



EcoCompute2024

April 25 - 26
Munich, Germany

SPONSOR IEEE TECHNOLOGY
CENTER *for Climate*

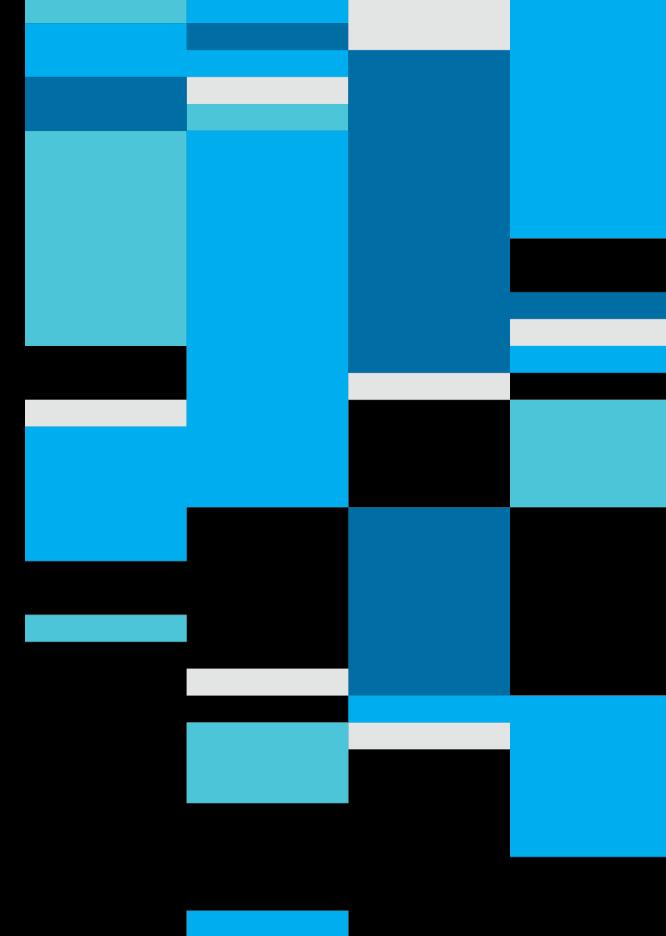
Silver

IEEE Technology Center for Climate

Innovation, Collaboration, Sustainability

EcoCompute Conference 2024

Welcome remarks



Munich, April 25, 2024

Irene Kitsara

European Standardization Initiatives Director, IEEE SA

IEEE Technology Center for Climate (ITCC), Vienna

The IEEE Technology Center for Climate - ITCC

The screenshot shows the homepage of the IEEE Technology Center for Climate. At the top, there's a navigation bar with links to IEEE.org, IEEE Xplore Digital Library, IEEE Standards, IEEE Spectrum, and More Sites. The IEEE logo is in the top right. Below the navigation is a main header with "IEEE TECHNOLOGY CENTER *for Climate*". To the right of this are "About", "Themes", "Partners", "News", "Blog", and "Engage With Us". A dropdown menu under "Themes" lists: Electrification, Frontier Technologies for Climate, Green Digital Transformation, Skills for Sustainability, Circular Economy, and Technology and environmental assessment. Below the header, a large banner features the text "Innovation, Collaboration, Sustainability." and a subtext "We drive global innovation through targeted collaboration and knowledge sharing." with a "Learn More" button. To the right of the banner is a video player showing a person speaking, with a "Unmute" button visible.

Featured

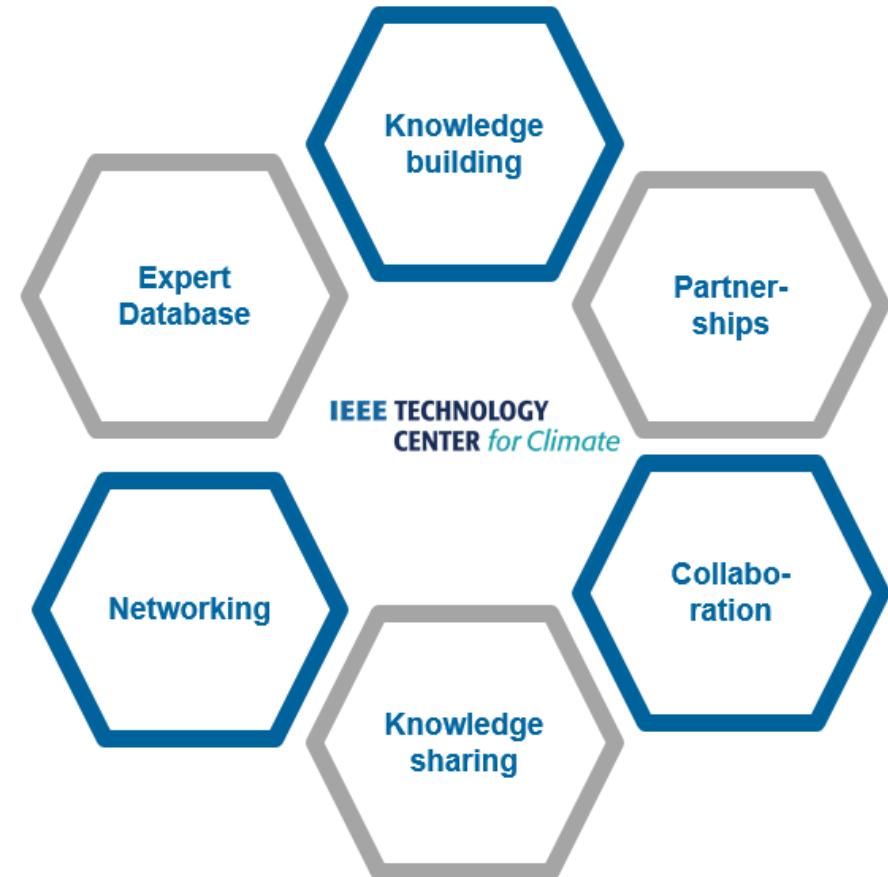


NEWS
ITCC participates in IEEE Young Professionals event "Navigating the Sustainable Computing and AI Landscape with IEEE Trailblazers"



NEWS
Navigating the Circular Economy With Natalia Lopez, PwC

21 MARCH 2024

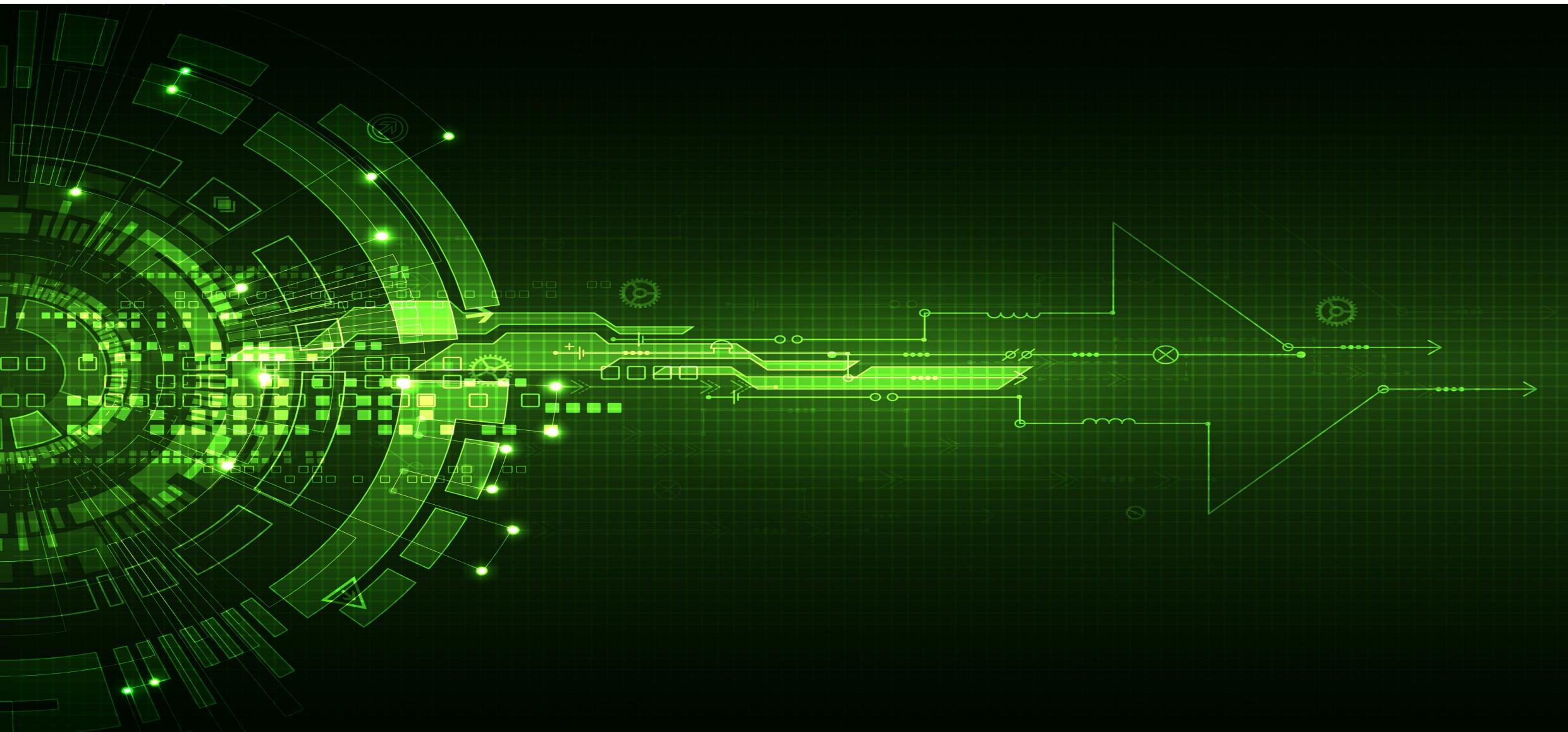


itcc.ieee.org



+ everything/
everywhere

From Digital to Green Digital Transformation



Sustainability by...

- Design/default
(part of optimization)
- Need:
 - Regulation
 - Reputation
- Hardware
- Software
- Infrastructure

SUSTAINABILITY
∞
DIGITALIZATION

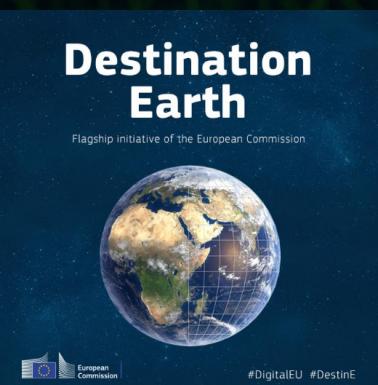


Frontier tech and digital solutions to tackle SDGs

SUSTAINABLE DEVELOPMENT GOALS



Computing as part of the solution



Digital Twin for climate modeling and monitoring



Smart Forestry



Precision Agriculture



Energy efficiency and resource optimization



Urban modelling (traffic/parking optimization, drone delivery, waste management)



Computing as part of the problem

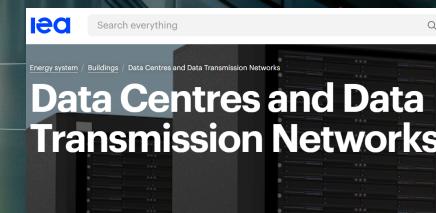
- Increased digitalization and use of AI (GenAI)
- Increased volume of data generated, processed and stored (data centers and cloud solutions)
- Energy-intensive endeavors = more emissions

Energy:

Data centers: in 2021 they used up to 1.3% of the electricity consumption worldwide

Training some popular LLM models: 5x lifetime emissions of an average car (University of Massachusetts study)

Google: ML 15% of overall energy consumption (2019-2022)

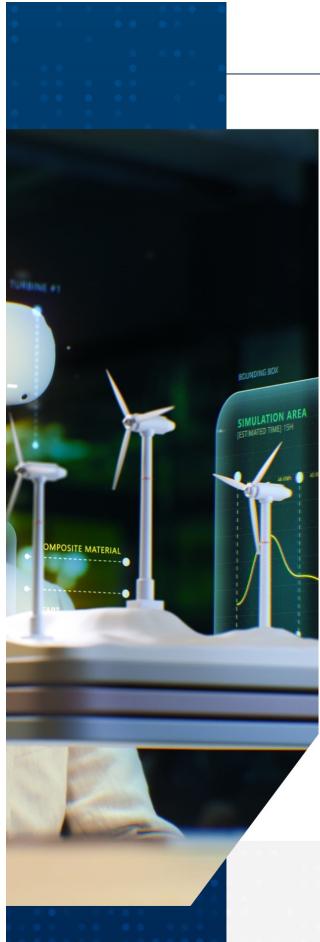


OECD publishing

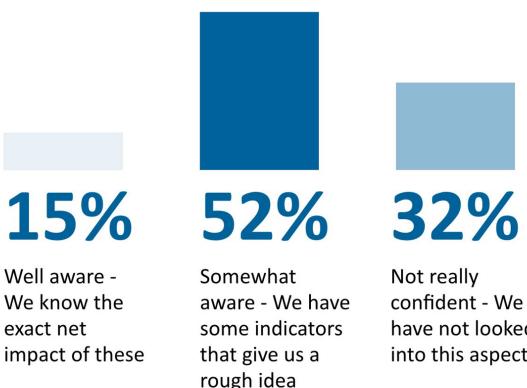
MEASURING THE
ENVIRONMENTAL
IMPACTS OF ARTIFICIAL
INTELLIGENCE COMPUTE
AND APPLICATIONS
THE AI FOOTPRINT

OECD DIGITAL ECONOMY
PAPERS
November 2022 No. 341

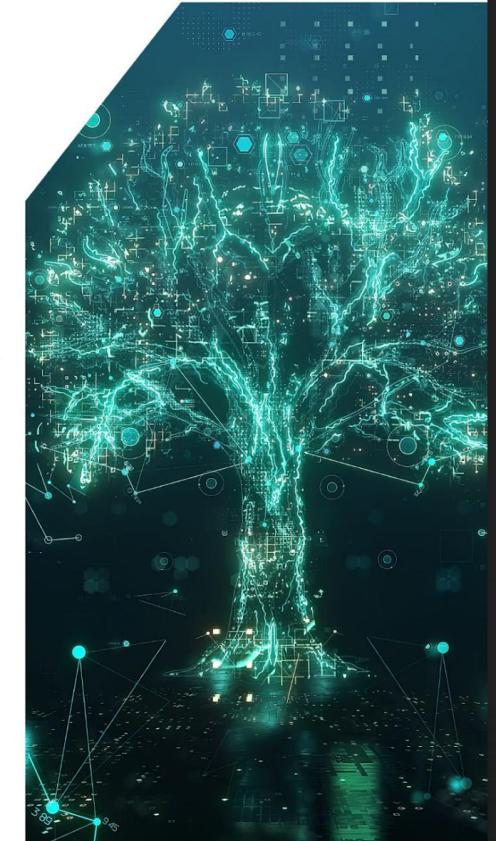
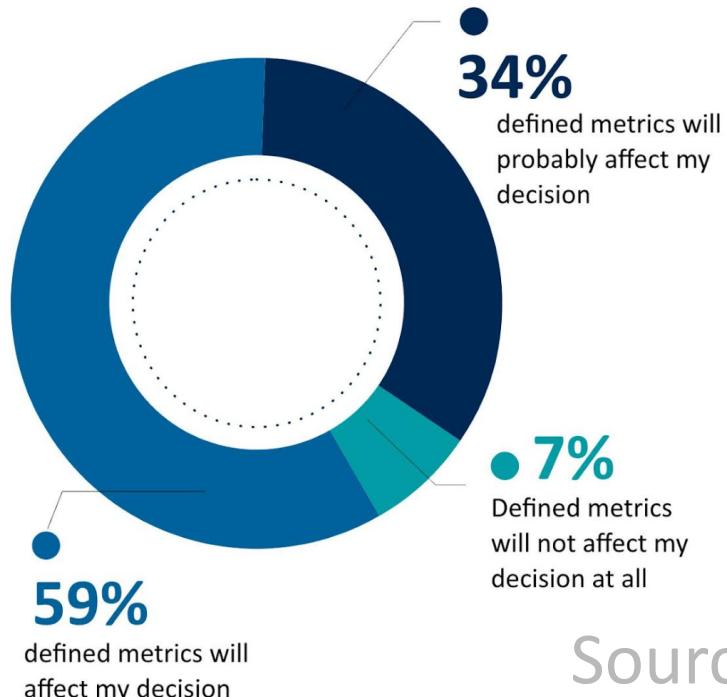
Computing as part of the problem: (ITCC survey)



Awareness about the **resource consumption** of frontier tech in organizations could be improved with nearly a third of respondents

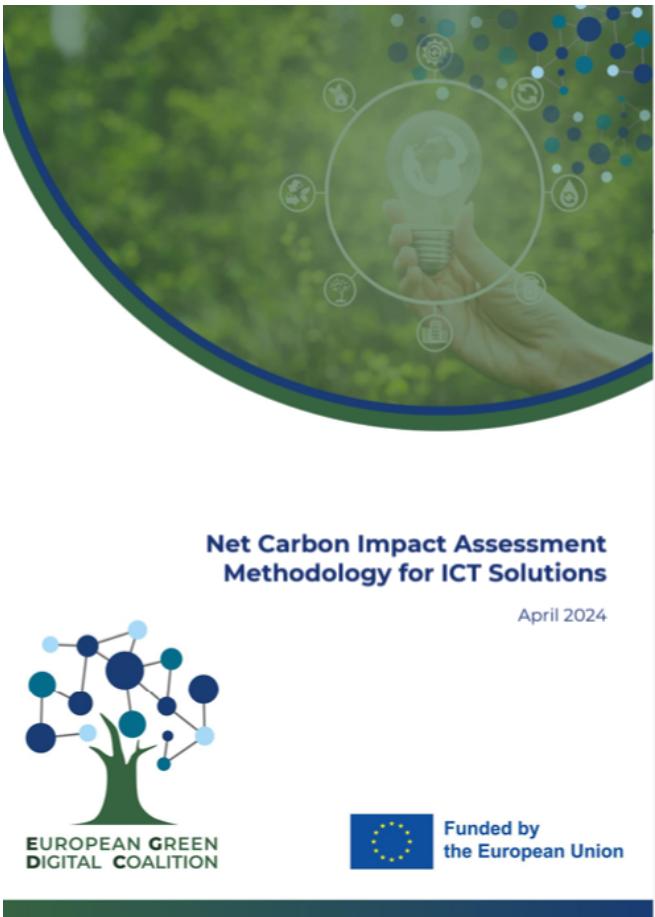


And clear **measurement** on the **carbon footprint** of frontier tech will inform adoption decisions



Source: ITCC Survey
(225 respondents)

ICT Net impact assessment



<https://www.greendigitalcoalition.eu/assets/uploads/2024/04/EGDC-Net-Carbon-Impact-Assessment-Methodology-for-ICT-Solutions.pdf>

What do we need?

Collecting more data on emissions and impact, beyond CO₂ / GHG emissions

Establish consistent and broadly used standards for holistic environmental impact assessment, emission calculations and sustainability

Enable deployment of technology and scaling up across the world for more inclusive and fair use of promising technologies and applications



Develop methodologies to assess the net impact of digital solutions

Challenge: AI embedded in solutions and often combined with other technologies

Green digital skills/ programming skills?
Responsibility for developing and selecting greener options – at which level?

Beyond energy efficiency – explore aspects like regeneration, biodiversity etc – towards more human-centric, responsible solutions

What else?

Embed more systems and design thinking in the identification of solutions and impact calculations

Standards, guidelines, calculation methodologies...

Towards a **sustainable and ethical AI by design** → adding a sustainability dimension to sociotechnical AI frameworks



Increased coordination among partnerships and initiatives – ecosystem approach and cooperation

Let's join forces

- IEEE: home of design and systems thinking, value-based engineering, multi-disciplinary global communities and technical/sociotechnical standards
- Standardization work and community building:
 - Ongoing IEEE SA initiatives and WG
 - Metrics for environmental impact of AI (new)
 - Sustainable AI lifecycles/ecosystems (upcoming)
 - Sustainable Supply Chains (upcoming)
 - what else?
- Learning, knowledge exchange and co-creation



Towards sustainable computing – what is next?



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