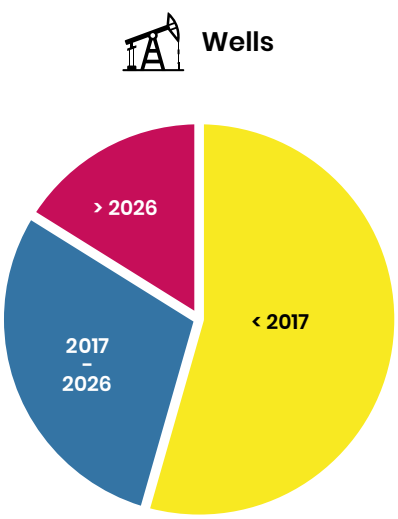
OFFSHORE RE-USE & DECOMMISSIONING INVENTORY

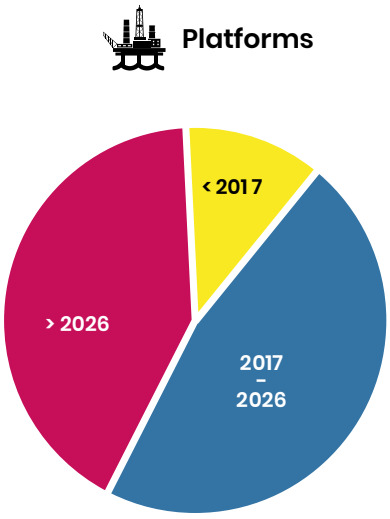
NOGEPA and EBN have initiated the development of a national inventory for all infrastructure associated with the upstream oil & gas industry. A first data collection has been completed for the offshore infrastructure; there are over 150 platforms, over 3,000 km of pipelines and over 600 wells. Details of the offshore collection are presented in this document. A first publicly available overview of the complete off- and onshore re-use and decommissioning landscape and activity is scheduled to be published by mid-year 2018.

The graphs presented in this initial inventory represent the status as per year end 2016. They are based on the initial offshore data collected from the various operators and provide the currently best available information. The forecasted economic life for the assets, and hence the resulting decommissioning activity, will greatly depend on many factors, such as the prices for oil and gas, the fields' production performance, the development of operational costs and the results of exploration for new oil and gas fields. It should be noted that opportunities for re-use and repurposing and initiatives for (joint) decommissioning campaigning will most likely have an impact on the timing of decommissioning.

Due to the inherent uncertainty in the forecasted activity the graphs are restricted to a 10-year forecast window. The charts below provide an indication of the realised and forecasted decommissioning activity. It is clear from these graphs that decommissioning is not a new activity as more than half of all wells ever drilled in the Netherlands have already been decommissioned. For offshore platforms the majority of the platforms is yet to be decommissioned, although the first platform was already decommissioned in 1988.



Timing of well decommissioning (onshore & offshore)



Timing of offshore platforms decommissioning

For the timing of the cessation of production (COP) reference is made to EBN's report Focus On Dutch Oil and Gas (2016) which illustrates the sensitivity to the gas price of the gas infrastructure's cessation of production (Figure 1).

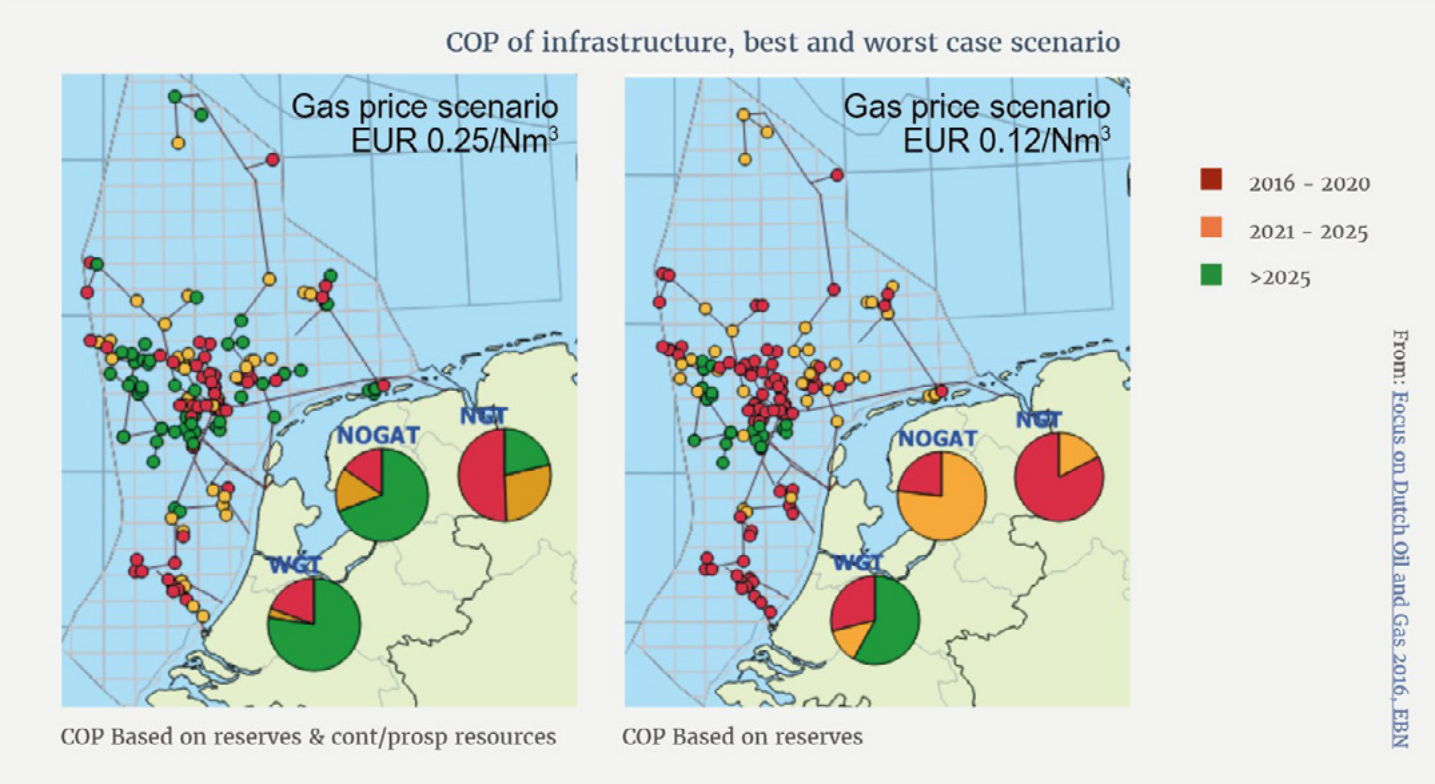


Figure 1: Cessation of production for offshore infrastructure

Offshore Well Decommissioning – by well type

The total offshore well population has been classified into wells which are drilled from a facility (either a platform or a subsea installation) and so called stand-alone wells which typically are suspended exploration or appraisal wells. The vast majority of wells are drilled from platforms. The well type is of importance for selecting the method and equipment required for the decommissioning of the well.

As is clear from the graph (Figure 2) the peak activity for offshore well decommissioning is expected to be in the period 2022-2025. Since detailed engineering for the decommissioning of wells is required, it is of great importance to start this process ahead of time and for operators and service providers to arrange for sufficient resources.

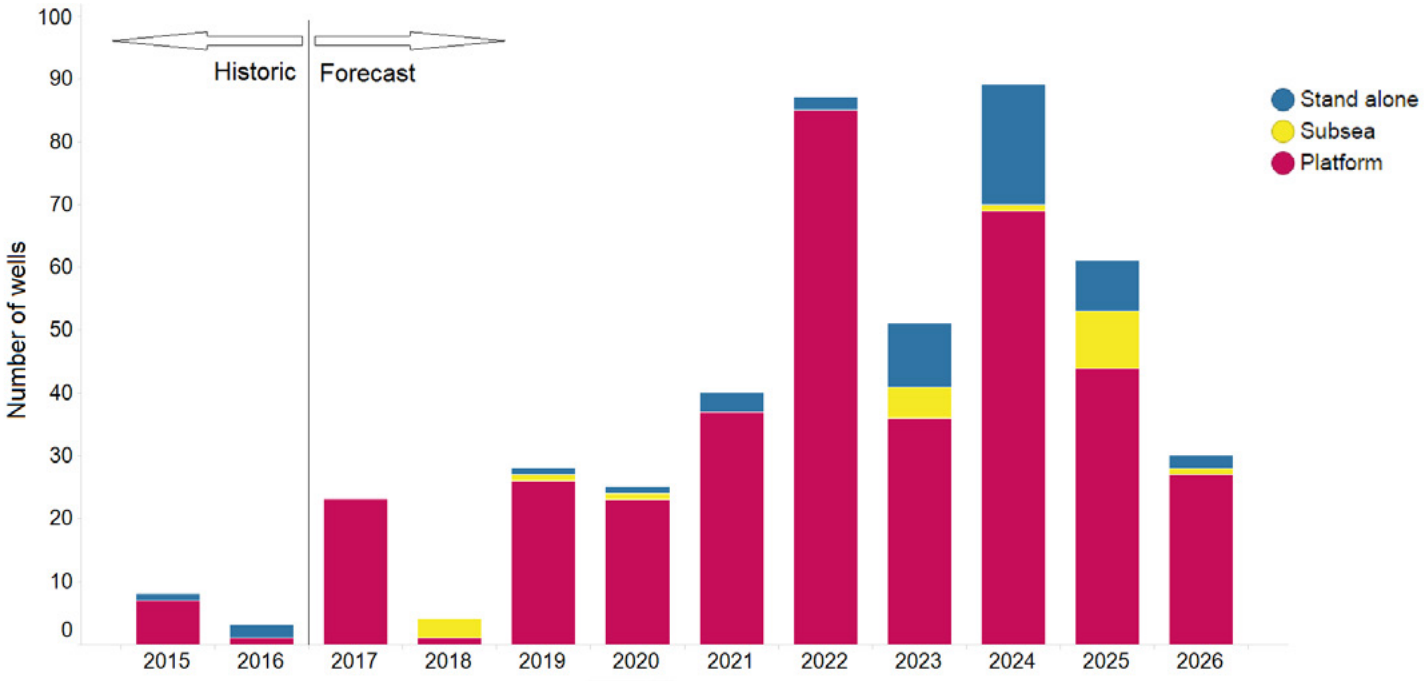


Figure 2: Historic & 10-year forecast of offshore well decommissioning - by well type

Offshore Well Decommissioning – by methodology

The platforms in the Dutch offshore sector are typically relatively small in size and as such will mostly require a mobile jack-up rig for the decommissioning of the wells (Figure 3). Some platforms do have sufficient available deck space to allow the decommissioning of the wells to be executed 'rig-less' by means of a smaller (often cheaper) installation which can be erected on the platform itself. For the stand-alone wells the decommissioning may be executed with a jack-up rig and sometimes by using a vessel; however this will depend on the specific work scope required to decommission each well. For some wells the selection of the methodology is yet to be selected.

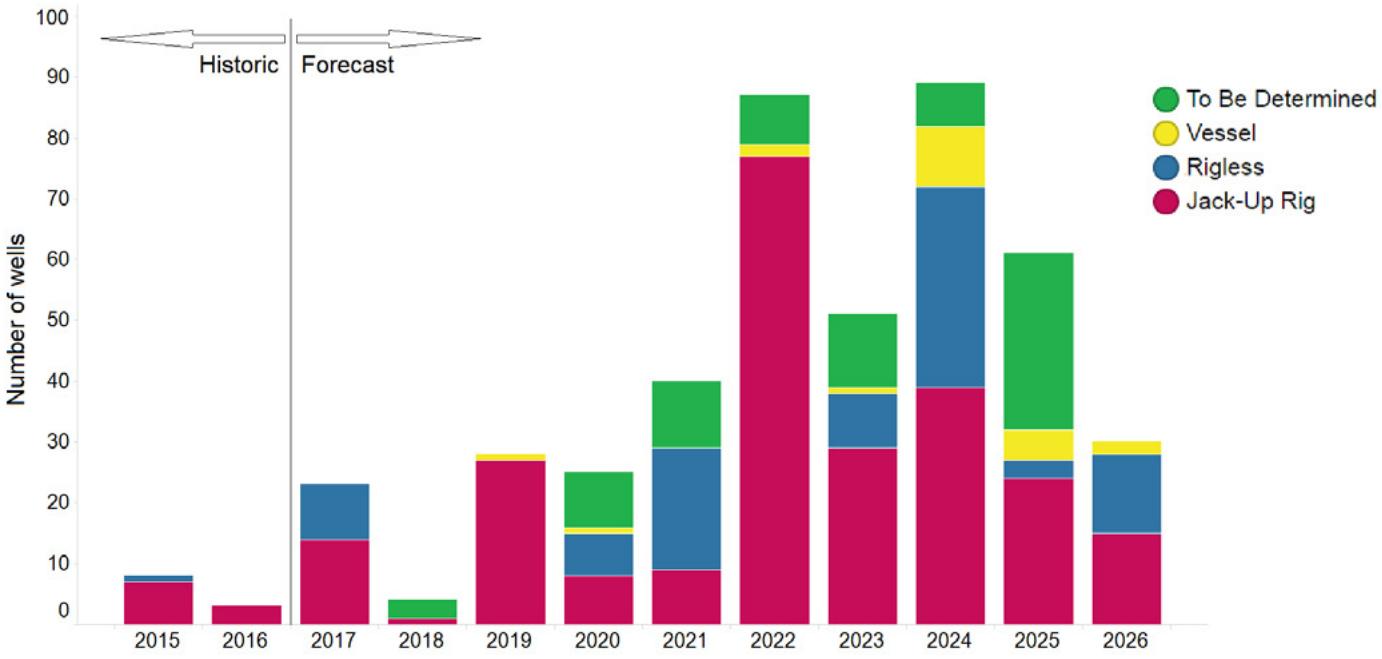


Figure 3: Historic & 10-year forecast of offshore well decommissioning - by methodology

Offshore Facilities Decommissioning - by facility type

The offshore facilities are classified into subsea installations and platforms, either being part of a main central complex or remotely located satellites (Figure 4). The majority of the platforms are satellites.
In the decommissioning of oil and gas assets typically the first activity is the decommissioning of the wells. From the graph it is clear that the forecasted peak activity in the decommissioning of the facilities is between 2023 and 2025 and follows the peak in well decommissioning with one year delay.

To date already 24 platforms have been decommissioned of which 13 topsides (decks) have been re-used for the development of other fields.

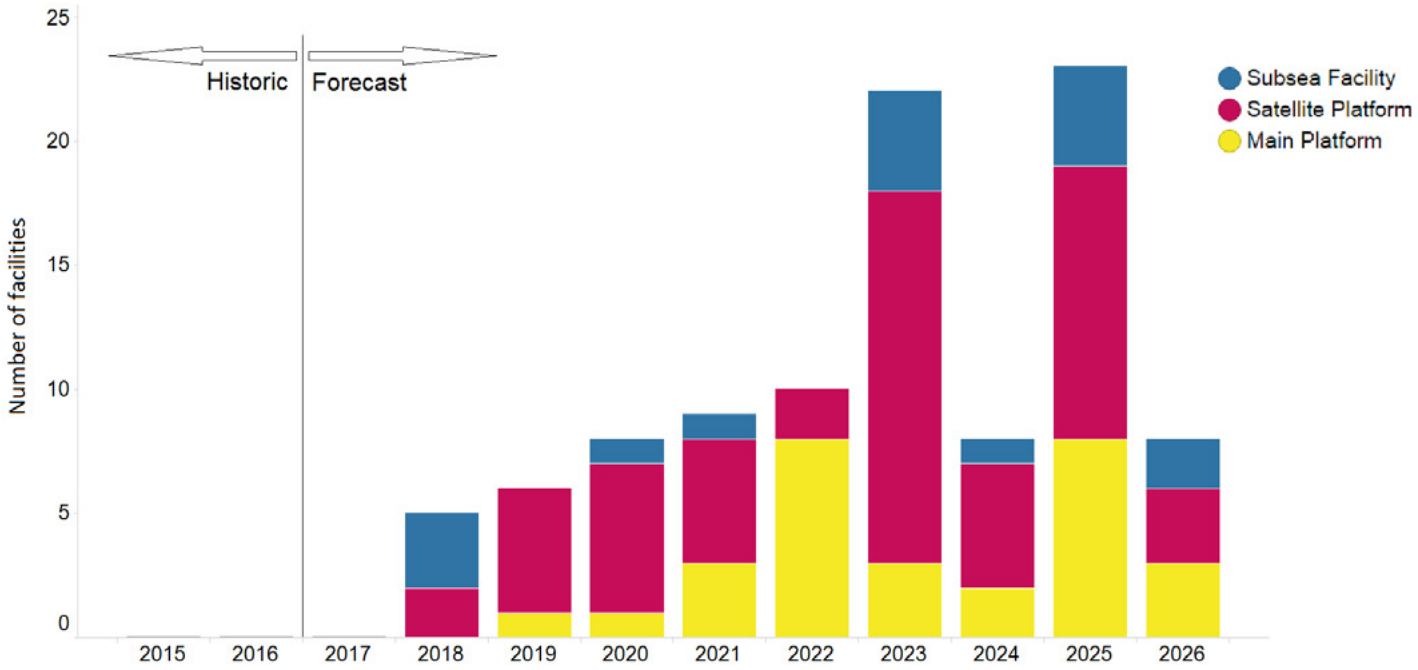


Figure 4: Historic & 10-year forecast of offshore facility decommissioning - by facility type

Offshore Facility Decommissioning – total weight

The decommissioning of offshore platforms requires the topsides or decks of the platforms to be removed, which is typically executed using so-called heavy-lifting vessels with a large crane capacity. Following the removal of the topside the supporting substructure will be removed from the seabed; the vast majority of the substructures in the Dutch sector are steel jacket type structures. The topsides and substructures are transported elsewhere for re-use or to shore for recycling of the materials.

Figure 5 presents the expected total weight for topsides and substructures to be removed. The label in the graph represents the total number of platforms from Figure 4. Platform decks weights may range from 150 to 8,000 tons; an average satellite platform weighs some 750 tons. The platform substructure may weigh between 200 and 4,000 tons, depending on the size and weight of the deck and the water depth. Just for comparison, the total steel weight of the Eiffel tower is 7,300 tons.

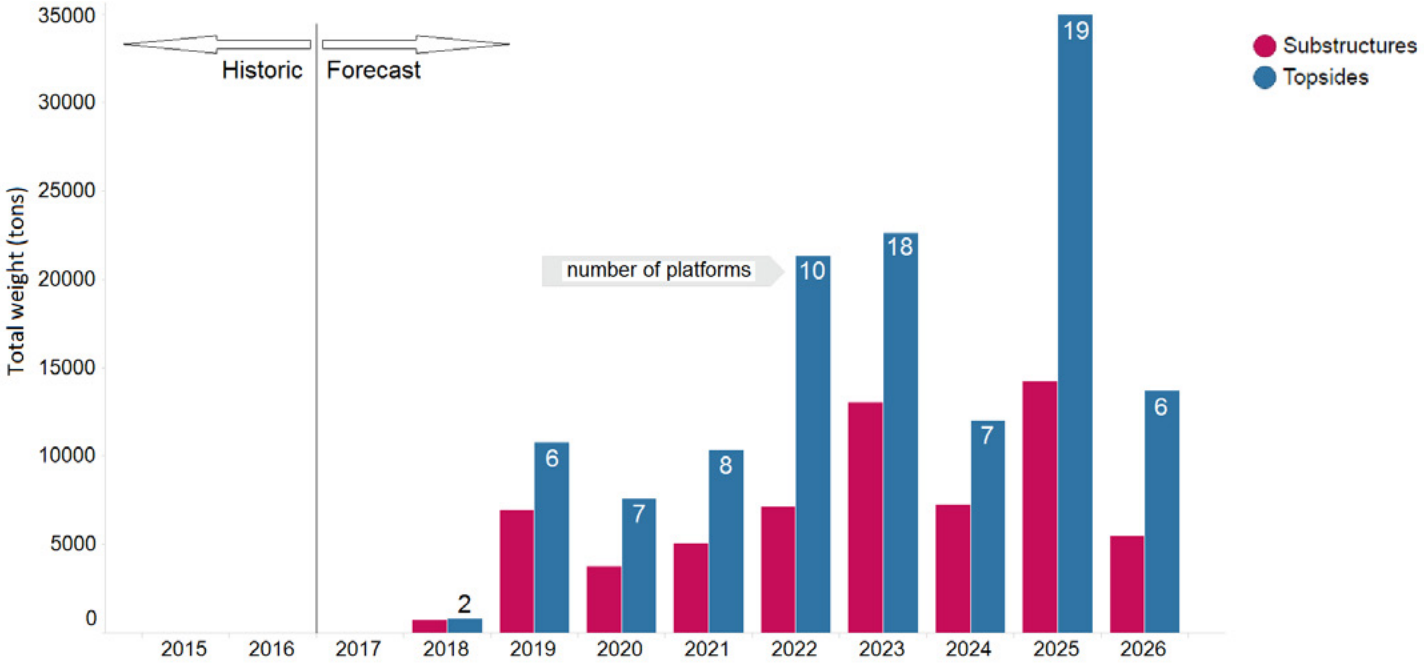


Figure 5: Historic & 10-year forecast of offshore facility decommissioning - total weight

Offshore Facility Decommissioning - heaviest module weight

The topsides of the facilities have been installed in the past by using a crane vessel. At the time of installation, however vessels often did not have the large crane capacity of today. As such, the older topsides often were installed in separate modules and typically the removal is carried out in reverse order. For this reason the heaviest topside module is of importance to select the required crane capacity (Figure 6). The Dutch facilities are relatively small and light-weight which will mean a larger fleet of crane vessels for decommissioning activities will be available.

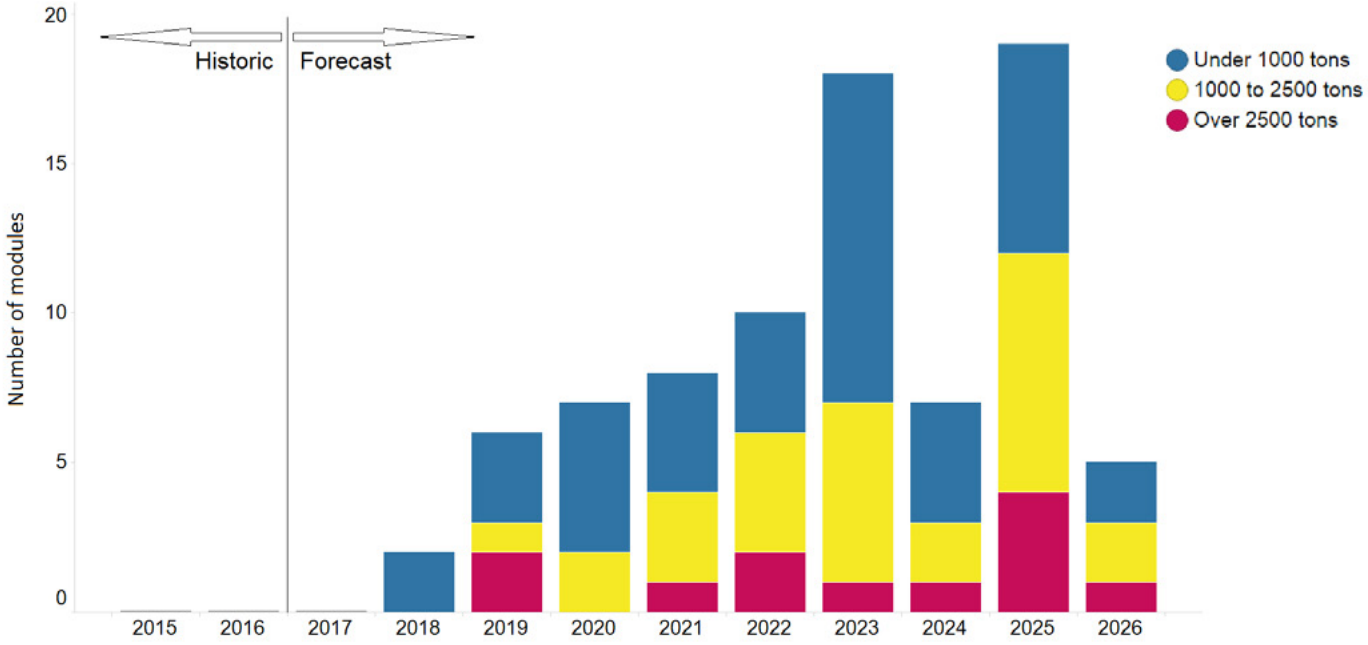


Figure 6: Historic & 10-year forecast of offshore facility decommissioning - heaviest topside module weight

Offshore Pipeline & Umbilical Decommissioning

For the offshore transport of oil and gas, pipelines are typically used with a diameter of 6 inches or larger. The pipelines for oil and gas between satellites and main facilities are typically between 6 and 14 inches in diameter. The pipelines which collect oil and gas from various main facilities and deliver it to shore are typically between 14 and 36 inches in diameter. Smaller size pipelines with diameters less than 6 inches are typically used for the distribution of fluids between the main facilities and satellites or subsea wells which are required for operating the wells and facilities. Besides pipelines also umbilicals are used for the distribution of fluids, controls, power or communication; an umbilical consists of a collection of smaller size (steel) tubes and cables combined into a single flexible string. The expected peak activity in pipeline decommissioning is between 2024 and 2025.

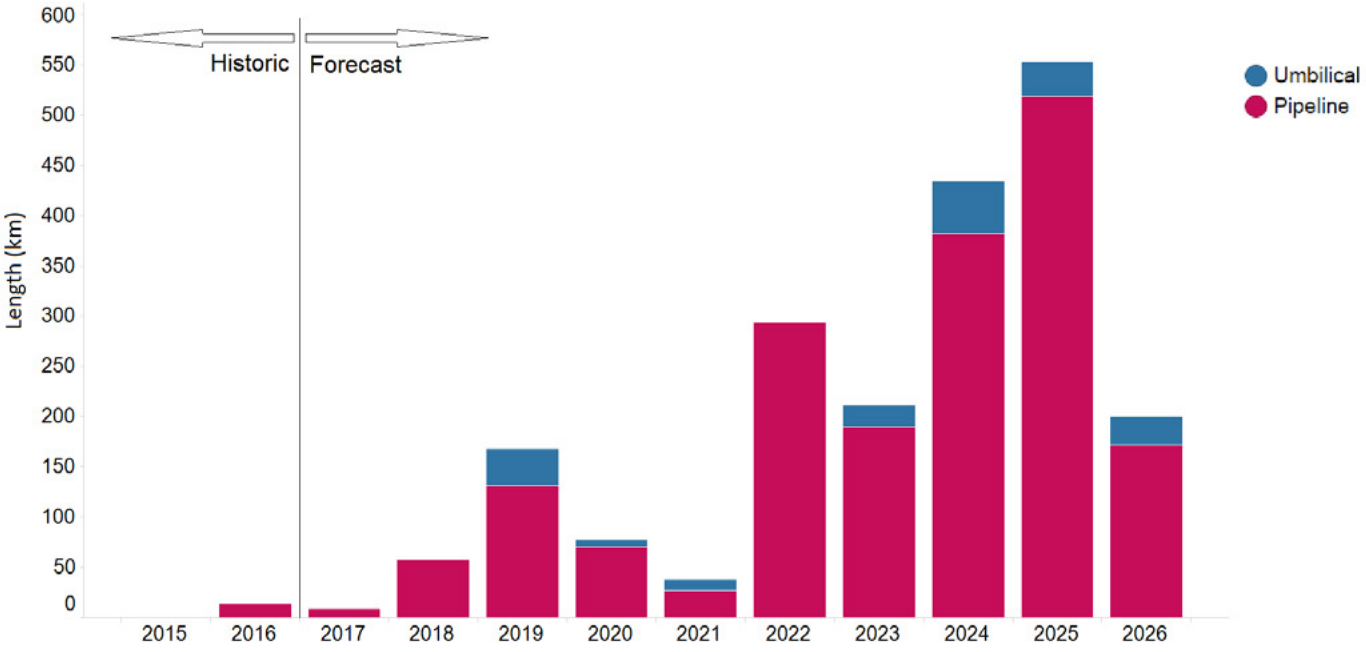


Figure 7: Historic & 10-year forecast of offshore pipeline & umbilical decommissioning

More information

For more information with regards to the decommissioning inventory, please contact Nexstep: info@nexstep.nl