

ARENA Insights Forum Session Summaries & Key Points

MELBOURNE, THURSDAY 21 NOVEMBER 2019



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Since 2012, ARENA has invested \$1.46 billion to accelerate Australia's uptake of renewable energy. One of the greatest returns we have on this investment is a wealth of knowledge that can help shape new business models and key market reforms in the energy sector.

INTRODUCTION

Sharing knowledge effectively to fast track industry development is central to our mandate. Guided by this, we brought together 120 people from the energy industry for the third ARENA Insights Forum to share project insights and discuss themes relating to ARENA's new [investment priorities](#).

Held on 21 November 2019 in Melbourne, presenters, panellists and audience members were fortunate to hear from guest speaker Kristina Haverkamp, Managing Director of the German Energy Agency (dena), who presented on the status, challenges and solutions to Germany's energy transition.

They were also invited to discuss and share knowledge across three sessions:

- supporting industry to reduce emissions
- integrating renewables into the electricity system
- accelerating hydrogen.

Each session is summarised in this document and there are links to the presentations and relevant reports on [ARENA's Knowledge Bank](#).

ARENA would like to thank all of the presenters and panelists for taking the time to share their valuable insights and the audience for their enthusiastic participation.



A question is asked in the Plenary Q&A session

PLENARY SESSION & KEYNOTE ADDRESS

Kristina Haverkamp

Managing Director of dena (the German Energy Agency):

'The German Energy Transition: Status, Challenges and Solutions'



Key takeaways:

- dena has identified three pillars for the German energy transition. Pillar 1) Energy efficiency, including a strategy with a systematic approach to help industry reduce emissions. Pillar 2) Enabling direct renewable energy technologies into the system. Pillar 3) Using 'Powerfuels' - hydrogen and synthetic liquid fuels from green power.
- Germany and Australia face similar energy transition challenges, especially regarding flexibility and integration. Demand side management has significant potential for flexibility in Germany provided the price is attractive to companies. Integrated infrastructure planning will be key.
- Although the carbon intensity per Euro of gross domestic product (GDP) has reduced in Germany, the growth of the economy and industry has meant that industrial emissions have risen since 2010. The low hanging energy efficiency opportunities have been realised and the remaining opportunities are more difficult.
- Powerfuels (including hydrogen) are going to be very important to Germany's energy future. On a macro-economic scale, powerfuels can reduce the cost of the energy transition by utilising existing infrastructure and provide long-term storage. Germany will increasingly look to a number of countries, potentially including Australia, to meet its future energy needs.

SESSION 1: SUPPORTING INDUSTRY TO REDUCE EMISSIONS

Session one explored the business case and pathways for the organisational transformation needed in industry to transition to renewables and reduce emissions. Representatives from the oil, gas, mining and agriculture industries shared how their organisations started their transitions.

Key takeaways:

- There are many drivers for industry to take the lead on reducing emissions. Firms are looking to renewable energy to improve their sustainability performance.
- The demand for improved sustainability performance is coming from shareholders more than from supply chains. Electrifying processes across a company's operations can reduce emissions and are increasingly viewed as making good business sense. It also serves as an avenue for differentiation from competition.
- Engaging key internal stakeholders early and gaining buy-in is necessary in order to advise them on the advantages of higher capital expenditure investment upfront that will lead to reducing ongoing operational costs.
- Industry is willing to make the transition and bear the financial costs and potential innovation risks as long as they can understand the new technologies and are confident about how to manage them. These businesses are gaining valuable lessons and experience by undertaking projects with these new technologies. These lessons enable the rest of industry to move along with them as well.

Chris Briggs

Technical Director - Business Renewables Centre:

['Renewable energy for business, simplified: Accelerating large-scale renewable energy use across Australia'](#)



- The Business Renewables Centre (BRC) recently launched its ['Corporate Renewable Power Purchase Agreements in Australia: State of the Market 2019'](#) report, which provides an overview of the corporate power purchase agreement (PPA) market and key trends in Australia.
- Key drivers for organisations to enter into renewable PPAs include sustainability and emissions reduction targets, the ability to hedge costs in a highly volatile electricity market, and have greater certainty of cost savings.
- Renewable energy PPAs represent huge value for corporations of all sizes and across diverse industries, allowing them to buy their electricity from large scale renewable energy generators. A key challenge for many buyers is that energy procurement is often not a core business function and understanding and negotiating corporate PPAs can be complex to navigate and time-consuming.

Panel Q&A Key Takeaways



Panel Members: Bethwyn Cowcher (Fortescue Metals Group), James Koerting (Gold Fields), Bob Mac Smith (MSM Milling), Rowan Mackay (Santos). Panel Facilitator: Brad Williams (ARENA)

- The first mover will bring the rest of the industry along with them. Especially as companies look to align to the Paris Agreement goals and other sustainability reporting.
- Panel members recommended finding the economic sweet spot, then moving quickly to implement projects. It is critical that the business case is strong and made effectively internally to get key stakeholders within the organisation on board and allow the project to move quickly.
- Sustainability is a big driver but it also makes sense from an economic point of view.

Find out more about the ARENA-funded projects and available resources from this session:

The Business Renewables Centre - [Australian online resource centre and marketplace platform](#)

Alinta Energy Pilbara Finance & Fortescue Metals Group - [Alinta Fortescue Solar Gas Hybrid project](#)

MSM Milling - [Biomass Fuel Switch Project](#)

Goldfields - [Agnew Renewable Energy Microgrid](#)

Santos - [Conversion of Remote Crude Oil Beam Pumps to Solar & Battery](#)

SESSION 2: INTEGRATING RENEWABLES INTO THE ELECTRICITY SYSTEM

Session two discussed the technical implications of a greater reliance on renewable electricity generation and the toolkit to enable this integration. The panel discussion focused on findings from AEMO's study on high penetration renewables and explored how the large-scale and distributed energy sectors approach common integration issues.

Key takeaways:

- Australia is a world leader in terms of renewables penetration - for example South Australia's share of the NEM has the highest renewables penetration in the world, equal only to Denmark. This means Australia is in uncharted territory in terms of grid operation and there is a need to be proactive about understanding the limits and opportunities in the transition to a first of a kind electricity system.
- Social equity needs to be at the forefront of the transition.
- Grid connection for large-scale renewable projects continues to be a challenging process.
- Consumer friendly products are needed to grow the distributed energy resources (DER) sector.

Chris Davies

Manager of Future Energy Systems - AEMO:

['AEMO Renewable Integration Study'](#)



- AEMO is undertaking a Renewable Integration Study (RIS) which is complementary to the Integrated System Plan. The RIS aims to determine what the energy system will look like on a day to day basis and how grid operators would manage to run that system as society shifts from an 'analogue' to 'digital' world.
- Australia's electricity system is in uncharted territory in how the grid is operated, as there are no international comparisons to learn from. Australia is leading in residential solar uptake, integration of distributed energy resources and addressing how to maintain the system strength of the NEM. One topic that Australia could learn from other systems is how to manage frequency when planning improvements to our own.
- AEMO's recommendation is to identify a path to transition the way the electricity system is operated. The study is expected to be released in March 2020.

Large Scale Projects Panel Q&A Key Takeaways



Panel Members: Chris Davies (AEMO), Mark Stedwell (AEMO), Darren Brown (AusNet), Stephanie Easton (Infigen), Keith Ayotte (Windlab)

Panel Facilitator: Dan Sturrock (ARENA)

- High quality renewable energy resources (such as high irradiance or wind) are not always located near the transmission network. Renewable energy developers need to be mindful of this when developing renewable energy projects to ensure projects are located strategically in relation to the transmission network.
- It is important to create the right signals for generators to connect into the right location. There is continual movement in the development path of a project. There are insights to be gained by looking at the starting point of a project versus where they end up for future grid development.
- Some advice from the panel to renewable energy developers is to be mindful when considering the idea of becoming an asset owner and operator as it is a demanding responsibility, requiring regular troubleshooting and maintenance of the asset.

Distributed Energy Resources Panel Q&A Key Takeaways



Panel Members: Ed Chan (AEMC), Panel Facilitator: Caitlin Sears (ARENA), Jill Cairney (ENA), Kellie Caught (ACOSS), Felicity Stening (Enova Energy), Lachlan Blackhall (ANU)

- The current system could be amended to better service all customer segments in our community. Considerable social, financial and technical benefits can be achieved if distributed energy resources (DER) are managed appropriately and equitably.
- In addition to a technological transition, there is a shift in industry thinking that better incorporates customer perspectives. Industry players are being more innovative in exploring how increased DER integration can benefit all end users.
- The [Distributed Energy Integration Program](#) (DEIP) provides a forum for industry regulators, operators, networks, retailers and consumer advocates to come together and rethink how the energy system operates, and how it can be made fairer and more efficient for all energy users.

Find out more about the ARENA-funded projects and available resources in this session:

Windlab - [Using Upstream LIDAR Measurements](#)

Infigen - [Lake Bonney Battery Energy Storage System](#) & [Lake Bonney Stages 2/3](#)

SESSION 3: ACCELERATING HYDROGEN

Session three explored the various ways Australia can accelerate towards a hydrogen economy. This session shared insights from some of ARENA's demonstration projects and discussed the practical actions that can be taken in the short term to better position Australia as a powerhouse of renewable hydrogen production and use.

Key takeaways:

- The technology to create renewable hydrogen exists; support is needed to commercialise it.
- Public education and sector upskilling will be needed for the industry to grow.
- There are gaps in standards and regulations around hydrogen.

Samuel Lee Mohan

Manager of Innovation Projects - ATCO:

['Clean Energy Innovation Hub Lessons Learnt'](#)



- Advice to others wishing to enter or develop in the hydrogen space is to closely assess where your organisation sits in the industry and how this aligns with your forward strategy.
- ATCO's Clean Energy Innovation Hub shows there is the ability to create commercial demonstration projects today.
- The Hub balances ATCO's various energy sources (solar PV generation, battery storage, hydrogen storage, gas grid and electricity grid) to provide the most economic outcome for its local energy demands.
- Now that the project is in operation there have been a number of lessons learnt along the way - a detailed list is included in the presentation slides available [here](#).
- For a project to accelerate its progress, it is essential to understand the project design upfront and procure equipment to fit, rather than ordering equipment and then changing the design to accommodate this.

Troy D'Souza

Senior Engagement & Education Specialist - Toyota:

'Toyota EcoPark Hydrogen Demonstration'



- The Toyota Fuel Cell project is a sector coupling project that models a hydrogen hub where hydrogen is produced onsite in Altona to power both the EcoPark and vehicles with a back to base style mobility refuelling.
- Hydrogen is currently classed as a speciality gas rather than a mobility fuel - this adds to the cost and slows down the potential for using hydrogen for mobility solutions.
- Upskilling decision makers, regulators and the public is crucial if the industry is to be adopted into the everyday lives of Australians.
- The Mirai Fuel Cell Vehicle loan program in Victoria will be an early stage step in education in the use of fuel cell vehicles as an opportunity to learn by doing. The main challenge with the loan program is the limited options to refuel the cars hence the trial will be limited to the wider Altona region until there are more refueling stations.

Panel Q&A Key Takeaways



*Panel Members: Samuel Lee Mohan (ATCO), Kristina Haverkamp (dena), Dr. Patrick Hartley (CSIRO), Troy D'Souza (Toyota), Alex Dronoff (BOC)
Panel Facilitator: Matt Walden (ARENA)*

- Hydrogen and hydrogen equipment are not new, but the use for energy and renewable generation of hydrogen is new. There is the new commercial challenge of integrating hydrogen production into the existing system.
- There is recognition that decarbonising the existing domestic natural gas market will be challenging due to the large demand for gas in Australia. Blending hydrogen into the existing gas grid can help to meet demand while also reducing the carbon intensity of the gas. This would also be an opportunity to utilise the vast existing gas grid infrastructure as an energy storage mechanism for hydrogen.
- Regulatory and safety frameworks will need to be adapted to deal with renewable hydrogen production and its use for energy.
- As a potential importer and technology provider, Germany's drivers and strategies for hydrogen differ from Australia where export opportunities are being explored.
- The hydrogen sector in Australia is highly collaborative with stakeholders working together to develop the sector and address common challenges.

Find out more about the ARENA-funded projects and available resources in this session:

ATCO - [Clean Energy Innovation Hub](#)

Toyota - [Ecopark Hydrogen Demonstration](#)

BOC - [Renewable Hydrogen Production and Refuelling Project](#)

Hydrogen R&D - [ARENA awards \\$22 million to unlock hydrogen potential](#)

