



THIS PROJECT
RECEIVES FUNDING
IN THE EUROPEAN
COMMISSION'S
HORIZON 2020
RESEARCH
PROGRAMME
UNDER GRANT
AGREEMENT
NUMBER 869991.



Generate **high
quality jobs**
along the value
chain



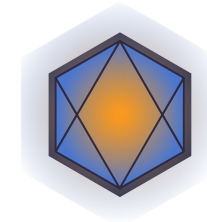
Accelerate the
adoption of **IoT
technologies**



40%
Reduction of
GHG emissions



50%
Reduction of
hazardous waste



InComEss

**INnovative polymer-based
COMposite systeMs
for high-efficient
Energy Scavenging and
Storage**

www.incomess-project.com

Advanced **polymer-based composite materials**

will be combined into a **novel single/multi-source concept**

to **harvest electrical energy** from mechanical energy and/or waste heat ambient sources

to be used in **3 different use cases:** vehicle monitoring in automotive, Structural Health Monitoring in aerospace and building.



Implementation of **Innovative Materials, Systems & Structures**

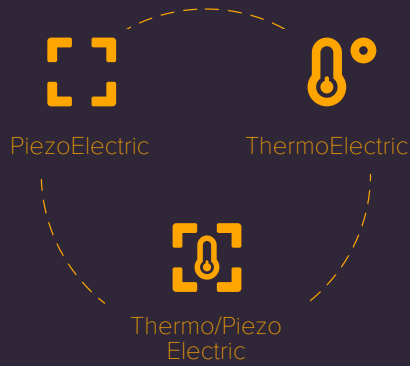


To develop **Energy Harvesting Systems**

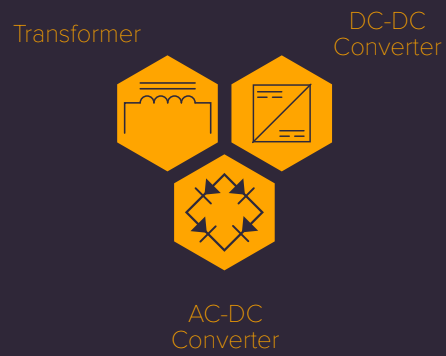


Able to power **FOS, GPS and MEMS sensors** in different Use Cases

Energy Harvesting/ Energy Generator Components



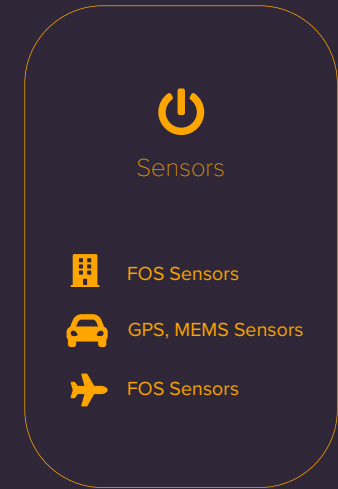
Power Conditioning Circuit



Energy Storage Component





Wireless Sensor Nodes (WSN) & IoT




Three Energy Harvesting Systems (EHSs)

3 cost-effective and green EHSs configurations will be realized through the combination of high performance piezoelectric (PE), thermoelectric (TE) and Thermo-Piezoelectric (TPE) generators and monolithic supercapacitors (SCs)

to power **selected wireless sensors nodes** to be implemented in different IoT scenarios

  for **Structural Health Monitoring (SHM)** in buildings and aircrafts

 and **accurate location and monitoring of vehicles** through GPS and MEMS sensing.

Development of Novel Energy Harvesting Systems (EHSs)

A novel **single/multi-source concept to harvest electrical energy** from mechanical energy and/or waste heat ambient sources.

- PiezoElectric EHS (PE-EHS)
- ThermoElectric EHS (TE-EHS)
- ThermoPiezo EHS (TPE-EHS)

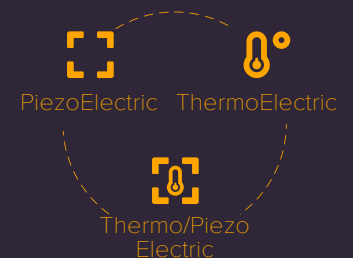
by their integration through an **Advanced Power Conditioning Circuit**

Power Conditioning Circuit

Wireless Sensor Nodes

Monolithic Supercapacitor

Energy Harvesting Energy Generator Components



Use Cases

The project will demonstrate its applicability in key sectors and applications, SHM and vehicle monitoring in automotive, aerospace and building, presenting the highest market potential.



Smart Buildings

Piezoelectric EHS
FOS



Automotive

Thermoelectric EHS
GPS, MEMS



Aerospace

Thermo/Piezo-electric EHS
FOS





Generate **high quality jobs** along the value chain



40% reduction of GHG emissions



50% reduction of hazardous waste



Accelerate the adoption of **IoT technologies**

Environment

The selected materials combinations and processing routes will allow reducing around 60% costs of overall materials and manufacturing process, including more than 40% reduction of the Green House Gas (GHGs) generated along their production value chain, and an overall reduction of hazardous waste by more than 50% compared to state-of-the-art materials.

Non-expensive ceramics and fillers together with highly recyclable and cheap polymer matrices will be used in InComEss, including avoidance of rare-earth elements and hazardous lead or Te-based elements, and ensuring a sustainable and efficient use of resources in line with the circular economy perspective.

 **40%**

Reduction of Green House Gas

 **50%**

Reduction of hazardous waste

 **60%**

Highly recyclable polymers

 **Pb**

Lead Free

 **Rare Earth**

Avoidance of rare-earth elements

 **Sustainability**

Sustainable and efficient use of resources



InComEss

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