

Green, Organic and Printed Ultra-High Frequency Identification Tags (GRETA)



GRETA

Printed electronics

Ultra-High Frequency

Wireless Identification

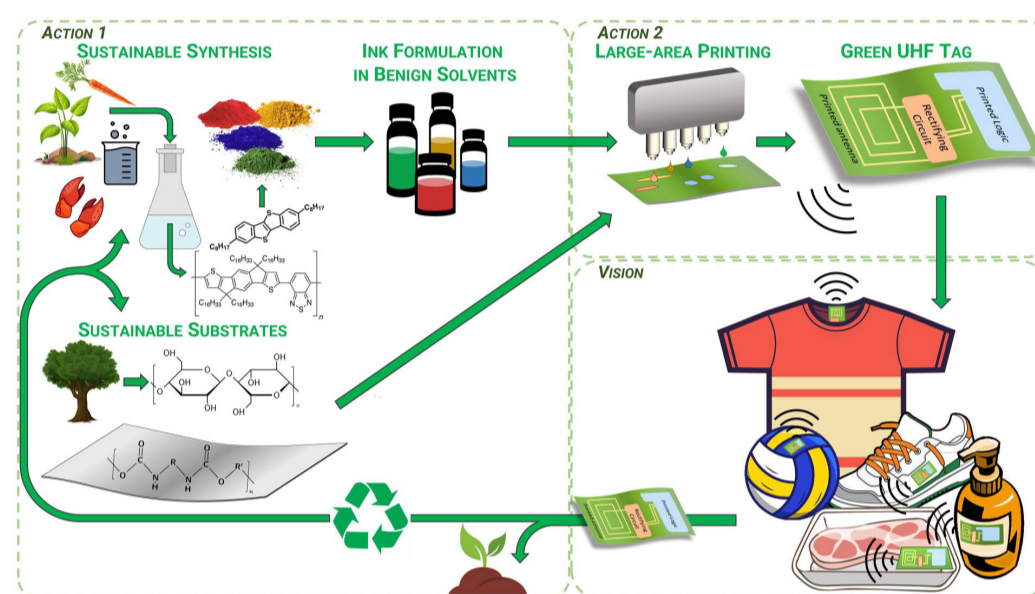
Organic Electronics

Green Chemistry

Eco-Design

PROJECT SUMMARY

GRETA will lay the foundation of the first green, printed and flexible organic wireless identification tag operating at Ultra-High Frequency (UHF, 300 MHz – 1 GHz). The long-term vision is to enable remote powering and readout of tags up to meters distance range, as required in logistics and security, without the need of a battery and with drastically reduced lifecycle impact and costing with respect to any available passive radio-frequency identification (RFID) technology. Measurable objectives: **Objective 1.** Green synthesis and development of sustainable and biodegradable materials (Action 1); **Objective 2.** Sustainable inks formulations for large-area printing tools (Action 1); **Objective 3.** UHF electronics based on sustainable printed organic semiconductors (Action 2); **Objective 4.** Enable an eco-designed, printed UHF wireless tag with sustainable lifecycle. GRETA will produce two demos: 1) GRETA UHF tag, demonstrating rectification of a 400 MHz wave to enable a code generator; 2) GRETA UHF logic, demonstrating a sustainable printed integrated 4-bit shift register. GRETA will serve emerging digitalization needs in logistics, healthcare and security without adding e-waste, independently from the silicon industry and from any critical raw material, and delivering safe materials for the environment. GRETA will quantify its drastically reduced environmental impact with a full LCA, along a cradle-to-grave approach, anticipating end-of-life scenarios.



CONSORTIUM PARTNERS



ISTITUTO ITALIANO DI TECNOLOGIA
INKJET PRINTING, PRINTED UHF TRANSISTORS, PRINTED ORGANIC LOGIC



DESIGN OF INTEGRATED CIRCUITS AND SYSTEMS



GREEN CHEMISTRY, SUSTAINABLE SYNTHESIS, ORGANIC SEMICONDUCTORS



PRINTED UHF ANTENNA, DISSEMINATION AND COMMUNICATION



LIFE-CYCLE ASSESSMENT (LCA) METHODOLOGY AND LIFE CYCLE COSTING (LCC)



CELLULOSE BASED SUSTAINABLE SUBSTRATES AND EXPLOITATION



ASSESSMENT OF ORGANIC SEMICONDUCTORS AND EXPLOITATION



HAVE

Competences

- Green Chemistry
- Printed Organic Electronics
- Electronic Design for Emerging Technologies
- LCA with cradle-to-grave approach
- Electronics industry experience

Materials

- Organic Semiconductors
- Functional inks formulations
- Cellulose based substrates
- Nanomembrane dielectrics

Processes

- Inkjet Printing of Organic Complementary Transistors and Circuits
- Femtosecond laser direct-writing
- Patterning of UHF antennas
- High-frequency characterization of devices (up to 1 GHz)

NEED

- High Resolution Printing/Patterning Processes
- Sustainable Printable Conductors with High Conductivity
- High-capacitance Robust Dielectrics for Organic Electronics
- Inert Substrates with High Thermal Conductivity
- Standardised purity characterisation protocols, with special emphasis on traces of metals

