



Isabel Obieta
European Innovation Council
Programme Manager SUSTAINABLE SEMICONDUCTORS



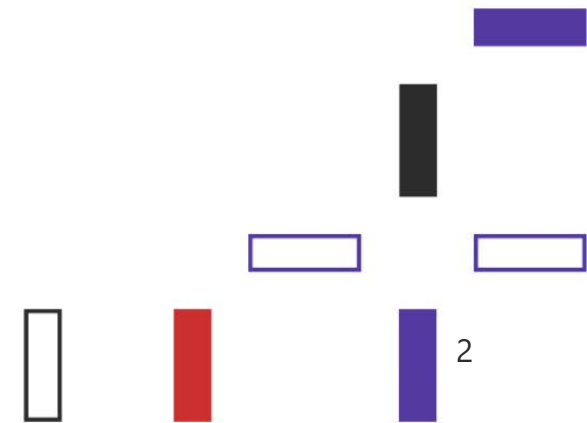
BACKING
VISIONARY
ENTREPRENEURS
AND RESEARCHERS





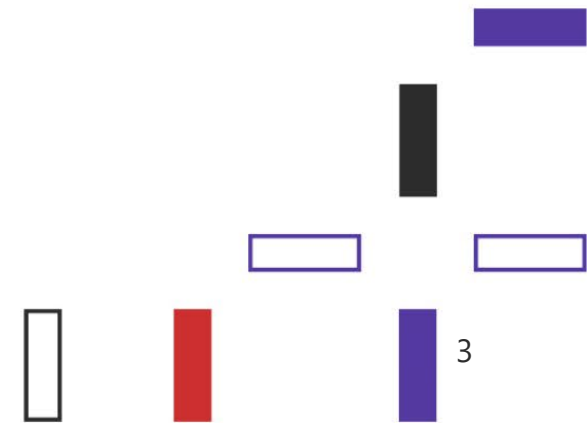
Agenda

1. EIC and its instruments
2. EIC Programme Managers
3. How do PMs select challenges
4. PROGRAMME on SUSTAINABLE SEMICONDUCTORS
 - Portfolios/Challenges in Pathfinder, Transition and Accelerator
 - Example of the "DNA-based digital data storage portfolio"
5. Conclusions





1. EIC and its instruments





- **€10 billion budget** under Horizon Europe to identify, develop and scale up breakthrough technologies and disruptive innovations
- **One-stop-shop for all TRLs** (early-stage research ideas to tech transfer/commercialisation to scaling finance for startups and SMEs)
- **Strategy steered by independent EIC Board** involving entrepreneurs, investors, researchers etc.
- **Dedicated EIC Fund** to invest in EIC selected companies, and syndicate and crowd in private VC
- **Policy impact** e.g. twin transition, strategic autonomy in key technologies
- **Partnerships** to enhance the European innovation ecosystem (Business Acceleration Services, Plug in from national programmes, from EIT, ERC, etc)
- **Portfolio overseen by Programme Managers** to identify new and emerging opportunities and pro-active management of portfolios

Pathfinder

- Early-stage research on breakthrough technologies (TRL 1-4)
- Grants up to 3 to 4 million EUR

Transition

- Technology maturation from proof of concept to validation (TRL 3-6)
- Grants up to 2.5 million EUR

Accelerator

- Development & scale up of deep-tech/disruptive innovations by startups/SMEs (TRL 6-9)
- Blended finance (grants up to 2.5 million EUR; equity investment up to 15 million EUR)

EIC Business Acceleration Services (EIC BAS): EIC Support beyond funding



WHY?

Accelerate EIC innovations and growth of EIC companies



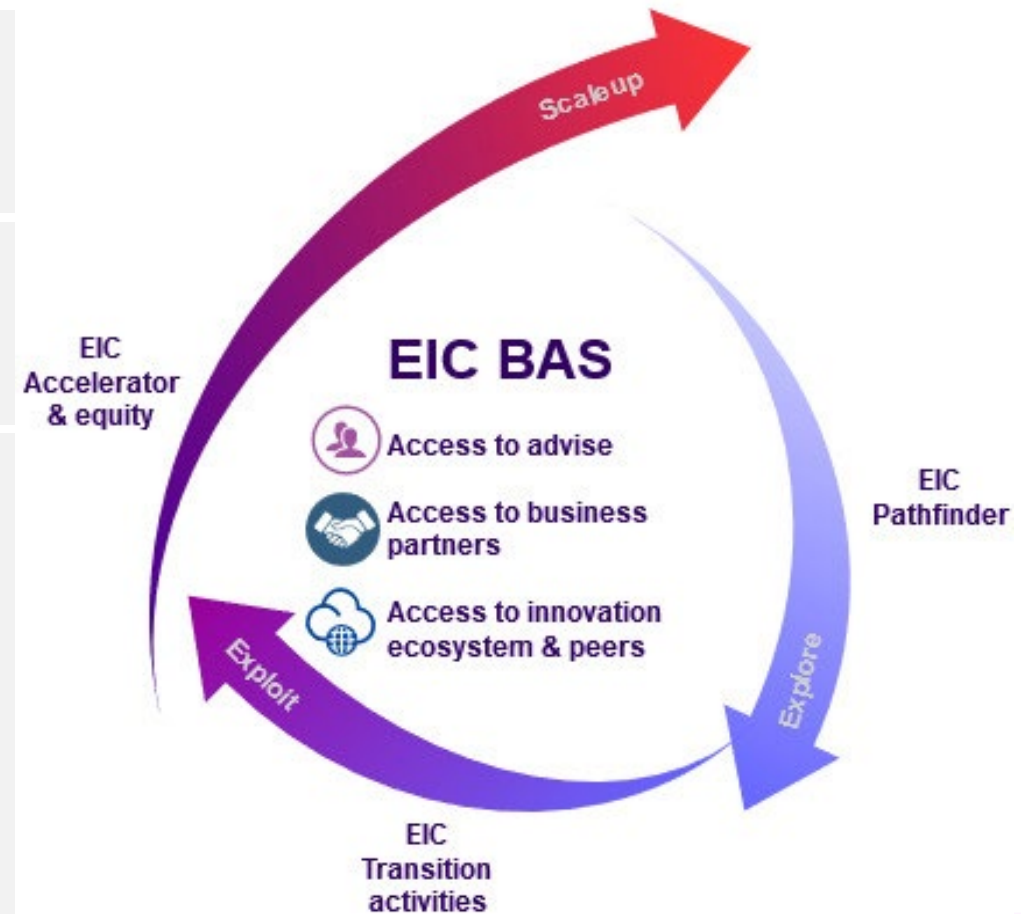
WHAT?

Access to tailor-made services for EIC beneficiaries and proactive management tool for PMs and POs



WHO?

- **EIC Awardees : Pathfinder, Transition, Accelerator**
- **Applicants** to EIC Accelerator 2nd stage (3 days coaching)
- **Horizon Europe Seal of excellence**
- **Women Tech EU**



EIC Business Acceleration Services (BAS)



Connection to Innovation Ecosystem Partners' services

Incubators

Accelerators

Innovation
Agencies

R&I
Infrastructure

Venture
builders



EIT KICs

Access to Business Partners



Corporates



Investors



Innovation
procurers



Trade Fairs

Access to Advice and skills



Coaching



Tech2Market



Women
Leadership

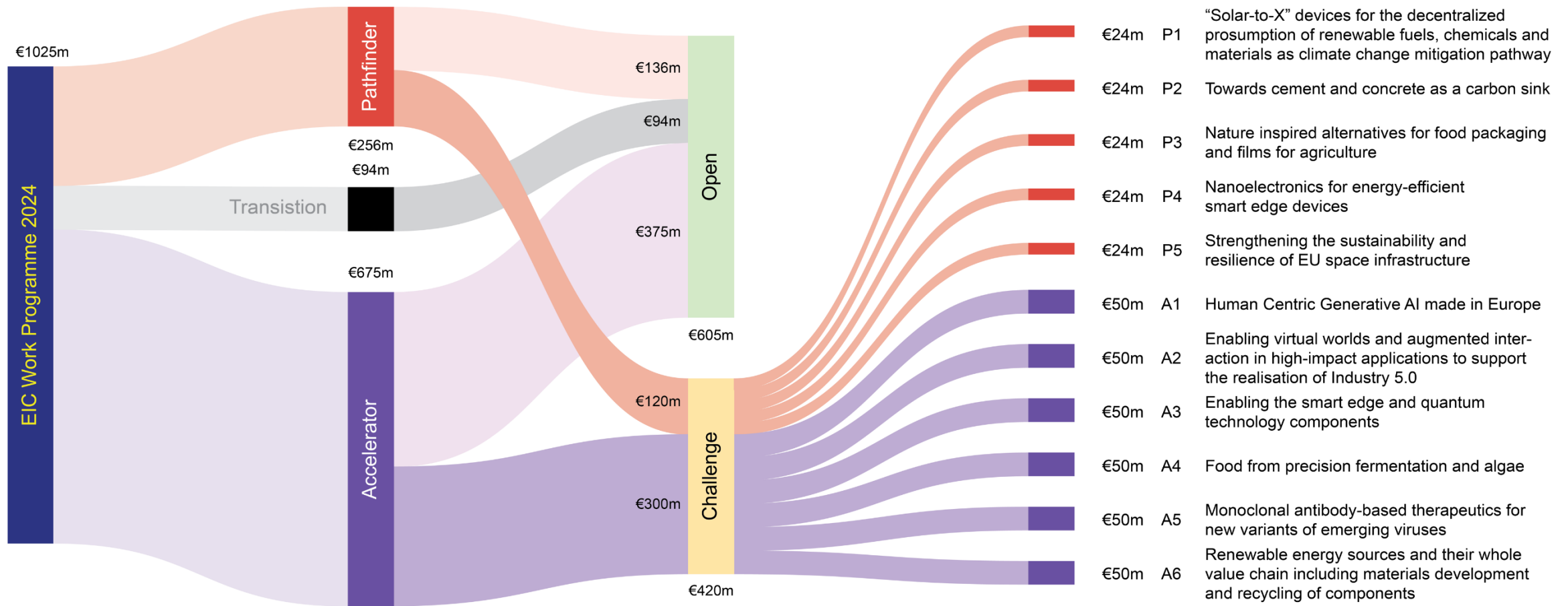


EIC
Scaleup

Reducing
GHG
emissions

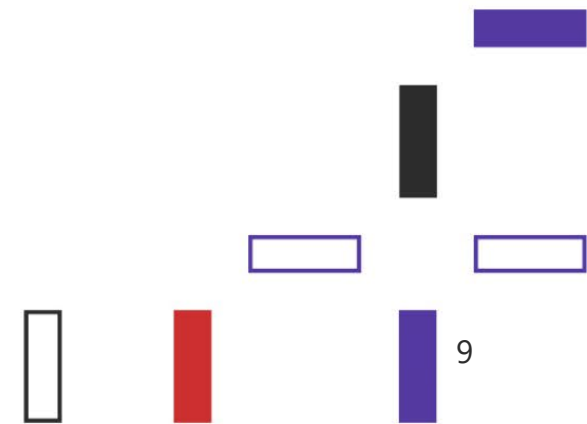
**EIC Community &
Marketplace &
Innospace**

In 2024 EIC allocates ~€1 bn to Open and Challenge calls by its Pathfinder, Transition, Accelerator programs





2. EIC PROGRAMME MANAGERS





Iordanis Arzimanoglou

Biotechnology & Health

Enric Claverol-Tinturé

MedTech & Medical Devices

Francesco Matteucci

Materials for Energy & Environment

Antonio Marco Pantaleo

Energy Systems

Stella Tkatchova

Space systems & technologies

Federica Zanca *Medical Imaging
and AI in healthcare*

Samira Nik

Quantum tech & electronics

Franc Mouwen

*Architecture engineering construction
technologies*

Ivan Stefanic

Food chain technologies, novel & sustainable food

Isabel Obieta

Sustainable electronics

Carina Faber

Renewable energy conversion & alternative resource exploitation

**EIC
PROGRAMME
MANAGERS**



EIC Programme Manager Priorities



Identify candidate challenges and select portfolios of projects

Science and innovation intelligence activity

Outreach and community building

Guiding panel members to select portfolio of projects for Pathfinder, and active observers for Transition and Accelerator

Pro-active management of selected portfolios and projects

Technology

Regulation

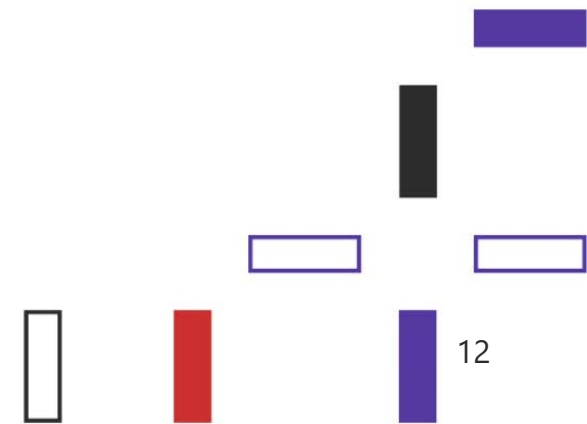
Transition to innovation

Communication and dissemination

EIC
Programme
Management
(per sector)



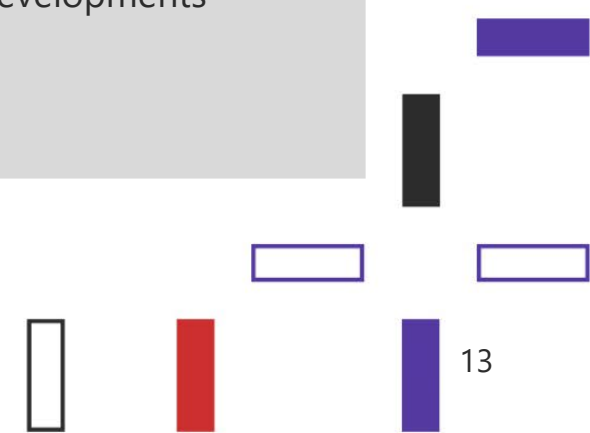
3. HOW do PROGRAMME MANAGERS select CHALLENGES



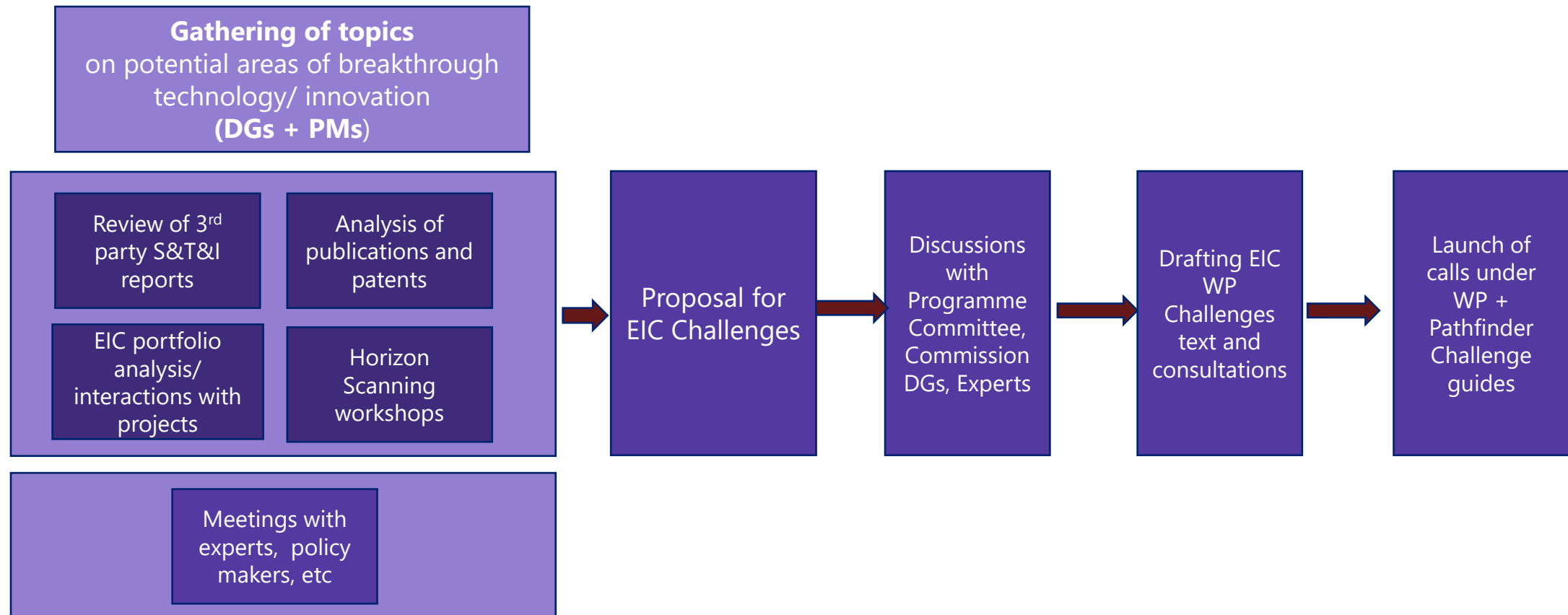
EIC Challenges – rationale and criteria for identification in 2024



Driver type	Pathfinder	Transition	Accelerator
S&T&I opportunities	<ul style="list-style-type: none"> Scientific breakthroughs creating new technological opportunities 	<ul style="list-style-type: none"> Maturation of ground-breaking results stemming from EIC Pathfinder, ERC Proof-of-Concept, Pillar 2 etc. 	<ul style="list-style-type: none"> Deployment of disruptive innovations on the market (high socio-economic impacts)
Strengthening EU positions in key emerging strategic areas of technology/ innovation through supporting tech & venture creation (Pathfinder/ Transition) and scaling up (Accelerator) spin-outs/ start-ups			
Demand/ challenges to overcome	<ul style="list-style-type: none"> Unexplored high-risk topics with great potential for high technology and socio-economic impacts Properties and limits of technology not fully understood 	<ul style="list-style-type: none"> Identifying new applications/ markets and maturing technology Robustness of new technology in real world environments, including societal aspects Developing business model and routes to markets 	<ul style="list-style-type: none"> Support to EU priorities/ policies Ensuring EU providers for open strategic autonomy Under investment/ incumbents blocking developments



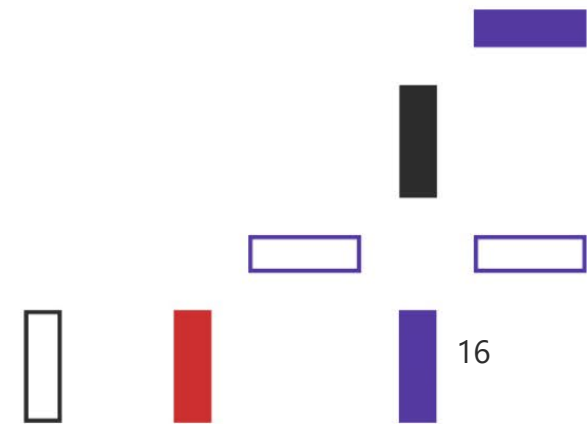
Process to identify EIC Challenges



EIC Challenges important points

- Supporting key, relevant, EU policies: - Open strategic autonomy & economic security (e.g. 10 critical technologies) - Chips and AI acts - Green Deal and climate spending - New EU strategies (biotech & biomanufacturing, advanced materials).
Growing policy demands for EIC Challenge
- EIC Board: from suggesting to discussing to endorsing the proposals
- Commission (RTD and CNECT) and Programme Committee: orientation and interservice consultation
- Member states: Specific workshops with discussions on the initial drafts. **Different views across Member States on balance between Open and Challenge funding**

4. PROGRAMME on SUSTAINABLE SEMICONDUCTORS



SUSTAINABLE SEMICONDUCTORS



CHIPS ACT objectives

1. Strengthen research and technological leadership – innovate in design, assembly and packaging
2. Reach 20% of chip production globally by 2030, compared with today's 7-8%
3. Create a dynamic semiconductor ecosystem in Europe and address skills shortage
4. Understand the global semiconductor supply chain

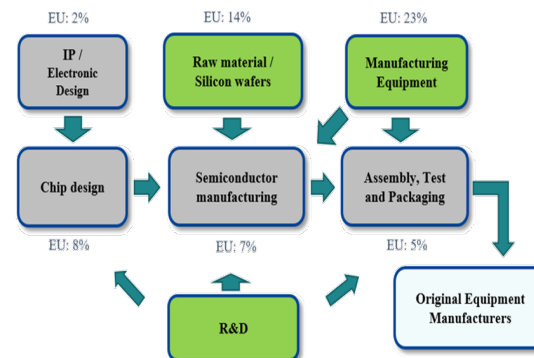
The 4 technologies Europe wants to keep safe from China

– **Advanced Semiconductor technologies** (microelectronics, photonics, high-frequency chips, semiconductor manufacturing equipment).

– **Artificial Intelligence technologies** (high-performance computing, cloud and edge computing, data analytics, computer vision, language processing, object recognition).

– **Quantum technologies** (quantum computing, quantum cryptography, quantum communications, quantum sensing and radar).

– **Biotechnologies** (techniques of genetic modification, new genomic techniques, gene-drive, synthetic biology).



SEMICON 2022 Sustainability Industry Group SEMICON 2023 Towards Netzero event

EXECUTIVE FORUM

The Microelectronics Industry

Enabling Solutions

- Advancements in semiconductors are critical to enabling solutions
- Healthcare, Manufacturing, Food and Agriculture, Mobility and Transportation
- Technologies that conserve energy and water and reduce carbon footprint

Part of the Problem

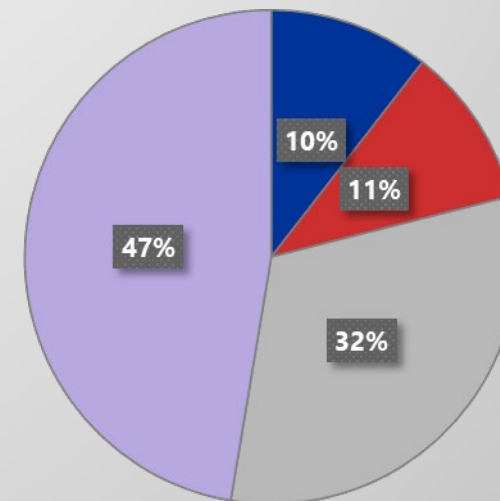
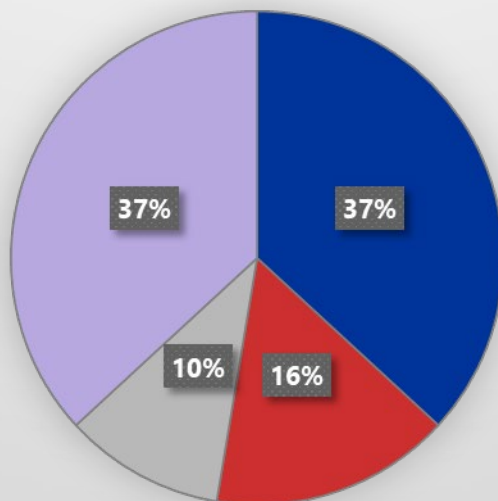
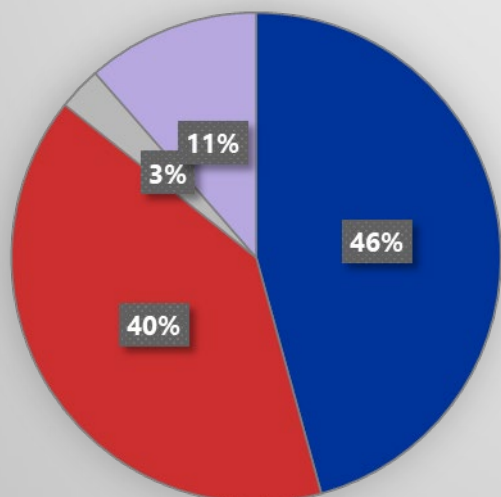
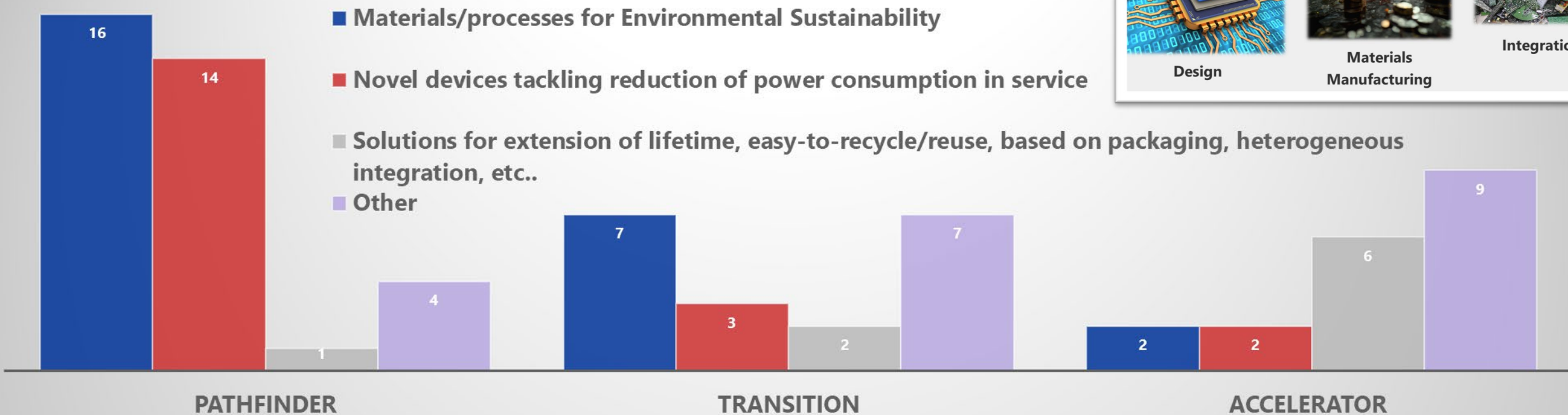
- Large semiconductor fabs can consume electricity at 100 MW / hour – enough to power 50K houses
- A single fab can use up to 9 million gallons of water / day
- Factor in 70+ new fabs coming online over the next few years

STARTUPS FOR SUSTAINABILITY

The StartUps for Sustainability program searches for and highlights young companies making great contributions to building a more sustainable industry. The program facilitates introductions to Corporate Venture Capital firms and private VC firms who are seeking to fund the next generation of business plans built around making sustainability achievable.

[LEARN MORE](#)

EIC Projects OPEN - Sustainability Arguments

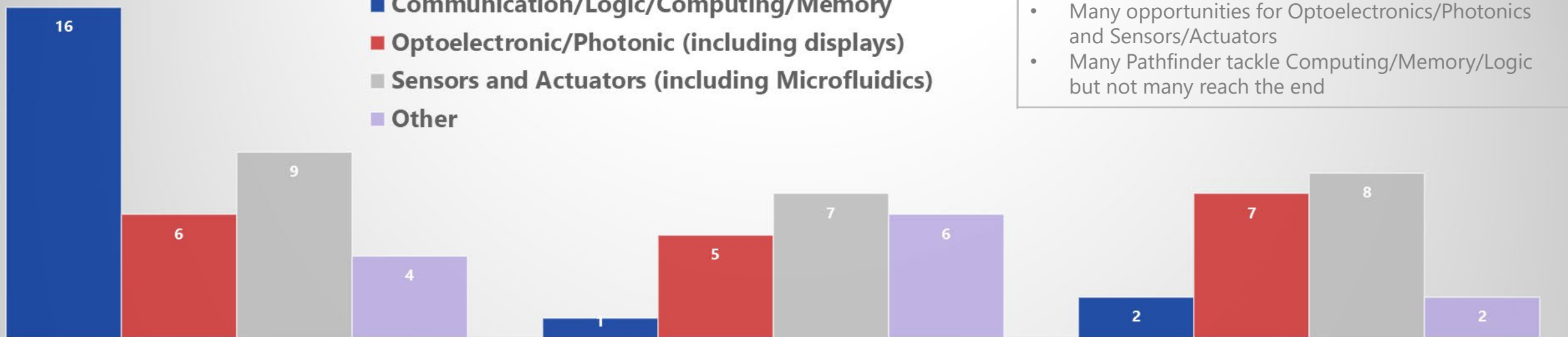


EIC Clustering - Devices

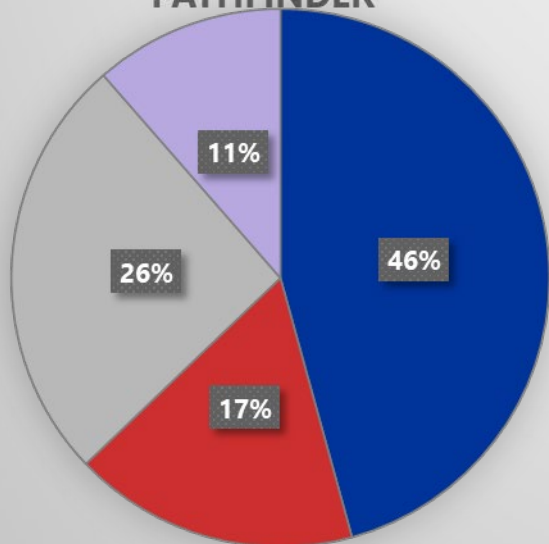


- Communication/Logic/Computing/Memory
- Optoelectronic/Photonic (including displays)
- Sensors and Actuators (including Microfluidics)
- Other

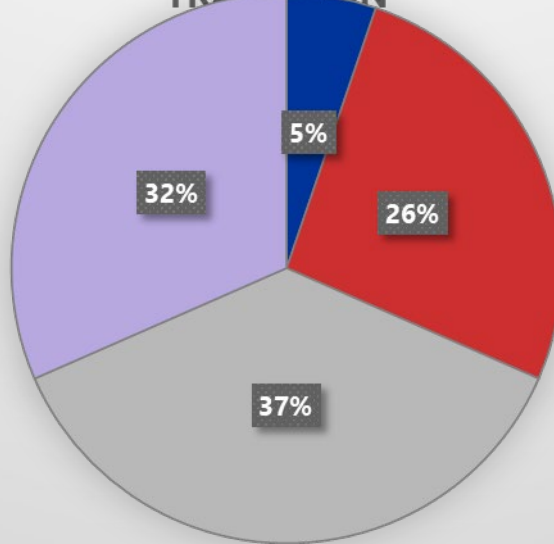
- **Nothing on power devices!**
- Many opportunities for Optoelectronics/Photonics and Sensors/Actuators
- Many Pathfinder tackle Computing/Memory/Logic but not many reach the end



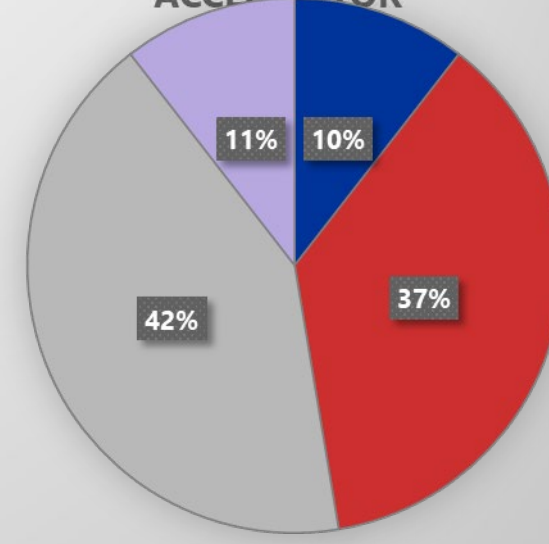
PATHFINDER



TRANSITION



ACCELERATOR





(Design) Radically New Devices

Lower the power consumption

Understanding the physics behind heat conduction

In-chip heat dissipation ..

WP 2024 Nanoelectronics for energy-efficient smart edge devices



Novel Materials

Manufacturing Changes

- Reduction of water, critical raw materials and energy consumption

- From fossil based to Bio/based, biodegradable, abundant, etc..

WP 2022 DNA-based digital data storage

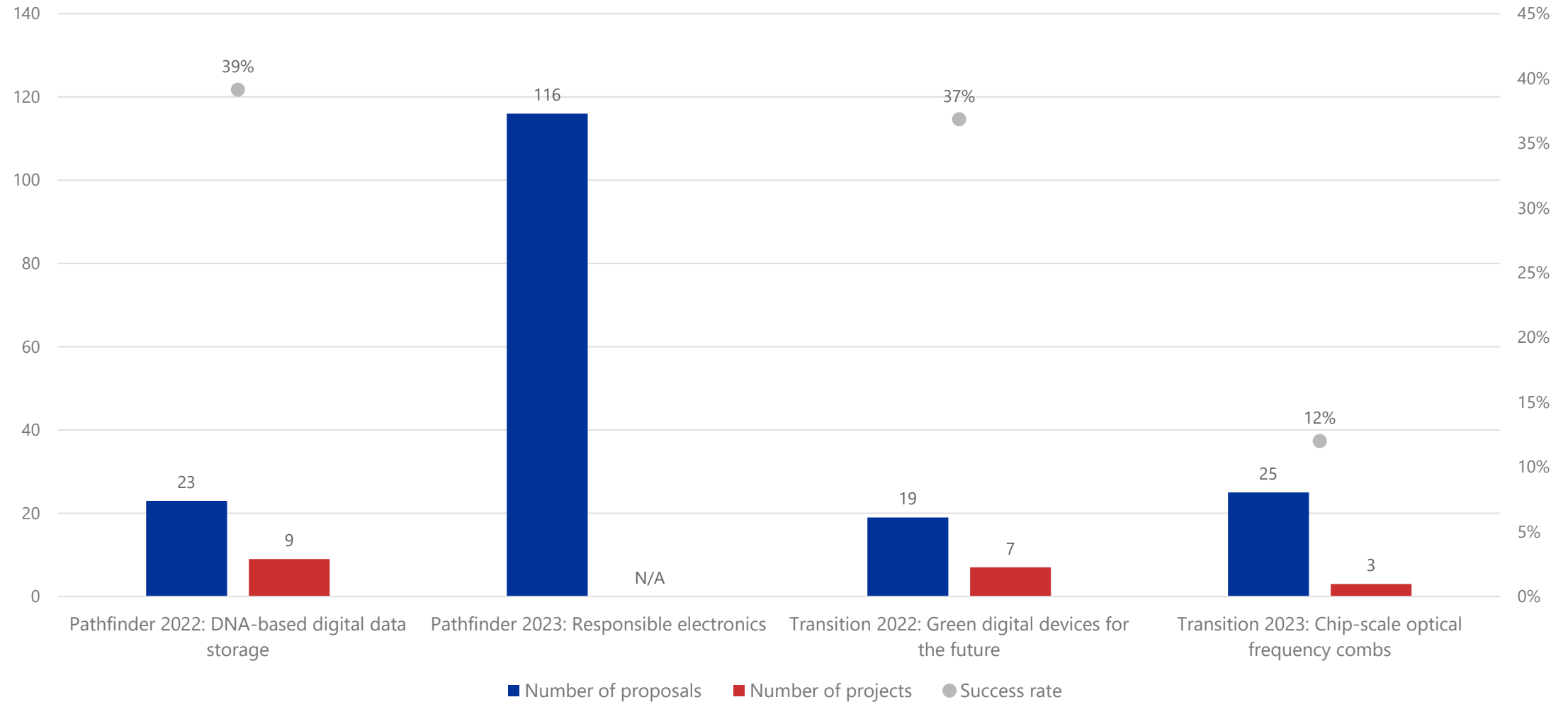


Hybrid Integration

Packaging or Interconnections for easy recyclability or reuse

WP 2023 Responsible Electronics

SUSTAINABLE SEMICONDUCTORS PORTFOLIOS



EIC Pathfinder DigNA Portfolio:

“DNA-based digital data storage”

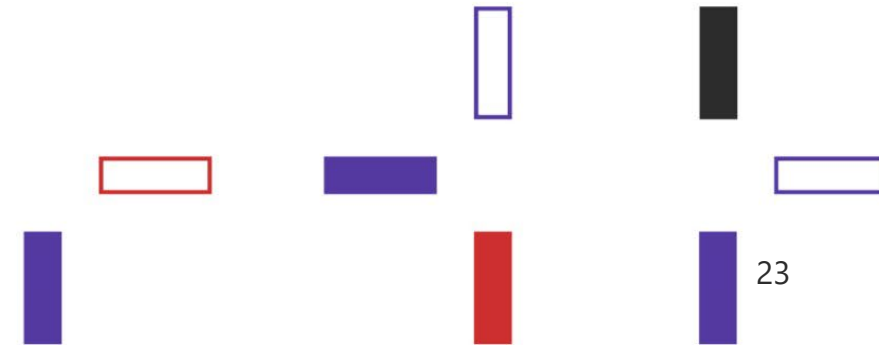
Overall goal of the Challenge



is to **explore scalable and reliable high-throughput approaches for using DNA as a general data-storage medium.**

Specific Objectives

- **New approaches for coding, decoding, modification or computational use of digital data** in synthetic DNA or other sequence-controllable polymers with quantitative targets (theoretical and technological);
- **Proof-of-Concept** of technical feasibility with indications of at least state of the art benefits and major operational characteristics (e.g., extreme densities, longevity, stability) and going well beyond for some of them (e.g., speed, cost, accuracy);
- End-to-end **scenarios of use**, be it for data storage (archival, but also shorter-term storage) or other purposes (like sensing, cryptography or computation) that exploit the benefits of the technology.



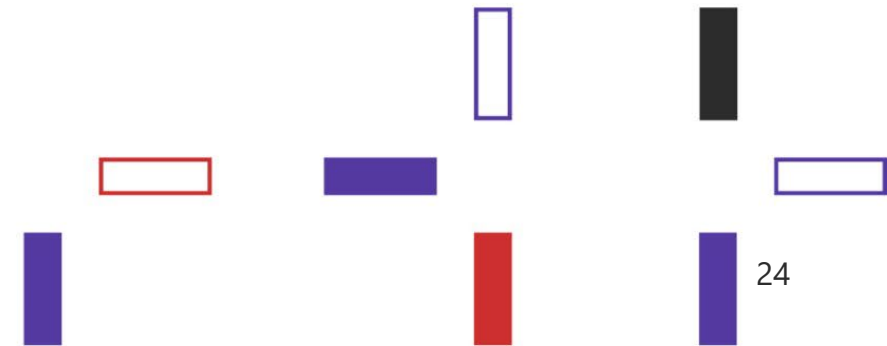
How: Portfolio of project



A diverse portfolio in terms of **time-frames** present, underlying **substrate**, and potential **applications**, combined with projects that demonstrate **end-to-end integration** and **interoperability** where applicable.

Storage duration: a set of projects that operate across the spectrum of time, from long-term, archival, “cold” storage, to medium-term, “working” storage and short-term “dynamic” storage.

Substrate: Whilst acknowledging that the bulk of the portfolio are comprised of projects that operate on synthetic DNA in vitro, the investigation of alternative substrates such as non-natural polymers or living cells is also part of the portfolio.



Objective of the portfolio of projects



Impact:

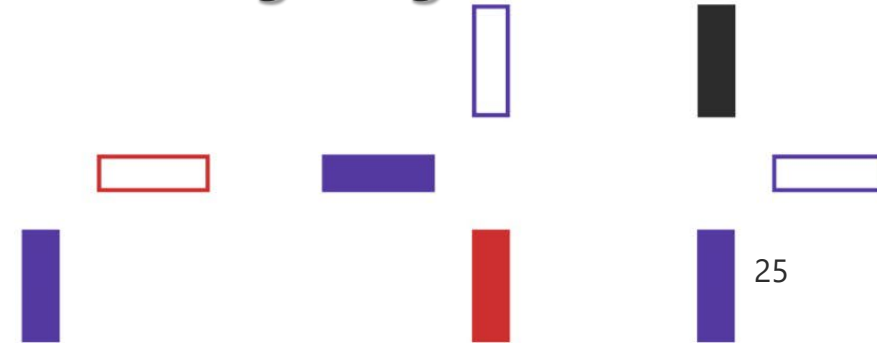
To build a **European ecosystem** in DNA based data storage

To synergistically explore **routes for exploitation**

How:

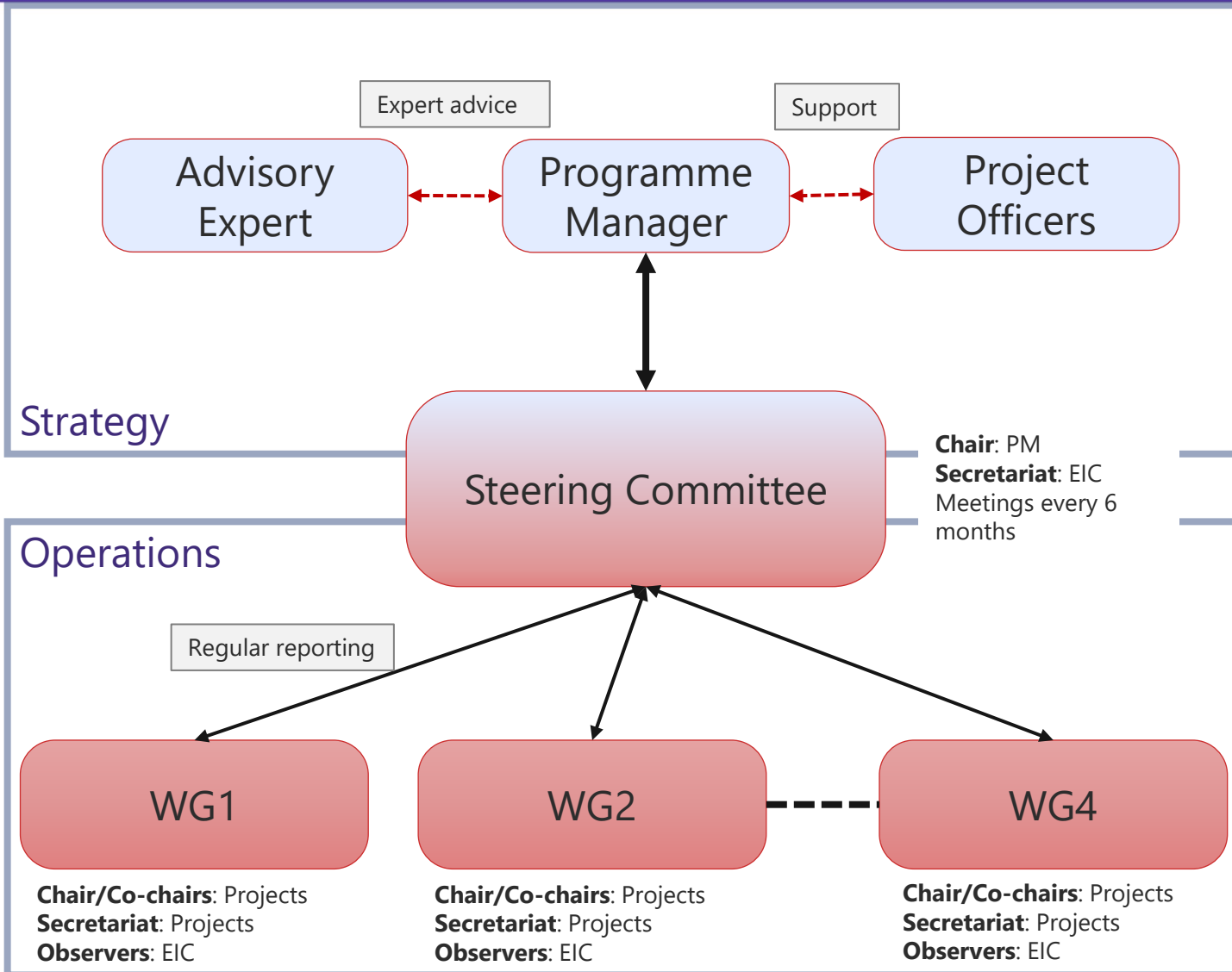
a **Portfolio Strategic Plan** where the overall and specific objectives linked to needs, challenges, or opportunities are defined, the activities to reach those objectives identified and their implementation is guided through a governance structure.

The Portfolio Strategic Plan will be revised once per year



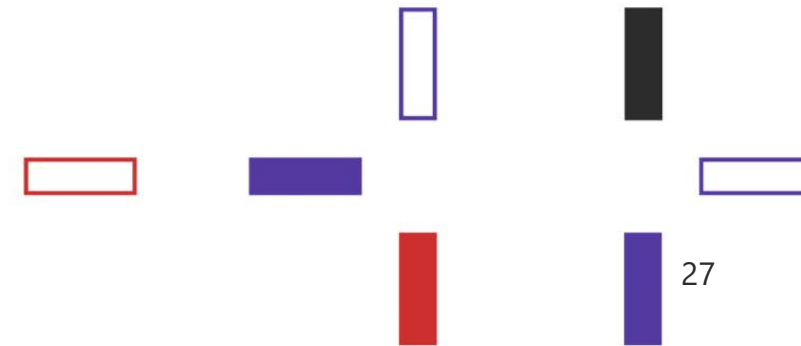
Priority	Step 1 Ranking	Project Number	Proposal	Case identified	Reasons for the priority position
1	1	101115115	PEARL-DNA		
2	2	101115134	DiDAX		
3	5	101115253	HYPERION		
4	7	101115215	MI-DNA DISC		
5	6	101115422	DISCO		
6	8	101115410	DURA-store		
7	13	101115317	NEO		
8	3	101115389	DNAMIC		
9	4	101115292	TextaDNA		
10	9	101115515	SHIFT		

DNA-based digital storage portfolio governance



Activities to be done:

- **Nominations** to the Steering Committee, and to each of the working groups;
- Elect **chairs** and co-chairs for the different working groups;
- Elect a **secretariat** for the WGs— Secretariats are in charge of setting up regular meetings, and taking minutes
- The PM, supported by the Expert, will lead the Steering Committee to define a **Strategic Plan** for the challenge.





The steering committee tasks:

- Ensure that the **Strategic Plan** is submitted and updated in time:
 - Agree on concrete collaborations and accompanying activities identified and developed either by individual portfolio projects, or flagged by one of the portfolio Working Groups, to be included in the strategic plan.
 - Ensure the proper implementation of the activities included in the strategic plan, always respecting individual portfolio project confidentiality issues.
- Report to the EIC the state of play in each of the WG, in line with their charter of activities



DigNAs EIC Pathfinder WORKING GROUPS



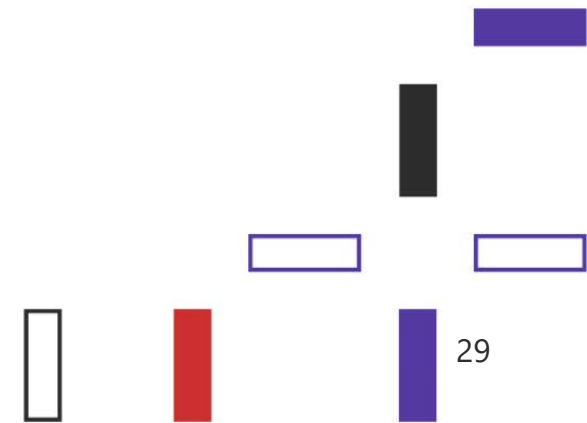
WG1. Technical synergies

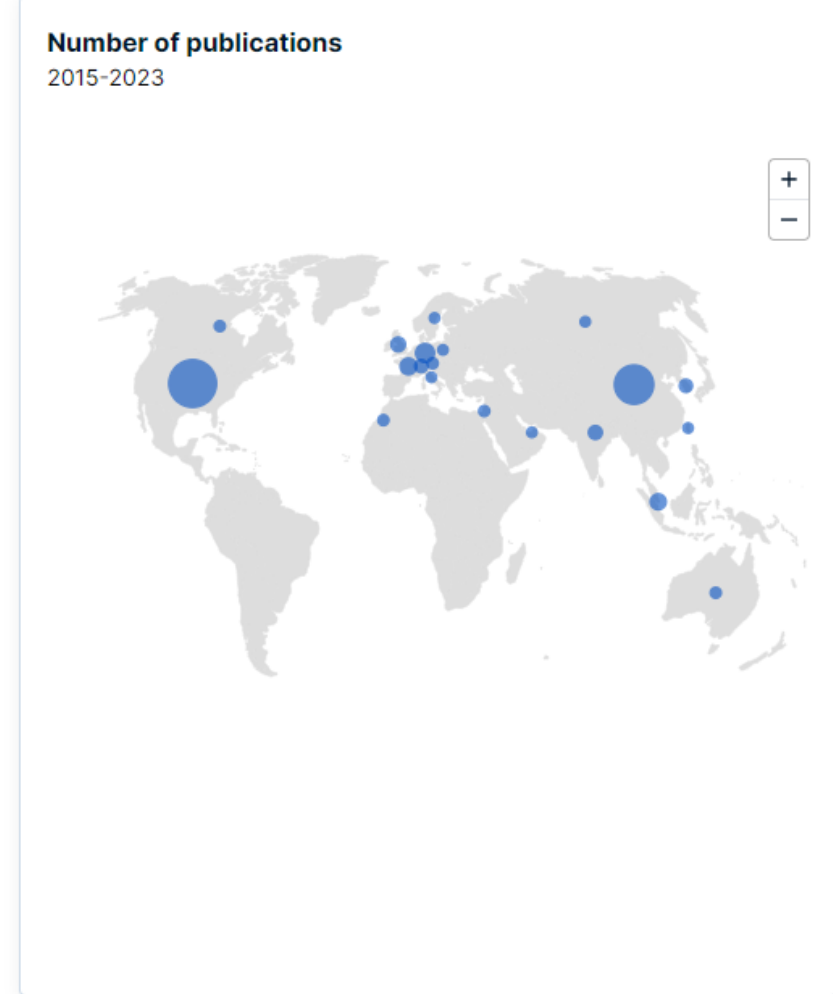
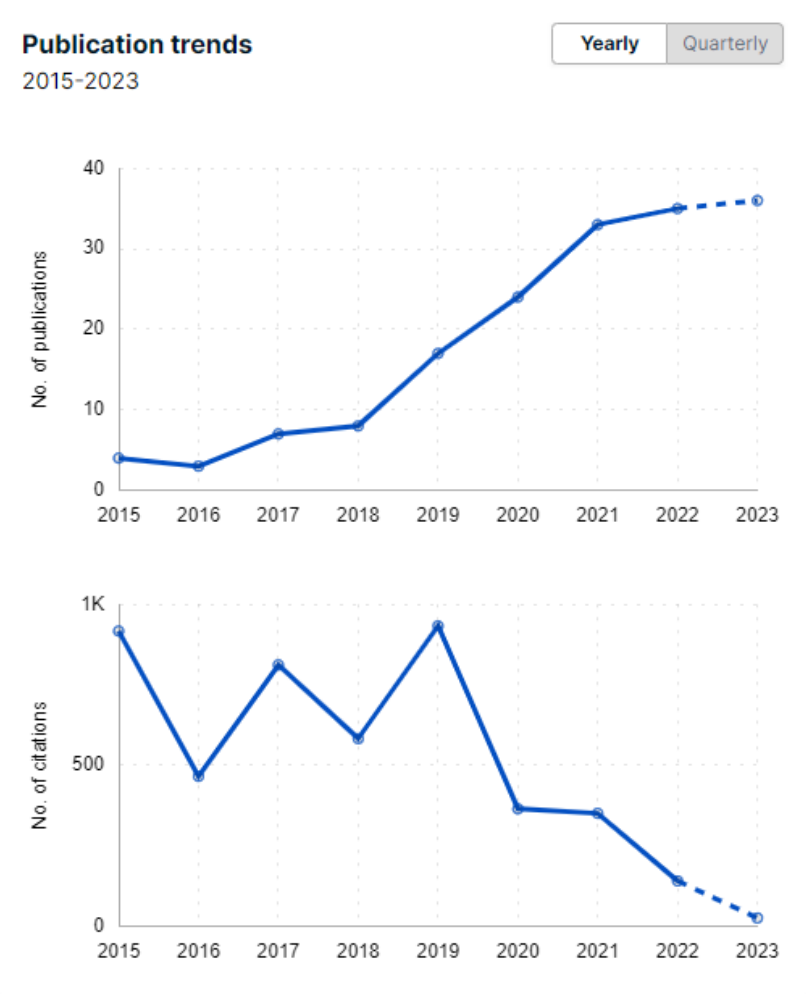
Subgroups: Imaging; sequencing; embedding

WG2. Outreach and Public Engagement

WG3. Metrics (as a foundation to Standards and Roadmapping)

WG4. Protection and Exploitation





Top publishing institutions

2015-2023

Institution	Publications	Times cited
University of Washington	16	1.3K
University of Illinois at Urbana-Champaign	4	703
Columbia University	2	543
ETH Zurich	4	531
Semiconductor Research Corporation	1	200
Rice University	1	166
Microsoft	5	135
Technion - Israel Institute of Technology	2	106
Technische Universität München	5	75
Nanyang Technological University	5	73
Tianjin University	12	70

Mario Platform, L'Atelier BNP Paribas

Building-up a common knowledge management database and repository on all projects funded in the European Union

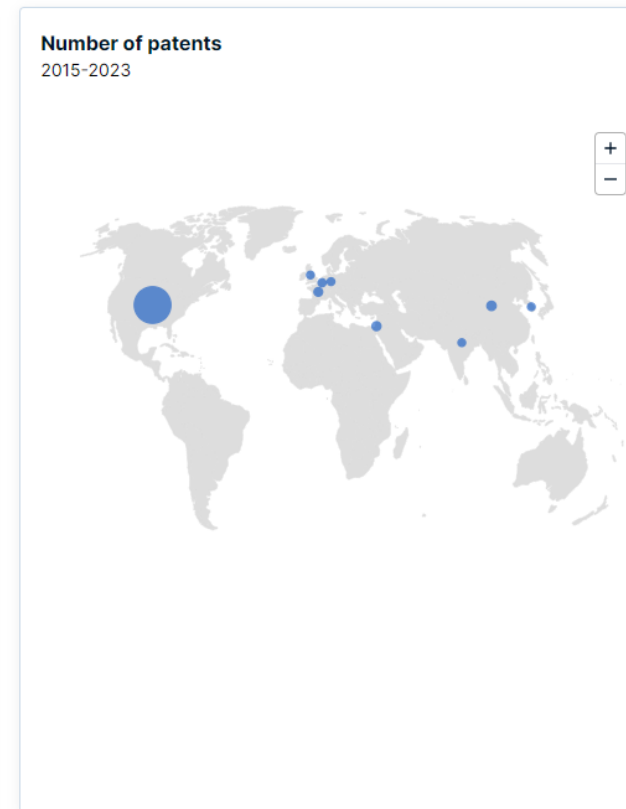
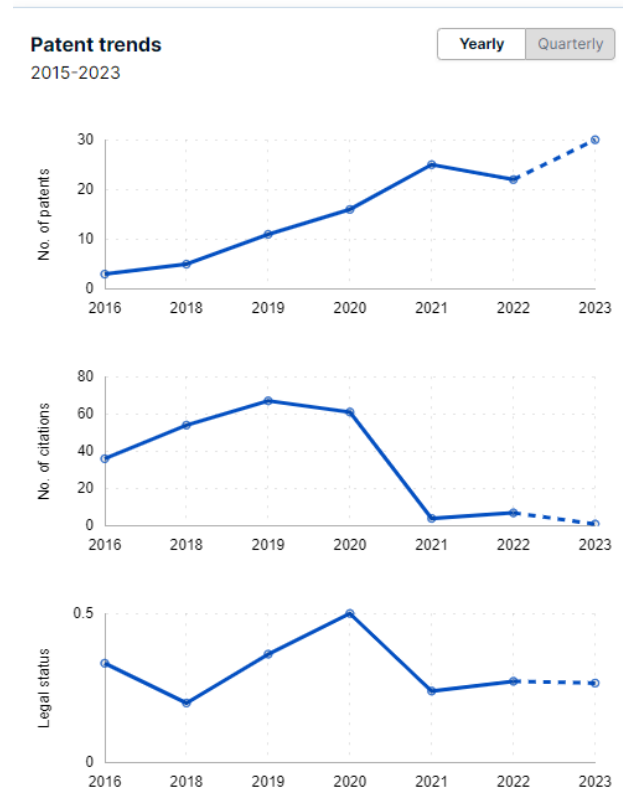
WG4: Protection and Exploitation

- Overall objective: *Help in the Journey to Innovation and value creation*

Activities related to **Protection**:

- IP Protection expert workshop and other BAS services related to this
- EPO specific analysis in the field
- Competition analysis

Mario Platform, L'Atelier BNP Paribas



Top filed patents
2015-2023

Patent applicant	Patents in US	Patents in EU	Patents elsewhere
MICROSOFT TECHNOLOGY LICENSING LLC	40	5	0
ROSWELL BIOTECHNOLOGIES INC	9	2	1
INTEGRATED DNA TECH INC	3	1	0
SEAGATE TECHNOLOGY LLC	4	0	0
TECHNION RES & DEVELOPMENT FOUND LTD	2	0	2
BGI SHENZHEN	2	1	0
DNA SCRIPT	1	2	0
IBM	1	1	1

WG4: Protection and Exploitation



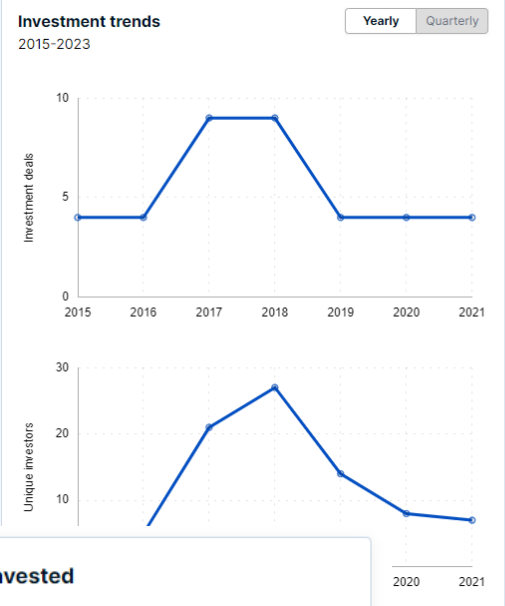
- Overall objective: *Help in the Journey to Innovation and value creation*

*Activities related to **Exploitation**:*

- Establishing contacts to possible stakeholders or end-users. Cooperation with relevant Joint Undertakings, such as the Chips JU where important stakeholders are present. Stakeholder mapping: each project identifies the main stakeholders, and this will be discussed in a dedicated portfolio meeting
- Portfolio members to exchange results of their individual market research analysis to identify key players of common interest with which, partnership(s) can be explored at portfolio level.
- PM and PO to catalyse the participation of portfolio projects in different EIC Business Acceleration Services (BAS), especially those providing Tech to market knowledge
- Start-ups: to provide guidance on commercialization and tech-to-market strategies and facilitate networking with key industrial players.
- Exposure to investors. Specific analysis on the investors/investees situation



Mario Platform, L'Atelier BNP Paribas



Top investors by AUM

2015-2023

Investor	Investor country	AUM	Related Deals
New Enterprise Associates	US	25B	3
Illumina	US	11.77B	1
Agilent Technologies	US	9.46B	1
Industry Ventures	US	7B	1
Y Combinator	US	3.2B	2
DCVC	US	3B	4
Sofinnova Partners	FR	2.67B	2
Morningside Group	US	2.48B	1
Molten Ventures	GB	2.2B	1
Alexandria Venture Investments	US	2B	1



Top investees by amount invested

2015-2023

Investee	Investee country	Received (USD)
Catalog (Biotechnology)	US	24.2M
DNA Script	FR	16.06M
Evonetix	GB	14.51M
Molecular Assemblies	US	6.48M
Unite Genomics	US	5.79M
Iridia	US	1.44M
Helixworks	IE	425K
Kern Systems	US	150K
Kilobaser	AT	125K
Nucleotrace	AU	59.5K
Twist Bioscience	US	0
C-ATOM	CN	0
DigiCodon(Hangzhou)	CN	0

Articles of interest
[DNA Edges Forward As Data Storage Option \(semiengineering.com\)](#)



Strategic Plan Implementation Proposal

- ***Bilateral meetings (EISMEA-PC) (Nov 2023)***
- ***Kick-off meeting (15 Dec 2023)***
- Dec2023-February 2024:
 - Brainstorming within project consortia exploring potential collaborations
 - Establish the WGs: responsables and one representative per project
- March-June 2023:
 - Interactions within projects towards the 1st draft of the Strategic Plan
 - Each WG set a lists of activities to be implemented in the next years with detail in 2024
- JUNE: In-person workshop to share





Conclusions

1. Pathfinder, Transition and Accelerator Challenges are dealt in different ways
2. Challenges are selected after a thorough process starting from PM proposals (based on expertise, interactions with stakeholders, analysis of previous calls, etc..). Go through EIC Board, DGs consultations, etc..
3. Creating portfolios are about IMPACT in strategic areas for Europe





Thank you!

<https://eic.ec.europa.eu>

Isabel.obieta-vilallonga@ec.europa.eu

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