Environmental impact assessment of AI systems in standards

Susanna Kallio
Head of Sustainability Standardization
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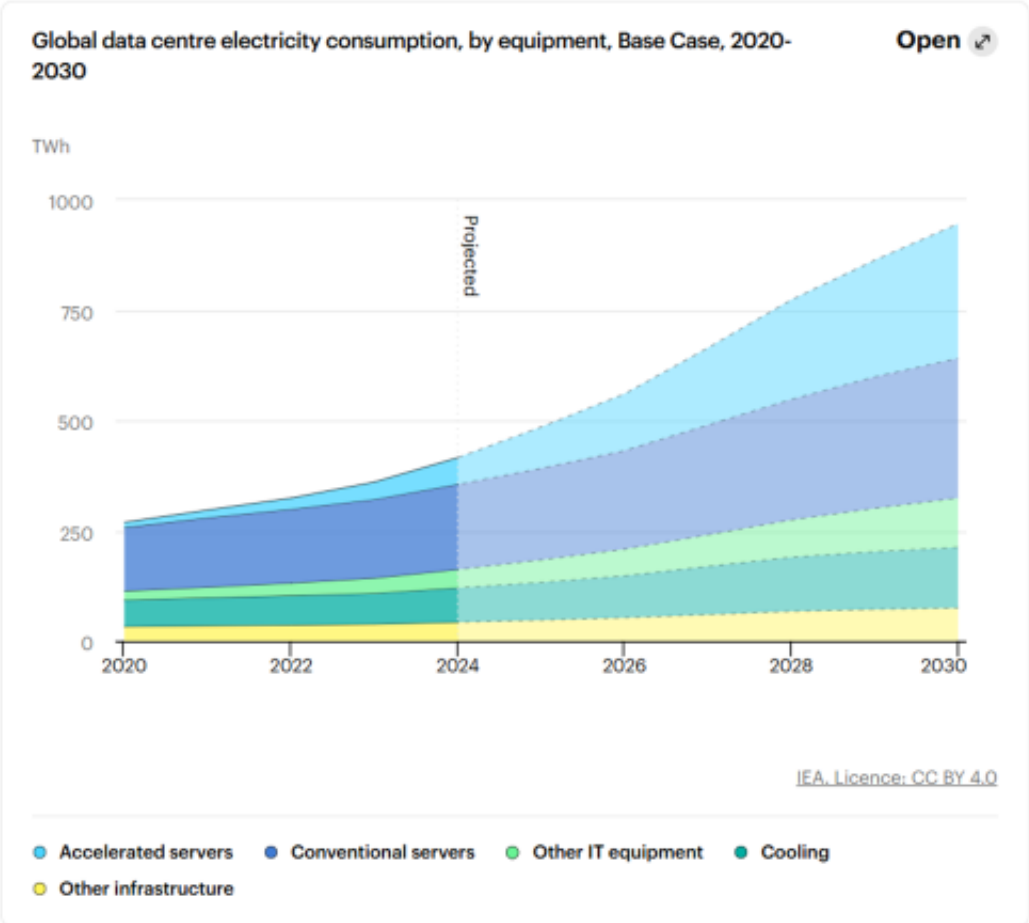
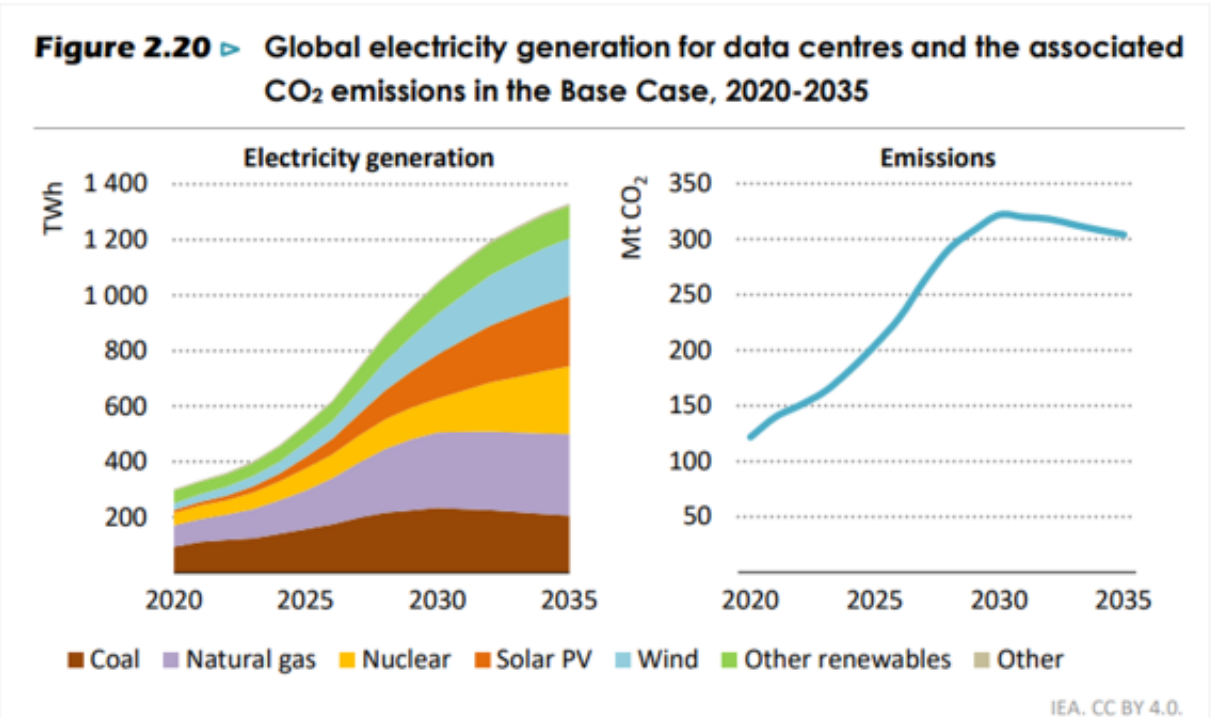
Exponential AI growth brings associated environmental impact



Source: IEA (2025), Global data centre electricity consumption, by equipment, Base Case, 2020-2030, IEA, Paris https://www.iea.org/data-and-statistics/charts/global-data-centre-electricity-consumption-by-equipment-base-case-2020-2030



Between now and 2030, renewables meet nearly half of the increase in global data centre electricity demand, followed closely by natural gas and coal-fired electricity generation

Source: IEA, Energy and AI - World Energy Outlook Special Report, April 2025

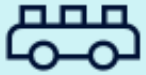
Standardized methodology for environmental impact of AI

Initiatives started

Using AI in manifold use cases

Smart agriculture

Smart manufacturing



Smart robots

Smart education

Smart energy

Smart telco networks

AI for health analysis

AI photo, graphics and video editor

AI contract management

Wildlife population monitoring using AI

Non-intrusive detection of malware

Traffic signal control using AI

Video surveillance

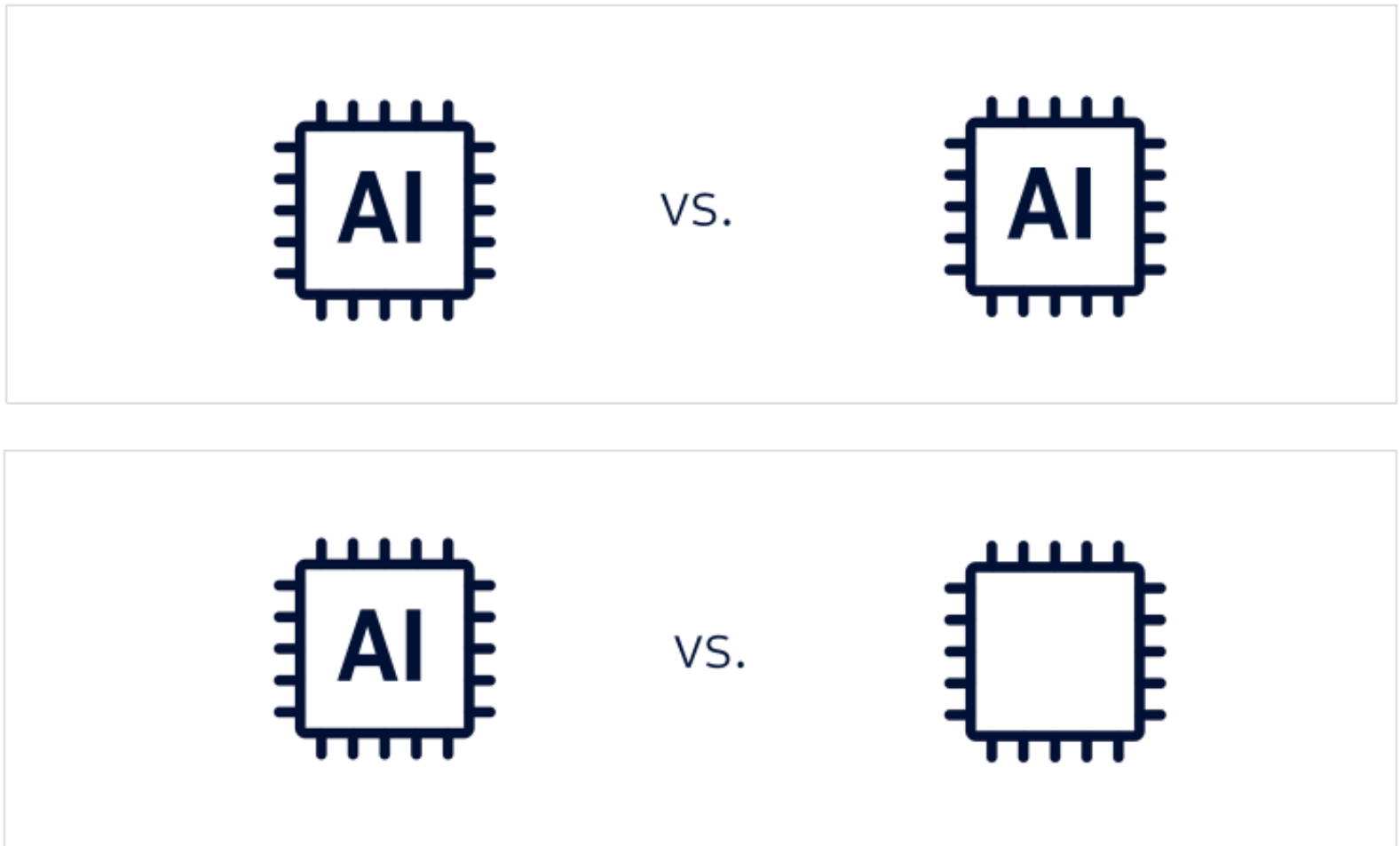
Autonomous system

Virtual bank assistant

AI Chatbots

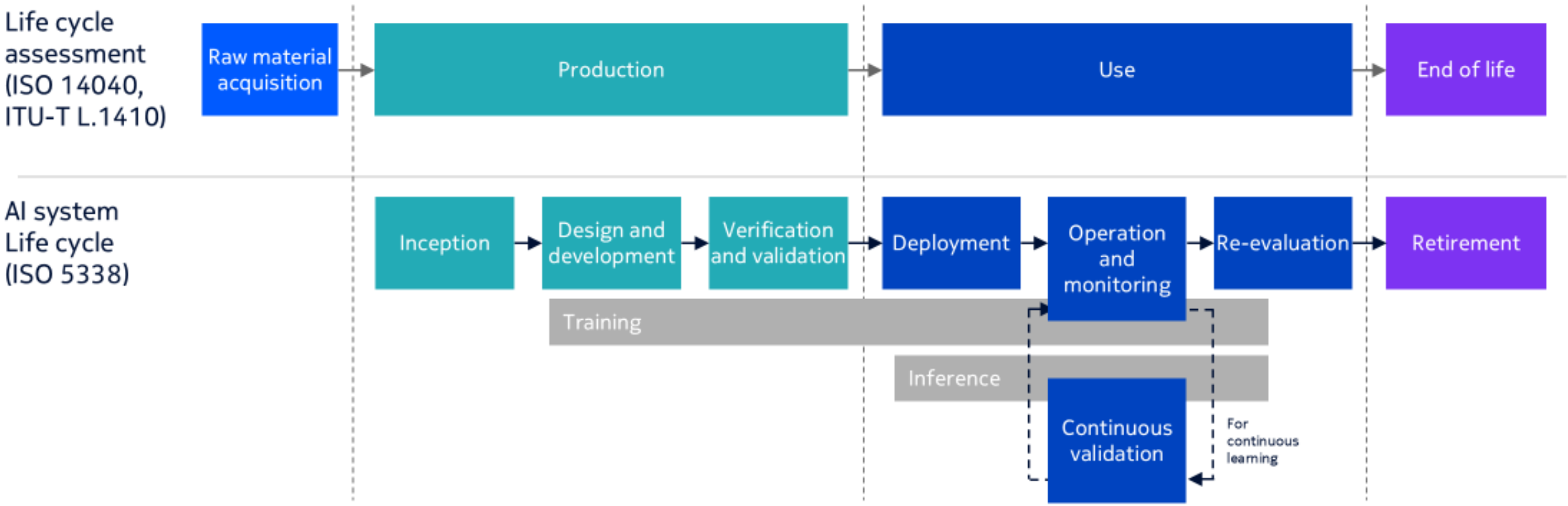
Source of use cases: ISO/IEC TR 24030:2024

Comparative analysis – for selecting the best solution



The environmental sustainability impact of AI system

Mapping standard approaches



Source: Figure 4 in Nokia WP 'A transparent and standards-based way to assess the environmental impact of AI systems', https://onestore.nokia.com/asset/214115

Some open points in the methodology – to be solved

Allocation of

- foundation model
- data handling and preparation
- embodied emissions of shared hardware
- etc.

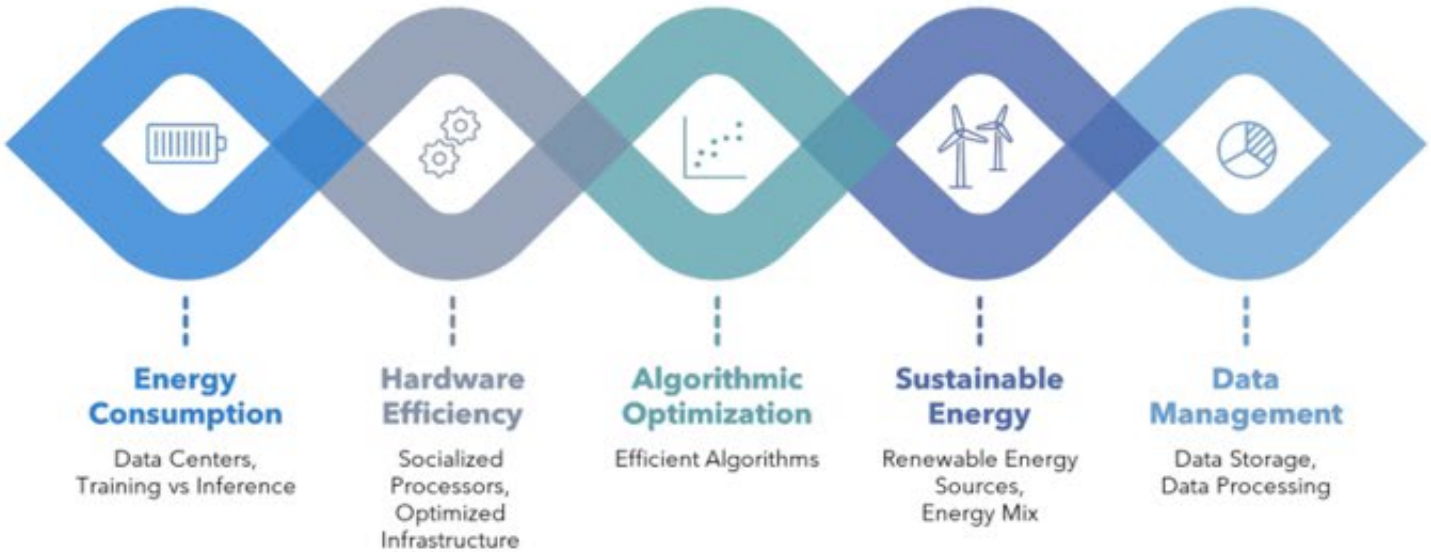
Inference

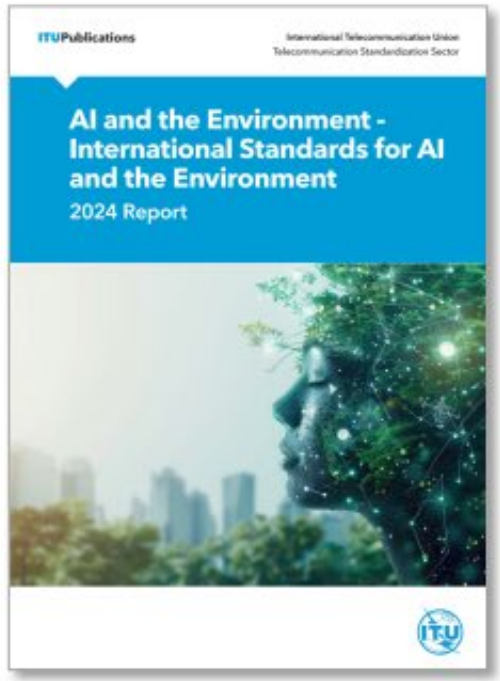
- happens in the future
- how widely deployed

Other impacts

- second order effects
- higher order effects, e.g., rebound

Targeted and tailored actions to reduce environmental impact





Source: ITU-T 2024 Report, AI and the Environment - International Standards for AI and the Environment, https://www.itu.int/dms_pub/itu-t/opb/env/T-ENV-ENV-2024-1-PDF-E.pdf

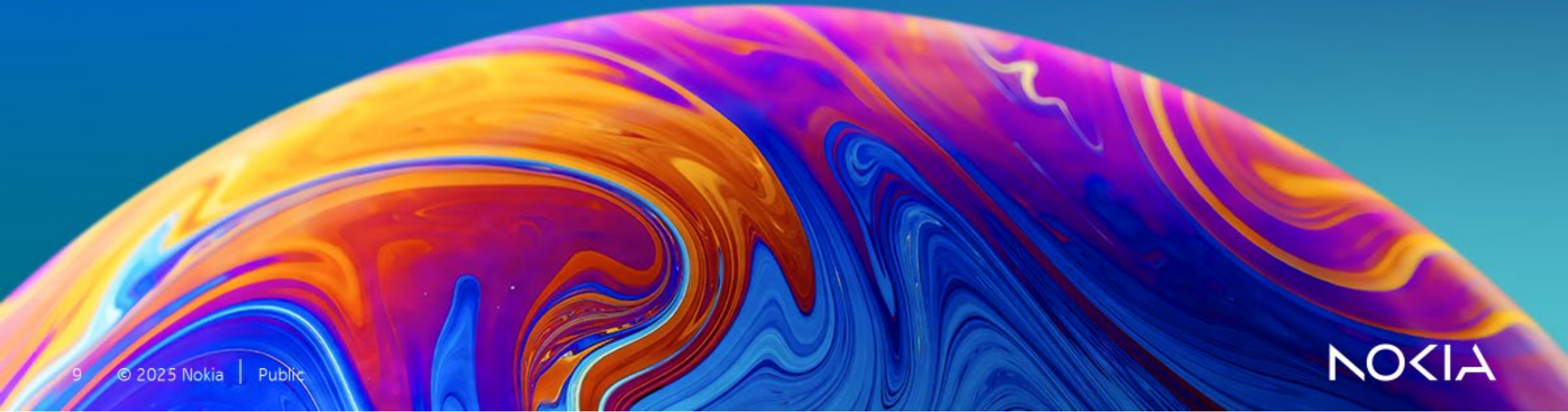
Take away

Standard methodology under development

General methodology for AI specific characteristics

- LCA based approach

Assessment enables fact-based mitigation

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