

# N1 Opportunity Assessment

# Electric vehicles and the grid

## Report at a glance



---

**Final Report**  
**RACE for Networks Program**  
**Research Theme N1: Electric vehicles and the Grid**  
**Project Code: 20.N1.A.0077**

**ISBN: 978-1-922746-04-7**

**October 2021**

**Project team**

**Monash University**

*Roger Dargaville*  
*Misita Anwar*  
*Katarina Tomka*

**UNSW**

*Amelia Thorpe*  
*Declan Kuch*  
*Alannah Milton*

**RMIT**

*Kazi Hasan*  
*Brendan McGrath*  
*Lasantha Meegahapola*  
*Sridevi Tirunagari*  
*Madhi Jalili*

**Curtin University**

*Peter Newman*  
*Dean Economou*  
*Ben James*  
*Charlie Hargroves*  
*Mike Mouritz*  
*Marie Verschuer*

**UTS**

*Scott Dwyer*  
*Kriti Nagrath*

**CSIRO**

*Phillip Paevere*  
*Brian Spak*

**EPRI**

*Matt Pellow*  
*Sunhil Chhaya*

**EA Technology**

*Paul Barnfather*

**EV Council**

*Behyad Jafari*

**Ultima Capital**

*John Fick*

**What is RACE for 2030?**

The Reliable Affordable Clean Energy for 2030 Cooperative Research Centre (RACE for 2030 CRC) is a 10-year, \$350 million Australian research collaboration involving industry, research, government and other stakeholders. Its mission is to drive innovation for a secure, affordable, clean energy future.

<https://www.racefor2030.com.au>

**Project partners**



---

## Report at a glance

### Theme N1: Electric Vehicles and the Grid

#### What is the report?

This theme, “Electric Vehicles and the Grid”, investigates how to maximise the benefits of electric vehicles (EVs) to electricity consumers, network businesses and network customers. This opportunity assessment report reviews: key domestic and international EV and grid trials; demonstration pilots; market research; the interaction of EVs with the grid; and social research into customer benefits, user patterns and market incentives. Based on this review, it presents a research roadmap for the theme.

#### Why is it important?

Some projections see EVs making up the majority of light passenger vehicle sales in Australia by 2030. There is an urgent need to understand EV uptake trends and pathways, and how to manage their impact on the grid to minimise cost impacts and to facilitate the use of this very large aggregate battery capacity to support the energy transition.

#### What did we do?

We established an industry reference group to provide input and feedback, and we reviewed Australian and international literature on barriers to and opportunities for EV integration into the grid. We also consulted with industry experts about the risks and barriers associated with the introduction of EVs, the research opportunities involved, and key metrics for research impact. We concluded by synthesising our findings, developing a road map for future research, writing a project report and establishing a knowledge sharing forum.

#### What difference will it make?

RACE’s involvement will support a customer-centric EV transition by removing barriers to vehicle-grid integration. This will contribute to lower energy bills, lower network costs, increased energy system reliability, reduced emission intensity, increased energy productivity and increased employment opportunities.

#### What next?

The project team identified a research priority for theme N1: EV integration into the grid. The research roadmap outlined in this report shows the direction that the research under this theme will take, including maximizing benefits of EV charging for distribution networks, optimal policy settings, implications for urban mobility and design, and behavioral science to better understand how people will interact with their EVs and the grid.

# RACE for 2030



Australian Government  
Department of Industry, Science,  
Energy and Resources

**AusIndustry**  
Cooperative Research  
Centres Program