Deloitte Access Economics

Economic benefits of better procurement practices

Consult Australia

2015

Deloitte.

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Acronyms

ABS	Australian Bureau of Statistics
ACIF	Australian Construction Industry Forum
ACT	Australian Capital Territory
AGS	Australian Government Solicitor
APCC	Australasian Procurement and Construction Council
APRA	Australian Prudential Regulation Authority
BMW	Building Management and Works
CGE	Computable General Equilibrium
D&C	Design & Construct
DAE-RGEM	Deloitte Access Economics Regional General Equilibrium Model
DPTI	Department of Planning, Transport and Infrastructure
EOI	Expression of Interest
FTE	Full Time Equivalent
GDP	Gross Domestic Product
GSP	Gross State Product
ICT	Information and Communications Technology
NPV	Net Present Value
NSW	New South Wales
NT	Northern Territory
PC	Productivity Commission
PPP	Public Private Partnership
QLD	Queensland
RFP	Request For Proposal
SA	South Australia
SCLJ	Standing Council on Law and Justice
TAS	Tasmania
VGPB	Victorian Government Purchasing Board
VIC	Victoria
WA	Western Australia

Executive Summary

Key Findings:

- Investments in public infrastructure account for a significant amount of economic activity in Australia, around $43 billion a year. A rising share (now 53% for engineering construction) is procured from the private sector, with almost 20% of this activity contributed by professional services, such as architects, engineers and surveyors. The value of professional services work for public infrastructure projects is estimated to be around $4.4 billion per year.
- However, some elements of current government procurement policy and practice are inefficient, adding unnecessarily to the cost of infrastructure. This includes cases where government clients have unclear project objectives, select inappropriate project delivery models, fail to guarantee the accuracy of information in project briefs and manage risk inefficiently through contract clauses, such as by contracting out of proportionate liability.
- In the bidding phase, firms respond to these practices in a number of ways. It is estimated that the total price impact of poor procurement practices is around 5.4% of total revenue obtained by professional services firms in public infrastructure projects. This comprises of direct price increases of 3.6%; indirect price increases of 1.5% from reduced competition; and inefficient costs of bidding worth 0.3% of project prices. Firms also report that with improvements in procurement, they could reduce delays to projects and improve project quality by 7%, respectively.
- The total price impacts borne by government as a result of poor procurement practices are estimated at around $239 million per annum. In addition, it is estimated that better procurement can lower the costs of rectifying design errors in construction, an annual saving of around $87 million.
- Assuming a five year phase in period, the net present value of these potential cost savings for government are estimated at $2.5 billion over the period to 2030. Using economy-wide Computable General Equilibrium (CGE) modelling, we find that better procurement can deliver around $5.1 billion in additional GDP between 2015 and 2030.
- Following consultation with government on the extent and causes of these issues, this report identifies seven next steps to shift the direction of procurement. This includes establishing procurement teams with a mix of skills, reallocating resources to better focus on project objectives, removing contract clauses that do not stack up, and developing and applying limited liability guidelines. While verification of brief information and streamlining compliance processes will remove inefficient bid costs, governments should also evaluate and adapt procurement frameworks to encourage innovation.

Introduction

Investments in public infrastructure account for a significant amount of economic activity in Australia, around $43 billion a year. A rising share (now 53%) is procured from the private sector.

While much of this activity is traditional construction work, professional services now contribute almost 20% to the overall value of projects. This includes the involvement of architects, engineers, designers, surveyors, project managers, lawyers and technology specialists from the private sector. These firms have the expertise and capacity to innovate to ensure that high value outcomes are achieved from public infrastructure investments.

However, there are some elements of current government procurement policy and practice that are inefficient, adding unnecessarily to the cost of infrastructure. This includes cases where government clients have unclear project objectives, select inappropriate project delivery models, fail to guarantee the accuracy of information in project briefs and use contract clauses to transfer responsibility for risks that firms are not best placed to manage.

In the bidding phase, businesses respond to these practices in a number of ways, by charging additional price premiums, recouping bid costs, accepting uninsurable risks and reducing competition. This has significant economic impacts over the longer term, constraining economic activity through a higher cost of infrastructure.

To better highlight the magnitude of these implications, Consult Australia commissioned Deloitte Access Economics to quantify the economic impacts of poor procurement practices, as it relates to professional services employed for public sector built environment projects. Here, the built environment includes all residential, commercial and public property, and supporting critical infrastructure such as utilities and transport facilities.

The key findings of this report are summarised in turn below.

Unclear project objectives

In any public infrastructure project, clarity around project objectives is critical to ensure that it is carried out in a way that cost-effectively achieves those goals. However, primary data collected from Consult Australia members indicates that unclear project objectives are encountered by firms for 37% of public sector RFPs.

Businesses frequently respond to the scope risk caused by unclear objectives by increasing prices or deciding not to bid. In particular, we estimate that unclear project objectives lead to higher prices, due to both direct premiums charged by firms and reduced competition, in 12% and 9% of government tenders respectively. These direct price premiums are estimated to be in the order of 25% of project value, leading to a 2.9% increase in project prices overall.

Unclear project objectives are the **largest driver of direct price premiums** identified in this study.

Contracting out of proportionate liability and other contract clauses

Contracts with the private sector are an important tool for government to manage the risks involved in public infrastructure projects. However, in order to achieve efficient management of risk at lowest cost, consistent with best practice, contract clauses must ensure that risks are borne by the party to the contract that is best placed to manage them. As noted by Infrastructure Australia, this may involve various risks being retained by government, transferred to the private sector, or shared by the parties (2008:29).

This report has considered the extent to which contracting is used by government to shift risk onto the private sector in procurement for built environment projects in circumstances where this risk allocation may not optimal, focusing on the clauses presented in Table i.

Table i: Common contract clauses

Clause	Description
Unlimited liability (52% of RFPs)	Unlimited liability clauses ensure that the liability of professional services firms to the public sector client is not capped. As 'unlimited' professional indemnity insurance is not provided in any insurance policies taken out by firms, the private sector is unable to fully insure against risks under contracts with unlimited liability clauses.
Specific insurance requirements (51% of RFPs)	Specific insurance requirements may include liability cap specifications that are higher than the optimal level necessary for a project, explicit naming of public sector clients in professional indemnity insurance (which is not technically feasible) and reductions in excess thresholds, among other terms.
Fitness for purpose (41% of RFPs)	This clause requires professional services firms to guarantee that the services provided achieve the intended result, and assume liability irrespective of negligence or fault. Liabilities assumed under a fitness for purpose clause are uninsured under standard professional indemnity policies.
Termination for convenience (36% of RFPs)	This clause allows public sector clients to terminate the contract for professional services at any time, for any reason. It will sometimes be accompanied by subclauses that reduce its risks for suppliers. Nevertheless these clauses can create labour cost risks for suppliers.
Expert standard of care (27% of RFPs)	Expert standard of care clauses increase the liability of professional services firms beyond that required by common law and under statute – greater than care, skill and diligence as would be accepted by peer professional opinion as competent practice. These liabilities are also generally uninsurable under standard professional indemnity policies.
Significant liquidated liabilities or abatement regimes (27% of RFPs)	These clauses impose penalties on professional services firms at the occurrence of particular events, such as delays, without the need for consideration of the causes of the event.
Contracting out of proportionate liability (26% of RFPs)	This clause waives state level proportionate liability legislation, such that firms can be held liable for 100% of the damages from negligence claims made by public sector clients, even if they were responsible for as little as 1% of the loss.
Novation provisions (26% of RFPs)	This clause allows for substitution of one party for another party without changing the rights and obligations under the original contract. In the context of this report, novation provisions allow public sector clients to designate a third party with which professional services firms must deal with under the terms of the existing contract. Sometimes there are subclauses that reduce its risks for suppliers.

Source: Business liaisons; AGS (2009); Consult Australia (2012); Planned Cover (2013)

The incidence of these clauses ranges from ¼ to ½ of RFPs. As shown in Chart i, we estimate that these clauses lead to higher priced proposals, reductions in competition and the implicit transfer of risks back to the government when firms proceed without adequate insurance. For example, while the impact of greater liability from 'contracting out' is absorbed by firms in around 20% of RFPs, the clause does trigger a reduction in competition (2.3% of RFPs) and generate higher project prices through risk premiums (1.6% of RFPs).

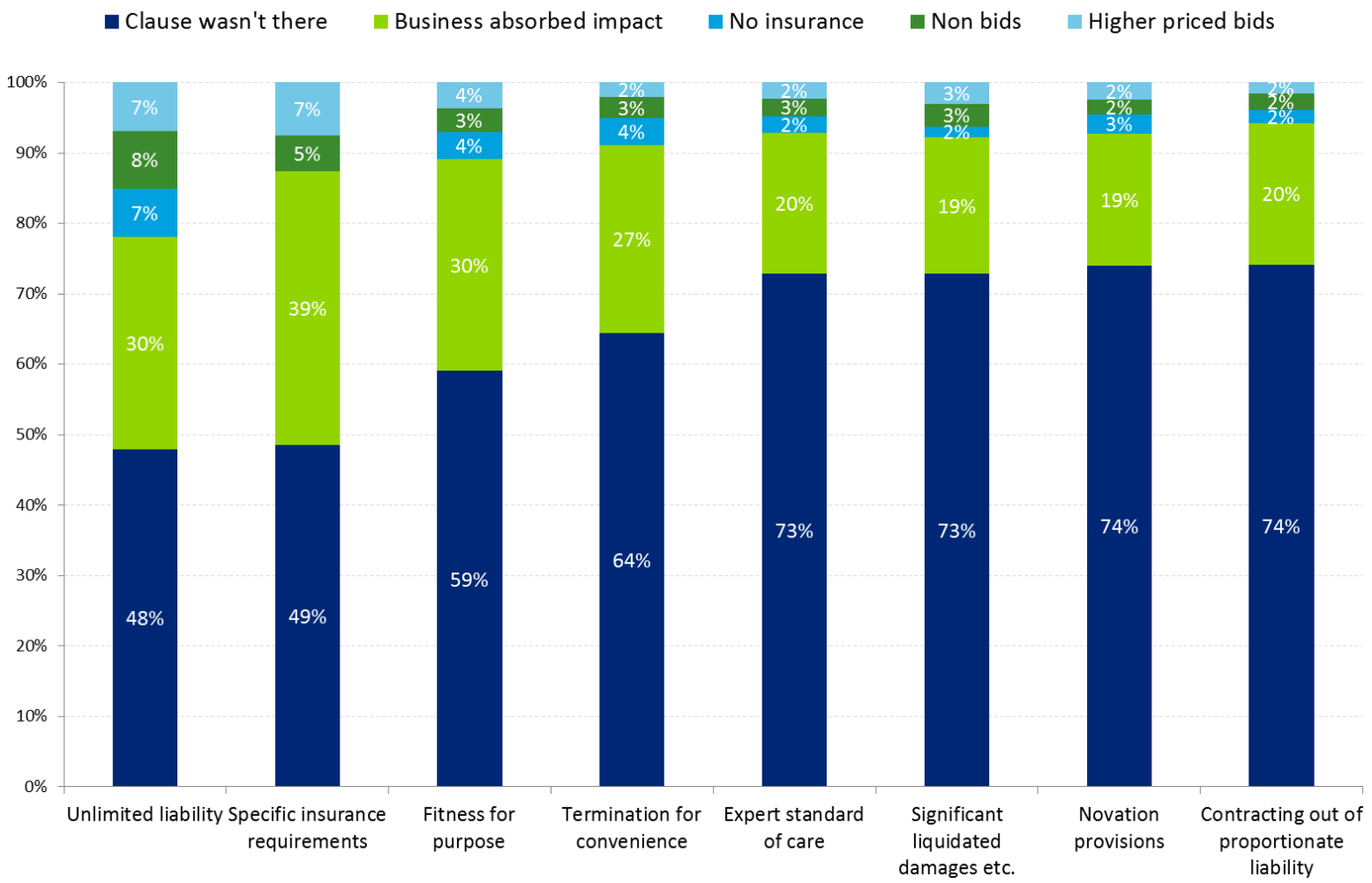
The premiums charged in response to these clauses also vary. For example, contracting out of proportionate liability and unlimited liability can increase project prices by around 0.1% and 0.2% respectively, when considering the additional premiums charged by insurers for extra cover.

It is important to acknowledge that while these estimates of the current insurance costs of such clauses are relatively small, they do not represent the full long term cost of these clauses for the public infrastructure market. For example, the price impact of contracting out of proportionate liability is likely to be higher during hard insurance markets that are characterised by low supply and higher premiums, compared to soft insurance markets, where premiums are lower as a result of high supply.

Further, the relatively immature market for providing insurance cover for 'contracting out' means that there is insufficient claims data at present to take into account the full impacts of shifting away from the proportionate liability regime. There are likely to be flow on effects of further price premiums and less competition in the future if governments fail to shift to an efficient risk management approach.

This report also finds that **delivery models play a role in contracting problems.** Between 3% and 19% of respondents reported the delivery model as a significant factor in the inclusion of the contract terms noted above. We estimate that the choice of delivery model accounts for around 22% of the price increases in public sector built environment projects caused by risk allocation and other contract terms.

Chart i: Business responses to onerous contract clauses



Skills of procurement managers

This report finds opportunities for improvement in the skills of public sector procurement managers – over one third of firms identified skills issues in traditional procurement models, and almost two thirds of firms in relation to privately financed procurement models.

Incentives for innovation

This report finds that around 45% of professional services firms find public sector clients to be non-responsive to innovative suggestions during tender processes. Practices for early market sounding process, during the bidding process, or unsolicited proposals exist but could be more widespread both in being offered and being used.

Bid costs and unverified brief information

An analysis of the primary data collected for this study suggests that **bid costs** for professional services firms involved in public sector built environment projects range between 0.6% and 2.9% of total project value. This is consistent with previous studies.

However, it is estimated that firms are required to undertake additional work in around 34% of tenders to confirm the accuracy of information provided by the public sector in briefs – such as geotechnical information, environmental impacts and financial data. The average costs of this additional work were reported at around $41,800 per firm per proposal.

Given that this work would ideally be undertaken once, by the public sector, inefficient costs per proposal are estimated at around 0.8% of total project value, using the average lifetime project value reported by firms.

Economic impacts

Overall, it is estimated that the total price impact of poor procurement practices is around 5.4% of total revenue obtained by professional services firms in public sector built environment projects. This comprises of:

- direct price increases of 3.6%;
- indirect price increases of 1.5% from reduced competition; and
- inefficient costs of bidding worth 0.3% of project prices.

This can be considered as a breakdown of the potential 6% reduction in project costs that firms report they can achieve through better procurement practices.

In addition, there are the improvements in quality and reduction in delays that firms will be able to achieve if these issues are addressed.

Potential cost savings from transforming procurement

Assuming that changes to procurement practices could be phased in over a five year period, the associated cost savings are presented in Table ii.

Table ii: Potential cost savings from transforming procurement practices ($m, real $2014), 2015 – 2019

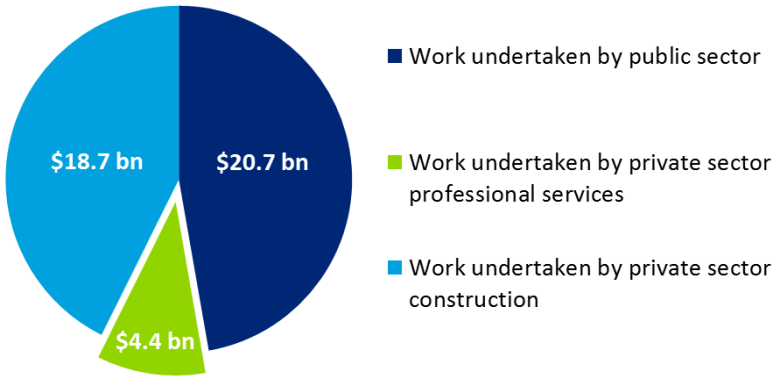
Input type	2015	2016	2017	2018	2019
Cost savings from reduced price impacts in professional service contracts	48	96	143	191	239
Cost savings from reduced design error costs in construction	17	35	52	70	87
Total cost savings	**65**	**131**	**196**	**261**	**326**

Source: Deloitte Access Economics

These cost estimates are based on the value of building and engineering construction work done for the public sector in 2013, of around $43 billion (ABS, 2014a & 2014b). In terms of engineering construction, around 53% of this work was undertaken by the private sector (ABS, 2014b). Assuming that a similar rate of procurement from the private sector could be applied to the total level of public sector building work, we estimate that around $23 billion of work was procured from the private sector for public built environment projects in 2013.

The value of professional services revenue from these projects is thus estimated at around $4.4 billion, based on the average contribution of 19% reported by firms in this study, and updating to 2014 prices using the Consumer Price Index. This implies that the revenue attributable to construction of public infrastructure was around $18.7 billion. This breakdown is illustrated in Chart ii.

Chart ii: Assumed breakdown of the value of building and construction work done for the public sector in 2013 ($bn, real $2014)



Source: ABS (2014a); ABS (2014b); data reported by Consult Australia members; Deloitte Access Economics assumptions

Accordingly, the total price impacts associated with poor procurement practices can be valued at around $239 million per annum. This comprises of around $161 million in direct price premiums, $67 million as a result of lower competition, and inefficient bid costs of $11 million.

In addition, the quality improvements associated with better procurement of professional services have the potential to reduce the costs incurred during construction to rectify design errors.

Assuming that the average direct design error costs in Australian construction and engineering projects of 6.85% (Lopez and Love, 2012) can be reduced by 7%, more efficient procurement can also deliver reductions in the cost of constructing public infrastructure by 0.47%. This cost saving is estimated at around $87 million per annum, in 2014 prices.

The dividend of transforming procurement practices is significant

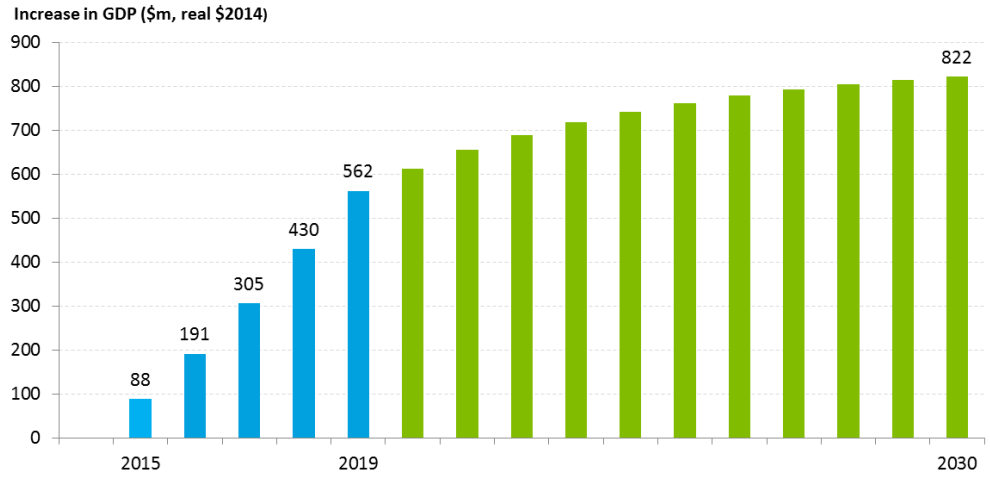
To understand the broader impacts of procurement practices on our businesses and economy, we use economy-wide Computable General Equilibrium (CGE) modelling to understand the impacts on GDP and employment. What we find is that while the dividend of transforming procurement practices is modest in annual terms, the benefits accumulate significantly over the long term, worth:

- around $2.5 billion in cost savings for government between 2015 and 2030; and
- around $5.1 billion in additional GDP between 2015 and 2030.

The profile of these GDP impacts is illustrated in Chart iii.

It is evident that the majority of the increases are achieved over the five year phase-in period, with smaller annual increases in additional GDP experienced out to 2030 due to continued benefits of the higher return on capital.

Chart iii: Impact of the potential cost savings on GDP ($m, real $2014), 2015 – 2030



Source: Deloitte Access Economics

A state-by-state breakdown of these additional GDP benefits is presented in Table iii.

Table iii: State breakdown of GDP impacts ($m, real $2014), 2015 – 2030

Increase in GSP ($m, real $2014)	NPV	2015	2019	2030
ACT	240	4	26	38
NSW	1,386	24	152	222
NT	100	2	11	16
QLD	1,379	24	151	221
SA	333	6	36	53
TAS	113	2	12	18
VIC	1,015	17	111	162
WA	565	10	62	90
Total Australia	**5,133**	**88**	**562**	**822**

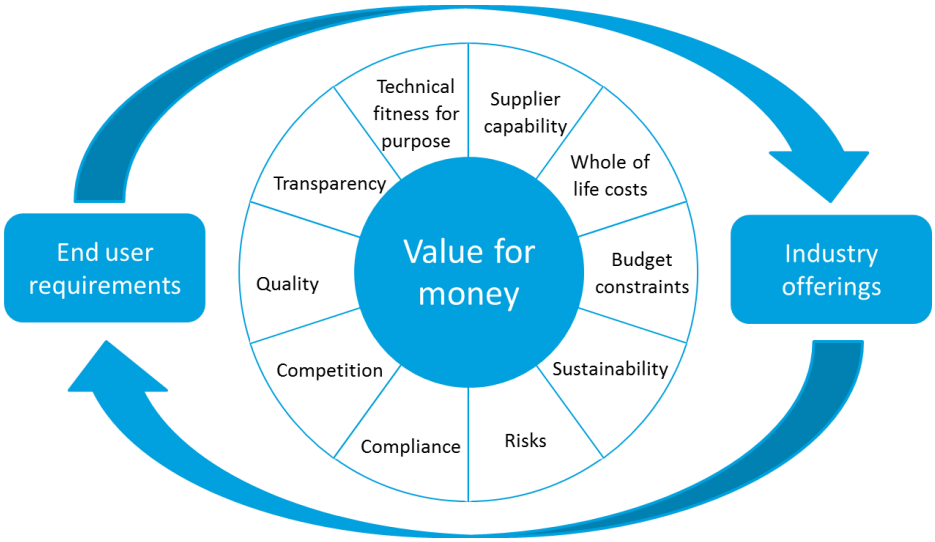
Source: Deloitte Access Economics

Overview of procurement policy and practice

Achieving these economic benefits requires consideration of government perspectives on the extent and causes of the issues raised by industry, taking into account the variations in procurement policy and practice across jurisdictions and departments.

The core objective of procurement policies across the Australian public sector is to achieve value for money. However, as shown in Figure i, the process of determining the optimal value for money solution through procurement is a careful balancing act. Rather than simply pursuing the lowest cost offering, government agencies must consider a range of factors in order to select the industry offering that best meets end user requirements. Managing this complex decision process efficiently requires a significant level of expertise.

Figure i: Factors to be considered in procuring value for money services



In addition, each jurisdiction of Australia has its own procurement policy and processes.

While there are similar policy structures across the states and territories, such as designation of responsibility for building and construction procurement policy to a specific agency and some centralisation of procurement management, there are differences in mechanics and implementation, such as agency culture and the existence of industry arrangements such as panels and prequalification schemes.

Government perspectives on areas for improvement

To provide further insight on the extent and underlying causes of the issues raised by industry, Deloitte Access Economics consulted with four government representatives holding different procurement-related positions within New South Wales, South Australia, Victoria and Western Australia.

While government representatives consider that the procurement arrangements in Australia are broadly effective in achieving value for money outcomes, it is acknowledged that improvements can be made.

Some of the drivers of unclear project objectives that were identified by government include difficulty of planning prior to cabinet approval, distinctions between end users and stakeholders for different infrastructure types and cultural differences between agencies in their approach to industry engagement.

In relation to contracting, government has expressed a willingness to pay for the transfer of risk to the private sector. However, it was acknowledged that government is uninformed about the costs incurred, particularly as they are often hidden by the competitive market. Inclusion of contract clauses is driven by legal advice, rather than economic assessments, and it was considered that the practical benefits of a standard approach offset the benefits of flexibility. However, this may not appropriately take into account the implications of shifting risks to the private sector which they may not be best placed to manage.

Next steps

This report highlights seven next steps to increase procurement efficiency, as summarised in the box below. While it will take time to implement these changes, this report demonstrates that the efforts should result in economic benefits. Above this, we note that achieving meaningful changes in a complex area such as procurement policy is unlikely to be delivered by any single action. It is a strategically significant area of government activity that needs more holistic consideration and cultural change to support that.

(1) Set up procurement teams with practical, legal, insurance and procurement experience: given the mixture of expertise required to undertake a successful procurement, governments should consider restructuring procurement teams to encourage the key players to work collaboratively. Together, legal experts that understand contracting, insurance specialists, practitioners with project experience and procurement experts can evaluate value for money and appropriately tailor procurement processes, contracts and delivery models to the objectives of a project.

(2) Reallocate procurement resources towards specification of project objectives: procurement policy should place a stronger focus on identifying the needs of public infrastructure end users, re-testing business case objectives in the procurement environment and taking advantage of opportunities to engage with industry in project scoping where appropriate. Without agreeing and documenting project objectives clearly, time spent on contracting will be less effective.

(3) Remove contract clauses that do not stack up: while this report has highlighted the costs of contracting out of proportionate liability and imposing expert standard of care on industry, these need to be evaluated with reference to the benefits of management of risk by industry, through a cost-benefit analysis. Where terms fail to meet a cost-benefit analysis, they should be removed from contracts unless justified by the specific circumstances of a particular project. This requires government to identify whether it intends to use clauses to cover their losses, or to actively mitigate risks.

(4) Develop and apply limited liability guidelines: while Professional Standards Schemes are one mechanism to achieve limitation of liability, these are challenging to implement and not viable for all professions. To enable a broader approach for efficient risk management, governments should develop and apply limited liability guidelines to assist agencies with ensuring that liability clauses do not add unnecessarily to project costs. Such guidelines should simplify the process of setting liability caps, while taking into account variations in market practice, project size, risk and the size of the supplier.

(5) Verification of brief information: it is more efficient for government to undertake the necessary work to verify the accuracy of information provided in a request for tender, rather than transferring the costs of that work to all bidders, creating duplication. Purchasing agencies should actively seek to minimise this burden.

(6) Streamline compliance processes: governments can also reduce bid costs for public infrastructure projects to more efficient levels by streamlining compliance requirements, particularly where the information provided by firms is rarely a differentiating feature of the successful tenderer. Options include development of standard form agreements for firms, or submission of compliance documentation as part of pre-qualification schemes.

(7) Evaluate and adapt procurement frameworks to encourage innovation: continuing to evaluate and adapt procurement frameworks with reference to changes in market offerings will help to maximise innovation in public infrastructure projects. Going forward, the public sector should be open to new delivery models, early market sounding options and continue to provide opportunities for unsolicited proposals.

1 Introduction

Professional services firms make a significant contribution to the development of public infrastructure in Australia. When procuring major projects, such as roads, bridges, public transport or water facilities, government departments and agencies frequently engage the services of architects, engineers, designers, surveyors, project managers, lawyers and technology specialists from the private sector. These firms have the expertise and capacity to innovate to ensure that high value outcomes are achieved from public infrastructure investments.

However, there are some elements of current government procurement policy and practice that are inefficient, adding unnecessarily to the cost of infrastructure. This includes cases where government clients have unclear project objectives, select inappropriate project delivery models, fail to guarantee the accuracy of information in project briefs and pass on uncontrollable risks through contract clauses.

In the bidding phase, businesses respond to these practices in a number of ways, by charging additional price premiums, recouping bid costs, accepting uninsurable risks and reducing competition. This has economic impacts in the form of higher prices, project delays and lower quality infrastructure, which in turn, flow through to the supply side of the broader economy, constraining employment and GDP through a lower rate of return on capital.

There are also longer term impacts of procurement decisions for public infrastructure. The costs of businesses choosing to absorb the costs of poor procurement can add up, impacting the longer term viability of the industry with unnecessary reduction in competition. Government procurement policies recognise the importance of fostering competition over the long term, while also seeking to achieve value for money on a project-by-project basis.

These issues are well documented in a number of previous reports and analyses. To better highlight the magnitude of these implications, Consult Australia commissioned Deloitte Access Economics to quantify and model the economic benefits of better procurement practices, as it relates to professional services employed for public sector built environment projects.

1.1 Outline of this report

This report approaches the task of quantifying the economic benefits of better procurement practices in four stages.

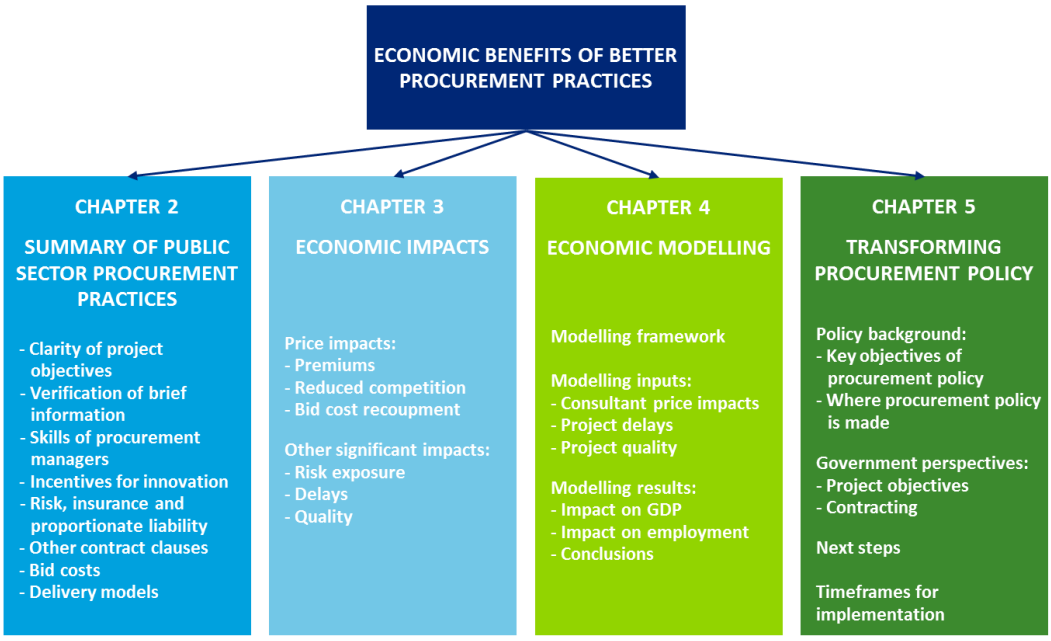
First, it considers the evidence for eight different aspects of poor procurement policy. It then produces estimates of the net costs to society of these practices, based on an analysis of business responses. Computable General Equilibrium (CGE) modelling is then used to estimate the economic outcomes that would be achieved if these supply-side costs were reduced over time.

The report concludes by considering government perspectives on these issues and identifies practical next steps to reduce the cost of infrastructure and increase productivity.

The structure of the report is as follows:

- **Chapter 2** summarises the evidence of poor procurement practices in public sector built environment projects, as they are encountered by professional services firms. This section covers eight aspects of procurement, highlighting opportunities for improvement – clarity around project objectives, verification of brief information, skills of procurement managers, incentives for innovation, risk allocation, use of contract terms, bid costs and choice of delivery model.
- **Chapter 3** analyses the economic costs that result from these poor practices. This encompasses price impacts, which manifest through premiums, recoupment of bid costs and reduced competition. Other impacts, such as public exposure to risk, project delays and lower quality deliverables are also considered.
- **Chapter 4** investigates how the potential cost savings from changes in procurement can impact on macroeconomic outcomes, such as employment and GDP. To model these broader economic impacts we have used our in-house Deloitte Access Economics Regional General Equilibrium Model (DAE-RGEM), a Computable General Equilibrium (CGE) model that represents the dynamic relationship between economy agents.
- **Chapter 5** outlines practical next steps to transform procurement practices and deliver benefits for the economy as a whole. These are informed by a review of the key objectives of procurement, the variations in policy and practice across jurisdictions, and recognition of public sector perspectives on the extent and causes of the issues raised by industry.

Figure 1.1: Report structure



1.2 Approach

To develop the evidence base for this report, the following five stage approach was undertaken:

- **Literature review –** to identify the key issues in public sector procurement, a literature review was undertaken with a primary focus on previous studies in the Australian context. The challenges within public sector procurement are well documented, with work undertaken from the perspective of academics, consultants, other businesses and government. At the same time, some gaps in the research were identified, particularly in that there has not been a single systematic review of the costs of various poor procurement practices in Australia. This evidence base in this report seeks to address this.
- **Workshop with industry leaders** – in May 2014, eight senior industry leaders, representing some of Consult Australia's member firms (with total employment of 32,683 full time equivalent workers), participated in a workshop at Deloitte's Sydney office. The workshop discussion centred on the key issues faced by firms in public sector procurement, and the nature of their responses. This was a valuable exercise as it gave firms an opportunity to challenge each other's assumptions regarding the nature of the issues, business responses and costs.
- **Business liaison –** both prior to and following the workshop, a number of business liaisons were undertaken to ascertain more detailed evidence from member firms and stakeholders in the insurance sector. These one-on-one interviews helped to clarify important nuances and understand the deeper causes of problems and business behaviours.
- **Primary data gathering –** two surveys were developed to collect primary evidence from Consult Australia's member firms. This included a survey of state branch managers of large firms, and a national level survey for small and medium sized businesses. The surveys were fielded from 18 June – 25 June 2014. In total, 55 responses were received.
- **Government consultation –** in order to better understand the extent of the issues raised by industry and the different arrangements used across Australia, Deloitte Access Economics consulted with four government representatives holding different procurement-related positions within New South Wales, South Australia, Victoria and Western Australia. These discussions highlighted some of the best practice features of public sector procurement and identified win-win opportunities to realise mutual gains for government, business and the broader community.

Figure 1.2: Developing the evidence base

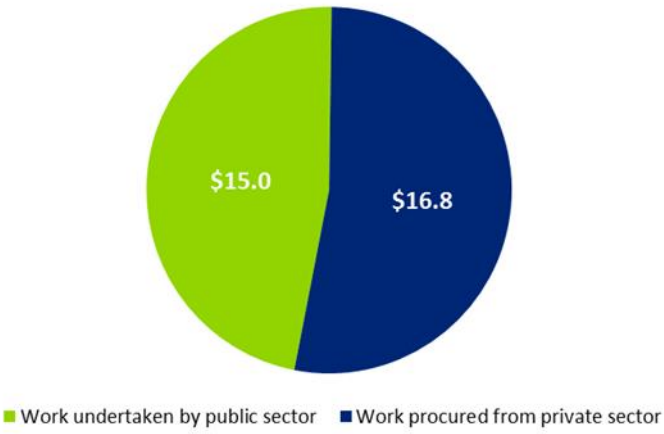
1.3 Procurement for public sector infrastructure

While some of the procurement practices discussed in this paper may also be of relevance in other areas, the scope of this report is limited to the procurement of professional services for public sector built environment projects.

The built environment encompasses all man-made physical structures that accommodate the needs of society. This includes residential, commercial and public property, and supporting critical infrastructure such as utilities and transport facilities. In 2013, the public sector building and construction work done was valued at $43 billion, 75% of which related to engineering construction. This captures physical infrastructure projects, as opposed to residential and non-residential building activity (ABS, 2014).

Focusing on public sector engineering construction, $16.8 billion worth of work was procured from the private sector in 2013, 53% of total activity (Chart 1.1).

Chart 1.1: Breakdown of public sector engineering construction work (2013, $bn)

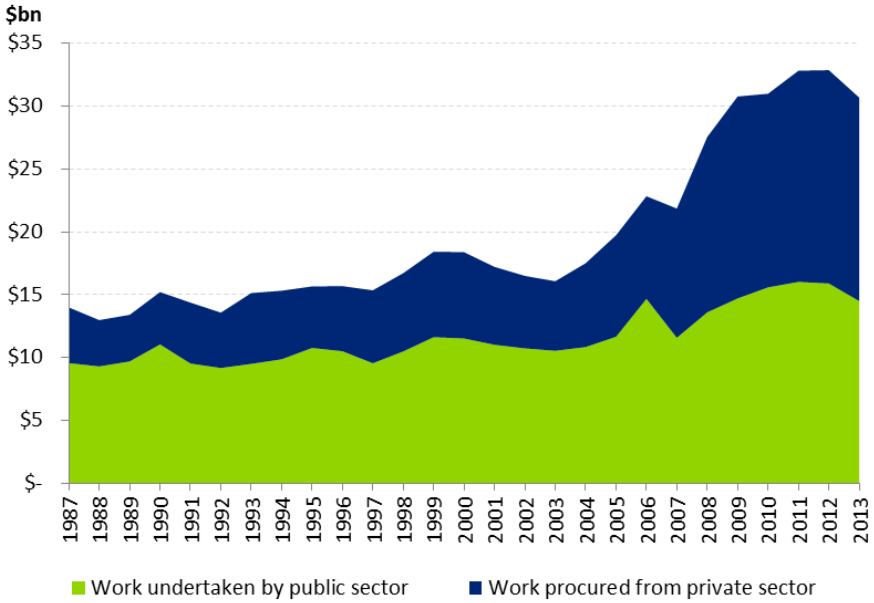


Source: ABS (2014) Cat. 8762.0 Engineering Construction Activity

Note: this data presents a lower bound estimate of the value of work procured by the public sector, as some Public Private Partnerships (PPPs) are classified as work for the private sector, even though the government may be the ultimate owner of the asset in the long term.

Furthermore, government procurement of private sector services for infrastructure projects has grown over time. As illustrated in Chart 1.2, share of activity procured from the private sector has also grown, from 32% in 1987 to 53% in 2013.

Chart 1.2: Value of engineering construction work done for public sector (1987 – 2013, $bn – chain volume measures)



Source: ABS (2014) - Cat. 8762.0 Engineering Construction Activity

Note: Values presented are measured in chain volume measures. This means that the changes from year to year reflect volume changes only, not changes in price.

Overall, the implications of this transition are that government will naturally seek to pass on more issues of uncertainty to the private sector. It is recognised that some level of transfer of risk from the public to the private sector will be optimal, to the extent that risks are borne by the party that is best able to manage them. Accordingly, this report seeks to quantify the net costs incurred by the taxpayer, as a result of poor procurement practices, rather than costs transferred.

Assuming that the private sector share of residential and non-residential building activity done is around 53%, the same for engineering construction, we estimate that the total pool of private sector building and construction work undertaken in 2013 for the public sector was around $23 billion in 2014 prices.

Professional services firms reported that, on average, the services they provide for public sector built environment projects accounts for 19% of total project value. This implies that professional services earned around $4.4 billion in revenue from public building and construction projects.

When interpreting this data, it should be acknowledged that the contracting arrangements for infrastructure projects can be particularly complex compared to other areas of government procurement. The box on the following page provides some background information in this regard.

Contracting in the built environment sector – it's complicated

Given the significant, long term investments associated with public infrastructure development, procurement of professional services from the private sector is just one component of a range of intertwined contractual arrangements between multiple parties.

The nature of these relationships will depend on the delivery model selected for the project. While these are discussed in more detail later in this report, this can range from direct engagement of professional service firms by the government, to indirect engagement through a government appointed developer that is also responsible for the construction, subsequent to the design phase. Alternatively, government, professional services firms, constructors and operators of infrastructure may form an alliance structure or partnership.

The contractual arrangements to which professional services firms are committed will therefore vary on a project-by-project basis. Accordingly, the full contribution of professional services firms towards public infrastructure projects may not be fully captured in the data presented in Chart 1.1.

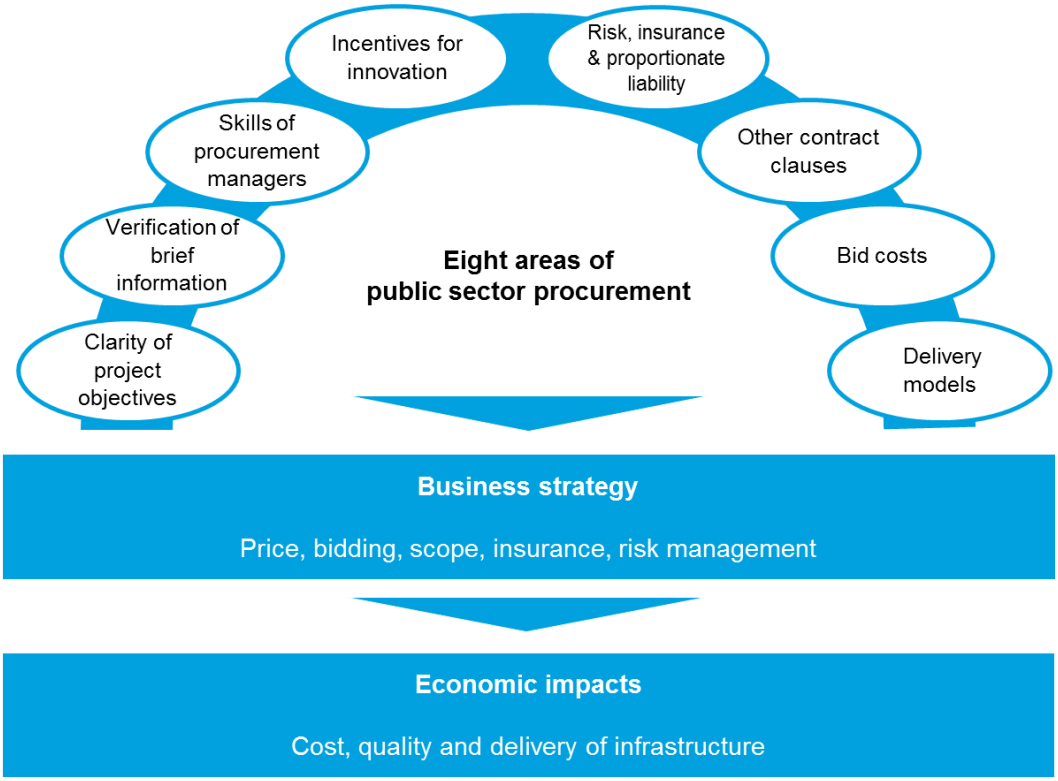
Nevertheless, the remaining 80% of work procured from the private sector highlights the broader flow on effects of inefficient procurement practices on the economy. Government make large investments into public infrastructure because they deliver essential services to society over the long term. When appropriately targeted, public infrastructure can drive improvements in economic welfare through increased productivity, greater competition and better quality of life for individuals (Productivity Commission 2014:50). Globally, it is estimated that strategic infrastructure projects have the potential to deliver economic returns of between 5% and 25% (World Economic Forum 2012:2).

Accordingly, a focus on achieving value for money from work procured from the private sector is a key objective. This takes into account issues of risk management during project delivery, but also requires consideration of incentives for innovation.

2 Summary of public sector procurement practices

This report summarises public sector procurement practices into eight key areas, as illustrated in Figure 2.1 below.

Figure 2.1: Eight areas of public sector procurement



Where issues arise within a particular area, the behavioural changes undertaken by firms in response can have negative economic impacts. While this typology of procurement into eight areas is useful to assess the issues in isolation, it is also the case that where poor practices occur in more than one area, there is a cumulative impact of dragging resources into public sector procurement, and away from other parts of the economy.

This chapter provides evidence on these opportunities for improvement, as they relate to public sector procurement of professional services for built environment projects.

2.1 Clarity of project objectives

Key Points:

- Unclear project objectives are encountered by firms for 37% of RFPs.
- This has led to higher prices in around 12% of projects due to direct premiums charged by firms in response.
- Unclear project objectives also lead to reduced competition in around 9% of public sector infrastructure projects.

In any public infrastructure project, clarity around project objectives is critical to ensure that it is carried out in a way that cost-effectively achieves those goals. As the purchaser of professional services, responsibility for clearly defining the purpose of a project lies with government departments and agencies during the initial planning and specification stage (Royal Academy of Engineering, 2014:5). It is difficult to conceive how a public infrastructure project can be successful when the aims of the project are not identified by government and consistently conveyed to the private sector from the outset.

Nevertheless, professional services firms claim to have frequently encountered requests for proposal (RFPs) from public sector clients with unclear project objectives over the last 12 months. This encompasses tenders which have insufficient detail on both the requirements and need for the project.

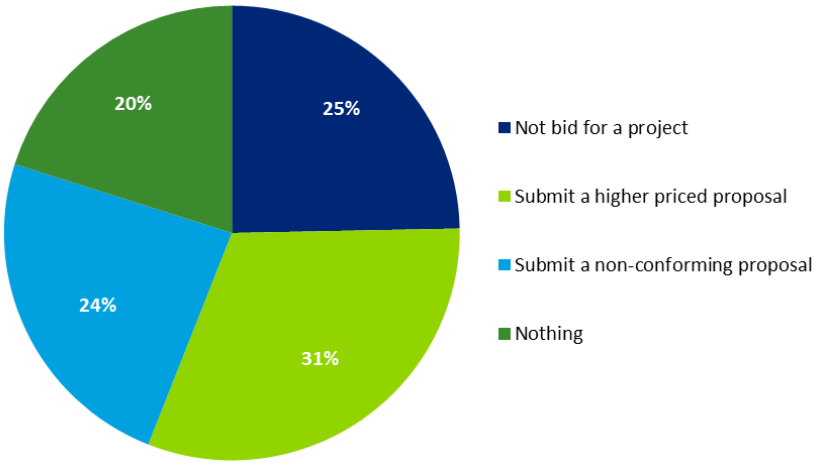
Specifically, primary data collected from Consult Australia members indicates that unclear project objectives are encountered by firms for 37% of RFPs.

This finding is similar to the evidence from a 2008 survey by Blake Dawson, where 32% of respondents identified inadequate definition of project objectives as a main cause of poor scoping in Australian construction and infrastructure projects.

Firms can respond to unclear project objectives in a variety of ways, including increasing bid prices to cover project risks, deciding not to bid and reducing competitive tension, or submitting proposals that do not conform to the specifications of the project brief.

Around a fifth of firms (20%) do not take any specific action. However, as shown in Chart 2.1, a common business response (31%) is to increase the price of the bid. Furthermore, firms have also responded by withdrawing from the bidding process (25%) or submitting a non-conforming bid (24%).

Chart 2.1: Business responses to unclear project objectives



Based on these results, we estimate that 12% of government tenders for professional services in the built environment sector have higher prices due to direct premiums charged by firms, as a result of unclear project objectives.

In addition, unclear project objectives lead to reduced competition in 9% of public sector RFPs. This is a significant issue. For instance, the data collected indicates that on average, firms choose not to pursue 17% of their opportunities to bid for public sector projects. While this reflects a number of business reasons, it is evident that unclear project objectives are a contributing factor to over half of firm's decisions not to bid.

2.2 Verification of brief information

Key Points:

- Firms are required to undertake additional work to verify the accuracy of information in around 34% public sector tenders.
- The costs of this additional work are estimated at around $41,800 per firm per bid.

Another issue identified by professional services firms in public sector procurement for built environment projects is potential unwillingness of government clients to verify the accuracy of information provided in the project brief. Examples include geotechnical information, environment information or financial information. This places a burden on prospective bidders.

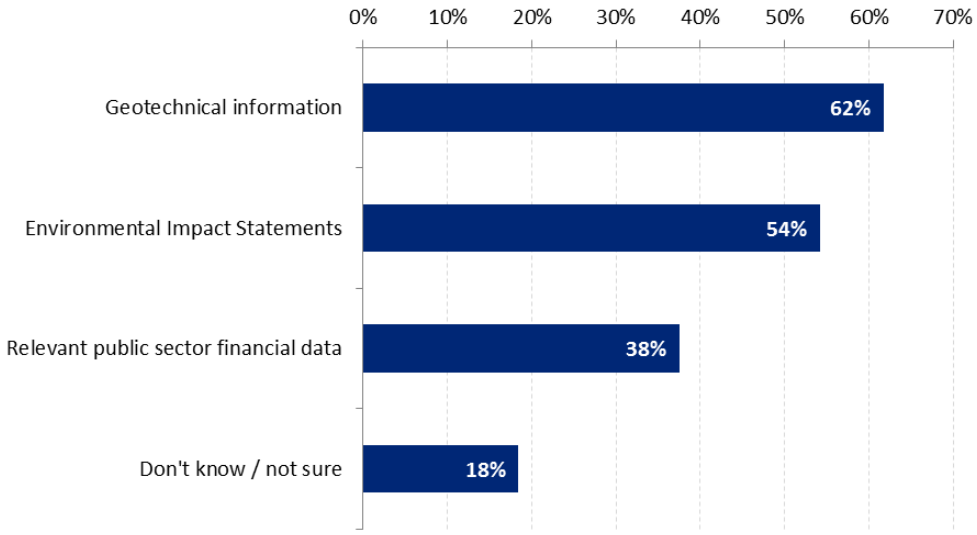
Again, this is not a new concern. In a 2006 survey undertaken by Blake Dawson Waldron, it was found that inadequate site information in market request phase restricted the quality and pricing of bids for around 20% of construction and infrastructure projects (2006:17).

Based on the primary data collected for this report, professional services firms are required to undertake additional work for 34% of public sector tenders, to verify the information provided in the brief. Furthermore, the average costs of this additional work were reported at around $41,800 per firm per proposal.

With multiple bidders undertaking verification work for the same projects, public sector clients are driving duplication and adding to overall project costs. To the extent that the costs of this additional work are greater than the costs to government in providing a guarantee, this practice is inefficient. This has been acknowledged by the Productivity Commission, which recommends that by undertaking site investigations and passing better information on to bidders, the public sector can avoid duplication and reduce project prices (PC 2014:479-480).

Many respondents agreed that provision of geotechnical information, Environmental Impact Statements or relevant public sector financial data as part of RFPs would improve the efficiency of bidding processes or the quality of proposals (see Chart 2.2).

Chart 2.2: Types of information which would improve the efficiency of bidding processes



2.3 Skills of procurement managers

Key Points:

- There are substantial opportunities for improvement in the skills of public sector procurement managers, despite widespread recognition of the issue in the literature.
- Skills shortages are identified by over one third of firms in relation to traditional procurement models, and almost two thirds of firms in relation to privately financed procurement models.

There is an inherent link between the quality of public sector procurement practices and the extent to which procurement managers are appropriately qualified to administer dealings with the private sector.

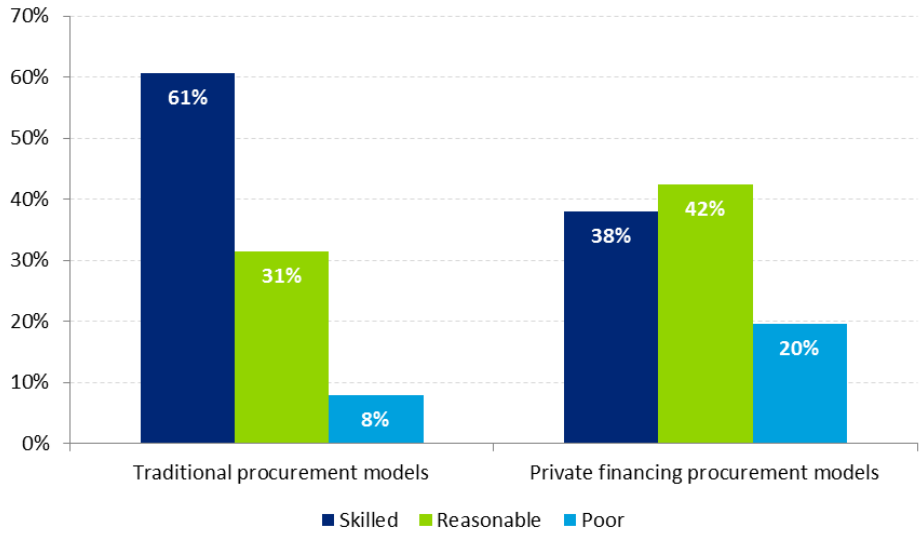
Over the last few years, a number of studies have identified the inexperience of procurement managers in the public sector as a causal factor of poor project scoping, documentation and disputes.

For example:

- the absence of a qualified, client appointed design manager to oversee projects from initiation to completion was identified as one of ten core issues contributing to poor design and documentation in an analysis released by Engineers Australia (2005);
- the lack of experienced and sufficiently competent personnel was highlighted as the biggest contributor to inadequate scoping in Australian construction and infrastructure projects in a survey undertaken by Blake Dawson (2008:14);
- educational and behavioural adaptations of individuals within the people system, such as poor communication, management, skills, experience and personality traits, have been identified as a key causal factor contributing to disputes in construction projects (Cooperative Research Centre for Construction Innovation 2009:14); and
- improvements in the skill base of public procurers can reduce infrastructure costs, if accompanied by a simultaneous focus on taking the time necessary to scope projects before going to market (Productivity Commission 2014:439,491).

The primary data collected for this analysis presents a mixed outlook on the skill levels of procurement managers in the public sector. As shown in Chart 2.3, government managers are rated as skilled by 61% of firms in relation to traditional procurement models such as D&Cs, and less than 40% of firms for private financing procurement models, generally used for larger and more complex projects.

Chart 2.3: Ratings on the skills of public sector procurement managers



This suggests that substantial opportunities for improvement remain, with over one third of firms identifying skills shortages in relation to the public sector management of traditional procurement, and almost two thirds of firms in relation to private financing procurement models.

In order to address these concerns, government agencies should consider a mix of initiatives that build the technical skills necessary to understand specific details of project design, as well as the capability necessary to manage tender processes efficiently.

2.4 Incentives for innovation

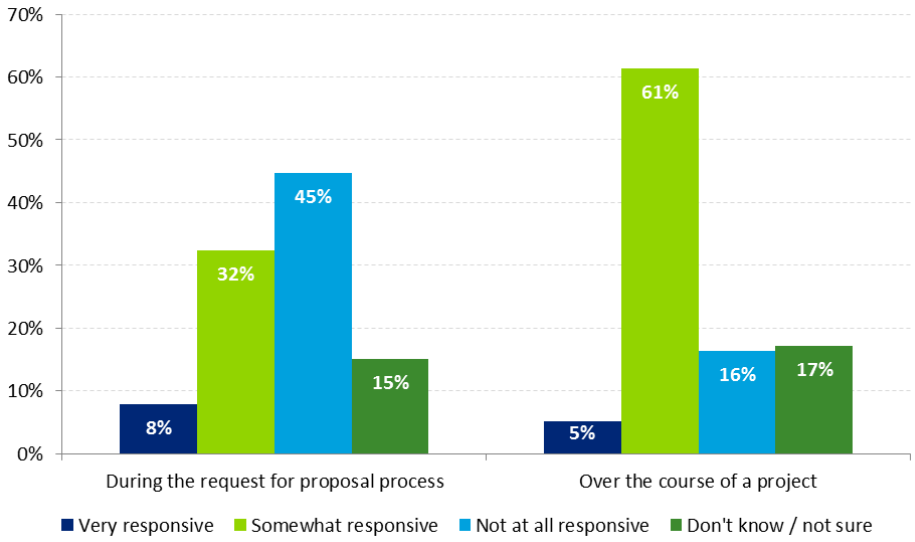
Key Points:

- 45% of professional services firms find public sector clients to be non-responsive to innovative suggestions during tender processes.
- Meanwhile, around one in six firms find the government to be non-responsive to innovation during the course of a project.
- Firms interact with public sector clients for just under 50% of tenders.
- Only 9% of firms have actively participated in the unsolicited proposals process.

In order to capture the full value for money offered by professional service firms in relation to built environment projects, it is necessary to ensure that procurement processes do not place unnecessary constraints on the opportunities and incentives for innovation.

As illustrated in Chart 2.4, only 40% professional services firms bidding for built environment sector projects consider public sector clients to be very or somewhat responsive to innovative suggestions during the RFP process. In contrast, almost half of the industry has found public sector clients to unwilling to take innovative suggestions on board.

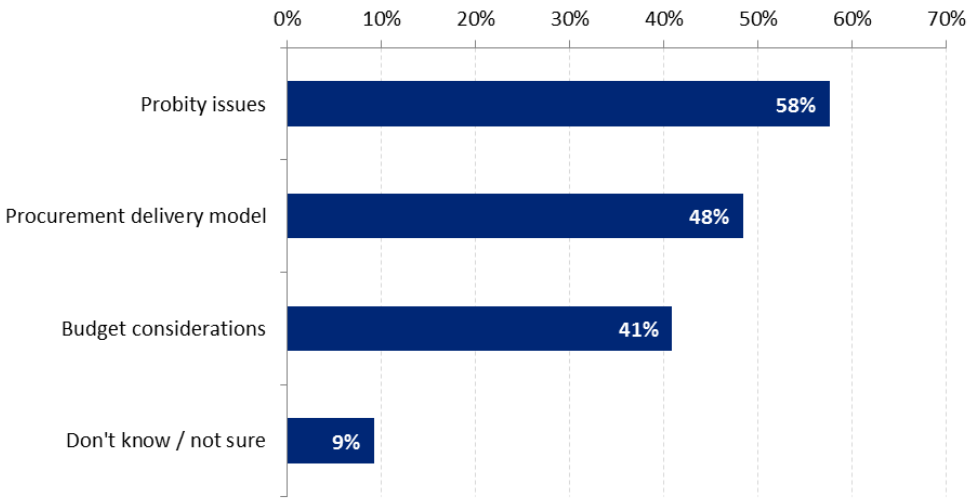
Chart 2.4: Responsiveness of public sector clients to innovative suggestions made by firms



Firms suggest that government is more responsive to innovative ideas once a project has commenced, however, around one in six firms consider that opportunities for greater innovation remain.

Some of the common drivers of non-responsive behaviours cited by firms are listed in Chart 2.5 below. Unsurprisingly, the most prominent drivers appear to be probity issues and the influence of the procurement delivery model.

Chart 2.5: Main drivers of non-responsiveness of the public sector to innovation

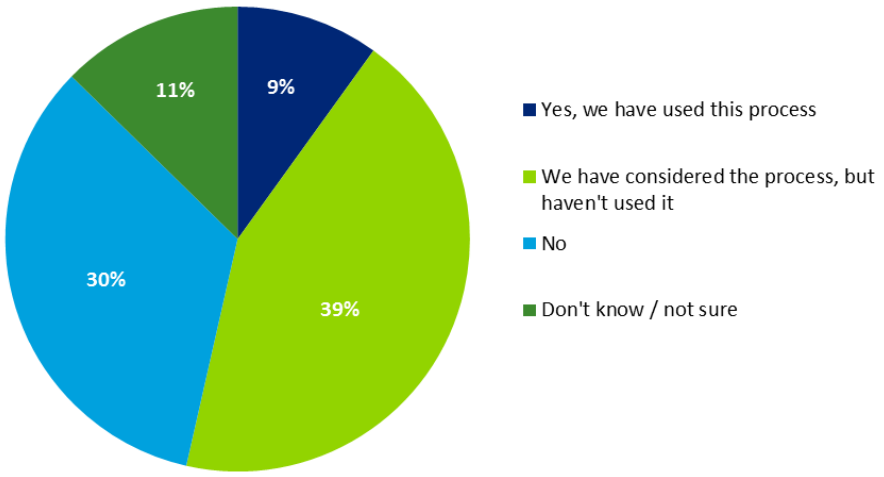


One method that the public sector can use to promote opportunities for innovation is to interact with firms, either as an early market sounding process or during the bidding process. The data collected for this report suggests that these interactions take place for just below half of all tenders for professional services in built environment projects.

Furthermore, each state and territory jurisdiction in Australia provides opportunities for the private sector to make unsolicited proposals outside of standard tender processes. These mechanisms are designed to promote innovation and often require proposals to be unique, to justify negotiation with government outside of a competitive market.

The primary data collected in this survey finds that while over half of firms have considered submitting unsolicited proposals to government, only 9% of firms have actively participated in the processes (see Chart 2.6).

Chart 2.6: Consideration of unsolicited proposal processes



Overall, this evidence suggests that while private sector professional services firms have reasonable opportunities to make innovative proposals to government, there is scope to improve the responsiveness of the public sector during the RFP process, through greater interactions with firms prior to the commencement of projects.

2.5 Risk, insurance & proportionate liability

Key Points:

- Around 26% of firms were required to 'contract out' of proportionate liability in public built environment projects over the last 12 months.
- This clause has triggered a reduction in competition for 2.3% of tenders, and has generated higher project prices through direct risk premiums in 1.6% of tenders.
- Almost half of respondents (44%) report that they do not currently hold insurance cover for contracting out of proportionate liability.

Best practice risk allocation prescribes that responsibility for risk should be allocated to the party that is best able to manage that risk. For example, Abrahamson (1983) proposed that "a party to a contract should bear a risk where:

- the risk is within the party's control;
- the party can transfer the risk, e.g. through insurance, and it is most economically beneficial to deal with the risk in this fashion;
- the preponderant economic benefit in controlling the risk lies with party in question;
- to place the risk upon the party in question is in the interests of efficiency, including planning, incentive and innovation;
- if the risk eventuates, the loss falls on that party in the first instance and it is not practicable, or there is no reason under the above principles to cause expense and uncertainty by attempting to transfer the loss to another" (in NPWC/NBCC Joint Working Party, 1990:6).

While discretion is required when applying these principles (Allens Arthur Robinson 2003; Molino Cahill Lawyers 2013), the core notion of efficient risk management is well established in the Australian context. For example, the Commonwealth Procurement Rules (Department of Finance, 2008) prescribe that "as a general principle, risks should be borne by the party best placed to manage them".

Nevertheless there is evidence that, in practice, government clients are involved in shifting risk onto the private sector in procurement for built environment projects even in circumstances where this risk allocation is not optimal.

This issue arises frequently in relation to distribution of liability. In particular, government departments and agencies commonly require professional service firms to 'contract out' of proportionate liability legislation, despite the fact that this was introduced to address the policy problem of rising liability insurance costs (AGS, 2013).

Prior to the early 2000s, firms were subject to the doctrine of joint and several liability, which meant that an injured party could recover its entire loss from any single concurrent wrongdoer in a negligence claim. In response to rising liability insurance costs,

proportionate liability legislation was put in place to revise this arrangement and limit the liability of any 'wrongdoer' to the share of the loss for which they are responsible.

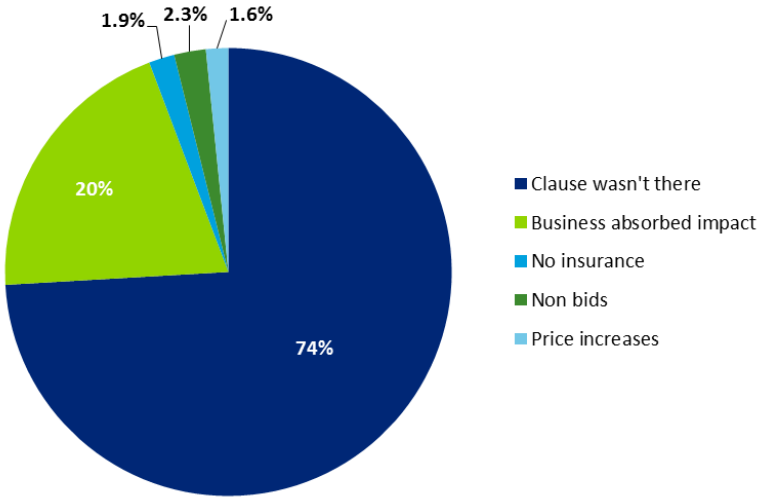
However, governments in most jurisdictions (apart from Queensland) have taken advantage of provisions to 'contract out' of proportionate liability, such that professional services firms can be held liable for 100% of damages claimed by public sector clients, even if they were responsible for as little as 1% of the loss. This limits the effectiveness of the legislation in achieving its original objectives – to support efficient management of risk and affordability of insurance.

The cost implications of contracting out of proportionate liability have been recognised. For instance, Lateral Economics estimated that the benefits from a prohibition on contracting out of proportionate liability ranged between $11 million and $151 million per year (2011). Furthermore, in 2013 the Standing Council on Law and Justice (SCLJ) released draft model proportionate liability model provisions which prohibit contracting out, except in certain circumstances involving indemnities (2013a). While ministers agreed to consider introducing these provisions in October 2013, the extent of progress to date is uncertain (SCLJ, 2013b).

According to the primary data collected for this study, 26% of firms were required to 'contract out' of proportionate liability in public built environment projects over the last 12 months. While this incidence is consistent with information reported through the business liaison process, it should be noted that a substantial share of respondents (38%) either chose not to respond to the survey question, or were unsure about how frequently this clause had been imposed by government.

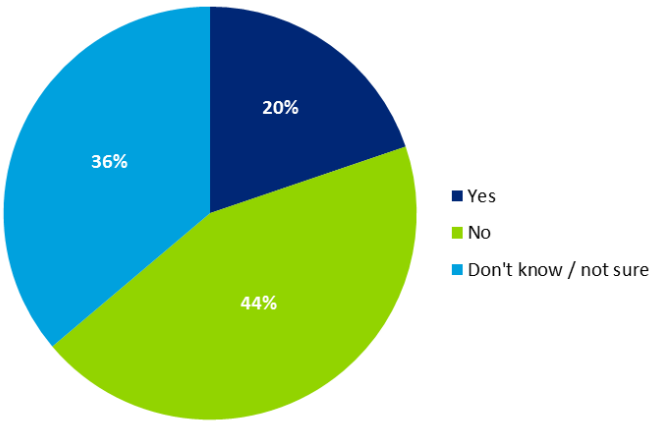
As shown in Chart 2.7, while the impact of greater liability from 'contracting out' is absorbed by firms in around 20% of RFPs, the clause does trigger a reduction in competition (2.3% of RFPs) and generate higher project prices through risk premiums (1.6% of RFPs).

Chart 2.7: Business responses to contracting out of proportionate liability



Furthermore, in almost 2% of RFPs, professional services firms proceed without insurance despite the significantly higher risks placed on them by 'contracting out' clauses.

Chart 2.8: Private sector insurance cover for contracting out of proportionate liability



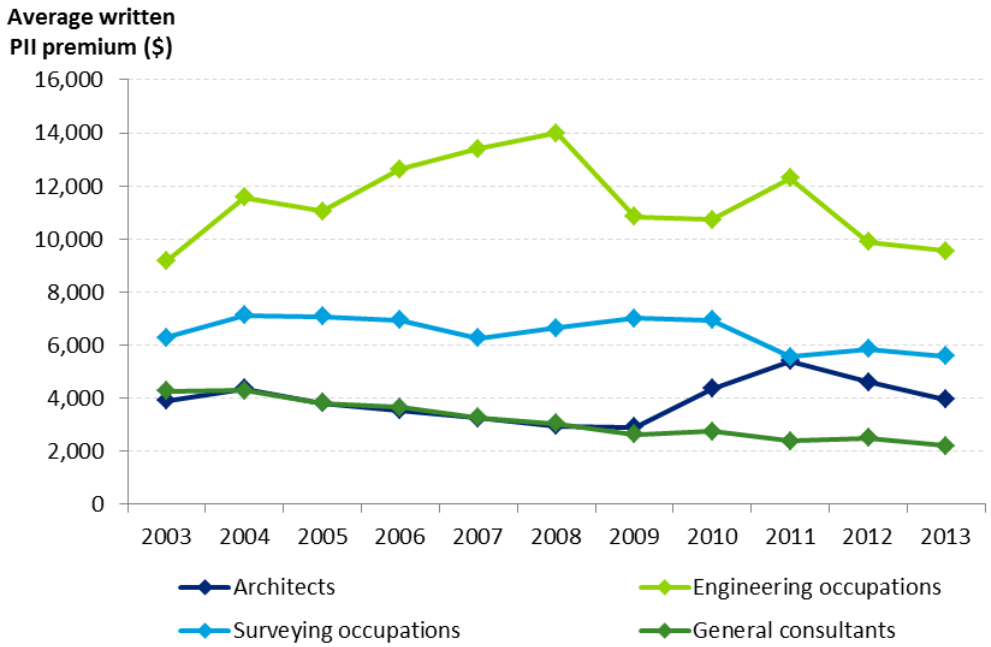
As shown in Chart 2.8, while around 20% of respondents indicate that they currently hold insurance cover for contracting out of proportionate liability, almost half of respondents (44%) indicate that they do not. Excluding respondents who were unsure, it is estimated that around one third of firms currently hold cover for contracting out.

Due to the 'claims made' basis of professional indemnity insurance, firms that do seek insurance for 'contracting out' must purchase cover on a year-by-year basis, even following the conclusion of a project, to continue to be covered for the additional liability imposed on them through these clauses.

As shown in Chart 2.9, the average professional indemnity insurance premium for engineers in Australia has fluctuated at around $10,000 per annum, while average premiums for surveyors and architects are slightly lower at around $6,000 and $4,000 per annum respectively. The variations in average annual premiums over time reflects both firm specific factors, as well as movements in the insurance cycle between soft markets, characterised by high supply with lower prices, and hard markets, where prices rise due to a reduction in supply (Lateral Economics, 2011).

Business liaisons suggest that, to obtain cover for contracting out, firms can be required to pay between 0-25% extra in insurance premiums. This varies for different reasons, but perhaps most significantly according to the size of the firm. It was indicated that smaller firms may find it more difficult to afford cover for contracting out of proportionate liability, with the increases imposed by insurance companies accounting for a greater share of their total premium relative to their larger competitors. This uneven distribution of the costs of contracting out across the industry may lead to further impacts on the level of competition over the longer term.

Chart 2.9: Average professional indemnity premiums, 2003 - 2013



Source: APRA (2014)

The broader economic impacts of higher priced bids, a reduction in competition and firms proceeding without insurance are explored further in Chapter 3.

2.6 Other contract clauses

Key Points:

- Public sector clients often seek to include onerous contract clauses in arrangements with professional services firms.
- These include unlimited liability (52% of RFPs), specific insurance requirements (51%), significant liquidated liabilities or abatement regimes (27%), novation provisions (26%) and clauses on fitness for purpose (41%), termination for convenience (36%), expert standard of care (27%).
- These clauses lead to higher priced proposals, reductions in competition and the implicit transfer of risks back to the government when firms proceed without adequate insurance – similar to the effects of contracting out of proportionate liability as discussed in the previous section.

Professional services firms often also face additional contract clauses when negotiating to undertake work for public sector built environment projects that can be inconsistent with the notion of efficient risk management, described in Section 2.5. The most common clauses include unlimited liability, specific insurance requirements, fitness for purpose, expert standard of care, termination for convenience, novation provisions, and significant liquidated liabilities or abatement regimes.

A description of each of these clauses is provided in Table 2.1 on the following page, along with an estimate of their incidence based on the primary data collected for this analysis.

The most common response of professional services firms when faced with these clauses is to absorb the impacts of the additional risks transferred on their business from the public sector. However, we estimate that these clauses lead to higher priced proposals, reductions in competition and the implicit transfer of risks back to the government when firms proceed without adequate insurance. The frequency of these responses, for each clause, is presented in Chart 2.10.

Overall, the evidence provided by firms suggests that unlimited liability clauses, specific insurance requirements and contract terms on fitness for purpose are particularly strong drivers of these types of business responses.

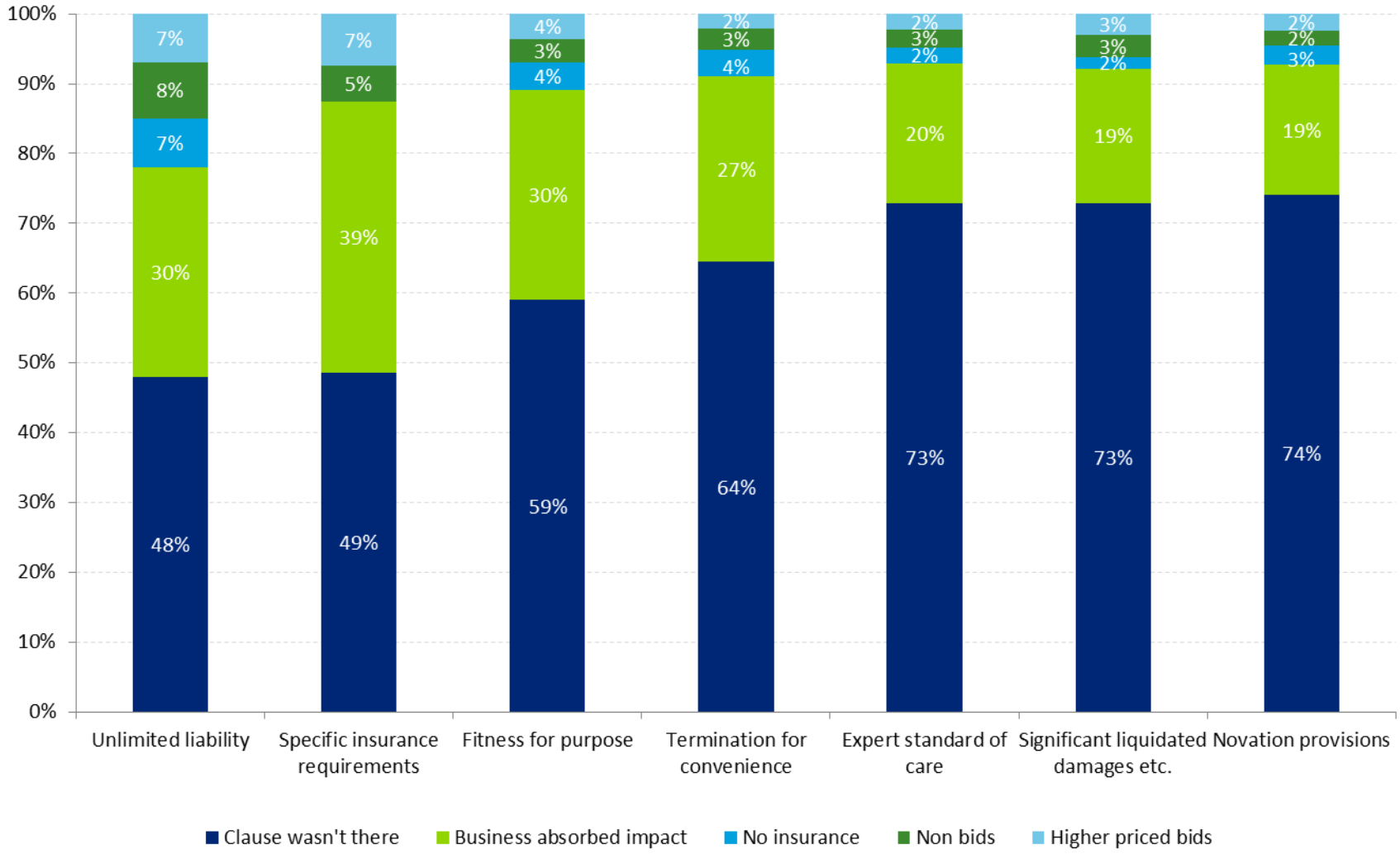
The economic impacts of these responses are examined in Chapter 3.

Table 2.1: Other common onerous contract clauses

Clause	Description	Incidence over last 12 months
Unlimited liability	Unlimited liability clauses ensure that the liability of professional services firms to the public sector client is not capped. As 'unlimited' professional indemnity insurance is not provided in any insurance policies taken out by firms, the private sector is unable to fully insure against risks under contracts with unlimited liability clauses.	52%
Specific insurance requirements	Specific insurance requirements may include liability cap specifications that are higher than the optimal level necessary for a project, explicit naming of public sector clients in professional indemnity insurance (which is not technically feasible) and reductions in excess thresholds, among other terms.	51%
Fitness for purpose	This clause requires professional services firms to guarantee that the services provided achieve the intended result, and assume liability irrespective of negligence or fault. Liabilities assumed under a fitness for purpose clause are uninsured under standard professional indemnity policies.	41%
Termination for convenience	This clause allows public sector clients to terminate the contract for professional services at any time, for any reason. It will sometimes be accompanied by subclauses that reduce its risks for suppliers. Nevertheless these clauses can create labour cost risks for suppliers.	36%
Expert standard of care	Expert standard of care clauses increase the liability of professional services firms beyond that required by common law and under statute – greater than care, skill and diligence as would be accepted by peer professional opinion as competent practice. These liabilities are also generally uninsurable under standard professional indemnity policies.	27%
Significant liquidated liabilities or abatement regimes	These clauses impose penalties on professional services firms at the occurrence of particular events, such as delays, without the need for consideration of the causes of the event.	27%
Novation provisions	This clause allows for substitution of one party for another party without changing the rights and obligations under the original contract. In the context of this report, novation provisions allow public sector clients to designate a third party with which professional services firms must deal with under the terms of the existing contract. Sometimes there are subclauses that reduce its risks for suppliers.	26%

Source: Business liaisons; AGS (2009); Consult Australia (2012); Planned Cover (2013)

Chart 2.10: Business responses to other onerous contract clauses



2.7 Bid costs

Key Points:

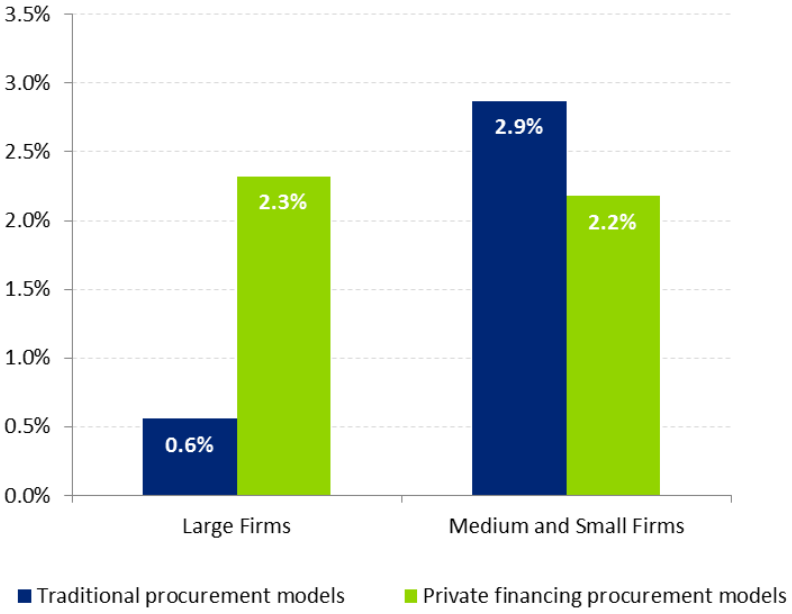
- Bid costs for professional services firms involved in public sector built environment projects range between 0.6% and 2.9% of total project value.
- Only 46% of firms support government reimbursement of proponents' bid costs from the perspective of industry, possibly reflecting concerns about changes to business models and intellectual property rights.

Professional services firms face transaction costs of preparing and submitting bids for public sector projects. While the cost of bidding is a natural feature of competitive markets, ensuring that bid costs are at a minimum efficient level should be a consideration for government in designing their procurement processes. As highlighted by the Productivity Commission (PC), high bid costs not only reduce the return on projects for firms, but can also add to the overall costs of projects as firms increase their bid prices to recoup their losses (PC, 2014:451).

An analysis of the primary data collected for this study suggests that bid costs for professional services firms involved in public sector built environment projects range between 0.6% and 2.9% of total project value.

As shown in Chart 2.11 below, large firms (classified as those with more than 200 employees) face higher costs as a share of project value for private financing procurement models (such as public private partnerships), compared to traditional procurement models (such as design and construct arrangements). However, bid costs as a share of project value are largely constant for small and medium sized firms, regardless of procurement model.

Chart 2.11: Bid costs as a proportion of total project value

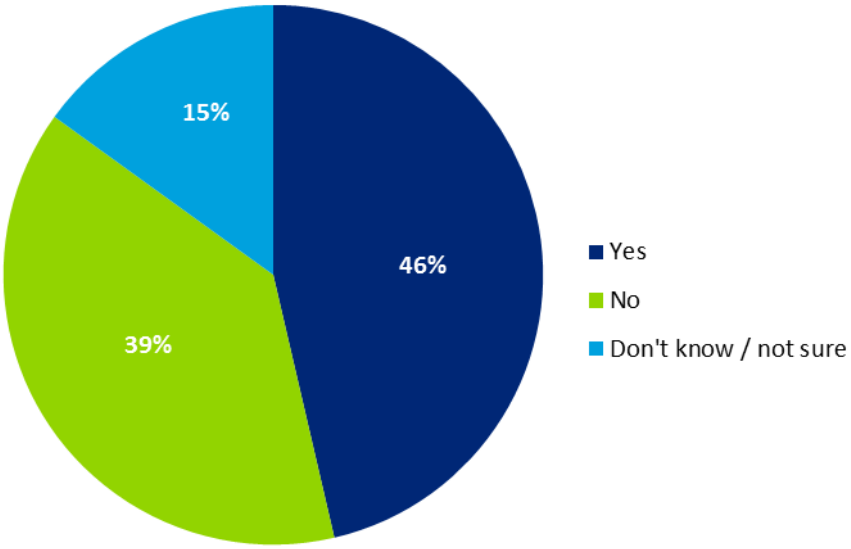


These estimates are broadly similar to those presented in Australian literature. For instance, a 2006 survey undertaken by Blake Dawson Waldron found that bid costs were less than 1% of project value for one third of respondents, but that almost one fifth of firms involved in projects valued over $500 million estimated bid costs at 3-5% of total project value (2006:18). More recently, the PC's Inquiry Report on Public Infrastructure found that bidding costs for large complex projects can be up to 1% of project value, with design costs accounting for around 50% of this expenditure (PC, 2014).

Drawing from this evidence, the PC has argued that bid costs appear "too high" in Australia (2014:26). One mechanism proposed by the PC to reduce this burden is for governments to contribute to the costs of proposals where innovation is of particular importance for the project. This would transfer the ownership of design material to the public sector, so that features of proposals from unsuccessful bidders could still be employed (PC, 2014).

However, according to the primary data collected for this report, only 46% of firms support government reimbursement of proponents' bid costs from the perspective of industry (see Chart 2.12). This may reflect concerns about changes to business models and intellectual property rights.

Chart 2.12: Agreement on government process for reimbursing some/all bid costs



Overall, it appears that there may be some scope to further reduce the transaction costs faced by professional services firms when seeking to be involved in public built environment projects. However, this issue appears to be less critical than some of the other features of government procurement highlighted in this report.

2.8 Delivery models

Key Points:

- The contractual arrangements for professional services firm involvement in public infrastructure projects varies by the type of delivery model selected by government.
- In particular, delivery models appear to be most strongly linked with the inclusion of novation provisions, unlimited liability and specific insurance requirements in contracts.
- The choice of delivery model accounts for around 22% of the price increases in public sector built environment projects caused by risk allocation and other contract terms.

Government departments and agencies have a range of delivery models available to them when undertaking public infrastructure projects and procuring services from the private sector. This ranges from construct only options, where design work has already been completed, through to arrangements where the private sector plays a key project management and financing role through public private partnerships (PPPs). A summary of the main delivery model categories is provided in Table 2.2 below.

Table 2.2: Summary of main project delivery models

Delivery model	Key features
Construct only	• Government agency has completed majority of design work (perhaps with assistance from consultants) • Government engages contractor to build, based on supplied design • Risks associated with design faults, changing requirements and adverse site conditions are typically borne by the government client
Design and construct (D&C)	• Government client provides a project brief • Contractor engages design consultants • Contractors bid on their developed design and lump sum construction price • Risks associated with errors or omissions in final design, and latent conditions typically borne by contractors and design consultants • Costs of directed variation typically borne by government client
Alliance contracts	• Government client and other alliance partners jointly develop design and share risks • Other alliance partners may include designers, consultants, management service providers, suppliers, construction contractors • Often considered to be of greatest value where the government client has had limited experience with the risks for the project

Managing contractor arrangements	• Contractor undertakes significant part of project management role, including:
	  ◦ obtaining development approvals
	  ◦ undertaking onsite investigations
	  ◦ finalisation of design
	  ◦ develop construction, commissioning and maintenance program
	• Design risks taken on by contractor where guaranteed construction sums are used
	• Contractors given incentives to manage project costs by sharing cost savings

Public private partnership (PPP)	• Contract between the public and private sector, which can reflect a number of different partnership models • Private sector delivers infrastructure and services over the long term • Some level of private financing for the project • Project may be funded by government, user payments or a combination of the two

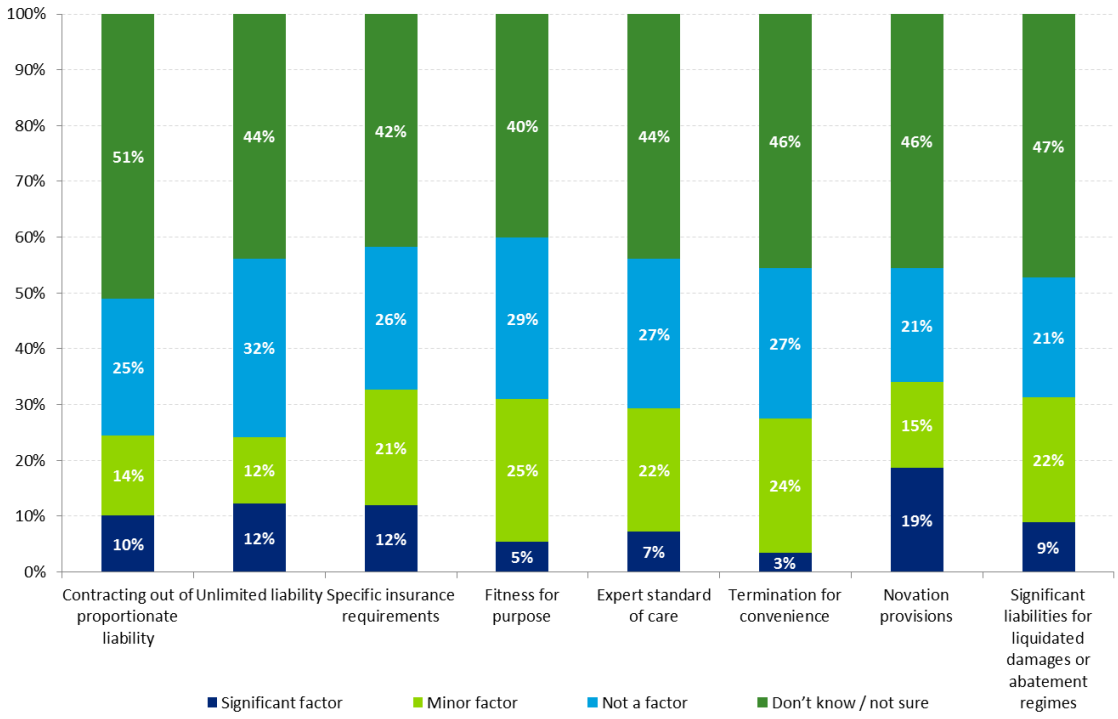
Source: Adapted from PC (2014)

Selection of the most appropriate delivery model is a complex process that requires consideration of a number of project-specific factors. One of the most important considerations in this regard is the risks associated with the project.

While is it is difficult to generalise on the implications of inappropriate choice of specific delivery models due the differences in context of individual projects, it is appropriate to consider the extent to which overall delivery model selection contributes to the inclusion of onerous risk allocation and other contract clauses faced by firms.

As illustrated in Chart 2.13, between 3% and 19% of respondents reported delivery model selection as a significant factor in the inclusion of the contract terms discussed in Sections 2.5 and 2.6. In particular, delivery model selection appears to be a particularly strong driver of the inclusion of novation provisions, unlimited liability and specific insurance requirements in contracts.

Chart 2.13: Extent to which delivery model was a factor in the inclusion of contract clauses over the last 12 months



Taking into account the incidence of these clauses and the extent to which firms respond by submitting higher priced proposals, we estimate that the choice of delivery model accounts for around 22% of the price increases in public sector built environment projects caused by risk allocation and other contract terms.

3 Economic impacts

As highlighted in the previous chapter, there are a number of significant opportunities to improve public sector procurement practices for built environment projects. To varying extents, these drive businesses to raise their prices, proceed without insurance, withdraw from bidding opportunities and reduce incentives for innovation.

This chapter analyses the economic impacts that result from these business responses. This is divided into two sections – quantification of the price impacts, supported by a discussion of other impacts, in terms of higher risk exposure, project delays and project quality.

3.1 Price impacts

Key Points:

- The total price impact of poor procurement practices is estimated at around 5.4% of total revenue obtained by professional services firms in public sector built environment projects.
- This is generated by direct price premiums, indirect price impacts through reduced competition and inefficient pricing from bid cost recoupment.

The evidence presented in Chapter 2 identified multiple opportunities to improve procurement practices which currently increase the costs of public sector built environment projects – unclear project objectives, unverified brief information, contracting out of proportionate liability and seven additional onerous contract terms: unlimited liability, specific insurance requirements, fitness for purpose, expert standard of care, termination for convenience, novation provisions and significant liabilities for liquidated damages or abatement regimes.

This section quantifies these impacts, taking into account direct price premiums, indirect price impacts through reductions in competition and duplication of bid costs that are ultimately recouped by firms down the track.

These calculations follow a three step, bottom-up calculation process:

- **Incidence** – identifying the frequency of the business response to the poor procurement practice;
- **Magnitude** – identifying the extent of the associated price increase; and
- **Impact** – calculating the overall impact on prices based on the combined effects of incidence and magnitude.

3.1.1 Direct price premiums

Key Points:

- Overall, poor procurement practices are estimated to directly contribute to project price increases of 3.6%.
- The main driver of price premiums is unclear project objectives, accounting for price increases in the order of 2.9%.
- In addition, expert standard of care clauses and novation provisions generate increases of 0.5% and 0.2% respectively.

The primary data collected for this study indicates that firms add premiums to the price of their proposals for public sector built environment projects in response to unclear project objectives, clauses for contracting out of proportionate liability and a number of other onerous contract terms.

Using a bottom-up calculation process, we estimate that these factors account for additional project prices in the order of 3.6%. The process of obtaining this estimate is described below.

3.1.1.1 Incidence – how often are premiums added to project prices?

Chapter 2 provided estimates of the extent to which price premiums are imposed by firms in response to a number of inefficient procurement practices. To recap, around 12% of projects have higher prices due to unclear project objectives, 1.6% of projects have higher prices due to contracting out of proportionate liability, and between 2-7% of projects have higher prices due to a number of other onerous contract clauses.

3.1.1.2 Magnitude – how large are the price premiums involved?

Estimates of the magnitude of premiums charged in response to five specific poor procurement practices have been obtained through business liaisons and the literature. These are summarised in turn below.

Unclear project objectives

Unclear project objectives typically involve price premiums in the order of 25% of project value. This value has been obtained from the literature on pricing for scope risks, comparing fixed price contracts to contracts for value and materials (Harrell, 2011).

Contracting out of proportionate liability

While there are broader costs associated with contracting out of proportionate liability, this analysis focuses on quantifying the current annual insurance cost associated with inclusion of this clause – based on the additional insurance premiums for inclusion of cover for contracting out in professional indemnity insurance policies.

As noted in Section 2.5, firms can be required to pay between 0-25% extra in professional indemnity insurance premiums to obtain cover for contracting out of proportionate liability. Lateral Economics estimate that professional indemnity insurance premiums are around 1% of firm revenue (Lateral Economics, 2011). Taking into account that around one third of firms hold cover for contracting out, the price premium passed on to government can be estimated at 0.1% of total project value.

While this estimate is relatively small, it is unlikely to represent the full long term cost imposed by the government practice of contracting out. This is due to a number of factors, including:

- **The relatively immature market for 'contracting out' insurance cover** – this means that there is currently insufficient claims data to take into account the full impacts of shifting away from the proportionate liability regime. There are likely to be flow on effects of further price premiums and less competition in the future as premiums rise, if governments fail to shift to an efficient risk management approach.
- **Fluctuations in the insurance market –** as noted in Section 2.5, the price impact of contracting out of proportionate liability is also likely to vary according to the stage of the insurance cycle, with higher costs incurred during a hard market, where prices are higher due to limited supply (Lateral Economics, 2011).
- **Longer term implications of reverting away from the objective of proportionate liability legislation –** contracting out limits the effectiveness of the legislation in achieving its original objectives: to support efficient management of risk and affordability of insurance. This is likely to create issues for both government and business over the longer term if this practice continues.
- **Indirect costs where firms proceed without insurance –** this estimate reflects the price premiums charged by firms that take out insurance for contracting out. It does not include the future costs likely to be imposed on government as a result of firms that choose to accept risks that they are not capable of managing. This is discussed further in Section 3.2.1.

As such, it is acknowledged that while the price impacts identified here are relatively small, this sole consideration of insurance-related price premiums is not an appropriate measure of the full impact of the clause on firms and firm behaviour, over the long term.

Unlimited liability

Similarly, the price premiums for unlimited liability also flow through higher professional indemnity insurance premiums. While unlimited insurance cover is not available to firms, they are able to respond to these risks somewhat, by increasing their level of coverage. Business liaisons indicate that this can add between 20-50% to insurance premiums. Accordingly, a conservative estimate of this price premium is in the order of 0.2%.

The magnitude of this price premium is also likely to vary over time according to economic conditions. When the market for professional services is strong, firms are more likely to withdraw from the bidding process when faced with unlimited liability clauses, rather than take on the risks that cannot be fully mitigated through insurance. The indirect price impacts that flow from reduced competition are considered in Section 3.1.2.

Expert standard of care

Expert standard of care clauses require firms to undertake additional work, so that they can demonstrate, if necessary, that they have exceeded the standard of care required under common law to comply with the contract. This involves dedicating more skilled staff and time towards a project than is necessary. Liaisons with industry suggest that the premiums associated with expert standard of care clauses are generally in the order of 20%.

Novation provisions

Novation provisions increase the financial risks for firms in projects. This is due to uncertainty around whether there might be a change in the party to which they are accountable for work, often from the government to a contractor, and who that party might be. Discussions with firms indicate that most often, they will attempt to include wording around these provisions in contracts to ensure that novation arrangements are only taken if mutually agreeable. Nevertheless, in these circumstances the premiums charged are often in the order of 10% of project prices.

Other onerous contract terms

Due to some difficulties in making generalisations, and to ensure that the price estimate produced here does not double-count the effects of similar clauses, the premiums for the other clauses noted in Chapter 2 are assumed to be zero.

For instance, the premiums charged for specific insurance requirements, the labour costs for termination for convenience, and the financial risks for liquidated damages and abatement regimes will vary from project to project. Similarly, as the risks transferred to firms through fitness for purpose clauses are closely linked to the risks from unclear project objectives, it is assumed that no further price impacts are passed on to firms.

3.1.1.3 Impact – how large are the price premiums involved?

By combining the estimates of incidence and magnitude described above, we estimate that:

- unclear project objectives generate a 2.9% increase in project prices;
- expert standard of care clauses increase project prices by 0.5%; and
- novation provisions increase project prices by 0.2%.

The price impacts described here are additive, such that overall, inefficient procurement practices are estimated to directly contribute to project price increases of 3.6%.

We did not identify a significant price impact for contracting out of proportionate liability and unlimited liability. However, it is acknowledged that the state of the insurance market, as well as the market for professional services, can have a big impact on the costs incurred by firms in relation to these clauses, and hence, the nature of their impacts on prices through direct premiums or reduced competition. The measures used here do not reflect the full magnitude of the impacts of such clauses on the efficiency of the procurement process.

The inputs to this calculation are summarised in Table 3.1

Table 3.1: Quantifying direct price premiums from inefficient procurement practices

Key drivers of price premiums	Incidence (higher priced bid responses)	Magnitude (price premium)	Impact on project prices
Unlimited liability	7%	0.2%	0.0%
Unclear project objectives	12%	25.0%	2.9%
Novation provisions	2%	10.0%	0.2%
Expert standard of care	2%	20.0%	0.5%
Contracting out of proportionate liability	2%	0.1%	0.0%
Total impact (project price increases)			3.6%

3.1.2 Reduced competition

Key Points:

- It is estimated that inefficient procurement practices by the public sector lead to reductions in competition for 13.2% of public sector RFPs.
- This leads to indirect price increases of around 1.5% on average.

In addition, there are also indirect price impacts of poor procurement practices caused by the decisions of firms not to bid. These are estimated at around 1.5% of project costs.

3.1.2.1 Incidence – how often do firms withdraw from bidding?

As noted in Chapter 2, firms make decisions not to bid for projects for a range of business reasons, some related to poor procurement practices, but others not. Overall, the primary data collected from firms indicates that, on average, professional services firms choose not to submit proposals for around 17% of public sector projects.

In practice, decisions by firms not to bid are triggered by number of factors. As such, double-counting issues make it difficult to isolate the reduction in competition caused by individual procurement practices.

Nevertheless, the data presented in Chapter 2 provides a guide on the incidence of reduced competition from poor procurement practices overall. As a starting point, the primary data collected for this study highlights unclear project objectives as the largest driver of no-bid decisions by firms, leading to reduced competition in 9% of public sector RFPs. This is followed by unlimited liability clauses, which lead to reduced competition in 8% of RFPs.

It is unreasonable to suggest that these two clauses would account for all no-bid decisions by professional services firms. Accordingly, we conservatively assume that 50% of the time, no-bid decisions by firms reflect both of these issues, and that collectively, these two issues overlap with all of the other no-bid decisions made in relation to other poor procurement practices.

This implies that overall, poor procurement practices by the public sector lead to reductions in competition for 13.2% of public sector RFPs.

3.1.2.2 Magnitude – what are the indirect price implications?

There is limited literature on the impacts of reductions in competition on project costs in Australia. Indeed, the relationship between the number of bidders participating in a tender process and the overall costs of the project is highly complex.

As a proxy estimate for the indirect price implications, we assume that project costs increase by 3.8% for each bidder lost. This estimate was produced by Carr (2005) through a regression analysis of data from 19 major public works educational construction projects in New York, in which 84 contracts were awarded following the submission of 438 bidders – an average of 5.2 bidders per contract.

This estimate has a number of limitations. For instance, it is based on data from a different, international market, and is simplistic in that it does not account for variations in price impacts as the total number of remaining bidders changes. Nevertheless, given the absence of relevant data in Australia, and the similarity in the average number of bidders in this context, it appears to be a reasonable proxy to use for this purpose.

3.1.2.3 Impact – how large are the indirect price impacts overall?

The price implications of reductions in competition are driven by the number of bidders in the market. In the context of procurement of professional services for public sector built environment projects, the average number of bidders per tender is difficult to ascertain, as the level of competition varies with the size of projects.

For example, the benchmarks for efficient procurement of major infrastructure published by Infrastructure Australia (2012) recommend that between two and three proponents should be selected from Expression of Interest (EOI) processes to participate in RFPs, depending on the delivery model for the project. However, where open tender arrangements are used, the number of bidders can be much higher. For instance, Ashurst (2014) report an example where principals receive 10 or more responses to a tender.

This analysis employs the estimate of 2.62 bidders per public sector RFP for professional services in built environment projects, obtained from the primary data reported by firms. Applying the incidence of reduced competition of 13.2% implies that, for each public sector project, 0.4 bidders are lost due to poor procurement practices on average.

Applying the average increase in prices of 3.8% then suggests that inefficient procurement leads to price increases of around 1.5% on average, through reduced competition.

3.1.3 Bid cost recoupment

Key Points:

- The inefficient costs associated with duplication of effort to verify the accuracy of brief information is estimated at around $68,000 per tender, around 0.8% of total project value.
- Based on the incidence of unverified information (34%), the price impact of this procurement practice is estimated at around 0.3% of total project value, on average.

There will also be price impacts on public sector built environment projects as firms seek to recoup the transactions costs involved in preparing and submitting proposals. While this will always occur to some extent, the duplication of effort in verifying brief information generates additional, inefficient costs in the system.

As outlined below, we find that these costs add around 0.3% to the costs of public sector built environment projects.

3.1.3.1 Incidence – how often do firms verify brief information?

As described in Section 2.2, firms are required to undertake additional work to verify the accuracy of brief information in around 34% of public sector RFPs.

3.1.3.2 Magnitude – what are the costs of this additional work?

Section 2.2 also notes that the average costs of this additional work are around $41,800 per firm per proposal. Applying the estimate of 2.62 bidders on average per proposal (as described above), each proposal generates costs of around $109,643. However, given that this work would ideally be undertaken once, by the public sector, inefficient costs are around $67,843 per tender. These costs constitute around 0.8% of total project value, using the average lifetime project value reported by firms of $8,936,406.

3.1.3.3 Impact – how large are the impacts overall?

Based on the incidence of 34%, and the magnitude estimate of 0.8%, the price impact of unverified brief information is around 0.3% of total project value, on average.

3.1.4 Summary

Key Points:

- The total price impact of poor procurement practices is estimated at around 5.4% of total revenue obtained by professional services firms in public sector built environment projects.
- Firms have reported that with improvements in project briefs, selection of delivery models and contracts, they could reduce the costs of projects by 6%.

This section estimates that inefficient procurement practices:

- directly contribute to project price increases of 3.6%;
- indirectly contribute to project price increases of 1.5%; and
- add inefficient costs worth 0.3% of project prices.

Overall, this suggests that the total price impact of poor procurement practices is around 5.4% of total revenue obtained by professional services firms in public sector built environment projects. The broader economic impacts of these costs are assessed in the following chapter.

3.2 Other significant impacts

Key Points:

- Beyond price impacts, there are additional economic impacts of poor procurement practices, including the implications of risk exposure, delays and reduced quality.
- The costs of risk exposure are estimated at around 0.8% of total project value.
- Firms report that they can reduce delays to projects by 7% on average, if project briefs, delivery model selection and contracts are improved.
- Firms also claim that they can improve the quality of public sector built environment projects by 7%, on average, through these improvements.

This section examines other significant impacts of poor procurement in terms of greater risk exposure, project delays and reductions in project quality.

3.2.1 Risk exposure

When faced with many of the poor procurement practices identified in this report, firms are unable to insure themselves against the additional risks transferred upon them from the public sector. For instance, insurance is not available for contract clauses such as fitness

for purpose, expert standard of care and novation provisions. Furthermore, while firms can increase the limit of their professional indemnity insurance policies in response to unlimited liability clauses, there will always be a gap between their level of cover and the unlimited damages that they are potentially exposed to. As noted in Chapter 2, there are also cases where firms absorb risks without purchasing available insurance, such as the risks from contracting out of proportionate liability.

In these cases, firms, and to some extent, governments, remain exposed to risks that have the potential to generate significant costs over the course of a project. A conservative estimate of these costs, by applying the price premiums described in Section 3.1.1 is in the range of 0.8% of project costs.

3.2.2 Project delays

The literature also identifies poor procurement practices as a driver of delays in project delivery. For example, where project objectives are not defined clearly from the outset, changes in scope that delay project delivery are common (Blake Dawson Waldron, 2006 & 2008).

It has also been suggested in discussions with industry that some other causes of delays attributable to poor procurement practice include inappropriate consultant selection on the basis of lowest cost, rather than taking into account quality aspects of value for money, or simply where the good or service sought by government is not suitable for their underlying requirements.

In addition, underinvestment in the professional services component of public infrastructure projects, through poor procurement practices can cause delays during construction. Some examples include where insufficient investigation of geotechnical issues or community consultation cause interruptions to construction activities.

Overall, professional services firms report that they can reduce project delays by 7% on average, if project briefs, delivery model selection and contracts are improved. This can deliver significant downstream benefits for society.

3.2.3 Project quality

Finally, poor procurement practices also have an impact on the quality of project deliverables. This flows through in terms of the value for money achieved from procurement of professional services from the private sector. Beyond the price impacts described above, unclear project objectives, duplication of effort in verifying brief information, inappropriate risk allocation and onerous contract terms each affect the capacity of firms to explore and propose innovative ways of delivering on Australia's infrastructure requirements.

Accordingly, it is important to emphasise the importance of consultant selection based on the principle of value for money, taking into account project objectives, rather than simply selecting on the basis of lowest cost. This is generally recognised by the public sector in theory, although it can be difficult to apply in practice. However, making improvements in procurement practices is a tangible way in which the public sector can better promote value for money outcomes.

Specifically, professional services firms claim that they can improve the quality of public sector built environment projects by 7%, on average, if project briefs, selection of delivery models and contracts are improved.

The flow on benefits for the Australian economy of these quality improvements are quantified in monetary terms through the use of CGE modelling, discussed in the following section.

4 Economic modelling

The analysis presented in this report so far has focused on the economic costs associated with specific aspects of procurement practice, in terms of what they can mean for business and what they can mean for government customers.

But above this there is a bigger picture. Our procurement policies can impact infrastructure delivery in Australia, productivity of businesses across the economy, and ultimately, the living standards of all of society.

In this chapter, we want to understand those broader impacts of procurement practices on our businesses and economy. Beyond the business and government impacts, we use economy-wide Computable General Equilibrium (CGE) modelling to understand the impacts on GDP and employment. What we find is that while the dividend of transforming procurement is modest in annual terms, the benefits accumulate significantly over the long term, worth:

- around $2.5 billion in cost savings for government between 2015 and 2030; and
- around $5.1 billion in additional GDP between 2015 and 2030.

4.1 Modelling framework

Key Points:

- This analysis employs the Deloitte Access Economics Regional General Equilibrium Model (DAE-RGEM) to simulate the economy-wide impacts of improving procurement policies.
- The model measures results by comparing a baseline 'business as usual' scenario with a policy scenario, where the cost savings from better procurement practices are phased in over a five year period from 2015.

At the core of the economy wide analysis is the Deloitte Access Economics Regional General Equilibrium Model (DAE-RGEM) which allows us to simulate the economy-wide impacts of improving procurement policies. The model is a large scale, dynamic, multi-region, multi-commodity computable general equilibrium model of the Australian and world economy. The model allows project analysis in a single, robust, integrated economic framework, projecting changes in macroeconomic aggregates such as Gross Domestic Product (GDP) and employment.

Underpinning the CGE model is a set of input-output or social accounting matrices, which describe how the Australian economy is linked through production, consumption, trade and investment flows. For example, the model considers:

- direct linkages between industries and countries through purchases and sales of each other's goods and services; and
- indirect linkages through mechanisms such as the collective competition for available resources, e.g., labour, that operate in a global, economy-wide context.

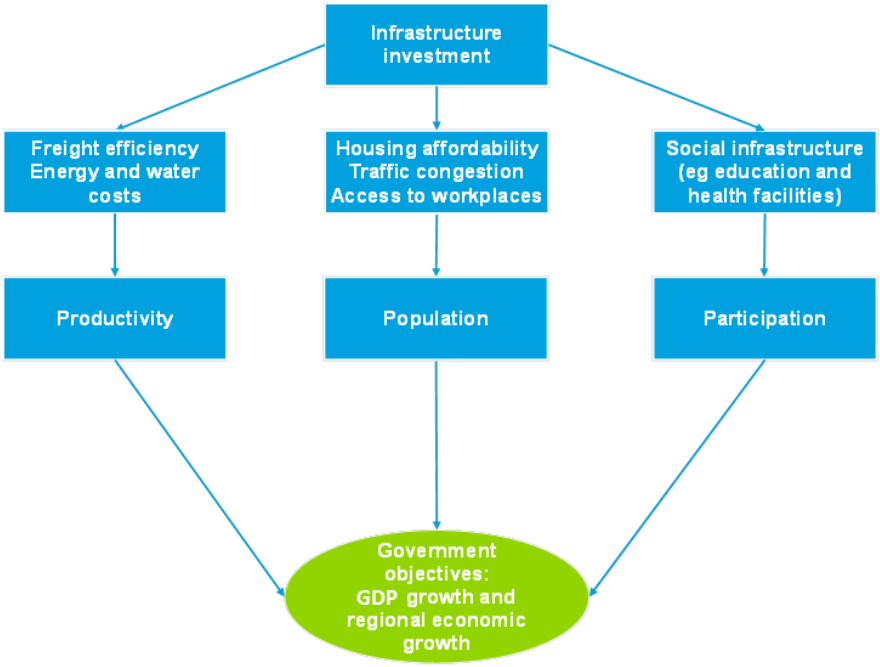
For further details on the CGE model please refer to Appendix A.

The CGE model measures results by comparing a policy scenario against a baseline case. In the context of this analysis, the baseline represents a 'business as usual' scenario, where there are no changes to government procurement practices. Under the policy scenario, the cost savings from changes in procurement practices are phased in over a five year period from 2015. This means that the results outlined below are, essentially, deviations from what would be expected given long term economic and demographic trends.

Before proceeding to the calculation of the inputs for CGE modelling, it is useful to understand the channels through which changes to macroeconomic outcomes are driven by reformed procurement practices which effectively lower the cost of investing in public infrastructure.

Previous work undertaken by Deloitte Access Economics has explored the relationship between infrastructure and economic growth. In one form or another, all growth in the economy is driven by one of the 'three Ps' - productivity, population and participation. Figure 4.1 shows how investment in infrastructure impacts on the 'three Ps' and in turn how they drive economic growth.

Figure 4.1: The relationship of infrastructure investments to broader economic indicators



Source: Deloitte Access Economics

For example, investment in transport infrastructure such as the freight rail network improves freight efficiency by reducing the time taken to transport goods to market. Similarly, investment in roads and rail can reduce traffic congestion and promote population growth in non-metropolitan areas, growing the economy in these regions. Finally, investment in social infrastructure, such as improvements health and education facilities, encourages greater participation in the labour force.

Accordingly, when the cost of investing in public infrastructure is reduced, the return on capital increases. This in turn increases the incentive for both the public and private sector to invest in infrastructure. This increased investment in infrastructure improves productivity, population and participation, all of which drive economic growth. Through CGE modelling, this chapter assesses the extent to which improvements in procurement can deliver better macroeconomic outcomes.

4.2 Modelling inputs

Key Points:

- Considering the costs associated with higher prices, delays and lower quality in the delivery of public infrastructure, that are attributable to poor procurement practices, inputs for the CGE model were developed.
- Overall, the net present value of the potential savings that can be delivered by improvements in procurement practices between 2015 and 2030 is over $2.5 billion, measured using a 7% discount rate.

For this exercise, we considered three economy-wide impacts attributable to inefficient procurement practices:

- higher prices associated with the professional services component of projects;
- delays in the delivery of public infrastructure; and
- reductions in the quality of public infrastructure.

Some of these impacts were not explicitly quantified for inclusion in the modelling, either because it was not clear that they were separate from other modelling inputs, or because they were difficult to estimate accurately.

This section describes the nature of these impacts and the process used to develop inputs for use in the CGE model. It is estimated that the value of cost savings over the period to 2030 that can be delivered by improvements in procurement practices is around $2.5 billion, in present value terms.

4.2.1 Higher prices

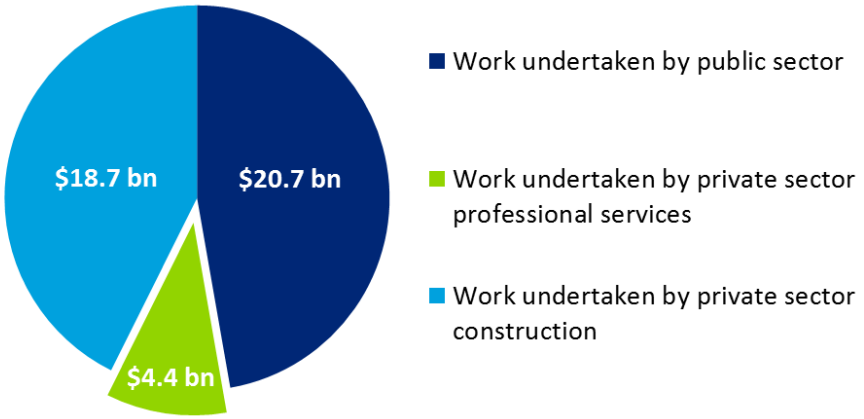
The previous chapter identified that the total price impact of poor procurement practices is around 5.4% of total revenue obtained by professional services firms in public sector built environment projects. In order to model the broader economic implications of these higher infrastructure costs, this price impact was converted into monetary terms using data from the ABS and the results of the survey of Consult Australia members.

In 2013, the value of building and engineering construction work done for the public sector was around $43 billion (ABS, 2014a & 2014b). In terms of engineering construction, around 53% of this work was undertaken by the private sector (ABS, 2014b).

Assuming that a similar rate of procurement from the private sector could be applied to the total level of public sector building work, we estimate that around $23 billion of work was

procured from the private sector for public built environment projects in 2013. The value of professional services revenue from these projects in 2013 is thus estimated at around $4.4 billion (in 2014 price terms), based on the average contribution of 19% reported by firms in this study and updating for changes in the Consumer Price Index. This breakdown is illustrated in Chart 4.1.

Chart 4.1: Assumed breakdown of the value of building and construction work done for the public sector in 2013 ($bn, real $2014)



Source: ABS (2014a); ABS (2014b); data reported by Consult Australia members; Deloitte Access Economics assumptions

Applying the price impact of 5.4% then implies that the total price impacts associated with poor procurement practices can be valued at around $239 million per annum in current prices. This comprises around $161 million in direct price premiums, $67 million as a result of lower competition, and $11 million worth of inefficient bid costs.

To the extent that professional services firms earn revenue from the public sector that are not included in the value of building and construction work done, these estimates should be interpreted as lower bound values.

That said, we note that there are other measures of the size of the sector which affect the size of the estimate. For example, firms reported that approximately 32% of their work has been undertaken for the public sector on average over the last five years. According to Bills (2014), the professional services industry, as it relates to building and construction, generated revenue of around $47 billion in 2012/13. This implies that revenue of around $15 billion was generated from the public sector. Depending on the assumptions made regarding the proportion of this revenue that is attributed to the provision of professional services for public infrastructure projects (as opposed to construction work or other services provided to government) the total price impacts of poor procurement practices could range from $82 million (assuming a 10% share) to $822 million (assuming a 100% share).

For the purpose of this analysis, the total cost estimate of $239 million has been employed in the economic modelling, to present a conservative estimate of the broader implications of better procurement for the economy.

4.2.2 Project delays

As noted in Section 3.2.2, professional services firms indicate that they can reduce project delays by a factor of 7% through improvements in procurement practice, particularly in relation to project briefs, selection of delivery models and contracts. These project delays have implications for all stakeholders, including:

- professional services firms;
- construction firms;
- government; and
- the ultimate end-users of the infrastructure.

These impacts are considered in turn below.

4.2.2.1 Impacts of delays on professional services firms

In consultations with industry, it was expressed that project delays can cause resourcing inefficiencies. For example, where a project is delayed, the staff involved will typically shift their attention to other work, creating additional costs through the process of bringing new staff onto the project once it resumes.

Firms have suggested that they take the risk of these inefficiencies into account when pricing their responses to public sector tenders. Accordingly, it is likely that these costs will be accounted for by the price premiums imposed on governments as a result of unclear project objectives.

4.2.2.2 Impacts of delays on construction firms

While construction firms are likely to experience delays during the delivery of public infrastructure projects for a range of reasons, the focus of this report is the impact of delays that occur with the professional services design stage of projects, attributable to poor procurement practices. For example, where governments do not clearly specify the objectives to be achieved from a project, the revisions of scope that occur as a result take time and can interrupt construction activities, or create additional work.

The costs incurred by construction firms as a result of these delays will primarily materialise through design error costs, which are considered separately in Section 4.2.3. Therefore, to avoid double counting, the costs of delays to construction firms are considered qualitatively in this section.

4.2.2.3 Impacts of delays on government and infrastructure end-users

Finally, project delays attributable to poor procurement practices also impact government and the ultimate end-users who are temporarily denied access to the infrastructure. However, it is difficult to determine the extent of the costs associated with the impacts on these stakeholders, given that government has the ability to make capital available for other investments during periods of delay.

While these shifts in investment will impact the end-user group affected by the project delay, at the economy-wide level, it is unlikely that there would be a substantial difference between the rate of return on capital generated from such other investments, and the

return received from the original project. As such, these impacts are also excluded from the economic modelling.

4.2.2.4 Conclusions on project delays

While it is evident that implications of project delays can be significant, it is likely that the costs borne by firms involved in professional services and construction will generally be priced into their contracts with government, and as such, captured under the modelling inputs described in Section 4.2.1 and Section 4.2.3. Similarly, it is likely that where delays in public infrastructure occur, it is likely that government would shift capital to other purposes, generating a similar level of return over the period of the delay.

For these reasons, the impacts of poor procurement practices on project delays are noted qualitatively, but not modelled explicitly in this analysis.

4.2.3 Project quality

Reductions in project quality as a result of poor procurement practices also have broader implications for the economy. As the benefits delivered by public infrastructure can vary significantly by type, it is difficult to measure the value of improvements in infrastructure quality in a general way.

Therefore, this analysis considers how improvements in the quality of professional services work can reduce the costs of rectifying design errors during the construction phase of projects.

According to Lopez and Love (2012), the average direct design error costs incurred by construction firms in a sample of 139 Australian construction and engineering projects was 6.85% of the value of construction contracts. While design errors can also generate indirect costs, such as those associated with resourcing inefficiencies, lower productivity and contractual litigations, this analysis focuses on the direct design error costs to present a conservative analysis. There are a number of causes of design error costs, including reduction in design audits, reviews and verifications as professional services firms compete to undertake work for the lowest price, or within insufficient timeframes.

As described in Section 3.2.3, professional service firms claim that quality improvements in the order of 7% can be achieved through better procurement practices. Assuming that these quality improvements would translate through an equivalent proportional reduction in direct design error costs, it is estimated that there is a potential to reduce the costs of constructing public infrastructure projects by 0.47%.

Following from the estimate that around $23 billion of work was procured from the private sector for public built environment projects in 2013, and the finding of the industry survey that around 81% of this work is attributable to the construction phase of projects, this cost saving is estimated at around $87 million per annum, in 2014 prices.

4.2.4 Summary of modelling inputs

The resulting modelling inputs are presented in Table 4.1 below. In recognition that it will take time for changes procurement practices to be implemented, these potential cost savings are phased in gradually over a five year period. On this basis, the savings are estimated to increase from $65 million in 2015 and peak at $326 million by 2019.

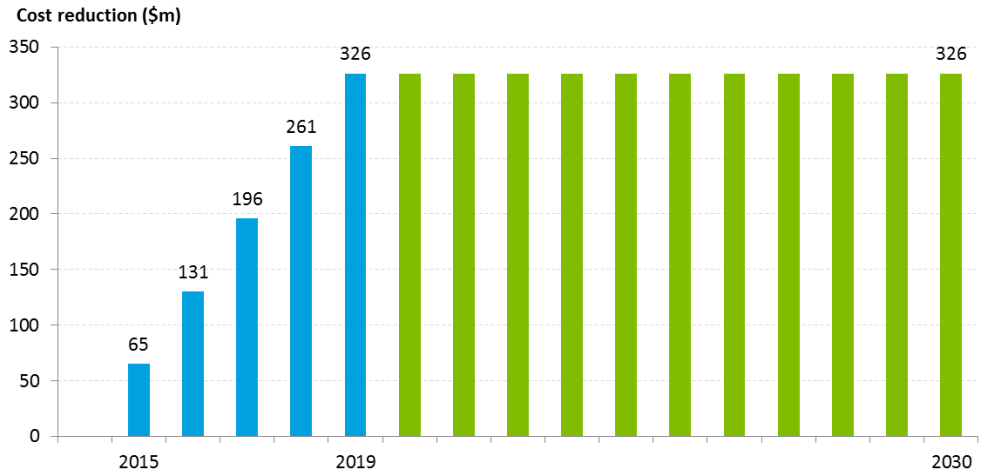
Table 4.1: Potential cost savings from improved procurement practices ($m, real $2014), 2015 – 2019

Input type	2015	2016	2017	2018	2019
Cost savings from reduced price impacts in professional service contracts	48	96	143	191	239
Cost savings from reduced design error costs in construction	17	35	52	70	87
Total cost savings	**65**	**131**	**196**	**261**	**326**

Source: Deloitte Access Economics

As demonstrated in Chart 4.2, these cost savings can deliver significant fiscal savings to government over the longer term. For example, the net present value of the potential savings that can be delivered by advances in procurement between 2015 and 2030 is over $2.5 billion, measured using a 7% discount rate.

Chart 4.2: CGE modelling inputs ($m), 2015 – 2030



Source: Deloitte Access Economics

4.3 CGE modelling results

Key Points:

- The cost savings associated with better procurement practices have the potential to increase the rate of return on capital in the economy. This flows through to significant long-term economic impacts.
- Specifically, reformed procurement practices are estimated to lift GDP by $5.1 billion in present value terms, measuring over the period to 2030.

This section demonstrates how changes in procurement practices can impact on broader macroeconomic outcomes. Essentially, achievement of the cost savings described above increases productivity on the supply-side of the economy, by increasing the rate of return on capital. This increases the attractiveness of capital inputs, stimulating economic activity and employment. In particular, we find that improved procurement can lift GDP by $5.1 billion in present value terms, measuring over the period to 2030, and generate a small increase in employment, peaking at 326 FTEs in 2019.

4.3.1 Impact on GDP

The impact of the potential cost savings on Australia's Gross Domestic Product (GDP) is shown in Table 4.2. The annual impact on GDP rises from $88 million in 2015, the first year of implementation, to $562 million by 2019, at the completion of the phase-in period. This is followed by gradual annual further increases in GDP, reaching $822 million by 2030.

Table 4.2: Impact of the potential cost savings on GDP ($m, real $2014), 2015-2030

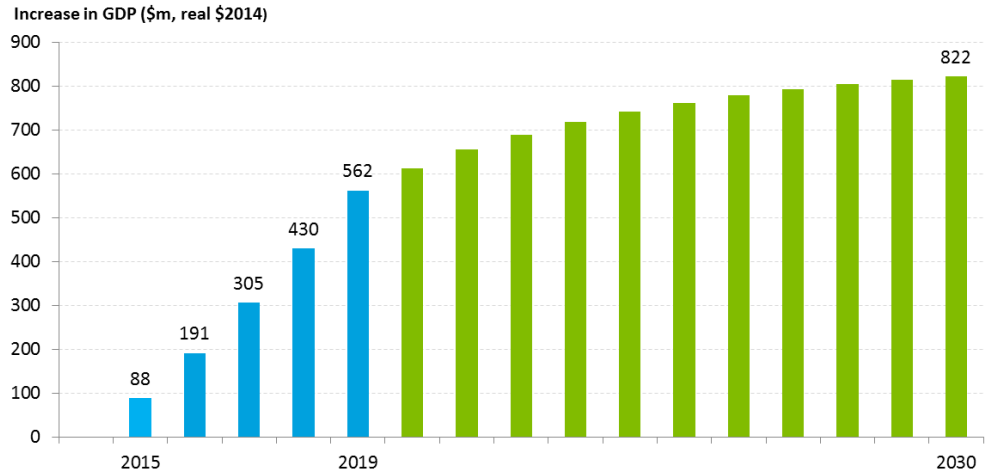
	NPV	2015	2019	2030
Increase in GDP	5,133	88	562	822

Source: Deloitte Access Economics

In net present value terms, strategic changes in procurement are estimated to lift GDP by $5.1 billion.

The impact of the cost savings from improved procurement practices on GDP over time is presented in Chart 4.3. It is evident that the majority of the increases are achieved over the five year phase-in period, with smaller annual increases in additional GDP experienced out to 2030 due to continued benefits of the higher return on capital.

Chart 4.3: Impact of the potential cost savings on GDP ($m, real $2014), 2015 – 2030



Source: Deloitte Access Economics

Implications for the states and territories

In order to understand what these results mean for different jurisdictions of Australia, a top-down approach was used to apportion these GDP impacts across the states and territories of Australia. This breakdown is presented in Table 4.3, and is derived from each state and territory's share of total public capital formation over the five years to 2012-13 (ABS, 2013).

Table 4.3: State breakdown of GDP impacts ($m, real $2014), 2015 – 2030

Increase in GSP ($m, real $2014)	NPV	2015	2019	2030
ACT	240	4	26	38
NSW	1,386	24	152	222
NT	100	2	11	16
QLD	1,379	24	151	221
SA	333	6	36	53
TAS	113	2	12	18
VIC	1,015	17	111	162
WA	565	10	62	90
Total Australia	**5,133**	**88**	**562**	**822**

Source: Deloitte Access Economics

Overall, the benefits of transforming procurement will be largely concentrated in states that experience the greatest level of public sector capital investment, with the present value of GSP improvements out to 2030 valued at over $1 billion in NSW, QLD and VIC. Taking into account the relative size of each state and territory economy, it is possible to achieve significant long term benefits from better procurement in every jurisdiction.

4.3.2 Impact on employment

As shown in Table 4.4 the cost savings from advances in procurement are estimated to have a small positive impact on employment. Employment is expected to grow gradually from 69 FTEs within the first year of improvements to procurement, peaking at 326 FTEs by 2019.

However, following the conclusion of the phase-in period, the additional annual employment attributable to improvements in procurement will fall slightly over time, reaching 303 additional FTEs by 2030. This tapering off effect can be attributed to a shift in the economy away from labour to capital inputs, triggered by the higher rate of return on capital that is delivered by a lower cost of infrastructure.

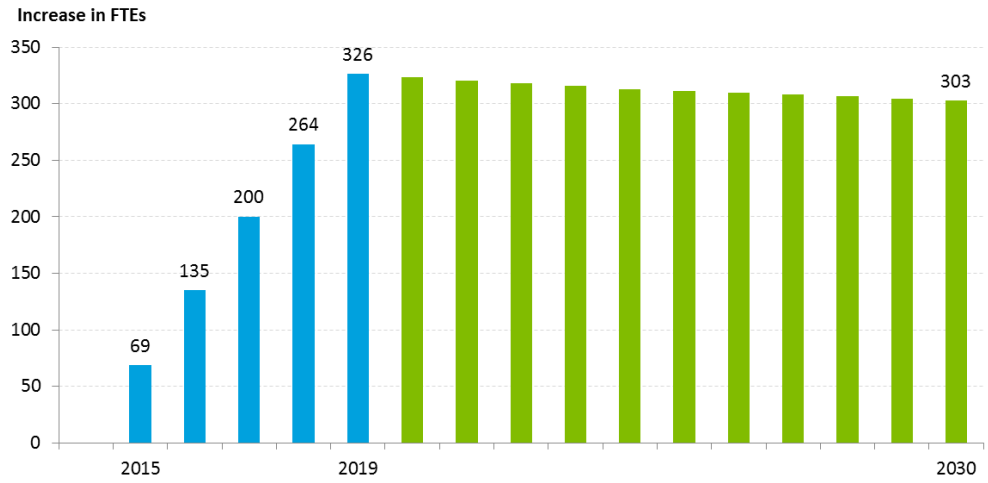
Table 4.4: Employment impact of the potential cost savings (FTEs), 2015-2030

	2015	2016	2017	2018	2019	2030
Increase in employment	69	135	200	264	326	303

Source: Deloitte Access Economics

The impact of the cost savings on employment over time is shown in Chart 4.4.

Chart 4.4: Impact of the potential cost savings on employment (FTEs), 2015-2030



Source: Deloitte Access Economics

4.3.3 Conclusions from the CGE modelling

Overall, these results suggest that while there are modest annual economic impacts associated with better procurement for public infrastructure projects, these have a significant long term cumulative effect. Between 2015 and 2030, the cost savings worth around $2.5 billion in present value terms are estimated to increase GDP by $5.1 billion.

5 Transforming procurement policy

The previous chapter has demonstrated how better procurement can deliver cost savings for government and generate higher employment and GDP. Achieving these outcomes requires consideration of government perspectives on the extent and causes of the issues raised by industry, taking into account the variations in procurement policy and practice across jurisdictions and departments.

This section discusses the objectives of procurement policies, outlines some of the main differences in the way that procurement policy is structured in different parts of Australia, and identifies some of the underlying causes of inefficiencies in procurement, based on consultation with government. Drawing from this policy context, it outlines practical next steps that will help to reduce the cost of infrastructure, delivering mutual gains for not only industry, but also government and the broader community.

5.1 Key objectives for procurement policies

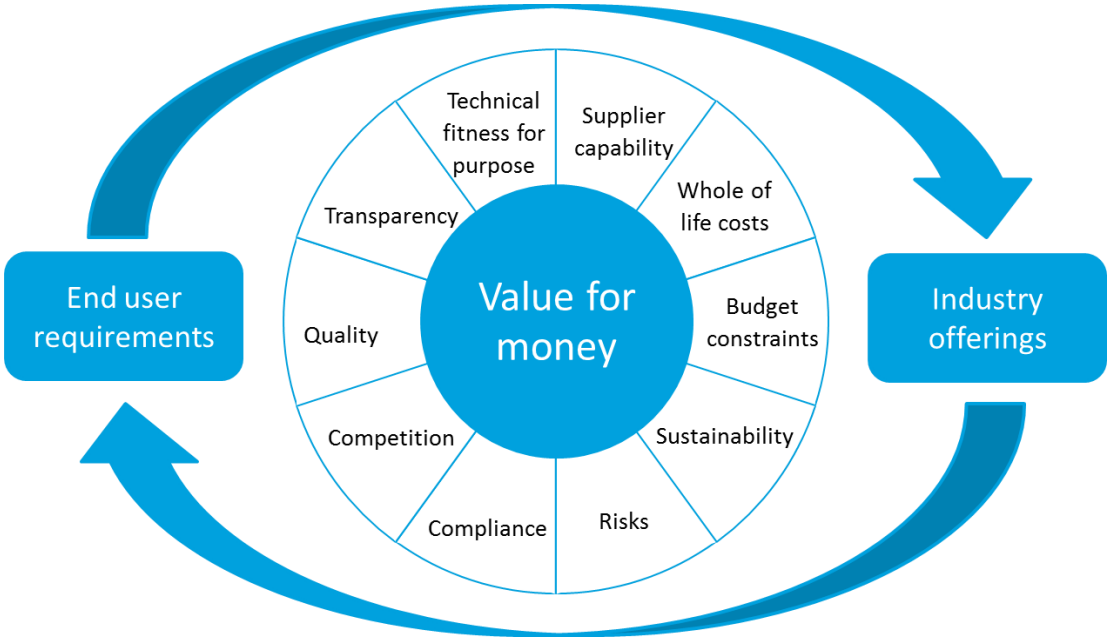
Key Points:

- Determining the optimal value for money solution through procurement is a careful balancing act, trading off a range of factors in order to select the industry offering that best meets end user requirements.
- Within government, ensuring the integrity of procurement through probity, accountability and transparency is also critical to minimise the scope for misuse of public funds.

The core objective of procurement policies across the Australian public sector is to achieve value for money. As the custodian of public funds, governments have a responsibility to carry out careful financial management, and as such, within the context of procurement, are required to ensure that the best return and performance is obtained for money spent.

However, as illustrated in Figure 5.1, the process of determining the optimal value for money solution through procurement is a careful balancing act. Rather than simply pursuing the lowest cost offering, government agencies must consider a range of factors in order to select the industry offering that best meets end user requirements.

Figure 5.1: Factors to be considered in procuring value for money services



The requirements of the end user are at the heart of the procurement decision making process. Understanding the motivation behind a request to market is critical to setting procurement specifications that clearly focus industry on the problem to be addressed. In turn, these specifications set the prime benchmark for assessing the bids put forward by industry. Where government is unclear internally on the outcomes to be delivered by procurement, they are at risk of paying for a good or service that fails to meet the business needs.

At the same time, procurement managers must identify and respond to the level of industry capability. It is important to recognise that government can only receive what businesses are able to deliver in terms of product, timing and cost. While industry capability will not always constrain procurement objectives, it is important to be flexible and work with firms when that is the case. As outlined in the box below, it is also important for governments to recognise the longer term implications of their procurement decisions on industry capability, given their significant market power.

Perhaps the most obvious factor for consideration when assessing industry offerings in procurement is cost. Here, procurement managers must identify not only the upfront prices proposed by firms, but also any relevant ongoing financial obligations, to capture whole of life costs. For example, Value for Money Policy in Western Australia prescribes that "assessment of cost needs to consider any ongoing costs that may accrue beyond the initial price, including the associated costs of holding, using, maintaining and disposing of the goods, services or assets" (Building Management and Works, 2013b).

Procuring public infrastructure – government monopsony power

As a major procurer of professional services for public infrastructure with many potential suppliers, governments have a degree of market power when setting the terms of an engagement. This means that government decisions about procurement can affect the industry over the long term. For example, choosing just one or two suppliers regularly can over the longer term erode the capability of other firms in the industry, leading to higher prices and reduced innovation. At the same time, governments have a responsibility to choose the firm that presents the best value for money on any given project.

Balancing the short term objective of choosing the right team for a specific project with the long term objective of maintaining market depth adds to the complexity of decision making in procurement. Procurement policies recognise the importance of fostering competition, that is, not only allowing for the best firm to be chosen for a particular project, but also allowing for the best firm to vary from project to project.

However, to appropriately compare the product or service proposed to be delivered by different firms, the cost elements of a bid must be interpreted alongside an assessment of quality and supplier capability. Determining whether price premiums for higher quality service are justified, affordable and necessary to deliver on the specifications of a contract is a day-to-day challenge for procurement managers.

Carrying out this process is not a simple financial calculation of costs and benefits. Other factors to be considered include transition issues, risks, and sustainability. Procurement policy, such as the NSW Procurement Board's Statement on Value for Money (n.d.) provides guidance on the relevant considerations for assessment. However, successful implementation of policy requires input from experienced practitioners that understand the nuances of the problem at hand, and the different ways of delivering on the ultimate objectives.

There is also an added responsibility in the public sector to ensure the integrity of procurement processes. The rules-based procedures within government procurement policy are set to minimise the scope for misuse of public funds, and as such, compliance with these requirements is a central part of bid evaluation and supplier selection.

For example, providing for ethical and fair treatment of participants, and ensuring probity, accountability and transparency in procurement operations are key principles within procurement policy in South Australia, that sit alongside achievement of value for money (State Procurement Board, 2014:5-6). Procurement policies in other jurisdictions place similar emphasis on integrity of process (Department of Housing and Public Works, 2013; NSW Government, 2005; Building Management and Works, 2013a). It is a challenge for government to ensure these outcomes are met at lowest cost, and to avoid imposing unnecessary requirements that do not add sufficient value to decision-making.

Efficient management of procurement therefore requires a significant level of expertise. The following section examines some of the features of procurement policies and practice employed across Australia to achieve value for money.

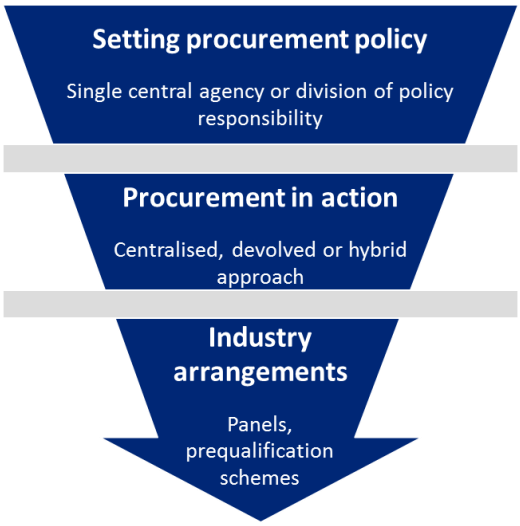
5.2 Where procurement policy is made

Key Points:

- Various jurisdictions have similar procurement policy structures including specific agencies responsibility for building and construction procurement policy and some centralisation, however, there are differences in mechanics and implementation, such as agency culture and the existence of industry arrangements such as panels and prequalification schemes.

Each jurisdiction of Australia has its own procurement policy and processes. While the core objectives of procurement policies are broadly similar, as discussed in Section 5.1, there are some differences in the way those objectives are implemented, for example, through variations in the level of centralisation. A number of jurisdictions are also in the process of delivering procurement reforms. This makes it difficult to generalise on the causes of inefficiencies raised by industry.

Figure 5.2: Moving from procurement policy to practice



To help understand the implementation of procurement policy in Australia, this section describes some of the main features of the flow from policy to practice in different jurisdictions and departments, as summarised in Figure 5.2. Given the scope of this report, focus is placed on procurement of professional service consultants for public infrastructure projects.

5.2.1 Setting procurement policy

Designation of responsibility for procurement policy varies across Australia. Given the close association with procurement and financial management objectives, described in Section 5.1, agencies or boards that set the policy frameworks and principles which guide procurement processes undertaken within their jurisdiction will often reside in, or be supported administratively by the relevant finance department. However, as outlined

below, there are often differences in the scope of procurement categories to which their policies apply.

The approach to procurement policy is most centralised within NSW, ACT and at the Commonwealth level. In these jurisdictions, responsibility of overall procurement policies lies with NSW Procurement within the Office of Finance and Services; the Infrastructure Procurement team within the ACT Chief Minister, Treasury and Economic Development Directorate; and the Business, Procurement and Asset Management Group within the Commonwealth Department of Finance respectively. That said, these policy units are supported by other areas of government. For instance, the Infrastructure Financing Unit within NSW Treasury also has a strong influence on building and construction procurement policy alongside NSW Procurement.

In some other jurisdictions, procurement policy responsibilities are more clearly divided between two lead stakeholders – one which focuses on building and construction, and another that sets policy for all other types of goods and services. For example:

- in Victoria, goods and services procurement policy is set by Victorian Government Purchasing Board (VGPB), while construction procurement policy is the responsibility of the Minister for Finance (VGPB, 2014; Department of Treasury and Finance 2013); and
- in Western Australia, the broader procurement policies set by the State Supply Commission are adapted to the context of building projects by Building Management and Works (BMW), also located within the Department of Finance (BMW, n.d.).

A similar approach is taken in South Australia, whereby the policies of the State Procurement Board apply to construction projects worth no more than $165,000. The Minister for Transport and Infrastructure and the Department of Planning, Transport and Infrastructure (DPTI) is responsible for setting procurement policy for all construction projects that exceed this threshold value (State Procurement Board, 2012; Department of Premier & Cabinet, 2011).

The Queensland approach to procurement policy is somewhat of a hybrid policy-setting model. Overall, the Department of Housing and Public Works is responsible for state-wide procurement policy. As part of the ongoing Procurement Transformation Program, the Department revised its procurement policy in 2013. This is then supported by more specific policies and guidelines produced by the leaders of the six procurement mega-categories identified in the Queensland Procurement Framework, including general goods and services, building, construction and maintenance, and ICT.

There are also a number of important cross-jurisdictional organisations that influence the direction of procurement policy. Infrastructure Australia, established under the *Infrastructure Australia Act 2008* to provide advice on a range of infrastructure-related matters, has released a number of papers on infrastructure procurement and delivery.

In particular, Infrastructure Australia funded a study between 2011 and 2012 to identify measures that contribute to efficiency in the procurement of major infrastructure projects. Two reports were released that summarised the findings of this work, providing benchmarks for best practice procurement, and outlining efficiency strategies for the different phases of the procurement process (Infrastructure Australia 2012a; 2012b). In 2013, Infrastructure Australia also commissioned a review of project governance effectiveness. This called for both short term and long term actions to improve governance

arrangements, which should in turn increase the proportion of projects that meet their baseline time, cost and quality objectives (Caravel, 2013).

The next steps outlined in Section 5.4 of this report seek to increase uptake of the features of best practice procurement advocated by Infrastructure Australia, in relation to stakeholder consultation, clarity of project requirements, engaging with industry and maintaining appropriate procurement teams.

Another leader in the development of procurement policy is the Australasian Procurement and Construction Council Inc (APCC) which consists of government representatives at the Commonwealth, state and territory levels in Australia, and representatives from government in New Zealand and Papua New Guinea. The APCC engages with industry and develops publications to advance procurement policy and practice, consistent with its strategic goals:

- enhanced management and performance of government assets;
- procurement capability development;
- procurement as a strategic function;
- smarter procurement and construction solutions; and
- enhanced jurisdictional collaboration (APCC, 2013).

5.2.2 Procurement in action

Separate from policy setting responsibilities, governments also have different arrangements for managing procurement processes. Some jurisdictions undertake procurement based on a centralised framework. This involves appointment of a lead agency to undertake procurement on behalf of other departments in a specific area, to allow for consolidation of expertise in relation to technical requirements, assessment of value for money and project risk management.

This model is used in South Australia, whereby the Building Management division of the Department of Planning, Transport and Infrastructure (DPTI) is responsible for the procurement and delivery of all government building construction projects, such as schools, libraries, hospitals and police stations. In this role, they work closely with the relevant purchasing agency, such as the education, health or justice department, to ensure that the requirements of the end user group are met (DPTI, n.d.).

Western Australia also has centralised procurement arrangements, whereby agencies are required to involve procurement staff within the Department of Finance for contracts valued at $250,000 or more (Department of Finance, 2014). In some cases, the Department has procurement staff located within key agencies. However, in regard to non-residential construction projects, the Building Management and Works (BMW) division manages procurement on behalf of other agencies, similar to DPTI in South Australia.

The Queensland Government is currently shifting away from an individual agency approach to procurement towards a more centralised, whole-of-government operating model (Department of Housing and Public Works, 2014). Under the current reforms, the leaders of procurement policy under the six specific mega-categories are also appointed responsibility for procurement practice.

For example, the Department of Housing and Public Works is responsible for procurement in the Building, Construction and Maintenance category, through its Building and Asset Services unit, while the Department of Transport and Main Roads is responsible for procurement within the Road, Construction and Maintenance category.

Meanwhile, the procurement reforms underway in NSW seek to place a greater emphasis on the devolvement of procurement responsibilities to the agency level, to allow for greater proximity to business needs (NSW Procurement, n.d.). At the same time, the reforms allow for appointment of agencies as leaders of whole-of-government procurement categories where appropriate, similar to other states. One of the aims of this reform agenda is to shift away from rules and process-based procurement, to a more flexible approach allowing for discretion and interpretation.

NSW Procurement is responsible for agency accreditation schemes that determine the extent to which an agency is permitted to undertake procurement without external support (NSW Procurement, n.d.). There are currently two schemes, one for goods and services, and the other for construction, which are to be merged from 1 January 2015. Some of the agencies currently accredited for both the planning and delivery phases of construction procurement include Transport for NSW, Roads and Maritime Services, Land and Housing Corp within the Department of Family and Community Services, and the Health Administration Corporation (NSW Government, 2014). These agencies are permitted to apply their own procurement systems, regardless of project value or risk.

5.2.3 Industry arrangements

At the ground level, procurement practices vary on a case by case basis, typically accounting for contract value, risk and complexity. In relation to the procurement of professional services for public infrastructure projects, some government agencies provide opportunities for firms to make standing offer arrangements, often as a member of a panel, which specify pricing terms for different types of services. For example, BMW in Western Australia manages six different consultant panel arrangements, including architectural services, engineering and building, and cost management (BMW, n.d.).

Agencies can then consider the options presented by the panel when seeking to procure low risk and medium value work. In contrast, high value contracts will generally be awarded through an open tender process.

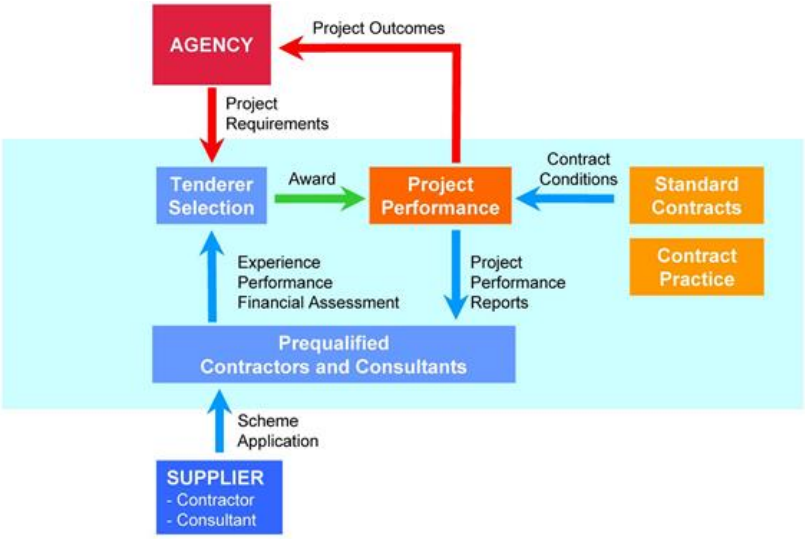
Most jurisdictions also utilise prequalification schemes for firms that offer consultancy services in relation to building and construction projects. To be listed on a prequalification register, firms must apply to the relevant government agency having documented their capability against the specified assessment criteria.

The prequalification register then provides the public sector with a pre-approved pool of suppliers that can be approached for proposals, based on the type of work required.

For example, VicRoads administers a pre-qualification scheme for consultants and contractors with experience in civil construction. The scheme identifies nine distinct work types, which are in turn split into categories and different levels of expertise (VicRoads, 2014).

Along with the information provided by firms in their initial application, the registers are usually updated to keep track of performance in subsequent engagements with the public sector. Such schemes are often used by government to streamline competitive tendering for high value or high risk projects, and can assist in the identification of potential suppliers with specific expertise. The relationship between the New South Wales prequalification scheme for construction consultants and the broader procurement process is illustrated in Figure 5.3, although these arrangements are currently under review.

Figure 5.3: Consultant prequalification within the NSW Government Procurement System for Construction



Source: NSW Office of Finance and Services (2013)

5.2.4 Conclusions

It is evident that there are many similarities in the approach to procurement of professional services for public infrastructure in various jurisdictions, through specific designation of responsibility for building and construction procurement policy and centralised procurement management responsibilities in particular areas. However, there are differences in the mechanics of how these approaches are implemented, often reflecting the variations in structure of departments and the relationships between them. Procurement reforms are also underway in a number of states. Cultural differences are another key driver of the way procurement is undertaken across Australia.

The following section provides further insight on these matters, drawing from consultations with procurement leaders in the public sector.

5.3 Government perspectives on opportunities for improvement

Key Points:

- While government representatives consider that the procurement arrangements in Australia are broadly effective in achieving value for money outcomes, it is acknowledged that further improvements can be made.
- Some of the drivers of unclear project objectives that were identified by government in consultation include difficulty of planning prior to cabinet approval, distinctions between end users and stakeholders for different infrastructure types and cultural differences between agencies in their approach to industry engagement. However, the price premiums or lack of competition associated with poor scoping was not frequently recognised by government.
- In relation to contracting, government has expressed a willingness to pay to shift responsibility for risk management to the private sector. However, it was acknowledged that government is uninformed about the costs incurred, particularly as they are often hidden by the competitive market. Inclusion of contract clauses is driven by legal advice, rather than commercial or economic assessments, and it was considered that the practical benefits of a standard approach offset the benefits of flexibility.

Government representatives consider that the procurement arrangements in Australia are broadly effective in achieving value for money outcomes, and recognise the importance of being flexible and responsive to the changing needs and requirements of the Australian economy, such as the ageing population, greater budget restraints and growing citizen expectations.

At the same time, it was acknowledged that procurement could be improved, and that open, direct and respectful dialogue with industry is a good basis for moving forward and acting on these opportunities.

This is also formally reflected in some current procurement reform agendas. For example, three of the seven strategic directions currently being implemented in NSW, following identification by the NSW Procurement Board in late 2012 include:

- simplification and reduction of red tape for suppliers and agencies;
- engaging with industry; and
- innovating the approach to government procurement.

Similarly, two of the five priorities within the Queensland Government Procurement Plan 2012-15 are to:

- improve engagement with internal stakeholders, supply markets and industry; and

- build procurement and contract management capability (Department of Housing and Public Works, 2012).

Accordingly, this section outlines the government perspectives on some of specific procurement issues that have been raised by industry. It covers two main areas in detail: clarity of project objectives and contracting.

5.3.1 Project objectives

In each of the consultations, public sector representatives agreed that proper scoping and documentation of objectives is critical to the success of public infrastructure projects. Where scoping is inadequate, there is a risk that professional services firms will under-bid for the work that is required, such that the outcomes of procurement are not achieved without cost overruns and delays. Poor scoping at the commencement of a project is also likely to lead to costly variations down the track.

Given the mechanisms that have been established by government to ensure that adequate investments are made during the brief preparation stage, some representatives considered that briefs with unclear objectives were less frequent than proposed by industry.

For example, some departments engage consultants to assist with the development of project scope, or have processes that can accommodate non-conforming bids where industry is able to make an innovative suggestion. Others recognise that there is a potential for greater flexibility, but that obtaining early industry involvement is somewhat constrained by probity requirements.

In addition, the price premiums or lack of competition associated with briefs that have unclear objectives are not obvious to the public sector. Instead of visible price increases from higher bids and less supplier interest, it was considered that poor quality of service was a more common outcome associated with scope inadequacies. This suggests that the price impacts reported by firms are often masked by the procurement process – limiting government incentives to address the underlying issues.

Nevertheless, a number of reasons were given to explain some of the incidence of unclear objectives in project briefs for professional services. These include:

- **Planning prior to cabinet approval:** it was acknowledged that it can be challenging for agencies to engage fully with an end user group before a project has received official cabinet approval. This can contribute to a situation where a project is inadequately scoped, due to a mismatch between the needs of the end user and the objectives of the agency. If not resolved prior to going to market, this political barrier can then flow through the efficiency of the procurement process.
- **Distinctions between end users and stakeholders for different infrastructure types:** it was also raised that there may be a more natural tendency for greater end user involvement in the delivery of certain types of public infrastructure, driven by differences in the level of conflict between end users and other stakeholders. For example, a road project is likely to be more complex and have broader stakeholder impacts, beyond the benefits accrued by end-users, compared to the construction of a school. This can impact the ability of governments to define project objectives with clarity from the outset.

- **Cultural differences in approach to industry engagement:** it was suggested that there were likely to be differences in the way that agencies engage with industry throughout procurement, even within the same jurisdiction. The culture within a procuring agency can have significant influence on whether a supervisory or co-operative approach is taken in project scoping stages.

5.3.2 Contracting

Public sector leaders recognise the challenges associated with contracting and efficient allocation and management of risk in procurement. A number of representatives recognised that their standard contracts contain most of the clauses identified in Section 2 of this report, including contracting out of proportionate liability, unlimited liability, expert standard of care and fitness for purpose. That said, in other cases, government agencies rely on the Australian Standard General Conditions of Contract (AS4122-2010), which addresses some of the issues encountered by industry in relation to risk allocation clauses. However, amendments of the Australian Standard made by governments can have the effect of returning to a state of less than optimal risk management from an economic perspective.

There are a range of underlying causes that drive the inclusion of these terms in professional service contracts for infrastructure projects. For example:

- **Focus on legal implications:** the approach taken by the public sector to allocate and manage risk is generally driven by legal advice. For example, despite the existence of proportionate liability legislation, some jurisdictions include contracting out clauses as a way of designating co-ordination responsibility to the lead consultant for a project. It was reported that this has been the traditional approach to risk management within government procurement.
- **Practical benefits of a standard approach:** standard clauses are often applied in contracts due to the costs involved in negotiating individual terms on a case by case basis. For example, one of the reasons given for use of unlimited liability clauses is the difficulty and time necessary to ascertain appropriate limits for individual contracts. While standard approaches can be effective when clauses are drafted to allow for appropriate risk management, this justification for use of unlimited liability clauses suggests that governments are unaware of the implications of unmanaged risks.

  That said, most jurisdictions do have arrangements whereby firms can register under a Professional Standards Scheme that limits their occupational liability in work performed for government. However, there are number of challenges associated with implementation of such schemes. Accordingly, some jurisdictions apply rules of thumb in other circumstances. For example, South Australia has a default liability cap of five times the contract value, for low risk contracts valued up to $1 million, where professional schemes do not apply.
- **Willingness to pay while costs are hidden by the market:** government acknowledges that price premiums from industry are associated with a risk-averse approach to procurement, and has expressed willingness to pay those costs.

  At the same time, government is uninformed about how much contract terms are adding to the cost of infrastructure, and whether this is greater than necessary. A common view is that the strong competition among professional services firms

contributes to lower prices, which masks the extent of price premiums charged in exchange for risk transfers.

However, there are examples of where the inclusion of clauses seeking to transfer risk to the private sector has led to specific premiums. One representative described a case where the removal of clauses transferring risks in relation to wet weather, industrial relations and latent conditions led to a reduction in prices quoted by industry of around $5 million.

- **Slower progress through cross-jurisdiction negotiations:** some representatives indicated that greater co-operation by government across jurisdictions could help to improve the efficiency of contract clauses in procurement. However, it was suggested that improvements in relation to the frequency of contracting out of proportionate liability at the state level have been stalled by the limited progress the Commonwealth level.

5.4 Next steps

Key Points:

- Increasing the efficiency of procurement requires action at all levels of the procurement process. This chapter discusses seven practical next steps relevant for policy makers through to procurement officers in government.
- While it will take time to deliver on these reforms, the significant long-term flow on benefits identified in Chapter 4 illustrate that the efforts may result in economic benefits.

Just as infrastructure projects can vary significantly, it is important that procurement practices are flexible to ensure that the right arrangements are made for the right project. However, there are a number of reforms that can transform the procurement of professional services and deliver public infrastructure more efficiently.

This report highlights seven practical next steps that will re-focus public sector procurement, as summarised in the box below. While it will take time to implement these changes, this report demonstrates that the efforts should result in economic benefits. Above this, we note that achieving meaningful changes in a complex area such as procurement policy is unlikely to be delivered by any single action. It is a strategically significant area of government activity that needs more holistic consideration and cultural change to support that.

(1) Set up procurement teams with practical, legal, insurance and procurement experience: given the mixture of expertise required to undertake a successful procurement, governments should consider restructuring procurement teams to encourage the key players to work collaboratively. Together, legal experts that understand contracting, insurance specialists, practitioners with project experience and procurement experts can evaluate value for money and appropriately tailor procurement processes, contracts and delivery models to the objectives of a project

(2) Reallocate procurement resources towards specification of project objectives: procurement policy should place a stronger focus on identifying the needs of public infrastructure end users, re-testing business case objectives in the procurement environment and taking advantage of opportunities to engage with industry in project scoping where appropriate. Without agreeing and documenting project objectives clearly, time spent on contracting will be less effective.

(3) Remove contract clauses that do not stack up: while this report has highlighted the costs of contracting out of proportionate liability and imposing expert standard of care on industry, these need to be evaluated with reference to the benefits of transferring risk to industry, through a cost-benefit analysis. Where terms fail to meet a cost-benefit analysis, they should be removed from contracts unless justified by the specific circumstances of a particular project. Where clauses are maintained, governments should be prepared to explain the justification of doing so. This requires government to identify whether it intends to use clauses to cover their losses, or to actively mitigate risks.

(4) Develop and apply limited liability guidelines: while Professional Standards Schemes are one mechanism to achieve limitation of liability, these are challenging to implement and not viable for all professions. To enable a broader approach for efficient risk management, governments should develop and apply limited liability guidelines to assist agencies with ensuring that liability clauses do not add unnecessarily to project costs. Such guidelines should simplify the process of setting liability caps, while taking into account variations in market practice, project size, risk and the size of the supplier.

(5) Verification of brief information: it is more efficient for government to undertake the necessary work to verify the accuracy of information provided in a request for tender, rather than transferring the costs of that work to all bidders, creating duplication. Purchasing agencies should actively seek to minimise this burden.

(6) Streamline compliance processes: governments can also reduce bid costs for public infrastructure projects to more efficient levels by streamlining compliance requirements, particularly where the information provided by firms is rarely a differentiating feature of the successful tenderer. Options include development of standard form agreements for firms, or submission of compliance documentation as part of pre-qualification schemes.

(7) Evaluate and adapt procurement frameworks to encourage innovation: continuing to evaluate and adapt procurement frameworks with reference to changes in market offerings will help to maximise innovation in public infrastructure projects. Going forward, the public sector should be open to non-conforming bids, new delivery models, early market sounding options and continue to provide opportunities for unsolicited proposals.

These are presented in more detail below, followed by a discussion around variation in time frames for implementing these changes.

5.4.1 Set up procurement teams with practical, legal, insurance and procurement experience

Given the range of factors to be considered when assessing value for money, successful procurement requires input from a range of disciplines, including legal expertise, an understanding of insurance markets, project management skills, technical expertise and experience in sound procurement processes.

This report finds that there is substantial industry recognition of the skills of public sector procurement managers, a notable achievement. That said, both government and business recognise that there are some skills gaps in procurement that need to be addressed, including:

- management of privately financed procurement models;
- technical knowledge in the assessment of service quality;
- understanding the implications of contract terms particularly in the context of insurance markets, the justification of standard form contract positions and where opportunities for flexibility can arise; and
- assessment processes to ensure efficient risk management.

In particular, there is a need to establish a role for practitioners with technical expertise within agencies that undertake procurement. Without an understanding of the spectrum of service quality available from professional services, and what is appropriate in the context of a particular project, it is very difficult to evaluate which industry proposal presents the optimal value for money. While it is not necessary that practitioners undertake or manage the procurement process, some level of technical oversight within government should be required.

It is also important to address cases where procurement officers do not have authority to negotiate changes to contract terms with industry, or use the time that it would take as an excuse for inefficient outcomes. Given the shift towards greater procurement of services from the public sector, it is critical that governments ensure that their procurement professionals have a strong understanding of the importance of combining technical, legal and commercial perspectives when developing a request for services and selecting a supplier.

For example, in drafting contracts it is critical to understand implications of risk transfer to consultants not only from a legal perspective, but also acknowledging the nature and availability of professional indemnity insurance for consultants, and the ability of consultants to manage those risks as they carry out their work. Access to specialists should be embedded within the procurement process.

Therefore, governments should consider broader structural change in the approach to procurement, by establishing smaller procurement teams that mix skills from different disciplines, rather than isolating them. There is an opportunity to achieve better outcomes from procurement if the key players in government, from the legal experts to engineering practitioners, work collaboratively to appropriately tailor procurement processes, contracts and delivery models to the objectives of a project.

Making this shift should also help to drive a culture of engaging with industry, rather than supervising, to ensure that everyone is on the same page.

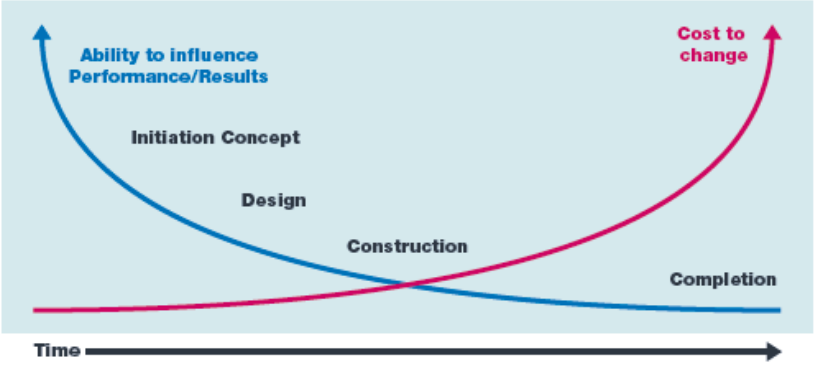
5.4.2 Reallocate procurement resources towards specification of project objectives

Proper investment into planning and scope development before a brief goes to market is a well-established foundation of good procurement practice.

Nevertheless, this report has found that over one third of requests for tender made by the public sector for professional services in the built environment sector have unclear project objectives. Although representatives from government have expressed that this may overestimate the extent of the problem, it is evident that pre-procurement planning requires greater focus.

Governments should assess whether there is an appropriate allocation of resources in procurement that balances the need to accurately specify project objectives and also draft contracts that efficiently manage project risks. It is important to acknowledge that without clearly defining the outcomes to be achieved from procurement, effort spent on contracting will be less effective. This is not to say that contracting is not important – indeed, this report demonstrates that there are substantial long term benefits to be achieved from improving all aspects of procurement. Rather, governments have a responsibility to focus on clearly identifying core objectives for a project from the outset which is just as important as ensuring efficient risk management. As illustrated in Figure 5.4, the ability to influence project outcomes are maximised in the early stages of planning, whilst the costs of making changes are simultaneously minimised.

Figure 5.4: Ability to influence performance/results over project time



Source: ACIF & APCC (2010:10)

As such, the primary focus of procurement should be on working as closely as possible with end users to identify and confirm outcomes to be achieved. There may be a number of parties involved in this process, from the end users that require the infrastructure, to the agency staff that is purchasing on their behalf, and, where centralised procurement is in place, the agency that is managing the procurement process.

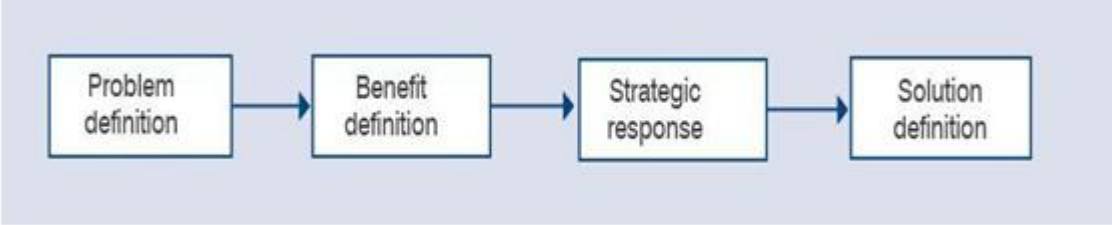
In order to request responses from industry that are relevant to the problem at hand, it is important that the expectations of each stakeholder on the demand-side of the transaction are consistent. Ultimately, this requires formal agreement among key stakeholders on project objectives before proceeding to market.

However, the political sensitivities associated with planning and consultation prior to formal approval must also be acknowledged and addressed by government.

To ensure that this does not lead to a mismatch of expectations, it is critical that agencies re-test business case objectives in the procurement environment.

Where appropriate, governments should consider using investment tools that focus attention on clearly defining the objectives to be achieved. The Victorian Government has made some progress in this regard, through the Investment Logic Map developed from the Victorian Government's Investment Management Standard. As shown in Figure 5.5, this provides a template for identifying how the benefits of a project will address the underlying problem. There is scope for further development of this framework as it relates to public infrastructure projects.

Figure 5.5: Investment Logic Map – shaping a new investment



Source: Department of Treasury and Finance (2012)

Furthermore, agencies should consider early engagement with industry in cases where the way to achieve project outcomes are particularly complex or uncertain. Employing industry expertise can help to inform government, and encourage innovative suggestions that may not have been considered otherwise.

By addressing scoping challenges from the outset of a project, governments will be well placed to realise cost savings through lower price premiums and improved competition, as well as higher quality services.

5.4.3 Remove contract clauses that do not stack up

The issues surrounding contract clauses and risk management are complex, and require a flexible approach on a case-by-case basis. However, at present, governments in Australia are not informed about the impact of the clauses they are including in contracts.

While understanding the impact of clauses from a legal perspective is an important responsibility of government when procuring from the private sector, it is just as important for governments to evaluate the costs and benefits associated with contract terms in the context of the market and the broader economic impacts.

As noted in the National Public Private Partnership Guidelines developed by Infrastructure Australia, in cases where neither party to a contract has full control over a risk:

> *"the risk allocation should reflect how the private party prices the risk and whether it is reasonable for government to pay that price, taking into account the likelihood of the risk eventuating, the cost to government if it retained that risk and the ability of government to mitigate any consequences if the risk materialises" (Infrastructure Australia, 2008:29).*

Accordingly, government should assess whether the benefits of risk transfer to the private sector achieved through contract clauses are sufficiently large to offset the costs transferred back by industry through direct price premiums, reduced competition and uninsured risk exposure.

When estimating these benefits, government must consider whether the purpose of including a particular clause is to provide cover for potential losses, or whether clauses are intended to provide incentives for firms to manage their risks appropriately. In general, it is noted that invoking contracts is rarely the solution when a project goes wrong. Further, transfer of risk does not ensure that the risk is being cost-effectively managed.

Where clauses do not pass a cost-benefit analysis, they should be removed from the standard form contracts used by government agencies, and only included where there is a strong case for inclusion in the context of a specific project. Contracting must balance the benefits of reducing negotiation time through standard forms against the benefits of providing opportunity for flexibility. Governments should also be able to reasonably justify why clauses have been included in contracts from an economy-wide perspective.

Overall, efficient risk sharing and management between the public and private sectors will not only reduce the cost of infrastructure in Australia, but will also promote better outcomes for government by reducing legal disputes and building more collaborative relationships with industry.

5.4.4 Develop and apply limited liability guidelines

This report has found that over half of all requests for proposal made to professional services firms for public infrastructure projects include unlimited liability clauses. However, firms are unable to fully insure against risks under contracts with such clauses, given that all professional indemnity insurance places a limit on the total payout available.

Accordingly, development and application of limited liability guidelines for purchasing agencies can help to reduce the costs associated with setting limits on a case-by-case basis, and in turn, reduce the costs charged by professional services firms. Such guidelines would outline a standard approach to setting limitations on liability for different types of market practice, taking into account variations in project size, risk and the size of the supplier.

While these guidelines would need to be accommodated within the policy of each jurisdiction, they could synthesise existing material, including the Commonwealth Government Liability Risk Assessment Guide for Financial Management and Accountability Act Agencies (2010), or approaches in other jurisdictions, such as the default liability cap for low risk contracts in South Australia.

While professional standards legislation provides a mechanism for limitation of liability through approved Professional Standards Schemes, this has not proved to be a viable option for all professions, including engineers, architects and other consultants within the infrastructure sector. There are significant implementation issues associated with development and administration of schemes under this framework, and in any case, schemes are much more difficult for smaller firms to partake in, creating a barrier to competition.

On this basis, it is considered that actions by government to develop and apply limited liability more broadly are likely to be more effective in improving risk management in procurement for public infrastructure.

5.4.5 Verification of brief information

This report finds that, within the context of procuring professional services for public infrastructure, around one third of requests for tender include information that must be verified by bidders. This leads to inefficient duplication of effort and contributes to project prices as firms attempt to recoup the costs incurred during the preparation of a bid.

Accordingly, purchasing agencies should actively seek to minimise this burden by undertaking the necessary work to confirm the accuracy of information before making an open approach to market. This is consistent with the recommendation of the Productivity Commission, that the public sector should undertake site investigations and pass on better information to bidders (PC 2014:479-480).

5.4.6 Streamline compliance processes

Another way in which governments can reduce the costs of bidding for public infrastructure projects, and indirectly contribute to lower project prices is by streamlining their compliance processes. In many projects, firms are required to submit detailed environmental plans, occupational health and safety plans and other compliance-related documentation as part of their proposals, despite the fact that government agencies rarely differentiate between firms on this basis.

The cost burden associated with these information requirements was acknowledged in the Productivity Commission's Inquiry into Public Infrastructure, supported by a number of submissions, including that of the Department of Infrastructure and Regional Development (PC, 2014:454).

There are a number of options available to government which can reduce these costs, such as:

- including submission of standard compliance-related documentation as part of prequalification schemes, so that firms are only required to provide the material once, rather than on a project-by-project basis; or
- replacing the requirement to submit detailed compliance documentation with standard form responses that firms can agree to as part of their proposals.

The Productivity Commission also recommended that non-design management plans be only required from the preferred tenderer (PC 2014:462). Overall, these options are relatively straightforward actions for government that can help to set bid costs at more efficient levels.

5.4.7 Evaluate and adapt procurement frameworks to encourage innovation

Encouraging innovation in public infrastructure through procurement can deliver substantial long term benefits. It is therefore important that governments continue to review and tailor their procurement frameworks in response to new opportunities presented by the market.

While most jurisdictions have mechanisms that allow for innovation in procurement of professional services for infrastructure, this report has highlighted that government responsiveness to innovation during tender processes could be improved. Some of the ways that this can be achieved is through:

- providing opportunities for submission of non-conforming bids;
- a flexible approach to procurement delivery models;
- seeking ideas from industry on complex projects through early market soundings; and
- supporting greater participation in unsolicited proposal processes.

It is acknowledged that government faces constraints when engaging with industry through procurement, due to the need to demonstrate transparency and accountability in decision making and fairness across competitors. Incentivising innovative solutions therefore requires flexibility to adapt both procedural and cultural aspects of procurement, a responsibility for both policy makers and procurement managers at the ground level. While many jurisdictions currently offer opportunities in this regard, such as the South Australian Guidelines for Assessment of Unsolicited Proposals (Department of Premier and Cabinet, 2014), these should be regularly reviewed and updated as required to account for changes in market offerings.

5.5 Time frames for implementation

Implementing these important changes will require action from stakeholders throughout the procurement process. Different parties will be required to take accountability for the areas of procurement policy and practice upon which they have control. However, it is important to acknowledge that the time frames for implementing these changes will vary.

Some changes will be achievable by government in the next 12 to 18 months, such as verification of brief information, streamlining compliance processes and re-allocating resources towards understanding end-user requirements during project scoping. However, policy and cultural change will require a more concerted effort over the medium to long term, such as restructuring procurement teams, revising default positions on contract clauses, implementation of limited liability guidelines and adaptation of procurement frameworks in response to changes in the market.

While it will take time to transform procurement, the significant long-term flow on benefits identified in Section 4 illustrate that the efforts should result in economic benefits.

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Appendix A: Detailed modelling methodology

Background on the DAE CGE model

A Computable General Equilibrium (CGE) model is a stylised representation of the real world economy which allows for analysis of how the economy might react to changes in external factors such as policy, technology, environment and population.

CGE models are based on real world economic data. The fundamental building block is a database which reconciles how goods and services flow from one industry to another. For example, this database could show how much road transport is used by the food and beverage industry or how much output from agricultural industries is used in food manufacturing. This database covers the entire economy. From this real world data information on key variables such as GDP can be calculated.

The second main component of the model is an extensive set of information on the preferences of consumers and producers. These preferences cover details such as how consumption of an item changes as its price increases, how likely consumers are to switch their consumption between different goods and how producers are best able to produce their output.

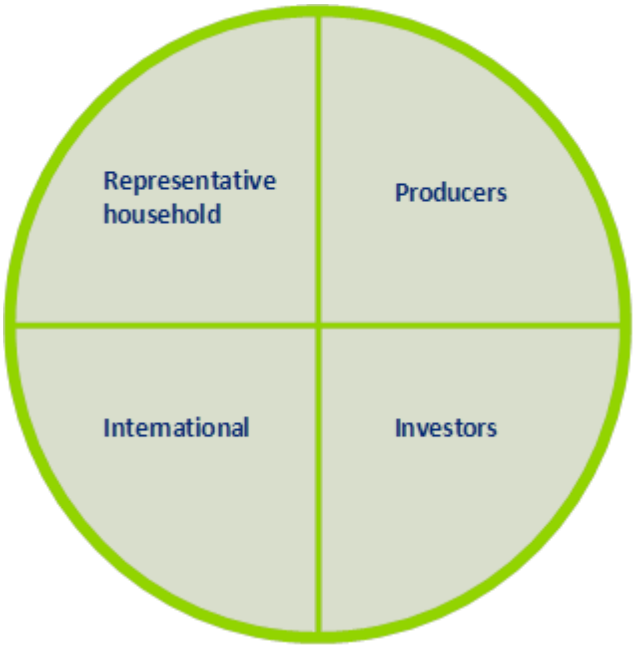
The model therefore represents a static picture of the economy (how goods and services are currently used) and a framework for measuring how changes to this picture will flow through the economy.

The Deloitte Access Economics – Regional General Equilibrium Model (DAE-RGEM) is a large scale, dynamic, multi-region, multi-commodity computable general equilibrium model of the world economy. The model allows policy analysis in a single, robust, integrated economic framework. This model projects changes in macroeconomic aggregates such as GDP, employment, export volumes, investment and private consumption. At the sectoral level, detailed results such as output, exports, imports and employment are also produced.

The model is based upon a set of key underlying relationships between the various components of the model, each which represent a different group of agents in the economy. These relationships are solved simultaneously, and so there is no logical start or end point for describing how the model actually works.

Figure A.1 shows the key components of the model for an individual region. The components include a representative household, producers, investors and international (or linkages with the other regions in the model, including other Australian States and foreign regions). Below is a description of each component of the model and key linkages between components. Some additional, somewhat technical, detail is also provided.

Figure A.1: Key components of DAE-RGEM



DAE-RGEM is based on a substantial body of accepted microeconomic theory. Key assumptions underpinning the model are:

- The model contains a 'regional consumer' that receives all income from factor payments (labour, capital, land and natural resources), taxes and net foreign income from borrowing (lending).
- Income is allocated across household consumption, government consumption and savings so as to maximise a Cobb-Douglas (C-D) utility function.
- Household consumption for composite goods is determined by minimising expenditure via a CDE (Constant Differences of Elasticities) expenditure function. For most regions, households can source consumption goods only from domestic and imported sources. In the Australian regions, households can also source goods from interstate. In all cases, the choice of commodities by source is determined by a CRESH (Constant Ratios of Elasticities Substitution, Homothetic) utility function.
- Government consumption for composite goods, and goods from different sources (domestic, imported and interstate), is determined by maximising utility via a C-D utility function.
- All savings generated in each region are used to purchase bonds whose price movements reflect movements in the price of creating capital.
- Producers supply goods by combining aggregate intermediate inputs and primary factors in fixed proportions (the Leontief assumption). Composite intermediate inputs are also combined in fixed proportions, whereas individual primary factors are combined using a CES production function.
- Producers are cost minimisers, and in doing so, choose between domestic, imported and interstate intermediate inputs via a CRESH production function.
- The model contains a more detailed treatment of the electricity sector that is based on the 'technology bundle' approach for general equilibrium modelling developed by ABARE (1996).

- The supply of labour is positively influenced by movements in the real wage rate governed by an elasticity of supply.
- Investment takes place in a global market and allows for different regions to have different rates of return that reflect different risk profiles and policy impediments to investment. A global investor ranks countries as investment destinations based on two factors: global investment and rates of return in a given region compared with global rates of return. Once the aggregate investment has been determined for Australia, aggregate investment in each Australian sub-region is determined by an Australian investor based on: Australian investment and rates of return in a given sub-region compared with the national rate of return.
- Once aggregate investment is determined in each region, the regional investor constructs capital goods by combining composite investment goods in fixed proportions, and minimises costs by choosing between domestic, imported and interstate sources for these goods via a CRESH production function.
- Prices are determined via market-clearing conditions that require sectoral output (supply) to equal the amount sold (demand) to final users (households and government), intermediate users (firms and investors), foreigners (international exports), and other Australian regions (interstate exports).
- For internationally-traded goods (imports and exports), the Armington assumption is applied whereby the same goods produced in different countries are treated as imperfect substitutes. But, in relative terms, imported goods from different regions are treated as closer substitutes than domestically-produced goods and imported composites. Goods traded interstate within the Australian regions are assumed to be closer substitutes again.
- The model accounts for greenhouse gas emissions from fossil fuel combustion. Taxes can be applied to emissions, which are converted to good-specific sales taxes that impact on demand. Emission quotas can be set by region and these can be traded, at a value equal to the carbon tax avoided, where a region's emissions fall below or exceed their quota.

The representative household

Each region in the model has a so-called representative household that receives and spends all income. The representative household allocates income across three different expenditure areas: private household consumption; government consumption; and savings.

Going clockwise around Figure A.1, the representative household interacts with producers in two ways. First, in allocating expenditure across household and government consumption, this sustains demand for production. Second, the representative household owns and receives all income from factor payments (labour, capital, land and natural resources) as well as net taxes. Factors of production are used by producers as inputs into production along with intermediate inputs. The level of production, as well as supply of factors, determines the amount of income generated in each region.

The representative household's relationship with investors is through the supply of investable funds – savings. The relationship between the representative household and the international sector is twofold. First, importers compete with domestic producers in consumption markets. Second, other regions in the model can lend (borrow) money from each other.

Some detail:

- The representative household allocates income across three different expenditure areas – private household consumption; government consumption; and savings – to maximise a Cobb-Douglas utility function.
- Private household consumption on composite goods is determined by minimising a CDE (Constant Differences of Elasticities) expenditure function. Private household consumption on composite goods from different sources is determined is determined by a CRESH (Constant Ratios of Elasticities Substitution, Homothetic) utility function.
- Government consumption on composite goods, and composite goods from different sources, is determined by maximising a Cobb-Douglas utility function.
- All savings generated in each region are used to purchase bonds whose price movements reflect movements in the price of generating capital.

Producers

Apart from selling goods and services to households and government, producers sell products to each other (intermediate usage) and to investors. Intermediate usage is where one producer supplies inputs to another's production. For example, coal producers supply inputs to the electricity sector.

Capital is an input into production. Investors react to the conditions facing producers in a region to determine the amount of investment. Generally, increases in production are accompanied by increased investment. In addition, the production of machinery, construction of buildings and the like that forms the basis of a region's capital stock, is undertaken by producers. In other words, investment demand adds to household and government expenditure from the representative household, to determine the demand for goods and services in a region.

Producers interact with international markets in two main ways. First, they compete with producers in overseas regions for export markets, as well as in their own region. Second, they use inputs from overseas in their production.

Some detail:

- Sectoral output equals the amount demanded by consumers (households and government) and intermediate users (firms and investors) as well as exports.
- Intermediate inputs are assumed to be combined in fixed proportions at the composite level. As mentioned above, the exception to this is the electricity sector that is able to substitute different technologies (brown coal, black coal, oil, gas, hydropower and other renewables) using the 'technology bundle' approach developed by ABARE (1996).
- To minimise costs, producers substitute between domestic and imported intermediate inputs is governed by the Armington assumption as well as between primary factors of production (through a CES aggregator). Substitution between skilled and unskilled labour is also allowed (again via a CES function).
- The supply of labour is positively influenced by movements in the wage rate governed by an elasticity of supply is (assumed to be 0.2). This implies that changes influencing the demand for labour, positively or negatively, will impact both the level of employment and the wage rate. This is a typical labour market specification for a dynamic model such as DAE-RGEM. There are other labour market 'settings' that can be used. First, the labour market could take on long-run characteristics with aggregate employment being fixed and any changes to labour demand changes being absorbed through movements in the wage rate. Second, the labour market could take on short-run characteristics with fixed wages and flexible employment levels.

Investors

Investment takes place in a global market and allows for different regions to have different rates of return that reflect different risk profiles and policy impediments to investment. The global investor ranks countries as investment destination based on two factors: current economic growth and rates of return in a given region compared with global rates of return.

Some detail

- Once aggregate investment is determined in each region, the regional investor constructs capital goods by combining composite investment goods in fixed proportions, and minimises costs by choosing between domestic, imported and interstate sources for these goods via a CRESH production function.

International

Each of the components outlined above operate, simultaneously, in each region of the model. That is, for any simulation the model forecasts changes to trade and investment flows within, and between, regions subject to optimising behaviour by producers, consumers and investors. Of course, this implies some global conditions must be met such as global exports and global imports are the same and that global debt repayments equals global debt receipts each year.

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