FutureBridge

REPORT

TOWARDS A GREENER TOMORROW

AI Innovations in Life Sciences Sustainability

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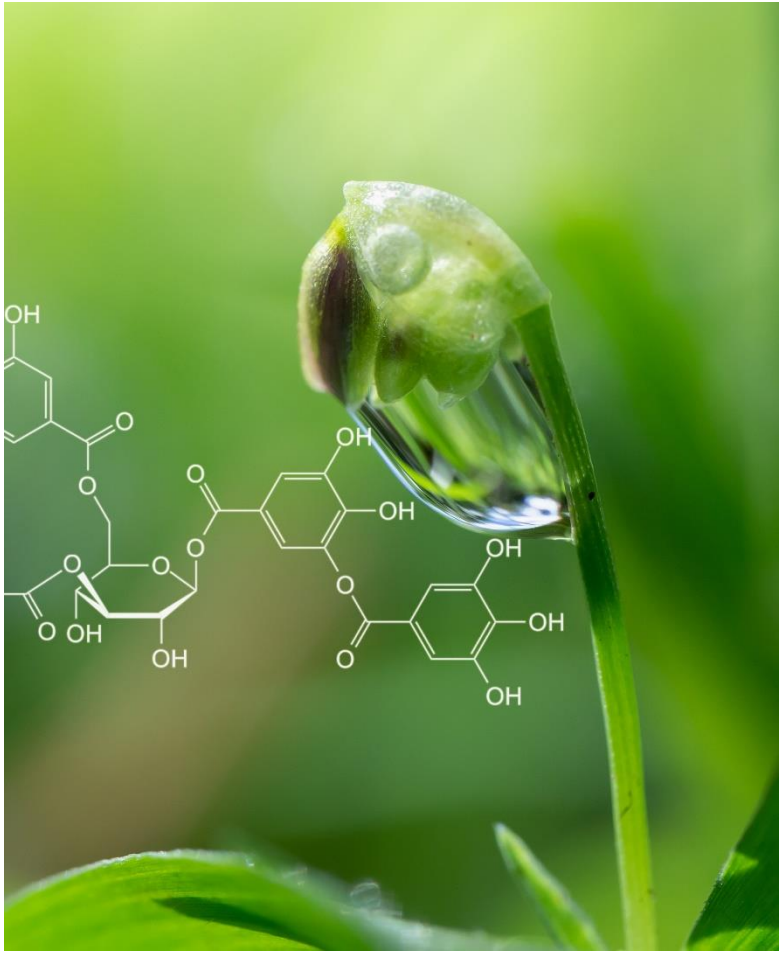
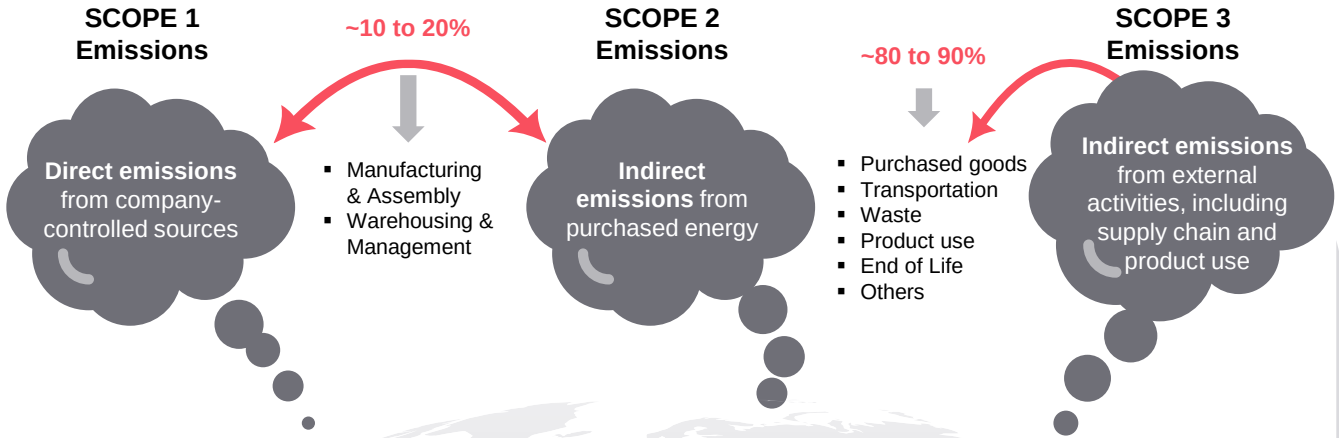


Sustainability in MedTech

MedTech companies need to revamp there manufacturing process as Governments of various countries have implemented stringent waste disposal regulations



MedTech companies should start to monitor and reduce emissions strictly as in next **5 to 10 years**, countries like Singapore, China, and South Korea are planning to **increase carbon offset price** and other countries may follow the suit

Relevant UN SDG for MedTech (Goals)

- **3** Good health, well-being, and better patient outcomes
- **10** Reduced inequalities
- **12** Responsible consumption and production
- **13** Climate action

AI-driven sustainability

AI-driven sustainability enables MedTech companies to align their operations with ESG goals through forecasts and analytics

AI technologies like Predictive AI & Generative AI are trending opportunities for sustainable MedTech

For setting and meeting ESG or SDG goals, MedTech companies require minimal investment and can even be cost neutral for years to come.

Reduction of Scope 1 & Scope 2 Emissions

- Up to **50%** downtime reduction
- Deploy sustainable materials within **1 to 3 years**
- **2X faster pace** in design innovation

Reduction of Scope 3 Emissions

- **30%** material savings and error reduction
- **44%** cost reductions
- **40%** reduction in non-compliance incidents

Impact of AI in Sustainable Practices

Over 50% of emission and waste can be eliminated by AI-driven circular economy model

SCOPE 1 & 2 Emissions Reduction

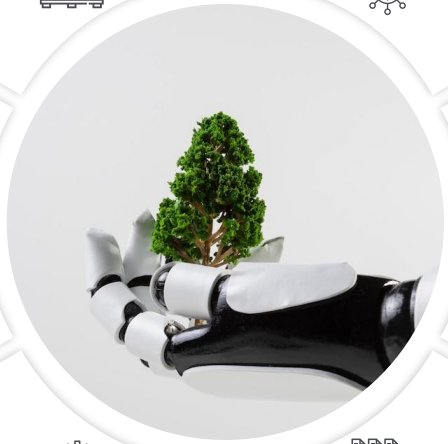
SCOPE 3 Emissions Reduction

RAW MATERIALS

Use **Sustainable Materials** through selection and testing of materials

DISTRIBUTE

Reduction of emissions from transport via **green logistics** and optimized packaging and routing



DESIGN

Develop **Sustainable Design** for remanufacturing, maintenance, reduced material use, and energy efficiency

USE

Extend product lifetime via service/ maintenance offerings, software-based updates, and multiple-use capabilities

PRODUCE

Manufacturing by reduce manufacturing scrap and waste; improve energy efficiency

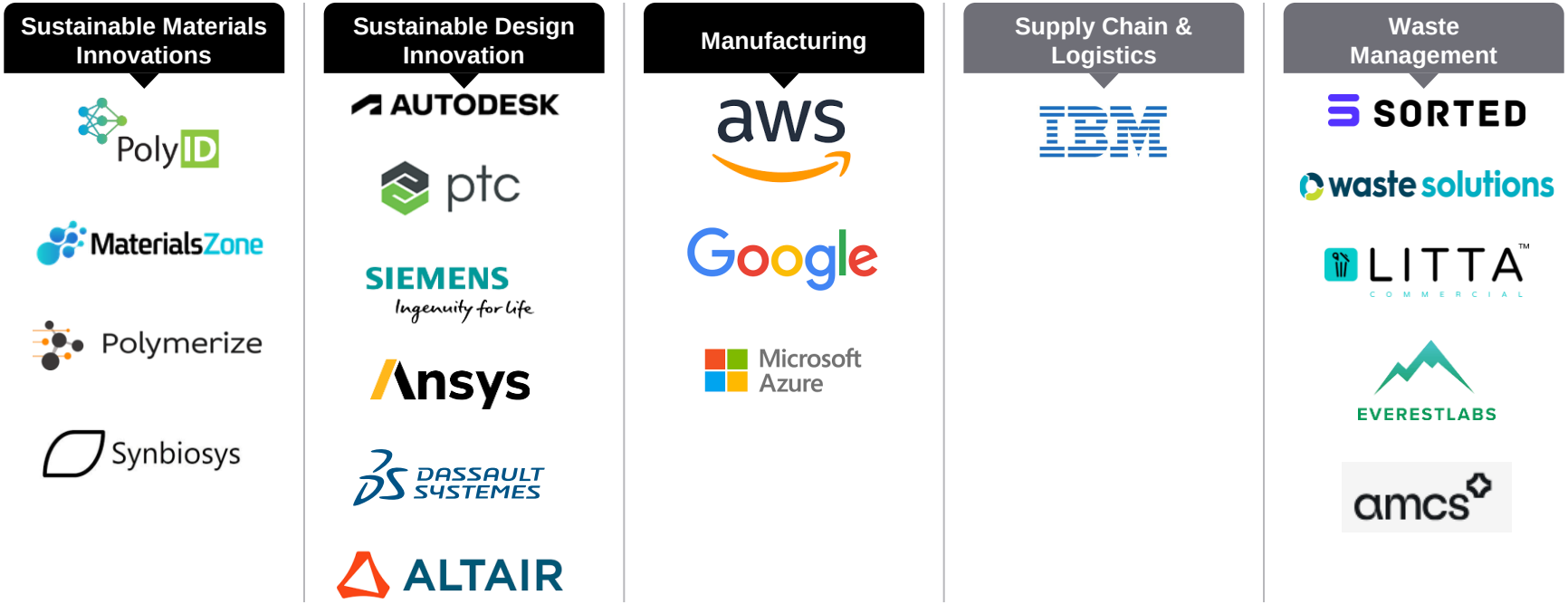
COLLECT & SORT

Product traceability, facilitate collection & sorting; establish infrastructure and technology for **recycling and reprocessing**

> Some of MedTech companies have already identified ways to embrace circularity for a sustainable future and at same time enjoy benefits for their business

AI in Sustainable Practices

Identify use cases prior to AI adoption



Who are the MedTech players adopting the automation of the circular economy practice? And how?

Note: Not an exhaustive list

Start-up Activity for exploring AI in sustainability

Start-ups developing technology-based products and services that enhance environmental sustainability

Mavarick AI's solution enables sustainable manufacturing through AI and recently has raised **€1.3 million** in pre-seed funding

Note: Not an exhaustive list

How Big Players are leveraging AI in sustainability?

Healthcare centers have started collaborating with various players for their waste recycling using AI and automation of their workflow

Using **AI-based predictive maintenance programs**, Philips has achieved its entire **value-chain CO_2 emissions reduction** targets approved by the Science Based Targets initiative (SBTi) and was awarded with a CDP 'A-list' score for climate change for the 10th consecutive time

Surgical Holdings launches **academy for medical device education** about manufacturing, materials, function, and performance of surgical instrumentation that are used daily. It's about educating stakeholders on the profound implications of **sustainability** in healthcare by embracing a circular economy

BCN Smart Tech is set to deploy *CINWAM (Centralised INfectious WAste Management)* platform leveraging on the **Internet of Things (IoT)** and **Artificial Intelligence (A.I)** for smarter hospital waste management in Malaysia

Established a **sustainable remanufacturing facility** in Geelong. The company **remanufactures single-use medical devices** from local Australian hospitals by sorting, cleaning, testing, inspecting, packaging and relabeling of products to prevent them from going into landfill

> **Baxter** has successfully **implemented IV bag recycling pilot program** for US hospitals, and it plans to expand this outside US as well

Note: Not an exhaustive list

Success Stories: Manufacturing – Machine Monitoring

Predictive AI can predict energy consumption and emissions at early stages

CASE STUDY

TITLE

Optimizing Overall Asset and Employee Efficiency

COLLABORATION ACTIVITY

Mavarick

Orthopedic manufacturer

CHALLENGE

Manufacturer lacked automatic data capture and manufacturing data analytics. Their data was manually processed, unreliable and not being used to inform their operations or key decisions

SOLUTION

Mavarick's Production management & machine monitoring system impact:

14% Increased machine output

18% Improved quality & decreased scrap

>€200k per year

39 hours/week saved in manual data processing

RESULTS

Mavarick's system increased manufacturers machine output by 14%, reduced their scrap rate and improved employee efficiency, achieving an ROI in 7 weeks.

> By adopting AI based predictive solutions, MedTech companies can implement predictive maintenance easier, and faster for sustainability analytics, with or without requiring any data resources

Success Stories: Sustainable Materials Innovation

AI can cut MedTech research time from 20 years to 1-2 years and reduce costs

CASE STUDY

TITLE

Biodegradable Polymer Design Enabled by **PolymRizeTM**

MATMERIZE Accelerated materials design

PolymRize™ AI ASSISTED POLYMER DEVELOPMENT

COLLABORATION ACTIVITY

MATMERIZE Accelerated materials design

CJ BIOMATERIALS

CHALLENGE

Increasing plastic waste in environment created an urgency for sustainable alternatives

SOLUTION

PolymRize™ is an AI based custom model training and predictive platform:

- Rapidly estimate the performance of newly designed materials
- Quicker decision-making
- Reduces time and costs compared to traditional methods

RESULTS

CJ Biomaterials developed PHACT, a 100% bio-based Polyhydroxyalkanoate (PHA) naturally degradable in environment

Source: Matmerize

> Microsoft launched **MatterGen**, a generative AI model for material discovery that generates hypothetical materials with specified properties rather than a filter-based traditional approach using properties

Drawbacks with AI implementation

Assessing the positive and negative impacts of AI in decarbonization efforts

High Energy Consumption

- AI systems, particularly deep learning models, require computational resources and energy consumption during both the training and inference phase
- A study reported estimated that training a single large AI model can emit as much carbon dioxide as five cars over their lifetimes

Data Centers

- Data centers are important for AI infrastructure, and these data centers require servers, cooling systems, and networking equipment
- A study reported that data centers account for approximately 1% of global electricity consumption, and is expected to rise with the growing demand for AI

E-waste Generation

- E-waste contain toxic materials such as lead, cadmium, and mercury
- The improper handling and disposal of e-waste can result in the release of toxic substances, posing risks to human health and the environment.

Indirect Environmental Consequences

- E.g., mining of rare earth elements and materials required for AI hardware production can lead to habitat destruction, biodiversity loss, and water pollution
- Further, the transportation and logistics associated with the AI devices contribute to greenhouse gas emissions

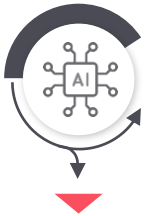
Experts predict that in future, healthcare providers will partner more with technology companies to develop and deploy AI tools

Note: Not an exhaustive list

Best practices for Sustainable AI: What now? - Continuous monitoring: key for MedTech AI integration

Lifecycle Assessment of AI Systems

- Eco-design
- Sustainable material selection, and
- End-of-life management of AI systems

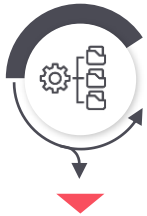


Energy-efficient AI Models

- Develop energy-efficient AI models to reduce energy consumption

Green Computing Infrastructure for AI Systems

- Energy-efficient hardware
- Optimized software
- Sustainable infrastructure designs
- Renewable energy source



Sustainable procurement and disposal practices

- Adopt sustainable procurement practices
- Implement responsible disposal practices to ensure proper handling and recycling of e-waste

Continuous Monitoring of AI Systems

- Continuous monitoring to ensure that their AI systems remain environmentally friendly over time

One of the study reported that “autonomous AI could potentially reduce greenhouse gas emissions in healthcare by up to 80%”

AI Innovations in Life Sciences Sustainability: Let’s Shape the Next Breakthrough Together

I hope you found the content in the report helpful and that it answered some of your questions.

We’d love to hear more about what prompted you to **download it** - was there something specific you were hoping to find?

If there are any areas you’d like to explore further or if you have ongoing priorities in this field, **we’d be happy to chat.**

This is an area our Life Sciences practice works in closely with clients across the industry, so we’re always open to a conversation about what might be useful for you.

Feel free to click below to set up a time that works best. Look forward to connecting!

Schedule time with us

Thank you

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