Thin, Organic and Large Area Electronics

a. Research and Innovation Actions

Advancing the readiness of TOLAE technologies and/or hybrid integration for use in applications.

Actions will address the development of advanced materials, technologies and scalable manufacturing processes (ranging from vacuum deposition to printing under ambient conditions) and/or the hybrid integration of micro/nano-electronics (including thin silicon) and photonics components. Focus is on conformable, flexible or stretchable substrates (such as paper, plastic, metal foil, glass or textile). The goal is to have reliable TOLAE-enabled devices with more functionality, better performance and longer lifetime that are ready for use in applications with high growth or high volume potential.

Actions may include related work on design and modelling tools in particular addressing variability issues in printing, interfacing of hybrid integration and reliability. Work could also address specific needs for textile electronics.

Actions should demonstrate strong industrial and user commitment, be driven by user requirements and include validation of the results for the chosen applications. They should include standardisation and address the value chain, as appropriate.

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 and 4 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

b. Innovation Actions

Proposals should cover one or both of the following themes:

- **Set-up and validation of pilot line for Hybrid Systems**

The objective of the pilot line is to provide design and development services in particular for SMEs. Focus is on manufacturing of Hybrid Systems where conventional micro-/nano-electronics and photonic components are integrated on flexible substrates. The action should be driven by stakeholders able to set-up and run the pilot line. Proposals should describe the business cases and exploitation strategy for the industrialisation of the pilot line and the pilot line should be open access by offering services to external users under fair conditions. There should be a strong commitment to manufacturing in Europe. The pilot line could make use of existing (research or industrial) pilot lines.

- **Demonstration of TOLAE-enabled product prototypes**

The objective is to develop and demonstrate innovative product prototypes enabled by TOLAE technologies in automotive, healthcare, smart packaging and buildings[[Demonstration of wearable solutions for healthcare and well-being are addressed under topic IoT-01 Large Scale Pilots.]]. Proposals may include small scale pilot manufacturing.

The action should build a dedicated innovation value chain (preferably covering the full value chain).

The action should target medium- to high-volume markets, be driven by concrete business cases and address user needs. They should include exploitation strategies for the targeted products with strong commitment to industrialise and manufacture them in Europe.

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 and 8 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. In case of proposals covering one theme, one action for each theme will be selected.

Thin, Organic and Large Area Electronics (TOLAE) is an emerging technology with high growth potential, well suited for applications that need large area and/or flexibility or stretchability. To be able to fully benefit from the opportunities brought by this technology and widen the scope of its applications, improvements are sought on features such as reliability, manufacturability and performance. The main challenge is to develop and also demonstrate prototypes of innovative TOLAE-enabled solutions with the above characteristics. This can be addressed in two complementing ways, hybrid integration bringing new opportunities for traditional electronics on flexible substrates and improving readiness of TOLAE technologies for use in dedicated applications.

Proposals should describe how the proposed work will contribute to one or more of the following impact criteria, as appropriate, and provide metrics, the baseline and targets to measure impact.

a. Research and Innovation Actions

- Increased readiness of TOLAE technologies, in particular on functionality, performance, manufacturability and reliability, and wider exploitation of TOLAE in concrete applications with high-growth or high volume potential;
- Improved business opportunities and value creation in Europe by strengthening cooperation along the value chain.

b. Innovation Actions

- Fabrication of reliable hybrid systems with short time-to-market and higher investment in advanced manufacturing capabilities;
- Market introduction of innovative and competitive TOLAE-enabled products targeting medium- to high-volume applications in automotive, healthcare, smart packaging and buildings;
- Industrial leadership in TOLAE technology, improved business opportunities in Europe and strengthening Europe's position in growing market segments.

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