

# Shifting gears – preparing for a transport revolution

Dr Matt Wenham

Australian Academy of Technology & Engineering, Level 6, 436 St Kilda Road, Melbourne, VIC 3004

Email for correspondence: [matt.wenham@applied.org.au](mailto:matt.wenham@applied.org.au)

## Abstract

The research project examines the readiness of Australian transport sector to develop, adapt and adopt new and emerging technologies, with a horizon out to 2030. The report has identified the key challenges within the transport sector that need to be addressed over the next decade along with potential solutions that can be critical in this early phase of transition. Each of these potential transport solutions have been analysed against five readiness indicators – infrastructure readiness, skills availability, social readiness, economic and commercial feasibility and policy and regulatory readiness. Our analysis demonstrates that Australia is performing well on a number of readiness indicators and is well placed to capitalise on the coming technology revolution.

Four key policy recommendations have been suggested to address the challenges and support emerging transport technologies. The work further highlights future research priorities to be considered in addressing the possible challenges in the decade to come.

This report provides an opportunity for government, industry and research organisations to develop and plan for future urban environments based on the transport needs and mobility patterns of Australian communities, and how this will translate to a transport sector for the future.

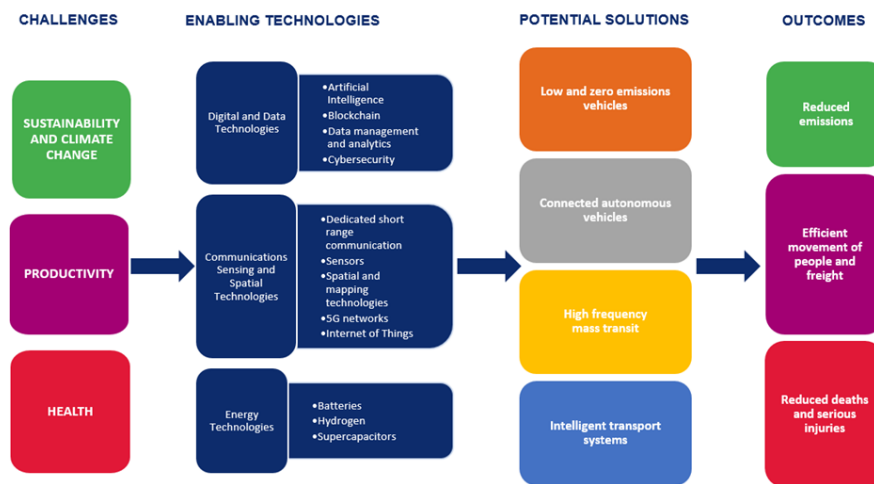
## 1 Introduction

In this early phase of the transport technology transition, failure to be prepared will risk a decline in many aspects of our quality of life. For example, inadequate planning for population growth and the spread of urban centres could significantly impede the mobility of passengers and freight in both urban and regional areas. This could increase congestion and vehicle-related emissions, lead to a deterioration in health, safety and security, and negatively impact productivity and the cost of living.

## 2 Challenges and potential solutions

The Australian Academy of Technology and Engineering has identified **sustainability and climate change, productivity and health** as the key challenges to be addressed in the transport sector over the next decade. Specifically, the transport sector will need to lower emissions, improve the efficient movement of people and freight, and reduce transport-related deaths and serious injuries. The deployment of connected and autonomous vehicles (CAVs), low and zero emission vehicles (LEVs), high frequency mass transport, and intelligent transport systems (ITS) are potential solutions to these challenges. This framework is outlined in **Figure 1**.

**Figure 1: Transport technologies and systems to address key 2030 challenges**



### 2.1 Readiness indicator analysis






Each of the emerging transport solutions were analysed against five readiness indicators: **infrastructure readiness, skills availability, social readiness, economic and commercial feasibility** and **policy and regulatory readiness**.

The report's analysis was informed by research and targeted consultations with over thirty representative transport stakeholders from industry, government and research across Australia. The readiness assessment was compiled by combining the views of those representatives and experts with the results of the Academy's research into the current developmental state of each of these technologies. This analysis was overseen by a steering committee comprising Fellows of the Academy and transport experts.





















### 2.2 Results

The Academy's analysis shows that Australia is performing well in terms of **social readiness, economic and commercial feasibility** and **policy and regulatory readiness**, and is well placed to capitalise on the coming technology revolution. However, the Australian transport sector is least prepared in terms of **infrastructure readiness** (*with respect to LEVs, high frequency mass transit and intelligent transport systems*) and **skills availability** (*with respect to LEVs, CAVs and high frequency mass transit*). The readiness scale is outlined in **Table 1** and the results of the analysis are summarised in **Table 2**.

**Table 1: Readiness indicator scale**

	Not ready	More work still required			Ready
Readiness scale					

**Table 2: Results for readiness metrics**

	Infrastructure readiness	Skills availability	Social readiness	Economic and commercial feasibility	Policy and regulatory readiness
Low and zero emissions vehicles					
Connected autonomous vehicles					
High frequency mass transit					
Intelligent transport systems					

### 3 Conclusions and key policy recommendations

Following finalisation of the readiness metric results, the steering committee of policy and transport experts refined a number of policy and research recommendations to support achievement of the desired outcomes within the transport sector by 2030. These recommendations are:

#### 3.1 Implement mechanisms to drive a widespread shift towards low emission transport options

Australia needs a national target and associated regulatory mechanisms to drive this shift, and LEVs should be powered by low emission energy sources. Industry should lead ambitious uptake of LEVs by ensuring that vehicles imported into Australia meet stringent standards for emissions, and public and private corporations should be incentivised to use LEVs as fleet vehicles.

##### 3.1.1 Research priorities

- Impacts of uptake of LEVs on Australian emissions
- Ensure that EVs have a neutral to positive impact on the electricity grid
- Cost/benefit analysis of privately owned vs shared fleet ownership models

#### 3.2 Provide an adaptive framework to regulate new transport technologies

Australian governments should introduce flexible legislative and regulatory frameworks that can track the global technology frontier. The Council of Australian Governments (COAG) should set nationally consistent standards and regulations, including standards for charging infrastructure and connections for LEVs, standards

for data sharing and data privacy, and the selection of standards for V2X communications based on global standards.

### **3.2.1 Research priorities**

- Identify transferrable international best practices within the transport sector
- Identify the best approaches to a whole-of-government, integrated transport systems view involving industry, technology providers, infrastructure planning and education and training

## **3.3 Develop and adapt transport technologies to an Australian setting to achieve greatest impact**

The Commonwealth and state governments should establish competitive grants programs that encourage the trial of transport technologies that can be adapted to geographical or climatic conditions unique to Australia. State, territory and local governments should plan for, and adapt to, future changes to Australia's vehicle fleet. This requires integrated land use and transportation planning that takes into account likely network use changes from new technologies.

### **3.3.1 Research priorities**

- Which transport technologies should Australia adopt early, and why?
- Likely impacts of new transport technologies on population distribution
- Obstacles to the use of productivity-enhancing transportation solutions, from the provision of technologies by firms to consumer adoption decisions, and what can be done to overcome them
- The drivers and impediments to the application of data and digital science to the transportation sector

## **3.4 Prepare the workforce for transition to future transport models**

To prepare the workforce for the disruption of new transport technologies, workers must be supported to develop STEM skills and obtain the qualifications, skills and training to adapt to changing roles and tasks.

State and territory departments of education should strengthen the content and teaching of STEM during upper primary and compulsory secondary schooling to encourage students to pursue university and VET courses in these areas

Universities and VET institutions, in collaboration with industry, should provide and promote course options that will assist Australia's current and future workforce to develop the skills required to meet the demands of the future transport sector.

### **3.4.1 Research priorities**

Identify skills requirements to meet future transportation needs, and assess how these map on to existing incentives, provision, and accreditation processes. How should any gaps be addressed?