



Pawsey High Performance Computing Centre for SKA Science at Kensington, WA

- 6.1 The proposed construction of the Pawsey High Performance Computing Centre (HPC) for Square Kilometre Array (SKA) Science (the Pawsey Centre) at Kensington, WA proposes to provide facilities for researchers in high-end computation and data-intensive science. The estimated cost of the project is \$66.0 million (excluding GST).
- 6.2 The Pawsey Centre was referred to the Committee on 18 March 2010.

Conduct of the inquiry

- 6.3 The inquiry was advertised in *The Australian* and submissions sought from those with a direct interest in the project. The Committee received sixteen submissions and three confidential supplementary submissions detailing the project costs and addressing questions raised by the Committee. A list of submissions can be found at Appendix A.
- 6.4 The Committee undertook a site inspection, public hearing and an in-camera hearing on the project costs on 16 April 2010 in Perth.
- 6.5 The transcript of the public hearing as well as submissions to the inquiry are available on the Committee's website.¹ Plans for the proposed works are detailed in Submission 1: CSIRO.

1 <aph.gov.au/pwc>

Need for works

6.6 Australia currently has one HPC system and greater capacity is needed to ensure Australian remains internationally competitive. The CSIRO submission states that the works are needed to extend research in the fields of radio astronomy and other areas of computation and data-intensive science. The CSIRO states:

Supercomputers are of the highest and most pervasive strategic importance, as a major contributor to the development of science and technology, and to the economic competitiveness of oil, gas and mineral resources, and medical and pharmaceutical industries.²

6.7 The Committee was told that the proposed centre will meet the needs of science research as well furthering commercial scientific discovery. The proposed centre will:

- provide internationally significant HPC capability, and associated data support, to prioritised radio astronomy data analysis and physical sciences research endeavours;
- develop and operate a resource allocation system that gives priority research on-demand access to allocated resources;
- support meritorious research in all fields through the provision of 'capability' quality computational services which specifically require petascale HPC processing; and
- provide the opportunity to develop world-class HPC expertise among high-end researchers.³

6.8 The Committee recognises that supercomputers are an essential resource for scientists in the modern research environment in order for Australia to remain innovative and competitive in international research and development. In addition, the Committee received twelve submissions to this inquiry from a wide range of organisations strongly supporting the proposal.⁴

6.9 The Committee finds that there is a need for the proposed works.

2 Submission 1, CSIRO, p.5.

3 Submission 1, CSIRO, p.4-5.

4 Submission 2, Department of Innovation, Industry, Science and Research; Submission 4, Astronomy Australia Ltd.; Submission 5, Australian Computer Society; Submission 6, Edith Cowan University; Submission 8, International Centre for Radio Astronomy Research; Submission 10, University of Western Australia; Submission 11, Western Australian Marine Science Institution; Submission 12, Integrated Marine Observing System; Submission 13, Western Australian Satellite Technology Applications Consortium; Submission 14, IBM Australia; Submission 15, City of South Perth; Submission 16, Murdoch University.

Scope of works

- 6.10 The proposed scope of the works is detailed in Submission 1: CSIRO. In short the project proposes the following:
- Pawsey Centre building to house the high performance computing facility including:
 - ⇒ single story building with 4 000 square metres gross floor area providing working accommodation for administrative and ancillary support, computer hall and plant rooms;
 - ⇒ mechanical services;
 - ⇒ electrical services;
 - ⇒ hydraulic services; and
 - ⇒ landscaping.
 - high performance computing (HPC) facility will comprise:
 - ⇒ high performance computing subsystem;
 - ⇒ disk storage subsystem; and
 - ⇒ tape storage subsystem.⁵
- 6.11 Construction is due to commence in late 2010 and be completed by late 2011. The HPC system is due to be completed in 2013.
- 6.12 The Committee finds that the proposed scope of works is suitable to meet the needs of the Pawsey Centre project.

Cost of works

- 6.13 The total estimated out-turn cost for this project is \$66.0 million comprising \$26 million in building works and \$40 million for the HPC system.
- 6.14 In addition to the works presented to the Committee in this proposal, \$14 million has been allocated to expand the HPC capacity at existing iVEC locations. Legal advice to the Department of Innovation, Industry, Science and Resources (the funding department) confirmed that this project component was not subject to the PWC Act.⁶

5 Submission 1, CSIRO, p.10-11.

6 Dr Alex Zelinsky, Group Executive, Information Sciences, Communications and Science Strategy, CSIRO, *Transcript of Evidence*, 16 April 2010, p. 6.

- 6.15 The Committee is satisfied that, on the evidence provided to it for the Pawsey Centre building, the costings for the project provided to it are adequate.

Project issues

Risk management

- 6.16 The Pawsey Centre is being delivered by the CSIRO, but established and operated by iVEC – an unincorporated joint venture between the CSIRO, Curtin University of Technology, Edith Cowan University, Murdoch University and the University of Western Australia – aimed at allowing the science and technology community to access high performance computing.⁷
- 6.17 The Committee had some concerns about the project management processes and who would bear the project risk given this method of project delivery.
- 6.18 Representatives from iVEC and the CSIRO told the Committee that a steering committee comprising representatives from both iVEC and the CSIRO with expertise in building delivery and management will be responsible for managing the project delivery and associated risks. Procurement processes will be in accordance with CSIRO policies, which comply with Commonwealth regulations.⁸
- 6.19 Nonetheless, the legal risk, and eventual ownership, of the project remains with the CSIRO.⁹ Representatives from both the CSIRO and iVEC gave the Committee assurances that they had confidence in the agreement put in place between the two entities regarding the management and delivery of the Pawsey Centre.¹⁰

7 Submission 1, CSIRO, p.1.

8 The Hon Dr Mal Bryce, Chair, iVEC Board, *Transcript of Evidence*, 16 April 2010, p.3.

9 Ms Clare McLaughlin, Manager, eResearch, Research Infrastructure Branch, Science Infrastructure Division, Department of Innovation, Industry, Science and Research, *Transcript of Evidence*, 16 April 2010, p.8.

10 The Hon. Dr Mal Bryce, Chair, iVEC Board, *Transcript of Evidence*, 16 April 2010, p.3; Dr Alex Zelinsky, Group Executive, Information Sciences, Communications and Science Strategy, CSIRO, *Transcript of Evidence*, 16 April 2010, p.3, 8.

Environmental impact

- 6.20 The CSIRO acknowledged that the energy usage of the Pawsey Centre will be high and there are currently no rating systems (such as Green Star) for computer centres. However, initiatives to reduce environmental impact will be incorporated into the building where possible, such as:
- selection of materials with low volatile organic compound emissions and those of a proven sustainable manufacture;
 - selection of materials with consideration of their embodied energy;
 - module selection of building materials to minimise waste;
 - incorporation of water saving devices on hydraulic fittings and fixtures to reduce water consumption; and
 - flexibility of the core design so that it does not become obsolete and can adapt to changing needs in the future.¹¹
- 6.21 A significant environmental and financial cost to running the centre will be cooling for the system. The CSIRO told the Committee that it is looking at utilising the geothermal energy of the Perth Basin to reduce the impact of cooling in the building.¹² Subsequently, the Government has announced funding for the construction of geothermal and solar power generation and distribution infrastructure at the Murchison Radio-Astronomy Observatory and the Pawsey High Performance Computing Centre.¹³
- 6.22 In addition, the CSIRO is working with the Department of Climate Change and Energy Efficiency to develop energy targets for high-demand science facilities such as laboratories, data centres and computer centres.
- 6.23 The Committee commends the CSIRO for these initiatives.

Childcare

- 6.24 The CSIRO Staff Association raised concerns about an increase in staff numbers and the provision of childcare.¹⁴ The Committee was told that given the low staff numbers associated with the Pawsey Centre (sixteen) it was not seen to be necessary to link childcare to this proposal. However, the CSIRO acknowledged that childcare is an issue of concern for staff
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11 Submission 1, CSIRO, p.16.

12 Dr Steve Harvey, Deputy Business Unit Leader, Earth Science and Resource Engineering, CSIRO, *Transcript of Evidence*, 16 April 2010, p.11.

13 The Hon Julia Gillard MP, Deputy Prime Minister and Senator the Hon Kim Carr, Minister for Innovation, Industry, Science and Research, Joint Media Release, 9 June 2010, *Rudd Labor invests in Western Australian students and researchers*.

14 Submission 9, CSIRO Staff Association.

across Perth more broadly and has plans in place to address these need in the coming months.¹⁵

Committee comment

- 6.25 Overall, the Committee is satisfied that this project has merit in terms of need, scope and cost.
- 6.26 Having examined the purpose, need, use, revenue and public value of the work, the Committee considers that it is expedient that the proposed works proceed.

Recommendation 6

The Committee recommends that the House of Representatives resolve, pursuant to Section 18(7) of the *Public Works Committee Act 1969*, that it is expedient to carry out the following proposed work: construction of the Pawsey High Performance Computing Centre for SKA Science at Kensington, WA.

Senator the Hon Jan McLucas
Chair
17 June 2010

15 Mr Trevor Moody, General Manager, Property Services, CSIRO, *Transcript of Evidence*, 16 April 2010, p.3.