



Towards a decision tool for decommissioning of subsea assets of oil-gas platforms in Brazil

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ABBREVIATION LIST

| | |
|--------|--|
| MCDA | Multi Criterion Decision Analysis Method |
| UKOOA | UK Offshore Association |
| IRM | Information Resources Management |
| EIA | Energy Information Administration |
| CoP | Cessation of Production |
| DNV-GL | Det Norske Veritas (Norway) and Germanischer Lloyd (Germany) |
| PLEM | Pipeline End Manifold |
| PLET | Pipeline End Termination |
| ROV | Remotely Operated Vehicle |
| SAM | Subsea Accumulator Module |
| SCM | Subsea Control Module |
| CPU | Central Processing Unit |
| OPEX | Operational Expenditure |
| ANP | Agência Nacional do Petróleo / National Agency of Petroleum |

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ABSTRACT (English Version)

This master thesis will offer an overview on the decommissioning process in Brazil. It will provide a created decision tool to find the best solution to know the most available decommissioning options to all subsea equipment which are mostly used for fixed oil gas platforms in Campos Basin. This tool has been created using the Multi Criterion Decision Analysis Method and it is prepared using the Microsoft Excel (64-bit).

Decommissioning is the closure of fossil fuel drilling operations at an offshore platform and after the ending of the operations, rehabilitation of ocean and sea floor from the constructed condition to the pre lease circumstance.

Oil crises in recent years and increasing global borrowings have increased the importance of oil gas platforms. With this increase, over 9,000 platforms were built. As a result of the changing of international and local legal basis and laws, abandoned platforms without take any precautions, at the ocean has been precluded. The oil companies were not doing the cleaning and recycling of the platforms that had been left out of operation because of the high costs and technological restrictions. In the wake of international laws, these companies are taking serious steps to remove platforms.

In last few years decommissioning of offshore platforms in Brazil has become more importance. However, many factors should be taken into consideration during the decommissioning activities. These are various factors that are defined as socio-economic, technical, environmental, cost, restrictions on engineering work, safety measures. When these factors come together, the processes to be done become more complicated. At this point, we will develop a tool that will become a decision-making mechanism when the subsea assets of oil gas platforms are decommissioned, and will bring together all the factors considered above to make the best decision. All these factors will be analyzed for all subsea equipment using the weighting factor that is defined based on previous engineering works and expert opinions.

Keywords: Decommissioning & Fixed Oil Gas Platforms & Multi Criterion Decision Analysis Method & MCDA & Subsea Equipment & Decommissioning Alternatives & Brazil Campos Basin

ABSTRACT (Turkish Version)

Bu yüksek lisans tezi, Brezilya'daki hizmetten uzaklaştırma sürecine genel bir bakış sağlayacak ve özellikle Campos Havzası'ndaki sabit petrol gaz platformları için kullanılan tüm denizaltı takımlarına en uygun hizmetten çıkarma seçeneklerini öğrenmek için en iyi çözümü bulmak için yaratılmış bir karar aracı sağlayacaktır. Bu araç Çok Ölçütlü Karar Analizi Yöntemi kullanılarak oluşturulmuştur ve Microsoft Excel (64 bit) kullanılarak hazırlanmıştır.

Devre dışı bırakma, bir deniz platformunda fosil yakıt sondaj operasyonlarının kapatılması ve operasyonların bitiminden sonra, okyanus ve deniz tabanının yapılı koşuldan ön kiralama koşuluna kadar iyileştirilmesidir.

Son yıllardaki petrol krizleri ve artan küresel krediler petrol gazı platformlarının önemini arttırmıştır. Bu artışla 9000'den fazla platform inşa edildi. Uluslararası ve yerel yasal temellerin ve yasaların değişmesi sonucunda bu platformların okyanusta terk edilmesi engellenmiştir. Petrol şirketleri, maliyetlerin yüksek olması nedeniyle hareketsiz bırakılan platformların temizlenmesi ve geri dönüşümü yapmıyorlardı. Uluslararası kanunların ardından bu şirketler platformları kaldırmak için ciddi adımlar atıyor.

Son birkaç yılda Brezilya'daki açık deniz platformlarının hizmet dışı bırakılması daha da önem kazanmıştır.

Ancak, görevden uzaklaştırma faaliyetleri sırasında birçok faktör göz önüne alınmalıdır. Bunlar, sosyal-ekonomik, teknik, çevresel, maliyet, mühendislik çalışmalarında kısıtlamalar, güvenlik önlemleri olarak tanımlanan çeşitli faktörlerdir. Bu faktörler bir araya geldiğinde, yapılması gereken işlemler daha karmaşık hale gelir. Bu noktada, petrol gazı platformlarının denizaltı varlıkları devre dışı bırakıldığında bir karar mekanizması olacak bir araç geliştirip, en iyi kararı vermek için yukarıdaki tüm faktörleri bir araya getireceğiz.

Anahtar Kelimeler: Devre Dışı Bırakma ve Sabit Petrol Gaz Platformları ve Çok Ölçütlü Karar Analizi Yöntemi & MCDA & Su altı Ekipmanları & Devre Dışı Bırakma Alternatifleri & Brezilya Campos Havzası

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1. INTRODUCTION

1.1. Introduction to Decommissioning

Decommissioning is the closure of fossil fuel drilling operations at an offshore platform (Fig. 1) and implementation of rehabilitation works to ocean or sea floor to return that area to a pre lease circumstance.



Figure 1 Typical offshore platform.

Available from: (<http://splash247.com/>) [Accessed 15 August 2017]

According to UK Offshore Association (UKOOA), “decommissioning is the process which the operator of an offshore oil and gas installation goes through to plan, gain government approval and implement the removal, disposal or re-use of a structure when it is no longer needed for its current purpose.” (<http://www.ukooa.co.uk/index.cfm>)

Generally, decommissioning procedures of offshore subsea equipment follows the steps below respectively:

- Perform engineering desk top studies and regarding to them marshal the resources,
- Stakeholder engagements and advisory,
- Look over the recent surveys and IRMs,
- Study on regulations and governing legislations in intensely,
- Perform a detailed EIA (Energy Information Administration),
- Study on any potential effects on the marine environment,
- Preparation of detailed cost assessment for each different decommissioning scenarios,
- Prepare the methodology for pipeline pigging, cleaning and flushing,
- Give information to regulatory authorities about the planned decommissioning and date for CoP (Cessation of Production) ,
- Prepare offshore pipeline decommissioning study and hand over to the regulatory authorities,
- Prepare detailed offshore action plan including the disconnecting method, cutting method, plugging, and type of vessels to be used, etc. and regulatory approval of the decommissioning plan,
- Stop the production, plug the wells and make them safe,
- Partially or total installation usually has to removed and these removed parts has to be disposed or recycled,
- Sea floor surveys are performed and of it is necessary, monitoring studies should be done,
- Plan a post decommissioning environmental survey to see quality of the sea water.

“In summary, decommissioning is the process of deciding how best to shut down operations at the end of a field’s life, closing the wells, cleaning up, making the installation safe, removing some or all the facilities and reusing or disposing of them as appropriate.” (Bemment, 2001)

1.2. Background

Globally, many petro-gas oceanic platforms consummate their aims. These platforms have to recover and their detrimental effects on the subsea habitat must be annihilating after they reach end of the life cycle or mission. Partially or totally removal operations (Fig. 2) may progress to rehabilitate the sea floor. On the other hand, for some cases platforms or related parts or equipment may leave on the sea floor. These options are related with national and international regulations also company profits and company or region restrictions. So, all these limitations give more complexity to decision mechanism about decommissioning options.



Figure 2 Example to removal operations

Available from (<https://hmc.heerema.com/>) [Accessed 22 August 2017]

Under certain circumstances, a particular area in Brazil has been selected within the scope of the intended studies during this project. Determination of the region selection has been done depending on the necessity and observations.

Near to state of Rio de Janeiro, there are 3 important fundamental basins which are shown in the figure 4. These basins have been named as Espirito Santos Basin, Campos Basin and Santos Basin.

The Campos Basin has been established as initial and most of the jackets and platforms reached end of their life cycle and missions. According to national and international regulations, companies which have platforms on this basin have to apply decommissioning procedures and rehabilitate the area. At the moment of the selection of this basin, the key point was the platforms reached their end of the life cycle or approach to the end. In the light of this knowledge, Campos Basin gained more importance in the all offshore oil gas basins at Brazil. Another point is place the thesis on strong idea by studying on the area (Fig. 3) which has to carry out to decommissioning implementations in the short term.

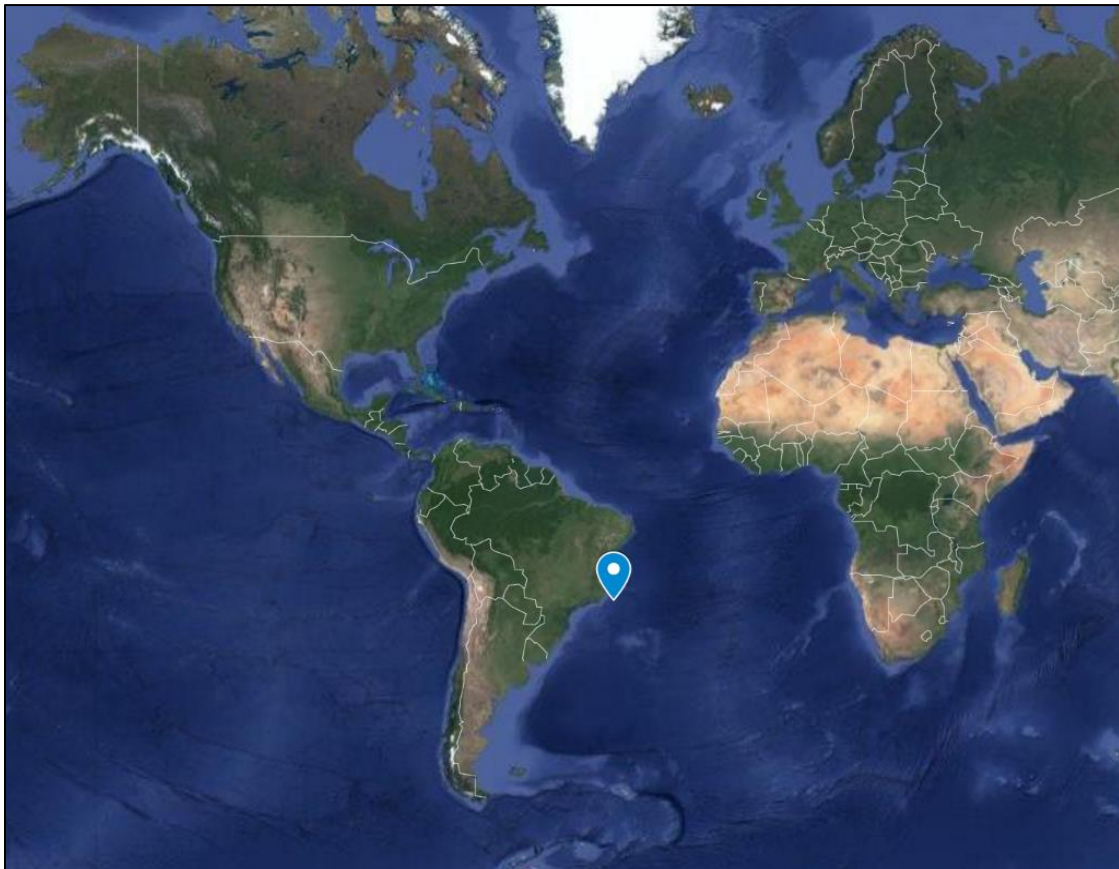


Figure 3 Location of Campos Basin

Available from (<https://www.google.com/maps>) [Accessed 18 December 2017]

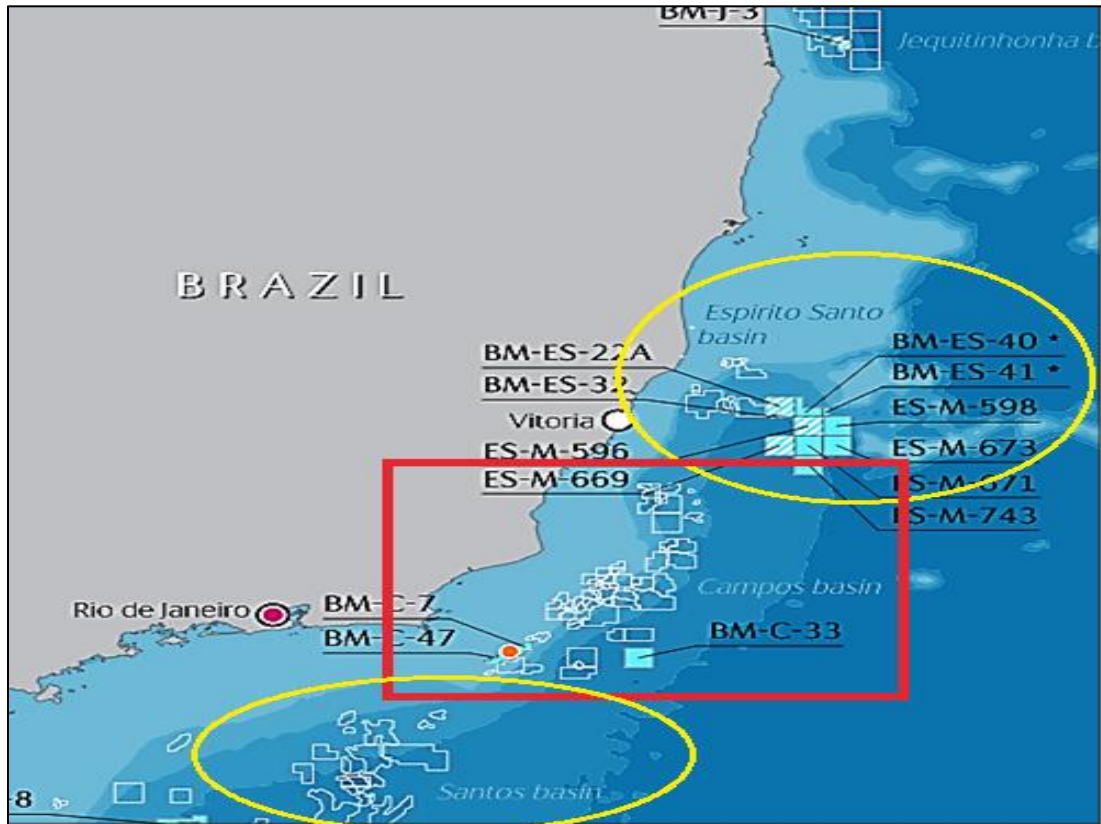


Figure 4 Basins in Brazil

Available from (<https://www.statoil.com/>) [Accessed 24 August 2017]

According to obtained information from the web site of (<http://www.qgep.com.br/?idioma=enu>), “located in the Brazilian continental margin, along the coastline of the state of Espírito Santo (Fig.5), the sea basin of Espírito Santo produces oil and gas in shallow and deep waters, and several marketable discoveries in ultra-deep waters. In its sea portion, this basin has an area of 18,000 km² and is responsible for around 2% of oil and 7% of gas of the Brazilian production, and it also has other areas with great exploration potential. Although the wells in the pre-salt section of the basin did not have high quality reservoirs, there remains the possibility that region more distant from the siliciclastic sediment sources could have the necessary microbial carbonate presence, similar to those found in Campos and Santos basins.”



Figure 5 Location of Espírito Santo Basin in Brazil

Available from (<http://www.qgep.com.br/?idioma=enu>) [Accessed 24 August 2017]

“Located in the southern portion of the Brazilian continental margin, Santos Basin (Fig. 6) covers an area of approximately 350,000 km² in water with depths up to 3,000 m, from the southern coast of the state of Rio de Janeiro reaching to the north of Santa Catarina. It is geologically defined as a large depression, limited by Alto do Cabo Frio to the North and Alto de Florianópolis to the South, which makes it the most extensive of all the coastal basins in Brazil.” (<http://www.qgep.com.br/?idioma=enu>)

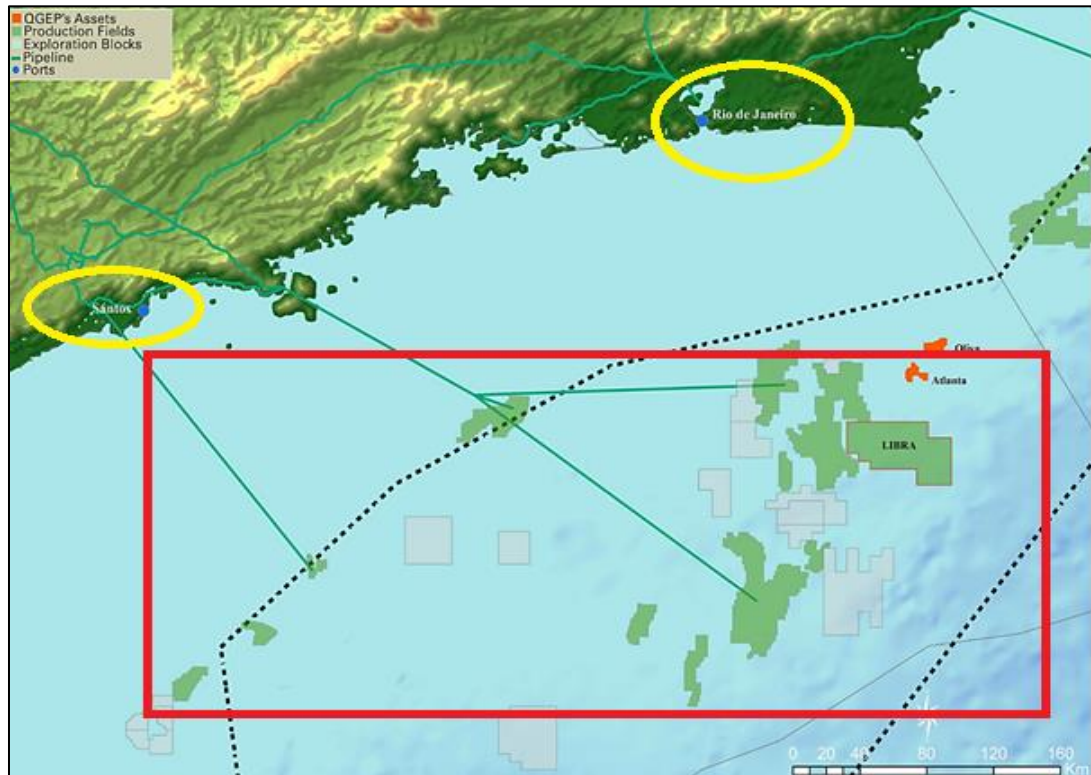


Figure 6 Location of Santos Basin in Brazil

Available from (<http://www.qgpe.com.br/?idioma=enu>) [Accessed 25 August 2017]

“Campos Basin (Fig. 7) is one of 12 coastal sedimentary basins of Brazil. It spans both on-shore and off-shore parts and is located near Rio de Janeiro. The basin originated in Neocomian stage of the Cretaceous period 145–130 million years ago during the breakup of Gondwana. It has a total area of about 115,000 square kilometers whereas the on-shore portion is small at only 500 square kilometers.” (Bruhn, Gomes, Lucchese , Cesar, & Et, 2003)

“The off-shore oil exploration in the Campos Basin began in 1968.” (Fraga, Borges, & Beltrão, 2003). “The first exploratory well was drilled in 1971. The first field to be discovered was Garoupa in 1974 at a shallow depth of 120 m followed by Namorado in 1975 in 166 m of water.” (Bacocoli, Morales, & Campos, 1980) “The first oil production started in 1977 from Enchova field at the depth of 124 m.” (Bruhn, Gomes, Lucchese , Cesar, & Et, 2003) “By 2003 41 oil and gas fields had discovered, which lie at the distances 50 to 140 km from the cost and at water depths varying from 80 to 2,400 m. Of these fields 37 are being developed by Petrobras. By 2003 the oil production from the basin had reached 1.21 million barrels per day. The production comes from a variety of reservoirs including siliciclastic turbidites, fractured basalts, coquinas, calcarenites (limestones).

The total cumulative production from the Campos Basin by 2003 was 3.9 billion barrels of oil with remaining reserves of 8.5 billion barrels.” (Bacocoli, Morales, & Campos, 1980)

“In February 2010 a new 65 million barrel discovery was made by Petrobras near the Barracuda oil field.” (Flower & Merlin, 2010)

The Campos Basin overall production system comprising presently 14 fixed platforms and 11 floating systems distributed among 22 fields (Freire, 1989)



Figure 7 Campos Basin

Available from (<https://mb50.wordpress.com/>) [Accessed 28 August 2017]

In the view of the national and international conventions, the expectation of stakeholders and national supply chain benchmarking and laws, companies has to take necessary precautions for the offshore oil gas platforms which are completed their mission or life cycles. But then, the global petro-gas industry entered to the economic crisis with the dramatically go down in the crude oil prices in the years of 2014. All petro-gas companies scrutinized their programs, to be surviving in the oil-gas field.

The companies had to review their budget planning on the cost reductions and increasing the efficiency. While they were working on the cost reduction they faced significant numbers for the decommissioning costs of mature depleted fields. Thus, the global works on the decommissioning area were accelerated.

“Now, more than 9,000 offshore platforms are in service worldwide, operating in water depths ranging from 10 ft. to greater than 5,000 ft. Topside payloads range from 5 to 50,000 tons, producing oil, gas, or both.” (<http://petrowiki.org/PetroWiki>)

(Mimmi, Dalvi Nunes, Miguel Silva, & Lobo de Souza, 2015) indicated on their OTC paper, “The amount of the decommissioning of offshore oil and gas platforms, subsea wells and related assets is rising, with more than 600 projects expected to be during the next five years. When we look to the Brazil, North Sea, Indonesia and Gulf Mexico regions, decommissioning is getting a very big size. Decommissioning of offshore fixed platforms has become a reality that the Brazilian market has to face since only 5% of the offshore platforms installed in Brazil have been completely removed until now. In the last few years, many oil and gas fields have reached the end of their productive lives and many platform structures are reaching, or already exceeding, their project service life, 20 to 30 years on average.”

In the next future, 1,800 wells will have to be sealed and 7,500 km of pipelines dismantled, providing a massive opportunity to the decommissioning industry. “ (Pultarova, 2016)

1.3. Thesis Objectives and Scope

Oil crisis in recent years and increasing global borrowings have increased the importance of oil gas platforms. On the other hand, over 9000 oil gas offshore platform were built. As a result of the changing international and local basis and laws, companies faced have to take essential precautions to abandoned platforms.

Due to the high expenses, companies were not assuming the responsibility to remove the platform and rehabilitate the area. But, in the wake of international legislations, all these companies are taking serious steps to remove the platforms.

Some of these decommissioning projects can cost billions of dollars and take long times. On the other hand, it does not bring in profit from decommissioning of these platforms. However, due to the regulations and environmental effects, companies have to carry out complete decommissioning of offshore platforms, subsea wells, and related assets successfully.

Cost of these giant engineering projects naturally increases with complexity and size of the platforms, wells or subsea assets. In addition, it depends on water depth as well as by type. This is why we embark on a comprehensive analysis of the decommissioning of offshore platforms.

In order to be able to specialize in one area of this gigantic project, only subsea assets have been considered for this project to study on it.

Taking a decision without using any tool was goofed up due to the number of decommissioning alternatives which are able to use on that equipment. During the all decommissioning procedures also companies has to follow environmental, safety, technical, economical, societal factors and their sub criteria. To simplify the decision mechanism a tool will be created using the multi criteria decision analysis method. Thereby this method, petrol companies will be reduced planned budget for take a best decision about how to apply decommissioning option to each subsea assets and thus they will saving on time and money. Also another important point about what we are planning with this project, during decision processes of companies some time can take wrong decisions under the all this complexity and unclear laws. so we are planning to minimize this mistakes.

Here is a point that, Brazilian legislations are not showing a clear way that what companies have to do about decommissioning. Regulations are in the developing process and due to this all studies have to be review every year by checking the Brazilian regulations.

To sum up, a decision tool will be created using the multi criteria decision analysis method to obtain the successful decisions about how to select the best appropriate option for the subsea assets. Also we will use the weighting factor to be able to give more importance to any main or sub criteria which have may be different importance for companies or for regulations. For instance, from the equivalent level we can increase or decrease the importance of environment factor or other factors. The factor ratio depends on the company aims, region and legislation and expert opinions.

1.4. Methodology of the Thesis

The main point of the thesis is, to develop a decision tool to make the appropriate decision in the decommissioning of sub-sea assets that related with fixed oil gas platforms at Campos Basin in Brazil. To develop this tool, “Multi Criterion Decision Analysis Method” (MCDA) has been used on Microsoft Excel (64-bit).

First of all, all equipment that is commonly useable subsea equipment which is independent from the wells or jackets for the fixed offshore oil -gas platforms has been clarified and listed follows:

Production Equipment:

- Subsea Manifolds,
- Subsea Trees.

Transportation and Connection Equipment:

- Jumper (flexible),
- Spool (rigid),
- Pipelines (export lines) /Trunk lines,
- Rigid Flow lines,
- Flexible Flow lines,
- Umbilical Systems,
- Power Cables,
- Rigid Risers.

Processing Equipment:

- Subsea Pressure Booster Pump,
- Separation Systems.

Supported Structural Equipment:

- Template,
- Mudmat.

Decommissioning alternatives that can be used for all subsea equipment has been defined after the being shown of the list of equipment. These alternatives can be categorized under the 3 different main title and these alternatives demonstrated deeply at the next chapters. Main titles of the alternatives are total removal, partial removal and leave in situ respectively. Additionally, disposal alternatives described at the same table with decommissioning alternatives. But only decommissioning options will be considered throughout the studies. Therefore disposal alternatives will not be defined on this thesis we will referred them on the table 9.

As a next step of this thesis, all main and sub criteria that effects to decommissioning procedures, were identified and listed.

To find the most available decommissioning alternative for each of the subsea equipment, a tool will be created using the MCDA method. However, all subsea criteria and main criteria, available decommissioning options were analyzed together with the effect of weighting factor. All options will be ranked based on previous works, legislations and expert opinions.

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2. SUBSEA EQUIPMENTS MOSTLY USED IN CAMPOS BASIN

The list of equipments has been defined under this title. This list has been created with regard to most used equipment which is unrelated with wells or jackets for only fixed offshore oil gas platforms in Campos Basin at Brazil.

2.1. Subsea Manifold

Subsea manifolds are useful to minimize the utilization of subsea pipelines and risers while optimize the flow of fluids in the system. Main objectives of the system clarified below:

- Minimize the flow lines,
- Optimization of subsea layout,
- Diminish the quantity and size of risers that are connected to the offshore platforms,
- Full production in advance,
- Distribute electrical and hydraulic systems,
- Distribute production fluids, chemicals, and gas and control fluids.

According to ISO 13628-1, the manifolds should provide sufficient piping, valves and flow controls to safely gather produced fluids or distribute injected fluids such as gas, water or chemicals. (DNV-GL, 2013)

Subsea manifolds are installed on the sea floor and located independently from the wells. Jumpers have been used to make connection between the wells and pipelines to the manifolds thusly in figure 9.

Since the manifolds do not have moving parts, partial removal method for manifolds cannot get a place in the recommendations.

There are different kinds of manifolds. One of the most used manifolds is PLEM/PLET. These kinds of manifolds have direct connections to the pipelines. At the some of the sources this manifolds explained under the different title but due to "PLEM/PLET is a manifold", we will not consider separately from the manifolds.

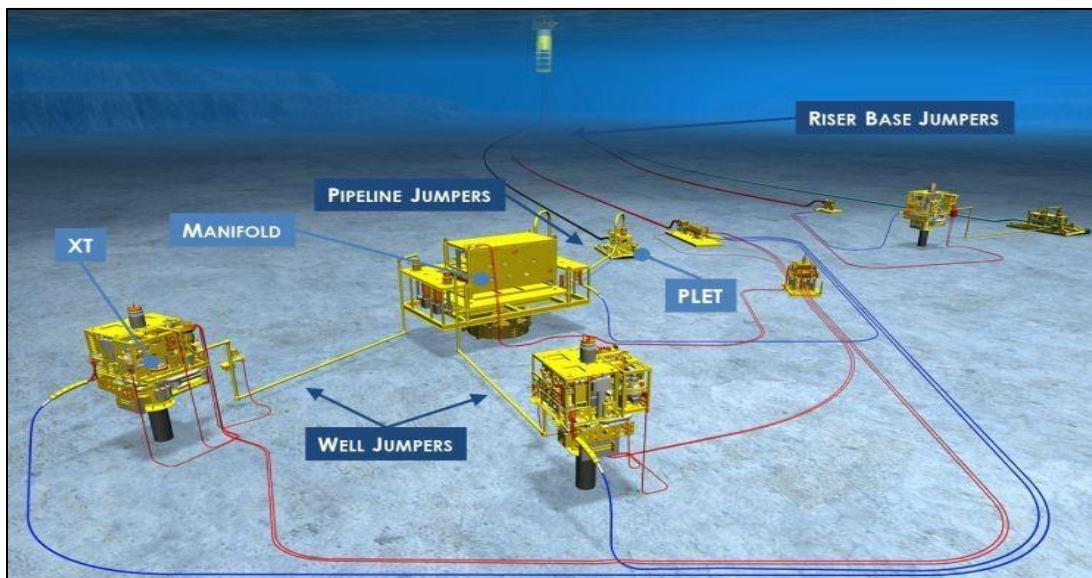


Figure 8 Example of layout plan of manifold-pipeline and jumpers

Source available from (<http://www.pretechnologies.com/>) [Accessed 29 August 2017]

Apart from PLEM/PLET, there are some kinds of manifolds as template and cluster. Template manifold (Fig. 10) has the necessity to be used while Xmas tree (Christmas tree) is grouped side by side. On the other perspective, if the Xmas trees have been located near to central location, cluster manifolds (Fig. 11) can get the priority to be used on the system instead of template manifolds.



Figure 9 Template manifold

Source available from (<http://www.fishsafe.eu/en/home.aspx>) [Accessed 30 August 2017]

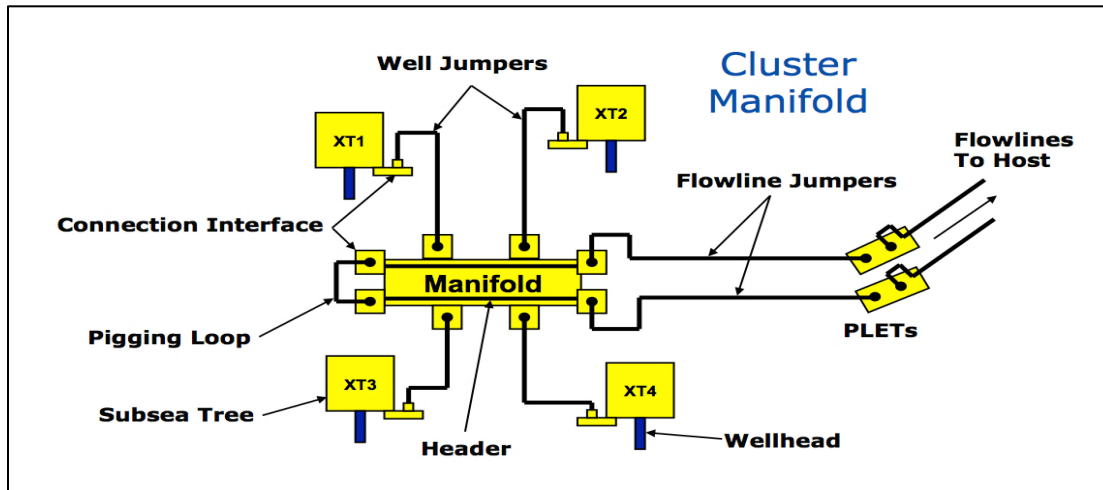


Figure 10 Schematic drawing of cluster manifold

Source available from (<http://www.subseapedia.org>) [Accessed 30 August 2017]

Subsea manifold consist of various components as shown as below. So all these components will considered as a part of manifold.

- Valves,
- Chokes,
- Hubs,
- Subsea Modules,
- Piping System,
- Control System (Allows to remote control of any hydraulically actuated),
- Framework Structure,
- Foundation (Mud mats, Piles),
- Connection Equipment (Allows subsea tie-in of multiple pieces of equipment),
- Sensors and Transmitters (Pressure Transmitters, Pig Detector),
- Inspection (Pigging),
- ROV Panel,
- Multiphase Flow Meter,
- Templates.

The Pipeline End Termination (PLET) connects a single pipeline, meantime the Pipeline End Manifolds (PLEM-a simple manifold) is useable to connect two or more pipeline with other subsea structures, such as manifolds or Xmas Trees through a jumper.

The PLET/ PLEM (Fig. 13) are located at the end of a subsea pipeline, while the inline structure is located in the middle of the pipeline.

The PLEM consists of following assemblies that are demonstrated in figure 12. PLEMs supply the extra supporting force for the collect connectors and piping systems of subsea equipment.

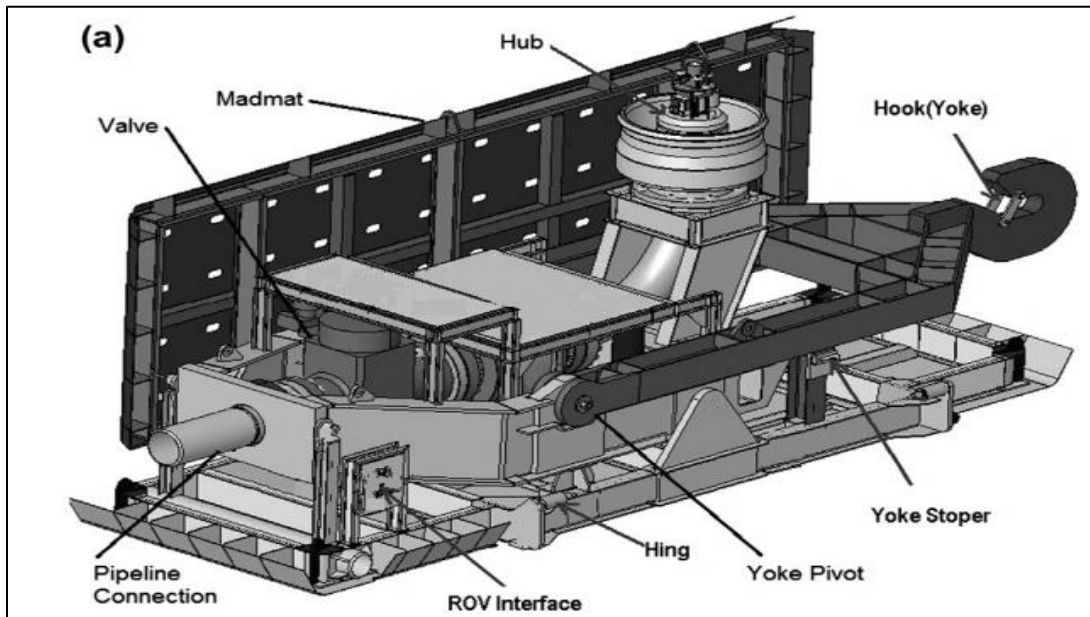


Figure 11 Typical PLEM

Source available from (Bai & Bai, 2010) [Accessed 30 August 2017]

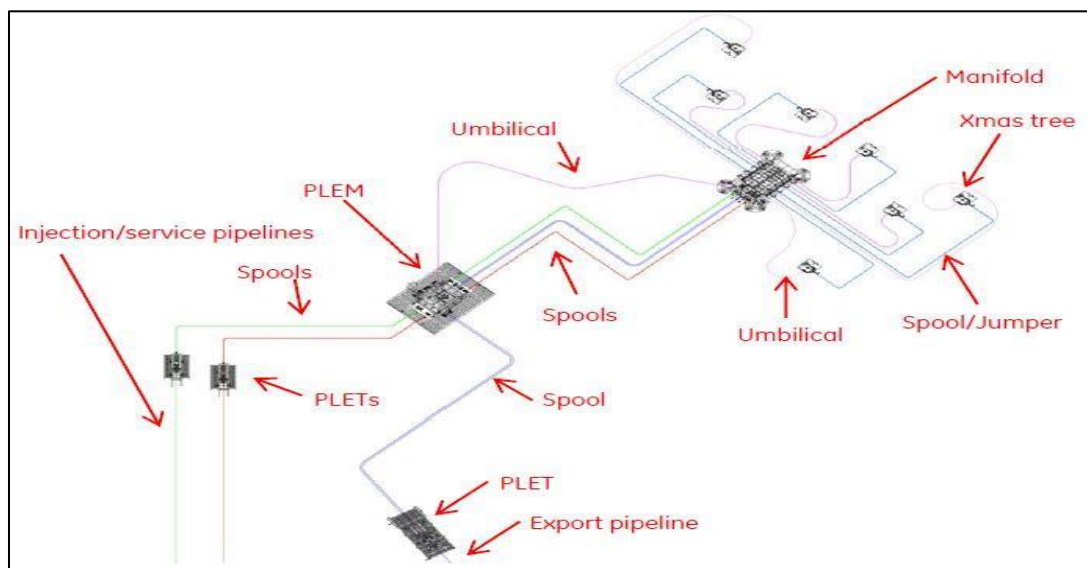


Figure 12 PLET and PLEM in subsea field layout

Source available from (<http://nfatmala.blogspot.com/>) ([Accessed 30 August 2017])

2.2. Subsea Tree

Subsea Trees which are called with different names as Xmas Trees, Christmas trees, subsea Xmas trees or tree, monitors and controls production flow and manages gas or fluids injection.

Basically subsea trees are group of valves, pipes, fittings and it is located on a subsea wellhead.

Subsea Trees are consisting as their equipment listed following:

- Subsea Control Module (SCM),
- Subsea Electronic Module,
- CPU,
- Power Supply,
- Communication Boards,
- Solenoid Driver Modules,
- Digital Transmitter Modules,
- Hydraulic Valves,
- Internal Communication via CAN bus,
- Subsea Accumulator Module (SAM),
- A set of valves,
- Tubing Hanger,
- Well Head Connectors,
- Connectors,
- Vertical Connector,
- Hydraulic Flying Leads,
- Electronic,
- Flying Leads,
- Sensors/Transmitters,
- Choke,
- ROV Panel.

There are two different type of subsea tree as demonstrated in the figures of 14, 15 and 16.

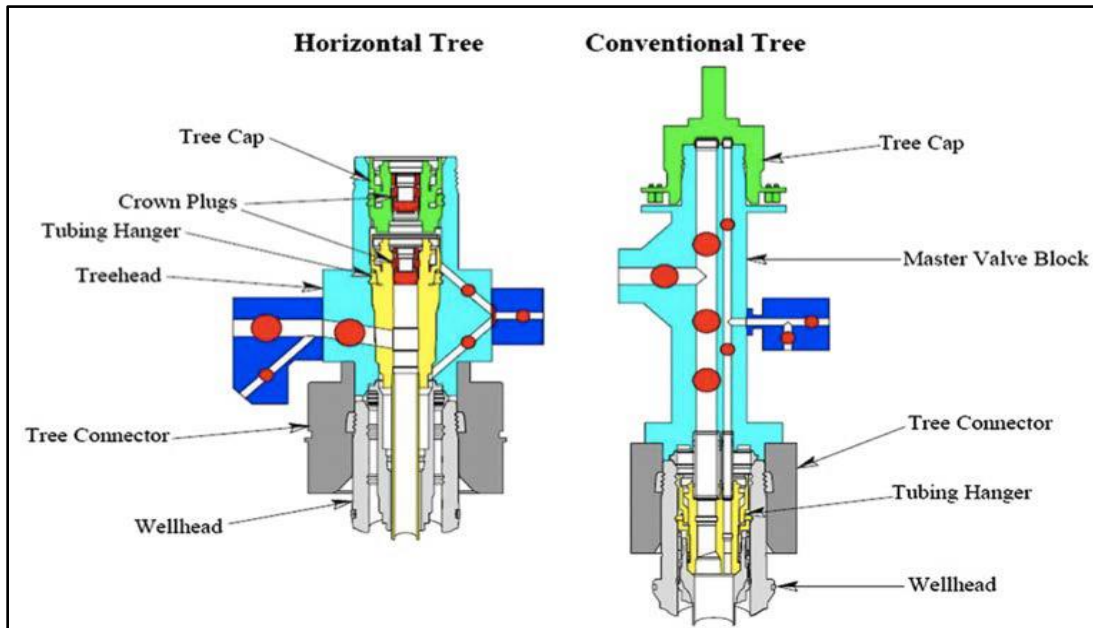


Figure 13 Horizontal and conventional subsea trees

Source available from (<http://nfatmala.blogspot.com/>) [Accessed 30 August 2017]



Figure 14 Sample of horizontal subsea tree

Source available from (<http://www.drillingformulas.com>) [Accessed 30 August 2017]



Figure 15 Sample of vertical subsea tree

Source available from (<http://www.drillingcontractor.org>) [Accessed 30 August 2017]

2.3. Jumper (Flexible and Rigid)

Subsea jumpers (Fig. 17) are a kind of short pipe connectors which are located on seabed to transportation of production fluids from one of the subsea component to another one such as like from Xmas tree to manifold or between the flow lines to manifolds. (Fig. 18) Additionally, in some systems that are searched during the literature studies, some of the jumpers (jumper spools) were used to connect PLEM/PLET and riser bases and it can be utilized to inject water into the wells.

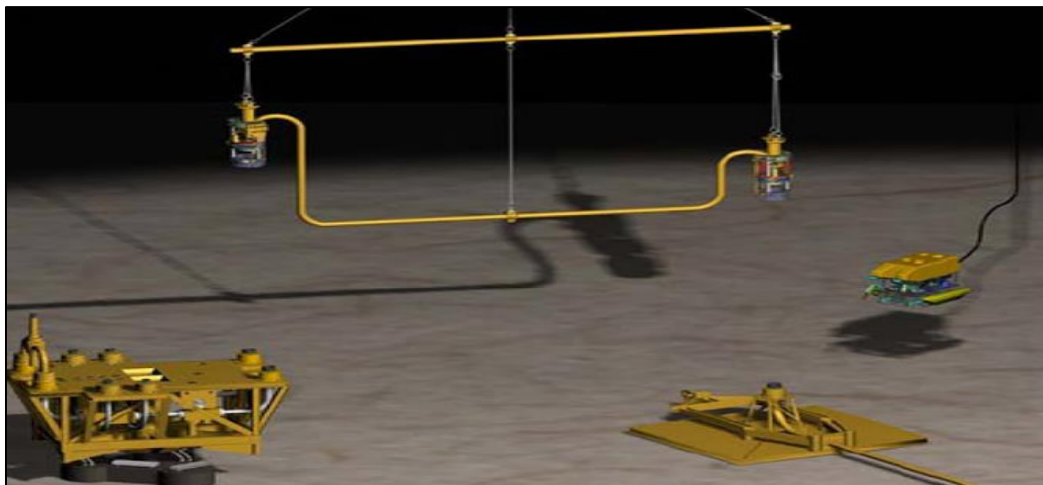


Figure 16 Sample of jumper

Source available from (<http://www.fogt.com/index.php>) [Accessed 30 August 2017]

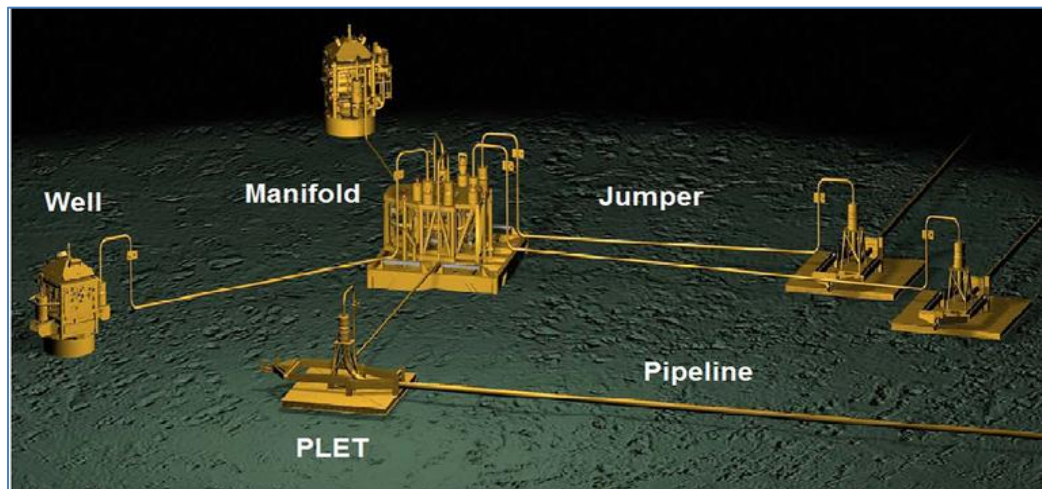


Figure 17 Subsea template layout

Source available from (<http://15511009.blogspot.com/>, 2015) [Accessed 30 August 2017]

2.4. Umbilical System

Umbilical systems (Fig. 19-20) consist of fiber optic cables, electrical cables, thermoplastic hoses, and steel tubes. All these components located in a circular cross-section (Fig. 19).

Umbilical systems are used by the offshore industry. The main missions of this equipment:

- Transmit the control fluid and electric current necessary to control the functions of the subsea production and safety equipment,
- Control of subsea manifold or isolation valve,
- Subsea production and water injection well control,
- Monitor pressures and chemical Injection,
- Operate subsea electrical devices.

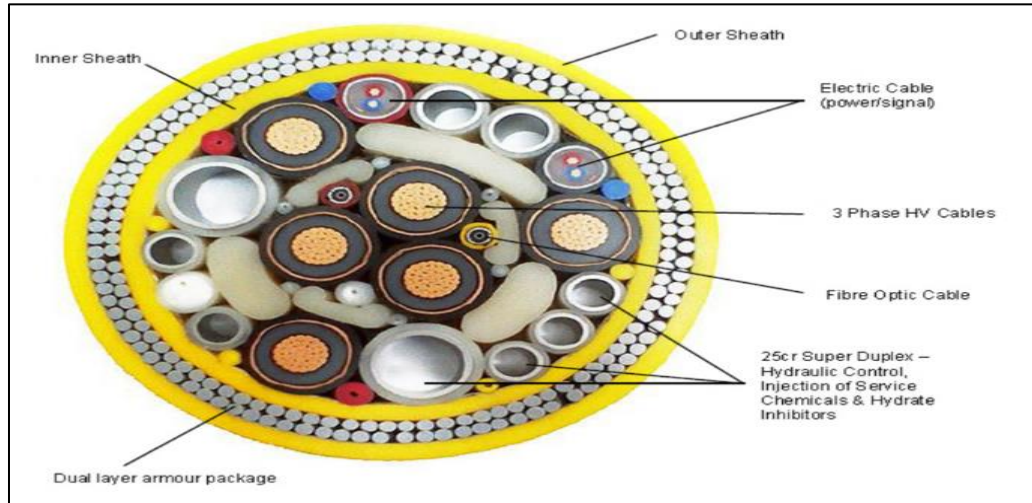


Figure 18 Umbilical cross-section

Source available from (<http://www.subseapedia.org>) [Accessed 31 August 2017]

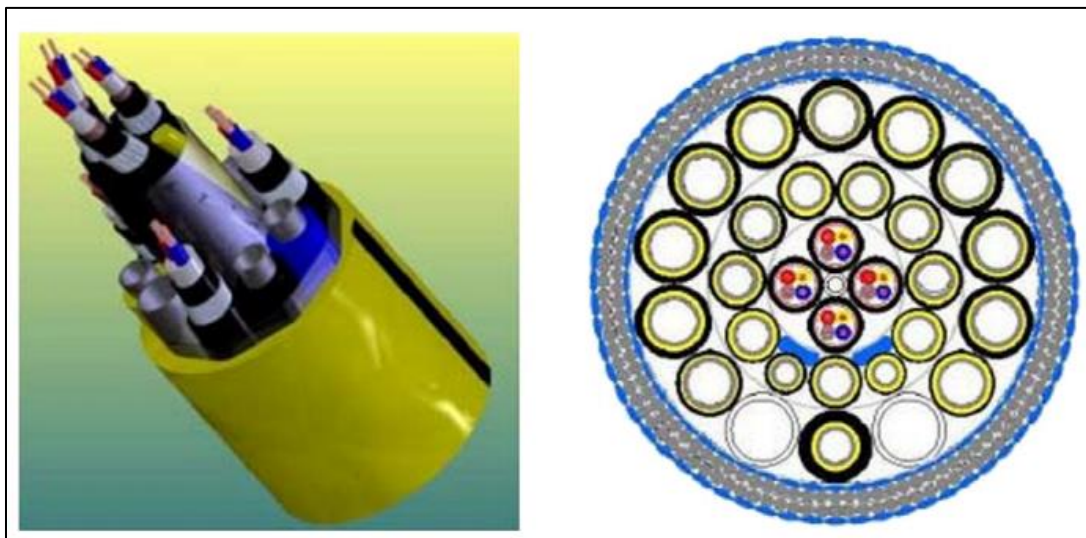


Figure 19 Subsea control umbilical

Source available from (<http://gcaptain.com/>) [Accessed 31 August 2017]

The clarification of subsea umbilical components (Fig. 21) has done below. Electrical cables have two different types as power cables and signal communication cables.

Power cables assembled in the umbilical for power transfer to offshore platforms and subsea production equipment. Signal communication cables utilizes for the monitoring and remote control of subsea equipment. Fiber optic cables, umbilical steel tube and thermoplastic hose are capable of uninterrupted operations when immersed in seawater.

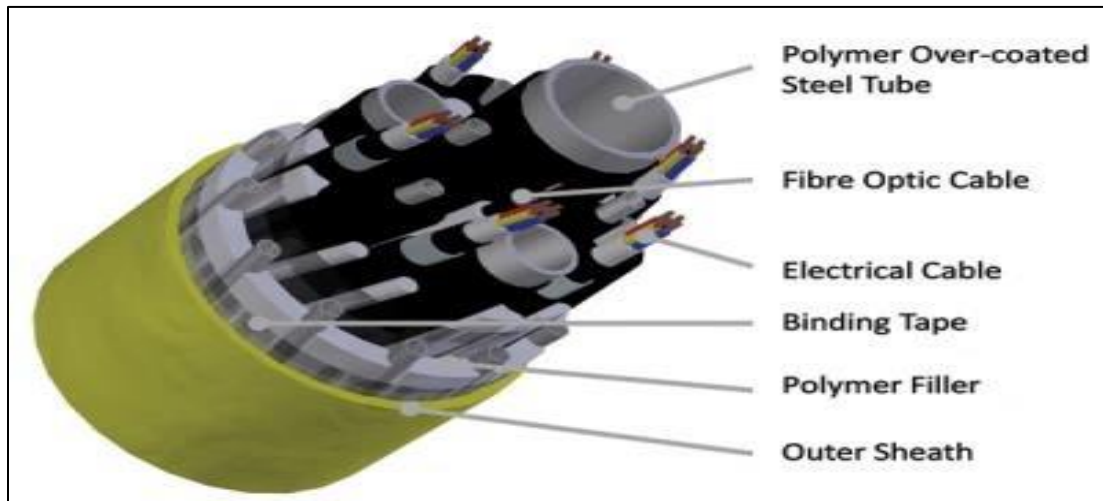


Figure 20 Components of umbilical

Source available from (<http://www.offshore-mag.com/index.html>) [Accessed 31 August 2017]

Umbilical termination assemblies (Fig. 22) put an end to umbilical lines and provide one or more connections for chemical, hydraulic, electrical and fiber optic services.

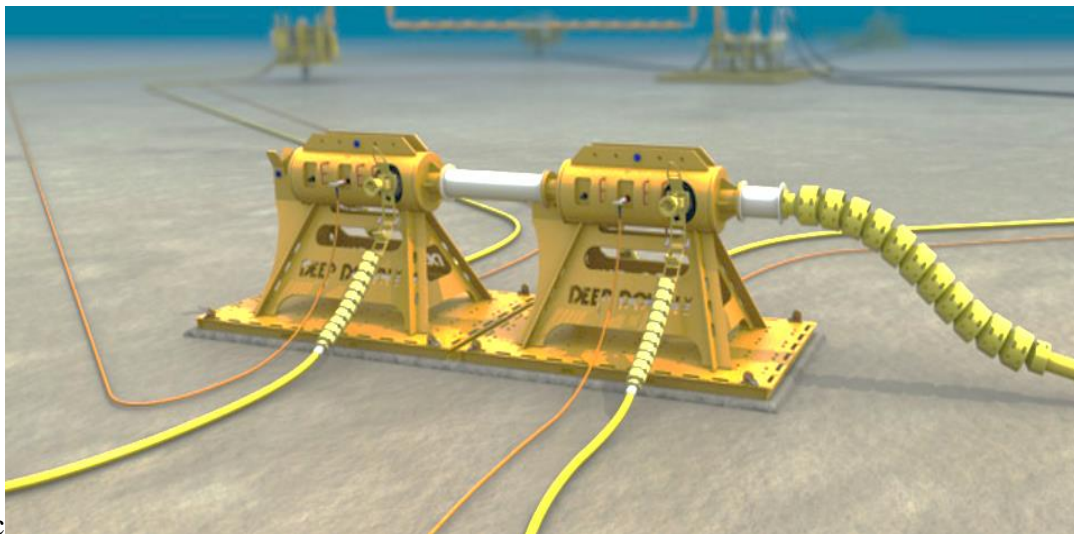


Figure 21 Umbilical termination assembly

Source available from (<http://www.deepdowninc.com/>) [Accessed 01 September 2017]

2.5. Subsea Pipelines

Subsea pipelines are one of the most important part of moving hydrocarbons and natural gas from offshore production equipment to processing facilities. Subsea pipelines have a variety of usage aims. There are different kinds of subsea pipelines defined in Table 1.

Table 1 Offshore pipelines and relevant descriptions
(Shen, Birkinshaw , & Palmer, 2017)

| Pipelines | Typical Dimensions | Applications | Primary Materials |
|---------------------------------|---|---|---|
| Trunk lines/Export Lines | Up to 44 inches, Up to 840 km long | Major Export infrastructure for oil and gas | Carbon Steel |
| Rigid Flow lines | Up to 16 inches Less than 50 km long | Infield flow lines and tie in spools | Carbon steel |
| Flexible Flow lines | Up to 16 inches Up to 10 km long | Infield flow lines and tie in spools | Carcass and polymer layers; alloy end fittings |
| Umbilical | 2 to 8 inches Up to 50 km long | Chemical hydraulic and communication distribution | Thermoplastic polymer or steel tubes; wire armour protected |
| Power Cables | 2 to 4 inches diameter Up to 300 km long | Power distribution between and within fields | Copper cores with wire armour protected |

The flow lines may transport hydrocarbon resources, lift gas, injection water and chemicals from wellhead to riser foot (Fig. 23). The export pipelines (Fig.23) located from the processing facilities to shore.

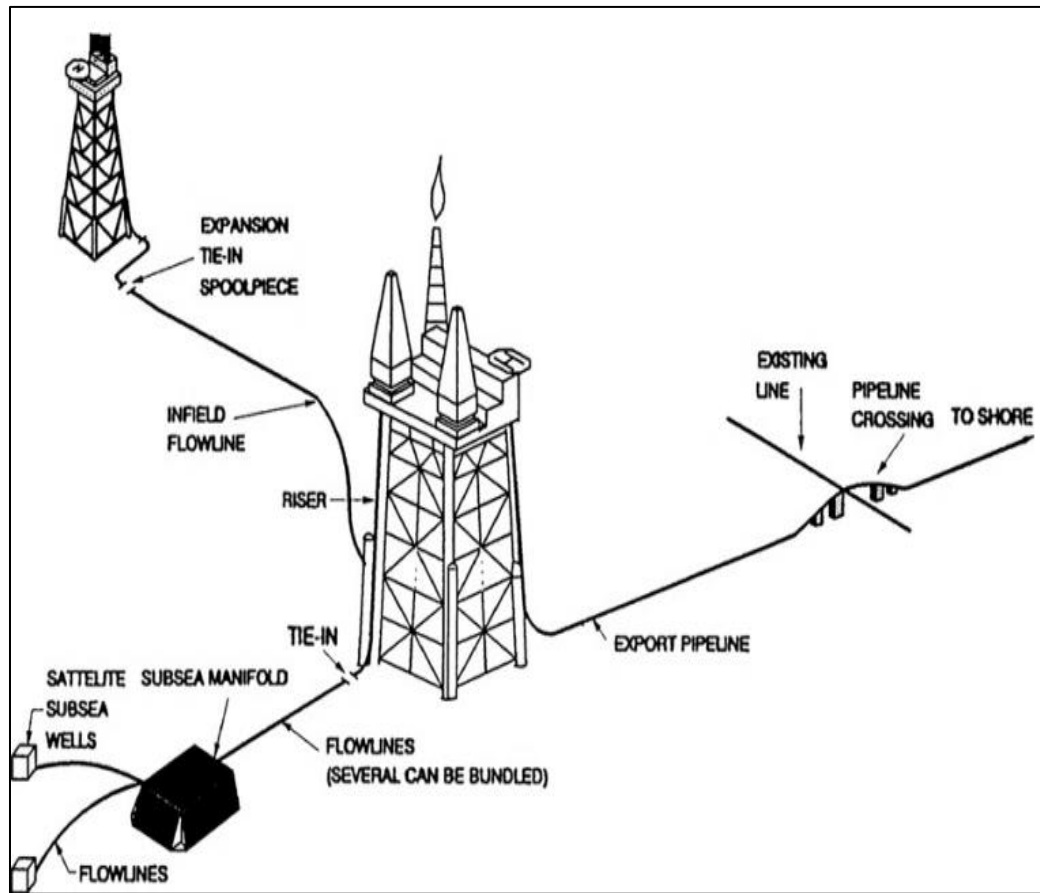


Figure 22 Application of subsea pipelines

Source available from (<http://www.piping-engineering.com>)[Accessed 01 September 2017]

According to figure 23, the subsea pipelines include:

- Export pipelines,
- Flow lines for transfer products between platform, subsea manifolds and wells,
- Flow lines for transfer products from platform to export lines,
- Pipeline bundles,
- Water injection or chemical injection flow lines.

2.6. Risers

Riser systems (Fig. 24) are key equipment for offshore drilling. In offshore industry, risers get in uses for drilling, transportation of hydrocarbons, fluids and gas lifts.

There are different types of risers that are assembled in subsea oil gas offshore platforms in Brazil.

A list below shows these types of risers:

- Attached Risers,
- Pull Tube Risers,
- Catenary Steel Riser,
- Flexible Risers,
- Top Tensioned,
- Hybrid Tower Risers.

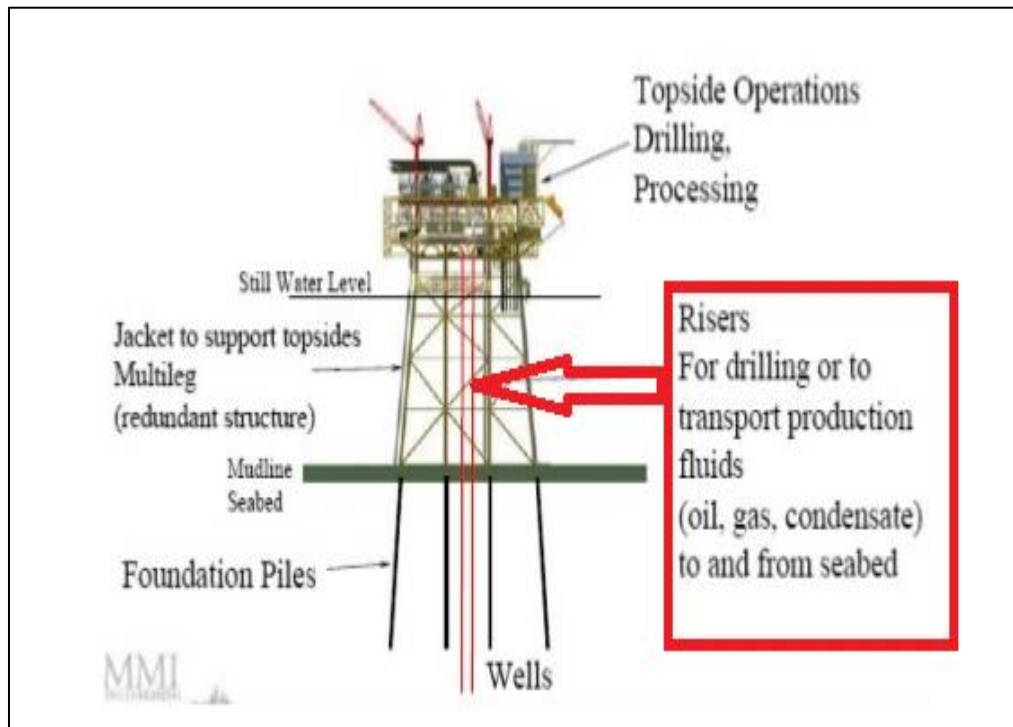


Figure 23 A riser installed on fixed platform

Source available from (<https://subseaworldnews.com>) [Accessed 05 September 2017]

Attached and pull tube risers (Fig. 25) are one of the easiest approaches to the riser design. “The attached riser utilizes clamps, typically with polymer liners, to fix the riser pipe to the tower. The pull tube differs in that, although it is mounted statically to the tower, it serves as a conduit for a smaller diameter flow line to pass through. The flow line is typically pulled through the riser via a high-capacity winch connected to the messenger wire of the flow line.”

(<https://www.gateinc.com>)

Attached and pull tube riser designs compared on the table 2.

Table 2 Comparisons of attached and pull tube risers

| ATTACHED RISERS | PULL TUBE RISERS |
|---|---|
| Limited to the fixed platforms | Limited to the fixed platforms |
| Applicable in depths up to 3000 feet | Applicable in depths up to 3000 feet |
| High ROV installation expense | Dry connection at deck level can be monitored more reliably |
| Exposed to platform movements that may induce stress on riser | High stresses on components during pulling operations |

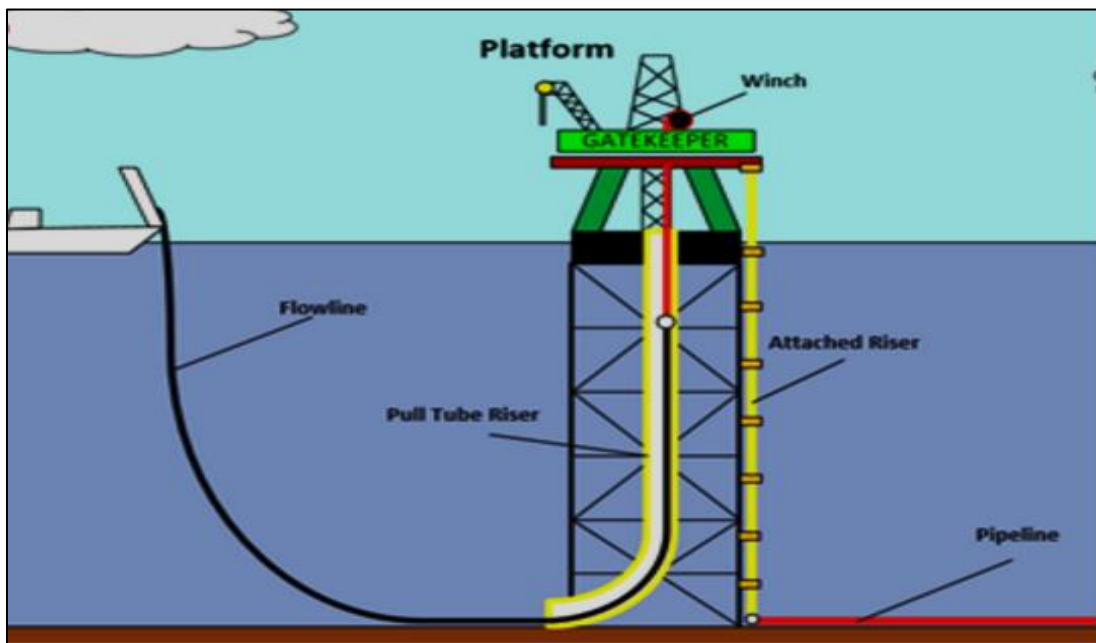


Figure 24 Attached risers and pull tube risers

Source available from (<https://www.gateinc.com>) [Accessed 05 September 2017]

Steel catenary risers (Fig. 26) assembled with semi-submersible floating platforms and when these risers are more effective when used in deep water.

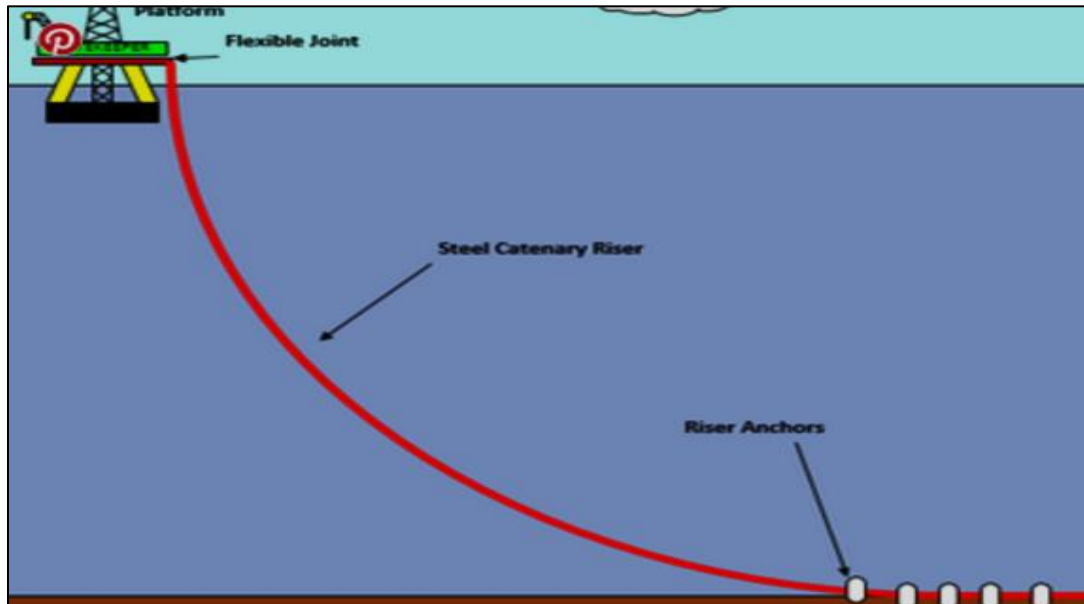


Figure 25 Steel catenary riser on the floating oil gas offshore platform

Source available from (<https://www.gateinc.com>) [Accessed 05 September 2017]

Flexible risers (Fig. 27) have high level of bending capacity. In the general cases, we use these kinds of risers for application of flow lines between the vessels.

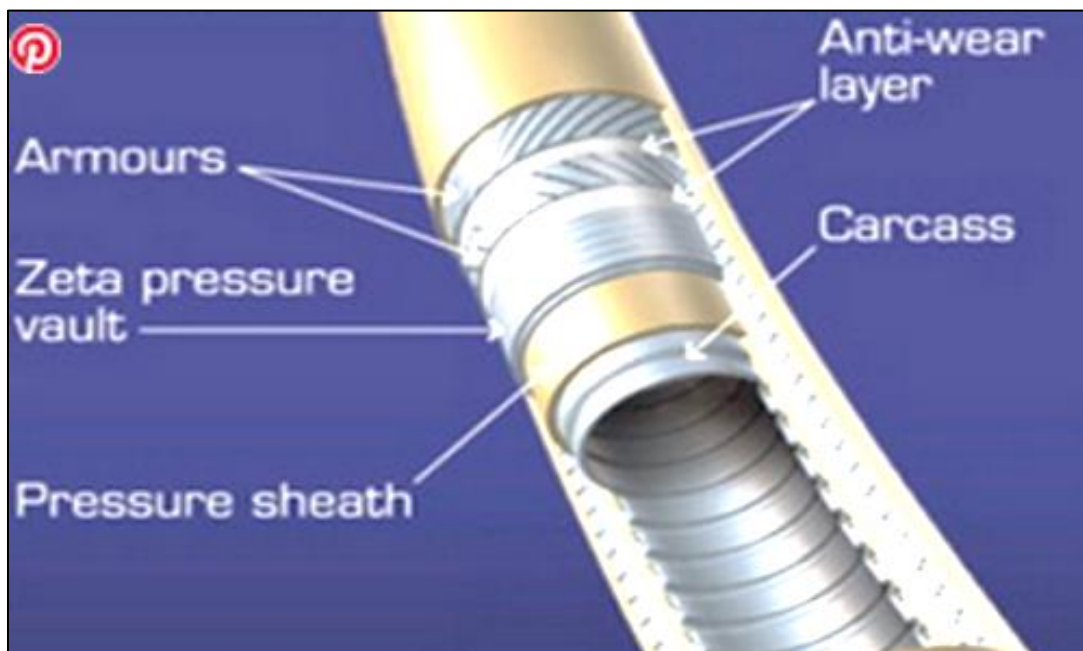


Figure 26 Flexible risers

Source available from (<https://www.gateinc.com>) [Accessed 05 September 2017]

Top tensioned risers are vertically located and these kinds of risers related with tension leg platforms and spars. Hybrid risers (Fig. 28) are similar to the top tensioned risers. Also these risers connect points between floating vessel and the production flow lines.

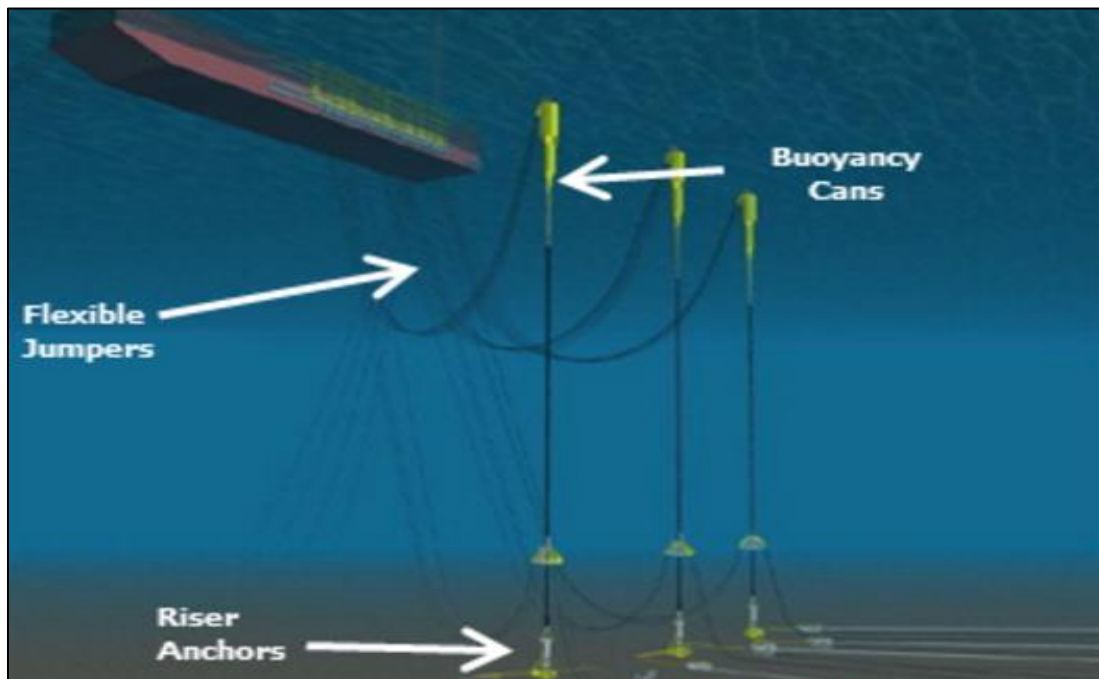


Figure 27 Hybrid riser

Source available from (<https://www.gateinc.com>) [Accessed 05 September 2017]

Due to we selected fixed platforms as working area, we will consider to analyze just for attached and pull tube risers (rigid risers).

2.7. Pressure Booster Pump

Subsea pressure pumping (Fig. 29) is one of the most mature solutions for increasing oil recovery from subsea tie-backs and these systems give accelerates to production. One of another benefit of these systems is increase the recovery and extensions of field life. They reduce operational expenditures (OPEX) and they improve flow assurance performance.



Figure 28 Subsea pressure booster pump

Source available from (<https://mokveld.com>) [Accessed 06 September 2017]

2.8. Separation System

Subsea separation system's (Fig. 30) main purpose is separate the multiphase fluids on the seabed and then send the separated oil and gas streams to the surface of the platform. There are two different kinds of separators which are used mainly and they called as gravity based three-phase subsea separation systems and cyclone based two-phase subsea separation systems.



Figure 29 Separation system

Source available from (<https://www.rigzone.com>) [Accessed 06 September 2017]

Subsea separation systems (Fig. 46) have advantages on the production system. They are effective to increase the production and reservoir recovery. These systems also positively influence the flow.

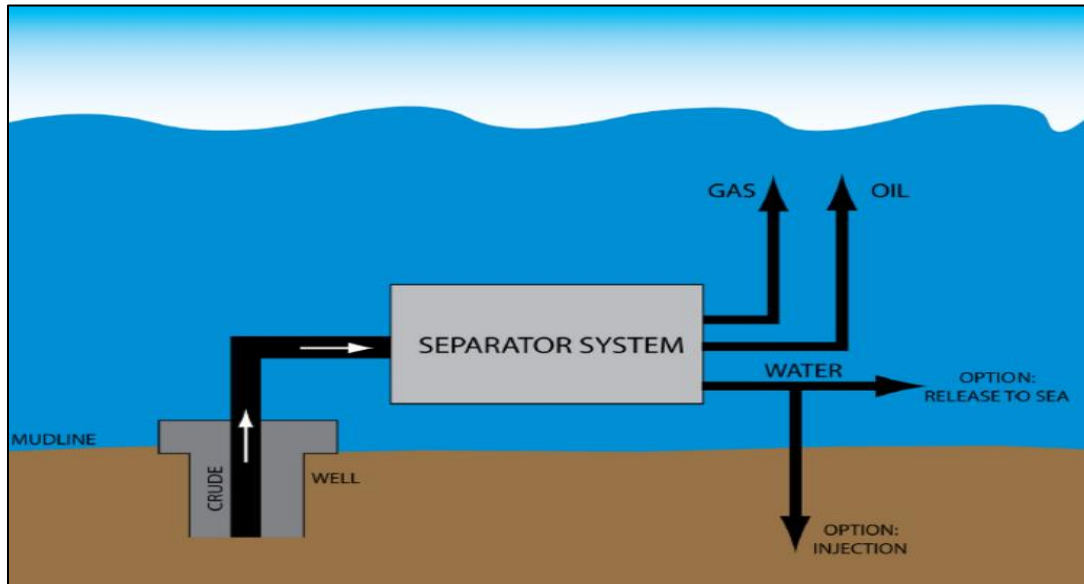


Figure 30 Subsea separator system

Source available from (<https://publicintelligence.net>) [Accessed 06 September 2017]

2.9. Protection Structure / Template Structure

The template (Fig. 32) is the basis that carries the weight and loads of the structure, and supports the wellhead and drilling activities, manifold and control system as well as the protection structure. The protection structure shields the subsea assets to protect the equipment from third-party damages as e.g. dropped objects, anchors or trawl equipment.



Figure 31 Subsea protection structure / Template structure

Source available from (<https://subseaworldnews.com>) [Accessed 06 September 2017]

2.10. Mudmat

Mudmat (Fig. 33) give support to seafloor temporarily for jackets and subsea equipment but we will focus on mudmat which are assembled under the subsea equipment during these studies (Not for jacket).

The function of mudmat is to provide sufficient area for load distribution to the ground.

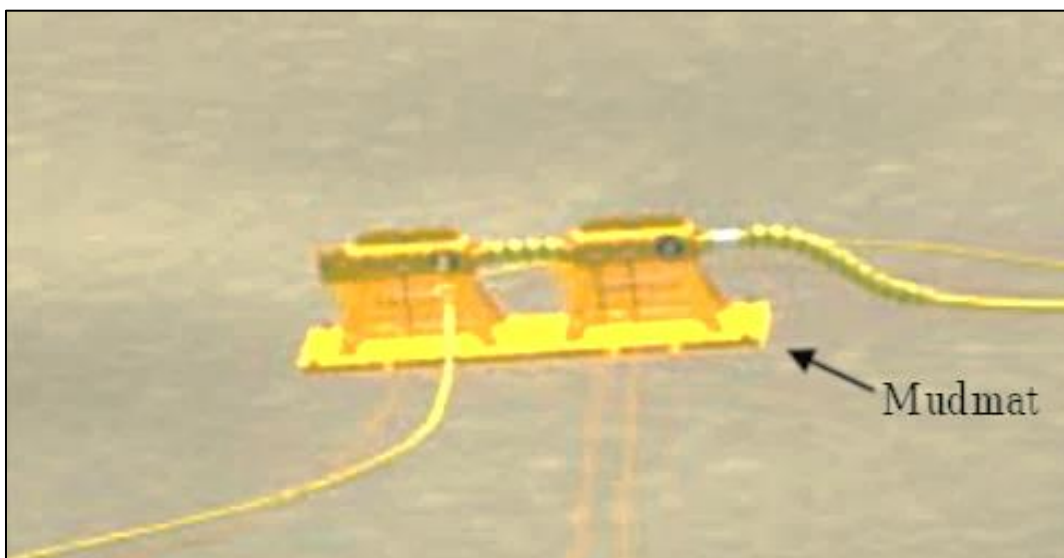


Figure 32 Mudmat for umbilical termination assembly

Source available from (<http://www.deepdowninc.com>) [Accessed 06 September 2017]

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3. CREATE A TOOL USING THE MULTI CRITERIA DECISION ANALYSIS METHOD

3.1. Introduction to Multi Criteria Decision Analysis Method

Multi Criteria Decision Analysis also called as Multi Criteria Evaluation or Multi Criteria Decision Modeling is a tool for analyses the issues that are involving multiple criteria, and it helps to how to get a decision for that complex analysis.

The method allows technical, societal, economical, safety criteria with the opponent priorities to evaluate and animadverted the results analytically. During the evaluation, quantitative and qualitative data can be combined or included to analyze the non-monetary value. In general cases, procedure of the method can be listed respectively as shown as below:

- Establish context,
- Definition of Criteria,
- Ranking and Weighting Criteria,
- Definition of Management Options,
- Score Management Options Against Criteria
- Multi-Criteria Options.

MCDA is an “umbrella term to describe a collection of formal approaches which seek to take explicit account of multiple criteria in helping individuals or groups explore decisions that matter” (Belton & Stewart, 2002). It is rooted in operational research and support for single decision-makers (Mendoza & Martins, 2006). Recently the emphasis has shifted towards multi-stakeholder processes to structure decision alternatives and their consequences, to facilitate dialogue on the relative merits of alternative courses of action, thereby enhancing procedural quality in the decision-making process (Fish, 2011).

Basically, the main idea of MCDA method is analyze and evaluate the different management options with respect to criteria that can be economic, societal, technical, safety, containing human decisions and preferences.

3.2. MCDA Benefits and Drawbacks

Advantages of MCDA include:

- It can structure an assessment of a complex problem along both cognitive and normative dimensions, both of which are essential in evaluating ecosystem services (Vatn, 2009).
- It allows comparison of ecological objectives with socio-cultural and economic ones in a structured and shared framework (Mendoza & Martins, 2006).
- It can facilitate multi-stakeholder processes, transparency and discussion about the subjective elements in policy analysis, including the nature and scope of the decision problem, the selection and definition of options (alternatives), and the characterization and prioritization of evaluation criteria (Keune & N., 2013).
- It can deal with incomplete and uncertain information which is characteristic of most environmental planning situations by allowing use of a mixed set of both quantitative and qualitative information (Locatelli, Rojas, & Salinas, 2008).

The performance of MCDA suffers when there are a high number of management options and criteria involved in the decision-making process; which puts too high burden on the participants to understand all of the options sufficiently well during the ranking and scoring stages. Problems also arise when the decision problem is very complex and there are interactions and feedbacks between the criteria that are difficult to unravel and understand. The method has also been criticized where conclusions have been based on the results of a purely quantitative analysis without sufficient consideration of qualitative data, thereby excluding more subjective values that are less easy to define and measure. (Saarikoski, Barton, Mustajoki, Keune, Gomez-Baggethun, & Langemeyer, 2015).

3.3. Definition of Main and Sub Criteria

The context of this process determined as Decommissioning Sub Sea Assets of Oil Gas Platforms in Brazil. Within this context a tool will be created using MCDA method to achieve the best option of decommissioning approach. But on the other hand, we need to identify the criteria which will be evaluated with management options crossingly. All the stages starting from “definition of criteria” will be clarified.

Five different criteria have been defined as main criteria and the sub criteria of these criteria have been determined. The main criteria have been demonstrated below:

- Environmental
- Safety,
- Technical,
- Economic,
- Societal.

In addition, sub criteria of these main criteria are explained in detail in the table below. This data will be used as the criteria for the process in MCDA analyses and evaluations. It is up to the operator to decide which sub-criteria are appropriate.

Table 3 Criteria matrix for a comparative assessment
(Limited, Shell U.K., 2017)

| Main Criterion | Sub Criteria | Definition of Criteria |
|-----------------------|---|--|
| Environmental | Operational Environmental Impacts | An assessment of the environmental impacts that could arise as a result of the planned operations offshore and onshore. |
| | Legacy Environmental Impacts | An assessment of the environmental impacts that could arise as a result of the long-term legacy effects of the structure or facility after completion of the proposed programme of work. |
| | Energy Use | An estimate of the total net energy use of the proposed programme of work, including an allowance for energy saved by recycling and energy used in the manufacture of new material to replace otherwise recyclable material left at sea. |
| | Gaseous Emissions | An estimate of the total net emission of CO ₂ from the proposed programme of work, including an allowance for emissions from the manufacture of new material to replace otherwise recyclable material left at sea. |
| Safety | Safety Risk to Offshore Project Personnel | An estimate of the safety risk to offshore personnel as a result of completing the proposed offshore programme of work. |

| | | |
|------------------|--|--|
| | Safety Risk to Other Users of the Sea | An estimate of the safety risk to other users of the sea form the long-term legacy of the structure after completion of the proposed programme of work. |
| | Safety Risk to Onshore Project Personnel | An estimate of the safety risk to onshore personnel as a result of completing the proposed onshore programme of work. |
| Technical | Technical Feasibility | An assessment of the technical feasibility of being able to complete the proposed programme of work as planned. |
| Economic | Cost | An estimate of the total likely cost of the option, including an allowance for long-term monitoring. |
| Societal | Effects on Commercial Fisheries | An estimate of the financial gain or loss compared with the current situation that might be experienced by commercial fishermen as a result of the successful completion of the planned programme of work. |
| | Employment | An estimate of the man-years of employment that might be supported or created by the options |
| | Communities | An assessment of the effects of the option on communities and onshore infrastructure. |

3.4. Ranking and Weighting Criteria

To determine the priorities or obtain the best solutions, criteria are ranked from 1 to 5. For the worst condition 5 is defined and for the best condition 1 is used on the excel tables. The meanings of these scores are identified as shown in table 4. The ranking has been done based on the, previous works, statutory limitations, and expert opinions under the circumstances of sample of limited work and unclear regulations in Brazil. For the every different area and platform, we have to review the ranking. Also developing Brazilian laws will force the changings on the ranking and weighting. Therefore review works must be done for all special different platforms and different area and also every year.

Table 4 Meaning scoring from 1 to 5

| | |
|---|-----------|
| 1 | Very Low |
| 2 | Low |
| 3 | Medium |
| 4 | High |
| 5 | Very High |

We will use the weighting factor to be able to give more importance to any main or sub criteria which have may be different importance for companies or for regulations. For instance, from the equivalent level we can increase or decrease the importance of environment factor or other factors. The factor ratio depends on the company aims, region and legislation and expert opinions.

In this context, different weighting scenarios are used and firstly equivalent schema selected and used, than weighting of each criterion has been changed as shown as below. And this weighting score may be changeable according to region, national or international regulations and companies' policies and these scores has been defined based on arithmetical usage and my own ideas. 6 different scenarios has been selected and used as demonstrated in table 5.

Table 5 Different scenarios for weighting factor

| Scenario | Description |
|-----------------|---|
| 1 | Weighted equivalent (%20 for each main criteria) |
| 2 | Weighted to Environment (%40 for environment and % 15 for others) |
| 3 | Weighted to Safety (%40 for safety and % 15 for others) |
| 4 | Weighted to Technical (%40 for technical and % 15 for others) |
| 5 | Weighted to Economic (%40 for economic and % 15 for others) |
| 6 | Weighted to Societal (%40 for societal and % 15 for others) |

3.5. Definition of Management Options

3.5.1. Management Option 1: Total Removal

This method is the most desirable option for marine animals and other benefactors of the environment but it is not commercially attractive for the owner of the companies.

Application of this method is quite hard due to cost, huge engineering challenges, and safety risks and so on. There are some ways that can be following after total removal of the subsea equipment. These ways are about how to utilize this equipment after total removal. For instance, transport to shore done for use again, after some modifications and, improvement works, on that platform. Also, this equipment may be utilized by recycling facilities or scrapping.

Another way about total removal method is that may be transportation of subsea equipment to shallow or deep water by purpose of reuse for the other platforms or for using as artificial Reefs.

Artificial reefs mean using cleaned offshore platforms or equipment to create reefs for marine life and environment. But this option is more applicable for huge volumes such as wells. Therefore artificial reef will not be considered for our study.

3.5.2. Management Option 2: Partial Removal

Partial Removal is an alternative method of decommissioning of subsea equipment. This method is useful for the decommissioning of large structures that are important in view of technical, economical and safety reasons. This method is cheaper in contrast with total removal option. But the method has restrictions and due to abandon of the some part of the equipment on the sea bed and costs arising from removing of the some part of the equipment, it remained between the total removal and leave in situ decommissioning options.

The partial removal method includes the methods of transporting some of the equipment to the shore, shallow water or deep water, and subsequent uses such as reuse, disposal, recycling separation.

3.5.3. Management Option 3: Leave on Sea Bed

Subsea equipment could be left in its original location as a decommissioning process . This alternative may be attractive for some subsea equipment, which would be extremely difficult to remove from one place to another place. Also energy usage and gaseous emissions will be at the minimal level. When the technological restrictions doesn't allow to removing operations, this option can be used.

But for the decommissioning options of "leave on sea bed", according to (ANP R. n., 2006) report, the companies have to prepare their proof and documents and submit the agencies within 180 days in Brazil.

On the other hand, the problem of this alternative is maintenance and residual liability.

This option is often not feasible because of international and national regulations. But due to the legal loopholes in "developing Brazil legislation framework", usage of this option in Brazil has more flexibility than other countries.

Following methods may preferable as "Leave in Place Alternative":

- Leave In Situ,
- Landfill-Rock Dumping,
- Burial or Trenching.

These alternatives will be defined under the title of "Management Options for Pipeline Decommissioning".

3.5.4. Management Option for Pipeline Decommissioning

Pipeline decommissioning is a major part of decommissioning facilities of offshore platforms. We will look on trunk lines, rigid flow lines, flexible flow lines, umbilical and power cables. (Table 6)

Table 6 Offshore pipelines and relevant descriptions
(Shen, Birkinshaw , & Palmer, 2017)

| Pipelines | Typical Dimensions | Applications |
|---------------------|---------------------------------------|--|
| Trunk lines | Up to 44 inches, up to 840 km | Major export infrastructure for oil and gas |
| Rigid Flow lines | Up to 16 inches, less than 50 km long | Infield flow lines and tie-in spools |
| Flexible Flow lines | Up to 16 inches, up to 10 km long | Infield flow lines and tie-in spools |
| Umbilical | 2 to 8 inches, up to 50 km long | Chemical, hydraulic and communication distribution |
| Power Cables | 2 to 4 inches, up to 300 km long | Power distribution between and within fields |

There are many techniques available for subsea pipeline decommissioning. However, there is no one size fits all approach and techniques depend on many factors including the pipeline size, water depth, type of pipeline, type of conveying fluid, technical limitations, regulatory framework, risk factors, environmental effects, stakeholder interests and cost.

There are no internationally accepted patterns for pipelines in particular, although there exists a number of international treaties that govern the disposal of general waste at sea.

The decommissioning of subsea pipelines is governed by the relevant national legislations and whatever good practice which is done before successfully.

The following methods are available for decommissioning of subsea pipelines:

- Reverse Reeling,
- Reverse S-Lay,
- Cut and Lift,
- Leave in Situ with Minimal Interventions,
- Rock Dumping,
- Burial or Trenching.

If the best decision is removal of the pipelines from the sea bed, we will consider the following table which has been developed.

Table 7 Pipelines removal options

| REMOVAL OPTIONS PIPELINES | Reverse Reeling | Reverse S-Lay | Cut and Lift |
|------------------------------|-----------------|---------------|--------------|
| Trunk lines | | ☑ | ☑ |
| Rigid Flow lines | ☑ | | ☑ |
| Flexible Flow lines | ☑ | | ☑ |
| Umbilical Systems | ☑ | | ☑ |
| Power Cables | ☑ | | ☑ |

If the best decision is abandonment of the pipelines on the sea bed, we will consider the developed table 8 which shows pipeline types corresponding to removal alternatives.

Table 8 Pipelines and abandonment options

| PIPELINES \ ABANDONMENT | Leave in Situ | Rock Dumping | Burial and Trenching |
|---------------------------------------|----------------------|---------------------|-----------------------------|
| Trunk lines | ☑ | ☑ | ☑ |
| Rigid Flow lines | ☑ | | ☑ |
| Flexible Flow lines | ☑ | | ☑ |
| Umbilical Systems | ☑ | | ☑ |
| Power Cables | ☑ | | ☑ |

In general cases, following list should take into account before starting the pipeline decommissioning for all kind of methods:

- Carry out desk top study and gather data regarding production history, operational philosophy and relevant geometrical, burial and crossing data,
- Stakeholder Engagement and Consultations,
- Review recent survey(s) and IRMs,
- Review recent pigging results including intelligent pigging,
- Study the relevant regulations and governing legislations in detail,
- Where possible, carry out a site visit to verify the information obtained during the desktop study,
- Carry out a detailed EIA (Energy Information Administration),
- Examine the availability of the waste disposal facilities and methodology to be used,
- Study and document any potential effect on the marine environment, inter alia, water quality, geological and hydrographical characteristics, presence of endangered species, existing habitat types, local fishery resources, contamination potential,
- Prepare a detailed cost assessment for all potential decommissioning scenarios,
- Carry out CA for all possible decommissioning scenarios,
- Prepare methodology for pipeline pigging, cleaning and flushing,
- If necessary, carry out a dedicated survey,
- Inform the regulatory authorities of the planned decommissioning and date for CoP,

- Prepare offshore pipeline decommissioning study and hand over to the regulatory authorities,
- Prepare detailed offshore action plan including the disconnecting method, cutting method, plugging, and type of vessels to be used, etc. and regulatory approval of the decommissioning plan.

3.5.4.1. Management Option 1: Reverse S-Lay

Reverse S-Lay (Fig. 34) method gets used to installation of larger diameter and concrete coated export lines. Availability of this method is limited in excess of 16 inches diameter.

Special S-Lay vessels are duty holder of this process and the process involves recovering a subsea pipeline edge to the deck of the vessel. During the process, the vessel moves along the pipeline starting from the end of the line and stops at the most proper point where a cut is conceivable to remove the pipeline. These cut sections be transferred to a barge for onshore disposal operations.

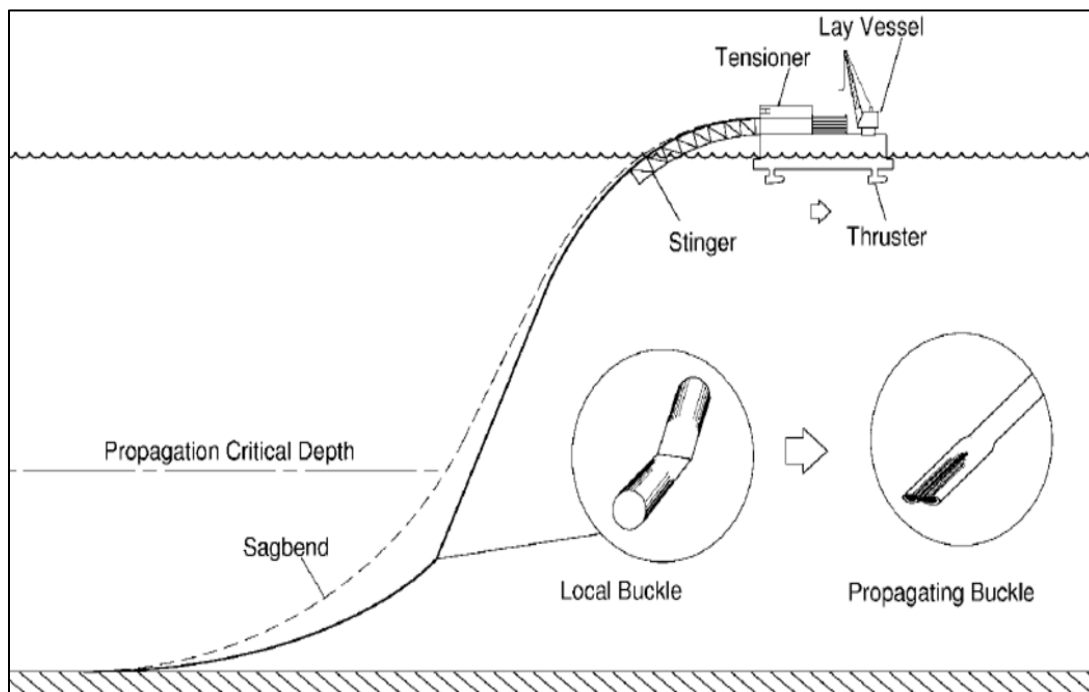


Figure 33 Reverse S-Lay method

Source available from (<https://pricilia281.wordpress.com/>) [Accessed 01 October 2017]

3.5.4.2. *Management Option 2: Reverse Reeling*

Reverse reeling method is the most preferred method for the pipelines which have a diameter of 16 inches or less and not concrete coated. Decommissioning of flexible flow lines, rigid flow lines, umbilical and power cables are carried out by using the reverse reeling method. (Table 7)

A pipeline is reeled onto the deck of the special reel vessel (Fig. 35) and the pipe plastically deformed during the reeling process.

The reeling process of the pipeline is restricted by the dimensions of the reel. The recovered pipeline is taken onto the shore thereby reversing process repeating again on the shore. Due to these processes, unlikely the recovered rigid pipeline could not be reused. Therefore the steel that is obtained from the recovered rigid pipelines is recycled.



Figure 34 Specialist reel vessel

Source available from (<https://www.offshoreenergytoday.com/>) [Accessed 02 October 2017]

3.5.4.3. *Management Option 3: Cut and Lift*

Cut and lift method is one of the useful method that have possibility to use for decommissioning of subsea pipelines (Fig. 36). For this method there is no limitation of dimension of pipeline so it means it is get used for all kind of pipelines.

A pipeline is cut into the sections by using the cutting tools or remotely operated cutting equipment and after the cutting procedure, the sections are recovered to vessels using the cranes. Also the section may be recovered to surface using the some special tools.

Practically, this method is the most ideal one for the short pipes. In contrast, for the long section of pipelines, this method is expensive to mobilize major removal equipment.

It should be mentioned in particular, the cut and lift method carry on greater risks for the personnel who are carrying out the offshore operations.

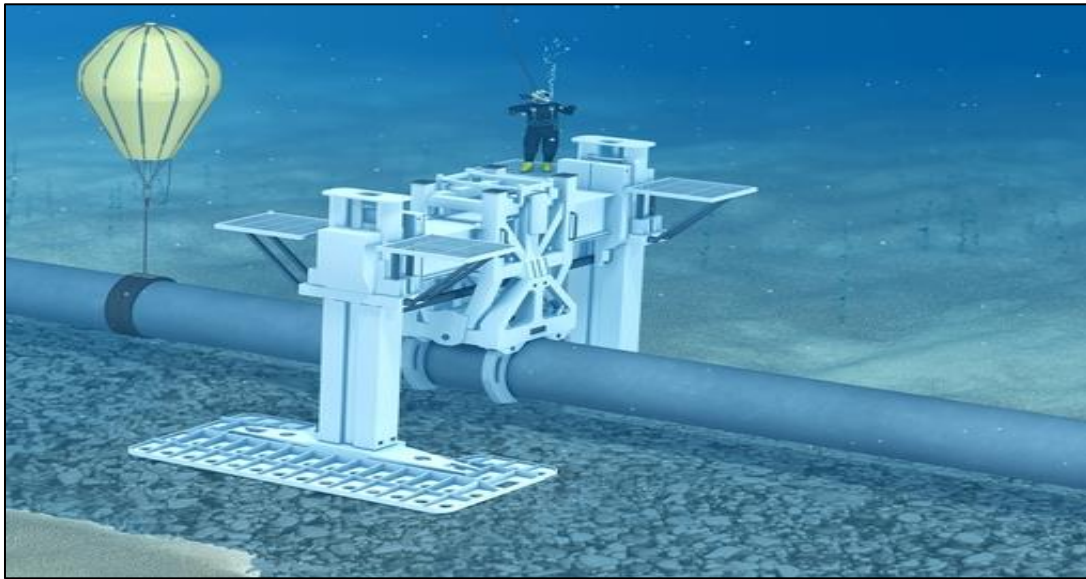


Figure 35 Application of cut and lift method for subsea pipelines

Source available from (<https://oilandgastechologies.wordpress.com/>) [Accessed 02 October 2017]

3.5.4.4. *Management Option 3: Leave in Situ*

Some pipelines may be suitable candidates for in-situ decommissioning with minimal corrective measures. Typical pipelines suitable for this option are:

- Pipes which are satisfactorily buried or trenched and expected to remain,
- Pipes which are expected self-bury over an adequate length within a time and remain so buried,
- Pipes which are shown that to the preferred options by CA,
- Pipes which can not be recovered safely and efficiently due to structural damages or weakening,
- Pipes which are undertaken to a sufficient depth and is expected to be permanent.

Lefted pipelines on the sea bed without any preservation would slowly decompose. Apart from environmental apprehensions, a corroded pipeline will become more vulnerable to any damage.

Therefore, to minimize the rate of corrosion, pipelines shall be preserved and filled with treated water. Consequently, pipeline ends are plugged and free ends are secured.

In all cases, pipelines have to be cleaned to an appropriate level as part of the decommissioning operations. Also pipelines have to be checked and monitored every year based on engineering operations.

3.5.4.5. Management Option 3: Rock Dumping

Rock or gravel dumping (Fig. 37) is one of the old-style methods of stabilizing entrenched subsea pipelines. This method also provides additional protection against impact damage. Three methods for placing the rock which are commonly employed, are as follows:

- Split hopper barge,
- Side dumping vessel,
- Fall pipe placement.

Split hopper barge and side dumping vessel methods are only valid for shallow waters. On the other hand, fall pipe placement method is applicable to medium depths of waters.

Rock dumping methods use significant quantities of material, but most of these materials are wasted because of the preferred techniques. The rock dumping method is limited to dimensions of pipelines of up to a few hundred meters long.

Gravel dumping, where it is applicable, is more precise and is now widely used for providing pipeline cover.

Typical pipelines suitable for this option are:

- Buried or trenched pipelines,
- Pipelines which have large diameters such as trunk lines,
- Pipelines which are not capable of recovery process in the view of safety and environmental factors,
- If the EIA results remark that pipelines will pose significant risks to the underwater habitat, personnel or subsea assets.



Figure 36 Application of rock dumping

Source available from (blob:<https://www.youtube.com/>) [Accessed 12 October 2017]

3.5.4.6. Management Option 3: Burial and Trenching

Using the burial or trenching method, we offer a high degree of protection to subsea pipelines. The following benefits become apparent significantly during the application of this methodology.

- Increased stability,
- Protection from damage from impact by heavy fishing gear or anchors,
- Minimum obstruction to other users of the sea.

High pressure jetting, low pressure high volume jetting, fluidization, cutting and plugging are the principal methods that are used for trenching a pipeline.

According to explanation of report of (UK, 2013), “Jetting systems vary from complex excavators to simple trenching sleds. Jetting tools can work in sand, silt and medium clay. Jetting produces wide shallow trenches in loose sand, and therefore may not provide sufficient burial for decommissioning. In denser sands and weaker cohesive soils the trench shape is well defined. Cutting trenchers are essentially the same as jet trenching vehicles but use mechanical means of creating an open trench such as chain cutters, wheels, disks, etc. “

“The soil is cut under the pipe and the material is entrained using a dredge pump system and ejected to the side of the trench. A trenching plough operates by being positioned astride the

pipeline with the cutting share open. The pipeline is picked up by fore and aft grabs creating a span in the pipeline. Rollers are closed around the pipe to support the load during burial process and the share is closed beneath the pipe. The rigid pipeline is lowered into a ‘V’ cut trench, formed by mechanical deformation of the seabed by the pipeline plough as the plough is pulled forward. The excavated trench material is deposited in berms on both sides of the formed trench and can be removed on completion of the trenching pass by a backfilling process. Some trenching ploughs exist that can be used to backfill trenches on a second pass. Otherwise, a separate backfill plough will be used in combination with the trenching plough” (UK, 2013).

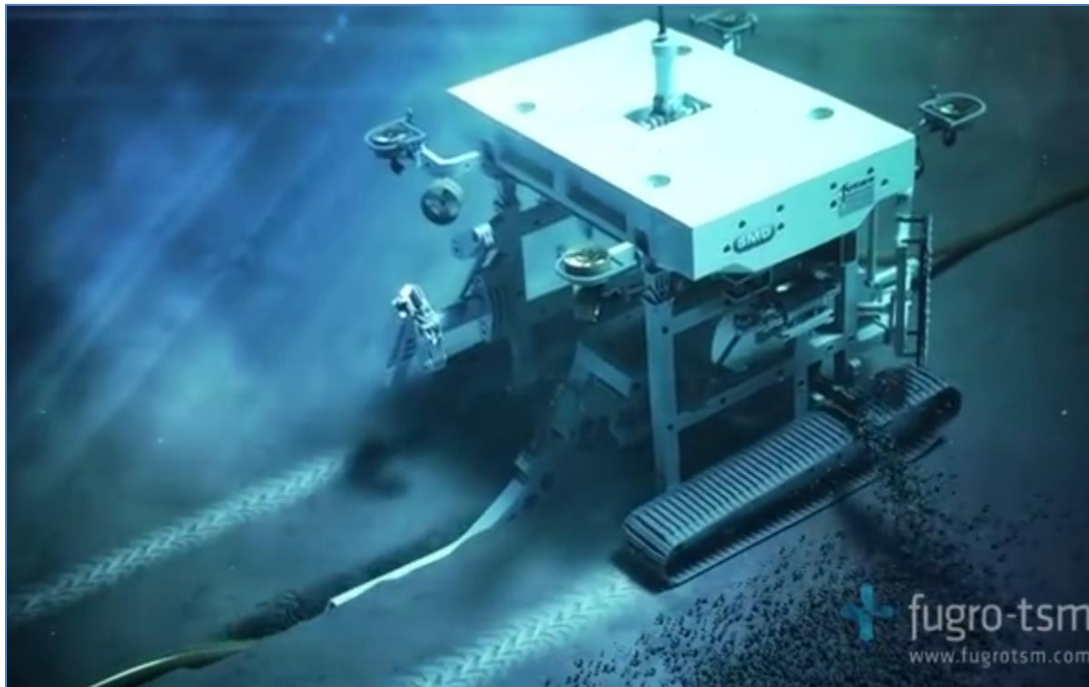


Figure 37 Application of burial and trenching for subsea pipelines

Source available from (<http://www.windpowerengineering.com/>) [Accessed 05 October 2017]

All decommissioning and disposal alternatives have been demonstrated in figure 38 and table 9.

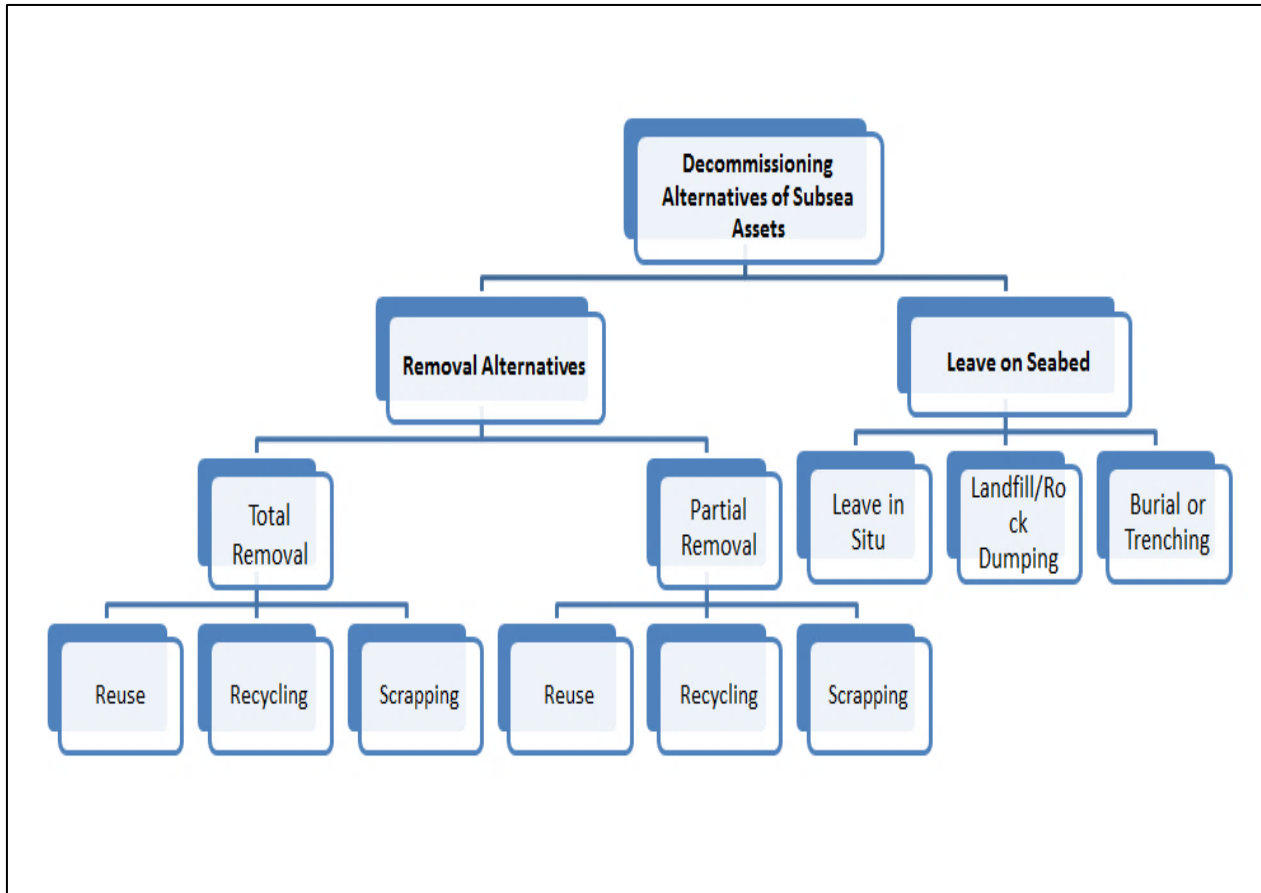


Figure 38 Decommissioning alternatives of subsea assets for fixed oil –gas platform

3.6. Legislation Framework in Brazil

The offshore decommissioning activity is a recent development in the Brazilian oil industry. The regulation of this activity is still in the process of development and updating. This fact brings great economic uncertainty to the costs of decommissioning in Brazil.

There are ANP resolutions that point out the obligations of operators in the process of decommissioning offshore projects. These refer to several important aspects of decommissioning, to the regulation of IBAMA and the Navy, which do not yet have sufficiently comprehensive and detailed technical regulations for the subject. Thus, Brazilian regulation clearly points out what must be done to decommission an offshore project, but leaves many gaps about what the best practices are and how this decommissioning can be done.

ANP acknowledges being too prescriptive and unwieldy. This is the part of the reason of why decommissioning procedures have proceeded relatively slowly in Brazil.

Brazil, despite its leading role in the development of deep water drilling and technology has not yet formulated any domestic abandonment regulation.

There are no international regulations or guidelines, relating specifically to the decommissioning of pipelines. At present, pipeline decommissioning is covered within national legislation. (ANP, 2015)

For the decommissioning option of "leave in situ", the companies have to prepare their proof and documents and submit the agencies within 180 days. (ANP, 2006)

To summarize, Brazil regulation system is still developing and the rules are not covering all procedures. Therefore most of the decisions that must be taken for decommissioning process show up by stakeholder engagement and experts opinions.

Under the all references that are mentioned and legislation framework, the following matrix has been developed to be used as reference to our decision analysis study. For more detail of the matrix please check the appendix 1.

Table 9 Decommissioning Options of Subsea Equipment of Fixed Platforms at Campos Basin

(Caprace, 2017) (Ekins, Vanner, & Firebrace, 2005)a (Ekins, Vanner, & Firebrace, 2005)b (Lakhal, Khan, & Islam, 2009) (Mimmi, Ralston, Silva, & Martins, 2017)a (Mimmi, Ralston, Silva, & Martins, 2017)b (ARUP, 2017) (Barbabela, 2016) (Paranhos) (Ruivo & Morooka)

| | | | | DECOMMISSIONING OPTIONS | | | | | | DISPOSAL OPTIONS | | | | |
|--|--------------------------------------|--|--|-------------------------|---------------|--------------|-----------------------------|-----------------|---------------|-----------------------|---------------------|-----------|-------|-----------|
| | | | | REMOVAL ALTERNATIVES | | | LEAVE ON SEABED | | | | | | | |
| | | | | LINE REMOVAL | | | LOCAL REMOVAL AT DEEP WATER | | | | | | | |
| ALTERNATIVES SUBSEA COMPONENTS | | | | Reverse Reeling | Reverse S-Lay | Cut and Lift | Total Removal | Partial Removal | Leave In Situ | Landfill-Rock Dumping | Burial or Trenching | Recycling | Reuse | Scrapping |
| PRODUCTION EQUIPMENTS | Subsea Manifolds | | | | | | ✓ | | ✓ | | | ✓ | | ✓ |
| | Subsea Trees | | | | | | ✓ | ✓ | ✓ | | | ✓ | | ✓ |
| TRANSPORTATION AND CONNECTION EQUIPMENTS | Jumper (flexible) | | | | | | ✓ | ✓ | ✓ | | | ✓ | | ✓ |
| | Spool (rigid) | | | | | | ✓ | ✓ | ✓ | | | ✓ | | ✓ |
| | Pipelines (export lines) /Trunklines | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Rigid Flowlines | | | ✓ | | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | ✓ |
| | Flexible Flowlines | | | ✓ | | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| | Umbilical Systems | | | ✓ | | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| | Power Cables | | | ✓ | | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| | Rigid Risers | | | | | | ✓ | ✓ | ✓ | ✓ | | ✓ | | ✓ |
| PROCESSING EQUIPMENTS | Subsea Pressure Booster Pump | | | | | | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ |
| | Separation Systems | | | | | | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ |
| SUPPORTER STRUCTURAL EQUIPMENTS | Template | | | | | | ✓ | ✓ | ✓ | | | ✓ | | ✓ |
| | Mudmat | | | | | | ✓ | ✓ | ✓ | | | ✓ | | ✓ |

NOT: Please for more detail go to Appendix A1.

3.7. Scoring and Analyzing of Multi Criteria

Following tables demonstrates for weighting scenario 1 which is defined before. Please for more detail and see the other scenarios go to Appendix A2.

Description of Subsea Assets: Subsea Manifold

Weighting Scenario 1: %20 for each main criteria

| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Leave In Situ | | | | |
|--|---|-------------------------|--------|------|-----------|---------------|-------------------------|--------|------|-----------|--------------|
| | | Likelihood | Impact | Risk | Weigtning | Score | Likelihood | Impact | Risk | Weigtning | Score |
| ENVIRONMENTAL %20 | Operational Environmental Impacts | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Energy Use | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Gaseous Emissions | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 |
| Total Environment= | | | | | | 1.75 | | | | | 2.90 |
| SAFETY %15 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 6.7% | 1.07 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 4 | 4 | 16 | 6.7% | 1.07 |
| | Safety Risk to Onshore Project Personnel | 3 | 3 | 9 | 6.7% | 0.60 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety= | | | | | | 1.73 | | | | | 1.27 |
| TECHNICAL %15 | Technical Feasibility | 5 | 5 | 25 | 20.0% | 5.00 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Technical= | | | | | | 5.00 | | | | | 0.20 |
| SOCIAL %15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 4 | 5 | 20 | 6.7% | 1.33 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 2 | 2 | 6.7% | 0.13 | 4 | 4 | 16 | 6.7% | 1.07 |
| Total Societal= | | | | | | 0.80 | | | | | 2.53 |
| ECONOMIC %15 | Cost | 5 | 5 | 25 | 20.0% | 5.00 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Economic= | | | | | | 5.00 | | | | | 0.20 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 14.283 | | | | | 7.100 |

Description of Subsea Assets: Subsea Tree**Weighting Scenario 1: %20 for each main criteria**

| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
|--|---|-------------------------|--------|------|-----------|---------------|---------------------------|--------|------|-----------|--------------|-------------------------|--------|------|-----------|--------------|
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL %20 | Operational Environmental Impacts | 3 | 4 | 12 | 5.0% | 0.60 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Energy Use | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 |
| | Gaseous Emissions | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Environment=- | | | | | | 1.25 | | | | | 1.80 | | | | | 2.50 |
| SAFETY %20 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 6.7% | 1.07 | 3 | 4 | 12 | 6.7% | 0.80 | 1 | 1 | 1 | 6.7% | 0.07 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 3 | 9 | 6.7% | 0.60 | 4 | 5 | 20 | 6.7% | 1.33 |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety=- | | | | | | 1.53 | | | | | 1.67 | | | | | 1.47 |
| TECHNICAL %20 | Technical Feasibility | 4 | 5 | 20 | 20.0% | 4.00 | 4 | 4 | 16 | 20.0% | 3.20 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Technical=- | | | | | | 4.00 | | | | | 3.20 | | | | | 0.20 |
| SOCIAL %20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 3 | 6 | 6.7% | 0.40 | 4 | 5 | 20 | 6.7% | 1.33 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 2 | 2 | 6.7% | 0.13 | 2 | 3 | 6 | 6.7% | 0.40 | 3 | 4 | 12 | 6.7% | 0.80 |
| Total Societal=- | | | | | | 0.80 | | | | | 1.07 | | | | | 2.27 |
| ECONOMIC %20 | Cost | 4 | 4 | 16 | 20.0% | 3.20 | 3 | 3 | 9 | 20.0% | 1.80 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Economic=- | | | | | | 3.20 | | | | | 1.80 | | | | | 0.20 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 10.783 | | | | | 9.533 | | | | | 6.633 |

Description of Subsea Assets: Jumper

Weightining Scenario 1: %20 for each main criteria

| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
|--|---|-------------------------|--------|------|------------|--------------|---------------------------|--------|------|------------|--------------|-------------------------|--------|------|------------|--------------|
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL %20 | Operational Environmental Impacts | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 2 | 4 | 5.0% | 0.20 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Energy Use | 2 | 2 | 4 | 5.0% | 0.20 | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 |
| | Gaseous Emissions | 2 | 2 | 4 | 5.0% | 0.20 | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Environment= | | | | | | 0.65 | | | | | 1.55 | | | | | 2.05 |
| SAFETY %20 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 1 | 1 | 6.7% | 0.07 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 2 | 2 | 6.7% | 0.13 | 2 | 2 | 4 | 6.7% | 0.27 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety= | | | | | | 0.73 | | | | | 0.53 | | | | | 0.40 |
| TECHNICAL %20 | Technical Feasibility | 3 | 3 | 9 | 20.0% | 1.80 | 2 | 2 | 4 | 20.0% | 0.80 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Technical= | | | | | | 1.80 | | | | | 0.80 | | | | | 0.20 |
| SOCIETAL %20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 3 | 6 | 6.7% | 0.40 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 2 | 2 | 6.7% | 0.13 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 3 | 6 | 6.7% | 0.40 |
| Total Societal= | | | | | | 0.80 | | | | | 0.80 | | | | | 0.93 |
| ECONOMIC %20 | Cost | 3 | 3 | 9 | 20.0% | 1.80 | 2 | 2 | 4 | 20.0% | 0.80 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Economic= | | | | | | 1.80 | | | | | 0.80 | | | | | 0.20 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 5.783 | | | | | 4.483 | | | | | 3.783 |

Description of Subsea Assets: Spool**Weighting Scenario 1: %20 for each main criteria**

| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
|--|---|-------------------------|--------|------|-----------|--------------|---------------------------|--------|------|-----------|--------------|-------------------------|--------|------|-----------|--------------|
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL %20 | Operational Environmental Impacts | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Energy Use | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Gaseous Emissions | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 |
| Total Environment= | | | | | | 0.95 | | | | | 1.95 | | | | | 2.45 |
| SAFETY %20 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 1 | 1 | 6.7% | 0.07 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 2 | 2 | 6.7% | 0.13 | 2 | 2 | 4 | 6.7% | 0.27 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety= | | | | | | 0.73 | | | | | 0.53 | | | | | 0.40 |
| TECHNICAL %20 | Technical Feasibility | 3 | 3 | 9 | 20.0% | 1.80 | 2 | 2 | 4 | 20.0% | 0.80 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Technical= | | | | | | 1.80 | | | | | 0.80 | | | | | 0.20 |
| SOCIAL %20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 3 | 6 | 6.7% | 0.40 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 2 | 2 | 6.7% | 0.13 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 3 | 6 | 6.7% | 0.40 |
| Total Societal= | | | | | | 0.80 | | | | | 0.80 | | | | | 0.93 |
| ECONOMIC %20 | Cost | 3 | 3 | 9 | 20.0% | 1.80 | 2 | 2 | 4 | 20.0% | 0.80 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Economic= | | | | | | 1.80 | | | | | 0.80 | | | | | 0.20 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 6.083 | | | | | 4.883 | | | | | 4.183 |

Description of Subsea Assets: Trunk Line

Weighting Scenario 1: %20 for each main criteria

| Main Criteria | Sub Criteria | Option 1: Reverse S-lay | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Landfill-Rock Dumping | | | | | Option 5: Burial or Trenching | | | | | | | | | |
|--|---|-------------------------|--------|------|-----------|-------|------------------------|--------|------|-----------|-------|-------------------------|--------|------|-----------|-------|---------------------------------|--------|------|-----------|-------|-------------------------------|--------|------|-----------|-------|---|---|----|-------|------|
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | | | | | |
| ENVIRONMENTAL %20 | Operational Environmental Impacts | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 5 | 5 | 25 | 5.0% | 1.25 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 2 | 2 | 5.0% | 0.10 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Energy Use | 2 | 3 | 6 | 5.0% | 0.30 | 4 | 5 | 20 | 5.0% | 1.00 | 4 | 4 | 16 | 5.0% | 0.80 | 4 | 5 | 20 | 5.0% | 1.00 | 5 | 5 | 25 | 5.0% | 1.25 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Gaseous Emissions | 2 | 3 | 6 | 5.0% | 0.30 | 4 | 5 | 20 | 5.0% | 1.00 | 4 | 4 | 16 | 5.0% | 0.80 | 4 | 5 | 20 | 5.0% | 1.00 | 5 | 5 | 25 | 5.0% | 1.25 | 5 | 5 | 25 | 5.0% | 1.25 |
| Total Environment=- | | 1.25 | | | | | 2.85 | | | | | 2.90 | | | | | 2.75 | | | | | 2.90 | | | | | | | | | |
| SAFETY %20 | Safety Risk to Offshore Project Personnel | 3 | 4 | 12 | 6.7% | 0.80 | 5 | 5 | 25 | 6.7% | 1.67 | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 3 | 6 | 6.7% | 0.40 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 4 | 4 | 16 | 6.7% | 1.07 | 2 | 3 | 6 | 6.7% | 0.40 | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 3 | 6 | 6.7% | 0.40 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety=- | | 1.27 | | | | | 2.13 | | | | | 1.20 | | | | | 1.07 | | | | | 0.60 | | | | | | | | | |
| TECHNICAL %20 | Technical Feasibility | 4 | 4 | 16 | 20.0% | 3.20 | 5 | 5 | 25 | 20.0% | 5.00 | 1 | 1 | 1 | 20.0% | 0.20 | 2 | 3 | 6 | 20.0% | 1.20 | 3 | 3 | 9 | 20.0% | 1.80 | 3 | 3 | 9 | 20.0% | 1.80 |
| Total Technical=- | | 3.20 | | | | | 5.00 | | | | | 0.20 | | | | | 1.20 | | | | | 1.80 | | | | | | | | | |
| SOCIETAL %20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 5 | 5 | 25 | 6.7% | 1.67 | 4 | 4 | 16 | 6.7% | 1.07 | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 1 | 2 | 6.7% | 0.13 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 3 | 6 | 6.7% | 0.40 |
| | Communities | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 4 | 4 | 16 | 6.7% | 1.07 | 3 | 4 | 12 | 6.7% | 0.80 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 2 | 4 | 6.7% | 0.27 |
| Total Societal=- | | 0.73 | | | | | 0.73 | | | | | 2.87 | | | | | 2.13 | | | | | 0.80 | | | | | | | | | |
| ECONOMIC %20 | Cost | 4 | 4 | 16 | 20.0% | 3.20 | 5 | 5 | 25 | 20.0% | 5.00 | 1 | 1 | 1 | 20.0% | 0.20 | 2 | 3 | 6 | 20.0% | 1.20 | 3 | 3 | 9 | 20.0% | 1.80 | 3 | 3 | 9 | 20.0% | 1.80 |
| Total Economic=- | | 3.20 | | | | | 5.00 | | | | | 0.20 | | | | | 1.20 | | | | | 1.80 | | | | | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 9.650 | | | | | 15.716 | | | | | 7.366 | | | | | 8.350 | | | | | 7.900 | | | | | | | | | |

Description of Subsea Assets: Rigid FlowLines**Weighting Scenario 1: %20 for each main criteria**

| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
|--|---|---------------------------|--------|------|-----------|--------------|------------------------|--------|------|-----------|---------------|-------------------------|--------|------|-----------|--------------|-------------------------------|--------|------|-----------|--------------|
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL %20 | Operational Environmental Impacts | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 5 | 5 | 25 | 5.0% | 1.25 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Energy Use | 2 | 3 | 6 | 5.0% | 0.30 | 4 | 5 | 20 | 5.0% | 1.00 | 4 | 4 | 16 | 5.0% | 0.80 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Gaseous Emissions | 2 | 3 | 6 | 5.0% | 0.30 | 4 | 5 | 20 | 5.0% | 1.00 | 4 | 4 | 16 | 5.0% | 0.80 | 5 | 5 | 25 | 5.0% | 1.25 |
| Total Environment=- | | | | | | 1.10 | | | | | 2.85 | | | | | 2.90 | | | | | 2.90 |
| SAFETY %20 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 6.7% | 0.60 | 4 | 5 | 20 | 6.7% | 1.33 | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 2 | 4 | 6.7% | 0.27 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 4 | 4 | 16 | 6.7% | 1.07 | 2 | 3 | 6 | 6.7% | 0.40 |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety=- | | | | | | 1.07 | | | | | 1.67 | | | | | 1.20 | | | | | 0.73 |
| TECHNICAL %20 | Technical Feasibility | 4 | 4 | 16 | 20.0% | 3.20 | 5 | 5 | 25 | 20.0% | 5.00 | 1 | 1 | 1 | 20.0% | 0.20 | 3 | 3 | 9 | 20.0% | 1.80 |
| Total Technical=- | | | | | | 3.20 | | | | | 5.00 | | | | | 0.20 | | | | | 1.80 |
| SOCIETAL %20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 5 | 5 | 25 | 6.7% | 1.67 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 1 | 2 | 6.7% | 0.13 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 4 | 12 | 6.7% | 0.80 | 1 | 2 | 2 | 6.7% | 0.13 |
| Total Societal=- | | | | | | 0.73 | | | | | 0.73 | | | | | 2.60 | | | | | 0.40 |
| ECONOMIC %20 | Cost | 3 | 4 | 12 | 20.0% | 2.40 | 5 | 5 | 25 | 20.0% | 5.00 | 1 | 1 | 1 | 20.0% | 0.20 | 3 | 3 | 9 | 20.0% | 1.80 |
| Total Economic=- | | | | | | 2.40 | | | | | 5.00 | | | | | 0.20 | | | | | 1.80 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 8.500 | | | | | 15.250 | | | | | 7.100 | | | | | 7.633 |

Description of Subsea Assets: Flexible Flow Lines

Weighting Scenario 1: %20 for each main criteria

| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
|--|---|---------------------------|--------|------|-----------|--------------|------------------------|--------|------|-----------|---------------|-------------------------|--------|------|-----------|--------------|-------------------------------|--------|------|-----------|--------------|
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL %20 | Operational Environmental Impacts | 2 | 3 | 6 | 5.0% | 0.30 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Energy Use | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 5 | 20 | 5.0% | 1.00 | 4 | 4 | 16 | 5.0% | 0.80 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Gaseous Emissions | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 5 | 20 | 5.0% | 1.00 | 4 | 4 | 16 | 5.0% | 0.80 | 5 | 5 | 25 | 5.0% | 1.25 |
| Total Environment=- | | | | | | 1.55 | | | | | 2.85 | | | | | 2.45 | | | | | 2.80 |
| SAFETY %20 | Safety Risk to Offshore Project Personnel | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 3 | 6 | 6.7% | 0.40 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 4 | 4 | 16 | 6.7% | 1.07 | 4 | 3 | 12 | 6.7% | 0.80 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 6.7% | 0.13 | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety=- | | | | | | 0.47 | | | | | 0.73 | | | | | 1.20 | | | | | 1.00 |
| TECHNICAL %20 | Technical Feasibility | 3 | 3 | 9 | 20.0% | 1.80 | 4 | 4 | 16 | 20.0% | 3.20 | 1 | 1 | 1 | 20.0% | 0.20 | 2 | 3 | 6 | 20.0% | 1.20 |
| Total Technical=- | | | | | | 1.80 | | | | | 3.20 | | | | | 0.20 | | | | | 1.20 |
| SOCIETAL %20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 5 | 5 | 25 | 6.7% | 1.67 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 1 | 2 | 6.7% | 0.13 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 4 | 12 | 6.7% | 0.80 | 1 | 2 | 2 | 6.7% | 0.13 |
| Total Societal=- | | | | | | 0.73 | | | | | 0.73 | | | | | 2.60 | | | | | 0.40 |
| ECONOMIC %20 | Cost | 3 | 4 | 12 | 20.0% | 2.40 | 5 | 5 | 25 | 20.0% | 5.00 | 1 | 1 | 1 | 20.0% | 0.20 | 3 | 3 | 9 | 20.0% | 1.80 |
| Total Economic=- | | | | | | 2.40 | | | | | 5.00 | | | | | 0.20 | | | | | 1.80 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 6.950 | | | | | 12.517 | | | | | 6.650 | | | | | 7.200 |

Description of Subsea Assets: Umbilical Systems**Weighting Scenario 1: %20 for each main criteria**

| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
|--|---|---------------------------|--------|------|-----------|--------------|------------------------|--------|------|-----------|---------------|-------------------------|--------|------|-----------|--------------|-------------------------------|--------|------|-----------|--------------|
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL %20 | Operational Environmental Impacts | 2 | 2 | 4 | 5.0% | 0.20 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Energy Use | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 5 | 20 | 5.0% | 1.00 |
| | Gaseous Emissions | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 5 | 20 | 5.0% | 1.00 |
| Total Environment=- | | | | | | 1.15 | | | | | 2.45 | | | | | 2.05 | | | | | 2.20 |
| SAFETY %20 | Safety Risk to Offshore Project Personnel | 1 | 2 | 2 | 6.7% | 0.13 | 2 | 3 | 6 | 6.7% | 0.40 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 3 | 6 | 6.7% | 0.40 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety=- | | | | | | 0.33 | | | | | 0.60 | | | | | 0.73 | | | | | 0.60 |
| TECHNICAL %20 | Technical Feasibility | 3 | 3 | 9 | 20.0% | 1.80 | 4 | 4 | 16 | 20.0% | 3.20 | 1 | 1 | 1 | 20.0% | 0.20 | 2 | 3 | 6 | 20.0% | 1.20 |
| Total Technical=- | | | | | | 1.80 | | | | | 3.20 | | | | | 0.20 | | | | | 1.20 |
| SOCIAL %20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 4 | 4 | 16 | 6.7% | 1.07 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 1 | 2 | 6.7% | 0.13 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 4 | 12 | 6.7% | 0.80 | 1 | 2 | 2 | 6.7% | 0.13 |
| Total Societal=- | | | | | | 0.73 | | | | | 0.73 | | | | | 2.00 | | | | | 0.40 |
| ECONOMIC %20 | Cost | 3 | 4 | 12 | 20.0% | 2.40 | 5 | 5 | 25 | 20.0% | 5.00 | 1 | 1 | 1 | 20.0% | 0.20 | 3 | 3 | 9 | 20.0% | 1.80 |
| Total Economic=- | | | | | | 2.40 | | | | | 5.00 | | | | | 0.20 | | | | | 1.80 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 6.417 | | | | | 11.983 | | | | | 5.183 | | | | | 6.200 |

Description of Subsea Assets: Power Cables

Weighting Scenario 1: %20 for each main criteria

| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
|--|---|---------------------------|--------|------|-----------|--------------|------------------------|--------|------|-----------|---------------|-------------------------|--------|------|-----------|--------------|-------------------------------|--------|------|-----------|--------------|
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL %20 | Operational Environmental Impacts | 2 | 2 | 4 | 5.0% | 0.20 | 3 | 3 | 9 | 5.0% | 0.45 | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Energy Use | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Gaseous Emissions | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 |
| Total Environment=- | | | | | | 1.15 | | | | | 2.10 | | | | | 2.05 | | | | | 1.80 |
| SAFETY %20 | Safety Risk to Offshore Project Personnel | 1 | 2 | 2 | 6.7% | 0.13 | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 3 | 6 | 6.7% | 0.40 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety=- | | | | | | 0.33 | | | | | 0.40 | | | | | 0.53 | | | | | 0.33 |
| TECHNICAL %20 | Technical Feasibility | 2 | 3 | 6 | 20.0% | 1.20 | 4 | 4 | 16 | 20.0% | 3.20 | 1 | 1 | 1 | 20.0% | 0.20 | 2 | 3 | 6 | 20.0% | 1.20 |
| Total Technical=- | | | | | | 1.20 | | | | | 3.20 | | | | | 0.20 | | | | | 1.20 |
| SOCIAL %20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 4 | 12 | 6.7% | 0.80 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 1 | 2 | 6.7% | 0.13 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 4 | 12 | 6.7% | 0.80 | 1 | 2 | 2 | 6.7% | 0.13 |
| Total Societal=- | | | | | | 0.73 | | | | | 0.73 | | | | | 1.73 | | | | | 0.40 |
| ECONOMIC %20 | Cost | 3 | 4 | 12 | 20.0% | 2.40 | 5 | 5 | 25 | 20.0% | 5.00 | 1 | 1 | 1 | 20.0% | 0.20 | 3 | 3 | 9 | 20.0% | 1.80 |
| Total Economic=- | | | | | | 2.40 | | | | | 5.00 | | | | | 0.20 | | | | | 1.80 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 5.817 | | | | | 11.433 | | | | | 4.716 | | | | | 5.533 |

Description of Subsea Assets: Rigid Risers**Weighting Scenario 1: %20 for each main criteria**

| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | | Option 4: Landfill-Rock Dumping | | | | |
|--|---|-------------------------|--------|------|-------------|--------------|---------------------------|--------|------|-------------|--------------|-------------------------|--------|------|-------------|--------------|---------------------------------|--------|------|-------------|--------------|
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL %20 | Operational Environmental Impacts | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 | 2 | 3 | 6 | 5.0% | 0.30 |
| | Energy Use | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 | 4 | 5 | 20 | 5.0% | 1.00 |
| | Gaseous Emissions | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 | 4 | 5 | 20 | 5.0% | 1.00 |
| Total Environment=- | | | | | 1.10 | | | | | 1.95 | | | | | 2.45 | | | | | 2.50 | |
| SAFETY %20 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 3 | 6 | 6.7% | 0.40 | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 2 | 4 | 6.7% | 0.27 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 3 | 6 | 6.7% | 0.40 | 4 | 4 | 16 | 6.7% | 1.07 | 2 | 3 | 6 | 6.7% | 0.40 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety=- | | | | | 0.80 | | | | | 0.93 | | | | | 1.20 | | | | | 0.73 | |
| TECHNICAL %20 | Technical Feasibility | 3 | 3 | 9 | 20.0% | 1.80 | 2 | 2 | 4 | 20.0% | 0.80 | 1 | 1 | 1 | 20.0% | 0.20 | 2 | 2 | 4 | 20.0% | 0.80 |
| Total Technical=- | | | | | 1.80 | | | | | 0.80 | | | | | 0.20 | | | | | 0.80 | |
| SOCIAL %20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 2 | 4 | 6.7% | 0.27 | 4 | 4 | 16 | 6.7% | 1.07 | 3 | 4 | 12 | 6.7% | 0.80 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 1 | 2 | 6.7% | 0.13 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 3 | 6 | 6.7% | 0.40 |
| Total Societal=- | | | | | 0.73 | | | | | 0.80 | | | | | 1.60 | | | | | 1.33 | |
| ECONOMIC %20 | Cost | 4 | 4 | 16 | 20.0% | 3.20 | 3 | 3 | 9 | 20.0% | 1.80 | 1 | 1 | 1 | 20.0% | 0.20 | 2 | 3 | 6 | 20.0% | 1.20 |
| Total Economic=- | | | | | 3.20 | | | | | 1.80 | | | | | 0.20 | | | | | 1.20 | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 7.633 | | | | | 6.283 | | | | | 5.650 | | | | | 6.566 |

Description of Subsea Assets: Subsea Pressure Booster

Weighting Scenario 1: %20 for each main criteria

| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
|--|---|-------------------------|--------|------|-----------|--------------|---------------------------|--------|------|-----------|--------------|-------------------------|--------|------|-----------|--------------|
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL %20 | Operational Environmental Impacts | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Energy Use | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 |
| | Gaseous Emissions | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Environment= | | | | | | 1.10 | | | | | 1.80 | | | | | 2.50 |
| SAFETY %20 | Safety Risk to Offshore Project Personnel | 3 | 4 | 12 | 6.7% | 0.80 | 3 | 3 | 9 | 6.7% | 0.60 | 1 | 1 | 1 | 6.7% | 0.07 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 3 | 9 | 6.7% | 0.60 | 4 | 5 | 20 | 6.7% | 1.33 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety= | | | | | | 1.13 | | | | | 1.33 | | | | | 1.47 |
| TECHNICAL %20 | Technical Feasibility | 4 | 4 | 16 | 20.0% | 3.20 | 3 | 4 | 12 | 20.0% | 2.40 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Technical= | | | | | | 3.20 | | | | | 2.40 | | | | | 0.20 |
| SOCIAL %20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 3 | 6 | 6.7% | 0.40 | 5 | 5 | 25 | 6.7% | 1.67 |
| | Employment | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 3 | 6 | 6.7% | 0.40 | 3 | 4 | 12 | 6.7% | 0.80 |
| Total Societal= | | | | | | 0.53 | | | | | 1.07 | | | | | 2.60 |
| ECONOMIC %20 | Cost | 4 | 4 | 16 | 20.0% | 3.20 | 3 | 3 | 9 | 20.0% | 1.80 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Economic= | | | | | | 3.20 | | | | | 1.80 | | | | | 0.20 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 9.167 | | | | | 8.400 | | | | | 6.966 |

Description of Subsea Assets: Separation System**Weighting Scenario 1: %20 for each main criteria**

| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
|--|---|-------------------------|--------|------|-----------|--------------|---------------------------|--------|------|-----------|--------------|-------------------------|--------|------|-----------|--------------|
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL %20 | Operational Environmental Impacts | 3 | 4 | 12 | 5.0% | 0.60 | 3 | 3 | 9 | 5.0% | 0.45 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Energy Use | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Gaseous Emissions | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 |
| Total Environment= | | | | | | 1.55 | | | | | 2.45 | | | | | 2.90 |
| SAFETY %20 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 6.7% | 1.07 | 3 | 4 | 12 | 6.7% | 0.80 | 1 | 1 | 1 | 6.7% | 0.07 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 3 | 9 | 6.7% | 0.60 | 5 | 5 | 25 | 6.7% | 1.67 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety= | | | | | | 1.40 | | | | | 1.53 | | | | | 1.80 |
| TECHNICAL %20 | Technical Feasibility | 4 | 4 | 16 | 20.0% | 3.20 | 3 | 4 | 12 | 20.0% | 2.40 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Technical= | | | | | | 3.20 | | | | | 2.40 | | | | | 0.20 |
| SOCIAL %20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 3 | 6 | 6.7% | 0.40 | 5 | 5 | 25 | 6.7% | 1.67 |
| | Employment | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 3 | 6 | 6.7% | 0.40 | 3 | 4 | 12 | 6.7% | 0.80 |
| Total Societal= | | | | | | 0.53 | | | | | 1.07 | | | | | 2.60 |
| ECONOMIC %20 | Cost | 4 | 4 | 16 | 20.0% | 3.20 | 3 | 3 | 9 | 20.0% | 1.80 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Economic= | | | | | | 3.20 | | | | | 1.80 | | | | | 0.20 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 9.883 | | | | | 9.250 | | | | | 7.700 |

Description of Subsea Assets: Template

Weighting Scenario 1: %20 for each main criteria

| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
|--|---|-------------------------|--------|------|--------------|-------|---------------------------|--------|------|--------------|-------|-------------------------|--------|------|--------------|-------|
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL %40 | Operational Environmental Impacts | 2 | 3 | 6 | 10.0% | 0.60 | 2 | 2 | 4 | 10.0% | 0.40 | 1 | 1 | 1 | 10.0% | 0.10 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 10.0% | 0.10 | 2 | 2 | 4 | 10.0% | 0.40 | 4 | 4 | 16 | 10.0% | 1.60 |
| | Energy Use | 3 | 3 | 9 | 10.0% | 0.90 | 3 | 4 | 12 | 10.0% | 1.20 | 4 | 4 | 16 | 10.0% | 1.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 10.0% | 0.90 | 3 | 4 | 12 | 10.0% | 1.20 | 4 | 4 | 16 | 10.0% | 1.60 |
| Total Environment= | | | | | 2.50 | | | | | 3.20 | | | | | 4.90 | |
| SAFETY %15 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 3 | 9 | 5.0% | 0.45 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.0% | 0.20 | 1 | 2 | 2 | 5.0% | 0.10 | 1 | 1 | 1 | 5.0% | 0.05 |
| Total Safety= | | | | | 0.70 | | | | | 0.85 | | | | | 1.35 | |
| TECHNICAL %15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 4 | 12 | 15.0% | 1.80 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 2.40 | | | | | 1.80 | | | | | 0.15 | |
| SOCIAL %15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Employment | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Societal= | | | | | 0.40 | | | | | 0.80 | | | | | 1.95 | |
| ECONOMIC %15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | 2.40 | | | | | 1.35 | | | | | 0.15 | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 8.400 | | | | | 8.000 | | | | | 8.500 | |

Description of Subsea Assets: Mudmat**Weighting Scenario 1: %20 for each main criteria**

| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
|--|---|-------------------------|--------|------|----------|--------------|---------------------------|--------|------|----------|--------------|-------------------------|--------|------|----------|--------------|
| | | Likelihood | Impact | Risk | Weigting | Score | Likelihood | Impact | Risk | Weigting | Score | Likelihood | Impact | Risk | Weigting | Score |
| ENVIRONMENTAL %20 | Operational Environmental Impacts | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Energy Use | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 |
| | Gaseous Emissions | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Environment= | | | | | | 0.95 | | | | | 1.30 | | | | | 2.05 |
| SAFETY %20 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 3 | 6 | 6.7% | 0.40 | 1 | 1 | 1 | 6.7% | 0.07 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 3 | 6 | 6.7% | 0.40 | 4 | 4 | 16 | 6.7% | 1.07 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety= | | | | | | 0.60 | | | | | 0.93 | | | | | 1.20 |
| TECHNICAL %20 | Technical Feasibility | 3 | 4 | 12 | 20.0% | 2.40 | 3 | 3 | 9 | 20.0% | 1.80 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Technical= | | | | | | 2.40 | | | | | 1.80 | | | | | 0.20 |
| SOCIAL %20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 2 | 4 | 6.7% | 0.27 | 4 | 4 | 16 | 6.7% | 1.07 |
| | Employment | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 2 | 4 | 6.7% | 0.27 | 4 | 4 | 16 | 6.7% | 1.07 |
| Total Societal= | | | | | | 0.53 | | | | | 0.80 | | | | | 2.27 |
| ECONOMIC %20 | Cost | 4 | 4 | 16 | 20.0% | 3.20 | 3 | 3 | 9 | 20.0% | 1.80 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Economic= | | | | | | 3.20 | | | | | 1.80 | | | | | 0.20 |
| Total Score =total environment+total safety+total technical+total | | | | | | 7.683 | | | | | 6.633 | | | | | 5.916 |

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4. CONCLUSIONS and RECOMMENDATIONS

The obtained results from the Multi Criteria Decision Analysis should not be used as the final decision for decommissioning of subsea assets. Generally, the decommissioning option "leave in situ" has minimum scores according to analyzed results and it shows that the most available option is "leave in situ" for the equipments in Brazil. But this option cannot be the best decision as decommissioning alternative for all places and all the time. In today's world environmental politics have accelerated positively and under this circumstance, abandon of the equipments should not be handled, unless it has to be leave on sea bed due to significant reasons. Additionally according to Brazil national legislations, for the abandoned option, the companies have to prepare valid and very strong arguments, also submit these proofs within 180 days to competent authorities.

On the other hand, MCDA method is so useful to analyze and display the ambiguous situations.

On this analysis method, defined weighting factors and scoring/ranking can be changeable with more or less amounts depending on the stakeholders, expert opinions, purpose of the project, local laws, location and features of the offshore platforms. Especially in Brazil, laws on the decommissioning area have a lot of loopholes. If the company owners want to take advantage of these legal gaps, they may destroy the sea habitant and these negative effects start the butterfly effect. However, societal, environmental and safety troubles can occur in the region of platform.

For the analysis results, it should be noted that the smallest of the total results is the most ideal option. However, other options that are at least close to the ideal option can be considered as an alternative to decommissioning operations. As mentioned before, to create specific molds for this decommissioning and apply them to all platforms will be inadequate.

In these analyzes we have done, the weight factor can be applied in the required and necessary proportions in accordance with the state and company policies. And on this issue, we can remove the uncertainties.

At the beginning of this study, we asserted a claim and we mentioned that using MCDA

But according to analyze, the obtained results cannot be the final decisions. On the other hand it is still a consistent approach. With this approach, we may have taken a step towards comprehensive results.

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6.2. APPENDIX A2

Developed Tool for Taking a Decision about Decommissioning of Subsea Manifold (Weighting Scenario 1-2)

| Description of Subsea Assets: Subsea Manifold | | | | | | | | | | | |
|--|---|-------------------------|--------|------|-----------|---------------|-------------------------|--------|------|-----------|--------------|
| Weighting Scenario 1: %20 for each main criteria | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtning | Score | Likelihood | Impact | Risk | Weigtning | Score |
| ENVIRONMENTAL % 20 | Operational Environmental Impacts | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Energy Use | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Gaseous Emissions | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 |
| Total Environment= | | | | | | 1.75 | | | | | 2.90 |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 6.7% | 1.07 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 4 | 4 | 16 | 6.7% | 1.07 |
| | Safety Risk to Onshore Project Personnel | 3 | 3 | 9 | 6.7% | 0.60 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety= | | | | | | 1.73 | | | | | 1.27 |
| TECHNICAL % 15 | Technical Feasibility | 5 | 5 | 25 | 20.0% | 5.00 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Technical= | | | | | | 5.00 | | | | | 0.20 |
| SOCIAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 4 | 5 | 20 | 6.7% | 1.33 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 2 | 2 | 6.7% | 0.13 | 4 | 4 | 16 | 6.7% | 1.07 |
| Total Societal= | | | | | | 0.80 | | | | | 2.53 |
| ECONOMIC % 15 | Cost | 5 | 5 | 25 | 20.0% | 5.00 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Economic= | | | | | | 5.00 | | | | | 0.20 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 14.283 | | | | | 7.100 |
| Description of Subsea Assets: Subsea Manifold | | | | | | | | | | | |
| Weighting Scenario 2: %40 for environment and %15 for others | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtning | Score | Likelihood | Impact | Risk | Weigtning | Score |
| ENVIRONMENTAL % 40 | Operational Environmental Impacts | 4 | 4 | 16 | 10.0% | 1.60 | 1 | 1 | 1 | 10.0% | 0.10 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 10.0% | 0.10 | 5 | 5 | 25 | 10.0% | 2.50 |
| | Energy Use | 3 | 3 | 9 | 10.0% | 0.90 | 4 | 4 | 16 | 10.0% | 1.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 10.0% | 0.90 | 4 | 4 | 16 | 10.0% | 1.60 |
| Total Environment= | | | | | | 3.50 | | | | | 5.80 |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Safety Risk to Onshore Project Personnel | 3 | 3 | 9 | 5.0% | 0.45 | 1 | 1 | 1 | 5.0% | 0.05 |
| Total Safety= | | | | | | 1.30 | | | | | 0.95 |
| TECHNICAL % 15 | Technical Feasibility | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | | 3.75 | | | | | 0.15 |
| SOCIAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 5 | 20 | 5.0% | 1.00 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 2 | 2 | 5.0% | 0.10 | 4 | 4 | 16 | 5.0% | 0.80 |
| Total Societal= | | | | | | 0.60 | | | | | 1.90 |
| ECONOMIC % 15 | Cost | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | | 3.75 | | | | | 0.15 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 12.900 | | | | | 8.950 |

Developed Tool for Taking a Decision about Decommissioning of Subsea Manifold (Weighting Scenario 3-4)

| Description of Subsea Assets: Subsea Manifold | | | | | | | | | | | |
|--|---|-------------------------|--------|------|------------|---------------|-------------------------|--------|------|------------|--------------|
| Weighting Scenario 3: %40 for safety and %15 for others | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | | | | | 1.31 | | | | | 2.18 |
| SAFETY % 40 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 13.33% | 2.13 | 1 | 2 | 2 | 13.33% | 0.27 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 13.33% | 0.13 | 4 | 4 | 16 | 13.33% | 2.13 |
| | Safety Risk to Onshore Project Personnel | 3 | 3 | 9 | 13.33% | 1.20 | 1 | 1 | 1 | 13.33% | 0.13 |
| Total Safety= | | | | | | 3.47 | | | | | 2.53 |
| TECHNICAL % 15 | Technical Feasibility | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | | 3.75 | | | | | 0.15 |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 5 | 20 | 5.0% | 1.00 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 2 | 2 | 5.0% | 0.10 | 4 | 4 | 16 | 5.0% | 0.80 |
| Total Societal= | | | | | | 0.60 | | | | | 1.90 |
| ECONOMIC % 15 | Cost | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | | 3.75 | | | | | 0.15 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 12.879 | | | | | 6.908 |
| | | | | | | | | | | | |
| Description of Subsea Assets: Subsea Manifold | | | | | | | | | | | |
| Weighting Scenario 4: %40 for technical and %15 for others | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | | | | | 1.31 | | | | | 2.18 |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 5.00% | 0.80 | 1 | 2 | 2 | 5.00% | 0.10 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 4 | 4 | 16 | 5.00% | 0.80 |
| | Safety Risk to Onshore Project Personnel | 3 | 3 | 9 | 5.00% | 0.45 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | | 1.30 | | | | | 0.95 |
| TECHNICAL % 40 | Technical Feasibility | 5 | 5 | 25 | 40% | 10.00 | 1 | 1 | 1 | 40% | 0.40 |
| Total Technical= | | | | | | 10.00 | | | | | 0.40 |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 5 | 20 | 5.0% | 1.00 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 2 | 2 | 5.0% | 0.10 | 4 | 4 | 16 | 5.0% | 0.80 |
| Total Societal= | | | | | | 0.60 | | | | | 1.90 |
| ECONOMIC % 15 | Cost | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | | 3.75 | | | | | 0.15 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 16.963 | | | | | 5.575 |

Developed Tool for Taking a Decision about Decommissioning of Subsea Manifold (Weighting Scenario 5-6)

| Description of Subsea Assets: Subsea Manifold Weighting Scenario 5: %40 for economic and %15 for others | | | | | | | | | | | |
|--|---|-------------------------|--------|------|-----------|---------------|-------------------------|--------|------|-----------|--------------|
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtning | Score | Likelihood | Impact | Risk | Weigtning | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | | | | | 1.31 | | | | | 2.18 |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 5.00% | 0.80 | 1 | 2 | 2 | 5.00% | 0.10 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 4 | 4 | 16 | 5.00% | 0.80 |
| | Safety Risk to Onshore Project Personnel | 3 | 3 | 9 | 5.00% | 0.45 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | | 1.30 | | | | | 0.95 |
| TECHNICAL % 15 | Technical Feasibility | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | | 3.75 | | | | | 0.15 |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 5 | 20 | 5.0% | 1.00 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 2 | 2 | 5.0% | 0.10 | 4 | 4 | 16 | 5.0% | 0.80 |
| Total Societal= | | | | | | 0.60 | | | | | 1.90 |
| ECONOMIC % 40 | Cost | 5 | 5 | 25 | 40% | 10.00 | 1 | 1 | 1 | 40% | 0.40 |
| Total Economic= | | | | | | 10.00 | | | | | 0.40 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 16.963 | | | | | 5.575 |
| Description of Subsea Assets: Subsea Manifold Weighting Scenario 6: %40 for societal and %15 for others | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtning | Score | Likelihood | Impact | Risk | Weigtning | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | | | | | 1.31 | | | | | 2.18 |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 5.00% | 0.80 | 1 | 2 | 2 | 5.00% | 0.10 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 4 | 4 | 16 | 5.00% | 0.80 |
| | Safety Risk to Onshore Project Personnel | 3 | 3 | 9 | 5.00% | 0.45 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | | 1.30 | | | | | 0.95 |
| TECHNICAL % 15 | Technical Feasibility | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | | 3.75 | | | | | 0.15 |
| SOCIETAL % 40 | Effects on Commercial Fisheries | 1 | 1 | 1 | 13.33% | 0.13 | 4 | 5 | 20 | 13.33% | 2.67 |
| | Employment | 3 | 3 | 9 | 13.33% | 1.20 | 2 | 1 | 2 | 13.33% | 0.27 |
| | Communities | 1 | 2 | 2 | 13.33% | 0.27 | 4 | 4 | 16 | 13.33% | 2.13 |
| Total Societal= | | | | | | 1.60 | | | | | 5.07 |
| ECONOMIC % 15 | Cost | 5 | 5 | 25 | 15% | 3.75 | 1 | 1 | 1 | 15% | 0.15 |
| Total Economic= | | | | | | 3.75 | | | | | 0.15 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 11.712 | | | | | 8.492 |

Developed Tool for Taking a Decision about Decommissioning of Subsea Tree (Weighting Scenario 1-2)

| Description of Subsea Assets: Subsea Tree | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|-----------|-------|---------------------------|--------|------|-----------|-------|-------------------------|--------|------|-----------|-------|
| Weighting Scenario 1: %20 for each main criteria | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL %20 | Operational Environmental Impacts | 3 | 4 | 12 | 5.0% | 0.60 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Energy Use | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 |
| | Gaseous Emissions | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Environment= | | 1.25 | | | | | 1.80 | | | | | 2.50 | | | | |
| SAFETY %20 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 6.7% | 1.07 | 3 | 4 | 12 | 6.7% | 0.80 | 1 | 1 | 1 | 6.7% | 0.07 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 3 | 9 | 6.7% | 0.60 | 4 | 5 | 20 | 6.7% | 1.33 |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety= | | 1.53 | | | | | 1.67 | | | | | 1.47 | | | | |
| TECHNICAL %20 | Technical Feasibility | 4 | 5 | 20 | 20.0% | 4.00 | 4 | 4 | 16 | 20.0% | 3.20 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Technical= | | 4.00 | | | | | 3.20 | | | | | 0.20 | | | | |
| SOCIAL %20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 3 | 6 | 6.7% | 0.40 | 4 | 5 | 20 | 6.7% | 1.33 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 2 | 2 | 6.7% | 0.13 | 2 | 3 | 6 | 6.7% | 0.40 | 3 | 4 | 12 | 6.7% | 0.80 |
| Total Societal= | | 0.80 | | | | | 1.07 | | | | | 2.27 | | | | |
| ECONOMIC %20 | Cost | 4 | 4 | 16 | 20.0% | 3.20 | 3 | 3 | 9 | 20.0% | 1.80 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Economic= | | 3.20 | | | | | 1.80 | | | | | 0.20 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 10.783 | | | | | 9.533 | | | | | 6.633 | | | | |
| | | | | | | | | | | | | | | | | |
| Description of Subsea Assets: Subsea Tree | | | | | | | | | | | | | | | | |
| Weighting Scenario 2: %40 for environment and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL %40 | Operational Environmental Impacts | 3 | 4 | 12 | 10.0% | 1.20 | 2 | 3 | 6 | 10.0% | 0.60 | 1 | 1 | 1 | 10.0% | 0.10 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 10.0% | 0.10 | 3 | 4 | 12 | 10.0% | 1.20 | 5 | 5 | 25 | 10.0% | 2.50 |
| | Energy Use | 2 | 3 | 6 | 10.0% | 0.60 | 3 | 3 | 9 | 10.0% | 0.90 | 3 | 4 | 12 | 10.0% | 1.20 |
| | Gaseous Emissions | 2 | 3 | 6 | 10.0% | 0.60 | 3 | 3 | 9 | 10.0% | 0.90 | 3 | 4 | 12 | 10.0% | 1.20 |
| Total Environment= | | 2.50 | | | | | 3.60 | | | | | 5.00 | | | | |
| SAFETY %15 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 5.0% | 0.80 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 5 | 20 | 5.0% | 1.00 |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 1 | 1 | 1 | 5.0% | 0.05 |
| Total Safety= | | 1.15 | | | | | 1.25 | | | | | 1.10 | | | | |
| TECHNICAL %15 | Technical Feasibility | 4 | 5 | 20 | 15.0% | 3.00 | 4 | 4 | 16 | 15.0% | 2.40 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | 3.00 | | | | | 2.40 | | | | | 0.15 | | | | |
| SOCIAL %15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 4 | 5 | 20 | 5.0% | 1.00 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 2 | 2 | 5.0% | 0.10 | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Societal= | | 0.60 | | | | | 0.80 | | | | | 1.70 | | | | |
| ECONOMIC %15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | 2.40 | | | | | 1.35 | | | | | 0.15 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 9.650 | | | | | 9.400 | | | | | 8.100 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Subsea Tree (Weighting Scenario 3-4)

| Description of Subsea Assets: Subsea Manifold | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|---------------|-------|---------------------------|--------|------|---------------|-------|-------------------------|--------|------|--------------|-------|
| Weighting Scenario 3: %40 for safety and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 4 | 12 | 3.75% | 0.45 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 4 | 12 | 3.75% | 0.45 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| Total Environment= | | | | | 0.94 | | | | | 1.35 | | | | | 1.88 | |
| SAFETY % 40 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 13.33% | 2.13 | 3 | 4 | 12 | 13.33% | 1.60 | 1 | 1 | 1 | 13.33% | 0.13 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 13.33% | 0.13 | 3 | 3 | 9 | 13.33% | 1.20 | 4 | 5 | 20 | 13.33% | 2.67 |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 13.33% | 0.80 | 2 | 2 | 4 | 13.33% | 0.53 | 1 | 1 | 1 | 13.33% | 0.13 |
| Total Safety= | | | | | 3.07 | | | | | 3.33 | | | | | 2.93 | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 5 | 20 | 15.0% | 3.00 | 4 | 4 | 16 | 15.0% | 2.40 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 3.00 | | | | | 2.40 | | | | | 0.15 | |
| SOCIAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 4 | 5 | 20 | 5.0% | 1.00 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 2 | 2 | 5.0% | 0.10 | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Societal= | | | | | 0.60 | | | | | 0.80 | | | | | 1.70 | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | 2.40 | | | | | 1.35 | | | | | 0.15 | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 10.004 | | | | | 9.233 | | | | | 6.808 | |
| Description of Subsea Assets: Subsea Manifold | | | | | | | | | | | | | | | | |
| Weighting Scenario 4: %40 for technical and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 4 | 12 | 3.75% | 0.45 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 4 | 12 | 3.75% | 0.45 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| Total Environment= | | | | | 0.94 | | | | | 1.35 | | | | | 1.88 | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 5.00% | 0.80 | 3 | 4 | 12 | 5.00% | 0.60 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 3 | 3 | 9 | 5.00% | 0.45 | 4 | 5 | 20 | 5.00% | 1.00 |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 5.00% | 0.30 | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 1.15 | | | | | 1.25 | | | | | 1.10 | |
| TECHNICAL % 40 | Technical Feasibility | 4 | 5 | 20 | 40% | 8.00 | 4 | 4 | 16 | 40% | 6.40 | 1 | 1 | 1 | 40% | 0.40 |
| Total Technical= | | | | | 8.00 | | | | | 6.40 | | | | | 0.40 | |
| SOCIAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 4 | 5 | 20 | 5.0% | 1.00 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 2 | 2 | 5.0% | 0.10 | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Societal= | | | | | 0.60 | | | | | 0.80 | | | | | 1.70 | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | 2.40 | | | | | 1.35 | | | | | 0.15 | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 13.088 | | | | | 11.150 | | | | | 5.225 | |

Developed Tool for Taking a Decision about Decommissioning of Subsea Tree (Weighting Scenario 5-6)

| Description of Subsea Assets: Subsea Manifold | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|---------------|--------------|---------------------------|--------|------|------------|--------------|-------------------------|--------|------|------------|-------|
| Weightining Scenario 5: %40 for economic and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 4 | 12 | 3.75% | 0.45 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 4 | 12 | 3.75% | 0.45 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| Total Environment= | | | | | 0.94 | 1.35 | | | | | 1.88 | | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 5.00% | 0.80 | 3 | 4 | 12 | 5.00% | 0.60 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 3 | 3 | 9 | 5.00% | 0.45 | 4 | 5 | 20 | 5.00% | 1.00 |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 5.00% | 0.30 | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 1.15 | 1.25 | | | | | 1.10 | | | | | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 5 | 20 | 15.0% | 3.00 | 4 | 4 | 16 | 15.0% | 2.40 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 3.00 | 2.40 | | | | | 0.15 | | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 4 | 5 | 20 | 5.0% | 1.00 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 2 | 2 | 5.0% | 0.10 | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Societal= | | | | | 0.60 | 0.80 | | | | | 1.70 | | | | | |
| ECONOMIC % 40 | Cost | 4 | 4 | 16 | 40% | 6.40 | 3 | 3 | 9 | 40% | 3.60 | 1 | 1 | 1 | 40% | 0.40 |
| Total Economic= | | | | | 6.40 | 3.60 | | | | | 0.40 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 12.088 | 9.400 | | | | | 5.225 | | | | | |
| Description of Subsea Assets: Subsea Manifold | | | | | | | | | | | | | | | | |
| Weightining Scenario 6: %40 for societal and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 4 | 12 | 3.75% | 0.45 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 4 | 12 | 3.75% | 0.45 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| Total Environment= | | | | | 0.94 | 1.35 | | | | | 1.88 | | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 5.00% | 0.80 | 3 | 4 | 12 | 5.00% | 0.60 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 3 | 3 | 9 | 5.00% | 0.45 | 4 | 5 | 20 | 5.00% | 1.00 |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 5.00% | 0.30 | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 1.15 | 1.25 | | | | | 1.10 | | | | | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 5 | 20 | 15.0% | 3.00 | 4 | 4 | 16 | 15.0% | 2.40 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 3.00 | 2.40 | | | | | 0.15 | | | | | |
| SOCIETAL % 40 | Effects on Commercial Fisheries | 1 | 1 | 1 | 13.33% | 0.13 | 2 | 3 | 6 | 13.33% | 0.80 | 4 | 5 | 20 | 13.33% | 2.67 |
| | Employment | 3 | 3 | 9 | 13.33% | 1.20 | 2 | 2 | 4 | 13.33% | 0.53 | 2 | 1 | 2 | 13.33% | 0.27 |
| | Communities | 1 | 2 | 2 | 13.33% | 0.27 | 2 | 3 | 6 | 13.33% | 0.80 | 3 | 4 | 12 | 13.33% | 1.60 |
| Total Societal= | | | | | 1.60 | 2.13 | | | | | 4.53 | | | | | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15% | 2.40 | 3 | 3 | 9 | 15% | 1.35 | 1 | 1 | 1 | 15% | 0.15 |
| Total Economic= | | | | | 2.40 | 1.35 | | | | | 0.15 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 9.087 | 8.483 | | | | | 7.808 | | | | | |

Developed Tool for Taking a Decision about Decommissioning of Jumper (Weighting Scenario 1-2)

| Description of Subsea Assets: Subsea Jumper | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|--------------|--------------|---------------------------|--------|------|-----------|--------------|-------------------------|--------|------|-----------|-------|
| Weighting Scenario 1: %20 for each main criteria | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL % 20 | Operational Environmental Impacts | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 2 | 4 | 5.0% | 0.20 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Energy Use | 2 | 2 | 4 | 5.0% | 0.20 | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 |
| | Gaseous Emissions | 2 | 2 | 4 | 5.0% | 0.20 | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Environment= | | | | | 0.65 | 1.55 | | | | | 2.05 | | | | | |
| SAFETY % 20 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 1 | 1 | 6.7% | 0.07 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 2 | 2 | 6.7% | 0.13 | 2 | 2 | 4 | 6.7% | 0.27 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety= | | | | | 0.73 | 0.53 | | | | | 0.40 | | | | | |
| TECHNICAL % 20 | Technical Feasibility | 3 | 3 | 9 | 20.0% | 1.80 | 2 | 2 | 4 | 20.0% | 0.80 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Technical= | | | | | 1.80 | 0.80 | | | | | 0.20 | | | | | |
| SOCIAL % 20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 3 | 6 | 6.7% | 0.40 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 2 | 2 | 6.7% | 0.13 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 3 | 6 | 6.7% | 0.40 |
| Total Societal= | | | | | 0.80 | 0.80 | | | | | 0.93 | | | | | |
| ECONOMIC % 20 | Cost | 3 | 3 | 9 | 20.0% | 1.80 | 2 | 2 | 4 | 20.0% | 0.80 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Economic= | | | | | 1.80 | 0.80 | | | | | 0.20 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 5.783 | 4.483 | | | | | 3.783 | | | | | |
| Description of Subsea Assets: Subsea Jumper | | | | | | | | | | | | | | | | |
| Weighting Scenario 2: %40 for environment and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL % 40 | Operational Environmental Impacts | 2 | 2 | 4 | 10.0% | 0.40 | 2 | 2 | 4 | 10.0% | 0.40 | 1 | 1 | 1 | 10.0% | 0.10 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 10.0% | 0.10 | 3 | 3 | 9 | 10.0% | 0.90 | 4 | 4 | 16 | 10.0% | 1.60 |
| | Energy Use | 2 | 2 | 4 | 10.0% | 0.40 | 3 | 3 | 9 | 10.0% | 0.90 | 3 | 4 | 12 | 10.0% | 1.20 |
| | Gaseous Emissions | 2 | 2 | 4 | 10.0% | 0.40 | 3 | 3 | 9 | 10.0% | 0.90 | 3 | 4 | 12 | 10.0% | 1.20 |
| Total Environment= | | | | | 1.30 | 3.10 | | | | | 4.10 | | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 2 | 2 | 5.0% | 0.10 | 2 | 2 | 4 | 5.0% | 0.20 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.0% | 0.20 | 1 | 2 | 2 | 5.0% | 0.10 | 1 | 1 | 1 | 5.0% | 0.05 |
| Total Safety= | | | | | 0.55 | 0.40 | | | | | 0.30 | | | | | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 2 | 2 | 4 | 15.0% | 0.60 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 1.35 | 0.60 | | | | | 0.15 | | | | | |
| SOCIAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 2 | 2 | 5.0% | 0.10 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 |
| Total Societal= | | | | | 0.60 | 0.60 | | | | | 0.70 | | | | | |
| ECONOMIC % 15 | Cost | 3 | 3 | 9 | 15.0% | 1.35 | 2 | 2 | 4 | 15.0% | 0.60 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | 1.35 | 0.60 | | | | | 0.15 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 5.150 | 5.300 | | | | | 5.400 | | | | | |

Developed Tool for Taking a Decision about Decommissioning of Jumper (Weighting Scenario 3-4)

| Description of Subsea Assets: Subsea Jumper | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|--------------|--------------|---------------------------|--------|------|------------|--------------|-------------------------|--------|------|------------|-------|
| Weighting Scenario 3: %40 for safety and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 2 | 4 | 3.75% | 0.15 | 2 | 2 | 4 | 3.75% | 0.15 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Energy Use | 2 | 2 | 4 | 3.75% | 0.15 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| | Gaseous Emissions | 2 | 2 | 4 | 3.75% | 0.15 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| Total Environment= | | | | | 0.49 | 1.16 | | | | | 1.54 | | | | | |
| SAFETY % 40 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 13.33% | 0.80 | 2 | 2 | 4 | 13.33% | 0.53 | 1 | 1 | 1 | 13.33% | 0.13 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 2 | 2 | 13.33% | 0.27 | 2 | 2 | 4 | 13.33% | 0.53 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 13.33% | 0.53 | 1 | 2 | 2 | 13.33% | 0.27 | 1 | 1 | 1 | 13.33% | 0.13 |
| Total Safety= | | | | | 1.47 | 1.07 | | | | | 0.80 | | | | | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 2 | 2 | 4 | 15.0% | 0.60 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 1.35 | 0.60 | | | | | 0.15 | | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 2 | 2 | 5.0% | 0.10 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 |
| Total Societal= | | | | | 0.60 | 0.60 | | | | | 0.70 | | | | | |
| ECONOMIC % 15 | Cost | 3 | 3 | 9 | 15.0% | 1.35 | 2 | 2 | 4 | 15.0% | 0.60 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | 1.35 | 0.60 | | | | | 0.15 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 5.254 | 4.029 | | | | | 3.337 | | | | | |
| | | | | | | | | | | | | | | | | |
| Description of Subsea Assets: Subsea Jumper | | | | | | | | | | | | | | | | |
| Weighting Scenario 4: %40 for technical and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 2 | 4 | 3.75% | 0.15 | 2 | 2 | 4 | 3.75% | 0.15 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Energy Use | 2 | 2 | 4 | 3.75% | 0.15 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| | Gaseous Emissions | 2 | 2 | 4 | 3.75% | 0.15 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| Total Environment= | | | | | 0.49 | 1.16 | | | | | 1.54 | | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 5.00% | 0.30 | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 2 | 2 | 5.00% | 0.10 | 2 | 2 | 4 | 5.00% | 0.20 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 0.55 | 0.40 | | | | | 0.30 | | | | | |
| TECHNICAL % 40 | Technical Feasibility | 3 | 3 | 9 | 40% | 3.60 | 2 | 2 | 4 | 40% | 1.60 | 1 | 1 | 1 | 40% | 0.40 |
| Total Technical= | | | | | 3.60 | 1.60 | | | | | 0.40 | | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 2 | 2 | 5.0% | 0.10 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 |
| Total Societal= | | | | | 0.60 | 0.60 | | | | | 0.70 | | | | | |
| ECONOMIC % 15 | Cost | 3 | 3 | 9 | 15.0% | 1.35 | 2 | 2 | 4 | 15.0% | 0.60 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | 1.35 | 0.60 | | | | | 0.15 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 6.588 | 4.363 | | | | | 3.088 | | | | | |

Developed Tool for Taking a Decision about Decommissioning of Jumper (Weighting Scenario 5-6)

| Description of Subsea Assets: Subsea Jumper | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|-------------|--------------|---------------------------|--------|------|-------------|--------------|-------------------------|--------|------|-------------|--------------|
| Weighting Scenario 5: %40 for economic and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 2 | 4 | 3.75% | 0.15 | 2 | 2 | 4 | 3.75% | 0.15 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Energy Use | 2 | 2 | 4 | 3.75% | 0.15 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| | Gaseous Emissions | 2 | 2 | 4 | 3.75% | 0.15 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| Total Environment= | | | | | 0.49 | | | | | 1.16 | | | | | 1.54 | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 5.00% | 0.30 | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 2 | 2 | 5.00% | 0.10 | 2 | 2 | 4 | 5.00% | 0.20 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 0.55 | | | | | 0.40 | | | | | 0.30 | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 2 | 2 | 4 | 15.0% | 0.60 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 1.35 | | | | | 0.60 | | | | | 0.15 | |
| SOCIAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 2 | 2 | 5.0% | 0.10 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 |
| Total Societal= | | | | | 0.60 | | | | | 0.60 | | | | | 0.70 | |
| ECONOMIC % 40 | Cost | 3 | 3 | 9 | 40% | 3.60 | 2 | 2 | 4 | 40% | 1.60 | 1 | 1 | 1 | 40% | 0.40 |
| Total Economic= | | | | | 3.60 | | | | | 1.60 | | | | | 0.40 | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 6.588 | | | | | 4.363 | | | | | 3.088 |
| Description of Subsea Assets: Subsea Jumper | | | | | | | | | | | | | | | | |
| Weighting Scenario 6: %40 for societal and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 2 | 4 | 3.75% | 0.15 | 2 | 2 | 4 | 3.75% | 0.15 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Energy Use | 2 | 2 | 4 | 3.75% | 0.15 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| | Gaseous Emissions | 2 | 2 | 4 | 3.75% | 0.15 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| Total Environment= | | | | | 0.49 | | | | | 1.16 | | | | | 1.54 | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 5.00% | 0.30 | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 2 | 2 | 5.00% | 0.10 | 2 | 2 | 4 | 5.00% | 0.20 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 0.55 | | | | | 0.40 | | | | | 0.30 | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 2 | 2 | 4 | 15.0% | 0.60 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 1.35 | | | | | 0.60 | | | | | 0.15 | |
| SOCIAL % 40 | Effects on Commercial Fisheries | 1 | 1 | 1 | 13.33% | 0.13 | 2 | 2 | 4 | 13.33% | 0.53 | 2 | 3 | 6 | 13.33% | 0.80 |
| | Employment | 3 | 3 | 9 | 13.33% | 1.20 | 2 | 2 | 4 | 13.33% | 0.53 | 2 | 1 | 2 | 13.33% | 0.27 |
| | Communities | 1 | 2 | 2 | 13.33% | 0.27 | 2 | 2 | 4 | 13.33% | 0.53 | 2 | 3 | 6 | 13.33% | 0.80 |
| Total Societal= | | | | | 1.60 | | | | | 1.60 | | | | | 1.87 | |
| ECONOMIC % 15 | Cost | 3 | 3 | 9 | 15% | 1.35 | 2 | 2 | 4 | 15% | 0.60 | 1 | 1 | 1 | 15% | 0.15 |
| Total Economic= | | | | | 1.35 | | | | | 0.60 | | | | | 0.15 | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 5.337 | | | | | 4.362 | | | | | 4.004 |

Developed Tool for Taking a Decision about Decommissioning of Spool (Weighting Scenario 1-2)

| Description of Subsea Assets: Spool | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|------------|-------|---------------------------|--------|------|------------|-------|-------------------------|--------|------|------------|-------|
| Weighting Scenario 1: %20 for each main criteria | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 20 | Operational Environmental Impacts | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Energy Use | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Gaseous Emissions | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 |
| Total Environment= | | 0.95 | | | | | 1.95 | | | | | 2.45 | | | | |
| SAFETY % 20 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 1 | 1 | 6.7% | 0.07 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 2 | 2 | 6.7% | 0.13 | 2 | 2 | 4 | 6.7% | 0.27 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety= | | 0.73 | | | | | 0.53 | | | | | 0.40 | | | | |
| TECHNICAL % 20 | Technical Feasibility | 3 | 3 | 9 | 20.0% | 1.80 | 2 | 2 | 4 | 20.0% | 0.80 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Technical= | | 1.80 | | | | | 0.80 | | | | | 0.20 | | | | |
| SOCIETAL % 20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 3 | 6 | 6.7% | 0.40 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 2 | 2 | 6.7% | 0.13 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 3 | 6 | 6.7% | 0.40 |
| Total Societal= | | 0.80 | | | | | 0.80 | | | | | 0.93 | | | | |
| ECONOMIC % 20 | Cost | 3 | 3 | 9 | 20.0% | 1.80 | 2 | 2 | 4 | 20.0% | 0.80 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Economic= | | 1.80 | | | | | 0.80 | | | | | 0.20 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 6.083 | | | | | 4.883 | | | | | 4.183 | | | | |
| | | | | | | | | | | | | | | | | |
| Description of Subsea Assets: Spool | | | | | | | | | | | | | | | | |
| Weighting Scenario 2: %40 for environment and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 40 | Operational Environmental Impacts | 2 | 3 | 6 | 10.0% | 0.60 | 2 | 3 | 6 | 10.0% | 0.60 | 1 | 1 | 1 | 10.0% | 0.10 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 10.0% | 0.10 | 3 | 3 | 9 | 10.0% | 0.90 | 4 | 4 | 16 | 10.0% | 1.60 |
| | Energy Use | 2 | 3 | 6 | 10.0% | 0.60 | 3 | 4 | 12 | 10.0% | 1.20 | 4 | 4 | 16 | 10.0% | 1.60 |
| | Gaseous Emissions | 2 | 3 | 6 | 10.0% | 0.60 | 3 | 4 | 12 | 10.0% | 1.20 | 4 | 4 | 16 | 10.0% | 1.60 |
| Total Environment= | | 1.90 | | | | | 3.90 | | | | | 4.90 | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 2 | 2 | 5.0% | 0.10 | 2 | 2 | 4 | 5.0% | 0.20 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.0% | 0.20 | 1 | 2 | 2 | 5.0% | 0.10 | 1 | 1 | 1 | 5.0% | 0.05 |
| Total Safety= | | 0.55 | | | | | 0.40 | | | | | 0.30 | | | | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 2 | 2 | 4 | 15.0% | 0.60 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | 1.35 | | | | | 0.60 | | | | | 0.15 | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 2 | 2 | 5.0% | 0.10 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 |
| Total Societal= | | 0.60 | | | | | 0.60 | | | | | 0.70 | | | | |
| ECONOMIC % 15 | Cost | 3 | 3 | 9 | 15.0% | 1.35 | 2 | 2 | 4 | 15.0% | 0.60 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | 1.35 | | | | | 0.60 | | | | | 0.15 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 5.750 | | | | | 6.100 | | | | | 6.200 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Spool (Weighting Scenario 3-4)

| Description of Subsea Assets: Spool | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|--------------|--------------|---------------------------|--------|------|-----------|--------------|-------------------------|--------|------|-----------|-------|
| Weighting Scenario 3: %40 for safety and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 3 | 6 | 3.75% | 0.23 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | | | | 0.71 | 1.46 | | | | | 1.84 | | | | | |
| SAFETY % 40 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 13.33% | 0.80 | 2 | 2 | 4 | 13.33% | 0.53 | 1 | 1 | 1 | 13.33% | 0.13 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 2 | 2 | 13.33% | 0.27 | 2 | 2 | 4 | 13.33% | 0.53 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 13.33% | 0.53 | 1 | 2 | 2 | 13.33% | 0.27 | 1 | 1 | 1 | 13.33% | 0.13 |
| Total Safety= | | | | | 1.47 | 1.07 | | | | | 0.80 | | | | | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 2 | 2 | 4 | 15.0% | 0.60 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 1.35 | 0.60 | | | | | 0.15 | | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 2 | 2 | 5.0% | 0.10 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 |
| Total Societal= | | | | | 0.60 | 0.60 | | | | | 0.70 | | | | | |
| ECONOMIC % 15 | Cost | 3 | 3 | 9 | 15.0% | 1.35 | 2 | 2 | 4 | 15.0% | 0.60 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | 1.35 | 0.60 | | | | | 0.15 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 5.479 | 4.329 | | | | | 3.637 | | | | | |
| Description of Subsea Assets: Spool | | | | | | | | | | | | | | | | |
| Weighting Scenario 4: %40 for technical and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 3 | 6 | 3.75% | 0.23 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | | | | 0.71 | 1.46 | | | | | 1.84 | | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 5.00% | 0.30 | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 2 | 2 | 5.00% | 0.10 | 2 | 2 | 4 | 5.00% | 0.20 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 0.55 | 0.40 | | | | | 0.30 | | | | | |
| TECHNICAL % 40 | Technical Feasibility | 3 | 3 | 9 | 40% | 3.60 | 2 | 2 | 4 | 40% | 1.60 | 1 | 1 | 1 | 40% | 0.40 |
| Total Technical= | | | | | 3.60 | 1.60 | | | | | 0.40 | | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 2 | 2 | 5.0% | 0.10 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 |
| Total Societal= | | | | | 0.60 | 0.60 | | | | | 0.70 | | | | | |
| ECONOMIC % 15 | Cost | 3 | 3 | 9 | 15.0% | 1.35 | 2 | 2 | 4 | 15.0% | 0.60 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | 1.35 | 0.60 | | | | | 0.15 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 6.813 | 4.663 | | | | | 3.388 | | | | | |

Developed Tool for Taking a Decision about Decommissioning of Spool (Weighting Scenario 5-6)

| Description of Subsea Assets: Spool | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|--------------|--------------|---------------------------|--------|------|------------|--------------|-------------------------|--------|------|------------|-------|
| Weighting Scenario 5: %40 for economic and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 3 | 6 | 3.75% | 0.23 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | | | | 0.71 | 1.46 | | | | | 1.84 | | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 5.00% | 0.30 | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 2 | 2 | 5.00% | 0.10 | 2 | 2 | 4 | 5.00% | 0.20 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 0.55 | 0.40 | | | | | 0.30 | | | | | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 2 | 2 | 4 | 15.0% | 0.60 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 1.35 | 0.60 | | | | | 0.15 | | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 2 | 2 | 5.0% | 0.10 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 |
| Total Societal= | | | | | 0.60 | 0.60 | | | | | 0.70 | | | | | |
| ECONOMIC % 40 | Cost | 3 | 3 | 9 | 40% | 3.60 | 2 | 2 | 4 | 40% | 1.60 | 1 | 1 | 1 | 40% | 0.40 |
| Total Economic= | | | | | 3.60 | 1.60 | | | | | 0.40 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 6.813 | 4.663 | | | | | 3.388 | | | | | |
| Description of Subsea Assets: Spool | | | | | | | | | | | | | | | | |
| Weighting Scenario 6: %40 for societal and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 3 | 6 | 3.75% | 0.23 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | | | | 0.71 | 1.46 | | | | | 1.84 | | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 5.00% | 0.30 | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 2 | 2 | 5.00% | 0.10 | 2 | 2 | 4 | 5.00% | 0.20 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 0.55 | 0.40 | | | | | 0.30 | | | | | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 2 | 2 | 4 | 15.0% | 0.60 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 1.35 | 0.60 | | | | | 0.15 | | | | | |
| SOCIETAL % 40 | Effects on Commercial Fisheries | 1 | 1 | 1 | 13.33% | 0.13 | 2 | 2 | 4 | 13.33% | 0.53 | 2 | 3 | 6 | 13.33% | 0.80 |
| | Employment | 3 | 3 | 9 | 13.33% | 1.20 | 2 | 2 | 4 | 13.33% | 0.53 | 2 | 1 | 2 | 13.33% | 0.27 |
| | Communities | 1 | 2 | 2 | 13.33% | 0.27 | 2 | 2 | 4 | 13.33% | 0.53 | 2 | 3 | 6 | 13.33% | 0.80 |
| Total Societal= | | | | | 1.60 | 1.60 | | | | | 1.87 | | | | | |
| ECONOMIC % 15 | Cost | 3 | 3 | 9 | 15% | 1.35 | 2 | 2 | 4 | 15% | 0.60 | 1 | 1 | 1 | 15% | 0.15 |
| Total Economic= | | | | | 1.35 | 0.60 | | | | | 0.15 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 5.562 | 4.662 | | | | | 4.304 | | | | | |

Developed Tool for Taking a Decision about Decommissioning of Trunk Line (Weighting Scenario 1-2)

| Description of Subsea Assets: Trunk Line | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|------------|-------|------------------------|--------|------|------------|-------|-------------------------|--------|------|------------|-------|---------------------------------|--------|------|------------|-------|-------------------------------|--------|------|------------|-------|
| Weighting Scenario 1: %20 for each main criteria | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse S-lay | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Landfill-Rock Dumping | | | | | Option 5: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL %20 | Operational Environmental Impacts | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 3 | 6 | 5.0% | 0.30 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 5 | 5 | 25 | 5.0% | 1.25 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Energy Use | 2 | 3 | 6 | 5.0% | 0.30 | 4 | 5 | 20 | 5.0% | 1.00 | 4 | 4 | 16 | 5.0% | 0.80 | 4 | 5 | 20 | 5.0% | 1.00 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Gaseous Emissions | 2 | 3 | 6 | 5.0% | 0.30 | 4 | 5 | 20 | 5.0% | 1.00 | 4 | 4 | 16 | 5.0% | 0.80 | 4 | 5 | 20 | 5.0% | 1.00 | 5 | 5 | 25 | 5.0% | 1.25 |
| Total Environment= | | 1.25 | | | | | 2.85 | | | | | 2.90 | | | | | 2.75 | | | | | 2.90 | | | | |
| SAFETY %20 | Safety Risk to Offshore Project Personnel | 3 | 4 | 12 | 6.7% | 0.80 | 5 | 5 | 25 | 6.7% | 1.67 | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 3 | 6 | 6.7% | 0.40 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 4 | 4 | 16 | 6.7% | 1.07 | 2 | 3 | 6 | 6.7% | 0.40 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 3 | 6 | 6.7% | 0.40 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety= | | 1.27 | | | | | 2.13 | | | | | 1.20 | | | | | 1.07 | | | | | 0.60 | | | | |
| TECHNICAL %20 | Technical Feasibility | 4 | 4 | 16 | 20.0% | 3.20 | 5 | 5 | 25 | 20.0% | 5.00 | 1 | 1 | 1 | 20.0% | 0.20 | 2 | 3 | 6 | 20.0% | 1.20 | 3 | 3 | 9 | 20.0% | 1.80 |
| Total Technical= | | 3.20 | | | | | 5.00 | | | | | 0.20 | | | | | 1.20 | | | | | 1.80 | | | | |
| SOCIETAL %20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 5 | 5 | 25 | 6.7% | 1.67 | 4 | 4 | 16 | 6.7% | 1.07 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 1 | 2 | 6.7% | 0.13 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 3 | 6 | 6.7% | 0.40 |
| | Communities | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 4 | 4 | 16 | 6.7% | 1.07 | 3 | 4 | 12 | 6.7% | 0.80 | 2 | 2 | 4 | 6.7% | 0.27 |
| Total Societal= | | 0.73 | | | | | 0.73 | | | | | 2.87 | | | | | 2.13 | | | | | 0.80 | | | | |
| ECONOMIC %20 | Cost | 4 | 4 | 16 | 20.0% | 3.20 | 5 | 5 | 25 | 20.0% | 5.00 | 1 | 1 | 1 | 20.0% | 0.20 | 2 | 3 | 6 | 20.0% | 1.20 | 3 | 3 | 9 | 20.0% | 1.80 |
| Total Economic= | | 3.20 | | | | | 5.00 | | | | | 0.20 | | | | | 1.20 | | | | | 1.80 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 9.650 | | | | | 15.716 | | | | | 7.366 | | | | | 8.350 | | | | | 7.900 | | | | |
| Description of Subsea Assets: Trunk Line | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Weighting Scenario 2: %40 for environment and %15 for others | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse S-lay | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Landfill-Rock Dumping | | | | | Option 5: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL %40 | Operational Environmental Impacts | 3 | 4 | 12 | 10.0% | 1.20 | 4 | 4 | 16 | 10.0% | 1.60 | 1 | 1 | 1 | 10.0% | 0.10 | 3 | 3 | 9 | 10.0% | 0.90 | 2 | 3 | 6 | 10.0% | 0.60 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 10.0% | 0.10 | 1 | 1 | 1 | 10.0% | 0.10 | 5 | 5 | 25 | 10.0% | 2.50 | 2 | 3 | 6 | 10.0% | 0.60 | 1 | 2 | 2 | 10.0% | 0.20 |
| | Energy Use | 2 | 3 | 6 | 10.0% | 0.60 | 4 | 5 | 20 | 10.0% | 2.00 | 4 | 4 | 16 | 10.0% | 1.60 | 4 | 5 | 20 | 10.0% | 2.00 | 5 | 5 | 25 | 10.0% | 2.50 |
| | Gaseous Emissions | 2 | 3 | 6 | 10.0% | 0.60 | 4 | 5 | 20 | 10.0% | 2.00 | 4 | 4 | 16 | 10.0% | 1.60 | 4 | 5 | 20 | 10.0% | 2.00 | 5 | 5 | 25 | 10.0% | 2.50 |
| Total Environment= | | 2.50 | | | | | 5.70 | | | | | 5.80 | | | | | 5.50 | | | | | 5.80 | | | | |
| SAFETY %15 | Safety Risk to Offshore Project Personnel | 3 | 4 | 12 | 5.0% | 0.60 | 5 | 5 | 25 | 5.0% | 1.25 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 3 | 6 | 5.0% | 0.30 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 |
| Total Safety= | | 0.95 | | | | | 1.60 | | | | | 0.90 | | | | | 0.80 | | | | | 0.45 | | | | |
| TECHNICAL %15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Technical= | | 2.40 | | | | | 3.75 | | | | | 0.15 | | | | | 0.90 | | | | | 1.35 | | | | |
| SOCIETAL %15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 5 | 5 | 25 | 5.0% | 1.25 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 | 3 | 4 | 12 | 5.0% | 0.60 | 2 | 2 | 4 | 5.0% | 0.20 |
| Total Societal= | | 0.55 | | | | | 0.55 | | | | | 2.15 | | | | | 1.60 | | | | | 0.60 | | | | |
| ECONOMIC %15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Economic= | | 2.40 | | | | | 3.75 | | | | | 0.15 | | | | | 0.90 | | | | | 1.35 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 8.800 | | | | | 15.350 | | | | | 9.150 | | | | | 9.700 | | | | | 9.550 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Trunk Line (Weighting Scenario 3-4)

| Description of Subsea Assets: Trunk Line | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|-----------|---------------|------------------------|--------|------|-----------|-------|-------------------------|--------|------|-----------|-------|---------------------------------|--------------|------|-----------|-------|-------------------------------|--------|--------------|-----------|-------|--|--|--|--------------|
| Weighting Scenario 3: %40 for safety and %15 for others | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse S-lay | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Landfill-Rock Dumping | | | | | Option 5: Burial or Trenching | | | | | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | | | | |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 3 | 9 | 3.75% | 0.34 | 2 | 3 | 6 | 3.75% | 0.23 | | | | |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 5 | 5 | 25 | 3.75% | 0.94 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 2 | 2 | 3.75% | 0.08 | | | | |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 4 | 5 | 20 | 3.75% | 0.75 | 5 | 5 | 25 | 3.75% | 0.94 | | | | |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 4 | 5 | 20 | 3.75% | 0.75 | 5 | 5 | 25 | 3.75% | 0.94 | | | | |
| Total Environment= | | | | | | 0.94 | | | | | | 2.14 | | | | | | 2.18 | | | | | | 2.06 | | | | | | 2.18 |
| SAFETY %40 | Safety Risk to Offshore Project Personnel | 3 | 4 | 12 | 13.33% | 1.60 | 5 | 5 | 25 | 13.33% | 3.33 | 1 | 1 | 1 | 13.33% | 0.13 | 3 | 3 | 9 | 13.33% | 1.20 | 2 | 3 | 6 | 13.33% | 0.80 | | | | |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 | 4 | 4 | 16 | 13.33% | 2.13 | 2 | 3 | 6 | 13.33% | 0.80 | 1 | 2 | 2 | 13.33% | 0.27 | | | | |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 13.33% | 0.80 | 2 | 3 | 6 | 13.33% | 0.80 | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 | | | | |
| Total Safety= | | | | | | 2.53 | | | | | | 4.27 | | | | | | 2.40 | | | | | | 2.13 | | | | | | 1.20 |
| TECHNICAL % 15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 | 3 | 3 | 9 | 15.0% | 1.35 | | | | |
| Total Technical= | | | | | | 2.40 | | | | | | 3.75 | | | | | | 0.15 | | | | | | 0.90 | | | | | | 1.35 |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 5 | 5 | 25 | 5.0% | 1.25 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 2 | 2 | 5.0% | 0.10 | | | | |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 | | | | |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 | 3 | 4 | 12 | 5.0% | 0.60 | 2 | 2 | 4 | 5.0% | 0.20 | | | | |
| Total Societal= | | | | | | 0.55 | | | | | | 0.55 | | | | | | 2.15 | | | | | | 1.60 | | | | | | 0.60 |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 | 3 | 3 | 9 | 15.0% | 1.35 | | | | |
| Total Economic= | | | | | | 2.40 | | | | | | 3.75 | | | | | | 0.15 | | | | | | 0.90 | | | | | | 1.35 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 8.821 | | | | | | 14.454 | | | | | | 7.025 | | | | | | 7.596 | | | | | | 6.675 |
| Description of Subsea Assets: Trunk Line | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Weighting Scenario 4: %40 for technical and %15 for others | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse S-lay | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Landfill-Rock Dumping | | | | | Option 5: Burial or Trenching | | | | | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | | | | |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 3 | 9 | 3.75% | 0.34 | 2 | 3 | 6 | 3.75% | 0.23 | | | | |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 5 | 5 | 25 | 3.75% | 0.94 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 2 | 2 | 3.75% | 0.08 | | | | |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 4 | 5 | 20 | 3.75% | 0.75 | 5 | 5 | 25 | 3.75% | 0.94 | | | | |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 4 | 5 | 20 | 3.75% | 0.75 | 5 | 5 | 25 | 3.75% | 0.94 | | | | |
| Total Environment= | | | | | | 0.94 | | | | | | 2.14 | | | | | | 2.18 | | | | | | 2.06 | | | | | | 2.18 |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 3 | 4 | 12 | 5.00% | 0.60 | 5 | 5 | 25 | 5.00% | 1.25 | 1 | 1 | 1 | 5.00% | 0.05 | 3 | 3 | 9 | 5.00% | 0.45 | 2 | 3 | 6 | 5.00% | 0.30 | | | | |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 4 | 4 | 16 | 5.00% | 0.80 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 2 | 2 | 5.00% | 0.10 | | | | |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 5.00% | 0.30 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | | | | |
| Total Safety= | | | | | | 0.95 | | | | | | 1.60 | | | | | | 0.90 | | | | | | 0.80 | | | | | | 0.45 |
| TECHNICAL % 40 | Technical Feasibility | 4 | 4 | 16 | 40% | 6.40 | 5 | 5 | 25 | 40% | 10.00 | 1 | 1 | 1 | 40% | 0.40 | 2 | 3 | 6 | 40% | 2.40 | 3 | 3 | 9 | 40% | 3.60 | | | | |
| Total Technical= | | | | | | 6.40 | | | | | | 10.00 | | | | | | 0.40 | | | | | | 2.40 | | | | | | 3.60 |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 5 | 5 | 25 | 5.0% | 1.25 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 2 | 2 | 5.0% | 0.10 | | | | |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 | | | | |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 | 3 | 4 | 12 | 5.0% | 0.60 | 2 | 2 | 4 | 5.0% | 0.20 | | | | |
| Total Societal= | | | | | | 0.55 | | | | | | 0.55 | | | | | | 2.15 | | | | | | 1.60 | | | | | | 0.60 |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 | 3 | 3 | 9 | 15.0% | 1.35 | | | | |
| Total Economic= | | | | | | 2.40 | | | | | | 3.75 | | | | | | 0.15 | | | | | | 0.90 | | | | | | 1.35 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 11.238 | | | | | | 18.038 | | | | | | 5.775 | | | | | | 7.763 | | | | | | 8.175 |

Developed Tool for Taking a Decision about Decommissioning of Trunk Line (Weighting Scenario 5-6)

| Description of Subsea Assets: Trunk Line | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|-----------|-------|------------------------|--------|------|-----------|-------|-------------------------|--------|------|-----------|-------|---------------------------------|--------|------|-----------|-------|-------------------------------|--------|------|-----------|-------|
| Weighting Scenario 5: %40 for economic and %15 for others | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse S-lay | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Landfill-Rock Dumping | | | | | Option 5: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 3 | 9 | 3.75% | 0.34 | 2 | 3 | 6 | 3.75% | 0.23 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 5 | 5 | 25 | 3.75% | 0.94 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 4 | 5 | 20 | 3.75% | 0.75 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 4 | 5 | 20 | 3.75% | 0.75 | 5 | 5 | 25 | 3.75% | 0.94 |
| Total Environment= | | 0.94 | | | | | 2.14 | | | | | 2.18 | | | | | 2.06 | | | | | 2.18 | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 3 | 4 | 12 | 5.00% | 0.60 | 5 | 5 | 25 | 5.00% | 1.25 | 1 | 1 | 1 | 5.00% | 0.05 | 3 | 3 | 9 | 5.00% | 0.45 | 2 | 3 | 6 | 5.00% | 0.30 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 4 | 4 | 16 | 5.00% | 0.80 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 2 | 2 | 5.00% | 0.10 |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 5.00% | 0.30 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | 0.95 | | | | | 1.60 | | | | | 0.90 | | | | | 0.80 | | | | | 0.45 | | | | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Technical= | | 2.40 | | | | | 3.75 | | | | | 0.15 | | | | | 0.90 | | | | | 1.35 | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 5 | 5 | 25 | 5.0% | 1.25 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 | 3 | 4 | 12 | 5.0% | 0.60 | 2 | 2 | 4 | 5.0% | 0.20 |
| Total Societal= | | 0.55 | | | | | 0.55 | | | | | 2.15 | | | | | 1.60 | | | | | 0.60 | | | | |
| ECONOMIC % 40 | Cost | 4 | 4 | 16 | 40% | 6.40 | 5 | 5 | 25 | 40% | 10.00 | 1 | 1 | 1 | 40% | 0.40 | 2 | 3 | 6 | 40% | 2.40 | 3 | 3 | 9 | 40% | 3.60 |
| Total Economic= | | 6.40 | | | | | 10.00 | | | | | 0.40 | | | | | 2.40 | | | | | 3.60 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 11.238 | | | | | 18.038 | | | | | 5.775 | | | | | 7.763 | | | | | 8.175 | | | | |
| Description of Subsea Assets: Trunk Line | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Weighting Scenario 6: %40 for societal and %15 for others | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse S-lay | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Landfill-Rock Dumping | | | | | Option 5: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 3 | 9 | 3.75% | 0.34 | 2 | 3 | 6 | 3.75% | 0.23 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 5 | 5 | 25 | 3.75% | 0.94 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 4 | 5 | 20 | 3.75% | 0.75 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 4 | 5 | 20 | 3.75% | 0.75 | 5 | 5 | 25 | 3.75% | 0.94 |
| Total Environment= | | 0.94 | | | | | 2.14 | | | | | 2.18 | | | | | 2.06 | | | | | 2.18 | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 3 | 4 | 12 | 5.00% | 0.60 | 5 | 5 | 25 | 5.00% | 1.25 | 1 | 1 | 1 | 5.00% | 0.05 | 3 | 3 | 9 | 5.00% | 0.45 | 2 | 3 | 6 | 5.00% | 0.30 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 4 | 4 | 16 | 5.00% | 0.80 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 2 | 2 | 5.00% | 0.10 |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 5.00% | 0.30 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | 0.95 | | | | | 1.60 | | | | | 0.90 | | | | | 0.80 | | | | | 0.45 | | | | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Technical= | | 2.40 | | | | | 3.75 | | | | | 0.15 | | | | | 0.90 | | | | | 1.35 | | | | |
| SOCIETAL % 40 | Effects on Commercial Fisheries | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 | 5 | 5 | 25 | 13.33% | 3.33 | 4 | 4 | 16 | 13.33% | 2.13 | 1 | 2 | 2 | 13.33% | 0.27 |
| | Employment | 3 | 3 | 9 | 13.33% | 1.20 | 3 | 3 | 9 | 13.33% | 1.20 | 2 | 1 | 2 | 13.33% | 0.27 | 2 | 2 | 4 | 13.33% | 0.53 | 2 | 3 | 6 | 13.33% | 0.80 |
| | Communities | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 | 4 | 4 | 16 | 13.33% | 2.13 | 3 | 4 | 12 | 13.33% | 1.60 | 2 | 2 | 4 | 13.33% | 0.53 |
| Total Societal= | | 1.47 | | | | | 1.47 | | | | | 5.73 | | | | | 4.27 | | | | | 1.60 | | | | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15% | 2.40 | 5 | 5 | 25 | 15% | 3.75 | 1 | 1 | 1 | 15% | 0.15 | 2 | 3 | 6 | 15% | 0.90 | 3 | 3 | 9 | 15% | 1.35 |
| Total Economic= | | 2.40 | | | | | 3.75 | | | | | 0.15 | | | | | 0.90 | | | | | 1.35 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 8.154 | | | | | 12.704 | | | | | 9.108 | | | | | 8.929 | | | | | 6.925 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Rigid Flow Line (Weighting Scenario 1-2)

| Description of Subsea Assets: Rigid Flow Lines | | | | | | | | | | | | | | | | | | | | | |
|--|---|---------------------------|--------|------|------------|-------|------------------------|--------|------|------------|-------|-------------------------|--------|------|------------|-------|-------------------------------|--------|------|------------|-------|
| Weighting Scenario 1: %20 for each main criteria | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 20 | Operational Environmental Impacts | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 5 | 5 | 25 | 5.0% | 1.25 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Energy Use | 2 | 3 | 6 | 5.0% | 0.30 | 4 | 5 | 20 | 5.0% | 1.00 | 4 | 4 | 16 | 5.0% | 0.80 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Gaseous Emissions | 2 | 3 | 6 | 5.0% | 0.30 | 4 | 5 | 20 | 5.0% | 1.00 | 4 | 4 | 16 | 5.0% | 0.80 | 5 | 5 | 25 | 5.0% | 1.25 |
| Total Environment= | | 1.10 | | | | | 2.85 | | | | | 2.90 | | | | | 2.90 | | | | |
| SAFETY % 20 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 6.7% | 0.60 | 4 | 5 | 20 | 6.7% | 1.33 | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 2 | 4 | 6.7% | 0.27 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 4 | 4 | 16 | 6.7% | 1.07 | 2 | 3 | 6 | 6.7% | 0.40 |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety= | | 1.07 | | | | | 1.67 | | | | | 1.20 | | | | | 0.73 | | | | |
| TECHNICAL % 20 | Technical Feasibility | 4 | 4 | 16 | 20.0% | 3.20 | 5 | 5 | 25 | 20.0% | 5.00 | 1 | 1 | 1 | 20.0% | 0.20 | 3 | 3 | 9 | 20.0% | 1.80 |
| Total Technical= | | 3.20 | | | | | 5.00 | | | | | 0.20 | | | | | 1.80 | | | | |
| SOCIAL % 20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 5 | 5 | 25 | 6.7% | 1.67 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 1 | 2 | 6.7% | 0.13 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 4 | 12 | 6.7% | 0.80 | 1 | 2 | 2 | 6.7% | 0.13 |
| Total Societal= | | 0.73 | | | | | 0.73 | | | | | 2.60 | | | | | 0.40 | | | | |
| ECONOMIC % 20 | Cost | 3 | 4 | 12 | 20.0% | 2.40 | 5 | 5 | 25 | 20.0% | 5.00 | 1 | 1 | 1 | 20.0% | 0.20 | 3 | 3 | 9 | 20.0% | 1.80 |
| Total Economic= | | 2.40 | | | | | 5.00 | | | | | 0.20 | | | | | 1.80 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 8.500 | | | | | 15.250 | | | | | 7.100 | | | | | 7.633 | | | | |
| Description of Subsea Assets: Rigid Flow Lines | | | | | | | | | | | | | | | | | | | | | |
| Weighting Scenario 2: %40 for environment and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 40 | Operational Environmental Impacts | 3 | 3 | 9 | 10.0% | 0.90 | 4 | 4 | 16 | 10.0% | 1.60 | 1 | 1 | 1 | 10.0% | 0.10 | 2 | 3 | 6 | 10.0% | 0.60 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 10.0% | 0.10 | 1 | 1 | 1 | 10.0% | 0.10 | 5 | 5 | 25 | 10.0% | 2.50 | 1 | 2 | 2 | 10.0% | 0.20 |
| | Energy Use | 2 | 3 | 6 | 10.0% | 0.60 | 4 | 5 | 20 | 10.0% | 2.00 | 4 | 4 | 16 | 10.0% | 1.60 | 5 | 5 | 25 | 10.0% | 2.50 |
| | Gaseous Emissions | 2 | 3 | 6 | 10.0% | 0.60 | 4 | 5 | 20 | 10.0% | 2.00 | 4 | 4 | 16 | 10.0% | 1.60 | 5 | 5 | 25 | 10.0% | 2.50 |
| Total Environment= | | 2.20 | | | | | 5.70 | | | | | 5.80 | | | | | 5.80 | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 5 | 20 | 5.0% | 1.00 | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 | 2 | 3 | 6 | 5.0% | 0.30 |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 |
| Total Safety= | | 0.80 | | | | | 1.25 | | | | | 0.90 | | | | | 0.55 | | | | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Technical= | | 2.40 | | | | | 3.75 | | | | | 0.15 | | | | | 1.35 | | | | |
| SOCIAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 5 | 5 | 25 | 5.0% | 1.25 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| Total Societal= | | 0.55 | | | | | 0.55 | | | | | 1.95 | | | | | 0.30 | | | | |
| ECONOMIC % 15 | Cost | 3 | 4 | 12 | 15.0% | 1.80 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Economic= | | 1.80 | | | | | 3.75 | | | | | 0.15 | | | | | 1.35 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 7.750 | | | | | 15.000 | | | | | 8.950 | | | | | 9.350 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Rigid Flow Line (Weighting Scenario 3-4)

| Description of Subsea Assets: Rigid Flow Lines | | | | | | | | | | | | | | | | | | | | | |
|--|---|---------------------------|--------|------|------------|-------|------------------------|--------|------|------------|-------|-------------------------|--------|------|------------|-------|-------------------------------|--------|------|------------|-------|
| Weighting Scenario 3: %40 for safety and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 3 | 6 | 3.75% | 0.23 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 5 | 5 | 25 | 3.75% | 0.94 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| Total Environment= | | 0.83 | | | | | 2.14 | | | | | 2.18 | | | | | 2.18 | | | | |
| SAFETY % 40 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 13.33% | 1.20 | 4 | 5 | 20 | 13.33% | 2.67 | 1 | 1 | 1 | 13.33% | 0.13 | 2 | 2 | 4 | 13.33% | 0.53 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 | 4 | 4 | 16 | 13.33% | 2.13 | 2 | 3 | 6 | 13.33% | 0.80 |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 13.33% | 0.80 | 2 | 2 | 4 | 13.33% | 0.53 | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 |
| Total Safety= | | 2.13 | | | | | 3.33 | | | | | 2.40 | | | | | 1.47 | | | | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Technical= | | 2.40 | | | | | 3.75 | | | | | 0.15 | | | | | 1.35 | | | | |
| SOCIAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 5 | 5 | 25 | 5.0% | 1.25 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| Total Societal= | | 0.55 | | | | | 0.55 | | | | | 1.95 | | | | | 0.30 | | | | |
| ECONOMIC % 15 | Cost | 3 | 4 | 12 | 15.0% | 1.80 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Economic= | | 1.80 | | | | | 3.75 | | | | | 0.15 | | | | | 1.35 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 7.708 | | | | | 13.521 | | | | | 6.825 | | | | | 6.642 | | | | |
| Description of Subsea Assets: Rigid Flow Lines | | | | | | | | | | | | | | | | | | | | | |
| Weighting Scenario 4: %40 for technical and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 3 | 6 | 3.75% | 0.23 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 5 | 5 | 25 | 3.75% | 0.94 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| Total Environment= | | 0.83 | | | | | 2.14 | | | | | 2.18 | | | | | 2.18 | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 5.00% | 0.45 | 4 | 5 | 20 | 5.00% | 1.00 | 1 | 1 | 1 | 5.00% | 0.05 | 2 | 2 | 4 | 5.00% | 0.20 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 4 | 4 | 16 | 5.00% | 0.80 | 2 | 3 | 6 | 5.00% | 0.30 |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 5.00% | 0.30 | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | 0.80 | | | | | 1.25 | | | | | 0.90 | | | | | 0.55 | | | | |
| TECHNICAL % 40 | Technical Feasibility | 4 | 4 | 16 | 40% | 6.40 | 5 | 5 | 25 | 40% | 10.00 | 1 | 1 | 1 | 40% | 0.40 | 3 | 3 | 9 | 40% | 3.60 |
| Total Technical= | | 6.40 | | | | | 10.00 | | | | | 0.40 | | | | | 3.60 | | | | |
| SOCIAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 5 | 5 | 25 | 5.0% | 1.25 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| Total Societal= | | 0.55 | | | | | 0.55 | | | | | 1.95 | | | | | 0.30 | | | | |
| ECONOMIC % 15 | Cost | 3 | 4 | 12 | 15.0% | 1.80 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Economic= | | 1.80 | | | | | 3.75 | | | | | 0.15 | | | | | 1.35 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 10.375 | | | | | 17.688 | | | | | 5.575 | | | | | 7.975 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Rigid Flow Line (Weighting Scenario 5-6)

| Description of Subsea Assets: Rigid Flow Lines | | | | | | | | | | | | | | | | | | | | | |
|--|---|---------------------------|--------|------|------------|-------|------------------------|--------|------|------------|-------|-------------------------|--------|------|------------|-------|-------------------------------|--------|------|------------|-------|
| Weighting Scenario 5: %40 for economic and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 3 | 6 | 3.75% | 0.23 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 5 | 5 | 25 | 3.75% | 0.94 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| Total Environment= | | 0.83 | | | | | 2.14 | | | | | 2.18 | | | | | 2.18 | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 5.00% | 0.45 | 4 | 5 | 20 | 5.00% | 1.00 | 1 | 1 | 1 | 5.00% | 0.05 | 2 | 2 | 4 | 5.00% | 0.20 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 4 | 4 | 16 | 5.00% | 0.80 | 2 | 3 | 6 | 5.00% | 0.30 |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 5.00% | 0.30 | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | 0.80 | | | | | 1.25 | | | | | 0.90 | | | | | 0.55 | | | | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Technical= | | 2.40 | | | | | 3.75 | | | | | 0.15 | | | | | 1.35 | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 5 | 5 | 25 | 5.0% | 1.25 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| Total Societal= | | 0.55 | | | | | 0.55 | | | | | 1.95 | | | | | 0.30 | | | | |
| ECONOMIC % 40 | Cost | 3 | 4 | 12 | 40% | 4.80 | 5 | 5 | 25 | 40% | 10.00 | 1 | 1 | 1 | 40% | 0.40 | 3 | 3 | 9 | 40% | 3.60 |
| Total Economic= | | 4.80 | | | | | 10.00 | | | | | 0.40 | | | | | 3.60 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 9.375 | | | | | 17.688 | | | | | 5.575 | | | | | 7.975 | | | | |
| Description of Subsea Assets: Rigid Flow Lines | | | | | | | | | | | | | | | | | | | | | |
| Weighting Scenario 6: %40 for societal and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 3 | 6 | 3.75% | 0.23 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 5 | 5 | 25 | 3.75% | 0.94 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| Total Environment= | | 0.83 | | | | | 2.14 | | | | | 2.18 | | | | | 2.18 | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 5.00% | 0.45 | 4 | 5 | 20 | 5.00% | 1.00 | 1 | 1 | 1 | 5.00% | 0.05 | 2 | 2 | 4 | 5.00% | 0.20 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 4 | 4 | 16 | 5.00% | 0.80 | 2 | 3 | 6 | 5.00% | 0.30 |
| | Safety Risk to Onshore Project Personnel | 2 | 3 | 6 | 5.00% | 0.30 | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | 0.80 | | | | | 1.25 | | | | | 0.90 | | | | | 0.55 | | | | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Technical= | | 2.40 | | | | | 3.75 | | | | | 0.15 | | | | | 1.35 | | | | |
| SOCIETAL % 40 | Effects on Commercial Fisheries | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 | 5 | 5 | 25 | 13.33% | 3.33 | 1 | 2 | 2 | 13.33% | 0.27 |
| | Employment | 3 | 3 | 9 | 13.33% | 1.20 | 3 | 3 | 9 | 13.33% | 1.20 | 2 | 1 | 2 | 13.33% | 0.27 | 2 | 1 | 2 | 13.33% | 0.27 |
| | Communities | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 | 3 | 4 | 12 | 13.33% | 1.60 | 1 | 2 | 2 | 13.33% | 0.27 |
| Total Societal= | | 1.47 | | | | | 1.47 | | | | | 5.20 | | | | | 0.80 | | | | |
| ECONOMIC % 15 | Cost | 3 | 4 | 12 | 15% | 1.80 | 5 | 5 | 25 | 15% | 3.75 | 1 | 1 | 1 | 15% | 0.15 | 3 | 3 | 9 | 15% | 1.35 |
| Total Economic= | | 1.80 | | | | | 3.75 | | | | | 0.15 | | | | | 1.35 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 7.292 | | | | | 12.354 | | | | | 8.575 | | | | | 6.225 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Flexible Flow Line (Weighting Scenario 1-2)

| Description of Subsea Assets: Flexible Flow Lines | | | | | | | | | | | | | | | | | | | | | |
|--|---|---------------------------|--------|------|-----------|-------|------------------------|--------|------|-----------|-------|-------------------------|--------|------|-----------|-------|-------------------------------|--------|------|-----------|-------|
| Weighting Scenario 1: %20 for each main criteria | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL %20 | Operational Environmental Impacts | 2 | 3 | 6 | 5.0% | 0.30 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Energy Use | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 5 | 20 | 5.0% | 1.00 | 4 | 4 | 16 | 5.0% | 0.80 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Gaseous Emissions | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 5 | 20 | 5.0% | 1.00 | 4 | 4 | 16 | 5.0% | 0.80 | 5 | 5 | 25 | 5.0% | 1.25 |
| Total Environment= | | 1.55 | | | | | 2.85 | | | | | 2.45 | | | | | 2.80 | | | | |
| SAFETY %20 | Safety Risk to Offshore Project Personnel | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 3 | 6 | 6.7% | 0.40 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 4 | 4 | 16 | 6.7% | 1.07 | 4 | 3 | 12 | 6.7% | 0.80 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 6.7% | 0.13 | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety= | | 0.47 | | | | | 0.73 | | | | | 1.20 | | | | | 1.00 | | | | |
| TECHNICAL %20 | Technical Feasibility | 3 | 3 | 9 | 20.0% | 1.80 | 4 | 4 | 16 | 20.0% | 3.20 | 1 | 1 | 1 | 20.0% | 0.20 | 2 | 3 | 6 | 20.0% | 1.20 |
| Total Technical= | | 1.80 | | | | | 3.20 | | | | | 0.20 | | | | | 1.20 | | | | |
| SOCIAL %20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 5 | 5 | 25 | 6.7% | 1.67 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 1 | 2 | 6.7% | 0.13 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 4 | 12 | 6.7% | 0.80 | 1 | 2 | 2 | 6.7% | 0.13 |
| Total Societal= | | 0.73 | | | | | 0.73 | | | | | 2.60 | | | | | 0.40 | | | | |
| ECONOMIC %20 | Cost | 3 | 4 | 12 | 20.0% | 2.40 | 5 | 5 | 25 | 20.0% | 5.00 | 1 | 1 | 1 | 20.0% | 0.20 | 3 | 3 | 9 | 20.0% | 1.80 |
| Total Economic= | | 2.40 | | | | | 5.00 | | | | | 0.20 | | | | | 1.80 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 6.950 | | | | | 12.517 | | | | | 6.650 | | | | | 7.200 | | | | |
| Description of Subsea Assets: Flexible Flow Lines | | | | | | | | | | | | | | | | | | | | | |
| Weighting Scenario 2: %40 for environment and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL %40 | Operational Environmental Impacts | 2 | 3 | 6 | 10.0% | 0.60 | 4 | 4 | 16 | 10.0% | 1.60 | 1 | 1 | 1 | 10.0% | 0.10 | 2 | 2 | 4 | 10.0% | 0.40 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 10.0% | 0.10 | 1 | 1 | 1 | 10.0% | 0.10 | 4 | 4 | 16 | 10.0% | 1.60 | 1 | 2 | 2 | 10.0% | 0.20 |
| | Energy Use | 3 | 4 | 12 | 10.0% | 1.20 | 4 | 5 | 20 | 10.0% | 2.00 | 4 | 4 | 16 | 10.0% | 1.60 | 5 | 5 | 25 | 10.0% | 2.50 |
| | Gaseous Emissions | 3 | 4 | 12 | 10.0% | 1.20 | 4 | 5 | 20 | 10.0% | 2.00 | 4 | 4 | 16 | 10.0% | 1.60 | 5 | 5 | 25 | 10.0% | 2.50 |
| Total Environment= | | 3.10 | | | | | 5.70 | | | | | 4.90 | | | | | 5.60 | | | | |
| SAFETY %15 | Safety Risk to Offshore Project Personnel | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 | 4 | 3 | 12 | 5.0% | 0.60 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.0% | 0.10 | 2 | 2 | 4 | 5.0% | 0.20 | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 |
| Total Safety= | | 0.35 | | | | | 0.55 | | | | | 0.90 | | | | | 0.75 | | | | |
| TECHNICAL %15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 4 | 4 | 16 | 15.0% | 2.40 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 |
| Total Technical= | | 1.35 | | | | | 2.40 | | | | | 0.15 | | | | | 0.90 | | | | |
| SOCIAL %15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 5 | 5 | 25 | 5.0% | 1.25 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| Total Societal= | | 0.55 | | | | | 0.55 | | | | | 1.95 | | | | | 0.30 | | | | |
| ECONOMIC %15 | Cost | 3 | 4 | 12 | 15.0% | 1.80 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Economic= | | 1.80 | | | | | 3.75 | | | | | 0.15 | | | | | 1.35 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 7.150 | | | | | 12.950 | | | | | 8.050 | | | | | 8.900 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Flexible Flow Line (Weighting Scenario 3-4)

| Description of Subsea Assets: Flexible Flow Lines | | | | | | | | | | | | | | | | | | | | | |
|--|---|---------------------------|--------|------|------------|-------|------------------------|--------|------|------------|-------|-------------------------|--------|------|------------|-------|-------------------------------|--------|------|------------|-------|
| Weighting Scenario 3: %40 for safety and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 2 | 4 | 3.75% | 0.15 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Energy Use | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Gaseous Emissions | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| Total Environment= | | 1.16 | | | | | 2.14 | | | | | 1.84 | | | | | 2.10 | | | | |
| SAFETY %40 | Safety Risk to Offshore Project Personnel | 2 | 2 | 4 | 13.33% | 0.53 | 2 | 3 | 6 | 13.33% | 0.80 | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 2 | 2 | 13.33% | 0.27 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 | 4 | 4 | 16 | 13.33% | 2.13 | 4 | 3 | 12 | 13.33% | 1.60 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 13.33% | 0.27 | 2 | 2 | 4 | 13.33% | 0.53 | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 |
| Total Safety= | | 0.93 | | | | | 1.47 | | | | | 2.40 | | | | | 2.00 | | | | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 4 | 4 | 16 | 15.0% | 2.40 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 |
| Total Technical= | | 1.35 | | | | | 2.40 | | | | | 0.15 | | | | | 0.90 | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 5 | 5 | 25 | 5.0% | 1.25 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| Total Societal= | | 0.55 | | | | | 0.55 | | | | | 1.95 | | | | | 0.30 | | | | |
| ECONOMIC % 15 | Cost | 3 | 4 | 12 | 15.0% | 1.80 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Economic= | | 1.80 | | | | | 3.75 | | | | | 0.15 | | | | | 1.35 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 5.796 | | | | | 10.304 | | | | | 6.487 | | | | | 6.650 | | | | |
| Description of Subsea Assets: Flexible Flow Lines | | | | | | | | | | | | | | | | | | | | | |
| Weighting Scenario 4: %40 for technical and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 2 | 4 | 3.75% | 0.15 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Energy Use | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Gaseous Emissions | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| Total Environment= | | 1.16 | | | | | 2.14 | | | | | 1.84 | | | | | 2.10 | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 2 | 2 | 4 | 5.00% | 0.20 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 2 | 2 | 5.00% | 0.10 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 4 | 4 | 16 | 5.00% | 0.80 | 4 | 3 | 12 | 5.00% | 0.60 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | 0.35 | | | | | 0.55 | | | | | 0.90 | | | | | 0.75 | | | | |
| TECHNICAL % 40 | Technical Feasibility | 3 | 3 | 9 | 40% | 3.60 | 4 | 4 | 16 | 40% | 6.40 | 1 | 1 | 1 | 40% | 0.40 | 2 | 3 | 6 | 40% | 2.40 |
| Total Technical= | | 3.60 | | | | | 6.40 | | | | | 0.40 | | | | | 2.40 | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 5 | 5 | 25 | 5.0% | 1.25 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| Total Societal= | | 0.55 | | | | | 0.55 | | | | | 1.95 | | | | | 0.30 | | | | |
| ECONOMIC % 15 | Cost | 3 | 4 | 12 | 15.0% | 1.80 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Economic= | | 1.80 | | | | | 3.75 | | | | | 0.15 | | | | | 1.35 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 7.463 | | | | | 13.388 | | | | | 5.238 | | | | | 6.900 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Flexible Flow Line (Weighting Scenario 5-6)

| Description of Subsea Assets: Flexible Flow Lines | | | | | | | | | | | | | | | | | | | | | |
|--|---|---------------------------|--------|------|------------|-------|------------------------|--------|------|------------|-------|-------------------------|--------|------|------------|-------|-------------------------------|--------|------|------------|-------|
| Weighting Scenario 5: %40 for economic and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 2 | 4 | 3.75% | 0.15 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Energy Use | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Gaseous Emissions | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| Total Environment= | | 1.16 | | | | | 2.14 | | | | | 1.84 | | | | | 2.10 | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 2 | 2 | 4 | 5.00% | 0.20 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 2 | 2 | 5.00% | 0.10 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 4 | 4 | 16 | 5.00% | 0.80 | 4 | 3 | 12 | 5.00% | 0.60 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | 0.35 | | | | | 0.55 | | | | | 0.90 | | | | | 0.75 | | | | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 4 | 4 | 16 | 15.0% | 2.40 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 |
| Total Technical= | | 1.35 | | | | | 2.40 | | | | | 0.15 | | | | | 0.90 | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 5 | 5 | 25 | 5.0% | 1.25 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| Total Societal= | | 0.55 | | | | | 0.55 | | | | | 1.95 | | | | | 0.30 | | | | |
| ECONOMIC % 40 | Cost | 3 | 4 | 12 | 40% | 4.80 | 5 | 5 | 25 | 40% | 10.00 | 1 | 1 | 1 | 40% | 0.40 | 3 | 3 | 9 | 40% | 3.60 |
| Total Economic= | | 4.80 | | | | | 10.00 | | | | | 0.40 | | | | | 3.60 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 8.213 | | | | | 15.638 | | | | | 5.238 | | | | | 7.650 | | | | |
| Description of Subsea Assets: Flexible Flow Lines | | | | | | | | | | | | | | | | | | | | | |
| Weighting Scenario 6: %40 for societal and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 3 | 6 | 3.75% | 0.23 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 2 | 4 | 3.75% | 0.15 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Energy Use | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Gaseous Emissions | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 5 | 20 | 3.75% | 0.75 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| Total Environment= | | 1.16 | | | | | 2.14 | | | | | 1.84 | | | | | 2.10 | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 2 | 2 | 4 | 5.00% | 0.20 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 2 | 2 | 5.00% | 0.10 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 4 | 4 | 16 | 5.00% | 0.80 | 4 | 3 | 12 | 5.00% | 0.60 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | 0.35 | | | | | 0.55 | | | | | 0.90 | | | | | 0.75 | | | | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 4 | 4 | 16 | 15.0% | 2.40 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 |
| Total Technical= | | 1.35 | | | | | 2.40 | | | | | 0.15 | | | | | 0.90 | | | | |
| SOCIETAL % 40 | Effects on Commercial Fisheries | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 | 5 | 5 | 25 | 13.33% | 3.33 | 1 | 2 | 2 | 13.33% | 0.27 |
| | Employment | 3 | 3 | 9 | 13.33% | 1.20 | 3 | 3 | 9 | 13.33% | 1.20 | 2 | 1 | 2 | 13.33% | 0.27 | 2 | 1 | 2 | 13.33% | 0.27 |
| | Communities | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 | 3 | 4 | 12 | 13.33% | 1.60 | 1 | 2 | 2 | 13.33% | 0.27 |
| Total Societal= | | 1.47 | | | | | 1.47 | | | | | 5.20 | | | | | 0.80 | | | | |
| ECONOMIC % 15 | Cost | 3 | 4 | 12 | 15% | 1.80 | 5 | 5 | 25 | 15% | 3.75 | 1 | 1 | 1 | 15% | 0.15 | 3 | 3 | 9 | 15% | 1.35 |
| Total Economic= | | 1.80 | | | | | 3.75 | | | | | 0.15 | | | | | 1.35 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 6.129 | | | | | 10.304 | | | | | 8.237 | | | | | 5.900 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Umbilical Systems (Weighting Scenario 1-2)

| Description of Subsea Assets: Umbilicals | | | | | | | | | | | | | | | | | | | | | |
|--|---|---------------------------|--------|------|------------|-------|------------------------|--------|------|------------|-------|-------------------------|--------|------|------------|-------|-------------------------------|--------|------|------------|-------|
| Weighting Scenario 1: %20 for each main criteria | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL %20 | Operational Environmental Impacts | 2 | 2 | 4 | 5.0% | 0.20 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Energy Use | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 5 | 20 | 5.0% | 1.00 |
| | Gaseous Emissions | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 5 | 20 | 5.0% | 1.00 |
| Total Environment= | | 1.15 | | | | | 2.45 | | | | | 2.05 | | | | | 2.20 | | | | |
| SAFETY %20 | Safety Risk to Offshore Project Personnel | 1 | 2 | 2 | 6.7% | 0.13 | 2 | 3 | 6 | 6.7% | 0.40 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 3 | 6 | 6.7% | 0.40 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety= | | 0.33 | | | | | 0.60 | | | | | 0.73 | | | | | 0.60 | | | | |
| TECHNICAL %20 | Technical Feasibility | 3 | 3 | 9 | 20.0% | 1.80 | 4 | 4 | 16 | 20.0% | 3.20 | 1 | 1 | 1 | 20.0% | 0.20 | 2 | 3 | 6 | 20.0% | 1.20 |
| Total Technical= | | 1.80 | | | | | 3.20 | | | | | 0.20 | | | | | 1.20 | | | | |
| SOCIETAL %20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 4 | 4 | 16 | 6.7% | 1.07 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 1 | 2 | 6.7% | 0.13 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 4 | 12 | 6.7% | 0.80 | 1 | 2 | 2 | 6.7% | 0.13 |
| Total Societal= | | 0.73 | | | | | 0.73 | | | | | 2.00 | | | | | 0.40 | | | | |
| ECONOMIC %20 | Cost | 3 | 4 | 12 | 20.0% | 2.40 | 5 | 5 | 25 | 20.0% | 5.00 | 1 | 1 | 1 | 20.0% | 0.20 | 3 | 3 | 9 | 20.0% | 1.80 |
| Total Economic= | | 2.40 | | | | | 5.00 | | | | | 0.20 | | | | | 1.80 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 6.417 | | | | | 11.983 | | | | | 5.183 | | | | | 6.200 | | | | |
| Description of Subsea Assets: Umbilicals | | | | | | | | | | | | | | | | | | | | | |
| Weighting Scenario 2: %40 for environment and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL %40 | Operational Environmental Impacts | 2 | 2 | 4 | 10.0% | 0.40 | 4 | 4 | 16 | 10.0% | 1.60 | 1 | 1 | 1 | 10.0% | 0.10 | 1 | 2 | 2 | 10.0% | 0.20 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 10.0% | 0.10 | 1 | 1 | 1 | 10.0% | 0.10 | 4 | 4 | 16 | 10.0% | 1.60 | 1 | 2 | 2 | 10.0% | 0.20 |
| | Energy Use | 3 | 3 | 9 | 10.0% | 0.90 | 4 | 4 | 16 | 10.0% | 1.60 | 3 | 4 | 12 | 10.0% | 1.20 | 4 | 4 | 16 | 10.0% | 1.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 10.0% | 0.90 | 4 | 4 | 16 | 10.0% | 1.60 | 3 | 4 | 12 | 10.0% | 1.20 | 4 | 4 | 16 | 10.0% | 1.60 |
| Total Environment= | | 2.30 | | | | | 4.90 | | | | | 4.10 | | | | | 3.60 | | | | |
| SAFETY %15 | Safety Risk to Offshore Project Personnel | 1 | 2 | 2 | 5.0% | 0.10 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 3 | 9 | 5.0% | 0.45 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.0% | 0.10 | 1 | 2 | 2 | 5.0% | 0.10 | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 |
| Total Safety= | | 0.25 | | | | | 0.45 | | | | | 0.55 | | | | | 0.25 | | | | |
| TECHNICAL %15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 4 | 4 | 16 | 15.0% | 2.40 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 |
| Total Technical= | | 1.35 | | | | | 2.40 | | | | | 0.15 | | | | | 0.90 | | | | |
| SOCIETAL %15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| Total Societal= | | 0.55 | | | | | 0.55 | | | | | 1.50 | | | | | 0.30 | | | | |
| ECONOMIC %15 | Cost | 3 | 4 | 12 | 15.0% | 1.80 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Economic= | | 1.80 | | | | | 3.75 | | | | | 0.15 | | | | | 1.35 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 6.250 | | | | | 12.050 | | | | | 6.450 | | | | | 6.400 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Umbilical Systems (Weighting Scenario 3-4)

| Description of Subsea Assets: Umbilicals | | | | | | | | | | | | | | | | | | | | | |
|--|---|---------------------------|--------|------|------------|-------|------------------------|--------|------|------------|-------|-------------------------|--------|------|------------|-------|-------------------------------|--------|------|------------|-------|
| Weighting Scenario 3: %40 for safety and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 2 | 4 | 3.75% | 0.15 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 5 | 20 | 3.75% | 0.75 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 5 | 20 | 3.75% | 0.75 |
| Total Environment= | | 0.86 | | | | | 1.84 | | | | | 1.54 | | | | | 1.65 | | | | |
| SAFETY % 40 | Safety Risk to Offshore Project Personnel | 1 | 2 | 2 | 13.33% | 0.27 | 2 | 3 | 6 | 13.33% | 0.80 | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 2 | 2 | 13.33% | 0.27 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 | 3 | 3 | 9 | 13.33% | 1.20 | 2 | 3 | 6 | 13.33% | 0.80 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 13.33% | 0.27 | 1 | 2 | 2 | 13.33% | 0.27 | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 |
| Total Safety= | | 0.67 | | | | | 1.20 | | | | | 1.47 | | | | | 1.20 | | | | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 4 | 4 | 16 | 15.0% | 2.40 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 |
| Total Technical= | | 1.35 | | | | | 2.40 | | | | | 0.15 | | | | | 0.90 | | | | |
| SOCIAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| Total Societal= | | 0.55 | | | | | 0.55 | | | | | 1.50 | | | | | 0.30 | | | | |
| ECONOMIC % 15 | Cost | 3 | 4 | 12 | 15.0% | 1.80 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Economic= | | 1.80 | | | | | 3.75 | | | | | 0.15 | | | | | 1.35 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 5.229 | | | | | 9.737 | | | | | 4.804 | | | | | 5.400 | | | | |
| Description of Subsea Assets: Umbilicals | | | | | | | | | | | | | | | | | | | | | |
| Weighting Scenario 4: %40 for technical and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 2 | 4 | 3.75% | 0.15 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 5 | 20 | 3.75% | 0.75 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 5 | 20 | 3.75% | 0.75 |
| Total Environment= | | 0.86 | | | | | 1.84 | | | | | 1.54 | | | | | 1.65 | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 2 | 2 | 5.00% | 0.10 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 3 | 3 | 9 | 5.00% | 0.45 | 2 | 3 | 6 | 5.00% | 0.30 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | 0.25 | | | | | 0.45 | | | | | 0.55 | | | | | 0.45 | | | | |
| TECHNICAL % 40 | Technical Feasibility | 3 | 3 | 9 | 40% | 3.60 | 4 | 4 | 16 | 40% | 6.40 | 1 | 1 | 1 | 40% | 0.40 | 2 | 3 | 6 | 40% | 2.40 |
| Total Technical= | | 3.60 | | | | | 6.40 | | | | | 0.40 | | | | | 2.40 | | | | |
| SOCIAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| Total Societal= | | 0.55 | | | | | 0.55 | | | | | 1.50 | | | | | 0.30 | | | | |
| ECONOMIC % 15 | Cost | 3 | 4 | 12 | 15.0% | 1.80 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Economic= | | 1.80 | | | | | 3.75 | | | | | 0.15 | | | | | 1.35 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 7.063 | | | | | 12.988 | | | | | 4.138 | | | | | 6.150 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Umbilical Systems (Weighting Scenario 5-6)

| Description of Subsea Assets: Umbilicals | | | | | | | | | | | | | | | | | | | | | |
|--|---|---------------------------|--------|------|------------|-------|------------------------|--------|------|------------|-------|-------------------------|--------|------|------------|-------|-------------------------------|--------|------|------------|-------|
| Weightining Scenario 5: %40 for economic and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 2 | 4 | 3.75% | 0.15 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 5 | 20 | 3.75% | 0.75 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 5 | 20 | 3.75% | 0.75 |
| Total Environment= | | 0.86 | | | | | 1.84 | | | | | 1.54 | | | | | 1.65 | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 2 | 2 | 5.00% | 0.10 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 3 | 3 | 9 | 5.00% | 0.45 | 2 | 3 | 6 | 5.00% | 0.30 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | 0.25 | | | | | 0.45 | | | | | 0.55 | | | | | 0.45 | | | | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 4 | 4 | 16 | 15.0% | 2.40 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 |
| Total Technical= | | 1.35 | | | | | 2.40 | | | | | 0.15 | | | | | 0.90 | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| Total Societal= | | 0.55 | | | | | 0.55 | | | | | 1.50 | | | | | 0.30 | | | | |
| ECONOMIC % 40 | Cost | 3 | 4 | 12 | 40% | 4.80 | 5 | 5 | 25 | 40% | 10.00 | 1 | 1 | 1 | 40% | 0.40 | 3 | 3 | 9 | 40% | 3.60 |
| Total Economic= | | 4.80 | | | | | 10.00 | | | | | 0.40 | | | | | 3.60 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 7.813 | | | | | 15.238 | | | | | 4.138 | | | | | 6.900 | | | | |
| Description of Subsea Assets: Umbilicals | | | | | | | | | | | | | | | | | | | | | |
| Weightining Scenario 6: %40 for societal and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 2 | 4 | 3.75% | 0.15 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 5 | 20 | 3.75% | 0.75 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 5 | 20 | 3.75% | 0.75 |
| Total Environment= | | 0.86 | | | | | 1.84 | | | | | 1.54 | | | | | 1.65 | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 2 | 2 | 5.00% | 0.10 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 3 | 3 | 9 | 5.00% | 0.45 | 2 | 3 | 6 | 5.00% | 0.30 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | 0.25 | | | | | 0.45 | | | | | 0.55 | | | | | 0.45 | | | | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 4 | 4 | 16 | 15.0% | 2.40 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 |
| Total Technical= | | 1.35 | | | | | 2.40 | | | | | 0.15 | | | | | 0.90 | | | | |
| SOCIETAL % 40 | Effects on Commercial Fisheries | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 | 4 | 4 | 16 | 13.33% | 2.13 | 1 | 2 | 2 | 13.33% | 0.27 |
| | Employment | 3 | 3 | 9 | 13.33% | 1.20 | 3 | 3 | 9 | 13.33% | 1.20 | 2 | 1 | 2 | 13.33% | 0.27 | 2 | 1 | 2 | 13.33% | 0.27 |
| | Communities | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 | 3 | 4 | 12 | 13.33% | 1.60 | 1 | 2 | 2 | 13.33% | 0.27 |
| Total Societal= | | 1.47 | | | | | 1.47 | | | | | 4.00 | | | | | 0.80 | | | | |
| ECONOMIC % 15 | Cost | 3 | 4 | 12 | 15% | 1.80 | 5 | 5 | 25 | 15% | 3.75 | 1 | 1 | 1 | 15% | 0.15 | 3 | 3 | 9 | 15% | 1.35 |
| Total Economic= | | 1.80 | | | | | 3.75 | | | | | 0.15 | | | | | 1.35 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 5.729 | | | | | 9.904 | | | | | 6.387 | | | | | 5.150 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Power Cables (Weighting Scenario 1-2)

| Description of Subsea Assets: Power Cables | | | | | | | | | | | | | | | | | | | | | |
|--|---|---------------------------|--------|------|------------|-------|------------------------|--------|------|------------|-------|-------------------------|--------|------|------------|-------|-------------------------------|--------|------|------------|-------|
| Weighting Scenario 1: %20 for each main criteria | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL %20 | Operational Environmental Impacts | 2 | 2 | 4 | 5.0% | 0.20 | 3 | 3 | 9 | 5.0% | 0.45 | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Energy Use | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Gaseous Emissions | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 |
| Total Environment= | | 1.15 | | | | | 2.10 | | | | | 2.05 | | | | | 1.80 | | | | |
| SAFETY %20 | Safety Risk to Offshore Project Personnel | 1 | 2 | 2 | 6.7% | 0.13 | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 3 | 6 | 6.7% | 0.40 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety= | | 0.33 | | | | | 0.40 | | | | | 0.53 | | | | | 0.33 | | | | |
| TECHNICAL %20 | Technical Feasibility | 2 | 3 | 6 | 20.0% | 1.20 | 4 | 4 | 16 | 20.0% | 3.20 | 1 | 1 | 1 | 20.0% | 0.20 | 2 | 3 | 6 | 20.0% | 1.20 |
| Total Technical= | | 1.20 | | | | | 3.20 | | | | | 0.20 | | | | | 1.20 | | | | |
| SOCIAL %20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 4 | 12 | 6.7% | 0.80 | 1 | 2 | 2 | 6.7% | 0.13 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 1 | 2 | 6.7% | 0.13 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 4 | 12 | 6.7% | 0.80 | 1 | 2 | 2 | 6.7% | 0.13 |
| Total Societal= | | 0.73 | | | | | 0.73 | | | | | 1.73 | | | | | 0.40 | | | | |
| ECONOMIC %20 | Cost | 3 | 4 | 12 | 20.0% | 2.40 | 5 | 5 | 25 | 20.0% | 5.00 | 1 | 1 | 1 | 20.0% | 0.20 | 3 | 3 | 9 | 20.0% | 1.80 |
| Total Economic= | | 2.40 | | | | | 5.00 | | | | | 0.20 | | | | | 1.80 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 5.817 | | | | | 11.433 | | | | | 4.716 | | | | | 5.533 | | | | |
| Description of Subsea Assets: Power Cables | | | | | | | | | | | | | | | | | | | | | |
| Weighting Scenario 2: %40 for environment and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL %40 | Operational Environmental Impacts | 2 | 2 | 4 | 10.0% | 0.40 | 3 | 3 | 9 | 10.0% | 0.90 | 1 | 1 | 1 | 10.0% | 0.10 | 1 | 2 | 2 | 10.0% | 0.20 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 10.0% | 0.10 | 1 | 1 | 1 | 10.0% | 0.10 | 4 | 4 | 16 | 10.0% | 1.60 | 1 | 2 | 2 | 10.0% | 0.20 |
| | Energy Use | 3 | 3 | 9 | 10.0% | 0.90 | 4 | 4 | 16 | 10.0% | 1.60 | 3 | 4 | 12 | 10.0% | 1.20 | 4 | 4 | 16 | 10.0% | 1.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 10.0% | 0.90 | 4 | 4 | 16 | 10.0% | 1.60 | 3 | 4 | 12 | 10.0% | 1.20 | 4 | 4 | 16 | 10.0% | 1.60 |
| Total Environment= | | 2.30 | | | | | 4.20 | | | | | 4.10 | | | | | 3.60 | | | | |
| SAFETY %15 | Safety Risk to Offshore Project Personnel | 1 | 2 | 2 | 5.0% | 0.10 | 2 | 2 | 4 | 5.0% | 0.20 | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.0% | 0.10 | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 |
| Total Safety= | | 0.25 | | | | | 0.30 | | | | | 0.40 | | | | | 0.25 | | | | |
| TECHNICAL %15 | Technical Feasibility | 2 | 3 | 6 | 15.0% | 0.90 | 4 | 4 | 16 | 15.0% | 2.40 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 |
| Total Technical= | | 0.90 | | | | | 2.40 | | | | | 0.15 | | | | | 0.90 | | | | |
| SOCIAL %15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| Total Societal= | | 0.55 | | | | | 0.55 | | | | | 1.30 | | | | | 0.30 | | | | |
| ECONOMIC %15 | Cost | 3 | 4 | 12 | 15.0% | 1.80 | 5 | 4 | 20 | 15.0% | 3.00 | 1 | 1 | 1 | 15.0% | 0.15 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Economic= | | 1.80 | | | | | 3.00 | | | | | 0.15 | | | | | 1.35 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 5.800 | | | | | 10.450 | | | | | 6.100 | | | | | 6.400 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Power Cables (Weighting Scenario 3-4)

| Description of Subsea Assets: Power Cables | | | | | | | | | | | | | | | | | | | | | |
|--|---|---------------------------|--------|------|------------|-------|------------------------|--------|------|------------|-------|-------------------------|--------|------|------------|-------|-------------------------------|--------|------|------------|-------|
| Weighting Scenario 3: %40 for safety and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 2 | 4 | 3.75% | 0.15 | 3 | 3 | 9 | 3.75% | 0.34 | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | 0.86 | | | | | 1.58 | | | | | 1.54 | | | | | 1.35 | | | | |
| SAFETY % 40 | Safety Risk to Offshore Project Personnel | 1 | 2 | 2 | 13.33% | 0.27 | 2 | 2 | 4 | 13.33% | 0.53 | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 2 | 2 | 13.33% | 0.27 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 | 2 | 3 | 6 | 13.33% | 0.80 | 1 | 2 | 2 | 13.33% | 0.27 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 13.33% | 0.27 | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 |
| Total Safety= | | 0.67 | | | | | 0.80 | | | | | 1.07 | | | | | 0.67 | | | | |
| TECHNICAL % 15 | Technical Feasibility | 2 | 3 | 6 | 15.0% | 0.90 | 4 | 4 | 16 | 15.0% | 2.40 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 |
| Total Technical= | | 0.90 | | | | | 2.40 | | | | | 0.15 | | | | | 0.90 | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| Total Societal= | | 0.55 | | | | | 0.55 | | | | | 1.30 | | | | | 0.30 | | | | |
| ECONOMIC % 15 | Cost | 3 | 4 | 12 | 15.0% | 1.80 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Economic= | | 1.80 | | | | | 3.75 | | | | | 0.15 | | | | | 1.35 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 4.779 | | | | | 9.075 | | | | | 4.204 | | | | | 4.567 | | | | |
| Description of Subsea Assets: Power Cables | | | | | | | | | | | | | | | | | | | | | |
| Weighting Scenario 4: %40 for technical and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 2 | 4 | 3.75% | 0.15 | 3 | 3 | 9 | 3.75% | 0.34 | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | 0.86 | | | | | 1.58 | | | | | 1.54 | | | | | 1.35 | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 2 | 2 | 5.00% | 0.10 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 2 | 2 | 5.00% | 0.10 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | 0.25 | | | | | 0.30 | | | | | 0.40 | | | | | 0.25 | | | | |
| TECHNICAL % 40 | Technical Feasibility | 2 | 3 | 6 | 40% | 2.40 | 4 | 4 | 16 | 40% | 6.40 | 1 | 1 | 1 | 40% | 0.40 | 2 | 3 | 6 | 40% | 2.40 |
| Total Technical= | | 2.40 | | | | | 6.40 | | | | | 0.40 | | | | | 2.40 | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| Total Societal= | | 0.55 | | | | | 0.55 | | | | | 1.30 | | | | | 0.30 | | | | |
| ECONOMIC % 15 | Cost | 3 | 4 | 12 | 15.0% | 1.80 | 5 | 5 | 25 | 15.0% | 3.75 | 1 | 1 | 1 | 15.0% | 0.15 | 3 | 3 | 9 | 15.0% | 1.35 |
| Total Economic= | | 1.80 | | | | | 3.75 | | | | | 0.15 | | | | | 1.35 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 5.863 | | | | | 12.575 | | | | | 3.788 | | | | | 5.650 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Power Cables (Weighting Scenario 5-6)

| Description of Subsea Assets: Power Cables | | | | | | | | | | | | | | | | | | | | | |
|--|---|---------------------------|--------|------|------------|-------|------------------------|--------|------|------------|-------|-------------------------|--------|------|------------|-------|-------------------------------|--------|------|------------|-------|
| Weighting Scenario 5: %40 for economic and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 2 | 4 | 3.75% | 0.15 | 3 | 3 | 9 | 3.75% | 0.34 | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | 0.86 | | | | | 1.58 | | | | | 1.54 | | | | | 1.35 | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 2 | 2 | 5.00% | 0.10 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 2 | 2 | 5.00% | 0.10 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | 0.25 | | | | | 0.30 | | | | | 0.40 | | | | | 0.25 | | | | |
| TECHNICAL % 15 | Technical Feasibility | 2 | 3 | 6 | 15.0% | 0.90 | 4 | 4 | 16 | 15.0% | 2.40 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 |
| Total Technical= | | 0.90 | | | | | 2.40 | | | | | 0.15 | | | | | 0.90 | | | | |
| SOCIAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 2 | 2 | 5.0% | 0.10 |
| Total Societal= | | 0.55 | | | | | 0.55 | | | | | 1.30 | | | | | 0.30 | | | | |
| ECONOMIC % 40 | Cost | 3 | 4 | 12 | 40% | 4.80 | 5 | 5 | 25 | 40% | 10.00 | 1 | 1 | 1 | 40% | 0.40 | 3 | 3 | 9 | 40% | 3.60 |
| Total Economic= | | 4.80 | | | | | 10.00 | | | | | 0.40 | | | | | 3.60 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 7.363 | | | | | 14.825 | | | | | 3.788 | | | | | 6.400 | | | | |
| Description of Subsea Assets: Power Cables | | | | | | | | | | | | | | | | | | | | | |
| Weighting Scenario 6: %40 for societal and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Reverse Reeling | | | | | Option 2: Cut and Lift | | | | | Option 3: Leave In Situ | | | | | Option 4: Burial or Trenching | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 2 | 4 | 3.75% | 0.15 | 3 | 3 | 9 | 3.75% | 0.34 | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 1 | 1 | 1 | 3.75% | 0.04 | 4 | 4 | 16 | 3.75% | 0.60 | 1 | 2 | 2 | 3.75% | 0.08 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | 0.86 | | | | | 1.58 | | | | | 1.54 | | | | | 1.35 | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 2 | 2 | 5.00% | 0.10 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 2 | 2 | 5.00% | 0.10 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | 0.25 | | | | | 0.30 | | | | | 0.40 | | | | | 0.25 | | | | |
| TECHNICAL % 15 | Technical Feasibility | 2 | 3 | 6 | 15.0% | 0.90 | 4 | 4 | 16 | 15.0% | 2.40 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 |
| Total Technical= | | 0.90 | | | | | 2.40 | | | | | 0.15 | | | | | 0.90 | | | | |
| SOCIAL % 40 | Effects on Commercial Fisheries | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 | 3 | 4 | 12 | 13.33% | 1.60 | 1 | 2 | 2 | 13.33% | 0.27 |
| | Employment | 3 | 3 | 9 | 13.33% | 1.20 | 3 | 3 | 9 | 13.33% | 1.20 | 2 | 1 | 2 | 13.33% | 0.27 | 2 | 1 | 2 | 13.33% | 0.27 |
| | Communities | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 | 3 | 4 | 12 | 13.33% | 1.60 | 1 | 2 | 2 | 13.33% | 0.27 |
| Total Societal= | | 1.47 | | | | | 1.47 | | | | | 3.47 | | | | | 0.80 | | | | |
| ECONOMIC % 15 | Cost | 3 | 4 | 12 | 15% | 1.80 | 5 | 5 | 25 | 15% | 3.75 | 1 | 1 | 1 | 15% | 0.15 | 3 | 3 | 9 | 15% | 1.35 |
| Total Economic= | | 1.80 | | | | | 3.75 | | | | | 0.15 | | | | | 1.35 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 5.279 | | | | | 9.492 | | | | | 5.704 | | | | | 4.650 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Rigid Riser (Weighting Scenario 1-2)

| Description of Subsea Assets: Rigid Risers | | | | | | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|------------|-------|---------------------------|--------|------|------------|-------|-------------------------|--------|------|------------|-------|---------------------------------|--------|------|------------|-------|
| Weighting Scenario 1: %20 for each main criteria | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | | Option 4: Landfill-Rock Dumping | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL %20 | Operational Environmental Impacts | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 4 | 16 | 5.0% | 0.80 | 2 | 3 | 6 | 5.0% | 0.30 |
| | Energy Use | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 | 4 | 5 | 20 | 5.0% | 1.00 |
| | Gaseous Emissions | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 | 4 | 5 | 20 | 5.0% | 1.00 |
| Total Environment= | | 1.10 | | | | | 1.95 | | | | | 2.45 | | | | | 2.50 | | | | |
| SAFETY %20 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 3 | 6 | 6.7% | 0.40 | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 2 | 4 | 6.7% | 0.27 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 3 | 6 | 6.7% | 0.40 | 4 | 4 | 16 | 6.7% | 1.07 | 2 | 3 | 6 | 6.7% | 0.40 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 1 | 1 | 6.7% | 0.07 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety= | | 0.80 | | | | | 0.93 | | | | | 1.20 | | | | | 0.73 | | | | |
| TECHNICAL %20 | Technical Feasibility | 3 | 3 | 9 | 20.0% | 1.80 | 2 | 2 | 4 | 20.0% | 0.80 | 1 | 1 | 1 | 20.0% | 0.20 | 2 | 2 | 4 | 20.0% | 0.80 |
| Total Technical= | | 1.80 | | | | | 0.80 | | | | | 0.20 | | | | | 0.80 | | | | |
| SOCIETAL %20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 2 | 4 | 6.7% | 0.27 | 4 | 4 | 16 | 6.7% | 1.07 | 3 | 4 | 12 | 6.7% | 0.80 |
| | Employment | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 1 | 2 | 6.7% | 0.13 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 3 | 6 | 6.7% | 0.40 |
| Total Societal= | | 0.73 | | | | | 0.80 | | | | | 1.60 | | | | | 1.33 | | | | |
| ECONOMIC %20 | Cost | 4 | 4 | 16 | 20.0% | 3.20 | 3 | 3 | 9 | 20.0% | 1.80 | 1 | 1 | 1 | 20.0% | 0.20 | 2 | 3 | 6 | 20.0% | 1.20 |
| Total Economic= | | 3.20 | | | | | 1.80 | | | | | 0.20 | | | | | 1.20 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 7.633 | | | | | 6.283 | | | | | 5.650 | | | | | 6.566 | | | | |
| Description of Subsea Assets: Rigid Risers | | | | | | | | | | | | | | | | | | | | | |
| Weighting Scenario 2: %40 for environment and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | | Option 4: Landfill-Rock Dumping | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL %40 | Operational Environmental Impacts | 3 | 3 | 9 | 10.0% | 0.90 | 2 | 3 | 6 | 10.0% | 0.60 | 1 | 1 | 1 | 10.0% | 0.10 | 2 | 2 | 4 | 10.0% | 0.40 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 10.0% | 0.10 | 3 | 3 | 9 | 10.0% | 0.90 | 4 | 4 | 16 | 10.0% | 1.60 | 2 | 3 | 6 | 10.0% | 0.60 |
| | Energy Use | 2 | 3 | 6 | 10.0% | 0.60 | 3 | 4 | 12 | 10.0% | 1.20 | 4 | 4 | 16 | 10.0% | 1.60 | 4 | 5 | 20 | 10.0% | 2.00 |
| | Gaseous Emissions | 2 | 3 | 6 | 10.0% | 0.60 | 3 | 4 | 12 | 10.0% | 1.20 | 4 | 4 | 16 | 10.0% | 1.60 | 4 | 5 | 20 | 10.0% | 2.00 |
| Total Environment= | | 2.20 | | | | | 3.90 | | | | | 4.90 | | | | | 5.00 | | | | |
| SAFETY %15 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 4 | 4 | 16 | 5.0% | 0.80 | 2 | 3 | 6 | 5.0% | 0.30 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.0% | 0.10 | 1 | 2 | 2 | 5.0% | 0.10 | 1 | 1 | 1 | 5.0% | 0.05 | 1 | 1 | 1 | 5.0% | 0.05 |
| Total Safety= | | 0.60 | | | | | 0.70 | | | | | 0.90 | | | | | 0.55 | | | | |
| TECHNICAL %15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 2 | 2 | 4 | 15.0% | 0.60 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 2 | 4 | 15.0% | 0.60 |
| Total Technical= | | 1.35 | | | | | 0.60 | | | | | 0.15 | | | | | 0.60 | | | | |
| SOCIETAL %15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 4 | 4 | 16 | 5.0% | 0.80 | 3 | 4 | 12 | 5.0% | 0.60 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 3 | 6 | 5.0% | 0.30 |
| Total Societal= | | 0.55 | | | | | 0.60 | | | | | 1.20 | | | | | 1.00 | | | | |
| ECONOMIC %15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 |
| Total Economic= | | 2.40 | | | | | 1.35 | | | | | 0.15 | | | | | 0.90 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 7.100 | | | | | 7.150 | | | | | 7.300 | | | | | 8.050 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Rigid Riser (Weighting Scenario 3-4)

| Description of Subsea Assets: Rigid Risers | | | | | | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|-------------|--------------|---------------------------|--------|------|------------|-------------|-------------------------|--------|------|------------|-------------|---------------------------------|--------|------|------------|-------|
| Weighting Scenario 3: %40 for safety and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | | Option 4: Landfill-Rock Dumping | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 3 | 9 | 3.75% | 0.34 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 2 | 4 | 3.75% | 0.15 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 2 | 3 | 6 | 3.75% | 0.23 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 | 4 | 5 | 20 | 3.75% | 0.75 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 | 4 | 5 | 20 | 3.75% | 0.75 |
| Total Environment= | | | | | 0.83 | 1.46 | | | | | 1.84 | | | | | 1.88 | | | | | |
| SAFETY %40 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 13.33% | 1.20 | 2 | 3 | 6 | 13.33% | 0.80 | 1 | 1 | 1 | 13.33% | 0.13 | 2 | 2 | 4 | 13.33% | 0.53 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 13.33% | 0.13 | 2 | 3 | 6 | 13.33% | 0.80 | 4 | 4 | 16 | 13.33% | 2.13 | 2 | 3 | 6 | 13.33% | 0.80 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 13.33% | 0.27 | 1 | 2 | 2 | 13.33% | 0.27 | 1 | 1 | 1 | 13.33% | 0.13 | 1 | 1 | 1 | 13.33% | 0.13 |
| Total Safety= | | | | | 1.60 | 1.87 | | | | | 2.40 | | | | | 1.47 | | | | | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 2 | 2 | 4 | 15.0% | 0.60 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 2 | 4 | 15.0% | 0.60 |
| Total Technical= | | | | | 1.35 | 0.60 | | | | | 0.15 | | | | | 0.60 | | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 4 | 4 | 16 | 5.0% | 0.80 | 3 | 4 | 12 | 5.0% | 0.60 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 3 | 6 | 5.0% | 0.30 |
| Total Societal= | | | | | 0.55 | 0.60 | | | | | 1.20 | | | | | 1.00 | | | | | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 |
| Total Economic= | | | | | 2.40 | 1.35 | | | | | 0.15 | | | | | 0.90 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 6.725 | 5.879 | | | | | 5.737 | | | | | 5.842 | | | | |
| Description of Subsea Assets: Rigid Risers | | | | | | | | | | | | | | | | | | | | | |
| Weighting Scenario 4: %40 for technical and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | | Option 4: Landfill-Rock Dumping | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 3 | 9 | 3.75% | 0.34 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 2 | 4 | 3.75% | 0.15 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 2 | 3 | 6 | 3.75% | 0.23 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 | 4 | 5 | 20 | 3.75% | 0.75 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 | 4 | 5 | 20 | 3.75% | 0.75 |
| Total Environment= | | | | | 0.83 | 1.46 | | | | | 1.84 | | | | | 1.88 | | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 5.00% | 0.45 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 1 | 1 | 5.00% | 0.05 | 2 | 2 | 4 | 5.00% | 0.20 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 2 | 3 | 6 | 5.00% | 0.30 | 4 | 4 | 16 | 5.00% | 0.80 | 2 | 3 | 6 | 5.00% | 0.30 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 0.60 | 0.70 | | | | | 0.90 | | | | | 0.55 | | | | | |
| TECHNICAL %40 | Technical Feasibility | 3 | 3 | 9 | 40% | 3.60 | 2 | 2 | 4 | 40% | 1.60 | 1 | 1 | 1 | 40% | 0.40 | 2 | 2 | 4 | 40% | 1.60 |
| Total Technical= | | | | | 3.60 | 1.60 | | | | | 0.40 | | | | | 1.60 | | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 4 | 4 | 16 | 5.0% | 0.80 | 3 | 4 | 12 | 5.0% | 0.60 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 3 | 6 | 5.0% | 0.30 |
| Total Societal= | | | | | 0.55 | 0.60 | | | | | 1.20 | | | | | 1.00 | | | | | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 3 | 6 | 15.0% | 0.90 |
| Total Economic= | | | | | 2.40 | 1.35 | | | | | 0.15 | | | | | 0.90 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 7.975 | 5.713 | | | | | 4.488 | | | | | 5.925 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Rigid Riser (Weighting Scenario 5-6)

| Description of Subsea Assets: Rigid Risers | | | | | | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|------------|-------|---------------------------|--------|------|------------|-------|-------------------------|--------|------|------------|-------|---------------------------------|--------|------|------------|-------|
| Weighting Scenario 5: %40 for economic and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | | Option 4: Landfill-Rock Dumping | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 3 | 9 | 3.75% | 0.34 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 2 | 4 | 3.75% | 0.15 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 2 | 3 | 6 | 3.75% | 0.23 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 | 4 | 5 | 20 | 3.75% | 0.75 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 | 4 | 5 | 20 | 3.75% | 0.75 |
| Total Environment= | | 0.83 | | | | | 1.46 | | | | | 1.84 | | | | | 1.88 | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 5.00% | 0.45 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 1 | 1 | 5.00% | 0.05 | 2 | 2 | 4 | 5.00% | 0.20 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 2 | 3 | 6 | 5.00% | 0.30 | 4 | 4 | 16 | 5.00% | 0.80 | 2 | 3 | 6 | 5.00% | 0.30 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | 0.60 | | | | | 0.70 | | | | | 0.90 | | | | | 0.55 | | | | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 2 | 2 | 4 | 15.0% | 0.60 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 2 | 4 | 15.0% | 0.60 |
| Total Technical= | | 1.35 | | | | | 0.60 | | | | | 0.15 | | | | | 0.60 | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 4 | 4 | 16 | 5.0% | 0.80 | 3 | 4 | 12 | 5.0% | 0.60 |
| | Employment | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 3 | 6 | 5.0% | 0.30 |
| Total Societal= | | 0.55 | | | | | 0.60 | | | | | 1.20 | | | | | 1.00 | | | | |
| ECONOMIC % 40 | Cost | 4 | 4 | 16 | 40% | 6.40 | 3 | 3 | 9 | 40% | 3.60 | 1 | 1 | 1 | 40% | 0.40 | 2 | 3 | 6 | 40% | 2.40 |
| Total Economic= | | 6.40 | | | | | 3.60 | | | | | 0.40 | | | | | 2.40 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 9.725 | | | | | 6.963 | | | | | 4.488 | | | | | 6.425 | | | | |
| Description of Subsea Assets: Rigid Risers | | | | | | | | | | | | | | | | | | | | | |
| Weighting Scenario 6: %40 for societal and %15 for others | | | | | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | | Option 4: Landfill-Rock Dumping | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 3 | 9 | 3.75% | 0.34 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 2 | 4 | 3.75% | 0.15 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 3 | 9 | 3.75% | 0.34 | 4 | 4 | 16 | 3.75% | 0.60 | 2 | 3 | 6 | 3.75% | 0.23 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 | 4 | 5 | 20 | 3.75% | 0.75 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 | 4 | 5 | 20 | 3.75% | 0.75 |
| Total Environment= | | 0.83 | | | | | 1.46 | | | | | 1.84 | | | | | 1.88 | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 5.00% | 0.45 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 1 | 1 | 5.00% | 0.05 | 2 | 2 | 4 | 5.00% | 0.20 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 2 | 3 | 6 | 5.00% | 0.30 | 4 | 4 | 16 | 5.00% | 0.80 | 2 | 3 | 6 | 5.00% | 0.30 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | 0.60 | | | | | 0.70 | | | | | 0.90 | | | | | 0.55 | | | | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 3 | 9 | 15.0% | 1.35 | 2 | 2 | 4 | 15.0% | 0.60 | 1 | 1 | 1 | 15.0% | 0.15 | 2 | 2 | 4 | 15.0% | 0.60 |
| Total Technical= | | 1.35 | | | | | 0.60 | | | | | 0.15 | | | | | 0.60 | | | | |
| SOCIETAL % 40 | Effects on Commercial Fisheries | 1 | 1 | 1 | 13.33% | 0.13 | 2 | 2 | 4 | 13.33% | 0.53 | 4 | 4 | 16 | 13.33% | 2.13 | 3 | 4 | 12 | 13.33% | 1.60 |
| | Employment | 3 | 3 | 9 | 13.33% | 1.20 | 2 | 2 | 4 | 13.33% | 0.53 | 2 | 1 | 2 | 13.33% | 0.27 | 2 | 1 | 2 | 13.33% | 0.27 |
| | Communities | 1 | 1 | 1 | 13.33% | 0.13 | 2 | 2 | 4 | 13.33% | 0.53 | 2 | 3 | 6 | 13.33% | 0.80 | 2 | 3 | 6 | 13.33% | 0.80 |
| Total Societal= | | 1.47 | | | | | 1.60 | | | | | 3.20 | | | | | 2.67 | | | | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15% | 2.40 | 3 | 3 | 9 | 15% | 1.35 | 1 | 1 | 1 | 15% | 0.15 | 2 | 3 | 6 | 15% | 0.90 |
| Total Economic= | | 2.40 | | | | | 1.35 | | | | | 0.15 | | | | | 0.90 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 6.642 | | | | | 5.712 | | | | | 6.237 | | | | | 6.592 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Subsea Pressure Booster Pump (Weighting Scenario 1-2)

| Description of Subsea Assets: Pressure Booster Pump | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|--------------|--------------|---------------------------|--------|------|------------|--------------|-------------------------|--------|------|------------|-------|
| Weighting Scenario 1: %20 for each main criteria | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 20 | Operational Environmental Impacts | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 4 | 12 | 5.0% | 0.60 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Energy Use | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 |
| | Gaseous Emissions | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Environment= | | | | | 1.10 | 1.80 | | | | | 2.50 | | | | | |
| SAFETY % 20 | Safety Risk to Offshore Project Personnel | 3 | 4 | 12 | 6.7% | 0.80 | 3 | 3 | 9 | 6.7% | 0.60 | 1 | 1 | 1 | 6.7% | 0.07 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 3 | 9 | 6.7% | 0.60 | 4 | 5 | 20 | 6.7% | 1.33 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety= | | | | | 1.13 | 1.33 | | | | | 1.47 | | | | | |
| TECHNICAL % 20 | Technical Feasibility | 4 | 4 | 16 | 20.0% | 3.20 | 3 | 4 | 12 | 20.0% | 2.40 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Technical= | | | | | 3.20 | 2.40 | | | | | 0.20 | | | | | |
| SOCIETAL % 20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 3 | 6 | 6.7% | 0.40 | 5 | 5 | 25 | 6.7% | 1.67 |
| | Employment | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 3 | 6 | 6.7% | 0.40 | 3 | 4 | 12 | 6.7% | 0.80 |
| Total Societal= | | | | | 0.53 | 1.07 | | | | | 2.60 | | | | | |
| ECONOMIC % 20 | Cost | 4 | 4 | 16 | 20.0% | 3.20 | 3 | 3 | 9 | 20.0% | 1.80 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Economic= | | | | | 3.20 | 1.80 | | | | | 0.20 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 9.167 | 8.400 | | | | | 6.966 | | | | | |
| Description of Subsea Assets: Pressure Booster Pump | | | | | | | | | | | | | | | | |
| Weighting Scenario 2: %40 for environment and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 40 | Operational Environmental Impacts | 3 | 3 | 9 | 10.0% | 0.90 | 2 | 3 | 6 | 10.0% | 0.60 | 1 | 1 | 1 | 10.0% | 0.10 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 10.0% | 0.10 | 3 | 4 | 12 | 10.0% | 1.20 | 5 | 5 | 25 | 10.0% | 2.50 |
| | Energy Use | 2 | 3 | 6 | 10.0% | 0.60 | 3 | 3 | 9 | 10.0% | 0.90 | 3 | 4 | 12 | 10.0% | 1.20 |
| | Gaseous Emissions | 2 | 3 | 6 | 10.0% | 0.60 | 3 | 3 | 9 | 10.0% | 0.90 | 3 | 4 | 12 | 10.0% | 1.20 |
| Total Environment= | | | | | 2.20 | 3.60 | | | | | 5.00 | | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 3 | 4 | 12 | 5.0% | 0.60 | 3 | 3 | 9 | 5.0% | 0.45 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 3 | 9 | 5.0% | 0.45 | 4 | 5 | 20 | 5.0% | 1.00 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.0% | 0.20 | 1 | 2 | 2 | 5.0% | 0.10 | 1 | 1 | 1 | 5.0% | 0.05 |
| Total Safety= | | | | | 0.85 | 1.00 | | | | | 1.10 | | | | | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 4 | 12 | 15.0% | 1.80 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 2.40 | 1.80 | | | | | 0.15 | | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Employment | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Societal= | | | | | 0.40 | 0.80 | | | | | 1.95 | | | | | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | 2.40 | 1.35 | | | | | 0.15 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 8.250 | 8.550 | | | | | 8.350 | | | | | |

Developed Tool for Taking a Decision about Decommissioning of Subsea Pressure Booster Pump (Weighting Scenario 3-4)

| Description of Subsea Assets: Pressure Booster Pump | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|---------------|--------------|---------------------------|--------|------|------------|--------------|-------------------------|--------|------|------------|-------|
| Weighting Scenario 3: %40 for safety and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 3 | 9 | 3.75% | 0.34 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 4 | 12 | 3.75% | 0.45 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| Total Environment= | | | | | 0.83 | 1.35 | | | | | 1.88 | | | | | |
| SAFETY % 40 | Safety Risk to Offshore Project Personnel | 3 | 4 | 12 | 13.33% | 1.60 | 3 | 3 | 9 | 13.33% | 1.20 | 1 | 1 | 1 | 13.33% | 0.13 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 13.33% | 0.13 | 3 | 3 | 9 | 13.33% | 1.20 | 4 | 5 | 20 | 13.33% | 2.67 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 13.33% | 0.53 | 1 | 2 | 2 | 13.33% | 0.27 | 1 | 1 | 1 | 13.33% | 0.13 |
| Total Safety= | | | | | 2.27 | 2.67 | | | | | 2.93 | | | | | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 4 | 12 | 15.0% | 1.80 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 2.40 | 1.80 | | | | | 0.15 | | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Employment | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Societal= | | | | | 0.40 | 0.80 | | | | | 1.95 | | | | | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | 2.40 | 1.35 | | | | | 0.15 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 8.292 | 7.967 | | | | | 7.058 | | | | | |
| Description of Subsea Assets: Pressure Booster Pump | | | | | | | | | | | | | | | | |
| Weighting Scenario 4: %40 for technical and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 3 | 9 | 3.75% | 0.34 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 4 | 12 | 3.75% | 0.45 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| Total Environment= | | | | | 0.83 | 1.35 | | | | | 1.88 | | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 3 | 4 | 12 | 5.00% | 0.60 | 3 | 3 | 9 | 5.00% | 0.45 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 3 | 3 | 9 | 5.00% | 0.45 | 4 | 5 | 20 | 5.00% | 1.00 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 0.85 | 1.00 | | | | | 1.10 | | | | | |
| TECHNICAL % 40 | Technical Feasibility | 4 | 4 | 16 | 40% | 6.40 | 3 | 4 | 12 | 40% | 4.80 | 1 | 1 | 1 | 40% | 0.40 |
| Total Technical= | | | | | 6.40 | 4.80 | | | | | 0.40 | | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Employment | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Societal= | | | | | 0.40 | 0.80 | | | | | 1.95 | | | | | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | 2.40 | 1.35 | | | | | 0.15 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 10.875 | 9.300 | | | | | 5.475 | | | | | |

Developed Tool for Taking a Decision about Decommissioning of Subsea Pressure Booster Pump (Weighting Scenario 5-6)

| Description of Subsea Assets: Pressure Booster Pump | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|---------------|--------------|---------------------------|--------|------|-----------|--------------|-------------------------|--------|------|-----------|-------|
| Weighting Scenario 5: %40 for economic and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 3 | 9 | 3.75% | 0.34 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 4 | 12 | 3.75% | 0.45 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| Total Environment= | | | | | 0.83 | 1.35 | | | | | 1.88 | | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 3 | 4 | 12 | 5.00% | 0.60 | 3 | 3 | 9 | 5.00% | 0.45 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 3 | 3 | 9 | 5.00% | 0.45 | 4 | 5 | 20 | 5.00% | 1.00 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 0.85 | 1.00 | | | | | 1.10 | | | | | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 4 | 12 | 15.0% | 1.80 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 2.40 | 1.80 | | | | | 0.15 | | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Employment | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Societal= | | | | | 0.40 | 0.80 | | | | | 1.95 | | | | | |
| ECONOMIC % 40 | Cost | 4 | 4 | 16 | 40% | 6.40 | 3 | 3 | 9 | 40% | 3.60 | 1 | 1 | 1 | 40% | 0.40 |
| Total Economic= | | | | | 6.40 | 3.60 | | | | | 0.40 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 10.875 | 8.550 | | | | | 5.475 | | | | | |
| | | | | | | | | | | | | | | | | |
| Description of Subsea Assets: Pressure Booster Pump | | | | | | | | | | | | | | | | |
| Weighting Scenario 6: %40 for societal and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 3 | 9 | 3.75% | 0.34 | 2 | 3 | 6 | 3.75% | 0.23 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 3 | 4 | 12 | 3.75% | 0.45 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| Total Environment= | | | | | 0.83 | 1.35 | | | | | 1.88 | | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 3 | 4 | 12 | 5.00% | 0.60 | 3 | 3 | 9 | 5.00% | 0.45 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 3 | 3 | 9 | 5.00% | 0.45 | 4 | 5 | 20 | 5.00% | 1.00 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 0.85 | 1.00 | | | | | 1.10 | | | | | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 4 | 12 | 15.0% | 1.80 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 2.40 | 1.80 | | | | | 0.15 | | | | | |
| SOCIETAL % 40 | Effects on Commercial Fisheries | 1 | 1 | 1 | 13.33% | 0.13 | 2 | 3 | 6 | 13.33% | 0.80 | 5 | 5 | 25 | 13.33% | 3.33 |
| | Employment | 2 | 3 | 6 | 13.33% | 0.80 | 2 | 2 | 4 | 13.33% | 0.53 | 2 | 1 | 2 | 13.33% | 0.27 |
| | Communities | 1 | 1 | 1 | 13.33% | 0.13 | 2 | 3 | 6 | 13.33% | 0.80 | 3 | 4 | 12 | 13.33% | 1.60 |
| Total Societal= | | | | | 1.07 | 2.13 | | | | | 5.20 | | | | | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15% | 2.40 | 3 | 3 | 9 | 15% | 1.35 | 1 | 1 | 1 | 15% | 0.15 |
| Total Economic= | | | | | 2.40 | 1.35 | | | | | 0.15 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 7.542 | 7.633 | | | | | 8.475 | | | | | |

Developed Tool for Taking a Decision about Decommissioning of Separation System (Weighting Scenario 1-2)

| Description of Subsea Assets: Separation System | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|--------------|---------------|---------------------------|--------|------|------------|--------------|-------------------------|--------|------|------------|-------|
| Weighting Scenario 1: %20 for each main criteria | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 20 | Operational Environmental Impacts | 3 | 4 | 12 | 5.0% | 0.60 | 3 | 3 | 9 | 5.0% | 0.45 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 4 | 4 | 16 | 5.0% | 0.80 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Energy Use | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Gaseous Emissions | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 |
| Total Environment= | | | | | 1.55 | 2.45 | | | | | 2.90 | | | | | |
| SAFETY % 20 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 6.7% | 1.07 | 3 | 4 | 12 | 6.7% | 0.80 | 1 | 1 | 1 | 6.7% | 0.07 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 3 | 9 | 6.7% | 0.60 | 5 | 5 | 25 | 6.7% | 1.67 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety= | | | | | 1.40 | 1.53 | | | | | 1.80 | | | | | |
| TECHNICAL % 20 | Technical Feasibility | 4 | 4 | 16 | 20.0% | 3.20 | 3 | 4 | 12 | 20.0% | 2.40 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Technical= | | | | | 3.20 | 2.40 | | | | | 0.20 | | | | | |
| SOCIETAL % 20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 3 | 6 | 6.7% | 0.40 | 5 | 5 | 25 | 6.7% | 1.67 |
| | Employment | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 3 | 6 | 6.7% | 0.40 | 3 | 4 | 12 | 6.7% | 0.80 |
| Total Societal= | | | | | 0.53 | 1.07 | | | | | 2.60 | | | | | |
| ECONOMIC % 20 | Cost | 4 | 4 | 16 | 20.0% | 3.20 | 3 | 3 | 9 | 20.0% | 1.80 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Economic= | | | | | 3.20 | 1.80 | | | | | 0.20 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 9.883 | 9.250 | | | | | 7.700 | | | | | |
| Description of Subsea Assets: Separation System | | | | | | | | | | | | | | | | |
| Weighting Scenario 2: %40 for environment and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 40 | Operational Environmental Impacts | 3 | 4 | 12 | 10.0% | 1.20 | 3 | 3 | 9 | 10.0% | 0.90 | 1 | 1 | 1 | 10.0% | 0.10 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 10.0% | 0.10 | 4 | 4 | 16 | 10.0% | 1.60 | 5 | 5 | 25 | 10.0% | 2.50 |
| | Energy Use | 3 | 3 | 9 | 10.0% | 0.90 | 3 | 4 | 12 | 10.0% | 1.20 | 4 | 4 | 16 | 10.0% | 1.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 10.0% | 0.90 | 3 | 4 | 12 | 10.0% | 1.20 | 4 | 4 | 16 | 10.0% | 1.60 |
| Total Environment= | | | | | 3.10 | 4.90 | | | | | 5.80 | | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 5.0% | 0.80 | 3 | 4 | 12 | 5.0% | 0.60 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 3 | 9 | 5.0% | 0.45 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.0% | 0.20 | 1 | 2 | 2 | 5.0% | 0.10 | 1 | 1 | 1 | 5.0% | 0.05 |
| Total Safety= | | | | | 1.05 | 1.15 | | | | | 1.35 | | | | | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 4 | 12 | 15.0% | 1.80 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 2.40 | 1.80 | | | | | 0.15 | | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Employment | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Societal= | | | | | 0.40 | 0.80 | | | | | 1.95 | | | | | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | 2.40 | 1.35 | | | | | 0.15 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 9.350 | 10.000 | | | | | 9.400 | | | | | |

Developed Tool for Taking a Decision about Decommissioning of Separation System (Weighting Scenario 3-4)

| Description of Subsea Assets: Separation System | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|-----------|-------|---------------------------|--------|------|-----------|-------|-------------------------|--------|------|-----------|-------|
| Weighting Scenario 3: %40 for safety and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 4 | 12 | 3.75% | 0.45 | 3 | 3 | 9 | 3.75% | 0.34 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | 1.16 | | | | | 1.84 | | | | | 2.18 | | | | |
| SAFETY % 40 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 13.33% | 2.13 | 3 | 4 | 12 | 13.33% | 1.60 | 1 | 1 | 1 | 13.33% | 0.13 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 13.33% | 0.13 | 3 | 3 | 9 | 13.33% | 1.20 | 5 | 5 | 25 | 13.33% | 3.33 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 13.33% | 0.53 | 1 | 2 | 2 | 13.33% | 0.27 | 1 | 1 | 1 | 13.33% | 0.13 |
| Total Safety= | | 2.80 | | | | | 3.07 | | | | | 3.60 | | | | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 4 | 12 | 15.0% | 1.80 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | 2.40 | | | | | 1.80 | | | | | 0.15 | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Employment | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Societal= | | 0.40 | | | | | 0.80 | | | | | 1.95 | | | | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | 2.40 | | | | | 1.35 | | | | | 0.15 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 9.162 | | | | | 8.854 | | | | | 8.025 | | | | |
| Description of Subsea Assets: Separation System | | | | | | | | | | | | | | | | |
| Weighting Scenario 4: %40 for technical and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 4 | 12 | 3.75% | 0.45 | 3 | 3 | 9 | 3.75% | 0.34 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | 1.16 | | | | | 1.84 | | | | | 2.18 | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 5.00% | 0.80 | 3 | 4 | 12 | 5.00% | 0.60 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 3 | 3 | 9 | 5.00% | 0.45 | 5 | 5 | 25 | 5.00% | 1.25 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | 1.05 | | | | | 1.15 | | | | | 1.35 | | | | |
| TECHNICAL % 40 | Technical Feasibility | 4 | 4 | 16 | 40% | 6.40 | 3 | 4 | 12 | 40% | 4.80 | 1 | 1 | 1 | 40% | 0.40 |
| Total Technical= | | 6.40 | | | | | 4.80 | | | | | 0.40 | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Employment | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Societal= | | 0.40 | | | | | 0.80 | | | | | 1.95 | | | | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | 2.40 | | | | | 1.35 | | | | | 0.15 | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | 11.413 | | | | | 9.938 | | | | | 6.025 | | | | |

Developed Tool for Taking a Decision about Decommissioning of Separation System (Weighting Scenario 5-6)

| Description of Subsea Assets: Separation System | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|-------------|---------------|---------------------------|--------|------|-------------|--------------|-------------------------|--------|------|-------------|--------------|
| Weighting Scenario 5: %40 for economic and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 4 | 12 | 3.75% | 0.45 | 3 | 3 | 9 | 3.75% | 0.34 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | | | | 1.16 | | | | | 1.84 | | | | | 2.18 | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 5.00% | 0.80 | 3 | 4 | 12 | 5.00% | 0.60 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 3 | 3 | 9 | 5.00% | 0.45 | 5 | 5 | 25 | 5.00% | 1.25 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 1.05 | | | | | 1.15 | | | | | 1.35 | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 4 | 12 | 15.0% | 1.80 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 2.40 | | | | | 1.80 | | | | | 0.15 | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Employment | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Societal= | | | | | 0.40 | | | | | 0.80 | | | | | 1.95 | |
| ECONOMIC % 40 | Cost | 4 | 4 | 16 | 40% | 6.40 | 3 | 3 | 9 | 40% | 3.60 | 1 | 1 | 1 | 40% | 0.40 |
| Total Economic= | | | | | 6.40 | | | | | 3.60 | | | | | 0.40 | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 11.413 | | | | | 9.188 | | | | | 6.025 |
| Description of Subsea Assets: Separation System | | | | | | | | | | | | | | | | |
| Weighting Scenario 6: %40 for societal and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score | Likelihood | Impact | Risk | Weighting | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 3 | 4 | 12 | 3.75% | 0.45 | 3 | 3 | 9 | 3.75% | 0.34 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 4 | 4 | 16 | 3.75% | 0.60 | 5 | 5 | 25 | 3.75% | 0.94 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | | | | 1.16 | | | | | 1.84 | | | | | 2.18 | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 4 | 4 | 16 | 5.00% | 0.80 | 3 | 4 | 12 | 5.00% | 0.60 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 3 | 3 | 9 | 5.00% | 0.45 | 5 | 5 | 25 | 5.00% | 1.25 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 1.05 | | | | | 1.15 | | | | | 1.35 | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 4 | 12 | 15.0% | 1.80 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 2.40 | | | | | 1.80 | | | | | 0.15 | |
| SOCIETAL % 40 | Effects on Commercial Fisheries | 1 | 1 | 1 | 13.33% | 0.13 | 2 | 3 | 6 | 13.33% | 0.80 | 5 | 5 | 25 | 13.33% | 3.33 |
| | Employment | 2 | 3 | 6 | 13.33% | 0.80 | 2 | 2 | 4 | 13.33% | 0.53 | 2 | 1 | 2 | 13.33% | 0.27 |
| | Communities | 1 | 1 | 1 | 13.33% | 0.13 | 2 | 3 | 6 | 13.33% | 0.80 | 3 | 4 | 12 | 13.33% | 1.60 |
| Total Societal= | | | | | 1.07 | | | | | 2.13 | | | | | 5.20 | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15% | 2.40 | 3 | 3 | 9 | 15% | 1.35 | 1 | 1 | 1 | 15% | 0.15 |
| Total Economic= | | | | | 2.40 | | | | | 1.35 | | | | | 0.15 | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 8.079 | | | | | 8.271 | | | | | 9.025 |

Developed Tool for Taking a Decision about Decommissioning of Template (Weighting Scenario 1-2)

| Description of Subsea Assets: Template | | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|--------------|-------|---------------------------|--------|------|------------|--------------|-------------------------|--------|------|------------|-------|--------------|
| Weighting Scenario 1: %20 for each main criteria | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | |
| ENVIRONMENTAL % 20 | Operational Environmental Impacts | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 1 | 1 | 1 | 5.0% | 0.05 | |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 4 | 4 | 16 | 5.0% | 0.80 | |
| | Energy Use | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 | |
| | Gaseous Emissions | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 | 4 | 4 | 16 | 5.0% | 0.80 | |
| Total Environment= | | | | | | | | | | | | | | | | | |
| | | | | | 1.25 | | | | | | 1.60 | | | | | | 2.45 |
| SAFETY % 20 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 6.7% | 0.60 | 2 | 3 | 6 | 6.7% | 0.40 | 1 | 1 | 1 | 6.7% | 0.07 | |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 3 | 3 | 9 | 6.7% | 0.60 | 5 | 5 | 25 | 6.7% | 1.67 | |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 6.7% | 0.27 | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 1 | 1 | 6.7% | 0.07 | |
| Total Safety= | | | | | | | | | | | | | | | | | |
| | | | | | 0.93 | | | | | | 1.13 | | | | | | 1.80 |
| TECHNICAL % 20 | Technical Feasibility | 4 | 4 | 16 | 20.0% | 3.20 | 3 | 4 | 12 | 20.0% | 2.40 | 1 | 1 | 1 | 20.0% | 0.20 | |
| Total Technical= | | | | | | | | | | | | | | | | | |
| | | | | | 3.20 | | | | | | 2.40 | | | | | | 0.20 |
| SOCIETAL % 20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 3 | 6 | 6.7% | 0.40 | 5 | 5 | 25 | 6.7% | 1.67 | |
| | Employment | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 1 | 2 | 6.7% | 0.13 | |
| | Communities | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 3 | 6 | 6.7% | 0.40 | 3 | 4 | 12 | 6.7% | 0.80 | |
| Total Societal= | | | | | | | | | | | | | | | | | |
| | | | | | 0.53 | | | | | | 1.07 | | | | | | 2.60 |
| ECONOMIC % 20 | Cost | 4 | 4 | 16 | 20.0% | 3.20 | 3 | 3 | 9 | 20.0% | 1.80 | 1 | 1 | 1 | 20.0% | 0.20 | |
| Total Economic= | | | | | | | | | | | | | | | | | |
| | | | | | 3.20 | | | | | | 1.80 | | | | | | 0.20 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | | | | | | | | | | | | |
| | | | | | 9.117 | | | | | | 8.000 | | | | | | 7.250 |
| | | | | | | | | | | | | | | | | | |
| Description of Subsea Assets: Template | | | | | | | | | | | | | | | | | |
| Weighting Scenario 2: %40 for environment and %15 for others | | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | |
| ENVIRONMENTAL % 40 | Operational Environmental Impacts | 2 | 3 | 6 | 10.0% | 0.60 | 2 | 2 | 4 | 10.0% | 0.40 | 1 | 1 | 1 | 10.0% | 0.10 | |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 10.0% | 0.10 | 2 | 2 | 4 | 10.0% | 0.40 | 4 | 4 | 16 | 10.0% | 1.60 | |
| | Energy Use | 3 | 3 | 9 | 10.0% | 0.90 | 3 | 4 | 12 | 10.0% | 1.20 | 4 | 4 | 16 | 10.0% | 1.60 | |
| | Gaseous Emissions | 3 | 3 | 9 | 10.0% | 0.90 | 3 | 4 | 12 | 10.0% | 1.20 | 4 | 4 | 16 | 10.0% | 1.60 | |
| Total Environment= | | | | | | | | | | | | | | | | | |
| | | | | | 2.50 | | | | | | 3.20 | | | | | | 4.90 |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 5.0% | 0.45 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 1 | 1 | 5.0% | 0.05 | |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.0% | 0.05 | 3 | 3 | 9 | 5.0% | 0.45 | 5 | 5 | 25 | 5.0% | 1.25 | |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.0% | 0.20 | 1 | 2 | 2 | 5.0% | 0.10 | 1 | 1 | 1 | 5.0% | 0.05 | |
| Total Safety= | | | | | | | | | | | | | | | | | |
| | | | | | 0.70 | | | | | | 0.85 | | | | | | 1.35 |
| TECHNICAL % 15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 4 | 12 | 15.0% | 1.80 | 1 | 1 | 1 | 15.0% | 0.15 | |
| Total Technical= | | | | | | | | | | | | | | | | | |
| | | | | | 2.40 | | | | | | 1.80 | | | | | | 0.15 |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 5 | 5 | 25 | 5.0% | 1.25 | |
| | Employment | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 | |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 | |
| Total Societal= | | | | | | | | | | | | | | | | | |
| | | | | | 0.40 | | | | | | 0.80 | | | | | | 1.95 |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 | |
| Total Economic= | | | | | | | | | | | | | | | | | |
| | | | | | 2.40 | | | | | | 1.35 | | | | | | 0.15 |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | | | | | | | | | | | | |
| | | | | | 8.400 | | | | | | 8.000 | | | | | | 8.500 |

Developed Tool for Taking a Decision about Decommissioning of Template (Weighting Scenario 3-4)

| Description of Subsea Assets: Template | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|---------------|--------------|---------------------------|--------|------|------------|--------------|-------------------------|--------|------|------------|-------|
| Weighting Scenario 3: %40 for safety and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 3 | 6 | 3.75% | 0.23 | 2 | 2 | 4 | 3.75% | 0.15 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 2 | 4 | 3.75% | 0.15 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | | | | 0.94 | 1.20 | | | | | 1.84 | | | | | |
| SAFETY % 40 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 13.33% | 1.20 | 2 | 3 | 6 | 13.33% | 0.80 | 1 | 1 | 1 | 13.33% | 0.13 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 13.33% | 0.13 | 3 | 3 | 9 | 13.33% | 1.20 | 5 | 5 | 25 | 13.33% | 3.33 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 13.33% | 0.53 | 1 | 2 | 2 | 13.33% | 0.27 | 1 | 1 | 1 | 13.33% | 0.13 |
| Total Safety= | | | | | 1.87 | 2.27 | | | | | 3.60 | | | | | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 4 | 12 | 15.0% | 1.80 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 2.40 | 1.80 | | | | | 0.15 | | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Employment | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Societal= | | | | | 0.40 | 0.80 | | | | | 1.95 | | | | | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | 2.40 | 1.35 | | | | | 0.15 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 8.004 | 7.417 | | | | | 7.687 | | | | | |
| Description of Subsea Assets: Template | | | | | | | | | | | | | | | | |
| Weighting Scenario 4: %40 for technical and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 3 | 6 | 3.75% | 0.23 | 2 | 2 | 4 | 3.75% | 0.15 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 2 | 4 | 3.75% | 0.15 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | | | | 0.94 | 1.20 | | | | | 1.84 | | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 5.00% | 0.45 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 3 | 3 | 9 | 5.00% | 0.45 | 5 | 5 | 25 | 5.00% | 1.25 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 0.70 | 0.85 | | | | | 1.35 | | | | | |
| TECHNICAL % 40 | Technical Feasibility | 4 | 4 | 16 | 40% | 6.40 | 3 | 4 | 12 | 40% | 4.80 | 1 | 1 | 1 | 40% | 0.40 |
| Total Technical= | | | | | 6.40 | 4.80 | | | | | 0.40 | | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Employment | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Societal= | | | | | 0.40 | 0.80 | | | | | 1.95 | | | | | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | 2.40 | 1.35 | | | | | 0.15 | | | | | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | 10.838 | 9.000 | | | | | 5.688 | | | | | |

Developed Tool for Taking a Decision about Decommissioning of Template (Weighting Scenario 5-6)

| Description of Subsea Assets: Template | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|-------------|---------------|---------------------------|--------|------|-------------|--------------|-------------------------|--------|------|-------------|--------------|
| Weighting Scenario 5: %40 for economic and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 3 | 6 | 3.75% | 0.23 | 2 | 2 | 4 | 3.75% | 0.15 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 2 | 4 | 3.75% | 0.15 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | | | | 0.94 | | | | | 1.20 | | | | | 1.84 | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 5.00% | 0.45 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 3 | 3 | 9 | 5.00% | 0.45 | 5 | 5 | 25 | 5.00% | 1.25 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 0.70 | | | | | 0.85 | | | | | 1.35 | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 4 | 12 | 15.0% | 1.80 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 2.40 | | | | | 1.80 | | | | | 0.15 | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 5 | 5 | 25 | 5.0% | 1.25 |
| | Employment | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Societal= | | | | | 0.40 | | | | | 0.80 | | | | | 1.95 | |
| ECONOMIC % 40 | Cost | 4 | 4 | 16 | 40% | 6.40 | 3 | 3 | 9 | 40% | 3.60 | 1 | 1 | 1 | 40% | 0.40 |
| Total Economic= | | | | | 6.40 | | | | | 3.60 | | | | | 0.40 | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 10.838 | | | | | 8.250 | | | | | 5.688 |
| Description of Subsea Assets: Template | | | | | | | | | | | | | | | | |
| Weighting Scenario 6: %40 for societal and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 3 | 6 | 3.75% | 0.23 | 2 | 2 | 4 | 3.75% | 0.15 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 2 | 4 | 3.75% | 0.15 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Energy Use | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Gaseous Emissions | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 | 4 | 4 | 16 | 3.75% | 0.60 |
| Total Environment= | | | | | 0.94 | | | | | 1.20 | | | | | 1.84 | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 3 | 3 | 9 | 5.00% | 0.45 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 3 | 3 | 9 | 5.00% | 0.45 | 5 | 5 | 25 | 5.00% | 1.25 |
| | Safety Risk to Onshore Project Personnel | 2 | 2 | 4 | 5.00% | 0.20 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 0.70 | | | | | 0.85 | | | | | 1.35 | |
| TECHNICAL % 15 | Technical Feasibility | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 4 | 12 | 15.0% | 1.80 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 2.40 | | | | | 1.80 | | | | | 0.15 | |
| SOCIETAL % 40 | Effects on Commercial Fisheries | 1 | 1 | 1 | 13.33% | 0.13 | 2 | 3 | 6 | 13.33% | 0.80 | 5 | 5 | 25 | 13.33% | 3.33 |
| | Employment | 2 | 3 | 6 | 13.33% | 0.80 | 2 | 2 | 4 | 13.33% | 0.53 | 2 | 1 | 2 | 13.33% | 0.27 |
| | Communities | 1 | 1 | 1 | 13.33% | 0.13 | 2 | 3 | 6 | 13.33% | 0.80 | 3 | 4 | 12 | 13.33% | 1.60 |
| Total Societal= | | | | | 1.07 | | | | | 2.13 | | | | | 5.20 | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15% | 2.40 | 3 | 3 | 9 | 15% | 1.35 | 1 | 1 | 1 | 15% | 0.15 |
| Total Economic= | | | | | 2.40 | | | | | 1.35 | | | | | 0.15 | |
| Total Score =total environment+total safety+total technical+total societal+total economic | | | | | | 7.504 | | | | | 7.333 | | | | | 8.687 |

Developed Tool for Taking a Decision about Decommissioning of Mudmat (Weighting Scenario 1-2)

| Description of Subsea Assets: Mudmat | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|--------------|--------------|---------------------------|--------|------|------------|--------------|-------------------------|--------|------|------------|-------|
| Weighting Scenario 1: %20 for each main criteria | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 20 | Operational Environmental Impacts | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Energy Use | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 |
| | Gaseous Emissions | 2 | 3 | 6 | 5.0% | 0.30 | 3 | 3 | 9 | 5.0% | 0.45 | 3 | 4 | 12 | 5.0% | 0.60 |
| Total Environment= | | | | | 0.95 | 1.30 | | | | | 2.05 | | | | | |
| SAFETY % 20 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 3 | 6 | 6.7% | 0.40 | 1 | 1 | 1 | 6.7% | 0.07 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 3 | 6 | 6.7% | 0.40 | 4 | 4 | 16 | 6.7% | 1.07 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 2 | 2 | 6.7% | 0.13 | 1 | 1 | 1 | 6.7% | 0.07 |
| Total Safety= | | | | | 0.60 | 0.93 | | | | | 1.20 | | | | | |
| TECHNICAL % 20 | Technical Feasibility | 3 | 4 | 12 | 20.0% | 2.40 | 3 | 3 | 9 | 20.0% | 1.80 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Technical= | | | | | 2.40 | 1.80 | | | | | 0.20 | | | | | |
| SOCIETAL % 20 | Effects on Commercial Fisheries | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 2 | 4 | 6.7% | 0.27 | 4 | 4 | 16 | 6.7% | 1.07 |
| | Employment | 2 | 3 | 6 | 6.7% | 0.40 | 2 | 2 | 4 | 6.7% | 0.27 | 2 | 1 | 2 | 6.7% | 0.13 |
| | Communities | 1 | 1 | 1 | 6.7% | 0.07 | 2 | 2 | 4 | 6.7% | 0.27 | 4 | 4 | 16 | 6.7% | 1.07 |
| Total Societal= | | | | | 0.53 | 0.80 | | | | | 2.27 | | | | | |
| ECONOMIC % 20 | Cost | 4 | 4 | 16 | 20.0% | 3.20 | 3 | 3 | 9 | 20.0% | 1.80 | 1 | 1 | 1 | 20.0% | 0.20 |
| Total Economic= | | | | | 3.20 | 1.80 | | | | | 0.20 | | | | | |
| Total Score =total environment+total safety+total technical+total | | | | | 7.683 | 6.633 | | | | | 5.916 | | | | | |
| Description of Subsea Assets: Mudmat | | | | | | | | | | | | | | | | |
| Weighting Scenario 2: %40 for environment and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 40 | Operational Environmental Impacts | 2 | 3 | 6 | 10.0% | 0.60 | 2 | 2 | 4 | 10.0% | 0.40 | 1 | 1 | 1 | 10.0% | 0.10 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 10.0% | 0.10 | 2 | 2 | 4 | 10.0% | 0.40 | 4 | 4 | 16 | 10.0% | 1.60 |
| | Energy Use | 2 | 3 | 6 | 10.0% | 0.60 | 3 | 3 | 9 | 10.0% | 0.90 | 3 | 4 | 12 | 10.0% | 1.20 |
| | Gaseous Emissions | 2 | 3 | 6 | 10.0% | 0.60 | 3 | 3 | 9 | 10.0% | 0.90 | 3 | 4 | 12 | 10.0% | 1.20 |
| Total Environment= | | | | | 1.90 | 2.60 | | | | | 4.10 | | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 3 | 6 | 5.0% | 0.30 | 1 | 1 | 1 | 5.0% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 3 | 6 | 5.0% | 0.30 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.0% | 0.10 | 1 | 2 | 2 | 5.0% | 0.10 | 1 | 1 | 1 | 5.0% | 0.05 |
| Total Safety= | | | | | 0.45 | 0.70 | | | | | 0.90 | | | | | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 4 | 12 | 15.0% | 1.80 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 1.80 | 1.35 | | | | | 0.15 | | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Employment | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 4 | 4 | 16 | 5.0% | 0.80 |
| Total Societal= | | | | | 0.40 | 0.60 | | | | | 1.70 | | | | | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | 2.40 | 1.35 | | | | | 0.15 | | | | | |
| Total Score =total environment+total safety+total technical+total | | | | | 6.950 | 6.600 | | | | | 7.000 | | | | | |

Developed Tool for Taking a Decision about Decommissioning of Mudmat (Weighting Scenario 3-4)

| Description of Subsea Assets: Mudmat | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|--------------|--------------|---------------------------|--------|------|------------|--------------|-------------------------|--------|------|------------|-------|
| Weighting Scenario 3: %40 for safety and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 3 | 6 | 3.75% | 0.23 | 2 | 2 | 4 | 3.75% | 0.15 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 2 | 4 | 3.75% | 0.15 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| Total Environment= | | | | | 0.71 | 0.98 | | | | | 1.54 | | | | | |
| SAFETY % 40 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 13.33% | 0.80 | 2 | 3 | 6 | 13.33% | 0.80 | 1 | 1 | 1 | 13.33% | 0.13 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 13.33% | 0.13 | 2 | 3 | 6 | 13.33% | 0.80 | 4 | 4 | 16 | 13.33% | 2.13 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 13.33% | 0.27 | 1 | 2 | 2 | 13.33% | 0.27 | 1 | 1 | 1 | 13.33% | 0.13 |
| Total Safety= | | | | | 1.20 | 1.87 | | | | | 2.40 | | | | | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 4 | 12 | 15.0% | 1.80 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 1.80 | 1.35 | | | | | 0.15 | | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Employment | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 4 | 4 | 16 | 5.0% | 0.80 |
| Total Societal= | | | | | 0.40 | 0.60 | | | | | 1.70 | | | | | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | 2.40 | 1.35 | | | | | 0.15 | | | | | |
| Total Score =total environment+total safety+total technical+total | | | | | 6.512 | 6.142 | | | | | 5.937 | | | | | |
| Description of Subsea Assets: Mudmat | | | | | | | | | | | | | | | | |
| Weighting Scenario 4: %40 for technical and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 3 | 6 | 3.75% | 0.23 | 2 | 2 | 4 | 3.75% | 0.15 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 2 | 4 | 3.75% | 0.15 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| Total Environment= | | | | | 0.71 | 0.98 | | | | | 1.54 | | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 5.00% | 0.30 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 2 | 3 | 6 | 5.00% | 0.30 | 4 | 4 | 16 | 5.00% | 0.80 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 0.45 | 0.70 | | | | | 0.90 | | | | | |
| TECHNICAL % 40 | Technical Feasibility | 3 | 4 | 12 | 40% | 4.80 | 3 | 3 | 9 | 40% | 3.60 | 1 | 1 | 1 | 40% | 0.40 |
| Total Technical= | | | | | 4.80 | 3.60 | | | | | 0.40 | | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Employment | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 4 | 4 | 16 | 5.0% | 0.80 |
| Total Societal= | | | | | 0.40 | 0.60 | | | | | 1.70 | | | | | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15.0% | 2.40 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Economic= | | | | | 2.40 | 1.35 | | | | | 0.15 | | | | | |
| Total Score =total environment+total safety+total technical+total | | | | | 8.763 | 7.225 | | | | | 4.688 | | | | | |

Developed Tool for Taking a Decision about Decommissioning of Mudmat (Weighting Scenario 5-6)

| Description of Subsea Assets: Mudmat | | | | | | | | | | | | | | | | |
|--|---|-------------------------|--------|------|--------------|--------------|---------------------------|--------|------|------------|--------------|-------------------------|--------|------|------------|-------|
| Weighting Scenario 5: %40 for economic and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 3 | 6 | 3.75% | 0.23 | 2 | 2 | 4 | 3.75% | 0.15 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 2 | 4 | 3.75% | 0.15 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| Total Environment= | | | | | 0.71 | 0.98 | | | | | 1.54 | | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 5.00% | 0.30 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 2 | 3 | 6 | 5.00% | 0.30 | 4 | 4 | 16 | 5.00% | 0.80 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 0.45 | 0.70 | | | | | 0.90 | | | | | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 4 | 12 | 15.0% | 1.80 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 1.80 | 1.35 | | | | | 0.15 | | | | | |
| SOCIETAL % 15 | Effects on Commercial Fisheries | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 4 | 4 | 16 | 5.0% | 0.80 |
| | Employment | 2 | 3 | 6 | 5.0% | 0.30 | 2 | 2 | 4 | 5.0% | 0.20 | 2 | 1 | 2 | 5.0% | 0.10 |
| | Communities | 1 | 1 | 1 | 5.0% | 0.05 | 2 | 2 | 4 | 5.0% | 0.20 | 4 | 4 | 16 | 5.0% | 0.80 |
| Total Societal= | | | | | 0.40 | 0.60 | | | | | 1.70 | | | | | |
| ECONOMIC % 40 | Cost | 4 | 4 | 16 | 40% | 6.40 | 3 | 3 | 9 | 40% | 3.60 | 1 | 1 | 1 | 40% | 0.40 |
| Total Economic= | | | | | 6.40 | 3.60 | | | | | 0.40 | | | | | |
| Total Score =total environment+total safety+total technical+total | | | | | 9.763 | 7.225 | | | | | 4.688 | | | | | |
| Description of Subsea Assets: Mudmat | | | | | | | | | | | | | | | | |
| Weighting Scenario 6: %40 for societal and %15 for others | | | | | | | | | | | | | | | | |
| Main Criteria | Sub Criteria | Option 1: Total Removal | | | | | Option 2: Partial Removal | | | | | Option 3: Leave In Situ | | | | |
| | | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score | Likelihood | Impact | Risk | Weigtining | Score |
| ENVIRONMENTAL % 15 | Operational Environmental Impacts | 2 | 3 | 6 | 3.75% | 0.23 | 2 | 2 | 4 | 3.75% | 0.15 | 1 | 1 | 1 | 3.75% | 0.04 |
| | Legacy Environmental Impacts | 1 | 1 | 1 | 3.75% | 0.04 | 2 | 2 | 4 | 3.75% | 0.15 | 4 | 4 | 16 | 3.75% | 0.60 |
| | Energy Use | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| | Gaseous Emissions | 2 | 3 | 6 | 3.75% | 0.23 | 3 | 3 | 9 | 3.75% | 0.34 | 3 | 4 | 12 | 3.75% | 0.45 |
| Total Environment= | | | | | 0.71 | 0.98 | | | | | 1.54 | | | | | |
| SAFETY % 15 | Safety Risk to Offshore Project Personnel | 2 | 3 | 6 | 5.00% | 0.30 | 2 | 3 | 6 | 5.00% | 0.30 | 1 | 1 | 1 | 5.00% | 0.05 |
| | Safety Risk to Other Users of the Sea | 1 | 1 | 1 | 5.00% | 0.05 | 2 | 3 | 6 | 5.00% | 0.30 | 4 | 4 | 16 | 5.00% | 0.80 |
| | Safety Risk to Onshore Project Personnel | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 2 | 2 | 5.00% | 0.10 | 1 | 1 | 1 | 5.00% | 0.05 |
| Total Safety= | | | | | 0.45 | 0.70 | | | | | 0.90 | | | | | |
| TECHNICAL % 15 | Technical Feasibility | 3 | 4 | 12 | 15.0% | 1.80 | 3 | 3 | 9 | 15.0% | 1.35 | 1 | 1 | 1 | 15.0% | 0.15 |
| Total Technical= | | | | | 1.80 | 1.35 | | | | | 0.15 | | | | | |
| SOCIETAL % 40 | Effects on Commercial Fisheries | 1 | 1 | 1 | 13.33% | 0.13 | 2 | 2 | 4 | 13.33% | 0.53 | 4 | 4 | 16 | 13.33% | 2.13 |
| | Employment | 2 | 3 | 6 | 13.33% | 0.80 | 2 | 2 | 4 | 13.33% | 0.53 | 2 | 1 | 2 | 13.33% | 0.27 |
| | Communities | 1 | 1 | 1 | 13.33% | 0.13 | 2 | 2 | 4 | 13.33% | 0.53 | 4 | 4 | 16 | 13.33% | 2.13 |
| Total Societal= | | | | | 1.07 | 1.60 | | | | | 4.53 | | | | | |
| ECONOMIC % 15 | Cost | 4 | 4 | 16 | 15% | 2.40 | 3 | 3 | 9 | 15% | 1.35 | 1 | 1 | 1 | 15% | 0.15 |
| Total Economic= | | | | | 2.40 | 1.35 | | | | | 0.15 | | | | | |
| Total Score =total environment+total safety+total technical+total | | | | | 6.429 | 5.975 | | | | | 7.271 | | | | | |