

# ARENA's Renewable Ammonia Projects

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Amy Philbrook

## ARENA's Purpose

ARENA is the Australian Renewable Energy Agency.

The Agency was established by the Australian Government in July 2012 .

Our purpose is to improve the competitiveness of renewable energy technologies and increase the supply of renewable energy through innovation that benefits Australian consumers and businesses.

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# AUSTRALIAN RENEWABLE ENERGY AGENCY

KEY STATISTICS 2012-2020

ARENA



INVESTED

**\$1.58B**



PROJECTS

**543**



VALUE

**\$6.48B**



INVESTMENT LEVERAGE

**\$1:\$3.09**



## PROJECTS BY TECHNOLOGY

BIOENERGY

**\$128M**



GEOTHERMAL

**\$42M**



GRID INTEGRATION

**\$236M**



HYBRID

**\$110M**



HYDROGEN

**\$54M**



OCEAN

**\$44M**



SOLAR PV

**\$703M**



SOLAR THERMAL

**\$163M**



STORAGE - BATTERIES/PHES

**\$105M**

## RECENT ACTIVITY



**\$70M** Renewable Hydrogen Deployment Funding Round received 36 Expressions of Interest

**\$1.7M** to assess the feasibility of a renewable hydrogen and ammonia production facility in WA

**\$1.1M** to trial renewable methane in Australia's gas pipelines

**\$490K** to address emerging power system strength challenges so that more wind and solar can connect to the grid

**\$480K** for an Australian startup program that will assist clean energy entrepreneurs

## INVESTMENT BY STATE

**NT** PROJECTS 6  
INVESTED \$37M  
VALUE \$72M

**WA** PROJECTS 34  
INVESTED \$172M  
VALUE \$1.79B

**SA** PROJECTS 49  
INVESTED \$134M  
VALUE \$512M

**TAS** PROJECTS 19  
INVESTED \$40M  
VALUE \$97M

**QLD** PROJECTS 55  
INVESTED \$201M  
VALUE \$1.19B

**NSW** PROJECTS 223  
INVESTED \$789M\*  
VALUE \$2.28B

**ACT** PROJECTS 62  
INVESTED \$63M  
VALUE \$173M

**VIC** PROJECTS 95  
INVESTED \$148M  
VALUE \$364M

## INVESTMENT LEVERAGE ALONG THE INNOVATION CHAIN

STUDY

**\$1:\$1.59**

R&D

**\$1:\$1.59**

DEMONSTRATION

**\$1:\$1.85**

DEPLOYMENT

**\$1:\$5.91**

## ENGAGEMENT

### ARENA INSIGHTS WEBINAR

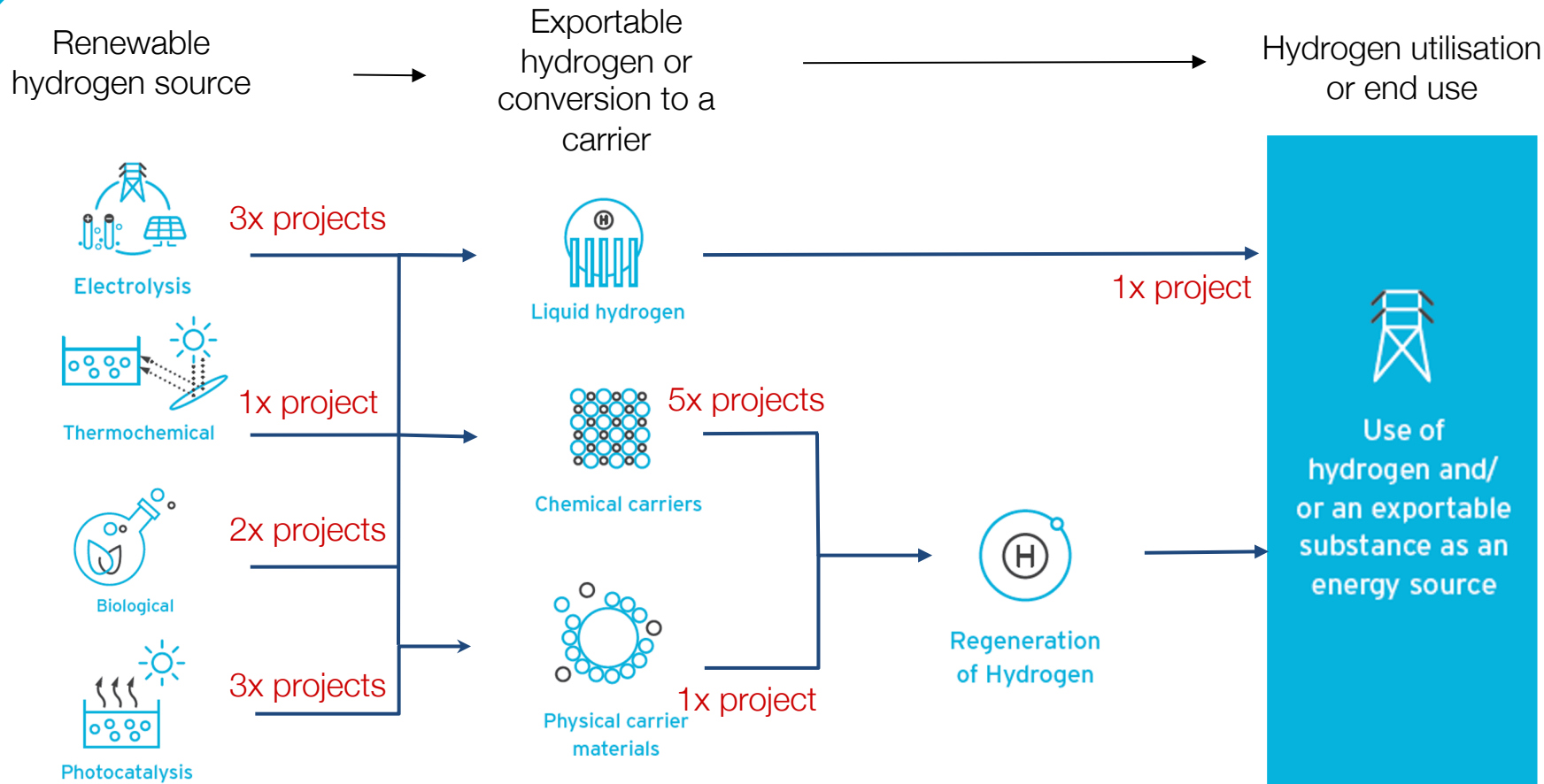
More than 100 industry professionals heard from AEMO, SAPN, Infigen, Simply Energy and Electranet on the January 2020 separation events in South Australia

### BIOENERGY ROADMAP

Sought input from Australia's bioenergy sector to help develop a Bioenergy Roadmap

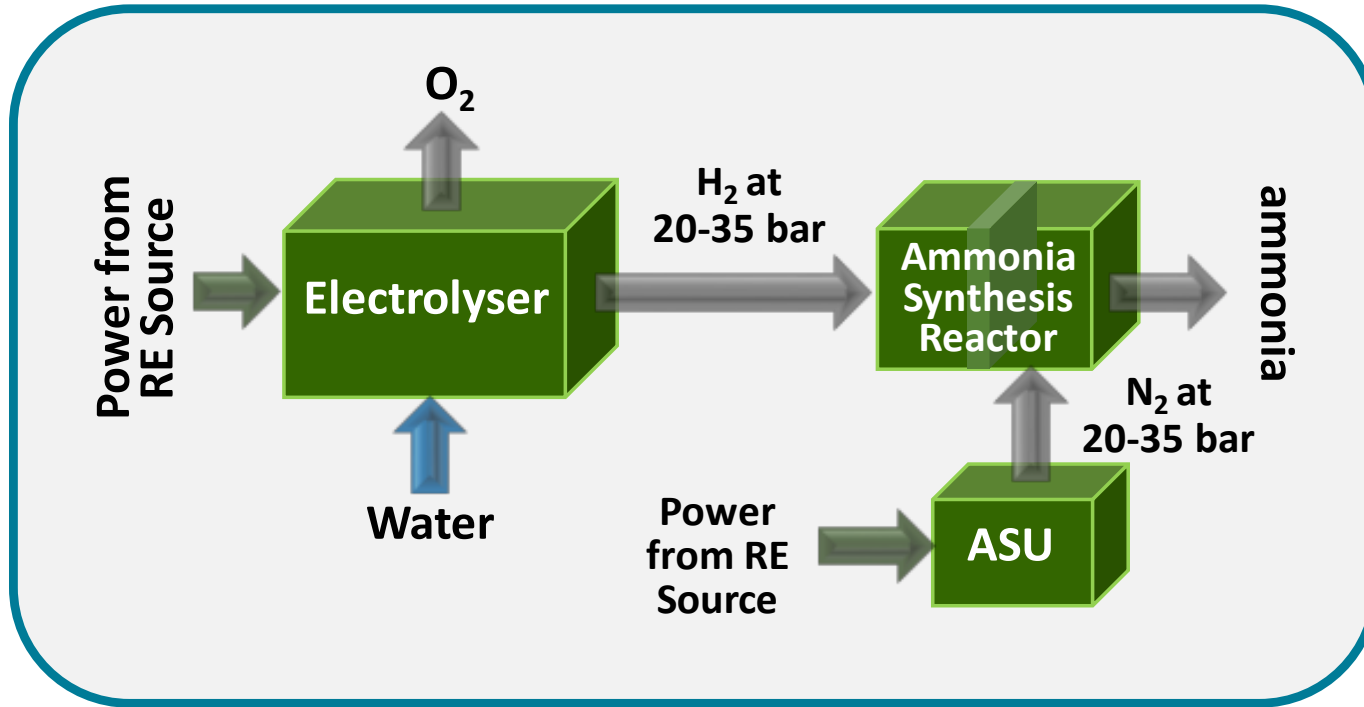
\* Includes \$567 million contributed to projects inherited by ARENA in 2012.

## ARENA awarded \$22.1 million to 16 hydrogen R&D projects across the supply chain





## CSIRO: Ammonia production at distributed scale



# Monash: Ammonia Production from Renewables at Ambient Temperature and Pressure



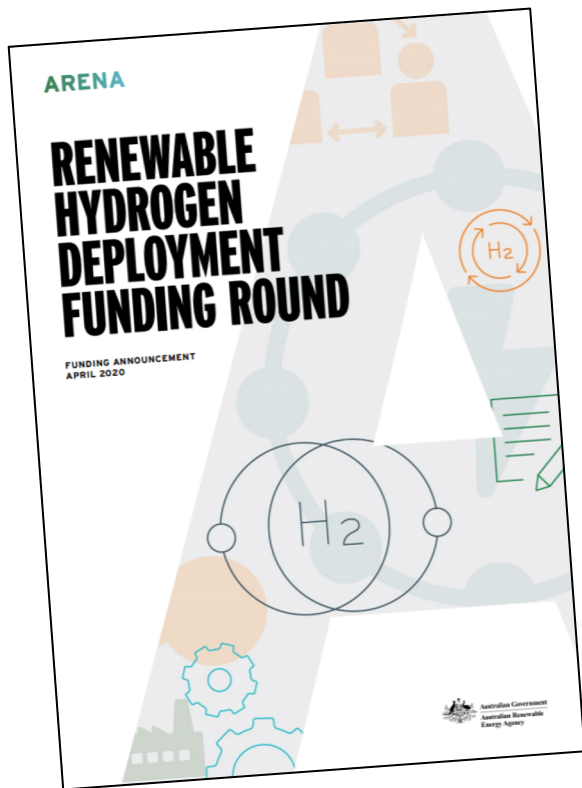
## BP Australia, QNP, Dyno Nobel, Yara

- Determine the technical and economic feasibility of producing renewable ammonia at a commercial scale
- Helping to further progress the commercialisation of renewable hydrogen production
- Analyse the end-uses and offtake demand for renewable hydrogen in domestic and international markets
- Understand the implications of a fully integrated renewable hydrogen supply chain



QNP Ammonia Plant

# ARENA Hydrogen Funding Round



- **Demonstration** of electrolysis and associated renewable hydrogen technologies at scale
- Provide **price discovery and transparency** in relation to the current and projected economics for renewable hydrogen technologies
- Facilitate a **pathway to technical and commercial viability** of renewable hydrogen in Australia
- \$70 million funding envelope - ARENA anticipates supporting more than one project

# Yara / Engie and green ammonia

