

Re-use & Decommissioning report

Innovation & collaboration

2020



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Preface



Jacqueline Vaessen
General Manager Nexstep

I am very proud to present to you Nexstep's third Re-use & Decommissioning report. We are facing a formidable task. A substantial infrastructure for the production and transportation of oil and gas has been built up in the Netherlands over the past decades, however, a large proportion of the oil and gas fields is approaching the end of its economic life.

This annual report provides insight into the expected oil and gas infrastructure that will be taken out of production in the Netherlands over the coming ten years and covers what has been done so far on the repurposing of the infrastructure. Nexstep facilitates, stimulates and accelerates the re-use and decommissioning of oil and gas infrastructure in the Netherlands. The total costs of decommissioning the infrastructure was estimated in 2017 at 7 billion euro; Nexstep's aim is to reduce these costs by 30%.

“Innovation and collaboration are key to facing the challenge of decommissioning and repurposing our infrastructure”

One of the key assignments for Nexstep in 2018 was to develop a dedicated innovation agenda that ensures safe decommissioning, increases efficiency, minimises the impact on the environment and reduces costs. Innovation can also help to preserve crucial infrastructure to accelerate the energy transition. The Nexstep team developed “The Road to 30%” that contains five roadmaps and aims to reduce costs by 30%. In this edition of the Re-use and Decommissioning report the team leads will update you on the content of the Road to 30% program and the results so far.

There was a lot of decommissioning activity in 2019, which shows that the industry is taking its responsibility to decommission infrastructure when it no longer delivers any value. In this report, the operators present the major decommissioning projects that have been carried out in 2019. I am always impressed when I see the pictures, it shows the enormous task we are facing.

Part of the oil and gas infrastructure could be used to accelerate the energy transition. At the end of 2018, Nexstep and TNO launched a pilot project to determine the feasibility of offshore hydrogen production. Based on the results of this study we are now working on a project to place a 1 MW electrolyser on Neptune Energy's Q13a-A platform, the so-called PosHYdon project. Last March, our graduate intern Dennie Kleijweg presented a model to determine possible re-use for the offshore platforms. We now have a good overview of the possibilities, but also of the challenges that the timeline poses. We estimate that approximately 10% of the platforms in the Dutch part of the North Sea are suitable for re-use.

Each year the collection of data is improved and becomes more accurate. Compared to last year's report, there have been some changes in the forecasted decommissioning activity. By collecting and analysing the data, we want to provide more insight into the extensive job we're facing over the coming years. We invite you to respond to this report. Only by receiving feedback can we learn from one another and new opportunities for cooperation will arise.

The subtitle of this report is "Innovation and collaboration". Nexstep has been operational for a little over two years now, and we consider those two words to be key to the challenge of decommissioning and repurposing our infrastructure. Collaboration does not stop at our borders; therefore, we have a structured dialogue with our neighbours around the North Sea. We meet with partner organisations in the UK, Norway and Denmark on a regular basis to discuss the same challenges we're facing (although in different time frames). We exchange best practices and collaborate to work on future challenges.

I write this preface from my temporary home office, which turns out to be not so temporary anymore. COVID-19 has changed our lives, and at this moment, we cannot foresee how big the impact of the virus is going to be on the oil and gas industry. In addition, the collapse of the oil and gas price is also having an immense impact. I expect that in the next edition of this report we will give more insight into that.

I hope you will enjoy reading this report.

Jacqueline Vaessen
General Manager Nexstep

1 Decommissioning & re-use

This third report presents the recent as well as the forecasted decommissioning activities of the oil and gas infrastructure in the Netherlands. In these forecasts neither re-use nor repurposing of the infrastructure has been included.

However, Nexstep's mission is to optimise decommissioning of the infrastructure by promoting that the industry should carefully evaluate any potential re-use or repurposing. Only as a last resort should wells be permanently plugged and decommissioned, should installations be dismantled, removed and recycled and should pipelines be permanently decommissioned.

At the same time, Nexstep recognises that only a limited part of the infrastructure can be successfully re-used or repurposed. The Dutch sector has demonstrated that re-use of platform topsides can be done well; to date 45% of the topsides removed have been re-used for new developments. With CCUS (Carbon Capture, Utilisation and Storage) being seen as an efficient intermediate measure to reduce CO₂ emissions the repurposing of the first platforms for offshore underground storage is currently being evaluated with projects such as Porthos in the Rotterdam area and Athos for the Amsterdam area. System integration projects are launched such as the first offshore hydrogen project on the Q13a-A platform initiated by Nexstep and TNO. And onshore the transformation of a large former gas treatment location to an energy hub for sustainable energy production is taking shape.

See also the interview with René Jansen, page 44.

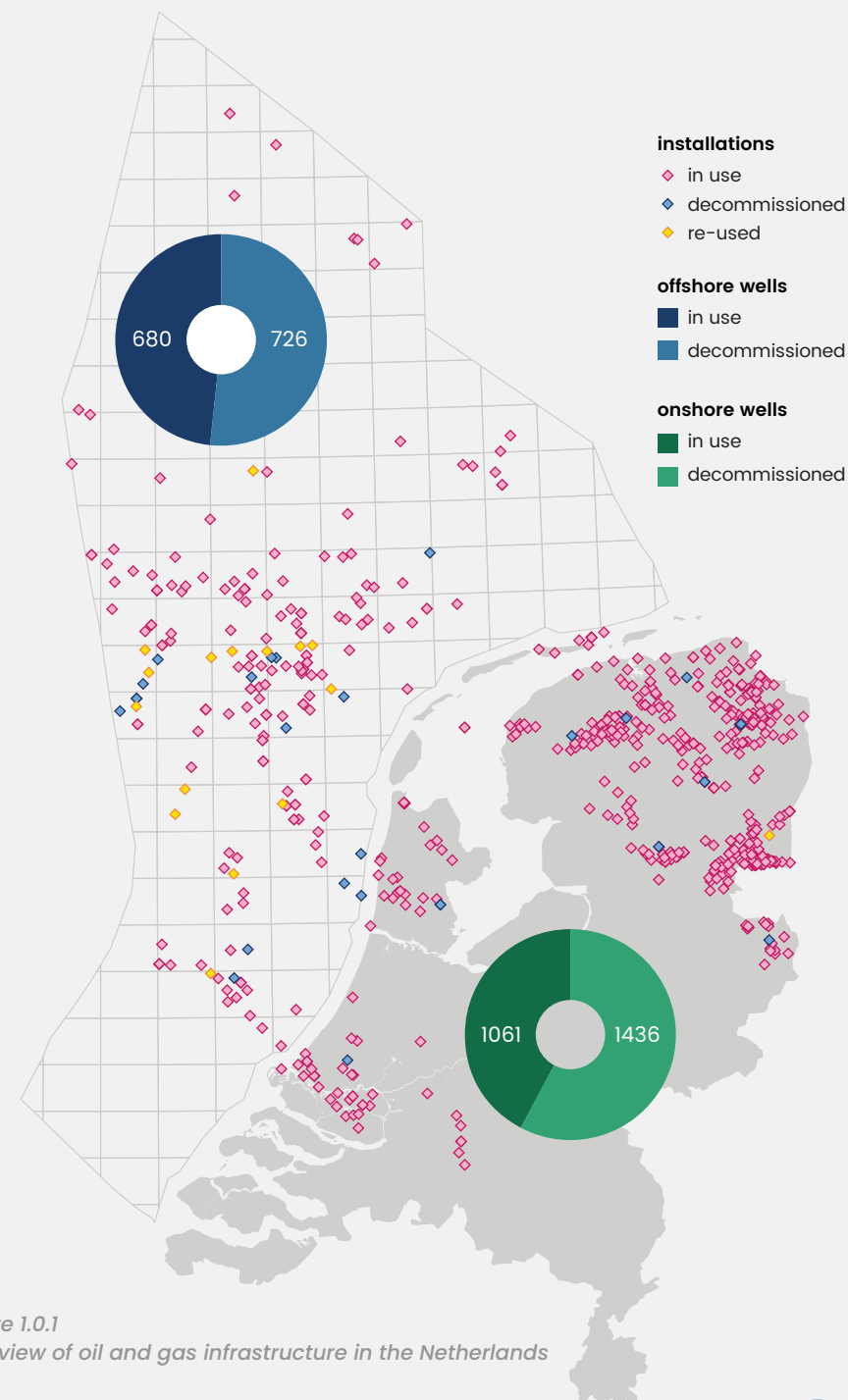


Figure 1.0.1
Overview of oil and gas infrastructure in the Netherlands

interview: Maarten Camps



Secretary General of the Ministry of Economic Affairs and Climate Policy

As Secretary General of the Ministry of Economic Affairs and Climate Policy (MEAC) Maarten Camps follows Nexstep's progress with great interest. In this interview we ask Maarten Camps some questions on how he looks at the past and the future.

What do you consider the added value of Nexstep?

Nexstep has made oil and gas companies aware of the need for collaboration in decommissioning. In addition, I think it is very important that Nexstep remains committed to identifying possibilities for re-using the infrastructure that is no longer used for gas or oil extraction. My colleagues at MEAC and I are very pleased with the cooperation between MEAC and Nexstep. We're all on the same page. For example, the technical briefing in the House of Representatives had been well coordinated, highlighting what we wanted to highlight and conveying a coherent message.

“It is very important that Nexstep remains committed to identifying possibilities for re-using the infrastructure that is no longer used for gas or oil extraction”

What did you find the most surprising result of Nexstep last year?

What I find most surprising is that a pilot project is in preparation to produce hydrogen on a production platform. This indicates that developments are moving fast, even in a sector such as the oil and gas industry that is typically considered traditional by the public. I also find the inclusion of Industry Standard 45 for decommissioning of wells and boreholes in the Mining Regulation a specific result that stands out. However, I would not call that “surprising”, because it is part of the objectives for which Nexstep was created: decommissioning as efficiently as possible through cooperation, not only between companies, but also with the government.

How do you see Nexstep's role in the future?

The Dutch State contributes approximately 70% to the costs of decommissioning through the participation of EBN and the tax regulations, but on the other hand, Dutch society has also benefited from the same 70% from the revenues generated by oil and gas extraction. That does not occur in any other industry. Therefore, I am convinced that Nexstep's aim to reduce costs by 30% is beneficial to the industry, the government and the general public. I follow the progress in the Road to 30% with great enthusiasm.

The coming years will become even more important for the energy transition. More infrastructure will be decommissioned. Actual choices will have to be made between removing or re-using the existing oil and gas infrastructure. It is important that Nexstep properly maps out whether, where and when this infrastructure can still be used in the context of the energy transition.

With historically low prices and the corona crisis hitting the industry hard, how do you view the task of meeting the decommissioning challenge in the coming years?

The oil and gas sector is going through tough times, which have worsened due to the corona crisis. We must try to prevent the decommissioning of infrastructure too early, so that it will not be lost for both gas extraction and re-use in the context of the energy transition. That is why a bill to amend the Mining Act includes a proposal to improve the investment allowance for investments in oil and gas extraction. The bill also provides further rules for the removal or re-use of the infrastructure. The obligations for mining companies to provide financial guarantees for the costs of decommissioning are also structured and tightened.

Nexstep is currently working on a joint campaign. What is MEAC's opinion on this?

The fact that collaboration is needed to face the challenges in decommissioning and that operators are open to a first joint campaign is in my opinion the merit of Nexstep, which has brought parties together, but at the same time also of the operators themselves, who have expanded their willingness to cooperate. I am also very interested in the model chosen in the tender. After all, the Ministry also stands for the proper functioning of the market and the associated tendering rules.

How do you see the role of the oil and gas industry in the coming years?

On March 30th the Minister of MEAC explained in a letter to the House of Representatives that natural gas will be essential in the coming decades as long as there are still insufficient sustainable alternatives. Natural gas is still needed and its extraction can be done safely and responsibly. The government prefers gas extraction from the Dutch small fields, both on land and at sea, because this is better for the climate, employment, the economy, and the retention of knowledge of the deep subsurface and existing gas infrastructure and limitation of import dependence. So, there is definitely still a role for the oil and gas industry.

Halfweg

Petrogas E&P Netherlands



- Well decommissioning and pipeline decommissioning
- Topside and legs removal
- Topside demolition and disposal

Platform

Designed as a self-installing platform with a concrete Gravity Base Structure (GBS) foundation
Topsides 452 tonnes
Legs 283 tonnes

Wells

3 gas wells decommissioned with drill rig Maersk Resolute

Project summary

The Halfweg platform was installed in 1995 and production was stopped on June 6th, 2016. Well decommissioning and pipeline cleaning was done in 2017. During the tendering process for removal the platform was hit by a vessel causing severe damage and complicating the decommissioning work. Additional reinforcements were installed to enable safe lifting of the topsides early 2019. Next the 4 legs were cut just above the concrete GBS. The GBS is still in place and the decommissioning strategy is currently being assessed.

The installation will be dismantled and recycled. The main contractors involved in the decommissioning were Maersk Drilling, Innovation Shipping (DEME), Boskalis, DECO and Hoondert.



2 Expected decommissioning in the Netherlands 2020–2029

Gas production in the Netherlands continues to decrease with an average of some 10% each year. With the dramatic drop of the oil and gas prices, operators are seeking opportunities to keep their assets from becoming uneconomic.

It should be noted that the forecasted decommissioning reported here depends on many factors like oil and gas price, volume upsides from exploration, operating cost and does not include any potential re-use or repurposing of the infrastructure.

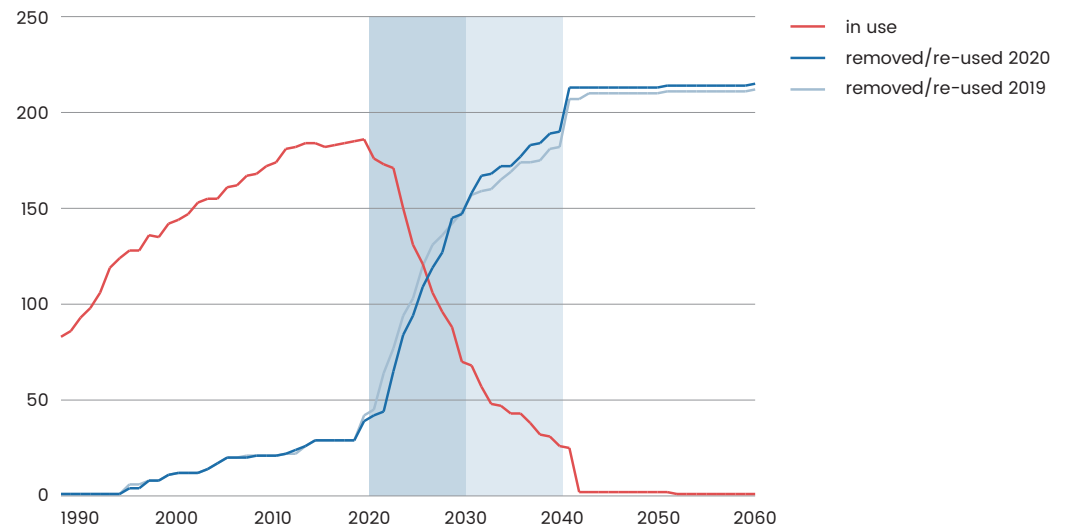


Compared to last year's report a slight deferral can be seen in the forecasted removal of offshore installations. In the next decade 60% of the current installations are forecasted to be decommissioned and the remaining 40% in the decade thereafter.

The average gas price for 2019 has dropped to 14 EUR/MWh which quickly erodes the economic lifetime of the assets. This could mean an acceleration of decommissioning. At the same time the industry is under pressure to reduce expenditures, especially those like decommissioning with no future (potential) revenues.

With regard to decommissioning in 2020 there is low activity offshore as only three satellite platforms have been removed earlier in the year which were delayed from 2019. For 2021 also low activity is forecasted for offshore platform removal. For 2022 and 2023 the removal activity is expected to be high with fifteen and nineteen platforms respectively. Onshore however displays an increasing activity from 2020 onwards using a purpose-built unit for continuous well decommissioning and subsequent restoration of the well sites from 2021 onwards. Also, the first Groningen wells and locations are being decommissioned.

Figure 2.0.1. Number of installed and removed offshore installations



interview:

Jan Willem van Hoogstraten (CEO – EBN) and
Jo Peters (Secretary General – NOGEPA)



When Nexstep was established, Jan Willem van Hoogstraten (EBN) and Jo Peters (NOGEPA) were its founding fathers. As members of the Supervisory Board, they are still closely involved. Together they look back on the origin of Nexstep. Van Hoogstraten – “A lot has been achieved in a short time, but we mustn’t sit back and relax.”

Van Hoogstraten about what had formed the basis of Nexstep: “During the conversations I had with the Ministry of Economic Affairs and Climate Policy (MEAC) before I joined EBN, the subject was on the agenda. This was late 2015, early 2016. In order to meet the challenge of decommissioning the oil and gas infrastructure with all parties involved, we agreed it was very important to provide insight into the abandonment costs of this infrastructure. Ultimately, the largest part of these costs is borne by society, which meant that the government also saw the urgency of meeting this challenge.”

Peters: “In August 2016, EBN and NOGEPA, with immense involvement of both MEAC and IRO, started with the production of the ‘Masterplan Decommissioning and Re-use’. Six weeks later it was there. We quickly realised that close cooperation would lead to enormous cost savings. Initial calculations indicated that decommissioning of the infrastructure would cost around seven billion euros. The goal was (and is) to reduce these costs by 30%.”

“A lot has been achieved in a short time, but we mustn’t sit back and relax”

Van Hoogstraten: “The Masterplan was ready by the end of September 2016, and on November 18th of that year we presented it to Sandor Gaastra (Director-General Climate and Energy Policy). We deliberately kept the momentum going because all those directly involved were aware of the enormous potential of the project. One of the recommendations in the report was the creation of a National Platform for Decommissioning. This Platform should facilitate knowledge sharing, collaboration and innovation, and together with the operators, would be responsible for achieving the targets related to the reduction of costs.”

Peters: “The Platform was founded in October 2017 under the name Nexstep. Nexstep itself was set up to be lean and mean. A conscious decision was made to make it a compact organisation at its core. A lot of work is done in the working groups that mainly consist of representatives from EBN and the NOGEPA members. This way, we increase involvement, and everyone really contributes to Nexstep’s objectives.”

Van Hoogstraten: “We have already shown that collaboration pays off, but it is not part of the natural genetic make-up of oil and gas companies. There is a certain reluctance to share knowledge and reach out at this intense level. But overall, the positive by far outweighs the negative: when you see what has been achieved over the past two and a half years, we can only be very satisfied. There is a very good foundation on which we can continue to build.”

Peters: “To name two specific examples: Standard 45 (for the permanent decommissioning of wells) can be regarded as a great success; that is really very important for our industry. And the hydrogen pilot PosHYdon, where Nexstep played a crucial role, is a good example where different energy functions are brought together highlighting the benefit of knowledge sharing, collaboration and innovation.”

Van Hoogstraten: “Beautiful examples indeed that show that we are on the right track. That doesn’t mean we can sit back and relax. The coming years will be extremely challenging for the oil and gas infrastructure in the North Sea. Most of the Dutch oil and gas fields will reach the end of their economic life during the next decade and the decommissioning of the infrastructure presents itself earlier than the demand for re-use/multi-use. Nexstep can really show its added value here.”

F3-FA

Spirit Energy



Platform

Manned processing platform

Topside – 5,000 tonnes

Jacket – 5,000 tonnes

Wells

1 Well decommissioning using conventional jack-up

Subsea

Pipeline bundles, isolation valves and mattresses



Project summary

The F3-FA development is situated in the Dutch sector of the Southern North Sea approximately five kilometres from the German median block boundary, and straddles blocks F3a and B18a. Spirit Energy Production Nederland has a unitised interest of 58% in the field, with Energie Beheer Nederland (EBN) holding the remaining 42%.

The project consisted of the following scope of work:

- Decommissioning of topside well
- Flushing and cleaning of the export pipeline
- Removal of subsea infrastructure (SSIV and bundles)
- Flushing and cleaning of production facilities
- Preparation for removal
- Removal of topside and suction anchors
- Transport to shore for dismantling

The project was delivered on schedule with no HSE incidents and below budget estimates. The main contractors involved in the decommissioning were Borr Drilling, Heerema Marine Contractors and Subsea7. The installation will be dismantled and recycled.

Some learnings from the project

- Early engagement with the removal market was very helpful to set requirements and timeline before formal tendering
- Disposal yard preparation required more effort/work than anticipated



interview: Floris van Hest



Director Stichting de Noordzee

Nexstep contributes to the Dutch energy transition by focusing on collaboration with stakeholders. One of these stakeholders is the independent nature and environmental organisation 'Stichting de Noordzee'. This North Sea foundation has been the organisation for protection and sustainable use of the North Sea for over 35 years.

How important do you think it is that all parties work together in the North Sea?

"Whichever way you look at it, we only have one North Sea together. Therefore, collaboration is vital. The North Sea is one of the busiest and most productive seas in the world. There is currently some tension between nature, energy, shipping and food supply (especially fishing). The Climate Agreement will lead to substantial growth of wind farms in the North Sea in the coming decades.

The North Sea will change completely in the coming years. If we continue on the current path, it simply will not fit. It is therefore imperative to achieve a balance on one of the busiest seas in the world between nature, energy production and food supply. The Netherlands can now become a global leader in this field: this is how the blue economy uses its full potential, and we achieve our climate and nature objectives.

It is encouraging that almost all parties in the North Sea have been willing to cooperate constructively in recent years. It is important to take a leap and not be interested in gains for your own organisation, but for a higher interest that benefits everyone."

"If we continue on the current path, it simply will not fit"

How do you experience the collaboration with Nexstep?

"Positive. They provide more transparency about what is happening with energy in the North Sea, which is of course largely a public matter. Nexstep brings more clarity to this. In addition, we find Nexstep's working attitude constructive. Together we are moving forward to a sustainable energy system."

How do you look at the future?

“The field of influence in the North Sea has changed completely in a short time, and that offers immense opportunities. Previously, the government did not pay much attention to it. The North Sea has become a matter of national importance in recent years. Everyone looks at the North Sea, which gives cause for hope.

I am confident that we can achieve a good balance between man and nature. It is therefore important to take several important steps.

First step is taking nature to a higher level. I hope that, based on scientific research, new protected areas will be allocated without wind farms and without fishing. In addition, the locations and design criteria of wind farms are examined to minimise risks, for example for birds and underwater nature, and to utilise the opportunities for nature enhancement.

With our ‘De Rijke Noordzee’ (The Rich North Sea) program, we are investigating together with the independent environmental organisation Natuur & Milieu (Nature & Environment) how wind and nature can reinforce each other. The lessons we gain from this are hopefully also very interesting for Nexstep. In this respect, the joint nature and environmental organisations have a double objective: a healthier North Sea and a more sustainable energy supply.

Another important step is to make fishing more sustainable and to invest more in research, because there are many uncertainties, but we also have to move forward at a rapid pace.”

ST-1

Spirit Energy



Platform

Normally Unmanned Installation (NUI)
satellite platform
Topside – 1,250 tonnes
Jacket – 1,000 tonnes

Wells

6 Wells – conventional Jack-up
decommissioning campaign

Subsea

Pipeline, stabilisation features
and mattresses

Project summary

The ST-1 satellite platform was installed in 1994. It is a normally unattended facility on a four-legged steel jacket in 31 meter water depth. The project consisted of the decommissioning of 6 production wells, flushing and cleaning of the facilities, decommissioning of the 12" gas export pipeline and the piggybacked 2" methanol pipeline and mattresses and the removal of the ST-1 topsides and jacket.

The project was delivered on schedule and within budget with no HSE incidents. The main contactors involved in the decommissioning were Borr Drilling, Seaway7 and Subsea7. The installation will be dismantled and recycled.

Some learnings from the project

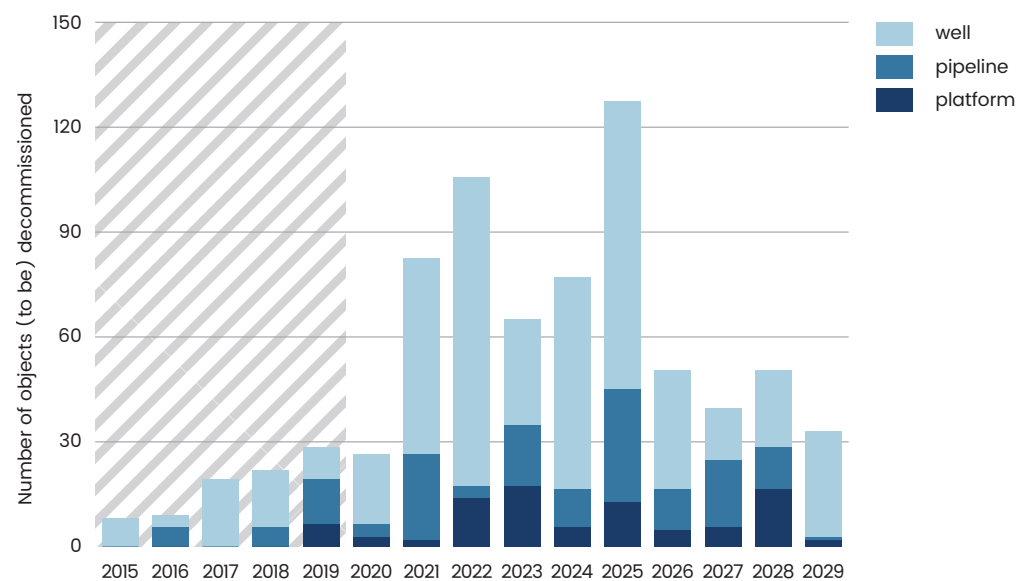
- contingency planning is essential for efficient decommissioning operations
- paint containing chromium-6 brought some additional challenges around dismantling and recycling



2.1 Total overview offshore & onshore

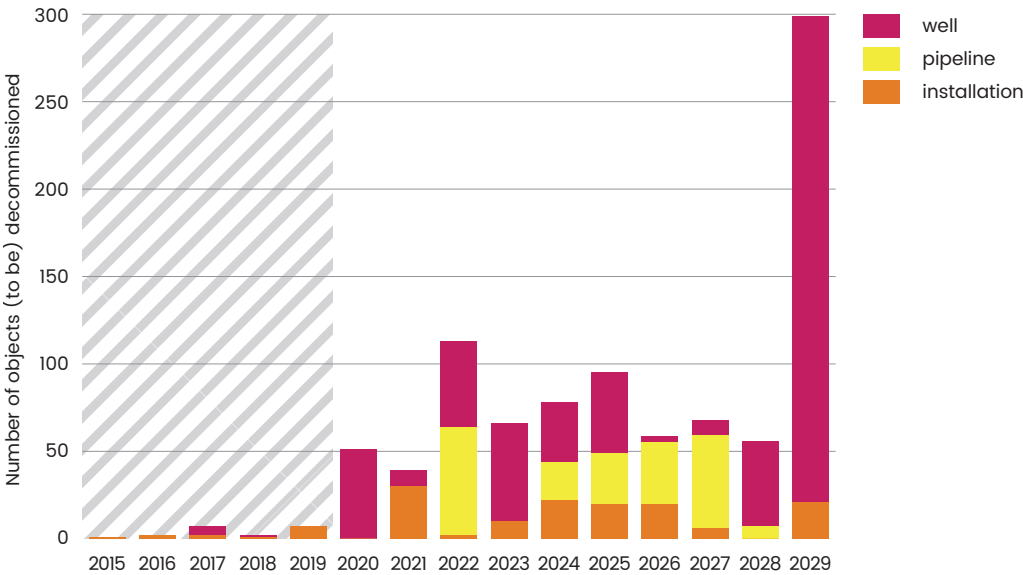
A complete view of all offshore decommissioning shows that activities are picking up and are expected to peak over the period 2021-2025.

Figure 2.1.1. Realised and forecasted decommissioning – offshore infrastructure



Onshore a higher activity can be seen for the next ten years with a gradual shift from well decommissioning at the start to removal of facilities and finally pipelines. The high number of wells currently shown for 2029 will likely be spread out over a number of years to attain a more stable workload favorable for both the operator and service industry.

Figure 2.1.2. Realised and forecasted decommissioning – onshore infrastructure



column: Sander Vergroesen



Managing Director IRO

IRO – The Association of Dutch Suppliers in the Offshore Energy Industry

Collaboration and innovation, especially in these challenging times, are key.

With 2020 on its way, a sudden shift in the world's economy has taken place because of the COVID-19 virus and the dramatic decrease of the oil price. It has a great influence on the service industry. Last year, and even in the first quarter of this year, we witnessed a slight economic recovery. Companies in the entire supply chain were optimistic again and willing to invest.

Proof of this was evident in the investments in the Arabian Gulf, oil developments in Guyana, Suriname and Mexico, offshore gas in Mozambique, the new offshore wind projects in Europe, Asia and the US, the various initiatives taken in the area of hydrogen and CCS and the upcoming decommissioning industry. Obviously, the situation is completely different now and unexpected issues such as the corona virus, the oil price collapse and their influence on the worldwide economy will affect this optimism immensely.

Over the long term, we can tell that the energy industry is in full transition. In addition to the necessary fossil fuels, new forms of sustainable energy are

explored and developed. As the Dutch are true pioneers in creating new possibilities, we can claim that the Dutch offshore industry is one of the most innovative industries in the field. All the developments that you see in the new forms of energy come from the knowledge and expertise we have gained in the offshore oil and gas industry during the last 50 years. We are now benefiting from that.

“The Dutch offshore industry is one of the most innovative industries in the field”

Working in a sustainable manner is a conscious choice rather than an obligation. Investing in vessels which sail on LNG or smart shipping are a couple of the many examples. Many IRO members are involved in projects that focus on the re-use of North Sea offshore oil and gas assets. These assets could play an important role, for example in the storage of CO₂, the production of hydrogen, and renewable energy. The most important example is of course the newest and unique trial project PosHYdon, where green hydrogen will be produced offshore on the North Sea. Unique in the world!

The North Sea provides us with several energy options which can all be integrated: wind farms, oil and gas platforms, tidal and wave energy, green hydrogen, floating solar, OTEC (Ocean Thermal Energy Conversion). The Sustainable Development Goals remain high on the agenda of the Dutch entrepreneurs in the offshore energy industry.

Energy is a need which will grow during the coming decades despite today's setback. However, renewable energy is not the only energy source to meet this growing demand since renewables can only supply around 50% of the total energy demand in 2050. There is no question that the ecological footprint we leave on the planet is massive and executing the Climate Agreement is necessary. However, oil and gas production will remain necessary during this transition period, and the Dutch suppliers can provide the best sustainable solutions in this branch all over the world.

Collaboration and innovation, especially in these challenging times, are key. Investing in innovative projects together with the industry, knowledge institutes, universities and the government, are important requirements. A proactive industrial policy is also an essential precondition for a strong export position. The Dutch offshore industry has been able to withstand the past difficult years and has laid a strong foundation for the future. We are therefore convinced that with our knowledge, skills, equipment and mindset we as a Dutch offshore association can optimally contribute to today's challenges and future opportunities that the recent vulnerable situation and the energy transition will bring us - both nationally and internationally.

I am very pleased that I have been able to join Nexstep's Supervisory Board as a non-voting observer in January 2020. In this role I look forward to contributing to the further developments and cooperation between all stakeholders of Nexstep.

L10-C/D/G

Neptune Energy



Platform

3 satellite platforms

Topsides approximately 550 tonnes each

Jackets approximately 600 tonnes each
(including pile sections)

Wells

L10-C: 6 wells

L10-D: 5 wells

L10-G: 1 well

Project summary

The three satellite platforms L10-C, L10-D and L10-G were installed in the 70's and the 80's in block L10 of the Dutch North Sea in approximately 26 meters of water. After several decades of gas production, the platforms reached the end of their economic lives and production was permanently ceased in 2016. After abandonment of the pipelines, cleaning of the topsides, decommissioning of the wells and execution of preparatory construction works, the platforms were left in cold suspension (lighthouse mode).

The heavy-lift contractor was provided with a 2-year flexible window for removal. The platforms were ultimately removed in March/April 2020 by Boskalis, with their heavy-lift vessel Bokalift 1. Currently the platforms are being dismantled at Hoondert, an onshore demolition & disposal contractor in Vlissingen.

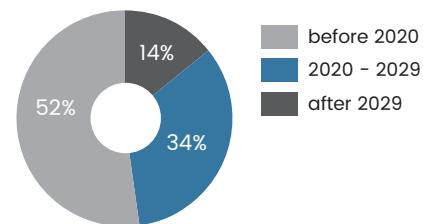
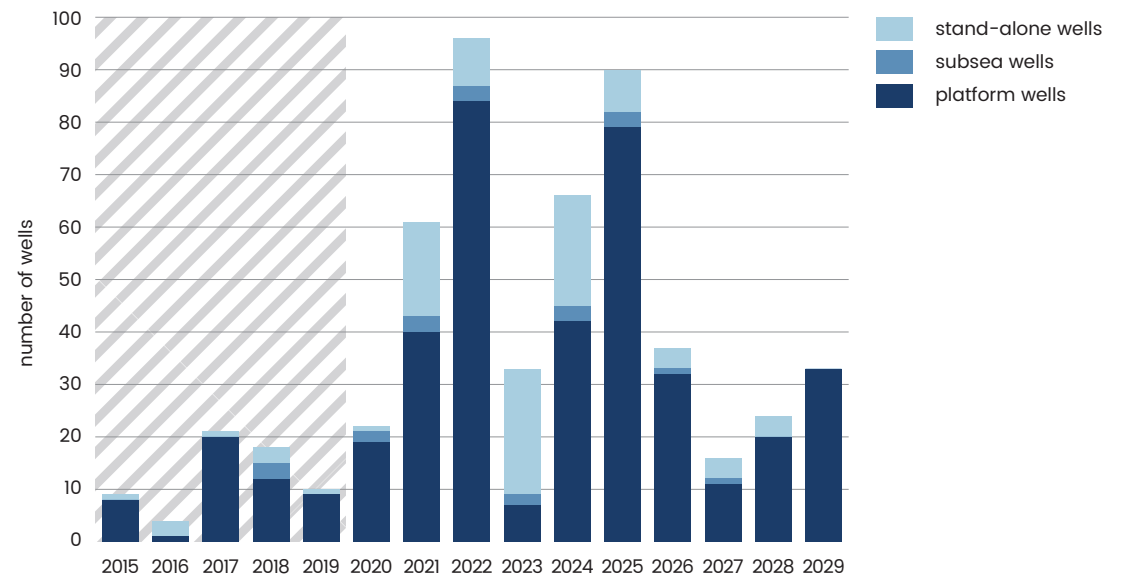
Clustering the removal of three similar type platforms in a combined campaign leads to synergies.



2.2 Offshore wells

Compared to last year's report a considerable higher decommissioning activity is noticed for 2021-2022 with a low in 2023 and higher activity again for 2024-2025. To reap the benefits of a portfolio approach and a learning curve a more stable activity level spread out over the years would be advantageous. Currently, Nexstep is evaluating the opportunity for a joint multi-operator decommissioning campaign of mudline suspension wells. Some of these wells can possibly be decommissioned using a vessel instead of a jack-up rig while others may require a jack-up rig for a more extensive work scope. Any such potential campaigns in the coming years have not yet been firmly included by all operators in the data.

Figure 2.2.1. Realised and forecasted decommissioning – offshore wells by well type

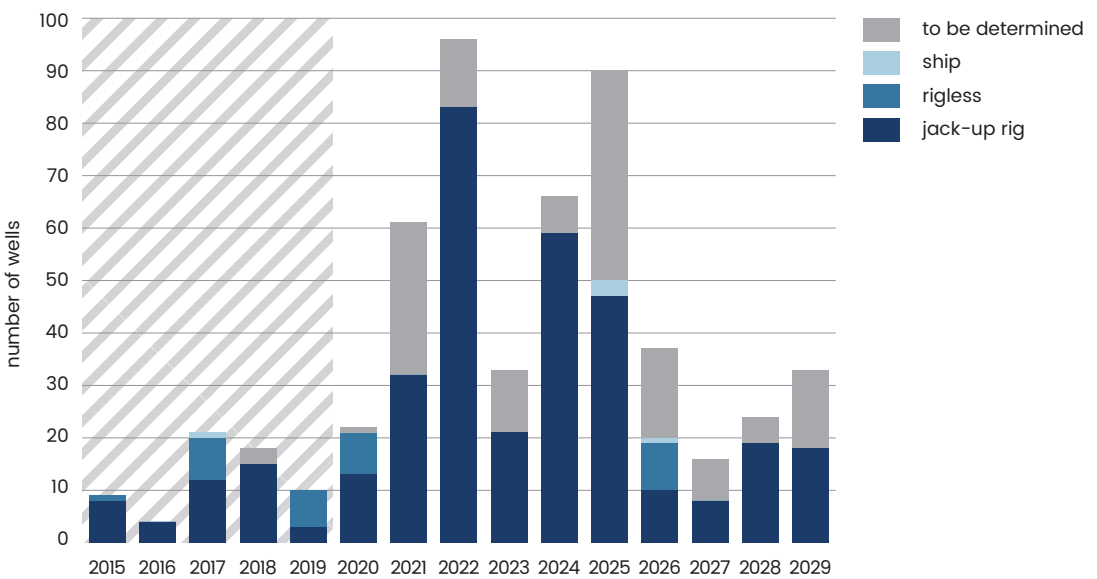


Only a modest number of wells is expected to be decommissioned rigless as this method is typically only possible on larger size platforms. The majority of the satellite platforms are either too small with limited to no lay-down area or have limited deck loading capacity to host a hydraulic workover unit. The majority of wells therefore are likely to require a jack-up rig for the decommissioning.

If rigless decommissioning would be possible this could reduce the cost substantially. Nexstep is aiming to get so-called Through Tubing Cementation introduced for decommissioning of wells in the Netherlands like it is in the UK.

See also the Road to 30% section on Through Tubing Cementation on page 28.

Figure 2.2.2. Realised and forecasted decommissioning – offshore wells by decommissioning method



Road to 30% Frank de Lange



Chair Road to joint execution

A large study into the decommissioning of wells in the Dutch sector of the North Sea shows that coordination and collaboration across multiple assets and industry partners provide many opportunities for optimisation, large scale efficiency gains and cost reductions.

To realise these benefits, the sector must prepare itself now, so that the industry is equipped for the anticipated increasing workload of the upcoming years.

Collaboration is something that does not always come naturally and has to be learned. It is best to start with the simplest approach and build complexity as experience is gained. The Nexstep wells committee has therefore decided to investigate the feasibility of developing a joint execution campaign to decommission Mud Line Suspension (MLS) wells in the Dutch sector of the North Sea. MLS wells are stand-alone exploration or appraisal wells that have been suspended in anticipation of possible re-use as production wells. However, many of these wells have never been put into production and have not been connected to a pipeline or production platform. They are therefore relatively easy to access with an offshore rig or service vessel and share (to a large degree) the same type of design and technology. These wells are

“Collaboration is something that does not always come naturally”

typically partially, but not permanently decommissioned and require some work to decommission them permanently. Due to the similarities in design and technology and independence of existing offshore platforms and infrastructure, decommissioning of these wells provides an ideal starting point to develop a joint execution campaign as a stepping stone towards more complex decommissioning campaigns.

An inventory of the wells identified approximately one hundred MLS wells that require final decommissioning. These wells are owned by several operators and cover a substantial part of the North Sea. This number of wells provided a meaningful and impactful scope to pursue opportunities for optimisation, large scale efficiency gains and cost reductions. The wells committee completed the first phase of this study by mid-2019 by demonstrating that a jointly planned and executed decommissioning campaign of the MLS wells could yield a cost reduction of at least 30%. These efficiency gains are a result of using a standard

approach to the decommissioning of these wells and of removing the well materials up to 6 meters below seabed in a safer and more efficient manner. The large number of wells allows campaign efficiencies, creation of a learning curve, application of innovative technologies and benefits from market forces. The study also identified an opportunity to execute part of the decommissioning activities with standard offshore vessels, rather than using a more traditional mobile drilling rig.

The Executive Committee provided the green light to proceed with a follow-up study in June 2019. Subsequently, two work groups were established to develop the second phase of the project. Working together with the wells committee, these work groups represented the full cross section of staff from participating operators, providing both technical, commercial and legal expertise. Working collaboratively across multiple operators provides a good test case to make decommissioning more efficient. Earlier this year we also engaged with the decommissioning service industry by sending out a request for information to assess their capability and to identify the latest innovations and decommissioning techniques for MLS wells.

The road to joint execution is now heading towards specifying the detailed work scope for each well and preparations for establishing contracts and agreements needed to carry out a joint decommissioning campaign. If all goes according to plan, we hope to execute the first campaign in the summer of 2021.

P15 Subsea Protection Frames

TAQA Energy

Preparation

~2 years. Offshore work: one week

Wells

The subsea wells, P15-10s, P15-12s & P15-14s, have been decommissioned in 2018 by TAQA with the Maersk Resolute drilling rig.

Subsea

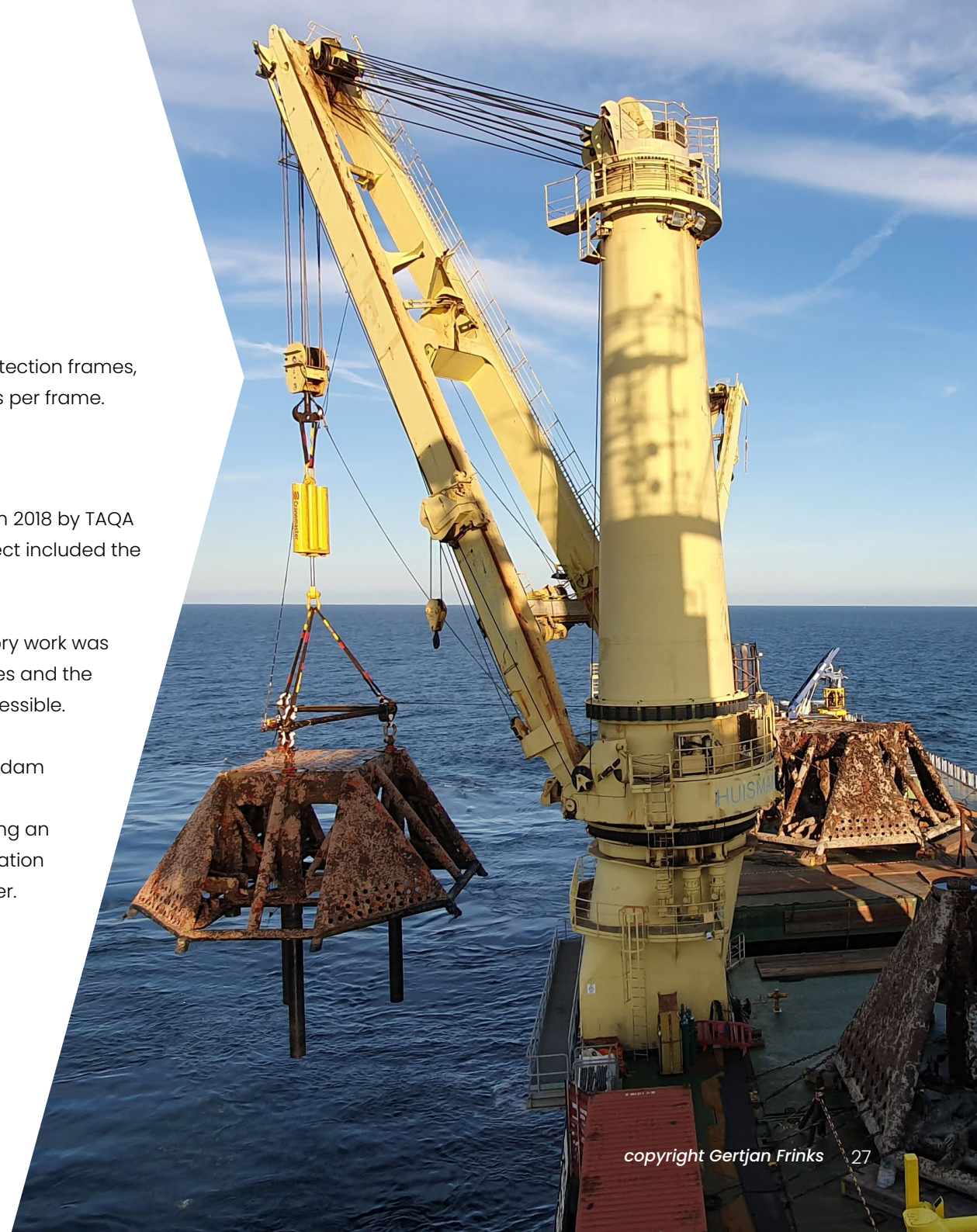
3 Subsea well protection frames, weight ~110 tonnes per frame.

Project summary

The subsea wells, P15-10s, P15-12s & P15-14s, have been decommissioned in 2018 by TAQA with the Maersk Resolute drilling rig. The 2019 subsea frame removal project included the removal of three wellhead protection domes in the P15 block.

Simultaneously with the well decommissioning, diving assisted preparatory work was executed; the flowlines and umbilicals were disconnected from the frames and the frame foundation piles were internally dredged and confirmed to be accessible.

In the summer of 2019, the Jumbo MV Fair Player left the harbour of Rotterdam and sailed to the P15 block. At location, the frame foundation piles were confirmed to be empty and the piles were cut 6 meter below seabed using an internal abrasive jet cutting tool. After completion of the pile cutting operation the frame was lifted from the seabed and stored on deck of the Fair Player. Work on location was concluded by covering the pipeline and umbilical ends with concrete mattresses and an as left ROV camera survey. The steel structures have been recycled.



Road to 30% Jules Schoenmakers



Chair Road to rigless well decommissioning

Knowing that the decommissioning of wells by far accounts for most of the total decommissioning costs, and that there is an expected peak in offshore well decommissioning around 2024, it is Nexstep's goal to have rigless well decommissioning available by 2023.

Nexstep has started by investigating how to get the Through Tubing Cementation (TTC) method implemented in the Netherlands. This technique is applied in many wells in the UK and elsewhere but is not a common technique in the Netherlands. It involves using the production tubing to easily place extra-large cement columns in the well. The tubing remains in place like well casings. This technique is more efficient, safer and reduces waste and emissions. It can be performed without a drilling rig and can then be – besides the safety and environmental advantages – an important contributor on the Road to 30% while fulfilling Nexstep's HSE goals.

In 2019, we started with a lot of investigative work. We contacted our neighbours in the North Sea basin to find out their experiences with TTC. The conclusion was that TTC is widely applied in the UK with good results compared to conventional

decommissioning. We also talked to contractors offering TTC as a technique to the market and got useful information where TTC has been applied recently. Next, we started working on a framework on how to determine which wells are suitable for decommissioning with TTC. We are nearly finished with this framework and will soon continue discussions with State Supervision of Mines on trials with TTC. Trials are planned for the second half of 2020 and then we prepare for getting TTC available as a decommissioning technique in the Netherlands by 2022.

Application of TTC in the decommissioning of wells will lead to safer and more environmentally friendly operations. Our expectation is that applying TTC as a decommissioning technique on wells that are suitable for it could lead to savings in decommissioning costs of around 300 million euros in the Netherlands.

“Application of TTC in the decommissioning of wells will lead to safer and more environmentally friendly operations”

2.3 Offshore installations

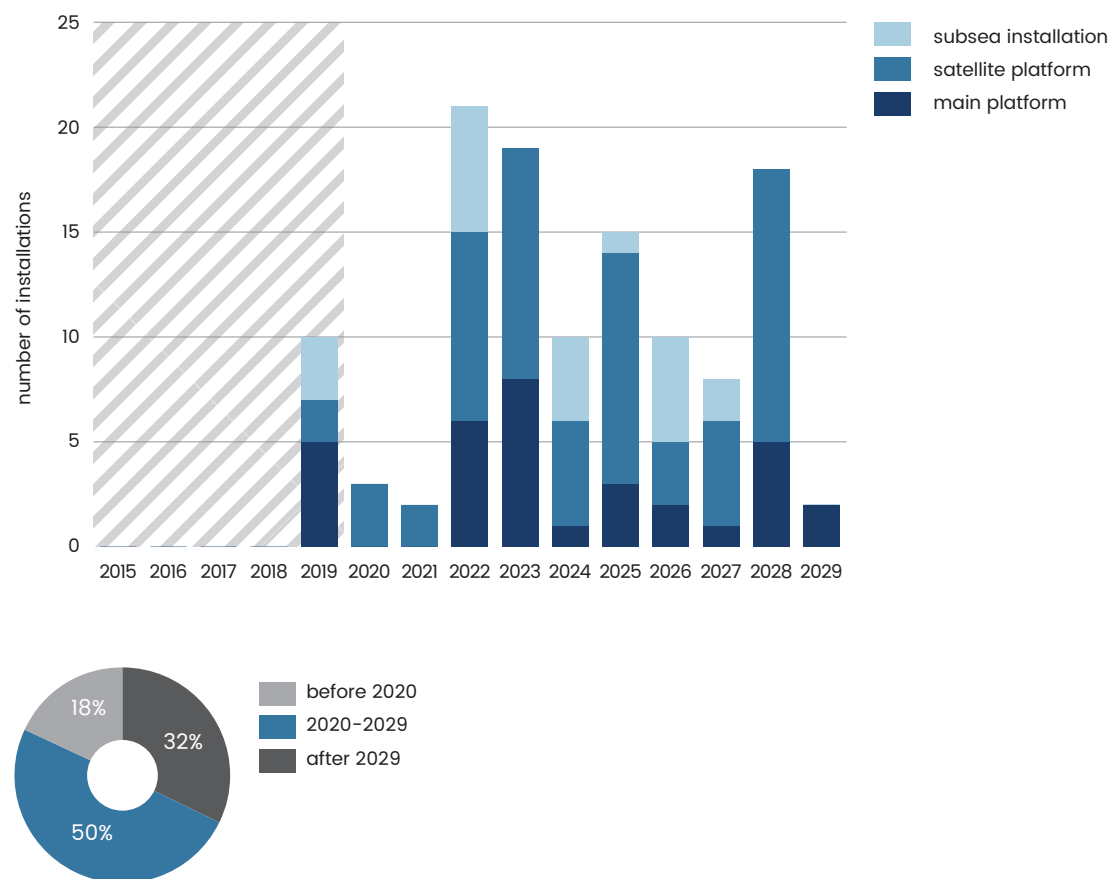
As forecasted last year, 2019 has proven to be a year with high activity. Last year, a total of ten platforms and three subsea installations had been forecasted to be removed. Due to a delay in the arrival of the crane vessel three satellite platforms which had been scheduled to be removed in 2018-2019 were actually removed early 2020. Throughout this report you will find summaries of recent decommissioning projects.

The E18-A topside has been re-used for the second time which brings the total number of topsides which have been re-used in the Netherlands to fifteen (45%). So far, re-use has only been realised for joint ventures with the same operator.

The estimated offshore activity in 2020 and 2021 is low; in 2021 only two satellite platforms will be removed which is related to the planned wind farm Hollandse Kust Noord. The high activity projected last year for 2021 has shifted to 2022. However, the forecasted activity level for the coming five years has not changed except for a minor acceleration in the number of main platforms and deferral of satellite platforms.

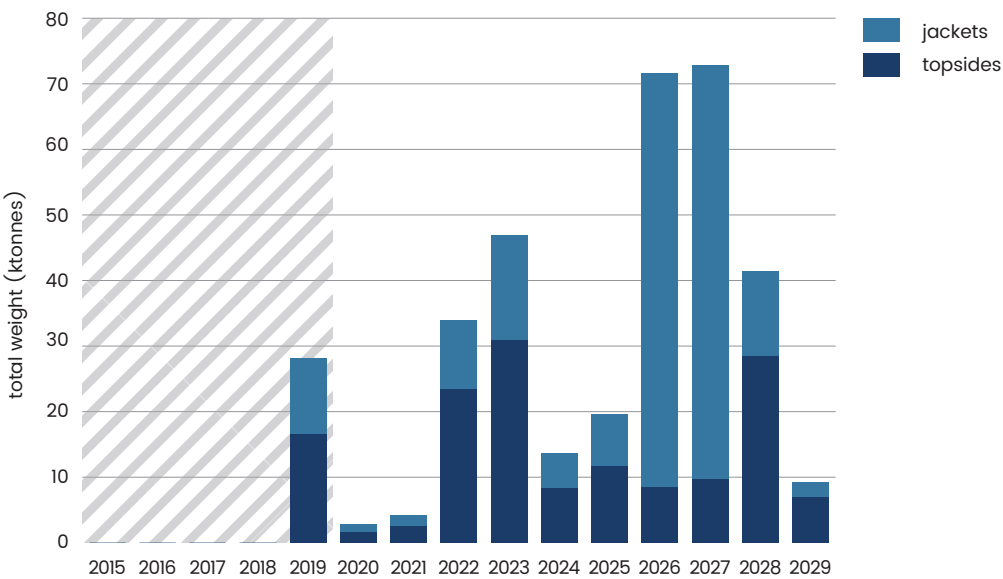
Nexstep has pointed out earlier that there is quite a time gap between the years forecasted for decommissioning and potential repurposing. Therefore, the industry is setting up an inventory of assets which are candidates for repurposing such as CO₂ storage or hydrogen generation. Depending on the business case these assets may need to be preserved for the period in between. Also, regulations for the repurposing of oil and gas infrastructure need to be developed.

Figure 2.3.1. Realised and forecasted decommissioning – offshore installations by type



The expected weights of decommissioned offshore installations in 2021 and 2022 show an increase compared to last year's report related to a shift from satellite platforms to main platforms which typically tend to be larger and heavier.

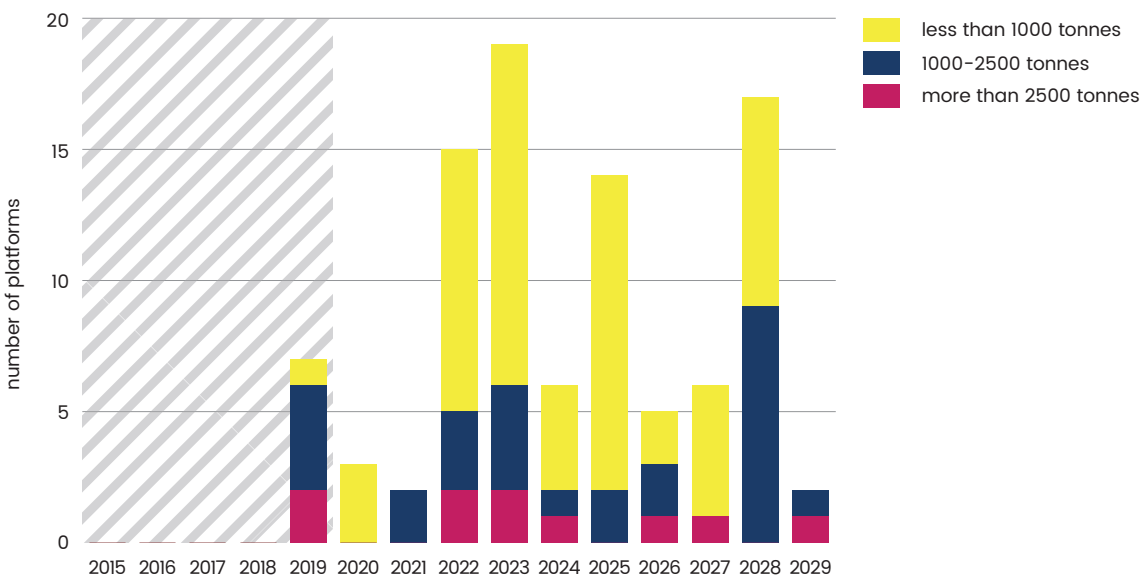
Figure 2.3.2. Realised and forecasted decommissioning – offshore installations weights



The platforms in the Dutch sector are relatively small compared to the ones in the UK's and Norway's central and northern North Sea. Therefore, for the removal of the Dutch installations a larger fleet of crane vessels will be available.

The graph with the heaviest module for each platform shows that most of the required lifts over the next decade will be less than 1,000 tons. Only eight of the lifts will be over 2,500 tons of which five between 4,000 and 7,000 tons.

Figure 2.3.3. Realised and forecasted decommissioning – offshore installations by heaviest module weight



Road to 30% Ruud Schulte



Chair Road to Re-use

Already in 2018 Nexstep looked into possibilities for repurposing infrastructure. The four most promising options are: electrification of platforms (not really a repurpose option in itself, but a prerequisite to make repurposing possible), offshore storage of CO₂ hydrogen production and geothermal operation in onshore wells.

Existing infrastructure can be re-used in the future, but in order to enable re-use opportunities we have to carefully 'mind the gap' between the moment that parts of the existing infrastructure become available and the moment that these parts can be re-used.

Nexstep's Re-use & Repurposing (R&R) committee conducts dedicated studies to investigate what the crucial parts are and develop tools for determining re-use possibilities. A graduate intern developed a model which can assess possibilities for re-use and repurpose while keeping in mind the timeframe in which infrastructure becomes available.

The R&R team took the initiative of investigating the possibility of an offshore hydrogen production pilot, which is now being developed as the PosHYdon project on Neptune Energy's Q13a-A platform. This pilot is the result of the successfully completed (fall 2019) feasibility study that concluded that there

are several suitable options for a hydrogen pilot. The R&R team also looks at possibilities for platform electrification and organised a shared learnings session to collect operators' experiences.

The R&R team invites subject matter experts to their meetings to discuss and identify new possibilities of repurposing infrastructure and thus keeps up to date with the latest innovations (e.g. sustainable energy) and developments such as the offshore electricity grid being developed by TenneT. The R&R team has had fruitful discussions with Tennet experts discussing several potential options to connect platforms to TenneT's upcoming offshore grid infrastructure. Connecting platforms to the future E-grid will enable significant (CO₂) emissions savings. Part of the discussions identified challenges (technical, economical but also legal) that have to be addressed. An important milestone is the recent (May 2020) announcement that states the government's commitment to update current legislation such that connections will be legally possible. For example connections to the forthcoming windfarm Hollandse Kust Noord.

“A bridge between opportunities and existing infrastructure before these are removed”

Kotter and Logger

Wintershall Noordzee



- wells decommissioning
- platform removal

Platform:

2 twin installations

Kotter, 2 topsides: 6,040 tonnes

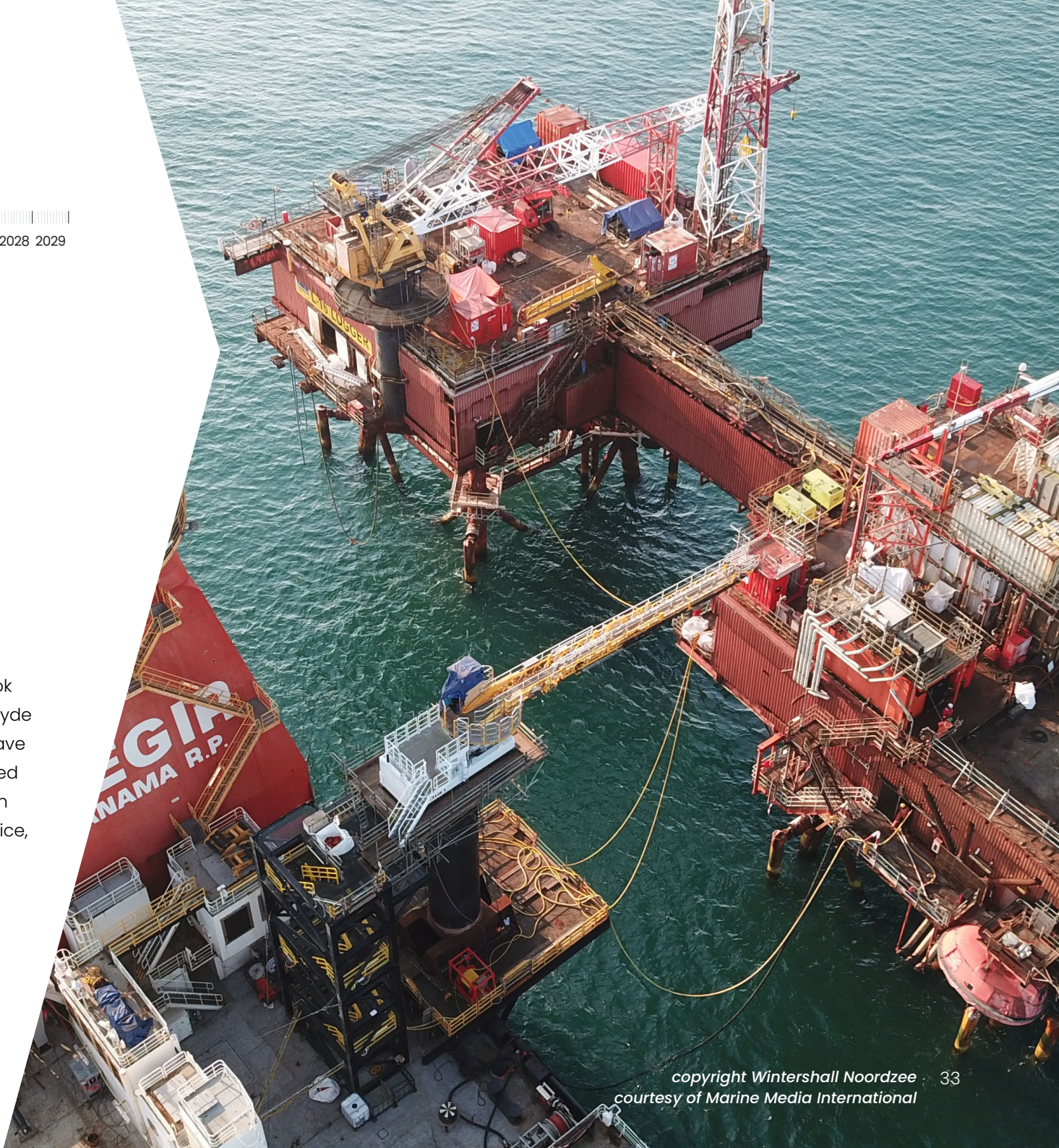
Kotter, 2 jackets: 4,160 tonnes

Logger, 2 jackets: 2,380 tonnes

Logger, 2 topsides: 2,830 tonnes

Project summary

The Kotter and Logger oil production installations were installed in 1984 & 1985. In 2002 Wintershall Noordzee took over the license and operations via the acquisition of Clyde Petroleum. Since then Kotter (K18b) and Logger (L16a) have produced around seven million barrels of oil and reached a recovery factor of more than 60%. Because production had been declining and because of the prevailing oil price, production was ceased in 2015 and the oil processing equipment and flow lines were taken out of operation. The pipelines between Kotter and Logger and between Kotter and the Helder installation of Petrogas were cleaned and blinded off in August 2015.



The platforms were changed into Normally Unmanned Installations, but for the decommissioning of the Logger platform wells mid 2017 the installation was manned again. All seven Logger wells were successfully decommissioned by means of a Hydraulic Workover Unit (HWO), followed by the decommissioning of six Kotter wells in Q1 2019. By choosing the same approach and HWO for both installations lessons learned could be effectively implemented.

Removal of the Kotter and Logger installations was previously discussed in 2015, but it was eventually decided to postpone the project. By the end of 2018 an opportunity for removal of both platforms occurred for Q3 2019. Though the Kotter and Logger removal was not foreseen for 2019, the removal retender was initiated resulting in considerable savings compared to the planned removal in 2021. In April 2019 the scope was granted to Heerema Marine Contractors. Preparational work was executed upfront, partly in parallel (i.e. installation visits, engineering and re-instatement), partly directly after decommissioning of the Kotter wells, followed by the actual execution phase.

During well decommissioning all conductors were cut at least 6 meter beneath seabed, pinned and lifted (to prove successful cut) to remain in-place until final platform removal. After cleaning, the Kotter and Logger associated pipelines were isolated from the production facilities. The 8-leg Kotter production platform and a 6-leg wellhead platform were connected by a bridge, as were the 4-leg Logger utilities platform and the 4-leg production platform. In total 14 lifts and 7 transports were required to bring all modules safely to the Hoondert yard in Vlissingen. All lifts were executed by the Heavy Lift Vessel (HLV) Aegir, except for the Kotter production topside lift. The HLV Thialf lifted this topside on deck of a barge, for transport to Vlissingen. After a minimum preparation phase of only 3 months, further engineering and review offshore on site, maximum collaboration between Wintershall and Heerema Marine Contractors, optimum collaboration

with the Marine Warranty Surveyor, the Kotter and Logger platforms were removed in a period of 10 weeks offshore. An amount of over 15,000 tonnes of structures/modules were removed, without any safety incidents.

Continuously monitoring of the (HLV) market and being flexible enough to step in when the opportunity arose, finally resulted in considerable savings. During the very short preparation time close cooperation with the Marine Warranty Surveyor (MWS) proved to be essential. The MWS, who had an engineering background and decom experience, reviewed most of the reports upfront, and continued his work offshore. This cooperation turned out to be very valuable. It is key to have experienced operational team members available, who are familiar with the installations. Their knowledge is important during preparations (offshore visits with the contractor), execution of the removal (intervene in case of unexpected events) and even during disposal to guide the disposal contractor if required.



Road to 30% Maarten Liebreks



Chair Road to Heavy Lift standard

Optimising the entire removal process of topsides and jackets is only possible in cooperation with the service industry. Nexstep has taken the initiative to organise several workshops with representatives from the heavy lift contractors.

“Optimising the entire removal process of topsides and jackets is only possible in cooperation with the service industry”

The service industry comes together in the IRO, and operators have extensive cooperation in NOGEPA and Nexstep, but both parties have never been together in this way. In addition, operators and the service industry have an opposite strategic angle: the operators want to remove their infrastructure as efficiently as possible, while the service industry naturally wants to protect its margins. The contractors who have participated are also competitors of each other. So, the question was to what extent they would like to put all their cards on the table. To ensure that we would not cross borders anywhere, the legal advisors of NOGEPA were involved. They ensured that we did not talk about prices and contracts, but purely about the general challenge: how do we remove the assets in the North Sea responsibly? And above all: how can we highlight the aspects that are of interest to both parties?

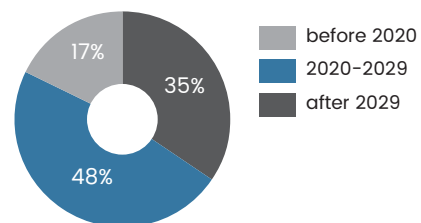
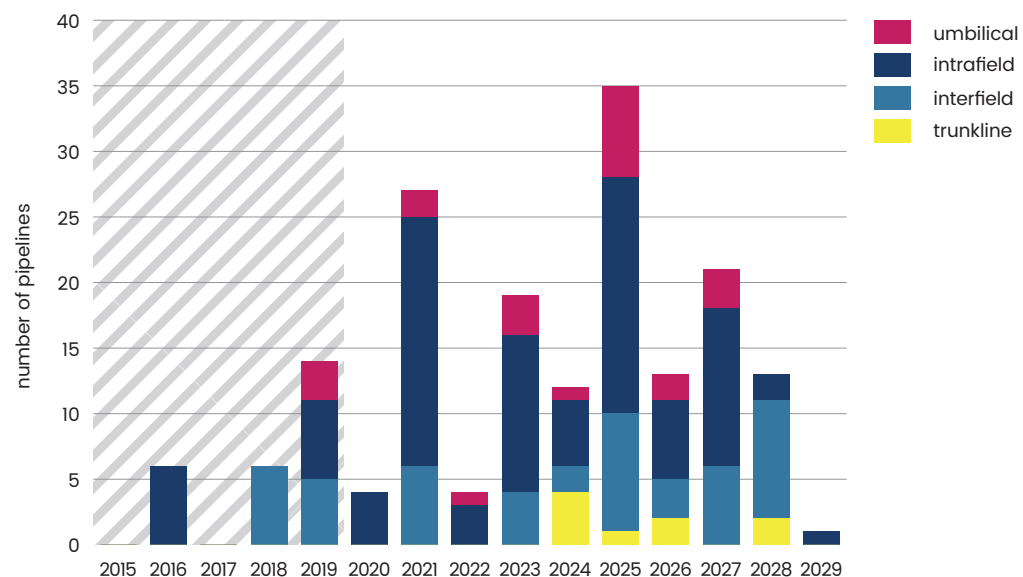
During the first workshop, it emerged which harmonisation and standardisation of processes could yield benefits for both parties. There are some 150 platforms in the Dutch North Sea. Steps occur in the decommissioning process that are always the same. But when you have to read the same list of terms and conditions 150 times and have to reach the same agreements over and over again, a lot of time is lost. Then we'd better agree on a standard. From the discussions with the service industry, the following priorities need to be addressed:

- Validated Risk Allocation Matrix
- Standardised contract template
- Technical dossier index
- A new approach to the pre-tender information process

2.4 Offshore pipelines

Decommissioning of pipelines typically precedes the decommissioning of the upstream installations; the high decommissioning activity of pipelines in 2021 is related to the high activity in platform removal in 2022-2023. Pipeline decommissioning appears to be more concentrated into campaigns during the years 2021, 2023, 2025 and 2027.

Figure 2.4.1. Realised and forecasted decommissioning – offshore pipelines by pipeline type



Road to 30% Maurits Waaijenberg



Chair Road to value protection pipelines

The current Mining Act states that an offshore pipeline, after being cleaned and secured, can be left at the seabed, unless the Ministry of Economic Affairs and Climate Policy (MEAC) determines that it must be removed.

Legislation and regulations do not elaborate further on the specific criteria or assessment that MEAC uses to decide about the decommissioning of pipelines. The current Beleidsnota Noordzee 2016-2021 however, mentions criteria as spatial planning, safety, environmental impact, but these have never been operationalised. In practice, in most cases MEAC agrees that pipelines can remain in place. For this reason, the pipeline committee recognises that there was a need for a Comparative Assessment (CA) standard from the operators to assess the decommissioning of pipelines. In 2019, the Pipeline committee developed – in close corporation with the regulatory committee – the comparative assessment framework.

The framework provides a roadmap (method) and script for the operator to answer the question if the to-be-decommissioned pipeline can be left in place or needs to be removed based on a risk assessment. It also provides information on request to the authorities regarding spatial planning of the North Sea. For example: the growing amount of wind farms, plans for CCS and plans for hydrogen production.

With this framework, the sector can deal with decommissioning of pipelines, and every operator can use this information for internal decision making for pipeline decommissioning policy on an unambiguously, traceable, comparable and transparent manner.

“With this framework, the sector can deal with decommissioning of pipelines”

The developed framework:

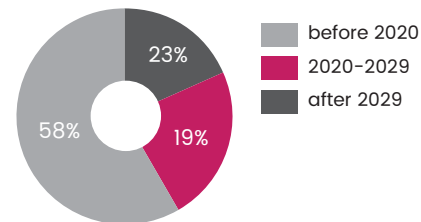
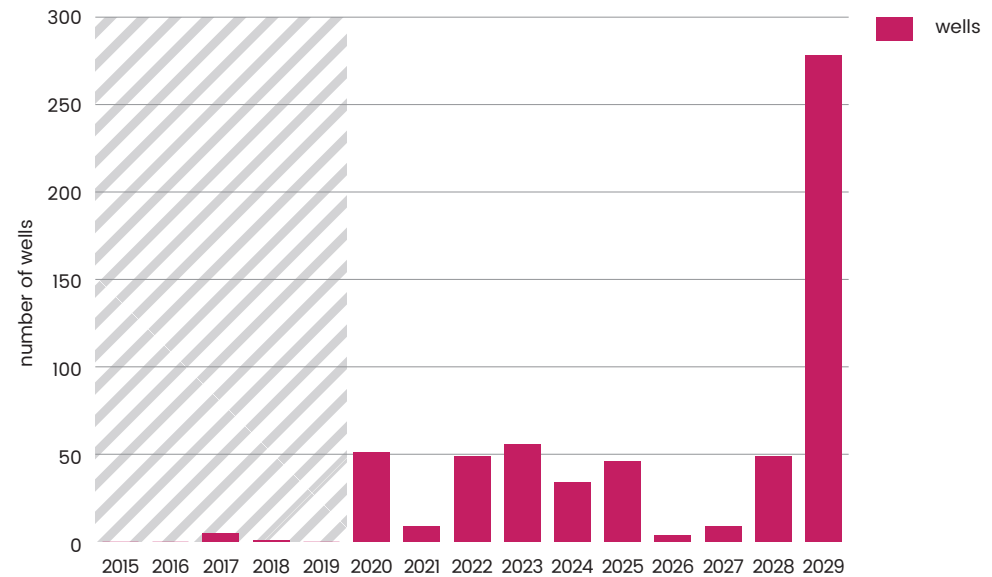
- Allows operators to use the current systematics and docs for internal planning, costs/value prediction, best decommissioning option, accountancy rules and policy making
- Allows, if implemented in a standard, convergence on decommissioning assessments between operators

The CA tool has been tested by operators to check its usability on assessing pipelines. With some final adjustments to be made, we expect it to be finalised before summer for internal use. Also, the issue of future regulation for decommissioning of pipelines is part of conversations with various government authorities.

2.5 Onshore wells

The decommissioning of onshore wells shows an acceleration of activity related to the closing of the production from the Groningen field by 2022. With an average duration for decommissioning of two to three weeks per well a rig or unit may decommission seventeen to twenty-six wells per year. The data show a peak of decommissioning activity in 2029 which in practice will likely be spread out over several years to attain a lower yet stable activity level for a longer period.

Figure 2.5.1. Realised and forecasted decommissioning – onshore wells



2.6 Onshore installations

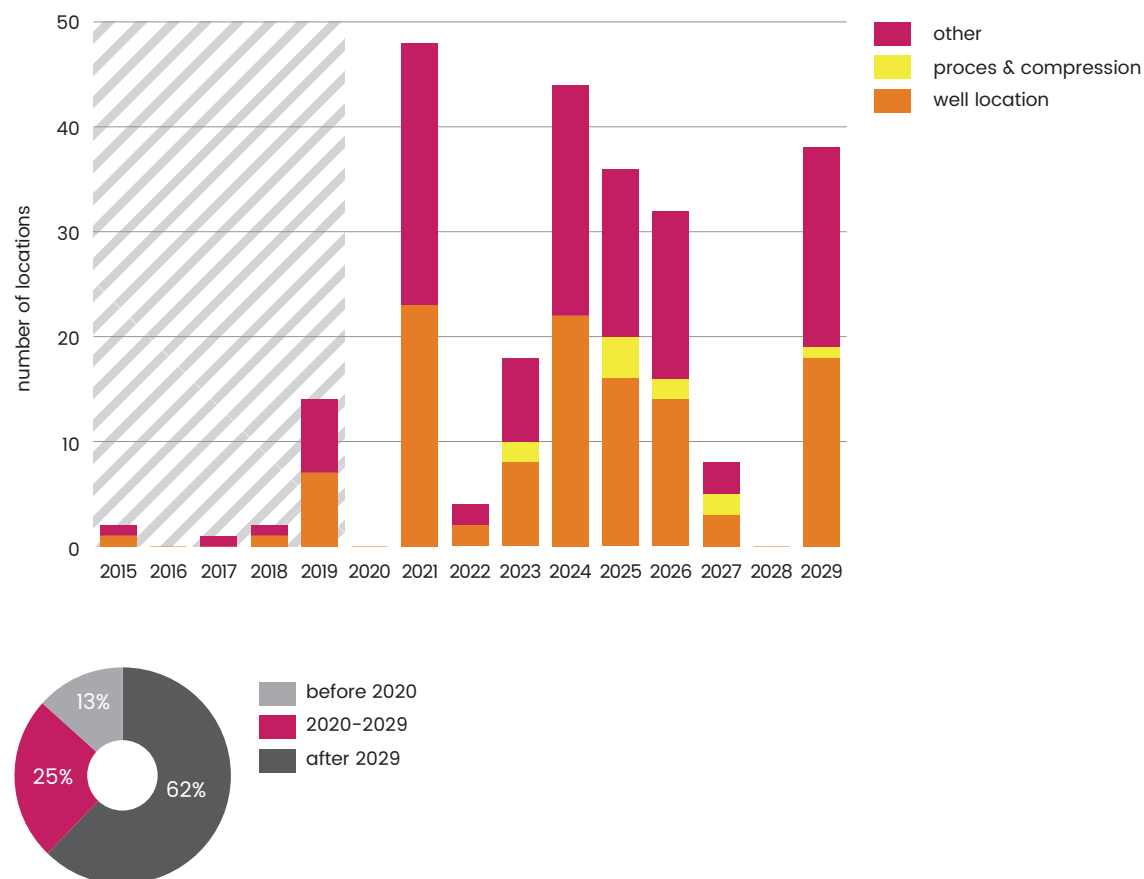
Compared to the forecast of last year's report there is a clear acceleration of the decommissioning of well sites beyond 2020. Obviously, this is related to the accelerated closing of the Groningen field by 2022 and subsequent earlier decommissioning of the twenty-two well sites.

For onshore locations, the industry is setting up an inventory of potential repurposing for the development of biogas, green gas, hydrogen, geothermal production, or solar power generation. After thirty-one years of service NAM's Gas Zuivering Installatie (GZI, a sour gas treatment installation) in Emmen ceased operation and was cleaned in 2018 and by the end of 2019 the processing installations were removed. The location will be transferred into energy hub GZI Next to produce green gas and green hydrogen from solar power panels.

Of the current 453 onshore locations the majority (62%) will be decommissioned from 2030 onwards. By 2050 all locations are expected to be decommissioned.

In 2020, Nexstep will organise a Shared Learnings session on possible repurposing of onshore facilities. With the outcome of this session we will be able to determine the potential number of facilities that may be repurposed. It is expected that the repurpose potential will be quite significant.

Figure 2.6.1. Realised and forecasted decommissioning – onshore installations by installation type



interview: René Jansen



General manager Decomm and Energy Hubs at NAM

Connecting the old with the new

The Netherlands faces the challenge of transforming its energy landscape to meet key climate goals by 2050. To accelerate this energy transition, existing infrastructure that can be repurposed is being examined. "A gas extraction location like the former GZI site in Emmen as an energy hub plays an important role in this," says René Jansen, manager for the D&R (Decommissioning & Restoration) and Energy Hubs teams at NAM. "We call this energy hub GZI Next."

When Nexstep was founded, René realised how beneficial it would be to look at repurposing existing oil and gas infrastructure. René became one of the driving forces behind Energy Hubs. "I also manage the D&R team, connecting the old with the new. The Energy Hubs team evaluates repurpose opportunities of the facilities before the D&R team decides to remove them."

When did Energy Hubs start?

"The Energy Hub concept was created by NAM in 2018. It represents three key values: re-use, collaboration and integration of different energy resources (hydrogen, green gas, wind power, solar energy and geothermal energy). In

the 1960s, the Netherlands switched rapidly from coal to natural gas. Within five years, 80% of households had a gas connection. It would not be easy for us to make everything electric in the Netherlands. Gas is much easier to store and to transport. Also, the losses in transporting electrons are much higher than when transporting molecules. Therefore, we look at how electrons can be converted into molecules at the GZI site."

What made NAM decide to choose the GZI in Emmen as the first Energy Hub?

"In 1986, NAM built GZI, a gas purification plant in Emmen to extract sulphur from sour natural gas. NAM stopped its gas production in Emmen in 2018, but the plant's closure offered new opportunities. We looked at developing the location as an Energy Hub. The good condition of the subterranean piping network could transport new types of energy in the future. GZI Next is perfectly suited to produce at least three types of sustainable energy: solar energy, hydrogen and green gas. The generated green electricity can be used to produce hydrogen and the green gas will be transported via Emmen to Gasunie who can deliver it anywhere in the Netherlands via the existing gas piping network."

You will present your key learnings in the shared learnings workshop of onshore facilities. Could you already share with us some findings?

“As I mentioned, one of our key values is collaboration. I would also like to highlight its importance to the re-use and repurpose committee. For GZI Next, NAM is part of a consortium with EBN, the municipality of Emmen, the Province Drenthe, EMMTEC services, New Energy Coalition, Gasunie and GTS. Companies on their own would never be able to take on the energy transition, and you need to work together, as every partner has their unique knowledge. An example for GZI Next is the collaborative effort of the consortium to win the HEAVENN subsidy for the GZI Next Hydrogen project where the northern part of the Netherlands has been identified as the Hydrogen Valley. In addition, with all these different organisations we quickly learned the importance of having a governance structure. Coordinated action, communication with one voice and having one message is key.”

“Companies on their own would never be able to take on the energy transition”

What is the status of the GZI Next project?

“Construction of the solar park started in May this year. The solar park will have a twelve megawatt capacity, comparable to the energy consumption of 4,500 households. For 2021, it is the plan to build a Hydrogen Refueling Station (HRS) to provide hydrogen for the region. For example, this HRS could supply hydrogen to busses and transport passengers in Emmen using hydrogen! In 2022, it is the plan to build a ten megawatt electrolyser to provide hydrogen to the industry and mobility sector. The PosHYdon project that Nexstep initiated together with TNO, will place an electrolyser on the Q13a-A platform with which hydrogen can be produced. We can share learnings with each other.”

How do you view the future of the energy transition?

“I’m someone who thinks the glass is half-full and am convinced that the energy transition will be successful. Nexstep helps us by stimulating re-use and collaboration in decommissioning of oil and gas infrastructure in the Netherlands. Together, we all contribute to the energy transition.”

GZI

NAM



2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029

Facility

Gas processing facility (desulphurisation unit)

Steel weight: 18,000 tonnes

Concrete weight: 90,000 tonnes

Other waste: 10,000 tonnes

Project summary

The Gas Zuivering Installatie (GZI) in Emmen was built in 1986 and was installed to process all the sour gas produced in the Emmen region. With the depletion of gas production from the fields, it was not profitable to keep using GZI. Hence, it was decided to stop the production in 2018. Sour gas production from Gasselternijveen (GSV) and the Emmen fields (EMM-8 and EMM-11) was also ceased together with the closure of the GZI. The EMM-8, EMM-11 and GSV-1 are the so-called satellite locations and were part of this decom project.

The GZI and satellite locations were cleaned between late 2017 and October 2018. The facility decommissioning began October 2018 and was concluded in December 2019. The building and concrete removal scope started as of March 2020 and will continue until October 2020. This will conclude GZI decommissioning.

GZI is being used as our first Energy Hub. The whole location with a footprint of some 45 hectare shall be equipped as a solar park, green hydrogen generation facility and biogas facility.



The main contractors involved were:

- VSM Sloopwerken (demolition contractor for piping and mechanical components)
- Meuva B.V. (demolition contractor for removal of civil infrastructure)
- SGS Search (project management company for piping and mechanical components)

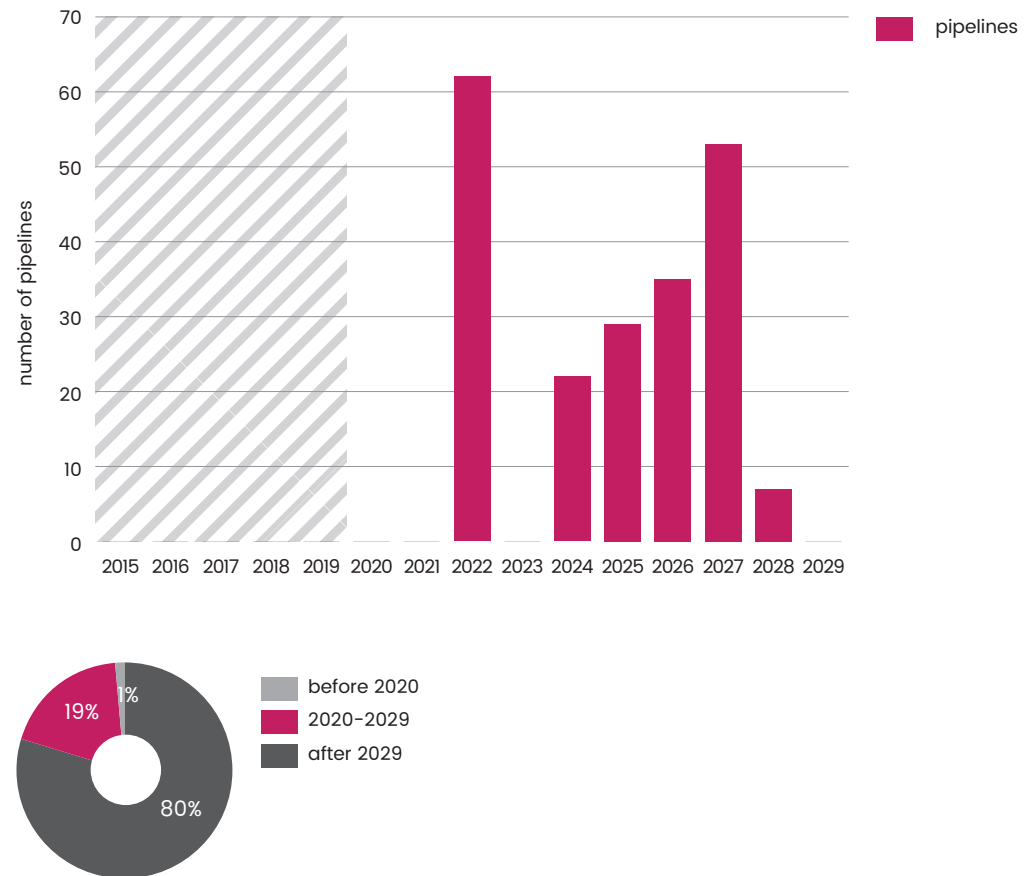
The contractor HSE assessment and demolition techniques must be thought about carefully in the front end of the project.



2.7 Onshore pipelines

With the accelerated decommissioning of the Groningen wells and well sites, the decommissioning of the associated pipelines sees a similar acceleration of activity. Onshore locations may be of value for repurposing the pipelines to produce green gas or green hydrogen, especially when the locations have access to pipelines that can transport the product into the existing natural gas grid.

Figure 2.7.1. Realised and forecasted decommissioning – onshore pipelines



Road to 30% Joep Sweyen



Chair regulatory committee

The regulatory committee is not the owner of one of the roadmaps but serves as a linking pin in “The Road to 30% program”.

The regulatory committee is represented in each of the roadmap teams, providing legal, regulatory, stakeholder and public affairs input. Doing so, this committee functions as a bridge between the internal and external perspectives that influences our industry.

A big milestone for the regulatory committee was when the Mining Regulation was updated with Standard 45. Standard 45 was established in 2016 by NOGEPA in collaboration with the State Supervision of Mines (SSM). It is one of the many industry standards and is specifically about decommissioning of wells. Taking into account newly developing techniques, Standard 45 reflects on ways to improve the decommissioning of wells. Decommissioning of wells is an important and fast-growing activity for the sector. However, the legislation and the current state of the art were not well aligned. NOGEPA and Nexstep's Regulatory Committee have invested a lot of time and energy in improving this alignment in recent years. This has now led to the Mining Regulation being updated (by 1st April 2019) in collaboration with the Ministry of Economic Affairs and Climate Policy and regulator SSM.

Also, the Regulatory Committee focusses on a good relationship with various authorities in the Netherlands, to be able to discuss various issues and the development of the Nexstep roadmaps.

“A bridge between the internal and external perspectives that influences our industry”

Ten Post

NAM



Facility

Gas processing facility

Steel weight: 2,000 tonnes

Concrete weight: 6,500 tonnes

Waste and other stream: 5,000 tonnes

Project summary

The Ten Post gas processing facility is part of the Groningen Asset of NAM. It was developed as part of the original Groningen field and constructed in the early 2000's and completely revamped in 2006-2008 as part of the Groningen Long Term Project. Gas was produced at the production locations and evacuated via the Groningen pipeline ring into Gasunie's high pressure Gas Transport System. Transfer of ownership of the gas takes place at the Custody Transfer Stations.

Gas production and the associated reservoir pressure decline has led to induced seismicity or earthquakes. The Ten Post location was shut-in on ministerial instruction on 2nd February 2018. Ten Post is the first Groningen cluster which was cleaned, de-complexed and decommissioned as part of this project. The Ten Post location is ear-marked for green gas installation. The main contractors involved are Meuva B.V (demolition contractor) and SGS Search (project management company).

Thorough cleaning and proper documentation are important for decommissioning. Emphasis is to be placed on cleaning of mercury. Working with mature demolition contractors is important for ensuring safe execution.



3 Expected decommissioning costs 2020 – 2029

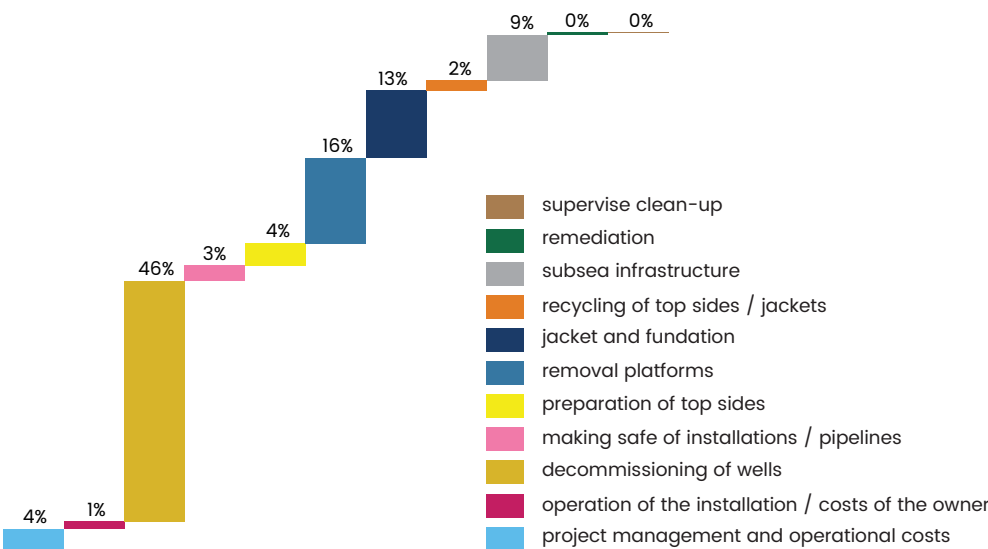
The total cost of decommissioning the oil and gas infrastructure was estimated at seven billion euro back in 2017. In 2019 Nexstep has started the “Road to 30%” program aiming to ultimately reduce the cost of decommissioning by 30%.

The various committees within Nexstep have identified goals and developed plans to achieve this. Of prime importance here is collaboration and innovation between the various operators but also with the service industry, the local authorities and government. By considering decommissioning as a joint effort and by combining similar projects into campaigns Nexstep expects that major savings can be achieved. Furthermore, Nexstep has initiated regular sessions to share their learnings. The learnings are gathered in a database and easily retrievable for associated members.



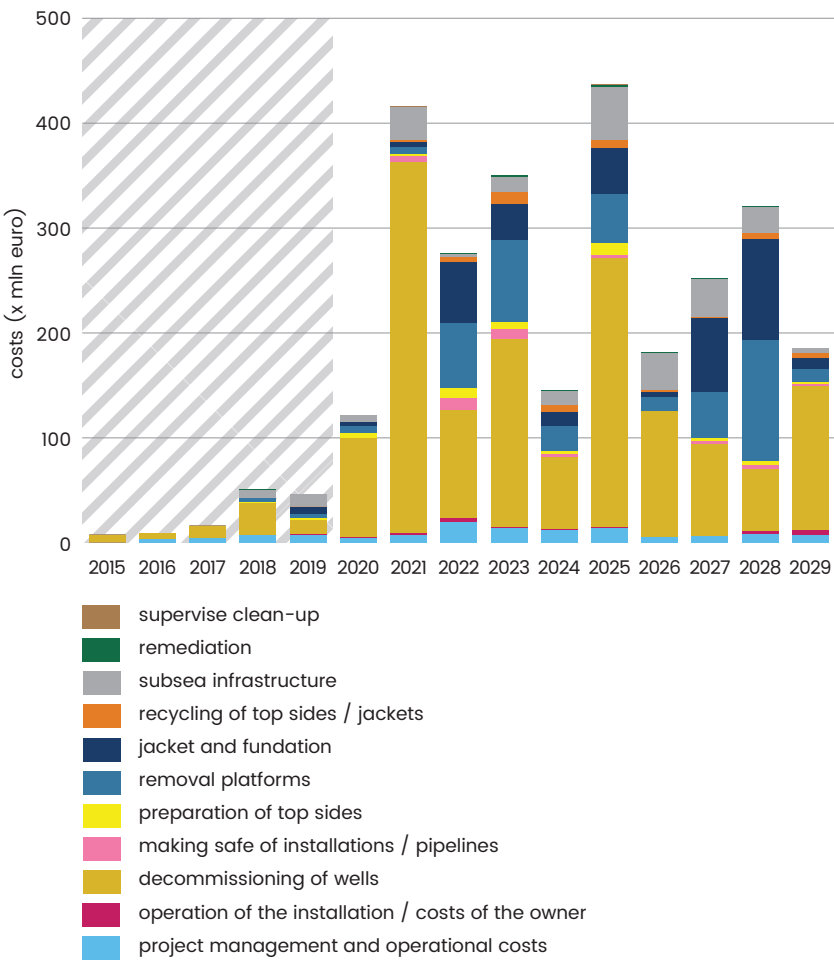
The distribution of the forecasted offshore decommissioning costs over the various activities is, as expected, the same as presented in last year's report. Decommissioning of wells take up the major part of decommissioning costs and is generally faced with higher uncertainties. Next biggest cost are associated with the removal of the topsides and jackets of the offshore platforms, which traditionally depend on the availability of heavy lift crane vessels.

Figure 3.0.1. Total decommissioning costs of offshore infrastructure subdivided by category



The total forecasted decommissioning cost for offshore infrastructure over the next decade amounts to some 2.6 billion euro. This year, the decommissioning activity will be low but for the years thereafter between 150 and 450 million euro is forecasted to be spent per annum on decommissioning.

Figure 3.0.2. Annual expected costs of offshore infrastructure by category



Road to 30% Radboud Bisschop



Team lead Shared Learnings

Learning from other projects is of great value to operator staff. Nexstep captures such learnings in a concise way and makes them available using the 'Shared Learnings' database.

Last year, the functionality of the database was given a software upgrade. The search function and the way each lesson is displayed have been greatly improved. For example, after reading a learning in the database, people can now provide feedback. It is possible to like/dislike learnings and one can provide valuable comments in a text box. In that box one can specify particular applications or limitations. The reviews and comments will enhance each learning significantly.

A built-in feature also tracks the use of each learning. As such, we can measure how often each learning has been accessed and collect the most visited, best liked, et cetera.

Learnings are anonymised and confidential, i.e. available for Nexstep members only. At the time of writing, there are 258 learnings in different categories, a significant number after only two years.

We want to collect as many learnings as possible and encourage people to use them to improve their business and save costs. Experience shows that the simple existence of a database does not mean that people will start using it. More is needed for that. We do this, for example, by organising Shared Learning events and participating in the committees and showing participants where they can find the learnings in the database.

“The simple existence of a database does not mean that people will start using it”