

## **EMISSION FREE MODES OF PUBLIC TRANSPORT**

**Organisation:** Transdev Australasia Pty Ltd

**Date Received:** 20 July 2022

Wednesday 20 July 2022

The Chair  
The Legislative Assembly Committee on Transport and Infrastructure  
Parliament House  
Macquarie Street  
Sydney NSW 2000

Dear Committee,

**Re: Emission Free Modes of Public Transport**

Transdev Australasia is delighted to submit our response to the Inquiry on Emission Free Modes of Public Transport. As a global leader in public transportation and **sustainable mobility**, Transdev supports transport initiatives that reduce emissions and pollution and promote a better quality of life in the communities where we operate.

Across the world, Transdev partners with governments and public transport authorities to deploy zero emissions vehicles across a range of metropolitan and regional environments. Today, we operate over **1,800 zero emission** vehicles in 87 operations in 13 countries.

Under NSW's pledge to become climate-neutral by 2050, the transport sector is required to undergo significant transformation, reducing greenhouse gas emissions, while ensuring accessibility and affordability for citizens. Adoption of a system-wide, multi-modal approach leading to net zero emissions transport options is essential.

By focusing on the daily mobility of citizens, particularly in urban and peripheral areas, political and legislative incentivisation must play a significant role in encouraging a modal shift from single-occupant vehicles to public transport modes in order to actively reverse carbon emissions from the transport sector in NSW. It is by converting citizens to shared transportation and through the decarbonisation of our fleet that we can collectively reduce our impact.

Members of our team of global experts would be delighted to discuss our submission, the results of our pilots and deployments locally and overseas, and the specific opportunities and challenges present in NSW. If you would like to learn more, please contact Emily Anderson, Business Development Officer on mobile [REDACTED] or via email [REDACTED].


Your sincerely,



Carol-Anne Nelson

Chief Operating Officer – Strategy & Performance

# EMISSION FREE MODES OF PUBLIC TRANSPORT

An aerial photograph of a transit depot. A large building with a roof covered in solar panels is on the left. Several buses are parked in yellow-lined bays. A large white arrow graphic points from the top right towards the center of the image.

**Parliament of NSW – Legislative Assembly  
Committee on Transport and Infrastructure**

# EXECUTIVE SUMMARY

Transdev Australasia welcomes the opportunity to respond to the Legislative Assembly Committee on Transport and Infrastructure's inquiry into and report on the feasibility of emission free modes of public transport in the long term.

As a global leader in public transportation and **sustainable mobility**, Transdev supports transport initiatives that reduce emissions and pollution and promote a better quality of life in the communities where we operate.

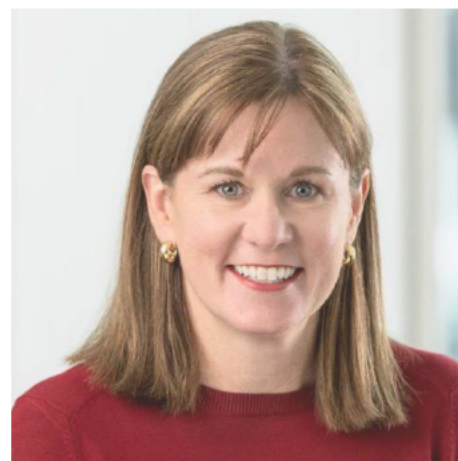
At Transdev, we believe **innovative** public transportation solutions can play an important role in achieving a **cleaner environment** through emissions abatement and that public transport can take the lead in the energy transition from fossil fuels. We know this because we deliver transport solutions that keep people moving around cities and significantly contribute towards meeting local, national and international environmental policy goals.

Across the world, Transdev partners with governments and public transport authorities (PTAs) to deploy zero emission vehicles across a range of metropolitan and regional environments. Today, we operate over 1,800 zero emission vehicles in 87 operations in 13 countries. Each year, we add new cities and new vehicles to our network.

To support the transition towards zero emission fleets, we also invest in projects to complement transport networks, partnering with vehicle manufacturers and fuel technologists to assess innovations like improving the efficiency and the use of new fuels such as hydrogen.



**Luke Agati**  
Chief Executive Officer



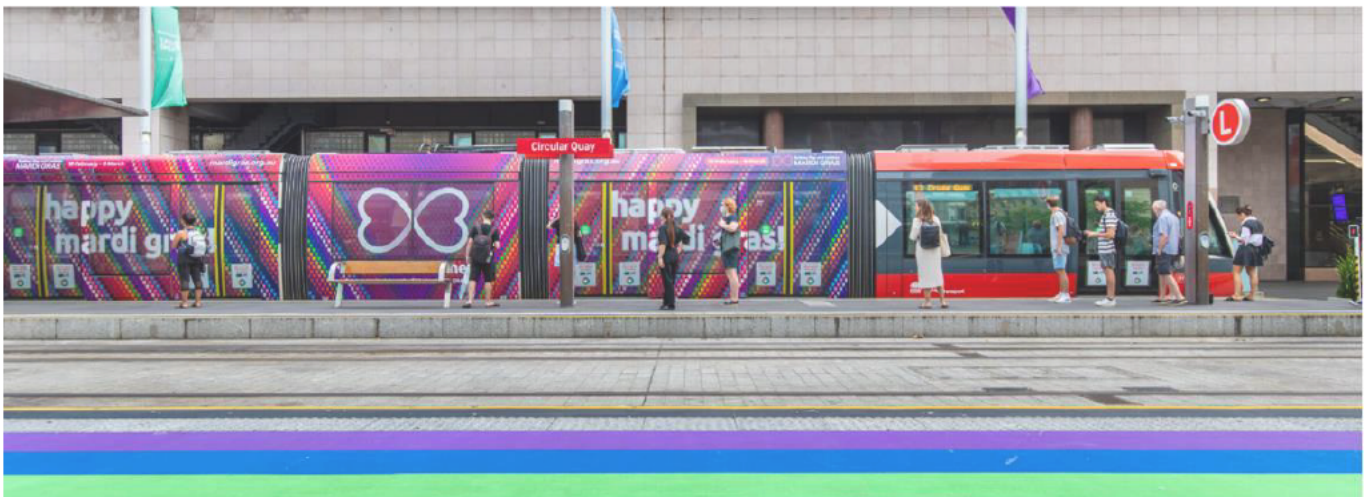
**Carol-Anne Nelson**  
Chief Operating Officer  
– Strategy & Performance



Through our Zero Emissions Living Lab, we test new technologies so we can advise PTAs on transitioning their fleets to low and zero emission solutions. Our investment in innovation means our city partners can reduce emissions and pollution while delivering safe, reliable and affordable transport services.



As a multi-modal (ferry, light rail and bus) operator in Sydney, we understand the local operating environment and have a longstanding commitment to continually improving our services to deliver innovative transport solutions in NSW. Transdev has been providing services to local communities on behalf of Transport for NSW (TfNSW) for nearly 20 years. Our operating region covers five geographic areas – South Sydney, South West Sydney, East Sydney and Sydney's North Shore and CBD.





# THE CAPACITY AND CAPABILITY FOR INDUSTRY TO PROVIDE EMISSION FREE MODES OF PUBLIC TRANSPORT



## 1. THE CAPACITY AND CAPABILITY FOR INDUSTRY TO PROVIDE EMISSION FREE MODES OF PUBLIC TRANSPORT

The NSW Government has set a target of achieving net zero emissions by 2050 and a 35 per cent reduction in emissions by 2030. The transport sector represents the second largest and fastest-growing source of Green House Gas (GHG) emissions at approximately 20% of NSW's GHG emissions.

Decarbonising our transport systems to achieve net zero emission is a significant challenge as we seek to prevent climate change for a more sustainable, future-proofed, and resilient NSW.

Yet decarbonisation offers a powerful opportunity to influence positive change – improving the quality of public transport and driving improved outcomes – from better – connected communities to cleaner air and thriving cities.



Under NSW's pledge to become climate-neutral by 2050, the transport sector is required to undergo significant transformation, reducing greenhouse gas emissions, while ensuring accessibility and affordability for citizens. Adoption of a system-wide, multi-modal approach leading to net zero emissions transport options is essential.

By focusing on the daily mobility of citizens, particularly in urban and peripheral areas, political and legislative incentivisation must play a significant role in encouraging a modal shift from single-occupant vehicles to public transport modes in order to **actively reverse carbon emissions** from the transport sector in NSW.

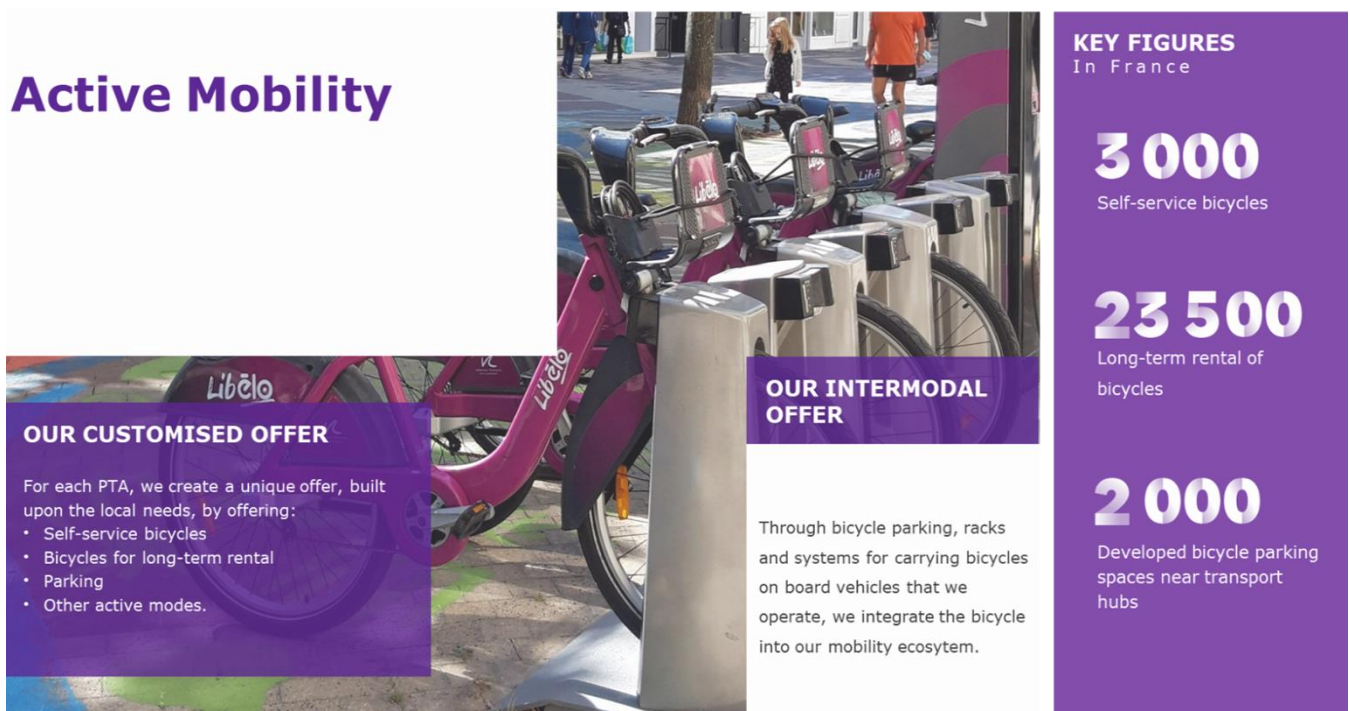




Mobility-as-a-Service (MaaS), is an innovative technological solution to sustainable transport, offering policy makers a new tool for change. MaaS has the potential to make behavioural change easier, delivering what customers need (e.g., how to get from point A to point B), conveniently and at a reasonable cost.

Exploring and integrating 'first mile' and 'last mile' mobility options, which may be used to complete a public transport journey, can also make public transport more attractive. Transdev takes part in this management through its shared transportation offer: offering alternatives to individual carbon-fuelled vehicles in order to reduce their use.

## Active Mobility



Promoting and developing public transportation and decarbonising our vehicle fleet are major challenges in the fight against climate change. It is by converting citizens to shared transportation and reducing the carbon footprint of our fleet that we can collectively reduce our impact. Modal shift is an effective way to contribute to meeting the climate challenges.





## Achieving carbon neutrality



Transdev acknowledges that while 'emission free' transportation is not feasible, there are actions that the sector can take to ensure **carbon-neutral public transportation** is achievable. Carbon neutrality means that we can still produce some emissions, as long as they are offset by processes that reduce greenhouse gases

already in the atmosphere.

We can reach carbon neutrality in three steps:

<b>Limit</b>	• By deploying and investing in zero emissions solutions
<b>Reduce</b>	• By managing and working with the supply chain
<b>Compensate</b>	• Using carbon sinks, removing carbon oxide from the atmosphere and then storing it (carbon sequestration).

### Limit

Limiting carbon emissions means the transition to more sustainable, emission free mobility. Transdev's partner, the French Ecological Transition Agency (ADEME), explains that the sector is currently highly dependent on oil, which accounts for over 90% of its energy consumption. Therefore, limiting carbon emissions will depend on investments in deploying zero emission fleets (electric, hydrogen fuel cell, bio-CNG, etc.). **Electrification** is considered a particularly useful tool for decarbonising the industry. Rail solutions, such as trains and trams, as well as electric buses and coaches, are feasible and proven solutions, provided the electricity is generated from environmentally friendly sources.

**Hydrogen** can power modes unsuitable for electrification, such as long-distance ferries, and provides a long-term storage solution to balance variable renewable energy flows. Hydrogen can support the decarbonisation of transport and power generation of buildings across NSW in an integrated energy system. Unlike electrification, hydrogen produces zero environmental pollution – zero pollutants, zero particles, zero carbon emissions, and zero engine noise, with a range of over 300 kilometres.

While the hydrogen industry is relatively underdeveloped in Australia, Transdev believes that hydrogen will play an essential role in the energy mix of future fuels for clean mobility.

The NSW Hydrogen Strategy sets out an imperative roadmap for transforming this into reality through investment, regulation, market creation, research, and innovation.

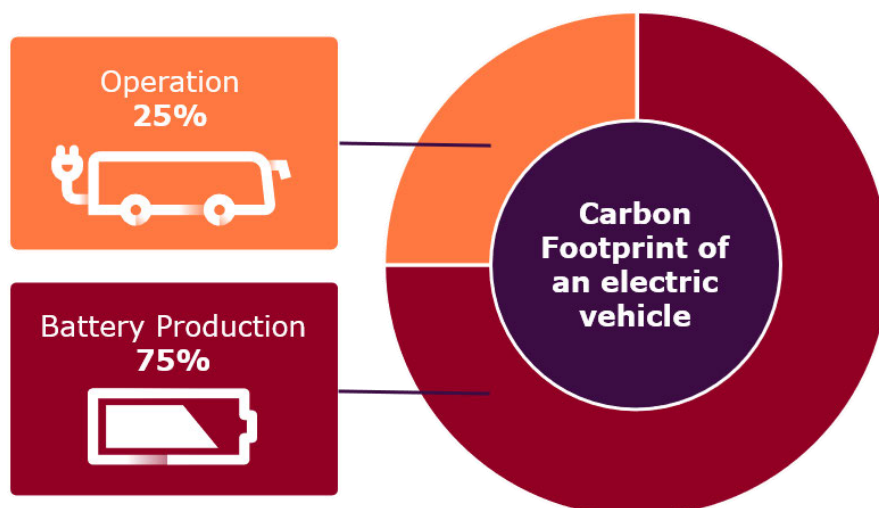
Significantly limiting transportation emissions would also involve the **greater use of shared** and **active transportation modes** and fewer individual cars. Therefore, public transportation operators have a pivotal role as well as policymakers in incentivising a **modal shift** to public transport.

## Reduce

Active engagement and support of the supply chain, working together with energy suppliers and manufacturers, is essential to reduce carbon emissions further. Currently, the battery production process accounts for a significant share, at 75% of its whole life cycle carbon footprint.

Therefore, it is not possible to reap the full benefits of electrification unless the battery's value chain becomes more sustainable. We must ensure, that batteries are produced with the lowest possible environmental impact, using material obtained using social and ecological standards, guaranteeing that batteries are long-lasting, safe and repurposed, remanufactured or recycled at the end of their life, feeding value materials back into the economy.

Overall, we must look towards creating a thriving circular economy, transforming every component of the supply chain where waste is eliminated, resources are circulated, and nature is regenerated, for a better, more resilient NSW.

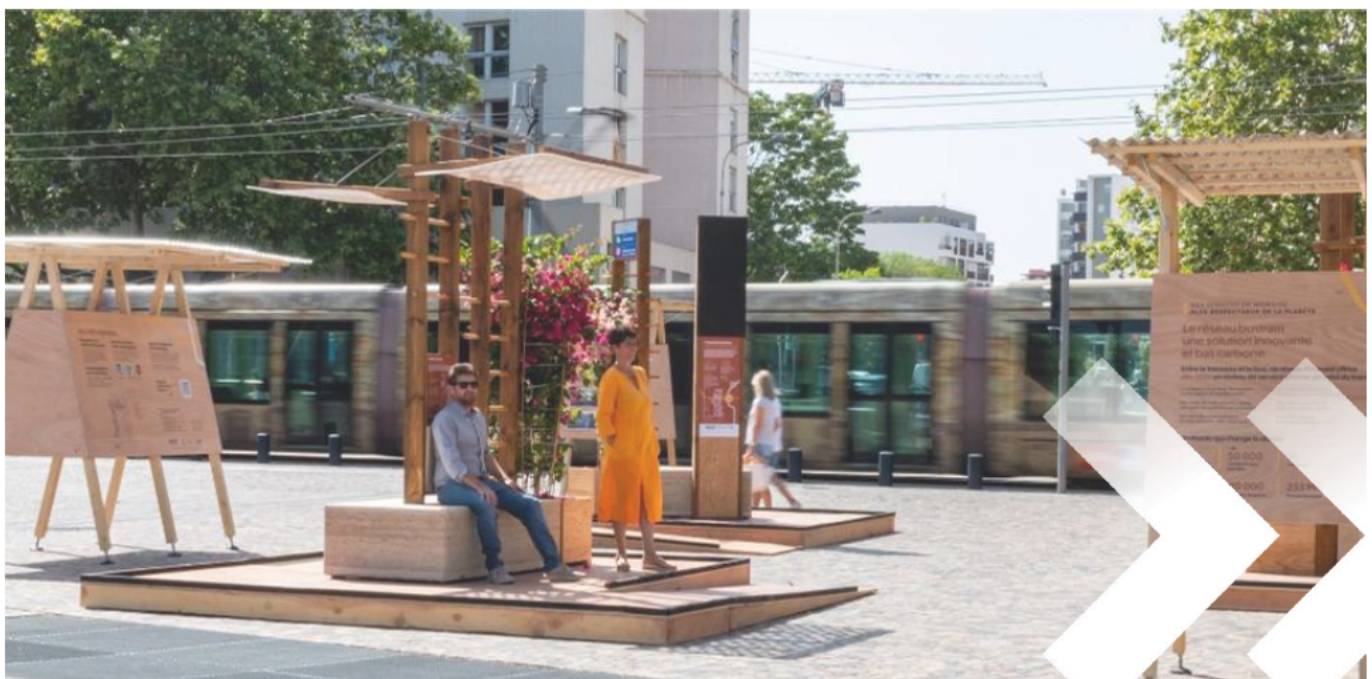


## Compensate

Nature-based carbon sinks have been suggested as a means of mitigating the greenhouse gas emissions of cities. Preserving biodiversity and establishing green infrastructure within urban and peri-urban areas, such as forests, parks, community gardens, private yards, and street trees, are essential in mitigating climate change's impacts and counteracting transportation emissions.

In Montpellier, France, Transdev, as a part of our Innovation Laboratory, Lemon®, and in partnership with key stakeholders, inaugurated an innovative bus stop that incorporates sustainable design elements to combat climate change, improve public health and comfort. This innovative bus stop was developed as a result of climate change, with Montpellier experiencing extreme heat more often, more severely, and for longer periods of time, deterring citizens from public transportation.

With a modular, low-tech design integrating natural materials (wood, plants, reinforced soil, ceramics, etc.) to create ventilation and cooling effect for passengers traveling on the network. It is envisaged that the plant will consume the structure, creating a natural shelter, interrupting solar radiation and cooling the air, and acting as a carbon sink.





# BENEFITS & COSTS TO TAXPAYERS

# 2





## 2. BENEFITS & COSTS TO TAXPAYERS

Beyond GHG emission reductions, emission free modes of public transport have social, economic and environmental benefits for citizens. Based on Transdev's global experience operating zero emission fleets and according to the latest research, the key benefits NSW can expect from transitioning to zero emission modes of transport, include:

- **Reduced pollution** and **environmental impact** from the public transportation network
- **Improved air quality** for citizens, creating more liveable cities and healthier communities
- **Decreased burden on the health system**, reducing taxpayer expenses
- **Supporting a climate-resilient community** and **economy**
- Improved attractiveness of public transport and promotion of **modal shift**
- **Local job creation** and manufacturing
- **Strong community** and **stakeholder support**.

Emissions can be further reduced by promoting and incentivising modal shift, increasing the share of public transport. Additional benefits can be realised, such as less noise pollution and decreased congestion.

While emission free modes of transportation have well-known benefits, there is an associated cost for taxpayers within the transition of the public transport system such as recharging/refuelling infrastructure, investments in zero emissions rolling stock and energy grid upgrades.



# THE OPPORTUNITY FOR, AND IMPACT TO, LOCAL MANUFACTURING OPERATIONS

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### 3. THE OPPORTUNITIES FOR, AND IMPACT TO, LOCAL MANUFACTURING OPERATIONS

Our **unique position as part of a multi-modal, global transport operator** provides us with the opportunity to positively impact environmental and social change through innovative and thoughtful sustainable action. As a partner of local authorities and businesses, Transdev's mission is to connect communities acting for the common good and contribute to building the sustainable and inclusive local areas of tomorrow.

Transdev supports the development of a local manufacturing and assembly sector for zero emission modes of transportation. By setting the policy and procurement rules toward a transition to the decarbonisation of the sector, the NSW Government will lay the groundwork for establishing a local industry.

Transdev can partner with the Government and its agencies to provide insights and support for this new sector, based on our experience overseas and in Australasia.

#### Partnering with local industry

To illustrate how Government and transport operators can work together to achieve environmental policy goals, as well as create jobs, Transdev worked with the Victorian Government on piloting its first electric bus in the state.

Transdev partnered with a local manufacturer, Volgren Australia, to build the new vehicle, while developing a Centre of Excellence for transport skills and training based in Victoria, ensuring industry understanding and skills in zero emission technology.

In doing so, exposed the Victorian transport industry to world best practices in bus manufacturing, zero emissions technology, workplace innovation, e-commerce and new technologies and materials by leveraging Transdev's position as a global leader in integrated mobility solutions.



**VOLGREN**  
A Marcopolo Company



## Normad Hydrogen Coach Project

In Normandy, Transdev is the initiator and major stakeholder in the Normad Hydrogen Coach (NCH2) project alongside the Normandy Region and numerous partners from institutional, industrial, and academic sectors. It is currently the world's first hydrogen retrofit project for a diesel bus, which will soon be running on the Rouen-Evreux Express line. This operation replaces the combustion engine with an electric motor powered by a fuel cell that converts hydrogen into electricity.



The experiment is already well underway and will eventually extend the service life of existing equipment and reduce greenhouse gas emissions. Of the 1,750 vehicles in its fleet, Transdev Normandy currently operates 580 thermally-powered Iveco Crossways and 200 Europe V models that are particularly well suited to retrofitting. Thus, through this project, Transdev and its partners are paving the way for a whole new sector, establishing a hydrogen ecosystem in Normandy, capitalising on the skills in the region, unlocking jobs and ensuring that hydrogen is at the forefront of Normandy's energy transition.



# OTHER JURISDICTIONS THAT HAVE EMISSION FREE MODES OF PUBLIC TRANSPORT



## 4. OTHER JURISDICTIONS THAT HAVE EMISSION FREE MODES OF PUBLIC TRANSPORT

Public transportation is one of the keys to the energy transition. The Netherlands is an example of a nation at the forefront of emission free modes of transport with highly sustainable public transport. Since 2017, all electric passenger trains have been powered by green energy. Dutch policies promote decarbonisation with requirements for all new buses to use **100% renewable energy or fuel** from 2025 onwards and for all buses to be **fully emission free** from 2030.

These targets have been developed based on a long-term, integrated, co-creation approach with policymakers and private partners. Transdev is a long-term partner of the Dutch government, and the leading operator in the Netherlands with over **500 zero emission** vehicles, the largest zero emissions fleet in Europe. Transdev has unique experience integrating choices around infrastructure, technology, rolling stock, and scheduling for electric buses into a single optimised, operationally robust system.





**Transdev Group** is the leading operator of electric buses in Europe, operating over 1,800 zero emission buses worldwide, and is accelerating on all fronts: electric buses, hydrogen, and non-motorised transportation.

**Electric buses.** Transdev has been involved in electric bus technology since its launch, and it represents a major axis of our energy mix.

Today, the Group is the leading operator in many counties and is leading new authorities down the road to zero emissions, including in **Colombia**, with the introduction of **406 electric buses** in the Bogota metropolitan area. This is the largest electric bus fleet in Latina America, adding to an existing fleet of 1,061 electric buses.

The electrification of the fleet is also progressing in **Chile**, with an extension of our Redbus Urbano business in Santiago for another five years, with a total of 912 buses, **258** of which are **electric**.

In **New Zealand**, Transdev launched a Wellington city airport shuttle bus service, including **10 electric buses**. It's a low-cost, all-electric and sustainable solution, servicing not only airport-bound travellers, but the people who work in and around the area every day - every 10-15 minutes during peak hours, seven days a week.





**Biogas.** Worldwide, Transdev operates more than **3,000 NGV** (natural gas for vehicles) vehicles. Many networks are now opting for biogas, a more carbon-free alternative to gas. Indeed, biogas is an accessible, local and interesting energy source. The average carbon footprint of a biogas vehicle is almost four times lower than that of a diesel vehicle. In France, more than 60% of the volume of gas purchased by Transdev is used by running on bioNGV.



**Hydrogen / experiments.** Transdev supports local authorities in the development of hydrogen mobility projects with experiments and commercial operations. In Normandy, Transdev is the initiator and major stakeholder in the

Normad Hydrogen Coach (NCH2) project alongside the Normandy Region and numerous partners. It is currently the **world's first hydrogen retrofit** project for a diesel bus, which will soon be running on the Rouen-Evreux Express line. In France, Transdev launched the first hydrogen fuel cell electric line. These buses are expected to drive **420,000 kilometres annually, saving more than 530 tons of CO<sub>2</sub> per year.**





**Solar-powered electric buses.** In Brisbane, a 39-seat 100% **electric bus operates entirely on solar energy**: the Capalaba depot is equipped with photovoltaic panels, for low-carbon and local energy. The new sustainable bus was entirely financed by Transdev, who have invested more than 2 million Australian dollars in the development of electric mobility in Queensland.



**Electric-powered ferries.** In Portugal, Transdev worked collaboratively with Navaltagus to design, commission, and construct Portugal's first 100% electric ferry, and one of the first in Europe. The ferry will operate in the urban intermodal network in Aveiro,



Portugal. The new ferryboat will **reduce the emission of 300 tons of carbon dioxide** released by the current model, also **reducing energy consumption by around 30%**. The low noise levels and increased comfort for passengers introduced by this vessel are also combined with the enhanced capacity for the transportation of vehicles (+ 30%) and passengers (+ 90%)



**Bus Rapid Transit (BRT).** For many regions, BRT is a new step towards more sustainable mobility: running on dedicated lanes for greater speed, it encourages the use of public transport tanks to the frequency of rotations and a wide range of operating hours, a high level of comfort and a large passenger capacity. BRT vehicles are increasingly powered by electric and "green" energy.



**The Coach Rapid Transit (CRT)** is the BRT for medium distance, and it has also just switched to electric mobility: in Provence, ten 100% electric CRT vehicles provide shuttle services between Aix-Toulon and Aix-Avignon. A French first for these distances of more than 80km.

**Bicycles.** With a fleet of 23,000 long-term rental bicycles, 3,000 self-service bicycles, and the building and management of 2,000 bicycle parking spaces, Transdev is committed to soft mobility: whether it involves integrating it into intermodality schemes or developing it for local authorities, soft transport is at the heart of our strategy.



**Hydrogen-powered trains.** As the second largest rail operator in Germany, from 2023, Transdev will be trialling a hydrogen train for 30 months in the Upper Rhine Valley.





# ANY OTHER RELATED MATTERS

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## 5. ANY OTHER RELATED MATTERS

### Zero Emissions Living Lab

Sharing expertise, co-constructing zero emission mobility Since 2015, the Living Lab has been bringing together the Transdev Group's growing family of eco-mobility experts from all its subsidiaries, as well as its customers, the organising authorities. Meeting every year - online in 2021 - these experts exchange and progress together on all zero emission themes, in all their dimensions. With a shared focus: the decarbonisation of transport is key to everyone's future.



Transdev would make available our Zero Emissions Living Lab for the NSW Government, sharing international best-practice and research and analysis that capitalises on various zero emissions mobility trials led by Transdev worldwide.



## Our global zero emission experts

Transdev has been guiding, advising, and supporting communities, partners and our clients in the ecological transition. As the leading European operator of zero emission mobility, our team of experts develop innovative solutions for greener and cleaner mobility and would be delighted to provide further insights to the Committee.



### Meeting the environmental challenge

"The ZE (Zero Emission) Team is the powerhouse leading energy transition for Transdev and its partners. The Dutch electric bus network remains the second largest in the world, after China. As the leading player in the Netherlands, Transdev has acquired unique experience integrating choices around infrastructure, technology, rolling stock and scheduling for electric buses into a single optimised, operationally robust system. Today, Transdev is helping the Netherlands to power ahead in meeting its goals, well above those of the Paris Agreement. The ZE team enables us to spread this expertise around the world, with the support of our ambassadors in all Transdev countries, to reach our Moving Green strategy ambition and reduce our GHG emissions."

**SPENCER MILBURN**  
Senior Zero Emission Project Manager, The Netherlands



**Tanguy Boulton**  
Group Fleet Director  
Program Manager



**Bart Kraaijvanger**  
Zero Emission Program Manager  
Expertise Manager & ZE Ambassador  
(Netherlands)



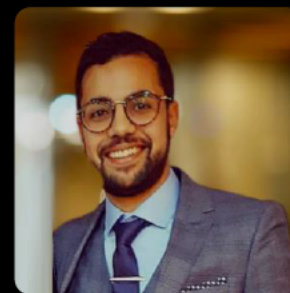
**Spencer Milburn**  
ZE Senior Project Manager  
Charging Infrastructure Expert



**Lucien Jegoux**  
Zero & Low Emission Manager  
Project Management & Community Leader



**Jean-Laurent Franchin**  
Zero Emission Strategy Manager  
Strategy Leader



**Adnane Houbbaoui**  
Smart Charging Manager  
Intel Charge Project Manager



**Bert Steur**  
Group Business Application Coordinator  
e-Scheduling Expert



**Robert Weijers**  
Energy Management Advisor  
R&D Lead



**Phil Driehen**  
Chief Data Officer  
Take Charge Project Manager



## About Transdev



**Transdev empowers freedom to move everyday thanks to safe, reliable and innovative solutions that serve the common good.**

**We connect and reconnect people and communities, the rural to the urban, providing solutions tailored to the needs of our customers and passengers.**

**We share and act for the collective, to contribute to the well-being of society and to create opportunities and progress.**

**We care about people and the environment, in order to achieve reliable and sustainable mobility.**

**We dare to take up challenges and step out of our comfort zone to always offer the best solutions and innovations in response to tomorrow's challenges.**

**We are people serving people. And mobility is what we do.**