

# South Australia's 20-Year State Infrastructure Strategy

CER gets us ahead of increasing energy demand pressures.

Chris Lehmann & Georgia Holmes  
24 October 2023



Master Electricians Australia (MEA) is the trade association representing electrical contractors recognised by industry, government and the community as the electrical industry's leading business partner, knowledge source and advocate. Our website is [www.masterelectricians.com.au](http://www.masterelectricians.com.au)

Infrastructure SA's 20-Year Plan presents an opportunity for South Australia (SA) to design an affective Consumer Energy Resource (CER) driven plan, electrifying the State to achieve its emissions targets. We emphasise the importance that significant CER infrastructure investment occurs within the first five years of the plan with the remaining 15 years focusing on residual implementation and maintenance.

CER are privately owned, self-generating energy assets which reduce reliance on traditional fossil fuel transmission networks. This technology not only allows for greener energy, but also provides consumers with control over their electricity thereby reducing overall energy prices.

Throughout this submission, MEA discusses the importance of upgrading the network to integrate CER which will support population growth and an increase in Electric Vehicle (EV) charging, both of which will place significant demand pressures on the grid. Networks need to be updated to enable two-way energy transfer between consumer and the grid and to facilitate bi-directional EV charging. We will describe the significant resilience capabilities batteries have and their ability to respond to climate hazards and other network disruptions.

The submission will discuss the benefits of implementing and educating consumers on Time of Use Tariffs (TOU) which will ultimately change consumer behaviour to become 'greener' in response to price signals, enabling the grid to maintain its stability and integrity.

The vital role licenced electrical contractors play within installation and maintenance of private CER will be explained and the importance of ensuring private CER installation and maintenance is left to licenced electrical contractors with a Cert IV qualifications.

Finally, we will advocate that integrated and streamlined secondary school VET curriculum is essential to ensuring a steady pipeline of electrical workers to continue implementing and maintaining private CER assets.

The term CER is more and more being used interchangeably with Distributed Energy Resources (DER). CER has become increasingly common reflecting the reality that there is a large and growing amount of consumer electrical infrastructure that remains chronically underutilised and its capacity to contribute to the electrical grid and price stability is largely ignored. We will be referring to it as CER throughout this submission.

## CER

### Investments to Unlock SA's Infrastructure

To achieve SA's goals of decreasing greenhouse gas emissions more than 50% below 2005 levels by 2030 and net zero emissions by 2050, the State needs to integrate CER technology within its infrastructure. This will facilitate "the transition to a large scale, cost-competitive renewable energy system [that will achieve] green industrialisation"<sup>1</sup>.

<sup>1</sup> 'South Australia's 20-Year State Infrastructure Strategy Discussion Paper' *Infrastructure SA* (2023), 35.

CER are numerous privately owned assets used to naturally generate, store and utilise energy in the most efficient manner distributed throughout the network. Implementing CER relieves the need to invest in as many big generation and transmission projects, whilst utilising the existing infrastructure (existing poles and wires in our cities and towns) that the community has cumulatively paid for over the last century.

Examples of CER include:

- Rooftop solar photovoltaic units (Solar PV)
- Battery storage
- Electric vehicle batteries

Consumers gain the ability to take control of their energy and enables domestic and commercial and industrial (C&I) customers to enter into trading arrangements that time shift loads, using power (soaking) when it is cheapest for flexible loads (hot water, ovens, EV charging, etc) and delivering power back (sourcing) from storage sources (batteries, bidirectional EV's) when energy prices are higher, giving households and businesses the ability to pro-actively reduce their overall power costs. CER external load control should be limited to flexible loads while the traditional network should continue to be utilised for inflexible loads (i.e., fridges, life support, etc).

The dream of changing the energy demand curve (the so called “ducks back”) by taking the excess/cheap energy produced in the middle of the day, and using it during times of peak demand, thereby flattening the demand curve and stabilising electricity prices can be realised in a reasonably short time period if we make some rational, sensible decisions. The technology is here now, the networks and regulations just need to catch up, and the private workforce of electrical businesses across SA stand ready to make it happen.

#### *Time of Use (TOU) Tariffs*

MEA believes the best way to “[gain] community acceptance”<sup>2</sup> towards reducing carbon emissions through CER is implementing flexible demand and generation TOU tariffs. During the middle of the day, the network experiences minimum demand for energy, while CER generated energy is at its greatest. Then, during 4PM-9PM, the network experiences peak demand for energy, while CER energy is no longer being generated.

Implementing wide spread use of ToU tariffs sends price signals to consumers when to store excess energy and when to utilise and/or send excess energy back to the grid. During the minimum demand window, ToU charges would deter consumers from sending excess energy back to the grid, preventing an oversupply of energy on the network. Then, during the peak demand window when energy rates are at their highest, ToU tariffs would provide consumers with rebates, encouraging excess energy to be supplied to the grid thereby assisting supply to meet demand. Consumers can react to ToU tariffs through digital smart meters and Home Energy Management Systems (HEMS).

---

<sup>2</sup> (n1), 36

### *Investment Opportunities*

How does this impact the way Infrastructure SA shapes its 20 year-strategy?

While MEA agrees that “significant investment will be required to deliver new transmission and modernised distribution networks”<sup>3</sup> we point out that CER provides the unique ability to directly source energy at the same location it will be utilised thereby reducing the need to spend millions building major transmission and distribution networks in newly developed areas.

For pre-existing developed areas, CER can utilise existing transmission structures which the community has cumulatively paid for over the last century, relieving the need to invest in as many new large-scale generation and transmission projects. Investment will be necessary to upgrade distribution and transmission infrastructure to reflect the changing energy supply chain, modifying from a one-way system to a two-way system, allowing consumers to not only receive energy but also transfer energy they have privately generated back to the grid, but this spend should be considerably less. In doing so, this will guarantee the “right energy transmission infrastructure that optimises benefits for households and industry”<sup>4</sup>.

### *Risks*

As more consumers implement and utilise CER, less consumers will be left using the traditional network. This raises concerns regarding equity of costs as they will become significantly higher for the reduced portion of consumers still fully relying on the traditional network. Policies need to be implemented to ensure prices remain reasonable for those remaining on the network. This is a good opportunity to begin phasing consumers into CER and educating them on the costs associated if the change is not made.

### *Licensed Electrical Contractors*

MEA stresses the importance of formally recognising licenced electrical contractors in the electrification process. Infrastructure SA should leave the role of installing private CER technology to licenced electrical contractors with the appropriate certifications. If these functions are removed from the private electrical industry and performed by DNSPs, there will be significant bottlenecks in the rollout of CER and network integration. Utilising the electrical workforce in installing and maintaining private CER creates a competitive market thereby driving down energy prices for consumers.

### *Opportunities to Improve SA’s Economic Growth*

CER will dramatically enhance South Australia’s (SA) economic growth. Not only will it reduce consumer energy bills thereby increasing household disposable income to inject back into the economy but will also increase employment by creating new jobs. Being at the forefront of CER infrastructure is attractive to interstate and international workers, further contributing towards population growth and therefore economic growth in the State.

---

<sup>3</sup>(n1), 17

<sup>4</sup> *Ibid.*

## Responding to Impacts of Climate Change.

CER achieves resilience through the following:

- *Resist, absorb, accommodate and recover*: the excess solar energy generated by CER is stored in batteries and able to be used in responding to disruptions. As physically independent assets, they can withstand hazards.
- *Transform*: CER is future focused as it reduces the grid demand pressures realised from significant population and EV growth.
- *Adapt*: SA is committed towards achieving reduced greenhouse gas emissions more than 50% below 2005 levels by 2030 and net zero emissions by 2050. CER technology is designed to facilitate and maintain this transition.

CER plays a vital role in responding to climate change. The ability to store excess power and utilise at a future point in time is enabled through home batteries. Recent testing of Western Power's *Symphony Project* in WA demonstrated the power of batteries to recover from outages through the provision of stored energy<sup>5</sup>. When the Cockbur Power Station fell off the grid, the Harrisdale community battery was quick to respond providing back-up energy, made possible through integration of CER infrastructure.

Overall, CER network integration will provide an "acceptable or tolerable level [risk mitigation] in a cost-effective manner"<sup>6</sup>.

## Coordinating infrastructure to support a growing population

"Failure to plan appropriately could result in cities, suburbs and towns expanding in population without access to ... infrastructure, negatively impacting on South Australia's desirability as a location to live and work"<sup>7</sup>. The technology is here now, the infrastructure and policies need to catch up. Immediate action of CER infrastructure and implementation needs to happen to be ahead of population growth as opposed to 'being behind the ball' in accommodating added grid demand pressures.

## Providing infrastructure investment to support equitable access and a more inclusive society

MEA recognises there are certain groups which are disadvantaged in the electrification transition namely rental tenants, low-income households and high-rise complex occupants. Not only are these groups at risk of being excluded from participating and directly benefiting in CER, but also risk inequitable network costs as less consumers remain on the traditional network causing the costs for those remaining to significantly increase.

Below we outline how these groups risk being excluded from participating in CER and our recommendations to addressing the problem through "reducing barriers by increasing access and inclusion"<sup>8</sup>:

- *Renters*: without mandating electrification of households, a significant portion of renters will be unable to directly participate in DER as landlords have no personal benefit to invest in such

<sup>5</sup> 'Project Symphony Industry Briefing' (Webinar, Zoom Link, 10 October 2023).

<sup>6</sup> (n1), 41

<sup>7</sup> (n1), 21

<sup>8</sup> (n1), 29

changes. We recommend providing incentives for landlords to implement DER within their residential properties such as tax rebates or provide deadlines for installing CER into rental properties with a one-off rebate to assist with costs.

- *Low-income households:* for this group the cost of investing in CER will be difficult if not impossible. We recommend efforts are focused on this group to ensure they are financially capable of installing CER and become educated towards its benefits. We recommend introducing rebates for households with income under a certain threshold. We highlight that utilising licenced electrical contractors in the electrification process will create natural market competition thereby keeping installation prices low, particularly beneficial for low-income households.
- *High-rise occupants:* Installing CER technology such as Solar PV and smart meters is more difficult for high-rise buildings. Investment costs of implementing solar PV (and other such CER) is the body corporate's decision. We recommend policies are implemented mandating body corporates to approve CER installations which benefit all residents. Further issues in metering can arise, however, we believe utilisation of pre-existing embedded networks is the solution.

Once policies are designed to better include the above groups, CER can radically enhance social inclusion and equity and reduce overall consumer costs.

### Rural and Remote Areas

Focusing on designing DNSP networks to support CER systems (as opposed to making it fit the traditional system), will normalise CER. As population growth occurs, the electricity grid becomes strained as “a growing population increases demand and pressure on infrastructure, meaning new and innovative options are needed”<sup>9</sup>. CER addresses this as households and businesses become more self-sufficient with energy generation thereby reducing demand pressures on the grid. With population growth, residential areas begin to expand towards remote and rural areas. By designing rural and remote networks around CER infrastructure, the future of electrification becomes easier as they become more urbanised.

## Electric Vehicles (EVs)

*What are the most significant challenges for decarbonising transport and how do we address them?*

In light of the Australian Energy Market Operator's (AEMO) anticipation of significant EV uptake in the coming decade<sup>10</sup>, there is more need than ever to significantly increase renewable energy production and storage required to service energy needs. It will also mean that existing oversupply of Solar PV capacity during daylight hours will have the ability to be soaked and be dispatched during times of need.

---

<sup>9</sup> (n1), 30

<sup>10</sup> (n1), 37

Infrastructure SA needs to encourage that new household and business infrastructure is designed to enable bi-directional EV charging for passenger vehicles, and that existing infrastructure is progressively upgraded. Introducing bi-directional charge enabled vehicles as an option for consumers will provide the benefits of soaking load for periods of daytime oversupply and be a dispatchable reservoir of power during periods of undersupply.

Installation of EV infrastructure in homes and businesses in concert with HEMS for residential buildings and Building Management Systems (BMS) for commercial businesses would increase the network's stability. It addresses the inevitable increased demand on the grid as more vehicles need to connect to charge and addresses public and private charging facility capacity issues.

Licensed and trained electrical contractors should be at the forefront of delivering this capacity.

## Skilled Labour

Providing infrastructure support for improved education and skills to deliver a transparent infrastructure pipeline.

### Long-Term Workforce: Vocational Education Training (VET) Education

A skilled labour pool is essential to maintain a sustainable long-term decarbonised economy. However, Australia is currently facing a skill-shortage crisis which requires immediate attention. MEA strongly advocate that investing into our future workforce now is the solution, enabling a “well planned timely and co-ordinated approach to infrastructure delivery”<sup>11</sup>.

Integrating and streamlining VET courses into the secondary school curriculum is essential in exposing and encouraging interaction and advancement in the Science, Technology, Engineering and Match (STEM) trade sector. Perception of entering trades for both females and males will be altered and students will become better equipped when entering STEM trades. It will also allow for better aptitude and competency screening ensuring the right skills are matched with the right trades, thereby improving commencement and retention rates in STEM.

Ensuring secondary schools are designed to facilitate this through not only streamlining the subjects, but also providing facilities to enable practical learning (e.g. designated zones for testing electrical switchboards) stimulates interest and development in STEM trades, securing a future skilled workforce to continue developing and maintaining a “cleaner greener economy”<sup>12</sup>. This will ensure SA has the “workforce in the right place with the right skills”<sup>13</sup>.

The *Greater Regional Adelaide Plan* recognises the importance of attracting “a skilled workforce and environment that [is] attractive for talented workers”<sup>14</sup>. While MEA agrees, we highlighted in our response to that consultation that investing in educational infrastructure to accommodate a streamlined and integrated VET secondary school curriculum is the solution to ensuring long-term sustainable pool of available skilled workers. This is particularly important as Australia aims towards,

---

<sup>11</sup> (n1), 36

<sup>12</sup> (n1), 34

<sup>13</sup> *Ibid*

<sup>14</sup> 'Greater Regional Adelaide Plan' *State Planning Commission* 2023, 146.

and maintains, net zero emission targets which will rely on electrification technology. A skilled workforce for transitioning and maintaining electrification is crucial and therefore important for Infrastructure SA to invest into its future pool of workers to enable long term actioning of the 20-year plan. The Plan provides significant opportunity for SA to develop educational spaces which encourage and foster development in STEM trades thereby “align[ing] workforce capabilities with future industry needs”<sup>15</sup>.

Short-Term Workforce: Inter-State Qualification Recognition

MEA has made several submissions regarding the current disarray of inter-state qualification recognition of licenced electrical workers. For a licenced electrical worker living outside of SA to work in the State, they are required to complete more qualifications under SA regimes despite having equivalent qualifications in their home State. This is a barrier to attracting a skilled workforce. With the goal of a developing “infrastructure [that] supports a de-carbonised, sustainable economy that capitalises on (SA’s) competitive advantages and opportunities”<sup>16</sup> SA needs to position itself to attract licenced electrical contractors to action the 20-year plan efficiently and swiftly. We recommend SA improves national harmonisation by allowing interstate qualified licenced electrical contractors, and their workers, to perform work in SA without having to undergo unnecessary additional qualifications.

---

<sup>15</sup> (n1), 28  
<sup>16</sup> (n1), 34





## Conclusion

To achieve SA's goals of decreasing greenhouse gas emissions more than 50% below 2005 levels by 2030 and net zero emissions by 2050, MEA advocate that Infrastructure SA prioritises implementation of CER technology into households and businesses and its integration into the network. Not only does this create green energy, but also provides a resilient framework to climate change and other network disruptions. The technology to achieve CER implementation is here now, it is the policies and public infrastructure integration that needs to catch up.

We are expecting to see significant population growth in the coming 20 years combined with a large uptake in EVs. These two cumulating factors will add demand pressures on the grid unless SA's infrastructure plan is pro-active in addressing the inevitable issues. CER policies combined with supporting network implementation strategies will go a long way to moving SA away from fossil fuel and cater to a growing population through CER technology.

Increasing the prevalence of ToU tariffs and educating consumers how to take advantage of them through Battery Energy Storage Systems and Home Energy Management Systems will foster community acceptance and therefore action towards transitioning to CER clean energy.

The technology to achieve meaningful CER implementation is here now, the policies and public infrastructure integration simply needs to catch up. The traditional one-way network system needs to be modernised to enable a two-way network system where consumers cannot only receive DNSP generated energy but also give back privately generated energy to the grid. This will enhance the stability and integrity of the grid especially as SA's population grows. SA's network infrastructure further needs to enable bi-directional EV charging. This will further reduce grid demand pressures and address private and public charging facility capacity problems.

Prioritisation towards equitable inclusion of rental, low-income households and high-rise complex occupants needs to be addressed with financial incentives to initiate their inclusion in CER technology.

MEA stresses the vital role licenced electrical contractors play with installing and maintaining the private CER infrastructure market. We encourage Infrastructure SA to integrate the private electrical sector into its plan to cohesively dedicate private functions to this industry. Ensuring licenced electrical contractors with appropriate qualifications service the private arena of CER will advance efficient private CER rollout, and create a competitive market driving down consumer prices. It further leaves more capacity to DNSPs to integrate CER with the network and monitoring functions.

A pipe-line of skilled labour is crucial for the implementation and maintenance of electrifying SA homes and businesses. Investment into SA's future pool of labour to facilitate the future needs of CER needs to happen now through a streamlined & integrated VET secondary school curriculum with equal weighting to ATAR subjects. This will foster interest and early training in STEM trades and allow for better aptitude and competency screening to better match the right skills with the right trade overall enhancing SA's trade commencement and attraction rates.

MEA looks forward to seeing the outcome of Infrastructure SA's 20-Year Plan and invite further contact on the future of CER integration within the State.