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EcoCompute Conference 2024
Welcome remarks

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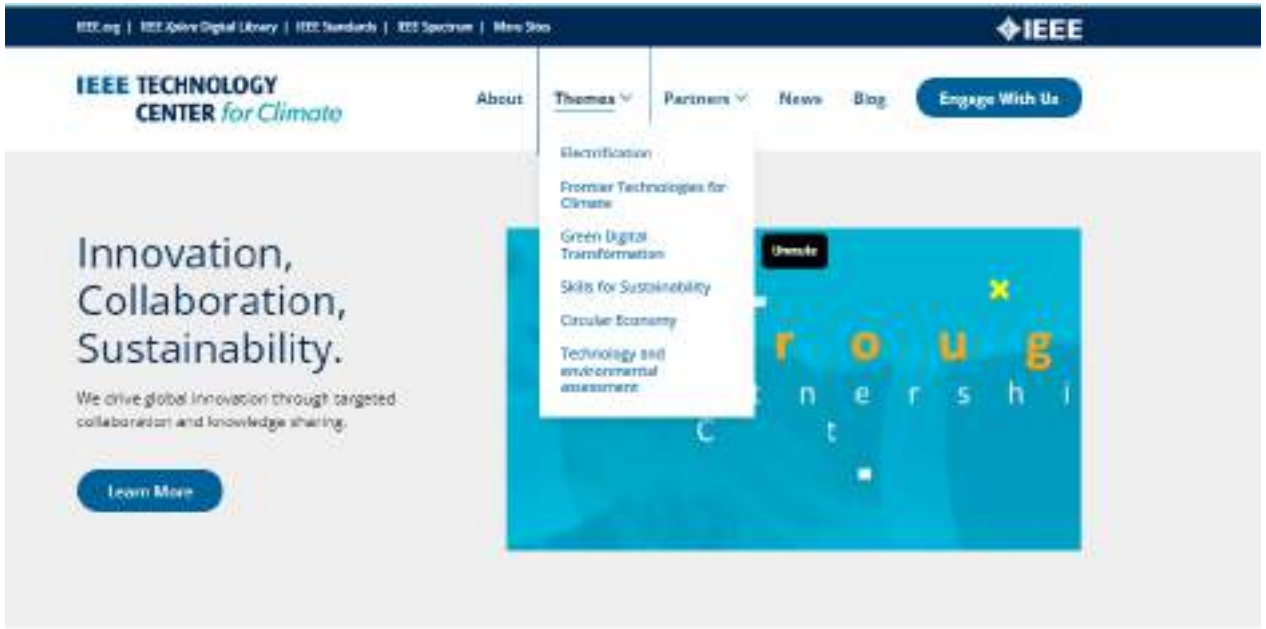
The IEEE Technology Center for Climate - ITCC



itcc.ieee.org

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+ everything/
everywhere

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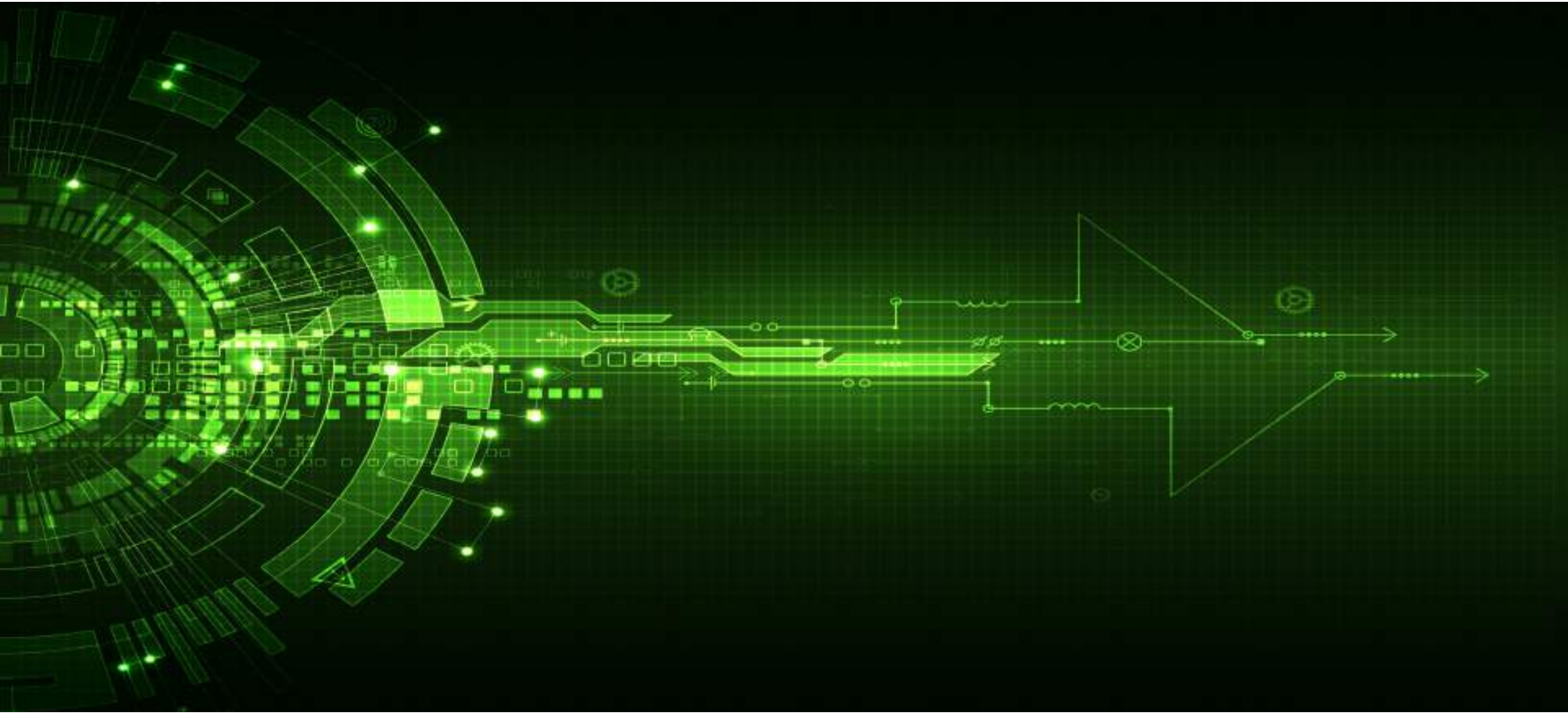
From Digital to Green Digital Transformation



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Sustainability by…

- Design/default (part of optimization)

- Need:
  - Regulation
  - Reputation

- Hardware
- Software
- Infrastructure

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Frontier tech and digital solutions to tackle SDGs

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Computing as part of the solution

Digital Twin for climate modeling and monitoring

Smart Forestry

Precision Agriculture

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

Energy efficiency and resource optimization

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Computing as part of the problem

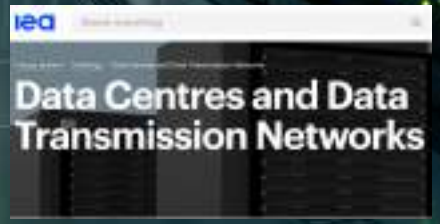
- Increased digitalization and use of AI (GenAI)
- Increased volume of data generated, processed and stored (data centers and cloud solutions)
- Energy-intensive endeavors = more emissions

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)



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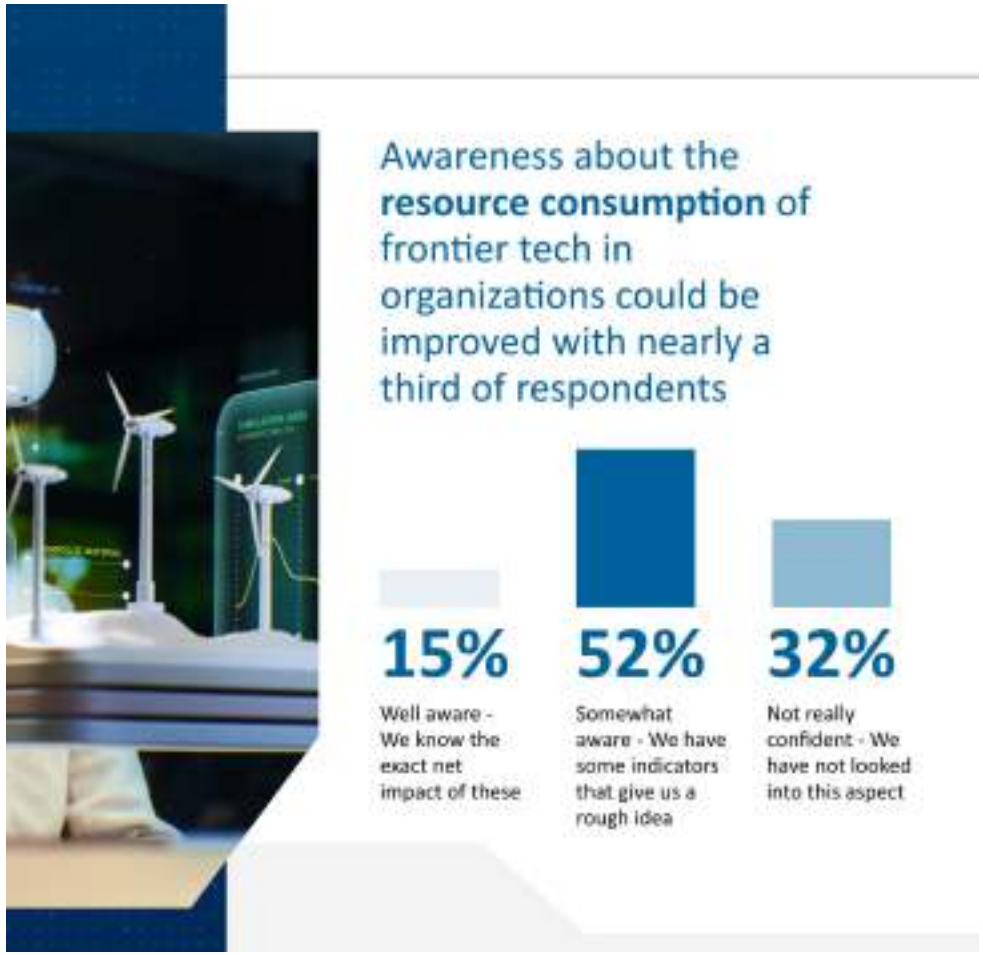
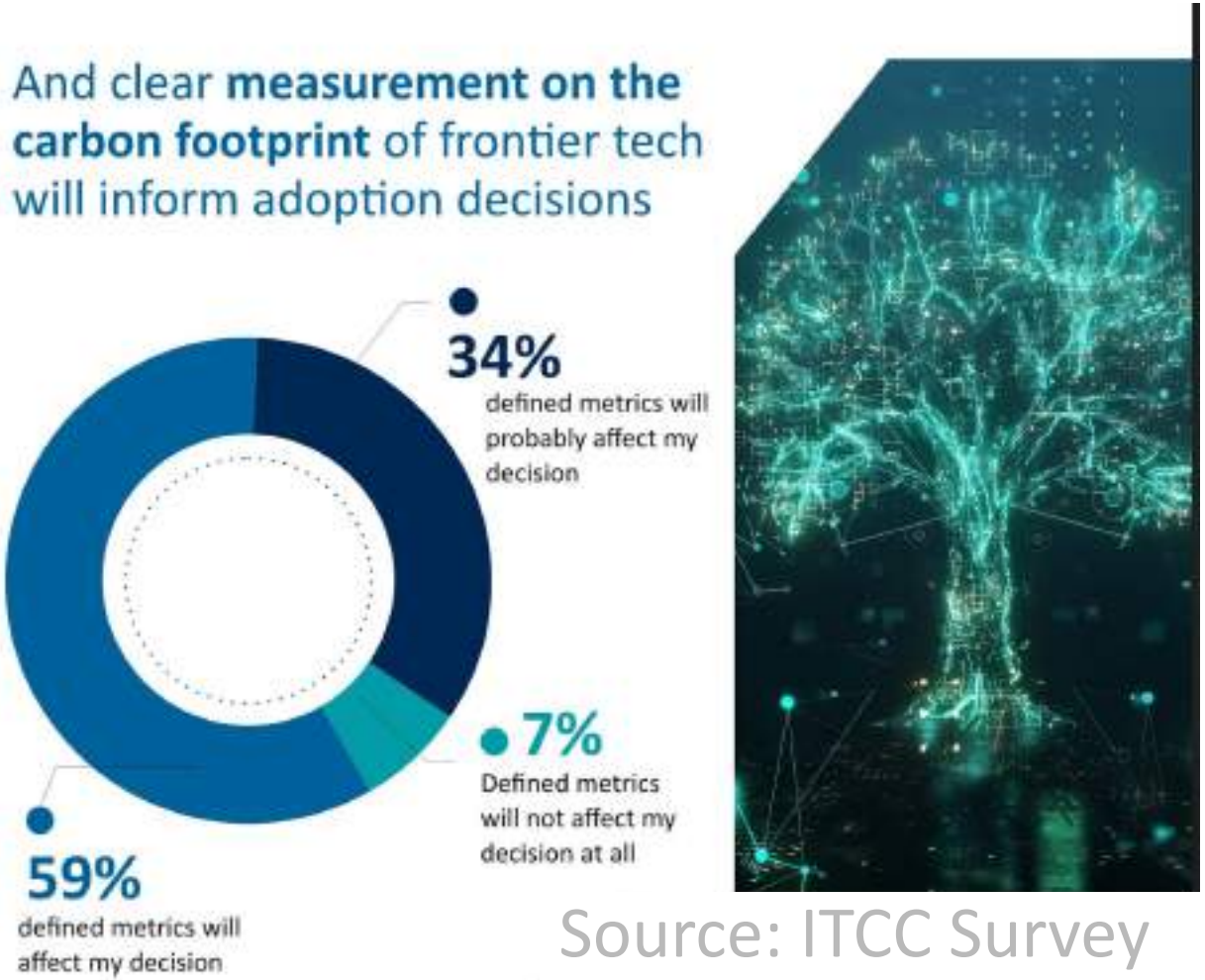
Computing as part of the problem: (ITCC survey)





Source: ITCC Survey (225 respondents)

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ICT Net impact assessment

EUROPEAN GREEN DIGITAL COALITION
Funded by the European Union
SUPPORTING PARTNER

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

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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

Increased coordination among partnerships and initiatives – ecosystem approach and cooperation

Standards, guidelines, calculation methodologies..

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

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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