

**BUSINESS
FINLAND**



H2020 Program opportunities for the Maritime Cluster

Tom WARRAS

National EUREKA Coordinator

NCP for Transport and Energy Programmes

27.11.2018 Helsinki

Business Finland gives insight in the European innovation landscape

European countries
and EU fund
innovation with
billions

These € are available
to raise the value of
your company –
project money

Lots and lots of
programs and
clusters: you will find
the interesting ones

BF offers insight in
H2020 and the E!
clusters – how to
play the game

BF wants to help you
to patriate the
money put into EU,
revenues to Finland

Please come and
discuss with us!



Why international R&D&I ?

Never join only to get money...

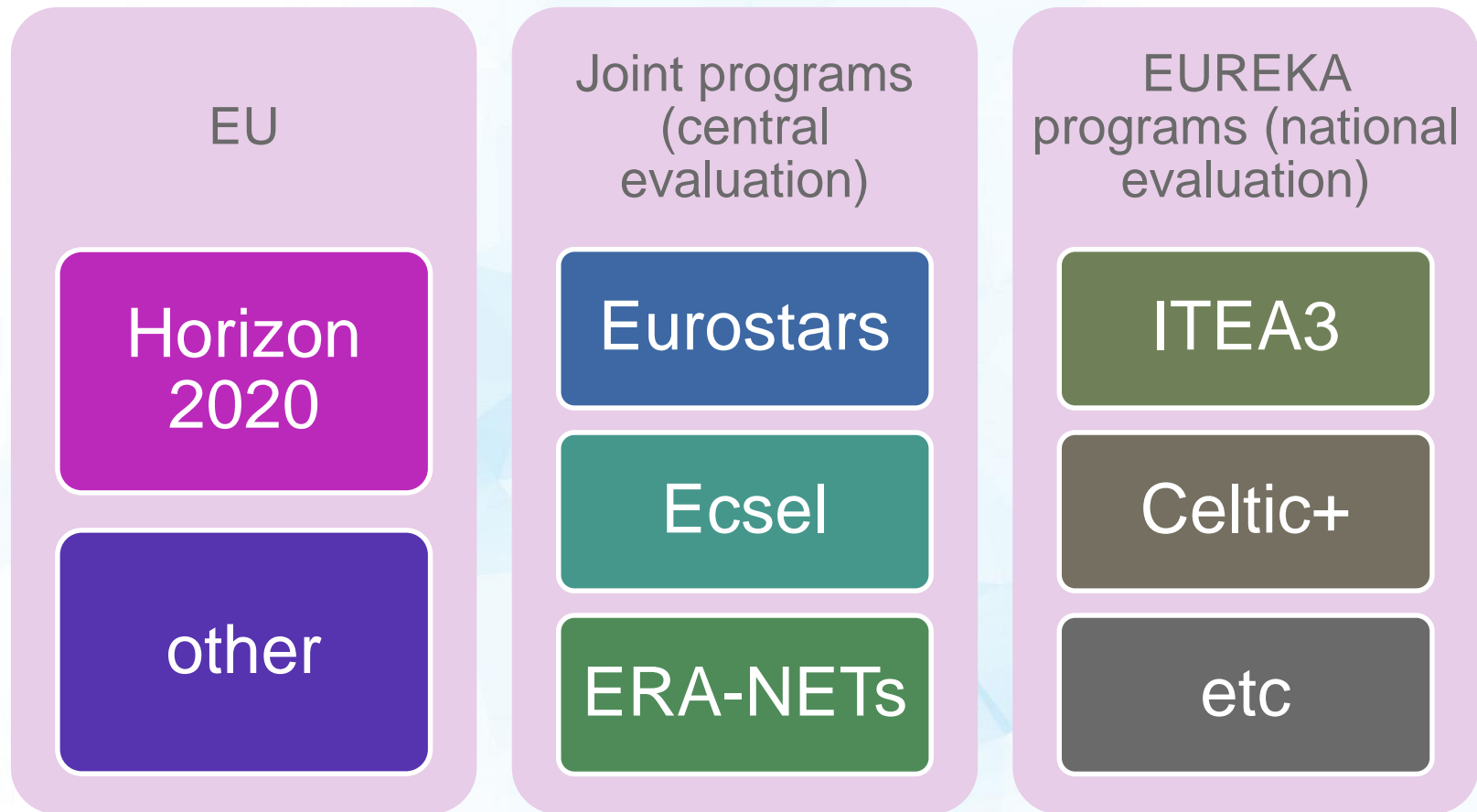
- ...but instead seek for:
- Cooperation in European networks
- Implementation of risky innovations
- Best competence in Europe to help you
- Influence to all sector through technology, practices and standards

Please take into account:

- Immaterial property questions
- Timeline for application, negotiation and contract
- "Byreaucracy" along the project



European models of R&D&I funding

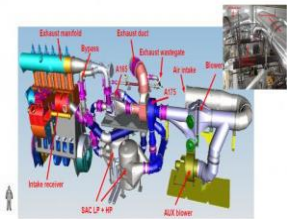


Horizon 2020 – Structure and themes

I Excellent Science	II Industrial Leadership	III Societal Challenges
<div><div>1. European Research Council (ERC)</div><div>2. Future and Emerging Technologies (FET).<div>a) Open b) Proactive c) Flagships</div></div><div>3. Marie Skłodowska-Curie (MSCA) – actions: training, career development and mobility for researchers</div><div>4. Research Infrastructures</div></div>	<div><div>1. Leadership in Enabling and Industrial Technologies<div>1.1. ICT 1.2. nanotechnology 1.3. materials 1.4. biotechnology 1.5. manufacturing and processes 1.6. space</div></div><div>2. Risk finance: loans & equity funding</div><div>3. Innovation in SMEs</div></div> <div><div>20% of the budget or pillars II + III to SMEs</div><div><div>SME Instrument(1/3)</div><div>Collaborative projects (2/3)</div></div></div>	<div><div>1. Health, demographic change and wellbeing</div><div>2. Food security, sustainable agriculture and forestry, marine, maritime and inland water research and bioeconomy</div><div>3. Secure, clean and efficient energy</div><div>4. Smart, green and integrated transport</div><div>5. Climate action, resource efficiency and raw materials</div><div>6. Europe in a changing world: inclusive, innovative and reflective societies</div><div>7. Secure societies – protecting freedom and security of Europe and its citizens</div></div>
Science with and for society, Spreading excellence and widening participation		
Joint Research center JRC	European Institution of Innovation and Technology EIT	
Nuclear research EURATOM		

Transport

ENERGY EFFICIENT AND EMISSION FREE VESSEL – FROM COMPONENT TO VESSEL DEPLOYMENT



HERCULES-2

Fuel flexible, near-zero emission, adaptive performance marine engine



LEANSHIPS

Efficient, less polluting new/retrofitted vessels with end users' requirements



E-FERRY

The first mid-size 100% electric ferry



ZERO EMISSION FERRIES

A green link across Oresund by converting RoPax ships

Technology readiness levels (TRL)



TECHNOLOGY PROGRESSION – CASE OF LNG



RETROFIT



PROMINENT



GAINN4 SHIP
INNOVATION

Research on LNG fuel for main engines and generators (dual-fuel engine – LNG/Diesel)

Pilot LNG system as a retrofit solution for existing vessels

Retrofit of a high-speed craft ro-pax 75% LNG fuelled vessel

Technology readiness levels (TRL)



The diagram illustrates the Maritime Cloud ecosystem and its applications. The top part shows a 'MARITIME CLOUD' connecting 'Stakeholders' (Ports, Companies, Government, etc.) and 'Services' (Management, Monitoring, Alerting, etc.) to a central cloud. Below this, three ship icons represent different stages of vessel platooning controlled by ITS. The bottom part shows a map of the North Atlantic region, highlighting the 'STM VALIDATION PROJECT' area, which includes Greenland, the Russian Federation, and various European countries like France, Ireland, and the UK.

TRL 1-2	TRL 3-4	TRL 5-6	TRL 7-8	TRL 9		
Principles and formulation	Proof of concept and validation	Validation in real environment	Prototype demonstration and completion	Proven and operational		
Basic research	Applied research	Prototype	Scale-up	Pilot	Demonstration	Deployment

TRANSPORT WP 2018-2020

Smart, green and integrated transport

Mobility for Growth –call

- 1. Building a low-carbon, climate resilient future: low-carbon and sustainable transport**
- 2. Safe, integrated and resilient transport systems**
- 3. Global leadership and competitiveness**
- 4. Accounting for the people**
- 5. Blue Growth**

Digitising and Transforming European Industry and Services: Automated Road Transport -call

Building a low-carbon, climate resilient future: Green Vehicles –call **Other actions, e.g. prizes, SME Instrument, FTI**

+ Clean Sky 2, SESAR, Shift2Rail

TRANSPORT WP 2018-2020

Smart, green and integrated transport

Mobility for Growth –call

- 1. Building a low-carbon, climate resilient future: low-carbon and sustainable transport**
- 2. Safe, integrated and resilient transport systems**
- 3. Global leadership and competitiveness**
- 4. Accounting for the people**
- 5. Blue Growth**

**Digitising and Transforming European Industry and Services:
Automated Road Transport -call**

Building a low-carbon, climate resilient future: Green Vehicles –call
Other actions, e.g. prizes, SME Instrument, FTI

+ Clean Sky 2, SESAR, Shift2Rail

Transport Work Programme 2018-2020

Main features in 2019

- **New call on Next-Generation Batteries (BAT)** cutting across different WP parts
- **3 International Cooperation flagship initiatives** of large scale and scope addressing global challenges in aviation and logistics and 4 more topics encouraging InCo
- **Budget 2019: EUR 386.01 mio** – (EUR 945 mio in 2018-2020)
- Transport relevant topics in **other parts of the H2020WP**: NMPB, ICT, ENERGY, SECURITY, CROSS-CUTTING ACTIVITIES
- **Open Access to Data policy**: by default to the whole H2020 to scientific publications and research data generated by projects → **opt-out option**

Main modification: the new call on battery R&I

- Main modification: the **new cross-cutting call** bringing together all topics related to batteries (**LC-BAT**)
- It includes topics from 3 parts of the H2020 Work Programme: NMBP, SC3-Energy and SC4-Transport
- The new call is linked to the Commission's engagement to invest in battery development and the need to make this investment highly visible
- The creation of this call had repercussions in the contents of the GV call, given that the battery-related topics are now part of the LC-BAT call.

Topic overview

2019

LC-BAT-1-2019	Strongly improved, highly performant and safe all solid state batteries for electric vehicles (generation 4)	NMBP	€ 25 M
LC-BAT-2-2019	Strengthening EU materials technologies for non-automotive battery storage	NMBP	€ 24 M
LC-BAT-3-2019	Modelling and simulation for Redox Flow Battery development	Energy	€ 5 M
LC-BAT-4-2019	Advanced Redox Flow Batteries for stationary energy storage	Energy	€ 15 M
LC-BAT-5-2019	Research and innovation for advanced Li-ion cells (generation 3b)	Transport	€ 30 M
LC-BAT-6-2019	Li-ion Cell Materials & Transport Modelling	Transport	€ 13 M
LC-BAT-7-2019	Network of Li-ion cell pilot lines (CSA)	Transport	€ 2 M

In 2019 in total 7 topics, € 114 M, of which

Transport: 3 topics, € 45 M

NMBP: 2 topics, € 49 M

Energy: 2 topics, € 20 M

2020

LC-BAT-8-2020	Next-generation batteries for stationary energy storage	Energy	For both
LC-BAT-9-2020	Hybridisation of battery systems for stationary energy storage	Energy	€ 30 M
LC-BAT-10-2020	Next generation and realisation of battery packs for BEV and HEV	Transport	€ 40 M

In 2020 in total 3 topics, € 70 M, of which

Transport: 1 topic, € 40 M

Energy: 2 topics € 30 M

In addition foreseen:

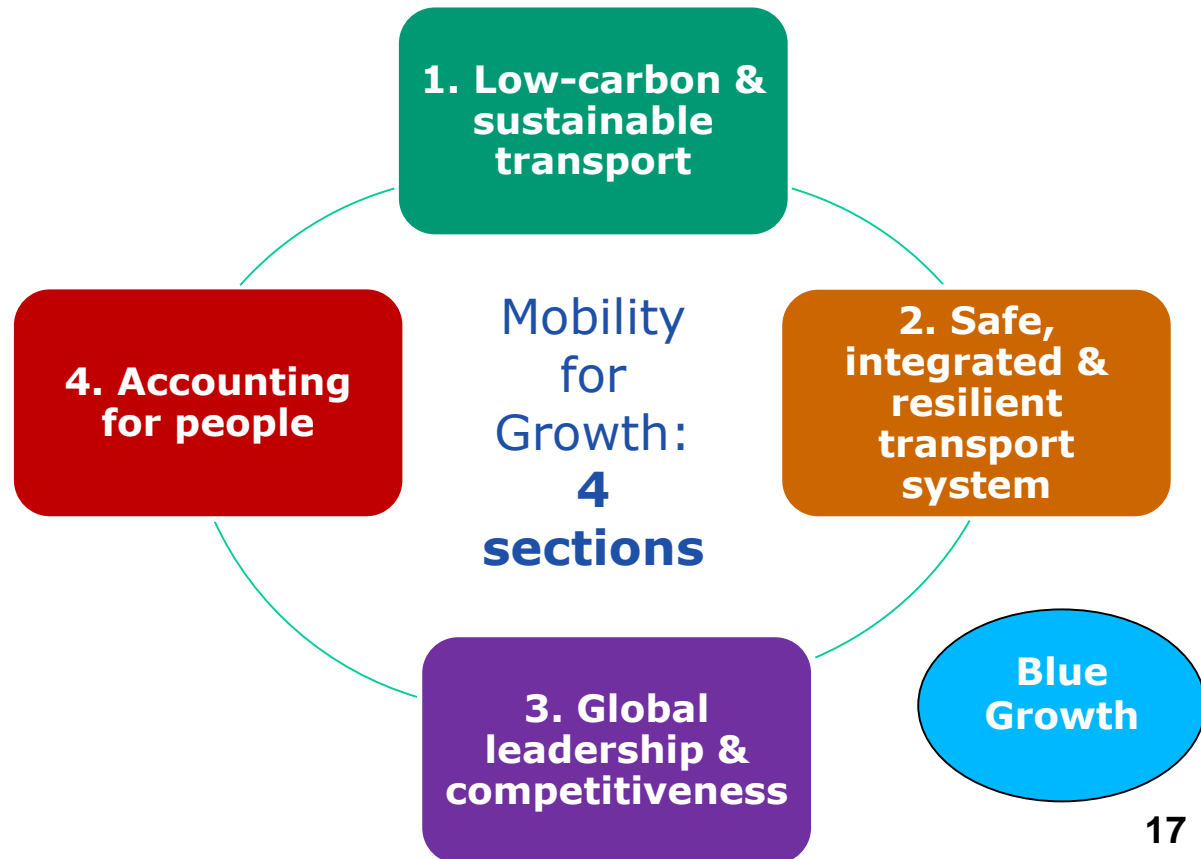
- support battery **future emerging technologies** from Transport
- one topic to support batteries for **waterborne applications** in Transport

I. Call MOBILITY FOR GROWTH (MG)



Overall objectives:

- ✓ Reconcile competitiveness & sustainability
- ✓ Ensure better and safer mobility for all
- ✓ Address socio-economic aspects and provide evidence for policy-making



H2020 – Call 2019

Currently opened topics – 2 two-stage topics, first stage opened from 05/09/2018, deadline: 16/01/2019

- ***LC-MG-1-8-2019:*** Retrofit solutions and next generation propulsion for waterborne transport

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/lc-mg-1-8-2019.html>

- ***MG-2-6-2019:*** Moving freight by Water: Sustainable Infrastructure and Innovative Vessels

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/mg-2-6-2019.html>

Retrofit Solutions and Next Generation Propulsion for Waterborne Transport - 1

**LC-MG-1-8-
2019**
(RIA/IA)

Indicative cost per
proposal:

Topic A €4-8M

Topic B €3-5M

Budget:

Topic A: €8M

Topic B: €15m

Challenge:

Retrofit solutions and next generation new builds (including fuel cells) to substantially reduce air pollution from shipping.

Scope (one of the following sub topics):

RIA:

- Concept passenger ship primarily powered by fuel cells of at least 5MW.
- Combined cycle OK for improved efficiency, using LNG, LBG, CPG or synthetic fuels with additional consideration of full H₂.

Retrofit Solutions and Next Generation Propulsion for Waterborne Transport - 2

**LC-MG-1-8-
2019**
(RIA/IA)

Indicative cost per
proposal:

Topic A €4-8M

Topic B €3-5M

Budget:

Topic A: €8M

Topic B: €15m

IA - One or more of:

- To TRL 5 Highly efficient next gen electrified, clean fuel, or renewable energy propulsion system
- To TRL 5 very innovative large area high efficiency or renewable energy assisted propulsion such as novel wind power, whale tale, bio mimic, considering all aspects.
- To TRL6 Cost effective retrofits for marine shipping that substantially reduce emissions and exceed current legislative requirements.
- As above for inland shipping

Expected impact:

Reduce air pollution from shipping, for retrofits particularly in coastal and port areas. Increase take up. Next gen solutions >10% reduction in CO2 emissions.

Moving freight by Water: Sustainable Infrastructure and Innovative Vessels - 1

**MG-2-6-
2019 (RIA)**

Challenge:

Find innovative solutions to move more European freight by water using inland waterways or short sea shipping.

Scope

Proposals should focus on either (a) Inland waterways, or (b) maritime transport. Proposals should indicate which is being addressed.

Those projects addressing:

Inland Waterways must address solutions for infrastructure maintenance and operations (4th bullet), plus at least 4 of the other bullets.

Marine Transport must address the development of innovative vessel(s) for more effective intermodal integration and with a focus of the TEN-T network, plus at least 4 of the other bullets.

Indicative cost per
proposal:

€5M to €10M

Topic Budget:

€30M

To ensure balance,
at least the highest
ranked proposal
addressing (a) and
b) will be selected

Moving freight by Water: Sustainable Infrastructure and Innovative Vessels - 2

**MG-2-6-
2019 (RIA)**

Expected impact:

- Decongest land transport.
- Reduce CO2 and air pollution from intra-European freight transport.
- Improve performance of TEN-T network.
- Substantially increase waterborne freight fed from intercontinental ports.
- Modernise and increase reliability.
- Demonstrate that the proposed solution increases the quantity of waterborne freight carried.

Indicative cost per
proposal:

€5M to €10M

Topic Budget:

€30M

To ensure balance,
at least the highest
ranked proposal
addressing (a) and
b) will be selected



Transport R&I contribution to the BLUE GROWTH action

2019: One RIA topic on:

« Ship emission control scenarios, marine environmental impact and mitigation » (8m euros)

- **emission reduction technologies and designs**
- **waste streams from emission control technologies**
- **propose sustainable cost effective emission reduction strategies and technologies**

H2020 – Call 2019

Upcoming topics – 2 single stage topics, opening from 04/12/2018, deadline: 25/04/2019

- ***LC-MG-1-11-2019:*** Structuring R&I towards zero emission waterborne transport
- ***MG-BG-02-2019:*** Ship emission control scenarios, marine environmental impact and mitigation

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/mg-bg-02-2019.html>

Structuring R&I towards zero emission waterborne transport - 1

**LC-MG-1-
11-2019
(CSA)**

Challenge:

- Need a structured approach towards R&I to decarbonise waterborne transports as well as reducing other pollutants such as SOX, NOX and PMs.
- All stakeholders need to be engaged.
- Priorities need to be established and widely communicated so that they can become a focus for the greening of waterborne transport as a whole.

Indicative cost per
proposal:

€1M

Topic Budget

€1M

Structuring R&I towards zero emission waterborne transport - 2

**LC-MG-1-
11-2019
(CSA)**

Indicative cost per
proposal:

€1M

Topic Budget

€1M

Proposals should address:

- Establish a comprehensive “green shipping stake holder group which should cooperate with waterborne TP and take into account other activities such as ESSF, STRIA, CEF TEN-T.
- Establish a quantified vision considering all pollutants and a strategic research agenda with the steps to achieve it.
- Support take up, including the establishment and implementation of a strong communications strategy.
- Some related activities concerning digitalisation, safety and competitiveness may also be included.

Expected impact:

- Towards zero-emission goal
- Increase competitiveness
- Better targeting and synergies
- Wider awareness and "buy in" to a European zero emission strategy

Ship Emission Control scenarios, marine environmental impact and mitigation - 1

**MG-BG-02-
2019 (RIA)**

Indicative cost per
proposal:
€8M

Topic Budget
€8M

Challenge:

- Increasingly strict emission limits apply to ships around coastlines of most developed countries.
- Now focussed on SOX but a focus on NOX and PM may follow.
- Some compliant solutions impacts and new waste streams. The effects and scenarios in the short and long term are not well understood.

Proposals should address:

- Assessment of the range of emission reduction technologies, considering their costs benefits.
- Experimentally characterise waste streams,
- Considering several scenarios model discernment around the European coast, considering main ship routes and real data, hydrological and weather as well as the constituents discharged

Ship Emission Control scenarios, marine environmental impact and mitigation - 2

**MG-BG-02-
2019 (RIA)**

- Environmental impact in the medium and long term including bio accumulation.
- Propose sustainable cost effective solutions.
- Recommended to provide open source access to dispersion model data.

Indicative cost per
proposal:

€8M

Topic Budget

€8M

Expected impact:

- Comprehensive understanding of dispersion and any long term environmental impacts.
- Identify most affected regions.
- Provide sound basis for future policies.

Battery prize published – evaluation in 2021

Year	Topic code	Topic name	EU award, €
2018	Inducement Prize	Innovative batteries for e-vehicles Joint DG RTD EIC pilot: EIC Horizon Prize	10,000,000
<i>deadline: 17 December 2020; prize award 4th quarter 2021</i>			



INNOVATIVE
BATTERIES
FOR E-VEHICLES

EIC HORIZON
prize

SOLVE THE CHALLENGE

€10 million

Apply by 17 December 2020

#eicHorizonPrize

European
Commission

Transport call deadlines

Work Programme 2018-2020	2019	
	Opening	Closing
Single Stage (MG, ART and GV calls) Exception MG-4-4	4/12/2018 5/09/2019	25/4/2019 16/01/2019
First Stage of 2-Stages (MG call only)	5/9/2018	16/1/2019
Second Stage of 2-Stages (MG call only)		12/9/2019
Batteries Call – single stage	24/01/2019	25/04/2019

H2020 – Call 2020

- 2 topics confirmed, calls open in fall 2019
 - **MG-3-07-2020: Improved Production Processes in Ship building**
 - **MG-BG-03-2020: Underwater noise mitigation and environmental impact**
- possibly several other topics will be added to the work programme (depending on the budget left towards the end of the H2020 programme)

Topic overview

2019

LC-BAT-1-2019	Strongly improved, highly performant and safe all solid state batteries for electric vehicles (generation 4)	NMBP	€ 25 M
LC-BAT-2-2019	Strengthening EU materials technologies for non-automotive battery storage	NMBP	€ 24 M
LC-BAT-3-2019	Modelling and simulation for Redox Flow Battery development	Energy	€ 5 M
LC-BAT-4-2019	Advanced Redox Flow Batteries for stationary energy storage	Energy	€ 15 M
LC-BAT-5-2019	Research and innovation for advanced Li-ion cells (generation 3b)	Transport	€ 30 M
LC-BAT-6-2019	Li-ion Cell Materials & Transport Modelling	Transport	€ 13 M
LC-BAT-7-2019	Network of Li-ion cell pilot lines (CSA)	Transport	€ 2 M

In 2019 in total 7 topics, € 114 M, of which

Transport: 3 topics, € 45 M

NMBP: 2 topics, € 49 M

Energy: 2 topics, € 20 M

2020

LC-BAT-8-2020	Next-generation batteries for stationary energy storage	Energy	For both
LC-BAT-9-2020	Hybridisation of battery systems for stationary energy storage	Energy	€ 30 M
LC-BAT-10-2020	Next generation and realisation of battery packs for BEV and HEV	Transport	€ 40 M

In 2020 in total 3 topics, € 70 M, of which

Transport: 1 topic, € 40 M

Energy: 2 topics € 30 M

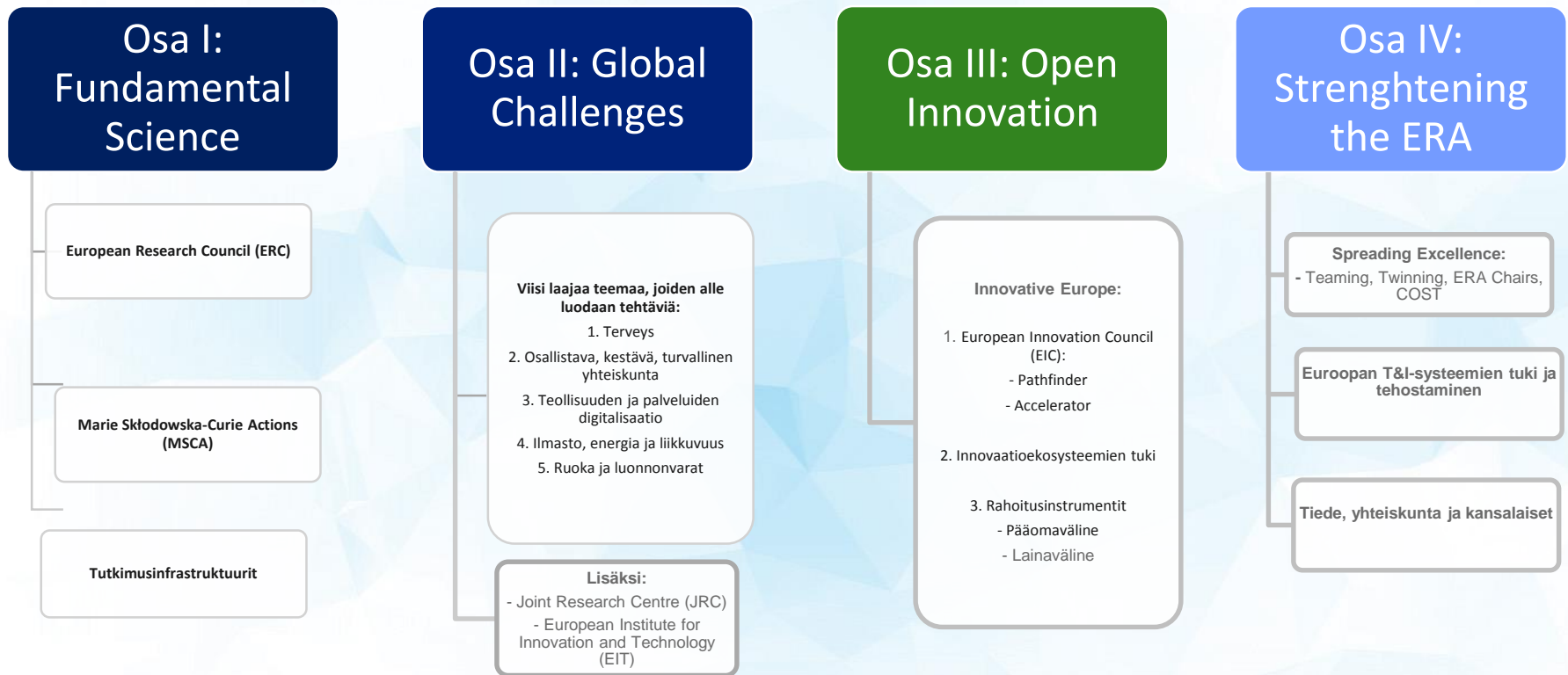
In addition foreseen:

- support battery **future emerging technologies** from Transport
- one topic to support batteries for **waterborne applications** in Transport



FP9: rakenneluonnos

- Komissio antaa esityksen FP9:stä MFF-esityksen jälkeen, todennäköisesti 7.6.2019. Tavoitteena on saattaa lainsäädäntö loppuun ennen nykyisen parlamentin vaalikauden loppua kesäkuussa 2019.



Professori Mazzucaton näkemys missioista globaalien haasteiden ja projektien välissä

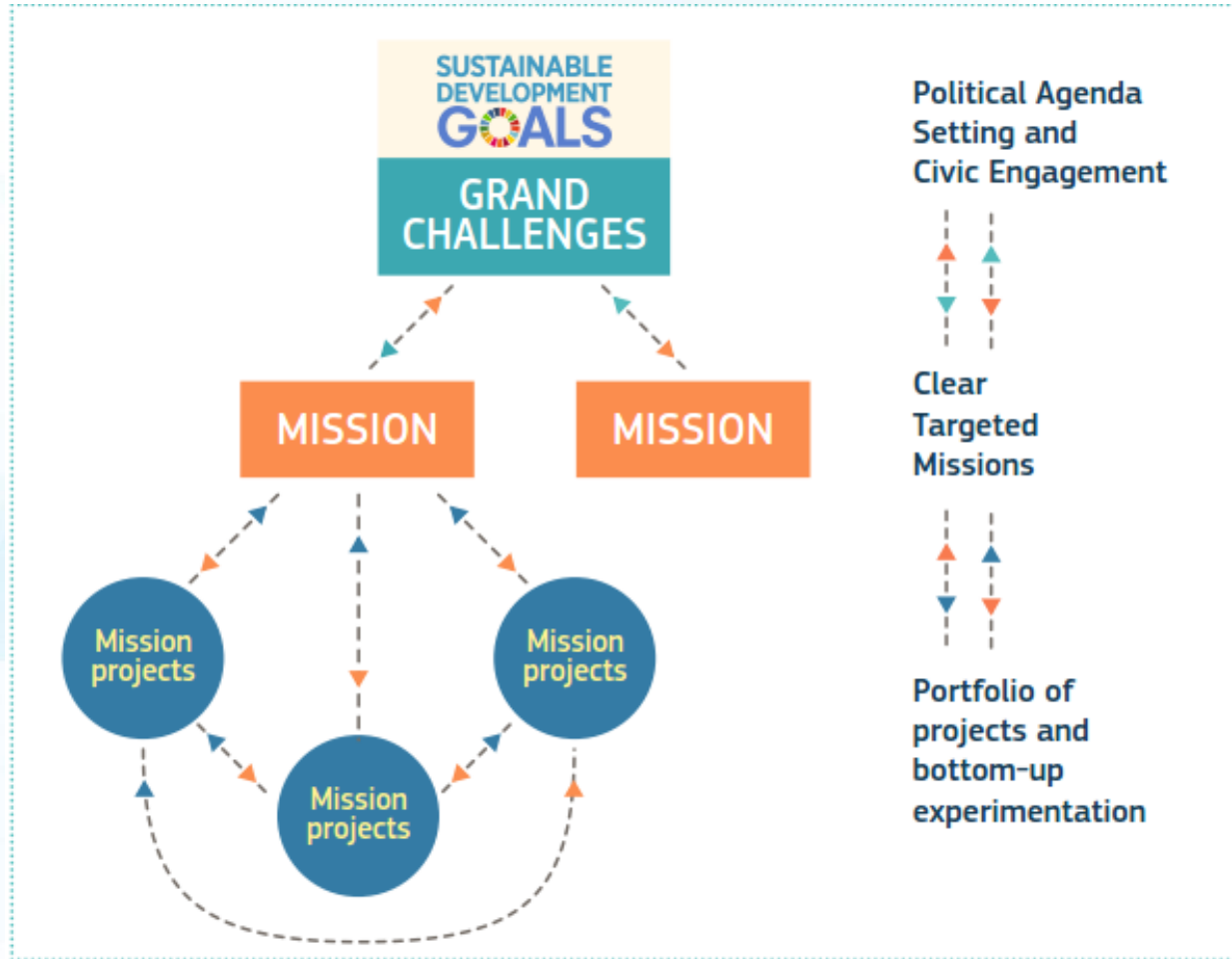


Figure 1. From Challenges to Missions Image: RTD - A.I based on Mazzucato (2017)

Technology Readiness Levels

100% funding					70% funding			
					FTI & SME instrument funding 70%			
1	2	3	4	5	6	7	8	9
Basic principle observed	Concept formulated	Proof of concept	Validation in lab	Technical validation in relevant environment	Demonstration in relevant environment	Demo in operational environment	System complete & operational	Commercial

Main differences of H2020 funding compared to BF funding:

1. H2020 funding is applicable to projects closer to market (high TRL)
2. H2020 is always grant funding, percentage higher than BF applies
3. Important prepayment given by EU

But of course: the nature of the project is quite different, true European

H2020 instruments

CONSORTIUM PROJECTS FOR RESEARCH AND INNOVATION

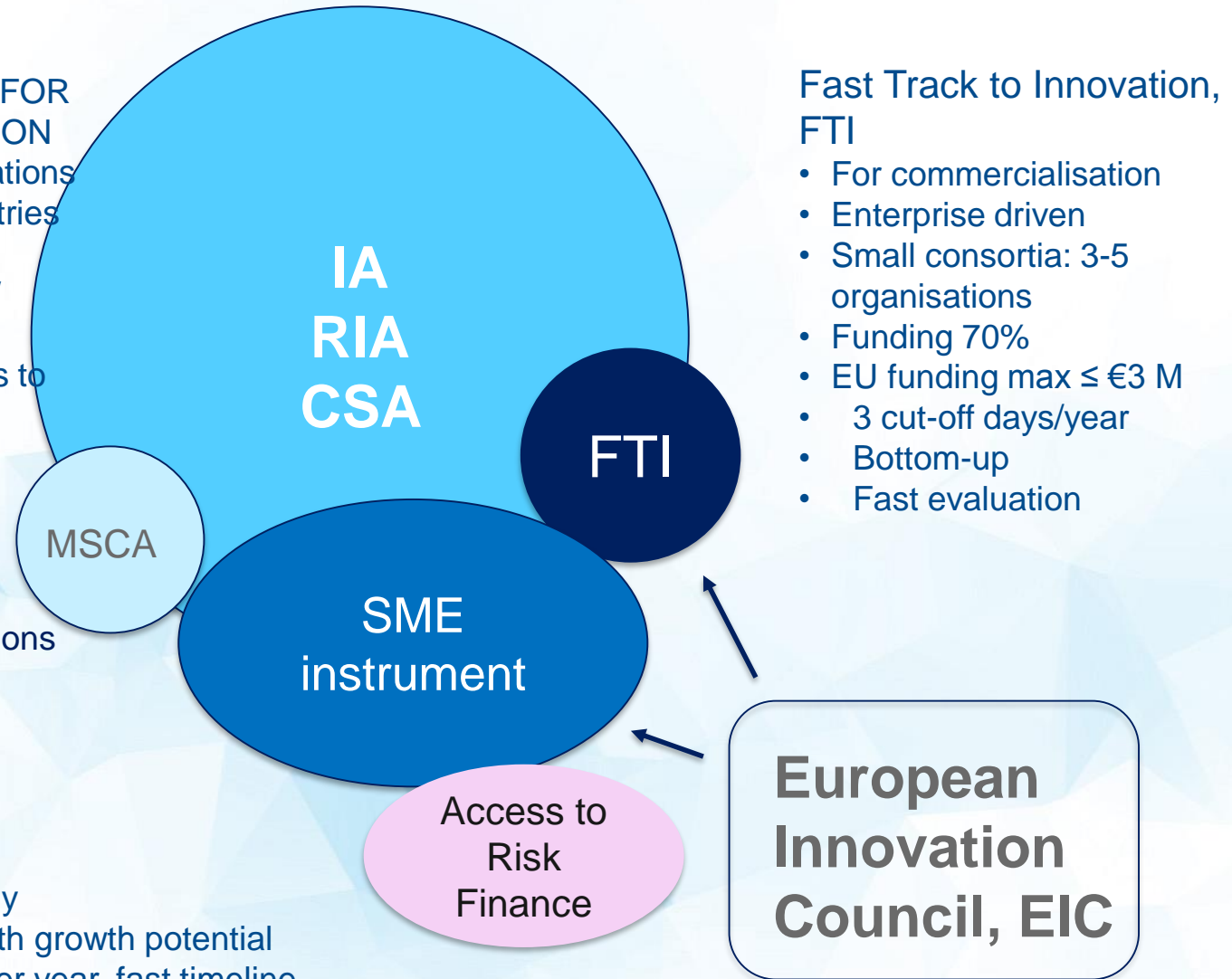
- ≥ 3 independent organisations from 3 EU or assoc.countries
- Funding: 100/70%
- Budget several million € / project
- Topics and call timetables to be found in the Work Programmes

Marie Skłodowska Curie Actions

- A researcher gets a job
- EU pays all costs

SME INSTRUMENT

- To a single SME company
- To the best in Europe, with growth potential
- Call with 4 cut-off days per year, fast timeline
- Phase 1 has its last round now, for pre-projects
- Phase 2 goes on till 2020, evaluated with interviews
- New concepts Pathfinder and Accelerator tested 2019-2020



Fast Track to Innovation, FTI

- For commercialisation
- Enterprise driven
- Small consortia: 3-5 organisations
- Funding 70%
- EU funding max $\leq \text{€}3 \text{ M}$
- 3 cut-off days/year
- Bottom-up
- Fast evaluation

**European
Innovation
Council, EIC**

- **Collaborative R&I for consortia** (typically at least 3 entities in 3 member or associated states) addressing topics defined in a published call.
- **SME** actions (bottom up)
- Up to **100% or 70%** of direct R&I costs.
- A typical **50% prepayment** at start of project
- **International** cooperation (most less developed countries funded same as an EU country)
- **Demonstration** activities

NCPt apunasi!



<https://www.horisontti2020.fi/Yhteystiedot/>

The detailed 2019 call info comes from
Renata Kadric

Renata.KADRIC@ec.europa.eu



The Transport website:

http://ec.europa.eu/research/transport/index_en.htm

**BUSINESS
FINLAND**



Tom WARRAS

NCP for Transport and Energy Programmes

Tom.warras@businessfinland.fi

Tel. +358 50 5577 839

**H2020 Program opportunities for the
Maritime Cluster**