Building Blind: can Australia build three national priorities at once?

The workforce Australia's data-centre build, housing programme and energy transition all need at the same time

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Project-pipeline estimates reflect publicly available planning records captured to 18 July 2026 and grid-connection data to the market operator's June quarter 2026 report. Model artefacts extracted 24 August 2026.

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Executive Summary

Australia's data-centre boom has become a political flashpoint, raising questions about energy, water, land and the consequences of artificial intelligence. A more immediate constraint on the build has drawn far less attention, and it is the supply of skilled labour.

Australia is attempting to deliver three generational construction programmes on the same timetable: the Housing Accord's published path toward 1.2 million homes, the energy transition, and a rapidly expanding data-centre pipeline. All three rely on many of the same regulated, qualification-dependent trades, especially electricians, and all three draw on a workforce that cannot expand quickly enough to meet their combined demand.

This report presents a public, quarter-by-quarter model of the three programmes' demand for the same pool of skilled workers, and what it finds is a risk rather than a certainty. If every uncertain input takes its central value the arithmetic closes, with demand for electricians reaching almost 98 per cent of the available workforce, the roughly one-fifth of the trade free for major construction, at the peak of the build and no shortfall opening in any quarter. That margin of about two per cent is thinner than the uncertainty on nearly every number that produces it, and across the plausible range of the evidence it fails in 90.64 per cent of 10,000 modelled futures. Each of the three programmes answers a legitimate national need, and Australia has committed to all of them in the same years, on two per cent of headroom, with no workforce plan and no public data infrastructure capable of showing whether the margin is holding.

Key findings

The shortfall is a risk across the plausible range of the evidence, not a certainty of the central case. At the central reading of every input, supply covers demand at the 2027–29 peak with about two per cent to spare. Across 10,000 model runs over evidence-based input ranges, demand exceeds the available electrician workforce in 90.64 per cent of futures, or nine in ten. The median shortfall is about 5,400 concurrent electricians, meaning workers needed on site at the same time. Measured against the whole trade of about 200,000, that is roughly one in thirty-six; measured against the far smaller pool actually free for major construction once ongoing work has taken its share, the same workforce every utilisation and shortfall figure in this report is measured against, it is about one in eight. Across the middle 80 per cent of futures, the P10–P90 range, the shortfall runs from 110 to about 11,600. In the remaining tenth, supply holds through the peak.

The constraint is broader than electricians. Plumbers, heating, ventilation, air conditioning and refrigeration (HVAC&R) mechanics, and telecommunications trades workers also show shortfalls at their own scale, although the underlying data are less precise for some smaller trades. Across the high- and medium-confidence trades, at least one trade is short during the period in 9,983 of 10,000 model runs, or 99.83 per cent.

The workforce baseline is the root cause, and data centres are the largest single addition to it. Remove every new data-centre project from the pipeline and a shortfall still occurs in 67.74 per cent of futures, because the housing and energy

programmes outrun the workforce on their own. Data centres are nonetheless the largest single contributor to the size of the median gap. With the pipeline included the median shortfall is 5,433 concurrent electricians, and with it removed 1,662. Measured as the difference of the two medians, the data-centre pipeline accounts for 69.4 per cent of the median gap and roughly triples it. Both statements hold because the gap is a residual, and because supply is fixed in the window, so every megawatt of marginal demand lands entirely inside the shortfall rather than being spread across the build.

Data centres help determine who bears the shortage. Under the model's strict allocation assumptions, highly capitalised data-centre projects are more likely to secure licensed labour than lower-margin residential construction, and the residual shortfall falls on housing, slowing the annualised dwelling-completion rate by about 34,000 homes at the peak quarter in the median future. With no new data centres at all, the housing and energy programmes still slow home-building by about 10,400 dwellings a year at the same point, leaving about 24,000 dwellings a year of the median rate attributable to the data-centre pipeline. Because the model assigns the whole residual to housing, these figures are an upper bound, and they are a rate at the worst quarter rather than a count of homes.

The collision is concentrated in western Sydney. On the central path, national demand never exceeds 98 per cent of the available electrician workforce in any quarter of the window, while the four-area western Sydney corridor exceeds 100 per cent in all twelve, peaking at 139 per cent. The corridor holds about 36 per cent of the staged data-centre pipeline captured by the two-state register, against 9.6 per cent of the two states' trades workforce on the matched basis. Its shortfall at the peak is 434 to 1,103 concurrent electricians on central demand, depending on a supply-basis choice disclosed here rather than made silently.

A plausible package closes the median future without closing the risk. Six measures act on the shortfall: keeping more electricians in the trade, drawing back licence-holders who have left it, lifting apprentice completion rates, licensing more skilled migrants, raising female participation, and deferring some construction out of the peak. Together they close 96.2 per cent of the median gap, the shortfall of about 5,400 workers described above, and about 4 per cent of it remains. Against the P90 gap, the shortfall in the hard futures where the coefficients run high and the workforce leaves fast, the same six measures cover 45.2 per cent, so more than half stays open, and even the aggressive variant with every lever at its maximum reaches 82 per cent of the P90. The urgency in these results sits in the distribution rather than the median. Two components rest on disclosed judgements, and in both cases an absent measurement forced the judgement. No registered source states what share of licensed but non-practising electricians would return to the trade, so the re-activation take-up band is unsourced. The national training collection publishes the sex split of apprentices at trade and non-trade level rather than for electricians, so the female-participation range has no derivation from registered sources.

Australia has weakened the tools needed to manage the risk. Detailed trade-level employment data ceased with the February 2026 quarter, occupation-mobility data are in transition until 2027, the national cabler count has not been published since 2019, and most planning systems do not require public disclosure of data-

centre capacity. Australia is trying to coordinate major national buildouts without a reliable, shared view of the workforce required to deliver them.

None of this argues for abandoning data centres, housing targets or the energy transition, each of which responds to a legitimate national need; it argues that a two per cent margin is not a plan. The data-centre build is a potentially important opportunity to strengthen Australia's digital and industrial capability. But without coordinated action to sequence discretionary construction demand and repair workforce-planning data, the collision's likely costs are higher construction prices and a housing programme that falls further behind.

In the near term, governments should sequence discretionary construction demand and expand recognition-to-licence capacity before simply increasing visa numbers, while strengthening retention and completion pathways. Over the longer term, Australia needs a standing public system to measure major project demand against the supply of qualification-dependent trades. Without it, Australia will continue to discover capacity constraints only once it is already paying for them.

Introduction: Three national ambitions, one constrained workforce

Australia is trying to build three futures with one workforce.

At the same time as it seeks to build 1.2 million homes, remake its electricity system and establish itself as a major data-centre hub, Australia is drawing on the same small pool of licensed tradespeople to deliver all three. Those projects are scheduled to peak in the same years. Under the training, migration and workforce-mobility pathways examined in this report, the workforce cannot expand at anything like the speed implied by the combined commitments.

What is at stake is larger than a temporary construction bottleneck. Australia's export economy has become less complex and more concentrated over the past generation. Its position in Harvard's Economic Complexity Index has fallen from 33rd to 73rd; manufacturing's share of the economy has fallen by more than half, from 13.7 to 5.3 per cent; and resource commodities now account for about 61.5 per cent of merchandise exports. The country's export profile has become more concentrated in resource commodities and less represented in complex manufacturing and industrial production.

The data-centre boom offers a rare opportunity to begin changing that trajectory. With an estimated $16 billion to $25 billion in committed capital, more than Snowy 2.0's revised cost, it could help underwrite investment in firmed renewable generation, transmission and digital infrastructure. Properly managed, it could help support a broader ecosystem of advanced capability, including engineering, energy systems, cloud services, specialised construction, research and high-value digital industries.

But that opportunity is now on a collision course with two other generational national priorities.

Australia must build the homes needed to address an acute housing shortage. It must also construct the generation, storage, transmission and distribution infrastructure required for the energy transition. Assessed in separate policy silos, these look like separate construction tasks. In practice they are concurrent claims on the same small pool of licensed workers: the electricians, plumbers, HVAC&R mechanics and telecommunications trades workers that every one of these builds requires.

And a licence in one of those trades is not interchangeable with a licence in another.

An electrician cannot simply be substituted with a cabler; a plumber cannot be redeployed to build transmission infrastructure; an apprentice cannot be made fully qualified in the two or three years before the projected construction peak. Each trade has its own training pipeline, licensing requirements, recognition rules and geographic distribution. In the short term, supply is rigid. When several capital-intensive projects seek the same workers at once, the question stops being whether demand exists in the abstract and becomes who gets built first, and at whose expense.

Until now, workforce assessments have largely considered these national priorities in isolation, with housing policy counting the workers housing requires, energy planning

counting the workers energy requires, and data-centre debates turning on power, water, land use and local planning approvals. Each analysis implicitly assumes that the labour market will clear, whether through rising wages, workers appearing, migration filling the gap, or projects adjusting without material economic or social cost.

This report tests that assumption by bringing the three buildouts together in a single, quarter-by-quarter model and comparing their combined demand with the actual supply of the qualification-dependent trades they require. The question is not whether data centres, housing or the energy transition are individually worthwhile, but whether Australia can build them all on their current schedules with the workforce it has, and if not, where the shortage lands.

The analysis measures data-centre construction demand in power. Rather than relying on operational employment figures, which understate the large, temporary workforce required to build hyperscale facilities, it converts megawatts, weighted by how far each project has actually progressed, into trade demand across each phase of construction. It then models the electrician workforce as a stock-and-flow system: a starting stock of roughly 200,000 employed electricians, replenished by completions and skilled migration and reduced by retirement, attrition and other exits. The constraint that matters is the number of qualified people available to build the projects at the same time, rather than the number of projects announced.

Not all of those electricians are free to build the three programmes. Most of the trade is already engaged in the work an economy generates whatever it happens to be building: maintenance and repair, renovation, and the ordinary run of commercial and industrial jobs that continue through any construction cycle. The model therefore measures the programmes' demand against the workforce left over once that ongoing work has taken its share, and this residual, roughly a fifth of the trade, about 43,000 of the roughly 200,000, is what this report calls the available workforce. Wherever demand is stated as a share of the available workforce, including the almost 98 per cent it reaches at the peak of the build, the denominator is that free fifth rather than the whole trade.

No published source decomposes electrician employment by type of work. The model therefore measures what can be measured, being the electricians the three programmes required in 2025 at their observed activity levels, and treats the rest of the trade as ongoing work carried forward at that level. Two features of the construction are generous to the build. The ongoing claim is carried forward at the pace recorded in the methodology, more slowly than the workforce itself grows, so the free pool widens over the window rather than holding a fixed share of the trade, and a construction that held the share fixed would show a larger shortfall. And the pool is treated as fully interchangeable, with no licence class, high-voltage endorsement or capability split inside it, so the same electricians are counted as able to build offshore wind, transmission and housing alike; any real capability constraint would tighten the binding.

The core problem is not data centres alone. Even without new data-centre construction, the combined housing and energy pipelines leave the workforce short in 67.74 per cent of modelled futures. Data centres matter because they add demand at precisely the moment the system is at the edge of its capacity, and

because their capital intensity and ability to pay can determine which other projects lose access to scarce workers.

That makes this a question of national sequencing and economic choice. Australia can allow the shortage to be resolved project by project, through bidding and delay, at the likely cost of lower-margin residential construction. Or it can manage the pipeline deliberately. The latter requires better data, realistic workforce planning, faster pathways from skilled migration to licensing, stronger retention and training systems, and a willingness to sequence discretionary demand when the margin is this thin.

Sections 1 and 2 establish the scale and timing of the converging data-centre, housing and energy buildouts. Sections 3 and 4 quantify the resulting trade-by-trade workforce risk. Sections 5 and 6 examine where the shortfalls are likely to fall, including their implications for housing delivery. Section 7 assesses the capacity of wages, apprenticeships, migration, retention and project sequencing to close the risk. Section 8 explains why the constraint has gone unseen, then sets out what governments should do inside the window and the measurement required to prevent a repeat.

How to read this report

This report tests whether Australia's published housing, energy and data-centre construction schedules can be delivered concurrently with the qualification-dependent trades workforce likely to be available between 2026 and 2031. It is a capacity test rather than a forecast, so it does not assume that every project will proceed on schedule, or that the labour market will fail to adjust. Its question is narrower: if the three programmes pursue their published paths, what workforce do they require at the same time, and can the available supply meet that requirement?

The analysis uses a quarter-by-quarter model of demand for four regulated or qualification-dependent trades: electricians, plumbers, HVAC&R mechanics and telecommunications trades workers. For housing, demand is based on the official expected dwelling-completions path. For the energy transition, it draws on the Australian Energy Market Operator's published development pathway for generation, storage and transmission. For data centres, it uses a project register built from public planning, connection and market information.

Data-centre demand is measured in megawatts rather than announcements or ongoing employment. Projects are classified by their stage of development, from early enquiry and assessment through approval, construction and commissioning, and earlier-stage capacity is discounted to reflect the fact that not every proposal will proceed. The register is necessarily incomplete: public capacity and location information is much stronger in New South Wales than elsewhere, while Victorian capacity is partly visible only in aggregate and South Australian capacity cannot be consistently identified project by project. The data-centre estimates should therefore be read as a staged account of the visible pipeline, not a complete census of national capacity.

Workforce supply is modelled as a stock and flow. It begins with the observed employment stock in each trade, adds qualified apprentice completions and skilled migrants who can enter licensed work, and subtracts retirement, occupational change and other exits. This approach reflects a central practical constraint: new apprentice commencements do not create fully qualified electricians in time for the projected 2027–29 peak, while additional skilled visas do not automatically translate into licensed workers without capacity in recognition, supervised practice and licensing systems.

Because several inputs are uncertain, the model uses evidence-based ranges rather than single estimates and runs 10,000 combinations of those ranges. One rule governs every share of model runs quoted in this report: each run is one combination of assumptions sampled from sourced ranges, so the shares describe how much of the plausible evidence produces a shortfall, not the odds that one occurs. A statement that a shortfall occurs in 90.64 per cent of futures means that nine in ten plausible combinations of the evidence produce one, and it is not a literal probability. The distinction cuts both ways, because the central combination of the evidence produces no shortfall at all, and that fact is reported with the same prominence as the risk around it. Before being used to assess future demand, each trade model was tested against historical official employment data. Results for electricians are the strongest; findings for smaller and noisier trade series are labelled accordingly.

The model does not estimate a wage-induced expansion in workforce supply. Higher wages may draw workers between employers, encourage some people to remain in or return to the trade, and affect project timing. But available Australian data do not permit a robust estimate of the size or timing of that response for the trades examined here. The results should therefore be interpreted as the workforce requirements implied by published schedules under measured supply channels, not as a prediction that shortages will appear only as unfilled jobs. In practice, a gap may appear through higher labour costs, delayed projects, changed sequencing, substitution, or slower housing delivery.

1. The three-build collision

Australia is undertaking three generational construction programmes at once.

The first is housing. Under the Housing Accord, governments have committed to an unprecedented expansion in dwelling supply, with a stated objective of 1.2 million new homes over five years. The second is the energy transition: new generation, storage, transmission and distribution infrastructure must be delivered at speed to maintain reliability while replacing ageing coal-fired capacity. The third is the fast-growing data-centre pipeline, driven by cloud computing, artificial intelligence, data sovereignty and demand for digital infrastructure.

Each programme responds to a legitimate national need. Together, however, they create a problem that none can solve alone.

The data-centre build is substantial even before the much larger announced pipeline is considered. Projects already under construction or commissioned represent roughly 1.8 gigawatts of server-hall capacity and associated electrical infrastructure. At benchmark construction costs of approximately $9 million to $14 million per megawatt, that represents between $16 billion and $25 billion in committed capital, more than Snowy 2.0's revised target cost.

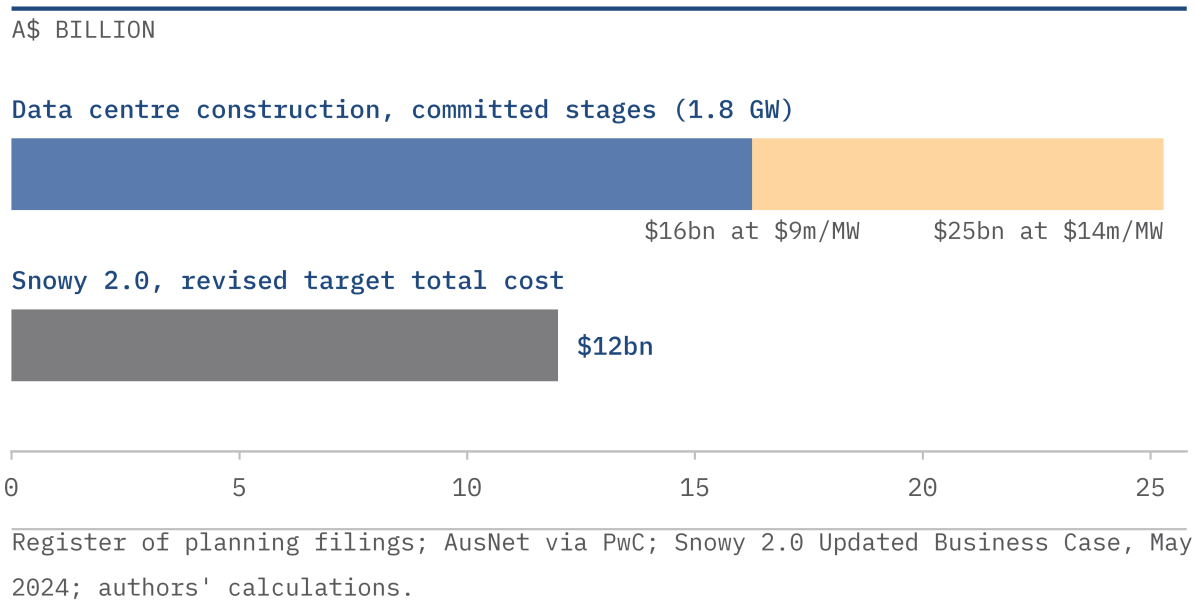


Figure 1. Data-centre construction is already a $16–25 billion national build

Notes: Estimate applies benchmark construction-cost ranges of $9 million to $14 million per megawatt to approximately 1.8 GW of data-centre server-hall capacity and associated electrical infrastructure that is under construction or commissioned. It excludes the larger announced pipeline and is not a measure of operating expenditure or the sector's total economic value. **Source:** Register of planning filings; AusNet via PwC; Snowy 2.0 Updated Business Case, May 2024; authors' calculations.

The scale matters not because data centres should be treated as uniquely problematic, but because they are arriving at the same moment as two other nationally important construction programmes. The question is whether Australia can

deliver all three according to their published schedules with the workforce they collectively require.

The answer depends on timing, and the housing, energy and data-centre pipelines all make their strongest calls on the construction workforce between 2027 and 2029, with housing and energy dominating the total. Data centres are the smallest of the three claimants; the question is never one build in isolation, it is the sum, quarter by quarter. The new demand arrives on top of an already crowded pipeline, at precisely the point when the labour market is least able to absorb another capital-intensive build.

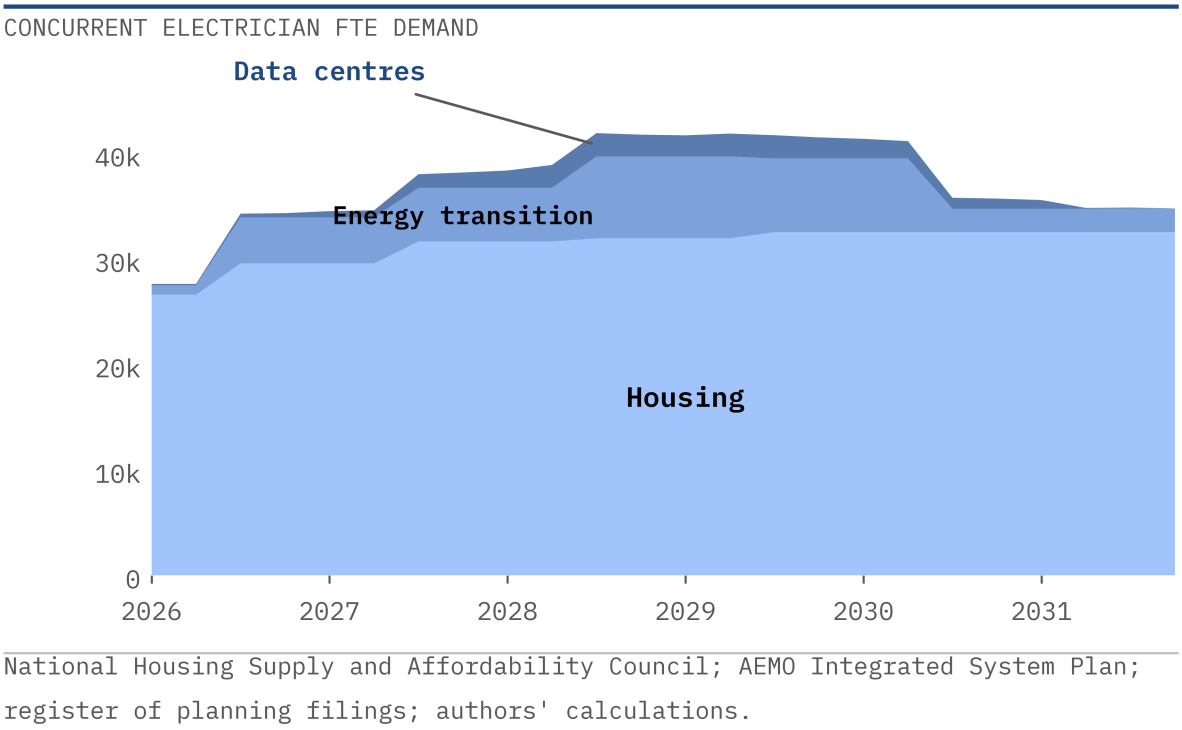


Figure 2. Housing, energy and data-centre construction all peak between 2027 and 2029

Notes: Chart shows modelled quarterly demand for the relevant qualification-dependent trades under the published housing, energy and staged data-centre schedules. Demand is expressed as concurrent workforce requirements; it is not a forecast that every project proceeds exactly as scheduled. **Source:** National Housing Supply and Affordability Council; Australian Bureau of Statistics; Australian Energy Market Operator, Integrated System Plan; register of planning filings; authors' calculations.

This is a national coordination problem disguised as three separate sectoral challenges, because all three programmes ultimately rely on many of the same people, often in the same places and over the same period.

The collision will be especially acute because the relevant workers are not generic "construction labour." They are drawn from a small set of regulated, qualification-dependent trades: electricians; plumbers; HVAC&R mechanics; and telecommunications trades workers. Those licences are not interchangeable, and an electrician cannot be substituted with a plumber or a cabler. Nor can a workforce be

expanded materially in two or three years when apprenticeship, assessment, recognition and licensing systems take much longer.

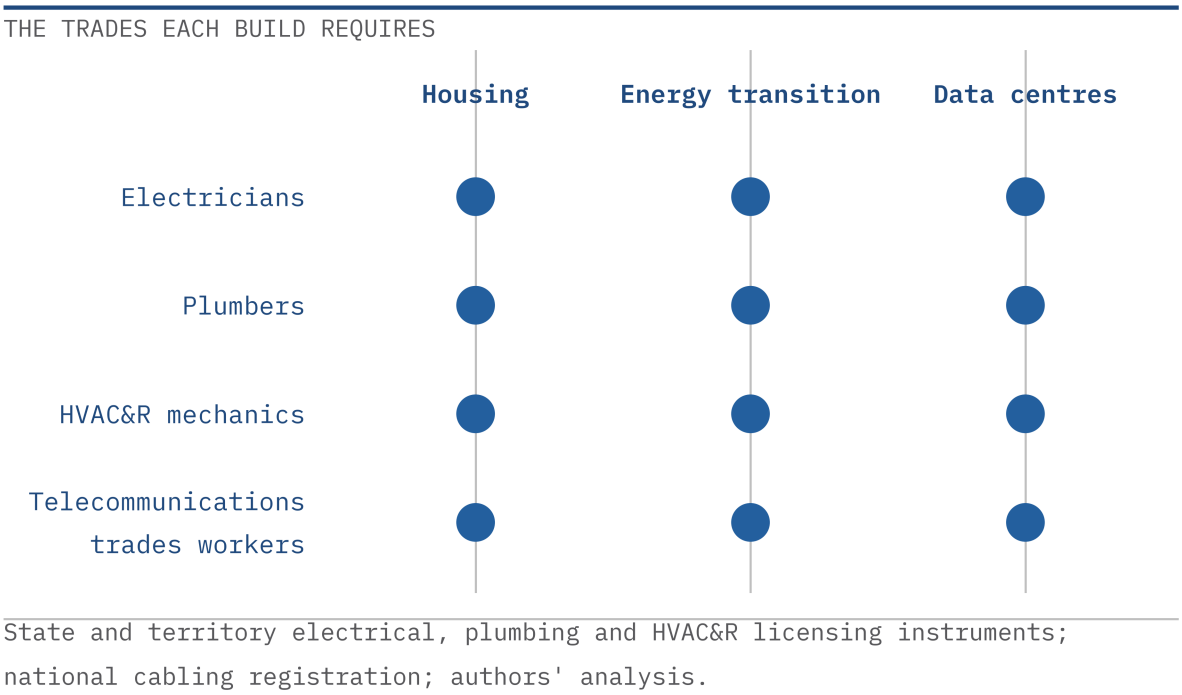


Figure 3. All three buildouts compete for the same four qualification-dependent trades

Notes: The figure identifies the four qualification-dependent trades common to the housing, energy and data-centre buildouts. It illustrates overlapping trade demand, not identical trade shares or task requirements across project types. **Source:** State and territory licensing requirements for electricians, plumbers, and HVAC&R mechanics; national cabling-registration requirements for telecommunications trades workers; authors' analysis.

What looks like three independent construction challenges is one constrained labour market being asked to meet three simultaneous national commitments.

2. Why the build matters, and what the public record cannot see

There is a substantive strategic and economic case for participating in the data-centre build. Australia's export economy has become less complex over the past generation. On Harvard's Economic Complexity Index, Australia fell from 33rd in 1995 to 73rd in 2024. Manufacturing's share of GDP declined from 13.7 per cent in 1990 to 5.3 per cent in 2025, while resource commodities account for approximately 61.5 per cent of merchandise exports. These indicators are imperfect measures of national capability, especially in a resource-rich economy, but their direction is difficult to ignore, and it is toward an economy more concentrated in what it exports and less embedded in complex industrial production.

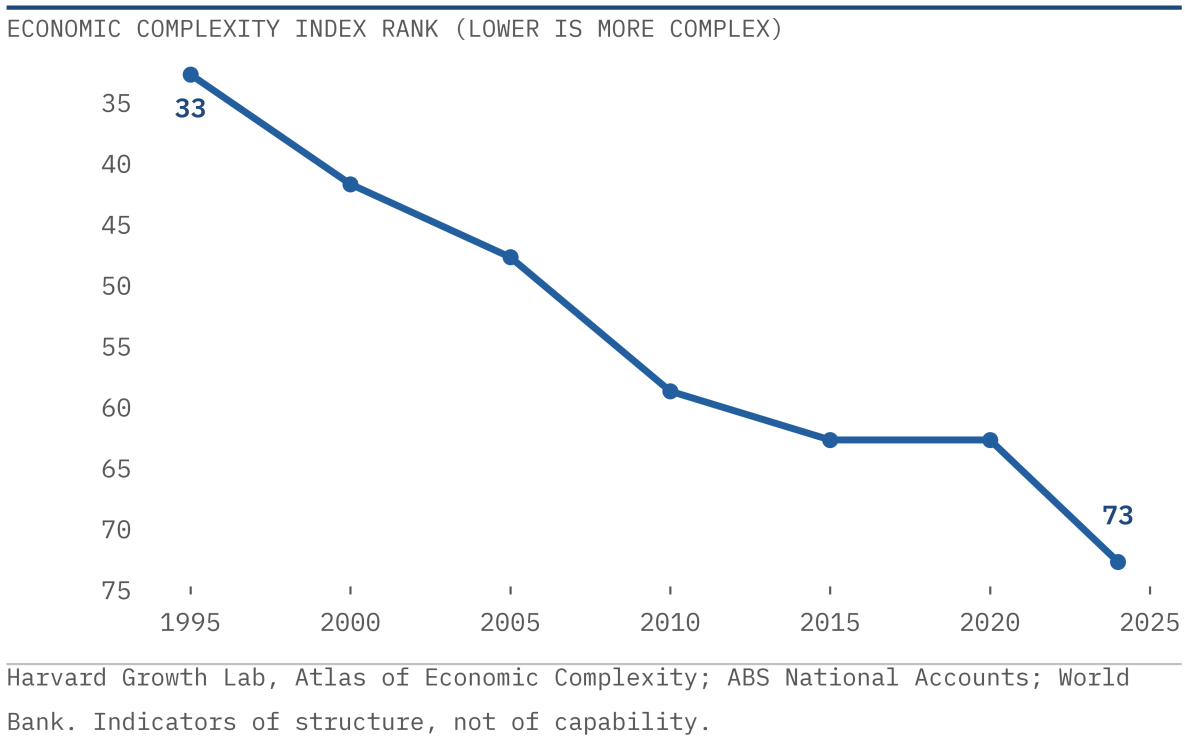


Figure 4. Australia's export economy has become less complex and more concentrated

Notes: Economic-complexity rank, manufacturing share and export-composition measures are indicators of long-run economic structure; they are not direct measures of national capability or productivity. **Source:** Harvard Growth Lab, Atlas of Economic Complexity; World Bank; Australian Bureau of Statistics.

The data-centre build offers one possible route toward greater digital and industrial capability. Australia has abundant renewable-energy resources, land, submarine-cable connectivity, stable institutions and a strategic interest in retaining data and compute capacity within its jurisdiction. Large, committed electricity loads may also help underpin investment in generation, firming and transmission that the energy transition requires in any event.

That opportunity should not be dismissed merely because operating data centres employ relatively few people. Their ongoing workforce is modest relative to their

capital cost: on the industry's own commissioned figures, about 9,600 people nationally, with roughly 15 construction jobs for every operational one. But operational headcount is the wrong measure of infrastructure value. Australia does not judge a substation, port, water-treatment plant or transmission line by the number of people employed within its fence. For every person who works in one, a data centre carries about $1.8 million of built assets; a factory carries a fraction of that. The relevant question is what the asset enables: activity, reliability, connectivity, capability and investment elsewhere in the economy.

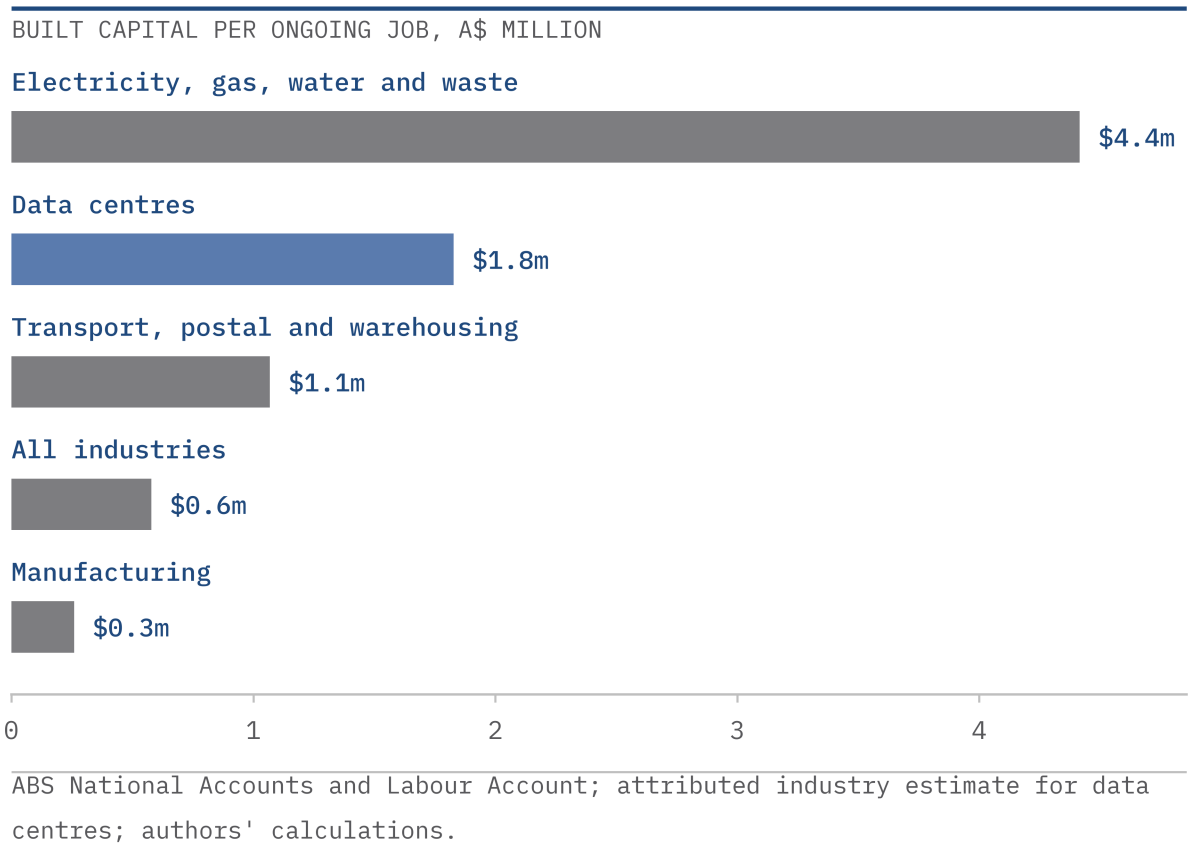


Figure 5. Operating headcount is a poor measure of infrastructure value

Notes: The figure compares built capital per ongoing job. The data-centre estimate is illustrative and uses attributed sectoral capital-expenditure and employment figures; it is not directly comparable in precision with the Australian Bureau of Statistics industry-division estimates. **Source:** Australian Bureau of Statistics, National Accounts and Labour Account; attributed industry estimate; authors' calculations.

The construction-phase workforce requirement, however, is immediate, substantial and unusually difficult to observe.

Australia has no complete public register of data-centre capacity, location, construction stage and timing. Among the jurisdictions assessed, New South Wales is the only one in which the planning framework generally requires data-centre developments above the relevant planning threshold to disclose electrical capacity in megawatts. Even this visibility is incomplete. The relevant New South Wales capacity trigger does not apply within the City of Sydney, meaning that capacity information for part of the state's densest existing data-centre estate is no more

consistently visible than it is in jurisdictions without a comparable disclosure threshold.

In Victoria, publicly available records capture some projects, but much capacity is visible only as a distribution-network aggregate. In South Australia, data-centre capacity is reported by the market operator at an aggregate level, but planning rules do not require proponents to disclose a project-level megawatt figure. Other jurisdictions are similarly incomplete or unmeasured.

As a result, more than two-fifths of the documented build, about 5.4 of 12.7 gigawatts, cannot be located precisely in public project-level data. The public record sees the national build unevenly, clearest in parts of New South Wales, while Victoria appears partly in aggregate and the remaining jurisdictions barely at all. The project register should therefore be read as a staged, evidence-based account of the visible pipeline, not as a complete census of national data-centre capacity. Where capacity is excluded because it cannot be observed consistently, the model is conservative on data-centre construction demand.

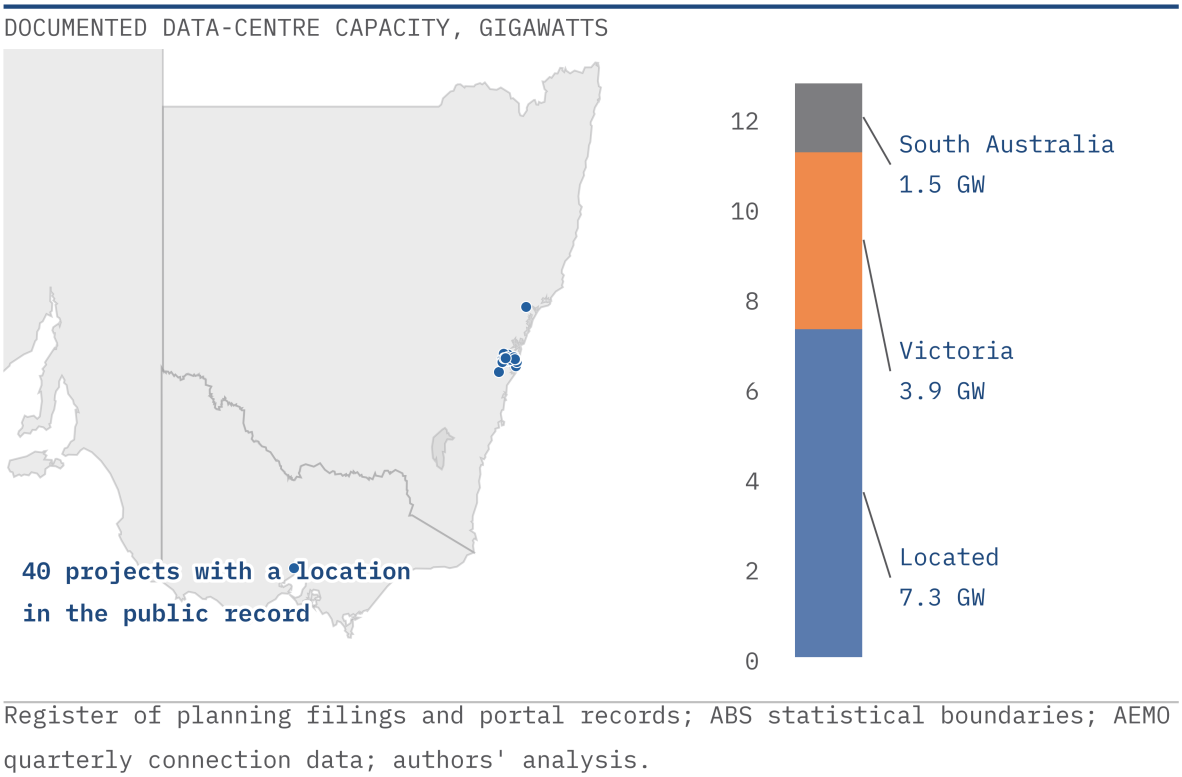


Figure 6. Australia cannot see much of its own data-centre pipeline

Notes: The figure classifies documented data-centre capacity according to the degree of visibility available in public planning, connection and market records. Capacity that is unlocated or only partly visible is not assumed not to exist; rather, its project-level location, timing or capacity cannot be consistently established from public information. The figure describes the coverage of the project register and related public records, not a complete national census of data-centre capacity. The two classes that cannot be placed are unlocated for different reasons, and neither is an absence of capacity: no Victorian planning instrument requires a megawatt figure to be stated, and South Australian capacity is reported by the market operator only as a state total. **Source:** Register of planning filings and portal records; state planning instruments; Australian Energy Market Operator quarterly connection data; authors' analysis.

This is not a technical inevitability. Planning systems already use megawatt and megavolt-ampere thresholds for generation, batteries and other energy infrastructure. The absence of an equivalent requirement for data centres is largely the result of separate drafting choices made across jurisdictions, rather than an inherent difficulty in measuring the asset.

Australia is debating the implications of a major new infrastructure class without consistently recording the basic facts required to plan for it: how much capacity is being built, and where and when it will call on labour and the grid.

3. Why the workforce cannot adjust in time

The most important feature of the workforce constraint is its timing.

It is tempting to assume that labour markets will resolve shortages through higher wages, more apprenticeships, migration or worker mobility. Over a long enough period, each of those channels matters. But the question here is narrower: can they expand the supply of licensed tradespeople quickly enough to meet the 2027–29 peak?

For electricians, the report's principal focus, the answer is unlikely to be yes.

The workforce is best understood as a stock-and-flow system that begins with approximately 200,000 employed electricians, of whom roughly a fifth are free for the three programmes once ongoing work has taken its share. Each year, the stock is replenished by about 8,900 apprentice completions and about 620 primary skilled-visa grants, while workers leave through retirement, occupational change, withdrawal from the labour force and other forms of attrition, at a central forward rate of about 1.4 per cent a year. The workforce does not expand because projects are announced, but only when people complete training, secure recognition and licences, return to practice, enter from interstate, or remain in the trade for longer.

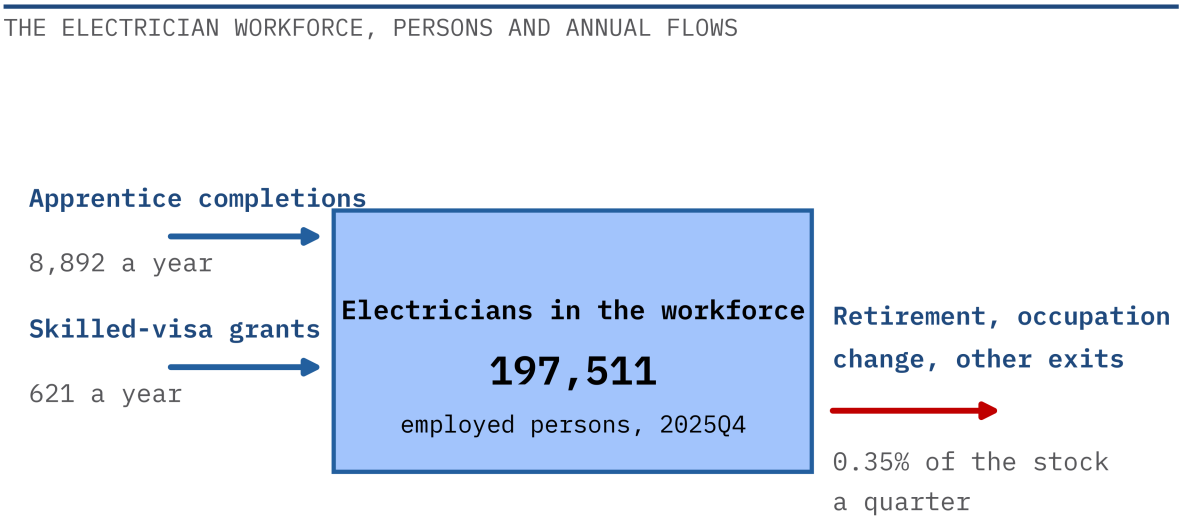


Figure 7. The electrician workforce cannot expand fast enough to meet the 2027–29 peak

Notes: The workforce is modelled as a stock of employed electricians, replenished by apprentice completions and migrant arrivals and reduced by retirement and other exits. Apprentice commencements after 2026 are assumed not to produce qualified electricians before the modelled peak. Migrant inflows are primary visa grants, not licences; the recognition-to-licence pathway is modelled separately. **Source:** Australian Bureau of Statistics; National Centre for Vocational Education Research; Department of Home Affairs; Jobs and Skills Australia; authors' calculations.

The apprenticeship pipeline creates a hard constraint. Recruiting more apprentices delivers zero qualified electricians before about 2030: the four-year apprenticeship is mechanical. Raising commencements is essential for the next construction cycle, but it cannot solve the immediate collision.

Migration is faster but not frictionless, because a skilled visa is not an Australian electrical licence. Overseas-trained electricians must generally move through skills assessment, provisional licensing, supervised work and full state or territory licensing. The system's throughput depends partly on the availability of already-licensed electricians able to supervise and sign off new entrants, who are the same workers in greatest demand on project sites.

Retention is potentially the most immediate supply-side lever. Reducing exits, improving conditions, supporting older workers to remain in the trade, and drawing some licensed but non-practising workers back to site can all help within the report's window. But none is large enough to transform the basic arithmetic on its own.

None of this stems from a want of effort by workers, employers or governments; it is the predictable consequence of asking a regulated, qualification-dependent workforce to grow much faster than the institutions that sustain it.

4. The arithmetic balances on a two per cent margin

This report brings the three pipelines together in a single quarterly model, comparing the workforce demand implied by the published housing, energy and data-centre schedules with the supply of licensed workers likely to be available under evidence-based assumptions about training completions, migration and workforce exits.

The model is deliberately not a forecast of market outcomes, and it neither predicts that every published project will proceed exactly as planned nor assumes that wages have no effect on behaviour in the real world. It asks what the published schedules require of the workforce if those schedules are pursued, and whether the measured supply channels can meet that requirement.

For data centres, the model uses power, not announcements or operational employment, as the unit of demand. Projects are tracked in megawatts and staged according to their progress through the connection and planning process. Announcements are not demand, because capacity at the earlier stages is discounted to reflect the fact that not every enquiry, application or approval becomes a built facility, and only the capacity that survives that staging is converted into trade demand.

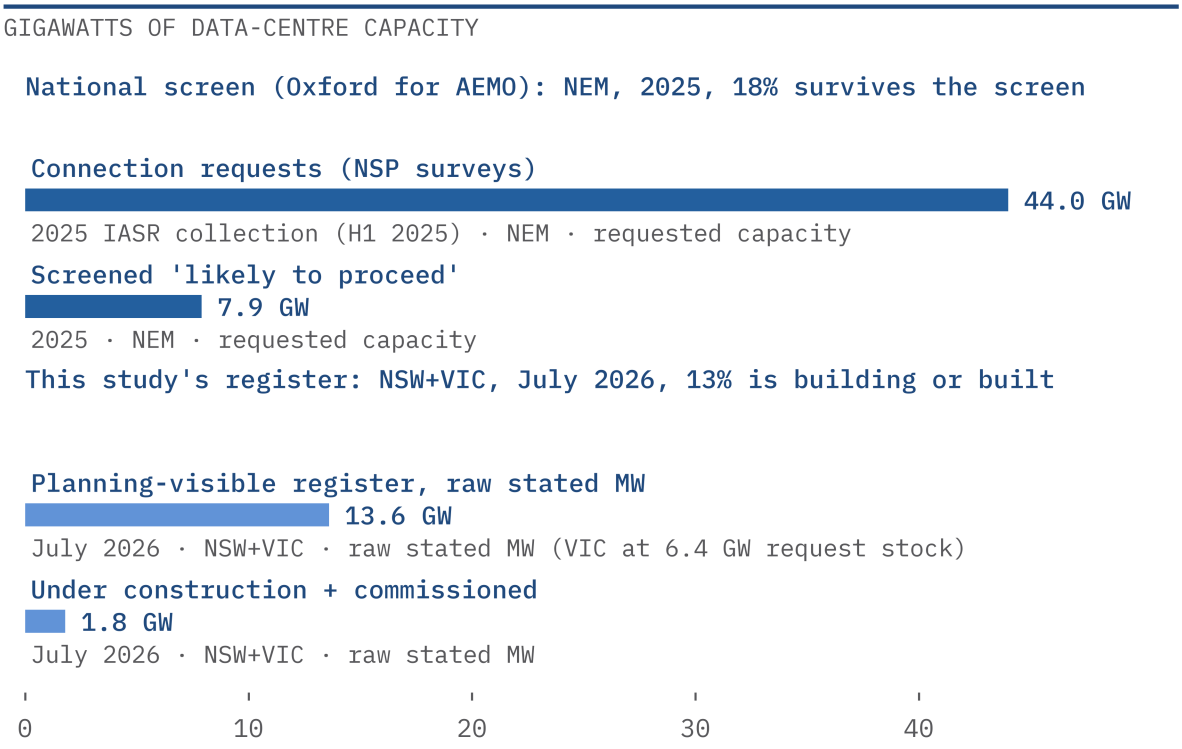


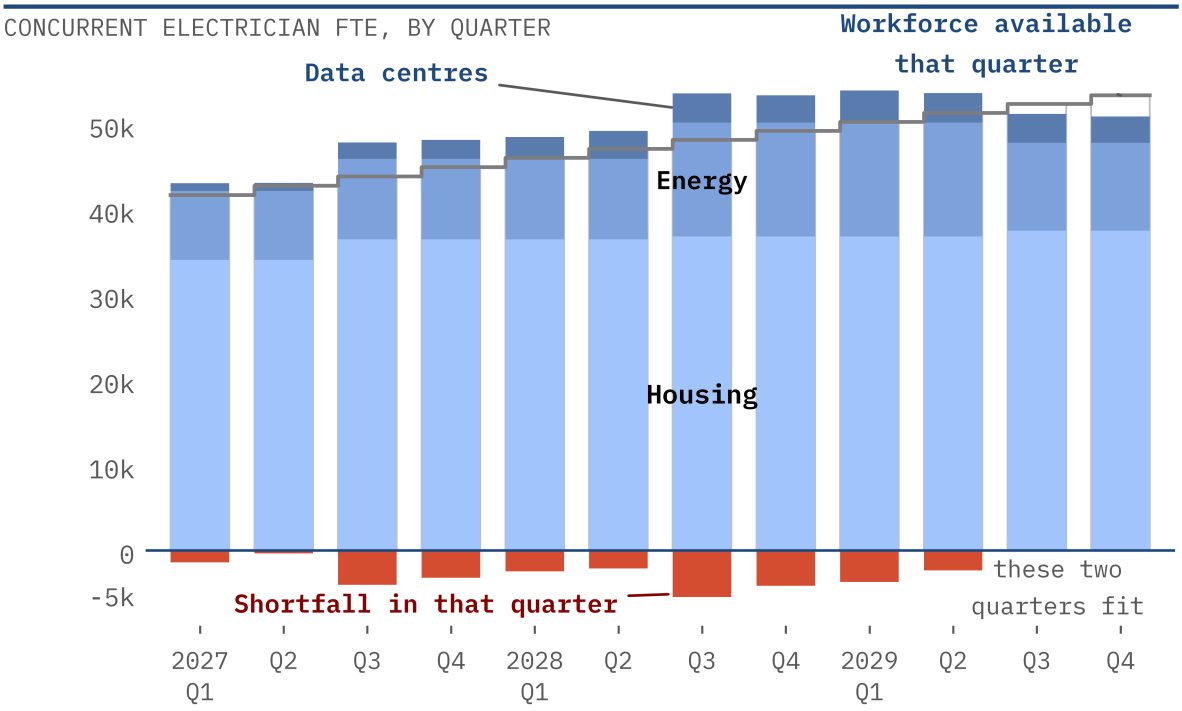
Figure 8. Megawatts, not operating jobs, determine data-centre construction demand

Notes: The model converts staged data-centre electrical capacity into construction-phase trade demand using benchmark labour-intensity assumptions. Capacity at earlier project stages is discounted to reflect the likelihood that not all proposals proceed to construction. Estimates relate to build-phase labour demand, not ongoing data-centre employment. As corroboration rather than as a stage in the funnel, the market operator reports 9.0 GW of formal transmission connection applications in Q2 2026 (17 data centres), against the register's as-stated stock of 9.4 GW at stage two and later. The two are different administrative populations and neither is derived from the other, so the closeness of the two figures is corroboration and not agreement between measures of the same quantity. **Source:** Register of planning filings; Oxford Economics for AEMO; Australian Energy Market Operator quarterly connection data; authors' calculations.

All uncertain inputs are modelled as ranges rather than single point estimates, and the model is run 10,000 times across them. As throughout, the shares describe plausible combinations of the evidence, not forecast odds.

The central result has two halves.

The first half is that the central case closes. If every sampled input takes its central value, national demand for electricians peaks just below 98 per cent of the available workforce in the September quarter of 2028, and no shortfall opens in any quarter of the window, so on the published schedules the three-build programme is feasible with about two per cent of headroom.



One run of 10,000, selected so its peak shortfall matches the median across all runs; authors' calculations.

Figure 9. The three programmes must fit the workforce quarter by quarter, and in the median future they do not

Notes: Each slot is one quarter's available electrician workforce, the part of the trade free for the three programmes once ongoing work has taken its share. The slots are drawn separately because the quarters do not pool, since workers free in one quarter cannot be carried into another, and the build must fit inside every slot in turn. Demand from housing, energy and data-centre construction is stacked inside each slot; where the stack exceeds the slot, the excess hangs below the shared axis as that quarter's concurrent shortfall, and no bar appears where the quarter fits. The future drawn is a single run of the 10,000, selected so that its peak shortfall matches the median across all runs, because only a run's own quarters sum programme by programme, which a percentile envelope does not. At the central value of every input, every quarter fits and no shortfall opens in any quarter of the window. A gap is not a forecast of unfilled vacancies: it may instead appear as project delays, higher labour costs, changed project sequencing or substitution. **Source:** Authors' calculations using the inputs and assumptions described in the methodology.

The second half is what happens to that headroom under uncertainty. Two per cent is thinner than the plausible error on nearly every input that produces it: the electrician content of a megawatt, the electrician content of a dwelling, the rate at which the existing workforce leaves, the labour intensity of the battery build. Several of those ranges are also asymmetric, because the evidence conflicts upward: the top of the data-centre coefficient's range sits 2.6 electrician-years per megawatt above its central value while the bottom sits 0.6 below it, and the battery-build factor's range is skewed the same way. When the model draws across the full ranges, the margin fails in 90.64 per cent of 10,000 futures.

At the peak of the 2027–29 period, the median shortfall across those futures is 5,433 concurrent electricians, roughly one in thirty-six of the whole trade and about one in eight of the workforce available to the three programmes once ongoing work has taken its share. The P10–P90 range runs from 110 to 11,566. The tall bar at zero carries the other half of the result, because in about one future in ten supply holds.

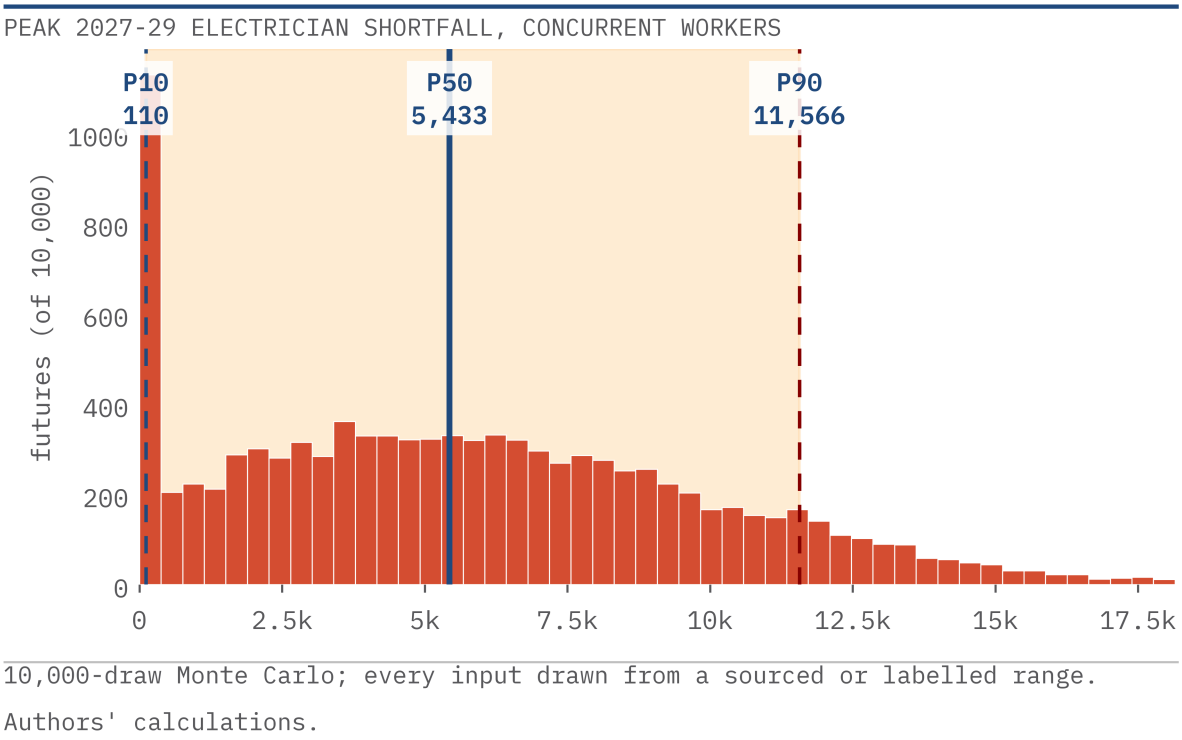


Figure 10. Across the plausible range of the evidence, Australia is short of electricians in nine futures out of ten

Notes: Estimates show the peak-window concurrent gap between modelled demand for qualified electricians and estimated available supply. The distribution shows results across 10,000 model runs using evidence-based input ranges; the central estimate is the median and the shaded range is P10–P90. Shares of runs describe the proportion of sampled assumption combinations in which a shortfall occurs, not literal forecast probabilities. At the central value of every input, no shortfall opens. Estimates do not assume an unmeasured wage-driven expansion in qualified labour supply. A gap is not a forecast of unfilled vacancies: it may instead appear as project delays, higher labour costs, changed project sequencing or substitution. **Source:** Authors' calculations using the inputs and assumptions described in the methodology.

How can the median future carry a shortfall of 5,433 when the central case carries none? They are different objects. The central case sets every input to its central reading simultaneously and follows that single path, while the median is the midpoint of ten thousand runs in which every input varies together across its evidence range. Two features of the problem then separate them. The first is the skew already described: for several coefficients, the distance from the central reading to the top of the defensible range is far greater than the distance to the bottom, so a typical draw carries more demand than the central path does. The second is that a shortfall has a floor at zero. A future in which supply comfortably exceeds demand contributes a

gap of zero, not a surplus that can be banked against harder futures. On a system running within two per cent of its ceiling, the favourable draws have almost nothing to give and the unfavourable draws have a long way to run, which is why most futures breach even though the single most likely reading of each input does not.

That asymmetry is also why this report treats the distribution, rather than the central path, as the object that matters for policy. The central reading of each contested coefficient is a considered choice, but nothing privileges the combination of all of them landing together. Workforce capacity cannot be bought retrospectively: an apprenticeship started after the evidence resolves arrives years after the peak. A plan that holds only if every contested input lands at its central value simultaneously amounts to a bet that the evidence will resolve favourably, with no recourse if it does not. Reporting the distribution alongside the central case is what makes that bet visible, and it is why the model's finding is a pair rather than a single number: the build fits at the centre of the evidence, and it fails across nine-tenths of the evidence's plausible range.

A one-at-a-time sensitivity across each input's full range, measured from the central path, shows the largest swing belongs to the workforce exit rate, because how fast people leave the trade compounds over every quarter of the window, so the answer moves furthest where that is least certain. The battery-build labour factor and the data-centre electrician coefficient follow. The contested early-stage data-centre pipeline sits at the bottom, because the central path closes, so each sensitivity bar measures the shortfall its input can open across its own range, and the in-assessment stage weight cannot open one even at its extremes.

The shortfall is not confined to electricians. Plumbers, HVAC&R mechanics, and telecommunications trades workers also show shortages at their own scale, with median peak gaps of 2,354, 1,681 and 1,156 concurrent workers respectively in the trade-stack model. The evidence is strongest for electricians and more qualified for the smaller trades, whose historical employment series are noisier. But the direction is consistent, and across the high- and medium-confidence trades at least one trade is short in 99.83 per cent of futures, with at least one of plumbers or HVAC&R mechanics short in 98.87 per cent. The telecommunications result is carried as an early warning rather than a headline, because its series is the weakest in the model.

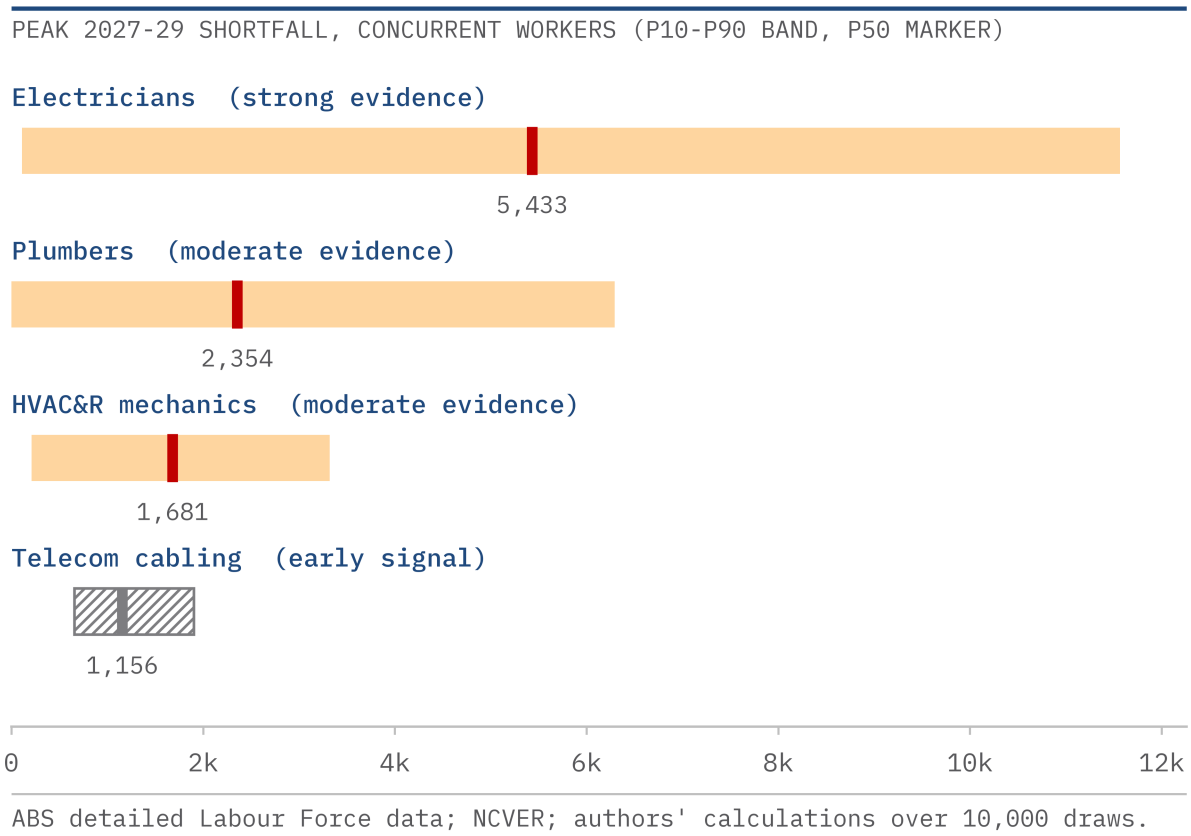


Figure 11. The shortage extends beyond electricians to other qualification-dependent trades

Notes: Estimates show peak concurrent workforce gaps by trade. The P10–P90 range and median are shown for each trade. Evidence labels reflect each model's ability to reproduce the historical official employment series before projection; results for smaller and noisier trade series should be interpreted as moderate evidence or early signals, as labelled. The telecommunications series is excluded from the composite share and carried as an early warning. **Source:** Australian Bureau of Statistics detailed Labour Force data; National Centre for Vocational Education Research; authors' calculations.

Construction programmes do not move at the pace of average workforce availability; a project moves at the pace of its binding constraint. A data centre cannot be commissioned without electrical systems, cooling systems, hydraulic and fire systems, and telecommunications fit-out; a home cannot be completed without the same basic licensed work, nor a transmission project built without specialist electrical labour.

5. Data centres are the largest addition to a shortage they did not create

The public debate has often been framed as though the relevant question is whether data centres are creating the skills shortage. The model points to a more complicated, and more useful, answer.

The workforce baseline is the root cause. When the model removes every new data-centre project from the pipeline and reruns the same 10,000 futures, a shortfall still occurs in 67.74 per cent of them. The housing and energy programmes outrun the licensed workforce on their own, in most plausible futures. Whether a shortage exists does not depend on data centres.

Data centres are the largest single contributor to how big the median shortfall is. With the data-centre pipeline included the median peak gap is 5,433 concurrent electricians, and with every new data centre removed it is 1,662. The difference between those two medians is 3,771 workers, which is 69.4 per cent of the median gap on that reading, the difference of the two independently ordered medians. Read as a multiple rather than a share, the data-centre pipeline roughly triples the median shortfall. Alternative readings of the same attribution sit lower and are reported in the appendix; the reading in use is named wherever the figure appears.

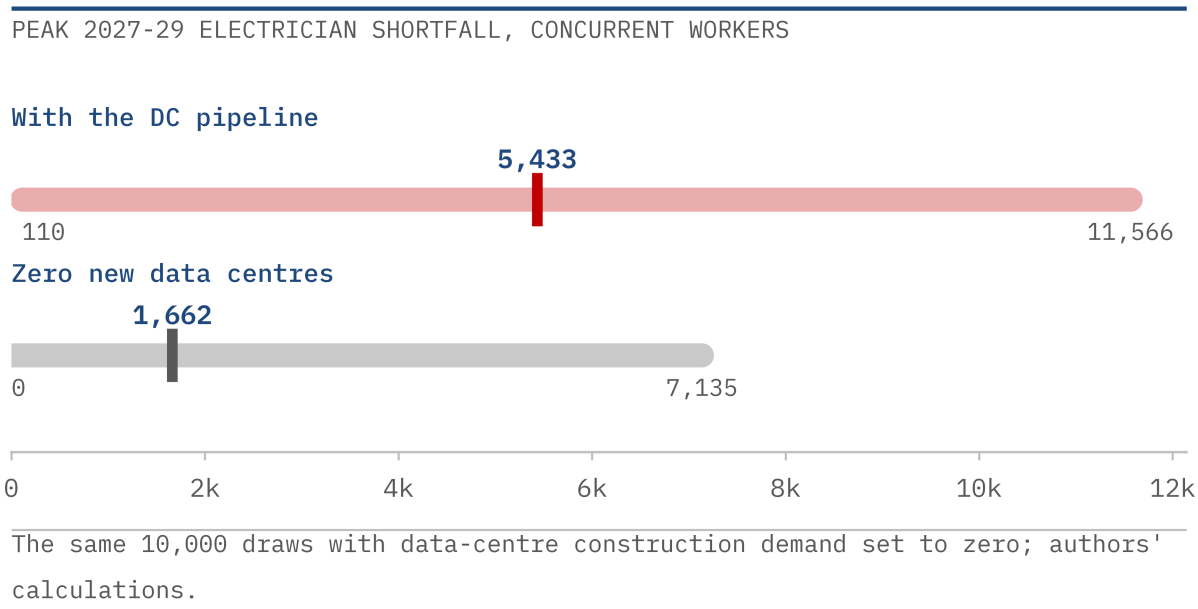


Figure 12. Even without new data centres, a shortfall persists in 67.74 per cent of futures

Notes: The counterfactual removes new data-centre projects in the staged pipeline captured by the project register, while retaining existing data-centre activity and all other modelled demand, and reruns the same 10,000 futures. A shortfall occurs in 67.74 per cent of futures without the pipeline, against 90.64 per cent with it; the median gap falls from 5,433 to 1,662 concurrent electricians. The 69.4 per cent attribution share quoted in the body is the difference of those two medians as a share of the first, and is not the share within any one future. The counterfactual estimates the contribution of the identified new-build pipeline under the model's assumptions; it should not be interpreted as the labour demand of the data-centre sector as a whole. **Source:** Authors' calculations.

Both findings are true at once, and the reason is the shape of the arithmetic. The shortfall is a residual: demand minus the workforce that remains after every measured supply channel has done its work. Supply is fixed in the window, because nothing that starts in 2026 arrives before 2030. So the housing and energy programmes consume the workforce almost to its ceiling on their own, and every unit of marginal demand that arrives on top lands entirely inside the shortfall rather than being spread across the build. Data centres are the marginal claimant. Removing them does not repair the baseline; adding them multiplies the gap.

This distinction is critical for policy, in both directions. A strategy focused only on blocking, deferring or criticising data centres would not solve the structural problem, because the shortage appears anyway in 67.74 per cent of futures, and Australia would still lack the workers to deliver its housing and energy commitments on their current schedules. Equally, the finding that the baseline is the root cause is not a licence to wave the pipeline through, because on a workforce already at its edge the pipeline is the difference between a median shortfall of 1,662 workers and one of 5,433. Data centres did not create the constraint, and they are the largest single claim being added to it.

The report's "phantom demand" test reinforces the risk framing rather than weakening it. Public debate often focuses on whether announced data-centre capacity is real. But the model already stages and discounts projects according to their likelihood of proceeding, and the most speculative capacity is heavily discounted before it reaches the workforce ledger. Settled either way, the contested in-assessment pipeline cannot open a central-path gap even at its extremes, and it is one of the model's two smallest sensitivities. The more consequential question is whether Australia has planned for the aggregate workforce demands of the projects that do proceed, rather than whether every proposal becomes a built facility.

Data centres decide who wears the shortage far more than whether one exists.

6. Who bears the brunt of the shortage?

A labour shortage does not affect all claimants equally.

In a market, scarce licensed labour will tend to move toward projects that can pay more, offer more secure work, absorb delays, centralise procurement, or otherwise outbid competing employers. The model represents this as a strict allocation ordering: hyperscale data centres first, then major energy and infrastructure projects, then commercial construction, and finally housing.

That ordering is deliberately stylised. It does not predict that every electrician will literally choose a data centre over every house; it identifies where the shortage is likely to land when project margins and bidding capacity differ. The ordering decides who wears the gap, not its size.

Under that allocation, housing bears the residual shortfall.

At the worst quarter of the modelled period, the missing electricians translate into a dwelling-completion rate about 34,000 dwellings per year slower than the model's expected housing path, in the median future. The P10–P90 range is about 850 to 73,000 dwellings per year, and on the central path the rate is zero, because the central path does not breach. With no new data centres at all, the housing and energy programmes still slow home-building by about 10,400 dwellings a year at the same point, leaving about 31 per cent of the median slowdown in place. About 24,000 dwellings a year of the median rate is attributable to the data-centre pipeline, on the same difference-of-medians reading as the workforce attribution.

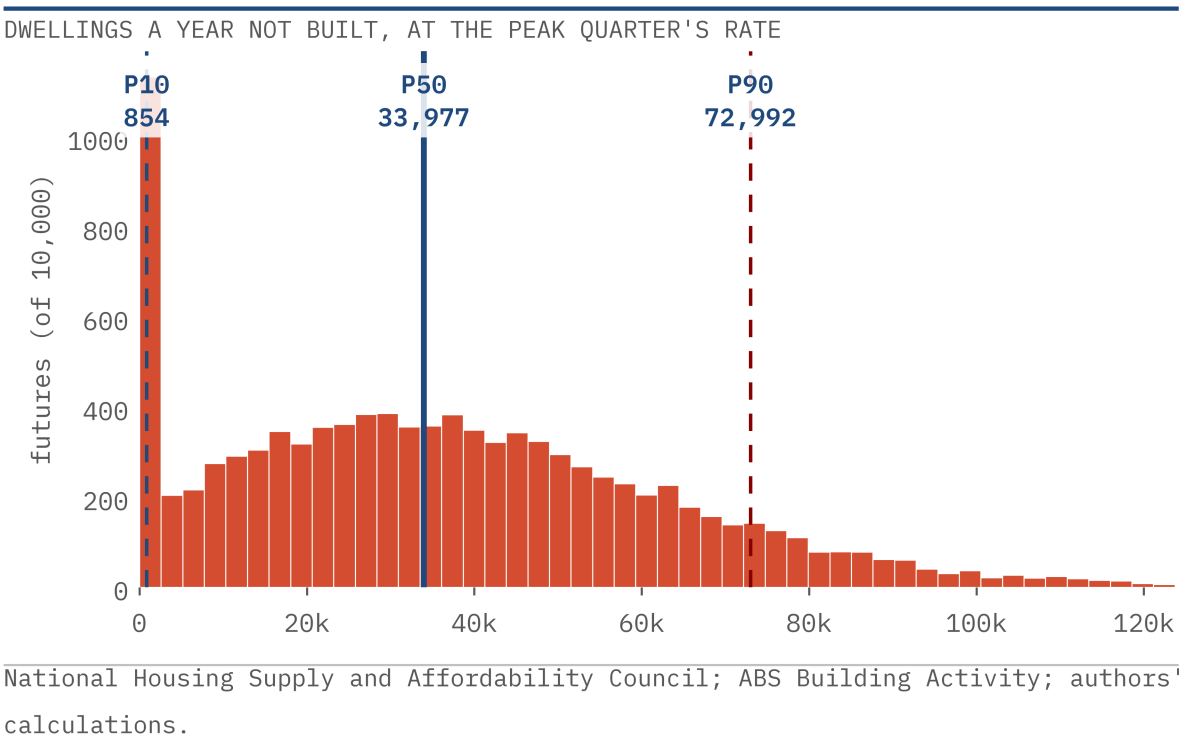


Figure 13. Under a strict market allocation, the residual shortage falls on housing

Notes: This is an annualised peak-quarter estimate of the residual housing effect under a strict allocation scenario in which more highly capitalised projects secure scarce licensed labour ahead of lower-margin residential construction. It is a rate at the worst quarter, expressed in dwellings per year, and an upper bound on housing incidence by construction, because the allocation assigns the entire residual to housing. The attribution reading is the difference of medians, stated in the body beside its counterfactual. In practice, effects may occur through delay, changed project timing, higher costs, substitution or other adjustments. **Source:** Authors' calculations using National Housing Supply and Affordability Council and Australian Bureau of Statistics Building Activity data.

The figure is a rate at the model's worst quarter, in the median of futures that breach, and it is neither a cumulative count of homes nor a forecast of any particular year's completions. Because the allocation assigns the entire residual to housing, it is an upper bound.

In reality, some of the adjustment would occur through higher wages, longer project timelines, altered designs, changed procurement strategies, greater use of prefabrication, lower margins, or delayed activity across multiple sectors. That would redistribute the shortage without eliminating it.

The trade that constrains the dwelling rate is usually not the electrician, because HVAC&R mechanics are the binding trade for home delivery in 73.5 per cent of futures. A house is finished at the pace of its scarcest qualification-dependent trade, and the scarcest trade for housing is frequently the one with the thinnest policy attention.

Data centres also convert abstract megawatts into a more concrete construction trade-off. One gigawatt of data-centre construction occupies roughly 360 electricians and about 190 workers across the other three key trades for close to three years. The four-trade content is equivalent to that of roughly 1,900 to 6,700 homes, depending on which trade runs out first.

This is a resource-content equivalence, not a calculation of homes lost or displaced, and every major build consumes scarce licensed labour that cannot be simultaneously deployed elsewhere.

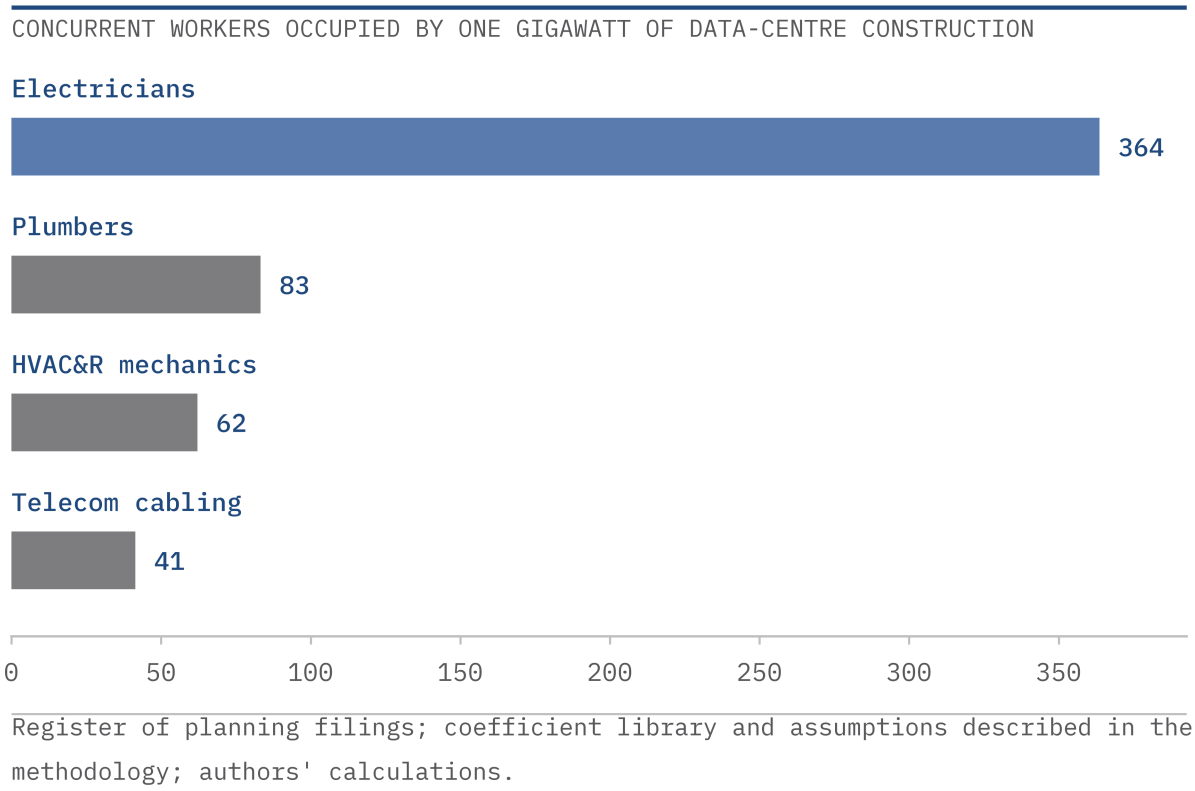


Figure 14. One gigawatt of data-centre construction consumes the qualification-dependent trade content of thousands of homes

Notes: The comparison expresses the estimated qualification-dependent trade content of one gigawatt of data-centre construction as an equivalent number of dwellings, depending on which trade is assumed to bind first. It is a resource-content comparison, not an estimate of homes lost, delayed or displaced by an individual data-centre project. The build-duration divisor is a declared judgement over sourced observations (2 to 3.5 years, central 2.75). **Source:** Register of planning filings; coefficient library and assumptions described in the methodology; authors' calculations.

The collision is also geographical. The data centres are being built where the tradespeople are not. Nowhere is that more visible than western Sydney. The four western Sydney areas identified in the model, Blacktown, Outer West and Blue Mountains, South West, and Outer South West, contain about 36 per cent of the staged data-centre pipeline captured by the two-state register, an upper bound given the register's scope, against 9.6 per cent of the two states' trades workforce measured on the matched basis.

The cleanest statement of the local pressure is a utilisation series: demand as a share of the workers available to meet it. On the central path, in no quarter of the 2027–29 window does national demand exceed 98 per cent of the available electrician workforce. The corridor exceeds 100 per cent of its available electricians in all twelve quarters of the window, peaking at 139 per cent. The corridor's shortfall at the peak-gap quarter is 434 to 1,103 concurrent electricians depending on the supply basis, with a central of 785; across the model's full scenario bounds the range runs from roughly zero to 4,300.

The supply-basis band needs plain words, because an earlier version of this analysis handled it badly. Corridor workforce supply can be counted where electricians live or where they work, and the two disagree: 7,330 electricians lived in the corridor at the 2021 Census while 5,251 worked there, a net outflow of 2,079, or 28 per cent of the resident workforce. The corridor is a net exporter of electricians, so a residence-based count overstates what is locally available, and that earlier version disclosed the bias in the wrong direction. Neither basis is forward supply, since residence is an upper bound on local availability and the 2021 place-of-work reading is a lower bound, affected by the restrictions in force on Census night. The band spans both, and what matters is the disclosure itself, because the corridor gap depends on a basis choice the model previously made silently.

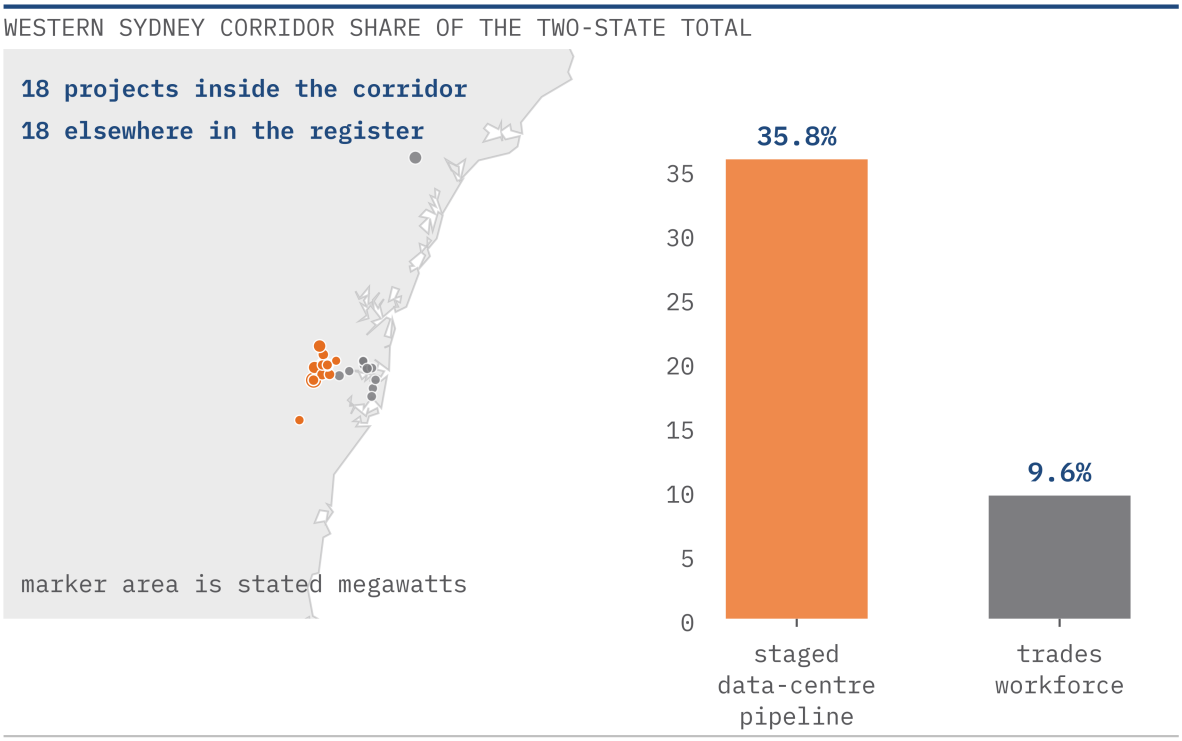


Figure 15. Western Sydney's data-centre pipeline is concentrated far beyond its share of the trades workforce

Notes: The corridor comprises Blacktown, Outer West and Blue Mountains, South West, and Outer South West. The 36 per cent pipeline share refers to the staged capacity captured in the register and is an upper-bound estimate given the register's two-state scope: the market operator reports a further 1.5 GW of data-centre connection capacity in South Australia that the register does not cover, and entering it hypothetically would put the corridor share at roughly 33 per cent on the register's staging basis, about 29 per cent with that capacity unweighted. The matched workforce share is the corridor's share of the New South Wales and Victorian trades pool; the corridor's share of the national pool is about 5 per cent, and the two-state MW share is never paired with the national workforce share. Workforce supply is measured at the four-digit occupation level and carried as a band between where electricians live and where they worked at the 2021 Census; more electricians live in the corridor than work there, so a residence-based measure overstates local availability, and the place-of-work end carries the Australian Bureau of Statistics' own caution about Census-night restrictions, with 14 per cent of the corridor's place-of-work records imputed. The corridor also applies two national ratios locally, which likely overstates availability for a young, greenfield dwelling stock. The corridor is a working definition of four adjacent statistical areas; the Census journey-to-work extract that would replace it with a measured commuting catchment is held for a post-publication refresh. The local model omits energy-transition demand and is therefore conservative on that dimension. The shortfall range is a low–central–high scenario range (roughly zero to 4,300), not a P10–P90 interval. The corridor boundary itself is not drawn on the map, because the statistical-area boundaries are not carried in the data behind the figure; the map therefore shows which projects fall inside the corridor without showing where its edge runs. **Source:** Australian Bureau of Statistics Census; register of planning filings; authors' calculations.

Commuting is not, by itself, a complete answer. Workers can move between sites, suburbs and states, but commuting redistributes a metropolitan or national labour pool that is itself under pressure, and the Census evidence is that this corridor already sends more electricians out each morning than it receives. Commuting moves scarce workers around; it does not add any.

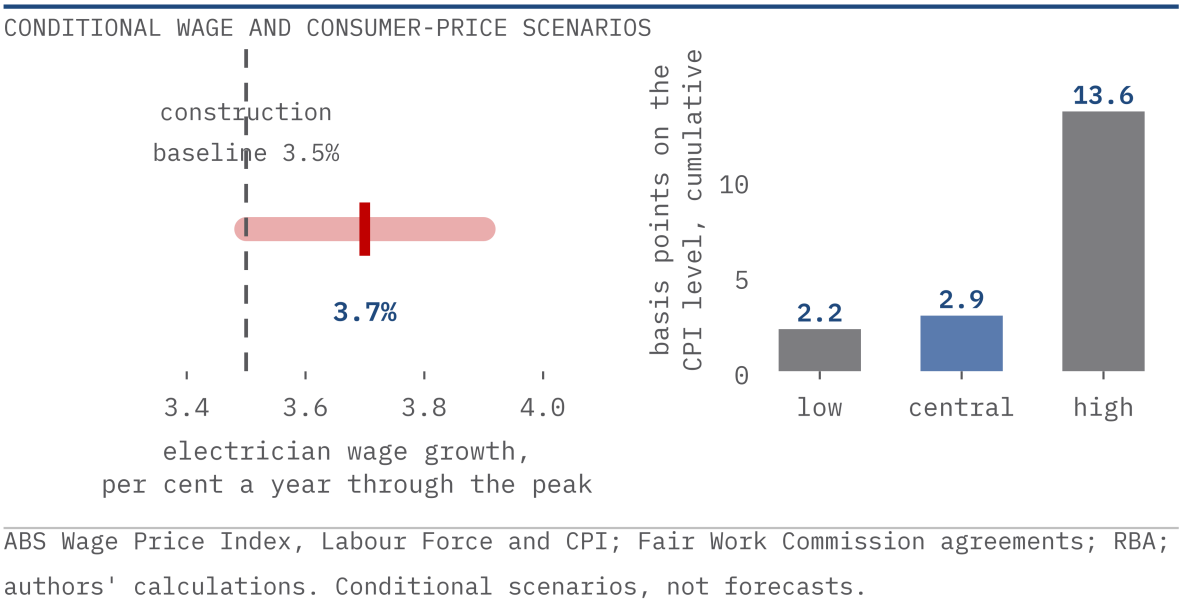
7. What the usual responses can close, and what they cannot

The most common response to a projected labour shortage is that the market will solve it through higher wages. That response is partly right, since wages are likely to rise if demand outstrips the available workforce. But in the short term higher wages are primarily an allocation mechanism, shifting workers between employers and projects more quickly than they create new licensed workers.

The evidence from Australia's last comparable period of construction-labour tightness, the Western Australian resources boom, does not permit a clean estimate of the wage-induced supply response for electricians. The workforce expanded, but the available public data cannot distinguish how much of that expansion resulted from relative wages, interstate movement, migration, apprenticeships, project deferral, or broader changes in Western Australia's economy. The report does not claim that wages have no supply effect; the narrower claim is that no available Australian evidence demonstrates a large, identifiable wage-induced increase in the national supply of electricians over the relevant time frame.

What the model can estimate is the likely wage pressure if the shortfall is realised. Drawing on the Western Australian episode as an analogy, and conditional on the gap, electrician wage growth runs at about 3.5 to 3.9 per cent a year through the peak, with a central estimate of 3.7 per cent, about 0.2 percentage points above the construction baseline. The direct effect on headline inflation through the one channel that can be quantified, new-dwelling construction labour, is small: an estimated 2 to 14 basis points on the level of consumer prices, cumulative over the window, with a central estimate of about 3.

The larger cost is not economy-wide inflation but the construction that is delayed or displaced.



ABS Wage Price Index, Labour Force and CPI; Fair Work Commission agreements; RBA; authors' calculations. Conditional scenarios, not forecasts.

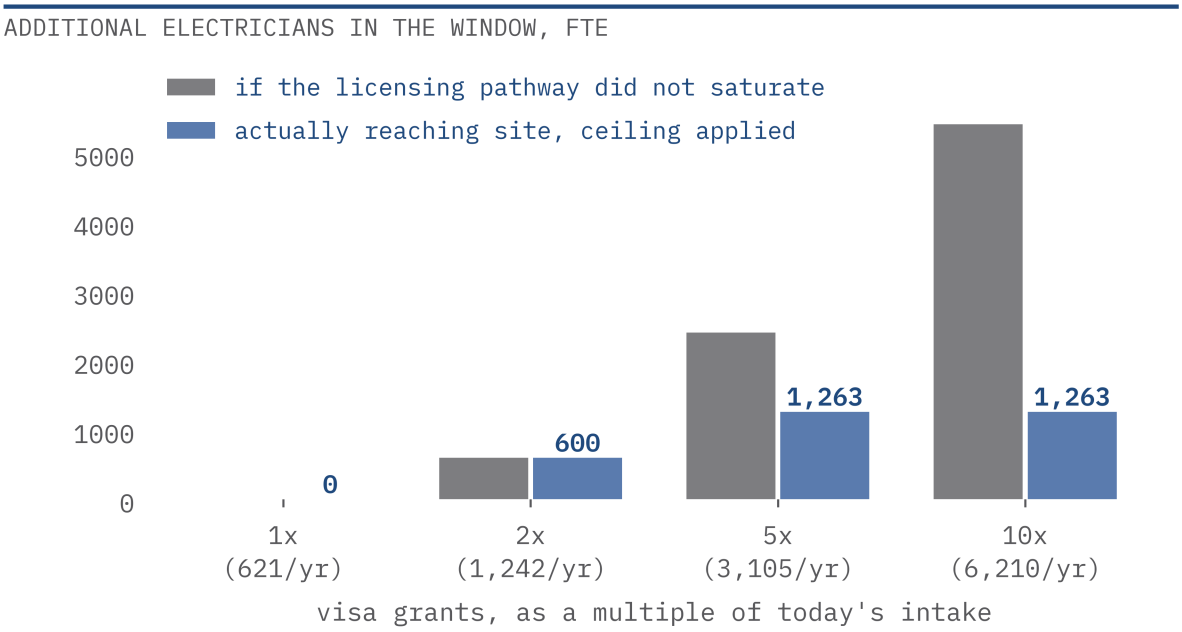
Figure 16. Electrician shortages are more likely to raise construction costs than headline inflation

Notes: Wage estimates are conditional scenario results calibrated to the Western Australian resources-boom episode; they are not forecasts of wages or a measured wage elasticity of electrician supply. The consumer-price estimate covers only the direct new-dwelling construction-labour channel, is cumulative over the window rather than annual, and excludes land, materials, imported equipment, energy and second-round effects. **Source:** Australian Bureau of Statistics Wage Price Index, Labour Force and CPI data; Fair Work Commission agreements; Reserve Bank of Australia; authors' calculations.

Higher wages may influence who receives scarce labour, but they cannot create a large new licensed workforce before the peak. And while training more apprentices is indispensable, it also cannot materially change the workforce available during 2027–29. The qualification lag is mechanical, and an apprentice commencing in 2026 would generally not be expected to enter the fully qualified workforce until around 2030.

Skilled migration helps, but its near-term effect is constrained by the capacity of the recognition-to-licence system. Australia granted about 620 primary skilled visas to electricians in 2024-25, close to the historical peak. Modelled scenarios that double visa grants add about 600 electricians within the relevant window. Lifting grants to five or ten times current levels does not produce a proportionate increase in workers on site, because the recognition-to-licence pathway becomes the binding constraint, with modelled throughput saturating near three times today's intake, a labelled assumption with wide bounds because no published measure of the system's capacity exists. At five times current grants the window gains about 1,263 workers, and at ten times, the same 1,263.

The finding is not that migration is unhelpful but that visa policy and licensing policy cannot be treated as separate levers, because once recognition, provisional licensing, supervised practice and full licensing reach capacity, additional visas queue upstream of the workforce the system is intended to expand.



Department of Home Affairs visa grants; recognition-pathway throughput; authors' calculations over 20,000 draws.

Figure 17. Skilled-migration gains plateau without more recognition and licensing capacity

Notes: Scenarios estimate the number of additional electricians likely to enter the qualified workforce under alternative visa and recognition-to-licence throughput assumptions. They are not forecasts of visa policy or migrant outcomes. The recognition-throughput ceiling is a stated modelling assumption with wide bounds, because no consistent public measure of system capacity is available. **Source:** Department of Home Affairs visa-grant data; licensing-throughput assumptions described in the methodology; authors' calculations.

Each lever is real and each has a ceiling. Retention is the largest and fastest, with reduced quarterly exits adding a central 1,200 full-time-equivalent workers within the window, a range of 800 to 1,640, and a cost that falls on employers rather than the public purse. Re-activation of licensed but non-practising electricians adds a central 1,029, with a range of 206 to 2,534; it is about a quarter of the supply-side response, and it rests on the weakest evidence in the package. The pool is an upper bound on an upper bound, derived from a decomposition of the New South Wales licence register, and the take-up band of 5 to 25 per cent that multiplies the whole lever is a judgement because no registered source states what share of that pool would return to the trade. Raising apprentice completion rates by five percentage points adds a central 701, though the observed cohort-to-cohort movement in completion rates over the past decade never reached five points. Doubling migrant-licensing throughput adds about 600. Doubling the female commencement-share trajectory adds a central 400 within the window, with a range of 200 to 700, and most of its effect arrives after 2030; the range is a judgement because the national training collection publishes apprentice sex splits at trade and non-trade level rather than for electricians, so no derivation exists from registered sources. And a training surge beginning in 2026 adds zero within the window, by lag arithmetic alone.

One further lever works on the other side of the ledger. An eight-quarter deferral of the discretionary data-centre pipeline, projects not yet under construction and not yet committed, moves about 1,298 concurrent electrician positions out of the binding quarters. It adds no workers; it moves work past the peak. It is counted in the package because the package is measured against a peak-window gap, and deferring peak demand closes that gap exactly as adding a worker does.

Put the plausible central of every lever together and the package totals 5,228 full-time-equivalent workers against a median gap of 5,433.

A plausible package closes 96.2 per cent of the median electrician gap, a result that reads differently from every earlier assessment of this collision. About 4 per cent of the median gap, roughly 200 workers, remains. On the middle of the distribution, the problem is closable with measures that are individually unremarkable.

The urgency survives that arithmetic; it has moved out into the distribution. The same package covers 45.2 per cent of the P90 gap of 11,566, so in the hard futures, the ones where the coefficients run high and the exits run fast, more than half the shortfall stays open after everything plausible has been done. Even the aggressive combination, every lever at its maximum plus the deferral, totalling 9,491, clears the median entirely and reaches 82 per cent of the P90, leaving 18 per cent of the hard futures' gap beyond every lever the model can defend. And no lever in either package is aimed at western Sydney, where the collision concentrates regardless of which future arrives.

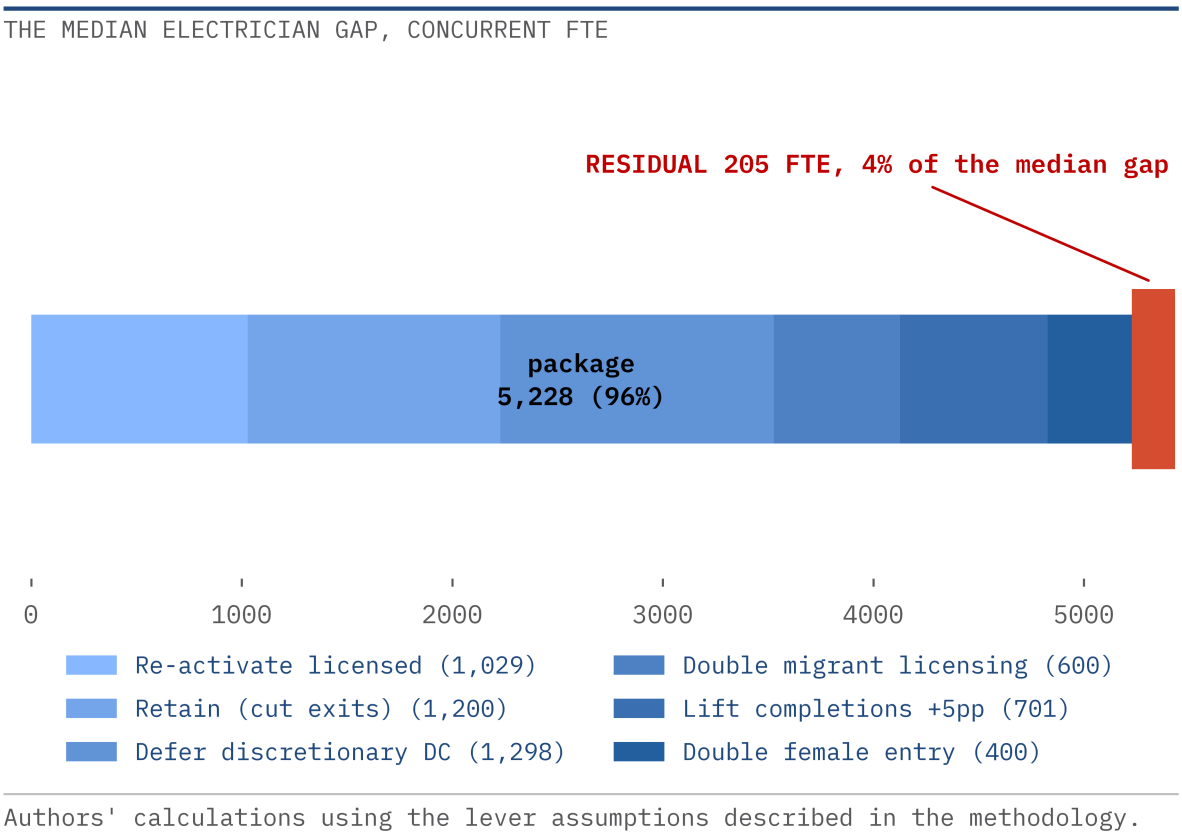


Figure 18. The plausible package closes the median future, and less than half of the hard ones

Notes: Estimates show the combined effect of retention, re-activation, completion, participation, migration-licensing and project-sequencing measures against the median and P90 peak electrician gaps. The plausible package closes 96.2 per cent of the median gap and 45.2 per cent of the P90 gap; the aggressive variant covers the median and 82 per cent of the P90. They are scenario results, not forecasts of policy implementation. Measures may interact, face delivery constraints and take longer to affect the qualified workforce than assumed. The re-activation take-up band is unsourced and the female-participation range is a judgement; both are disclosed in the appendix. The package should not be read as evidence that component effects can be added mechanically outside the model. **Source:** Authors' calculations using the lever assumptions described in the methodology.

None of this is a counsel of despair. The package is worth doing, because it converts the median future from a shortfall of about 5,400 into roughly balance. What it cannot do is buy insurance against the futures the evidence cannot rule out. Training is essential but slow, and migration is useful but bottlenecked. Retention is immediate but bounded, and re-activation rests on an unsourced take-up. Wage growth reallocates labour before it expands it, and sequencing alone reduces peak demand itself, which makes it the one measure that acts as fast as the window closes.

The aim is not to deter data-centre investment but to align the timing of the most flexible projects with the workforce that will actually be available to build them, before the hard futures arrive rather than after.

8. What government should do

Why has nobody seen this constraint whole? The instruments that would have shown it did not lapse by accident, and the answer decides who each recommendation is addressed to. Unlike the quantified findings, which come from the model, the observations in the next two paragraphs rest on the public institutional record.

Every piece of the problem is administered by somebody. Electrical licences are issued by the states and territories, each keeping its own register on its own definitions; the New South Wales register this report decomposes cannot be compared, row for row, with its counterparts elsewhere. Apprentice training is counted nationally by the National Centre for Vocational Education Research and supported through Commonwealth completion payments, while the licences its graduates need are issued state by state. Skilled visas are granted by the Commonwealth through the Department of Home Affairs; the skills assessments behind them run through a Commonwealth trades-recognition pathway; the provisional licences and supervised hours that turn an assessed migrant into a working electrician belong to the state and territory regulators. The electricity market operator publishes the grid plan and measures data-centre connections quarterly, while the projects behind those connections are approved through state planning systems, and, of the jurisdictions checked, only New South Wales requires a data centre to state its electrical capacity on the way through. Employment itself is measured by the Australian Bureau of Statistics, whose detailed trade-level series published its final edition in the year the build begins.

No government designed this arrangement, and each part of it is administered competently on its own terms. The difficulty is what a federation produces when a problem crosses every seam at once, because the constraint exists only in the sum, and the sum is nobody's responsibility. A shortfall visible only when state licence registers, Commonwealth visa grants, national training counts and three construction pipelines are added together is invisible to every party holding one piece, and no party has reason to build the instrument that would reveal it, because none is accountable for what it would show. The 290 registered public documents behind this report had to be assembled precisely because no institution had cause to.

That is why the recommendations below name their actors, and why they are ordered by what the model says each can deliver inside the 2027–29 window rather than by how familiar each is. The first five act inside the window; section 8.6 matters for the build after this one; section 8.7 serves both.

8.1 Sequence the peak deliberately

Sequencing means moving some construction out of the 2027–29 peak so that the three programmes stop drawing on the same workers in the same quarters. It is the only kind of measure examined in this report that reduces peak demand rather than adding workers, and one of only two that act immediately.

The recommendation is deliberately neutral about which programme moves. Peak demand can come down by moving discretionary data-centre capacity or by rephasing elements of the housing or energy programmes; these are real alternatives with real costs, and choosing among them is a decision for

governments, on considerations this report does not model. The trade-off is currently being made by default, because sequencing happens across the concurrent period whether or not anyone decides it, and when no government chooses what moves, the best-capitalised projects hire first and Section 6 shows where the residual lands. The peak will be sequenced either way; what governments decide is whether that sequencing is a decision or a consequence.

The measured case is the data-centre one, because that pipeline is the least committed of the three and the most readily rescheduled, since housing answers an acute shortage and the grid build is tied to reliability and the retirement of existing generation. In the tested case, an eight-quarter deferral of discretionary capacity, meaning projects not yet under construction and not yet committed through binding connection, procurement or delivery arrangements, moves about 1,298 concurrent electrician positions out of the binding quarters. The same arithmetic would apply to any deferral of comparable size in any of the three programmes, but only this case was measured, and the figure belongs to it.

The mechanism is the same whichever pipeline governments elect to move: a transparent, prospective framework with published criteria, distinguishing projects already committed from those still capable of being rescheduled without unreasonable disruption, and excluding anything whose delay would create material reliability, security or contractual risks. The actors are the states and territories, through their planning approvals, connection processes and major-project decisions; the Commonwealth can convene and set expectations, but the mechanism must be created where approvals and grid connections are governed. Sequencing requires neither cancelling projects nor interfering with facilities already under construction; it is a scheduling tool, not an anti-investment tool.

The limits are honest ones. Deferral moves work rather than removing it, and demand moved out of the peak lands after 2030, on the workforce the training measures below are meant to build. And the lever shrinks as time passes, because capacity that reaches binding commitments before a framework exists stops being available to move.

8.2 Keep the electricians Australia already has

Retention means slowing the rate at which qualified electricians leave the trade. The model credits it with a central 1,200 workers inside the window, with a range of 800 to 1,640, which makes it the largest immediate supply-side lever, at no cost to the public purse, because retention is bought through pay and conditions and the cost falls on employers. Its weight goes beyond its size, because the exit rate is the single largest sensitivity in the entire model, able to open a gap of 6,746 workers across its plausible range, so the number the model is most uncertain about is also the one retention acts on.

What the registered sources establish is the rate, not the reasons. The skills agency's data shows how fast electricians leave, and that the exit rate has already fallen 3.9 percentage points over five years; no registered source records why individual licensed electricians leave or what would keep the next one, and the survey that came closest ended in its current form in February 2026, with its successor publishing first estimates in April 2027, in the middle of the window. The

largest immediate lever is therefore the one with the thinnest evidence on how to pull it, which is itself a finding, and section 8.7 says what would fix it.

The actors are employers first, since they set the pay and conditions retention is made of. Under-delivery has a specific shape: exits have already fallen substantially, so further gains push against improvements already banked.

8.3 Bring back licensed electricians who are not practising

Some people hold current electrical licences but do not work in the trade: they manage, estimate, teach, or work in adjacent occupations. Re-activation means identifying them through the licence registers and drawing some back to site. The model credits it with a central 1,029 workers inside the window, with a range of 206 to 2,534, and it is the fastest supply lever after retention, at under a year. It also rests on the weakest evidence in the package, because the pool is derived from a decomposition of the New South Wales licence register and is an upper bound on an upper bound, and because no registered source states what share of that pool would return, so the take-up band of 5 to 25 per cent that multiplies the whole lever is a judgement rather than a measurement.

The actors are the state and territory licensing regulators, who hold the registers that would identify the pool; in New South Wales that is the Fair Trading register this report decomposes. The risk follows from the evidence, since the lever under-delivers if the pool is thinner than the register suggests, because licence holders in management, estimating and teaching sit inside the count and are the least likely to return, and it under-delivers badly if take-up lands at the bottom of a band nobody has measured.

8.4 Expand recognition and licensing capacity before expanding visas

An overseas-trained electrician does not walk from a visa onto a site, because the pathway runs through a skills assessment, a provisional licence, supervised work and a full state or territory licence, and each stage has its own capacity. Doubling visa grants adds about 600 electricians inside the window, but the pathway saturates near three times today's intake, so five times the grants delivers about 1,263 and ten times delivers the same 1,263. Beyond the ceiling, additional visas queue upstream of the workforce they are meant to expand.

Responsibility for that pathway is split. Visa numbers, and the occupation list they ride on, are the Commonwealth's, through the Department of Home Affairs; the trades-side skills assessment runs through the Commonwealth's trades-recognition pathway; the provisional licence, the supervised hours and the full licence belong to the state and territory electrical regulators. The recommendation is to expand the assessment-to-licence stages first and let visa settings follow the capacity that actually exists.

Two cautions attach. The ceiling itself is a labelled assumption with wide bounds, because no published measure of the pathway's capacity exists; section 8.7 returns to that. And supervised hours consume the time of licensed electricians, the scarce resource itself, so an expansion designed without regard to supervision load can subtract from the workforce it means to add.

8.5 Raise apprentice completion rates

Completion measures act on apprentices already enrolled, which is why some of their effect arrives inside the window when recruitment cannot. Raising the completion rate by five percentage points adds a central 701 workers in the window, with a range of 651 to 751, arriving over one to three years. The Commonwealth's apprenticeship completion payments are the existing instrument, and employers and training providers hold the conditions that decide whether an apprentice finishes.

The ceiling is history. Across the cohorts observed over the past decade, no cohort-to-cohort improvement in the completion rate has approached five points; the target exceeds anything the record has produced, and the aggressive ten-point variant is beyond the observed range entirely. The recommendation stands because the machinery exists and the direction is right, but the model treats the size with appropriate suspicion.

8.6 The build after this one

Three measures on the list deliver little or nothing before 2030, and they answer a different question. Recruiting more apprentices delivers zero qualified electricians this window, because the four-year apprenticeship is mechanical and a surge that begins in 2026 arrives from about 2030. Doubling the trajectory of female participation in the trade adds a central 400 within the window at the margin, with most of its effect after 2030, and its range is a disclosed judgement, because the national training collection publishes apprentice sex splits at trade and non-trade level rather than for electricians. Hyperscaler-funded apprenticeship places, tied to connection or approval on the model of training commitments attached to major industrial investments overseas, contribute up to 300, mostly after the window.

None of this argues for delay; begun now, these measures decide whether the next build starts with the pipeline this one lacked. The actors are the Commonwealth and the states through the training system, and, for funded places, the data-centre proponents themselves. Australia should treat trades capacity as national economic infrastructure, as foundational to housing, energy, digital capability and industrial policy as ports, transmission lines or roads.

8.7 Restore the measurements

Every recommendation above leans on at least one instrument that no longer publishes or never existed. Figure 19 sets out each one: what has degraded or was never created, who would restore it, and what it would make visible. The connections to the levers matter most. The successor to the job-mobility survey is what would show which exits are reversible, exactly the evidence the retention lever lacks; published recognition-to-licence throughput would turn the migration ceiling from a labelled assumption into a measurement; and deliberate sequencing needs to see the pipelines, one of which, in most jurisdictions, is not required to state its capacity.

Figure 19. The workforce data Australia lacks, and what would restore it

What needs measuring	What has changed	Who restores it, and how	What it would make visible
Employment by detailed trade	The final ANZSCO occupation reference quarter was February 2026 and the detailed publication has ceased; resumption on the new Occupation Standard Classification for Australia (OSCA) is announced from the September 2026 reference period, with backcast estimates.	ABS, with Commonwealth support: publish quarterly at a level that identifies the key qualification-dependent trades, with a usable backcast linking OSCA to ANZSCO.	Whether the supply of electricians, plumbers, HVAC&R mechanics and cablers is rising or falling, and where; invisible since the February 2026 quarter.
Movement into and out of trades	The Participation, Job Search and Mobility survey was last conducted in its previous form in February 2026; its replacement publishes first estimates in April 2027.	ABS, with Commonwealth support: the annual successor must identify a worker's current and previous occupation at detailed trade level.	Whether qualified workers are retiring, changing occupations, moving interstate or returning: the exits retention could reverse.
Training completions and apprentices in progress	Detailed training data is collected but not consistently published as a standing series at the individual-trade level.	Commonwealth, through the national training collection: publish commencements, completions and in-training stocks at four-digit occupation level, with duration and completion-rate information, as a standing series.	Which pipelines will supply qualified workers, and when.

What needs measuring	What has changed	Who restores it, and how	What it would make visible
Licences and recognition throughput	Licensing information is fragmented across states and territories, and occupation-specific recognition capacity for overseas-trained workers is not published.	Commonwealth assessing bodies and state and territory regulators: expand capacity across skills assessment, provisional licensing, supervised-hours arrangements and full licensing, and publish occupation-level throughput.	How quickly a visa grant becomes a worker on site; turns the migration ceiling from a labelled assumption into a measured quantity.
Telecommunications trade workforce	The national registration count was last published for 2018-19; the scheme itself, administered by the Australian Communications and Media Authority, continues, so only publication stopped: the cheapest restoration on this page.	Commonwealth, through the Australian Communications and Media Authority: publish the count the live scheme already holds.	A current national measure of the data-centre fit-out trade.
Wages by state and industry together	The wage index is published by state and by industry, never both at once; the record indicates a formatting decision rather than a confidentiality constraint.	ABS, with Commonwealth support: publish the existing index at the state-by-industry cut.	Whether pay is pulling workers into the trades; settles the report's first falsification condition in either direction.

What needs measuring	What has changed	Who restores it, and how	What it would make visible
Data-centre capacity, location and timing	Electrical capacity, expected connection dates and project location are not consistently disclosed through planning and connection processes; today the market operator's quarterly connection data is the first point at which most capacity becomes visible, just before it is built.	States and territories: make electrical capacity, proposed connection date and project location standard requirements in planning and connection processes; battery and generator thresholds in the same instruments show the drafting is routine.	Where large new construction and electricity loads will cluster, in time to plan for them.
The aggregate view	No instrument holds it, because no party is responsible for the sum.	Commonwealth, states and territories jointly: connect the restored instruments into a public quarterly trades-capacity index; a publication drawing on collections that already exist, not a new institution.	An early-warning system for workforce constraints before major construction programmes compete for the same qualification-dependent trades.

Source: Australian Bureau of Statistics; Australian Communications and Media Authority; National Centre for Vocational Education Research; state and territory planning instruments; Australian Energy Market Operator; authors' compilation and recommendations.

Taken together, these gaps mean Australia lacks a continuously updated view of the workforce it needs and the projects competing for it, and they are not mere technical statistical issues. They decide whether governments can answer basic questions: is the supply of electricians responding, which workers are leaving, can wages draw people back, where are new projects landing, and which trade is likely to become the next binding constraint?

The index in Figure 19's final row is the final layer, not the first step, and not an institution, but a quarterly publication assembled from instruments governments

already run, once they publish again, and it cannot compensate for missing source data. Preventing a repeat requires no new bureaucracy and no speculative national forecasting apparatus, only that the datasets and disclosure rules above be maintained and connected. The objective is not a single definitive forecast but enough warning for governments to sequence projects and target training and licensing reform before shortages are resolved through delay and crowd-out.

Australia does not need perfect foresight to plan better. It needs a basic operating picture: how many licensed workers it has, how quickly that number is changing, where workers are leaving, how long it takes to train or recognise replacements, and where major projects will require them. Without that picture, governments will keep learning about workforce constraints from the projects they slow.

Conclusion: building blind is a choice

Australia should not choose between homes, clean energy and digital infrastructure as though only one can matter.

The national interest lies in delivering all three. Housing is central to living standards and social cohesion; the energy transition to a grid that stays reliable and affordable as emissions fall. Data centres may be an important part of Australia's future digital capability and economic resilience.

But these ambitions cannot be delivered credibly on a two per cent margin, with no plan for the futures in which the margin fails.

At the central reading of the evidence, the three-build programme fits inside the available workforce, barely. Across the plausible range of the evidence, it does not fit in nine futures out of ten. The shortage, when it appears, is not created by data centres. A shortfall persists in 67.74 per cent of futures with every new data-centre project removed, because Australia committed to three simultaneous construction programmes without a workforce plan adequate to the combined task. Data centres matter because they are the largest single addition to that overstretched baseline, accounting for 69.4 per cent of the median gap on the difference-of-medians reading, and because, as highly capitalised projects, they help determine who bears the cost. In an unmanaged market, that cost is likely to fall disproportionately on lower-margin and more fragmented construction, especially housing.

The policy arithmetic has a hopeful half and a hard half, and both are new. A package of six plausible measures, from retention and re-activation through completions, migrant licensing and participation to sequencing, closes 96.2 per cent of the median gap, so the middle future is closable. The same package covers 45.2 per cent of the P90, so the hard futures stay open after everything plausible has been done. The immediate task is therefore to deliver the package and to sequence flexibly timed projects, the one measure that reduces peak demand itself. The longer-term task is more fundamental, and it is to restore the public capacity to measure both the workforce and the project demand placed upon it.

The question is no longer whether the constraint is real, but whether governments will manage it deliberately or allow it to be resolved by delay and displacement, with housing last in the queue.

Appendix A. Method and interpretation

A1. Purpose and scope

This report is a capacity test, not a forecast of market outcomes.

It asks whether Australia's published housing, energy and data-centre construction schedules can be delivered concurrently between 2026 and 2031 with the licensed workforce likely to be available. It does not assume that every project will proceed exactly as scheduled or that labour markets will not adjust. Rather, it estimates the workforce demand implied if the three programmes pursue their published paths, and compares that demand with the supply available through measured training, migration and workforce-retention channels.

The analysis focuses on four regulated or qualification-dependent trades that are required across all three buildouts: electricians; plumbers; heating, ventilation, air conditioning and refrigeration (HVAC&R) mechanics; and telecommunications trades workers.

Electricians are the principal focus because the available employment data are strongest for that trade, because electrical work is required across housing, energy and data-centre construction, and because the electrician series carries the deepest evidence base in the model. Results for other trades are included, but are labelled according to the quality of their historical data and model fit.

The model operates quarterly, because the question is not simply how much labour a project requires over its full life, but how many qualified workers are required at the same time during the 2027–29 construction peak.

A2. Demand modelling

Housing

Housing demand is based on the official expected dwelling-completions path used in the report, rather than on the higher Housing Accord target itself. The model tests the workforce implications of the expected construction path, which rises to about 215,000 dwellings in the 2029 financial year, not an assumption that the 1.2 million-home target will necessarily be reached.

Dwelling completions are converted into demand for each relevant trade using labour-intensity assumptions. For electricians, the housing-intensity estimate is derived from the occupation-level residential-utilisation rate in the national building workforce model, weighted across the electrician family of occupations, and is modelled as a range rather than a single fixed value. The basis of this parameter, and the separate standing of its lower and upper bounds, are disclosed in A10.

Energy transition

Energy-transition demand draws on the Australian Energy Market Operator's published development pathway for new generation, storage and transmission infrastructure. The model converts the relevant build schedule into quarterly trade demand using trade-specific labour factors.

The energy-demand estimates are intended to represent the workforce requirements implied by the published infrastructure pathway. They are not a forecast of the final generation, storage or transmission mix, nor a judgement on the merits of individual projects. One energy input, the battery-build labour factor, is a conflict between two published sources carried as scenario bounds rather than resolved; it is among the largest sensitivities in the model.

Data centres

Data-centre construction demand is measured in electrical capacity, megawatts, rather than project announcements, operational employment or investment headlines.

Each identified project is assigned to a development stage reflecting its progress through the planning and connection process. Earlier-stage projects are discounted because not every enquiry, application or approval will become a completed facility. Only capacity that survives this staging process is converted into construction-phase trade demand.

Project stage	Minimum weight	Central weight	Maximum weight
Enquiry	0.05	0.15	0.30
In assessment	0.30	0.35	0.60
Approved	0.80	0.90	0.95
Under construction	0.95	0.98	1.00
Commissioned	1.00	1.00	1.00

These weights are intended to reflect the probability that capacity at each stage proceeds to construction. They were triangulated against three separately observed connection and development funnels: the national screen prepared for the market operator, a New South Wales distributor's connection funnel given under sworn testimony, and Victoria's probability-adjusted register. Rows that arrive already probability-adjusted are never re-weighted. The weights are not forecasts of the outcome of any individual project.

The model then converts surviving capacity into trade demand using construction labour coefficients and a project-duration assumption. Each coefficient was built three ways: harvested from statutory filings whose environmental impact statements state their own workforces; cross-checked against unit economics, what a build of that value could employ at observed cost shares; and every divergence above 30 per cent between the two investigated before a value was adopted. The EIS-anchored central of 0.94 electrician-years per megawatt is adopted over the unit-economics chain and enters the sampler rounded to 1.0. The resulting estimates refer to construction-phase workforce requirements, not to the relatively small number of ongoing workers employed once a data centre is operating.

A3. Coverage and limits of the data-centre register

Australia does not maintain a complete public register of data-centre capacity, location, construction stage and timing. The project register is therefore a staged,

evidence-based account of the visible pipeline, not a complete census of national data-centre capacity.

New South Wales provides the clearest project-level public information because significant data-centre developments generally require proponents to disclose electrical capacity through the planning process. This visibility is not complete: the relevant capacity trigger does not apply within the City of Sydney.

Other jurisdictions are incompletely observed or unmeasured. Capacity that cannot be identified consistently is not assumed not to exist. Rather, it is excluded from the base project register because its location, stage, timing or capacity cannot be established on a comparable basis. South Australia's operator-reported connection stock of about 1.5 gigawatts is handled as a named scenario band strictly outside the base model, because applying the register's staging arithmetic to an operator-reported stock applies one population's arithmetic to another.

This has two implications.

First, the data-centre component of the model should be interpreted conservatively. Where capacity is excluded because it cannot be observed consistently, the model understates data-centre construction demand.

Second, the report's national conclusions do not depend on treating the register as complete. The model is separately tested by removing all new data-centre demand. Even under that counterfactual, the combined housing and energy schedules exceed the available electrician workforce in 67.74 per cent of modelled futures.

A4. Workforce supply model

Workforce supply is modelled as a stock and flow.

For each trade, the model begins with the observed employment stock and then estimates how that stock changes over time. Qualified workers enter through apprentice completions, skilled migration and, in policy scenarios, retention and re-activation measures. They leave through retirement, occupational change, withdrawal from the labour force and other forms of attrition.

Conceptually, the model carries two series, and they answer different questions.

The first is the workforce stock, the whole trade:

Workforce stock = starting workforce + qualified inflows − workforce exits

The second is the availability series, the part of the stock the three programmes can draw on, and it is the series every utilisation and shortfall figure in this report is measured against. Most of the trade is engaged in ongoing work that continues through the window regardless of the three programmes. No published source decomposes electrician employment by type of work, so the model measures what can be measured, being the electricians the three programmes required in 2025 at their observed activity levels, and treats the remainder of the trade as an ongoing-work claim carried forward from that level at about 1.4 per cent a year. In each quarter:

Available workforce = workforce stock − ongoing-work claim

The claim's level rests on that residual construction rather than on any registered source; the arithmetic that carries it forward is derived and reproducible. Because the claim grows more slowly than the stock, the available pool widens over the window, which is generous to the build, since a construction that held availability at a fixed share of the trade would show a larger shortfall. At the peak quarter the pool is roughly a fifth of the stock, about 43,000 of about 200,000 electricians, so a finding that demand reaches 98 per cent of the available workforce means the three programmes using nearly all of that pool, not 98 per cent of the trade.

For electricians, the starting stock is 197,511 employed persons at the December quarter of 2025, with the latest observed reading at 200,971 in the March quarter of 2026. Because the detailed occupation series has ceased, these stocks are frozen at the population benchmark current at the series' final edition and can never receive a later revision; absolute workforce levels quoted in this report carry that vintage. Wherever this report expresses the shortfall as a share of "today's workforce", the denominator is the model's starting stock, which is the denominator the project's claims register fixes for published gap-to-stock ratios; measured against the later observed reading instead, one in thirty-six becomes one in thirty-seven. Wherever the shortfall is instead expressed against the available workforce, the denominator is the availability series defined above, taken at the peak quarter, which is what turns roughly one in thirty-six of the trade into about one in eight of the pool the three programmes can draw on.

The four trades' 2025 workforce residuals are computed against a 2025Q4 anchor while their housing intensities are measured on the February 2026 Labour Force reading, and the two readings differ by +1.8 per cent for electricians and −7.8 per cent for plumbers. The mismatch is measured and bounded: across the three candidate treatments derived for it, the electrician headline moves by fewer than 110 concurrent workers and the plumber peak shortfall between −170 and +356. Choosing among the treatments is reserved for review, and the bound is what the published figures rest on in the meantime.

The model does not treat apprentice commencements as immediately available labour. Electrician apprenticeships generally take around four years to complete. New commencements after 2026 therefore contribute little or nothing to the fully qualified workforce during the 2027–29 peak period.

Similarly, a skilled visa is not treated as equivalent to a licensed worker on site. Overseas-trained electricians must generally move through skills assessment, provisional licensing, supervised practice and full state or territory licensing before they can enter the qualified workforce. Migration scenarios therefore account for the practical throughput limits of recognition and licensing systems.

The supply model uses employment data, training-completion data, migration data and workforce-exit assumptions. It distinguishes people, full-time-equivalent workforce demand and annual flows where necessary; these measures are not combined without an explicit conversion.

A5. Historical checks and trade-level confidence

Before being used to assess future demand, each trade model was tested against historical official employment data. The backcast is a minimum plausibility check

rather than a proof of foresight, since a model that cannot reproduce the broad pattern of the workforce it is intended to describe should not be relied upon for forward-looking analysis.

The report uses a historical-fit threshold of 5 per cent mean absolute percentage error as a practical benchmark. Results are labelled according to their historical fit and the quality of the underlying series.

Trade	Historical fit	Evidence status	Interpretation
Electricians	2.66%	Strong evidence	Principal headline trade; historical fit is within the benchmark threshold.
Plumbers	2.71%	Moderate evidence	Historical fit is within the benchmark threshold, but the series is less robust than for electricians.
HVAC&R mechanics	5.48%	Moderate evidence	Historical fit is marginally outside the benchmark threshold on the full period, and passes at 4.75% once a 2025 survey outlier is excluded; results are retained but qualified.
Telecommunications trades workers	13.81%	Early signal	The series is smaller, noisier and structurally declining; results indicate a potential constraint but should not be read with the same confidence as the electrician result.

The report's central conclusion rests on the electrician model. The broader finding, that at least one qualification-dependent trade becomes constrained during the construction window, is drawn from the high- and medium-confidence trades and holds in 99.83 per cent of runs. Telecommunications results are presented as an early warning rather than a definitive estimate, and are excluded from that composite.

A6. Uncertainty, simulation and what moves the answer

Several model inputs cannot be known precisely in advance. The model therefore specifies minimum, central and maximum values informed by available evidence and, where direct measurement is not available, transparent judgement or stated assumptions. It then runs 10,000 combinations of those inputs. Each sampled input carries a declared basis tier: a tier claiming a mechanism owes two independent derivations under the project's verification rules, while a judgement or asserted-input tier owes disclosure in print instead. The table below reports each input's range, its tier, and its swing: the peak-window shortfall that input can open across its own full range, measured one-at-a-time from a central path on which the gap is zero. A swing of zero means even the input's extreme cannot open a gap on its own.

Sampled input	Minimum	Central	Maximum	Basis tier	Swing (FTE)
Workforce exit rate (quarterly)	0.0014	0.0035	0.0070	judgement	6,746
Battery-build labour factor (job-years/MW)	0.53	1.0	4.7	asserted input	6,689
Electrician-years per MW of data-centre capacity	0.4	1.0	3.6	mechanism from sources	4,869
Electrician share of energy-build labour	0.15	0.20	0.30	asserted input	2,988
Housing electrician intensity (e-years/dwelling)	0.0779	0.1485	0.2493	mechanism from sources; bounds tiered separately	2,666
Apprentice completions level (x 2025 record)	0.80	0.95	1.05	judgement	2,388
Electrician share of relevant completions	0.694	0.747	0.801	mechanism from sources	741

Sampled input	Minimum	Central	Maximum	Basis tier	Swing (FTE)
Data-centre in-assessment stage weight (S2)	0.30	0.35	0.60	triangulated from three observed funnels	0
Data-centre build-speed cap (MW/yr)	50	100	200	judgement	0
Data-centre enquiry stage weight (S1)	0.05	0.15	0.30	triangulated from three observed funnels	sampled; not in tornado
Approved stage weight (S3)	0.80	0.90	0.95	triangulated from three observed funnels	sampled; not in tornado
Under-construction stage weight (S4)	0.95	0.98	1.00	triangulated from three observed funnels	sampled; not in tornado

The largest bar in one sentence: the workforce exit rate is how fast people leave the trade, which compounds over every quarter of the window, so the answer moves furthest where that is least certain.

Where a tier reads judgement, the central value is a declared choice over sourced observations rather than a derived quantity, and in each case what forced the choice was an instrument that does not measure the thing at the grain the model needs. The exit-rate central of 0.35 per cent a quarter has no stated derivation and is not the midpoint of its band, because no published series measures all exits from a single occupation, and the survey that came closest was last conducted in its previous form in February 2026, with its successor publishing first estimates in April 2027. The completions mode encodes an assumed mild reversion that no source states. And the build-speed cap is a labelled cap supported by indicative rather than derivational evidence, because the staged capacities behind it record what individual proponents built rather than a general rate, as does the build-duration divisor, which is a choice over three observed builds rather than a stated function of them. Where a tier reads asserted input, the value is transcribed from published sources without derivation: the battery factor's bounds are a carried conflict between two published sources and its central of 1.0 is stated by neither, while the energy-build electrician share carries labelled bounds around a central that is not separately derived.

Not every central estimate is directly measured. Some are derived from available source data; others reflect transparent judgement or asserted inputs where the evidence is incomplete or conflicting. These assumptions are carried as ranges, tested in the sensitivity above and described in the limitations section below.

In the sampling, the energy and data-centre legs of the ongoing-work claim are held at their central values while the same underlying parameters are sampled on the demand side. The central path and every central claim are unaffected, the exposure is confined to the sampled distribution, where it is roughly symmetric about the mode, and its net effect on any published distribution has not been tested, because the run that would test it is held for the next edition.

The median of the simulation exceeds the deterministic central for two structural reasons, stated here so the difference is not mistaken for an error. First, several input ranges are right-skewed, because where the evidence conflicts it conflicts upward, so the mean of each such distribution sits above its central and a typical draw carries more demand than the central path. Second, the peak-window gap is floored at zero, so futures in which supply holds contribute zero rather than a negative gap, and the favourable tail is compressed while the unfavourable tail is not. A bounded quantity computed on a system within two per cent of its ceiling therefore has a median well above its central value. That is a property of the question rather than of the method, since the same construction applied to a system with ample headroom returns a median of zero.

The reported P10–P90 range describes the middle 80 per cent of model results across these sampled input combinations. A finding that a shortfall occurs in a given share of model runs, for example 90.64 per cent, should be read as the share of plausible assumption combinations in which modelled demand exceeds modelled available supply.

It is not a literal probability that Australia will experience a shortage of that exact size. Real-world outcomes will also depend on factors outside the model, including changes to project schedules, wages, working hours, procurement, migration settings, technology, substitution and broader economic conditions.

A7. Interpreting the shortfall

The model estimates the gap between the workforce demanded by the published schedules and the workforce available through the supply channels it measures. It does not forecast that the gap will appear solely as unfilled vacancies.

In practice, a workforce constraint may appear through delayed or rescheduled projects, higher wages and contractor rates, reduced margins or changed procurement, workers moving between sectors or locations, changed project designs or greater prefabrication, slower housing delivery, or some combination of these responses.

The model does not estimate a wage-induced expansion in qualified labour supply. This is a deliberate limitation, not an assumption that wages have no effect in the real world. Higher wages may attract some workers back to site-based roles, encourage workers to remain in the trade, increase hours, draw workers between employers or states, and alter project timing.

However, the available Australian data do not permit a robust estimate of the scale or timing of that response for the specific qualification-dependent trades examined here. The report therefore makes no market-outcome claim; it identifies the workforce requirements implied by published construction schedules under measured supply channels.

The attribution of the gap to data centres is stated only beside its counterfactual, which is that a shortfall occurs in 67.74 per cent of futures with no new data centres at all, so the attribution describes the size of the gap on top of that baseline, never whether one exists. The attribution itself has more than one defensible reading, and the report names the one in use wherever the figure appears. The body quotes the difference of medians: the median gap with the pipeline (5,433) less the median without it (1,662), as a share of the first, which is 69.4 per cent. Because the two medians are ordered independently, that difference is not the attribution within any one future. The median attribution within futures that gap is 63.5 per cent, and the mean-based reading is 53.9 per cent. The same three readings for the housing slowdown are 69.4, 63.5 and 55.2 per cent.

A8. Allocation of scarcity and the housing result

The report models the likely incidence of a shortage through a strict allocation ordering: highly capitalised data-centre projects are assumed to secure labour first, followed by major energy and infrastructure projects, then commercial construction, with housing receiving the residual workforce.

This is a stylised analytical assumption, not a prediction that every individual worker will choose a data-centre project over every residential project or that all housing projects are equally exposed. Its purpose is to illustrate who is likely to bear the cost of scarcity when projects differ in their ability to pay, centralise procurement, absorb delay and offer secure work.

Under this allocation, the residual shortfall falls on housing. The resulting estimate of a slower annualised dwelling-completion rate at the worst quarter should be read as a rate, at the worst quarter, in the median of futures that breach, and as an upper bound on housing incidence by construction. On the central path the rate is zero in every quarter, because the central path does not breach.

Reordering the allocation would change which sector bears the estimated gap. It would not remove the underlying workforce constraint.

A9. Policy scenarios

The report tests a range of policy levers: improved retention of experienced workers; re-activation of some licensed but non-practising electricians; higher completion rates; increased female participation; expanded recognition-to-licence throughput; higher skilled-migration intake; hyperscaler-funded completions; and, as the sequencing scenario, an eight-quarter deferral of not-yet-committed data-centre projects.

Lever	Central in-window FTE	Range	Speed	Basis
Retention (exit-rate reduction)	1,200	800–1,640	immediate	mechanism from sources
Re-activation of licensed non-practising	1,029	206–2,534	under 1 year	asserted input

Lever	Central in-window FTE	Range	Speed	Basis
Completion rate +5 percentage points	701	651–751	1–3 years	mechanism from sources
Migrant licensing throughput x2	600	512–695	1–2 years	computed in the model
Female participation doubling	400	200–700	mostly post-window	judgement
Training commencement surge from 2026	0	0	four-year lag	mechanism from sources
Hyperscaler-funded completions	0	0–300	mostly post-window	illustrative
Deferral of discretionary pipeline (demand-side)	1,298	574–1,298	immediate	modelled staging

The scenarios are illustrative capacity estimates, not forecasts of government policy or programme delivery. Their effects may overlap, depend on implementation quality and face their own workforce constraints, for example the need for licensed supervisors to support overseas-trained workers through supervised practice.

Two disclosures attach to this table and are repeated here deliberately, and each names the missing measurement that made a judgement unavoidable. Re-activation rests on the New South Wales licence-register wedge, a pool that is itself an upper bound, and no registered source states what share of that pool would return to the trade, so the take-up band of 5 to 25 per cent that multiplies the whole lever cannot be derived. The take-up band remains unsourced and is the next thing a critic should attack here. **The female-participation lever (about 400 FTE, roughly 8 per cent of the plausible package) is a judgement**: no derivation exists from registered sources, and nothing checkable stands behind its range beyond the public aggregates its description cites. A forward derivation was attempted and none was found, because the national training collection publishes apprentice sex splits at trade and non-trade level rather than at the electrician grain, and the companion source publishes aggregates only, so the share and duration parameters a derivation needs are unpublished.

The plausible package, the central of every lever plus the demand-side deferral, totals 5,228 FTE against a median gap of 5,433, closing 96.2 per cent of the median and 45.2 per cent of the P90. The aggressive combination, every lever at its maximum plus the deferral, totals 9,491, covering the median and reaching 82 per

cent of the P90. This reflects the shape of the constraint. The package is a fixed addition; the gap is a wide distribution. Closing the median is not closing the risk.

Project sequencing is modelled separately because it reduces peak demand rather than expanding supply, and it is summed into the package because the package is measured against a peak-window gap, which deferral closes exactly as a worker does. The scenario tested is the data-centre case, applying to projects not yet under construction or otherwise committed, because that pipeline is the least committed of the three programmes; it is what the model measured, not a nomination of which programme should move, and the recommendation in section 8.1 is neutral on that choice. It is not a proposal to cancel projects already being delivered.

A10. Key limitations

The principal limitations of the analysis are as follows.

Incomplete data-centre visibility. The project register does not capture all national data-centre capacity on a consistent project-level basis. South Australian capacity is excluded from the base register because comparable project-level information is not available. Other jurisdictions are incompletely observed or unmeasured. This limitation makes the model conservative on identifiable data-centre construction demand.

Housing labour intensity. The electrician content of housing construction is derived from the occupation-level residential-utilisation rate in the national building workforce model, weighted across the electrician family. Its bounds do not share the central's basis, and each owes its own disclosure. The lower bound on housing electrician intensity is a declared judgement, not a measurement. It preserves the proportional spread the published parameter carried, so the width of the band is unchanged and only its centre has moved. No registered source states a lower bound. The upper bound applies the observed spread between the industry-level and occupation-level utilisation readings to the trade that spread was measured from, which makes it tautological in construction: the superseded industry-basis central becomes the ceiling, and the range narrows from above rather than relocating.

Workforce exits. The projected rate at which qualified electricians leave the occupation is the largest single driver of the headline uncertainty. The model uses a transparent range and tests sensitivity to that assumption, but Australia does not publish a complete, occupation-specific measure of all workforce exits at the level required for this analysis. The central exit-rate value is therefore a judgement rather than a directly observed occupation-specific measure, and the survey that came closest to measuring movement out of the trade was last conducted in its previous form in February 2026, with its successor publishing first estimates in April 2027.

Fungibility of the available workforce. The availability series is a single national pool. No licence class, high-voltage endorsement or capability distinction operates inside the modelled trade, so the same electricians are counted as available to offshore wind, transmission, data-centre fit-out and housing alike. Any real capability split would leave parts of the pool unable to serve parts of the demand, so the assumption runs in one direction, and the modelled shortfall is smaller than a capability-constrained construction would show.

Energy labour coefficients. Some energy-build labour factors reflect genuine uncertainty or disagreement between available published sources; the battery-build factor is a carried conflict between two published sources. These are held as ranges rather than presented as settled estimates.

Wage response. The model does not incorporate a quantified wage-induced supply response. The report tests the available Australian evidence from the Western Australian resources boom but does not identify a robust electrician labour-supply elasticity from that episode. The reverse test is also reported: after the episode's relative wage turned down, the workforce did not unwind at any genuine endpoint, which cautions against assuming the response is symmetric or fast.

Re-activation take-up. How many licensed but non-practising electricians would actually return is a take-up band of 5 to 25 per cent, and no registered source states what share of them would come back, so the band that multiplies the whole lever rests on judgement. The take-up band remains unsourced.

The female-participation lever is a judgement: no derivation exists from registered sources. The national training collection publishes apprentice sex splits at trade and non-trade level rather than at the electrician grain, so the parameters a derivation would need are unpublished.

Strict allocation assumption. The housing result relies on a deliberately stylised priority ordering. It is useful for identifying the likely incidence of scarcity, but it should not be read as a literal forecast of sector-by-sector employment outcomes.

Corridor estimates. The corridor analysis applies national ratios to a small geography, spans two Census supply bases rather than choosing one silently, and omits local energy-transition demand. Three biases are disclosed: the residence basis overstates local supply because the corridor is a net exporter of electricians; the coarse occupation imputation understates corridor electrician supply by about 4 per cent relative; and the national availability ratio is plausibly generous for a young, greenfield dwelling stock. Corridor results are low–central–high scenario bounds, never percentiles, and should not be read at the precision of the national distribution.

Smaller trade series. Results for HVAC&R mechanics and telecommunications trades workers are less precise than results for electricians because the available historical employment series are smaller and noisier.

A11. Method status

Method status: final. The results in this report are computed from the model artefacts extracted on 24 August 2026, and the research programme behind them is closed for this edition. Three ABS TableBuilder extracts are held for post-publication refresh rather than incorporated: the Census journey-to-work denominator, which would replace the corridor's working definition with a measured commuting catchment; the occupation-by-age cross, which bears on retirement timing; and the job-mobility extract, which bears on the exit rate. Each would refine a quantity this edition already carries with stated bounds, and each is named here so a reader knows where the next edition would move.

A12. What would change the conclusion?

The report's central claim is conditional and can be tested.

Three developments would materially alter the interpretation of the results.

A robustly identified wage-induced supply response. If Australian data established that higher wages reliably generate a large increase in the national supply of licensed tradespeople within the relevant time frame, the model's treatment of wage feedback would need to be revised. This condition is currently unmonitorable, because the series that would settle it, wages by state and industry jointly, has never been published at the needed grain, which disables the counter-claim equally.

A materially faster pathway to qualification. If completion data showed that new apprenticeship cohorts were qualifying at scale substantially faster than the model assumes, the conclusion that new commencements contribute little before the 2027–29 peak would need to be reconsidered.

Evidence that the published construction schedules are not the schedules being pursued. The model is conditional on published housing, energy and data-centre pathways. If realised dwelling completions, energy-project timelines or data-centre construction activity demonstrate that those schedules have shifted materially, the demand side of the model should be updated.

The report should therefore be read as a transparent assessment of the current published pipeline, rather than as a claim of perfect foresight.

A13. Sources and reproducibility

The analysis is built from public planning filings, connection and market records, Australian Bureau of Statistics labour and construction data, National Centre for Vocational Education Research training data, Department of Home Affairs migration data, Australian Energy Market Operator planning material, state and territory licensing and planning instruments, and other public sources identified in the report's source register: 290 registered public documents, each recorded with where it was retrieved and where in the document each value sits. Raw source files are kept unaltered and every transformation is scripted, so the full method reproduces end to end.

All headline results are derived from the underlying project register, coefficient library and workforce model. Figures are rounded in the body of the report for readability; ranges and point estimates should be interpreted as approximate unless otherwise stated.

The full methodology, source register, assumptions register, decision log and supporting data pack are available from the authors on request.

A14. The correction history, and why the current figures should be believed

The headline of this analysis has been revised three times before publication, and this section reports the revisions rather than leaving them to be discovered.

A dagger (†) marks a figure this report no longer stands behind. Every daggered value in this section is superseded and is printed only so the sequence can be read; the current figures are the undaggered ones. No daggered figure should be quoted as a finding of this report.

The first correction replaced a fitted parameter with a measured one. The electrician share of training-field completions was calibrated in the backcast for as long as no measured value existed; the fit passed its historical gate without identifying the parameter, running to the edge of whatever range it was given. When the national training collection's one four-digit publication supplied a direct measure, the share moved from the fitted 0.65† to the measured 0.747, the historical fit improved from 3.25† to 2.66 per cent error, and the headline median fell from 22,333† to 20,320†. The instrument ran against its own authors, which is what it is for.

The second and third corrections repaired the workforce baseline: a housing labour intensity re-derived on the occupation-level rate after an occupation-by-industry Census cross showed that only 59 per cent of electricians work in the industry whose residential rate had been applied to all of them, and a demand residual made to track that intensity under sampling rather than holding a superseded constant. Together they took the median from 20,320† to 7,179† and then to 5,433, and moved the shortfall share from 97.6† per cent down to 79.2† and back up to 90.64, because a residual that tracks the intensity widens the distribution it is drawn from.

The reason to believe the current figures is what stayed still while the headline moved. Throughout the sequence the persistence finding held, and on the current engine a shortfall occurs in 67.74 per cent of futures with every new data centre removed, with the attributable share below read only against that baseline. That persistence result governs every row of the table: each share in the final column measures how much larger the gap becomes above a baseline that already shows a shortfall in 67.74 per cent of futures, never whether a shortfall occurs, and the column reports a single reading of the attribution, the difference of independently ordered medians, of which the first three values are superseded vintages and the last is the current 69.4 per cent, the reading named wherever the figure appears in the body. Measured at four pinned points in the project's history:

Correction	Headline gap P50	No-data-centre baseline P50	Data-centre-attributable FTE	Attributable share
As first modelled *(superseded)*	22,333†	18,268†	4,065†	18.2%†
Training share measured *(superseded)*	20,320†	16,603†	3,717†	18.3%†
Housing intensity re-derived *(superseded)*	7,179†	3,543†	3,635†	50.6%†

Correction	Headline gap P50	No-data-centre baseline P50	Data-centre-attributable FTE	Attributable share
Demand baseline repaired (current)	**5,433**	**1,662**	**3,771**	**69.4%**

† superseded: not a finding of this report. Only the bold final row is the live engine.

The headline fell 76 per cent across the sequence and the no-data-centre baseline fell 91 per cent. The quantity attributable to data centres moved 11 per cent, around a mean of 3,797, with no trend. Every defect found sat in the workforce baseline: a training share fitted where it could be measured, an industry rate applied to an occupation, a residual that never followed its own parameter. None sat in the data-centre demand chain. The attributable share rose from 18† to 69.4 per cent because its denominator and its subtrahend shrank, not because anything the model says about data centres changed. That is why correcting the defects changed what the counterfactual looks like and not what data centres contribute, and it is the reason to trust the current figure rather than a reason to distrust it.

Two boundaries on that claim. It is a claim about workers, because homes-not-built is the same unmet requirement divided by the housing intensity, which one of these corrections cut by 38 per cent, so the homes equivalents move across the sequence and the invariance claim is not made about them. And the persistence finding is stated in its precise form: without data centres a shortfall occurs in 67.7 per cent of futures, against 90.6 per cent with them. The floor holds, and whether a shortage exists does not depend on data centres. What widened across the corrections is the incidence gap between those two shares, from 13† percentage points to 23.

The full decision log records every judgement call in the sequence, dated, with its rationale and its evidence.