



Embedded Networks Review

City of Melbourne Submission to the Victorian
Government

February 2021

Executive Summary

This submission is provided on behalf of the management of the City of Melbourne and is based on endorsed Council policy, including our *Climate Change Mitigation Strategy to 2050* and *Response to the Climate and Biodiversity Emergency 2020*.

The City of Melbourne welcomes the opportunity to provide input into Victoria's Embedded Networks Review and recognises that many residents living within embedded networks do not enjoy the same rights and protections as customers who are connected directly to the grid. The City of Melbourne supports the introduction of appropriate protections to ensure existing and future embedded network customers are not disadvantaged.

The primary focus of this submission, however, is on drawing attention to the benefits of embedded networks in terms of their ability to enable access to renewable energy and decarbonisation of the electricity grid. The City of Melbourne has identified embedded networks as a key enabler for delivering the renewable energy actions in its strategies and in helping deliver on Council's Pledge under the Victorian Government's *Climate Change Act 2017*.

The City of Melbourne notes that the focus of this review is on how to implement a ban on embedded networks in residential apartment blocks, with appropriate exemptions for renewable energy microgrids; and wishes to highlight that embedded networks can in fact help facilitate a range of renewable energy initiatives beyond microgrids. Most significantly, this includes the potential for renewable Power Purchase Agreements and the delivery of zero carbon precincts.

Through this submission the City of Melbourne aims to emphasise the importance of future regulation of embedded networks being proactive and sufficiently flexible to avoid inhibiting innovation and the accelerated uptake of renewable energy.

Summary of recommendations

The City of Melbourne makes the following recommendations for consideration in the Embedded Networks Review.

1. Introduce fit for purpose regulations specific to microgrids which enable solar power purchase agreements and community energy projects.
2. Ensure exemptions for embedded networks within precincts with ambitious renewable energy and emission reduction goals.
3. Ensure exemptions for embedded networks for apartment buildings with ambitious renewable energy and emissions reduction goals, and which are powered by onsite or offsite renewable energy.
4. Allow 'registrable exemptions' for embedded network operators utilising certified Green Power, or offsite renewable Power Purchase Agreements.
5. Ensure exemption processes do not present additional barriers to innovation.
6. Consider consumer protections including the use flat service fee pricing models, as opposed to pricing models based on on-selling power at a premium.

Introduction

The City of Melbourne welcomes the opportunity to provide input into Victoria's Embedded Networks Review. This submission is provided on behalf of the management of the City of Melbourne and is based on endorsed Council policy, including:

- 2020 Response to the Climate and Biodiversity Emergency
- Climate Change Mitigation Strategy to 2050

The City of Melbourne recognises that many residents living within embedded networks do not enjoy the same rights and protections as customers who are connected directly to the grid. This review is well founded to address these concerns and shows a strong focus on developing protections to improve outcomes for embedded network customers. The City of Melbourne supports the introduction of appropriate protections to ensure existing and future embedded network customers are not disadvantaged.

The primary focus of this submission however, is to draw attention to the benefits of embedded networks in their ability to enable access to renewable energy and decarbonisation of the electricity grid. Through this submission the City of Melbourne seeks to ensure any future regulation of embedded networks is appropriate to continue to accelerate uptake of renewable energy.

The City of Melbourne recognises that the scope of this review is specifically focussed on apartment buildings and consumer protections, nevertheless this submission also considers embedded networks in commercial contexts and precincts as their examples are relevant and illustrative for the design and implementation of a ban.

The City of Melbourne sees many opportunities for embedded networks to support the achievement of state and local government climate goals by enabling community energy initiatives, behind the meter solar sharing, renewable microgrids, Power Purchase Agreements (PPAs), and most significantly, the delivery of zero carbon precincts.

The City of Melbourne strongly supports exemptions to the embedded networks ban where positive customer outcomes and renewable energy benefits can be demonstrated.

City of Melbourne's context

Like many urban councils, the City of Melbourne has a significant number of embedded networks within its municipality. The density of the built environment, predominance of multi-story residential dwellings, and governance structures in strata buildings have tended to lend themselves to the establishment of embedded networks. Many commercial office buildings and shopping centres also currently utilise embedded networks.

The majority of the city's 178,955 residents live in high rise apartments¹. Of the 89,200 dwellings in the municipality, 79,270 (89 per cent) are residential or student apartments². While the exact number of embedded networks is not precisely known, the City of Melbourne estimates at least 25 per cent (19,800) of these dwellings are connected to an embedded network.

By 2041 our population is expected to reach 384,000³. Much of this growth is slated to occur in the urban renewal precincts of Arden-Macaulay and Fishermans Bend. The City of Melbourne is collaborating with the Victorian Government and the private sector to ensure we have the infrastructure and governance arrangements necessary to support these precincts to target zero emissions.

¹ <https://www.melbourne.vic.gov.au/about-melbourne/melbourne-profile/Pages/facts-about-melbourne.aspx>

² <https://www.melbourne.vic.gov.au/SiteCollectionDocuments/clue-2019-summary-report.pdf>

³ <https://www.melbourne.vic.gov.au/about-melbourne/research-and-statistics/city-population/Pages/population-forecasts.aspx>

City of Melbourne's renewable energy commitments

The City of Melbourne's [Climate Change Mitigation Strategy](https://www.melbourne.vic.gov.au/sitecollectiondocuments/climate-change-mitigation-strategy-2050.pdf)⁴ sets out an ambitious goal to create a zero-emissions city powered by 100 per cent renewable energy. This strategy describes the actions Council will take, together with stakeholders, to address the greenhouse gas emissions that cause climate change under four strategic priorities:

1. 100 per cent renewable energy
2. Zero emissions buildings and precincts
3. Zero emissions transport
4. Reducing the impact of waste.

The City of Melbourne's Climate Mitigation Strategy supports the Victorian Government's legislated target of net zero emissions by 2050. It contains our Council Pledge under the [Climate Change Act 2017](https://www.climatechange.vic.gov.au/legislation/climate-change-act-2017)⁵ and outlines the actions Council will take to reduce emissions from energy supply and buildings in our municipality by 2025, including accelerating the uptake of power purchase agreements.

Since releasing the Strategy, Council declared a [Climate and Biodiversity Emergency](https://www.melbourne.vic.gov.au/about-council/committees-meetings/meeting-archive/MeetingAgendaItemAttachments/886/15806/FEB20%20FMC2%20AGENDA%20ITEM%206.5.pdf)⁶. The Declaration recognises that climate change and mass species extinction pose serious risks to the people of Melbourne and Australia, and should be treated as an emergency. To support our Declaration, Council have accelerated action and prioritised projects where the City can make the most impact on climate change and biodiversity loss. The scope of Council's climate and biodiversity emergency response includes a commitment to accelerate renewable energy purchasing by residents.

The City of Melbourne has identified embedded networks as a key enabler for delivering the renewable energy actions in our strategies and meet our Council Pledge under the Victorian Government's *Climate Change Act 2017*.

Embedded networks can facilitate on-site renewable electricity generation and storage

Residential Apartment buildings

Embedded networks can facilitate the uptake of renewable energy within apartment buildings by allowing renewable generation and other technologies to be shared throughout a whole building. By centralising energy generation infrastructure as well as energy storage batteries and electric vehicle chargers, it is possible to make more efficient use of these assets through shared use behind the meter. The greater loads present at the point of connection mean that business cases for investing in this type of infrastructure can be greatly improved. This leads to better outcomes for the consumers and less impact on the electrical grid through export.

The complex governance structures of strata buildings means installing rooftop solar as an individual resident is rarely a simple option. This is a major barrier for residents living in these properties and limits their ability to engage with renewable energy. Embedded networks can reduce the complexity by simplifying governance of energy use within the building. With a single point of connection and a single actor paying the bill at the gate, some of the complexity involved in installing centralised energy infrastructure is removed.

⁴ <https://www.melbourne.vic.gov.au/sitecollectiondocuments/climate-change-mitigation-strategy-2050.pdf>

⁵ <https://www.climatechange.vic.gov.au/legislation/climate-change-act-2017>

⁶ <https://www.melbourne.vic.gov.au/about-council/committees-meetings/meeting-archive/MeetingAgendaItemAttachments/886/15806/FEB20%20FMC2%20AGENDA%20ITEM%206.5.pdf>

The City of Melbourne recognises that protections need to be in place to ensure that these benefits are passed through to consumers through the embedded network manager responsible, and notes there are examples where both renewables and consumer benefit has been achieved.

Case Study: Nightingale Housing

Where behind the meter renewable energy and embedded networks have been implemented by progressive developers, consumers have benefited from reduced energy costs and greater choice in terms of sustainability preferences. A leading example of this progressive apartment development model is Nightingale Housing⁷. In this example the use of embedded networks enable the benefits of rooftop solar to be distributed to residents and ground floor commercial operators, while also enabling the sourcing of certified Green Power for the entire building at bulk discounted rates.

Certainty of energy affordability for residents is achieved via contractual arrangements with the embedded network operator whereby the operator derives revenue from a flat service fee related to the number of customers, rather than from on-selling power at a premium⁸. In this way, the embedded network operator is not incentivised to price gouge customers by inflating margins, and is therefore able to pass through energy rates at lowest cost.

Community energy projects and microgrids

The City of Melbourne has assessed the potential of different community energy models in the city⁹. One of the viable models identified recognises embedded networks and microgrids as a key enabler to support community energy projects.

The existing General Exemption Order available for Community Energy projects applies to projects under which *a community group initiates, develops, operates and benefits from a renewable energy resource or energy efficiency initiative*. The phrasing of this exemption applies not necessarily to the project or project outcomes, but rather to the group who are delivering the project. The City of Melbourne notes that it is inconsistent with the regulation for the exemption to apply to a *group* rather than the applying to the *functions* of the project. However the City of Melbourne does support the intent of this exemption and recommends the development of new exemption processes that minimise regulatory and administrative burden for community groups and that do not present additional barriers to innovation.

The current regulatory framework does not adequately accommodate microgrid services, or support the users of these services. Microgrid proponents and users are currently forced to navigate significant regulatory complexity, uncertainty, and inconsistency, which represent significant barriers to investment. The City of Melbourne recommends that a fit for purpose, enabling set of regulations be created specific to the function of microgrids. To provide better regulatory clarity, an appropriate functional definition of a microgrid would need to be developed.

The definition of a microgrid, its function and participants, cited by Monash University's May 2019 White Paper, 'Victorian Market Assessment for Microgrid Electricity Market Operators'¹⁰ is supported. This definition appropriately recognises a microgrid as a system that controls and coordinates electricity supply and demand of locally interconnected users.

The scope of microgrid projects is wide and can encompass the integration, coordination, optimisation of distributed energy resources. Microgrids produce a number of benefits including;

- Facilitate the uptake of renewable energy particularly in urban contexts where the built form limits renewable energy.

⁷ <https://nightingalehousing.org/>

⁸ Interview with Gavin Ashley, Better Cities and Regions Lead, Hip v Hype (consultancy on Nightingale 2.0), 3 Feb 2021

⁹ <https://www.melbourne.vic.gov.au/SiteCollectionDocuments/community-energy-models.pdf>

¹⁰ https://www.monash.edu/__data/assets/pdf_file/0010/1857313/Monash-Net-Zero_Microgrid-Operator-Whitepaper_20190617-1.pdf

- Access to additional value streams which can provide better outcomes and electricity prices to customers.
- More effective use of the grid infrastructure and have lower energy distribution losses because the electricity is consumed close to the point of generation.
- Improved outcomes to the network through the provision of network and grid support services

Whilst it is often the case that microgrids can be island-able from the grid this is also often technically and commercially unviable in a residential apartment context. The ability to act stand-alone from the grid it is not required to realise the above benefits and as such this should not be included within the functional definition.

By defining microgrids and creating an enabling set of regulations it will be possible to realise the benefits for these grid interactive buildings and precincts. An appropriate set of regulations could both supersede and subsequently encompass the community energy and solar power purchase projects that are covered by the existing General Exemption Orders.

Commercial buildings & Shopping centres

While outside the scope of the review, the operation of embedded networks in commercial settings illustrates how they can support the deployment of renewable energy in larger developments and precincts including residential apartments.

The Queen Victoria Market Pty Ltd (QVM), which is a wholly owned subsidiary of the City of Melbourne, operates under an embedded network agreement with its traders. As owners of QVM, the City of Melbourne has oversight and responsibility for any capital improvements at the site; while QVM is responsible for managing the day to day operations of the market and paying the cost of electricity brought to the parent meter. QVM Operations engage an embedded network operator to manage the billing of eighty-eight separate child meters.

Under this operating model the City of Melbourne has been able to build the business case for the installation of significant solar capacity (up to 1.5 MW of solar PV) through the Queen Victoria Market Renewal Program. The existence of the embedded network allows for significantly more generation capacity to be included on the rooftops of the Markets and provides for this energy to be used across the entire market precinct.

Without an embedded network, providing traders and QVM Operations with access to onsite renewable energy would require the installation of eighty-four separate solar systems. Clearly, the operational complexity and cost inefficiency of such a model would prohibit the deployment of renewable generation; thereby leaving traders locked out from the benefits of clean, affordable energy.

This example encompasses the situation for many commercial tenants who are unable to access renewable energy and it is relevant to embedded network customers in residential apartment blocks. As most large developments include mixed commercial, retail and residential uses; the City of Melbourne believes the proposal to carve out of residential embedded networks would undermine precinct wide renewable energy solutions, complicate their implementation, and increase the cost of delivering state and local climate goals.

Embedded networks can facilitate off-site renewable electricity purchasing and the delivery of zero carbon precincts

Precincts

Unique and substantial opportunities exist to accelerate the uptake of renewable energy and achieve zero emissions targets by leveraging embedded networks in precincts and urban renewal areas. These sites can be powered with offsite renewable energy sourced through renewable Power Purchase Agreements.

A Power Purchase Agreement (PPA) is a long term contract between an electricity buyer (or group of buyers) and an electricity generation project¹¹. PPAs were not a feature of the Australian electricity market until recent years but their prevalence has grown rapidly since 2017.

The City of Melbourne helped pioneer the development of PPAs by bringing together a buying group which transacted one of the first corporate PPAs in Australia. The [Melbourne Renewable Energy Project](#)¹² (MREP) involved fourteen partners - corporates, universities, local governments and cultural institutions - whose aggregated electricity demand was of a scale sufficient to catalyse the construction of a 39-turbine, 80MW windfarm in western Victoria.

New renewable energy projects need revenue certainty to support their construction. By committing to purchase a large quantity of electricity under a long term agreement, PPA offtakers provide developers and financiers with the certainty required invest in new renewable generation projects. PPAs typically range in length from 10 to 20 years and longer terms deliver lower energy prices to the consumer. Due to their scale and long duration, PPAs suit very large, financially secure entities with substantial electricity requirements.

The existing General Exemption Orders specifically call out onsite solar power purchase arrangements for exemptions¹³. However, given the density of urban precincts, with their small and space constrained rooftops and the likelihood of overshadowing, the potential generation from on-site renewables is vastly insufficient to meet a precinct's electricity needs. Nevertheless, the major precinct renewal programs at Fisherman's Bend and Arden-Macaulay being delivered by the Victorian Planning Authority (VPA), Victorian Government, and the City of Melbourne, both have zero emissions commitments¹⁴¹⁵.

Recognising the necessity to achieve zero emissions, and the challenge in delivering sufficient renewable energy supply, the [draft Arden Structure Plan](#)¹⁵ includes a strategy to:

- *Facilitate a mechanism to procure a power purchase agreement to power the precinct with 100 per cent renewable energy. Opportunities exist for this agreement to also address the energy needs of surrounding neighbourhoods (Strategy 10.1)*

Similarly, the [Fishermans Bend Framework](#)¹⁴ includes the following strategies:

- *Explore opportunities to facilitate large scale purchase of renewable energy generated outside the Fishermans Bend boundaries (Strategy 7.1.4)*
- *Maximise renewable energy generation such as solar panels on appropriate rooftops and sharing or storing of this energy (Strategy 7.3.1)*
- *Explore opportunities for precinct wide sustainable energy generation and distribution (Strategy 7.3.2)*

The City of Melbourne are in active discussions with the VPA and the Department of Land Water and Planning (DEWLP) as part of the precinct planning process for urban renewals; specifically around what technologies and market mechanisms exist to achieve a zero carbon precinct. The City of Melbourne sees enormous potential for PPAs to help deliver zero carbon objectives at scale.

Embedded networks will likely be a key solution for precincts to be supplied by 100 per cent renewable energy, as they would allow a larger more bankable counterparty (such as a developer, building owner, institutional investors, or government) to sign a renewable PPA and on-sell that energy to customers within a building or precinct. The City of Melbourne believes it would be more economically efficient and less complex to deliver renewable energy objectives at a precinct level than at an individual building level. Embedded networks within precincts offer a ready-made structure through which to tie groups of energy users together to achieve precinct-wide emissions goal.

¹¹ <https://www.melbourne.vic.gov.au/sitecollectiondocuments/mrep-guide-renewable-energy-procurement.pdf>

¹² <https://www.melbourne.vic.gov.au/business/sustainable-business/mrep/Pages/melbourne-renewable-energy-project.aspx>

¹³ <https://www.energy.vic.gov.au/legislation/general-exemption-order-review>

¹⁴ https://www.fishermansbend.vic.gov.au/__data/assets/pdf_file/0020/35093/Fishermans-Bend-Framework.pdf

¹⁵ https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.com-participate.files/9815/9315/6556/Draft_Arden_Structure_Plan_-_26_June_2020.pdf

Individual buildings, businesses, or residential apartment buildings on their own typically do not have electrical loads large enough to be of interest to the developers of renewable energy projects, therefore the opportunity for PPAs is effectively unavailable to them. Aggregating the electrical loads of public infrastructure assets and buildings (including apartment buildings) together via the use of embedded networks would make it possible to achieve the kind of scale necessary to secure a PPA and deliver local and state government's zero carbon objectives.

Allowing renewables to be shared between buildings produces a more consistent load profile which improves load matching for offsite renewable generation. This translates to less risk for the project developer and lower electricity prices for electricity buyers.

The City of Melbourne therefor recommends exemptions for embedded networks within precincts with ambitious renewable energy and emissions reduction goals.

Recommendations

The City of Melbourne shares concerns around consumer protections and lack of access to competitive pricing, and supports the introduction of appropriate consumer protections to ensure existing and future embedded network customers are not disadvantaged.

The City of Melbourne wishes to highlight the benefits embedded networks provide and their ability to drive greater uptake of renewable energy within the built environment of the city. As such the following recommendations are offered for consideration in the Embedded Networks Review:

1. Introduce fit for purpose regulations specific to microgrids which enable solar power purchase agreements and community energy projects
2. Introduce for embedded networks within precincts with ambitious renewable energy and emission reduction goals
3. Introduce for embedded networks for apartment buildings with ambitious renewable energy and emissions reduction goals, and which are powered by onsite or offsite renewable energy
4. Allow 'registrable exemptions' for embedded network operators utilising certified Green Power or offsite renewable Power Purchase Agreements
5. Ensure exemption processes do not present additional barriers to innovation
6. Consider consumer protections to prevent customer price gouging, including the use flat service fee pricing models, as opposed to pricing models based on on-selling power at a premium.

We appreciate the opportunity to provide feedback on the proposed change and are committed to supporting development that enables renewable energy uptake and emission reduction goals to be met.

Yours sincerely,

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