Smartare Elektroniksystem

ELECTRONIC COMPONENTS & SYSTEMS

EUs Chip Act och Sveriges möjligheter

Thorbjörn ”TOBY” Ebefors, acting program manager

Smarter Electronic Systems

-a strategic innovation program to strengthen competitiveness of Swedish electronics sector

Med stöd från

VINNOVA Sveriges innovationsmyndighet

Energimyndigheten

FORMAS

Strategiska innovations-program

Outline

- What is a strategic innovation program
- SES SIP background and activities
- Swedish ECS landscape
- The 3 Pillars of ECA
- Swedish activities around EU Chip Act

Strategi ammes

FORMAS

STRATEGISKA INNOVATIONS-PROGRAM

Strategic innovation - Electronics

With support from

VINNOVA Sweden's Innovation Agency

Swedish Energy Agency

FORMAS

Strategic innovation programmes

- Cooperation Industry – public sector – Academia (PPP)
- Strategic research and innovation agendas
- Strategic innovation programme

SES Founded in 2014 and running to 2026:
+ ~70 companies, total 107 organisations

+ adding >350 new organisations (Large Corps and SME and ROTs) through-out 2014-2022 calls

SVENSK ELEKTRONIK

SWEDISH ICT ACREO

swerea swedish research

PhotonicSweden

CHALMERS

LULEÅ TEKNISKA UNIVERSITET

KTH

Smarter Electronic Systems (SES) – a Swedish ECS partnership program

- Cooperation Industry - Public sector - Academia

Vison

”by 2025 Swedish electronic systems enable a world-class Swedish industry ”

3 challenges

- Increased cooperation and efficiency in the **value chains**
- Further developed Swedish **excellence**
- Secure the **provision of skills**

Excellence

- Areas of Excellence
  - antenna, microwave and terahertz system
  - sensors and embedded technology
  - micro-nano electronics
  - power electronics
  - photonics
  - printed electronics

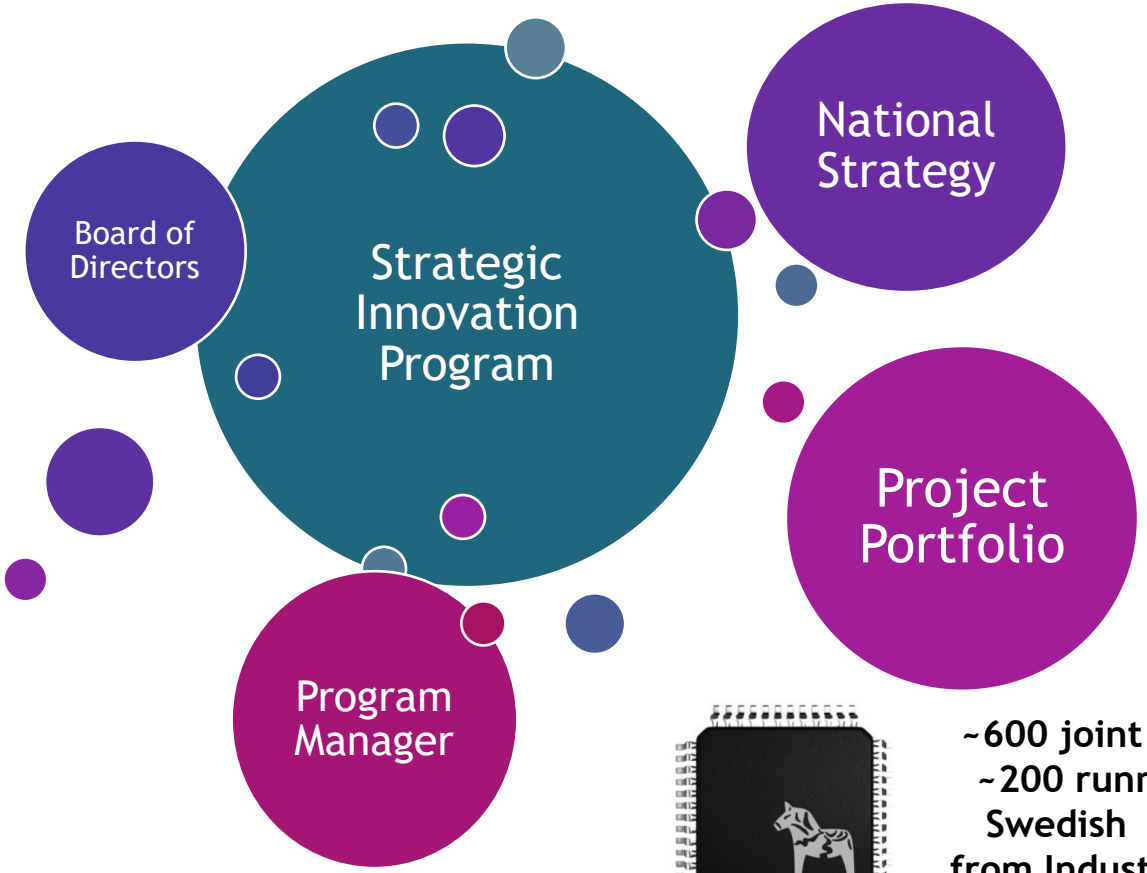
Focus areas

- electronics packaging
- reliability
- advanced manufacturing technology


Forming ~600 SWE ECS project proposals 2014-22
SMARTAREELEKTRONIKSYSTEM.SE

Internationalization @ Smarter Electronic System (SES)

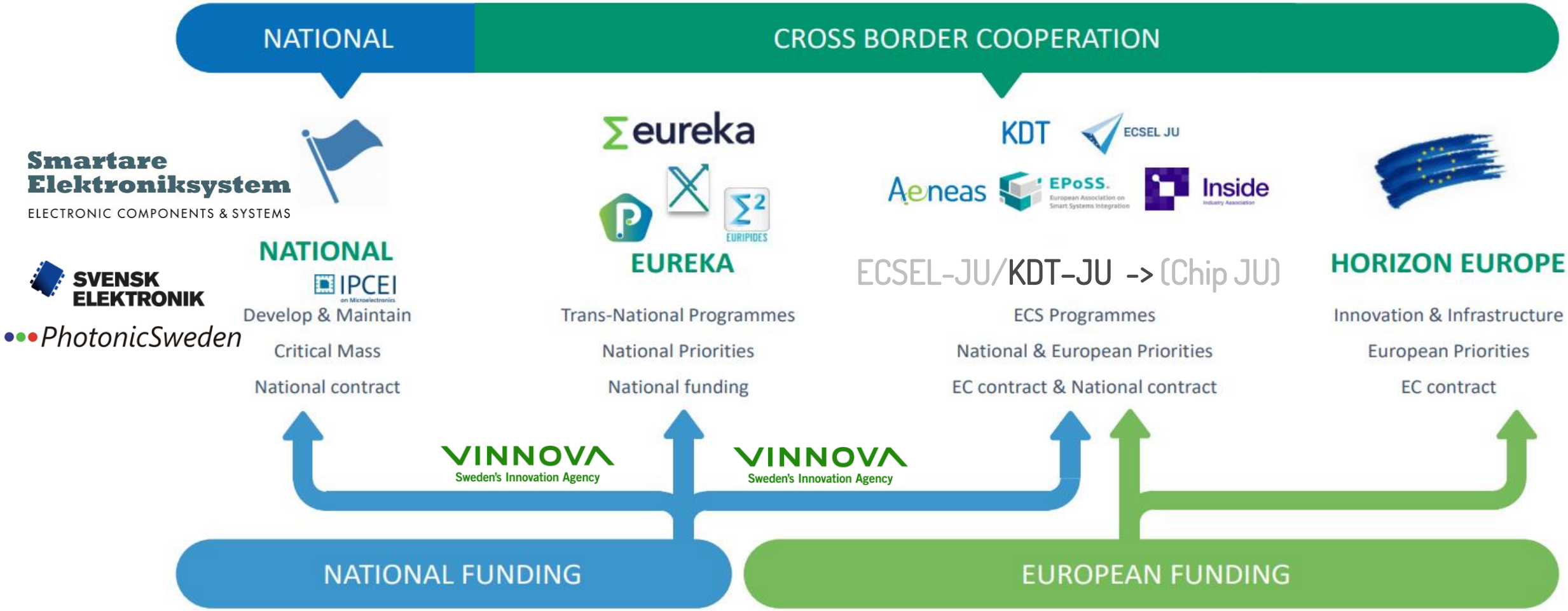
National Ecosystem



~600 joint proposals and
~200 running or ended
Swedish ECS projects
from Industry & Academia

The ECS Funding instrument landscape

Positioning Smarter Electronic Systems (SES) vs KDT / Chip JU in the European Funding Landscape



Chips Act Package

Generell presentation

Den europeiska halvledarakten har följande fem strategiska mål:

i) att främja europeisk forskning och tekniskt ledarskap,
ii) att bygga och stärka EU:s förmåga att förnya sig inom design, tillverkning och förpackning av avancerade, energieffektiva och säkra chips och förvandla dem till tillverkade produkter,
iii) att skapa ett ramverk för att öka produktionskapaciteten av halvledare till 2030,
iv) att adressera den akuta kompetensbristen genom att stödja uppkomsten av kvalificerad arbetskraft och
v) att utveckla en djupgående förståelse för globala halvledarförsörjningskedjor.

The context: we are in a crisis…

1 Severe shortage of semiconductor chips

In a context of…

- Accelerated digital transition
- Increased demand for semiconductors
- Concentration of production in Asia (Taiwan, Korea)

2 Security supply risk in the EU

Due to…

- Limited capabilities in manufacturing
- Insufficient expertise in manuf. at < 20 nm
- High entry fees / cost for new facilities
- Geopolitical tensions (e.g. South China Sea)

3 Detrimental effect across industries

Leading-edge semiconductor technology is central to…

- Competiveness
- Security, safety and data protection
- Energetic performance of digital systems

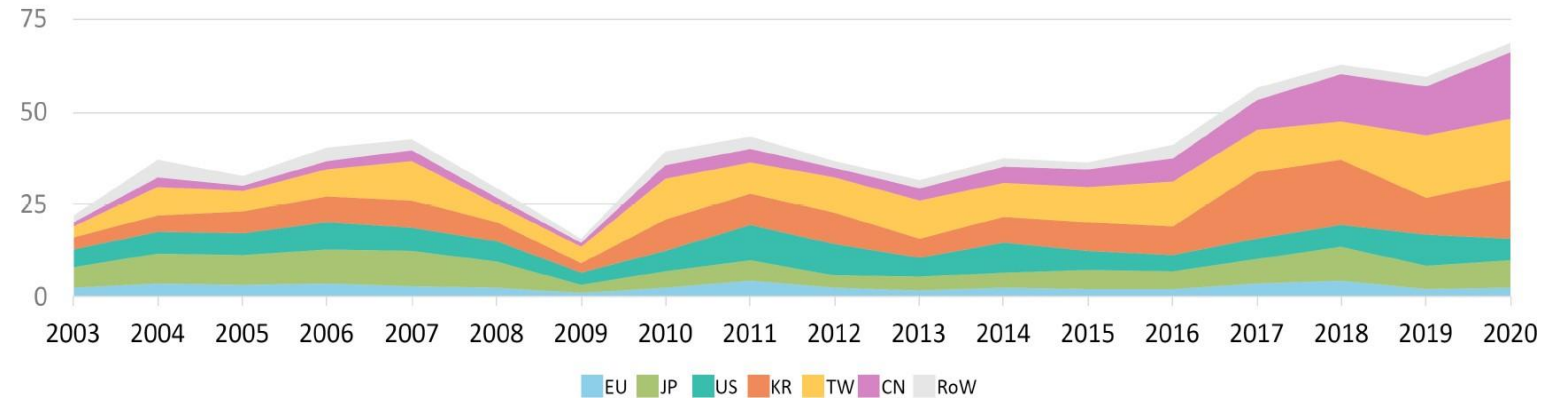
*No single Member State can face these problems alone, need for:

- **EU & international partnerships**
- **Public subsidies**

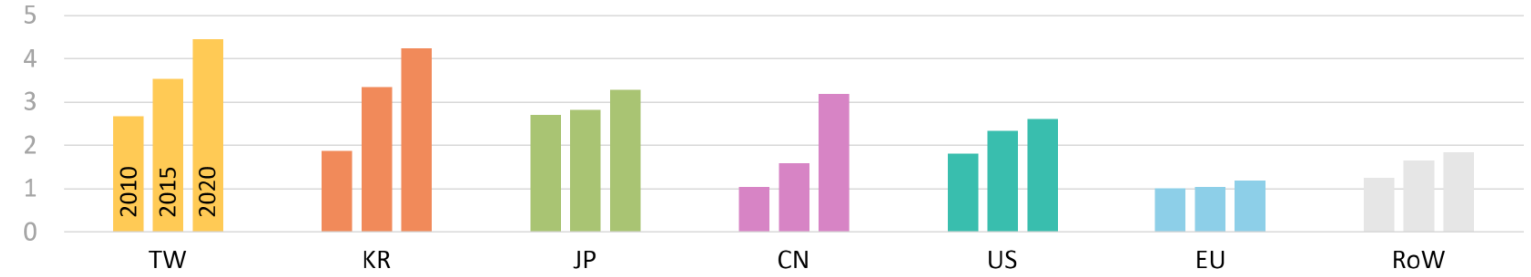
Minus 11 million cars produced globally and 23% drop in German car sales in 2021.

Market analysis

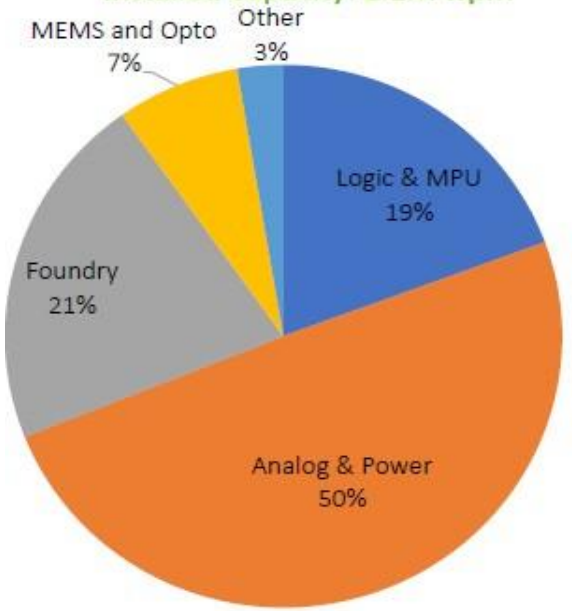
Equipment Spending by Region and Year
[sales in US$ billion]



Total Wafer Capacity by Region (2010, 2015, 2020)
[million wafers per month]



Capacity by Product Type in Europe, 2019
Installed Capacity: 2.1M wpm



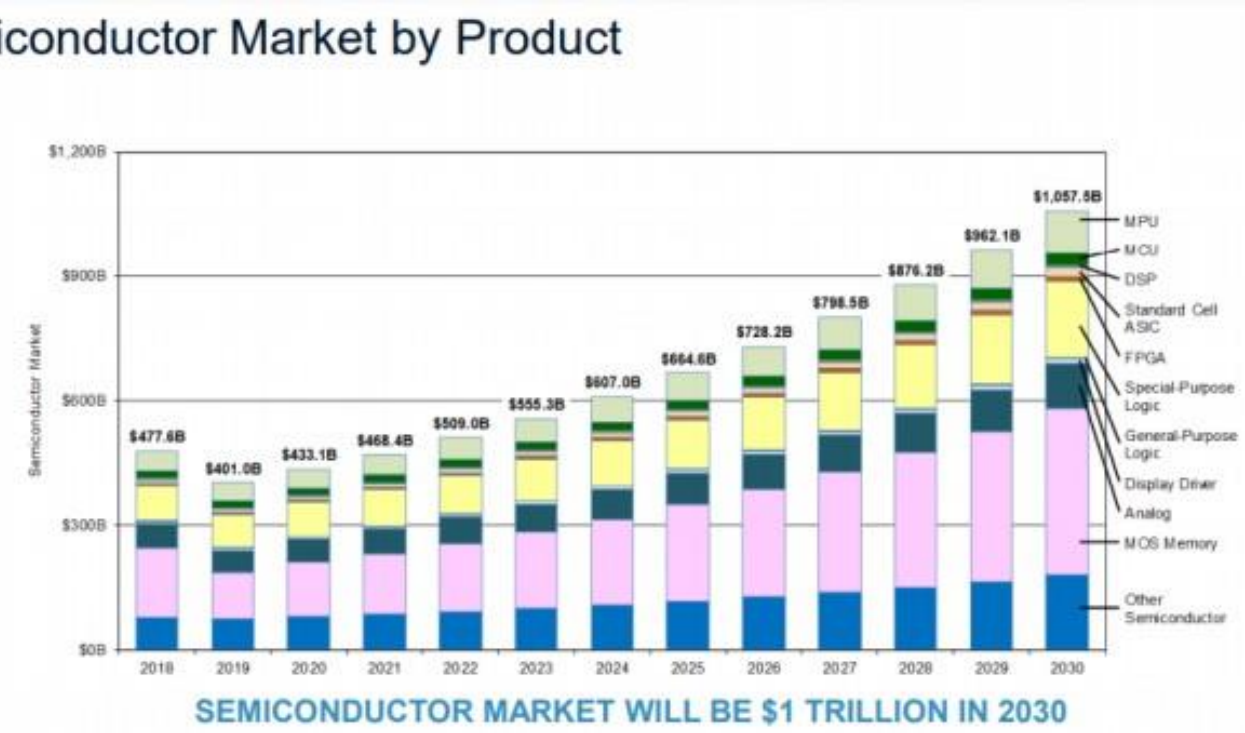
Source: World Fab Forecast Report, March 2019, SEMI

Europe has not increased its investments, therefore its capacity has not grown as in other regions, and its market share has decreased from 11,7% in 2005 to 7.2% in 2020, with little presence in more advanced nodes, necessary for digital applications

Market forecast

Market	2019 market size ($bn)	2024 market opportunity ($bn)	CAGR (%)
Smartphone	106	155	7.9%
Personal computing	86	99	2.8%
Consumer electronics	42	61	7.7%
Automotive	41	65	9.5%
Industrial electronics	49	71	7.8%
Wired and wireless infrastructure	34	45	5.5%
Servers, datacenters and storage	61	102	10.6%
	419	**598**	**7.3%**

ASML Annual Report, Feb 2021



IBS, SEMI, 2021

The market is forecast to exceed USD 1 Trilllion by 2030
Europe must develop capabilities in digital design and advanced node production to capture opportunities in edge computing, automotive, industrial electronics, etc

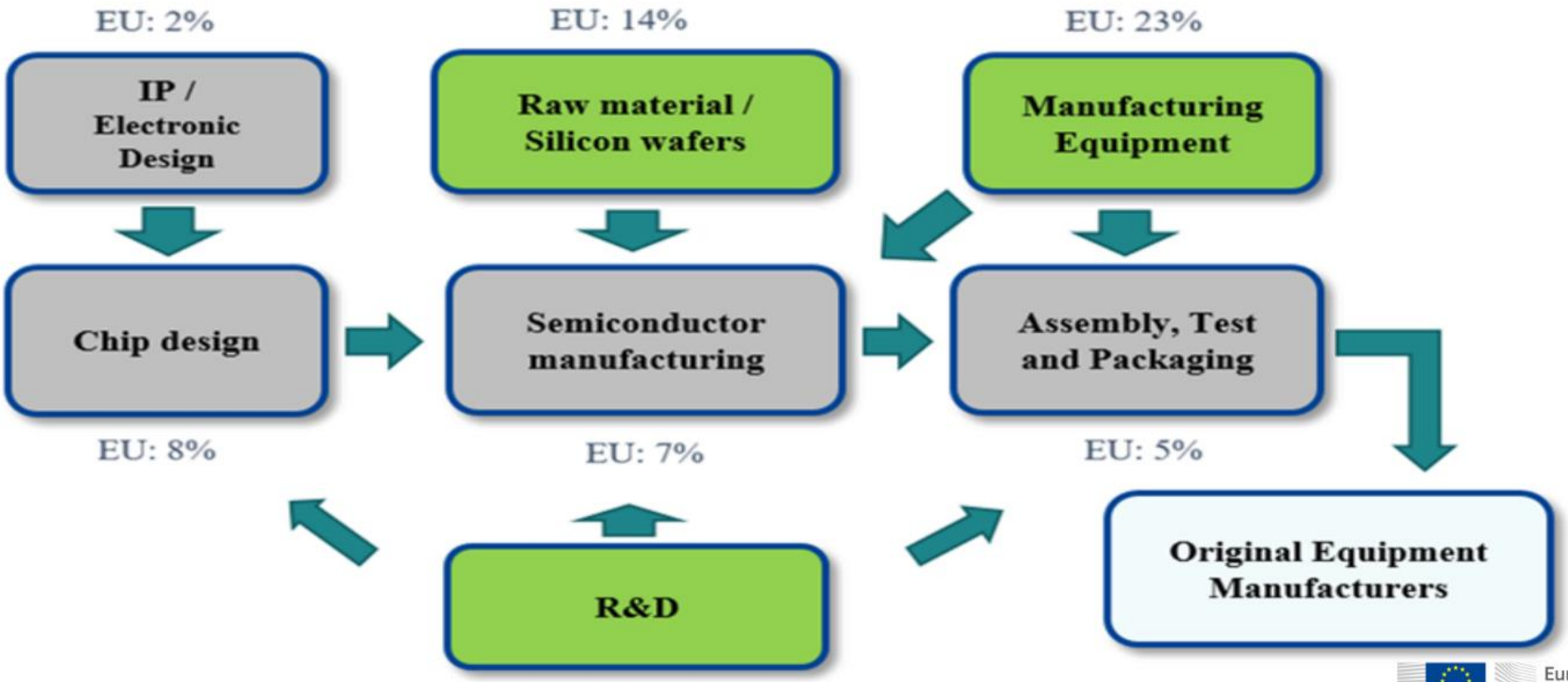
Digital Decade target: doubling of market share by 2030

Doubling of demand by 2030

Emerging market opportunities:
AI, edge computing, digital transformation

Technological change:
miniaturisation reaches its limits

Semiconductors value chain in Europe



European Commission

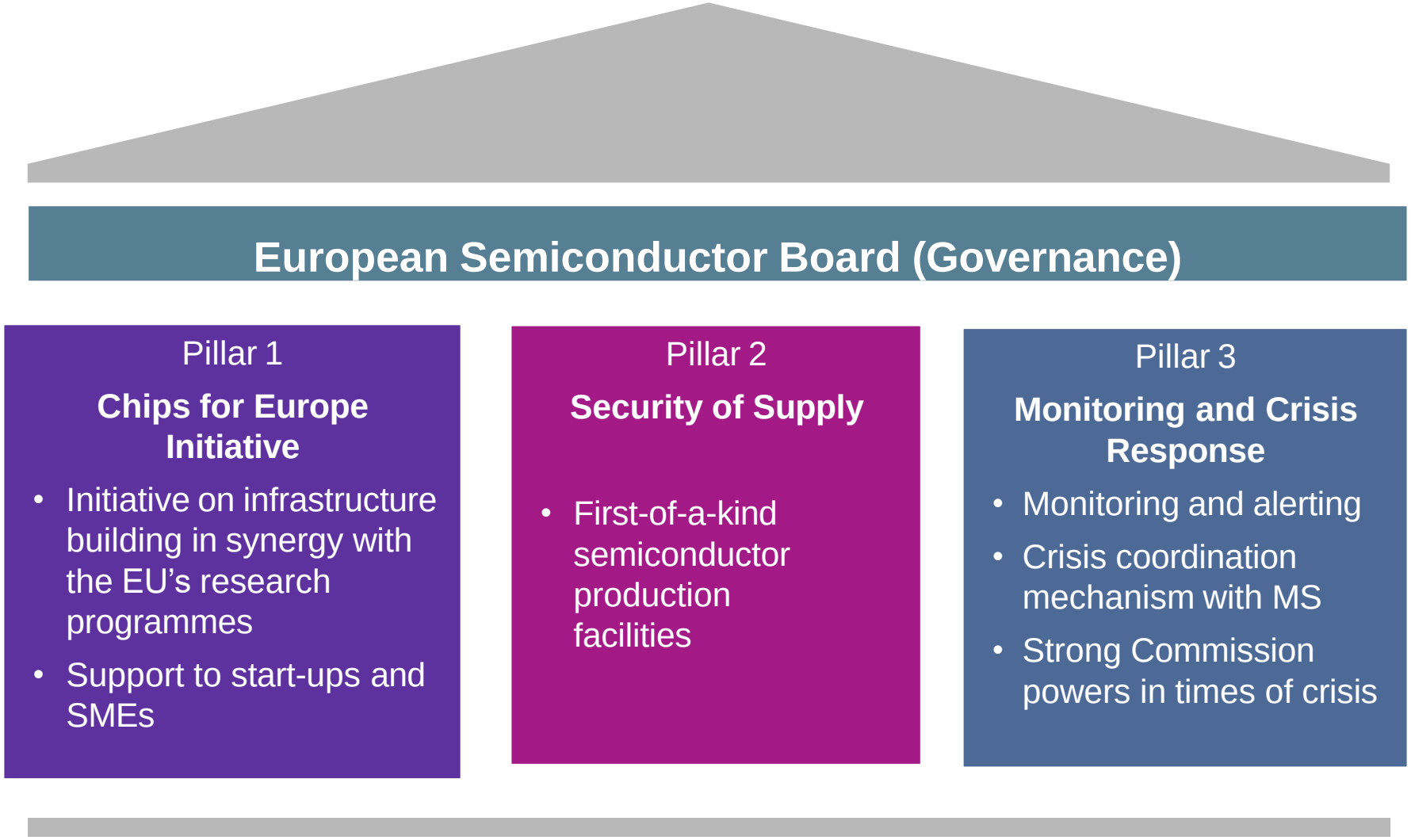
Europe needs a Chips Act!

> *Our aim is to jointly create a state-of-the-art European chip ecosystem, including production. We need to link together our world-class research, design and testing capacities. We need to coordinate EU and national investment along the value chain. This is not just a matter of our competitiveness. This is also a matter of tech sovereignty.*
>
> Commission President Ursula von der Leyen set the vision for Europe's chip strategy for the digital decade in her state of the Union speech of 15 September 2021:

Europe's objectives are:

- **To strengthen its research and technology leadership**
- **To build and reinforce its own capacity to innovate in the design, manufacturing and packaging of advanced chips**
- **To put in place an adequate framework to increase substantially its production capacity by 2030**
- **To address the acute skills shortage**
- **To develop an in-depth understanding of the global semiconductor supply chains**

Three pillars of the Chips Act



Chips for Europe Initiative Pillar 1

European Commission

Chips for Europe Initiative:
Why do we need an Initiative?

Situation today

- Strong in R&D, RTOs and in manufacturing equipment
- EU and Member States spend ~4 B€ in research and in part of the supply chain development in MFF programmes

What is the EU missing today

- Industrial capabilities in advanced production notably in leading edge nodes
- Design capabilities for leading-edge nodes
- Capability for translating R&D know-how into industrial innovation
- Market pull

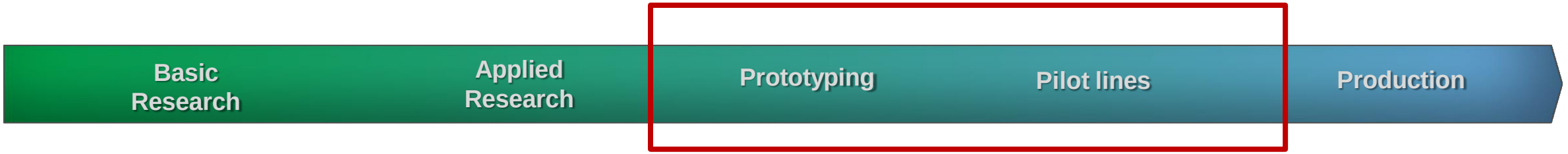
EU + MS programmes address the above to a very limited extent

Chips for Europe Initiative:
What are the objectives?

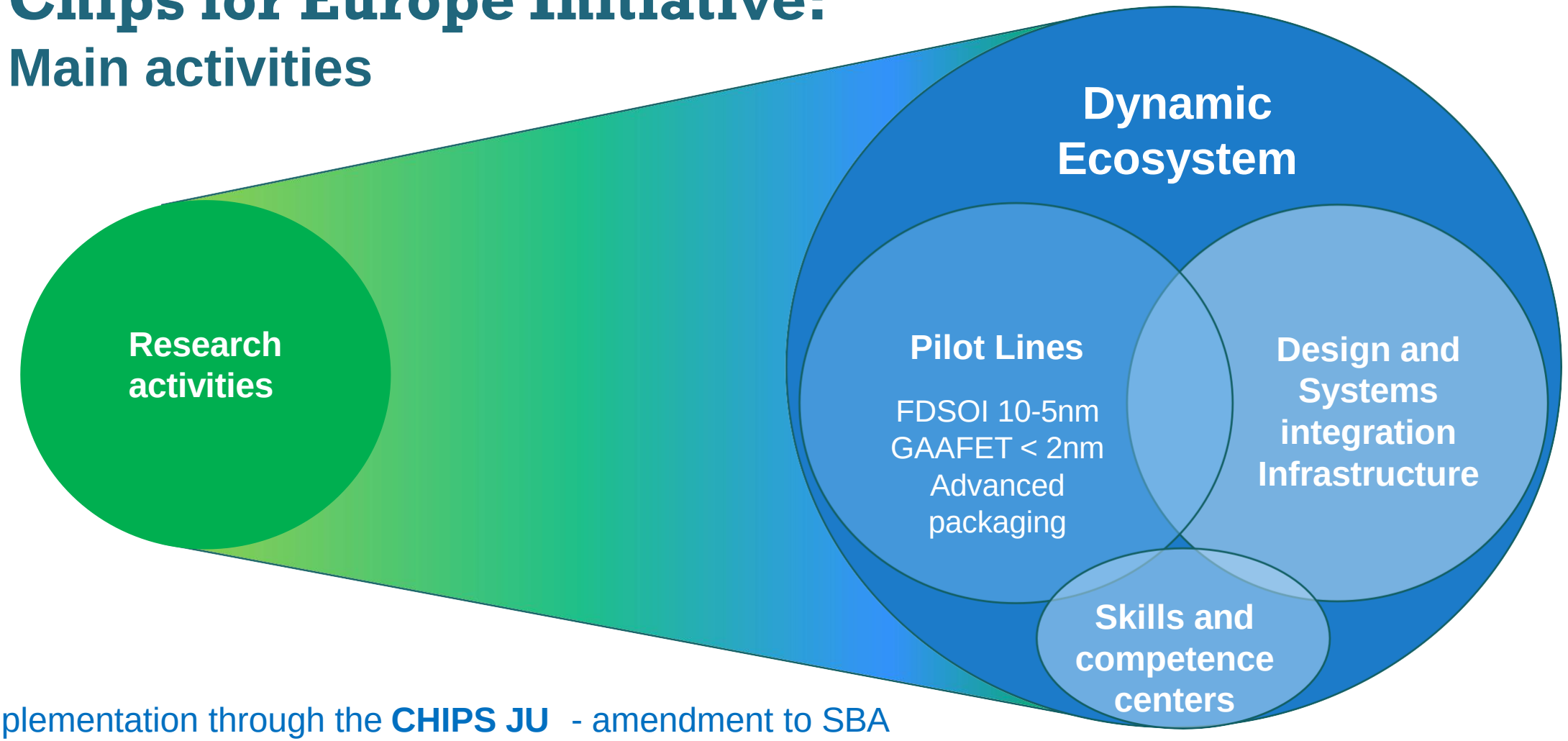
Bridge the gap ***from lab to fab***

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



Chips for Europe Initiative:
Main activities



Implementation through the **CHIPS JU** - amendment to SBA

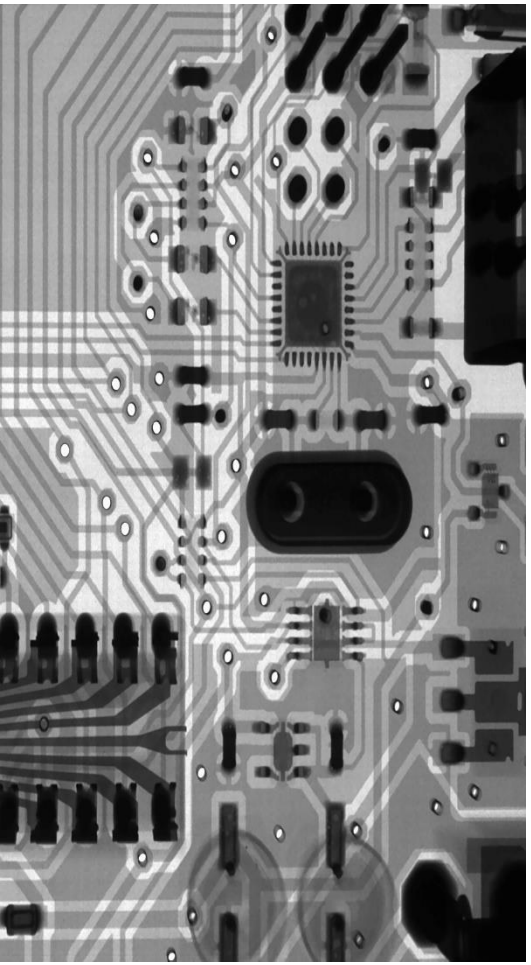
Chips JU

- Reinforced and reoriented KDT Joint Undertaking
- EU : EUR 4.175 billion, incl up to EUR 50 million for admin costs
  - up to EUR 2.650 billion from Horizon Europe;
  - up to EUR 1.525 billion from the Digital Europe Programme;
- Sweden contribution :
  - 7,5 M€ (2020 ECSEL JU)
  - 2 M€ (KDT 2021); 50 M€ (KDT 2022); indication 13M€ (Chip JU)
- Contributions from other members
  - Participating States: unchanged (“total contribution that is commensurate to the amount of the Union contribution to operational costs”)
  - Private members IKOP + IKAA: unchanged
  - Private members admin costs: at least EUR 26.3 million, 35% on annual basis

Security of Supply Pillar 2

European Commission

Definition of first-of-a-kind facilities



> ***First-of-a-kind:*** *an industrial facility capable of semiconductor manufacturing, including front-end or back-end, or both, that is not substantively already present or committed to be built within the Union, for instance with regard to the technology node, substrate material, such as silicon carbide and gallium nitride, and other product innovation that can offer better performance, process innovation or energy and environmental performance*

1 **Integrated Production Facility (IPF)**

vertically integrated first-of-a-kind facility

2 **Open EU Foundry (OEF)**

First-of-a-kind facility that **offers production capacity** to unrelated undertakings

Criteria:

- ✓ **Qualification as first-of-a-kind facility**
- ✓ **Clear positive impact on the value chain (security of supply and qualified workforce)**
- ✓ **Security of supply:** guarantee not to be subject to extraterritorial application of public service obligations of third countries in a way that undermines the ability to accept priority rated orders
- ✓ **Clear commitment to invest in the next generation of chips**

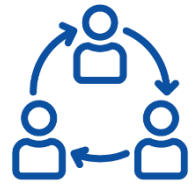
Monitoring and Crisis response
Pillar 3

European Commission

Coordination mechanism

Recommendation

- **Recommendation** asks Member States to coordinate in a **European Semiconductor Expert Group**
- Coordinated assessment of crisis response measures and information gathering to enable a Union risk assessment and monitoring



Regulation

- **European Semiconductor Board continues its work and becomes the central coordination and exchange platform** under the legislative act

Coordination mechanism

Monitoring stage

- Regular monitoring by Member States and update mechanism for alerts by stakeholders
- Board meetings with advisory participation of industry stakeholders and other relevant Union bodies

Crisis trigger

When **assessment of Commission provides evidence** of serious disruptions in the supply

- entailing significant negative effects on one or more important sectors, or
- preventing the repair and maintenance of essential products used by critical sectors

Commission implementing act

(preference for normal procedure, possibility for urgency procedure in exceptional cases)

Crisis stage

- Emergency Toolbox activated
- Intensified coordination in the Board

Emergency toolbox

- **Toolbox of emergency measures** which COM would be empowered to use to **ensure security of supply** in the crisis stage:

1. Information gathering

Mandatory request to provide sensitive information to COM on production capabilities, production capacities, current primary disruptions or any other existing data necessary to assess the crisis

2. Priority rated orders

Obligation of undertakings along the supply chain to accept and prioritise orders for supply to limited critical sectors subject to strict conditions and safeguards

3. Common purchasing

Mandate for COM from MS to act as central purchasing body on their behalf for ensuring security of supply and the operation for limited critical sectors (e.g. critical materials, wafers)

4. Export control

European Semiconductor Board may assess whether the Union should exercise surveillance over certain exports for the purpose of securing supply to the internal market

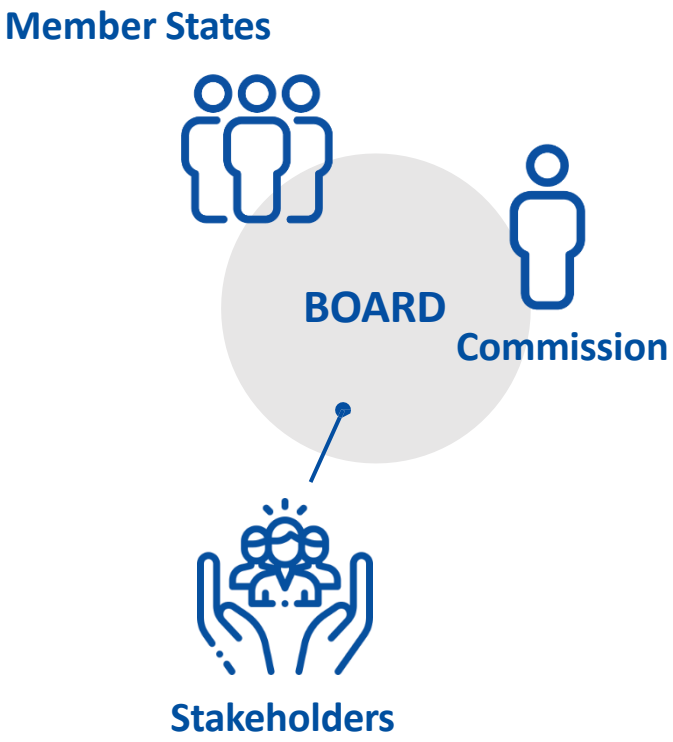
Projected funding for the Chips Act by 2030 (B€)

	EU Investment	MS Investments	Private Investments
CHIPS JU (incl. KDT budget)	4.175	4.175	2.50
		(proposal SWE 12,5 M/y => 87,5 M ~ 2,0 %)	
Next MFF (projection)	1.125	1.125	
European Innovation Council	0.3		0.9
InvestEU	0.25		1.25
TOTAL	**5.85**	**5.3**	**4.65**
	Total public spending **11.15**		
	Total public and private spending **15.80** during 2022-30		
IPCEI + potential fabs under negotiation		≈30	*Confidential*
	Total public (incl. equity)	**43.0**	

Horizontal tasks: governance framework and international cooperation

European Commission

Governance: The Semiconductor Board



European Semiconductor Board:

- Composed of high-level representatives of Member States' competent authorities
- Commission acts as chair and secretariat
- European Industrial Semiconductor Alliance, other stakeholder organisations or experts may be invited to participate in advisory function
- Ad-hoc subgroups
- Cooperation with other Union crisis response structures in a semiconductor crisis
- Support the Commission in international cooperation

Industrial Alliance for Processors and Semiconductor Technologies

leti ceatech

Fraunhofer

imec

International Cooperation

Strategy outlined in Communication

Proactively manage interdependencies with the rest of the world with a twofold objective:

(i) to ensure a reliable global marketplace for European products, and
(ii) to ensure security of supply, including in crisis situations.

Need for balanced semiconductor partnerships with like-minded countries.

Possible elements of partnerships: better visibility of potential shocks by regularly sharing information on mitigating upcoming shortages and effective early warning mechanisms; international standardisation; workforce development; coordination on export controls; research cooperation

Swedish thoughts on Chip Act and IPCEI ME/CT

Dagens industri

Magdalena Andersson om EU:s mål för halvledare: ”Marxistisk”

Sverige går delvis med på Frankrikes förslag att öka EU:s ekonomiska oberoende mot omvärlden.

Uppdaterad: 11 mars 2022, 21:30 **Publicerad:** 11 mars 2022, 20:35

Swedish thoughts on EU Chip Act

Regeringskansliet

Faktapromemoria från Näringsdepartementet

Halvledarakten2021/22:FPM67

Publicerad 17 mars 2022

Faktapromemoria gällande förslag till Europaparlamentets och Rådets förordning om en ram med åtgärder för att stärka Europas halvledarekosystem (förordning om halvledare), samt förslag till Rådets förordning om ändring av förordning (EU) 2021/2085 om bildande av gemensamma företag, vad gäller det gemensamma företaget för halvledare.

80 inbjudna remissinstanser (inkl. Smartare elektronik system och Svensk Elektronik) med 37 inkomna svar April 2022.

Smartare Elektroniksystem

ELECTRONIC COMPONENTS & SYSTEMS

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Thank you !