



## **Concept Note: Cryosphere Pavilion at COP-26**

### **I. Background**

COP-26 represents a key juncture as countries finalize their first formal revisions of Nationally Determined Contributions (NDCs) since the 2015 signing of the Paris Agreement.

Cryosphere and climate science makes clear that failure to achieve emissions reductions consistent with the Paris goals will result in “overshoot” of the 1.5°C goal and worst-case, even 2°C; and that such “overshoot” scenarios can trigger cryosphere feedbacks and resulting global-scale losses. The IPCC Special Report on 1.5°C of Warming made clear that staying within that temperature, with no or limited overshoot, was not physically possible without carbon neutrality by 2050 and 50% average global reductions in CO<sub>2</sub> emissions by 2030.

Very few countries are on track to meet that 2030 goal; and nothing makes the necessity of that goal more concrete than the cryosphere’s response to overshoot. These may be rapid and – more seriously -- to some degree irreversible. This is the case for glaciers and snow (losses persisting for many centuries, with re-growth at best a few percent per decade); sea-level rise from melting ice sheets (rising sea levels for centuries to thousands of years, with potential thresholds around 1.5-2°C for at least parts of Greenland and Antarctica); polar and high-latitude ocean acidification (50-70,000 years based on peak CO<sub>2</sub> concentrations); and permafrost (emissions as CO<sub>2</sub> and methane essentially permanent, and persisting for one-two centuries).

Because of the importance of as ambitious 2030 NDCs as possible, the COP-26 Cryosphere Pavilion will focus on the implications of overshoot in terms of both CO<sub>2</sub> emissions and temperature; as well as the path forwards in terms of achieving the needed 50% reductions by both governments, and other stakeholders.

Chile, as COP-25 President is the nearest Antarctic Presidency; and COP-26, with its location in Glasgow is actually the nearest Arctic COP; with the UK, as COP-26 President being a leading seat of research in both polar regions. Both countries also have mountain cryosphere and economic interest in protecting their near-polar seas. The release of the first sections of the IPCC Sixth Assessment, AR6 represents an opportunity to raise up these results; and ICCI together with a consortium of cryosphere researchers plans to release the first “State of the Global Cryosphere” report, meant to be an annual benchmarking exercise through 2030.

The process aims to generate both greater political level and public support for climate action plans consistent with a 1.5°C goal, incorporated into 2030 NDCs specifically to prevent cryosphere collapse and irreversible feedbacks.

## II. Project Summary

### 1. Overall Objective

The Pavilion will build on the “trial run” of the first Cryosphere Pavilion at COP-25 in Madrid, organized extremely quickly and with limited resources. The COP-26 Pavilion is meant to more fully realize the intent of this unique space, providing a place for permanent exhibits, cultural events, expert conferences and ministerial-level events.

Due to limited participation as a result of the pandemic, the Cryosphere Pavilion will also have a strong virtual element, connecting the COP with policymakers, scientists and the general public worldwide. The goal again however is not so much cryosphere science alone, but motivation of more ambitious and urgent emission reductions during the COP negotiation process; due to greater understanding of this physical reality: the simple melting point between ice, and liquid water.

### 2. Main Activities

**a. Specific Focus Days and Side Events on Key Topics:** The program of activities of the Cryosphere Pavilion will include specific focus days for each of the following topics, with targeted side events (nine, 90-minute slots per day), including ministerial-level speeches and strong Youth participation. In addition to livestreams and the ability to pose written questions, the Pavilion will also seek to partner with various academic institutions to provide Pavilion Hubs: dedicated spaces with strong two-way connections where, on some or all days, students and community members can gather to view events and interact with presenters live. We plan for at least one of these Hubs to be located in one Arctic and one mountain indigenous region.

- **How to Avert Overshoot: Pathways to Emissions Reductions**

*The IPCC SR1.5 has been joined by more recent papers and research, including the IEA report, work by Climate Analytics and annual updates of the Emissions Gap report. This day will focus on those pathways as feasible options to prevent global impacts from cryosphere, though with a narrowing window.*

- **IPCC Day: Working Group I: The Physical Science Basis (Sixth Assessment Report)**

*The Cryosphere Pavilion has offered to host presentations from AR6, the IPCC Report to be released in July/August, turning over the entire Pavilion to the IPCC for an entire “IPCC” day.*

- **Snow and Mountain Glaciers: Centuries of Impacts on Water Resources**

*Mid-latitude glaciers suffer nearly total loss at overshoot above 2 C°, but preserve some basis for re-growth, and restoration of water and other ecosystem services at 1.5 C°, though this will take many centuries. The Himalayan region and its vital water towers for 2.5 billion people preserve about two-thirds of their glaciers without overshoot of 1.5 C°.*

- **Polar Oceans: Extinctions and Long-tailed Legacy of Acidification, Warming and Freshening**

*Polar oceans and high latitude seas already show fisheries and shell impacts today, because cold water acidifies more quickly. Those impacts will be greater still with overshoot of CO2 concentrations above 450ppm, which with current growth of 3ppm annually will be breached around 2030. Warming, freshening and invasion by low latitude species all only add stress.*

- **Antarctica and Greenland: Overshoot Thresholds for 10+ Meters of Sea-level Rise**  
*The WAIS and its collapse will cause 4-6 meters of SLR over time, and may already have passed that point even today; but chances of slowing or preventing that collapse are far better without overshoot of 1.5 C°. Recent 2021 research has found thresholds of irreversible collapse on both Antarctica and Greenland around 2°C. It is imperative that policy makers understand the long-term loss and damage that will result from massive committed SLR.*
- **Permafrost: Centuries of Carbon Emissions from Overshoot**  
*Permafrost carbon emissions already drive some degree of global warming. Those emissions are increasing: methane concentrations spiked during the Arctic heat waves of 2020, and evidence is growing that permafrost was a primary reason. Emissions today are already on the order of Japan's; but overshoot will introduce a "permafrost contribution" closer to that of China or the U.S. today, and lasting 100-200 years, necessitating negative emissions to offset these.*
- **Absent Arctic Summer Sea Ice: Global Feedbacks**  
*Ice-free summers will still occur within the 1.5 C° limit; but with even slight overshoot to 1.7°C, this is projected to become an annual phenomenon. Increasing ice-free summer conditions will cause global feedbacks, including increased permafrost thaw, rising Greenland ice loss and sea-level rise; and damage to Arctic food chains dependent on thick, multi-year ice.*

**b. Permanent Exhibition:** The Cryosphere Pavilion will have several permanent exhibitions focusing on these key globally impactful dynamics that will kick in with overshoot of Paris goals:

- Polar ice sheets and sea-level rise
- Polar and near-polar ocean acidification/ warming/ freshening
- Mountain glaciers and snow
- Arctic sea ice
- Permafrost thaw and carbon emissions
- 1.5 C° pathways and national-level examples, including that of the UK illustrating how 50% average global reductions by 2030 are achievable in concrete terms

In addition, the Pavilion will host circulating cultural exhibits from various cryosphere regions, including from Scotland and Wales.

**c. Evening Cultural Events:** The Cryosphere Pavilion will host nightly cultural events, similar to and perhaps paired with those at the Pacific Pavilion with a "Cryosphere Cèllidh" fusing Gaelic music with the traditions of other cryosphere regions; providing an opportunity for both virtual viewing, and accredited participants to mingle and find some respite from the negotiations.

**d. Early Career Scientist Climate Internships:** The COP-25 Pavilion hosted 5 "early career scientists" (doctoral and post-doc level) to staff the Pavilion: introducing speakers, answering questions about the exhibits to make the science more accessible, and importantly, also providing them an inside view of a COP and negotiations to further inform their scientific careers (and perhaps encourage some to become more engaged in government policy work, such as AAAS placements in the U.S.). Accreditations permitting, the COP-26 Pavilion would hope to expand this program, and provide not only housing as in Madrid, but travel to Glasgow to allow greater and more global participation; adding to the strong Youth presence at the Pavilion.

### 3. Key Partners and Support

The International Cryosphere Climate Initiative (ICCI) will again coordinate Pavilion activities and exhibits, in strong cooperation with various partners, including lead organizing partners for the various Focus Days; with a call for side event applications to begin in early June. We seek diverse and strong support from a variety of government, multilateral, academic and private foundation partners, both for the Pavilion itself and in support of its programme. The following currently are engaged, but we seek even more partners; whether political, scientific and/or financial. Government, academic and other financial sponsors of the Pavilion will be offered space to exhibit about their programs and activities.

- **Countries/Multilateral:** Nordic Council of Ministers, Switzerland
- **Academic, International Organization and Private Foundations:** Bolin Centre for Climate Research/Stockholm University, Bristol University Glaciology Centre (UK), Grantham Institute at Imperial College (UK), University of Massachusetts Amherst, Climate Analytics (Germany), Plymouth National Laboratory (UK), Antarctic Research Centre, University of Wellington (New Zealand), National Snow and Ice Data Center (NSIDC, U.S.)

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