Digital technologies in SmartEEs2

Electronics

Organic Electronics (OE), Organic & Printed Electronics (OPE), Organic Large Area Electronics (OLAE), Thin Organic Large Area Electronics (**TOLAE**), Large Area Electronics (LAE), Flexible & Wearable Electronics (**FWE**), ...

Definition

- ❑ Differentiation to silicon based electronics and processing;
- ❑ Low integration density, low operation speed
- ❑ But multi-substrates, large area, conformable, flexible, transparent, colors,… enabling design-driven products.

SmartEEs & SmartEEs2 SAE projects on

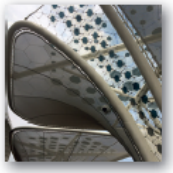
TOLAE & **FWE**

Previous pilot line project (InSCOPE) on

Hybrid electronics: organic + silicon based electronics

Smart4Europe2 has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 872111.

7th OE-A Roadmap for Organic and Printed Electronics (OPE)

	Existing 2017	Short Term 2018-2020	Medium Term 2021-2023	Long Term 2024+	
	Rigid white OLED modules; rigid red OLEDs for automotive applications	Flexible OLEDs (color); flexible OLEDs (white)	Transparent OLEDs; flexible red OLED for automotive applications	3D OLEDs; dynamic OLED signage (segmented); long stripes; OLED in general lighting	**OLED Lighting**
OPV	Portable OPV chargers; personal electronics power supply	Large area OPV foil; OPV objects; opaque OPV for building integration	OPV integrated in building products	OPV in packaging; energy harvesting combined with storage	
	Curved OLED displays, EPD shelf-edge labels, EPD secondary displays on phones; displays for wearables	EPD wrist band; transparent displays; conformable OLCD; enhanced display integration in wearables	Curved displays for autmotive interior; integration into clothing; white goods displays	Wallpaper displays; displays in everyday objects; foldable displays	**Flexible & OLED Displays**

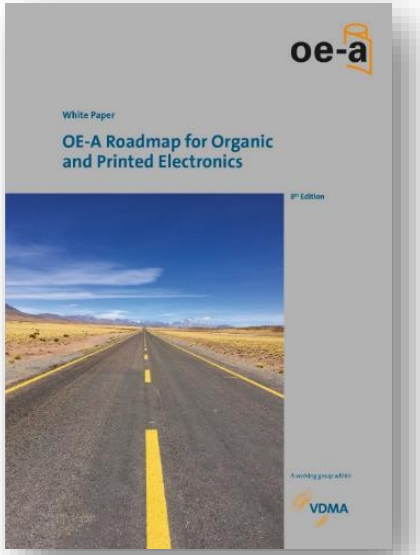
	Existing 2017	Short Term 2018-2020	Medium Term 2021-2023	Long Term 2024+	
Electronics & Components	Printed devices: memory, RFID antenna, primary battery, active backplane; sensors: glucose, touch, temperature, humidity	Printed mobile communication devices based on antennas, light sensor; stretchable conductors / resistors; 3D touch sensors	Printed lithium ion battery; printed super caps; active touch & gesture sensors	Printed complex logic; 3D & large area flexible electronics	
	Glucose in-body sensing; pressure sensor arrays; NFC labels; hybrid RFID; HMIs (sensors)	Smart labels (discrete); HMI (embedded electronics & displays)	Human monitoring patches (single parameter, point of care, on-skin); disposable & quantitative sensors for food safety; biomedical sensors	Fully printed RFID / NFC label; ambient intelligence (connected); sensors for security (explosives)	**Integrated Smart Systems**

Key Industry Sectors (OE-A)

Automotive

Consumer Electronics

Medical & Healthcare



Printing & Packaging

Smart Buildings

Internet of Things

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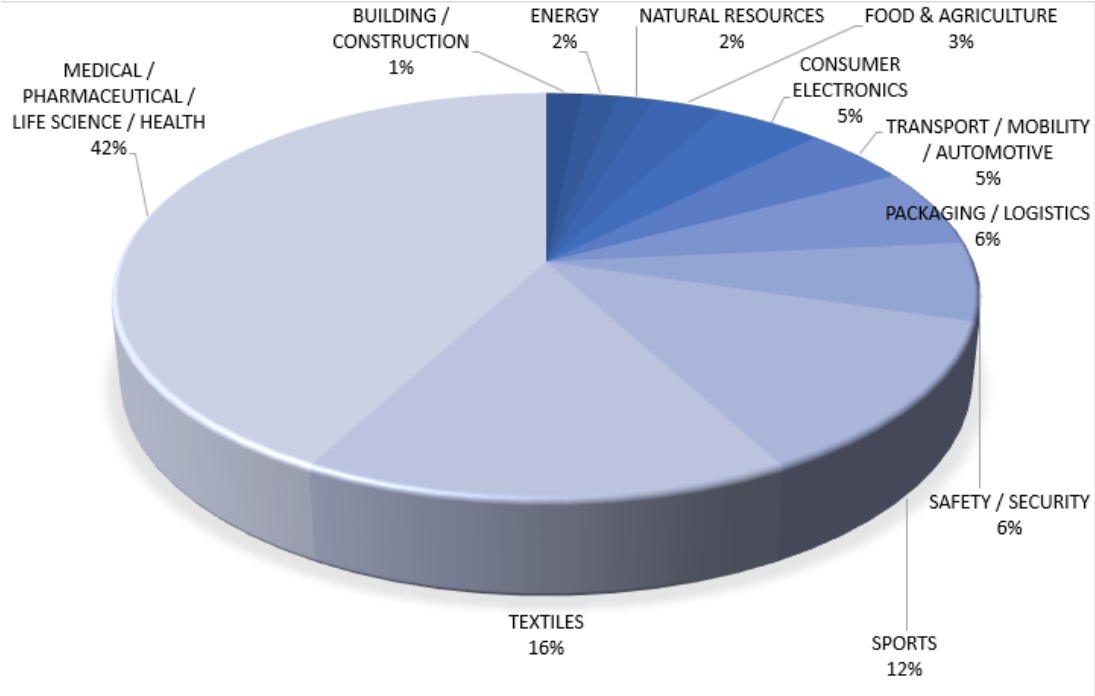
SmartEEs2 sectors

Open Call

- Open Call - from March 2020 to September 2021
- 5 Cut-offs - 2.8 M€ FSTP
- 108 applications
- 44 Application Experiments

Automotive	Logistics
Building & architecture	Medical & pharmaceutical
Consumer electronics	Packaging
Energy	Printing & graphic arts
Lighting	Textile & fashion
	Others

Sectors of application



Expectation / Demand by sectors

- OE-A covering the whole value chain / global data
- SmartEEs2 capturing early adopters / project data

→ Medical & Health confirmed as a key sector

→ Other sectors promising as well, some linked to Medical Health (sports, textiles, safety,…)

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SmartEEs2 product functionalities

44 Application Experiments

Products functionalities \ Sectors	BUILDING / CONSTRUCTION	CONSUMER ELECTRONICS	ENERGY	FOOD & AGRICULTURE	MEDICAL / PHARMACEUTICAL / LIFE SCIENCE / HEALTH	NATURAL RESOURCES	PACKAGING / LOGISTICS	SAFETY / SECURITY	TRANSPORT / MOBILITY / AUTOMOTIVE	SPORT	TEXTILES
ACTUATING	0	1	0	0	3	0	0	1	2	1	0
COMMUNICATING	1	2	1	0	9	0	3	1	0	1	1
COMPUTING / PROCESSING / DATA STORAGE	0	1	0	0	1	0	0	0	0	0	0
ENERGY HARVESTING / CONVERSION / STORAGE	1	0	1	0	3	0	3	0	0	0	0
SENSING	0	2	0	2	18	1	0	2	2	7	9
SIGNALLING (OPTICAL IMAGING, LIGHTING)	0	1	0	0	4	0	3	3	2	1	2

- ❑ Sensing, a main functionality
- ❑ Multi-functionalities of products
- ❑ Functionalities coupling for communicating applications

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Conclusion

Digital technologies in SmartEEs2

- Covering a large spectrum of applications / in various sectors
- Taylored for wearable applications hence interesting sectors like Health & Medical, textile, sports, packaging,…
- Enabling multi-functionality when coupled with silicon-based electronics
- Wearability opening opportunities for software development and AI to support communicant products with services

Call for EDIH applications

- SmartEEs association (sustainable service beyond IA action) joining Belgium EDIH application to implement FWE European community & service
- SmartEEs association as associated partner (not budgeted) to other EDIH application in Europe to leverage same unique & integrated offer on FWE → contact jerome.gavillet@cea.fr

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