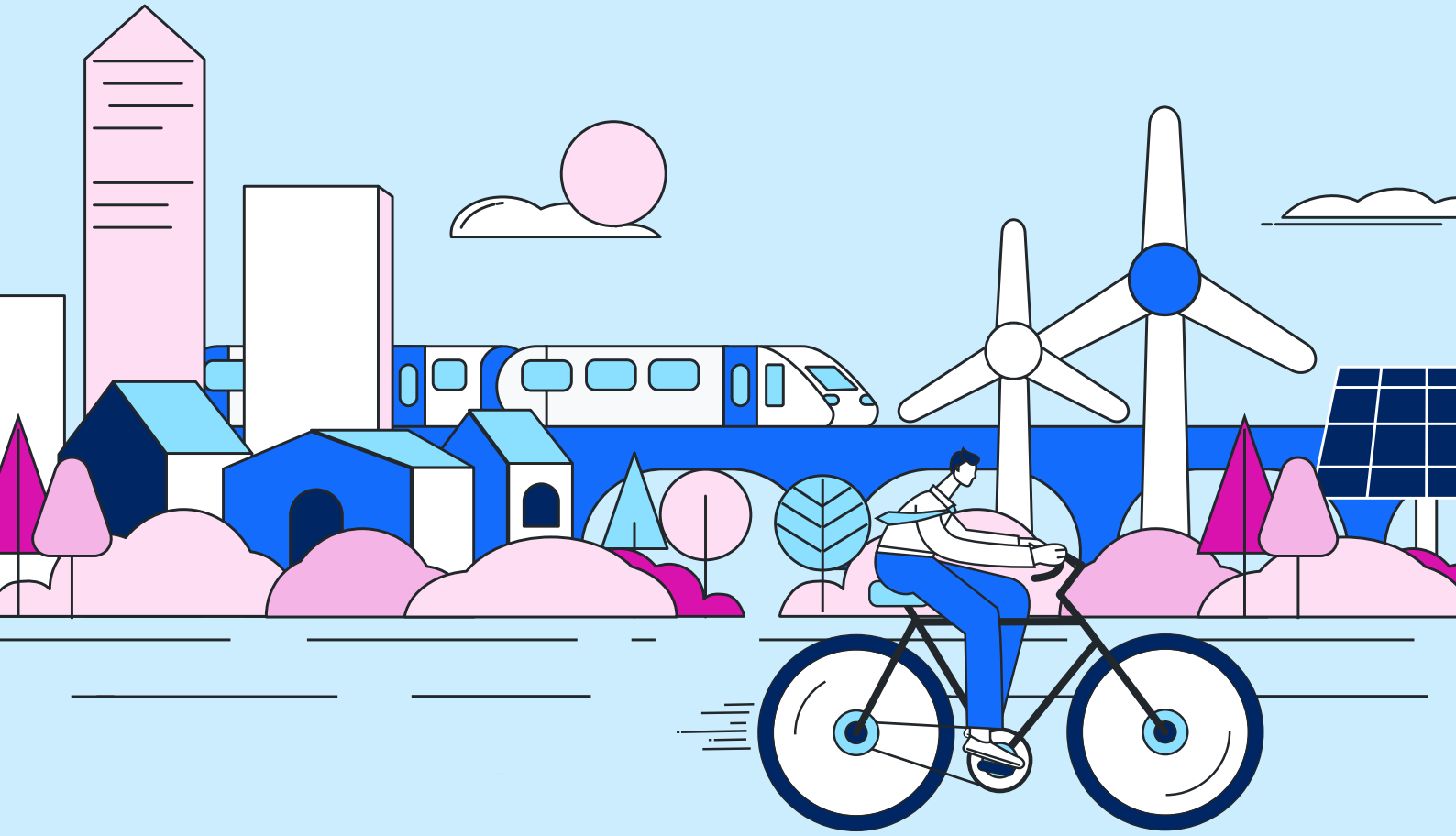
Infrastructure
NSW

Trends and Insights 2023 Report



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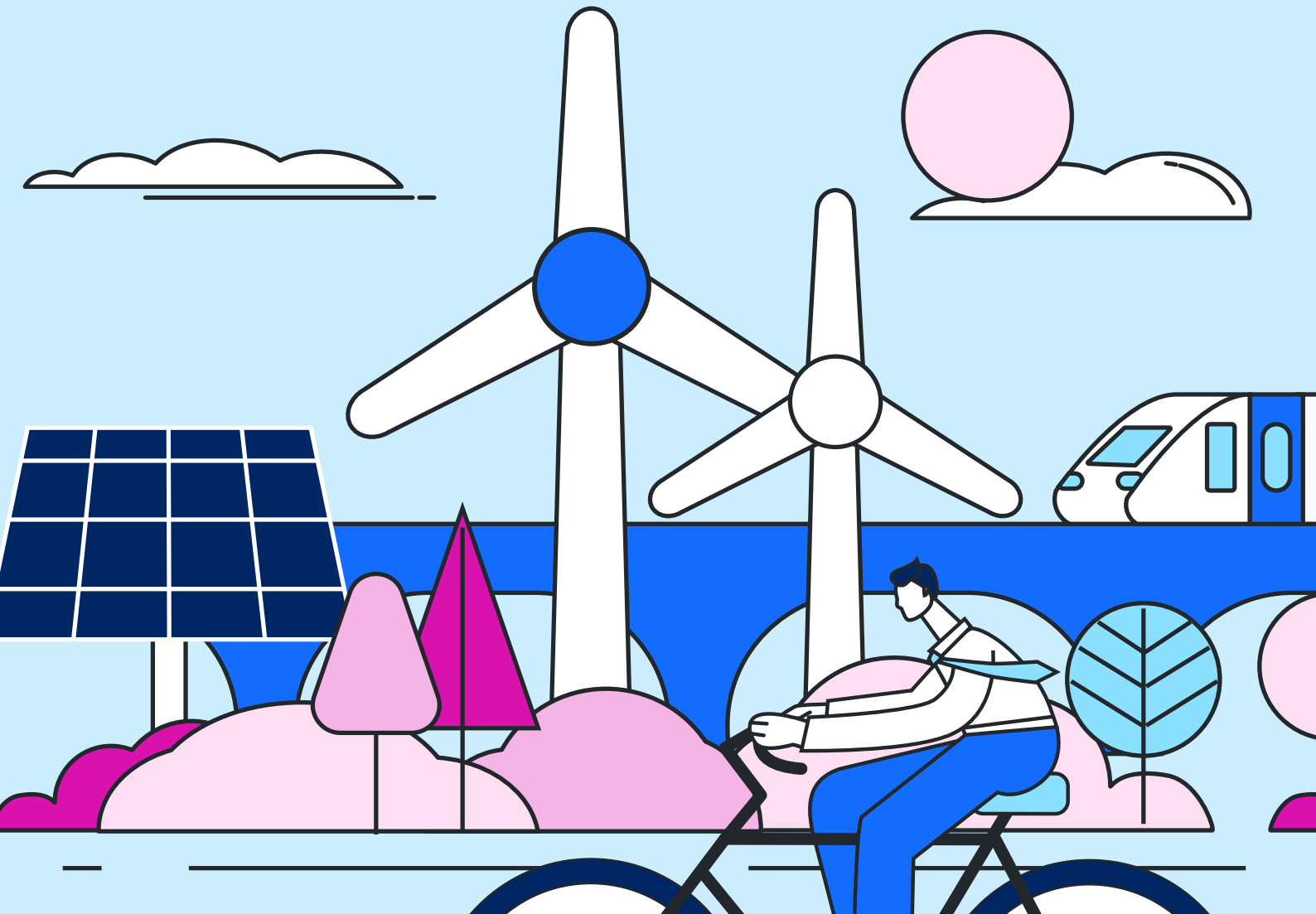
Acknowledgement of Country

Infrastructure NSW acknowledges the Traditional Custodians of the lands where we walk, work and live, and pays respect to their Elders past and present.

We acknowledge and respect their continuing connection to land, seas and waterways of NSW, and the continuation of their cultural, spiritual and educational practices.

In preparing the Trends and Insights Report, we acknowledge the importance of Aboriginal and Torres Strait Islander people's unique history of land and water management, and of art, culture and society that began over 65,000 years ago.



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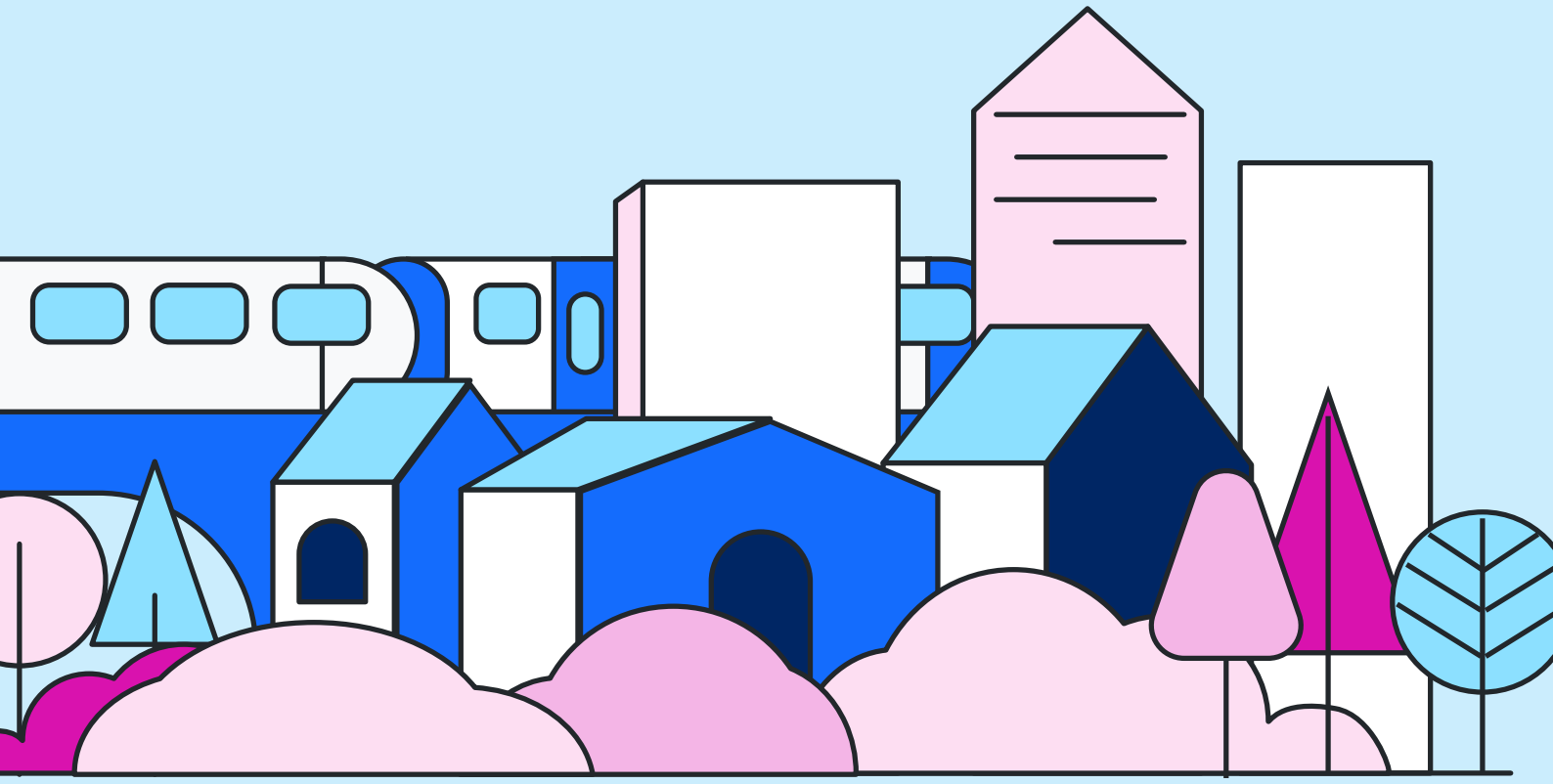


Introduction

Purpose

The Trends and Insights 2023 Report (report) leverages evidence from Infrastructure NSW's Assurance activities to analyse the performance of the NSW Infrastructure Program of capital projects and programs in the fiscal year 2022–2023 (FY23). It assesses:

- Program-wide trends affecting the performance of infrastructure projects.
- Progress made in addressing previously identified key drivers of risk and provides insights gained through this process.
- Opportunities and sets out insights on how Infrastructure NSW and government can further increase confidence to successfully deliver a sustainable infrastructure legacy in NSW.

Scope

Infrastructure Investor Assurance Framework

This report focuses on the information collected by Infrastructure NSW while administrating the *Infrastructure Investor Assurance Framework (IIAF).*[1] The principles of the IIAF, and thereby Infrastructure NSW's Assurance function, are established by the *NSW Gateway Policy*.[2] Infrastructure NSW's assurance function applies to all infrastructure projects with a value of $10 million and above that are developed, procured, or delivered by NSW Government agencies and businesses.

Mandated assurance activities include independent reviews at critical decision points during the life cycle of capital projects and regular, risk-based, project monitoring and reporting.

Although the assurance process is confidential to each project, aggregated insights from assurance activities provide a unique opportunity to evaluate and improve the overall performance of the NSW Infrastructure Program.

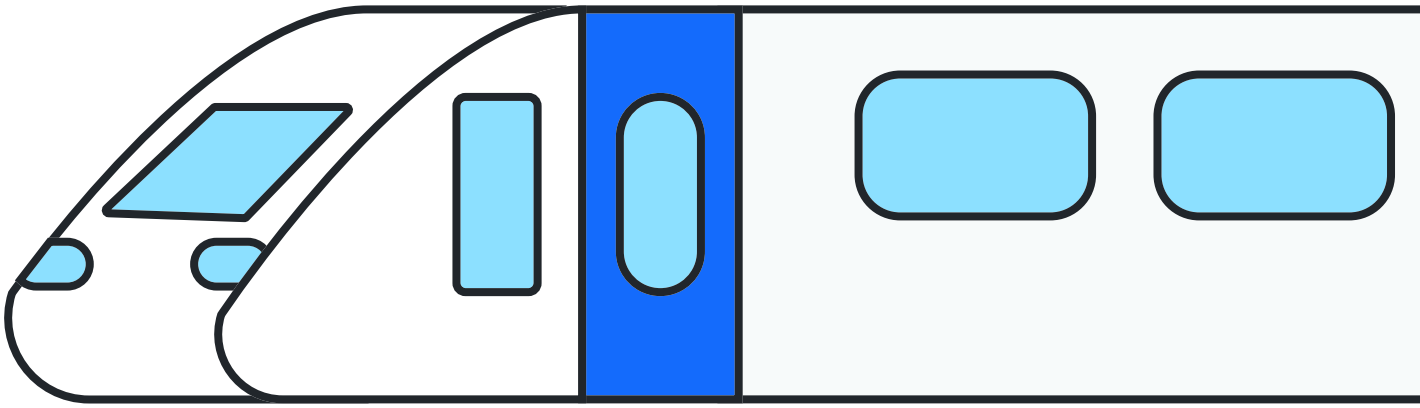
Assurance activities in FY23

In FY23, Infrastructure NSW completed 102 reviews on 75 projects, 6 capital portfolios and 6 precincts, which resulted in more than 1100 'Critical' and 'Essential' recommendations. These recommendations are categorised by risk topics and criticality as defined in the *IIAF* and *Review Workbooks*.[3] Infrastructure NSW's ongoing monitoring and reporting activities collected further performance and risk information on 405 projects.

1 Infrastructure NSW (2023), Infrastructure Investor Assurance Framework, NSW Government, see Infrastructure Investor Assurance Framework - December 2023 (nsw.gov.au)

2 NSW Treasury, Investor Assurance (Gateway), NSW Government, see https://www.treasury.nsw.gov.au/information-public-entities/governance-risk-and-assurance/investor-assurance-gateway

3 See https://www.infrastructure.nsw.gov.au/investor-assurance/project-assurance/about/



Limitations

The primary focus of this report is to identify new trends and insights based on data collected through the assurance process on the performance and risks impacting NSW Government projects.

Trends within the construction sector evolve at a gradual pace. Therefore, the trends and insights pinpointed in the previous reports still hold relevance. However, the primary focus of this report is on identifying and addressing new risks, trends and insights. There are also megatrends and other risks in the industry, that they may not be brought to light through Infrastructure NSW's assurance activities, which primarily concentrate on risks to the NSW Government.

Key definitions

The *IIAF* establishes 4 project tiers. A project is assigned to a tier based on its estimated total cost and qualitative risk profile. Tier 1 encompasses projects deemed to be the highest value and risk while tier 4 projects have the lowest risk profile. Only tier 1, 2 and 3 projects are subject to regular reporting.

Infrastructure NSW monitors and reports the performance of projects to inform the NSW Government of progress and risks. The definitions of performance status, 'On-track,' 'At-risk' or 'Not-on-track', are provided in the *IIAF*.[4]

Infrastructure NSW conducts project reviews following the guidelines of the *IIAF* and makes recommendations to mitigate key risk drivers, thereby enhancing the confidence in the successful delivery of projects. The IIAF provides confidence ratings for successful delivery, which can be classified as 'High', 'Medium', or 'Low'.[5]

4 On-track refers to no major unmitigated risks identified, At-risk refers to major risks identified but appropriate mitigating actions being taken, and Not-on-track refers to Major unmitigated risks identified with further action required.

5 Independent review teams use a confidence level that the project is being effectively developed and delivered of HIGH (clear purpose, scope, time, cost estimate and benefits with no unmitigated risks), MEDIUM (successful delivery is feasible with improvements) or LOW (viability of the project is in doubt).

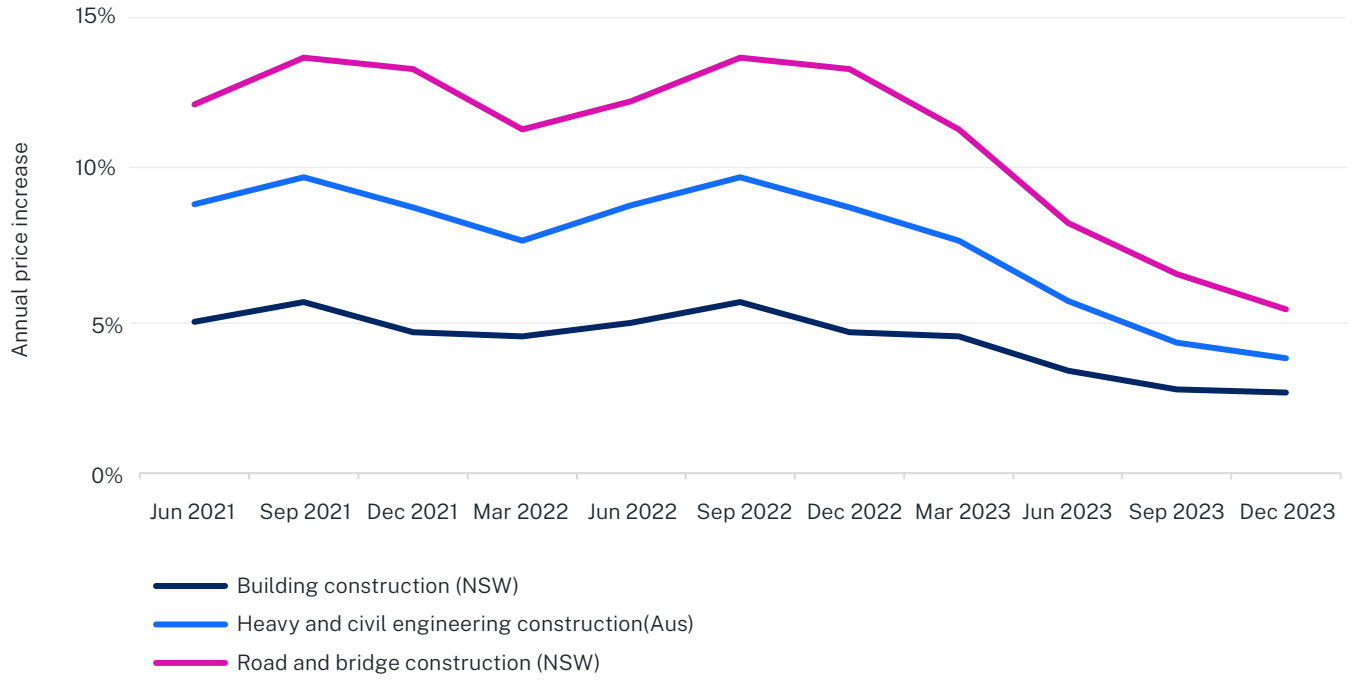
Update on earlier trends and insights

The following trends from the last Trends and Insights report have been re-evaluated and confirmed.

Rapid cost escalation placed significant pressure on infrastructure project delivery in FY22. Between July 2021 and June 2022, the annual building construction costs in NSW increased by 11.5%[6]. This increase was due to local and global supply chain instabilities, ongoing skilled labour shortages, strong global demand for building materials, particularly timber, steel, and crude oil. The 2022 floods in the NSW Northern Rivers region and unexpected global events, including the war in Ukraine, amplified these market factors.

Across FY23, annualised construction prices remained high, although the year-on-year increase in building construction costs reduced to 6% by the end of June 2023 (Figure 1[7]). The flow on effect of the increases in cost of delivery still challenges agencies. This is particularly relevant in the current situation where financial constraints are intensifying and demand is escalating in the housing sector notably to deliver the new priorities set by the Government.

Figure 1 — Construction sector annual price increase



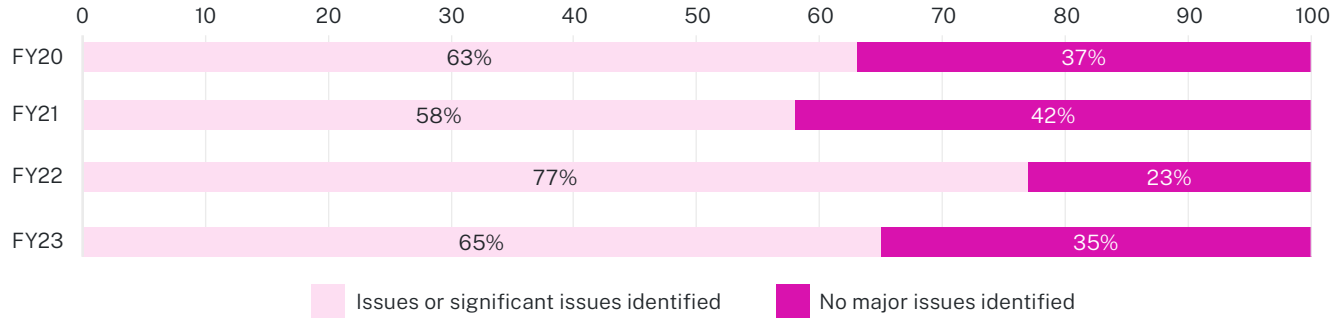
6 Australian Bureau of Statistics, Producer Price Indexes, June 2022, Australian Government

7 Australia Bureau of Statistics, Producer Price Indexes, Australia, Cat. 6427.0, Output of the Construction industries, subdivision and class index numbers, Table 17.

Insufficient management of change and the transition to new operating models was the fastest growing issue across the NSW Infrastructure Program in FY22. Assurance reviews in FY22 showed the fastest growing cause of reduced project delivery confidence related to the Asset Owner's Needs and Change Management Risks, see Figure 2.

These risks and issues were most notable in the rail sector, where the cost of not adequately engaging owners and operators early in the development process led to significant protracted industrial actions and delays. This trend, together with broader union-led enterprise agreement negotiations, is set to continue into FY24. The collective impact of this is yet to be determined, but it could be substantial.

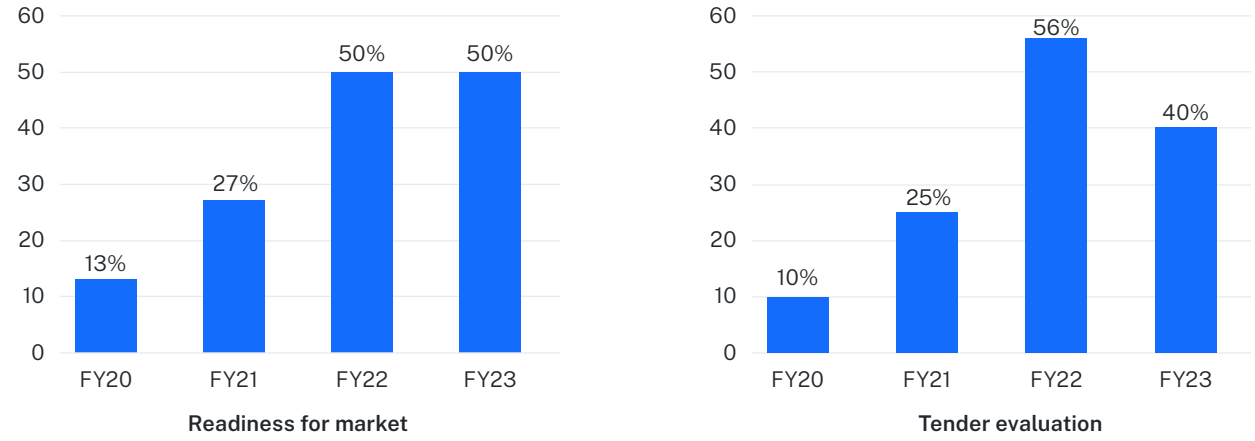
Figure 2 — Percentage of projects with a reduced overall delivery confidence rating which identified issues, or significant issues are in the Asset Owner's Need and Change Management KFA



Best practices during procurement activities continue to be applied. In FY22, assurance reviews showed a substantial increase in the implementation of good practice in procurement processes. The proportion of projects receiving a 'High' delivery confidence rating at procurement gates doubled 2 years in a row.

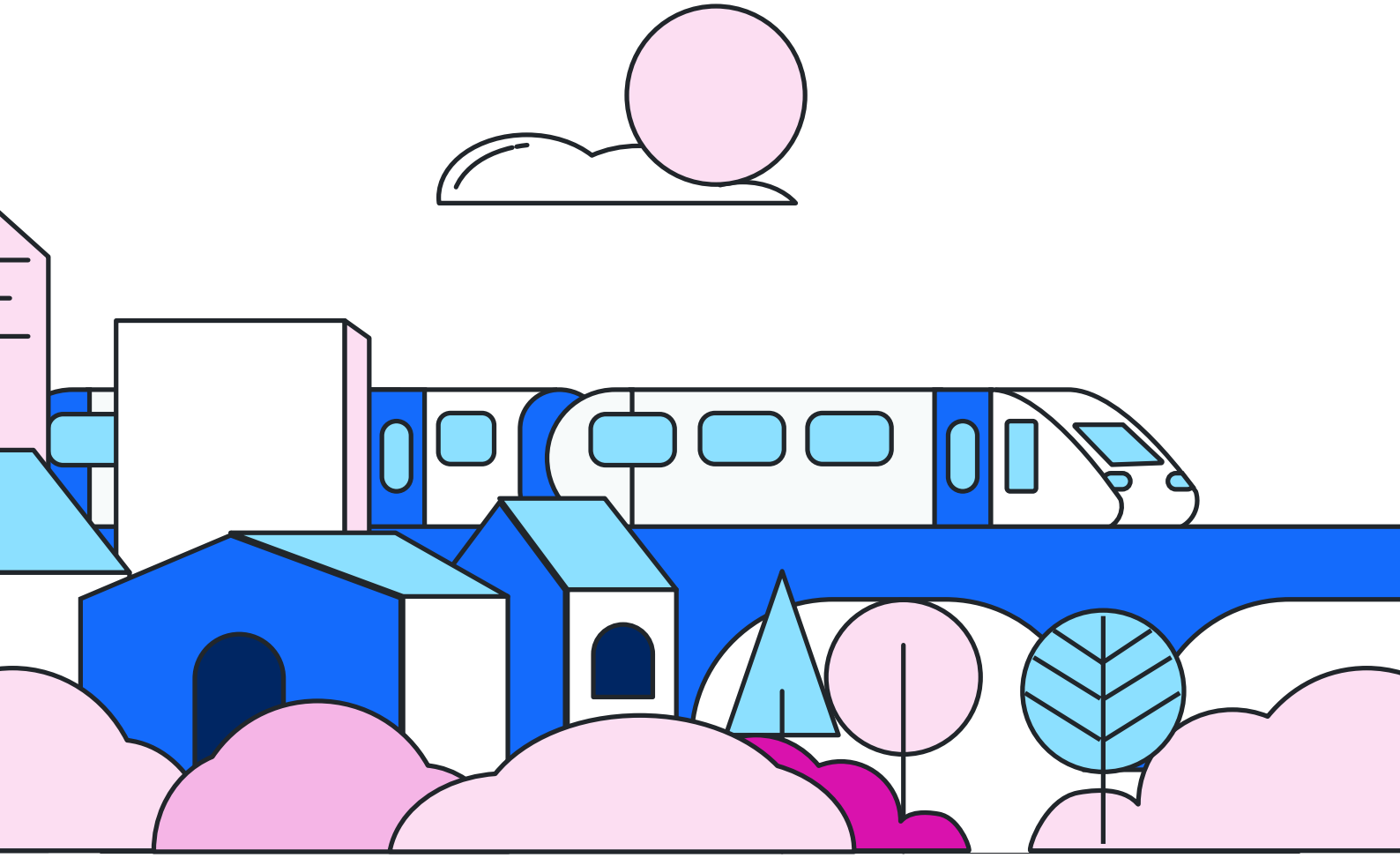
The performance of projects reviewed in the readiness for market phase remained stable in FY23, with 50% of reviews at this phase reporting a 'High' confidence rating. Over the same period, there was a slight year-on-year decline for project reviews in the tender evaluation phase, with 40% reporting a 'High' confidence rating, down from the 56% rating in FY22 but still higher than prior years.

Figure 3 — Percentages of project reviews in the procurement phase with a 'High' delivery confidence rating



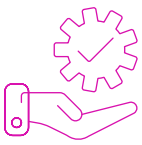
FY23 trends and insights

Positive results were achieved for the state's infrastructure program in FY23, despite macro-economic challenges that hindered infrastructure investments. Several opportunities can be explored to mitigate these risks. Where possible, the delivery of the NSW Infrastructure Program should be standardised to minimise risk and enhance productivity. Investments should be ongoingly optimised to maintain strong alignment with government priorities, considering constraints such as staffing and funding. To support the energy transition and meet ambitious housing targets, strategic planning and collaboration with industry is essential for coordinating interdependent investments and ensuring timely completion.



While previous trends discussed in the previous section remain relevant to the current performance of the NSW Infrastructure Program, this report focuses on the following 4 trends and insights that emerged or were reinforced in FY23:

1 Ongoing portfolio optimisation is crucial to deliver infrastructure priorities in a challenging economic environment.



2 Standardisation across the infrastructure life cycle reduces risk and boosts productivity.

3 Effective partnerships between the public and private sector is fundamental to delivering critical energy and water infrastructure.

4 Clear accountabilities and collaboration with industry are required to deliver the housing targets.

1 Ongoing portfolio optimisation is crucial to deliver infrastructure priorities in a challenging economic environment

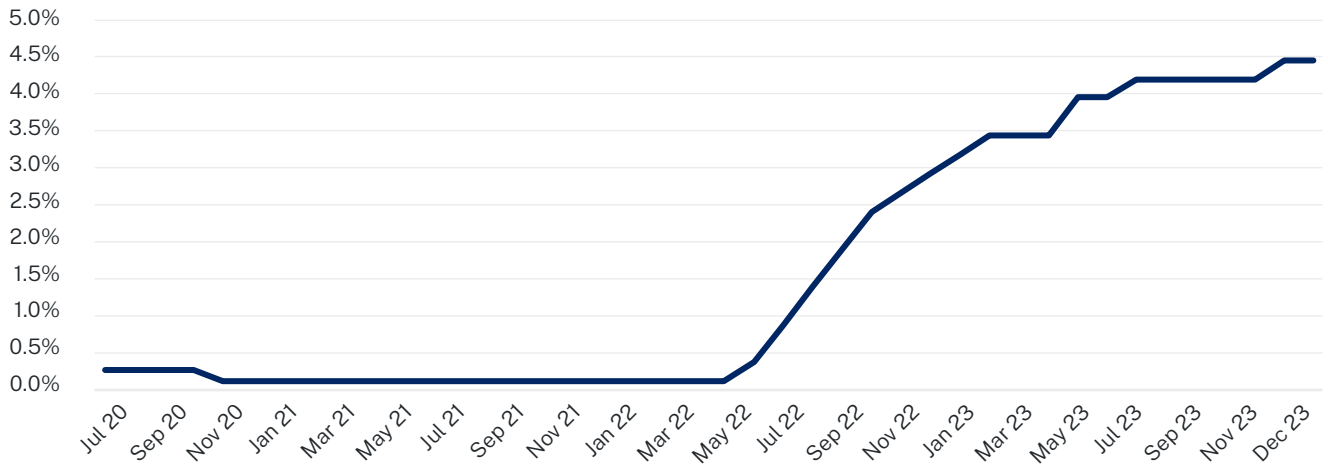
In FY23, the fiscal environment tightened due to inflationary pressures which resulted in higher interest rates increasing the cost of debt. In response, both the State and Federal Governments initiated independent reviews of their infrastructure programs to improve balance sheets and re-align infrastructure investments with new strategic priorities. Maintaining this focus on priorities will be essential for the NSW Government to achieve its ambitious objectives.

Context

As COVID-19 restrictions eased, economic conditions changed; most notably inflation surged due to skills shortages and supply chain bottlenecks. In response, the Reserve Bank of Australia rapidly increased the cash interest rate from 1.35% to 4.5% (See Figure 4)[8].

This significantly increased debt servicing costs, to the detriment of the State's budget position. Consequently, preserving a robust credit rating and decreasing interest expenses, whilst ambitiously investing in the future of NSW, became crucial.

Figure 4 — Cash interest rate



8 Reserve Bank of Australia, Cash Rate Target retrieved from https://www.rba.gov.au/statistics/cash-rate/ on December 2023

Rebalancing the portfolio

To tackle this challenge while ensuring ongoing investment in critical infrastructure for generations to come, there was a need to thoroughly re-evaluate and reset the infrastructure program. As a result, 63% of the 2023-24 budget forecast the infrastructure program to FY27 to be funded by borrowings, as opposed to the 80% figure reported in the 2023 pre-election budget update.[9]

Additionally, the State Government commissioned a number of infrastructure related reviews, including the *Strategic Infrastructure Review*, the *Sydney Metro Review*, and reviews in relation to rail, energy and public transport. The Federal Government commissioned the *Independent Strategic Review of the Infrastructure Investment Program (Federal Infrastructure Review)* to inform new infrastructure investment priorities. The reviews focused on re-balancing the portfolios to achieve value for money, deliver equitable infrastructure outcomes, and align with new priorities.[10]

At the State level, priorities included accelerating the energy transition, addressing cost of living and housing affordability pressures, boosting local manufacturing, and providing access to equitable and high-performing educational and health services.

In September 2023, the 2023/24 NSW Budget clarified project priorities and funding allocations. Also, the Federal Government released its Infrastructure Review in November 2023. This point-in-time reset optimises resource allocation by targeting priority areas, but the current portfolio optimisation processes need to be ongoing to sustain this focus.

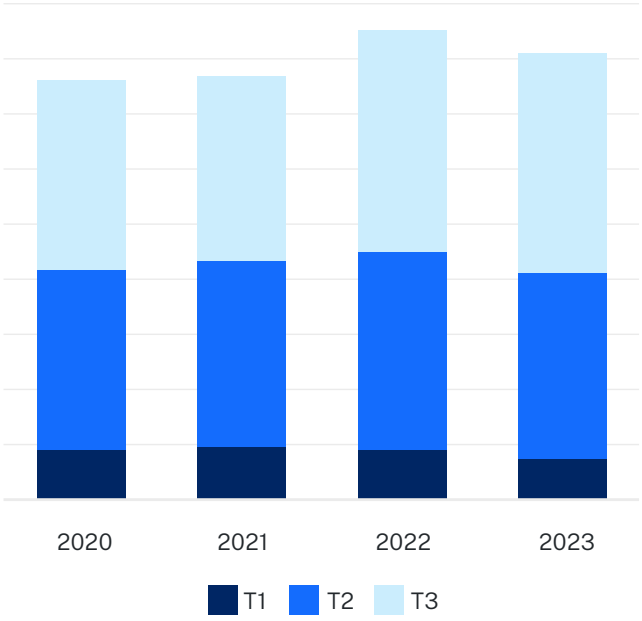
In the longer-term, the NSW Government also aims to restrict the value of the capital portfolio to around 2% of Gross State Product (GSP) by allocating approximately 1% of GSP to growth projects and 1% of GSP to maintain or replace aging infrastructure.[11]

Insights and evidence

The portfolio was refocused to make room for new priorities

In the medium-term, the average estimated infrastructure investment per annum over the next 4 years is $29.1 billion. This is 13.8% higher than the average 4-year investment of $25.6 billion across the period from 2019-23.[12]

Figure 5 — Portfolio count by year



Despite this significant increase, macro-economic challenges required the infrastructure portfolio to be rebalanced to create capacity for new strategic investments, notably in the Housing, Energy, Education and Health sectors. As this prioritisation process took place, the size of the State's infrastructure portfolio settled in the short-term (see Figure 5). This short-term situation may cause apprehension in parts of the construction sector, with limited new projects being started and contracted. This lack of confidence in future investments could negatively affect the industry and reduce the market competitiveness if it endures in the longer-term.

9 NSW Government, Budget Statement (Budget Paper No. 1), NSW Government, September 2023.

10 Independent Strategic Review of the Infrastructure Investment Program - Executive Summary retrieved from https://www.infrastructure.gov.au/department/media/publications/independent-strategic-review-infrastructure-investment-program-executive-summary in April 2024

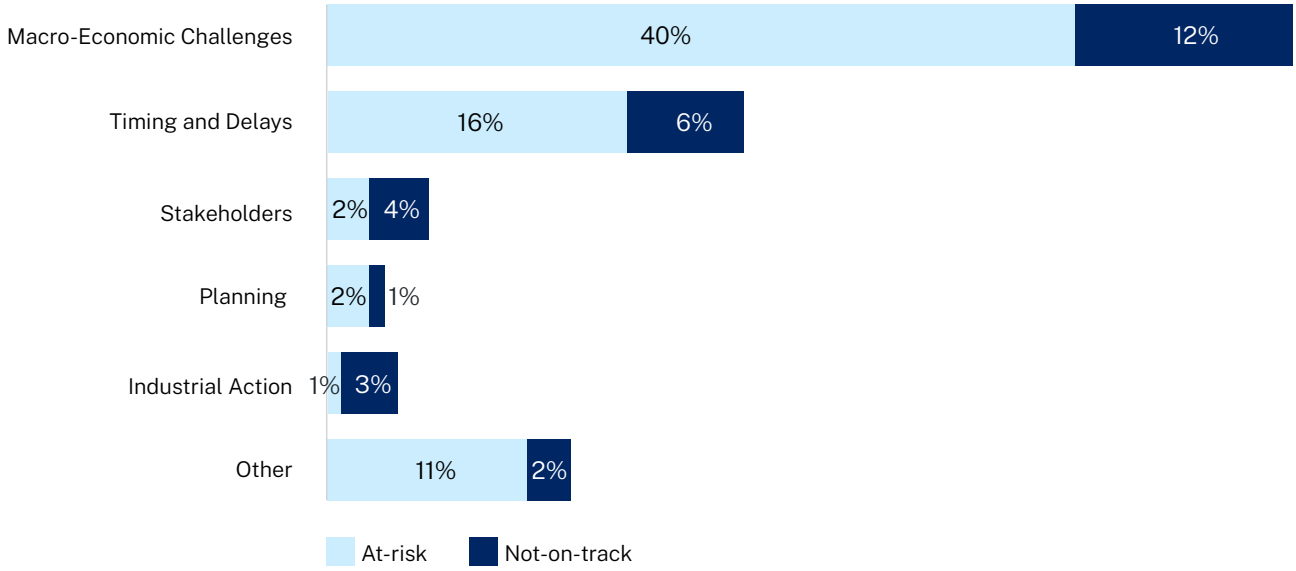
11 NSW Government Budget Statement (Budget Paper No. 1), p.3-8 table 3.2, NSW Government September 2023

12 NSW Government Budget Statement (Budget Paper No. 3), p.1-3, NSW Government September 2023

Funding challenges drive risk

In FY23, 30% of projects were either 'At-risk' or 'Not-on-track'.[13] Of these projects, 52% reported macro-economic challenges including cost escalation, the need for greater certainty around portfolio prioritisation and funding decisions as a significant risk factor. The budget was being finalised at the time this data was collected. (See Figure 6).

Figure 6 — % of projects 'Not-on-track' and 'At-risk' impacted by primary risk drivers.



Progress

Gate 0 - Go/No-go review enhancement to support investment in the right projects at the right time

Infrastructure NSW has implemented greater rigour around the Gate 0 review process, which assesses a project's merit and recommends progressing it, or not, to the development phase.

The Gate 0 process is now mandatory for all projects with an estimated total cost of more than $100 million. This requirement ensures resources are prioritised to develop projects that are feasible, affordable, represent value for money, and best support government priorities.

The change recognises portfolio optimisation against priorities and constraints requires greater focus at the centre of government and needs to be embedded in business-as-usual practice. Currently, the Gate 0 process evaluates projects on an individual basis, without considering financial limitations, prioritising between projects or sequencing projects to ease investment profiles. There is an opportunity to improve this to provide better support for government decision-making.

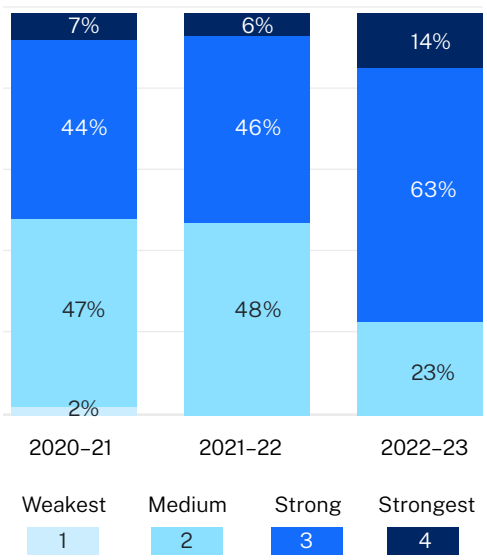
13 'On-track': No major unmitigated risks in the project/program. 'Not-on-track': Action required to mitigate major risks in the project/program.

Asset management capability uplift improving holistic infrastructure planning

A whole-of-government, strategic approach to asset management is an effective way to provide line-of-sight between strategic objectives and infrastructure investments plans.

The Asset Management Policy was released in 2019 and consequently delivery agencies show progress uplift in their asset management capability. Over the last year the number of agencies with strong asset management capability increased by 35% and the number of agencies achieving the 'strongest' capability rating more than doubled. (See Figure 7).

Figure 7 — % of agencies by asset management performance rating 2021-23.



Despite this uplift, there is often an inconsistent formal link between long-term asset planning and budget submissions or coordination of asset management objectives between agencies. Infrastructure NSW is leading the implementation of the approved Asset Management Strategy to support more coordinated and effective infrastructure planning and investment decisions which align with government priorities.

Opportunities

Opportunity 1

Strengthen the NSW Government's infrastructure portfolio management and optimisation processes to support evidence-based decisions selecting projects to develop, invest in and construct.

Infrastructure NSW to develop a formal process to recommend options to government for a sequenced and optimised infrastructure investment portfolio that considers the State's priorities and internal and external constraints (including funding, construction industry capacity and other resources) to inform the budget process. This includes reinforcing the assurance processes such as the Gate 0 reviews and the subsequent gateway reviews to provide the necessary evidence base to support this process.

2 Standardisation across the infrastructure life-cycle reduces risk and boosts productivity

To successfully deliver projects in a financially constrained environment and a market affected by persistent capacity limitations, in some sectors it is essential to focus on increasing productivity and proactively addressing the risk of cost overruns.

Evidence shows standardisation of processes, business cases, contracts, designs and construction methodologies, along with the adoption of program approaches, enhance productivity and reduce delivery risk. Having strong and consistent commercial capabilities and risk management practices play a crucial role in effectively mitigating cost overrun risk, especially for smaller projects where processes may not be as mature.

Context

In a market challenged by persistent labour shortages and rising costs, the need to do more with less is more important than ever. However, productivity growth in the construction industry in both Australia and globally has trailed other sectors for over 30 years.[14] The opportunity cost of weak productivity growth is significant. In August 2023, an Australian Constructors Association report found up to $17 billion of annual savings could be achieved in NSW by resolving the gap in productivity growth between construction and other key industries.[15]

Unlike the manufacturing sector, where repetitive processes can be automated and optimised with relative ease, the construction industry faces industry-specific challenges. Infrastructure projects vary in complexity, size, regulatory requirements, and ground conditions, making them site-and project-specific. As a result, projects frequently involve bespoke processes, designs and unique contracts. Despite these challenges, certain aspects of the project life-cycle offer opportunity for standardisation and simplification.

When standardisation is feasible, notably in procurement and management processes, and in design and construction methods, a program approach can bring significant productivity gains and help de-risk the delivery phase.

14 BIS Oxford Economics, The Opportunity Cost of Long Term Poor Productivity Performance in the Australian Construction Industry(June 2023) retrieved from https://www.constructors.com.au/wp-content/uploads/2023/08/BIS-Oxford-Economics-Australia-ACA-Construction-Industry-Productivity-Report-13.6.23.pdf in September 2023

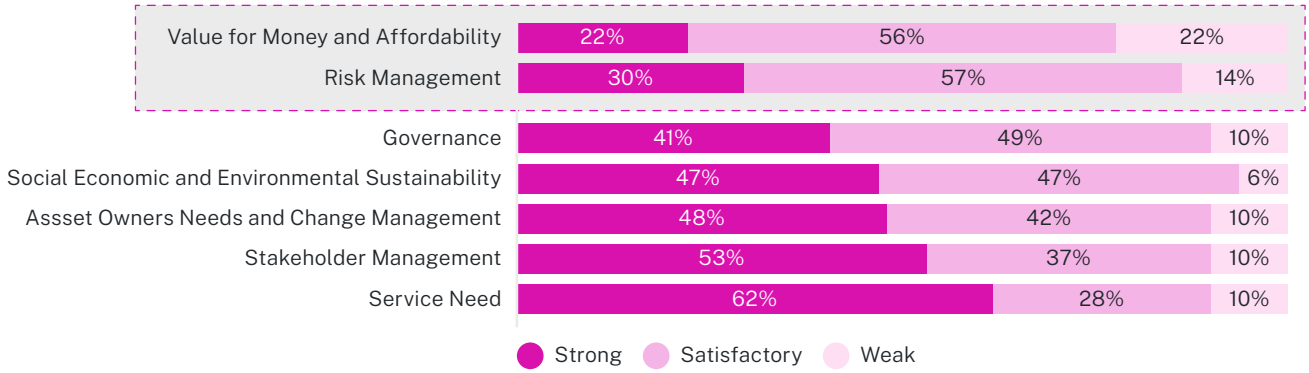
15 Australian Constructors Association, Nailing Construction Productivity, A Blueprint for Reform (August 2023) retrieved from https://www.constructors.com.au/wp-content/uploads/2023/08/Nailing-construction-productivity-FA_web.pdf in September 2023

Insights and evidence

Risk management practices continue to challenge performance

In FY23, the weakest performing assurance review Key Focus Areas (KFA) were Value for Money and Affordability, and Risk Management (see Figure 8), with only 22% and 30%, respectively, of reviews rating the performance of projects against these KFAs as 'Strong'[16]. The poor performance in the Value for Money and Affordability KFA is in part explained by the macro-economic and cost escalation challenges outlined in trend 1.

Figure 8 — Assurance reviews Key Focus Area performance



In addition, across the overall portfolio, the highest number of critical recommendations related to Risk Management, which highlights a need to improve management of risks including their assessment, tracking and mitigation.

16 Seven Key Focus Areas are rated to appraise how the topic has been addressed or considered by the project team and what risk it poses to the development or delivery confidence. Ratings definitions are: Strong (no major outstanding issues that at this stage appear to threaten delivery), Satisfactory (there are issues that can be addressed and are manageable, however require timely management attention) and Weak (there are significant issues that may jeopardise the successful delivery of the project.

In a significant shift from the past 3 years, the 'Commercial Capability' theme emerged as the second most significant area for critical recommendations[17] made during reviews, see Table 1. Recommendations focused on enhancing expertise in cost estimation, contingency management, commercial strategies, and contractual negotiations.

Table 1 — Ranking of critical recommendations made during reviews by theme

	FY21	FY22	FY23
1	Quality of Business case	Quality of Business case	**Risk Management**
2	**Risk Management**	**Risk Management**	**Commercial Capability**
3	Governance	Governance	Procurement
4	Program/Project management	Program/Project management	Governance
5	Project Resourcing	Procurement	Quality of Business case
6	Procurement	Options Analysis	Program/Project management

Issues identified as complicating retention of strong commercial expertise included the public sector wage cap, recruitment freezes and unprecedented demand for expertise in regions and in the renewable and rail sectors. Assurance reporting noted how a skilled permanent workforce is key to retaining institutional knowledge and fostering a culture of effective delivery which iteratively maximises productivity, see Table 1.

With regards to Risk Management, the data suggest a growing Risk Management capability gap in tier 2 projects.

Tier 2 project performance against this KFA was significantly lower than across the rest of the portfolio with only 18% of reviews on tier 2 projects scoring 'Strong' (see Figure 9). In addition, compared to last year, the percentage of 'On-track' tier 2 projects fell from 78% to 65% (See Figure 10). To address this growing risk, there is a need for greater assurance focus on the tier 2 portfolio projects and their risk management practices.

Figure 9 — Risk Management KFA performance

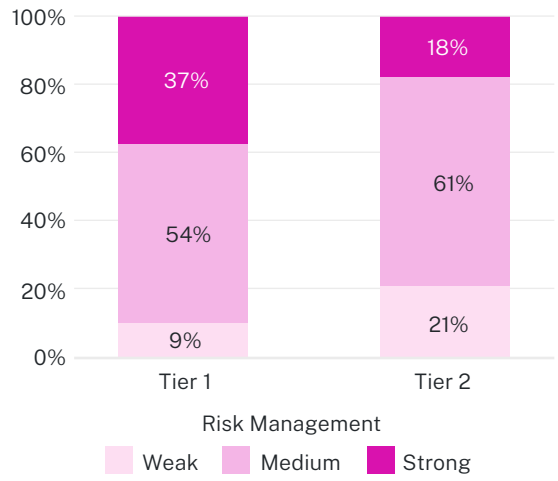
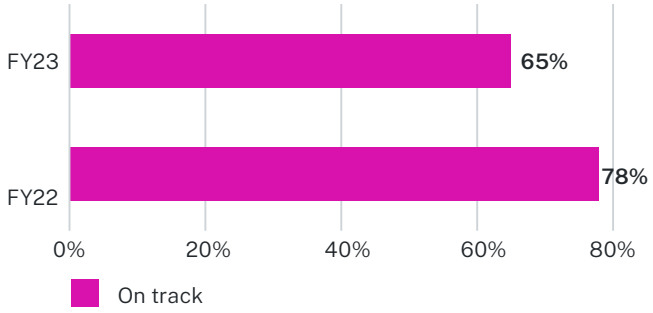


Figure 10 — Percentage of tier 2 projects reporting 'On-track'



17 Critical recommendations are critical and urgent. The agency should take action immediately as these recommendations are developed to fix the key problems fast, not stop the project.

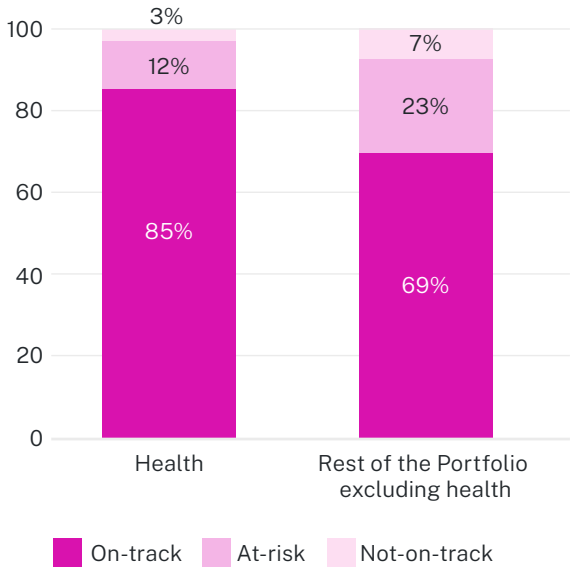
A portfolio and program approach to project delivery reduces risk and delivers productivity gains.

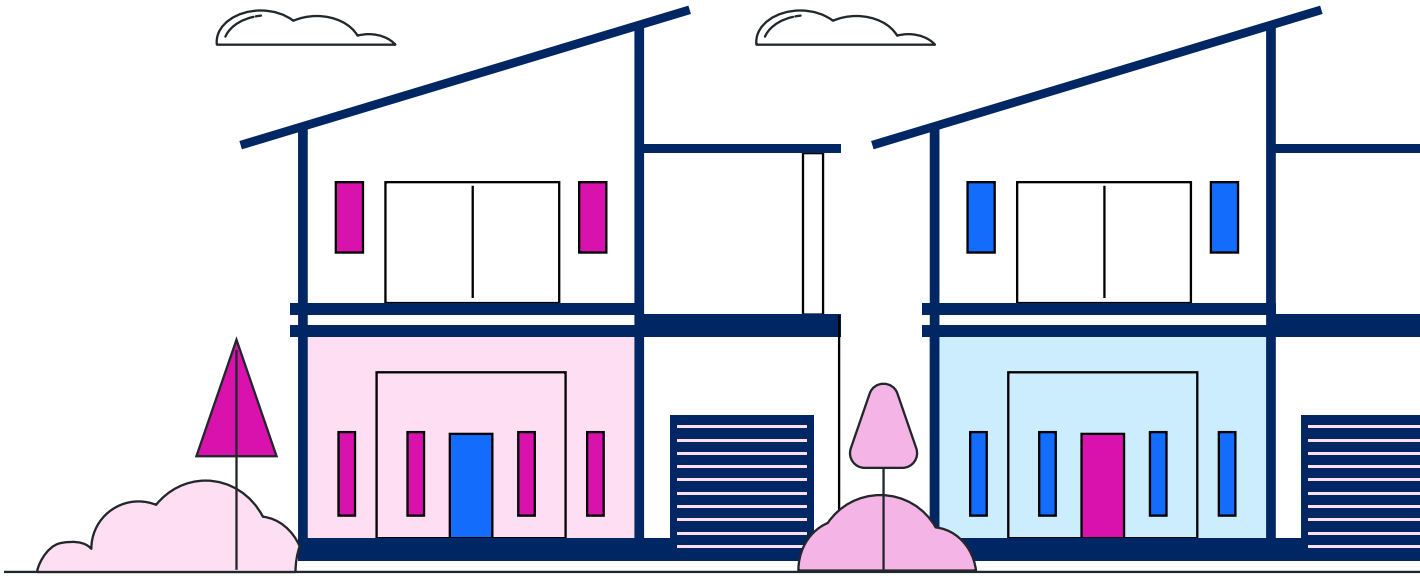
Repeatability and the use of standard processes and designs can be a challenge for construction projects; however, it is a proven mechanism to improve productivity and mitigate risks. The strong performance of projects in the NSW Health Infrastructure portfolio and the Zero Emissions Buses Project are 2 examples where a portfolio and program approach to delivery demonstrated positive outcomes (see case study on page 29).

Health projects are delivered centrally. They share delivery, risk and commercial management strategies, processes and designs to leverage efficiencies of scale and allow for sharing of lessons learned.

Although the Health portfolio is exposed to sector-specific and general construction risks, periodic reporting shows health projects regularly outperformed the performance of the wider portfolio. Over the financial year, 85% of Health projects were 'On-track', compared to 69% across the rest of the portfolio, see Figure 11.

Figure 11 — Project performance status by project count

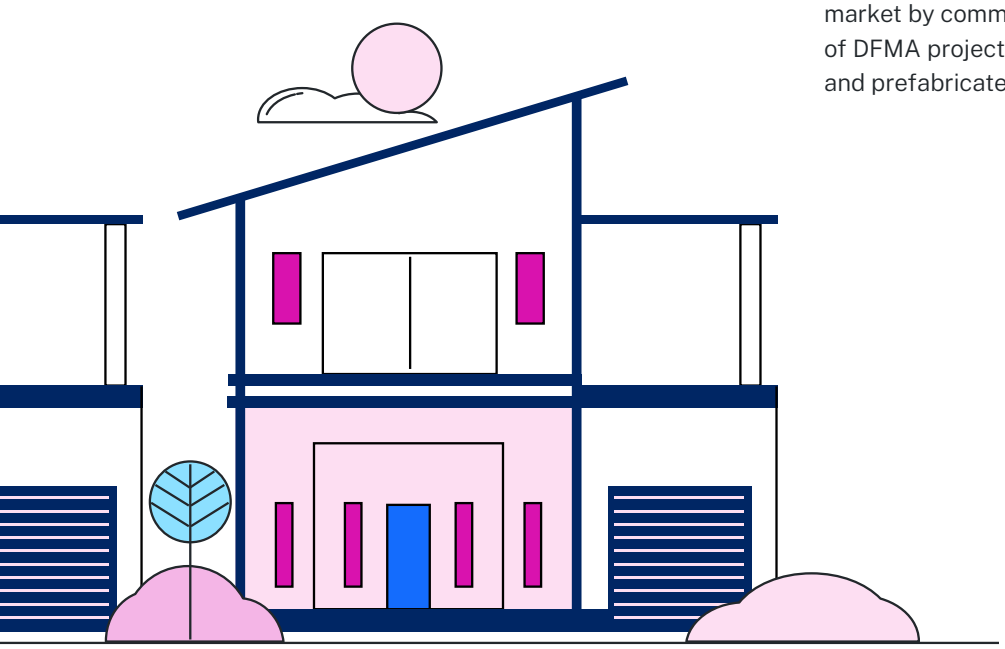




Progress

Increasing consistency across project delivery

The Procurement for Large, Complex Infrastructure Projects memorandum[18] provides specific advice on standardised procurement approaches, including the importance of maintaining consistency and simplicity of contracts across relevant projects, and the benefits associated with adopting a program approach to delivery. The intent of the document is to highlight aspects of delivery where best practice can be consistently achieved and to set expectations with stakeholders, including contractors and the community.



Adoption of modern methods of construction to deliver schools

The NSW Department of Education continues to expand and enhance its Manufacturing for Schools program, which adopts Design For Manufacture and Assembly (DFMA) construction processes. DFMA is proving an effective way to manage risk and improve value for money by:

- Saving up to 30% of construction time on site.
- Reducing material and water waste on sites.
- Improving safety by manufacturing parts in purpose-built spaces.
- Significantly reducing the impact of adverse weather and site conditions on build time.

As of early 2024, 15 schools have been delivered using DFMA methods, including the Oran Park Public School's Stage 2 upgrade that opened for students on Day 1, Term 1, 2024. It was installed on site in 8 weeks and the project, from design to completion, took a total of 13 months. The program is being targeted for use in high growth areas such as Western Sydney, rebuilding schools on the North Coast devastated by floods, and to deliver the majority of 100 public preschools across NSW. This work highlighted the importance of government fostering trust in the market by communicating and assuring a steady pipeline of DFMA projects to boost private investment in modular and prefabricated manufacturing facilities.

18 NSW Government, Premiers Memorandum M2021-10 Procurement for Large, Complex Infrastructure Projects March 2023 retrieved from (M2021-10 Procurement for Large, Complex Infrastructure Projects (nsw.gov.au), on 20 September 2023

Opportunities

Opportunity 2

Bolster monitoring of the tier 2 project portfolio to proactively determine the necessity of further targeted reviews where substantial risk is identified.

Tier 2 projects have become increasingly large and complex in nature. Infrastructure NSW will undertake additional and targeted reviews of tier 2 projects to assist mitigate a heightened risk that is increasingly affecting the growing portfolio of tier 2 projects.

Opportunity 3

Develop a roadmap to support agencies and industry adopting DFMA methodologies whilst boosting local manufacturing.

Modern methods of construction, including DFMA, have demonstrated their value in terms of cost efficiency and time savings. As well as improving productivity, DFMA has potential to support the Government's commitment to invest in and develop local manufacturing capability in NSW. To foster trust in the industry and encourage investment. Infrastructure NSW will develop a roadmap to establish clear milestones and pinpoint capability gaps in both the public and private sectors to promote the adoption modern methods of construction.

Opportunity 4

Enhance commercial capability across NSW Government infrastructure delivery agencies with targeted training and professional development programs.

Infrastructure NSW will explore opportunities to strengthen the commercial capability of project teams through additional training and other professional development initiatives.

3 Effective partnership between the public and private sector is fundamental to deliver critical energy and water infrastructure

The value of water infrastructure projects increased from 4% to 13% of the overall portfolio and very significant renewable energy projects were initiated in the year. These projects will require extensive collaboration with the private sector, specific technical expertise and a focus on rapidly achieving community support. There is a unique opportunity to strengthen relationships and build trust with the private sector, and share lessons learned to expedite the State's water and energy priorities.

Context

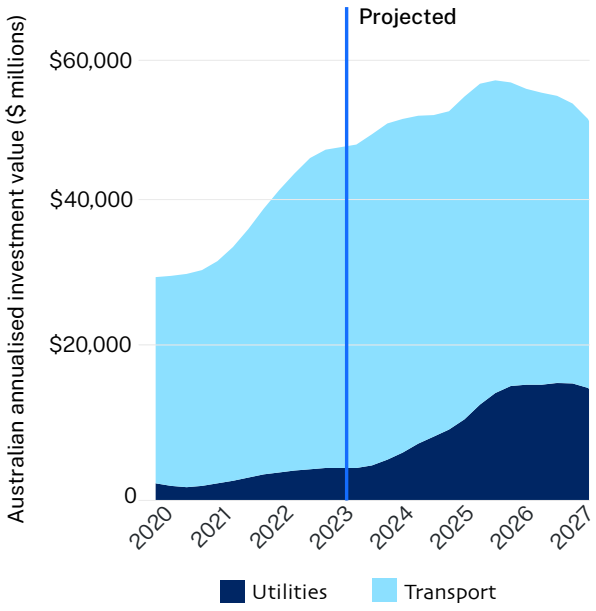
The NSW Government is committed to providing clean energy and a secure water supply to the community.

Energy transition

Government-enacted legislation sets a state target to reduce emissions by 70% (compared with 2005 levels) by 2035 and to reach net zero emissions by 2050. The transition to renewable energy and investments in the transmission network will be pivotal to drive private investment and achieve these goals.

The energy transition will require expediting projects aligned with the Energy Roadmap, extensive industry investment and considerable workforce realignment, especially in regional New South Wales. The private sector has also responded by announcing a wave of utility projects. Investment in utility projects are projected to increase four-fold in the next four years and will complete for scarce resources. (See Figure 12). Skilled migration can help address short-term skills shortages[19] but knowledge transfer to reinforce the local workforce remains critical.[20]

Figure 12 — Combined Infrastructure (public and private sector) - annualised investments by sector[21]



19 Committee for Economic Development of Australia, Powering the transition: The net-zero workforce challenge, July 2023 retrieved from https://www.ceda.com.au/ResearchAndPolicies/Research/Energy/Powering-the-transition-The-net-zero-workforce-cha on 7 September 2023.

20 International Energy Agency, World Energy Employment, August 2022 retrieved from https://iea.blob.core.windows.net/assets/a0432c97-14af-4fc7-b3bf-c409fb7e4ab8/WorldEnergyEmployment.pdf on 7 September 2023.

21 Infrastructure Australia, Infrastructure Market Capacity 2023 Report, December 2023 retrieved from www.infrastructureaustralia.gov.au/sites/default/files/2023-12/IA23_Market%20Capacity%20Report.pdf"IA23_Market Capacity Report.pdf (infrastructureaustralia.gov.au) in May 2024.

Water security

The water sector faces several difficulties managing the fast-growing demand for potable water. Demand is driven by population growth, industrial requirements, and the need to support urban greening and cooling objectives. These challenges are exacerbated by variable rainwater supply due to climate change and more frequent droughts. As the NSW Government seeks to achieve its housing targets, the need for investment in local utility infrastructure upgrades is also increasing. Relying solely on rainfall to meet water demand may no longer be sufficient. Projected increases in extreme weather conditions over the coming decades, including droughts, will inhibit the state's ability to meet demand unless investments are made. The water sector also faces a growing skills shortage, particularly in the areas of dam engineering, desalination, and hydroelectric plant delivery and operations.

Insights and evidence

The share of energy and water projects is increasing

FY23 marked the onset of a phase where water and energy projects will constitute a growing portion of the infrastructure investment portfolio, although transport projects continue to comprise more than half the infrastructure portfolio in value (57%, down 10% on the prior year, see Figure 13). The shift is driven, in part, by the value of water projects growing as a percentage of the portfolio, from 4% in FY22 to 13% in FY23. This increase occurred despite the cancellation of 4 significant projects, which were, in part, offset by the initiation of the Sydney Desalination Plant Expansion Project. (See Figure 14)

The implementation of the Energy Roadmap and its related infrastructure projects also commenced in FY23. The value of energy projects in the overall portfolio at the end of FY23 was a modest 1%; however, they account for 9% of the value of new projects initiated during the year, see Figure 14. The Transmission Acceleration Program, and projects within it are rapidly developing as a major sector of infrastructure investment. The next iteration of this report will reflect this shift.

Figure 13 — Portfolio composition (in $ value) in FY23 by asset type

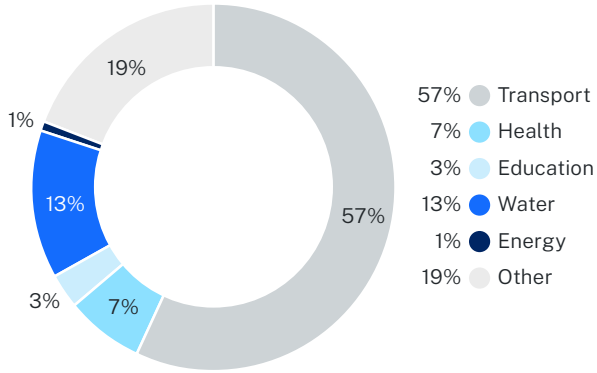
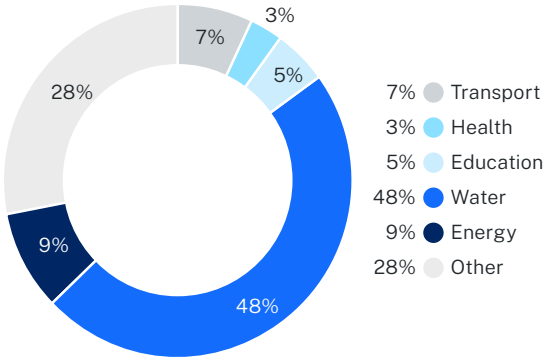


Figure 14 — New projects (in $ value) added in FY23 by asset type



Establishing trust and ensuring certainty of outcomes are essential factors in encouraging industry participation

Establishing trust and guaranteeing certainty of outcomes are essential to attract the investment needed for the energy transition. The private sector's investment depends on reliable returns, which must be considered while balancing the need to protect NSW consumers from rising energy costs and ensuring a secure energy legacy. In this context, certainty becomes a fundamental prerequisite for achieving energy transition goals and expediting the implementation of new renewable energy generation, storage, and network infrastructures. Assurance reviews on utility projects reflect this with critical recommendations made including the need to:

- Prioritise engagement with regulatory and planning authorities to provide industry with transparency around requirements and timing to delivery.
- Establish a formal structured engagement process to build strong commercial relationships and ensure technical, commercial and operational role clarity is achieved with industry partners.
- Undertake rigorous analysis of service need and consumer demand in business case development to safeguard the commercial viability of project scope.
- Ensure operator involvement in the design phases of projects.

There are opportunities to share learnings gained in delivering previous complex, large scale and in programs of works

Utility projects are challenging and carry significant risks, especially when being delivered in a tight timeframe. They are subject to complex regulatory and legislative regimes, require a specialised workforce, and often need to establish social licence very early in the development phase, given their potential social and environmental impacts. A common theme across reviews for these projects was the importance and value of capturing, sharing and applying lessons learned to improve delivery of future projects.

In FY23 and early FY24, 4 large water projects were cancelled. These cancellations were primarily due to the projects having a poor benefit to cost ratios, a lack of social licence, and potential significant negative impacts on local environments. While the cancellation of projects creates opportunity for investment in alternative projects, building on the findings of reviews, lessons can be learned. Especially regarding the importance of having a clear benefits realisation plan and meaningful engagement with the community to build social licence as early as possible. There are also lessons to be learned from overseas markets where the transition to renewable energy is more advanced.

The need to accelerate the development of specialized capabilities is a significant risk to the success of energy and water projects

In addition to the commercial capability constraints highlighted in Trend 2, the utility sector is further affected by its need for a highly specialised workforce. The global nature of the energy transition means qualified resources are in demand worldwide. The regional location of many of the energy, and some water, projects add another layer of complexity to the staffing challenge. The shortage of qualified resources and project directors in this sector is likely to seriously impact projects.

87.5% of reviews completed on Energy and Water projects (post the planning phase) made critical recommendations to address resource planning and capability risks.

Progress

Electricity Supply and Reliability Check Up provides recommendations to achieve the energy transition

In 2023, the NSW Government initiated the Electricity Supply and Reliability Check Up[22] (the Check Up). The Check Up outlined additional measures to ensure the NSW Electricity Infrastructure Roadmap's (Roadmap)[23] success in providing a dependable supply of clean and cost-effective energy, in line with the net zero 2050 commitment. This review addressed crucial issues such as delivery challenges, supply chain constraints, skill shortages and network business interfaces resulting in 54 recommendations.

The NSW Government made the delivery of the Roadmap a strategic priority, establishing an intergovernmental steering committee to oversee its implementation. A detailed plan of tactical actions was developed to ensure the success of the transition with the aim to provide visibility and certainty across the sector. It considers generation, transmission, and storage challenges. Additionally, the plan addresses related issues impacting communities, including transportation, housing, skill development, and workforce development.

The Construction Industry Leadership Forum on Energy Transition

In August 2023, Infrastructure NSW's Construction Industry Leadership Forum brought together key stakeholders from across Australia to share insights, challenges and opportunities for Australia's energy transition. Attended by over 70 stakeholders including private and public representatives from across the country, the forum discussed the breadth of the energy infrastructure opportunity in the context of emissions reduction targets set by the Commonwealth. Key opportunities and challenges identified included the provision of a clear and transparent pipeline of projects, securing stable finances, planning approvals delays impacting investment decisions, need for more mature procurement practices and harmonisation of processes across jurisdictions. The panel recommended government to deal with energy transition as a national problem and a more consistent approach to energy transition by adopted across jurisdictions.

Opportunities

Opportunity 5

Assess and provide transparency on timeframes for the implementation of the NSW Roadmap to build trust with private partners.

Noting the scale of the endeavour, the success of the NSW Electricity Infrastructure Roadmap relies on the Department of Climate Change, Energy, the Environment and Water's strong coordination and detailed planning of implementation actions. This coordination and planning is to avoid delays that could slow down the development of renewable energy projects and erode trust with private partners.

Opportunity 6

Facilitate a lessons learned initiative with local and international renewable energy and water projects delivery leaders.

Infrastructure NSW to build on work done to date to drive the capturing and sharing of lessons learned.

22 NSW Electricity Supply and Reliability Check Up retrieved from www.energy.nsw.gov.au/nsw-plans-and-progress/regulation-and-policy/electricity-supply-and-reliability-check on 10 May 2024.

23 NSW Electricity Infrastructure Roadmap retrieved from www.energy.nsw.gov.au/sites/default/files/2022-08/NSW%20Electricity%20Infrastructure%20Roadmap%20-%20Detailed%20Report.pdf on 10 May 2024.

4 Clear accountabilities and collaboration with industry are required to deliver the housing targets

To meet the increasing demand for housing, the NSW Government has set a goal of delivering 375,000 new homes by 2029. Achieving this target entails coordinated planning and the development of comprehensive strategies to ensure the timely provision of essential supporting infrastructure, including water, wastewater, and transport connectivity. This essential service infrastructure must be planned in tandem with other infrastructure investments crucial to placemaking, including hospitals, schools, and public spaces, which are fundamental to meeting the needs of new and emerging communities. Importantly, accelerating the delivery of housing cost-effectively relies on the construction sector being competitive in the housing segment.

Assurance reviews highlight the need for focused accountability for delivering housing outcomes related to place-making, with powers to prioritise infrastructure funding across government.

Context

Australia is grappling with a severe housing crisis, making it difficult for many people to find secure, affordable, and appropriate homes. The crisis is particularly acute in and around urban centres, which are priced at a premium due to their proximity to employment opportunities, transport hubs, health, education, and recreational amenities.

In response, the NSW Government set an ambitious housing target which will heighten demand for construction services.[24]

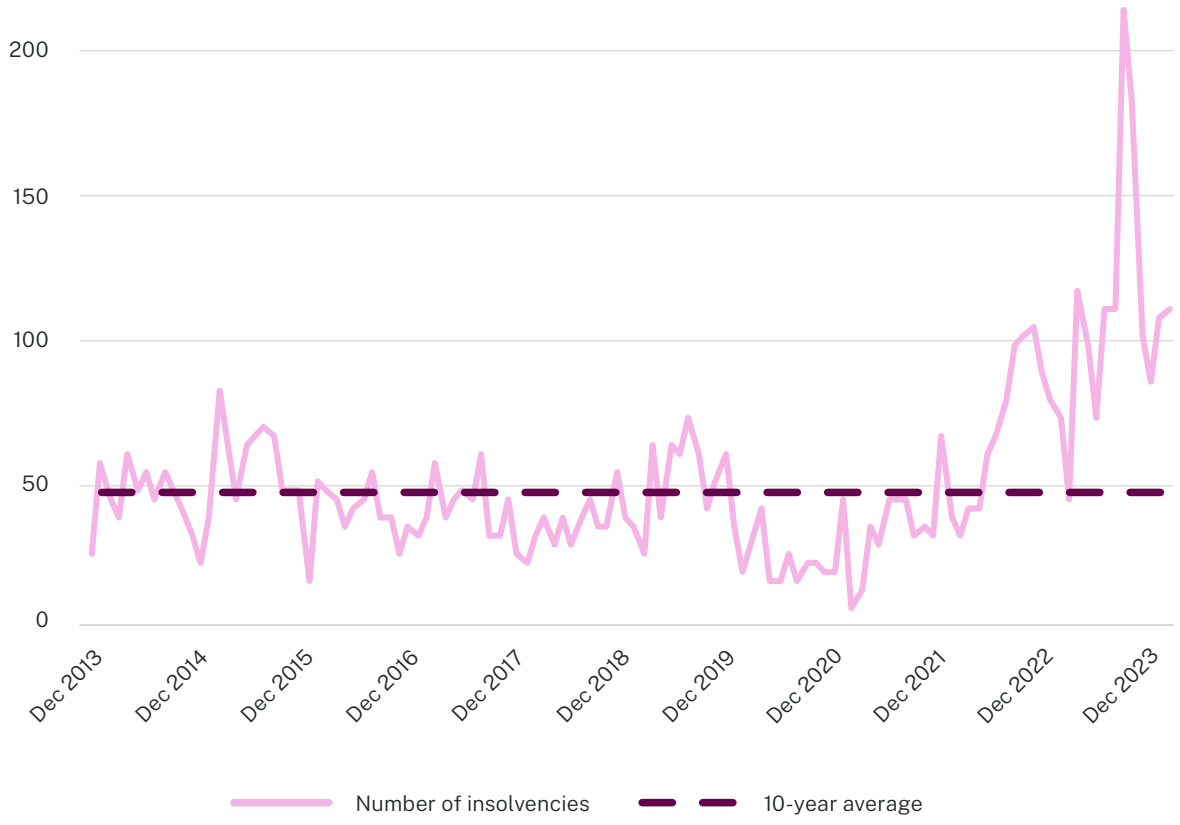
The macroeconomic factors described in Trend 1 already created a challenging period for the Australian construction industry in specific sectors.

Among other key dependencies, achieving ambitious housing targets also relies on the building industry's active participation and fair risk allocation models between contractors and government that foster a competitive market. The industry faces several challenges that may limit its participation in housing. These include difficulties to secure insurances and increasing labour costs driven by a skills shortage and enterprise agreement re-negotiations.

24 National Housing Accord retrieved from https://treasury.gov.au/housing-policy/accord#:~:text=On%2016%20August%202023%2C%20National,states%20and%20territories%20last%20year in May 2024.

The sector operates on low margins and recent setbacks, including from unplanned material cost increases on previous fixed-term contracts have left some companies with low cash reserves. As their vulnerability to bankruptcy increases, companies are less inclined to take on risk and more likely to aim for higher margin segments of the building sector. NSW insolvencies in the construction sector peaked across the 2023 calendar year, construction services accounted for the majority of insolvencies (62%) (Figure 15).[25]

Figure 15 — ASIC Business Insolvencies (NSW Construction, monthly)



Dealing with these issues is complicated by the diverse objectives and tools of the funding and regulatory frameworks for housing spread across three levels of government. While each also considers the needs of private sector and community stakeholders, better co-ordination is essential.

25 Australian Securities and Investments Commission, Insolvency statistics, Current from https://asic.gov.au/regulatory-resources/find-a-document/statistics/insolvency-statistics/insolvency-statistics-current/ in May 2023

Insights and evidence

A single point of accountability is critical for successful delivery of place outcomes

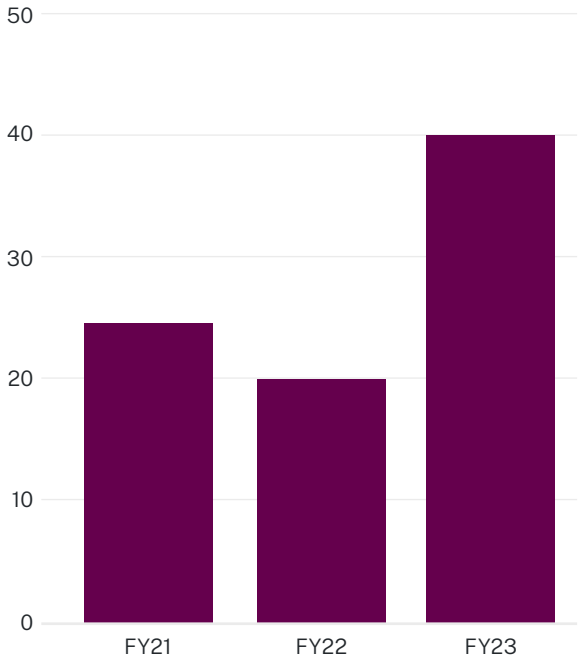
One government response to creating development-ready land for new housing is to leverage a precinct approach. Infrastructure NSW's assurance reviews of large precincts in FY23 found success hinges on establishing a clear governance structure and delivery model early. The top 4 recommendations made in precincts reviews are:

1. **Clarity of accountabilities across the lifecycle** – the governance structure must provide a single point of accountability to clearly define and deliver the precinct outcomes. Although some accountabilities may be transferred through the precinct lifecycle, these should be planned and communicated. Governance committees should consider having non-governmental members and must provide clarity of responsibilities.
2. **Top-down alignment between State strategies and component projects** – the governance structure must clearly articulate the hierarchies and responsibilities for decision-making between the various forums of the precinct governance model. To optimise returns and benefits and prevent opportunistic and fragmented approaches, investments must be meticulously planned and coordinated with a whole-of-state strategic vision.
3. **Decision powers to influence outcomes** – the governance structure must balance the power of key stakeholder groups to influence funding decisions, mitigate risks and prioritise capital projects. The top governance entity must take a sponsor role with power to deliver outcomes, mitigate risks, and reassign funds.
4. **Early engagement with private sector** – perceived long planning and development timeframes associated with Government projects may reduce industry engagement. Review recommendations emphasised the need for early consultation with industry proponents from the business case development stage to increase buy-in and certainty allowing input into design, construction and delivery and to protect the long-term commercial viability of investments.

Integrating projects is essential to realising a place vision

During FY 2023, recommendations to better integrate projects within places and precincts increased by 100%. (See Figure 16.) This emphasises the importance of having comprehensive strategic plans and coordinating interconnected work programs to maximise benefits, minimise community disruption and reduce costs for projects contributing to precinct outcomes. Assurance reviews also emphasised the critical value of collaboration and stakeholder involvement, particularly with private stakeholders and between local and state governments.

Figure 16 — Count of recommendations for the Integration with Precinct theme



Progress

Strategic planning is driving density uplift

One of the most challenging elements of housing delivery is the timely provision of access to transport networks, education, health, and recreational amenities. To respond to this need while meeting high demand for housing in urban areas, the NSW Government is focusing on infill development close to existing infrastructure. An example of such strategies is the new Transport Oriented Development State Environmental Planning Policy (TOD), which will take effect from April 2024. TODs mandate affordable housing and will generate density uplift around transport hubs.

A strong evidence base will support decisions and provide certainty

Precinct reviews highlighted the need for robust and well documented evidence at critical decision points. The place based Urban Development Programs[26] has been expanded and provides improved data and information sharing across Government and private sector stakeholders related to development, land supply and infrastructure. This information can now support evidence-based decisions for housing supply proposals and allow prioritised development in areas with capacity to provide density uplift, and where needs are greatest.

The Housing Network will steer alignment of infrastructure resources and investment

The Housing Infrastructure Working Group has been established as a sub-group to the Housing Network. The working group coordinates whole-of-government investment decisions and budget planning for housing and housing-enabling infrastructure.

Through the network, Infrastructure NSW is working on the allocation of $520 million to community infrastructure across seven TODs precincts. The assessment framework will consider strategic alignment, evidence of need, deliverability, and the potential for projects to enhance liveability and amenities. This approach will ensure investment decisions support the government's objectives by delivering the supporting infrastructure in stages. Infrastructure NSW has also been instructed to review water, wastewater, and transport infrastructure capacity to meet NSW's Housing Accord commitments.

Opportunities

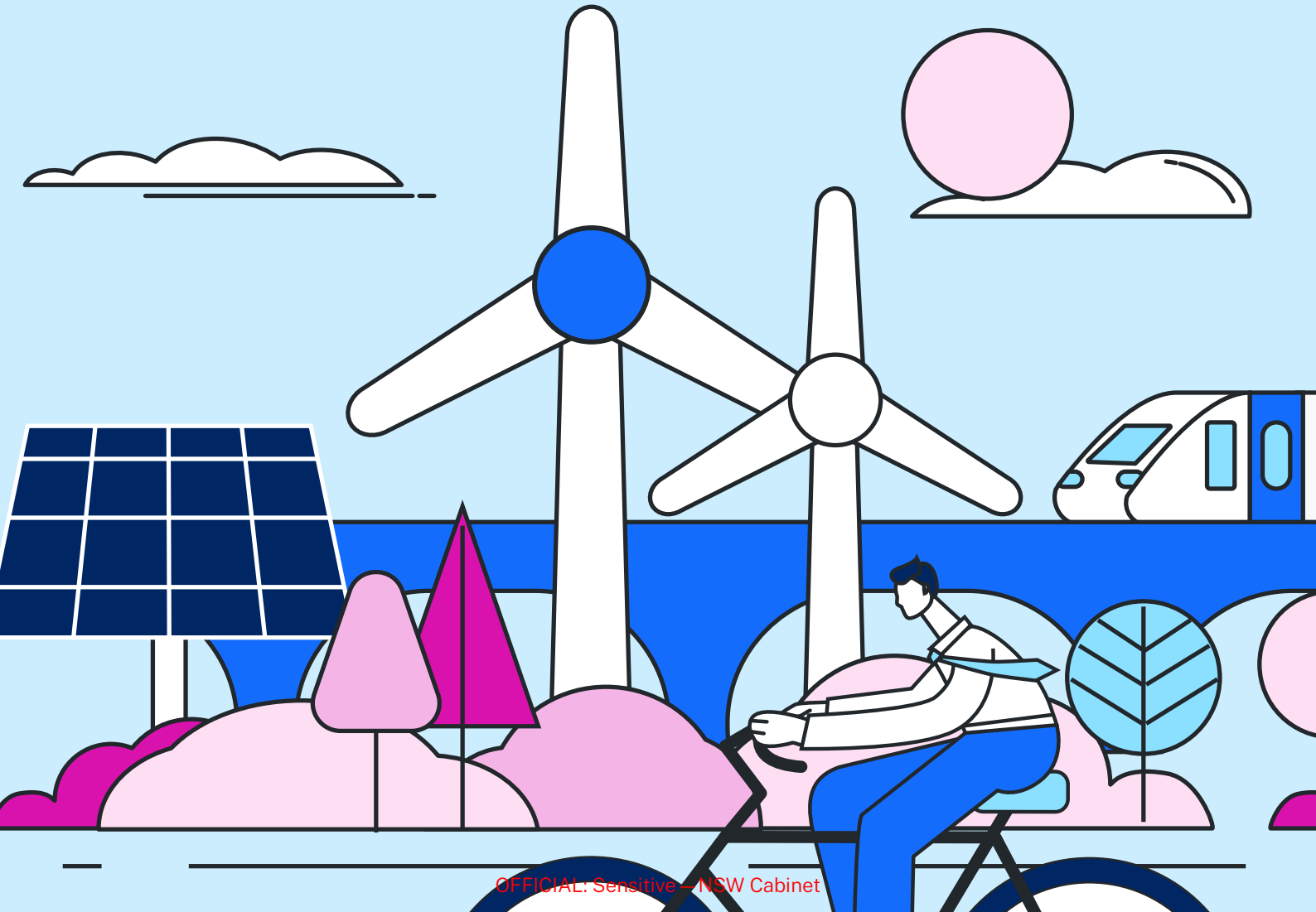
Opportunity 7

Assess the construction industry's ability and appetite to meet housing priorities in light of competing demands and the housing sector risk profile for industry partners. As part of the review, assess the opportunity for accelerating development pathways and use of modern methods of construction (incl. the local manufacturing opportunity) to assist expediting the delivery of housing.

Infrastructure NSW will undertake a targeted industry engagement to drive opportunities to increase participation and competition in the building construction market. The review will consider risk models and innovations including greater use of modern methods of construction such as prefabrication to accelerate delivery.

26 The Urban Development Program (UDP) monitors and coordinates the delivery of development, land supply, and infrastructure. Urban Development Programs retrieved from https://www.planning.nsw.gov.au/policy-and-legislation/housing/housing-supply-insights/quarterly-insights-monitor-q2/urban-development-programs in May 2024.

Case studies



TREND 2

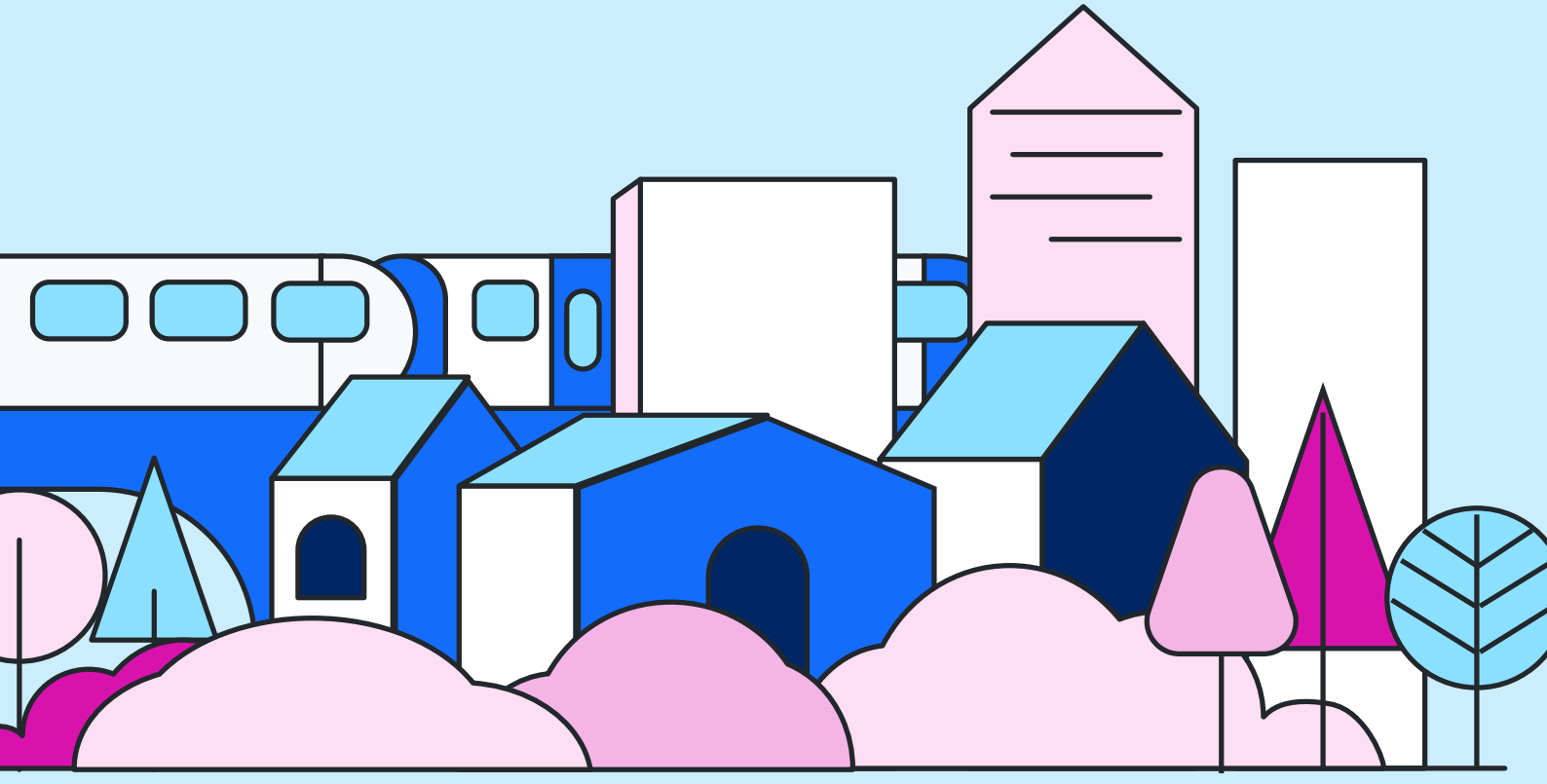
Zero Emission Buses

TREND 2 & 3

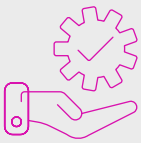
Sydney Water

TREND 4

Barangaroo



CASE STUDY



TREND 2

Zero Emission Buses (ZEB)

Zero Emission Buses (ZEB) is a major NSW Government program to transition more than 8,000 diesel and natural gas public transport buses to zero emissions technology. These will be powered by renewable energy sources. Transport for NSW is a large contributor to carbon emissions in NSW, with buses making up the majority of the state's public transport carbon footprint. The ZEB program supports the Government's commitment to reach net zero carbon emissions by 2050. Other program objectives include:

- Increase liveability through reduction in bus noise.
- Increase efficiencies in bus operations and maintenance.
- Improve fuel security, by removing reliance on imported fossil fuels.
- Increase the attractiveness of bus travel through improved customer experience.
- Increase opportunities for local investment in manufacturing, bus assembly and training.

The ZEB program will be delivered in stages starting with Greater Sydney Stage 1, with around 1,700 zero emission buses expected to be in operation on Sydney roads by late 2028. The transition to zero emission buses is scheduled to be completed in Greater Sydney by 2035, in Outer Metropolitan regions by 2040, and in Regional NSW by 2047.

Best practice

Program Management Approach

Transport for NSW has adopted a program management approach to deliver this work. Transport is converting 11 existing bus depots to zero emissions technology as part of Greater Sydney Stage 1. This includes installing charging infrastructure, procurement of new battery electric buses, power supply upgrades and procurement of renewable energy. This approach ensures consistency and interoperability across operating sites, economies of scale and value for money. Performance specifications, system requirements, and commercial terms are designed and overseen by Transport to provide client-side oversight across the program and to drive a consistent outcome.

Procurement panel and 'operator-partnership' delivery model

Transport for NSW adopted an 'operator-partnership' delivery model for the depot conversions, where the current bus operators will design, construct and commission the conversion of existing bus depots in line with Transport's system requirements. This approach will help ensure bus operations are not disrupted while the depots are converted. A pre-qualified panel of suppliers was established to streamline procurement processes. The panel gives operators assurance that contractors can deliver in line with Transport's requirements, thus saving time and costs.

Outcome

Implementing a programmatic approach to deliver the ZEB program will enable Transport for NSW to realise economies of scale and mitigate critical delivery, procurement and operational risks at an early stage. It will enable more efficient maintenance and operational processes and will minimise impact on current operators during the transition.

CASE STUDY

TREND 2 & 3

Sydney Water

Greater Sydney's population is expected to grow to 8 million people in the next 40 years. In response, Sydney Water, Australia's largest water utility, scaled its annual infrastructure expenditure from $500 million to $2 billion in the past 4 years and plans to double this to $3 to $4 billion a year in the next 2 years. This investment will cover the supply of water, wastewater, and stormwater services over an operational area of 12,700 km^2, encompassing Sydney, the Illawarra and the Blue Mountains regions.

Best practice

To successfully scale up water infrastructure delivery while mitigating risks, Sydney Water implemented standard NEC4 Contracts and initiated an enterprise-wide review of its existing procurement model and approach to supply chain integration and industry collaboration. Projects delivered through NEC4 contracts include:

- **Upper South Creek** – Design and construction of a greenfield Advanced Water Recycling Centre (AWRC).
- **Upper South Creek Networks** – a program of pipeline design and construction projects, currently in procurement.
- **Northwest Treatment Hub** – Upgrade of 3 wastewater treatment plants and a biosolids treatment facility.
- **Prospect South to Macarthur** – Implementation of pipeline upgrades.

NEC4 contracts balances Sydney Water's needs for timely and affordable water infrastructure assets with supply chain sustainability and commercial viability. The result is mutually beneficial outcomes for each partner, and value for money for its customers.

The flexibility of NEC4 contracts allows Sydney Water to tailor conventional and more advanced delivery models to allow varied selection choices of scale, risk-allocation, payment and pricing models, and performance-incentive regimes appropriate for each project or program.

To support the transition to NEC4 contracts across its infrastructure portfolio, Sydney Water invested in procurement and contract management training and implemented digital contract management platforms.

Outcome

The transition to NEC4 contracts yielded significant benefits for Sydney Water and its supply chain partners, including:

- **Broadening the supply chain:** the flexibility and scalability of the NEC4 contracts expanded Sydney Water's supplier network.
- **Enabling long-term partnerships:** through NEC4 contracts, Sydney Water adopts a programmatic approach to delivery in a constrained construction market.
- **Collaborative approach to procurement:** Given the complex nature of water infrastructure, Sydney Water adopts Early Contractor Involvement opportunities through NEC4 Professional Services Contracts during the procurement phase. This approach has fostered innovation, meaningful competition and mitigated delivery risks during the pre-delivery phase.
- **Efficiencies through standardisation:** establishment of panel arrangements make it easier to work with Sydney Water and increasing market attractiveness.

CASE STUDY

TREND 4

Barangaroo

Barangaroo is an important waterfront renewal project for Sydney in decades, transforming a once neglected and inaccessible central area into a dynamic cultural, residential, business and retail hub. Upon completion, it will support around 20,000 jobs, provide homes for 3,500 people and contribute $2 billion to the NSW economy annually. The early introduction of effective governance that outlined clear goals and responsibilities has been crucial in the project's successful implementation.

Best practice Governance

Barangaroo's transformation has required commitment across public and private organisations and interests. The places enjoyed today, and the precinct's bold sustainability, design excellence and art and culture initiatives, would not have been possible without the initial and ongoing governance arrangements that drove renewal and the subsequent industry and community partnerships and collaboration.

The Barangaroo Act 2009 No 2 (formerly Barangaroo Delivery Authority Act 2009) set the overarching governance framework for Barangaroo, as well as the special purpose delivery vehicle, the Barangaroo Delivery Authority (now Infrastructure NSW). Critically, the objectives and principal functions of the Act were utilised to inform the procurement process and the eventual Project Development Agreements that now drive Barangaroo's outcomes, including, for example:

- Design Excellence.
- Architecture and Public Domain Design.
- Sustainability and Connection with Country.
- Social, Economic and Environmental outcomes.
- Commitment to 50% Public Open Space.
- Undertake the delivery of infrastructure and co-ordination with Government Agencies.
- Cultural, Educational, Tourist and Recreational facilities and activities for public enjoyment and to support Community well-being.

Outcome

The implementation of effective governance early in the project had the following positive outcomes:

- It enabled the project team to realise specific funding mechanisms within the Agreements that supported the delivery of public benefits, including developer contributions, estate levies, and public art and culture contributions.
- It assisted management of competing interests around land use, community, social outcomes, or scale.
- It helped build good relationships and stakeholder engagement, but also established accountability around implementation of a shared vision and responsibilities for key actions and timings.

Annex A — Glossary

Term	Definition
Assurance review	Refers to gateway, health checks and deep dive reviews.
At risk	Project which has been determined as at risk through periodic reporting with reference to cost and time status.
Delivery confidence	The assessment of the project performance against 7 key focus areas during reviews. Delivery confidence is rated as either high, medium or low. Reduced delivery confidence is considered when a rating of 'low' or 'medium' has been provided.
IIAF	Infrastructure Investor Assurance Framework.
NSW Infrastructure Program	The total NSW state capital infrastructure investment across all government agencies. Subject to the IIAF (more than 10m)
KFA	Key focus area.
KFA requirements	189 requirement statements assessed by expert reviewers during Reviews across the Key Focus Areas. The requirements are assessed as either Yes, No or Partial assessment in meeting the requirements.
Mitigation measures	Feasible measures, actions, or features that are to be incorporated into the project to avoid or substantially reduce the project's significant risk impacts.
'On-track'	No major unmitigated risks in the project/program.
'Not-on-track'	Action required to mitigate major risks in the project/program.
Periodic reporting	Monthly reports submitting by agencies to Infrastructure NSW providing project updates. Periodic reporting is completed monthly for tier 1 projects and quarterly for tier 2 and tier 3 projects.
Phase	The phase of a project in its lifecycle. Project phases include needs confirmation, needs analysis, investment decision, procure, deliver and initial operations, and benefits realisation.
Portfolio	The totality of an organisation's capital investment program.
Project	Includes Infrastructure projects or programs that are in scope of the Infrastructure Investor Assurance Framework.

Term	Definition
Project tiers	Tier based classification of project profile and risk potential based on the project's estimated total cost and qualitative risk profile criteria (level of government priority, interface complexity, procurement complexity, agency capability and whether it is deemed as an essential service). The project tier classification is comprised of 4 project tiers, where tier 1 encompasses projects deemed as being the highest risk and profile (tier 1 — high profile/high risk projects), and Tier 4 with the lowest risk profile. T4 are not subject to assurance.
Reviews/gateway reviews	A review of a project/program by an independent team of experienced practitioners at a specific key decision point (Gate) in the project/program's lifecycle. A gateway review is a short, focused, independent expert appraisal of the project that highlights risks and issues, which if not addressed may threaten successful delivery. It provides a view of the current progress of a project and assurance.
State	State of New South Wales.

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