The Twin Transition:
Digital Technologies for Climate Mitigation

David Jensen, 29 May 2023
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We are living at a pivot moment in time when two of the greatest transformations in human history are underway
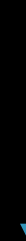
Digital transformation:

1. Global reach
2. Disrupting all sectors
3. New geopolitics

Sustainability transformation:

1. Economic
2. Social
3. Environmental

Our collective challenge is to catalyse a Twin Transition:
Digital technologies must be sustainable. Sustainability must be enabled through digital technology.

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Historic decision by the UN Environment Assembly to adopt Digital Transformation as a new area of work for UNEP during 2022-2025

Leverage digital technologies to create impactful products and services to better serve UNEP partners in tackling the Triple Planetary Crises

Achieve climate stability

Live in harmony with nature

A pollution free planet

Phase out of 80% of fossil fuel use by 2050

Eliminate 70% of the environmental impact of the global food system on nature by 2050
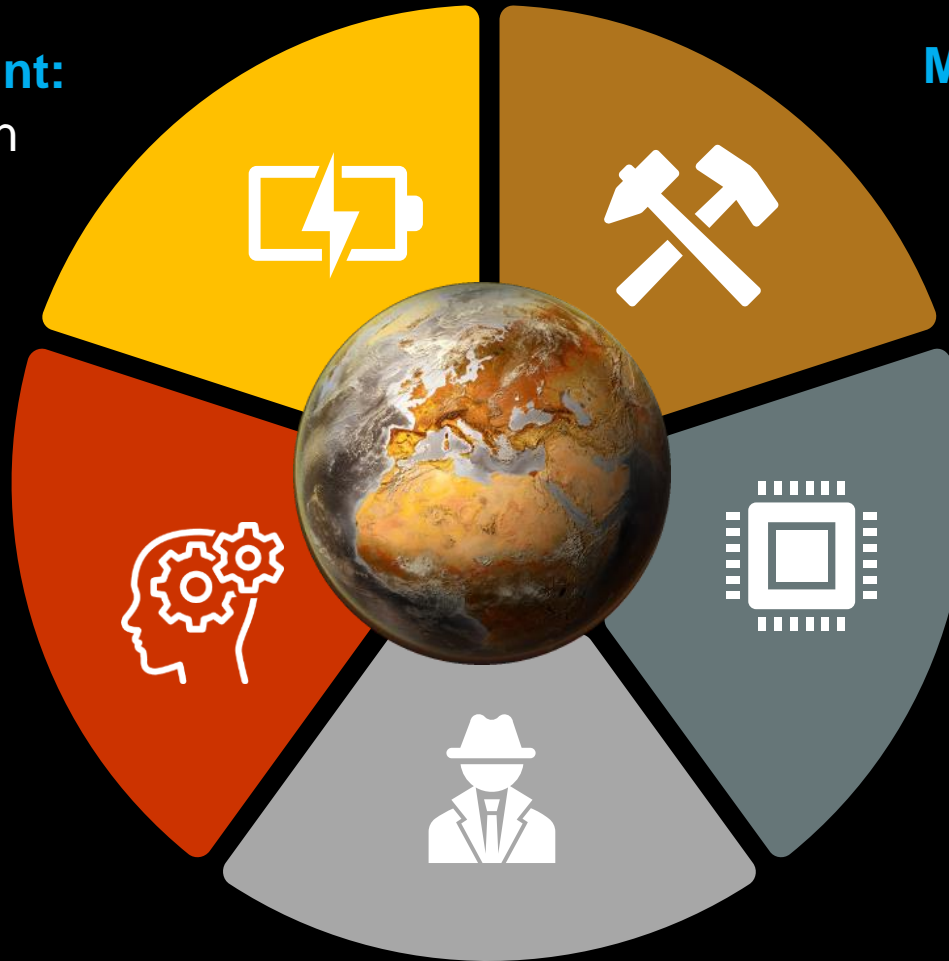
Achieve near-zero-waste economy by 2050

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Side 1.Sustainable Digitalization: Must begin to minimize the environmental risks & impacts of digital technologies

Energy, GHG and water footprint:
3% of global energy consumption
2-4% of GHG emissions

Metals and rare earth minerals:
500% increase in demand for lithium and cobalt by 2050

Hyper consumption and rebound effects:
62% of advertising sales are now digital and worth 710 billion

Pollution and e-waste:
53 million metric tons, only 17% recycled, 40% of countries have regulation

Misinformation:
misinformation spreads 6X faster than facts, 70% more likely to reshared

Side 2. Digitalization to Enable Sustainability: Harness digital technologies to enable and accelerate environmental solutions – 5 "impact apps"

Monitoring and modelling environmental systems and emissions

Full supply chain transparency and circularity

Empowering consumers to adopt sustainable lifestyles and behaviors

Automated sustainability decisions and optimization of resources

**Supporting participatory environmental governance processes and legal enforcement**

1. Monitoring and modelling environmental systems and emissions at global level

Example: IQ AIR

- Causes 7 million pre-mature deaths each year.

- UNEP and IQAir built the largest global network of 25,000 low-cost air quality sensors in 140 countries to monitor realtime air pollution levels of PM 2.5.

- Can identify risks to populations and help inform protection measures through public dashboards.
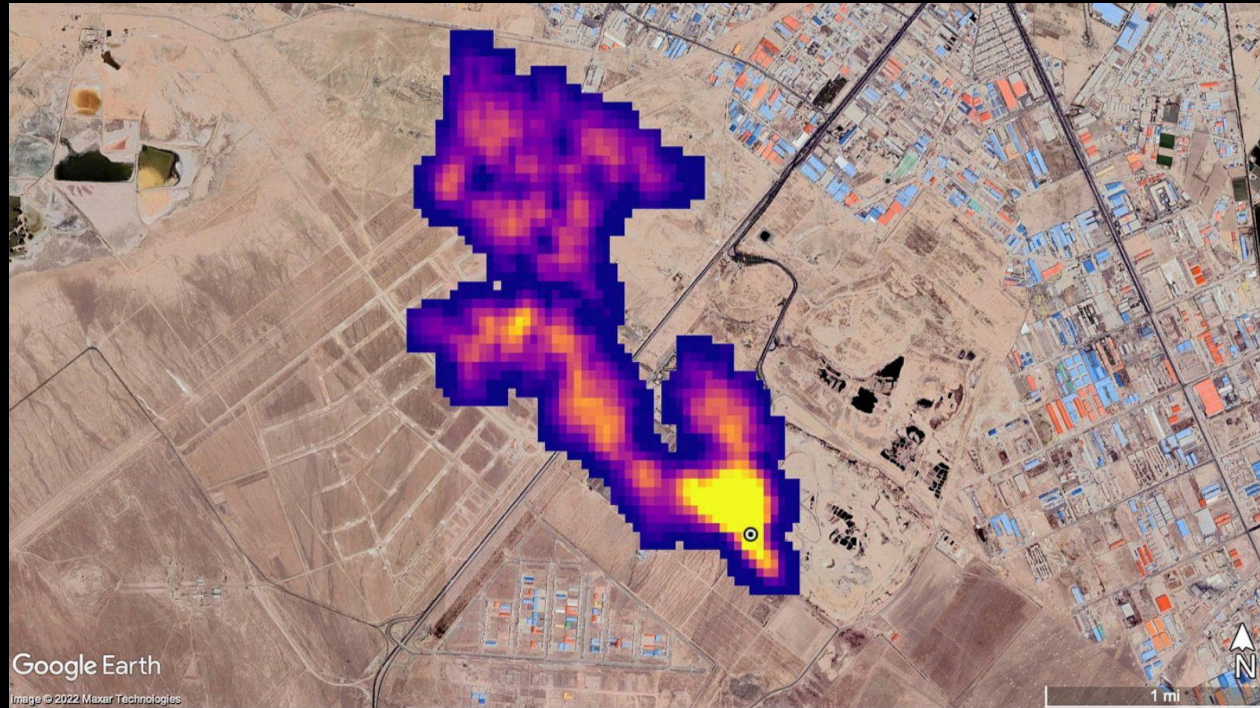
- 50 million users accessing the platform in 2020 alone.
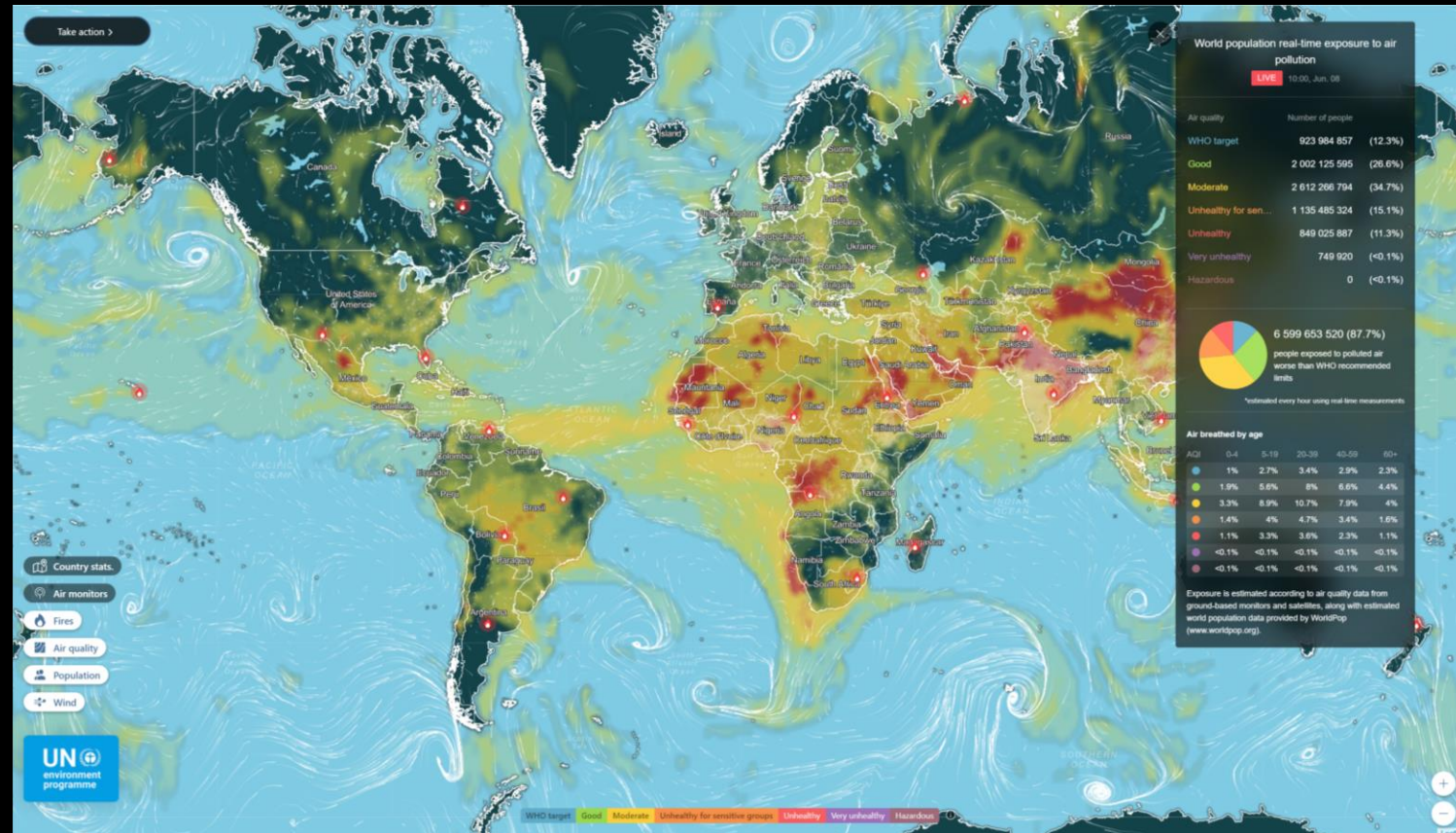
1. Monitoring and modelling environmental systems and emissions at global level
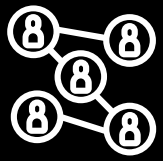
Example: MARS

- Methane is responsible for over 25% of the warming we are experiencing today.

- MARS is the first global system that leverages satellite observations to provide rapid, actionable, and transparent data on methane emissions

- MARS identifies major methane emission events, notifies relevant stakeholders, and supports and tracks mitigation progress.
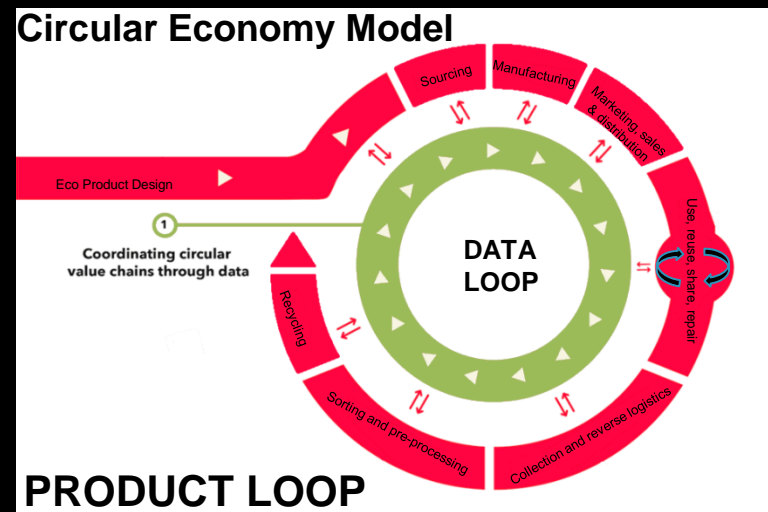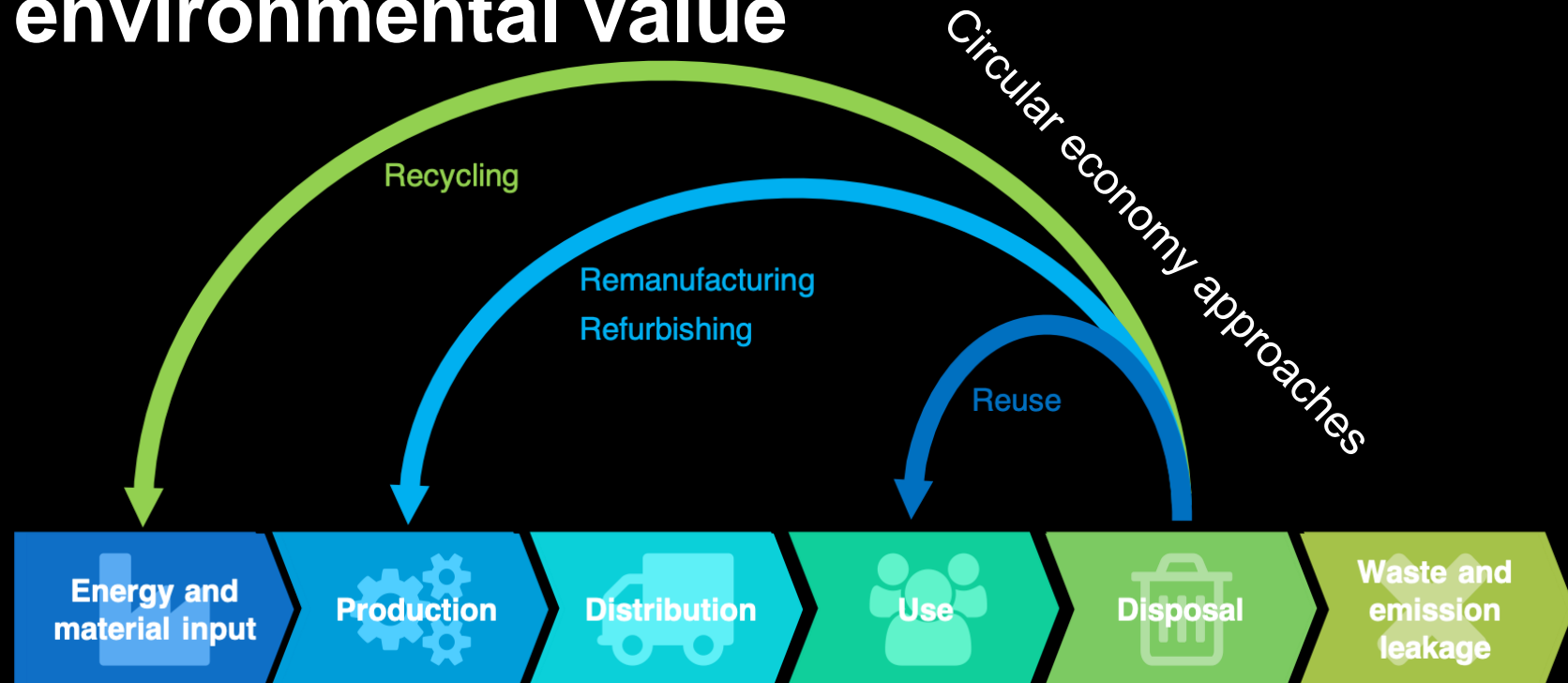
Example: Digital Product Passport

▸ Environmental footprint of products cannot be calculated across supply chains & lifecycles due to a loss of data

▸ Digital product passports solve this problem – for every product loop, there is a data loop

▸ Enables tracking and tracing of product information across supply chain & lifecycle.

▸ Enables extended producer responsibility, regulatory monitoring and consumer information

Circular economy approaches

Recycling

Remanufacturing
Refurbishing

Reuse

Energy and material input | Production | Distribution | Use | Disposal | Waste and emission leakage

Longer use
Intensifying use
Dematerialisation

Circular Economy Model

Eco Product Design

Sourcing — Manufacturing — Marketing, sales & distribution

Use, reuse, share, repair

Coordinating circular value chains through data

DATA LOOP

Recycling

Sorting and pre-processing

Collection and reverse logistics

PRODUCT LOOP

- Provenance
- Environmental certificates
- Composition
- Instructions for re-use, repair, recycling
- End of life handling and safe disposal

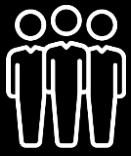# 3. Automated sustainability decisions and optimization of natural resources

Example: United for Smart Sustainable Cities

▸ Toolkit on Digital Transformation for People-Oriented Cities and Communities Self-assessment

▸ People-oriented

▸ Tailored approach & area-based intervention

▸ Capacity building

▸ Data management

▸ Globally 105+ cities

Digital Transformation of Cities and Communities

Developing a Digital Transformation Strategy

Data Processing and Management

Connectivity, Digital Divide and Digital Inclusion

Accessibility and Digital Inclusion

Reduce the Environmental Impact of Cities

Smart Energy Management

Smart Water Management

Emergency Management

4IR and Smart Manufacturing

Smart Sustainable City Governance

https://u4ssc.itu.int/

ITUPublications
International Telecommunication Union
Standardization Sector

Toolkit on digital transformation for people-oriented cities and communities
User guide

4. Agile and participatory environmental governance processes, services and enforcement

Example: Sparrow

▸ Low cost mobile air quality sensor providing hyperlocal air quality data

▸ A network of public vehicles, including buses, taxies and municipal equipment

▸ All equipped with Sparrow Nodes, providing real-time street-level data

- ⠿ PM$_1$ (μg/m^3)
- ⠿ PM$_{2.5}$ (μg/m^3)
- PM$_{10}$ (μg/m^3)
- NO$_2$ (μg/m^3)
- O$_3$ (μg/m^3)
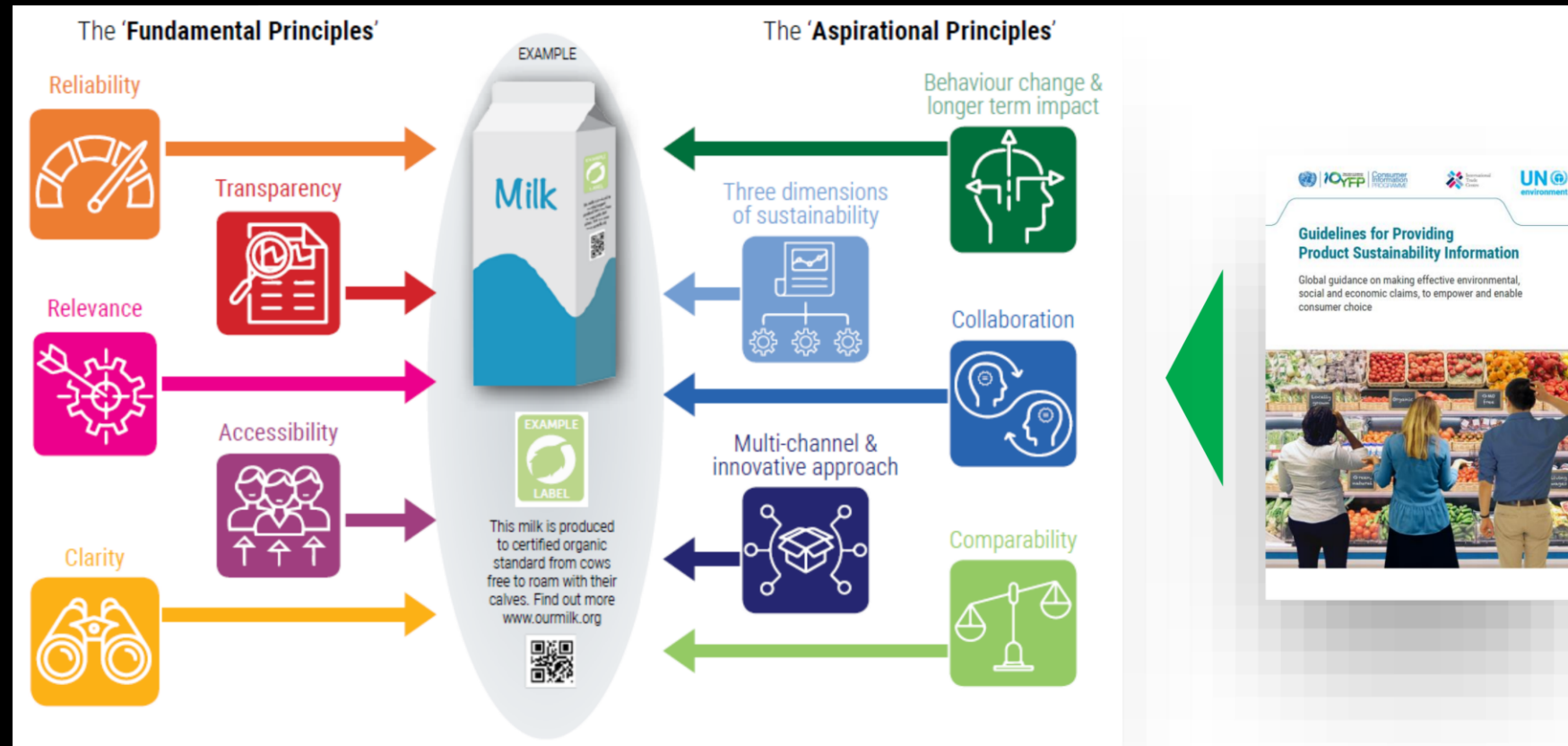- Temperature (°C)
- Humidity (%)

https://map.sparrow.city/
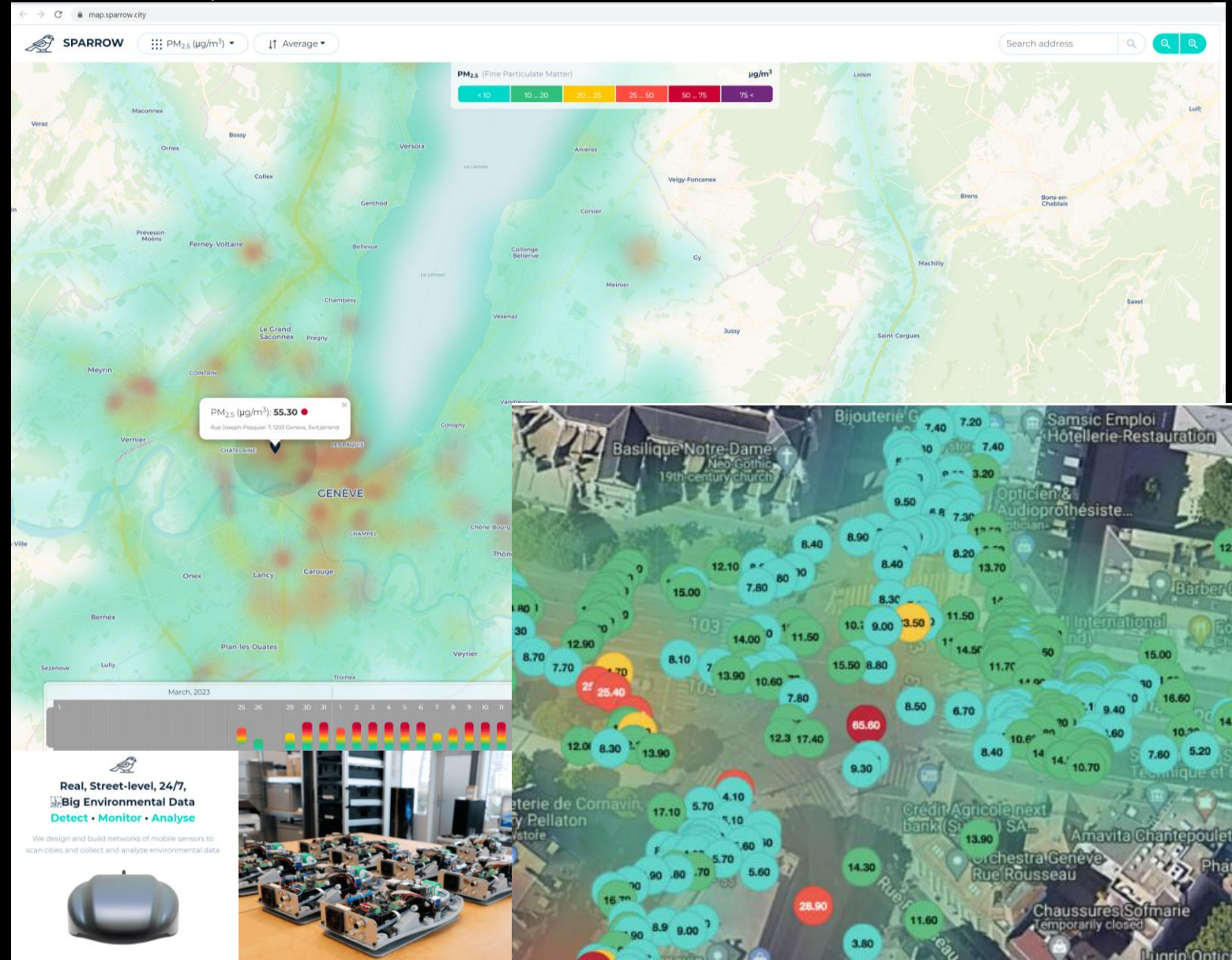
5. Enabling consumers to select green products and lifestyles & receive feedback

Example: E-commerce

▸ Over 2 billion people purchase goods or services online, raising new challenges and opportunities for sustainable consumption

▸ UNEP and Adelphi extended Product Sustainability Information Guidelines to E-Commerce

▸ Launching e-commerce working group for sustainability

5. Enabling consumers to select green products and lifestyles & receive feedback

Example: Playing for the Planet Alliance

- Over 3 billion people play video game worldwide

- 40+ video gaming companies with a combined reach of over 1.5 billion monthly active users

- Embeding green values and activations into video games

- Sharing best practice on net zero

- Annual Green Games Jam competition involving more than 120 million players

While 60 countries have digital transformation strategies - only partial provisions on environmental sustainability. 133 countries lack strategies.

Existing strategies over emphasize economic growth using "green ICT solutions" while <u>missing</u> enabling environmental sustainability through digital technologies.

National digital transformation strategies should begin to explicitly recognize

1. Environmental and Climate Goals:
Digital transformation must be done in a sustainable way that takes into account environmental and climate risks and opportunities. How can countries respond to the increasing demand for data about the environment and climate performance of all products and services.

2. Data as an enabler of national SDG goals, green economy and commitments to MEAs:
Identify how environmental data can contribute to accelerating SDG goals, MEA commitments and a circular green economy. How can environmental analytics detect risks to economic development ?

3. Data needed to measure the impact of the digital sector:
Identify the types of data needed to monitor and mitigate the environmental footprint of digital transformation (e.g. energy, GHG emissions, water, e-waste).

4. Green Digital Infrastructure:
What digital infrastructure are needed to support the collection, sharing, storage and analysis of environmental data. How can this infrastructure be green and climate-resilient ?

5. Capacities and capabilities:
Identify the public and private sector capacities needed to collect environmental data for decision-making, product transparency, and environmental disclosures.

International engagement opportunities
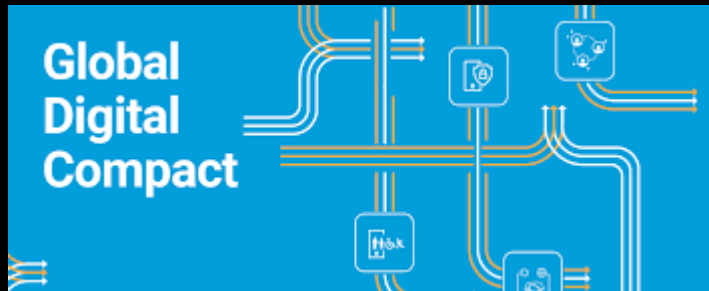
Global Digital Compact

- Integrate sustainability as a key principle – both sustainable digitalization and digitalization as an enabler of sustainability

UN Environment Assembly

- Agreement on global environmental data strategy
- UNEP to develop a global environmental data platform

Coalition for Digital Environmental Sustainability (CODES)

- Open multi-stakeholder coalition advancing collective action in 9 Impact Initiatives

Global Digital Compact is a major opportunities to address sustainability risks and opportunities

Global Digital Compact

| Roadmap for Digital Cooperation (Jun '20) | Our Common Agenda (Sept '21) | Roadmap for GDC issued (Jan '23) | Deadline for GDC submissions (30 Apr '23) | Thematic deep dives (until June '23) | Development issues paper | Intergovernmental negotiations on GDC | Summit of the Future (Sep '24) |

Potential topics for Geneva – e-commerce, digital product passports, data governance, digital for circular economy, digital finance

UN Environmental Assembly: A global environmental data strategy is needed underpinned by international standards

Interoperability:
Ensure shareability, interoperability and integration of environmental data

Quality:
Ensure quality control measures are in place

Provenance:
Ensure the source and methodology of the data is properly documented

Relevance:
Help understand the relevance and suitability of the data for analysis

Attribution of IP:
Attribution of Intellectual Property for derivative products
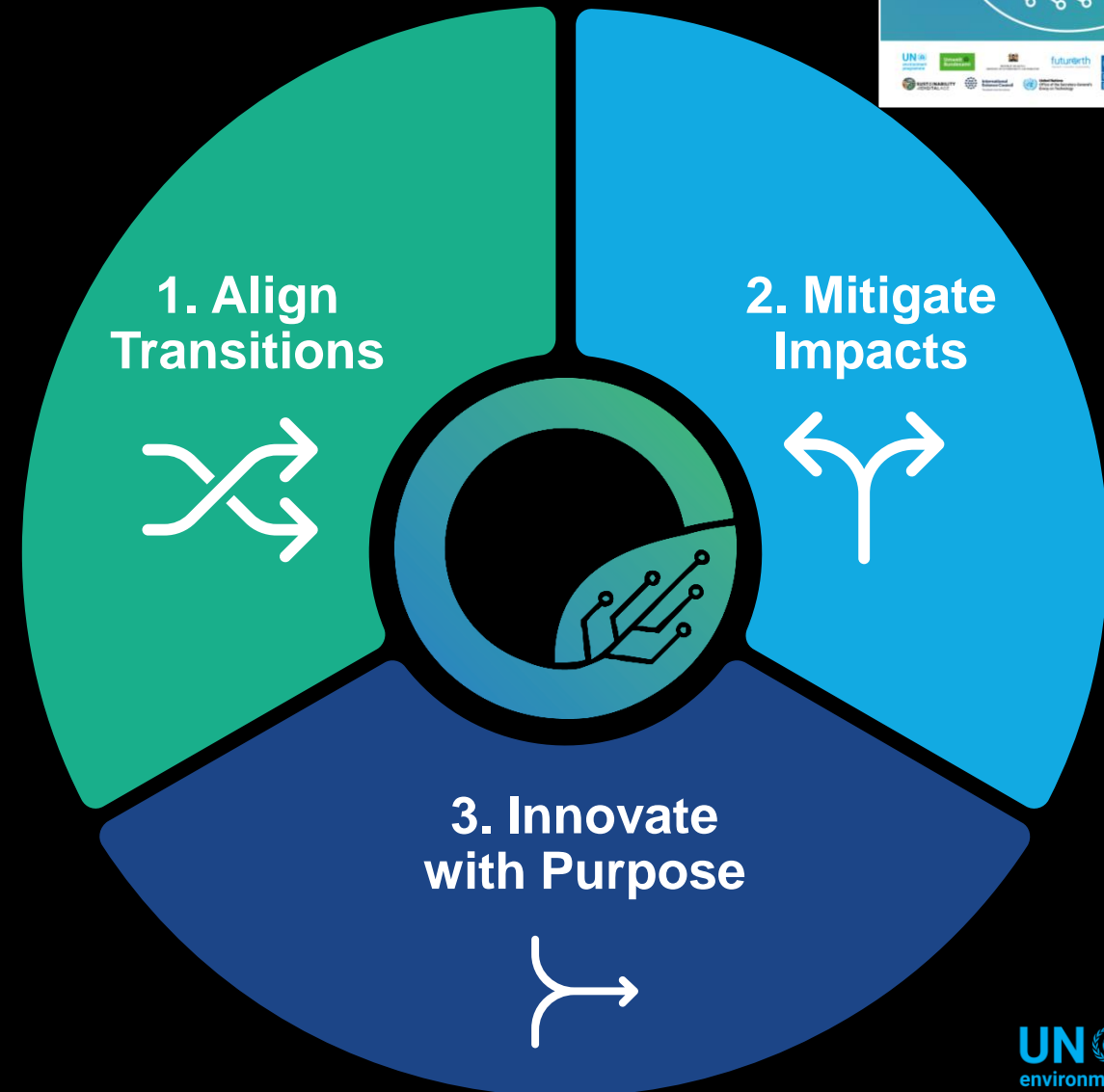
Business Models and Safeguards:
Public-Private partnerships with safeguards & suitable business models

UNEP co-founded the Coalition for Digital Environmental Sustainability (CODES)

- **SG Roadmap:** Follow-up to address key digital sustainability gaps (climate, nature, pollution).

- **Mission:** Convene, connect and coordinate stakeholders working on digital sustainability to:
  - Establish a policy agenda and set of priorities to influence relevant global multi-lateral processes
  - Catalyze collaboration and systems-level transformation across 3 shifts

- **Multi-stakeholder participation:** coalition of public sector, companies, academia and civil society. 1,200 members – 16k subscribers

- **Co-champions:** UNEP, UNDP, Future Earth, International Science Council, Kenyan Ministry of Environment and Forestry, German Environment Agency.

1. Align Transitions

2. Mitigate Impacts

3. Innovate with Purpose

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Engage in the 9 Impact Initiatives of CODES:

CODES COALITION FOR DIGITAL ENVIRONMENTAL SUSTAINABILITY

3. Education on digital sustainability

4. Harmonization of GHG Inventories

2. Digital standards clearing house

5. Sustainable procurement & green digital infrastructure

1. Align Transitions

2. Mitigate Impacts

1. World Commission on Digital Sustainability

6. Digital Product Passport

3. Innovate with Purpose

9. Decentralized Financing of Sustainable Solutions

7. Digital Sustainability Innovation Hubs and Accelerators

8. Data and Assessments for Sustainability

https://www.codes.global/

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Digital4Sustainability e-learning programme: 5k participants

https://www.unssc.org/courses/digital4sustainability-learning-path

UNEP is looking forward to strengthening our collaboration with international, regional and national partners in addressing these challenges together

UN environment programme

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