NET ZERO INDUSTRY AND INNOVATION

New Low Carbon Industry Foundations – Hunter Workshop Stakeholder Insights

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The views provided herein are the opinions expressed by attendees during the event and do not represent the views of the NSW Government or Australian Industry ETI.

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Cover image: Compliance team members, Newcastle office. Image courtesy of Jeremy Piper, Department of Planning, Industry and Environment.

Contents

Acknowledgment of Country

The Department of Planning, Industry and Environment acknowledges the Traditional Owners and Custodians of the land on which we live and work and pays respect to Elders past, present and future.

Overview

In collaboration with the Australian Industry Energy Transition Initiative, (Australian Industry ETI), the NSW Government hosted a Net Zero Industry and Innovation workshop on 17 June 2021 at Fort Scratchley, Newcastle. The workshop brought together a diverse range of stakeholders whose insights will help inform plans for developing a thriving, low carbon industrial region in the Hunter. These workshops built on information provided by stakeholders during the registration of interest process and market sounding interviews, both of which took place in early 2021.

This workshop insights document provides a summary of the key themes, opportunities and issues identified by workshop attendees at the event. It does not represent the views of the NSW Government or the Program and is intended only to capture a point-in-time snapshot of feedback provided during the event.

About Net Zero Industry and Innovation Program

Announced in March 2021, Net Zero Industry and Innovation (the Program) is the NSW Government's $750 million program to support and partner with industry to reduce emissions and help NSW businesses prosper in a low carbon world. By accelerating the development of clean technology and decarbonisation, we will grow the economy, support jobs and significantly reduce emissions.

The Program is the cornerstone of the NSW Government's NSW Net Zero Plan Stage 1: 2020-2030, which aims to reduce emissions by 35 percent by 2030 and achieve net zero by 2050.

The Net Zero Industry and Innovation Program has three areas of focus:

- New Low Carbon Industry Foundations
- High Emitting Industries
- Clean Technology Innovation.

The New Low Carbon Industry Foundations focus area looks at laying the foundations for low emissions industries by supporting the emergence of Clean Manufacturing Precincts (CMPs) in NSW by accelerating the deployment of the enabling, low carbon infrastructure and technologies.

The purpose of a CMP is to foster market coordination by establishing industry-based consortiums to develop strategic roadmaps to decarbonise industrial clusters in the state. The Hunter and the Illawarra regions have been identified as regions that may benefit from CMPs that support decarbonising the region’s industries.

Executive Summary

The following insights from the Hunter workshop in June 2021, outline stakeholder feedback on the New Low Carbon Industry Foundations focus area, point to what's critical for industrial transition in the region and summarise the concerns and potential barriers. These shared insights are represented here to support an open consultation and co-design process. It also supports regional stakeholders to come together and collaborate on roadmaps and decarbonisation projects by building on an open, shared understanding of the opportunities and challenges.

Program feedback

- Diverse organisations are supportive of the approach and recognise the value of coordination
- Coordination will be key - organisations are good at synergy, but need strategic coordination
- Help them navigate government - consolidate and clarify programs and strategy
- Help the region learn from what's working and what isn't elsewhere
- More clarity is needed on cluster boundaries, the role of hydrogen, and program language

Elements critical to success

- Roadmaps need vision, goals, and long-term investment signals
- Build in flexibility to allow for inevitable changes in technology, sectors and external context
- Develop diverse finance and investment approaches
- Coordinate markets to support new technologies
- Jobs, skills development and community needs are central
- Leverage Hunter assets, resources, know-how, capabilities
- Join-up research & development, start-ups, industry to support pilots and demonstration
- Cultivate new strategic thinking - it's a new paradigm for companies and collaboration
- Leadership is key - a positive vision and ability to convert aspiration to action
- Share learning and data early and along the way

Stakeholder concerns and barriers to transition

- Investment cases don't stack up and first movers take on the financial risk
- Concerns about hydrogen – price of energy impact, renewable energy sources, lack of expertise
- Regulatory constraints to innovation – port containers, offshore wind, electricity network costs
- Who could lead in the region? Organisation bandwidth is in short supply
- Competition dynamics hamper IP sharing between organisations

Emerging ideas for collaboration

- Leverage existing infrastructure, assets, capability and know how – energy, export, land
- Cross-sector market making – hydrogen, biofuel, sector coupling, green materials supply
- Support emergent technologies – Molten Oxide Electrolysis (MOE), Carbon Capture and Utilisation (CCU) and Carbon Capture and Storage (CCS), offshore wind

- Potential for new approaches to funding and finance – regional fund, mixed funding & finance
- Connect to existing collaborations and planning – University, CSIRO, Newcastle Institute for Energy and Resources (NIER), Beyond Zero Emissions (BZE), Renewable Energy Zone (REZ)

Workshop Insights

Hunter Valley workshop 17 June 2021

Purpose of the workshop

- Identify the challenges, opportunities and ideas for industrial decarbonisation in the Hunter region.
- Contribute to the design of the New Low Carbon Industry Foundations (NLCIF) focus area of the Net Zero Industry and Innovation (NZII) program.
- Explore the potential to build strategic alliances that will deliver regional decarbonisation.

This workshop was an important first step in strengthen the collaborative partnerships that are essential to accelerate the deployment of the enabling, low carbon infrastructure and technologies needed for industrial decarbonisation. The ideas that were captured are valuable insights that will aid the Department to finalise the design of the NLCIF's focus area of the NZIIP. It will help ensure the work is fit for purpose and delivered to meet the needs of stakeholders.

Participants

A total of 27 stakeholders attended the workshop held in Newcastle on 17 June 2021. Stakeholders were from diverse backgrounds including heavy industry, suppliers, engineering services firms, unions, non-government organisations (NGOs), research organisations and universities, start-ups, and government agencies.

Stakeholder Insights

The workshop was designed to facilitate conversations in small groups on the program design and emerging ideas for industrial transition in the region. The insights below are a summary of the conversations.

Discussion Topics

- **Program consultation - what we've heard so far:** A presentation on the insights gained from Eric Kimmel and Bradley Anderson (Department of Planning, Industry and Environment).
- **Program design and approach:** Presentation by Eric Kimmel.
- **Possibilities for Industrial Region Transitions:** A presentation from Eric Kimmel and Jason Nielsen (Australian Industry Energy Transitions Initiative) to explore the potential in taking a regional economy perspective and the promising technologies.
- **Coordination and Collaboration in industrial region transitions:** Examples from UK and WA presented by Eric Kimmel and Jason Nielsen.

- **Developing collaboration ideas and roadmap potential:** Discussions to share and explore ideas for the region and how roadmap development might progress.

The workshops were facilitated by Meredith England from the Australia Industry Transition Initiative and presentations were followed by small group discussions and time for questions and answers. A detailed agenda can be found on page 11.

Program Design Feedback

The workshop offered an opportunity for stakeholders in the region to provide feedback on the proposed program design. The feedback welcomed coordination efforts and stakeholders were excited about the industrial cluster approach. They requested more clarity on the boundaries of the project and definitions of key concepts.

Table 1. Program Design Feedback

Coordination is welcome	More clarity is needed
An exciting approach • Diverse organisations were supportive of the approach and recognise the value of coordination. • Not only is it possible, it's exciting.	**Boundaries** • What are the (geographic) boundaries of a precinct? • How might we avoid duplicating infrastructure because we set a boundary?
Coordination will be key • Orchestrate diverse opportunities. • Clustering is already happening, coordination can strengthen it. • A collaboration platform would be useful – a place to identify and share new tech. • Local organisations are good at synergy, but strategic coordination needed for region transition.	**Hydrogen** • Both interesting and challenging - capex support is welcome but price is still a barrier (opex). • Is the hydrogen hub in one location or distributed? • Surprised by optimism on hydrogen
Help us navigate government • Provide a one stop shop - who to talk to, what grants and programs, knowledge hub • Need to clarify program connections and differences e.g. NLCIF & High Emitting Industries (HEI), Clean Manufacturing Precincts (CMP) & Renewable Energy Zones (REZ) • Consolidate strategy across government for more certainty	**Infrastructure** • What does 'infrastructure' mean in NLCIF? Need specifics and concrete examples • Does this bias new infrastructure over existing?

Learn from what's working and what isn't • International examples - EU, UK, North America • Australian examples - Redbank Solar and Hydrogen, Kwinana, Narrabri, hydrogen National Energy Resources Australia (NERA) cluster • Hunter - Steelworks learning, Hunter Joint Organisation, Dantia	**'Clean Manufacturing Precinct' and other language** • Why 'clean manufacturing'? Doesn't reflect what this is; it's confusing and may inhibit international finance opportunities (e.g. Japan). Industrial precincts? Industrial ecology? • What is a cluster? Physical place with infrastructure (requires companies to move)? A network that includes existing companies? • Why 'low carbon' vs 'net zero' vs 'zero emissions'?

Regional Collaboration Insights Summary

The table below outlines feedback on regional collaboration, providing insights on what participants feel is critical to success, identifying concerns and potential barriers, and ideas emerging in the Hunter Valley.

Table 2: Regional Collaboration Insights Summary

Critical to success	Concerns & barriers	Emerging ideas
• Roadmaps need vision, goals, and long-term investment signals • Build in flexibility to allow for inevitable changes in technology, sectors and external context • Develop diverse finance and investment approaches • Coordinate markets to support new technologies • Jobs, skills development and community needs are central • Leverage Hunter assets, resources, know-how, capabilities • Join-up research & development, start-ups, with industry to support pilots and demonstrations • Cultivate new strategic thinking - it's a new paradigm for companies and collaboration • Leadership is key - a positive vision and ability to convert aspiration to action • Share learning and data early and along the way	**Finance & commerciality barriers** • Investment cases don't stack up, returns, pay back periods, no green premium • First movers take on the financial risk • Does state and fed funding have the flexibility and scope needed versus other countries? **Hydrogen concerns and energy costs** • Will the energy price reduce with hydrogen hubs? Where will the renewable energy come from? • How does energy strategy relate? • Community distrust of hydrogen and new industry infrastructure. • Missing hydrogen expertise – research & development and investors **Regulation constrains innovation** • Port regulation/ containers regulation barrier • Offshore wind planning barrier • Electricity network costs • Local regulation barriers for 100% hydrogen pilots **Regional leadership - who could lead?** • Organisational attention and bandwidth, and regional workforce skills for decarbonisation are in short supply **Competition dynamics hamper IP sharing between organisations** • Natural competitive tensions make it hard for companies to collaborate	**Leverage existing infrastructure, assets, capability and know how** • Coal infrastructure, SMEs, energy, mining • Export know-how • Progressive leadership • Land, wind • Skilled workforce in diverse industries **Cross-sector market making** • Hydrogen market coordination • Integrating with agriculture, waste and biofuel • Sector coupling, whole of system benefits and potential for large scale firming • Materials needed for the transition - decarbonise and supply **Support emergent technologies** • MOE, CCU and CCS, offshore wind **Potential for new approach to funding and finance** • e.g. Hunter Net Zero Fund (banks, venture capital, impact investors, NSW Government) • Potential finance from Clean Energy Finance Corporation (CEFC), Australian Renewable Energy Agency (ARENA), banks, super, RACE For 2030 • Leverage existing financing relationships in the region (e.g. port, existing industry) **Connect to existing collaborations and planning** • University of Newcastle, industry, CSIRO • Newcastle Institute of Energy and Resources • Hunter Joint Organisation • AGL Energy Park • Beyond Zero Emissions on industrial precincts • Liddell pathways planning • Muswellbrook planning • Grid greening and Renewable Energy Zones

Regional Collaboration Insights

What is critical to success for industrial region transition?

Roadmaps need vision, goals, and long-term investment signals

- Roadmaps need to provide long-term investment signals - e.g. targets with benefit & cost, underwritten carbon price
- Milestones and targets along the way (e.g. CO_2 targets) will help clarity and alignment

Build in flexibility to allow for inevitable changes in technology, sectors and external context

- Vision without prescription is needed to respond to emergent change over time
- Roadmaps will need to make room for a wide variety of technology solutions, organisation types, changing decisions and inflection points, new developments
- New sectors and businesses will emerge as clusters grow and industry changes
- Policy, regulation and external influences will shift
- Precinct and industrial ecology design and definition will need to be dynamic

Develop diverse finance and investment approaches

- New and diverse approaches are needed to address the economic gap in decarbonisation. This could include venture capital, banks, investors, state incentives, cooperative research centres, federal agencies

Coordinate markets to support new technologies

- Anchor projects need to bring together demand, supply, and scale
- Project definition needs to include upstream production and downstream consumption

Jobs, skills development, and community needs are central

- Ensuring future skills, talent, and secure, quality jobs is essential for the community and sustainable industry in the region
- Needs prioritisation, investment and broad community support

Leverage Hunter assets, resources, know-how, capabilities

- The region has great industry assets and know-how in the port, infrastructure, energy, equipment supply
- The Hunter has land, lifestyle and natural assets that lend themselves to transition of industry for a thriving region
- Need to break down and bridge the ‘us vs them’" of fossil fuels and renewables/decarbonisation. The transition will be stronger with everyone together

Join-up R&D, start-ups, with industry to support pilots and demonstrations

- Collaboration support needs to span research and development (R&D), technology transfer and commercialisation through pilots, demonstrations and scale
- Support different project types and sizes, exploring the range of different technologies, alongside each other
- Fostering strong relationships between industry operators, R&D, small to medium enterprises (SME) and start-ups is key for pilots and demonstration of emerging technologies

Cultivate new strategic thinking - it's a new paradigm for companies and collaboration

- There is a mix of strategies needed and all require different thinking - decarbonisation, no-emissions production, new solutions, changes to inputs, changes to outputs
- Many organisations need to take on different ideas of who they are, diversify and work with new collaborators - sticking to your knitting will no longer work

Leadership is key - a positive vision and ability to convert aspiration to action

- New industry leadership can create a positive vision, direct effort to new jobs, support communication
- A leader/leadership group will need to be visionary and overcome the resistance and economic hurdles

Share learning and data early and along the way

- Shared data and learning from demonstrations and pilots can support scaling
- Emissions, waste and resource data helps organisations understand the challenge and the opportunity

What are stakeholders' concerns and barriers for industrial transition in the Hunter?

Regulation constrains innovation

- Port regulation and containers regulation barriers
- Renewable gas regulation barriers
- Offshore wind planning barrier
- Electricity network costs
- Local regulation barriers for 100% hydrogen pilots

Regional leadership - who could lead?

- Are there too many cooks in the kitchen?
- Who could lead this? What group with a common vision and the ability to turn ambition into action?
- How to bring coal and the port into the conversation?

Organisational attention and bandwidth, and regional workforce skills for decarbonisation are in short supply

- Getting the whole company on board is a real challenge
- It's really challenging to re-think the organisation
- Matching skills with the downsizing of mining and coal is a huge challenge
- The region's skills shortage is a challenge - also an opportunity?

Competition dynamics hamper IP sharing between organisations

- Natural competitive tensions make it hard for companies to collaborate
- IP arrangements between partners can create barriers to collaboration and shared learning

What are the emerging ideas for collaboration and coordination in the Hunter?

1. Leverage Hunter assets and capabilities

Leverage the Hunter's existing infrastructure, assets, capability and know how

- Integrated infrastructure - steelworks, port, power, water, gas, transport
- Export capability, infrastructure and relationships (esp. Japan and Korea)
- Industrial land, especially near the port
- Energy generation expertise and energy end use
- A great lifestyle
- Wind resources
- Skilled industrial workforce - energy infrastructure, mining, defence, large projects, infrastructure
- Waste resources usable from a relatively densely populated region
- Research capability - University of Newcastle, CSIRO

Existing coal infrastructure and capabilities could be leveraged and re-positioned

- Build up capability to reposition small companies that currently serve coal
- Maritime workforce plus the existing component SMEs and skills could be re-positioned for decarbonised aluminium and steel for offshore wind
- Use coal rail network (ARTC), rail links, transmission networks, shipping infrastructure, coal loading and port for hydrogen
- Leverage existing funding and financing partners with knowledge of the region

Leverage existing players and relationships to lead

- Potential for a net zero industry leadership group with large anchor organisations, (senior representation), that represent demand (Tomago, Orica, Molycop, Bradken steel) and supply (Origin, AGL etc) and innovators.
- Port + Glencore + Rio Tinto could build up blue hydrogen industry

Connect to existing collaborations and planning

- University of Newcastle, industry, CSIRO
- Newcastle Institute of Energy and Resources
- AGL Energy Park
- Beyond Zero Emissions on industrial precincts
- Liddell pathways planning
- Muswellbrook planning
- Grid greening and Renewable Energy Zones
- Newcastle Council is progressive on climate change
- Clean technology cluster
- Build on Australian Industry ETI relationships - Orica, Rio Tinto, NAB, super funds

2. Market coordination for hydrogen, biofuels & agriculture, firming, and decarbonised materials

Hydrogen market coordination ideas - aggregation of demand, grey over green and coordinated supply, local demand, and export

- Aggregate Hunter demand to align with the Federal Government support for bringing electrolyser costs down
- Transport (e.g. government procurement), heavy vehicles and diesel displacement in agriculture are early 'open doors' for hydrogen demand
- Demonstrate renewables + hydrogen + storage in off grid mines (15 large off-grid mines in the region)
- Coordinate large users to make public offtake commitments to incentivise investment in supply
- Build up hydrogen demand in the shorter term then transition to green hydrogen as the market grows
- Liquify hydrogen for export and domestic users
- Leverage Japan and Korea's familiarity with the region for hydrogen export
- Support energy storage as a hydrogen storage battery
- A coordinated hydrogen demand and supply concept
- Local hydrogen production - grey, blue and green
- Port bulk hydrogen storage for local demand and export
- Guaranteed purchase of hydrogen (government procurement, feed in tariffs for grey or green) and other hydrogen demand - ammonia, buses and trucks, shipping, aviation, export (as ammonia),
- CO_2 hub
- Renewable supply from New England solar PV, offshore wind
- Grid firming and sector coupling, hydrogen, and storage solutions for demand side management
- Networks and leadership – Beyond Zero Emissions, University of Newcastle, large demand orgs, energy supply, innovators

Ideas for integrating with agriculture and waste

- Agriculture as a feedstock for bioenergy
- Range of bioenergy inputs exist - agriculture, forestry, local government, waste
- Potential for hydrogen electrolysers on farm as part of hydrogen supply and demand
- Aggregate waste streams for biomethane - create a marketplace for waste materials (circular economy in the region)
- Purpose build a biomethane facility, part of the recycling infrastructure - using landfill, digestate and agricultural waste
- Link to Redbank Power Station as bioenergy and CCS

Sector coupling, whole of system benefits and potential for large scale firming

- Large scale firming - excess energy can be used for electrolysis
- Make a joint investment into scaled firming as a precinct
- Deploy smart grids for firming
- Use sector coupling (not just demand) to stack benefits

- Understand sector coupling to identify where electricity and gas integrates
- Explore whole of system opportunities and sector coupling with players (government can create a safe environment to explore) e.g. offshore wind could reduce overall investment

Materials needed for the transition - decarbonise and supply

- Steel from scrap
- Potential for a full hydrogen furnace pilot that all players can learn and build from
- Decarbonised steel for offshore wind, mine components, mine vehicles, renewables infrastructure
- Decarbonised aluminium for Electric Vehicles and other decarbonised economy uses
- Connect to (Materials and Embodied Carbon Leader's Alliance (MECLA) for use in low carbon construction
- Leverage SME clusters that currently supply components to coal
- Copper processing and smelting needed for the energy system

3. Support emerging technologies and new approaches to finance

Support emergent technologies

- MOE pilot could connect to green steel offtake (see previous section on green materials supply). Boston Metals are looking for a second pilot location
- CCU and mineral carbonation to support manufacturing low carbon building and construction
- Explore CCS - potential for CO_2 hub
- Offshore wind (floating) - Hunter could be at the cutting edge

Potential for new approaches to funding and financing regional decarbonisation strategies

- Develop a ‘Hunter Net Zero Fund’ that focus on capital Investment for regional low carbon infrastructure projects. Capital for fund may be raised by banks, venture capital firms, impact investors, NSW Government sovereign wealth funds etc.
- Leverage existing financing relationships in the region (e.g. port, existing industry)

Next Steps – using your input to design the New Low Carbon Industry Foundations stream

The Net Zero Industry and Innovation (NZII) program will use the feedback and insights gained from this and other potential low carbon industrial regions to design the New Low Carbon Industry Foundation stream – a key focus of our efforts towards Net Zero industry in NSW.

If you have any questions or further inputs regarding this Insights document, please contact the New Low Carbon Industry Foundation team at netzeroindustry@environment.nsw.gov.au

Appendix

List of Abbreviations

Abbreviation	
ARENA	Australian Renewable Energy Agency
Australian Industry ETI	Australian Industry Energy Transitions Initiative
BZE	Beyond Zero Emissions
CCS	Carbon Capture and Storage
CCU	Carbon Capture and Utilisation
CCUS	Carbon Capture, Utilisation and Storage
CEFC	Clean Energy Finance Corporation
CMP	Clean Manufacturing Precinct
CO2	Carbon Dioxide
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CTI	Clean Technology Innovation
EV	Electric Vehicle
HEI	High Emitting Industries
IP	Intellectual Property
MECLA	Materials and Embodied Carbon Leader's Alliance
MOE	Molten Oxide Electrolysis
NEIR	Newcastle Institute for Energy and Resources
NERA	National Energy Resources Australia
NGO	Non-Governmental Organisation
NLCIF	New Low Carbon Industry Foundation
NZII	NSW Net Zero Industry and Innovation
PV	Photovoltaic (Solar)
R&D	Research and Development
REZ	Renewable Energy Zone
SMEs	Small-Medium Enterprises

Agenda

Table 3: Agenda

Time	Duration	Agenda Item
9.15	15 mins	**Introduction & Welcome** Eric Kimmel, Senior Project Officer, Department of Planning, Industry and Environment Meredith England, Principal, Australian Industry Energy Transitions Initiative
9.30	45 mins	**Program Consultation – What we've heard so far** Eric Kimmel and Bradley Anderson, Senior Project Officer, Department of Planning, Industry and Environment Followed by small group discussion and Q&A
10.15	30 mins	**Program Design & Approach – New Low Carbon Industry Foundations** Eric Kimmel, Department of Planning, Industry and Environment Followed by small group discussion
10.45	**15 mins**	**BREAK**
11.00	15 mins	Q&A
11.15	45 mins	**Possibilities for Industrial Region Transitions** Eric Kimmel, Department of Planning, Industry and Environment Jason Nielsen, Implementation Lead, Australian Industry Energy Transitions Initiative Followed by small group working session
12.00	45 mins	**Coordination and Collaboration in Industrial Region Transitions** Eric Kimmel, Department of Planning, Industry and Environment Jason Nielsen, Australian Industry Energy Transitions Initiative Followed by small group working session
12.45	**45 mins**	**LUNCH**
1.30	45mins	**Developing Collaboration Ideas & Potential for Roadmap Development** Small group working sessions
2.15	40 mins	**What's next for the New Low Carbon Industry Foundation program?** Eric Kimmel, Department of Planning, Industry and Environment Followed by discussion