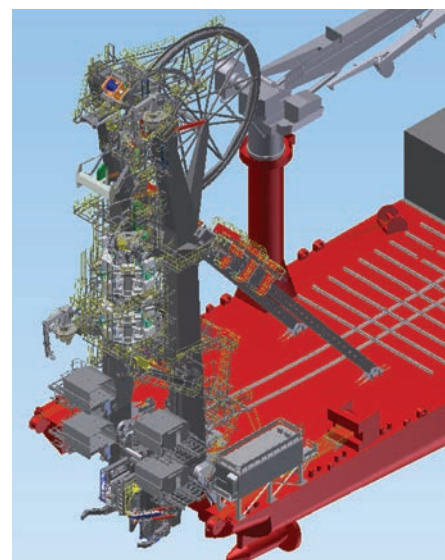
Pipelay activities are supported by two Triton XLX advanced work class ROVs, rated to 3,000 m. These are located in their own self-contained hangars positioned aft of the aft pipe reel, with one launching to port and the other from the starboard side.

The ROVs are deployed in powered cages complete with tether management systems and have excursion distances of 850 m. State-of-the-art manipulators, sensors and tooling are permanently fitted. Client-supplied tooling is easily interfaced via dedicated valve packs and hydraulic systems. Each system is configured with a 150 hp power train and can accommodate standard industry tooling. The ROVs are operated from a dedicated control room on the vessel and customised workshop and storage facilities are also provided.

Station keeping

The Deep Energy is dynamically positioned operating in Class 3 mode during pipelay operations. The main DP control system is a Kongsberg K-POS DP22 with K-POS DPI2 back-up system.

Station keeping is achieved using two forward tunnel thrusters (Rolls Royce 2.25 MW TT3300 DPD FP), three centreline retractable Azimuth thrusters (Rolls Royce 3.0 MW UL 4001 FP) and two Azipods aft (ABB 10 MW Azipod V18) which are used in both DP and transit modes.





Pipelay tower



Bridge

Navigation / Integrated Vessel Management System (IVMS)

The vessel is equipped with a Kongsberg K-Bridge navigation package; K-Thrust for thruster control and conning, Radars, ECDIS (Electronic Charting including route planning), the K-Pos DP, comprehensive internal and external communications systems together with K-Chief safety and alarm monitoring systems. The Kongsberg IVMS System satisfies IMO MSC 645 DP Equipment Class 3 and DNV AUTRO Rules for DP system redundancy and integrates the main vessel control tasks through a common communication infrastructure.

Machinery / propulsion

The vessel's main machinery consists of 6-off diesel driven (Wartsila 9L32) generators (two in each of the three engine rooms), providing a total of 24.9 MW generated power to the propulsion systems and other consumers. The vessel is fitted with the required machinery systems and back-ups to meet all Class, statutory and performance requirements.

The vessel is also equipped with a Rolls Royce (Intering) anti-heeling system and passive (air controlled) U-tanks for roll reduction.

Transit speed

Deep Energy has a maximum service speed of 19.5 knots to enable fast transit times between spoolbase and field locations and to shorten international transits between projects.



Day room 2



Mess room



Executive cabin

Specifications

Principal dimensions

Length overall	194.5 m
Length between PP	172.7 m
Breadth moulded	31 m
Depth main deck	11.8 m
Design draft	8.2 m
Summer load draft	8.8 m
Max displacement at 8.8 m draft	35,460 Te

Pipelay system

- Max rigid pipe diameter
 - 18" OD (460 mm)
 - 22" OD coated (560 mm)
- Max flexible pipe diameter opening
 - 23.6" OD (600 mm)

Maximum lay dynamic tensions

- Rigid pipe 450 Te
- Flexible pipe 300 Te
- Umbilicals 200 Te

Abandonment & Recovery dynamic tensions

- Primary A&R 500 Te*
- Secondary A&R 200 Te*
- Flex A&R 300 Te
- Max A&R depth 3,000 m

Pipelay

- Max operating depth 3,000 m
- Min operating depth 16 m

Reel weight capacity

- 2 x reels, each with max capacity of 2,800 Te

Ramp angles

- Max ramp angle 90°
- Min ramp angle 30°

PLET handling system

- Max no. of PLETs stored 6 off
- Max footprint 10 m x 6 m x 8.5 m
- Max weight 50 Te
- Max RGLB height below C/L 2.5 m

Cranage

- 1x 150 Te AHC knuckle boom crane (pedestal designed for 400 Te upgrade)
 - 150 Te at 15 m offshore lift to 500 m water depth (s/f)
 - 150 Te at 18 m harbour lift
 - 15 Te at 55 m whipline to 60 m water depth
- 2 x 30 Te at 20 m telescopic boom cranes
- 2 x 5 Te knuckle boom cranes

Deck capacity

- Area approx 1,700 m², 10 Te/m²

Power Plant

- 6 x Wartsila 9L32
- Total generated power 24.9 MW

Propulsion

Forward

- 2 x tunnel thrusters ea 2.25 MW
- 2 x retractable thruster ea 3 MW

Aft

- 2 x propulsion podded thrusters ea 9.5 MW (limited to 4 MW in DP)
- 1 x retractable thruster 3 MW

DP system

- DYNPOS AUTRO - Class III
- Kongsberg K-Pos DP 22 Main
- Kongsberg K-Pos DP 12 Backup

Environmental Regulatory Number

99.99.99.99

Positioning and reference systems

- 2 x Hipap 500 acoustic positioning system
- 1 x taut wire MK15B-500
- 1 x fanbeam Mk4.2
- 3 x Kongsberg DPS GPS receivers
- 1 x 180° radius range and bearing system
- 1 x Seapath 200 GPS / INS system
- 4 x MRU-5 motion sensors
- 4 x Navigat X Mk1 gyro compasses
- 4 x wind sensors

Capacities

- Heavy fuel oil 3,502 m³
- Marine gas oil 1,949 m³
- Potable fresh water 712 m³
- Technical water 565 m³
- Ballast water 10,972 m³
- Water makers 2 x 35 Te/day

Service air

- 2x 7 bar compressors
 - 1 compressor running 1,250 m³/h
 - 2 compressors running 2,500 m³/h

Vessel speed

- Maximum transit speed 19.5 knots

Helideck

- Dimensioned and strengthened for S-92

Mooring

- 2 x anchor winches
- 11 x mooring winches

Accommodation

- 140 persons in 107 cabins
- Executive single cabins: 9
- Single cabins: 65
- Double cabins: 33

Lifesaving appliances

- 4 x 70 person lifeboats
- 8 x 35 person + 2 x 6 person liferafts
- 1 x fast rescue craft

ROV

- 2 x 3,000 m Triton XLX work class ROVs

Flag

- Bahamas

Classification

DNV + IA1, CLEAN DESIGN, ICE-C, SF, HELDK-SH, E0, DYNPOS AUTRO (IMO III), CRANE, DK (+), COMF-V(3)C(3), BIS, ICS, NAUT-AW.

Year built

2013

Owners

Technip



* Factor of safety <3 at maximum load.

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