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# HOW COVID-19 HAS ACCELERATED USE OF TECHNOLOGY FOR low carbon behaviours

# Low Carbon Behaviour?

Countries have agreed to keep climate change within 1.5 degrees Celsius
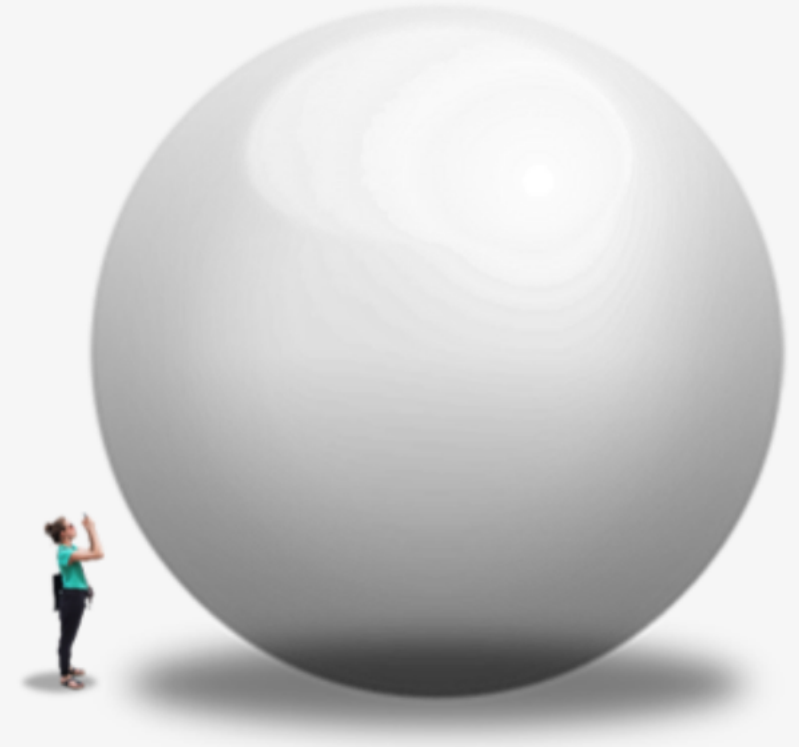
**01** tonne $CO_2$-eq per capita

**Our carbon footprint limit by 2050**

**06** tonne $CO_2$-eq per capita

**Current global average, and growing**

**20** tonne $CO_2$-eq per capita

**Developed countries levels**

# Food

Hotspot: meat and dairy, processed food

Reductions: plant based, local, unprocessed

# Housing/office

Hotspot: Fossil fuel based grid

Reductions: Telecommute, small homes, energy efficiency

# Mobility

Hotspots: car use and air travel

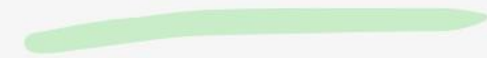Reductions: car-free travel, EV, ride share, teleconference

# Leisure and consumables

Hotspots: cheap flights, fast fashion/electronics

Reductions: Local travel/staycation, learn DIY, less shopping, more making, recycling/renting

what do low carbon behaviours look like?

# Technology for low carbon behaviour?

COVID-19 dramatically changed our everyday lives

ICT has played a large part in alternatives

But isn't technology bad for the environment?

supply chain

**Extraction** of minerals causing local impacts?

**Production** along unfair supply chains?

Energy **consumption** of data centers?

e**Waste**?

# ICT is an enabler for sustainability

The impacts of ICT must be measured, made transparent, and managed.

That said, some consider ICT one of the greenest sectors, not because of the impacts it has, but because of the impacts it prevents.

# COVID and ICT

Still too early to know what the impact of COVID on the environment is now and will be over the course of the pandemic.



**Food**

**YouTube, Pinterest, Instagram supporting home cooking (less waste, more conscious consumption)**



**Housing/ office**

**Work from home, virtual metings, eLearning reduce impacts of office/school**



**Mobility**

**Rise in bike share demand, no flights or even travel in some cases**



**Leisure/ Things**

**Virtual entertainment and exercise, online crafts/DIY, meeting friends online, repair, share**

# ICT and Plastic



Objective: Cities in ASEAN use smart technology to monitor, assess, and sustainably manage plastic waste
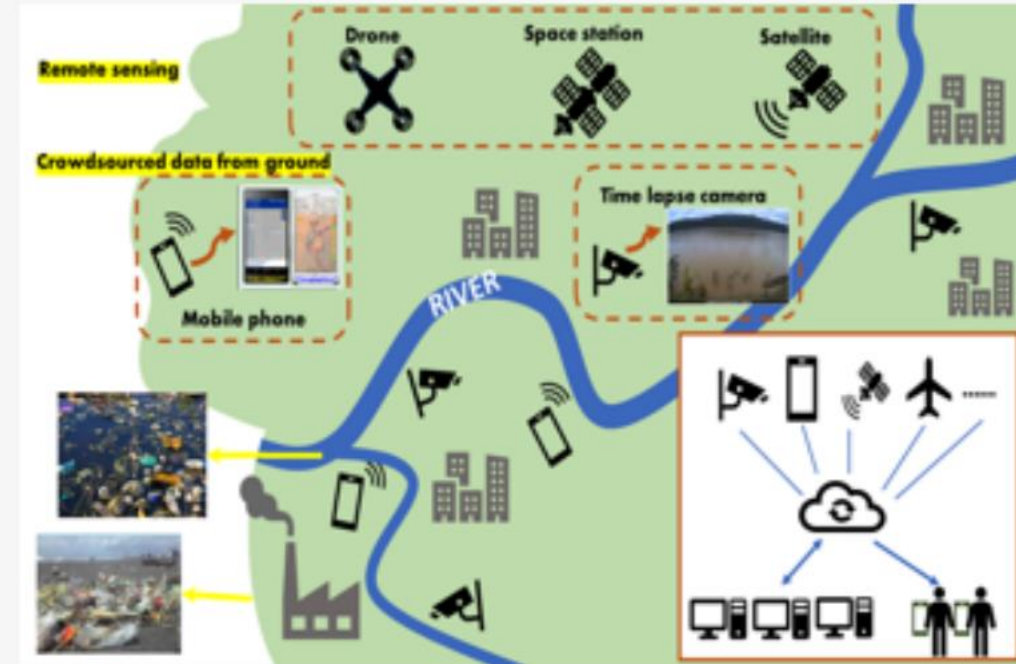
Vietnam, Indonesia, Thailand, Malaysia

**01**

Baseline assessment
(digital readiness, plastic flows, policies)

**02**

Digital Mapping Tool
(Remote sensing, crowdsourced data, machine learning, digital platform)

https://www.unescap.org/projects/closing-the-loop

From the People of Japan

**...Design for best possible after-use in a given market?**

**Durable design tool**
AI-based application supporting design choices by connecting data on alternatives to hazardous or hard-to-recycle material given the product's target market recycling infrastructure. Product modularity and overall durability is evaluated and results are communicated though an overall circularity index for the designed product.

- Big Data
- Artificial Intelligence
- Digital Twin

**...Enable transparency on material flows?**

**Provenance tool**
Blockchain enabled tracing of material to origin.

- Cryptographic Anchors
- Blockchain

**Product passport**
Standardized dataset including product specifications and real-time condition.

- Cryptographic Anchors
- Blockchain

**Internet of materials**
A decentralized data system building on a standardized digital dataset registering material types and volumes sold, collected, and treated across markets.
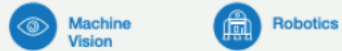
- Cloud Computing

**...Optimize sorting and pre-processing processes?**

**Hyper-intelligent sorting systems**
Machine vision and robotic-based sorting enabling cost-efficient and accurate sorting across products, components and brand owners, allowing for closed loop material recycling models

- Machine Vision
- Robotics
- Cryptographic Anchors

**Learning disassembly robots**
Disassembly processes with robots using dismantling commands stored in product passport, or in the case of open loop systems robots that can adapt their dismantling routines by learning from human colleagues working hand in hand

- Robotics
- Machine Learning
- Cryptographic Anchors
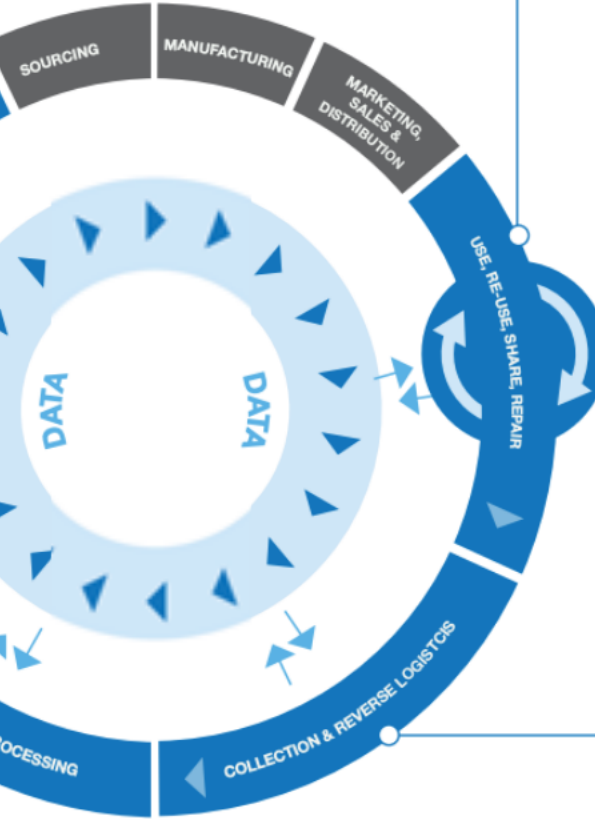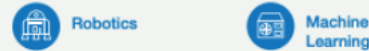
**...Enable efficient reuse of products?**

**Service-based models**
Sensor-based tracking of product condition throughout the use phase by device manufacturer to offer customers targeted repair and upgrade services/solutions.

- Internet of Things
- Blockchain

**Value assessment tool for used products**
Tool allowing consumers/resellers to read a product's condition, certify its value and assess most appropriate after-use pathway to increase trust and efficiency in second hand markets.

- Internet of Things
- Big Data
- Blockchain
- Cryptographic Anchors

**...Optimize collection & reverse logistics?**

**Value-based return incentives**
Collection stations equipped with product identification and value assessment capability offering incentives (e.g. tokens, discounts, donation) through a blockchain-based remuneration scheme.

- Machine Vision
- Blockchain
- Mobile

**Waste taxi**
Reversed logistics for high-value products leveraging existing infrastructure of customer-facing delivery services (e.g. taxis, parcel delivery).

- Big Data
- Artificial Intelligence
- Internet of Things

Diagram labels: SOURCING, MANUFACTURING, MARKETING, SALES & DISTRIBUTION, USE, RE-USE, SHARE, REPAIR, COLLECTION & REVERSE LOGISTICS, SORTING & PREPROCESSING, RECYCLING, PRODUCT DESIGN, DATA

WEF: Harnessing the Fourth Industrial Revolution for the Circular Economy Consumer Electronics and Plastics Packaging

# eCommerce and Plastic

Enable consumer choice for sustainable products

Green consumer segment (AI)

Nudging towards sustainable products

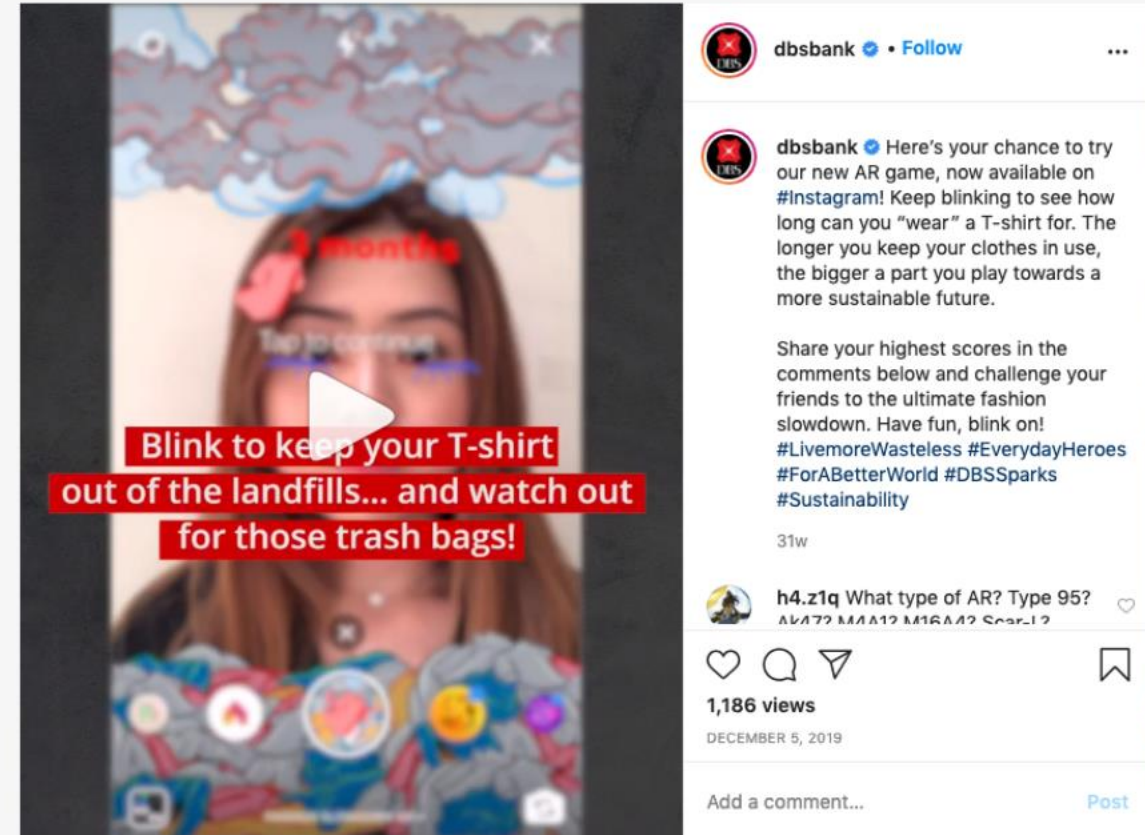Potential enabler for sustainable public procurement

# VR and Sustainable Lifestyles



Virtual reality as a medium for climate change communication:

- Scale
- Immersive environment
- Art: create a beautiful experience
- Ambisonic sound and 3D graphics (depth)

Augmented reality as a medium for gamifying sustainable lifestyles:

- Put yourself in the game
- Mix of reality and your story

# Thank you

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