ENERGY TRANSITION HUB

an Australian-German innovation partnership

Bilateral research turning a zero-carbon global economy into an opportunity

PIK Potsdam Institute for Climate Impact Research

MCC Mercator Research Institute on Global Commons and Climate Change

WWU Münster

SPONSORED BY THE:

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Australian-German Climate & Energy College

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MESSAGE FROM THE CHAIR

The Energy Transition Hub brings together some of the top research institutions in Australia and Germany to tackle the real-world challenges of energy policy. Announced by the Australian Prime Minister Turnbull at the Hamburg G20 Summit in July 2017, the Hub is an important step for both countries to cooperate with and learn from each other in transforming our energy sectors towards a lower carbon future.

The Energy Transition Hub's five core research partners are the University of Melbourne, the Australian National University, the Potsdam Institute for Climate Impact Research, Münster University's Centre of Applied Economic Research, and the Mercator Research Institute of Global Commons and Climate Change. At its inauguration, the Hub also includes Murdoch University, RMIT University, Monash University, the German Aerospace Centre (DLR), the German Institute for Economic Research (DIW) and the Hertie School of Governance.

In the transition to a net-zero emissions global economy, a partnership between Australia and Germany is opportune and timely. Germany has a strong established service and manufacturing sector and has begun its *Energiewende* to enable the energy transition. Australia has vast and diverse energy, mineral and land resources that are essential for a global zero-carbon energy system. Both countries can become 'energy superpowers' in a low-carbon world.

The Energy Transition Hub is a unique mechanism for Australia and Germany to learn from each other, generate mutual benefit through the global energy transition, and strengthen the bilateral relationship. The goal of the Hub is to provide a critical evidence base for new growth centred upon the economic opportunities of zero emissions. The Hub will underpin the emergence of modern energy policy, novel investment opportunities, technical solutions to system integration, and solutions to the social challenges of a global energy transition.

In pursuing these goals, the work of the Hub will generate business and research engagement with a focus on industry, investor and business opportunities. It will produce ready solutions for industry through a trained cohort of researchers, partnering with academic and policy experts able to respond to the challenges of a 21st century energy economy.

Professor Ross Garnaut
Chair of the Board
Energy Transition Hub

BACKING LOW-CARBON OPPORTUNITIES

The transition to low-carbon energy is a national priority for both Australia and Germany. The technological changes underway can unlock economic advantages for energy-intensive industrial processes, mining operations, renewable energies and exporters. The transition also poses risk of unnecessarily high power prices, dislocated communities, lost comparative advantage and investment uncertainty for businesses.

To maximise the benefits of the energy transition, infrastructure, technology, business models and market structures will be required. Building on fundamental research capabilities, the Energy Transition Hub will identify and address challenges, barriers, pathways to implementation and business models for emerging and market-ready technologies.

Governments, research organisations and industry stakeholders must work together to promote innovation and a sustainable investment environment. This requires development of high-quality technical and policy expertise at a national level interconnected with strategic international partners.

By way of collaborative research and academic-public sector-industry partnerships, the Energy Transition Hub will:

- Assist transition of the electricity grid and underpin the transformations of Australia and Germany into net-zero emissions economic powerhouses
- Establish robust networks within and between Australia and Germany and support them as leaders in net-zero emissions innovation
- Face the challenges and opportunities of achieving emissions reductions consistent with the Paris Agreement on climate change

HOW THE ENERGY TRANSITION HUB WILL DELIVER

Business, governments, and research organisations can work together to promote innovation and investment in a growing net-zero emissions economy. High-quality technical and international policy expertise can ensure an accurate and coherent picture of the investment landscape and commercial opportunities. The Energy Transition Hub will support this by:

- Providing world-leading research expertise and engagement in the energy transition, targeted to benefit communities, industry and policy makers, including on-request government and business research and briefings
- Providing open-access, open data and open knowledge sharing platforms for government, business and communities
- Promoting innovation and delivering world-leading applied research outcomes by undertaking and coordinating research and engagement between universities and business
- Facilitating collaboration and knowledge transfer between research, business, government and civil society in Australia and Germany
- Supporting a new generation of experts in the energy transition

SETTING THE AGENDA

The Energy Transition Hub will engage with business, governments and community organisations in Australia and Germany through direct collaboration as well as research symposia, workshops and a joint Australia-Germany agenda setting conference in 2019.

This will be supported by focussed research across four key areas that contribute to maximising the economic and social benefits of a managed transition and achieving the objectives of the climate change Paris Agreement. The four themes are aligned to priorities for Australian and German businesses, governments and industry stakeholders, ensuring both countries benefit from mutual scientific collaboration and that business will be well-served by long-term partnerships.

The Hub involves around 60 leading researchers with a broad range of research specialisations and capabilities that can be drawn upon to deliver research outcomes. The Hub's joint framework places emphasis on intermingling the Australian and German research groups.

AUSTRALIAN-GERMAN COLLABORATION

In 2014, the Australia-Germany Advisory Group was established to strengthen the two nations' bilateral relationship. The Group recommended that matters relating to energy, energy security and climate change be given special attention. In March 2017, a Declaration of Intent established an Australia-Germany Energy and Resources Working Group. The creation of the Energy Transition Hub, announced by Prime Minister Turnbull at the Hamburg G20 Summit in July 2017, is an important step for both countries to cooperate and to learn from each other in transforming our energy sectors towards net-zero emissions futures.

HUB THEMES

1. SOCIO-ECONOMIC ASPECTS OF THE ENERGY TRANSITION

Deep changes in energy systems create challenges for social adjustment but also economic opportunity; both need to be better understood. With a focus on energy and electricity markets and policy, this theme includes all socio-economic aspects of the energy transition and of a renewables-rich power system.

Current research capabilities include:

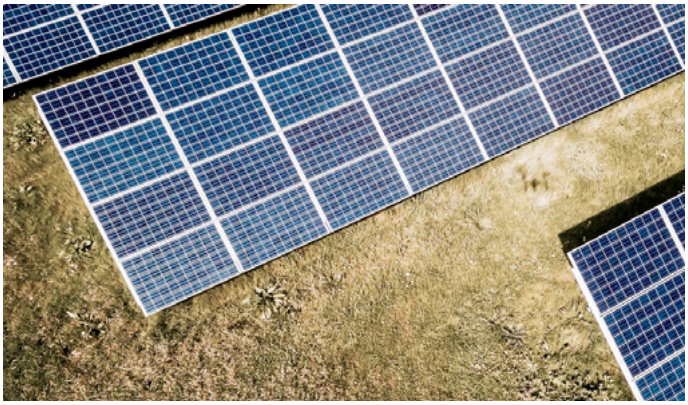
- Design of energy markets, regulation, policy and regional network tariff structures
- Identification of synergies between state and federal programs and climate and energy targets
- Empirical economic analysis of a low-carbon energy transition and research into evidence-based narratives to support decarbonisation and productivity growth
- Local and regional effects of the energy transition and how the energy transition can positively engage with communities

2. SCIENTIFIC AND TECHNICAL ASPECTS OF LOW-CARBON ENERGY

Lessons and experience from the first decades of Germany's energy transition can inform Australia's own journey. Australia's experience can also provide innovative impetus and identify scenario options for future development of Germany's regulatory framework in the electricity sector. This theme covers scientific and technical aspects of the energy transition with a focus on modelling supply and demand, solutions to integration of intermittent renewable energy sources, network infrastructure optimisation, battery integration and renewable energy upscaling.

Current research capabilities include:

- Development of Australian economy-wide or National Electricity Market (NEM)-wide electricity system models
- Devising solutions to the grid for supporting large-scale integration of renewable energy sources while generating zero-carbon fuels
- Design and optimisation of technical and market scenarios for high renewables penetration



3. ACHIEVING THE OBJECTIVES OF THE PARIS AGREEMENT

Achieving the objectives of the Paris Agreement will require global emissions to reach net-zero and below in the second half of this century. This theme explores achieving the Paris Agreement goals with a particular focus on options that remove carbon from the atmosphere, known as negative emissions technologies. It studies geological and biological carbon sequestration options, social and food security implications, and the impact of climate change and water scarcity on negative emissions options.

Current research capabilities include:

- Understanding of the role of negative emissions options in achieving the objectives of the Paris Agreement
- Identification of biological carbon removal options, including analysis of biomass potentials on a national scale and the potential for bioenergy with carbon capture and storage for agricultural waste or for municipal waste
- Devising solutions that bypass land-use related carbon removal, such as direct air capture and industrial carbon capture, use and storage

4. OPPORTUNITIES FOR EXTRACTIVE AND MANUFACTURING INDUSTRY

This theme brings together Australia's large renewable energy potential, world-leading mining operations and logistics, and Germany's renewable manufacturing and technological know-how. It investigates opportunities for extractive industries and the manufacturing sector with regard to energy-intensive production and strives to identify and support opportunities for both countries to become 'energy superpowers' in a net-zero emissions world.

Current research capabilities include:

- Identification of industrial processes and export opportunities, including hydrogen synthesis pathways, zero-carbon energy iron ore processing, opportunities and trade-offs for bio-carbon feedstock for urea production, and large-scale renewable energy export opportunities in the Pilbara region
- Understanding regional industrial restructuring in a net-zero emission future, trade, investment and innovation, and opportunities for cooperation with South-East Asia and global production networks in low-carbon technologies

SPOTLIGHT: THE ENERGY TRANSITION HUB IN ACTION – LAUNCH PROJECTS

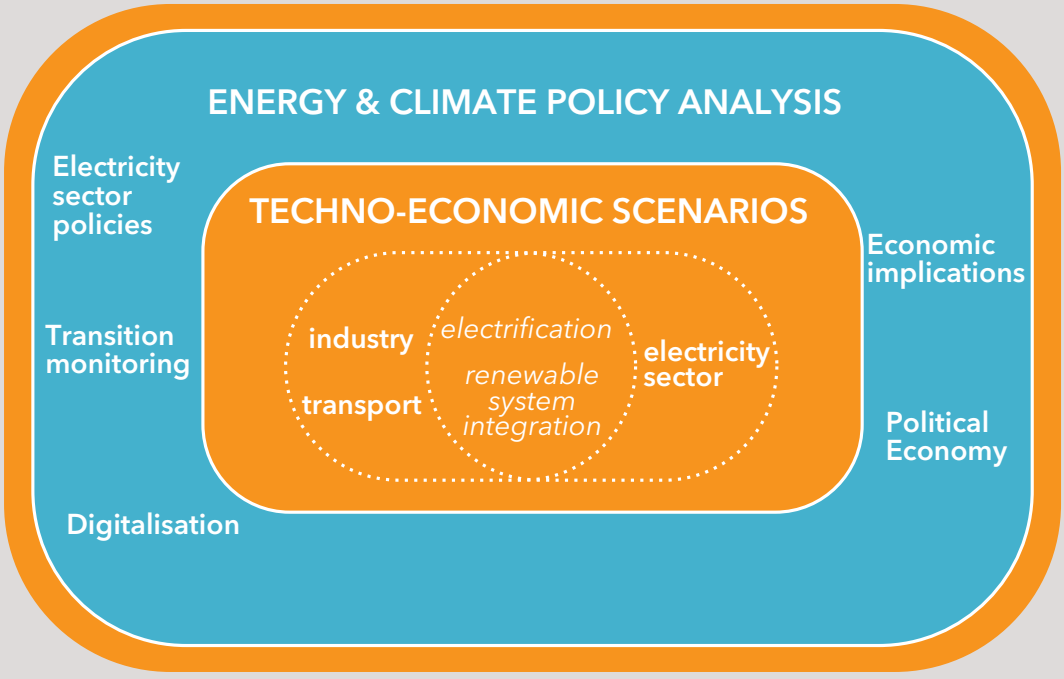
Delivering a longer-term research agenda will require not only input from all stakeholders but foundational research to inform decisions. Below are two initial projects that ensure longer-term research needs are met.

START PROJECT –
TECHNOLOGY & POLICY FOR THE FUTURE

In the START project, thirty researchers from Germany and Australia conduct a joint analysis of low-carbon energy transition pathways by combining future techno-economic scenarios with policy lessons learned in both countries. The project deepens the bilateral research links between both countries and brings together research, business, policy makers and civil society to facilitate a mutual learning process to deliver technological and policy solutions alongside economic opportunities such as emerging markets and export options. This collaboration will also provide insights for other countries embarking on their own energy transitions.

Core elements of the project include:

- Stakeholder involvement producing research results that are practically relevant, and that drive both social benefit and investment opportunities
- Defining transition scenarios for the energy systems of both countries, specifically technical and policy solutions to integrating renewable energy and climate mitigation in the energy industry and the transport sector
- Examining regulatory barriers and broader social, political and governance aspects of energy transitions to build cross-sectoral policy frameworks that can provide robust societal support



ZERO-CARBON TRANSITION – OPPORTUNITIES FOR WESTERN AUSTRALIA

Western Australia (WA) can benefit from its vast and diverse renewable energy, mineral, land and marine resources and with its economic linkages and proximity to Asia, play a vital role contributing to the national and global transition to a net-zero emissions future.

Hub partner, Murdoch University, will address specific opportunities and challenges at a state and regional level, including prospects for key industry and trade sectors. Structured engagement of stakeholders and local and regional communities will inform the research agenda. This research will help unlock the potential for WA's transition to a net-zero emissions future, maximising benefits for the state and regional economy, employment and sustainability.

The project will address a range of research questions including:

- What could be the respective roles of the Australian and WA governments, business and regional/local government/communities in transitioning to a net-zero emissions economy?
- How can WA achieve greenhouse gas emissions reductions consistent with international agreements, while benefiting from its renewable energy, mineral, land and marine resources?
- How can regional areas, such as the Collie South-West and Pilbara, economically prosper throughout the transition while maximising social benefit for their communities?

HOW THE HUB OPERATES

Board

The International Advisory Board consists of Australian and German representatives from industry, government and civil society. The Board identifies opportunities for the Hub, provides advice to the co-directors and contributes to the Hub's development.

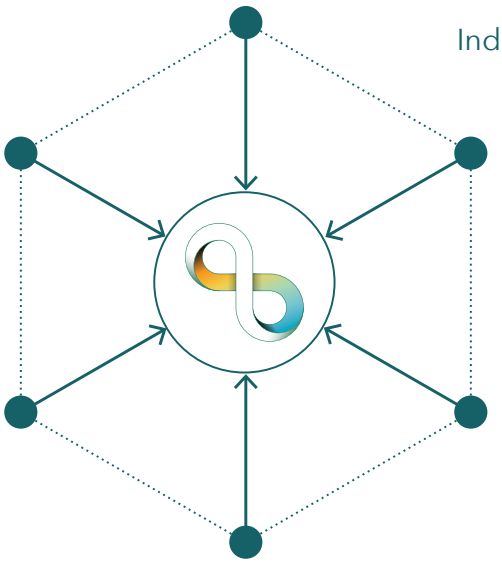
Management

Each core Research Partner institution has a designated co-director responsible for the overall direction of the Hub. There is also a Managing Director and Scientific Coordinator.

The Hub secretariat is led by the University of Melbourne.

Science Panel

The Science Panel assesses the Hub's activities against the Hub goals and ensures that projects remain current.



Academia
Industry
Government
Communities

Partners

The Hub builds strategic partnerships with key stakeholders, shaping the Hub's core governance.

Strategic Panel

The Strategic Panel ensures Hub activities are aligned to stakeholder needs.

Researchers

World leading experts from top institutions across Australia and Germany produce targeted research and insights, taking a multi-disciplinary and socially-informed approach to the scientific and technological challenges of the energy transition.

KEY PEOPLE

Prof. Malte Meinshausen
Co-Director

Prof. Frank Jotzo
Co-Director

Prof. Jan Minx
Co-Director

Prof. Gunnar Luderer
Co-Director

Prof. Andreas Loschel
Co-Director

Dr. Falko Ueckerdt
Managing Director

Cienna Turpie
Hub Manager

Dr. Anne Kallis
Project Leader

Dr. Ursula Fuentes Hutfilter
Project Leader

Anne Houston
College Manager

HOW TO GET INVOLVED

The Hub aims to address the challenges and opportunities of energy transition faced by energy producers, policy-makers, regulators and researchers, through to end-users. To do this effectively the Hub needs to bring together the perspectives, interests and needs of all these players.

At its essence, the Energy Transition Hub is about starting and building a robust conversation between industry, government, civil society and academia.

It is about co-producing relevant research questions with producer and consumer groups, so that research outcomes can drive appropriate reform and so that policy-making can be truly evidence-based.

We actively encourage energy stakeholders—industry, business, academic institutions, individual researchers, consumer groups—to get in contact and become a partner in the Energy Transition Hub.

Please contact us for further information.

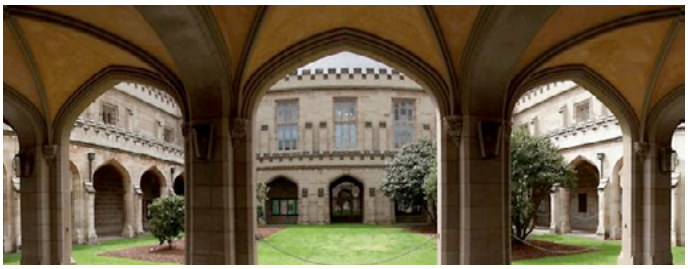
THE INSTITUTIONS

The Hub is led by five core research partners, each recognised leaders in their fields:

The University of Melbourne with its Australian-German Climate & Energy College and its Melbourne Energy Institute; the Australian National University with its Centre for Climate Economics and Policy, its Energy Change Institute, and its Climate Change Institute; the Potsdam Institute of Climate Impact Research; Münster University with its Centre of Applied Economic Research; and the Mercator Research Institute of Global Commons and Climate Change.

The Hub is interested in engaging with other partners from the business, research and non-government organisation communities.

CORE RESEARCH PARTNERS



THE UNIVERSITY OF MELBOURNE

The University of Melbourne is a leading research university and Australia's largest cohort of research students. It is consistently ranked among leading universities globally.

THE AUSTRALIAN NATIONAL UNIVERSITY

The Australian National University is a world-leading university. Its Centre for Climate Economics and Policy is among Australia's leaders on low-carbon energy policy and economics research.

THE POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH

The Potsdam Institute for Climate Impact Research (PIK) was founded in 1992 and has 320 staff. PIK addresses crucial scientific questions on global change, climate impacts and sustainable development. PIK is a partner in the Kopernikus projects, the largest research initiative of the German energy transformation.

THE UNIVERSITY OF MUNSTER CENTRE OF APPLIED ECONOMIC RESEARCH

The University of Münster Centre of Applied Economic Research focuses on transportation, housing, energy and resource economics. The centre provides empirical analyses for ministries, enterprises, foundations and associations. Münster University coordinated the energy expert committee of the German government to monitor the energy transformation.

THE MERCATOR RESEARCH INSTITUTE ON GLOBAL COMMONS AND CLIMATE CHANGE

The Mercator Research Institute on Global Commons and Climate Change, founded in 2012 by Stiftung Mercator and PIK, provides solution-oriented policy pathways for governing the global commons to enhance sustainable development and human wellbeing.

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