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Sustainability Strategy for the Cool Copper Collider

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In this talk, we will discuss the studies presented in PRX ENERGY 2, 047001, where the carbon impact of the Cool Copper Collider (C^3), a proposed e^+e^- linear collider operated at 250 and 550 GeV center-of-mass energies, is evaluated. We will introduce several strategies that could be utilized to reduce the power needs for C^3 without modifications in the ultimate physics reach. We will also propose a metric to evaluate the carbon costs of Higgs factories, balancing physics output, energy needs, and carbon footprint for both construction and operation, and we will present a comparison of C^3 with other Higgs factory proposals –ILC, CLIC, FCC-ee and CEPC –within this framework. We conclude that the compact 8 km footprint and the possibility for cut-and-cover construction make C^3 a compelling option for a sustainable Higgs factory. More broadly, the developed methodology serves as a starting point for evaluating and minimizing the environmental impact of future colliders without compromising their physics potential.

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