Functional electronics for green and circular economy

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CONNECT A3

30 June 2021
European Innovation leadership in electronics and photonics

2021

- DIGITAL-EMERGING-01-01: Ultra-low-power, secure processors for edge computing (RIA)
- DIGITAL-EMERGING-01-05: Open Source Hardware for ultra-low-power, secure processors (CSA)
- DIGITAL-EMERGING-01-31: Functional electronics for green and circular economy (RIA)
- DIGITAL-EMERGING-01-06: Advanced optical communication components (IA)
- DIGITAL-EMERGING-01-07: Advanced Photonic Integrated Circuits (RIA)

2022

- DIGITAL-EMERGING-01-03: Advanced multi-sensing systems (RIA)
Technology context: "Integrated in Diversity"

Photonics (Sources, waveguides, detectors, Si)

Micro-Nanoelectronics (CMOS & post-Moore)

Micromechanics (MEMS/NEMS sensing and actuating)

Microfluidics (pumps & channels)

Control / Processing Software (Embedded)

Co-design + Eco-design

Flexible & Printed substrates

Integrated Digital components

Communication (Optical / RF / Thz)

Miniaturisation

Packaging

Energy (batteries, harvesting)

Bio-photonics Bio-sensing

Storage
Advanced Nanoelectronics

Electronic Smart Systems

Flexible & Wearable Electronics

A holistic approach

01-32 Call coverage

Source: the 5E project - www.5e-project.eu
HORIZON-CL4-2021-DIGITAL-EMERGING-01-31:
Functional electronics for green and circular economy

**BUDGET**
- 35 million Euro
- Call opening 22-June-2021
- Submission: 21-Oct-2021

**PROJECTS**
- RIA
- EU contribution: 3-5 M€

**TRL (TECHNOLOGY READINESS LEVEL)**
- From 2-3 to 4-5 by the end of the project
Expected Outcomes:

- European leadership in the area of **flexible, printed and organic electronics**
- New concepts, designs and technologies in electronics for **circular economy and sustainability**.
- Next generation components and systems that will deliver **climate-neutral digital solutions**

Scope:

- **Technological breakthroughs** in functional electronics technologies
- Addressing challenges & opportunities of **green and digital transformations**.
- **Eco-design principles**
  - reduction of energy and resource consumption.
  - low-cost / light-weight / less energy intensive approach
Focus:

- Use of different types of substrates e.g. **flexible, stretchable and conformable**
- **Integration** in textiles, plastics, glass, paper and metal.
- Improvement of system characteristics - **performance, robustness, reliability**
- High throughput and low-cost **manufacturing processes**

- Application domains:
  - wearables, mobility, health/well-being, agriculture and environment, energy and smart logistics
- **Eco-design principles:**
  - Recovery and recycling solutions
  - Optimisation of the use of resources
    - e.g. energy efficiency at system and manufacturing level, material consumption
The principles of eco-design were published in 2002 (ISO/TR14062) [https://www.iso.org/standard/33020.html](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)

<table>
<thead>
<tr>
<th>Successive stages</th>
<th>Main criteria taken into account</th>
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<tbody>
<tr>
<td>• Raw material extraction and supply</td>
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<td>• Manufacturing</td>
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<td>• Product distribution</td>
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<td>• Consumer use</td>
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<td>• End of life (recovery and recycling)</td>
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<td>• Consumption of raw materials</td>
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<td>• Energy consumption</td>
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<td>• Releases in the natural environment and other pollutions</td>
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<td>• Climatic impacts</td>
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<td>• Impacts on biodiversity</td>
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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
Thank you

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