Green Electronics and Decarbonisation

Henri RAJBENBACH

European Commission
Directorate Artificial Intelligence and Digital Industries

Microelectronics and Photonics Industry

KDT Workshop #3 -Green ECS and Decarbonisation

Outline (What it is not about)

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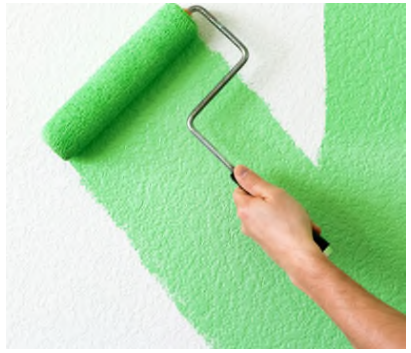

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Main common objective 3: Establish and strengthen sustainable and resilient ECS value chains supporting the Green deal

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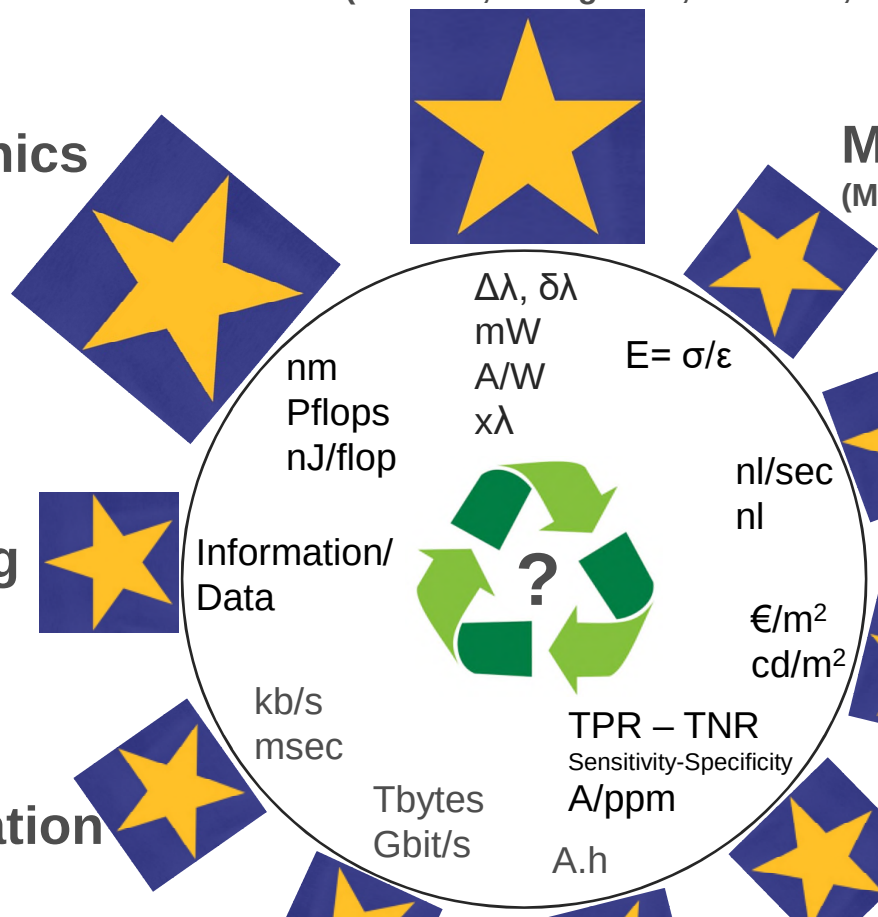
What it is also not about

Source: Le Monde 2, 2010

ECS: "*Integrated in Diversity*"

Specification space



Photonics
(Sources, waveguides, detectors, Si)

Micromechanics
(MEMS/NEMS sensing and actuating)

Microfluidics
(pumps & channels)

Flexible & Printed
substrates

Bio-photonics
Bio-sensing

Energy
(batteries, harvesting)

Storage

Communication
(Optical / RF/ Thz)

Control / Processing
Software (Embedded)

Micro- Nanoelectronics
(CMOS & post-Moore)

Co-design
+
Eco-design

Smart phone
Edge
Cloud

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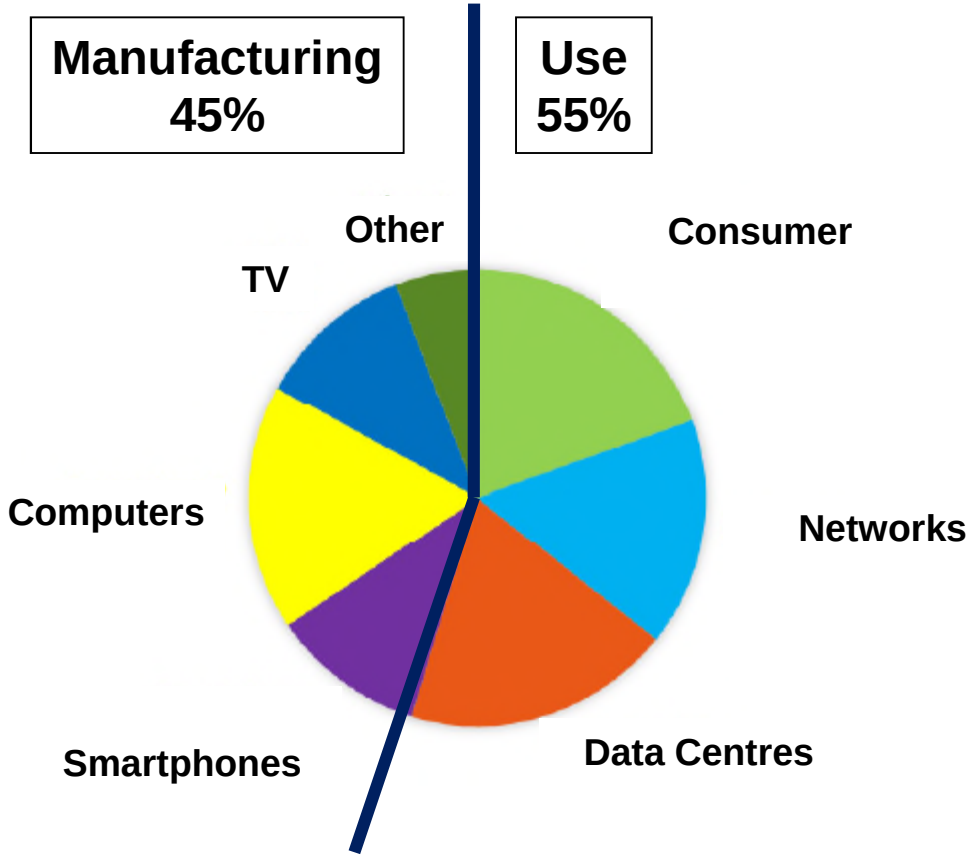
Energy consumption for digital



Equal pieces of cake

Need to fight on all fronts,
At the same time !

Manufacturing

Use

Source: Lean ICT materials, Forecast model; Produced by the Shift Project frm Data published by (Andrae & Edler, 2015)

Even worse….

Today the ICT sector accounts for:

5-9%
of electricity use

more than **2% of global greenhouse gas emissions** (as much as all air traffic).

2040

If unchecked, the ICT footprint could **increase to 14% of global emissions by 2040.**

But

But at the same time technologies could help:

reduce emission by 7 times
more than the amount created by the ICT sector;

reduce global emissions by **up to 15%.**

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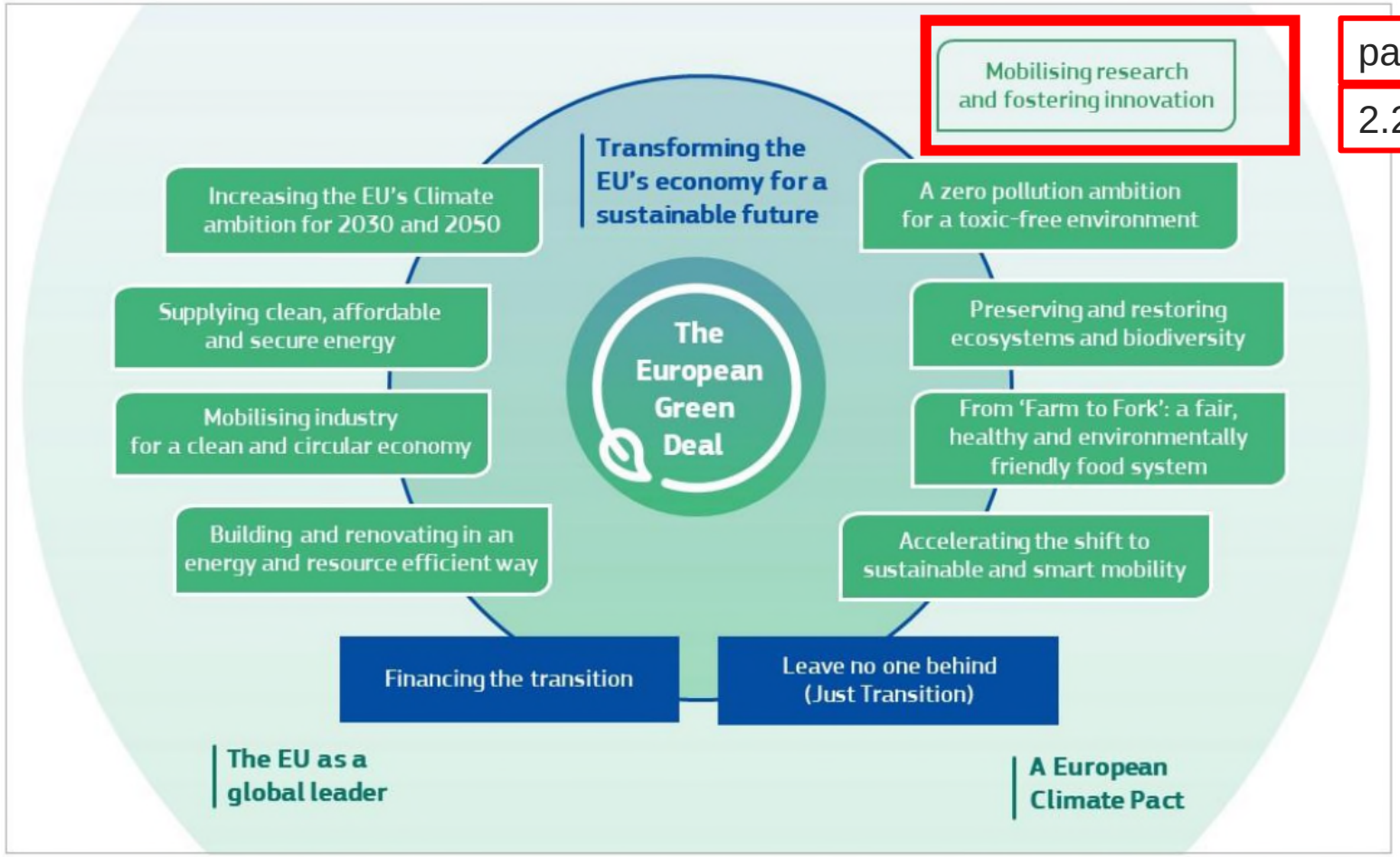
The European Green Deal



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2.2.3. Mobilising research and fostering innovation

New technologies, sustainable solutions and disruptive innovation are critical to achieve the objectives of the European Green Deal.

EU climate neutral by 2050

https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf (20 pages)

x ?

At least 35% of the budget of **Horizon Europe** will fund new solutions for climate, which are relevant for implementing the Green Deal.

Horizon Europe: x = 35 %

At least x % of the budget of **KDT-JU** will fund new solutions for climate, which are relevant for implementing the Green Deal.

Question: x in KDT-JU?

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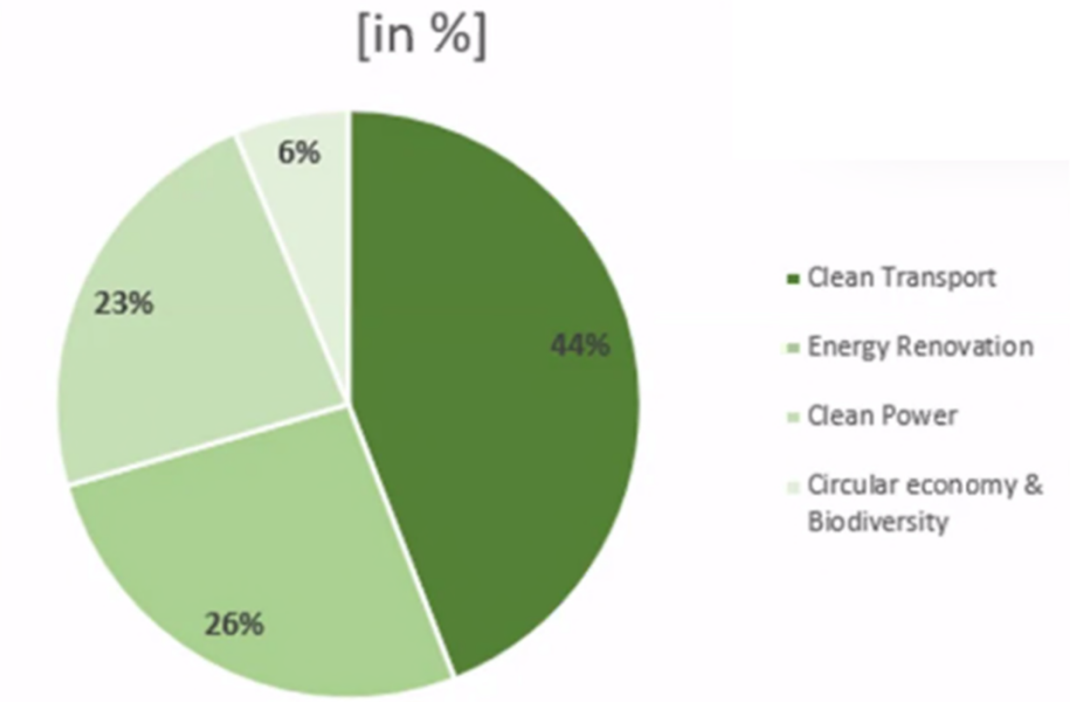
RFF (Recovery and Resilience Facility)

- **Climate-related investments** in the recovery and resilience plans will account for **at least 37%** of the total envelope of the Facility
- **EU added value (examples)**
  - IPCEI on hydrogen
  - Contribution to Energy Efficiency target (building renovation and decarbonisation of industry)
- Flanking **reforms** (e.g. permitting, taxation)
- Every single measure in the plans must comply with the **Do No Significant Harm Principle**



RRF: x = 37 %

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How to reach high x ?

50+ shades of Green

Green ECS

- **New materials and substrates**
  Wide bandgap, flexible
- **Low-power computing architectures**
  Neuromorphic, Quantum
- **Ultra-low power edge processing**
- **Si-Photonics, spintronic**
- **FDSOI**
- **In-memory computing**

ECS for Green

- **Multi-Sensing systems for environmental monitoring**
- **Post-Covid Teleworking environments**
- **AI – Artificial Intelligence, exploiting data base of good data, coming from distributed sensors, in real time**
- **Further digitalization of key application areas: Mobility, Agriculture, Health, Industry, Energy**
- **Reducing industrial environmental footprint: Energy efficiency, disposability of electronics**

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How much eco is eco ?

The principles of eco-design were published in 2002 (ISO/TR14062) https://www.iso.org/standard/33020.html

Eco-design considers **environmental** aspects at all stages of the product development process, striving for products which make the lowest possible **environmental** impact throughout the product life cycle. (Source: EEA Glossary)

Successive stages	• Raw material extraction and supply • Manufacturing • Product distribution • Consumer use • End of life (recovery and recycling)
Main criteria taken into account	• Consumption of raw materials • Energy consumption • Releases in the natural environment and other pollutions • Climatic impacts • Impacts on biodiversity
Some goals and principles are specifically about	• Using fewer materials and resources for manufacturing products • Using materials and resources obtained with a minimum environmental impact • Producing the least waste and pollution possible • Reducing the ecological impacts of distribution • Making reusing / recycling easier by intelligent design that makes disassembly easy

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How to green KDT-JU ECS portfolio?

Objective:

Green across the whole value chain

How to increase x ?

% of the KDT-JU budget relevant for implementing the Green Deal

- Green selection criteria (at PO or full proposal stage)?
- Green bonus in overall score (based on quantified objectives) ?
- Green evaluators ? (transversal evaluation)
- Green recommendations at reviews
  - Green exploitation plans
- Green € ? (Incentive funding)

Electrification of vehicles is intrinsically greener than Health – It is how much effort in project that counts

Going beyond “low power electronics is green”

Concluding,

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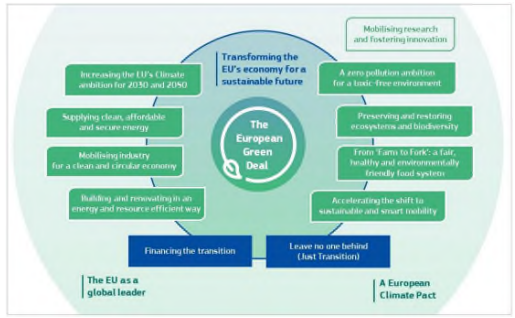

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“Extrinsically green”

“Intrinsically green”

Thank you

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