



European  
Commission



**Belgian National Info Day**  
**Brussels, 08 June 2018**

## **FET in Horizon 2020**

**Walter Van de Velde**  
**Future and Emerging Technologies**  
**European Commission**

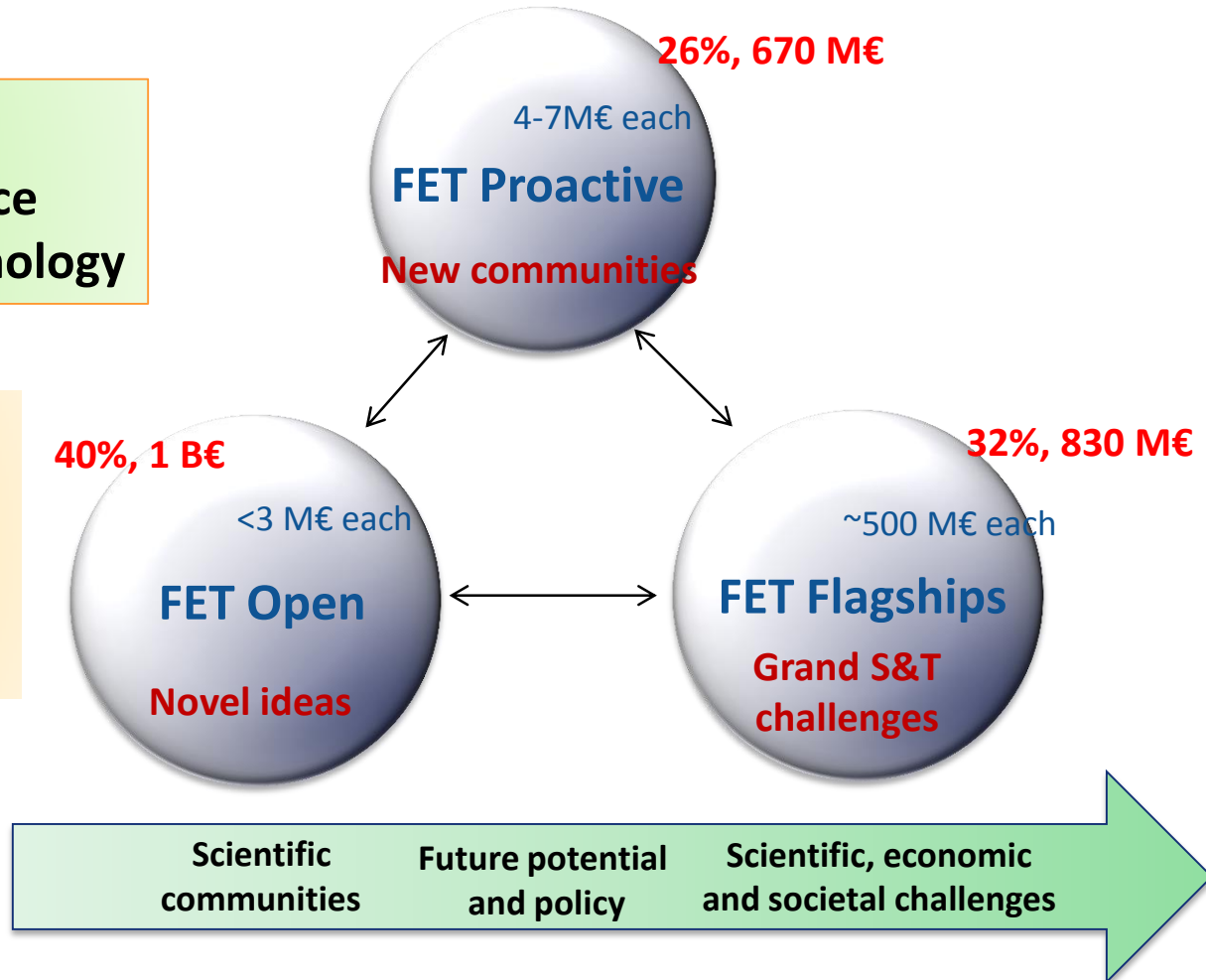


# FET in Horizon 2020 (Excellent Science Pillar) – three schemes, 2.5 B€

## FET Mission

Turn Europe's excellent science base into a competitive technology

- Visionary
- Collaborative & Interdisciplinary Excellence
- Technology breakthroughs

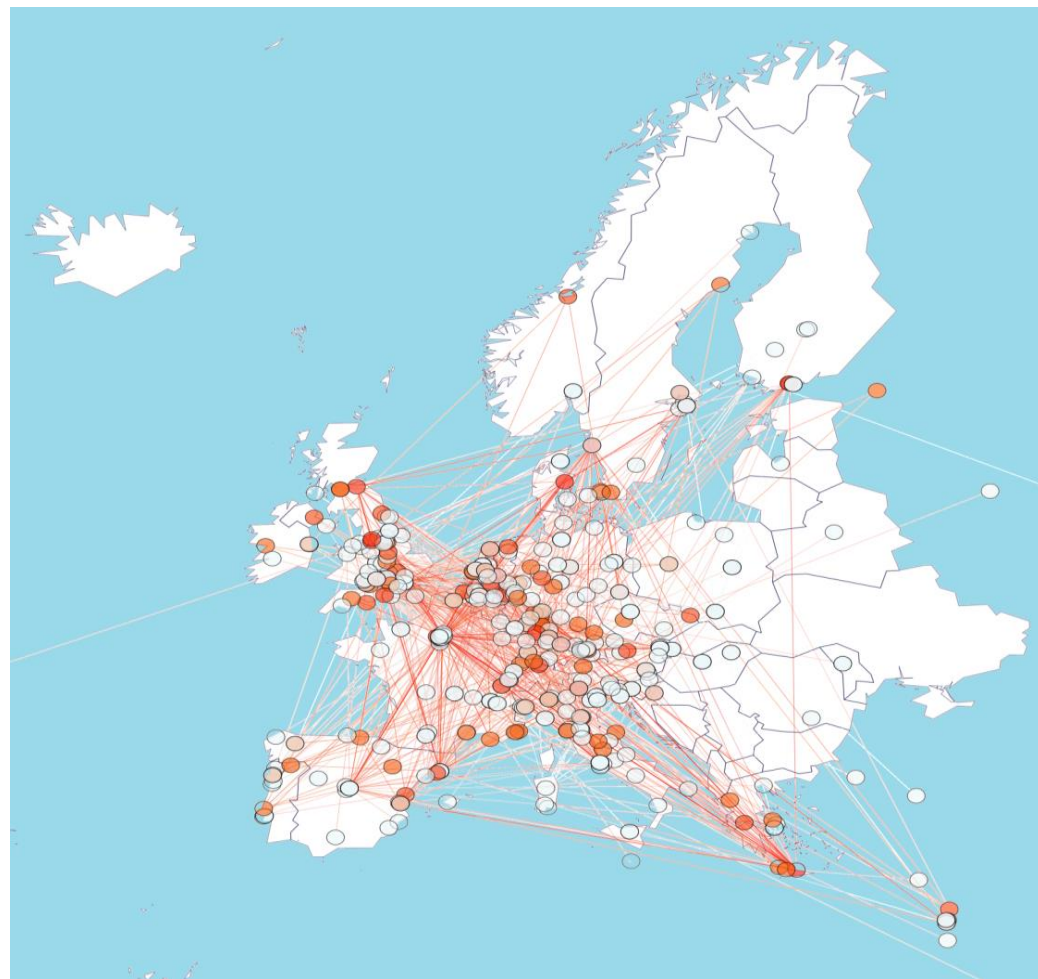


# FET in Horizon 2020 so far

## FET in numbers (2014-2017)

- 240 grants
- 1,1 B€ EU contribution
- 2.228 participations
- 888 beneficiaries covering all member states
- Companies in 40% of projects
- 12,75% SME participation
- 10 Nobel Prize winners
- ~10.000 scientists and PhD students involved

		Success Rate
Horizon 2020		14,71%
FET		
	EU-13	5,46%
	EU-15	8,18%
ERC		
	EU-13	4,14%
	EU-15	12,73%

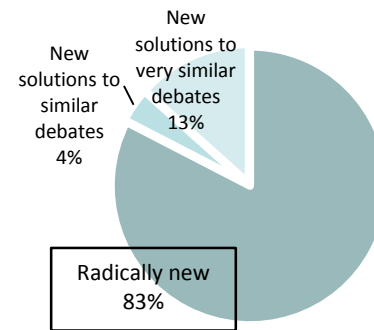
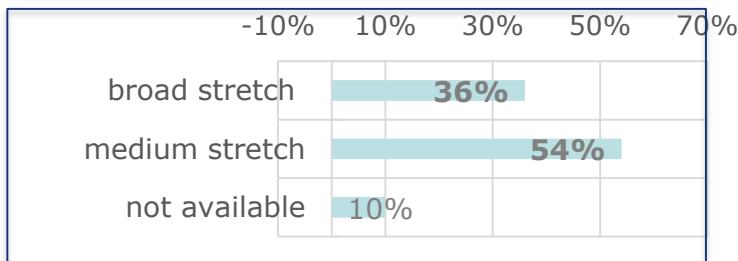
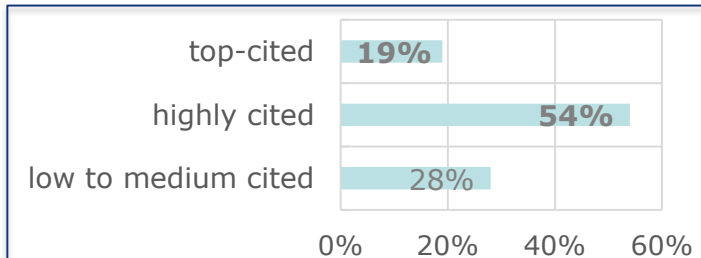


Sample of FET\* beneficiaries network  
(links of coordinators to participants)

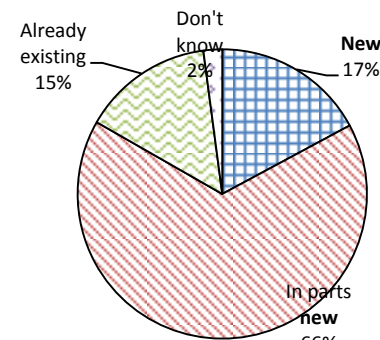
# FET Impacts

evidence from 224 FP6 & FP7 projects – FET\_TRACES Report

## Knowledge production

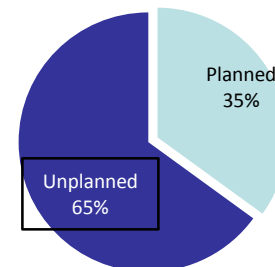
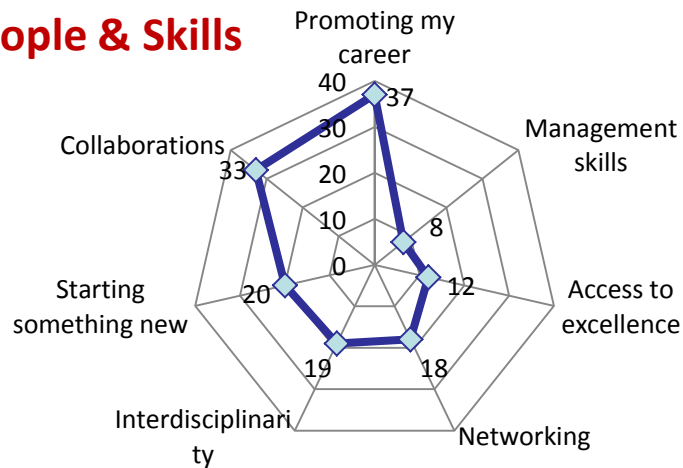


**Novelty of results**



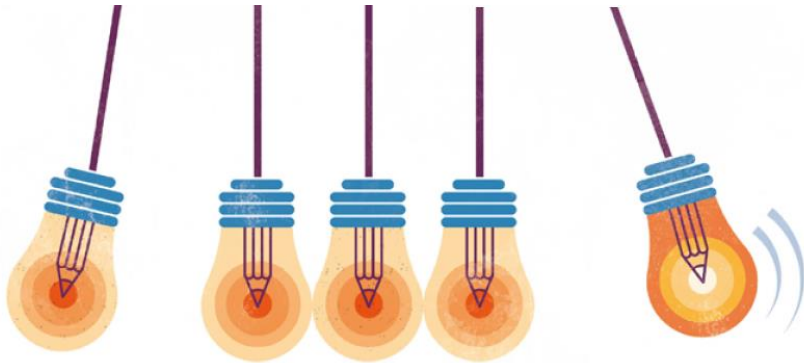
**Novelty of collaboration**

## People & Skills



**Serendipity**

# FET Open in Horizon 2020



## FET Open in numbers (2014-2017)

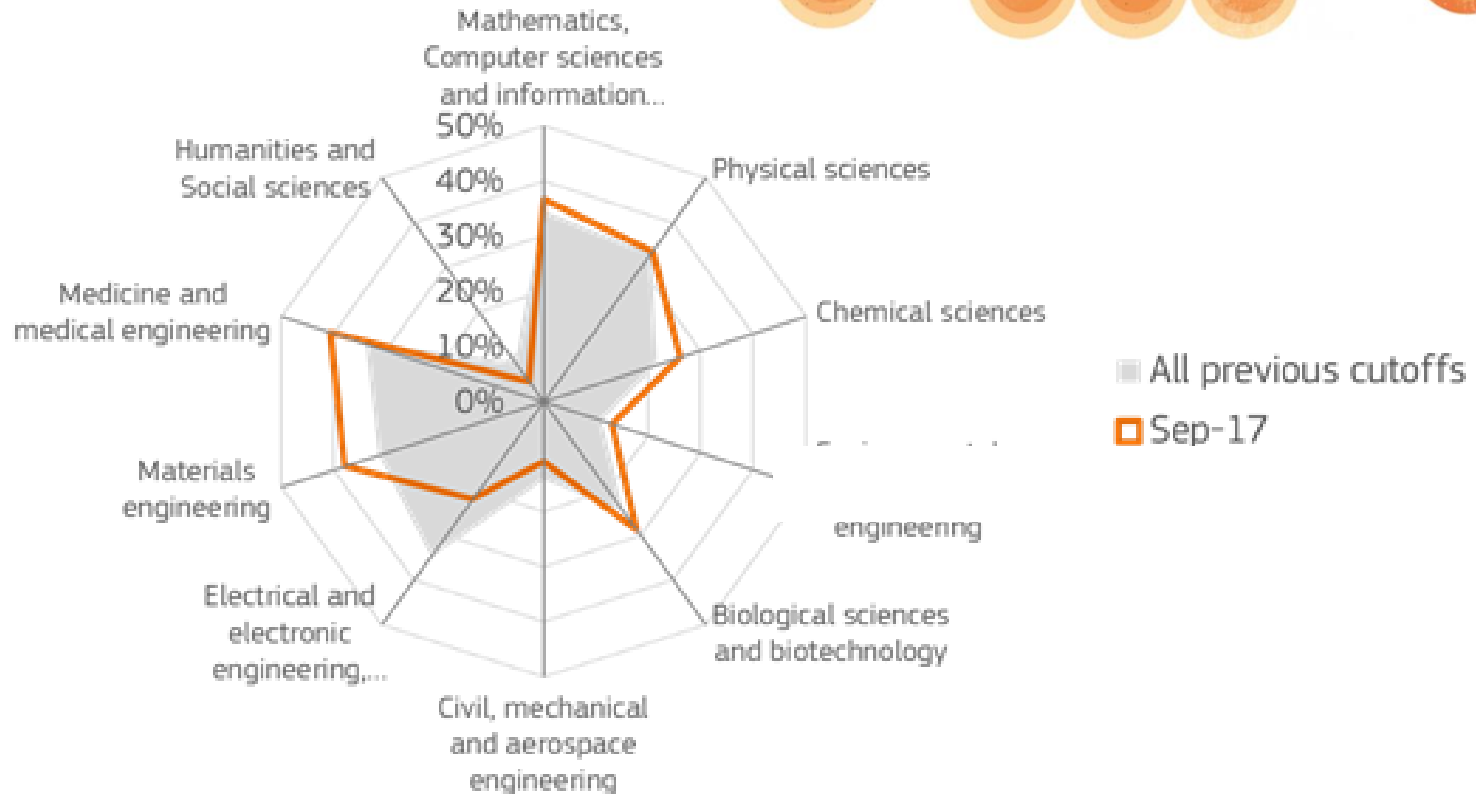
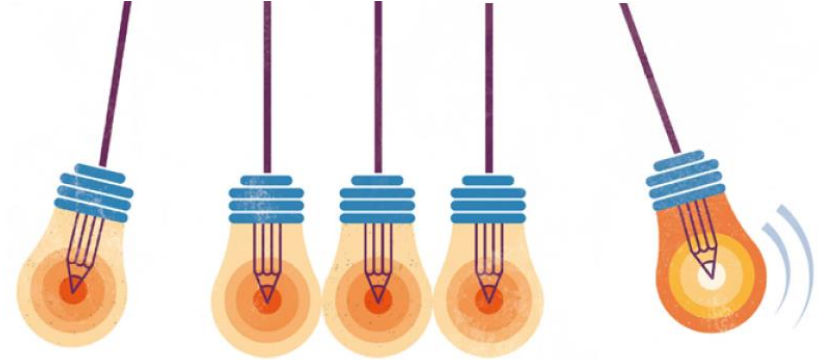
- Highly interdisciplinary
- 3408 proposals, 122 funded projects
- Funding rate: 1.7% in 2015, ~10% in 2018
- Many technology breakthroughs  
Towards curing cancer, Parkinson's, Alzheimer, energy storage, new computing paradigms, medical imaging, robotics, AI, etc.



## FET Open is part of the European Innovation Council Pilot (2018-2020)

- Exploratory engine for new possibilities
- Starting point for deep-tech innovation
- Early detection of new opportunities
- Accelerator towards impacts

# FET Open – open<sup>2</sup>



Disciplines in 3408 proposals

from all finalised FET-Open batches

Note that individual proposals contain a mix of disciplines





European  
Commission

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**eic** **INNOVATION**  
Council *BETA*

**EMPOWERING EUROPEAN INNOVATORS**

**Step by step  
guide to EU  
innovation  
funding**

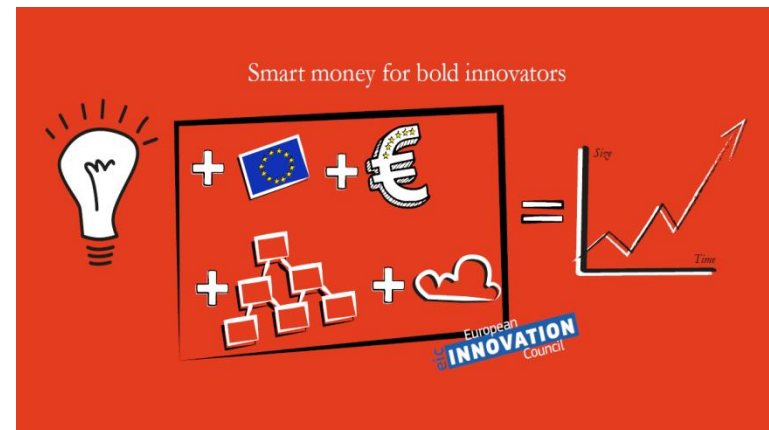
*Research and  
Innovation*



# *Objective:* **Strengthen breakthrough innovations and boost the number of high-growth companies**

Focus on:

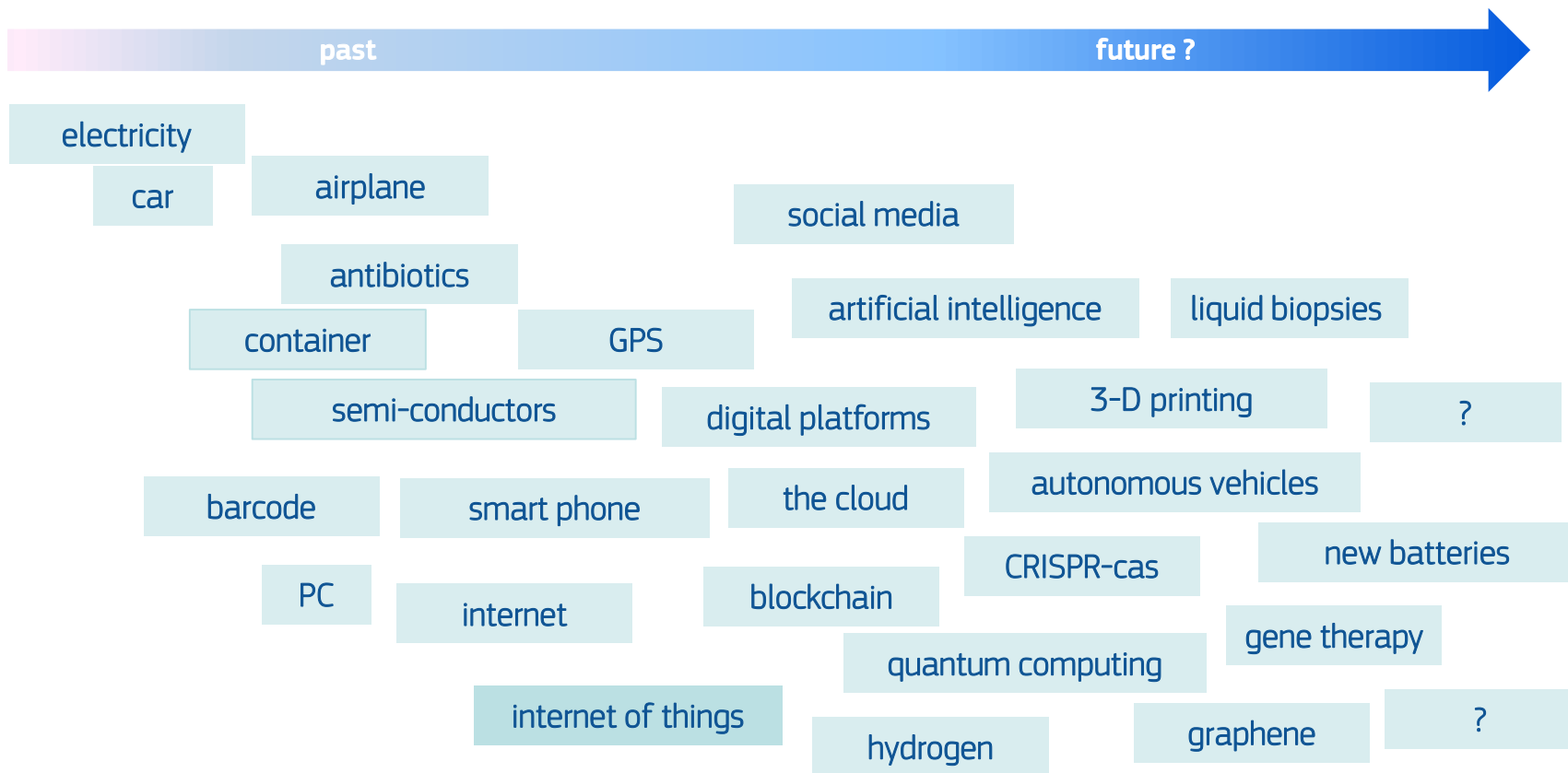
- **Radically new ideas**
- That **open up new markets and scale up growth..**
- .. **And combine disciplines**





# Market-creating **innovations?**

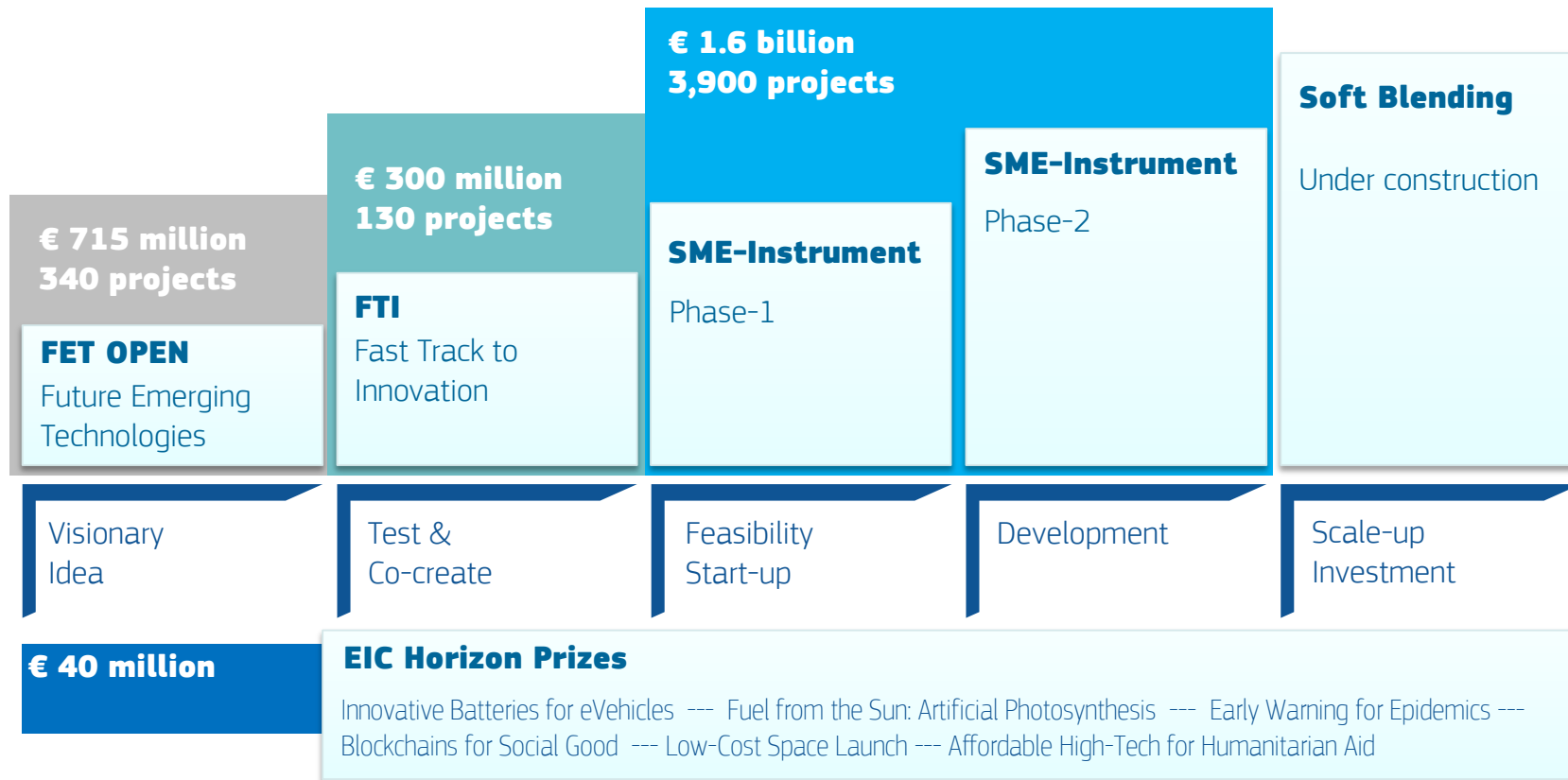
some eye-catchers based on WIPO, MIT, WEF, OECD, Harford, etc.



# Comprehensive package - 4 schemes in 1

**Ecosystem support**

Coaching, mentoring and business acceleration services for all SMEs



**FET  
OPEN**

**SME  
INSTRUMENT**

**FTI**

**HORIZON  
PRIZES**

# Future and Emerging Technologies (FET) FET Open: let's try even if it fails!



# FET Open and EIC – a win-win

- ✓ *Early science-driven technological innovation...  
... a key starting point for radical innovation;  
only done by FET*
- ✓ *Inspiring the entrepreneurial mind...  
... even when far from market, all FET-Open projects are full of inspiring ideas  
for the entrepreneurial minds in EIC*
- ✓ *Early detection of opportunities...  
... Where researchers see possibilities, they see more research. Where  
entrepreneurs see possibilities, they see an opportunity.*
- ✓ *Accelerator towards impact...  
... FET Innovation Launchpad is a fast learning track into the EIC*

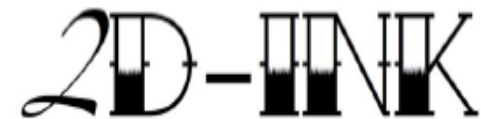


## FET Open – Research and Innovation projects

Foundations for radically new future technologies, high-risk & high-impact interdisciplinary research with "FET gatekeepers":

- **Radical vision**
- **Breakthrough technological target**
- **Ambitious interdisciplinary research**





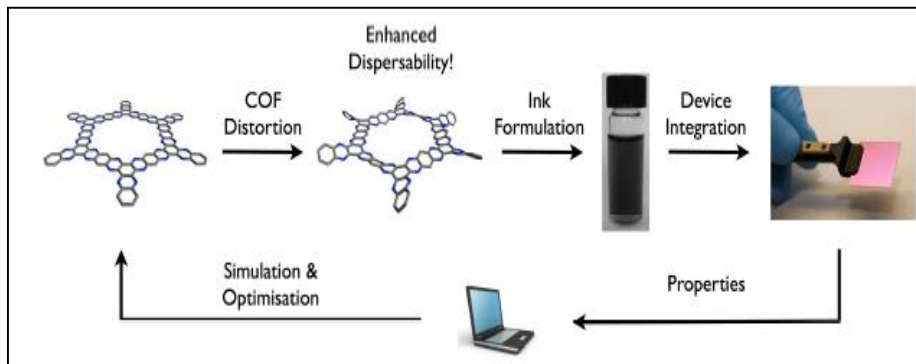
## The project goal

To explore radically new manufacturing and processing technologies for novel 2D semiconducting materials

## How?

**Proof-of-Principle** of covalent organic frameworks (COF)-based inks that exceed the current limits of graphene-based inks.

- Stablishing **Precursor synthesis** and assembly protocols
- Developing localised **distortions** of the planar aromatic framework
- **Formulating inks from dispersions** of stable monolayers to enable low-cost processing.
- COF inks will be **evaluated against state-of-the-art semiconducting inks**



## Impact on

**Science** - framework to encourage creativity in the synthesis of COF

**Technology** - realisation of ultra-thin, transparent and flexible electronic devices

**Society** - new 2D semiconductors will create new materials

15

## The project goal

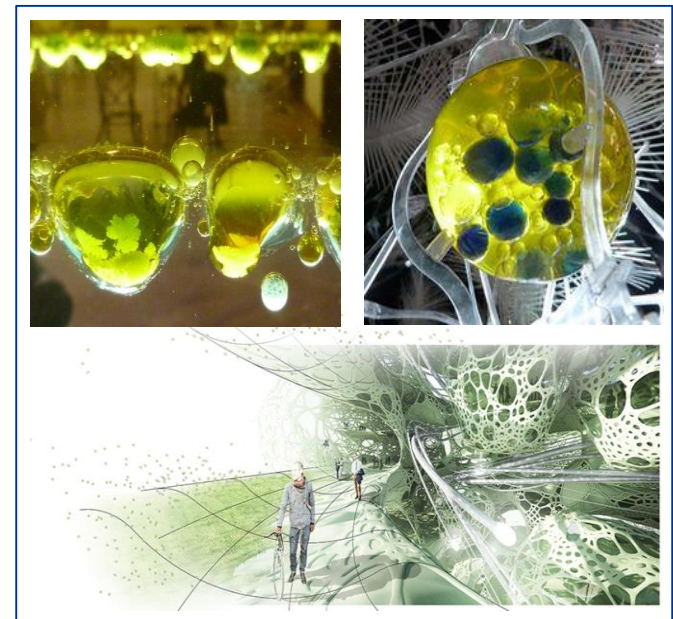
Designing and developing a programmable modular **bioreactor-wall** capable of extracting valuable resources from **waste** water and air, generating oxygen, proteins and biomass for **energy production**.

## How?

Based on the operational principles of **microbial fuel cells** as a programmable environment and its technical integration with **synthetic 'consortia' of microbes**.

## Impact on

Environmental performance of **living spaces**, improving **health**, productivity and **ecosystems** impact.



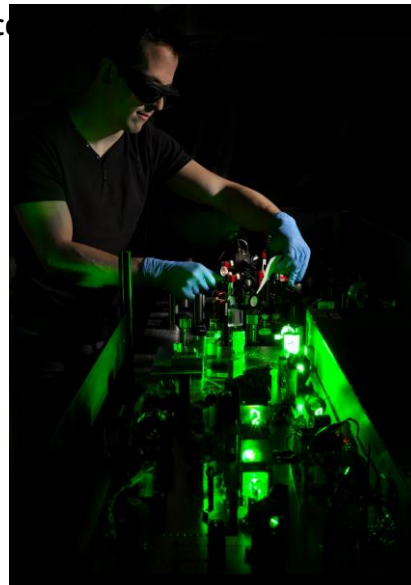


## The project goal

Development of a scientific clock that reaches a **much higher precision** compared to the best clocks that are operated today

## How?

- Identification and characterization of the  $^{229}\text{Th}$  isomer transition.
- Development of trapping and cooling techniques for  $^{229}\text{Th}$  ions together with solid-state approaches to furnish thorium ensembles for direct laser spectroscopy.



## Impact on

- **Scientific impact** – the  $^{229}\text{Th}$  isomer state will be accessible to direct laser manipulation.
- **Technological impact** – Th-based clocks → simpler, smaller, cheaper, more robust, smaller uncertainty compared to others.
- **Societal impact** – Improved next-generation global positioning. Applications and impact on: communication and navigation. Satellite and space missions, sensors in geodesy and precise timing.

# PHENOMEN

## The project goal

- Development of *novel phononic-based components* driven by light, primarily focusing on
  - (i) phonon sources/lasers
  - (ii) phonon detectors
  - (iii) phonon waveguides and
  - (iv) RF-light transducers

## How ?

- Theory and multi-scale modeling
- Nanofabrication of optomechanical and phononic components
- Full system integration

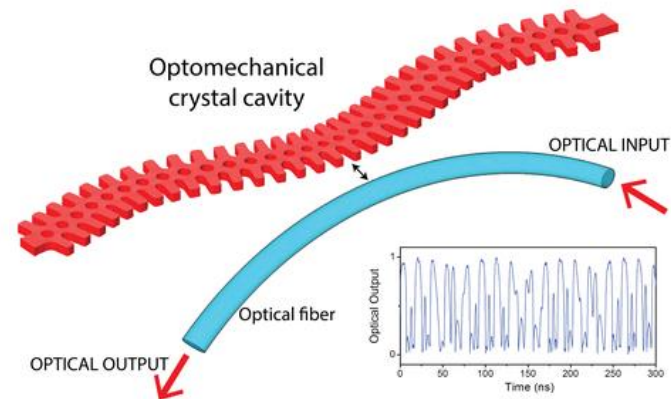
## Impact on

### 1. ICT:

Telecommunication process can be done in a passive way (faster and more efficient) without additional power consumption and without electrical connection

### 2. Space:

Developed new chips can be used for high efficiency and high speed information processing for satellite communication



## FET Open – Research and Innovation projects

- EU contribution up to 3 Mio € (indicative)
- Consortia of minimum 3 partners from 3 EU / associated countries

### 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**

## Expected Impact:

- Scientific & technological contributions to the **foundation of a new future technology**
- Potential for future **social or economic impact or market creation**
- Building leading R&I capacity across Europe by **involvement of key actors**, for example:
  - excellent young researchers
  - ambitious high-tech SMEs
  - first-time participants to FET under H2020



## FET Innovation Launchpad

Turning a result of a FET project into an innovation

Max 18 months, €100,000

## Other support services for involved SMEs

- Coaching services
- Business acceleration services



# Considering participation...?

	<b>FET OPEN</b>	<b>FTI</b>	<b>SME instrument</b>	<b>Horizon Prizes</b>
<b>Open to participants from...</b>	EU and Horizon 2020 associated countries, but exceptions...	EU and Horizon 2020 associated countries only	EU and Horizon 2020 associated countries only	Anywhere, except for the innovative battery and low-cost space launch prizes (MS and AC only)
<b>For who?</b>	Consortia open to anyone – specific targets: <ul style="list-style-type: none"> <li>- Excellent young researchers</li> <li>- Ambitious high-tech SMEs</li> <li>- First-time FP participants</li> </ul>	Consortia open to anyone – specific targets: <ul style="list-style-type: none"> <li>- Private-for-profit entities (industry)</li> <li>- First-time FP participants</li> </ul>	SMEs only (also single SMEs!)	Anyone
<b>Size of EU grant?</b>	<ul style="list-style-type: none"> <li>• Up to EUR 3 million (RIA)</li> <li>• EUR 0.1 million (Inno launchpad)</li> </ul>	Up to EUR 3 million (IA close-to-market)	<ul style="list-style-type: none"> <li>• EUR 50,000 (ph 1)</li> <li>• EUR 0.5 to 2.5 million (ph 2), exceptions possible</li> </ul>	Between EUR 1 and 10 million
<b>Upcoming submission deadlines?</b>	<ul style="list-style-type: none"> <li>- 16/5/2018 (RIA)</li> <li>- 16/10/2018 (Inno launchpad)</li> </ul>	3 per year – - 21/2/2018 31/5/2018 23/10/2018	4 per phase per year -- <u>Ph 1</u> : 8/2/2018, 3/5/2018... <u>Ph 2</u> : 10/1/2018, 14/3/2018...	No deadlines announced yet -- All contests open until at least Q2 of 2019

## FET Open – upcoming call deadlines

Topic (Type of Action)	Budget 2018 EUR Million	Budget 2019 EUR million	Budget 2020 EUR million	Deadlines (cut-off dates)
FETOPEN-01-2018-2019-2020 (RIA)	123,70	160,40 160,40	203,00	16 May 2018 24 January 2019 18 September 2019 13 May 2020
FETOPEN-03-2018-2019-2020 (CSA) Innovation Launchpad	2,50	2,70	3,00	16 October 2018 8 October 2019 14 October 2020

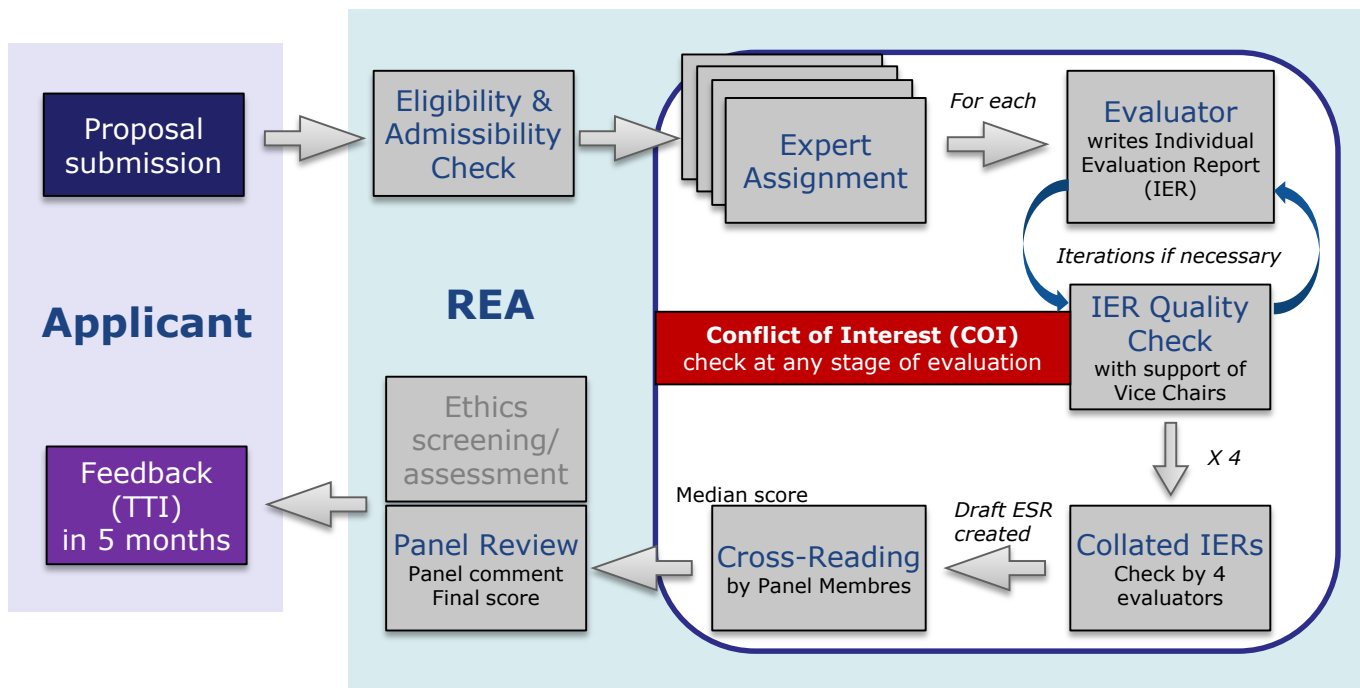
## Evaluation criteria

Excellence	Impact	Quality and efficiency of the implementation
<p><b>Adherence to the "FET gatekeepers"</b></p> <ul style="list-style-type: none"> <li>☒ <u>Clarity</u> of the <b>radical vision</b> of a science-enabled technology and its differentiation from current paradigms.</li> <li>☒ <u>Novelty</u> and <u>ambition</u> of the proposed <b>science-to-technology breakthrough</b> that addresses this vision.</li> <li>☒ <u>Range</u> of and <u>added</u> value from <b>interdisciplinarity</b> for opening up new areas of research; <b>non-incrementality</b> of the research proposed.</li> <li>☒ <b>High-risk, plausibility and flexibility</b> of the <u>research approach</u>.</li> </ul>	<ul style="list-style-type: none"> <li>☒ The extent to which the outputs of the project would contribute to the <b>expected impacts</b> listed in the work programme under this topic.</li> <li>☒ <u>Effectiveness</u> of measures and plans to <b>disseminate</b> and <b>use the results</b> (including management of IPR) and to <b>communicate</b> about the project to different target audiences.</li> </ul>	<ul style="list-style-type: none"> <li>☒ <b>Coherence and effectiveness</b> of the <u>research methodology</u> and <u>work plan</u> to achieve project objectives and impacts, including <b>adequate allocation</b> of <u>resources</u> to tasks and partners.</li> <li>☒ <b>Role and complementarity</b> of the <u>participants</u> and extent to which the consortium as a whole brings together the necessary expertise.</li> </ul>
<p><u>Threshold: 4/5</u> <u>Weight: 60%</u></p>	<p><u>Threshold: 3.5/5</u> <u>Weight: 20%</u></p>	<p><u>Threshold: 3/5</u> <u>Weight: 20%</u></p>

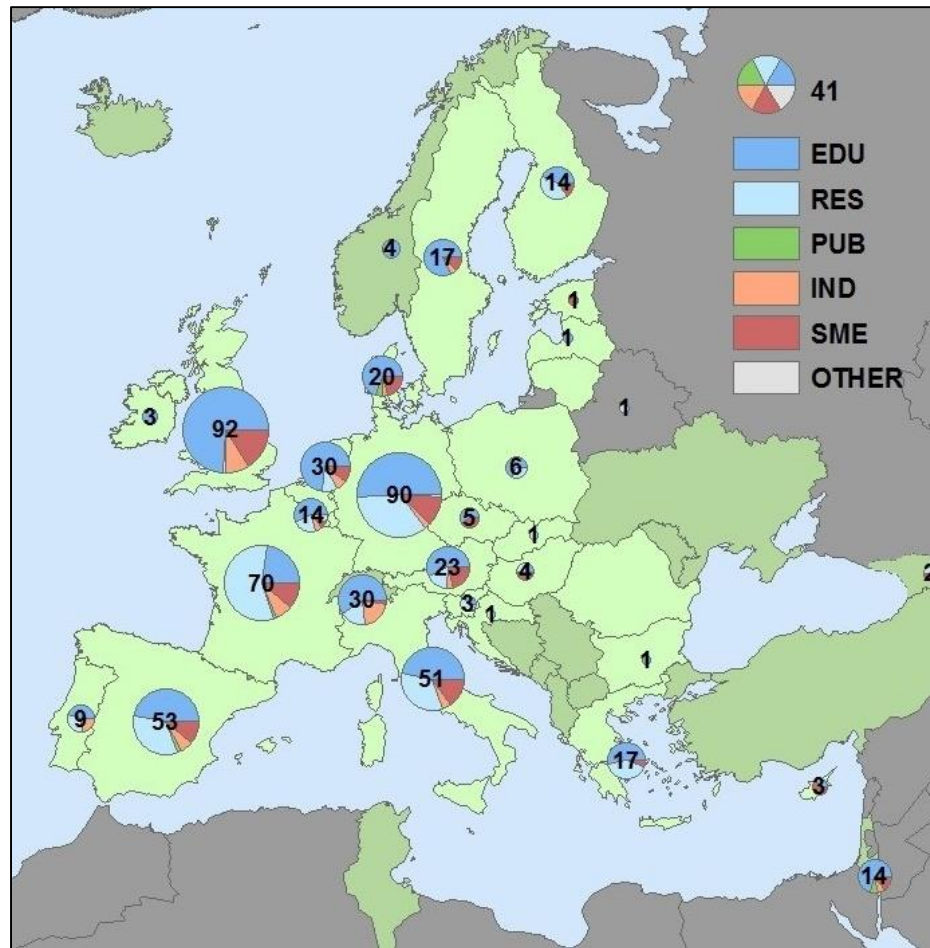
## FET Open in 2014-2017

Calls	Total # of eligible proposals	Number of grants	Success rate	Total Budget (M€)
Sep-14	639	24	3,8%	78,1
Mar-15	665	11	1,7%	41
Sep-15	800	11	1,4%	37,8
May-16	544	23	4,2%	87,8
Jan-17	365	26	7,1%	84,8
Sep-17	395	27	6,8%	85,3
<b>Total</b>	<b>3408</b>	<b>122</b>		<b>414,8</b>

## FET-Open Evaluation process (example for RIA)



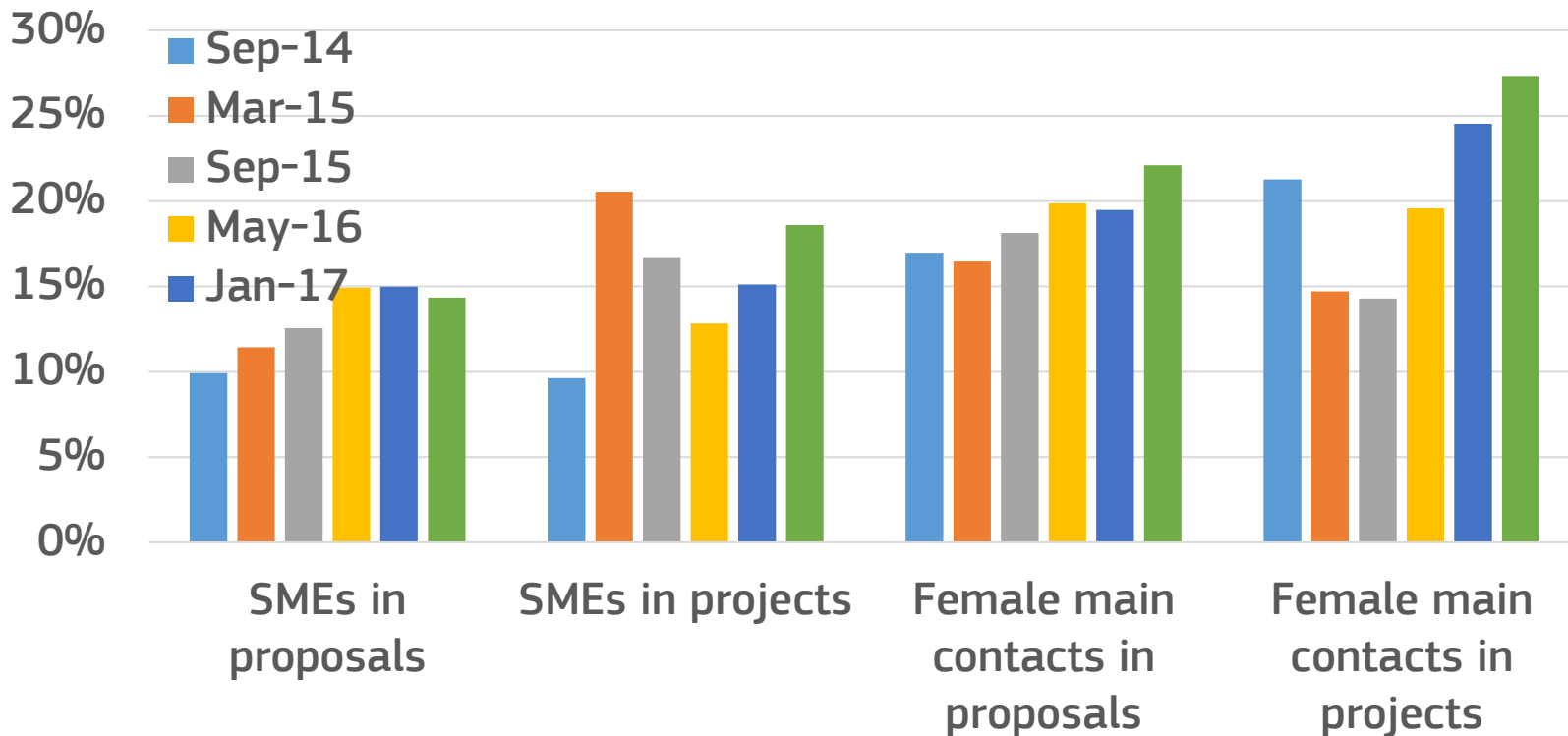




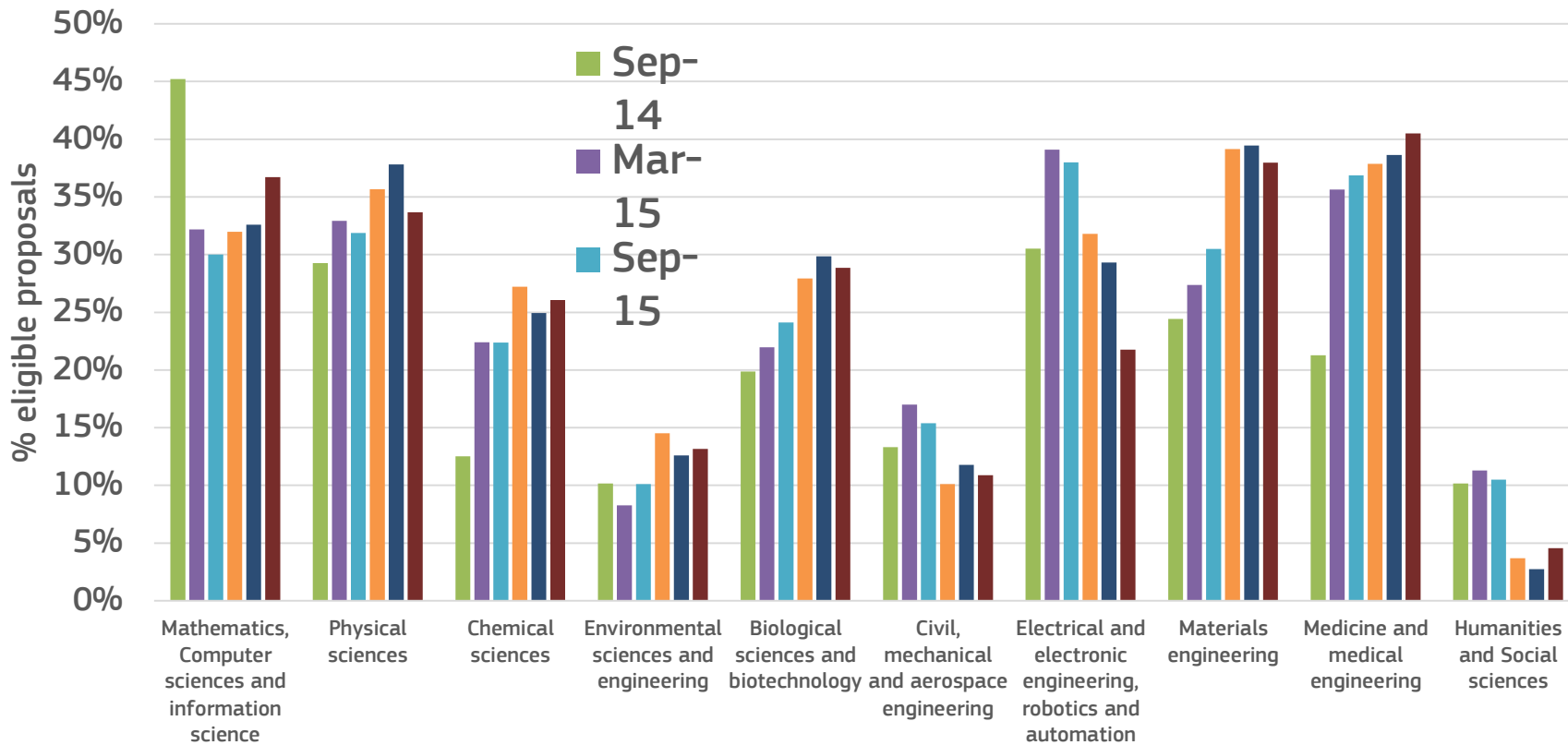
## Country participation

FET Open  
2014-2017  
(RIA signed grants)

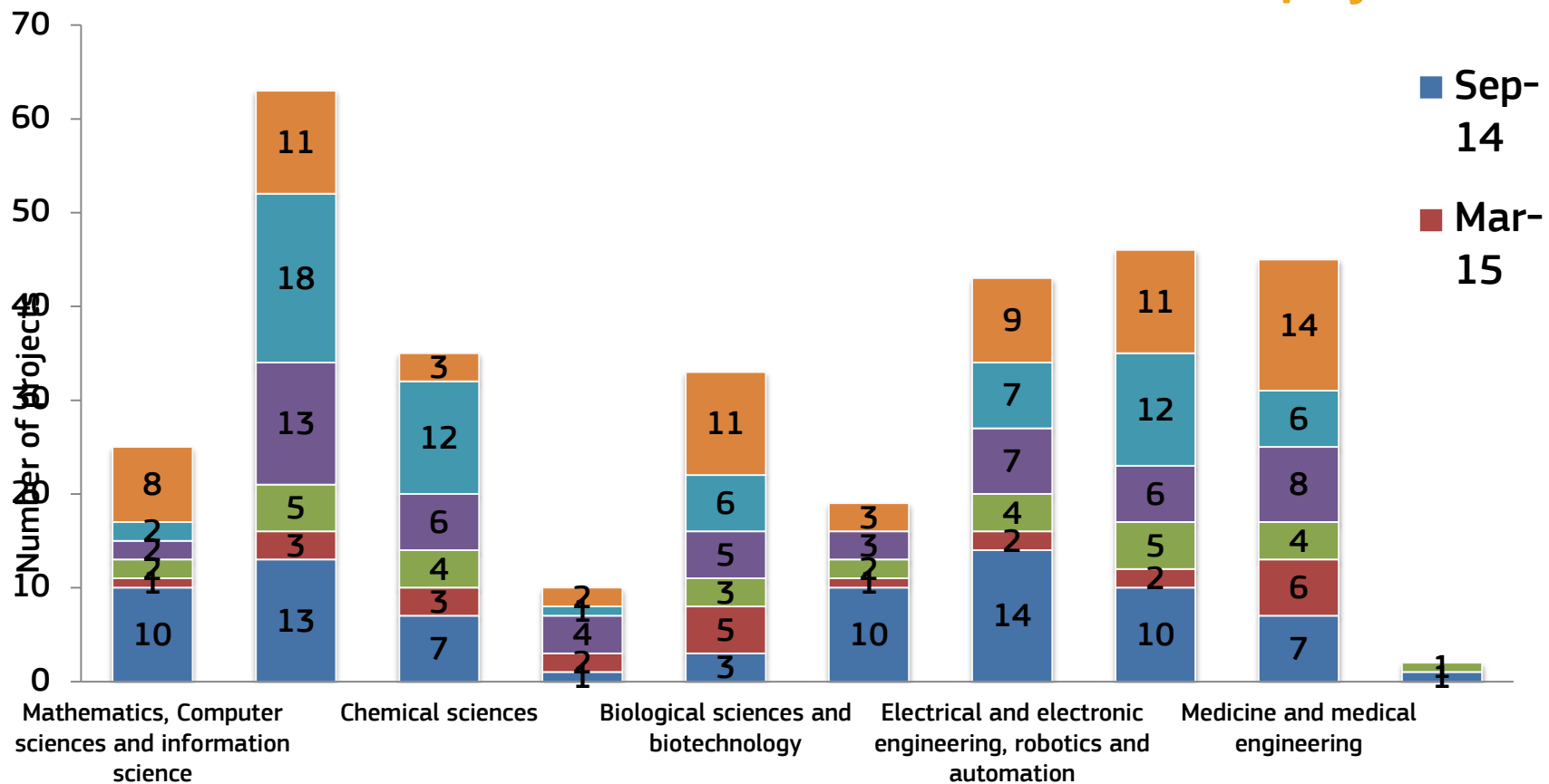
Participant Legal Name	Country	Number of projects' coordinator	Total number of projects
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS	FR	6	32
CONSIGLIO NAZIONALE DELLE RICERCHE	IT	7	16
AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS	ES	3	11
MAX-PLANCK-GESELLSCHAFT ZUR FORDERUNG DER WISSENSCHAFTEN	DE	1	11
AARHUS UNIVERSITET	DK	2	10
COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	FR	2	10
EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZUERICH	CH	1	10
UNIVERSITY OF OXFORD	UK	1	8
UNIVERSITY OF GLASGOW	UK	1	8
FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS	EL	4	7
FRAUNHOFER GESELLSCHAFT	DE	0	7
ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE	CH	1	6
UNIVERSITE PARIS-SUD	FR	1	6
UNIVERSITY COLLEGE LONDON	UK	0	6
IMPERIAL COLLEGE OF SCIENCE TECHNOLOGY AND MEDICINE	UK	0	6



## Trends in proposals



## Funded projects



# Thank you!

## About FET

[ec.europa.eu/digital-agenda/FET](https://ec.europa.eu/digital-agenda/FET)

## FET in H2020 (calls & projects)

[ec.europa.eu/horizon2020/fet](https://ec.europa.eu/horizon2020/fet)

## FET traces:

[https://www.fet-traces.eu/traces-wAssets/docs/FET\\_Traces\\_final\\_report\\_2018.pdf](https://www.fet-traces.eu/traces-wAssets/docs/FET_Traces_final_report_2018.pdf)



[@fet\\_eu](https://twitter.com/fet_eu) & [@FETFlagships](https://twitter.com/FETFlagships)

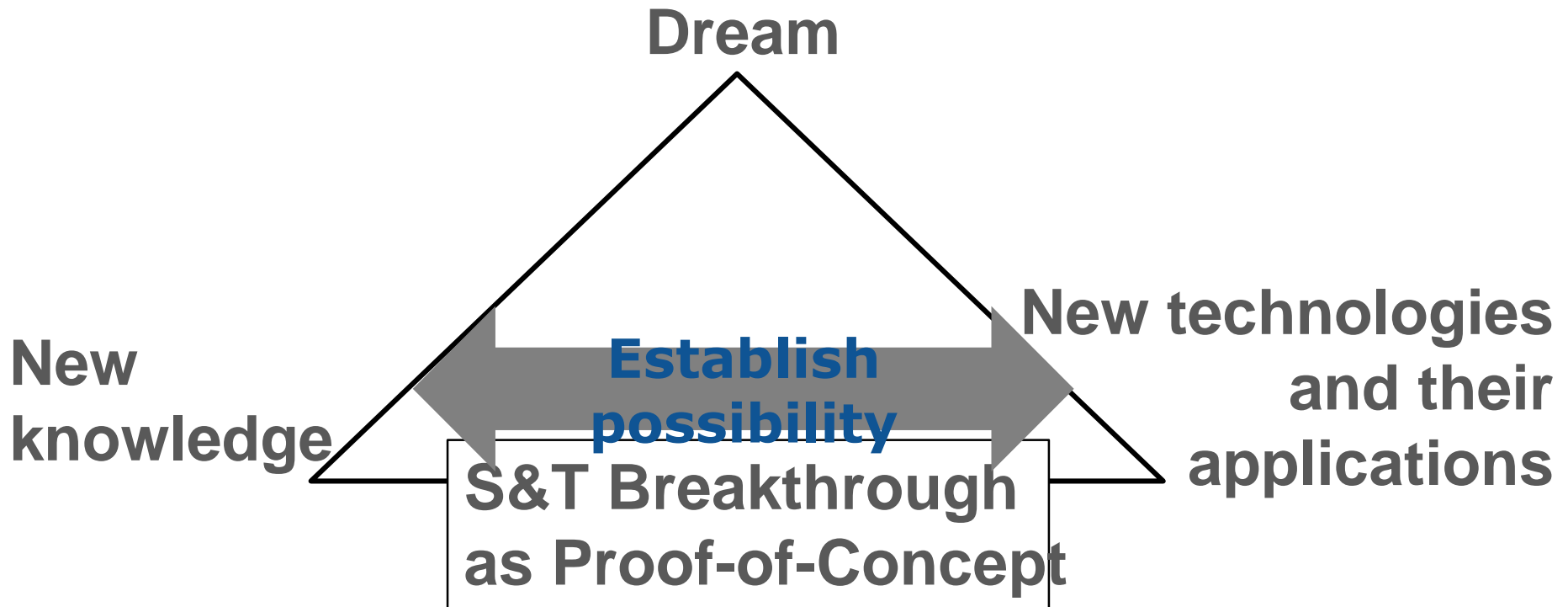
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# FET mission



# A typical FET-Open project



# And innovation?



**Dream**

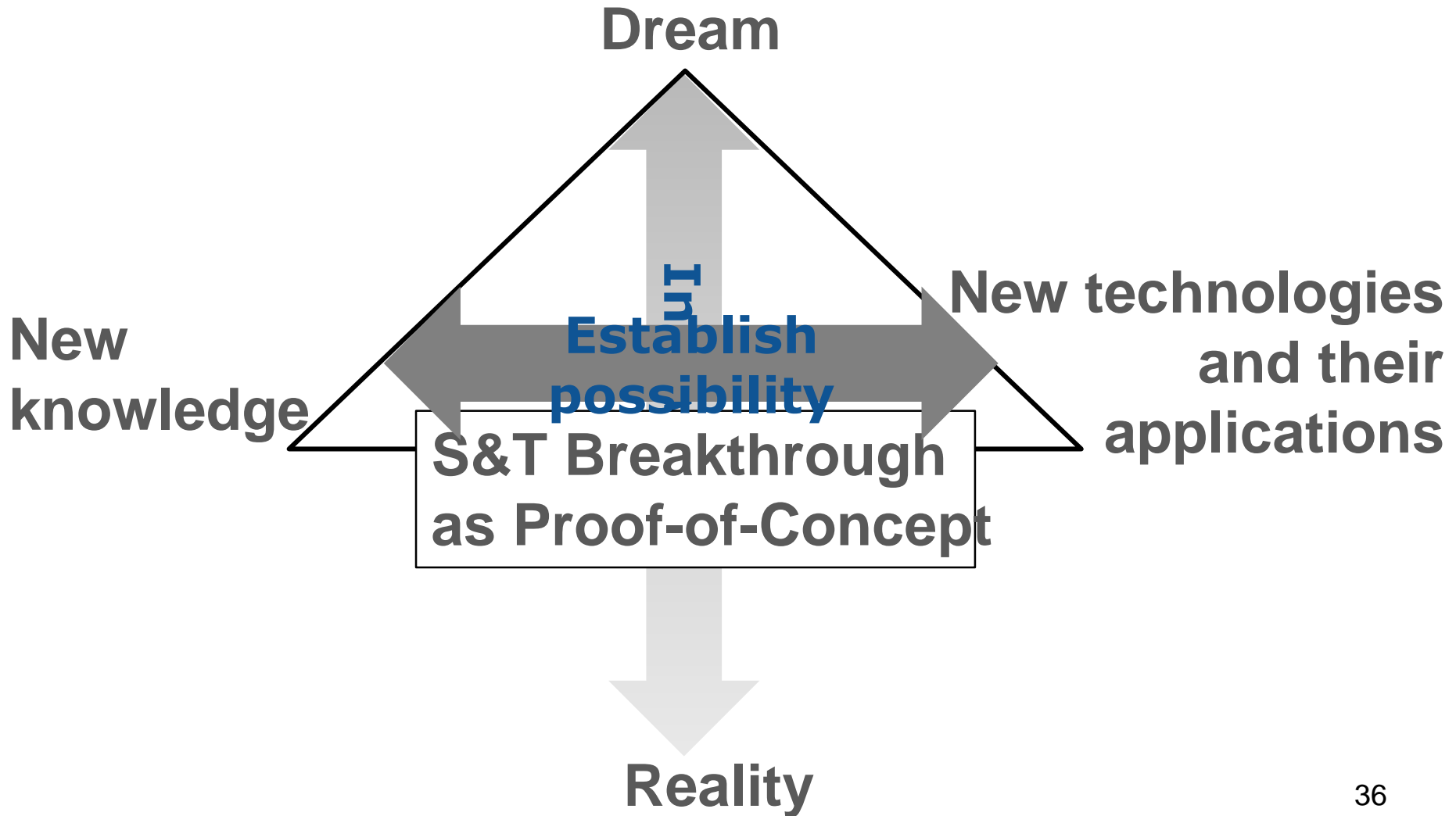


**Reality**

**Keeping focus  
on scientific risk**



**don't try to do too much  
in a single project**



# FET-Open is extremely competitive

- Don't waste time on a proposal that has no chance to make it through the FET-Open evaluation.
- Is FET-Open really the right scheme for you?
- Check out LEIT and Societal Challenges work programmes.
- FET is not ERC: collaboration, science and technology are all essential ingredients.
- It is not because something has not been done before that it is sufficiently novel for FET.
- FET is not the long-term end of an established industry's road-map
- A long-term vision is essential, but also a plausible idea on how to get there.
- Writing a good proposal is probably as hard as writing a good scientific publication (and more intellectually rewarding).

# Tips to write a good FET-Open proposal

*Be ambitious, follow your 'dream'*

- Novelty is essential
- Incremental refinements rarely make it – high-risk does
- Boil down the vision to a concrete and ambitious proof-of-concept

*Consortium for pathfinding*

- There are no hidden expectations from our side (beyond the rules for participation), i.e. no cosmetic roles – keep it simple
- Look for renewal here too - novelty probably starts here
- Narrow inter-disciplinarity will not be good enough to win (look beyond your comfort zone – this is not ERC-like career building)
- Commitment: will the project transform the partner(ship)? (mission vs. role)

### *Collaborate, collaborate, collaborate...*

- Take inter-disciplinarity seriously - write your proposal together
- Collaboration throughout the project, driven by joint questions, goals and mutual learning, not just passing on results between silos
- Explore new ways of working/learning/changing together

### *Communicate and engage*

- Scientific publications
- Social networks & media
- Public engagement

### *Keep it simple*

- Focus on the high-risk parts with crisp targets
- Don't write for 'us', but for people like you
- Check your deliverables list