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**Australian Academy of Science submission on the NSW Parliament  
*Inquiry into data centres***

The Australian Academy of Science (the Academy) welcomes the opportunity to comment on the *Inquiry into data centres*.

Data centres are needed to support vital functions such as accessing government services. Data centres also support scientific research, by providing the digital infrastructure for data-intensive research projects and AI development. This infrastructure must be coupled with high-performance computing systems to enable climate modelling, drug design, discovery of new materials and defence and industry applications.

There is an opportunity for Australia in establishing data centres. Australia has comparative advantages such as abundant renewable energy resources, stable governance and a skilled workforce which evidently are making Australia an attractive market for building data centres.

The NSW Government has an opportunity to create policy settings to ensure that private investment in establishing data centres is not extractive and creates a thriving digital ecosystem that supports research and research-industry partnerships that benefit Australia and Australians.

If data centres are to continue to be built on Australian shores, using Australian power, water and land, they must be delivering value back into the communities they are joining. The establishment of future data centres must also be done sustainably and should consider using innovative water conservation techniques developed in Australia.

The Academy:

- Supports the Australian Government's [expectations of data centres](#). The NSW Government should consider how to facilitate and enforce these expectations.
- Recommends that companies looking to establish data centres in Australia should contribute to local research and development (R&D), either by investing in their own R&D, or alternatively paying a levy to the government which would go back into funding fundamental research.
- Is calling on the Australian Government to develop a 10-year strategy for critical high-performance computing and data (HPCD) infrastructure.

[The Australian Government's expectations of data centres need to be enforced](#)

The Academy supports the Australian Government's [expectations of data centres](#). It is vital that data centres consider and contribute to Australia's national security and data sovereignty, support Australia's energy transition, minimise water use, invest in Australia's workforce and contribute to research and innovation.

[Expectation 1 – Prioritising Australia's national interest](#)

Governments should evaluate the actual demand for data centres and the degree that this can be accommodated without harm to the Australian environment, ecosystems, agriculture and living conditions for the population. This is important to ensure that investments and environmental costs align with Australia's national interest. Demonstrated needs should be a precondition for each significant new investment in data centre construction.

[Expectation 2 – Supporting Australia's energy transition](#)

In order for Australia to transition to renewable energy, a [major upgrade and expansion of electricity transmission networks is needed](#). The projected growth of data centres will place significant additional demands on energy supply, which should be included in energy system planning and infrastructure projections towards net zero. The Academy supports the expectation for new data centres and AI infrastructure to cover their share of transmission and distribution infrastructure costs.

#### Expectation 4 – Investment in Australian skills and workforce

There is an expectation for data centre operators to invest in developing a skilled domestic workforce. The Academy has previously highlighted an urgent need to build data skills in Australia's research sector in the [Australia's data-enabled research future: Science](#) report. Data infrastructure development must be complemented by adequate training and access to expertise to generate, curate, analyse and manage data for research.

There are current gaps in the workforce needed to support the operation of data centres. The Academy report [Australian Science, Australia's Future: Science 2035](#) is the most comprehensive, evidence-based capability analysis of Australia's science system to support our national ambitions, informed by the forces shaping our economy. It identified the eight science capabilities that will see the greatest increase in demand over the coming decade, including data science and artificial intelligence (AI). Data science is a capability of value to most scientific disciplines. This expertise is required to manage, secure, and use Australian and international data across diverse applications. AI will be used to support research in multiple science fields, leading to high demand for scientists with AI skills. The findings of the report indicate gaps in Australia's education and workforce for both data science and AI capability.

#### Expectation 5 – Research, innovation and local capability

Priorities for Australia's research sector in terms of data include large-scale storage capacity and improved network connectivity. Over the next decade, HPCD demands will evolve as AI becomes embedded in scientific workflows. The Academy supports the expectation that providers of large-scale compute will enable access to Australian researchers.

The Academy recommends that there is an expectation that companies looking to establish data centres in Australia should contribute to local research and development, either by investing in their own R&D, or alternatively paying a levy to the government which would go back into funding fundamental research. The Academy has proposed and [modelled a broad R&D levy](#) that could be used as a basis.

Such a system would set the standard for what we expect from these companies. Ideally, the levy never needs to be paid. However, it sets a baseline for what we expect from these companies, if they wish to benefit from our natural resources, they must invest in local skills and local science. In doing so, companies will likely benefit from these investments by becoming more innovative.

Now that these expectations have been set, how they will be enforced needs to be considered. This inquiry is an opportunity for the NSW Government to set the policy framework and conditions to ensure that data centres meet these expectations. Data Centres Australia has stated that data centres currently report under multiple existing frameworks, and implementation of the expectations should consider these.

#### Science has a role to play in improving the sustainability of data centres

Australian-owned data centres and supercomputers have found innovative solutions designed to work for Australia, a country shaped by drought. CDC's [closed-loop cooling system](#) and the Pawsey Supercomputing Research Centre's [groundwater cooling system](#) both significantly reduce water consumption compared to conventional approaches. Pawsey's novel, efficient and environmentally friendly system was developed by the CSIRO.

These examples demonstrate how locally developed solutions can deliver practical and climate-appropriate outcomes. These solutions should be considered for any future data centres built in Australia to preserve water and energy resources. Australian science capability will also be needed to deliver future solutions, and to model the impact of digital infrastructure on the climate.

#### Investing in HPCD infrastructure is critical for Australia's national R&D capability

Modern science requires analysing and storing large volumes of data which is expensive to store. Co-locating data with computing resources makes systems more usable, affordable, and enhances collaboration. High-performance computing systems rely on fast and reliable networking to connect compute resources with storage. Maintaining and upgrading this supporting infrastructure is essential to ensure that Australia's computing capability can scale with future scientific demands.

High-performance computing and data (HPCD) infrastructure is critical to Australia's research and development capability, but Australia has no national plan to invest in maintaining and expanding HPCD capabilities. The Academy is calling for the Australian Government to set out a long-term national HPCD strategy and roadmap to build national capacity, with targeted investment in next generation HPCD infrastructure over the next 10 years. There is a need to invest in a decadal program to secure, coordinate and expand Australia's high-performance computing and data capabilities across government, the private sector and the science sector. A sustainable, integrated HPCD system is needed to support Australian research.

#### Data centres are critical to Australia's data sovereignty

Sovereign data capability depends on access to domestic digital infrastructure, including data centres. This will provide Australia with secure access to health data, limit national security risks, and support sectors such as Australian climate and biodiversity data.

In Australia, data sovereignty should also be understood to include Indigenous Data Sovereignty, particularly where data concern Aboriginal and Torres Strait Islander Peoples, Country, and cultural knowledge. Future investment in data centres and digital infrastructure should therefore support both national data capability and the governance, protection, and appropriate stewardship of Indigenous data.

To discuss or clarify any aspect of this submission, please contact Lauren Sullivan, Science Policy and Advice Manager at [science.policy@science.org.au](mailto:science.policy@science.org.au).