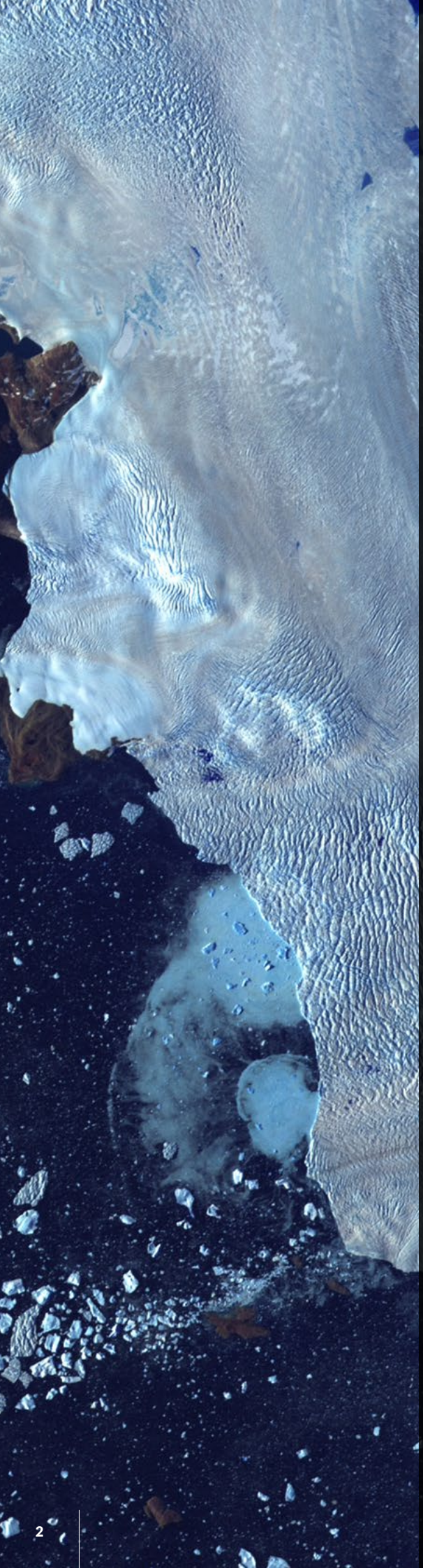
ENGINEERS
AUSTRALIA

Engineering Responses to Climate Change Roundtable

Wednesday 26 February 2020 | International Convention Centre, Sydney

SUMMARY REPORT



If not now, when?

Engineers have always designed for the future. Whether it has been about one in 100-year flood events, changing passenger loads, compatibility with upcoming technological innovations or potential traffic changes, we have always been prepared.

Now, climate change introduces us to a very real and increasingly urgent future situation that requires even greater consideration, knowledge and planning. But it doesn't just affect the future. Climate change affects the work we have done in the past, and it has an influence on the work we're carrying out right now.

The outputs of engineering, in fact, will play a vital role not only in developing resilience in a new climate, but also in reducing the number and regularity of destructive weather events.

To shape a collaborative way forward, Engineers Australia held the Engineering Responses to Climate Change Roundtable in Sydney on February 26, 2020. It brought together many leading industry groups and organisations.

This report summarises the major findings, discussions.

Roundtable Participants

TODD BATTLEY
Chief Executive ANZ, AECOM

PROF HUGH BRADLOW
President, Australian Academy of Technology and Engineering

DR JACI BROWN
Director, Climate Science Centre, CSIRO

PETER CHAMLEY
Chair Australasia, ARUP

JORGE CHAPA
Head of Market Transformation, Green Building Council of Australia

LARA HARLAND
Chair of Environmental College, Engineers Australia

DR ANNE HELLSTEDT
Chair of the College of Leadership and Management, Engineers Australia

PROFESSOR ROBIN KING
Australian Council of Engineering Deans

MICHAEL LI
Senior Project Manager, Cities & Policy, ClimateWorks Australia

DR PETER MAYFIELD
Executive Director, Environment Energy and Resources, CSIRO

ILONA MILLAR
Global Head of Climate Change, Baker McKenzie

ADRIAN O'CONNELL
CEO, Standards Australia

ANDREW PETERSEN
CEO, Business Council for Sustainable Development Australia

STEVE POSSELT
Chair of Sustainable Engineering Society

KIERAN POWER
National Lead for Resilience & Climate Adaptation – WSP

NEIL SAVERY
Chief Executive,
Australian Building Codes Board

AINSLEY SIMPSON
CEO, Infrastructure Sustainability Council of Australia

GUY TEMPLETON
CEO, WSP

BOBBY VIDAKOVIC
Director, Clean Energy Finance Corporation

DAVID WILLIAMS
CEO, Planning Institute of Australia

CHRIS CHAMPION
National President & Board Chair, Engineers Australia

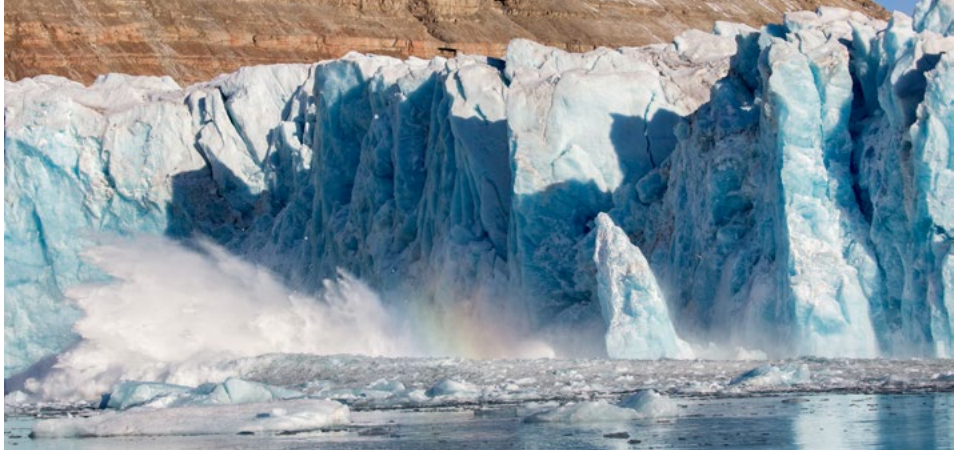
RAJ ASEERVATHAM
Board Director, Engineers Australia

LUCIA CADE
Board Director, Engineers Australia

NICK FLEMING
Board Director, Engineers Australia

HUROL INAN
Board Director, Engineers Australia

DR BRONWYN EVANS
CEO, Engineers Australia



1 Now is the time to act

The sudden sense of urgency around issues related to climate change is not surprising, particularly considering Australia's recent summer. The idea that we are now at a stage where there is no choice but to act was presented in support of several arguments unrelated to the recent bushfire and flood experiences.

First, there's innovation. If experts in other nations come up with solutions to related issues, such as renewable energy, then Australia becomes a customer rather than a producer. On the other hand, if we take action and become a developer of solutions, there is enormous opportunity.

Then there is the fact that Australians, perhaps more than any other advanced nation, regularly suffer the physical manifestations of climate change in the form of fires, floods and drought.

As a result, communities expect action.

Investors are showing keen interest in the carbon impact of new work, and if it doesn't measure up, they're far less likely to fund the project.

Finally, there's a sense of frustration amongst many engineers and the community that governments and industries, including engineering, have been given numerous warnings about what has been coming, but have not responded.

Australian engineering has a good record of leadership and innovation – just look at the work carried out by CSIRO and at universities around PV, for example. We are now in a position to take leadership around climate change.

"We've been told over Christmas that we've had a heart attack. We were told ten years ago that we had angina. Ten years before that we were told we had high cholesterol. And yet these continuing signals do not lead to a collective action … It's now all terribly complicated, but the issue has been around for over 25 years."

ANDREW PETERSEN, CEO,
BUSINESS COUNCIL FOR SUSTAINABLE DEVELOPMENT AUSTRALIA

"Australia probably has more options than most, but we don't appreciate that. We need to articulate what some of these alternative situations look like. Part of the energy problem is that we can't describe the transition well enough, to different types of people, for them to buy into it."

PETER CHAMLEY, CHAIR AUSTRALASIA, ARUP

Engineers will be the core ingredient in the recipe for success

Around 70 per cent of global greenhouse gas emissions, according to an analysis by ClimateWorks Australia, come from infrastructure construction and operations. These include power plants, buildings and transport.

Clearly, engineers must be at the centre of change but, at the same time, must themselves learn to change. They must seize the opportunity, be courageous and pick their targets.

Not only must engineers continue to innovate, to recognise best practice from around the globe and retain their status as trusted experts, they must also move away from being "job takers".

Engineers, it was agreed, should work to provide better communication with those outside the field, seek representation on boards and think tanks and collaborate more effectively both within and outside their industry.

Engineers must become trusted advisers and leaders around decisions on infrastructure planning and operation to minimise carbon emissions.

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Define Change

It's easy to agree change is necessary, but more challenging to define what change.

At the roundtable, the experts agreed that change centred around increasing resilience in the face of new environmental threats.

Resilience is defined as actively designing and building products and systems that are hardened to the potential challenges.

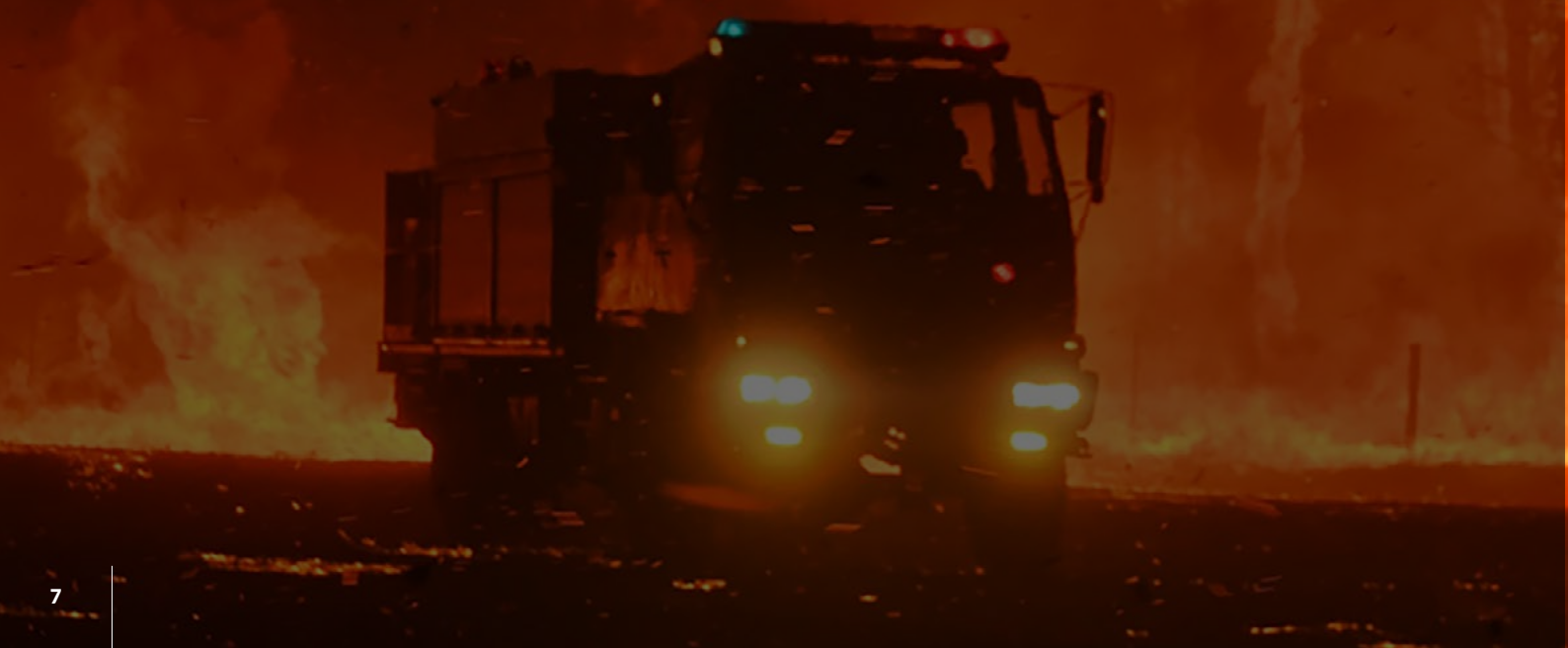
Resilience is important on several levels, from government and industry to organisations and infrastructure, particularly as we confront major events such as bushfires.

Of course, resilience also applies at an individual level, in terms of lifestyle, housing, sense of security and more.

Risk management underpins our profession, but that also needs to change. Our approach to risk must evolve to drive action and collaboration. Vital for the evolution of this approach is a clear understanding of Australia's priority climate change risks.

"A lot of people are asking what is resilience, what's required for that? It's embodied both in the built environment and in people. We need to work out how we progress that, because we will need it. Australia has been a resilient country in the past, but we're going to have to double down on how resilient we are, going forward. We will have to deal with a range of things that we probably haven't anticipated."

DR PETER MAYFIELD, EXECUTIVE DIRECTOR, ENVIRONMENT ENERGY & RESOURCES, CSIRO



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Let science show us the way

Dr Jaci Brown, Director of the CSIRO's Climate Science Centre, explained the opportunities offered by climate science, as well as its limitations.

While it's impossible to say what will be happening in terms of climate on this day 20 years from now, there are several certainties, including increasing temperatures, rising sea levels, changing rainfall patterns and an increase in regularity of extreme weather events.

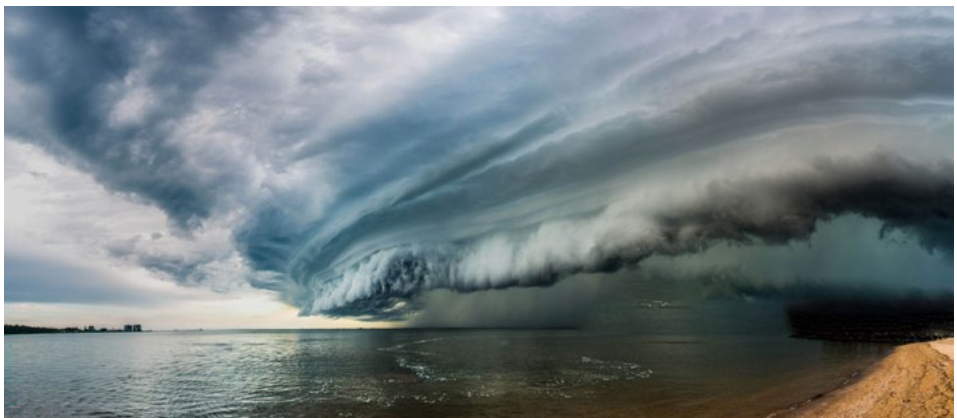
The CSIRO has mapped Australia's climate for the next 100 years and has contributed to other models developed around the globe.

To give these masses of climate data meaning to engineers, Dr Brown outlined a collaborative project between the CSIRO, the Bureau of Meteorology and various universities. It will act as a 'shopping mall' of sorts, for organisations requiring climate data.

What types of 'shops', in this climate data shopping mall, would engineering firms and consultants require, she asked?

"What do you need to know? The Climate Change shopping mall is interconnected. Every shop you visit will be using the same sets of raw data, so you know they can be trusted. Perhaps you want to be one of the shops. Perhaps we could work together, and you could build a shop that owns the offering, and we can supply you with the science behind that. We must be very creative about how we build this. It's not just one solution and it's not just CSIRO."

DR JACI BROWN,
DIRECTOR CLIMATE SCIENCE CENTRE, CSIRO



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"We simply can't keep designing to code. We've already got ageing infrastructure that is not fit for purpose. The reason it is not fit for purpose is because we've designed to minimum standards and things are changing more rapidly than we could possibly imagine. The risk sits with engineers and the liability, long term, is also with engineers."

AINSLEY SIMPSON, CEO INFRASTRUCTURE SUSTAINABILITY COUNCIL OF AUSTRALIA

Recognise three challenges of infrastructure

Climate change affects infrastructure on a number of levels.

New climate extremes will mean some current pieces of infrastructure – low-lying, coastal water treatment plants and networks likely to be affected by rising sea levels, for instance – may no longer be fully fit for purpose. This infrastructure will require re-design and innovative solutions to ensure it is ready for what the future holds.

New builds will be different in at least two ways. They will need to be resilient to the greater climate variations predicted, and have lower carbon emissions embedded in their materials and over their operating life. High performance and advanced designs will contribute to advancing standards.

Along those same lines, the industry must work to reduce the latency in climate/engineering cycles. If, for instance, there is currently a decade between emissions recognition and new code/infrastructure, that latency must be narrowed.

Climate considerations must be integrated from the start of any infrastructure project, with an appreciation of the fact that a climate resilient project, while not necessarily 'best practice' according to current understandings, is a good project.

Go to where the money is

Engineers can, and should, be deeply involved from the earliest moment of infrastructure ideation and planning, rather than accepting a brief once the important decisions have been made.

More importantly, organisations such as Engineers Australia have a responsibility to move beyond the current clients of engineering firms and begin communicating and collaborating with those that provide funding. Once investors begin to demand action on emissions, major change will result.

The example of Australia's big four banks refusing to fund certain types of mining developments was put forward as an example of powerful, climate-first influence. Collaboration on that scale removes the argument, 'If we don't take this job, the next lot will'.

"The changing role of engineers must involve being a part of that conversation where investment happens. People who make investment decisions must understand that the bare minimum will get them so far, but as climate changes they'll be held to a different standard."

LUCIA CADE, BOARD DIRECTOR, ENGINEERS AUSTRALIA

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Engineers Australia must lead

There is a sense that the profession requires strong leadership on the climate change issue, and that leadership must come from Engineers Australia. The single voice for engineers must give trusted advice to governments and should be considered an essential part of the conversation around big issues.

However, the leadership is not only for individuals and organisations in engineering. No organisation or industry acting on its own can possibly create the sort of change that is required to tackle the climate change problem.

Instead there must be powerful collaboration between governments, researchers, educators, membership associations, peak bodies, investors and communities. Engineers Australia will actively seek this collaboration, including with bodies such as the Australian Procurement and Construction Council (APCC) to deliver low-carbon projects and considerations.

Engineers Australia has the power, as pointed out by Business Council for Sustainable Development Australia CEO Andrew Petersen, to directly influence 100,000 members. They will each go on to influence countless others. That's the way real change is created.

"The Engineers Australia board supports having a more impactful voice on issues that impact the community. We have a responsibility to take the lead and engage more closely with the profession. Engineers have an important role to play … we want to move beyond the words and the language to solutions."

CHRIS CHAMPION,
NATIONAL PRESIDENT & BOARD CHAIR,
ENGINEERS AUSTRALIA

See value beyond cost

Much of the decision-making process around engineering projects comes down to cost, which makes sense on a certain level. But what is the cost to a business, to a community, to society or to an economy of a climate-change influenced event?

The economic impact of the summer fires of 2019/20, according to Moody's Analytics, is likely to exceed the $4.4 billion damage of the 2009 Black Saturday bushfires. Already the Federal Government has pledged $2 billion via the National Bushfire Recovery Fund, a figure that is only expected to rise.

Building resilience into a project at what may potentially be a greater cost could save a great deal in a future that involves major weather events. Value discussions must no longer be simply about the cost of the build.

"What's the cost benefit? What are the lost opportunities when we're increasing risks? How can we as engineers use climate science to insert a little bit more detail so it's not an ethereal conversation about coal-fired power stations versus sun capital? How do we bring engineering to a can-do style of conversation and put some parameters around climate cost?"

RAJ ASEERVATHAM,
BOARD DIRECTOR, ENGINEERS AUSTRALIA

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9 Engage the next generation

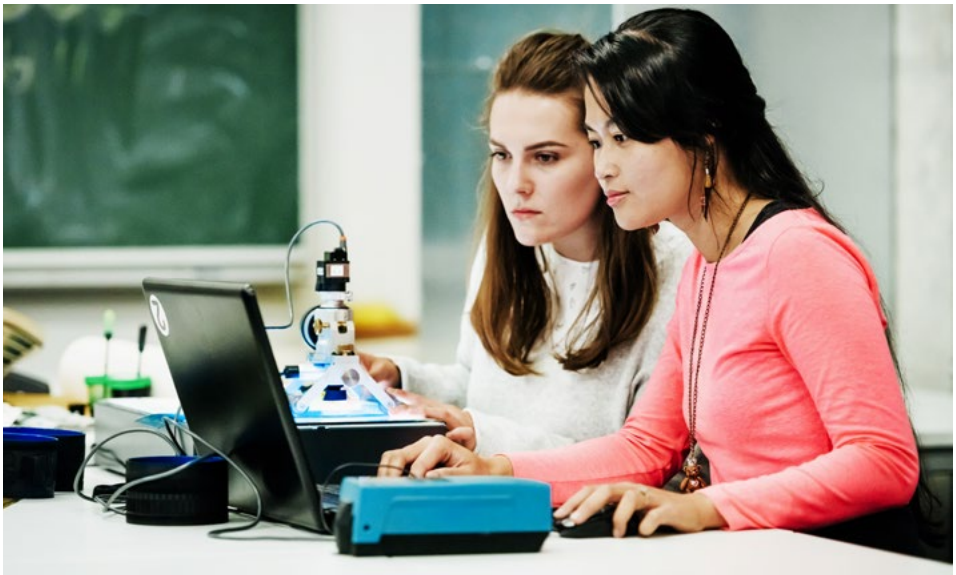
Students of today, educators told us, are looking for more than a career. They're interested in a cause, and in finding meaning and nourishment in the work they do.

Once governments, communities and businesses turn their focus towards solving the planet's greatest challenge, new demands and opportunities for engineers will be evident and an entirely new breed of engineering graduate, interested in taking current solutions even further, will result.

The CSIRO offering [see point 4] will provide a powerful pathway for researchers who wish to remain in the academic arena, providing the industry with innovations that could truly change the world.

"Climate change is this generation's greatest challenge. When I speak with students at universities in an attempt to attract them into the profession, or into our firm, they're looking for a cause. I can think of no greater purpose than this."

TODD BATTLEY, CHIEF EXECUTIVE ANZ, AECOM



Look offshore for great ideas

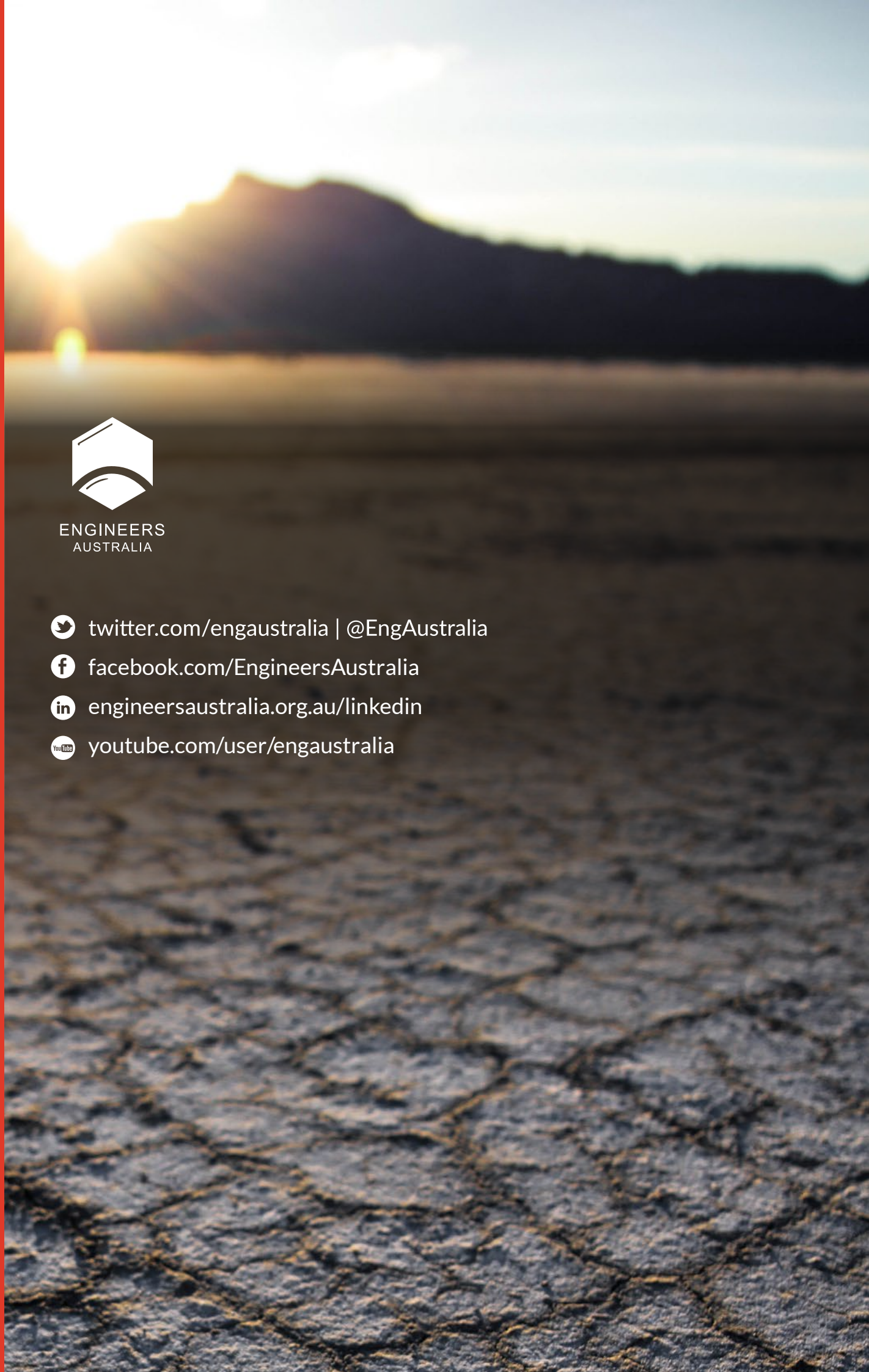
There are astounding success stories in other territories around the globe, such as Germany's move towards sustainable energy sources.

Engineering and other industries in Australia must look beyond our borders, to other countries and other industries, to recognise best practice and then to translate and customise those solutions for our own unique environment.

This applies equally to challenges relating to the environment, engineering, city planning, energy budgeting, infrastructure, organisational management, politics, and more.

"Climate change is the grandest of grand challenges."

DR BRONWYN EVANS, CEO, ENGINEERS AUSTRALIA



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