



RACE for 2030

EPRI engages with a wide variety of electric grid operators, research organizations, academic institutions, industry organizations, and other groups to coordinate and identify research activities, support technology transfer, and work to apply research results. Collaborative engagements enable EPRI research to be at the forefront of a rapidly changing energy landscape. Each engagement provides EPRI with insights into the unique challenges and pathways to solutions that support EPRI's mission to benefit the public. Strategic Engagement Briefs aim to highlight the value these engagements may provide to EPRI, EPRI members, and society. EPRI does not endorse any mentioned group or product.

INTRODUCTION

EPRI is one of more than 70 partners (and one of the few non-Australian participants) of Reliable, Affordable Clean Energy for 2030 (RACE for 2030, aka RACE), an industry-led collaborative research center. The mission of RACE is "to drive innovation for a secure, affordable, clean energy future" with a vision of "a flourishing low carbon Australia, where energy research improves quality of life and boosts energy productivity."¹

WHAT IS RACE FOR 2030?

RACE is a Cooperative Research Centre (CRC), a research initiative supported by the Australian government. CRCs are intended to enhance Australia's industrial, commercial, and economic growth through the development of sustained, user-driven, cooperative public-private research centers that achieve high levels of outcomes in adoption and commercialization.² RACE was formally established by agreement with the Australian government in 2020.³ RACE was funded by almost A\$70 million (US\$50 million) of government funds and commitments of almost A\$300 million (US\$210million) in cash and in-kind contributions from RACE's partners.

1 https://issuu.com/racefor2030/docs/business_plan_14.04.22

2 https://issuu.com/racefor2030/docs/business_plan_14.04.22

3 <https://www.racefor2030.com.au/wp-content/uploads/2021/11/Annual-report-FINAL-15.10.21.pdf>

The principal research partners for RACE projects are select Australian universities and Australia's national science agency, CSIRO. Several international research organizations, including EPRI, are also participating. RACE's industry partners include Australian energy users, energy suppliers, transmission and distribution companies, technology providers, and startup companies. RACE and its partners are targeting A\$3.9 billion (US\$2.7 billion) of cumulative energy productivity benefits, 20 megatons of cumulative carbon emission savings by 2030, increased load flexibility, and support for the Australian energy service technology industry so that it has the capacity to sustainably drive decarbonization and job creation.⁴

AUSTRALIA'S UNIQUE ENERGY POSITION

Australia uniquely encapsulates the challenges and opportunities posed by the global energy transition. The nation has significant fossil fuel resources and is one of the largest global exporters of coal and natural gas, making the fossil fuel industry a key component of the Australian economy.^{5, 6} The growth in the renewable energy sector in Australia over the past five years has been significant.⁷ For example, Australia has added new wind and solar capacity at a rate that is ten-times faster than the global average on a per capita basis.⁸ Particularly notable is the rapid advance of small-scale solar photovoltaics (PV) and other distributed energy resources (DER). More than 30 percent of Australian homes have PV and about 25 percent of the country's electricity is generated by solar.^{9, 10}

Similarly, Australian homeowners are also embracing battery storage at a rapid pace while the market operator is integrating virtual power plants (VPPs) that deliver wholesale grid services provided by DER.¹¹ These advances may put Australia at the forefront of the global energy transition, meaning that lessons learned as the nation moves ahead can inform policymakers, regulators, energy companies, and other stakeholders around the world as they grapple with similar issues. For example, RACE's goals include familiar priorities for many nations attempting to transform their energy systems: increasing penetration of renewables, grid reliability, and electrification while working to boost energy productivity to accelerate economic growth.¹²

4 https://issuu.com/racefor2030/docs/business_plan_14.04.22

5 IEA, *Key World Energy Statistics 2021*, IEA, Paris. Online: <https://www.iea.org/reports/key-world-energy-statistics-2021> [Accessed 28 September 2022]

6 Cunningham, Michelle; Van Uffelen, Luke; Chambers, Mark. "The Changing Global Market for Australian Coal." *Reserve Bank of Australia Bulletin*. 19 September 2019. Online: <https://www.rba.gov.au/publications/bulletin/2019/sep/the-changing-global-market-for-australian-coal.html> [Accessed 27 September 2022]

7 <https://www.trade.gov/country-commercial-guides/australia-clean-technology>

8 Stocks, M.; Blakers, A.; Baldwin, K. "Australia is the runaway global leader in building new renewable energy." *The Conversation*. 25 September 2019. Online: <https://theconversation.com/australia-is-the-runaway-global-leader-in-building-new-renewable-energy-123694> [Accessed 27 September 2022]

9 <https://arena.gov.au/renewable-energy/solar/> [Accessed 27 September 2022]

10 Clean Energy Council. *Clean Energy Australia Report 2022*. Online: <https://assets.cleanenergycouncil.org.au/documents/resources/reports/clean-energy-australia/clean-energy-australia-report-2022.pdf> [Accessed 27 September 2022]

11 Kuiper, G. "What is the state of virtual power plants in Australia? From thin margins to a future of VPP-tailers." Institute for Energy Economics & Financial Analysis. 1 March 2022. Online: <https://ieefa.org/resources/what-state-virtual-power-plants-australia-thin-margins-future-vpp-tailers> [Accessed 28 September 2022]

12 https://issuu.com/racefor2030/docs/business_plan_14.04.22

RACE's collaborative research is segmented into four programs with a total of 17 research themes designed to deliver unique insights to benefit the entire energy ecosystem:

- **RACE for Business** seeks to increase energy productivity for business and industrial uses while cutting costs by deploying digital technologies, increased electrification, and value chain optimization.
- **RACE for Homes** is devoted to the development and integration of new energy technologies that lower energy bills for Australians while improving household comfort.
- **RACE for Networks** includes the important work of bolstering Australia's grid with the help of customer DER and seamless network integration.
- **RACE for Everyone** aims to accelerate the customer-focused energy transition in ways that benefit all Australian society by helping to build connections between energy system stakeholders, innovative startups, and by training and educating the workforce a transformed energy system requires.¹³



¹³ https://issuu.com/racefor2030/docs/business_plan_14.04.22

EPRI'S ROLE IN RACE FOR 2030

EPRI and RACE share a similar mission and a foundational focus on research. Both organizations are committed to the goal of serving society through rigorous, science-based research. Both EPRI and RACE embrace a collaborative approach to research that brings together leading researchers from government and academia with policymakers, regulators, and industry experts to share experiences, lessons learned, and innovations.¹⁴

EPRI's global reach and broad research portfolio—much of which aligns with RACE's priorities—provides technical guidance and real-world experience that can help inform Australia's energy transformation. In RACE's first phase, EPRI contributed to several RACE opportunity assessments, which assess the technology status and research impact opportunities for each of RACE's program areas. More specifically, EPRI's subject matter experts contributed to opportunity assessments focused on:

- **Electric vehicle (EV)-grid integration.** Led by the Monash University, this research track examines how to optimize the integration of large numbers of EVs so that both EV owners and the grid benefit.
- **Hosting capacity and low-voltage network visibility.** Australia's national science agency, CSIRO, is leading research to both improve hosting capacity as electrification increases and elevate the visibility of assets across the distribution grid.
- **Cost reflective tariffs and incentives.** Working with the University of New South Wales, EPRI led a cost-benefit assessment examining the potential benefits that could accrue to Australian electricity consumers over a ten-year period using a variety of retail tariff and incentive design scenarios.
- **Distribution system operator (DSO) capabilities.** Drawing on extensive experience helping DSOs around the globe to integrate and manage DER, EPRI is supporting work to optimize planning and regulations for demand management and DER. The project is led by the University of Technology Sydney.

RACE's Opportunity Assessment reports are available at:

<https://www.racefor2030.com.au/opportunity-assessment-reports/>

RACE's Fast Track reports are available at:

<https://www.racefor2030.com.au/fast-track-reports/>

¹⁴ https://issuu.com/racefor2030/docs/business_plan_14.04.22

SHARED VALUE FOR EPRI AND ITS MEMBERS

EPRI intends to join other RACE members in ongoing collaborative research projects where EPRI's expertise may enhance research outcomes for all participants. EPRI's engagement with RACE will potentially help inform EPRI's members about innovative solutions and demonstrations being advanced in Australia that may address energy transition challenges encountered by power system stakeholders worldwide. In addition, EPRI's involvement with RACE helps strengthen and expand EPRI's continuously growing international engagement, capabilities, and presence (for example through collaborative projects with international experts who may contribute EPRI's key research priorities).

EPRI's engagement with RACE has the potential to strengthen several ongoing EPRI initiatives, including:

- Integrating large amounts of renewables and expanded electrification are central to achieving RACE's decarbonization goals. EPRI's **Efficient Electrification Initiative** explores the costs and benefits of electrification, develops and demonstrates promising electric technologies, and provides guidance on implementation strategies.¹⁵
- The shift to EVs potentially is one of the most promising ways to reduce greenhouse gas emissions, improve air quality, and save drivers money. EPRI's **Electric Transportation Program** supports industry and utility programs with objective data and analysis about the economic and environmental benefits of EVs, their impact on grid reliability, and strategies for building the necessary charging infrastructure.
- Transforming the energy system requires new ideas and RACE is working closely with startup companies. EPRI's **Incubatenergy Labs** has extensive experience linking utilities with startups to demonstrate promising technologies that drive decarbonization, improve customer engagement, and bolster grid resilience.¹⁶

¹⁵ <https://www.epri.com/research/products/000000003002011537>

¹⁶ <https://labs.incubatenergy.org/>

About EPRI

Founded in 1972, EPRI is the world's preeminent independent, non-profit energy research and development organization, with offices around the world. EPRI's trusted experts collaborate with more than 450 companies in 45 countries, driving innovation to ensure the public has clean, safe, reliable, affordable, and equitable access to electricity across the globe. Together, we are shaping the future of energy.

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