2026-2035 Decadal Plan for Australian Climate Predictions

Terms of Reference

Objective

This project will deliver a 2026-2035 decadal plan for Australian Climate Predictions that will consider gaps, enablers, and barriers to the climate science workflow. Targets and success indicators will be identified across three-, five-, and ten-year timelines.

The plan aims to examine how global and regional climate projections can be enhanced through Australian science (and international collaborations) to maintain the associated economic, social, and environmental benefits. Enabling a national uplift in capability and clarity around ambition is intended, by providing discipline strategic planning and coherence.

Key audiences include the Federal Government across relevant departments including Education, DCEE and Agriculture, and the Australian Research Council.

Scope

The National Committee for Earth System Science will produce a report that:

1. **Assesses** the current capabilities in the area against the six key drivers of the climate science workflow:
    a. Critical observed data,
    b. Process-level analysis,
    c. Scientific understanding,
    d. Process-based description built into models,
    e. Development of fit-for-purpose models, and
    f. Robust projections.
2. **Identifies** critical gaps in capabilities against the six key drivers of the climate science workflow for the delivery of enhanced global and regional predictions using Earth system and climate system models.
3. **Identifies** international trends and initiatives in the area over the period 2026-2035.
4. **Provides** strategies, recommendations, and implementation priorities and resources required to ensure robust global and regional projections using Earth system and climate system models.

IN-SCOPE

Not all of climate science is in-scope; only matters that directly align with ensuring climate models are more fit for purpose, including the relevant science for understanding and projections involving physical climate and earth system models.

Key areas of science to be considered, along with relevant infrastructure, resources, and workforce, include:

- Atmospheric science (processes at high resolution, chemistry, and aerosols)
- Land
- Hydrology
- Ocean processes
- Ice sheets and sea level
- Ocean biogeochemistry
- Boundary layer
- Terrestrial carbon and fire
- Urban
- Climate modelling processes (e.g. CMIP)
- High-performance computing (HPC) and high-performance data (HPD)
- Data technology and data systems
- Machine learning/artificial intelligence
- Climate science context and policy

For each key area, priorities, mid-term targets, crucial gaps, and treats/limitations, and how to manage what is not doable will be considered. Work on each key area should emphasise substance over style, producing strong arguments (preferring quantitative arguments over qualitative), meaningful statistics, telling examples and comprehensive lists. Figures and tables are advisable where possible.

OUT-OF-SCOPE

- Numerical weather prediction and seasonal prediction.
- Climate Impacts, adaptation, and resilience.
- Policy advice or policy recommendations, explicit or implied.
- Broader stakeholder perspectives.
- Decadal climate prediction [to be confirmed].

Membership

The National Committee for Earth System Science is a consensus and skills-based body. Its membership, tabulated below, comprises experts from key research disciplines, who can speak with authority on behalf of their discipline rather than their organisation. The members are senior people who are capable of significant contributions in a collegiate and collaborative manner.

Professor Andy Pitman FAA is chair of the NCESS.

NAME	AFFILIATION
Professor Andy Pitman FAA	ARC Centre of Excellence for Climate Extremes (UNSW)
Professor Julie Arblaster	Monash University
Dr Pep Canadell	CSIRO

Dr John Finnegan FAA	CSIRO
Dr Will Howard	Climate Change Authority
Dr Chloe Mackallah	CSIRO
Dr Felicity McCormack	Monash University
Dr Negin Nazarian	University of NSW
Adjunct Associate Professor Christoph Ruddiger	Bureau of Meteorology
Dr Claire Vincent	University of Melbourne
Dr Jan Zika	University of NSW

Key organisations not represented within NCESS membership will be engaged at various stages of the project, including Australian Earth System Simulator National Research Infrastructure (ACCESS NRI) and National Computational Infrastructure (NCI).

Meetings

- NCESS will meet via videoconference in November 2023, followed by two workshops in February and April 2024.
- Meetings will be minuted.
- NCESS may conduct business out-of-session.

Proposed timeline

PHASE	ACTIVITIES	DATE
Planning	Launch decadal plan public website Finalise Budget and timeline Set terms of reference for decadal plan	October 2023
Scoping	Research and logistics for scoping meeting Scoping meeting with NCESS Develop workplan and structure	November 2023
Consulting	NCESS members undertake targeted consultation with interest groups in scientific community 2-day NCESS National Workshop in February 2024 to consolidate inputs, determine and prioritise outcomes Prepare draft based on workshop output	November 2023 - February 2024
Drafting	Exposure draft socialised with selected experts Submit draft to Academy Council for comment Prepare final draft at NCESS April 2024 Workshop	March - April 2024
Publishing	Review of final draft Format and design final plan documentation Submit plan to Academy Council for endorsement Pre-publication activities Launch of Decadal Plan	May-June 2024

Governance/Responsibilities

The NCESS:

- **Advises** on strategic direction for the project.
- **Provides** expert input to project specifics where required.
- **Oversees** the drafting of the decadal plan.
- **Reviews** documentation and public presentation materials produced by the project.
- **Recommends** project materials to the Academy's Executive Committee of Council for endorsement.

Reporting and review

NCESS led by Prof Andy Pitman, will report to the Executive Committee of the Academy. Members of the NCESS are obliged to disclose any conflicts of interest to the Chair as appropriate, with standard format of disclosures to be published. All members of the NCESS are required to abide by the Academy's code of conduct.

Secretariat

National Committees for Science will provide secretariat support to the NCESS for the duration of the project. Project management, research and analysis will be led by Meaghan Dzundza, Manager of the secretariat, for this project. The NCESS will also work with the media and communications team of the secretariat as part of the editing, layout and design process, as well as media and video production.