

IIR WORKING GROUP

LIFE CYCLE CLIMATE PERFORMANCE GUIDELINE UPDATE (LCCP2)

Led by IIR Commission B1 with Commissions B2, E2

TERMS OF REFERENCE

1. INTRODUCTION

In accordance with Article XIX of the International Agreement concerning the IIR and articles 15 to 18 of the Internal Regulations of the Scientific Council of the IIR, the setting up of a Working Group (WG) is proposed. The following Terms of Reference (ToR) further define the role of the WG.

2. BACKGROUND

According to the UNEP's Global Cooling Watch 2025, global demand for refrigeration could more than triple by 2050, which would almost double emissions over 2022 levels ¹.

In response to global warming concerns, the IIR has been advocating environmentally friendly, safe, energy-efficient and cost-effective design, operation and end-of-life management of refrigeration and air-conditioning systems. As part of these efforts, the IIR released a *Guideline for Life Cycle Climate Performance* published in January 2016, under the coordination of Prof. Yunho Hwang (B1, USA).

Life Cycle Climate Performance (LCCP) evaluation is a cradle to grave analysis of a system which includes both direct emissions and indirect emissions of a system. Direct emissions include all refrigerant leaking during the lifetime of the system. Indirect emissions include total energy consumption and emissions from manufacturing and recycling of the components. The IIR LCCP guide published in 2016 provided:

- Detailed explanation of calculation process
- Recommended traceable data sources for GWP values, leakage rates, manufacturing emissions rates, recycling emissions rates
- Recommended traceable data sources for weather data, electricity generation rates
- Recommended standards for energy consumption calculation

¹ United Nations Environment Programme (2025). Global Cooling Watch 2025: The free degrees: How sustainable, passive-first cooling can save lives, money and food. Nairobi. <https://www.unep.org/resources/report/global-cooling-watch-2025>

- Comparison to TEWI
- Available LCCP calculation tools
- Residential heat pump sample problem

Almost a decade later, it is imperative to form a working group, hereafter called “LCCP2 WG”, to revise this important guideline, for use by decision makers and refrigeration stakeholders.

3. SCOPE, AIM & OBJECTIVES

3.1. Scope

Any stationary air conditioning, heat pumping and refrigeration systems.

3.2. Aim

To update the LCCP evaluation methodology applicable for stationary air conditioning, heat pumping and refrigeration systems.

The IIR LCCP guide provides a harmonised method to calculate the LCCP for all types of stationary air conditioning, heat pumping and refrigeration systems. This guide aims to provide designers, facility operators, manufacturers and policy makers a way to effectively evaluate and compare the environmental impact of different systems over the course of their lifetimes.

3.3. Objectives

- Review and update assumptions and baseline reference data
- Update calculations to include emissions due to material acquisition
- Update reference data such as GWP and emission values based on latest scientific information
- Clarify emission factors to include boundary conditions such as emissions due to upstream activities
- Expand coverage of equipment, refrigerants, and materials
- Include support for other energy standards and regions; perhaps representative climate regions
- Balance calculation complexity with reasonable ease of use
- Provide example calculations in the form of spreadsheets
- Provide an outlook on Life Cycle Assessment to capture environmental impacts beyond climate change
- Conduct outreach activities such as webinars and presentations at technical events to improve visibility and promotion

4. WORK PLAN OF THE WORKING GROUP

Indicative timeline: February 2026 – August 2027

The working group shall strive to meet once per quarter at minimum

A draft of the 2nd edition of the IIR Guideline for Life Cycle Climate Performance will be presented at ICR2027 in Seoul.

5. INVOLVEMENT OF IIR COMMISSIONS

Lead Commission: Commission B1

Cooperating Commissions: B2, E2

6. MEMBERSHIP

LCCP2 WG members are expected be either Commission members from IIR, private members or representatives of corporate members of the IIR with a technical expertise enabling them to contribute to the work of the WG.

7. CHAIRMAN AND BUREAU

Chair: Vikrant C. Aute

Vice-Chair: Christian Vering (Junior member, E2)

Observer: Yunho Hwang (Honorary member B1)

Secretariat: Monique Baha (IIR STID), Francesco Fabris (IIR STID) and Souhir Hammami (IIR STID Director).

Publicity and Communications: Souhir Hammami (IIR STID Director).

8. WEBPAGE

A webpage will be hosted on the IIR website to disseminate relevant information and to promote the activities of the Working Group.

9. DOCUMENTS

Working documents will be held on a MS Team site.