ICS 13.020.20, 35.240.01 TECHNICKÁ NORMALIZAČNÁ INFORMÁCIA Máj 2025

TNI	**Environmentálne udržateľná umelá inteligencia**	**TNI CEN/CLC/TR 18145** 97 4206

Environmentally sustainable Artificial Intelligence

Táto technická normalizačná informácia obsahuje anglickú verziu CEN/CLC/TR 18145:2025.
This Technical standard information includes the English version of CEN/CLC/TR 18145:2025.

Táto technická normalizačná informácia bola oznámená vo Vestníku ÚNMS SR č. 04/25

obsahuje farebné strany

140447

TECHNICAL REPORT

RAPPORT TECHNIQUE

TECHNISCHER REPORT

CEN/CLC/TR 18145

February 2025

ICS 13.020.20; 35.240.01

English version

Environmentally sustainable Artificial Intelligence

Informationstechnik - Künstliche Intelligenz - Grüne und nachhaltige KI

This Technical Report was approved by CEN on 10 February 2025. It has been drawn up by the Technical Committee CEN/CLC/JTC 21.

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European foreword

This document (CEN/CLC/TR 18145:2025) has been prepared by Technical Committee CEN/CLC/JTC 21 “Artificial Intelligence”, the secretariat of which is held by DS.

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1 Scope

This document provides a description of the main environmental sustainability issues that organisations or individuals that are developing and/or using Artificial Intelligence (AI) consider, in particular, in the context of the European energy systems and resources.

It is important to have a focus where AI helps in optimization and virtual deployment of engineering solutions [1], especially in Europe with limited natural resources. This document reviews the European AI landscape, with a context of environmental sustainability. This is addressed with a focus on European-specific aspects of AI demands for resources, as well as its potential to contribute to environmental sustainability in Europe [2]. The document creates an inventory of impacts and techniques to support environmentally sustainable use of AI, and an equitable access to computation resources.

Suggested improvements in AI resource management are focused on:

- reduction of the operational AI energy consumption (see section 5)
- reduction of other AI resource consumption (water, etc.) (see section 6)

The document also considers the potential benefits of using AI from a sustainability perspective. Methods of measuring the environmental sustainability impacts of AI are also quantified.

This document is intended to help with the development of new standards and complement existing European standards and standardization deliverables that define resource measurement for the use of AI. It describes best practices and indicates which techniques and management processes for improvement of AI resource performance and environmental viability. The document is expected to contribute to voluntary corporate social responsibility (CSR) in Europe, and increase sustainability awareness for individuals when designing, developing, and using AI. The aim is to create a focus on the responsible use of AI that prioritizes ethical considerations, human values, and an understanding of the social implications of AI design and use.

The document is aligned with equivalent activities in ISO/IEC/JTC 1/SC42/WG4, TR 20226 “Green and Sustainable AI”, but takes into account specific aspects of the European energy system that are not applicable elsewhere. In particular, sustainable energy supply provided via the European interconnectors will be taken into account when assessing AI carbon footprint. Additionally AI solutions for the optimization of energy use will be reviewed and quantified to balance the energy use of AI applications and services which make extensive use of energy. This report also identifies and addresses the United Nations Sustainable Development Goals [3, 4]. Additionally, this document aligns with ISO/IEC DIS 21031 Information Technology – Software Carbon Intensity (SCI) [5], ISO/DIS 59004 Circular Economy – Terminology, Principles and Guidance for Implementation, and the Greenhouse Gas Protocol (GHG), Product Life Cycle Accounting and Reporting Standard [6].

The upcoming EU AI Act in its current draft encourages voluntary assessment of companies for environmental sustainability.

2 Normative references

There are no normative references in this document.