

Executive Summary

Offshore Oil and Gas Industry Research Funding Models

An opportunity for coordinated, collaborative, industry based research

(White Paper - 29/06/2017)

Note: This Executive Summary refers to the Offshore Oil and Gas Industry Research Funding Models white paper - An opportunity for coordinated, industry based, research collaboration. Contact NERA for the full paper.

Introduction

Oil and gas research has traditionally been funded via uncoordinated, individual and collective research funding mechanisms. Duplication of research, reduction in financial leveraging opportunities, retention of knowledge, slow research progress and unfilled knowledge gaps can result. Opportunity exists for Australian offshore oil and gas operators, government, small to medium enterprise and research organisations to collaborate to perform coordinated industry research and improve this situation.

Collaboration and targeting high impact research topics provides opportunity to undertake more complex industry research, resulting in improved industry knowledge, enabling safe and efficient recovery of offshore oil and gas resources, and a sustainable industry. Benefits can be maximised for all stakeholders.

This paper investigates industry research funding models (IRFM) that may provide a sustainable and coordinated offshore oil and gas industry research mechanism. The objective is improved coordination and accelerated research that provides information to support informed regulation and research & development commercialisation.

Within the main report, research questions were posed, funding models and mechanisms identified, options considered and conclusions drawn on the relevance of IRFMs to Australian offshore oil and gas and how an IRFM may be introduced to the industry.

Australian Offshore Oil and Gas

Offshore oil and gas recovery is a complex pursuit. The industry's potential to impact positively on the Australian economy is immense. The aim is to reduce long term operational risk via improved research strategy and improved resource recovery.

In 2016, capital expenditure was estimated at \$200 billion[1]. In the period 2014-15 liquefied natural gas (LNG) made a \$16.9 billion contribution to Australian international trade. The forecasted contribution for LNG for 2016-17 is \$17.2 billion. Crude oil was lower in value at \$8.7 and \$5.7 billion respectively[2, 3]. If recovery is maximised, via coordinated research, the prize for the Australian economy is many billions of dollars.

Project Structure

The paper's primary objective was to investigate IRFMs that may be suitable for the Australian industry. There is an opportunity to learn from previous IRFM case studies and assess whether they fit the Australian context. To provide a starting point, some core research questions were posed.

"The Oil and Gas Industry in Australia is a high value, high profile industry, that benefits the Australian economy in many ways. It is proposed that to realise the full benefits of the industry and to maximise resource recovery, requires a systematic, coordinated, and sustainable industry approach. This may be achieved via industry led research collaboration to efficiently deliver more complex research projects and outcomes.

There is a need to develop a clear understanding of what industry research funding models exist, how they are formed, funded, administered, managed and governed, and how the industry views them. From this, it should be possible to determine whether an Offshore Oil and Gas Industry Research Funding Model (IRFM) fits the needs of the Australian oil and gas industry and determine what actions and processes are required to make this happen.

The key questions are,

- Does the industry understand, and government realise, the need for such a centralised industry research funding model?*
- Would such a model be permit based, production based, membership based or realised via some other mechanism to provide a research funding pool?*
- Who would provide the industry catalyst and capability to make an industry research funding model happen and more importantly make it sustainable?"*
- How would the concept of an industry research funding model be socialised to industry?"*

Funding Models

With the objectives of: identify IRFMs, key stakeholders, governance structures, regulations and a business case, an investigation was performed via interrogation of general publications, government websites, industry forums, industry organisations, industry websites, news feeds, and research organisations. Information about IRFMs ranged from broad high-level industry information, through to detailed anecdotal information on IRFM processes and procedures gained from experienced industry personnel interview.

After an initial review of IRFMs, it was apparent that several common formats existed. It also became clear that industry growth centres were popular in Europe and IRFMs were included within those entities, where much industry research commercialisation occurs[4-10]. Examples are entities such as Catapult Centres in the UK[8], Defence Innovation Centre[11], Innovation Technology Facilitator[9], and Oil and Gas Technology Centre[12]. Each IRFM has funds generated via either taxation revenue, application of a levy, collection of licence fees, charitable donations, government tax offset, industry membership fees or project sponsorship (Figure 1).

Where governments charge a fee, funds are collected via a government body, as is the case with Petroleum Infrastructure Programme (PIP) in the Republic of Ireland [13]. Where a production levy is used, government charges a levy via tonnage sold, as is the case with the Australian Coal Association Research Programme (ACARP). Funds are collected by the research body directly on behalf of the government[14]. Where the model is funded via memberships and project sponsorship[15], funds are collected using standard industry contracts.

Governance

The IRFMs reviewed are mostly not for profit entities. Generally, their structure was developed via collaboration between industry, government and research organisations. In some cases, government maintains a direct involvement[16], in others, industry runs the fund independently[14].

The governance structure of most IRFMs involves a board of directors, who steer the research priorities either independently, or via industry representation. Day to day management is performed by an administration arm. Project management is via technical committee and advice is generally provided by experienced industry managers and committees. An example governance model is shown in Figure 2.

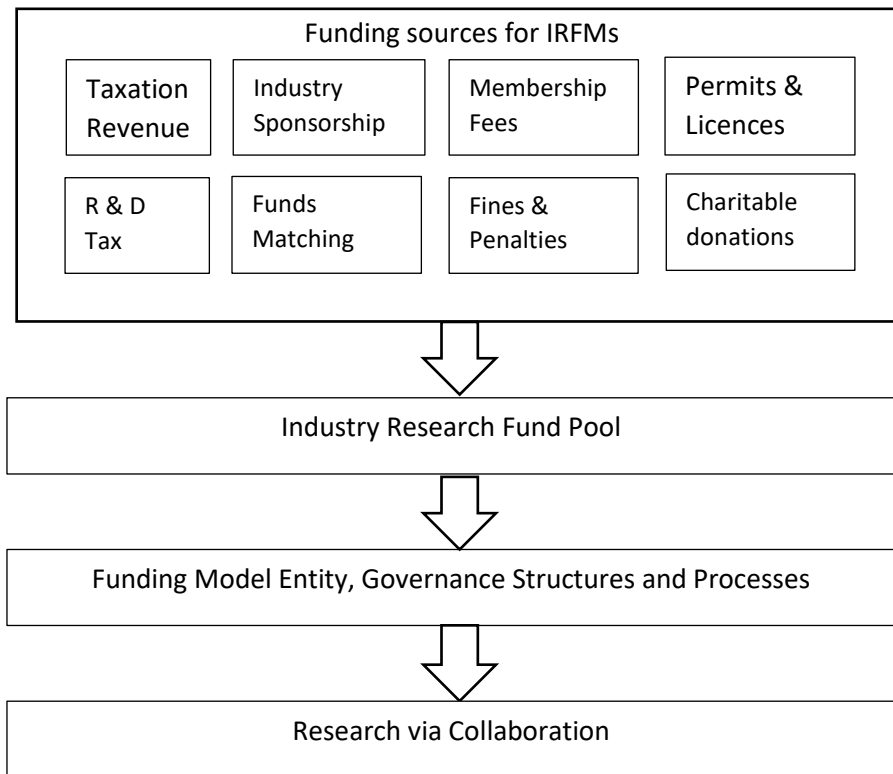


Figure 1. Generic industry research funding model showing alternative funding sources.

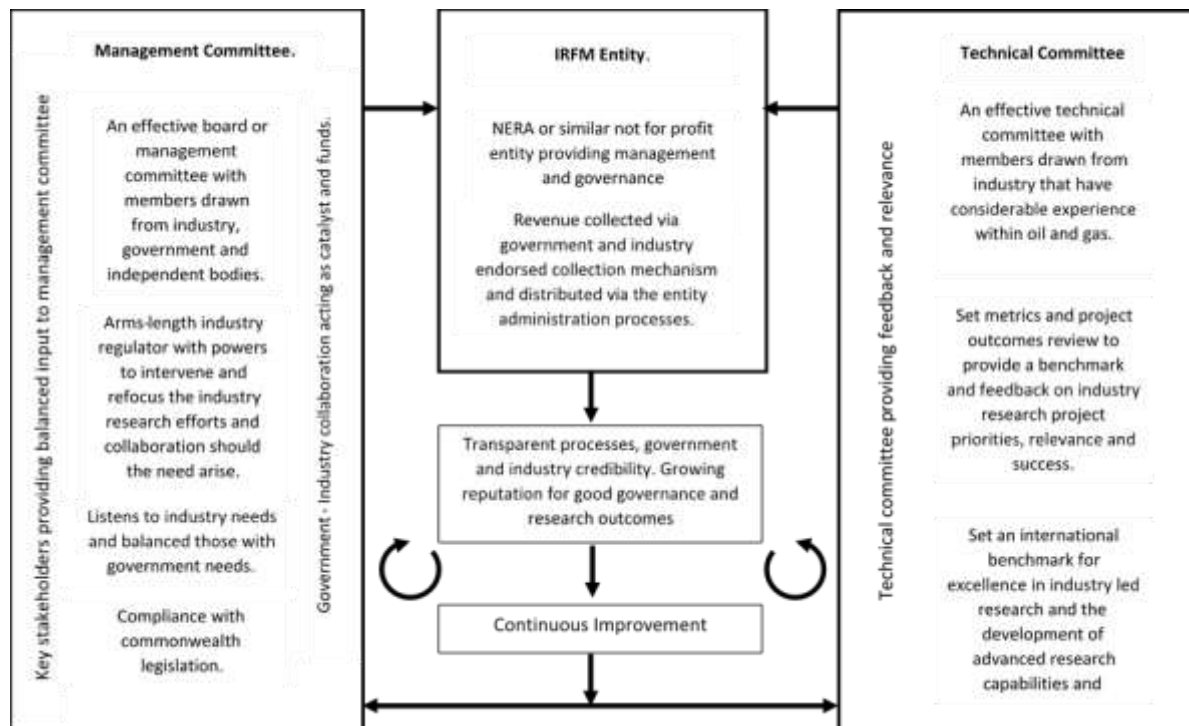


Figure 2. Example Governance Structure.

Assessment of IRFMs

An objective was to assess and rank each IRFM and to provide an assessment of the pros and cons of each model as applied to the oil and gas industry in Australia. This was quite difficult due to the disparity between IRFMs globally. However, it was possible to identify some basic parameters for comparison. From the analysis, five industry research entities and models appear favourable for an oil and gas IRFM. They are,

- The Petroleum Infrastructure Programme (PIP)[13] this is a successful joint industry-government permit model run by the Petroleum Affairs Division in Ireland.
- The Mining Research Institute Western Australia (MRIWA) is an industry research funding model run by the Government of Western Australia to promote Mining Industry Research via industry government collaboration.
- The Australian Coal Association Research Programme (ACARP), is a world class black coal research programme based on a production levy model.
- The Cooperative Research Centres (CRC) Programme is a competitive, merit based grant programme that supports industry-led and outcome-focused collaborative research partnerships between industry, researchers and the community[17].
- AMIRA International is an industry led membership based model that has been operating for several decades.

All the above models have relevance and application to oil and gas industry research. Figure 3 shows the broad assessment outcome. An example funding pool base on the permit model is shown in Figure 4.

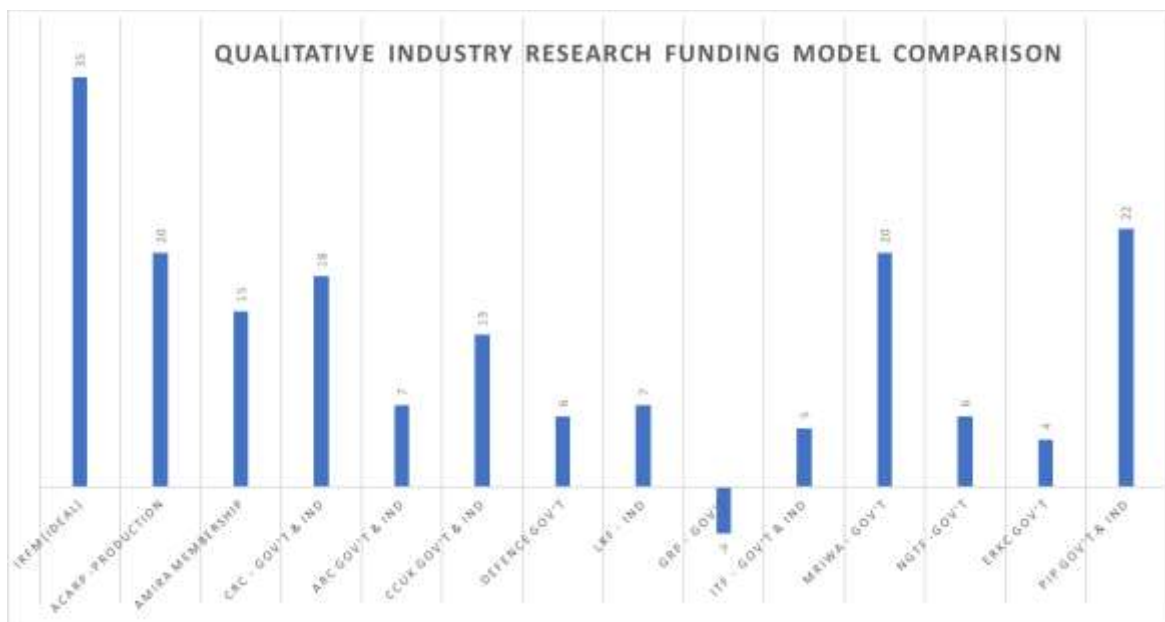


Figure 3. Qualitative comparison of industry research funding models and entities.

Key Stakeholders

To develop new IRFM it is essential to identify all stakeholders that would have an interest in the process. Here, stakeholder refers to those that would have a direct interest in developing an IRFM, would benefit from it, or would be affected by some aspect of it. During early stage development, the key stakeholders would be those that can provide a range of inputs relating to the formulation, implementation and long term management of any oil and gas IRFM. These entities would likely be the Titleholders.

In Australia, there are over 90 oil and gas operators involved in offshore activities. It is likely that operators having a large interest in the offshore oil and gas exploration permits, retention leases and production licences would also immerge as key stakeholders.

For example, from the National Electronic Approvals Tracking System (NEATS)[18] data there are over 880 entries relating to the various licences, permits and leases. [19, 20]. As of 2017, the top twenty stakeholders from a Titles perspective are shown in Table 1. However, during the initial formulation it may be necessary to keep the early stakeholder engagement to a smaller number to make the process more manageable.

Title Holder	Number of Titles	Titles held as percentage of Titleholders. (%)
Shell Australia Pty Ltd	71	36.04
Woodside Energy Ltd.	42	21.31
Chevron Australia Pty Ltd	41	20.81
BP Developments Australia Pty. Ltd.	28	14.21
Quadrant Northwest Pty Ltd	28	14.21
Mobil Australia Resources Company Pty Limited	27	13.70
Santos Offshore Pty Ltd	27	13.70
BHP Billiton Petroleum (North West Shelf) Pty. Ltd.	26	13.19
Esso Australia Resources Pty Ltd	23	11.67

Table 1. Top twenty industry stakeholders based on Titles held.

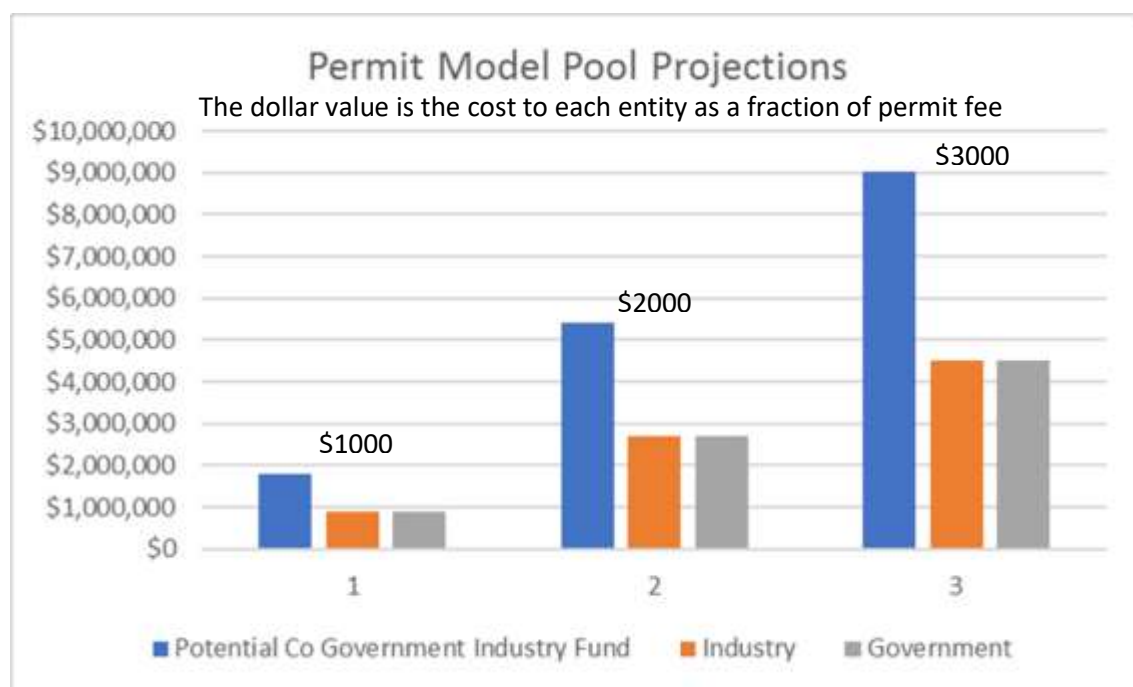


Figure 4. Potential funding pool via the permit model at \$1k, \$3k and \$5k increments.

Business Case

What is the value proposition, and why is an IRFM needed over traditional research funding methods? The short answer is to ensure continuing investment in and the economic wellbeing of the offshore oil and gas industry via co-ordinated industry led research activity that reduces duplication in the form of administration, project management and contract development costs. This can be achieved by centralising research activity within one centralised industry research centre that is actively engaged with industry. National Energy Resources Australia (NERA) for example[21]. Higher risk projects can be undertaken and the benefits shared. Another benefit is that a centralised IRFM can incorporate all current best practice research activity into its database and coordinate research across industry.

The IRFM can be established as a tri-partite industry-government-research-organisation entity with greater accountability to industry via the best practice IRFM governance mechanisms and technical committee feedback. Using a centralised IRFM funding entity, more holistic research focus can be achieved that can visualise the complete oil and gas cycle and industry research can become less production centric and insular. If

necessary an IRFM would be able to deliver more short term (transient) projects that are of immediate benefit to the industry at a lower cost.

The IRFM can place a greater focus on strategic research development that is of benefit to the stakeholders that can identify long term risks and potential liabilities. Research can be more diversified as knowledge gaps are easier identified via collaboration and forum, and industry experience and knowledge can be used to focus pure research activities within Universities via government and academic input

To place the business drivers in context, the cycle of the oil and gas industry is shown in Figure 5. The life cycle of an oil and gas industry project is shown along the horizontal bar in the centre of the ellipse. The project progresses along this bar. However, to place controls and reduce risks, stage gates are used at each key stage: exploration and discovery, scoping studies, feasibility, pre-development, construction and commissioning, operations and production, closure and legacy and finally sell or relinquish leases. The benefits of collaboration to realise a hypothetical research project are shown in Figure 6.

Government policy can be better informed because of improved understanding of the state of research within each stage. For example, if an essential research priority has not been completed within a stage, then the project cannot progress to the next stage unless that project is completed to the satisfaction of all stakeholders. Business can make more informed decisions and can ensure that legacies from previous stages are not left behind.

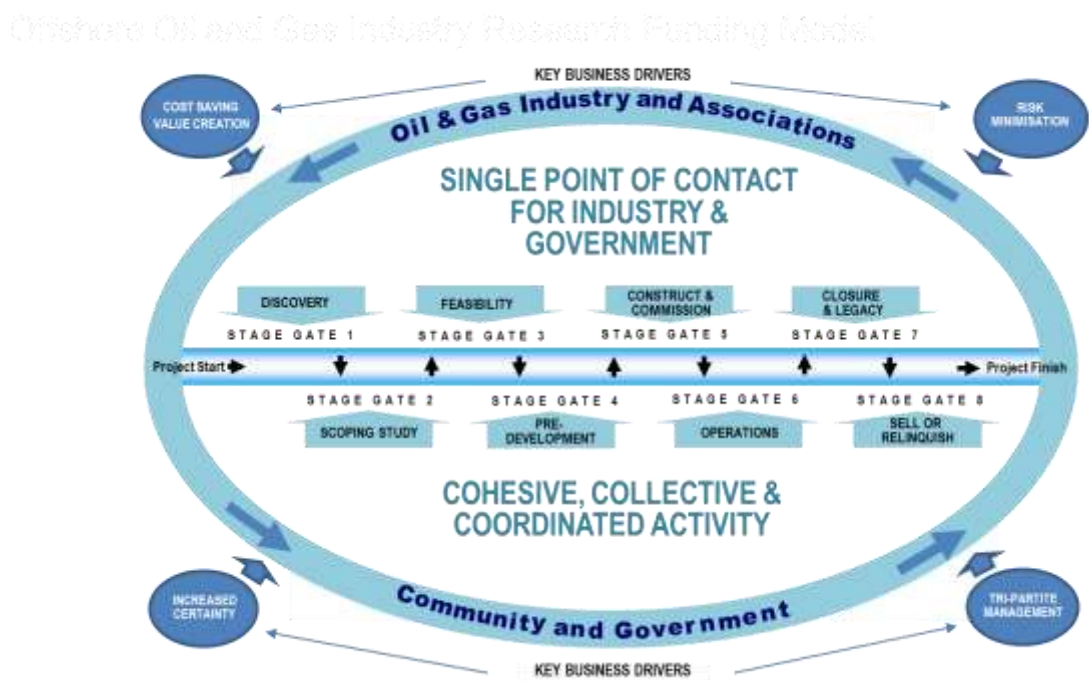


Figure 5. Offshore Oil and Gas Industry Research Funding Model applied to the oil and gas life cycle.

IRFM Socialisation Plan

The idea of combining industry research into one centralised entity that co-ordinates calls for research tenders, reviews proposals, deals with tenders and contracting, and manages the research process in general will no doubt improve industry research outcomes. Simply because it provides a co-ordinated approach to research and a forum to ensure that companies are aware of the research being undertaken. In its complete form, it can address many of the more complex industry research topics via industry collaboration and sharing of risk.

To realise a new IRFM requires the strategic socialising of the concept. To achieve this, it is recommended that a plan to socialise the IRFM is developed with a timeframe of approximately 12 to 18 months. The socialisation process has three key periods: engage with industry, develop organisational and individual relationships and

nurture and maintain relationships. The effort and strategy involved in this process and its value should not be underestimated and should be addressed quickly. An example socialisation plan is shown in Figure 7.

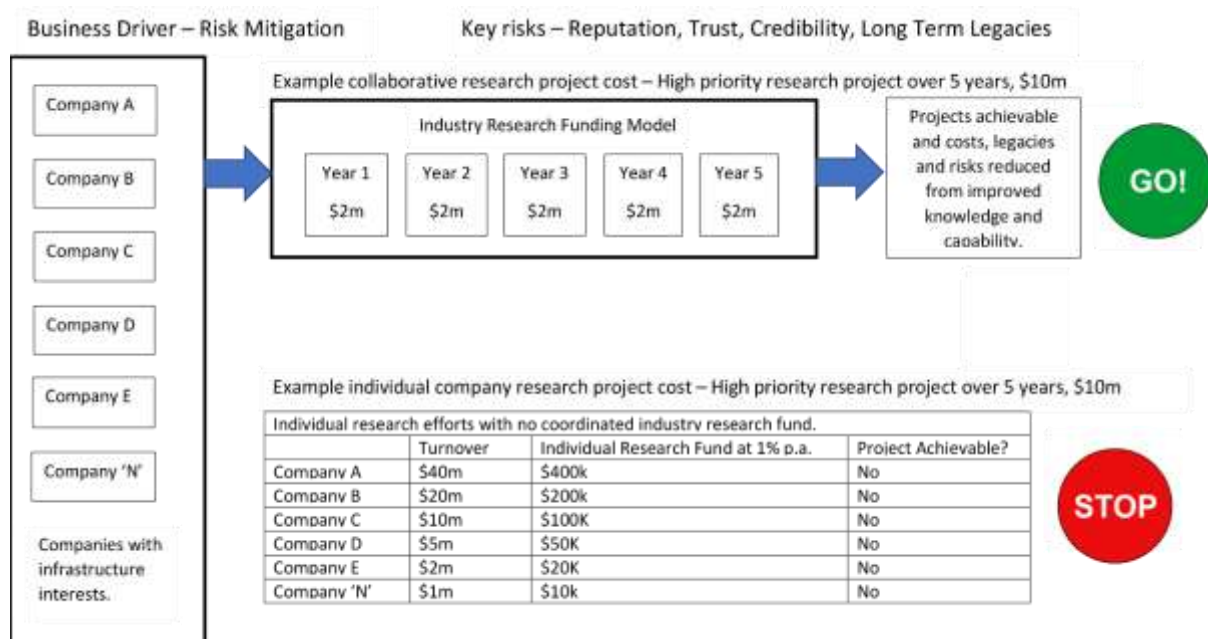


Figure 6. A simplified demonstration of the business case for an IRFM. Coordinated collaborative projects have more leverage.

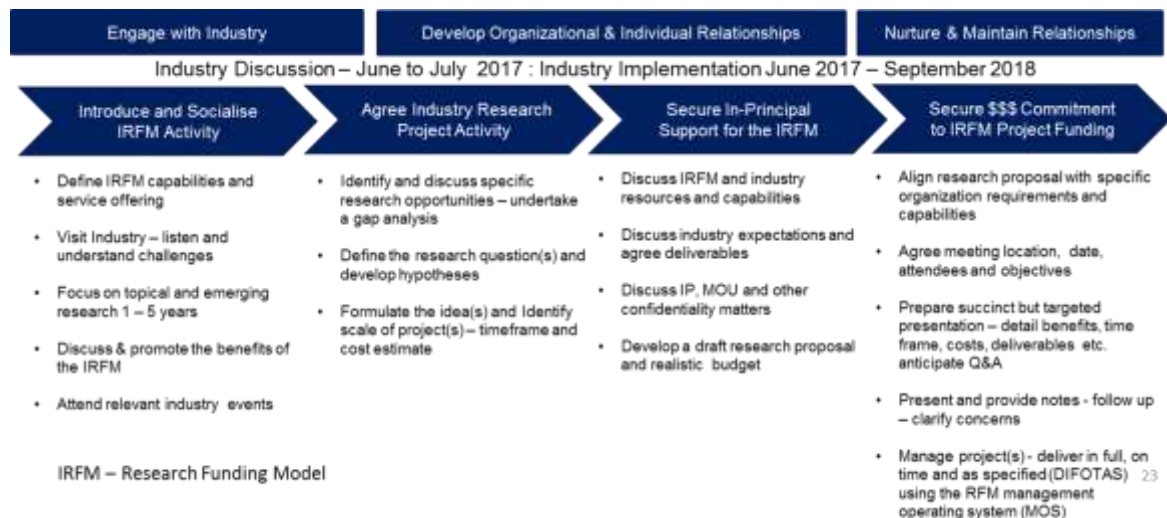


Figure 7. Socialising the Industry Research Funding Model.

Conclusions

The Australian offshore oil and gas industry is a complex and highly technical pursuit. To ensure that the Australian offshore oil and gas resource recovery is maximised, there is a need for a coordinated, industry led research initiative, that allows companies to come together under one centralised research entity. As a member of that entity it will be possible for companies to develop more complex research projects via collaboration. Improving research coordination will also assist government to make informed decisions on oil and gas research projects.

Such an approach requires a sophisticated IRFM and an entity to manage it that has a strong governance structure, an established and sustainable funding pool, and which considers the full life cycle of the oil and gas industry with respect to research collaboration and the business case for advanced industry led research.

Industry research funding models operating in Australia and globally revealed numerous models. Most have benefited from government funding to get them started and subsequent industry funding to maintain them. In the case of oil and gas, there is an exemplary example in the Petroleum Industry Programme (PIP) that has proven very successful with respect to providing capability to take on more advanced industry research projects and the sharing of data. This model should be seriously considered as an option for the Australian oil and gas industry research funding model.

Similarly, there are several existing mining-industry led research funding models that have direct relevance and should also be considered. They rely on different mechanisms for funding in the form of a levy, membership fees or government co-contribution at some ratio to industry funding.

In the levy model, it was originally applied by government to the black coal industry to encourage research. As a result, ACARP was formed. This was originally a government initiative that evolved over time to become purely industry led. This model raises many millions of dollars per year and focusses upon key industry research priorities identified via industry forum.

In Australia, the offshore oil and gas industry is heavily regulated and there are numerous regulations and laws that must be considered when performing oil and gas activities. Any industry research funding model will have to negotiate these regulations effectively for compliance of research projects with respect to operations, governance and so-on.

The business case for a centralised industry research funding model operated by an industry growth centre is compelling. Such a model and centre would allow companies and research organisations to pool their research capability into one centralised repository where past knowledge and experience can be brought together and leveraged to improve present and future research outcomes. The industry research funding model could focus on priority areas identified by the industry, government and community. The benefit will be increased leveraging of research funding and capability from shared projects.

A key factor to success in developing an industry research funding model is to engage the key stakeholders in industry via a staged socialisation plan. Such a plan requires clear objectives and milestones to commence positive engagement with key industry stakeholders. This should be approached systematically via stages with sufficient flexibility in the process to include all stakeholders who will be affected by any new industry research funding model.

Next Steps

It is recommended that the industry and government develop a centralised industry research funding model as soon as possible.

Industry engagement should be undertaken strategically.

NERA should build upon this white paper and lead this initiative under a dedicated Industry Research Funding Model development project during the remainder of 2017 and 2018.

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