Inquiry into Sustainable Cities 2025
- House of Representatives Standing Committee on Environment and Heritage

Submission from the Electricity Supply Association of Australia (ESAA) Limited

SUBMISSION NO. 13

- **Introduction**

ESAA welcomes the opportunity to make a submission to the Committee's inquiry into sustainable cities 2025. This submission is not all-inclusive and focuses on some specific aspects of the discussion paper related to electricity supply and use and associated energy management matters.

ESAA would welcome an opportunity to further discuss the identified issues with the Committee or its Secretariat.

ESAA and its members see sustainability as a journey that will never truly end; with the integration of economic, social and environmental objectives providing the sustainable development pathway to advance the journey.

This submission is prefaced by the fact that cities are very large users of energy, including electricity. The residential and commercial sector make up just over 50 percent of consumption and urban-based manufacturing activities makes up a further 16 percent.

Importantly, as most electricity generation takes place removed from urban centres, the supply and use of electricity in cities is non-polluting. Therefore, together with its value and versatility as an energy source, electricity makes a very significant contribution to sustaining urban amenity and quality of life, a fact often ignored by opponents of centrally-based generation or advocates of other energy sources.

In Australia, centrally-based electricity generation provides very large amounts of competitively priced and efficiently produced electricity for use in urban environments whilst being subjected to stringent environmental control measures at the point of generation.

Furthermore, the electricity supply industry in Australia is capable over time in responding to its greenhouse challenge, while maintaining cost-competitiveness.

- **Some broad energy dimensions**

Services for which the Australian community needs energy will remain the same far in to the future: space heating and cooling, water heating, lighting, commercial and industrial processes, education, entertainment and transport. Achieving key ongoing energy policy objectives -- energy security and affordability as well as sustainability -- require an approach beyond a 25-year horizon.

If 2025 is the immediate time horizon for policy, developments under way then need to be on the trajectory required to deliver secure, reliable and affordable energy supplies in to the further future while providing longer-term greenhouse gas emissions reductions.

Energy efficiency will continue to improve as it has done over many years past. The rate of future improvements depends on innovation, energy prices and policy decisions. Energy efficiency alone will not deliver greenhouse gas emission reductions on the large scale projected to be needed in the further future. No single part of the energy system can deliver all the greenhouse gas abatement objectives for Australia.

The pattern of energy supply will change over time depending on fuel costs, supply constraints, market structures and policy considerations, including environmental policy.

Electricity will meet a rising share of energy demand, but the scale of power production technologies may change. It is unlikely that any radical new technologies will have made major impacts on power production by 2025 -- the changes over the next two decades will flow from the rate at which currently available technologies replace the existing generation stock. Policy decisions will dictate the pace and extent of the introduction of commercially available lower greenhouse gas producing and renewable energy technology.

Oil will remain essential in transport but its role in the future will depend on its comparative cost advantage.

A lower carbon emissions urban environment in the future requires continuing and substantial progress in energy efficiency, in the development of a lower carbon electricity system able to meet the needs of a globally-competitive economy and in major progress towards a lower carbon-emitting road transport sector.

- **Ensure equitable access to and efficient use of energy, including renewable energy sources**

The issue of equitable energy supply and its effective and efficient use is a very complex one and an issue bounded by energy market realities and federal and state government regulation. Electricity in the hands of the consumer is a competitively-priced source of energy, which, in terms of individual spending power, is actually declining in price.

Electricity is supplied to nearly 8 million households and 1.2 million businesses in an equitable and efficient manner, with the affordability of electricity as an energy source improving significantly over time. Furthermore, as an essential service, government and privately-funded assistance is available to lower income households in order to ensure supply availability.

Effective energy use relates to using the most "sustainable" energy source for the "right" energy service. *Energy efficiency* relates to using the energy source as efficiently as possible for the required energy service. In moving towards more sustainable cities,

issues related to energy supply, energy effectiveness and energy efficiency may need to be addressed in a more integrated manner.

For instance, low grade heating and cooling requirements for both space conditioning and water heating can best be met from direct solar thermal applications, boosted by gas or electricity as needed. As water heating alone can make up 50 percent of electricity use in all-electric households, significant opportunities exist to reduce both water heating and space conditioning requirements. However, the capital cost for solar water heating equipment and more effective heating and cooling systems, such as heat-pumps, is simply too high at present for most consumers.

Very significant opportunities exist to improve the energy efficiency of new commercial and residential buildings and the refurbishment of existing buildings through standards and regulation, covering aspects such as thermal mass, orientation and fenestration, as well as setting standards for lighting, heating, cooling and ventilation.

With respect to renewables, there is currently excessive emphasis on the use of renewable energy sources in electricity production. There is much more to be gained initially and cost-effectively in addressing the passive solar applications listed above.

Overtime, both urban-scale renewables-based electricity generation and more remote renewables-based generation can make an increasing and significant contribution to sustainable cities requirements for electricity. At the urban level, the focus can be on an expanding array of photovoltaic surfaces, renewables-based fuel cells and heat-pumps and possible other solar-thermal technologies. There is a need for sound planning requirements in order to advance these opportunities.

For commercial and industrial developments in particular, opportunities exist for co-generation applications based on the use of natural gas. Co-generation can produce combined heat and power effectively and very efficiently as long as the equipment is matched to the required heat load. Any local generation of this kind will need to be carefully integrated with environmental regulations and controls to ensure maintenance of environmental standards.

There may also be growing opportunities for gas-powered fuel cells producing electricity and heat in individual premises but cost and consumer resistance are likely to remain key obstacles. Most consumers do not wish to take responsibility for their own energy supply needs but rather expect a reliable and quality supply of electricity, gas and transport fuel as essential for all aspects of modern living. Therefore, an important issue with respect to distributed and to renewable generation is its "seamless" integration into the current electricity supply system, requiring zero or minimal consumer intervention.

ESAA believes that all forms of electricity generation should be supported wherever it can be shown to be cost-effective and environmentally acceptable. At present, larger-scale installations are more likely to offer better economies of scale and more efficiency in the provision of secure and reliable electricity supply.

Over time, both transmission and distribution systems will need to be significantly upgraded to overcome ageing infrastructure and to evolve into a self-sustaining, secure and reliable network capable of accepting a wide range of electricity generation and demand-side options. Very large capital investments will be needed to realise the advantages such systems can offer.

As alluded to above, higher efficiency standards for all new dwellings, appliances and business operations, as well as for refurbishments, are likely to provide the most cost-effective means of improving energy sustainability, including reducing greenhouse gas emissions, in the shorter timeframe.

The challenge for energy efficiency is the development of the correct drivers to deliver real efficiency gains and to reduce transaction costs in order to make energy efficiency a greater reality in a comparatively low-cost energy society, as is the case for Australia. Also, very different programs and processes are needed to achieve energy efficiency objectives depending on factors such as investment cycles, economic growth, sectoral opportunities and consumer requirements.

For guidance, ESAA believes that *standards and regulation* can best be applied to 'bulk' items, such as dwellings, commercial buildings, appliances, plant and equipment; *best-practice benchmarking* to competitive manufacturing and retail operations; and *impact assessment processes,* based on established guidelines and principles, to major plant investment and infrastructure development. Using market-based principles and practices can do much to deliver outcomes at lower costs.

- **Manage and minimise domestic and industry waste**

The integration of industry complexes, such as those at Kwinana and Gladstone, offer significant opportunities for the re-use of waste streams, co-generation and other aspects of integrated energy and resource management. More incentives may be needed to establish better integrated industrial complexes and energy parks, including ones that can utilise significant quantities of power station waste heat and other by-products.

Partnerships with local communities could be encouraged through the effective use of environmental regulation, coupled to licence fee reduction incentives for superior socially and environmental responsible business behaviour. Elements of this already exist through processes such as the Victorian EPA's accredited licensing provisions.

- **Develop sustainable transport networks, nodal complementarity and logistics**

A major issue to address for sustainable cities is meeting transport needs and electricity can play a key role in current and future modes of travel. Electric trains and trams are highly efficient, but often inflexible, modes of transport. Electric vehicles, including vehicles producing electricity from in-vehicle fuel cells, offer significant transport energy

efficiency opportunities, compared to internal combustion engines, and without the associated pollution of hydrocarbons, particulates and oxides of nitrogen.

The use of life-cycle assessment techniques could play a valuable role in advancing sustainable transport opportunities.

- **Incorporate eco-efficiency principles into new buildings and housing**

Exposing consumers to the time-of-use price signal of energy, and in particular electricity, can do much to encourage more sustainable energy use. Up to a point, this is already happening to transport fuel pricing, where prices can vary by more that 10 percent on a daily basis. Electricity supply is far more price sensitive because electricity cannot be stored effectively and supply and demand can be balanced tightly. Exposing consumers to such price signals will lead to better allocation of energy resources, provide a focus for energy efficiency and energy effectiveness and reduce overall societal costs. Bundling all sorts of services with smart meters, such as security services, energy management, broad-band communication services, and so forth, can provide added economic stimulus and efficiency in growing urban environments, as well as reduce overall energy consumption.

Comparatively low population density in Australian cities result in reduced energy efficiency in supplying all energy services needed. Use of energy increases as travel distances increase, public transport is replaced by private transport and heating/cooling requirements increase when buildings/dwellings become larger and are more widely separated.

As a model, the high density European city is more sustainable that the lower density Australian or American city. However, whether a coordinated move towards higher density cities would be acceptable to a community used to lower density living in not clear.