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Public Perceptions of Decommissioning Oil and Gas Infrastructure: A case study of the MOD. It's Complicated Exhibition Final Report

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1. Introduction and Background

Oil and gas infrastructure, including the platforms and pipes, have been integral to society's access to energy supplies. In addition to their intended function, these structures have provided artificial habitat for a wide range in marine biodiversity. However, with ongoing recognition of the current climate and ecological crises, recent years have seen growing calls for a transition to low carbon technologies and energy sources, corresponding in an increasing emphasis on renewable energy. Furthermore, various international protocols and regulations, including the UN Convention of the Law of the Sea and the London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (and others depending on location), prohibit the abandonment of infrastructure as a means of disposal; however, there are clauses in place which allow for signatories to consider alternative options for safe and secure decommissioning processes. Coupling these with the knowledge that the existing oil and gas infrastructure globally will come to the end of its life (Fowler et al., 2014), options regarding removal or decommissioning of these structures are increasingly being considered by decision-makers and industry representatives, particularly in the context of the blue growth agenda and implementation of various marine management tools, such as Marine Protected Areas and Marine Spatial Planning (Birchenough and Degraer, 2020).

Decommissioning can be defined as the process of addressing a now defunct offshore platform, which includes the 'safe plugging of the hole in the Earth's surface and disposal of the equipment used in offshore oil production' (Engineers, 2017) (See Figure 1 for some examples). Discussions regarding decommissioning oil and gas platforms and their associated infrastructure began in the 1980s. Options have largely focused on either the complete removal of infrastructure, which has a number of risks, including further damage to the seabed, associated with it, or some form of Rigs to Reef approach (Kaiser and Pulsipher, 2005), in which oil and gas infrastructure is converted into an artificial reef system to provide ecological benefits (Macreadie et al., 2011; Smyth et al., 2015; Ouaninen et al., 2020). Over the last forty years, numerous studies have explored this from a range of perspectives recognising that the challenges of various options and the need to balance economic costs, operational feasibility, and the potential risks to the marine environment (Li and Hu, 2022; Tan et al., 2021; Smyth et al., 2015; Fowler et al., 2014).

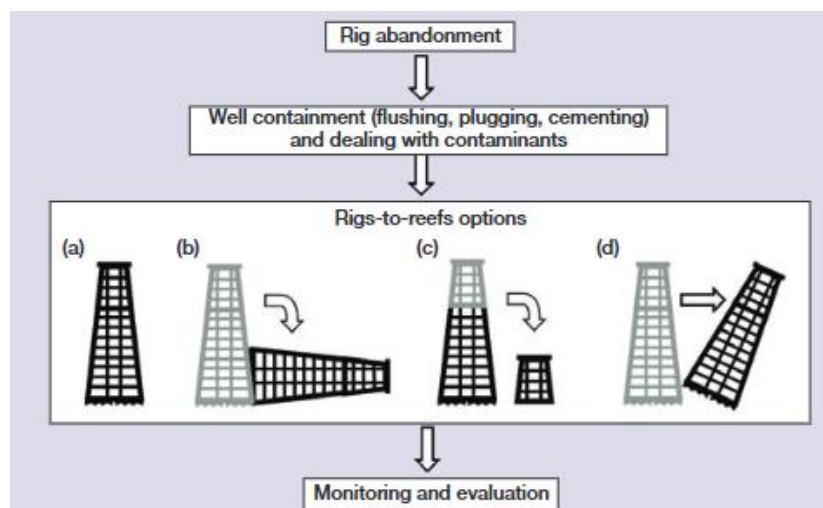


Figure 1: Process of decommissioning and the different options for rigs-to-reefs conversion, which include: (a) leaving the rig unaltered in its current location; (b) toppling the entire structure in its current location; (c) partially dismantling the rig in its current location (usually through “topping” – the removal of only the upper portion of the rig); or (d) relocating the rig to another location (e.g. the deep sea) (Source: Macreadie et al., 2011).

As uncertainty regarding the most appropriate approach to dealing with oil and gas infrastructure reaching the end of its life continues, there is an increasing emphasis on the need for multi, and indeed, interdisciplinary insight to be gathered to support decision-making, recognising the ecological, economic, and social dimensions that must be considered within this complex issue (as emphasised by Fowler et al., 2014). Despite calls for this, there has been limited research exploring public perceptions of decommissioning and the social acceptability of different options (see for example, Elrick-Barr et al., 2022; Capobianco et al., 2021 and Shaw et al., 2018). For instance, a 2020 Special Issue of the ICES Journal of Marine Science on ‘Decommissioned offshore man-made installations’ published fourteen articles on the topic, illustrating the timeliness and need for more research into decommissioning - none of the published articles explored this topic from a societal perspective. However, a recent paper from Capobianco et al., 2021 examined the decommissioning of oil and gas rigs using the multiple pillars of sustainability as a framework, including both economic (non-industry related) and social factors. This identified a range of social parameters which should be considered when thinking about decommissioning, including:

- Social justice and equity issues,
- Human wellbeing,
- Societal engagement and participation in decision-making,
- Opportunities for blue economy development, including through increased tourism at artificial reef sites created through decommissioning infrastructure,
- Employment, skills and international labour standards and regulations,
- Access to and impact on heritage and cultural resources,
- Environmental and ocean stewardship.

This list is not exhaustive but provides a starting point when thinking about why improving our understanding about public perceptions relating to oil and gas infrastructure and associated decommissioning is crucial. Recognising the existing gap in the literature, this project sought to address this knowledge gap, and through a public survey aimed to understand current public perceptions and attitudes towards decommissioning of oil and gas infrastructure in Australia. This was achieved through the following objectives:

- To explore public perceptions and attitudes towards decommissioning of oil and gas infrastructure.
- To examine how perceptions and attitudes might be influenced by socio-demographic characteristics.
- To make recommendations regarding future work to raise awareness about oil and gas decommissioning.

2. Methods

Using the IT’S COMPLICATED Exhibition at MOD. as an opportunity to reach a wide audience, a questionnaire was developed to collect information about existing attitudes and perceptions regarding decommissioning of oil and gas infrastructure. Based in Adelaide, South Australia, MOD. describes itself as a ‘museum of discovery’, with exhibitions which bring together researchers, industry and students on a wide range of complex topics. Exhibitions and events are generally designed for audiences aged 15-25 and seek to showcase how research from a broad spectrum of disciplines is used to help better understand the world around us¹. Running between February and November 2021, IT’S COMPLICATED, was MoD’s fifth gallery exhibition, with 55,670 people coming to visit. The exhibition

¹ More information about MOD. can be found here: [About Us - MOD](#)

sought to explore complex systems and the types of interactions between their parts or between a given system and its environment through a range of installations and materials. Examples of complex systems range widely, from the Earth's global climate to the human body, to the future of manufacturing and the Internet of Things, to social and economic organizations (like cities), and are defined by distinct properties that arise from these system's relationships, such as nonlinearity, emergence, spontaneous order, adaptation, and feedback loops. In relation to the theme of decommissioning oil and gas platforms and infrastructure, the exhibition design meant visitors entered the gallery under a large platform, designed to mimic the shape and scale of an oil or gas platform. The panels of this structure were covered with materials representing established coral and other marine organisms.

An iPad and digital screen were embedded in one of the columns presenting the questionnaire to visitors. The questionnaire consisted of three main components (see Appendix for full details about the questionnaire):

- Section 1: perceptions about oil and gas infrastructure.
- Section 2: views and attitudes towards decommissioning.
- Section 3: a short section on respondent characteristics, including age and gender.

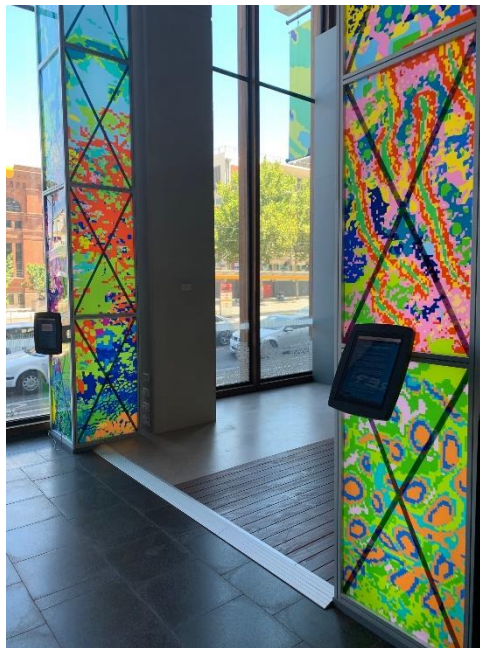


Image 1: Example of the kiosks at the It's Complicated Exhibition.

Ethical approval was obtained through Cardiff University's Ethical Review Process. The questionnaire was piloted by the research team, the museum team at MOD. and NDRI prior to final distribution at the IT's COMPLICATED Exhibition with any necessary amendments made to improve the accessibility and readability of the questions. Respondents were recruited using a self-selection, convenience-based sample approach (Bryman 2012), and the questionnaire was distributed through kiosks at the IT's COMPLICATED Exhibition, which ran from February to November 2021.

2.2. Data analysis

As an initial step, data cleaning was undertaken to remove entries which did not appear to be genuine responses to the questions (e.g. when responses included only the words oil', 'gas' and 'platform',

words clearly not related to the topic, such as The Lorax, or included the use of inappropriate language), or where an individual had only submitted a response to one question. These were regarded as incomplete or accidental submissions, which is a limitation of the self-selection, kiosk-based data collection approach.

Open-ended questions were used to collect data across a number of topics. All qualitative data collected through the online questionnaire were analysed manually adopting an emergent, inductive coding approach (Glaser and Strauss 1967; Charmaz 2008). First, the data was broadly coded against each of the four research questions (see section 1). Second, thematic coding of the data was undertaken to develop a coherent set of key themes. This involved the identification and interpretation of patterns or ‘themes’ in the dataset. Emergent categories were developed and revised through a repeated review process to ensure its validity and relevance (Fleming and Vanclay, 2009; Marshall et al 2011). Content analysis was then used to transform the qualitative data into categorical data. Content analysis quantified the content of the surveys in terms of the pre-determined themes or categories identified through inductive coding (Bryman, 2016). This enabled prioritisation of key themes and further statistical exploration. Where appropriate quotes are presented in the text to support the discussion. Basic descriptive quantitative analysis was used to explore the data collected from respondents on perceptions towards oil and gas infrastructure and their decommissioning. Where possible additional analysis has been carried out to explore potential influence of participant characteristics on perceptions.

3. Results and Discussion

The next section presents the key results of this study, and discusses the themes identified through the analysis.

3.1. Respondent Profile

In total 1,100 responses were obtained with a 57% completion rate. Following data cleaning, the sample totalled 779 usable respondents (i.e. where responses appeared to be genuine and individuals had provided a response to most questions), although it should be noted that not every question was answered by every respondent.

Of the respondents who provided answers to the questions on gender and age group, 305 identified as female, while 231 identified as male. Respondents were also found to represent a broad range of age groups, summarised in Table 1.

Age of respondents	Number of respondents
Under 18	130
18-24	112
25-39	179
40-54	116
55-69	51
70+	12

Table 1: Age profile of respondents

3.2. Public Perceptions of Oil and Gas Platforms

Both closed and open questions were used to explore public perceptions of oil and gas infrastructure. Respondents were asked to indicate their level of agreement with a series of statements relating to the oil and gas sector, and the associated infrastructure – a summary of responses is presented in Figure 1. Generally, public perceptions appeared to be quite negative regarding oil and gas platforms.

Over 90% of respondents indicated agreement with a statement regarding the oil and gas industries' impact on climate change, with 93% indicating that they thought that alternative energy sources should be explored. Although there has been relatively limited research carried out on social values or perceptions of oil and gas infrastructure, or man-made structures more generally, and their decommissioning, recent studies have indicated that there is a generally positive view of the potential biodiversity benefits of leaving decommissioned structures in situ (Elrick-Barr et al., 2022). However, despite these commonly discussed benefits of platforms and associated infrastructure as artificial reefs for marine biodiversity, less than 50% of respondents indicated agreement when asked whether platforms are good for ocean biodiversity (13% strongly agree and 35% agree), while only 11% indicated agreement to a statement about whether platforms can provide protection the seabed. There was an overwhelming view from respondents that platforms present a risk of damage to the marine environment, with 68% of respondents indicating that they strongly agreed and a further 26% indicating agreement. While the importance of these structures as an energy source for society over recent decades was recognised (72% of respondents indicated some level of agreement), there was also a feeling from 85% of respondents that these structures were dangerous places for workers.

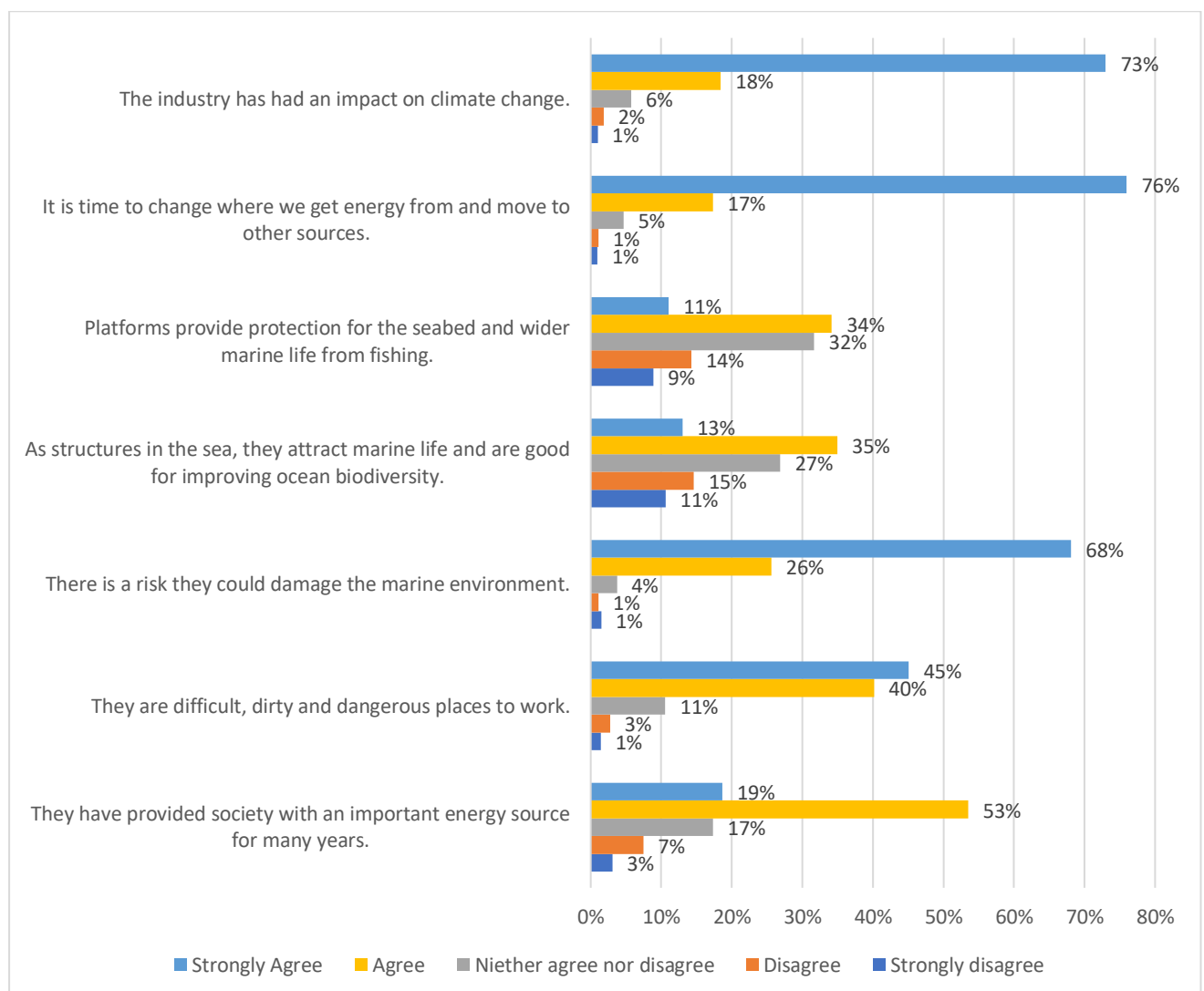


Figure 1: Summary of responses to statements relating to perceptions of oil and gas platforms.

be a one size fits all solution. While over 80% of respondents indicated agreement that platforms are dirty and dangerous places to work, and 94% indicated an agreement that they could present a risk to the marine environment, when asked about decommissioning, the majority indicated uncertainty regarding their removal (43%), with only 34% indicating clear agreement that they should be removed. There was significant agreement with the idea that removal of the platforms and infrastructure may cause damage than good, with 81% agreeing that this may cause an increased risk of pollution. Perceptions of potential risks were further explored by respondents' agreement (71%) to the statement that removal of the platforms may be damaging to the marine environment and the species living on and around these structures. In fact, 80% of respondents indicated that the preferred option would be to make infrastructure safe to leave in the marine environment – it should be noted that 34% also indicated that structures should be completely removed to allow the marine environment to recover. There appeared to be some uncertainty as to whether the cost of decommissioning would be prohibitive to this option, with 32% of respondents neither agreeing or disagreeing with this statement.

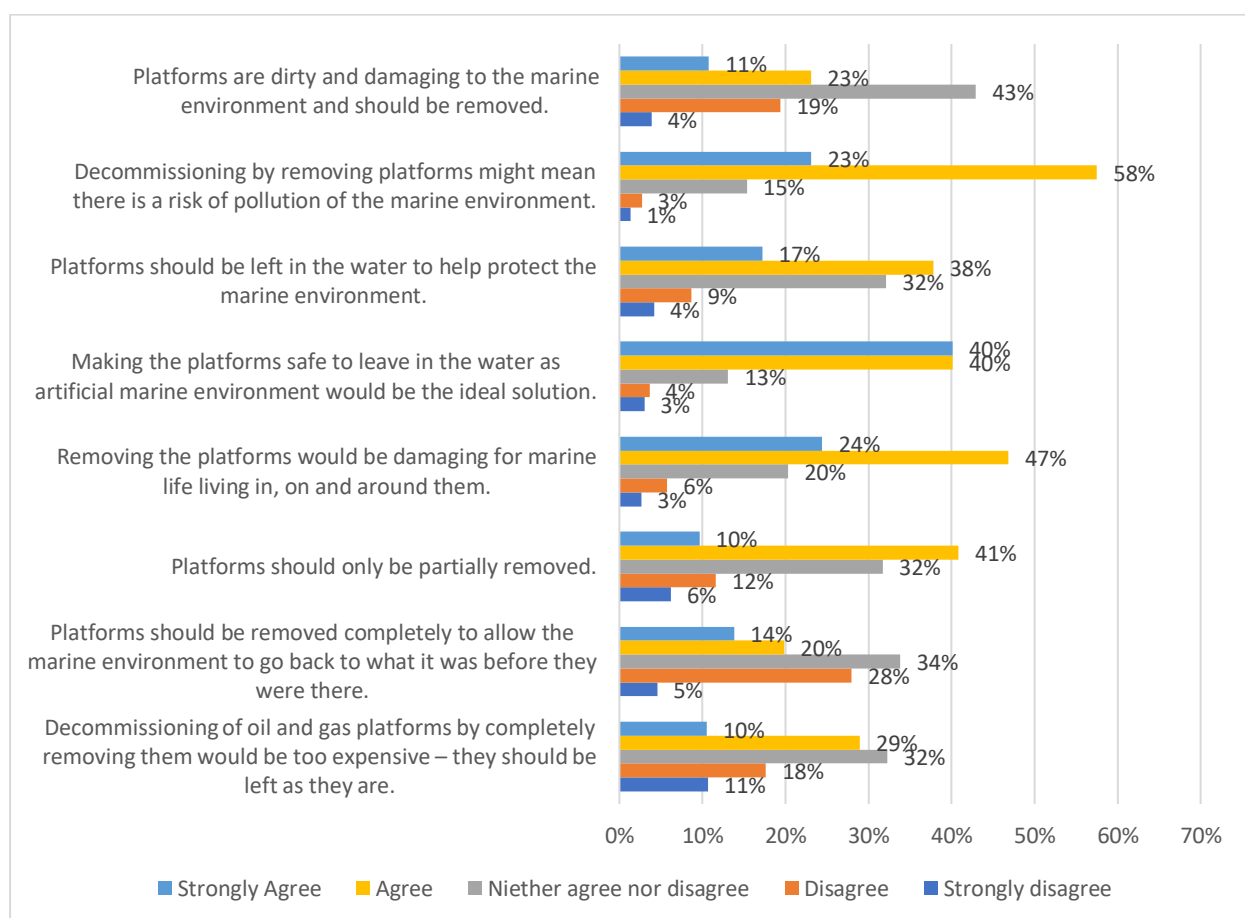


Figure 2: Summary of responses to statements relating to perceptions of decommissioning oil and gas platforms.

4. Recommendations and Concluding Remarks

This study and the MOD. IT'S COMPLICATED Exhibition provided a valuable opportunity to explore the current status of public perceptions towards oil and gas infrastructure and possible decommissioning options. While the responses to statements regarding the industry more widely appeared to be quite negative, these are not unexpected given the relatively recent declaration of both a climate and ecological crises and calls for a move away from historical dependence on fossil fuels. Additionally,

these views mirror the growing recognition of the industry that the oil and gas industry have contributed to climate change and that a transition to alternative energy sources and discussion regarding decommissioning is required. However, the results also indicate that there is no clear consensus on views regarding decommissioning – the findings presented in the previous section indicate significant uncertainty regarding the future of oil and gas infrastructure.

While this study provides a much-needed starting point to further work into the human dimensions of oil and gas decommissioning, due to the nature and design of this study, these results provide a relatively shallow examination of public perceptions relating to these topics. However, echoing other studies which have recommended that decommissioning decisions should be taken on a case-by-case basis, to truly understand public views in relation to specific decommissioning projects, more in-depth community engagement and research is required which accounts for diverse values and access to ocean spaces, and is inclusive of all community and user groups, including Indigenous communities and takes account of the multiple criteria influencing decisions about decommissioning (Fowler et al., 2014). In addition, the results of this survey indicated that only 7% of respondents were of the view that platforms should be removed if this can be done safely – there is perhaps a need for more work to be done to truly understand what ‘safe’ means and whether this can be done with the platforms and infrastructure left in situ, with more research to explore how this might then influence perceptions and social acceptability of decisions. While there are concerns regarding the potential influence of public perceptions on decisions (Macreadie et al., 2012), including human dimensions in the decommissioning research programme will be crucial to understanding how decisions on these topics are made and how public values, views and perceptions may shape and change industry and political decision-making.

Decommissioning redundant oil and gas infrastructure will continue to be a contentious and complicated issue. To ensure all stakeholders involved in decision-making can make informed decisions, and play a meaningful role in the deliberation process, it is possible that awareness raising activities regarding the potential costs and benefits of decommissioning activities will be required.

While recent years have seen calls for improved research programmes to deliver longitudinal data sets about the ecological implications of various decommissioning options, particularly on the Rigs to Reef approach (Macreadie et al., 2012), there has been no similar call for improved social research into this topic. It is therefore recommended that further investment be made into supporting social research regarding public and stakeholder views on decommissioning options, particularly where decisions are imminent. Without this data, it will not be possible to make truly informed decisions which take account of all potential influencers.

Acknowledgments

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Appendices

Attached as a pdf to the email – this can be added at the final stage