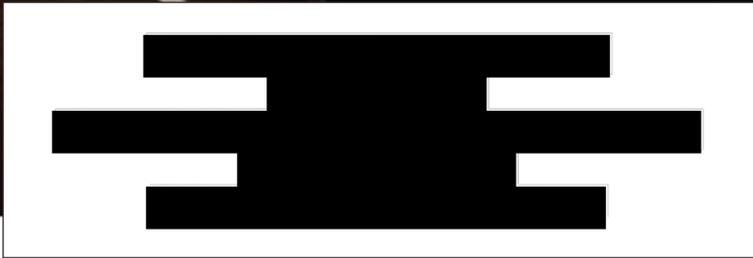


Volvo Group Australia submission to the
**Parliamentary Inquiry (Victoria) into Electric
Vehicle Charging – Economy and
Infrastructure Committee.**



V O L V O

Committee Manager
Michael Baker
Parliament of Victoria
Legislative Council Economy and Infrastructure Committee
Parliament House, Spring Street
EAST MELBOURNE VIC 3002

Submitted via online form

Dear Mr Baker,

On behalf of Volvo Group Australia, I am pleased to provide this submission to the Legislative Council Economy and Infrastructure Committee's inquiry into how Victoria can best harmonise electric vehicles (EVs) with electricity supply and demand. We welcome the opportunity to contribute to this important discussion and to share insights drawn from our experience in heavy vehicle transport and manufacturing.

The transport sector is already a major source of Australia's greenhouse gas emissions, and road freight is a disproportionately large contributor: *AECOM's Electrifying Road Freight Report* commissioned by the Australia Renewable Energy Agency (ARENA) details that road freight produces over 80% of freight emissions, which amounts to around 36 million tonnes of CO₂ annually. As freight activity is forecast to increase by 77% by 2050, the AECOM report argues that electrifying this sector is not optional, it is essential to meet our national climate goals.

Understandably, pressure is mounting on the industry to accelerate its decarbonisation journey, in which heavy electric vehicles, such as trucks and buses, will play a major and important role. The fact that the average age of trucks on Australian roads today is 15 years, and for city buses even longer, draws attention to the fact we cannot afford to wait to start prioritising decarbonisation of this sector. Zero emission battery electric trucks and buses are available and on Australian roads today.

We are pleased to read about the Committee's efforts to identify practical strategies for a reliable, sustainable and equitable EV transition across Victoria. **Our input focuses on heavy electric vehicles, which form an important component in meeting emission reduction targets.**

Thank you for considering our input. Volvo Group Australia welcomes the Committee's leadership in exploring how Victoria can achieve a balanced and forward-looking approach to EV integration and is available to assist as the inquiry progresses.

Yours faithfully,



Shylie Mackenzie

Vice President Public Affairs
Volvo Group Australia



Table of contents

1.0 Introduction4

1.1. About Volvo Group Australia4

2.0 Transitioning to Electric4

3.0 Power Supply, Grid Capacity and Stability5

4.0 Renewable and Green Energy Supply5

5.0 Heavy Vehicle Range and Energy Demand5

6.0 Charging Infrastructure5

6.1. In-Depot.....5

6.2. Public and Shared Charging Infrastructure.....6

6.3. Shared Intermodal Public EV Charging7

6.4. Charging Solutions Cost8

7.0 Second-Life Use and Recycling of EV Batteries9

7.1. Battery Circularity10

7.2. Battery Energy Storage System11

7.3. Battery Recycling.....12

8.0 Facilitating EV Update: Ecosystem and Partnerships (Policy, Incentives, Research)12

8.1. Sharing of learnings and best practice13

References14

1.0 Introduction

This document provides a brief overview of Volvo Group Australia's comments on, recommendations and input to the inquiry into how Victoria can best harmonise electric vehicles (EVs) with electricity supply and demand, focused on heavy vehicles.

1.1. About Volvo Group Australia

Volvo Group Australia (VGA) has more than 1,600 local employees, and manages the manufacturing, distribution and operation of Volvo Trucks, Mack Trucks, UD Trucks, Volvo Bus, Volvo Penta marine and industrial engines, Volvo Construction Equipment and Volvo Financial Services.

Since 1972 VGA has produced more than 80,000 Australian Made Volvo and Mack trucks, and today are one of Australia's largest vehicle manufacturers. Every truck built at our Wacol, Queensland facility carries official 'Australian Made' certification. These operations proudly support a local supply chain of more than 120 suppliers and injects more than \$400m annually into the Australian economy. Looking to the future, VGA has committed to expand its local manufacturing operations to build not only internal combustion engine (ICE) trucks, but also heavy battery electric trucks from 2026 in Wacol.

Globally Volvo Group has a target of a 'net zero emission' truck population by 2050. To achieve our Paris Agreement and Science Based Targets initiatives (SBTi) commitments, all trucks sold after 2040 will need to be fossil free.

2.0 Transitioning to Electric

While zero emission heavy vehicles are available in Australia today and have been operating for many years in other countries such as across Europe, Canada and the US, there are a number of barriers locally that are preventing the acceleration of their uptake. Australia faces unique legal constraints regarding axle weight limits, unlike many other countries globally that permit significantly higher limits to counterbalance the impact of battery tare weight. While we have seen jurisdictions announce increases to their axle weight limits, on a permanent and for some a trial basis, these have unfortunately been largely limited to state roads only.

The national harmonization of heavy vehicle standards, weights and dimensions is critical to ensure the maximum efficiency, productivity and decarbonization of the industry. The freight and logistics industry by its very nature is not bound by borders or boundaries, but as a result of the differing regulations between the jurisdictions unfortunately we are creating them. This significantly hampers the productivity potential of electric heavy vehicles, which in turn impacts the commercial viability for many operators.

Contributing to uptake, is the planning, procurement and set up of the required charging infrastructure, a significant and time-consuming step. It is also an area and topic that is new for many in the transport industry, and resourcing to manage this is challenging for small business.

As explained in the report Electrifying Road Freight by AECOM, the industry is made up of a high proportion of small-medium enterprises that own a small number of trucks and for 70% of those, only one truck. This can lead to challenges in achieving economies of scale, accessing capital for investment in newer technologies, and navigating regulatory requirements.

Fleet size, depot location and transport application are all key factors that influence the ease and/or complexity of charging infrastructure set-ups.

Below is an overview of some of the key considerations and potential barriers for charging infrastructure.

3.0 Power Supply, Grid Capacity and Stability

As the volume of EVs on the road increases, so too does the demand for electricity. Australia needs to ensure sufficient capacity of its electricity grid, including at peak times.

Not only is grid capacity going to be critical into the future however, but so too stability and reliability. As more vehicles are electrified, stable and reliable electricity supply, with contingency plans in the case of outages, will be critical for transport security.

To help meet the growing demand for electricity in the long term, industry, government and other stakeholders must work together on the planning, decision-making and actions to ensure that there is adequate transmission capacity in the national, regional and local power grids.

Public authorities should take steps in establishing their revised national policy objectives to ensure the power supply – ideally from renewable energy.

4.0 Renewable and Green Energy Supply

To reduce climate impact in the most efficient way, it is also necessary to promote and incentivise the transition to 100% fossil-free energy. Using electricity produced from brown coal for example, will not achieve the overall carbon reduction that Australia is targeting.

Government policy and investments into green energy, for example investment into or incentives for solar, wind, hydrogen production, and waste and energy recapturing.

5.0 Heavy Vehicle Range and Energy Demand

As battery technology improves, we will see the current range and battery capacities increase but they will always have a limit. Depending on the vehicle's application, energy draw and route requirements, in-depot charging may be the ideal and most efficient and effective charging solution.

For others, productivity and viability will be dependent on accessing other charging equipment – either in public spaces such as at driver rest areas and fuel stations, or on-site at other private locations such as end customer loading and unloading docks, ports and logistics centres. Partnerships and collaboration will be key to both scenarios.

6.0 Charging Infrastructure

6.1 In-Depot

With more infrastructure and electrical specialists now operating in Australia, conducting depot assessments for charging infrastructure set-ups is becoming easier and more accessible. Often initial site assessments are offered by charging and infrastructure companies at zero cost.

One of the major barriers to in-depot infrastructure is the potential high cost and complexity, pending for example:

- Volume of EVs to be charged
- Charging window / times available (to suit operations)
- Electricity demand required
- On-site grid connection and capacity
- Alternative green energy supply i.e. on-site solar panels, Battery Energy Storage Systems etc.
- Possible civil works required

- Alternative charging availability i.e. public or shared chargers

Various incentives, funding and financing models will be required to help overcome this barrier.

6.2. Public and Shared Charging Infrastructure

Shared and/or publicly available charging infrastructure will be required, and some types of operations will be dependent on them. For many, it will also offer a solution enabling longer routes, decreased downtime, potential for greater power take off energy draws, and higher productivity.

Some key considerations when planning shared and/or public charging infrastructure are outlined below.

One of the costs of developing a charging network arises due to the need for electricity grid connection upgrades, and as such early involvement of electricity utilities would be beneficial, to access site specific data that can be included in the analysis and planning.

6.3. A standardised, non-proprietary, and interoperable charging service

We already see examples of this in the light passenger vehicle space, where EVs are utilising the same standard AC or DC charging equipment, instead of being designed utilising unique charging ports or solutions. Standardisation and volumes will be key for the commercial viability and acceleration of our charging network.

It also opens the door to effective charging network location tools, such as PlugShare.

Online: [PlugShare - EV Charging Station Map - Find a place to charge your car!](#)

App: <https://company.plugshare.com/plugshare.html>

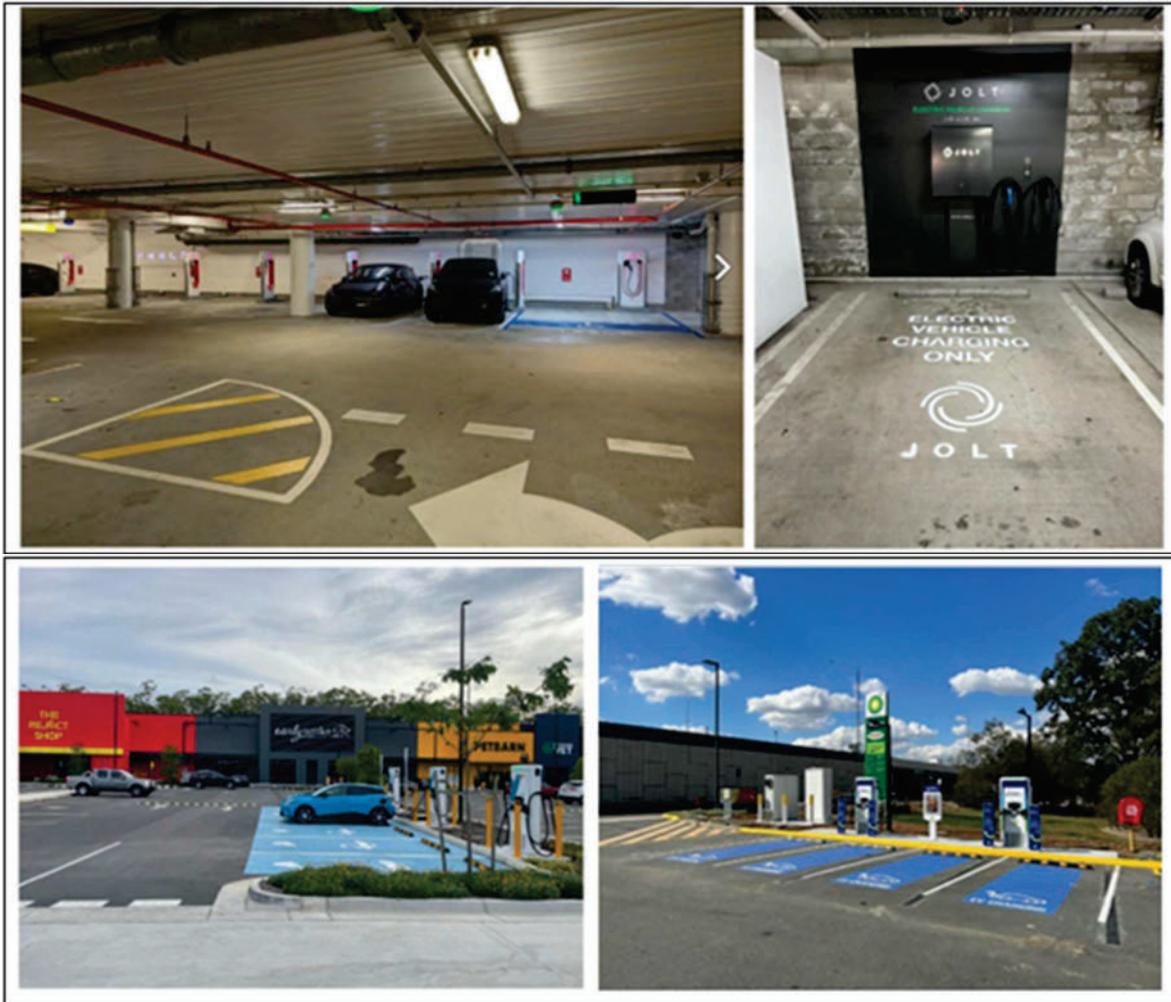
Figure 1: Example PlugShare map from website



6.4. Shared Intermodal Public EV Charging

The majority of EV chargers being set up across the country are designed for light vehicles and passenger cars. Please refer to Figures 2 below, showing example of shared car charging spaces that are not suitable for heavy vehicles, such as trucks and buses.

Figure 2a-2d: Example Public EV car charging spaces



When designing EV chargers for heavy vehicles, the below items should be considered –

- **Location and proximity to heavy vehicle EV operations**
 - Understanding where electric heavy vehicles will be operating is the first step required for planning charging infrastructure. With strategically placed infrastructure, operators would have the ability to extend short haul electric truck routes.
 - Urban and Metropolitan locations, as well on the main freight routes and trucks stops utilised for local and regional haul transportation are the initial obvious choices, while ensuring that these assets remain strategically relevant within a broader, long-term charging network.
 - Locations need to be selected strategically given the upfront establishment cost. The AECOM report **Electrifying Road Freight** commissioned by ARENA, provides a useful recommendation of strategic placement across key freight corridors, and a Network Staging approach.

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- Further, VGA would be open to collaborate with the Victorian Government to study a particular region and identify the ideal charging locations, considering truck movements, routes, distances travelled and stopping idling times, where we have access to data and insights. Further, requests to other truck OEMs to anonymise truck movement data to determine appropriate charging locations, and network planning could be beneficial.
- Overnight charging is required for many operators and enabling this through public charging infrastructure considering relevant availability and security needs.
- Opportunity charging, during operation with shifts or during breaks, requires a fast charger.
- Depot charging for locations such as major grocery stores or retail organisations such as Amazon, could include shared charging for operators at the loading dock. Particularly where drivers are required to wait for a set period of time, such as for order fulfilment and loading.
- Assessment of the appropriate sites should also consider grid capacity, where upgrades may be required to manage capital investment and where infrastructure may or may not be scalable.
- A research paper “*Exploring public charging infrastructure requirements for short-haul electric trucks*” linked in this submission, demonstrate that relatively few charging facility sites need to be established initially in order to provide substantial network coverage for short-haul electric trucks (in the South East Queensland region). The findings expect that similar results would be observed for other regions.
- **Adequate space for full sized heavy vehicles**
 - i.e. 14.5m bus or 19m prime mover & semitrailer combination and up to 26m B-double combination.
- **Adequate swept path (space needed to safely make a turn)**
 - Entry and exit of heavy vehicles – turning circles have to be considered.
- **Vehicle height and dimensions**
 - Underground chargers for example are normally not accessible with heavy vehicles.
- **Option of fast DC chargers**
 - Heavy commercial vehicles typically have larger energy storage systems than cars, therefore usually require a greater energy charge.

6.5. Charging Solutions Cost

The expansion of charging infrastructure in non-publicly accessible places, such as private depots and logistic centres is crucial to ensure on route and overnight charging can occur. As demand has increased volume and the number of providers has increased competition, the cost of the charging unit has decreased substantially over the decade.

The size and number of chargers required is very dependent on each operators’ individual set-up and operations. As a high-level guide, Figure 3 below outlines current indicative prices in AUD at various power levels for the charger only. It does not include the cost of civil works.

- **AC charging** is cheaper but requires an onboard converter.
- **DC charging** is faster but at a higher cost.

Figure 3: Indicative Pricing of Chargers in AUD



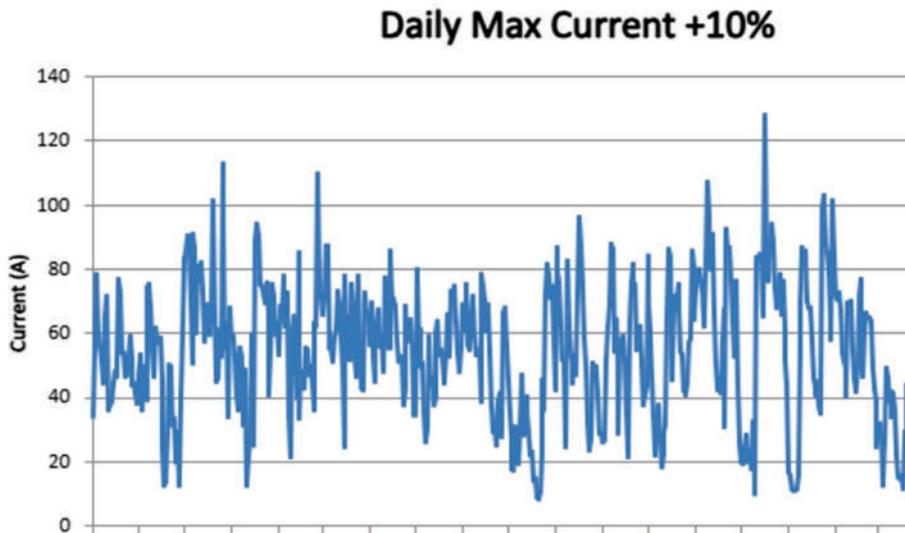
Depending on the location of the charger relative to the main switch board, civil works could be an extra \$5,000 or even double the cost of the charger.

Furthermore, the larger DC chargers often exceed the site’s available power and will require load management to avoid tripping circuit breakers and/or limitation in charger size.

Figure 4 below was taken as part of a zero emission heavy vehicle operator’s site assessment to install a large electric charger. The figure shows the significant fluctuations in available power and therefore the lack of full charge rate throughout most of the day.

Sites can have their available power increased but this often costs more and takes longer to procure than the truck and charger it is meant to enable.

Figure 4: Example fluctuations of power for a heavy vehicle charge



7.0 Second-Life Use and Recycling of EV Batteries

We closely monitor and optimise electric vehicle batteries to expand their lifespans. Through detailed battery data, we can understand each battery’s first life down to the cellular level, ensuring its journey into its second life.

When a battery has completed its primary task in a vehicle or bus, we breathe new life into it. Using detailed battery data, we can tell if a battery needs a few cells replaced or a total overhaul. We can then determine its next

V O L V O

purpose. They might return to the roads, powering vehicles or embark on a different journey, serving as Battery Energy Storage System, adding value to society at large. As each battery approaches the true end of its lifecycle, we aim to extract and reuse essential materials like lithium, cobalt, and nickel. This process ensures that we tap into the full value of every battery, from initial use to responsible recycling.

For sites that are particularly challenged by weak or non-existent grid connections, Volvo Penta's BESS has a power boosting feature. This functionality allows the unit to continue charging itself even with low power from the grid, while still providing the ability to charge vehicles or machinery quickly when needed. This technology is particularly helpful for remote locations or situations where grid power is intermittent, providing a consistent and reliable energy source when other solutions would fall short.

There is much we can learn globally and Volvo Group would be interested to share their knowledge and experience in this area. To share an example, Volvo Buses is now giving a second life to batteries from electric buses. In a unique cooperation with Stena Property and Stena Recycling's subsidiary BatteryLoop, bus batteries are used for energy storage and as an energy source in Gothenburg's Fyrklöver residential complex. The project is a step towards circular economy in electromobility creating new commercial possibilities for companies.

Volvo Buses is running a similar project together with several partners in the Viva residential area in Gothenburg. The project has received a number of awards, including the Environmental Building of the Year from Sweden Green Building Awards 2019.

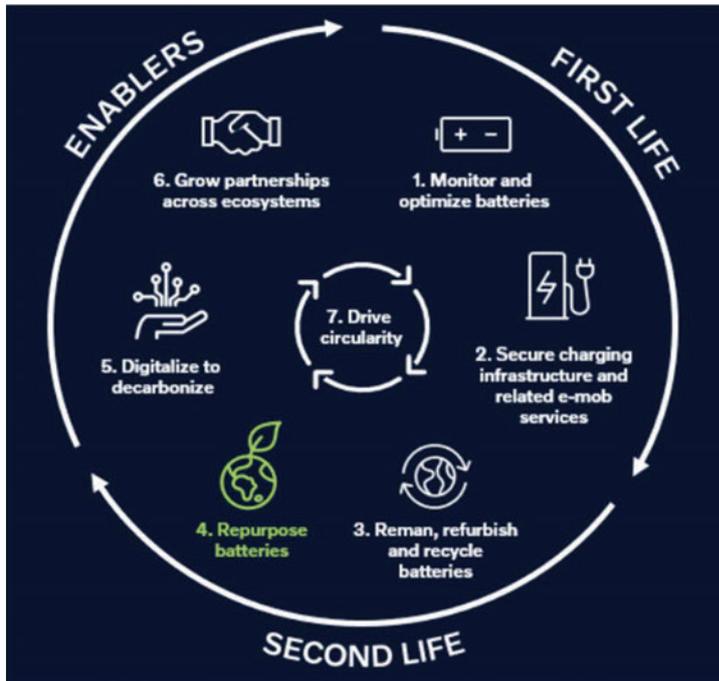
7.1. Battery Circularity

Batteries are a valuable resource and must be treated as such. When they reach the end of their energy storage lifetime in vehicles, a large proportion of their capacity remains intact. To ensure that batteries can be used as efficiently as possible throughout their life cycle, we need policies covering reuse, repurpose, refurbish, remanufacturing and recycling.

In VGA's experience, the in vehicle battery 1st life is estimated to be approximately 8-10 years, after which approximately 80% of its initial usable energy remains.

Once the battery is removed from its 1st life in the vehicle, other possible 2nd battery life uses could be in Battery Energy Storage Systems (BESS) and battery storage solutions on-site at depots, in mines, construction sites or even connected to housing and apartment blocks as examples. This area of battery circularity is a major opportunity for Australia. After the battery's 2nd (and sometimes 3rd) life, the battery can then be recycled.

Figure 5: Battery circularity design



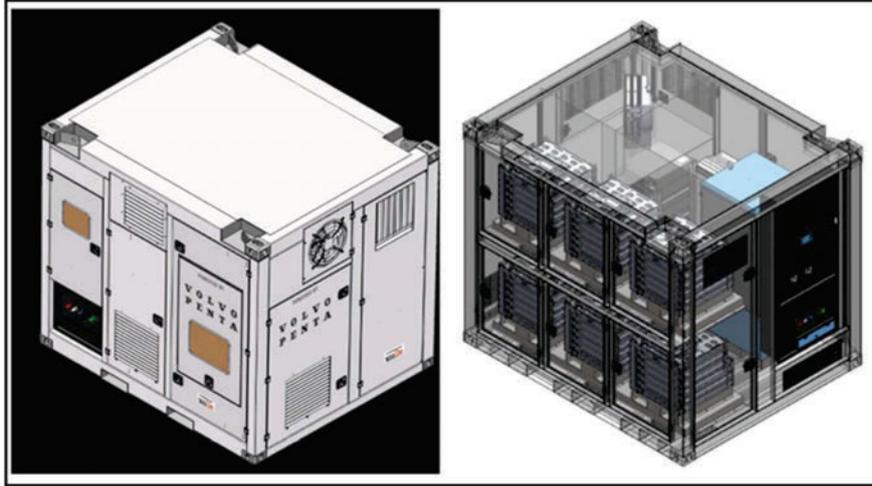
7.2. Battery Energy Storage System

A battery energy storage system (BESS), also called battery storage, works like a large-scale rechargeable battery. It stores electricity when it's abundant, often from renewable sources like the sun and wind, and supplies energy during peak hours. It also acts as a reliable backup during outages or disruptions. A BESS can deliver reliable power and grid stability, either for stationary or temporary setups in commercial and industrial applications or EV charging. BESS can be used to support EV charging by enabling faster and more reliable access to power. It helps balance grid demand and contributes to a smoother shift toward clean e-mobility, without concerns about energy supply.

A BESS allows you to store energy when electricity prices are low, like at night or when a lot of renewable energy is generated. Then, during peak hours when prices rise, you can draw power from the energy storage system rather than more costly sources. Solar and wind produce clean energy, but not always when needed. With battery energy storage, you can store excess power from renewable sources and release it when demand is high, replacing fossil-fuel-based electricity.

Battery energy storage not only bridges energy gaps and supports renewable power but also aids in meeting the demand for charging infrastructure. This is crucial for electric vehicle adoption and contributes to a sustainable future.

Figure 6: Volvo Penta BESS



7.3. Battery Recycling

Once a battery has completed its multiple lives in its usable battery form, the battery should then be recycled. Initial recycling of batteries both overseas and locally in Australia achieve a recycled percentage between 96-97%, with critical materials such as Cobalt and Nickel potentially being utilised in the manufacturing process of new batteries.

Currently in Australia, the skills, knowledge and expertise required for battery recycling is very limited.

8.0 Facilitating EV Update: Ecosystem and Partnerships (Policy, Incentives, Research)

The entire ecosystem needs to be coordinated: vehicle makers, infrastructure providers, electricity distribution/network operators, regulators/government, policy clarity, incentives for infrastructure (rather than only vehicle purchase), standards for battery reuse/recycling.

Increasing infrastructure for heavy vehicles could increase commercial confidence for this technology. Delivering the infrastructure first can allow for greater acceleration and support transport decarbonisation, compared to delivering the infrastructure sequentially. In considering EV infrastructure needs, considering the access requirements for trucks, alongside the work underway for cars will be important.

The Mondo and ARENA partnership is a welcomed development, with a purpose built heavy electric truck charging hub in Laverton North Victoria, supporting the deployment of an initial 20 heavy electric trucks under charging services agreements. By locating 14 dual-plug ultra-fast chargers in Melbourne's key freight precinct, this hub removes a major barrier to electrifying the heavy-vehicle sector and enables fleet operators to access shared fast-charging infrastructure that is otherwise unavailable. The partnership underscores how public-private collaboration can accelerate transport decarbonisation.

VGA would recommend collaboration between charging providers, electricity distribution businesses, and government to consider incentives for heavy vehicle truck operators, and grid-responsive charging and time-of-use incentives as potential solutions.

Electric trucks are an important part in decarbonising transport and today, we face a number of barriers related to road access. Further Government support with the States, Territories and Local Government Areas is required to provide confidence to operators of an electric trucks permitted access with payload certainty. While electric trucks are on the road today, more urgent action could facilitate an accelerated uptake. We note with optimism the current Heavy Vehicle Reform inquiry being undertaken by the Productivity Commission, which is well-placed to examine this important matter.

8.1. Sharing of learnings and best practice

Increasingly we are also starting to see operators, OEMs and infrastructure providers share openly about their in-depot infrastructure experiences, learnings, and best practice examples and recommendations. Volvo strongly encourages this open culture continues, as local industry in Australia makes further progress together.

As an increasingly global priority, there is much we can learn from other countries on their decarbonisation of transport journey. For VGA, we are in a very good position to access readily available information on this topic. VGA therefore also encourages the government, industry and academia to look at examples abroad to gather a greater volume, and depth, of information on best practice examples and failures that we can learn from. We would be happy to facilitate connections with operators, industry, and policy makers abroad if this is of interest to the Committee.

References

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