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The IT Toolkit for Responsible and Sustainable AI

A Field Guide for Implementation at Scale

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July 18, 2025

AI and machine learning have tremendous potential to accelerate climate action, through forecasting, optimization, and emissions monitoring, but they also introduce risks.

AI can be used to manipulate public opinion or generate persuasive misinformation. Transparency and ethical AI frameworks are essential.

(Center for Countering Digital Hate, 2023).

Meeting Purpose: To share knowledge, experience and collaborate to ensure we can create robust Responsible AI including Sustainable AI governance.

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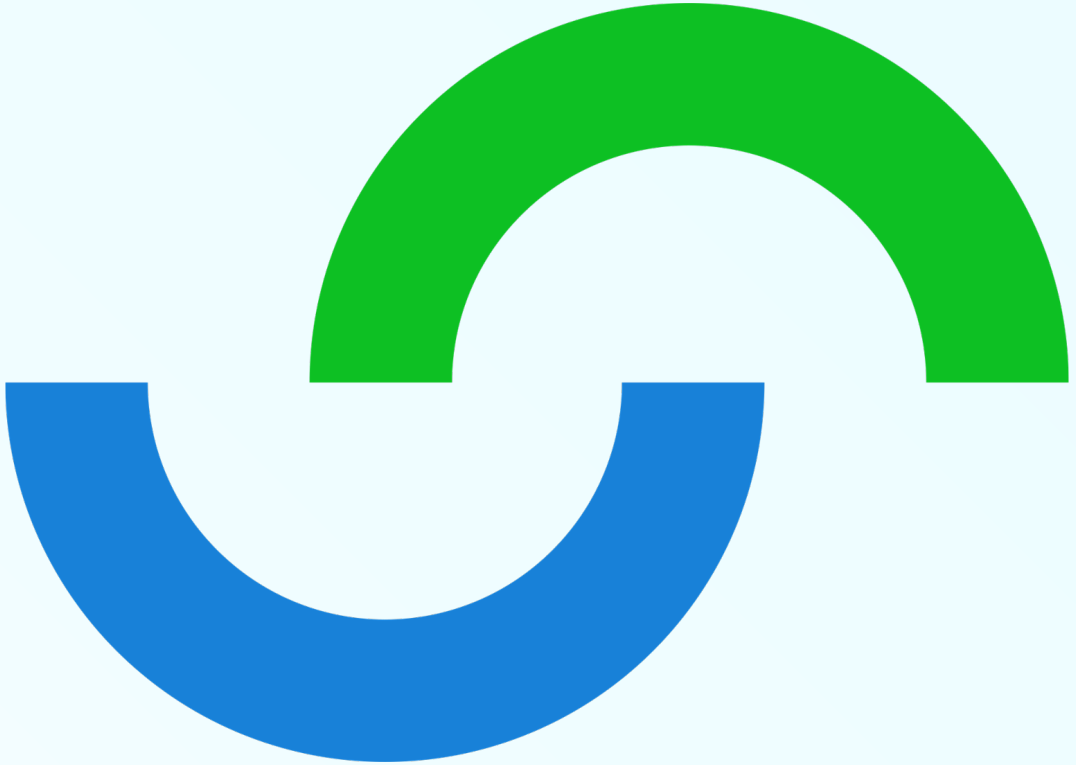
Introducing the IT Toolkit for Responsible and Sustainable AI

July 15, 2025



Leveraging work done by: Rick Pastore

Research Principal, SustainableIT.org,
Responsible AI Working Group Project Manager &
60 companies tied to Responsible AI community tracks

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50+ Hands-on Volunteers From More than a Dozen Industries

The IT Toolkit for Responsible and Sustainable AI was developed by a SustainableIT.org working group of global technology, business, and AI experts to provide executives with a strategic framework and practical guidance for navigating this transformation. Grounded in real-world practices and aligned with emerging standards, it equips organizations to not only mitigate AI-related risks but also unlock lasting business value and innovation at scale

ABN AMRO Bank
AI2030
Amer Sports
Capgemini
Danske Bank
IASA Global.org
Info-Tech Research
Juniper Networks
Kuehne + Nagel
Mattel
Mastercard
Mia AI
Morgan Stanley
National Grid
NTT Data
Rackspace
Save the Children
Stanford Health Care
Sterling
TBM Council
Volvo Group
World Bank Group

NTT DATA Materiality Topics

Based on this new materiality, NTT DATA will advance its sustainability management globally to ensure sustainable business operations, drive growth, and contribute to a sustainable society.

Lead by example, to disrupt industries for good, innovating services and solutions to regenerate our planet.

- Climate Change
- Circularity
- Water Management

Transform businesses and society for successful growth, with sustainable services and solutions.

- Innovation through Technology
- Responsible Technology and AI Ethics
- Sustainable Supply Chain
- Digital Safety and Reliability
- Secure and Sustainable-by-design Services and Solutions

Shape a better world for all, applying our digital capabilities to improve livelihoods and contribute to an inclusive society.

- People-Centric Company
- Diversity and Inclusion
- Health and Safety
- Human Rights
- Digital Accessibility

Toolkit V1 Contents

IT Toolkit for Responsible & Sustainable AI: A Field Guide for Implementation at Scale

Reference Materials

- ✓ Overview
- ✓ Reference Guide to Responsible AI Frameworks, Principles & Standards
- ✓ AI General Glossary

Guiding Principles and Operational Runbooks

- ✓ Responsible AI Leadership Framework and Principles
- ✓ AI Sustainability Runbook
- ✓ Responsible AI Data Governance Principles & Runbook - – A portion of which have been loaded into the IASA BTABOK
- ✓ Persona-based Literacy Guide for Sustainable AI
- ✓ Award-winning Use Cases & Best Practices (Summer)

Models

- ✓ Responsible AI Lifecycle
- ✓ Sustainable AI Ecosystem (Summer)
- ✓ Cost-Benefit Model (Late 2025)

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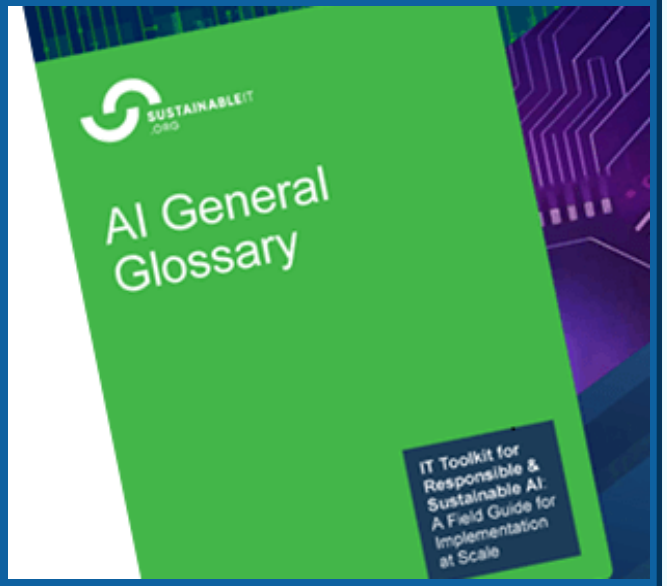
Definitions

Responsible AI is the broader governance and operational discipline that ensures AI systems are developed, deployed, and maintained in alignment with legal, ethical, and organizational standards. It includes oversight practices, risk and compliance management, and accountability across systems and teams.

Sustainable AI is the design, development, deployment, and lifecycle management of AI systems in a manner that mitigates environmental impact, promotes social responsibility, and adheres to ethics principles.



Sustainable AI focuses on the *impact on planet and society*.
Responsible AI focuses on making sure the *right processes* are in place.

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IT Toolkit for Responsible and Sustainable AI

- The Toolkit is designed as a practical, enterprise-wide resource to help organizations govern and operationalize AI responsibly and sustainably across the full lifecycle—from ideation to impact.
- Start with the fundamentals—the Leadership Framework and Principles, Governance Lifecycle Model, and AI Literacy Primer all outline key concepts for enterprise leaders and their teams.
- The Glossary and Reference Guide are there for background knowledge.
- The more granular Sustainability and Data Governance Runbooks delve into critical steps to operationalize AI responsibility and sustainability, with supporting KPIs, documentation, templates, and links.

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Runbooks Provide Details for Operationalizing the Principles

Responsible AI Leadership Principles

1. Risk Assurance
2. Sustainability
3. Ethical Alignment
4. Data Integrity
5. Trusted Outcomes
6. AI literacy
7. Human-First AI
8. Equitable Impact
9. Responsible Innovation

AI Data Governance Principles

- ✓ Validity & Reliability
- ✓ Transparency & Explanability
- ✓ Fit-For-Purpose & Scalability
- ✓ Environmental Sustainability
- ✓ Accountability

✓ Operationalization

- ✓ Goal Setting
- ✓ Role Establishment
- ✓ Prerequisites
- ✓ Tools & Resources
- ✓ Action Steps
- ✓ KPIs & Metrics
- ✓ Documentation & Templates

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Principles and Runbooks

A foundational framework of the nine key principles encased in a 3-R approach to drive responsible and sustainable AI Lifecyle leadership

- ✓ Risk Assurance - assessment of AI application risks to business
- ✓ Sustainability – Lifecyle view of ESG impact
- ✓ Ethical Alignment – alignment to ethical standards
- ✓ Data Integrity – data is appropriate, authorized, secure, resilient
- ✓ Trusted Outcomes – fair, safe and explainable
- ✓ AI Literacy – effective use of AI technology
- ✓ Human First AI – minimize hard to employees
- ✓ Equitable Impact – AI benefits distributed equally
- ✓ Responsible Innovation – AI used to align with ESG, and ethical standards

"Reflect" on the intended uses and desired outcomes of applications of AI, assessing potential positive and negative impacts to business stakeholders, strategies, goals and commitments.

"Reframe" governance rules, processes, roles and skill sets – as well as enterprise operations and architecture to maximize AI benefits and minimize potential risks.

"Reimagine" how the organization creates value by leveraging AI's unique capabilities to design new processes, products, experiences, and relationships expanding human potential and unlocking transformative opportunities.

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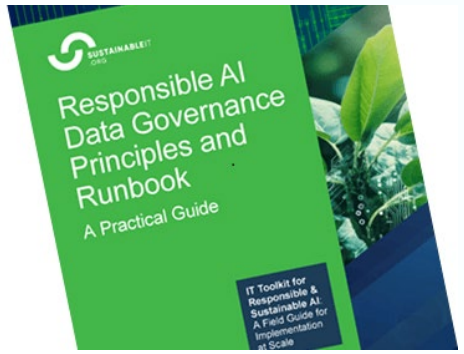
Principles and Runbooks



Step by step guidance for managing AI data with integrity, transparency and environmental responsibility

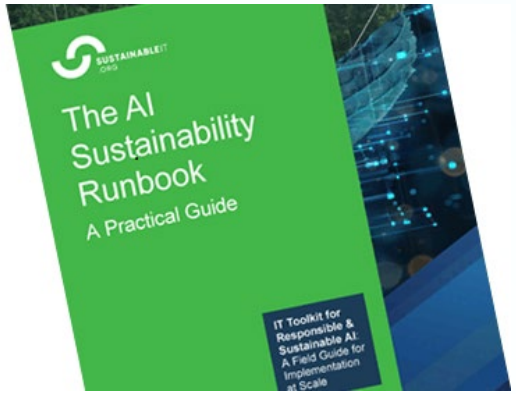
- ✓ Validity & Reliability - accurate
- ✓ Transparency & Explainability - traceable
- ✓ Fit for Purpose & Scalability – necessary use
- ✓ Environmental Sustainability – minimize harm
- ✓ Accountability – clear ownership

This table maps business goals to sustainable AI principles and the impact that strong and weak data governance could have on each.

Enterprise Goal	Impact of Strong AI Governance	Impact of Weak AI Governance	Relevant Principles
Ensure accurate, fair, and consistent AI outcomes	Data is validated, complete, and free of systemic bias, leading to reliable, equitable results.	Incomplete or biased data skews results, leading to discrimination or reputational damage.	• Validity & Reliability
Compliance with laws and regulations (e.g., GDPR, AI Act, ESG reporting)	Clear data provenance and transparent, accountable, governance streamlines ESG, compliance, and risk reporting.	Untraceable or excessive data use can lead to legal violations, fines, or audits.	• Transparency & Explainability • Fit for Purpose & Scalability • Accountability
Support stakeholder trust and brand credibility	Transparent, explainable AI decisions and clear data governance reassure employees, customers, partners, and regulators.	Lack of transparency and unclear data handling erodes confidence in the organization's use of AI.	• Transparency & Explainability • Accountability
Improve operational efficiency and decision-making	High-integrity data enables dependable analytics and efficient AI operations.	Dirty, redundant, or low-quality data slows AI pipelines and may lead to bad decisions.	• Validity & Reliability • Fit for Purpose & Scalability
Reduce environmental footprint	Governance ensures efficient data use, responsible hardware management, and low-impact processing.	Oversized datasets and inefficient pipelines increase energy use, water consumption, and e-waste.	• Environmental Sustainability • Fit for Purpose & Scalability
Lower costs of AI ownership and risk mitigation	Purposeful data management reduces storage, compute, compliance, and remediation costs.	Overcollection and unmanaged data increases infrastructure spend and risk exposure.	• Fit for Purpose & Scalability • Accountability • Environmental Sustainability

eserved.

Principles and Runbooks



Hands on guidance to operationalize sustainability within AI systems ensuring they support long-term ESG goals throughout their lifecycle

- ✓ Operational & Environmental Efficiency
- ✓ Risk Mitigation
- ✓ Regulatory Readiness
- ✓ Stakeholder Trust
- ✓ Infrastructure Resilience and Longevity
- ✓ Sustainable Growth

Utilize a Sustainability Questionnaire to determine AIs potential sustainability impact, starting with general tech sustainability questions for suppliers and AI-specific questions.

Create an AI Sustainability Risk Register to capture risk.

- **Energy Consumption**
- **AI Carbon Footprint**
- **Water Consumption Rate**
- **E-waste Generation Rate**
- **Data Processing Efficiency Impact**
- **Data Generation and Storage Efficiency Impact**
- **Compression Ratio**
- **Dark Data Ratio**

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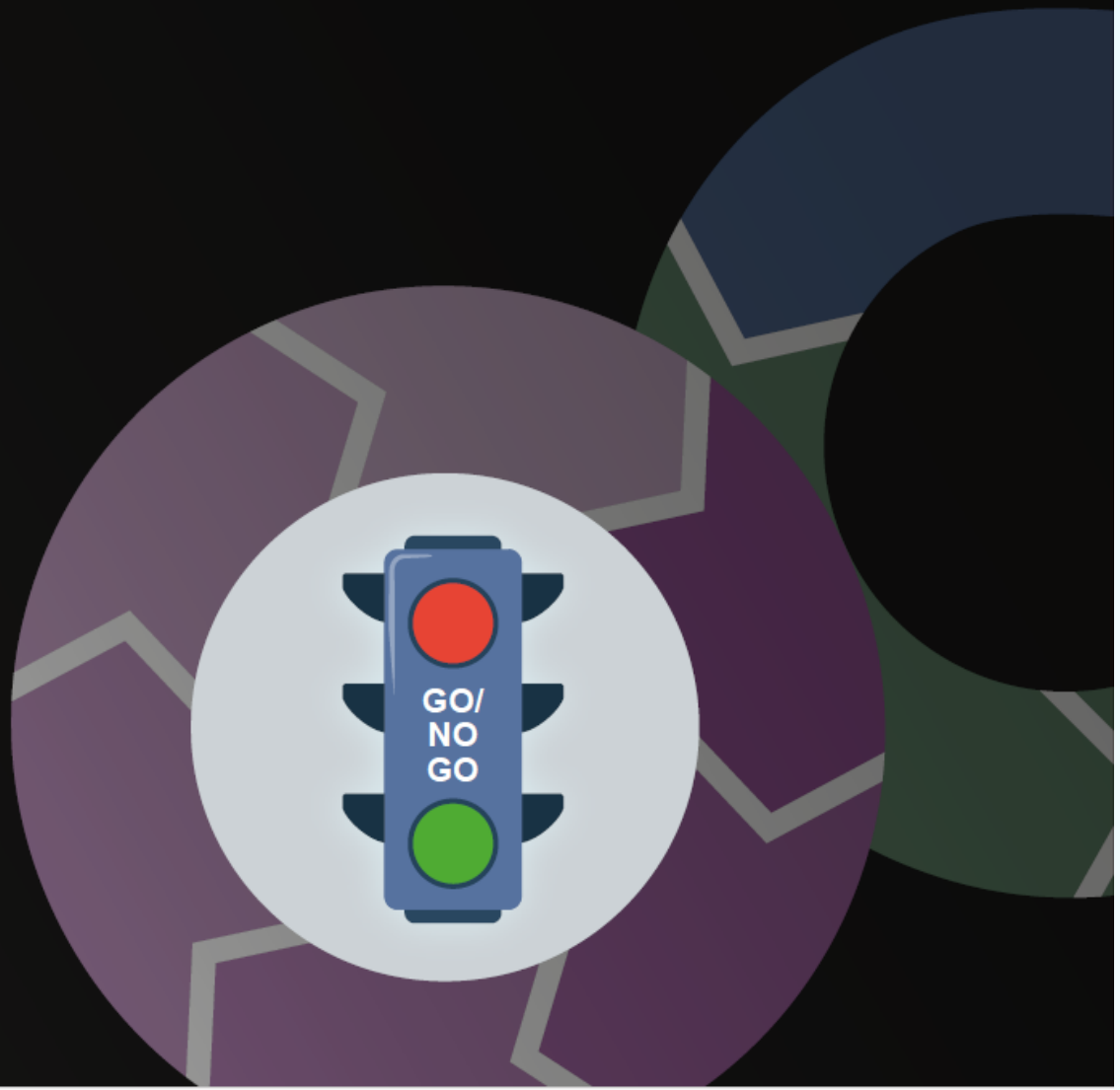
Responsible AI Governance Lifecycle

Introduction

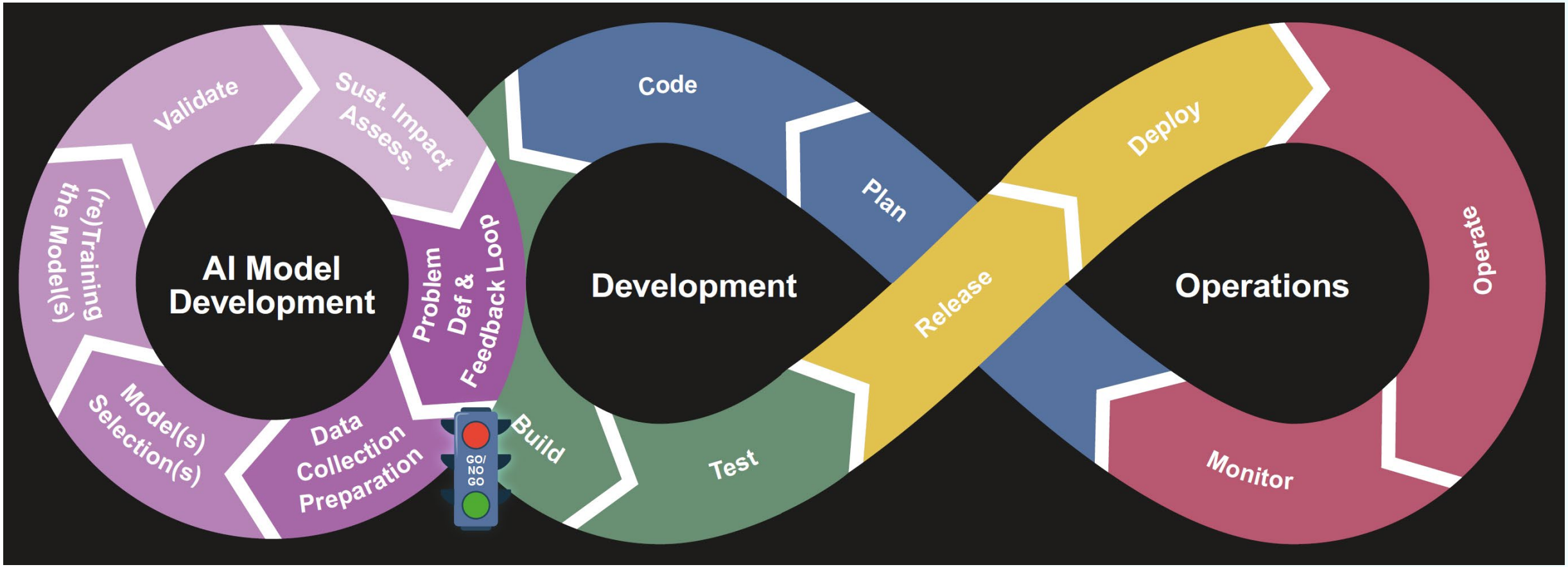
This model series, "**Responsible AI Governance Lifecycle**," embeds governance practices aligned to environmental, social and sustainability objectives across the AI system lifecycle.

- View 1 depicts the AI development lifecycle and its intersection with the enterprise DevOps model, where AI models are integrated deployed, and monitored.
- View 2 emphasizes ESG sustainability checkpoints and actions, and maps them to the AI development cycle.
- View 3 maps an IT Sustainability Impact Assessment to the lifecycle.
- View 4 describes a GenAI lifecycle governance strategy, composed of "Six Rs," mapped to the most relevant stages.

Together, these complementary views allow IT and business leaders to toggle between technical and governance priorities, enabling a holistic approach to AI stewardship that aligns with sustainability goals.



AI Lifecycle Governance Multi-layered Model – View 1



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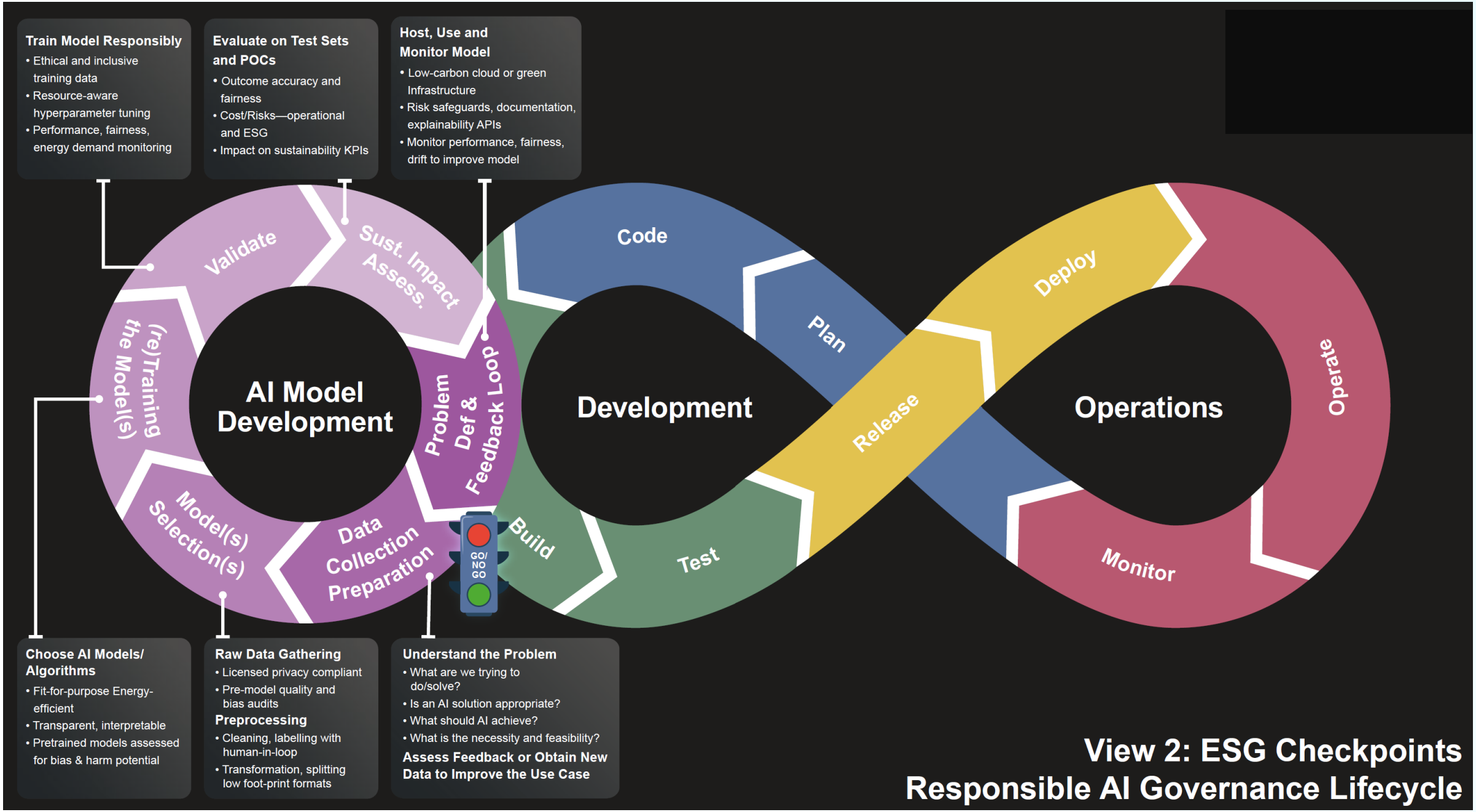

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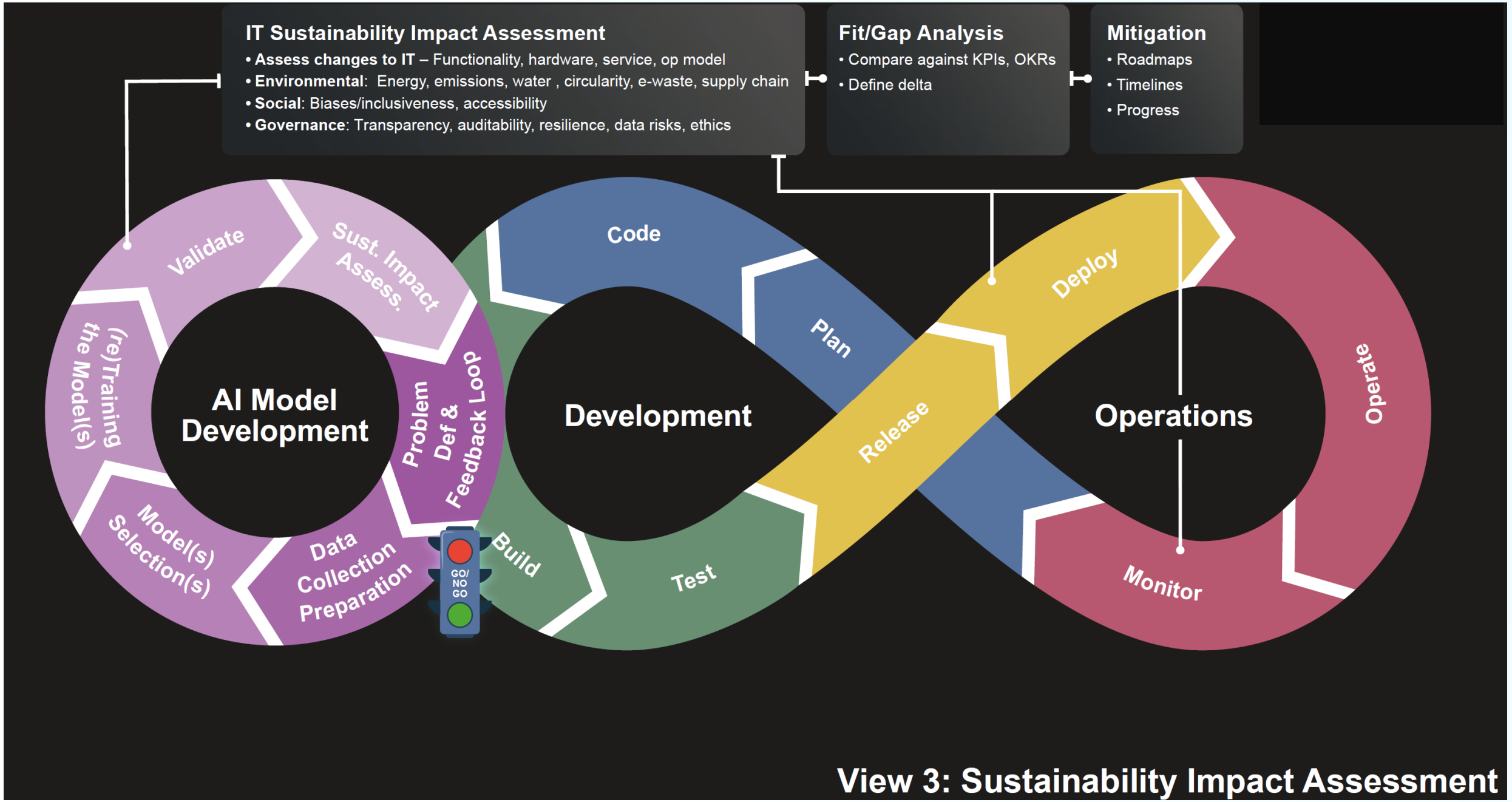

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Sustainable GenAI Governance Strategies – Explanations

R0 Refuse

The function that GenAI is planned to perform is abandoned or performed by other means—no GenAI is deployed.

Example: A cost-benefit framework to weigh negative environmental impact of GenAI to the business-as-usual.

R1 Reframe

Reducing the resources required to fulfill a specific use-case, by reframing the project and designing the environment that the GenAI model will be embedded in (focus on strategy, organizational set-up, governance and design).

Example: Introduction of a CO2 budget, to steer all development processes within a project.

R2 Reduce

Optimizing the technological processes and mechanisms to reduce the required resources for development and operation of the technology (focus on technological process and mechanisms).

Example: Using adaptive backpropagation as a way to only tune the impactful parameters of a model instead of all parameters in finetuning.

R3 Re-Use

Leveraging preexisting models instead of creating new ones.

Example: Reusing a model in a different context, for example by finetuning it to the new use case.

R4 Release

Enabling applications that fail to perform their intended function to regain their functionality.

Example: Include mechanisms for automated bug-fixes in the model.

R5 Revise

Utilization of components from a preexisting model in the development of a new one.

Example: Using transfer learning, by teaching a smaller model to replicate the behavior of a pretrained, larger model and therefore reusing its knowledge structures.

Support

Approaches, that indirectly affect the sustainability of GenAI applications by increasing the acceptance or implementation rate of the other sustainability strategies.

Examples: Reporting of environmental impacts, forming research consortia on sustainable AI, open sourcing.

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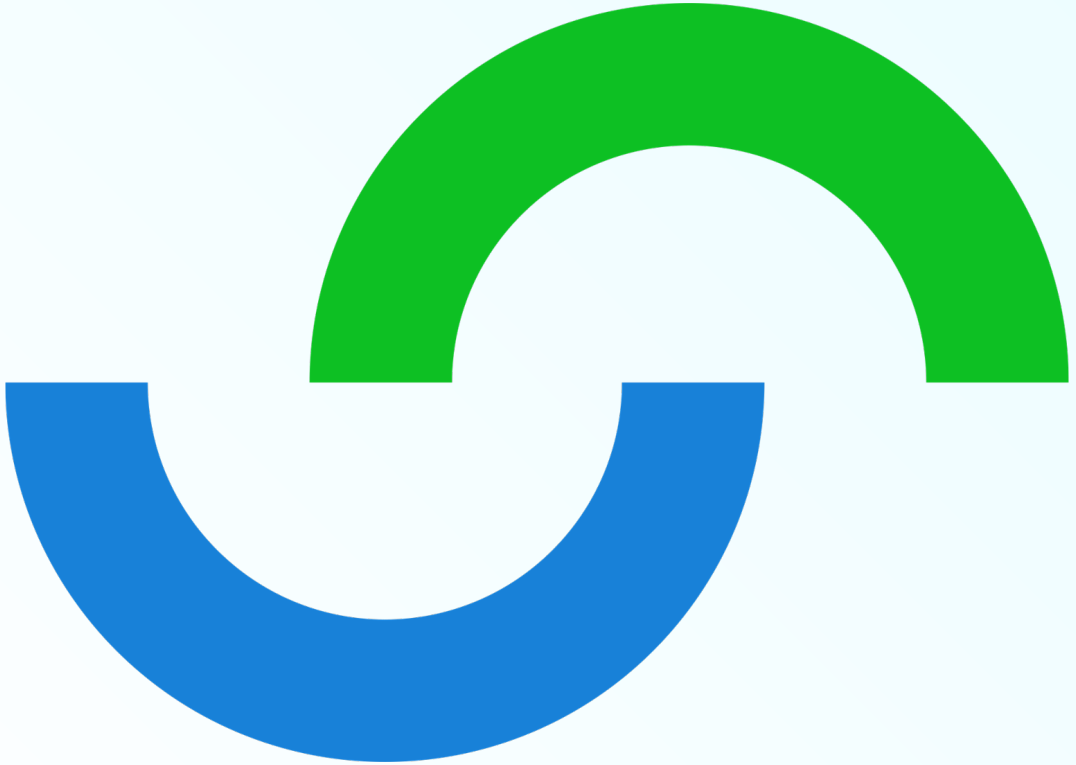
Q&A and Next Steps



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Supplementary Slides

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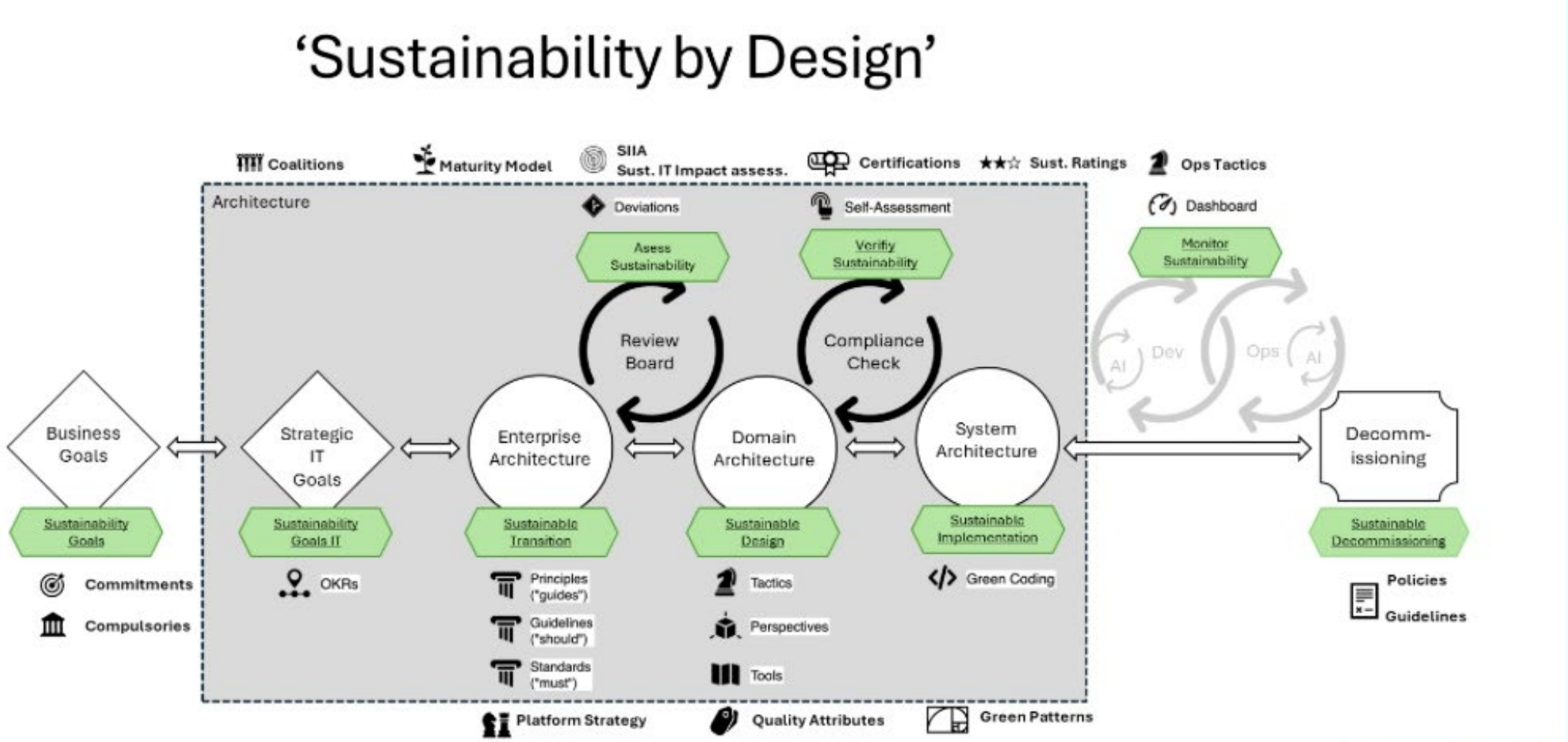
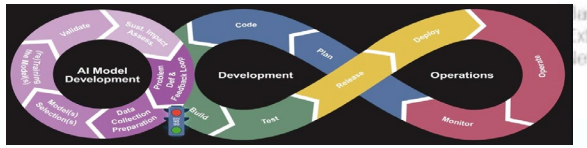
Enterprise Architectures

Involvement in Lifecycle Governance – It's not just about Data Architecture enabling AI



Involvement from one or more EA competencies:

- Business
- Data
- Security
- Technology
- Infrastructure



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xtension: Markus Funke, Wiebren van der Zee
etherlands, 2025

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SustainableIT.org

SustainableIT.org is a 501(c)(6) nonprofit organization founded and led by technology executives to advance global sustainability through technology leadership.

- Community
- Resources & tools
- Insights and research
- Media outreach, awards
- Webinar series: Tracks for Initiating, Intermediate, Advanced

Engage with SustainableIT.org

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Sustainable Architectures

ABOUT US

SustainableArchitectures.org is a 501(c)(6) nonprofit organization under IASA Global which is the world's leading professional association for all Business & Technology architects. Sustainable Architectures is focused on the creation and adoption of Sustainable IT and Responsible AI principles, patterns and practices in the global architecture community.

AREAS OF FOCUS

Sustainable Architectures is a development track for IASA Global

Focused on creating a community of architects to develop best practices, patterns, principles and frameworks for sustainable systems design and operations

Contributions will be posted to the BTABoK – the open- source business technology architecture book of knowledge, Publications (CIO.com, Architecture and Governance magazine)

Development of education, assessments and certification to spread sustainability principles and best practices

Collaborating with the GSF and SustainableIT.org

WHO WE WORK WITH

105 Members from global consultancies, IT & cloud service providers, financial, healthcare, energy/utilities companies, government, defense agencies, sustainability-focused startups, telecommunications, and academic institutions

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Green Software Foundation

GREEN WEB FOUNDATION
TOWARDS A FOSSIL-FREE INTERNET BY 2030

OUR FOCUSED WORKING GROUPS

- Strategy and Governance – White paper & Action plan
- Business Architecture – Action Plan
- Solution Architecture – White paper & Action Plan
- Infrastructure- White paper Outline, Action Plan & Principles
- Data and Responsible AI – Content in Responsible AI run book & Principles
- Metrics and GreenOps – Action Plan
- Security and Compliance- White Paper & Action Plan

Sustainable and Responsible AI Survey

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