Supporting Economic Recovery through Innovation and Digitalisation

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Towards Sustainable Digital Transformation

Covid-19 has put digital technologies in the centre of society:

• Accelerated the digital adoption
• Changed behaviour for goods and services
• Made us rethink business models
• Mainstreamed new tools: 5G, IoT, Machine Learning, AI, blockchain, Additive Manufacturing, Big Data, Automation, Cloud Computing, ...

However, Covid-19 has slowed even further down the energy efficiency progress!
How can innovation and digitalisation enhance Energy Efficiency?

Building Management Systems

Additive manufacturing, big data, IoT, automation...

Smart cities

Electrification of energy uses

Smart and efficient appliances

Last mile logistics

UNEP DTU Partnership
How can innovation and digitalisation enhance Energy Efficiency?


Figure 1. Blockchain-based decentralised P2P energy trading system.
How can innovation and digitalisation enhance Energy Efficiency?

- Predict supply and demand
- Measure in real time
- Remote monitoring
- Improve analysis and decision making
- Increase transparency
The backbone and drawbacks of digital infrastructure - Datacentres

- 1% to 1.5% of worldwide energy use (2019)
- Energy use increase of 6% between 2010-2018
- Computing instances with 550% growth 2010-2018
- Datacentres require 10 to 100 times more energy than other commercial building types
How does a datacentre use energy?

- From chips to servers
- Routers, switches and cables
- Direct power, backup and storage
- Cooling and ventilation
- Control and security systems
What are the challenges to innovation and digital economy?

- **Rebound Effects**
  - Direct Rebound Effects
  - Indirect Rebound Effects
  - Carbon Emissions
  - Energy Demand
  - E-waste & resource inefficiency

- **Environmental Impacts**
  - Cyber Security & Data Protection
  - Digital Divide & Digital Access
  - Regulation & Standards
  - Economic Disruptions

- **Governance**
Examples of technical solutions

Renewable energy and heat recovery to district heating

Innovative Data-Centre Cooling Technologies in China - Liquid Cooling Solution

Underwater datacentres

Fuel cells & green hydrogen
Placing digital and energy efficiency at the heart of NDCs, SDGs and recovery packages

- Boost public digital infrastructure investment
- Develop regulatory frameworks, standards and policy & planning. Beware: technology (hardware and software) develops faster than regulation!
- Bet on re-skilling and upskilling of professionals
- Support SME's on digital transformation: commercial, industry, agriculture, forestry
- Test innovation and fund R&D
- Promote global collaboration and digital toolkits for developing and emerging economies
- Promote information, communication and behaviour change (use gaming and streaming entertainment for the effect)
Thank you.

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