FUTURE FUELS CRC

Enabling the decarbonisation of Australia's energy networks

Project Status

Current status at 2 July 2021

RP1 Update - Future Fuels Technologies, Systems and Markets

Projects	Board Approval Date	Status	Completion	Proponent
RP1.1-01: Scenario and broad-scale modelling dynamics	Dec-18	In Progress	Jul-21	Dennis Van Puyvelde (ENA)
RP1.1-02: Regional case studies on multi-energy system integration	Dec-18	In Progress	Mar-22	Dennis Van Puyvelde (ENA)
RP1.1-03: Learning from international roadmaps and strategies	Apr-19	Completed	Jul-19	Mike Young (UoA)
RP1.1-04: Underground hydrogen storage in Australia	Dec-19	In progress	Jul-21	Dennis Van Puyvelde (ENA)
RP1.2-01: Future Fuels Production - Status Review	Dec-18	Completed	Dec-19	Craig Clarke (APA)
RP1.2-02: Techno-economic modelling of fuel production processes	Apr-19	In Progress	Jul-21	Craig Clarke (APA)
RP1.2-03: Assessment framework for bio-methane injection in gas networks	Oct-19	Completed	Apr-21	Alistair Wardrope (Jemena)
RP1.2-04 Integrated model for bio-methane injection in gas networks	Mar-21	In Progress	Oct-24	Alistair Wardrope (Jemena)
RP1.3-01: Solar Photocatalytic Hydrogen Production	Apr-19	In Progress	Apr-23	Craig de Laine (AGIG)
RP1.3-02: Novel H2/CH4 Separation Technology Development	Apr-19	In Progress	Dec-22	Craig de Laine (AGIG)
RP1.3-03 Methane pyrolysis for hydrogen production	Jun-19	In Progress	Mar-23	Catherine Simon (Woodside)
RP1.3-04 Efficient conversion of hydrogen to future fuels	Jan-21	In Progress	Jul-24	Daniel Krosch (GPA)

RP1.4-01: Future Fuels End-use – Type-A appliances	Dec-18	Completed	Mar-20	Leon Bogers (GAMAA)
RP1.4-02: Future fuel use in Type B and Industrial equipment	Apr-19	Completed	Jan-20	Josh Wickham (GPA)
RP1.4-03: Pathways for Hydrogen Adaptation to Industrial Processes	Mar-20	In Progress	Jul-23	Daniel Krosch (GPA)
RP1.4-04 Hydrogen gas specification and review of end-user instrumentation	Jul-20	In Progress	Jul-21	Daniel Krosch (GPA)
RP1.4-05 Performance of Type-A appliances with blends of hydrogen and natural gas	Feb-21	In Progress	Sep-24	Ben Greeneklee (GAMAA)
RP1.4-06 Assessment of Type B appliances with blends of hydrogen and natural gas	Feb-21	In Progress	Jul-21	Troy Praag (AGIG)

RP1 PhD Top-Up Projects				
Research Program (RP) Related	**Board Approval Date**	**Status**	**Estimated Duration**	**Research Institution**
RP1.10-01: Advanced power converter to improve fuel cell system performance	Sep-19	In Progress	3.5 years	Kashem Muttaqi (UoW)
RP1.10-02: Improving the efficiency of the renewable energy-based electrolyser	Sep-19	In Progress	3.5 years	Kashem Muttaqi (UoW)
RP1.10-03: Grid interaction and electrolyser and fuel cells for use of renewable energy	Dec-19	In Progress	3.5 years	Kashem Muttaqi (UoW)
RP1.10-04: Effects of dopants on hydrogen flames	Dec-19	In Progress	3 years	Paul Medwell (UoW)
RP1.10-05: Impact of hydrogen on performance of gas turbines, industrial burners	Dec-19	In Progress	3.5 years	Michael Brear (UoM)
RP1.10-06 Renewable hydrogen production by Reverse Electrodialysis	Feb-19	In Progress	Jul-24	Benjy Lee
RP1.10-07 Co-gasification of waste in a solar fluidized bed gasifier	Jan-21	In Progress	Jun-23	Josh Moran (Jemena)

RP2 Update - Social Acceptance, Public Safety and Security of Supply

Projects	Board Approval Date	Status	Completion	Proponent
RP2.1-01: Lessons Learned from major infrastructure upgrades	Dec-18	Completed	Mar-20	Kate Hawke (Jemena)
RP2.1-02: A social license and acceptance of future fuels	Jun-19	In Progress	May-23	Kate Hawke (Jemena)
RP2.1-03: Mapping key stakeholders in Australia's energy transition	Oct-19	Completed	Apr-20	Dennis Van Puyvelde (ENA)
RP2.1-04: Developing appropriate protocols for naming Future Fuels	Oct-19	Completed	Aug-20	Kate Hawke (Jemena), Claire Minns (AGIG)
RP2.1-05: Public Communication and Hydrogen as a Fuel in Australia	Dec-19	Completed	Jul-21	Sussan Johnson (Woodside)
RP2.1-06 - Mapping vulnerability to Future Fuels – A Scoping Review	Mar-20	Completed	Nov-20	Kate Hawke (Jemena)
RP2.1-07 Deliberative engagement processes on the role of future fuels	Jul-20	In Progress	Jan-22	Kate Hawke (Jemena)
RP2.1-09 - Social licence to operate training package	Mar-20	Completed	Oct-20	Kate Hawke (Jemena)
RP2.2-01: Regulatory mapping of future fuels	Jun-19	Completed	May-20	Alexandra Wickham (SA Govt.)
RP2.3-02: Code of Practice for pipeline engineers	Apr-19	Completed	Jul-20	James Czornohalan (Epic Energy)
RP2.3-03 - Establishing a Case Based Learning Framework for Pipeline Engineers	Mar-20	Completed	Dec-20	Susan Jaques (Sage Consulting Solutions)
RP2.3-04 - Gas fitting practices for future fuels: Opportunities for training and upskilling in VIC and SA	Jul-20	In Progress	Nov-22	Paul Harris (ESV)
RP2.3-05 ALARP Decision Making	Jan-21	In Progress	Oct-21	Richard McDonough (GPA)
RP2.3-06 Risk governance for procurement in future fuels	May-21	In Progress	Feb-22	Ted Metcalfe (Independent)
RP2.4-01: Pipeline intrusion avoidance solutions	Dec-18	Completed	May-21	Craig Bonar (APA)

RP2.4-02 - Understanding drivers for damage to distribution assets	Oct-20	In Progress	Oct-21	Anastasia Kontogiorgis (ESV)

RP2 PhD Top-Up Projects

Research Program (RP) Related	Board Approval Date	Status	Estimated Duration	Research Institution
RP2.10-01: Decision making and the role of social licence in natural resources	Sep-19	In Progress	2 years	David Adamson (UoA)
RP2.10-02 Fostering social acceptance of future fuels in Australia	Feb-21	In Progress	3.5 years	Andrew Skuse (UoA)

RP3 Update - Network Lifecycle Management

Projects	Board Approval Date	Status	Completion	Proponent
RP3.1-01 Review of future fuels transport and storage technologies	Feb-2019	Completed	Apr-20	Nick Kastelein (GPA)
RP3.1-02: Atom Probe tomography for hydrogen-steel interactions	Jun-19	In Progress	Sep-22	Geoff Callar (APA)
RP3.1-03: Future proofing plastic pipes	Dec-18	In Progress	Mar-22	Keith Lenghaus (APA)
RP3.1-04: Multi-channel hydrostatic pressure test kit	Dec-18	Completed	Feb-20	Keith Lenghaus (APA)
RP3.1-05: Compatibility of plastic piping with future fuels	Apr-19	In Progress	May-23	Huw Evans (Jemena)
RP3.1-06: Study of hydrogen permeation through the pipe wall	Jun-19	In Progress	Jan-23	Nick Kastelein (GPA)
RP3.1-07: Hydrogen field demonstration - plastic pipe network joining methods	Oct-19	In progress	Dec-24	Keith Lenghaus (APA)
RP3.1-09 - Deployment of the SAFE(TI) Lab for characterising the mechanical properties of linepipe steels exposed to high-pressure gaseous H2	Jul-20	In Progress	Sep-21	Nick Kastelein (GPA)
RP3.1-10 - Hydrogen embrittlement of pipeline steels, subcritical crack growth (formation) and critical crack growth (initiation)	Jul-20	In Progress	Oct-24	Tawake Rakai (AGIG)

RP3.1-08 Full-scale Fracture Initiation test program - phase 1	Apr-20	Completed	Apr-21	Tim Aujard (AGIG)
RP3.2-01: Proximity and ventilation requirements for fuel networks	Apr-19	In Progress	Sep-21	Phil Colvin (Jemena)
RP3.2-02: Future fuels decompression behaviour	Jun-19	In Progress	Jul-22	Mark Fothergill (APA)
RP3.2-03: The AS2885 online community	Jun-19	Completed	Aug-20	Francis Carroll APA)
RP3.2-04: Cohesive gas impurities	Oct-19	Completed	Feb-21	Francis Carroll (APA)
RP3.2-04B Cohesive Gas Impurities – Phase 2	Nov-20	In progress	Dec-22	Francis Carroll (APA)
RP3.2-05A: Tensile strain capacity - project 1 - literature review	Oct-19	Completed	Mar-21	Phil Colvin (Jemena)
RP3.2-05B: Tensile strain capacity - project 2 - experimental evaluation	Oct-19	In Progress	Jun-21	Paul Grace (Jemena)
RP3.2-05C: Tensile strain capacity - project 3 - predictive tool	Oct-19	In Progress	Nov-21	Mehdi Fardi (APA)
RP3.2-06: Stress safe sensitive fracture arrest model for pipeline fracture control	Dec-19	In Progress	Jan-21	Mark Fothergill (APA)
RP3.2-07: Metering and gas quality monitoring of future fuel blends	Dec-19	Completed	Mar-21	Scott Sharbanee (Enscope)
RP3.2-08 - Development of Efficient and Effective Methodologies for the Abandonment of Pipelines	Mar-20	In Progress	Jul-21	Greg Bishop (Santos)
RP3.2-09 Bio-methane Impurities	Nov-20	In progress	Dec-22	Siew Shan Foo (Jemena)
RP3.3-01: Gap analysis of smart monitoring and data analytics networks	Dec-18	Completed	Oct-19	Francis Carroll (APA)
RP3.3-02: Review of inspection techniques for unpiggable pipelines	Dec-19	Completed	Oct-20	Alan Creffield (APA)
RP3.3-04 - Smart Sign technology for continuous easement interference monitoring	Jul-20	In Progress	Feb-22	Eric Bardy (SEA Gas)
RP3.3-05 demonstrating a new pipeline corrosion control technology	Feb-21	In Progress	Feb-22	Alan Creffield (APA Group)
RP3.4-01: Retrofitting Pipelines by in situ coating	Dec-18	In Progress	Jan-23	William Hughson (SA Govt.)
RP3.4-02: Closed-loop CP control system for fuel networks	Dec-18	Completed	Apr-20	John Grapiglia (Corrosion Control Eng.)
RP3.4-03: Centre for pipeline damage assessment - Phase 1	Oct-19	Completed	Nov-20	Phil Colvin (Jemena)
RP3.4-04: Keyhole coating damage treatment	Oct-19	In Progress	May-23	Alan Creffield (APA)

RP3.4-05 - Quality assurance tests for two-part epoxy coatings	Mar-20	In Progress	Dec-23	Alan Creffield (APA)
RP3.4-07 - Bi-directional potential excursions on CP	Mar-20	Completed	Feb-21	Geoff Cope (GCA)

RP3 PhD Top-Up Projects				
Research Program (RP) Related	**Board Approval Date**	**Status**	**Estimated Duration**	**Research Institution**
RP3.10-01 - Molecular dynamics of hydrogen-induced failure	Mar-20	In Progress	3.5 years	Cheng Lu (UoW)

End of Report