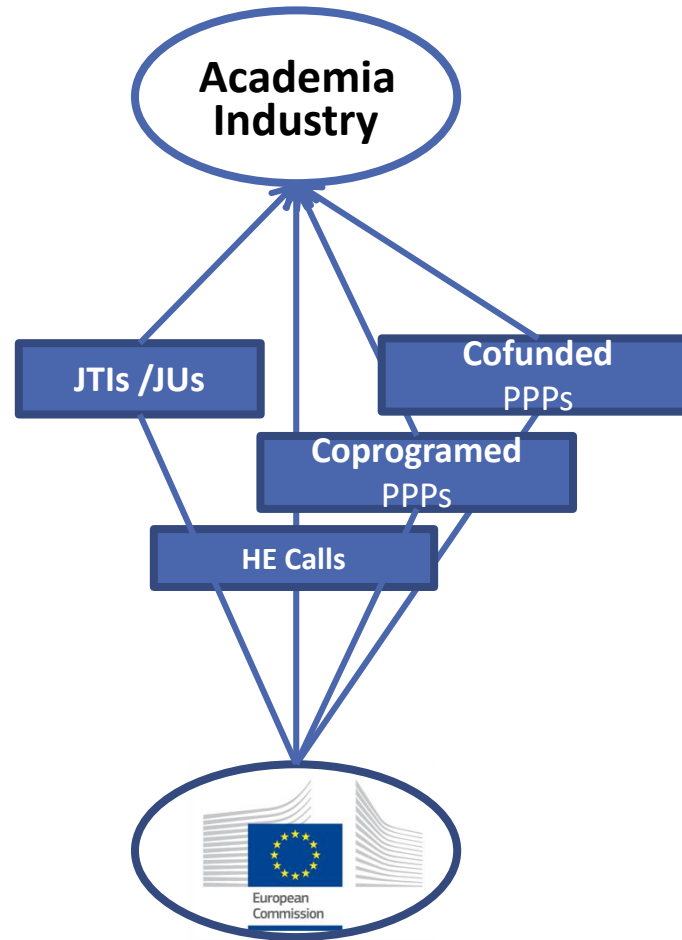# ECSEL JU
KDT JU
TO
CHIPS JU

Anton Chichkov

KDT JU
KEY DIGITAL
TECHNOLOGIES
JOINT UNDERTAKING

HORIZON EUROPE

EUROPEAN CO-PROGRAMED PARTNERSHIPS

- Includes commission and industrial cluster

- Memorandum of understanding with the Commission

- The partnership does not own the budget

- The Commission is in charge of the work program considering the input of the industrial cluster

- The Commission is in charge of the calls and the funding decision

- Funding % are the same as HE

- Flexible to create or stop

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EUROPEAN PARTNERSHIP

EUROPEAN CO-PROGRAMED PARTNERSHIPS

1. European Open Science Cloud.

2. Artificial Intelligence, Data and Robotics.

3. Photonics (light-based technologies).

4. Clean Steel – Low Carbon Steelmaking.

5. Made in Europe.

6. Processes4Planet.

7. People-centric Sustainable Built Environment (Built4People).

8. Zero-emission Road Transport (2Zero).

9. Connected, Cooperative and Automated Mobility.

10. Towards a competitive European industrial battery value chain.

11. Zero Emission Waterborne Transport.
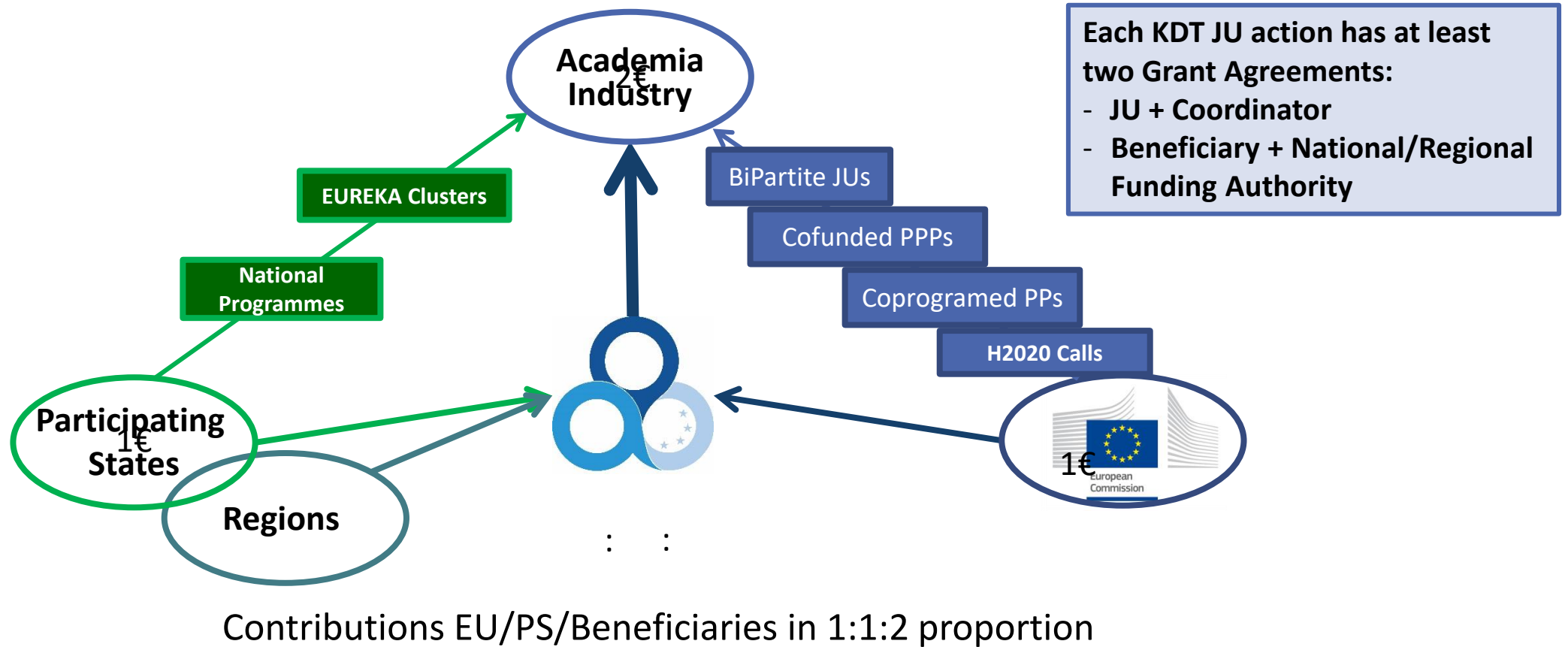
KDT JU

INSTITUTIONALIZED BI-PARTITE PPP (JUs)

- Includes commission and industrial cluster

- Council regulation

- The JU owns the budget

- GB of the JU is in charge of the work program considering the input of the industrial cluster

- The JU is in charge of the calls. Funding decision by GB

- Funding % are the same as HE

- Exist trough the programme

KDT JU

INSTITUTIONALIZED TRIPARTITE PPP (JUs)

- Includes commission, industrial cluster, and participating states

- Council regulation

- The JU owns the budget

- GB of the JU is in charge of the work program considering the input of the industrial cluster

- The JU is in charge of the calls. Finding decision by PAB

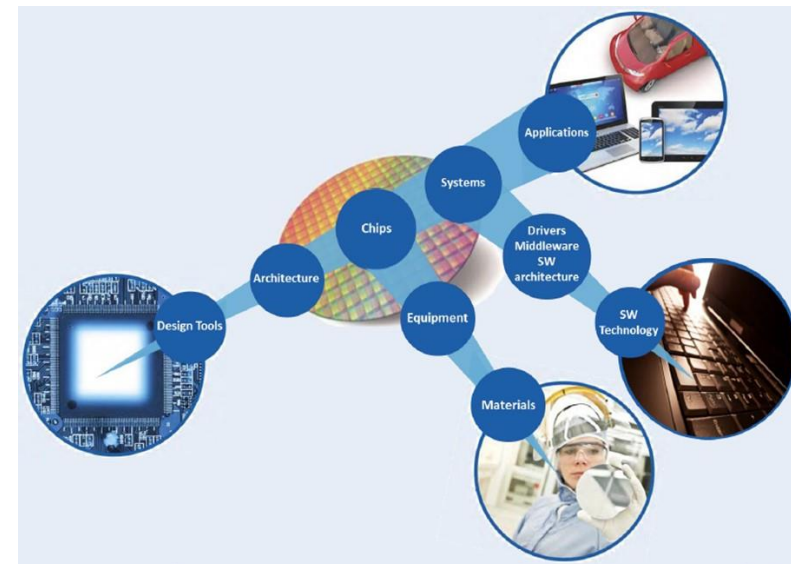- Funding % are <u>NOT</u> the same as HE

- Exist trough the programme

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KDT JU MECHANISM

Combining Funding: a Unique 3-Way Mechanism

Academia Industry
2€

EUREKA Clusters

National Programmes

BiPartite JUs

Cofunded PPPs

Coprogramed PPs

H2020 Calls

Each KDT JU action has at least two Grant Agreements:
- **JU + Coordinator**
- **Beneficiary + National/Regional Funding Authority**

Participating States
1€

Regions

1€

European Commission

: :

Contributions EU/PS/Beneficiaries in 1:1:2 proportion
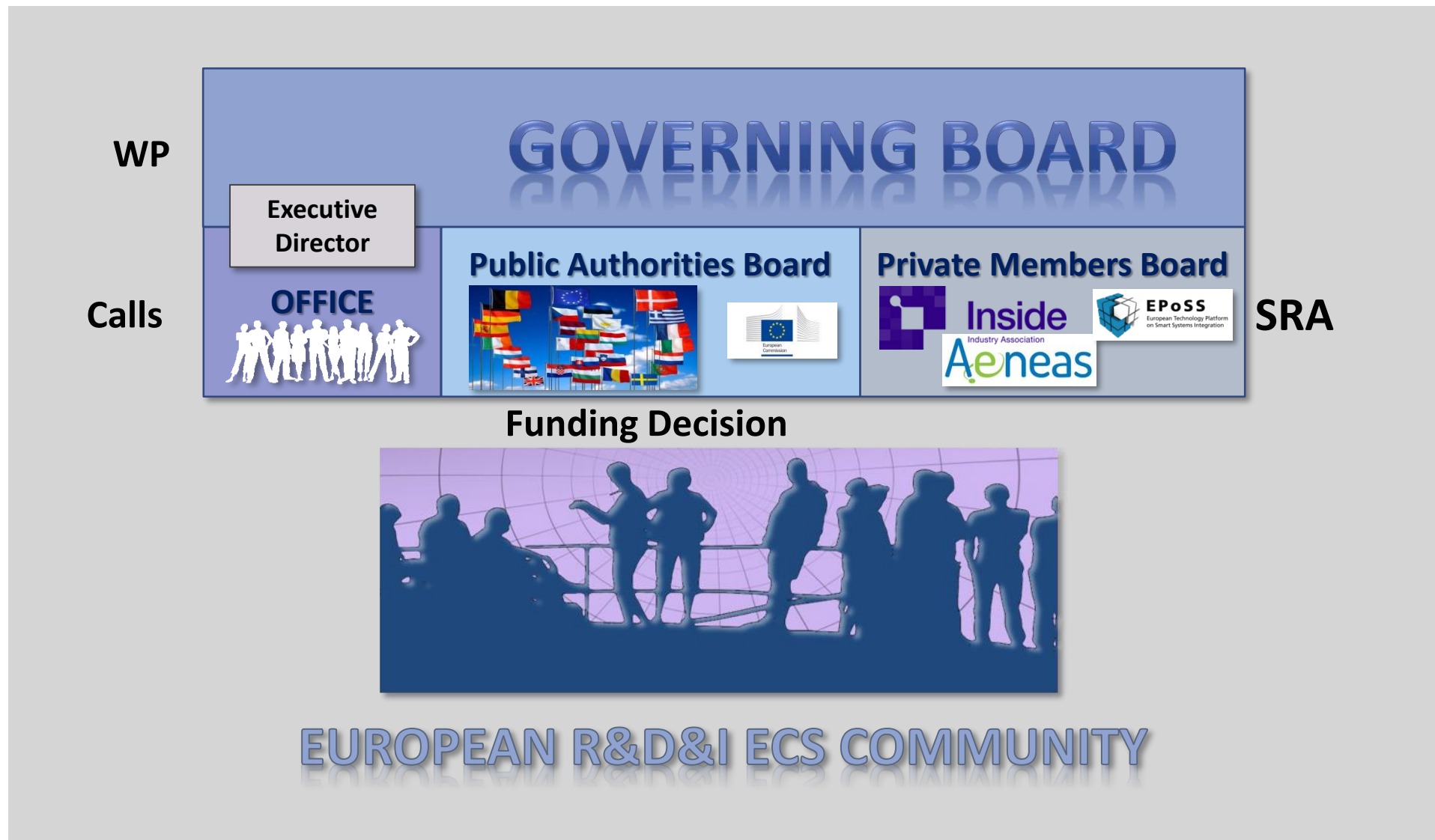
KDT JU

KDT JU 2021-2027

- Third generation JU

- KDT JU = Key Digital Technology Joint Undertaking

- Tripartite: Commission - Participating states – Industry associations

- Associations: AENEAS, INSIDE, EPoSS

- Started : 30 November 2021 (ECSEL JU -> KDT JU)

- Budget ambition : 6B€

  funded by 1,8 B€ (EU)+1,8 B€ (national)

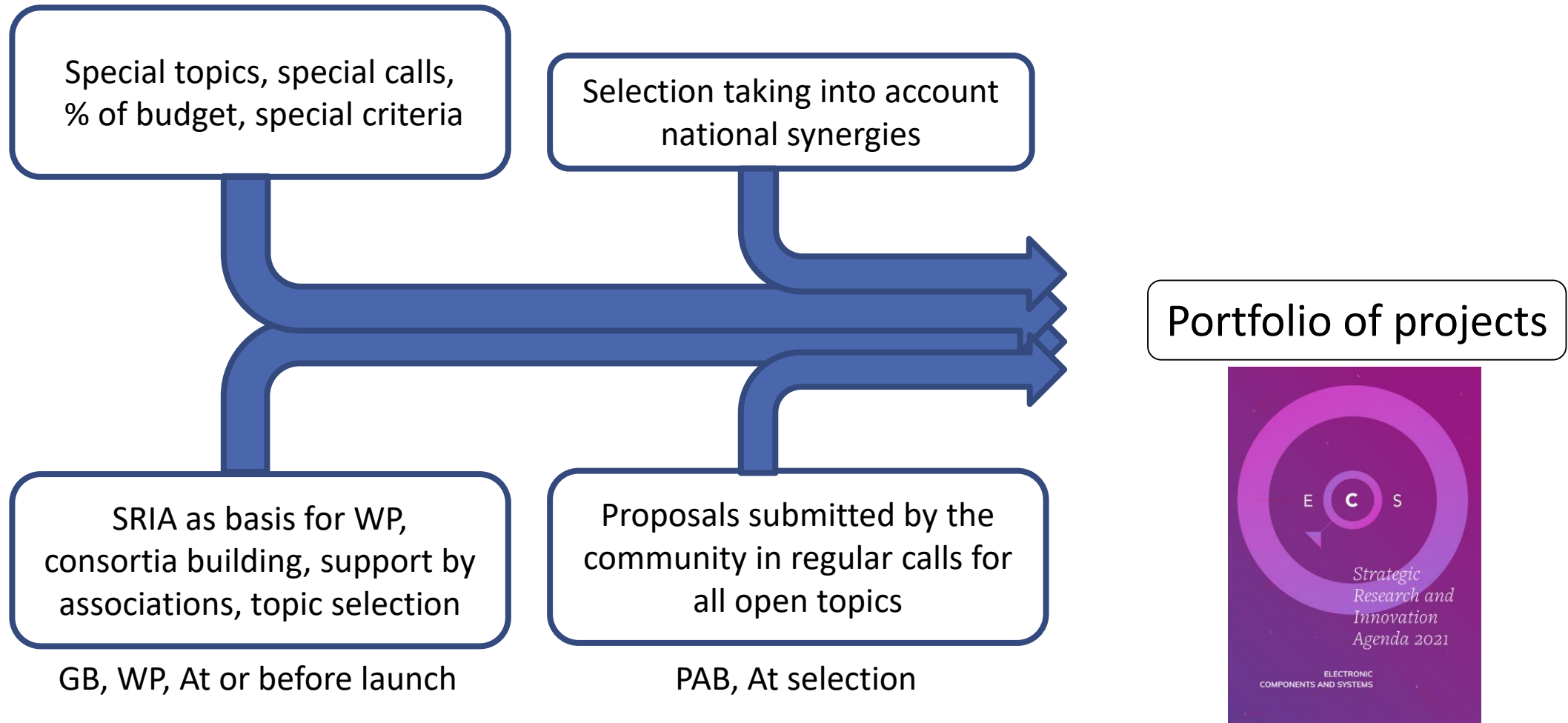- Based on new framework programme (Horizon Europe)

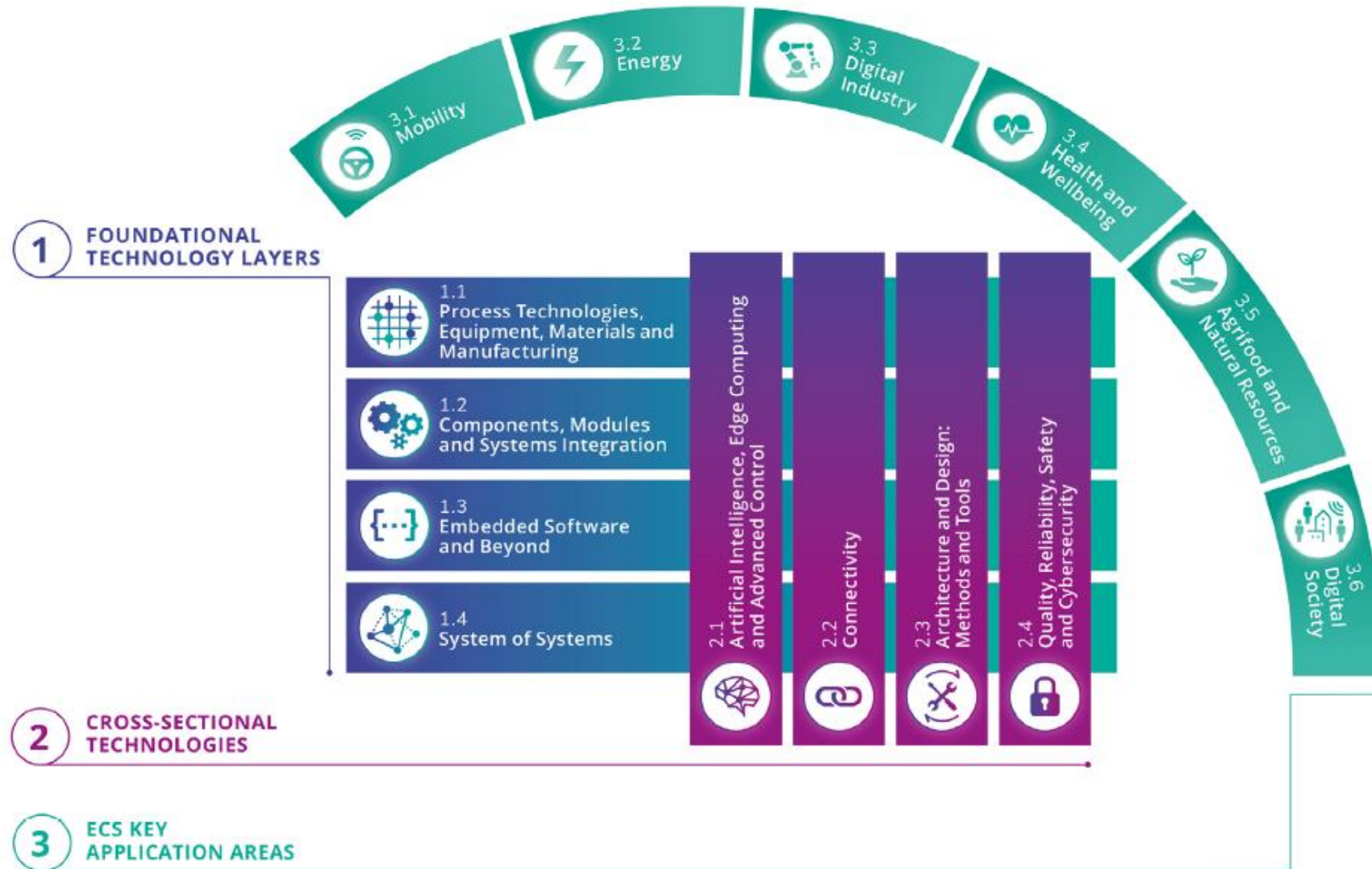**https://www.kdt-ju.europa.eu/**

KDT JU

EUROPEAN PARTNERSHIP

GOVERNANCE

BOTTOM UP VERSUS TOP DOWN - EU VERSUS NATIONAL SYNERGIES

FOCUS TOPICS

Special topics, special calls, % of budget, special criteria

Selection taking into account national synergies

Portfolio of projects

SRIA as basis for WP, consortia building, support by associations, topic selection

Proposals submitted by the community in regular calls for all open topics

GB, WP, At or before launch

PAB, At selection

E C S

Strategic Research and Innovation Agenda 2021

ELECTRONIC COMPONENTS AND SYSTEMS

KDT JU

EUROPEAN PARTNERSHIP

ECS SRIA

ECSEL JU 2014-2021

First generation JUs: ENIAC & ARTEMIS JU 2008-2014
- **full bottom-up**
- 2011-2013**: pilot lines, building critical mass**
- payments of EU funding part **linked to national cost recognition**
- start as first of its kind **tripartite** in the universe of European institutions

Second generation JU: ECSEL JU 2014-2021
- along the **value chain**
- focussed on **industrial leadership** that promote synergies between commercial strategies and societal needs
- full bottom-up **with some special topics** that re-inforce/align national strategies and European priorities
- programme based on the **common agenda of** Europe's ECS
- **lighthouse initiatives**: Mobile.E, Industry4.E, Health.E
- payments of **EU funding based on H2020 rules**, national funding on national cost recognition (with few NA adopting the H2020 rules)
- start as merger of the first two joint undertakings: growing bigger

SOI

Long term vision is needed for excellent projects to achieve impactful results
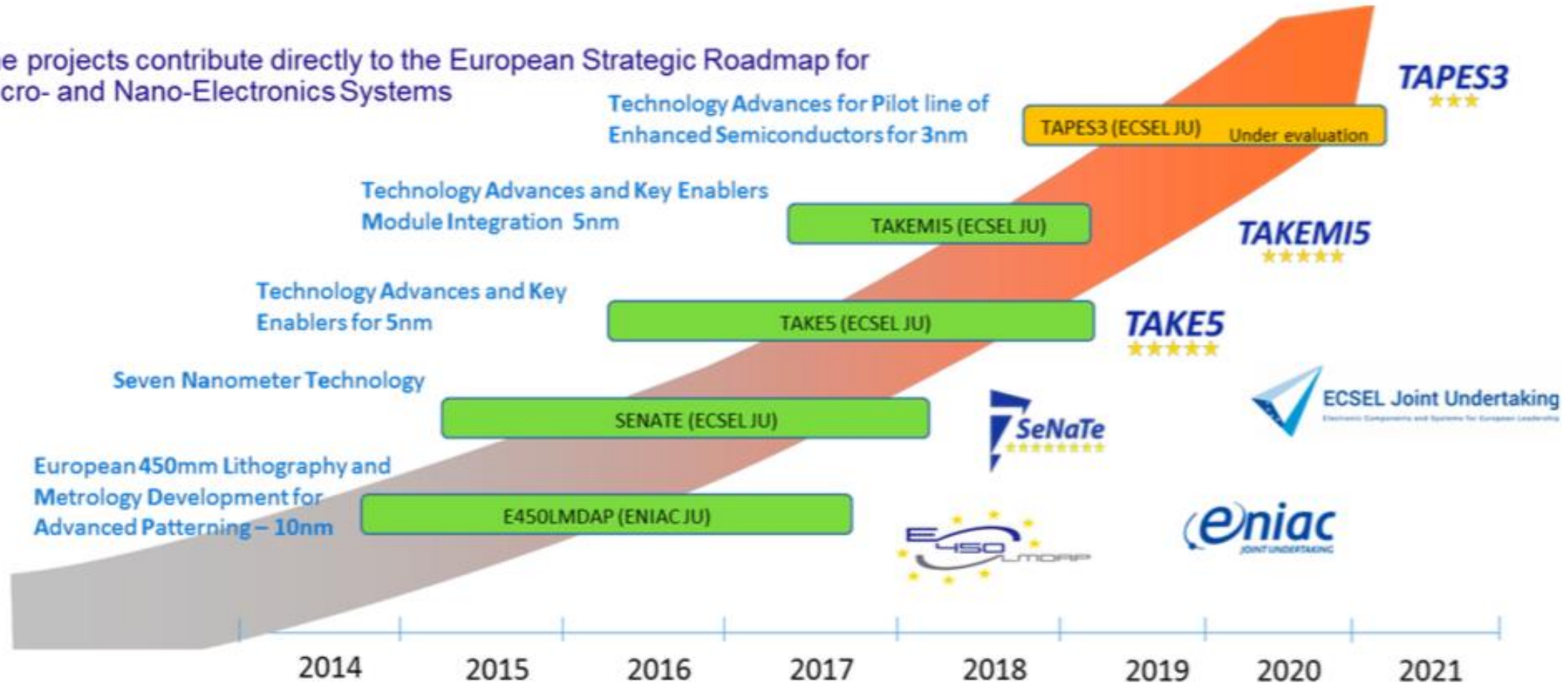
More Moore

The projects contribute directly to the European Strategic Roadmap for Micro- and Nano-Electronics Systems

Technology Advances for Pilot line of Enhanced Semiconductors for 3nm — TAPES3 (ECSEL JU) Under evaluation — TAPES3 ★★★

Technology Advances and Key Enablers Module Integration 5nm — TAKEMI5 (ECSEL JU) — TAKEMI5 ★★★★★

Technology Advances and Key Enablers for 5nm — TAKE5 (ECSEL JU) — TAKE5 ★★★★★

Seven Nanometer Technology — SENATE (ECSEL JU) — SeNaTe ★★★★★★★ — ECSEL Joint Undertaking

European 450mm Lithography and Metrology Development for Advanced Patterning – 10nm — E450LMDAP (ENIAC JU) — E450LMDAP — eniac JOINT UNDERTAKING

2014 2015 2016 2017 2018 2019 2020 2021

from ASML

KDT JU

POWER ELECTRONICS

Power Semiconductor and Electronics Manufacturing 4.0 smart, security, variation, simulation

excellence in speed and reliability for More than Moore technologies : high volume production and quick introduction.

"Enhanced Power Pilot Line": 2nd generation power semiconductor devices on 300mm wafer

"Enabling Power technologies on 300mm Wafers" project was based on the concept of a **1:1 transfer approach** from 200 mm to 300 mm diameter silicon wafers.

St
p

Staatspreis
Innovation 2013

des Bundesministeriums
für Wirtschaft, Familie
und Jugend

EPPL
Innovation meets manufacturing

EPT300

KDT JU

UltimateGaN

Research for GaN technologies, devices and applications to address the challenges of the future GaN roadmap

- project proposal with strong involvement of the vertical supply chain
- spans expertise and partners from raw material research, process innovation and assembly innovat
- envisioned Use Cases will be validated and exploited in compact power application domains representing **enhanced smart systems for health, mobility, communication, sensors,..**

2018,26 partners, 48MEuro cost

Objectives:

1. Research on vertical power GaN processes and devices pushing performance beyond current state-of-the-art
2. Research on lateral GaN technologies and devices to achieve best in class power density and efficiency while optimizing cost vs. performance
3. **Bringing GaN on Silicon radio frequency (RF) performance close to GaN on Silicon Carbide thus enabling an affordable 5G rollout.**
4. Breaking the packaging limits – size, electrical and thermal constraints – for high performance GaN power products
5. Close the reliability and defect density gap for most innovative GaN devices
6. Demonstrate European leadership in high performance power electronics and RF application domains

Demonstrators:

1. Extremely efficient server power supply enabling lower energy consumption in data centres (5G: digitalisation backbone)
2. Benchmark Photovoltaic inverters in terms of efficiency and size to foster the use of renewable energies (Smart Grids: energy backbone)
3. **Affordable 5G-Amplifiers up to mm-wave enabling a faster 5G rollout (5G: digitalisation backbone)**
4. GaN enabled ultra-fast switching LIDAR application to enable autonomous driving (Smart Mobility)
5. Highest efficiency μ-Grid-converters and On-Board Chargers (Smart Grids; Smart Mobility)

ECSEL PORTFOLIO ON SMART HEALTH

TARGET OBJECTIVES

1. Transform **healthcare** so that it becomes more and more applicable **outside the hospitals**.

2. **Open digital health platform ecosystem** for healthcare appliances and applications

3. **Mobile healthcare** systems for improved quality of life for e.g. elderly people with chronic disease

4. Medical equipment and devices to support **minimal invasive surgery** (e.g. imaging)
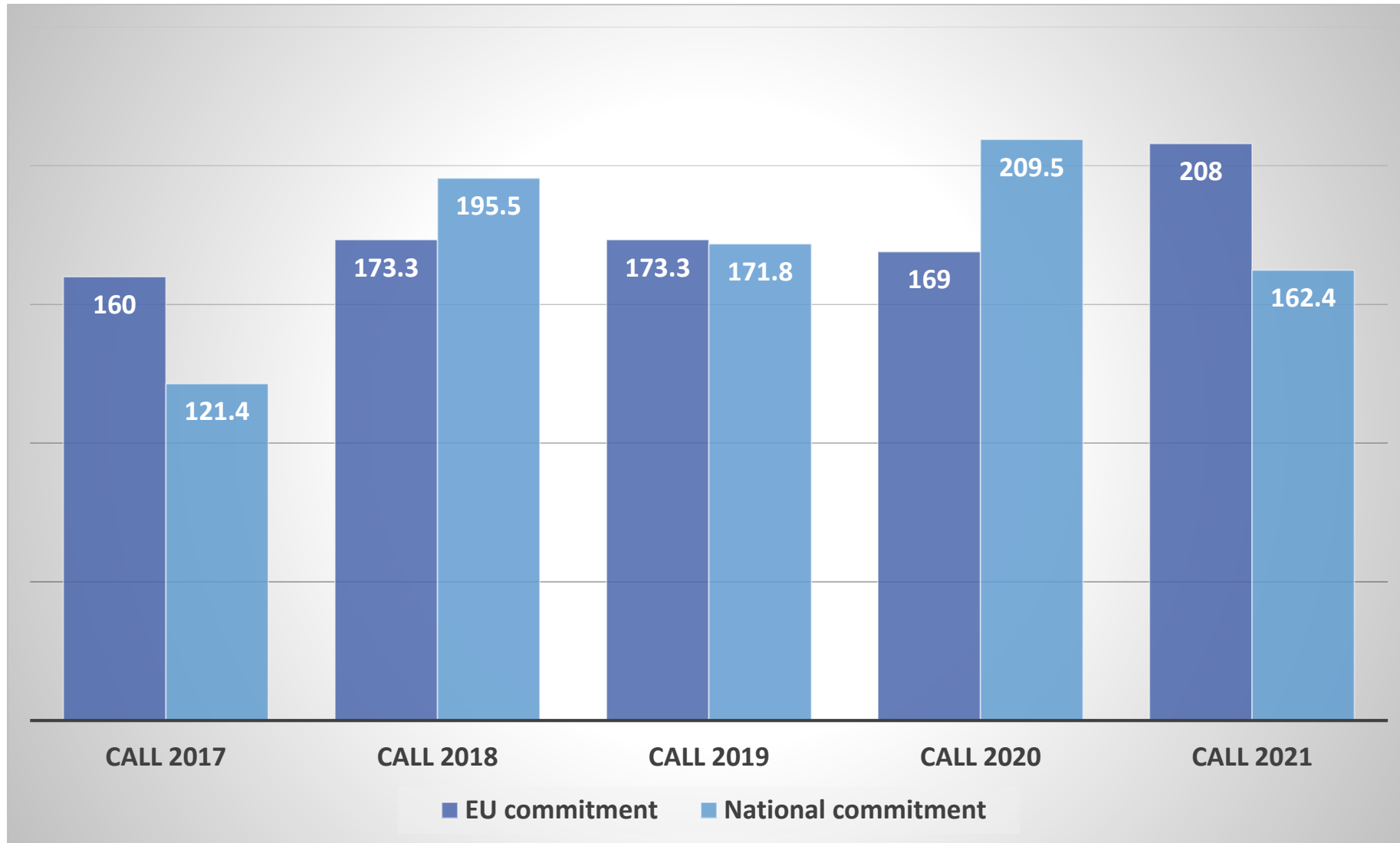
Home Healthcare	Hospital Healthcare	Heuristic Healthcare

Completed Projects:

- CSI (ENIAC)
- HIGH PROFILE (ARTEMIS)
- CHIRON (ARTEMIS)
- DeNeCor (ENIAC)
- INCITE (ENIAC)
- EXIST
- INFORMED
- ASTONISH
- ENSO
- SCOTT
- ENABLE-S3

Ongoing Projects:

- POSITION II
- FITOPTIVIS
- Moore4Medical
- HELoS → Health.E LI (Lighthouse Initiative)
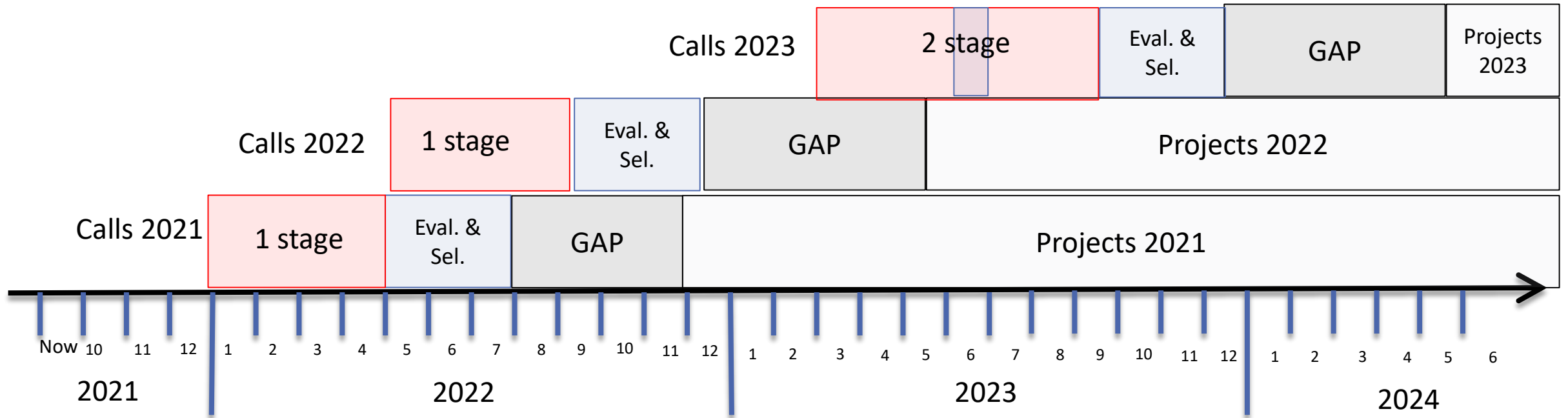
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Calls 2017 to 2021

	CALL 2017	CALL 2018	CALL 2019	CALL 2020	CALL 2021
EU commitment	160	173.3	173.3	169	208
National commitment	121.4	195.5	171.8	209.5	162.4

EU Estimated Expenditure for the Call 2022

Action	Topic	EU funding (M€)
Call 2022-1 T1	Topic 1 General according to SRIA 2022 (IA)	120.0
Call 2022-1 T2	Topic 2: Focus topic on Industrial supply chain for silicon photonics (IA)	20.0
Call 2022-1 T3	Topic 3: Focus topic on Design of Customisable and Domain Specific Open-source RISC-V Processors (IA)	20.0
Call 2022-2 T1	Topic 1: General according to SRIA 2022 (RIA)	74.5
Call 2022-2 T2	Ttopic 2: Focus topic on Ecodesigned smart electronic systems supporting the Green Deal objectives (RIA)	20.0
Total		254.5 M€

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CALL SCHEDULE

https://www.kdt-ju.europa.eu/current-call

HOW TO PARTICIPATE

Check regularly our call website under the KDT website:

www.kdt-ju.europa.eu

Check national conditions!

Contact email for your questions:

calls@kdt-ju.europa.eu

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A NEW DEVELOPMENT: EUROPEAN CHIPS ACT

https://ec.europa.eu/commission/presscorner/detail/en/ip_22_729

KDT JU

SEMICONDUCTORS VALUE CHAIN IN EUROPE

EU: 2%

IP / Electronic Design

EU: 14%

Raw material / Silicon wafers

EU: 23%

Manufacturing Equipment

Chip design

EU: 8%

Semiconductor manufacturing

EU: 7%

Assembly, Test and Packaging

EU: 5%

R&D

Original Equipment Manufacturers

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EUROPEAN PARTNERSHIP
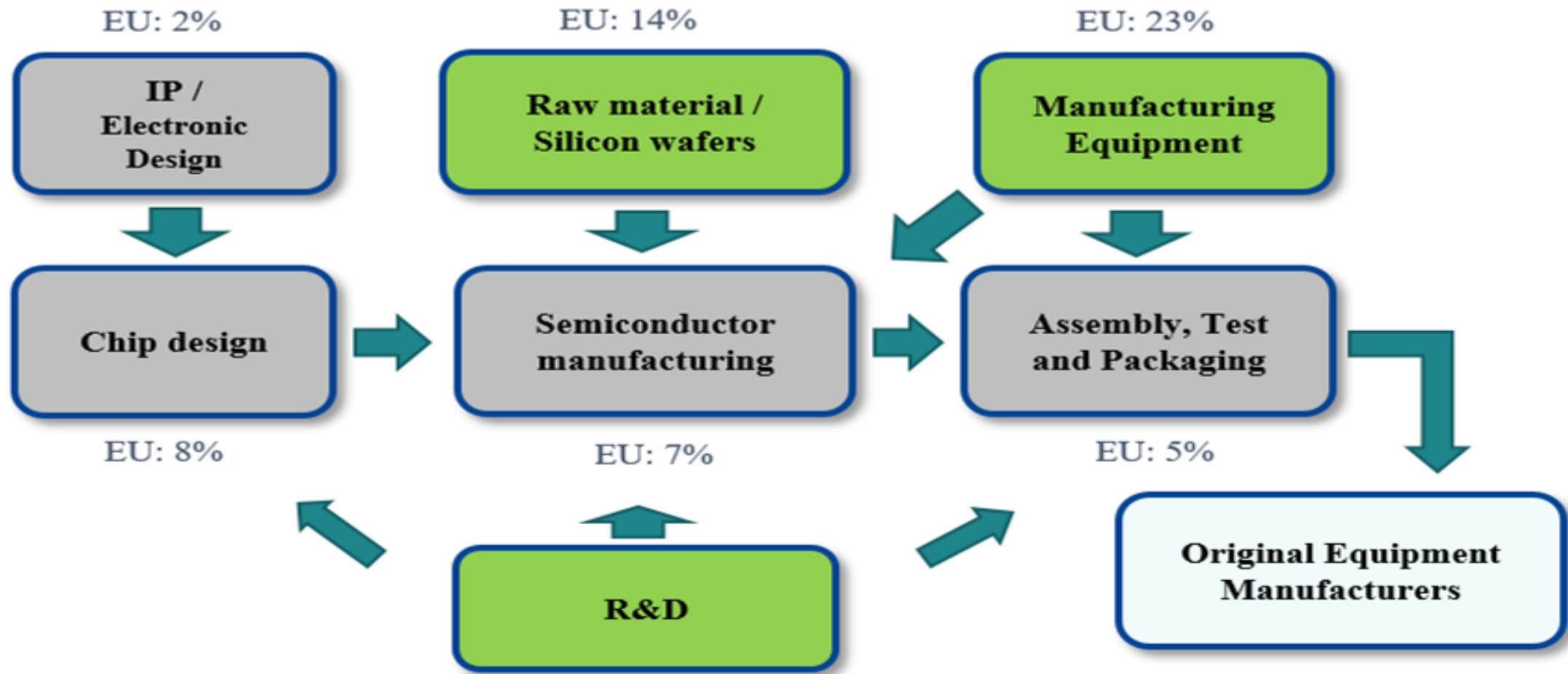
THE EUROPEAN CHIPS ACT

3 Pillars

Chips for Europe Initiative: pool resources from EU, MS and other, as well as the private sector, through: the "**Chips Joint Undertaking**"	**New framework to ensure security of supply** by: A. Attracting **investments** and enhanced **production capacities**. B. **Chips Fund to facilitate access to finance** for start-ups to help them mature their innovations and attract investors. C. D**edicated semiconductor equity investment facility** under InvestEU to support scale-ups and SMEs to ease their market expansion.	**Coordination mechanism between the Member States and the Commission** for monitoring the supply of semiconductors, estimating demand and anticipating the shortages. • **monitor** the semiconductor value chain • **common crisis assessment** • coordinate **actions to be taken** from a new emergency toolbox • **react swiftly and decisively together**

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CHIPS FOR EUROPE INITIATIVE

Bridge the gap *from lab to fab*

Create *large innovation capacity* and *a resilient and dynamic* semiconductor *ecosystem*

- Build up **large-scale design innovative capacities** for integrated semiconductor technologies

- Enhance existing and developing new **pilot lines**

- Build advanced technology and engineering capacities for accelerating the development of **quantum chips**

- Create a network of **competence centres** across Europe

- Establish a **Chips Fund** to facilitate access to loans and equity by start-ups, scale-ups and SMEs and other companies in the semiconductor value chains

Basic Research	Applied Research	Prototyping	Pilot lines	Production

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