Climate Change Inquiry
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Mr Darren Cheeseman MP
Chair
Legislative Assembly Environment and Planning Committee
Parliament House
Spring Street
EAST MELBOURNE VIC 3002

Dear Mr Cheeseman

Thank you for inviting CSIRO to contribute to the *Inquiry into Tackling Climate Change in Victorian Communities.*

CSIRO has a large portfolio of work in Victoria including current activities with the Victorian Department of Environment, Land, Water and Planning (DELWP) in relation to climate change mitigation and adaptation activities:

- The Victorian Water and Climate Initiative (VicWaCI) is a partnership between CSIRO, Bureau of Meteorology, University of Melbourne and DELWP. The VicWaCI carries out research into the impact of climate change and climate variability on Victoria's water resources. CSIRO conducts research on climate and hydrological modelling to predict water futures under climate change. These future water projections are used by Victorian water, catchment and environmental agencies, and industry and communities, to plan adaptation to climate change risk.

- CSIRO has partnered with DELWP to conduct the Port Phillip Bay Coastal Hazard Assessment, which aims to understand the environmental effects of climate change along the Port Phillip Bay coastline, to help land managers understand the hazards they may face in future. The project is being led by CSIRO and will assess the extent of three key coastal hazards – inundation, coastal erosion, and groundwater change – under several climate change scenarios.

- As our climate warms the frequency and intensity of bushfire is expected to increase and the need to reduce the risk of catastrophic bushfires by controlled burning of public land competes with the need to avoid the harmful effects of smoke on communities. DELWP funded CSIRO to improve modelling of bushfire smoke emission and transport to support decisions on whether and where to safely conduct planned fuel reduction burns. CSIRO developed and delivered a multi-tiered quantitative smoke and air quality prediction system – AQFx – that has now also been operationalised by the Bureau of Meteorology. This research has led to the adoption of AQFx for fire and land management in Victoria and the recommendation by the Australasian Fire and Emergency Service Authorities Council to adopt AQFx nationally so that exposure to smoke from planned burns can be minimised across Australia.

CSIRO would also like to highlight two specific examples of research that is helping to support communities in responding to climate change:

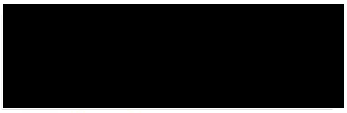
- CSIRO is currently partnered with the Queensland Department of Environment and Science, Clean Growth Choices and six Queensland regional councils on a project to develop for each council a business case and implementation pathway for investment in priority areas to transition the councils to low-carbon economies by 2050.

- More generally, in an adaptation context CSIRO has applied a multi-level systems approach to engagement that promotes shared understanding and alignment of initiatives informed by the values of the players across the various levels. This has been applied in Australian and internationally, working with the range of stakeholders whose engagement and buy-in is critical to addressing the issue at hand in each case. In most cases, climate change is only one of a suite of interdependent challenges stakeholders are grappling with. This is one of the reasons for taking a systems approach in our work.

In addition to the above examples, CSIRO has a comprehensive portfolio of research and development that aims to address the risks and opportunities to Australia posed by climate change. An overview of this research is attached.

Should any of these areas of work be of interest to the Committee, CSIRO would be happy to discuss these further with you or provide further details upon request.

Yours sincerely



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[redacted]

Attachment 1 Overview of CSIRO climate research

ATTACHMENT 1

Overview of CSIRO climate research

CSIRO has a comprehensive portfolio of research and development covering the breadth of interconnecting and complementary science areas needed to manage the risks and opportunities to Australia posed by climate change.

We address three integrated pillars:

- Information (data and knowledge) to support decisions
- Mitigation approaches and novel technologies to reduce emissions
- Adaptation expertise to build climate resilience across all sectors

Our research areas include:

Disaster preparedness and response: Changing the face of disaster risk management through innovation in sharing risk information and revealing and addressing the root causes of vulnerability.

Renewable and low emissions technologies: Reducing customer energy costs and building climate resilient communities by innovating new low carbon, renewable and clean fuel technologies, as well as whole of system integration support.

Climate smart agriculture: Sustainably improving productivity and delivering global food security while reducing agricultural emissions through innovative technologies.

Cities and coasts: Transforming urban and coastal development with new ways to assess whole-of-city carbon footprints, improving building strength and energy efficiency, addressing pressures in the coastal zone, and unlocking new types of collaborations.

Climate science: Observing and diagnosing climate change, to inform decisions and actions across all sectors, and improve our understanding of the climate system's interaction with environmental and human systems.

Climate modelling: Integrating physical, social and economic information using world-leading models to investigate future climate scenarios that underpin adaptation and mitigation plans and policies.

Strategic decision making for transitions: Helping others achieve proactive, strategic transitions by providing deliberate processes for navigating complexity and ambiguity about the future, including ways to draw on future scenarios to create effective adaptation plans.

Capacity building: Building the capacity of the Australian government, neighbouring nations and industry to understand and respond to climate challenges, especially transition risks.

Provision of tailored climate data: Providing authoritative data sets for ongoing research, plus tailoring climate information and data to meet the needs of Australian sectors and communities – from global and national down to regional and even local scales.

Building IQ – smart energy monitoring: Building IQ intelligently alters the operation of a building's HVAC control system according to settings for cost savings, occupant comfort and energy efficiency. Building IQ is an important step in reducing greenhouse gas emissions from built infrastructure.

Bottling sunshine for sustainable exports: We've developed a metal membrane to extract pure hydrogen from ammonia, paving the way for a new clean export market. The thin metal membrane allows hydrogen to pass, while blocking other gases. Australia can use vast energy resources to create exportable ammonia and one day power vehicles and industry around the world.

Making carbon capture viable in Australia: We are working to reduce the cost and improve the efficiency of carbon capture, utilisation and storage so it is a viable option for Australia's energy future. We're focused on deploying large-scale demonstration projects that enable substantial reductions in emissions and provide a pathway for industry to adopt the technologies at commercial scale.

Exporting Australian climate expertise: Can Tho, Vietnam, and Makassar, Indonesia are at risk of coastal inundation and loss of fresh water supplies. CSIRO and the Australian Government's Research for Development Alliance worked in close collaboration with stakeholder to build alternative future scenarios using integrated urban water management systems. These scenarios are used by international policy makers to assess and guide investment options.

FutureFeed…a sea-based land solution: We're working on a seaweed-based feed additive called FutureFeed that significantly reduces their methane emissions and has potential to increase livestock productivity.

Spark…predicting bushfire spread: Bushfires are complex processes, making it difficult to accurately predict their progress across the landscape, so we have developed Spark, which can model bushfire spread to help plan for and manage bushfires.

Regional Weather and Climate Guides to help build farm business resilience: The Bureau of Meteorology, FarmLink and CSIRO have partnered to provide farmers with practical guides that will include information such as the reliability of rainfall, likelihood, severity and duration of climate extremes like droughts, floods, and heatwaves, as well as the timing of key weather events like the autumn break, wet season onset and retreat, and the average date of first and last frost. The guides will help farmers make decisions on crop planting, stocking levels and managing water storages. The guides are being developed for National Resource Management regions across Australia by the end of 2019.

Weather Together – providing farmers with personalised local weather forecasts: In an Australian breakthrough, we are working with the Bureau of Meteorology to transform weather forecast data and tailor it for farmers and agribusiness in a way they've never had before. CSIRO has developed a complex algorithm to transform the Bureau's weather forecasts so they are more accurate for specific locations. This is done by ingesting data from individual on-farm weather stations and using this to continually 'learn' how the forecast differs to what farmers experience on their farms.

Helping the Great Barrier Reef resist, repair and recover: The Reef Restoration and Adaptation Program brings together Australia's leading experts to help preserve and restore the Great Barrier Reef. Despite being one of the best-managed reef ecosystems in the world, the Reef is under extreme pressure with increasing sea temperatures leading to coral bleaching, ocean acidification and increasingly frequent and severe weather events. The frequency and severity of these impacts is being exacerbated by climate change. In partnership with others we are looking at how we can help the Reef adapt and build resilience.

Drought tolerant crops: For decades, CSIRO has been breeding drought tolerant and water efficient crop varieties. Using Delta Carbon Technology to identify plants that use water more efficiently, CSIRO has bred the wheat variety "Drysdale" that yields at least five per cent more than other varieties under dry conditions. CSIRO is also helping farmers to manage water resources on their farms by developing user-friendly decision support tools. We are researching different crop and pasture management techniques that can best conserve water in different regions.

Climate information for the electricity sector: CSIRO is a delivery partner alongside the Bureau of Meteorology and the Australian Energy Market Operator (AEMO) on a project that will improve the reliability and resilience of the National Electricity Market (NEM) to the risks from climate change and associated extreme weather. The *Electricity Sector Climate Information* project will provide useable science-based climate change data and information tailored to the needs of AEMO risk managers to inform decision-making and support long-term climate risk planning and management for the NEM.