



Maintaining a High-Current Electrical Equipment Testing Capability in Australia

**Submission to the Senate Economics References
Committee**

The Australian Manufacturing Industry

Joint Submission from Ai Group and Engineers Australia

September 2021

Executive Summary

The Lane Cove Test Station (LCTS) is an electrical equipment testing facility in Sydney. It has supported Australia's electricity networks and electrical manufacturing sector for more than 50 years. It is an integral part of Australia's manufacturing infrastructure.

The LCTS provides a critical and unique service to electrical manufacturers, allowing them to demonstrate compliance of electrical equipment, as it is the only test facility in the southern hemisphere that has the capability to carry out standards compliance testing at the 100kA level. This testing capability is a requirement for innovation and development of electrical equipment, and as such plays a critical indirect role across many sectors which rely on electrical equipment, including energy, manufacturing, transport, health, mining, heavy industries, defence, building and construction, process industries, and water.

PLUS ES, an affiliate of Ausgrid and the owner of the LCTS since 2017, has announced that it intends to close the LCTS by the end of October 2021 for commercial reasons.

Without a domestic testing facility with this capability, Australia's electrical manufacturing industry would be severely challenged by the higher costs and lead-times of testing abroad. Many, particularly smaller businesses, would not be able to compete with imported equipment and our exporters will be significantly disadvantaged. The local capability for research and development of new electrical equipment will be significantly diminished as industry is reliant on proof-testing at the LCTS. There is a clear threat of a hollowing-out of the domestic electrical manufacturing industry.

In addition to threats posed to domestic electrical equipment manufacturers, their employees, and their customers, the closure of the facility would see a loss of broader social and economic benefits in the form of:

- Safe and reliable electricity networks;
- An ability for Australia and Australian industry to undertake research and development relevant to the energy transitions underway in Australia and around the world;
- The safety of electrical installations in homes and workplaces; and,
- Sovereign capability in electrical manufacturing.

The mix of private and public benefits associated with such a testing facility is a key factor in the form and provision of these services in other industrialised countries. If not entirely state operated, facilities are owned and operated by public-private partnerships.

Historically, this typical pattern of involvement of the public sector was followed in relation to the LCTS.

Until 2016 when Ausgrid was leased under a 99-year arrangement which saw IFM Investors and AustralianSuper take a combined share of 50.4 per cent (with the remaining 49.6 per cent retained by the NSW Government), LCTS was owned and operated as part of the state-owned electricity network. The LCTS was included in the assets leased with Ausgrid. A year later, in 2017, the LCTS was transferred to PLUS ES which is an affiliate of, and has the same ownership configuration as Ausgrid.

The announcement by PLUS ES of its intention to close the LCTS has galvanised industry interest in participating in a partnership arrangement with the public sector and its agencies to secure the long-term provision of high current testing services for electrical equipment.

A Way Forward

The best and most economical way for these services could be secured would be through the purchase by the Commonwealth in its own right or in partnership with industry of the LCTS.

The LCTS could be operated by the National Measurement Institute (NMI) which has experience in electrical product testing on a commercial basis. The possibility of an operating partnership between the NMI and industry could also be explored.

The testing services currently provided by PLUS ES could be reinstated and continued to be supplied on a commercial basis.

It may be that in the longer-term, an alternative location for high-current electrical testing would be a more suitable option. In this event, the LCTS could be sold to finance the purchase of a new site with suitable connections to the grid.

With the closure of LCTS scheduled for later in 2021, there is a pressing need for action.

Recommendation

Engineers Australia and Ai Group urge the Committee to recommend that the Commonwealth urgently consider the arguments presented in this submission for its involvement in securing high-current testing of electrical equipment in Australia.

Background

The Lane Cove Test Station (LCTS) is an accredited high power testing station that provides certification testing to Australian and International Standards for electricity transmission and distribution network equipment. It also provides specialist testing services for investigative, and research and development work conducted by electrical product manufacturers.

The primary role of the test station is to verify the performance of components under fault conditions, load conditions and overload conditions, to establish safety and performance of electrical equipment.

LCTS capabilities include:

- all types of short-circuit tests including for making and breaking fuses and earthing equipment;
- arcing fault containment tests – for worker health and safety. This includes switchgear and package substations used throughout Australia;
- temperature rise – operate equipment and ensure temperatures stay below limits, and ingress protection for all types of electrical products;
- dielectric tests – power frequency and lightning impulse withstand tests.

Customer types include:

- Low voltage switchgear and enclosures
- Medium voltage switchgear and enclosures
- Low voltage busducts
- Low and high voltage fuses
- Portable earthing equipment and surge arresters
- Transformer of all types (distribution, small and medium power, earthing, on board loco, rail track side, wind farm and solar farm applications, etc)
- Package substations
- Mining equipment for hazardous area switchgear and cable connections
- Earthing resistors
- Fault current limiters for domestic and export applications

Ultimate customers of LCTS users include:

- Power Generating companies (traditional and renewable)
- Power transmission and distribution companies
- Mining companies
- Oil & Gas producers and refiners
- Process industries
- Rail companies
- Defence and their contractors
- Data Centres
- EPC contactors and infrastructure builders and their customers
- Commercial building developers and owners
- Health facilities including hospitals
- Heavy industries (e.g. steel)
- Water companies
- Research companies involved in bushfire research and safety testing

- New Zealand and SE Asian manufacturers with no domestic high current testing capability.

Current Ownership and Operations

The LCTS was included in the 2016 arrangement for the 99-year lease by the NSW government of a significant segment of NSW's electricity network (Ausgrid). Under this arrangement, IFM Investors and AustralianSuper took a 50.4 per cent interest with the remaining 49.6 per cent held by the NSW government. In 2017 the LCTS was included in a transfer of assets from Ausgrid to PLUS ES which is a separate entity with the same ownership as Ausgrid.

Early in 2021, PLUS ES announced it intended to close the LCTS during 2021.

The Implications of the Closure of LCTS

Overview

The LCTS has provided fundamental services in support of the safety and reliability of Australia's electricity networks and manufactured electrical products for more than 50 years.

These services are critical for manufacturers to be able to demonstrate compliance as it is the only test facility in the southern hemisphere that has the capability to carry out standards compliance testing at the 100kA level.

Further, it is an essential part of our energy future because it provides the necessary testing capability for equipment development and ongoing innovation.

The alternative for industry would be to transport major equipment to Europe, China or South Korea for testing. Current indications are that such services involve wait times of up to 2 years and test fees up to 10 times more expensive than the LCTS service (mostly due to freight and logistical issues).

There is also a clear threat of a leakage of IP if testing is undertaken in facilities where confidentiality and integrity is not assured.

These extra costs and risks will likely undermine the innovative capacity of domestic electrical manufacturers. This capacity is particularly critical in the context of the profound energy transition currently underway.

In the near term, these barriers to accessing services provided abroad, are compounded by the COVID-19 emergency that is making it extremely difficult to send personnel to witness tests or reconfigure test objects as is necessary for this type of testing.

The capacity for large manufactures to carry such impediments is sub-optimal as innovation, lead times and costs would suffer. Smaller manufacturers, including enclosure and switchboard manufacturers, will not be able to absorb these costs and they will be unable to compete with imported equipment.

While there is an alternative source of supply for some of the lower-voltage testing services currently provided by PLUS ES, if the LCTS capacity were to close, many manufacturers would be likely to see prohibitive wait times and uncompetitive pricing.

As more businesses feel these pressures, they will cease to invest in equipment and workforce training, and the industry can be expected to hollow out and lose critical mass giving rise to a significant loss of sovereign capability in electrical equipment manufacturing.

The impacts would be felt by all segments of the electrical manufacturing industry with the most severe impacts weighing on the many smaller electrical product manufacturers, their employees, their suppliers, and the communities in which these businesses are embedded.

The impact of reduced Australian electrical manufacturing capability would be felt across many sectors of the Australian economy. This is an issue of national significance.

Detailed implications of the closure of LCTS

1. **Impact on jobs, businesses and the economy:** we estimate that businesses directly at risk from the closure of LCTS employ around 10,000 people, account for sales of around \$4.1 billion, and contribute over \$1.4 billion of Gross Value Added to the domestic economy.

There are many other additional businesses and jobs in upstream and downstream businesses, many of them in regional locations.

2. **Supply chain resilience/reliability:** COVID-19 has highlighted the fragility of supply chains. The activities of the LCTS, due to its proximity to customers and capability, has serviced and responded to industry testing needs exceptionally well. This will not be possible if overseas testing facilities become necessary.
3. **Innovation, R&D and exports:** The LCTS has facilitated two global success stories in the recloser market. Other manufacturers have used the knowledge gained through testing to export unique products overseas and licence Joint Venture Companies in otherwise inaccessible markets.
4. **Value adding in Australia** requires us to design it, make it and test it. Testing is critical to find the limits and then apply our learnings to improving performance and safety.
5. **Grid investment/reliability/safety:** The grid is evolving with the change in energy mix. The testing capability provided by the LCTS is required to meet the changing needs.
6. **Public Safety and WHS of electrical installations/systems:** Most electrical products, whether they be switchboards, transformers, package substations, require high current testing to validate and improve designs. Arc fault testing is also required to prevent arcs, which can kill or severely burn, reaching the public. The LCTS performs this work capably.

Over the last 50 years Australian deaths caused by electrocution has dropped from triple figures to single figures. This improvement has not been accidental, it has been driven by a steady improvement in standards, regulations and the ability to test and verify performance. The ability of LCTS to provide verification testing has been crucial in attaining this outcome.

7. **Advanced manufacturing capability:** The testing work done by the LCTS can refine designs to enable improved or new approaches to manufacture.

Alongside the closure of the LCTA, there would be an inevitable loss to Australia of skill sets and knowledge. Staff at LCTS have a deep knowledge of how electrical systems work and thereby provide Australia with this knowledge and problem-solving ability. Not only do LCTS have these skills they also share this knowledge and thereby up skill the companies and workforce in Australia. If Australia was to lose this skill, as LCTS staff find other employment outside this specialized area, this knowledge effectively dies out. Australian companies will be forced to look offshore for this facility and generally this will only give a pass/fail outcome without the sharing of knowledge. The opportunity to learn starts to evaporate and eventually Australia will lose this technological capability.

8. **Energy transition (large-scale batteries):** Electrical product manufacturers are involved in the supply of products, such as transformers, into large scale batteries.
9. **Security – Defence:** Australia is reinforcing its defence infrastructure, particularly in Northern Australia. Most electrical manufacturers are in some way involved and the specified requirements are high. It would be undesirable to send products for these installations into the northern hemisphere.
10. **Security – Critical Infrastructure, including cascading risk:** Highly reliable Australian made electrical products are being supplied into data centres and other critical infrastructure. The testing of such products should be conducted in Australia. Overseas testing would prevent Australian suppliers participating.

- 11. Building and Construction:** Every significant commercial building contains a switchboard which requires model testing at up to 100kA depending the application to ensure safety and performance.
- 12. Mining:** Australian mining relies on the provision of electrical products which meet the safety and performance requirements.
- 13. Gas extraction for domestic and export:** Hundreds or millions of dollars of Australian electrical products have been supplied to this sector.
- 14. Process Industries (e.g. Alumina & Aluminium Smelting):** A range of Australian designed and manufactures electrical products are supplied into this sector. While very large regulating and rectifier transformers cannot be tested at the LCTS, the knowledge gained from testing other products, particularly those with very high currents needed for aluminium smelting, supports this Australian capability.
- 15. Heavy Industries (Steel):** A range of switchgear and other electrical products including transformers, support the Australian steel industry.
- 16. Health:** Switchboards and other electrical products including transformers, support hospitals with safe and reliable products.
- 17. Transport (Rail and Roads):** Many electrical products including on-board loco transformers, trackside auto transformers and high voltage step down transformers are supplied to Australian rail companies. The loco and trackside transformers have been short circuit tested at the LCTS.
- 18. Water (pumping, desalination, chlorination, etc.):** Australian electrical manufacturers have supplied many of the products incorporated into these plants.
- 19. Renewable Energy (large scale wind and solar generating plants):** Many Australian-made electrical products are included in the large-scale wind and solar farms. Every wind tower has a transformer and other electrical components. A large-scale PV solar farm has 100s of PV generators incorporating inverters, transformers, switchgear, and control equipment, all mounted on a skid base. Every wind farm and solar farm has grid connecting substation.

The Case for an Industry-Government Partnership

In addition to the economic benefits to the industry, its employees and customers, there are substantial additional national benefits associated with the domestic availability of high-current testing of electrical equipment in Australia. These include:

- The safety and reliability of electricity supply and electrical products
- The role of testing services in the ability of undertaking electrical equipment Research and Development in Australia
- The strategic benefits of a competitive, domestic electrical manufacturing equipment industry
- The importance of electrical equipment product innovation to the more rapid and more successful transition to a renewable energy and associated emissions reduction.

The existence of these national benefits is a central reason public sector ownership and government-industry partnerships are common arrangements for electrical product testing services. Indeed prior to 2016, the LCTS was a NSW state government-owned and run facility whose services were provided on commercial terms to industry.

In other jurisdictions including Japan, South Korea and India, testing services are provided by institutes owned and operated through private-public partnerships.

Recommendation

Ai Group and Engineers Australia recommends that the Committee recommend the Australian Government, in its own right or in partnership with industry, steps in to purchase the LCTS from PLUS ES.

The LCTS could be operated by the National Measurement Institute (NMI) which has experience in electrical product testing on a commercial basis. The possibility of an operating partnership between the NMI and industry could also be explored.

The testing services currently provided by PLUS ES could be reinstated and continued to be supplied on a commercial basis.

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