

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