European Commission

European eic INNOVATION Council

EMPOWERING EUROPEAN INNOVATORS

Information session on the Pilot EIC Pathfinder calls in 2019 and 2020

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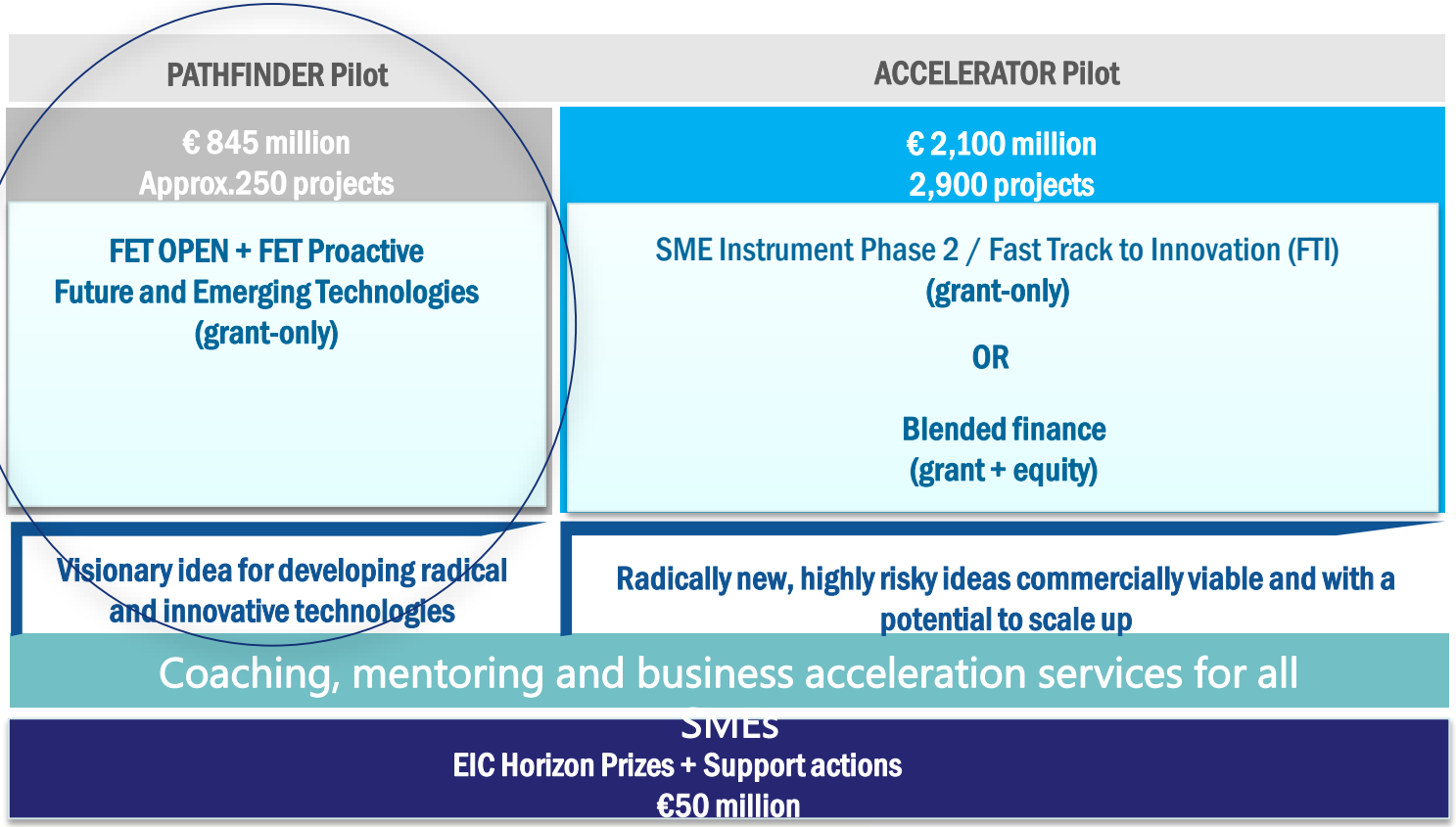
DG CNECT
European Commission

Research and Innovation

Agenda of the session

- Pathfinder FET Open RIA and ILP
- Pathfinder FET Proactive 2019
- NCPs Tips and Tricks + Q&A



EIC Pathfinder - FET Open
Research and Innovation Actions

- Foundations for radically new future technologies, high-risk & high-impact interdisciplinary research:
  - *Radical vision*
  - *Breakthrough technological target*
  - *Ambitious interdisciplinary research*
- **Bottom-up and continuously open**
- **15-page proposal,** up to **€3 million** (indicative), consortium of minimum **3 partners** from 3 EU / associated countries
- Budget:
  - *18 Sept 2019: 160M€*
  - *13 May 2020: 196M€*

FET-Open is OPEN!

- No thematic restriction (highly interdisciplinary)
- Completely bottom-up, but with a clear technological target
- Collaborative research (min. 3 partners from different MS/AC)
- Successful FET-Open project can be a proof-of-concept…
- EU contribution of up to 3M€ (indicative)
- Proposals are sought for **cutting-edge high-risk / high-impact interdisciplinary research** with ALL of the following essential characteristics so-called "**FET gatekeepers**"

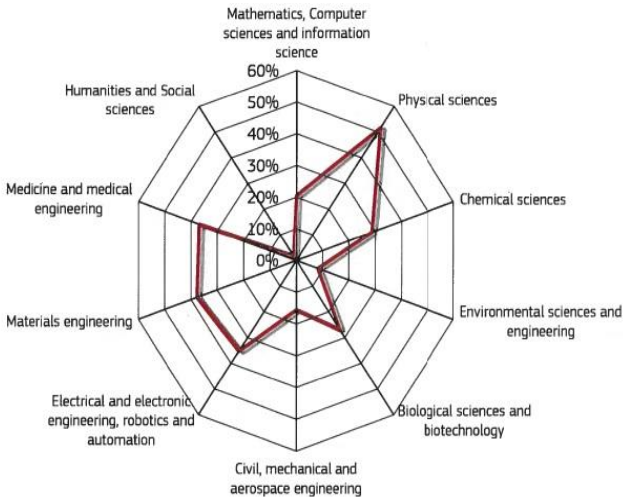


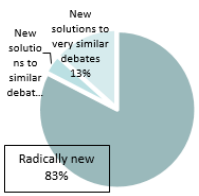
Figure 5. Discipline coverage of the funded projects.

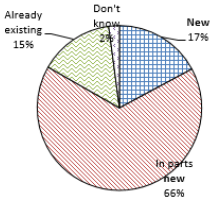
A typical Research and Innovation Action project

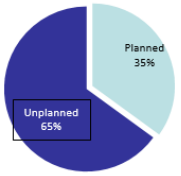
Average funding per project: **3.4 million €**

Average number of partners per project: **6**

Average project duration: **41 months**







FET gatekeepers

- **Radical vision:** the project must address a clear and radical vision, enabled by a new technology concept that challenges current paradigms. In particular, research to advance on the roadmap of a well-established technological paradigm, even if high-risk, will not be funded.
- **Breakthrough technological target:** the project must target a novel and ambitious science-to-technology breakthrough as a first proof of concept for its vision. In particular, blue-sky exploratory research without a clear technological objective will not be funded.
- **Ambitious interdisciplinary research** for achieving the technological breakthrough and that opens up new areas of investigation. In particular, projects with only low-risk incremental research, even if interdisciplinary, will not be funded.

https://www.youtube.com/watch?v=t8dAJvoiguM

Specific Challenges

- Lay the foundations for **radically new future technologies**;
- Visionary **interdisciplinary collaborations that** dissolve the traditional boundaries between sciences and disciplines;
- Encourage the **driving role of new actors** in research and innovation including excellent young researchers, ambitious high-tech SMEs and first-time participants to FET under Horizon 2020 from across Europe.

Expected Impact

- Scientific and technological contributions to the foundation of a new future technology
- Potential for future social or economic impact or market creation
- Building leading research and innovation capacity across Europe by involvement of key actors that can make a difference in the future, for example excellent young researchers, ambitious high-tech SMEs or first-time participants to FET under Horizon 2020

First-time participants to FET under Horizon 2020 are individuals who are not / have not been involved in actions funded under any call in the FET work programmes under Horizon 2020.

(evaluated under the Impact criterion)

EIC Pathfinder FETOPEN-03-2018-2019-2020
Innovation Launchpad

- **Turning results** from FET-funded projects **into genuine societal or economic innovations**
- Up to **€0.1 million** over 18 months
- Sole applicant or as part of a consortium
- Market analysis, business case, technology assessment, IPRs…
- ILP 2020 call introduces lump sum concept
- Budget:
  - *8 October 2019: 2.7M€*
  - *14 October 2020: 3.0M€*

FET
Innovation Launchpad

- **Examples of activities**
  - Definition of a commercialisation process
  - Market and competitiveness analysis
  - Technology assessment
  - Verification of innovation potential
  - Consolidation of intellectual property rights
  - Business case development
- Limited low-risk technology development
  - if clear and necessary role the broader proposed innovation strategy & plan

FET
Innovation Launchpad

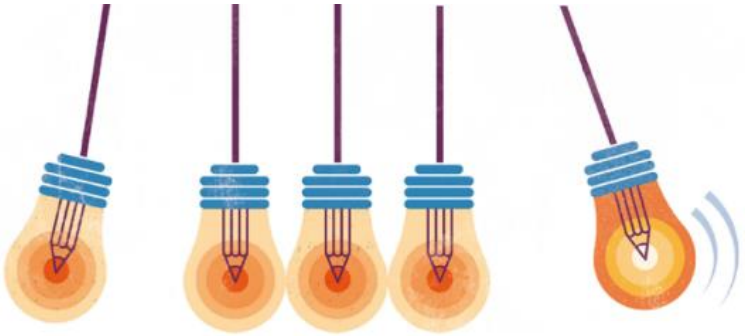
- **Expected impact**
  - Increased value creation from FET projects by picking innovation opportunities
  - Improved societal and market acceptance of concrete high-potential innovations from FET projects
  - Stimulating, supporting and rewarding an open and proactive mind-set towards exploitation beyond research world
  - Contributing to the competitiveness of European industry/economy by seeding future growth and the creation of jobs from FET research

Deadline: 8 Oct2019

FETProact-EIC-05-2019 budget: 87,4M€

Emerging paradigms and communities

- To explore and consolidate a new technological direction in order to put it firmly on the map as a viable **paradigm for future technology**.
- Stimulate the emergence of a European innovation eco-system around a **new technological paradigm**
- **Scope is one of the following subtopics:**
  - Human-Centric AI
  - Implantable autonomous devices and materials
  - Breakthrough zero-emissions energy generation for full decarbonisation
- Up to **€4-5 million and u**p to **4 year**
- Minimum **3 partners** from 3 EU / AC



The challenge: Human-Centric AI

Artificial intelligence (AI) is gaining more and more footholds in various aspects of our life, including in Life sciences.

However, many issues still need to be faced, like:

- Transparency and Accountability
- Robustness and Safety
- Data Governance and Privacy
- Diversity and Non-discrimination
- Human Autonomy and Oversight
- Societal and Environmental well-being

The problem

Explicability has become an essential element if users are to trust, accept and adopt the next generation of intelligent machines on a wider scale.

This initiative seeks to advance to the next AI frontier with verifiable, evidence-based features of trustworthiness (i.e., reliable and unbiased alignment of values, goals and beliefs) and transparency (explainable performance), exploring radically new approaches (e.g., inspired from neuro-science, cognition or social science).

Human-centric?

For instance:

- explanation could be more tightly intertwined with the decision making process itself
- decisions can be challenged, interpreted, refined and adjusted through mutual exchange, introspection (e.g., self-awareness, reflection, errors)
- active learning of both system and user, for example through dialogue or other forms of multi-modal interaction aimed at establishing mutual trust.

Solutions: Beyond the state-of-the-art

New data collection and ownership/governance models that go beyond the dominant off-line and centralised data processing should be investigated, and new avenues, such as for incremental, unsupervised, active, one-shot and ‘small data’ machine learning, should be explored.

Maximising benefits from AI

Economic impact ✓

+

Contribution to societal challenges ✓✓

- Healthcare
- Energy efficiency
- Road safety
- Cybersecurity
- ...

AI

European Commission

The broader picture

The projects are expected to contribute to the wider debate on the sociotechnical, organisational and AI-ethical dimensions of such technologies and systems, and link to the 'Commission's broader AI strategy.

See Artificial Intelligence for Europe (COM(2018) 237 final, 25.4.2018) and Coordinated Plan on Artificial Intelligence (COM(2018) 795 final, 7.12.2018).

Background – what do we have?

Current implants do not last long/the materials are not bio-compatible/are not adaptable/no clever sensing/no shape/function change/no movement/no power management

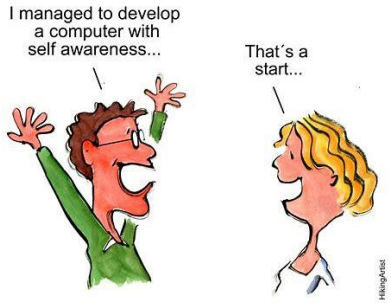
FETProact-EIC-05-2019-B

Challenge: *Implantable autonomous devices and materials*

Radically new biomedical technologies are needed for implantable devices and materials with dramatically longer functional lifetimes

incorporation of smart sensing, self-awareness, adaptation and self repair capabilities.

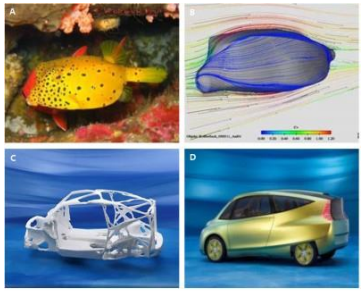
Smart sensing



Self-Awareness

Adaptation (form and function)

Self-repair

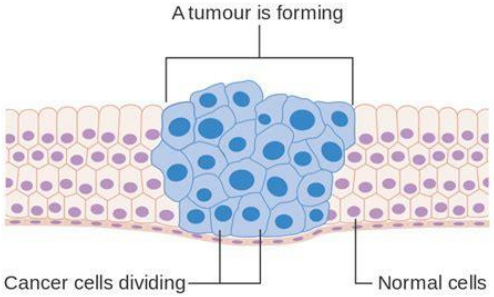


Bio-mimetism

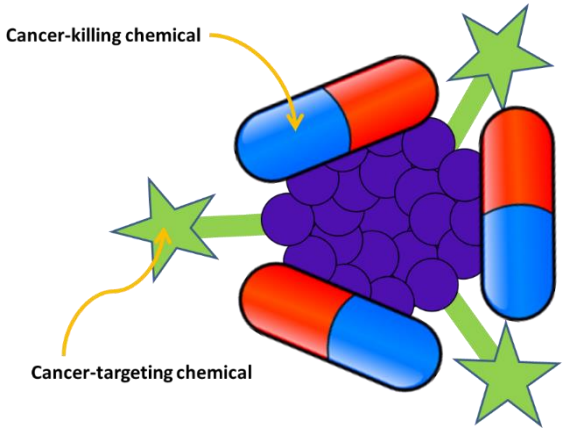
In-situ integration

FETProact-EIC-05-2019-B

Some examples (e.g. micro/nano devices)



Autonomously moving/ Distinguish tissue types



Sensing and Acting Delivering therapeutic agents

Power generation/ management

Zero-emissions energy generation

Background

Present transport engines (eg petrol/diesel/jet) release much waste energy

Waste energy is used to heat the vehicles (cold climates), power air-conditioning (hot regions) or for auxiliary systems (eg equipment environment)

Electric vehicles much more efficient – little waste heat

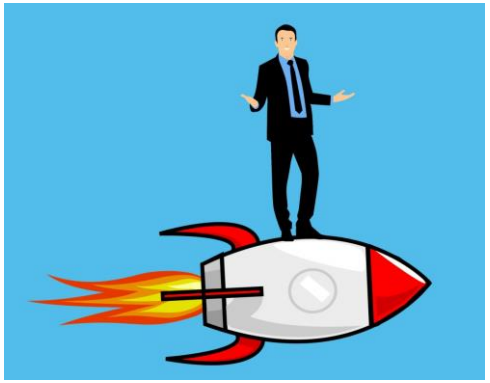
Inefficient to use batteries for heating

- Battery capacity needed to maximise range
- Electricity production from thermal energy ~ 30% efficient

Compact, portable, zero-emission energy source needed

FETProact-EIC-05-2019-C

Zero-emissions energy generation: Challenge and scope



Proposals should:

- Address new technologies (high risk) for energy generation with potential for significant take-up

- Bring together a European interdisciplinary pool of expertise to reach its goal, and encourage outside interest to increase the community working on the area

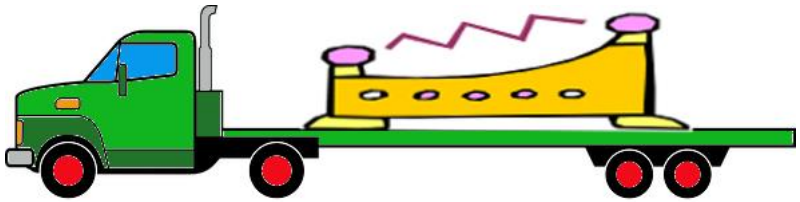
- Lay the foundations for a European innovation ecosystem (not only researchers) that can pursue the development after the project

Zero-emissions energy generation Scope

Any safe form of thermal or electrical energy generation
Proposed technology should produce no CO2

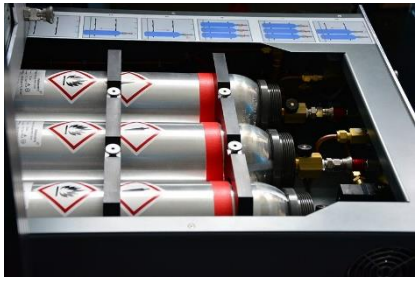
Equipment should be compact and portable:

- Transportable by lorry, boat, aircraft, people, ….
- Not built in to a fixed location
- Higher energy density than batteries



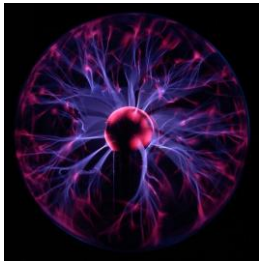
Identified application area
Minimal or no rare/toxic materials
Competitive (low cost)
Clear/ambitious performance targets and milestones needed

Zero-emissions energy generation Scope – possible examples



Hydrogen storage eg metal hydrides

- Large, safe, increase in storage density possible?



Plasma systems

- Plasmas are the most energetic state of matter
- Can they be confined in a portable device?

Cavitation systems

- Cavitation assisted energy harvesting systems:
- Can they provide enough energy in a portable form?

Novel batteries, fuel cells, solar cells?*

NB These are not preferred approaches, just possible examples

Zero-emissions energy generation
Expected impact

Foundations for new portable energy technologies

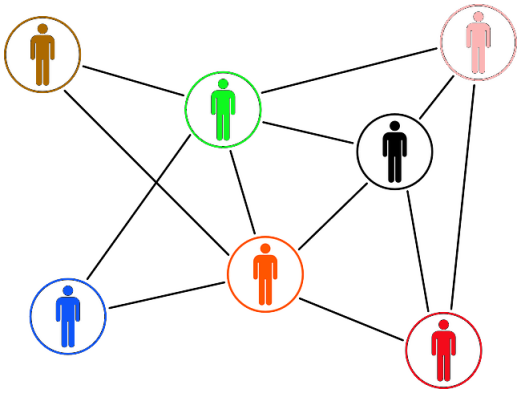
Building up interdisciplinary communities with

- Young researchers
- High-tech SMEs
- First time FET participants

… leading to

Emergence of new innovation ecosystems

- able to develop the market potential of the new tech
- including wider stakeholder engagement beyond researchers alone

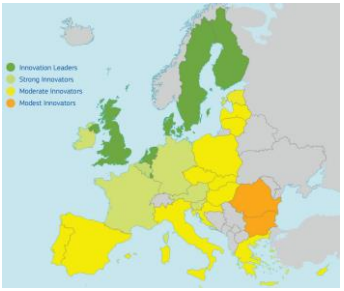


Impacts

Consolidation of a radically new future technology.

Creating the community of researchers and innovators that will change the future

Potential returns for society, innovation and market creation



Spreading excellence and building leading innovation capacity across Europe

Deadline: 8 Oct 2019

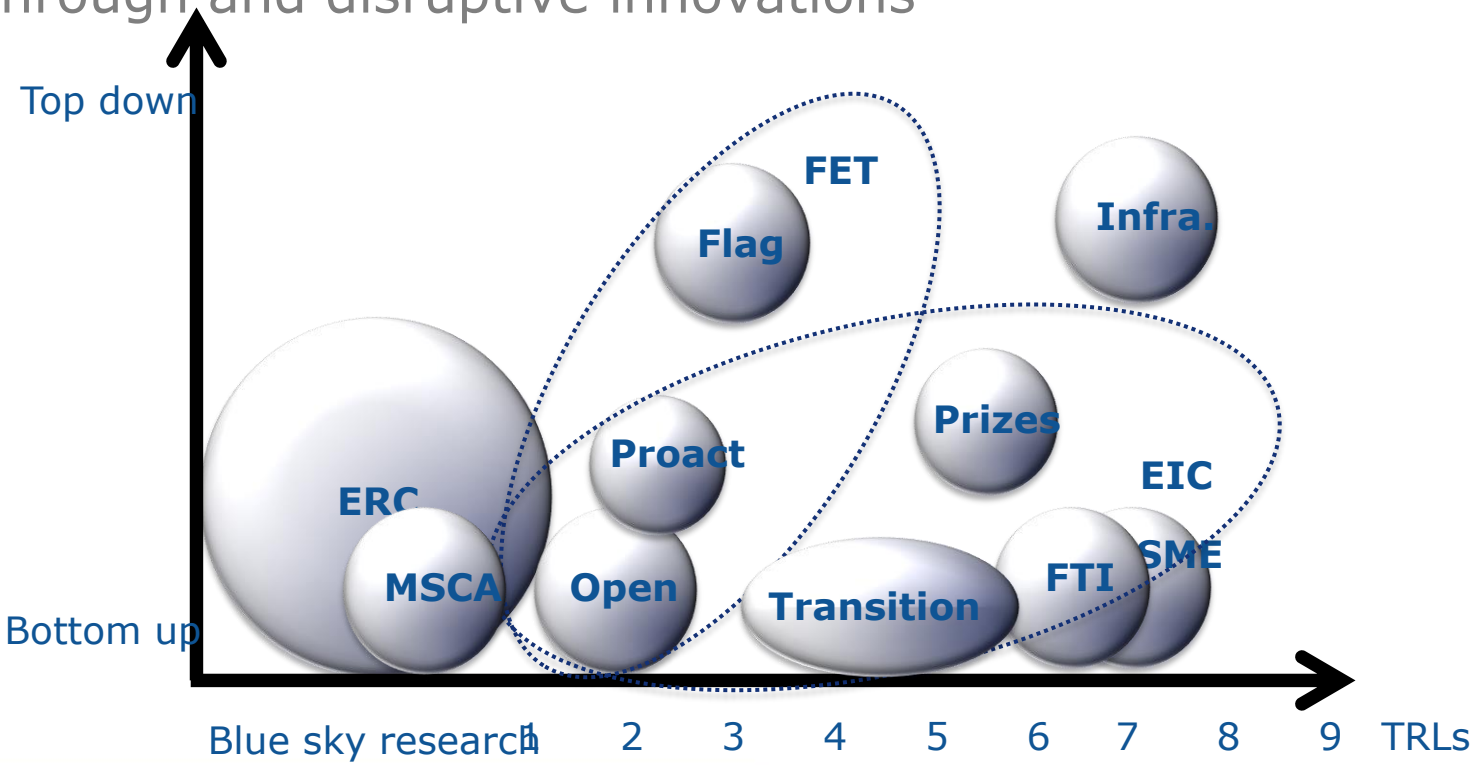
FETProact-EIC-06-2019 Budget: 26M€

Transition to Innovation Activities

- Turn promising results into **breakthrough innovations**
- Fill the gap between end of typical FET project and next opportunity
- Improving chance of turning FET research into innovation
- Increasing technological readiness of research outcomes
- **Targeted technologies**:
  - *Micro- and Nano-technologies*,
  - *Artificial Intelligence and advanced robotics*,
  - *Technologies for the life sciences, health and treatment*,
  - *Energy technologies and climate change related technologies*
  - *Interaction technologies*

The Challenge for Transition Activities

- Create a fertile ground for FET research results to mature, to a level where they start to be interesting for investors.
- Turn FET projects promising results into genuine technological breakthrough and disruptive innovations



Scope of Transition to Innovation Activities

- Advancing TRL of promising technologies starting at TRL 2/3
- Business driven visionary leadership
- Lean and ambitious consortium
- Essential capabilities to increase the maturity of targeted technology
- E.g. activities with TT partners, licence-takers, investors and users

Expected Impact Transition to Activities

☐ Increased value from FET projects

☐ Fast development & take-up of promising FET technologies

☐ Increased H2020 first time participation of high tech SMEs

☐ Leveraging more private investment into research and innovation

Conditions Transition to Innovation

- Budget, 8th of Oct 2019: **26M€**
- Small RIA up to 24 months
- EU contribution: 1-2M€
- Explicit links with H2020 FET OPEN and PROACT project(s)
- No duplications with activities of the original project(s)!
- Well-defined intended outcome, KPIs
- Strong exploitation plan with market potential
- Agreement on project(s) IPRs in proposal

Deadline: 22 April 2020

EIC Pathfinder - FET Proactive - 2020
Emerging paradigms and communities

- Stimulate the emergence of a **new technological paradigm**
- **Selected emerging paradigms**

2020 €50M
- *Future technologies for social experience*
- *Measuring the unmeasurable – Sub-nanoscale science for Nanometrology*
- *Digital twins for the life-sciences*

- **Environmental intelligence,2 sub-topics**:

2020 €18M
- *new techniques for creating and using dynamic models of environmental evolution*
- *radically novel approaches to resilient, reliable and environmentally responsible in-situ monitoring*

- Up to **€4-5 million**, across up to **4 years**
- 30-page proposal, Minimum **3 partners** from 3 EU / AC

EIC Pilot
Need help?

- EIC Wizard via EIC website
- EIC Pilot Guide for Applicants
- EIC Questions and Answers
- National Contact Points (NCPs)
- European Enterprise Network (EEN)

Further information:

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European Funding and Tender portal

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