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Le programme européen pour la recherche et l'innovation

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Webinaire EIC Pathfinder Challenges 2024

- ✓ Coupez votre micro
- ✓ Levez la main si vous souhaitez intervenir
- ✓ Posez vos questions **via Slido**

OU

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Programme

- **10h – Présentation générale EIC Pathfinder Challenges 2024 – PCN EIC Pathfinder et Transition**
- **10h30 – Présentation et Q&A des Program Managers**
  - **Franck Mouwen - Architecture engineering, construction technologies**
  - **Ivan Stefanic - Food chain technologies, novel & sustainable foods**
- **11h – Présentation et Q&A d'un lauréat**
  - **Pascal Xavier - projet « DESIRE4EU », *Pathfinder Challenge « sustainable electronics » 2023***
- **11h30 – Session Q&A pour le PCN**

Equipe PCN EIC Pathfinder - Transition

Coordinatrice/ coordinateur
MESR

Chiara Molinelli
MESR/Université de Lille

Laurent Volle
MESR/CCI Bourgogne Franche-Comté

PCN EIC Pathfinder/Transition
pcn-eic-eclaireur@recherche.gouv.fr

Site internet du PCN EIC Pathfinder-Transition
LinkedIn
Liste relais

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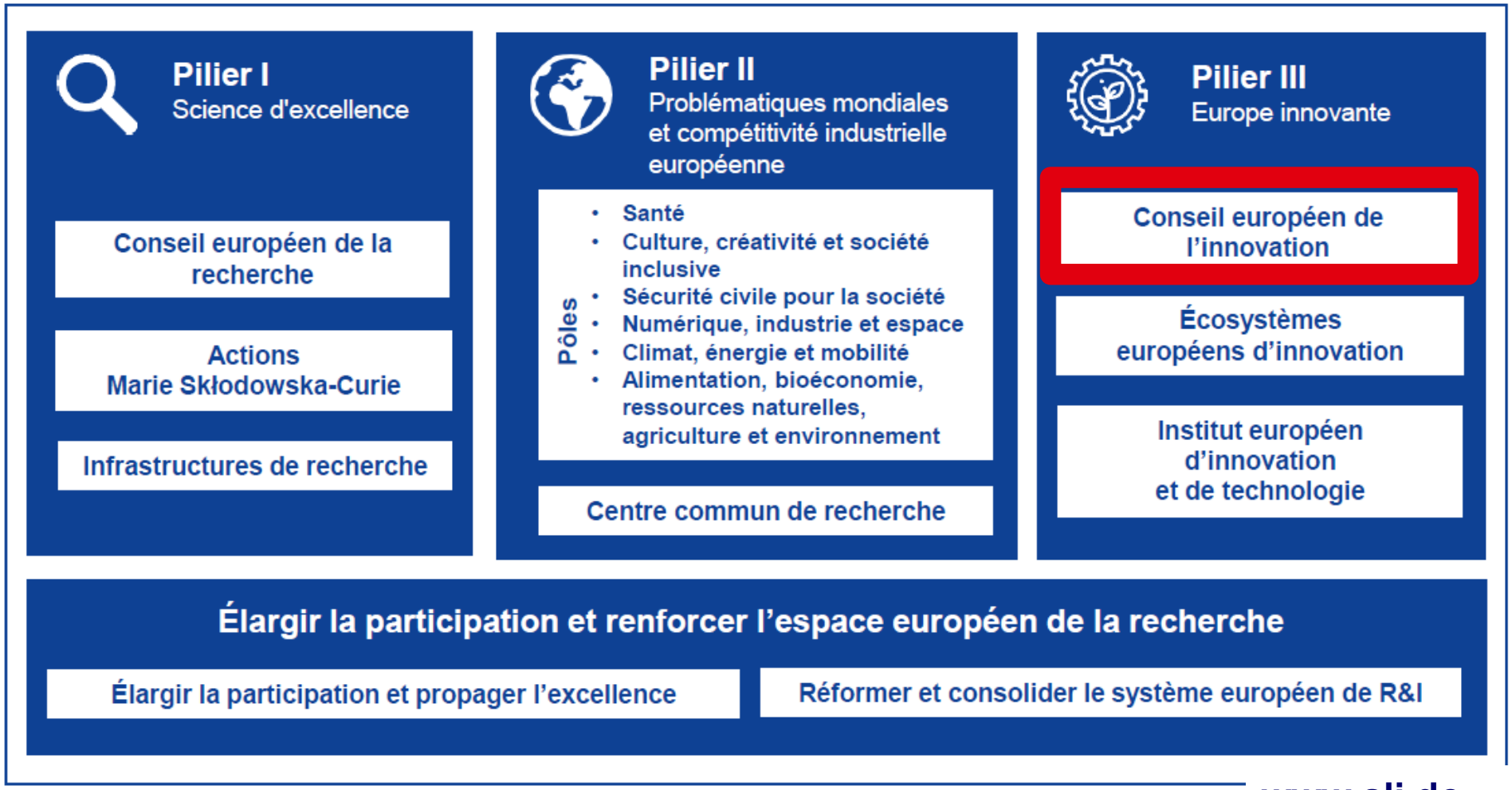
La structure d'Horizon Europe



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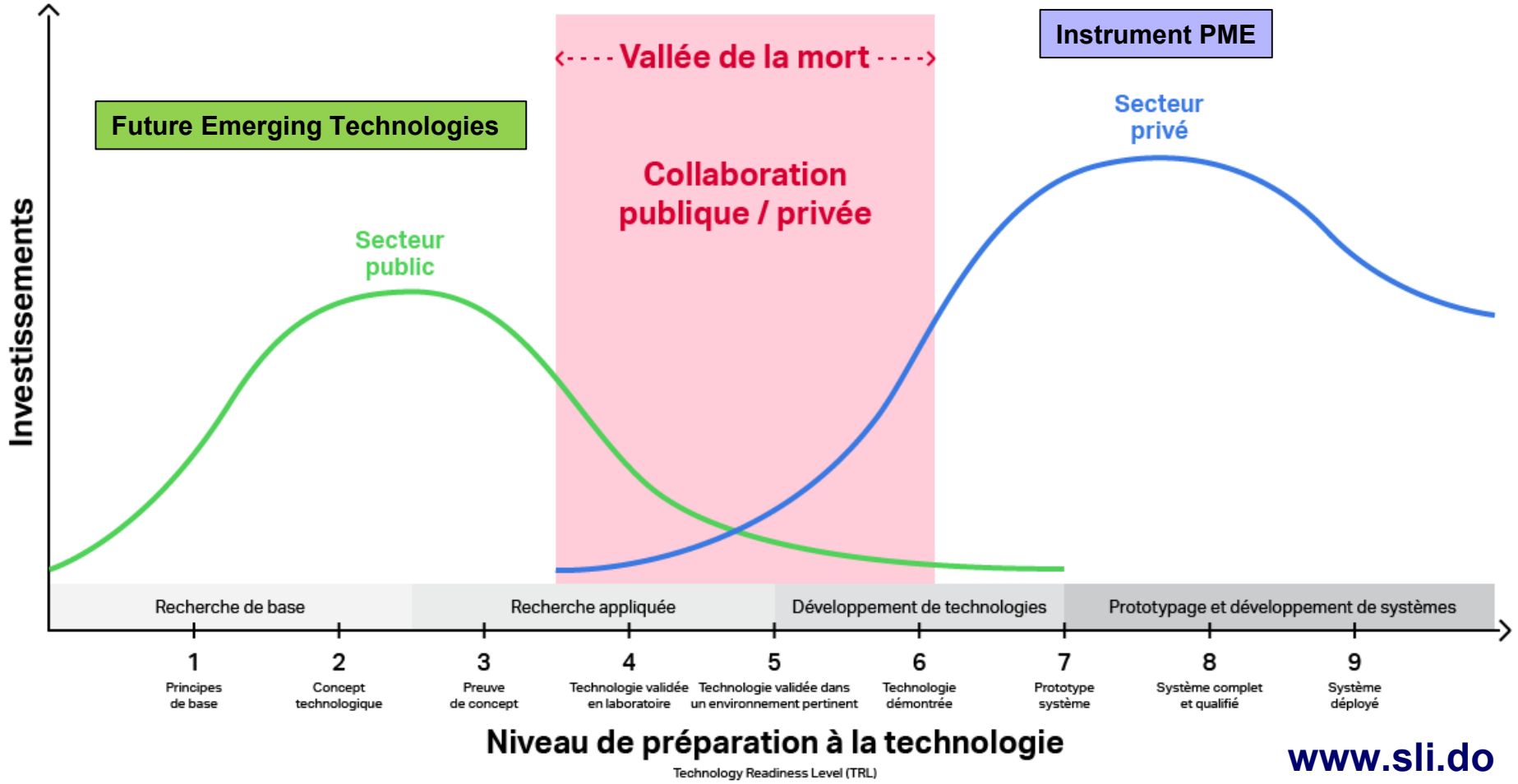
Constat sous Horizon 2020



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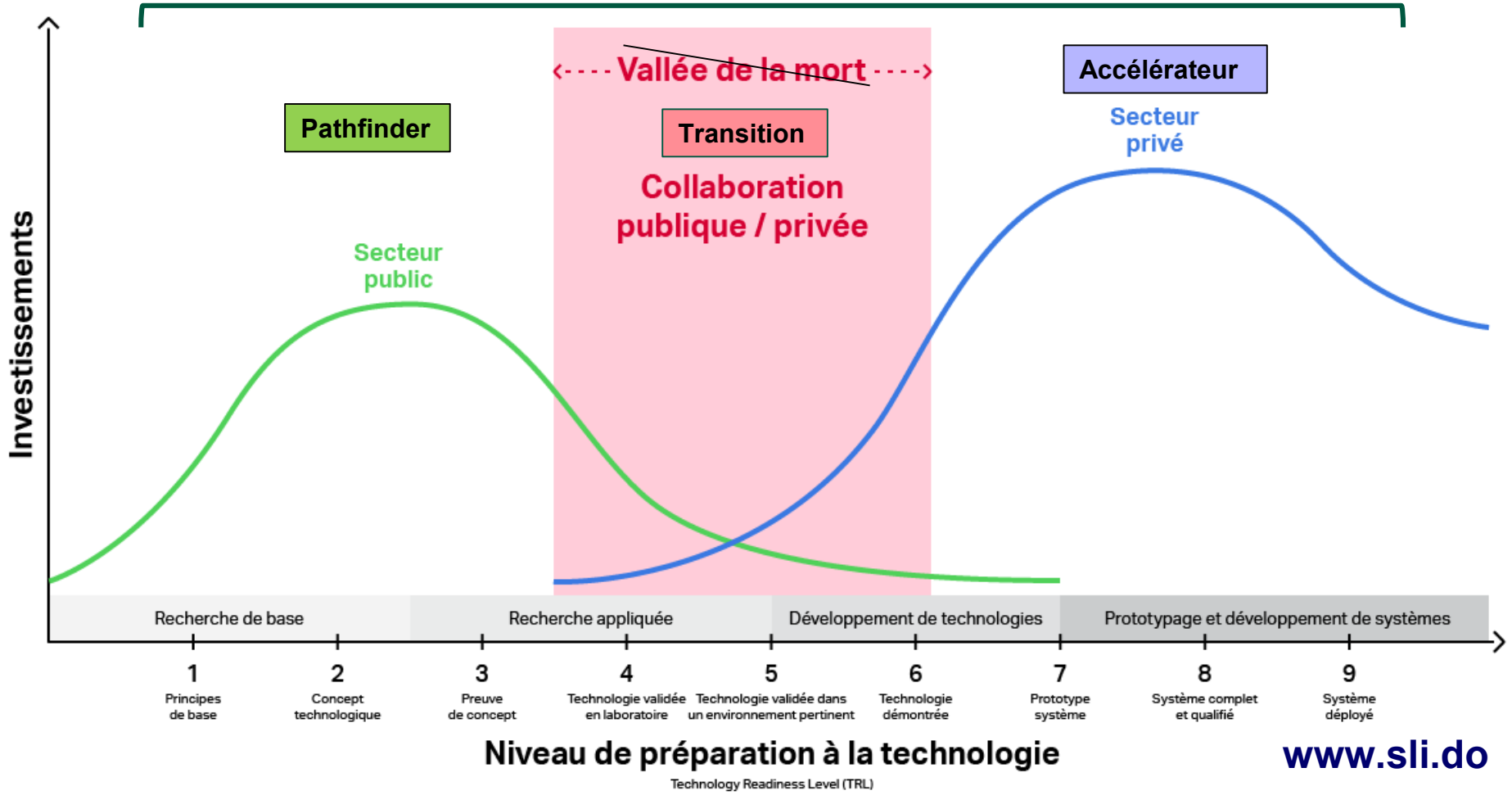
Nouveauté sous Horizon Europe

Conseil européen de l'innovation



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Les objectifs de l'EIC

« Faire de l'Europe un leader de l'innovation »

- Financer de l'innovation radicale à haut risque, créatrice de nouveaux marchés
- « Dérisquer » pour attirer les investisseurs privés
- Couvrir toute la chaîne de l'innovation (TRL 1 à 9) = combler le fossé entre labo et marché
- Accélérer la croissance des entreprises à haut potentiel, soutenir les meilleurs innovateurs

"The EIC aims at identifying and supporting breakthrough technologies and game-changing innovations with the potential to scale up internationally and become market leaders"

La mise en œuvre de l'EIC

- ✓ Budget : **10,1 Mds €** pour 7 ans et un programme de travail annuel sous l'égide de **l'EISMEA**
- ✓ Priorité « **Deep Tech** », investissement long terme & aux innovations **multidisciplinaires** et **multisectorielles**
- ✓ Appels « Bottom-up » et « Top-down » -> détecter, développer des **innovations de rupture très technologiques**

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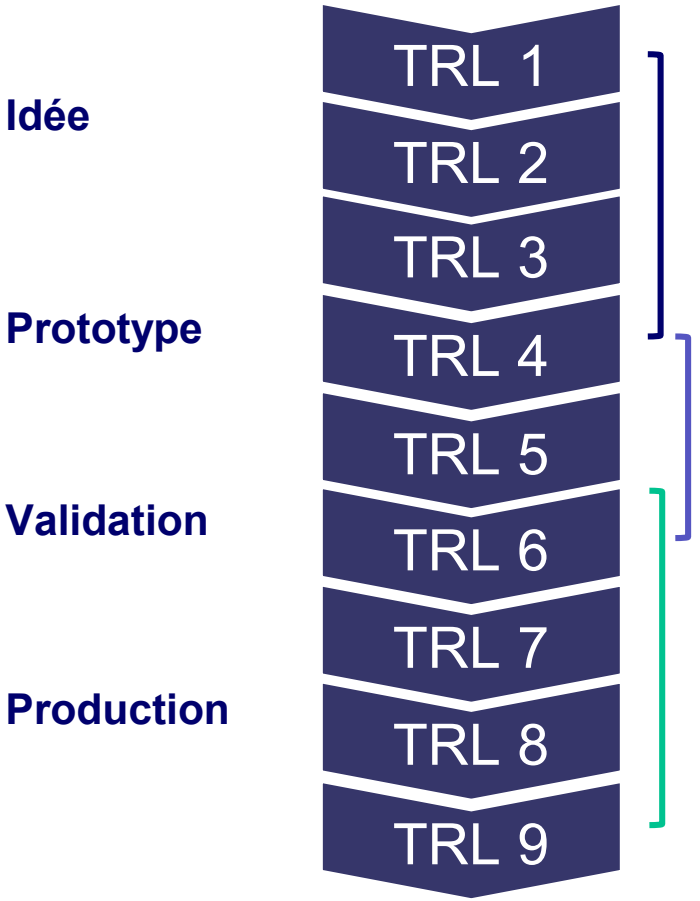
La structure du Work Programme 2024



- **EIC Pathfinder**
  - EIC Pathfinder Open : 1 appel blanc non-thématique
  - EIC Pathfinder Challenges : 5 défis tech. et sociétaux
- **EIC Transition**
  - EIC Transition Open : 1 appel non-thématique
- **EIC Accelerator**
  - EIC Accelerator Open
  - EIC Accelerator Challenges : 6 défis tech et sociétaux

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EIC Pathfinder 2024

❖ Challenges

EIC Pathfinder : la philosophie

- Proposer une **vision à long-terme** pour le développement d'une technologie qui a le potentiel **d'impacter positivement l'économie et la société**
- Avoir une approche et une méthodologie **high risk/high gain** avec une forte dimension **deeptech**
- Etablir des recherches posant **les fondations de la technologie ambitionnée**
- Faire **le pont** entre la science et le développement technologique

Les objectifs

- Recherche et développement **interdisciplinaires**
- **Preuve de concept** à la clé
- Validation des bases scientifiques et technologiques
- Prévoir l'« **après** » notamment en termes d'exploitation et de dissémination

- **Objectif : TRL 4 !**
- Lien avec programmes prioritaires EU (Green Deal, Repower EU, chips act …)

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Les challenges 2024

Les Challenges

Pour chaque Challenge :

- ✓ **1 appel**
- ✓ **1 guide**
- ✓ **1 portfolio**
- ✓ **1 programme manager**

Challenges 2024 :

- **"Solar-to-X" devices for the decentralized prosumption of renewable fuels, chemicals and materials as climate change mitigation pathway**
- **Towards cement and concrete as a carbon sink**
- **Nature inspired alternatives for food packaging and films.**
- **Nanoelectronics for energy-efficient smart edge devices**
- **Protecting EU space infrastructure**

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EIC - Programme managers

Carina Faber

Renewable energy conversion and alternative resource exploitation

Ch 1

Samira Nik

Quantum tech and electronics

Isabel Obieta

Responsible electronics

Ch 4

Stella Tkatchova

Space systems & technologies

Ch 5

Iordanis Arzimanoglou

Health and biotechnology

Enric Claverol-Tinturé

Medical technologies and medical devices

Ivan Stefanic

Food chain technologies, novel & sustainable food

Ch 3

Antonio Marco Pantaleo

Energy systems and green technologies

Francesco Matteucci

Advanced materials for energy and environmental sustainability

Franc Mouwen

Architecture engineering construction technologies

Ch 2

Federica Zanca

Medical imaging and AI in healthcare

Le programme manager est en charge des feuilles de route technologiques et d'affaires de son portfolio

- Continuer, réorienter, suspendre ou terminer un projet
- Demander des changements dans le programme d'un projet
- Demander l'accès au BAS ou la préparation d'un dépôt à l'Accélérateur (ou autre financement)

★ **La feuille de route d'un portfolio peut évoluer et impacter les attendus des projets concernés**

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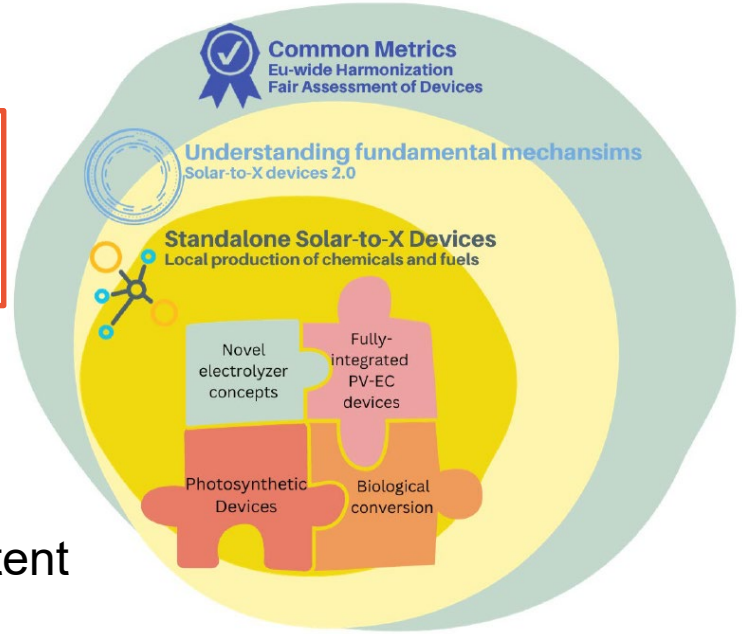
Challenge 1 : Solar-to-X devices

Solar-to-X devices (…)

Objectif : technologies de carburants synthétiques et de produits chimiques qui intègrent toutes les étapes de conversion nécessaires dans un seul dispositif et qui sont uniquement et directement alimentées par l'énergie solaire.



Les technologies explorées doivent démontrer le potentiel de :

1. **Développer des dispositifs** disruptifs depuis des systèmes couplés jusqu'à l'intégration complète,
2. **Produire des normes**, protocoles, indicateurs et données communes permettent une comparaison équitable entre les dispositifs
3. **Comprendre les mécanismes sous-jacents** : modèle théorique sur la base de science des matériaux

#artificial photosynthesis #disruptive electrolyzer #PV-EC devices #biological conversion

Téléchargez le guide du défi « Solar to X devices»

Visionnez le replay du webinaire réalisé par l'EIC

Carina FABER

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Challenge 2 : Cement and concrete

Towards cement and concrete as a carbon sink

Objectif : Développer des innovations révolutionnaires et des voies (alternatives) pour le ciment et le béton décarbonnés et à bilan carbone négatif

Les technologies explorées doivent viser un (ou plus) des objectifs spécifiques suivants :

1. **Liants alternatifs** avec composés à faible teneur en carbone basés sur des matières premières alternatives
2. **Utilisation plus efficace du clinker dans le ciment** (réduction de la fraction de clinker) **ou du ciment dans le béton** (efficacité du liant)
3. **Réduction de l'énergie de procédé et des émissions** : éliminer combustibles fossiles et émissions de CO2
4. **Technologies** dans le domaine de la modélisation des matériaux (AI et ML inclus) **en support de 1. 2. et 3.**

#architecture engineering #cement #concrete #decarbonization #binder technologies #design

Téléchargez le guide du défi « Towards cement & concrete»

Visionnez le replay du webinaire réalisé par l'EIC

Franc MOUWEN

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Challenge 3 : Food packaging

Nature inspired alternatives for food packaging and films for agriculture

Objectif : **remplacer l'utilisation du plastique « from farm to fork »** = développement d'alternatives durables inspirées de la nature pour l'emballage alimentaire et la production agricole, « *circular, safe and sustainable* »
Ces matériaux doivent avoir un faible impact environnemental et les caractéristiques fonctionnelles du plastique.

1. **Utilisation de sources et matières premières biosourcées** (polymères naturels et synthétiques bio-sourcés)
2. **Considération des aspects réglementaires** en développement et incorporation d'additifs chimiques
3. **Évaluation du cycle de vie** : réduction empreinte carbone, utilisation d'énergie et d'eau, biodégradabilité…
4. **Caractéristiques fonctionnelles améliorées** à utiliser dans la chaîne de valeur alimentaire

#agrifood #natural polymer #bio-sourced synthetic polymer #food packaging #pharmaceutical packaging

Téléchargez le guide du défi « Nature inspired packaging / films»

Visionnez le replay du webinaire réalisé par l'EIC

Ivan STEFANIC

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Challenge 4 : Smart edge devices

Nanoelectronics for energy-efficient smart edge devices

Objectif : explorer des solutions innovantes (nouveaux matériaux, dispositifs innovants, architectures et paradigmes alternatifs), pour **réduire drastiquement la consommation d'énergie des « smart edge devices »** afin de répondre aux besoins spécifiques aux applications pour *Edge Processing and memories*, *Edge Sensing and Imaging, Edge Communication* and *Edge Power Management*

Les projets peuvent couvrir un ou plusieurs des suivants « niveaux » :

1. **Conception/design :** modélisation et analyse des mécanismes de dissipation et transport de la chaleur, harvesting et conversion de l'énergie
2. **Matériaux/procédés :** nouveaux mécanismes d'interconnexion électrique-mécanique-optique, nouveaux matériaux pour la dissipation de la chaleur, intégration des récupérateurs d'énergie, intégration efficace
3. **Device/architecture** : circuits electr. moléculaires, transistor alternatifs (1electron), approches de traitement alterntives

#heat dissipation #energy harvesting #non-von Neumann architecture #beyond CMOS #molecular electronic circuit

Téléchargez le guide du défi « Nanoelectronics for energy-efficient»

Visionnez le replay du webinaire réalisé par l'EIC

Isabel OBIETA

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Challenge 5 : Space infrastructure

Strengthening the sustainability and resilience of EU space infrastructure

Objectif : solutions innovantes de désorbitation écologiques, compactes et abordables et de recyclage dans l'espace des débris spatiaux.

Les objectifs spécifiques de ce défi sont le développement :

1. de **technologies pour la réduction** des débris spatiaux **et l'élimination** active des débris
2. de concepts pour le **recyclage dans l'espace** des objets orbitaux dysfonctionnels
3. d'innovations pour la **protection des infrastructures spatiales** de l'UE.

#Euspace infractructures #spacedebris #activedebrisremoval #mitigation #remediation #ISRROA

Téléchargez le guide du défi « space infrastructure sustainability - resilience»

Visionnez le replay du webinaire réalisé par l'EIC

Stella TKATCHOVA

Critères d'évaluation

EIC Pathfinder Challenges : les critères d'évaluation

Excellence seuil 4/5 - 60%	Impact seuil 3,5/5 -20%	Mise en œuvre seuil 3/5 - 20%
Objectifs et relevance pour le Challenge	**Impact potentiel**, économique et sociétal	**Qualité du candidat ou du consortium**
Originalité, ambition, percée technologique	**Innovation potentielle** (mesures d'exploitation, protection des résultats… pour traduire la recherche en innovation)	**Work plan** (cohérence, risk management…)
Plausibilité de la méthodologie	**Communication et dissémination** (engagement du public et/ou parties prenantes, plan de diffusion et d'exploitation des résultats)	**Allocation des ressources**

→ **Section 1 à 3 de la Partie B = maximum 30 pages !**

NEW!

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EIC Pathfinder Challenges : le système d'évaluation

Évaluation en 2 étapes

- ✓ Fin de la phase dite de « **Rebuttal** » introduite en 2023 NEW!
- ✓ Toutes les propositions passant le seuil (*threshold*) de chaque critère d'évaluation seront considérées par le comité d'évaluation par la suite (étape 2)
- ✓ Le **comité d'évaluation** = Experts-évaluateurs différents de ceux ayant conduit l'évaluation à distance + Programme Managers (chaque défi a son comité)

EIC Pathfinder Challenges : le système d'évaluation (2)

L'étape 2: les considérations de portfolio

- ✓ Classement des propositions en plusieurs catégories
  - ➢ assez générales en lien avec les objectifs spécifiques du Challenge (par ex. blocs de construction ou sous-systèmes, domaines techniques et/ou technologies concurrentes, plates-formes, domaines d'application, niveau de risque et stade de niveau de maturité technologique, taille, etc.)
- ✓ Un portefeuille adapté de propositions est sélectionné par le comité d'évaluation
  - ➢ Les considérations du portfolio pour un ensemble cohérent selon les objectifs du défi
- ✓ **Retrouvez toutes les informations sur les catégories et les considérations de portfolio sont fournis dans les « Challenge guides » !**
- ✓ Le comité d'évaluation peut également proposer quelques ajustements mineurs aux propositions dans la mesure nécessaire à la cohérence de l'approche portefeuille.

Coopération au sein d'un portfolio

- Un projet EIC Pathfinder Challenge poursuit non seulement ses objectifs de projet, mais travaille également avec les autres projets du même portfolio sur des étapes communes sous la direction du responsable du programme EIC.

- Un workpackage dédié d'au moins 10 personnes-mois est demandé.

- Domaines possibles de coopération au sein du portfolio **décrits dans le guide du Challenge**
  - ✓ **Technologie**
  - ✓ **Législation**
  - ✓ **Communication et diffusion**
  - ✓ **Transition de la technologie vers l'innovation (sociale) :**
    - ✓ **Evaluation de la « techno – soutenabilité » du projet**
    - ✓ **Construction de scénarios, défis et opportunités sociétales**

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Les critères d'éligibilité

EIC Pathfinder Challenges : les conditions d'éligibilité

Qui ?

✓ Un consortium de 3 entités légales différentes ou ⚠ projet mono-bénéficiaire ou ⚠ bi-bénéficiaire issues de 2 pays différents (Etats membres ou associés, l'un au moins établi dans un Etat membre)

✓ **Attention aux pays associés !**

Deadline le 16 octobre 2024

Combien ?

✓ environ 4M€ par projet « as appropriate »

✓ durée ~ 36 à 60 mois

✓ Budget disponible pour le call EIC Pathfinder Challenges 2023 : 120 M€ (- 43,5M€ vs. 2023)

→ Call suivant attendu octobre 2025 ? – sur des Challenges différents

EIC Pathfinder Challenges : Retour sur les résultats 2021 – 2023

Projets déposés

	Evalués	Financés	% succès
2021	403	42 (229)	10,5%
2022	436	44 (259)	10%
2023	371	43 (263)	11,6%

Coordination (Bénéficiaires)

	Evalués	Financés	% succès
2021	48	7 (20)	15%
2022	30	3 (27)	10%
2023	22	6 (34)	27%

Coordination (Bénéficiaires)

Que retenir ?

- ~ 23 % des participants sont des entreprises
- **~20% coordinations par des entreprises**
- Un à deux projet(s) en mono-bénéficiaire à chaque call

En moyenne, par projet financé :
- ☆ 6,1 partenaires
- ☆ 3,7M€ de budget
- ☆ 47,3 mois

Financement en « lump sum » – *nouveauté 2024*

- **Les Parties scientifiques (B1 et B2) ne sont pas impactés**
- **Les principes du calcul du budget restent les mêmes**
- La présentation du budget va changer
- Les évaluateurs auront du soutien pour l'évaluation du budget
- La justification des projets acceptés va changer

https://www.horizon-europe.gouv.fr/financement-forfaitaire-dans-horizon-europe-comment-ca-marche-comment-rediger-une-proposition-36432

https://www.horizon-europe.gouv.fr/publication-de-nouveaux-outils-lump-sum-pour-les-beneficiaires-31436

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Le document scientifique

Le document scientifique

Sec. 1: Excellence

- **Commencez par la vision à long terme**, la technologie future visée
- **Positionnez votre projet précisément**, pour faire ressortir les aspects de rupture, nouveauté et ambition
- **Objectifs SMART** (*Specific, Measurable, Achievable, Realistic, Time-bound*)
- **Evoquez la méthodologie** dans la partie 1.3, ainsi que les aspects liés à la dimension de genre, de science ouverte, de management des données
- **Utilisez des schémas et des images** pour faciliter la comprehension
- **Soyez concis** : la partie Implementation peut prendre pas mal de place

Sec. 2: Impact

- **Soyez spécifiques** : utilisez des indicateurs et des cibles quantifiables
- **Stratégie d'exploitation avec un clair chemin vers le marché**
- **Impliquer et responsabiliser « key actors »**
- **Communication ≠ Dissemination** : l'**objet** (communication du projet vs dissemination des résultats) et les **cibles** (plus large public vs paires) sont différents !

Communication	Dissemination
• Dès le début du projet • Concerne les activités du projet, quels que soient les résultats → Site web, flyers, vidéos, réseaux sociaux etc.	• Diffusion des résultats • Protection des résultats • Transfert de technologie → Brevets, publications, open access etc.

Sec. 3: Quality and efficiency of the implementation

- **Présentez l'expertise des membres (*) du consortium**
- **Prévoir une actions / un budget pour les « activités de portfolio »**
- « Other countries and international organisations » = financement exceptionnel
- **Organisation du projet et ressources** :
  - ✓ **Gantt chart** : organisation dans le temps des WP, tâches … lisible et utile !
  - ✓ **Pert chart** : représentation graphique des relations entre « composantes » lisible et utile !
  - ✓ Liste et description des **WP** : pensez aux WP non scientifiques/techniques (management, dissemination…)
  - ✓ Liste des **livrables** : ne listez que les livrables que vous pourrez réaliser !
  - ✓ Liste des **milestones** = étapes-clés (nombre limité !)
  - ✓ Liste des **risques** !
  - ✓ Tableaux relatifs au budget

Informations utiles

Quels sites ?

Site EIC des PCN (en cours de construction) : Le Conseil européen de l'innovation | Horizon-europe.gouv.fr

Site de l'EIC : European Innovation Council (europa.eu)

Replay des webinaires de l'EISMEA : Events (europa.eu)

Site de la Commission européenne (où soumettre votre projet) : Funding & tenders (europa.eu)

Adresses génériques :

- PCN EIC Pathfinder & Transition : pcn-eic-eclaireur@recherche.gouv.fr
- PCN Juridique & Financier : pcn-jurfin@recherche.gouv.fr

Pour être au courant de l'actualité du PCN EIC Pathfinder & Transition :

- Vous avez un réseau pertinent à qui diffuser l'information, devenez relais : Relais Horizon Europe | Horizon-europe.gouv.fr
- Vous souhaitez être informé à titre individuel, inscrivez-vous à la liste de diffusion : Inscription - Liste de diffusion du PCN Pathfinder et Transition | Horizon-europe.gouv.fr

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Franc Mouwen

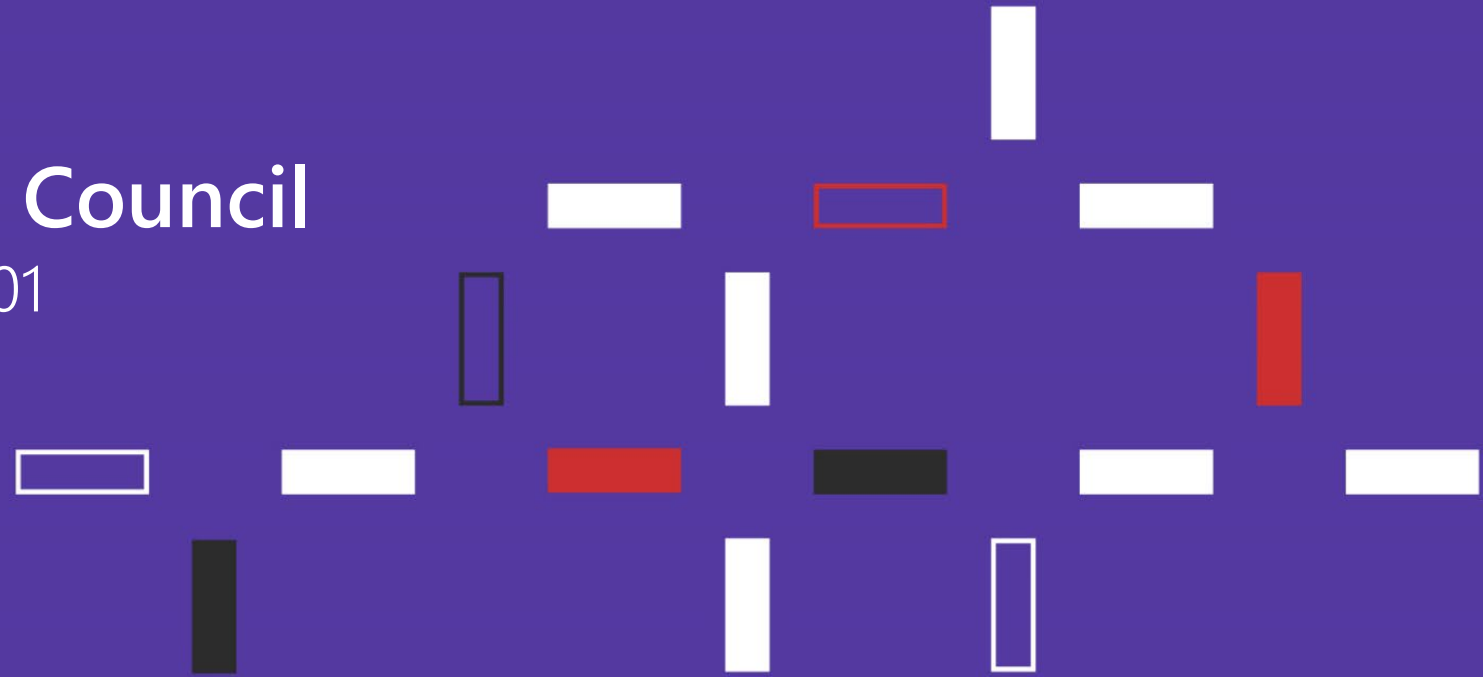
Towards cement and concrete as a carbon sink

European Innovation Council

Backing visionary entrepreneurs

The European Innovation Council

Programme Managers Office, Unit 01



Pathfinder Challenge

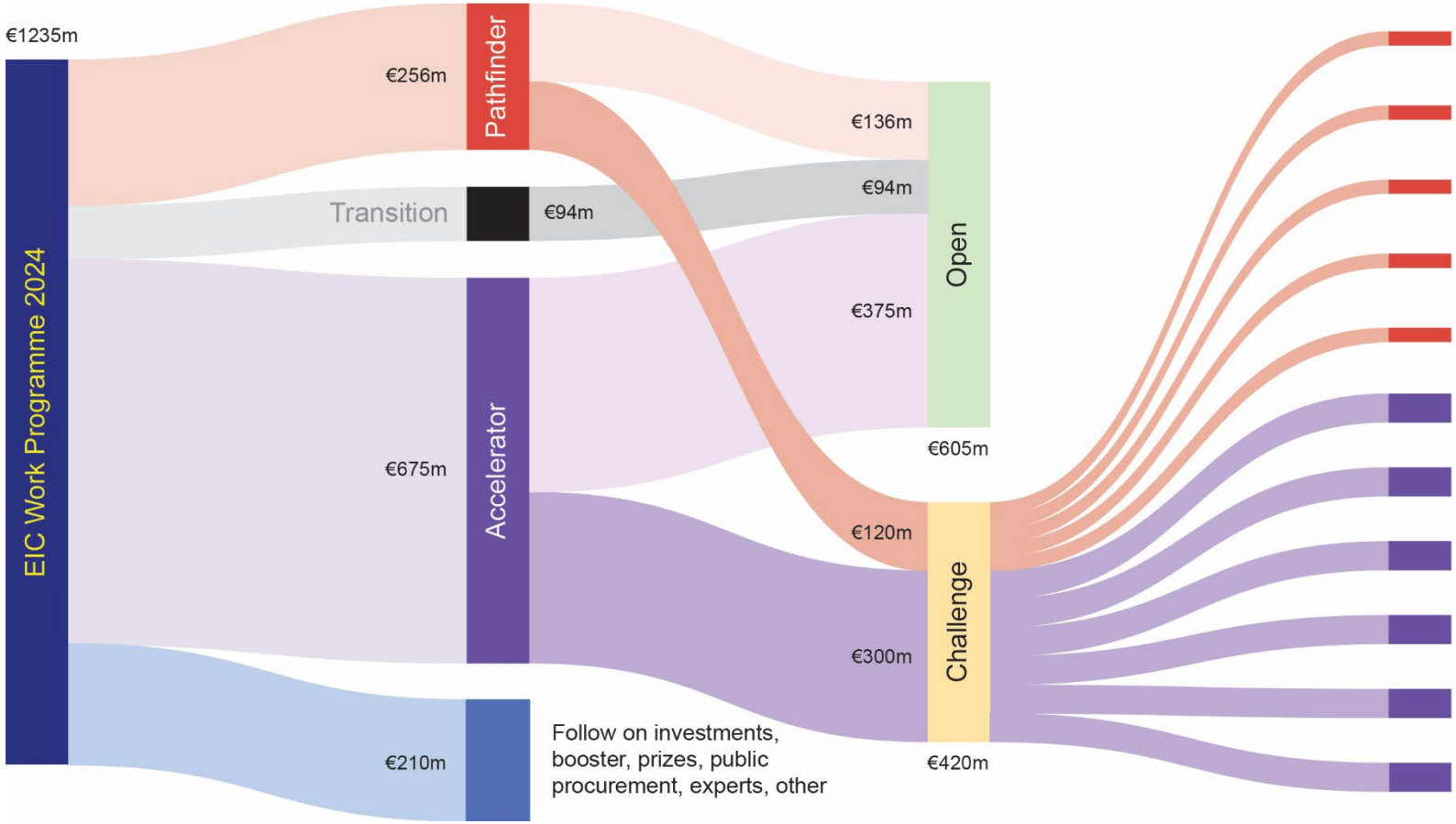
Towards cement and concrete as a carbon sink

Franc Mouwen

EIC Programme Manager

20 March, 2024

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



€24m	P1	"Solar-to-X" devices for the decentralized prosumption of renewable fuels, chemicals and materials as climate change mitigation pathway
€24m	P2	Towards cement and concrete as a carbon sink
€24m	P3	Nature inspired alternatives for food packaging and films for agriculture
€24m	P4	Nanoelectronics for energy-efficient smart edge devices
€24m	P5	Strengthening the sustainability and resilience of EU space infrastructure
€50m	A1	Human Centric Generative AI made in Europe
€50m	A2	Enabling virtual worlds and augmented inter-action in high-impact applications to support the realisation of Industry 5.0
€50m	A3	Enabling the smart edge and quantum technology components
€50m	A4	Food from precision fermentation and algae
€50m	A5	Monoclonal antibody-based therapeutics for new variants of emerging viruses
€50m	A6	Renewable energy sources and their whole value chain including materials development and recycling of components

European Innovation Council

Embedded emissions reductions need a mix of targeted strategies on both supply- and demand side

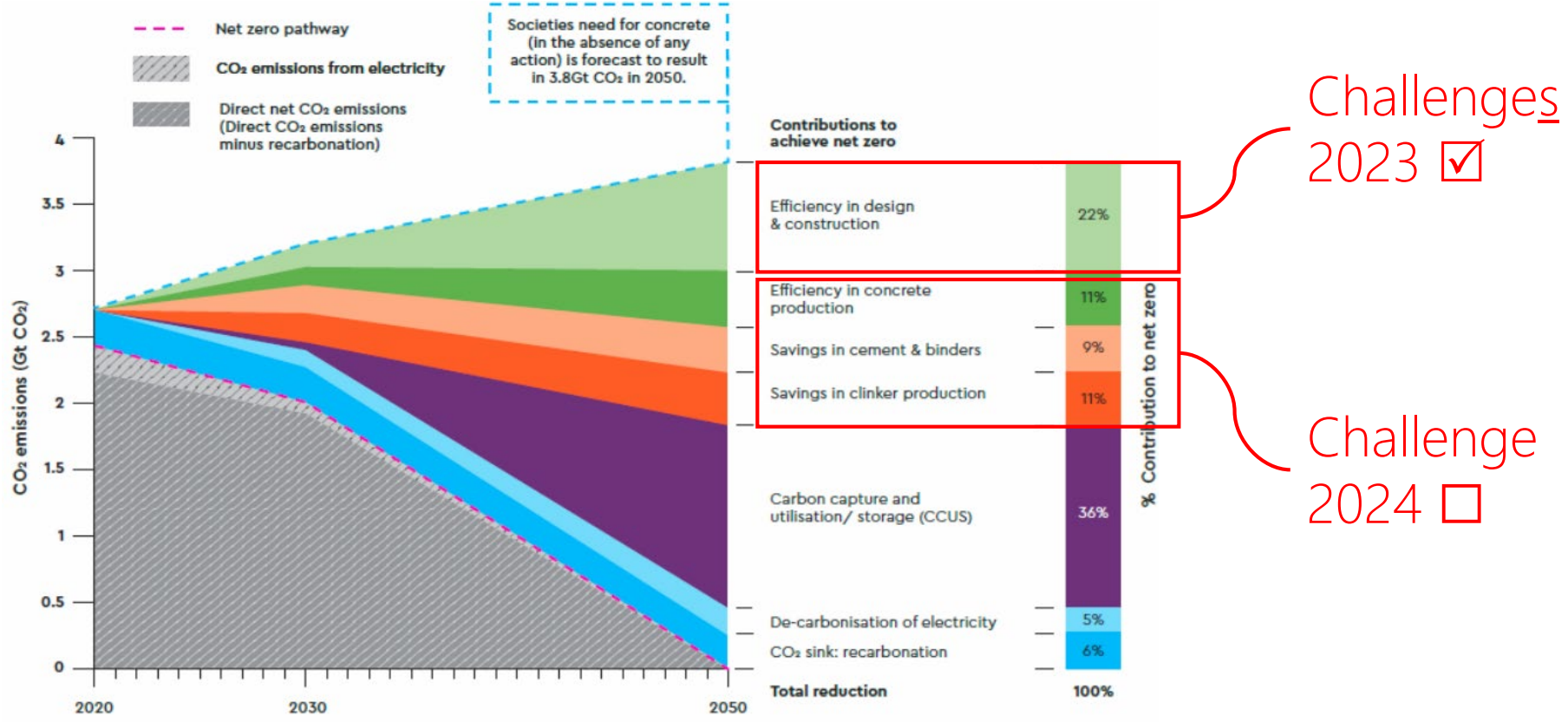
Supply side

Inventory side

Demand side

Source: Block Research Group

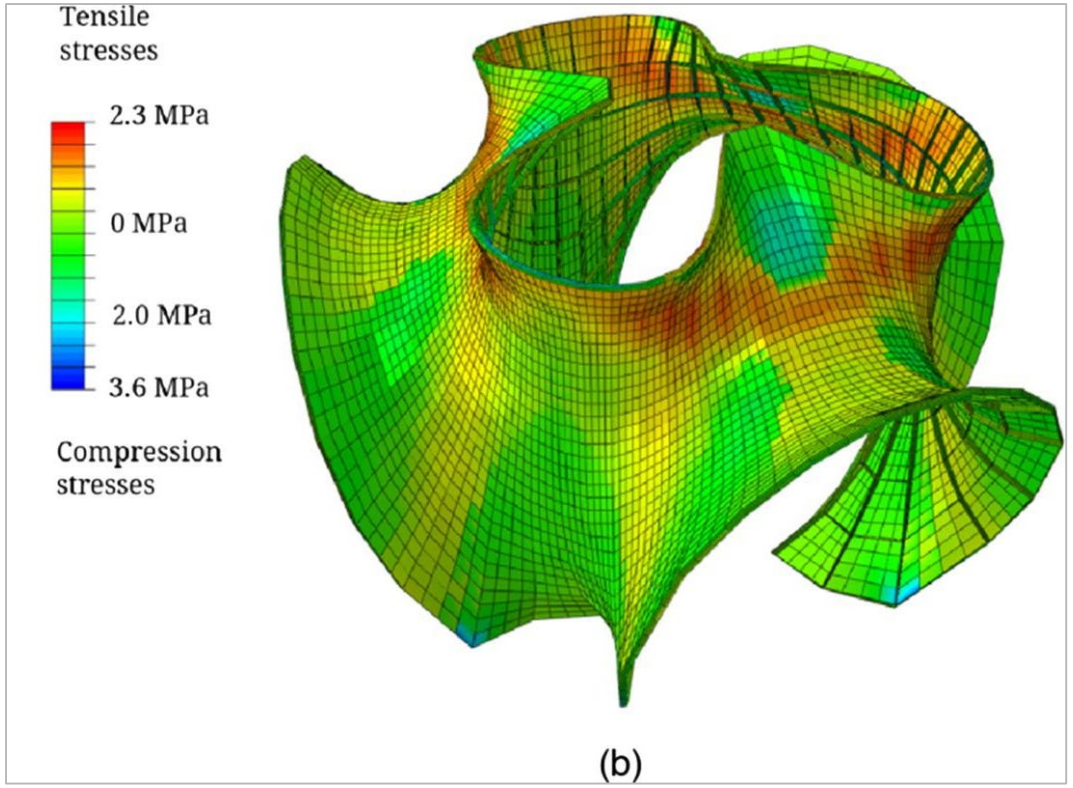
Embedded emissions reductions need a mix of targeted strategies on both supply- and demand side



Source: GCCA

European Innovation Council

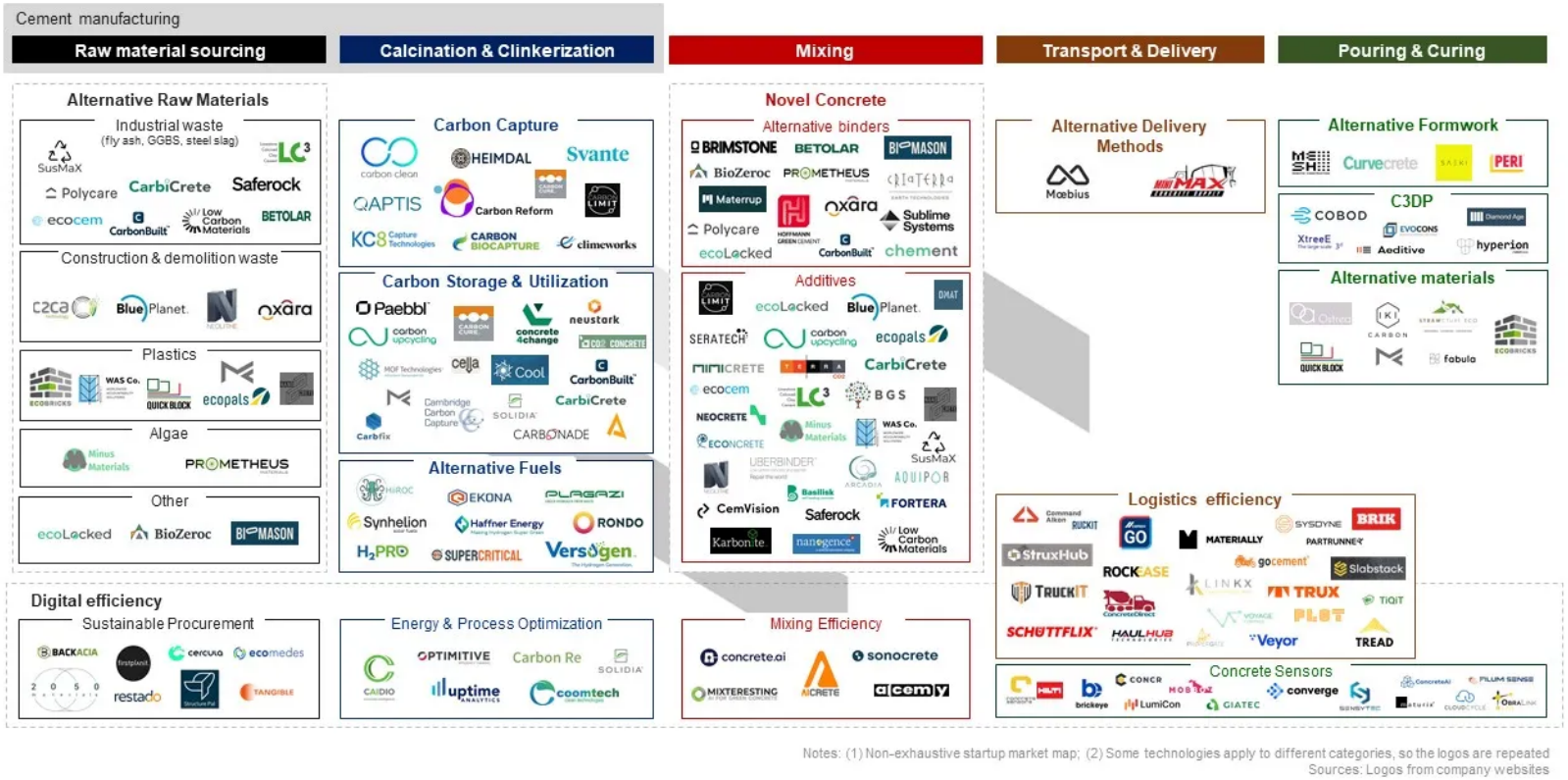
Computational design, digitalized fabrication, to use less or alternative materials (Challenge 2023)



Source: Mariana Popescu TU Delft, BRG

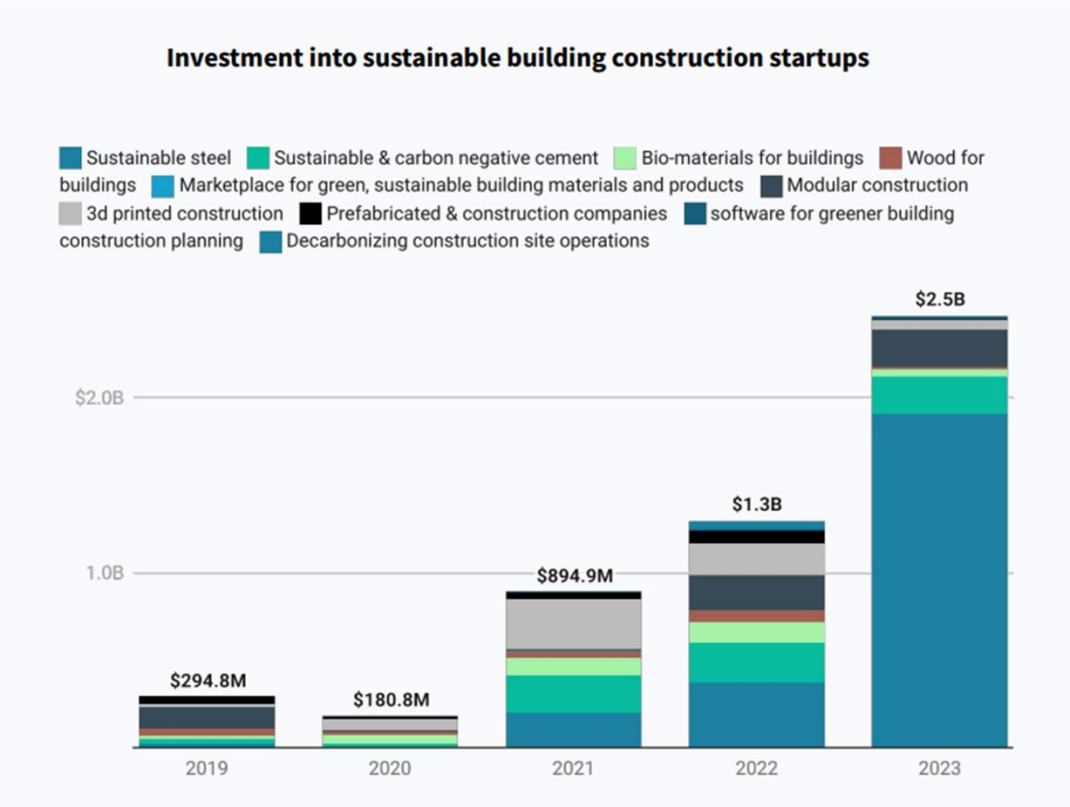

Materrup

Background: startup landscape in “green concrete”



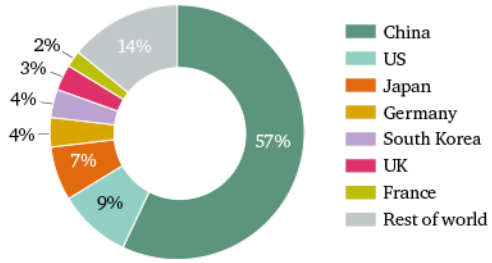
Source: Zacua Ventures

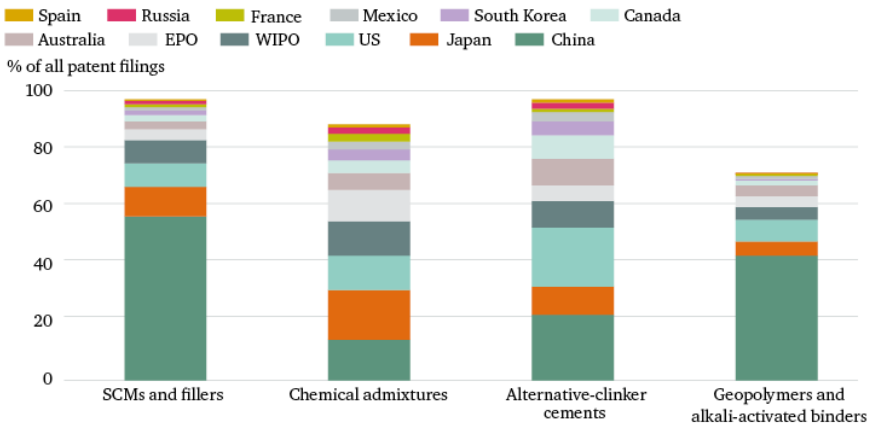
Background: investment in carbon negative cement

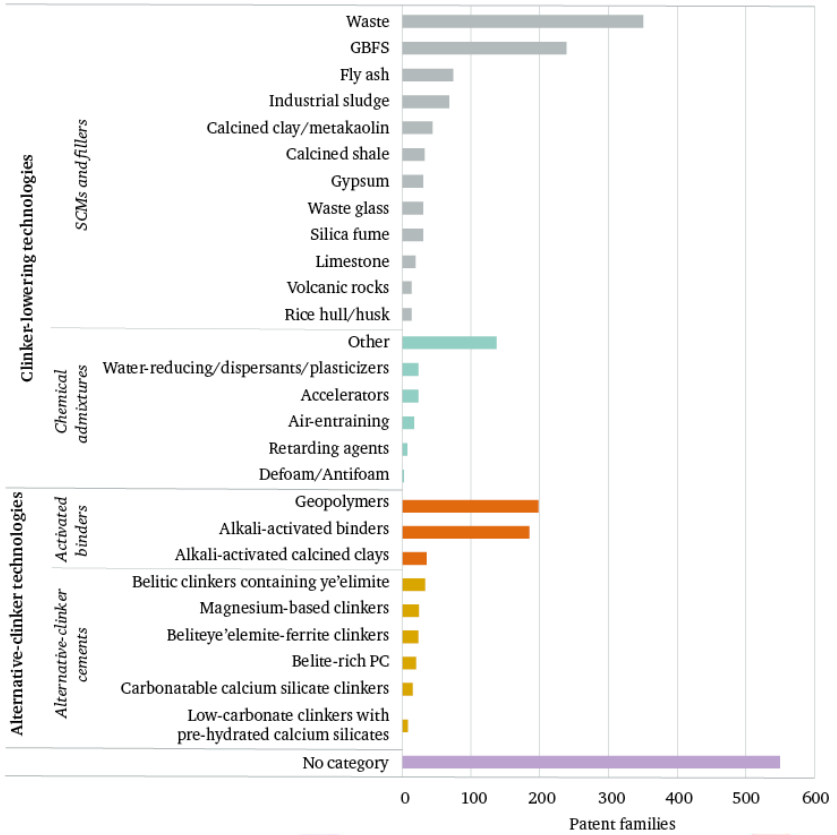


Source: DealRoom

Background: patent landscape (indicative)



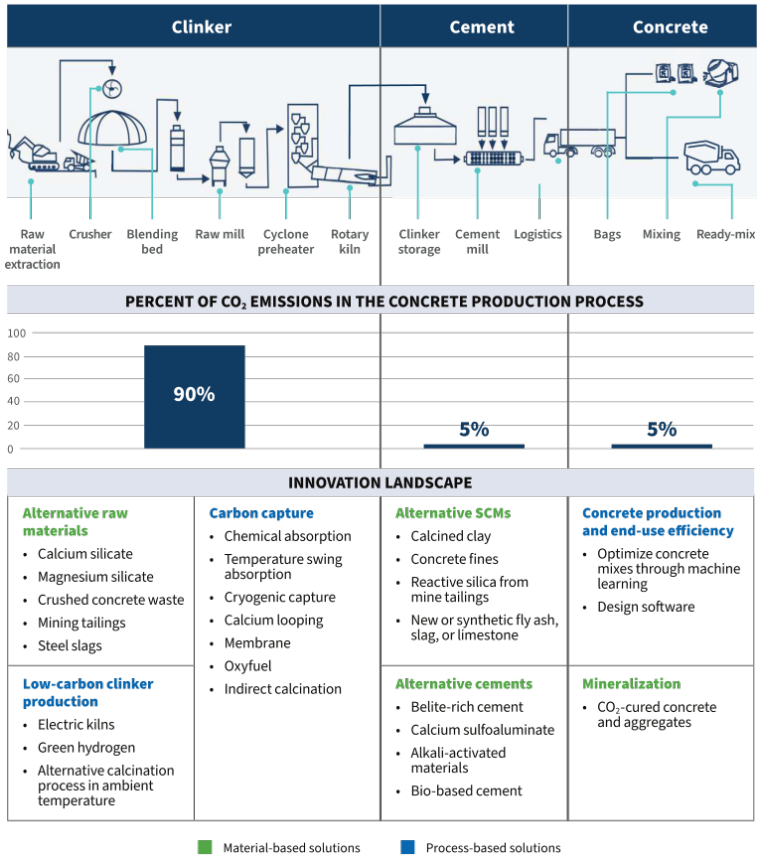




Source: Chatham House -> needs updating!

Background: 3Cs of Innovation in Low-Carbon Concrete

Exhibit 1 **3Cs framework of emerging and alternative technologies in decarbonizing concrete and cement**



Source: Rocky Mountain Institute, 2023

Scope:

Decarbonized and carbon-negative cement and concrete

Important conditions:

- Potential for economical and abundant availability of feedstock at the place of production and consumption
- Potential for scalability and low cost and ease of use also in developing economies
- Meeting or exceeding norms and standards for cement and concrete

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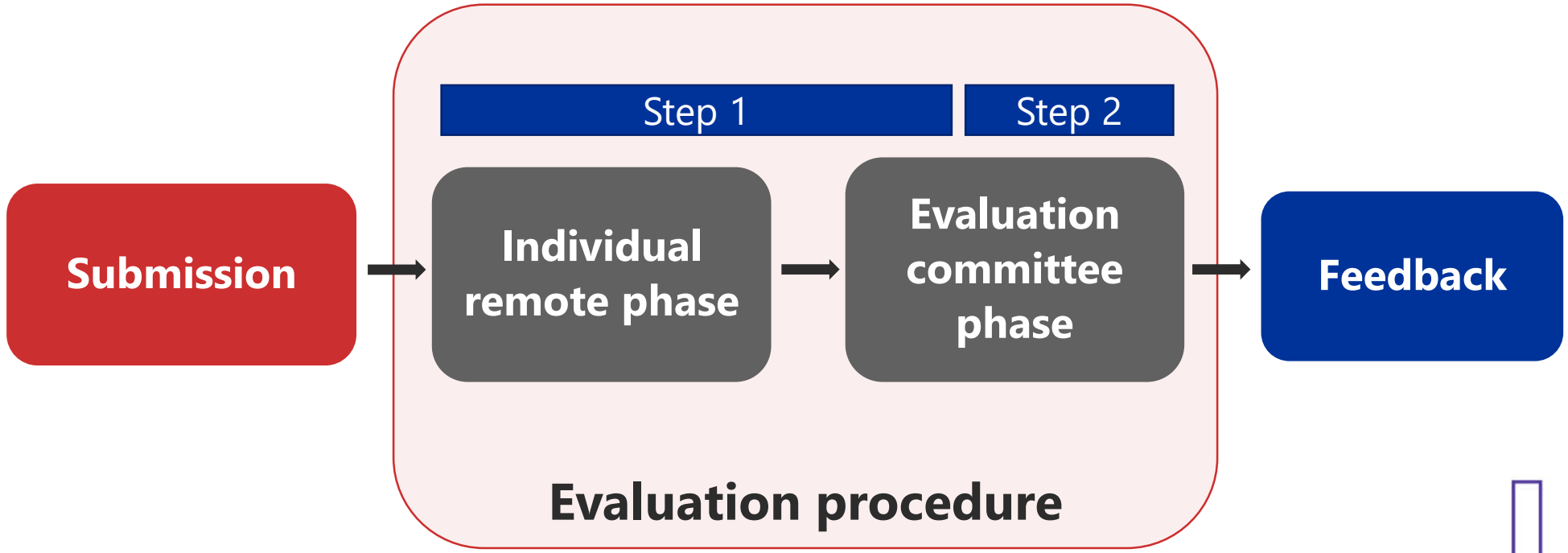
Specific objectives:

1. Alternative binder technologies with alternative low-carbon compounds based on alternative feedstocks
2. More efficient use of clinker in cement (reduce clinker fraction) and/or cement in concrete (binder efficiency)
3. Process energy and emission reduction: negate the need to burn fossil fuels and CO2 emissions (e/g alternative processes)
4. Enabling technologies in support of 1, 2, 3 (computational material science, data-driven science, imaging, etc.)

Expected outcomes and impacts:

- TRL4 (validation in laboratory environment).
- Added value from portfolio collaboration.
- Develop common metrics to compare project results (e/g quantitatively stating the decarbonization potential of the portfolio).
- Techno-economic views on the future implementation, adoption, scaling and commercialization under realistic conditions are encouraged.
- Portfolio to positively contribute to the understanding of compliance to industry norms and standards of novel technologies and innovations.

How does EIC decide if your proposal is funded?



Step 1: Ranking *

Award criteria Pathfinder Challenge 2024		
	Threshold	Weight
Excellence	4/5	60%
Impact	3.5/5	20%
Quality of implementation	3/5	20%

** EIC Work Programme 2024, section II.2 for detailed reference*

Step 2: Portfolio considerations:

- Map against main categories
- Map against sub-categories
- Identify shared components and complementarities
- Preference to balance portfolio towards first objective domain to enhance focus on “Towards cement and concrete as a carbon sink”

Categories	Sub-categories
1. Alternative binders and processes	-> Challenge guide
2. Clinker fraction and binder efficiency	-> Challenge guide
3. Energy and emissions reduction	-> Challenge guide
4. Enabling technologies	-> Challenge guide

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Step 2: Portfolio considerations: sub-categories

Categories	Sub-categories (not exhaustive)
1. Alternative binders and processes	• Alternative binder technologies • Alternative feed-stocks (e/g magnesium rocks, industrial waste, mining waste, etc.) • Carbonation curing technologies
2. Clinker fraction and binder efficiency	• Alternative SCM technologies • Synthetic aggregates (e/g carbon sink aggregates) • Particle size distribution control • Advanced admixtures • Mixture variability control • Novel reinforcement technologies
3. Energy and emissions reduction	• Alternative processes (e/g electro-chemical) • Electrification of high temperature processes • Technologies reducing process temperatures
4. Enabling technologies	• Advances in computational material science • Advances in AI/ML data technologies • Advances in imaging, scanning technologies

Notional Portfolio activities (examples)

- Activities on technology, regulation, innovation strategy, communication, dissemination
- Joint statement of portfolio CO2 reduction potential
- Build a joint understanding and identify gaps in on-going legislative processes (e/g building codes, standards, carbon markets) that are currently barriers to implementation
- Organize workshops, attend conferences for joint dissemination
- Development of common metrics, key performance indicators

Indicative budget and specific conditions:

- Indicative budget: €24m
- Cut-off date: 16 October 2024 at 17:00 Brussels local time
- Up to €4m per proposal, 100% funding rate
- Advised to include a work package dedicated to portfolio activities of at least 10 person-month
- Contact your NCP (National Contact Point)!

Link to EIC Work Programme 2024

European Innovation Council

Link to Info-day recording, slides, Challenge Guide

European Innovation Council

Link to “European Innovation Council online Info Day

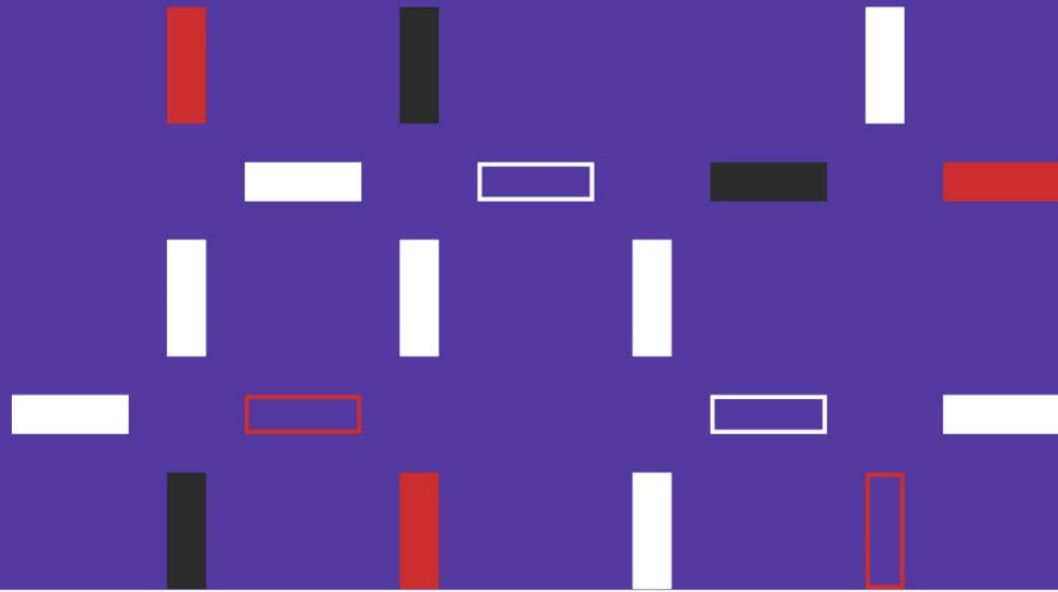
European Innovation Council

Thank you!

https://eic.ec.europa.eu

@EUeic

#EUeic



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Ivan Stefanic

Nature inspired alternatives for food packaging and films for agriculture

Webinar on EIC Pathfinder challenges 2024 for French NCP Network
3rd July 2024

European Innovation Council

Backing visionary entrepreneurs

Nature inspired alternatives for food packaging and films for agriculture
EIC Pathfinder challenge 2024

Ivan Stefanic

EIC Programme Manager for Food Chain Technologies

& Novel and Sustainable Food

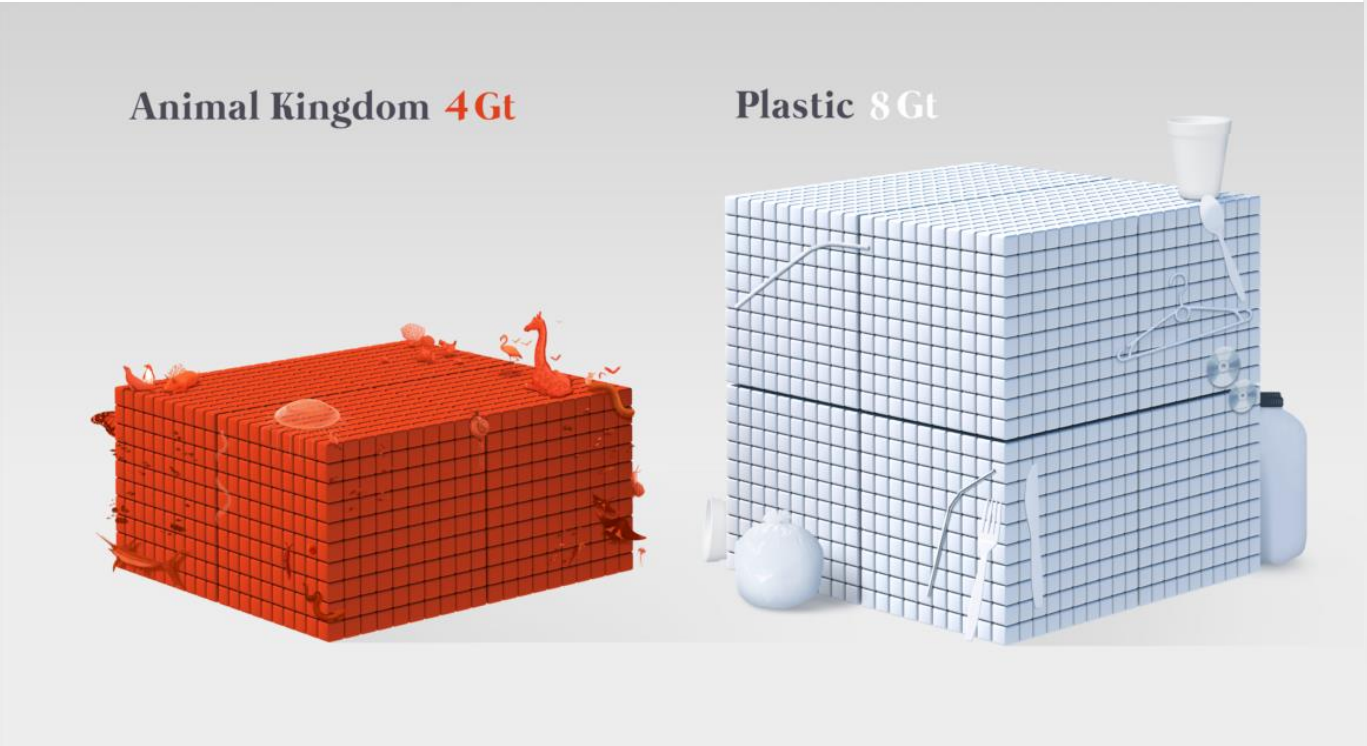
Background(I):

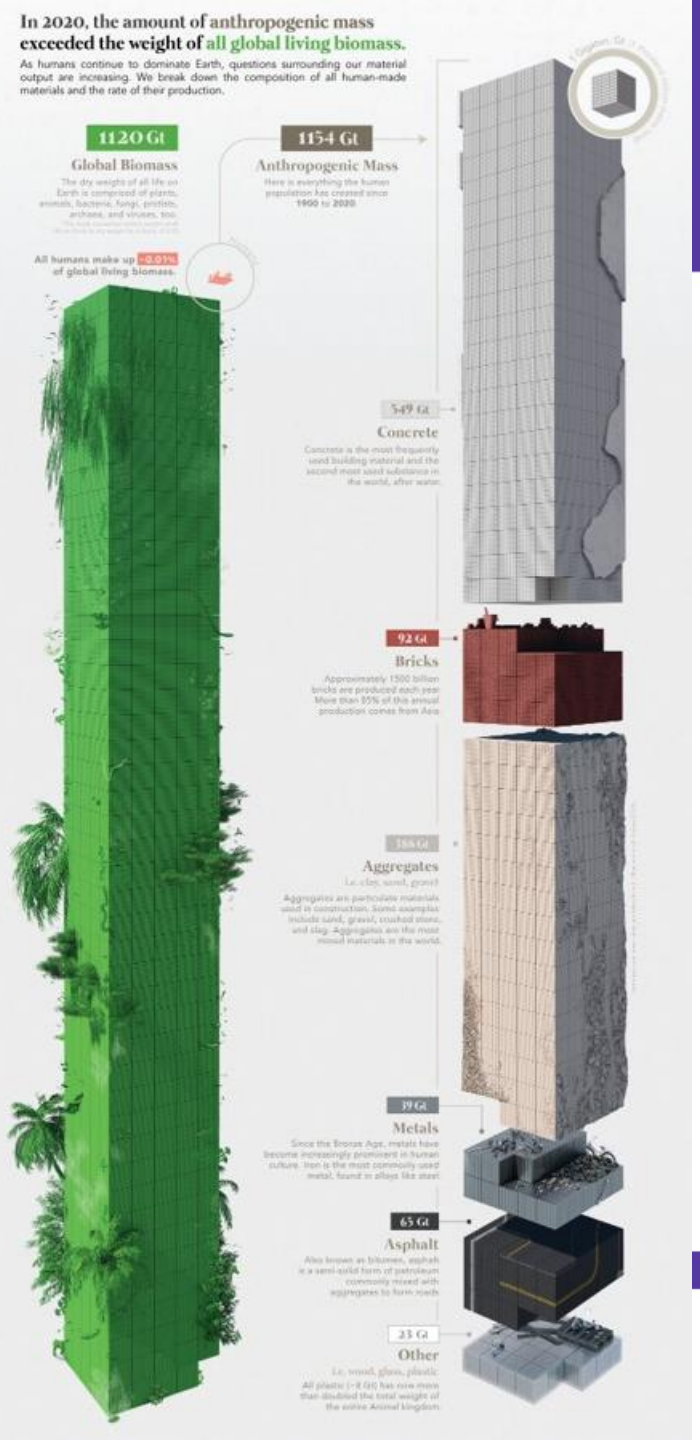
- The food production system is heavily reliant on fossil fuel derived plastics.
- In early stages of the production process, for example in mulch and polytunnel foils and mineral fertilizers coating.
- In latter stages in which food and beverages are packaged to enable food transportation, preservation, hygiene and safety, increasing the lifespan of foods and contributing to safety of foods and the retention of their nutritional content.

Background (II):

- Plastic's low cost, durability, and linear use with low levels of recycling is the source of numerous environmental challenges that impact whole ecosystems particularly at the end of life.
- These environmental impacts are further accentuated by coating agents and formulation additives that deliver a range of functional properties.
- These additives can in turn leach out into the surrounding environment including air, water, food or animal and human body tissues, in particular during biodegradation.

Why this challenge?





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Why this challenge?

European Innovation Council

Some leachable chemicals used in plastic include [1] [2] [3] :

- Bisphenol A (BPA)
- Polybrominated diphenyl ethers (PBDE)
- Phthalates

These chemicals are known as **endocrine-disrupting compounds (EDCs)** [2] [3] . They can leach out of the plastic and into the food and beverages we eat [4] . Some of these chemicals have been linked to health problems such as metabolic disorders (including obesity) and reduced fertility [4] .

Why this challenge?

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KEY ASPECTS

1 Regulate plastic chemicals comprehensively and efficiently

- Implement a hazard- and group-based approach
- Set criteria to identify chemicals of concern
- Phase out priority groups and Red List chemicals
- Prioritize Orange and Grey List chemicals for data collection and assessment

16 000+
Chemicals known for use in plastics

4000+
Known to be hazardous

<6%
Subject to global regulation

Table 5: Comparison of the number of chemicals listed, evaluated, and identified as hazardous in PlastChem and the previous databases.

Source	All chemicals with CASRN	Chemicals on hazard lists[a]	Chemicals with hazard data	Hazardous chemicals
Wiesinger at al. (2021)[103]	10 547	6400	Not analyzed	2486
UNEP Technical Report (2023)[2]	>13 000	7000	Not analyzed	>3200
Aurisano et al. (2021)[105]	>6000	1463	Not analyzed	590
PlastChem	**16 325**	**10 153**	**5599**	**4332**
		3437 (recognized)	**2669** (recognized)	**2131** (recognized)
		6715 (identified)	**930** (identified)	**2201** (identified)

Note: [a] This means that some chemicals present on a list of hazardous chemicals do not have associated hazard data. Consequently, some of the sources overestimate the number of chemicals that have been assessed for their hazards.

ENDOCRINE DISRUPTING CHEMICALS: THREATS TO HUMAN HEALTH

PESTICIDES, PLASTICS, FOREVER CHEMICALS, AND BEYOND

February 2024

Authors:
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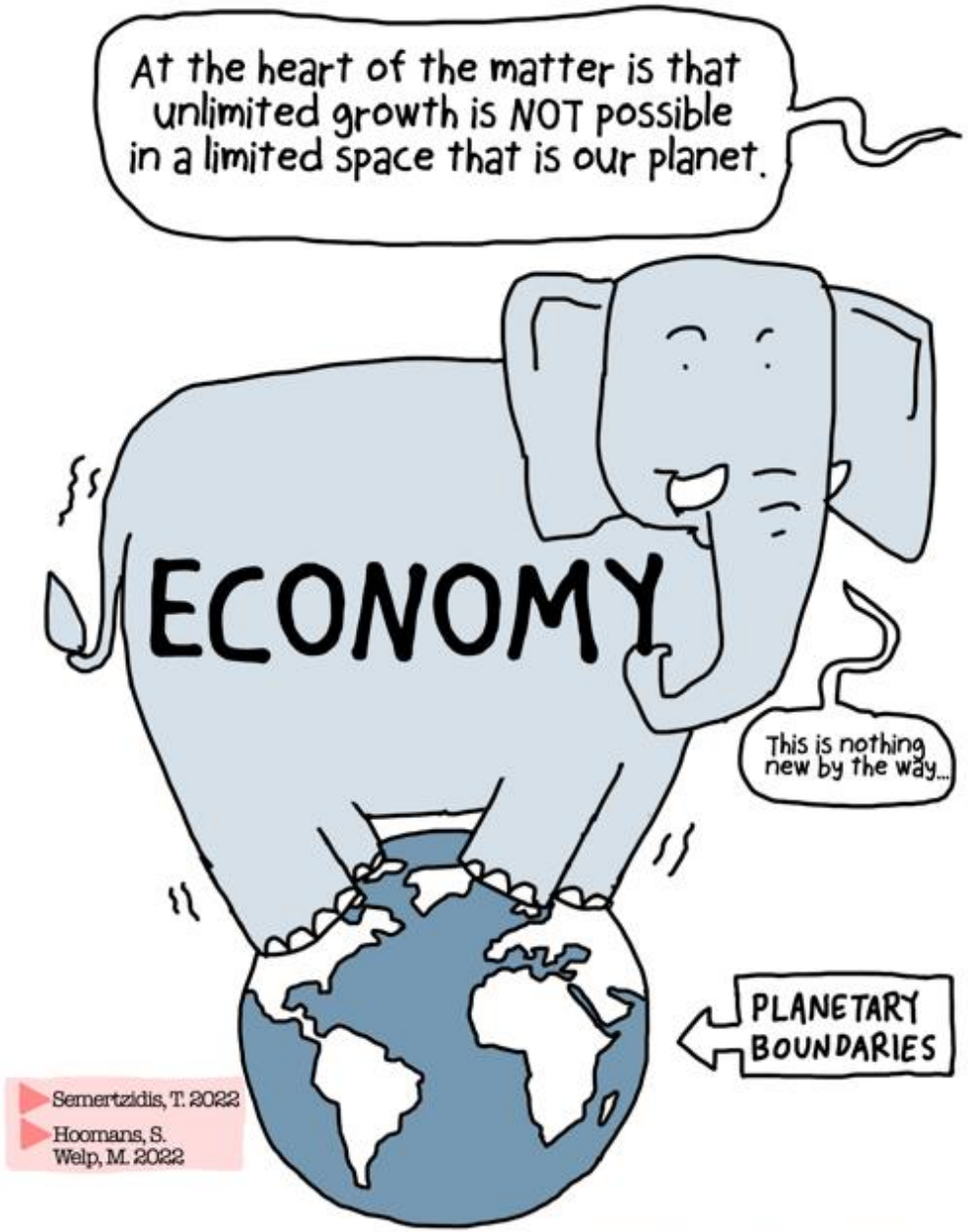
Michele A. La Merrill, Ph.D.
Heather Patisaul, Ph.D.
Robert M. Sargis, M.D., Ph.D.



Club of Rome 1972:

"The global system of nature in which we all live – probably cannot support present rates of economic and population growth much beyond the year 2100, if that long, even with advanced technology."

Pathfinder 2024: Nature inspired alternatives for food packaging and films for agriculture

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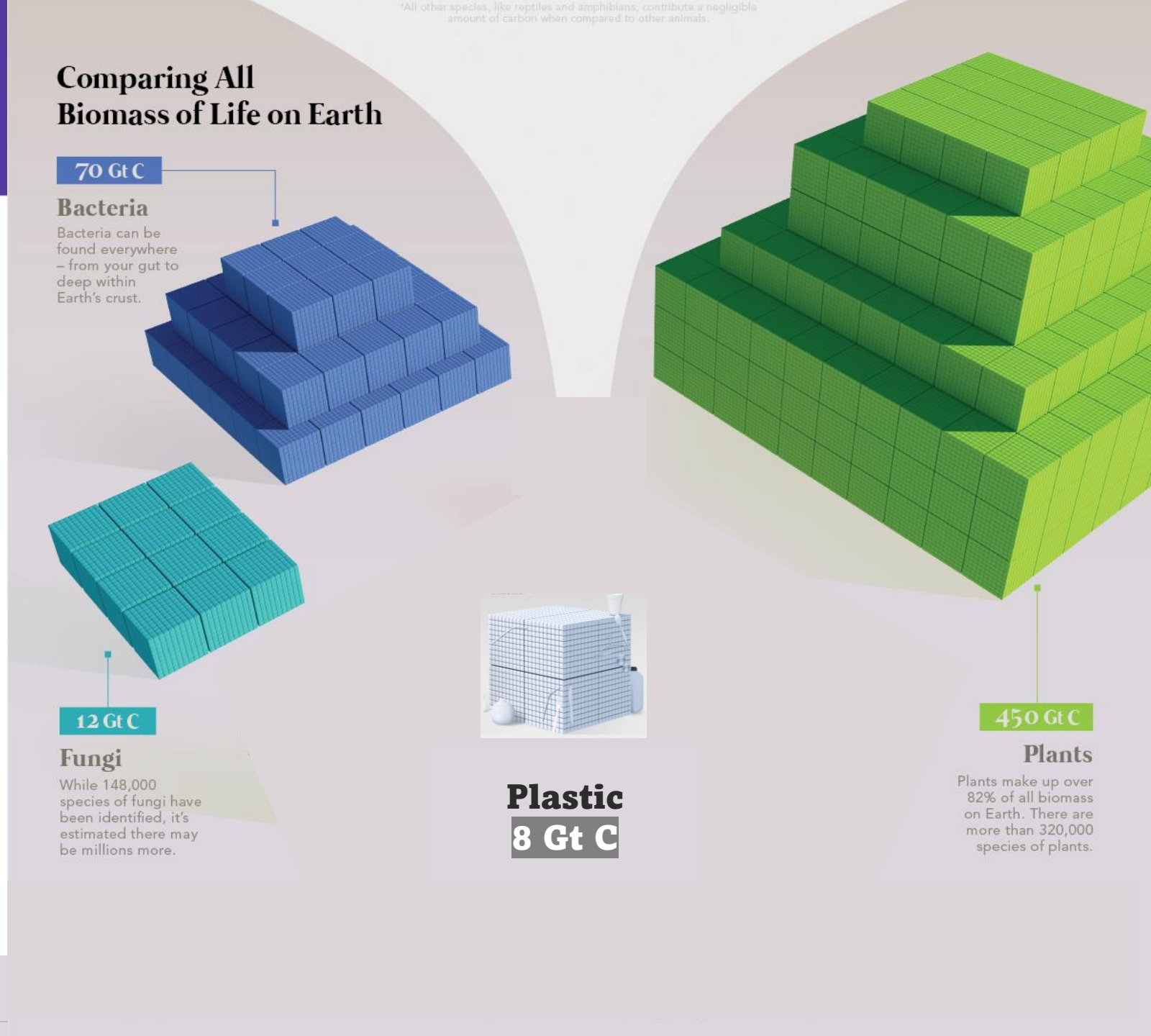
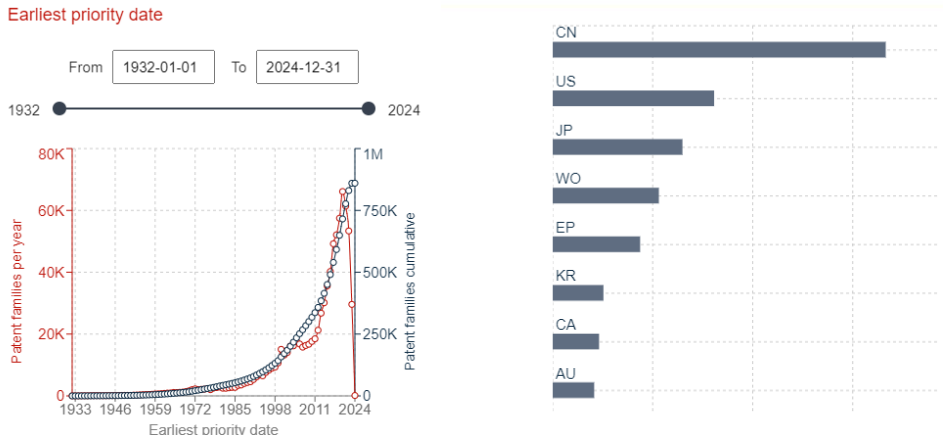
Why this challenge?

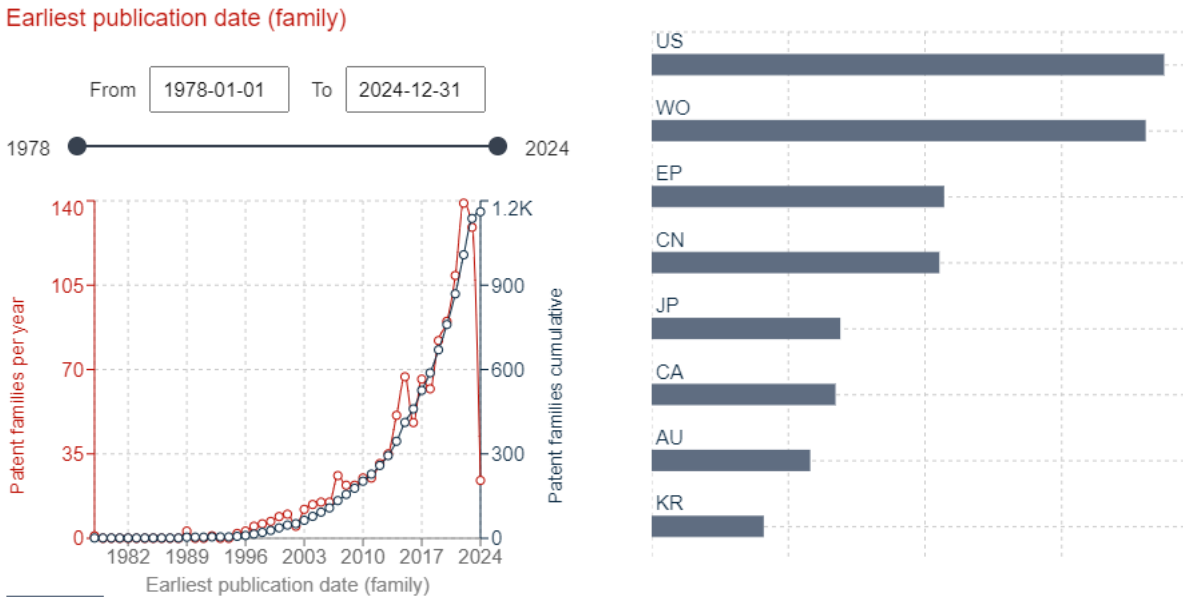


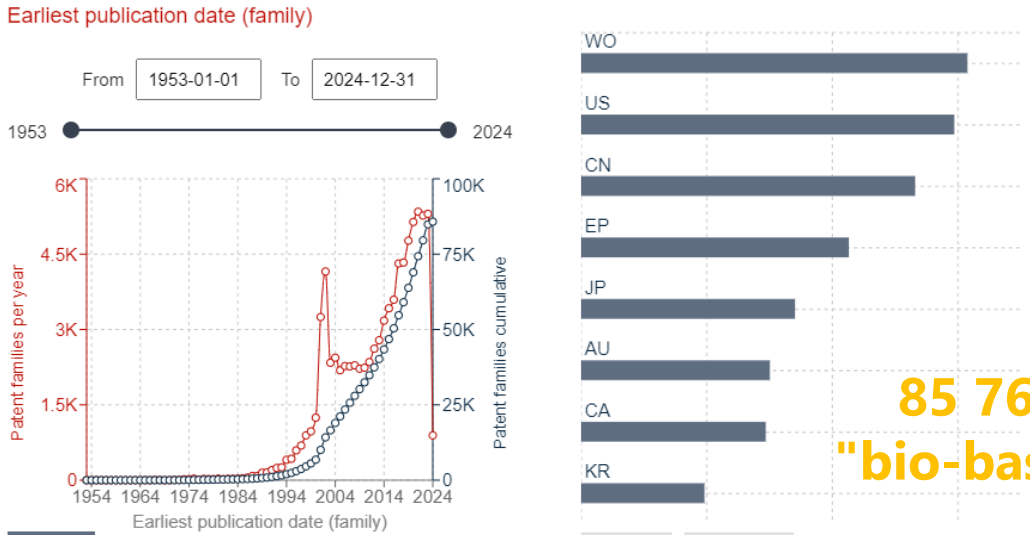
Why this challenge?

European Innovation Council



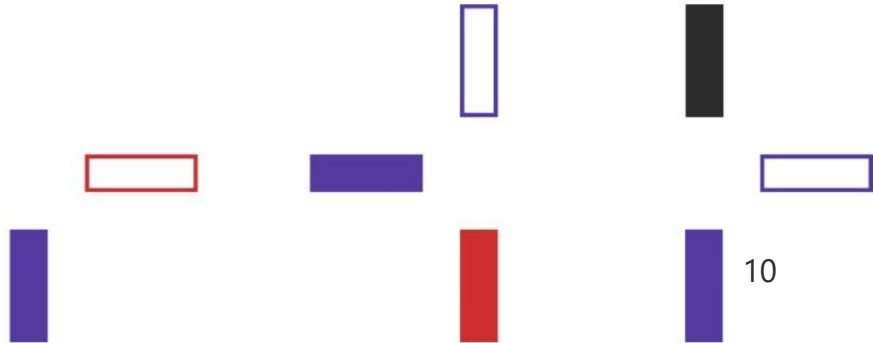
859.963 results found for:
"plastic" AND "packaging"





1.161 results found for:
"bio-inspired" AND "packaging"

85 767 results found for:
"bio-based" AND "packaging"



Scope (I):

- This Pathfinder Challenge aims to support ambitious interdisciplinary research that will lead to the **development and production of sustainable nature inspired alternatives** for food packaging and agricultural production.
- These materials must have a reduced environmental impact, through design and production, while delivering the functional characteristics of plastics.

Scope (II):

- Proposals should look to bring forward ideas that span the product lifecycle from the development of novel sustainable materials, their design and production through to end of life, while maximising the time and extent of use.
- Abundant, naturally occurring materials that display properties to be optimized for food related applications with a reduced environmental footprint in production including in extreme environments, are encouraged.

Specific objectives (I):

- The Challenge seeks **groundbreaking proposals** with the capacity to replace the use of fossil-carbon-based plastics from farm to fork.
- These alternatives shall be circular, safe and sustainable by design and allow for reusability, recyclability and full biodegradability

Specific objectives (II):

- Proposals must look to address one or more of the current uses of plastics in the food system such as but not limited to:
  - food packaging materials
  - films for agriculture
- By utilising bio-based sources and raw materials such as:
  - polymers extracted from nature (e.g., cellulose, chitin, lignin, keratin)
  - natural polymers (e.g., microbial, fungal and plant materials)
  - synthetic polymers from biobased materials

Specific objectives (III):

- Proposals are expected to consider **regulatory aspects** in the development and incorporation of chemical additives that can deliver high sanitary standards for contact with food.
- The additives must be formulated in a way to meet set of biodegradability criteria and the assessment of the ability of the products to fully biodegrade in natural soil and aquatic environments across the EU.

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Specific objectives (IV):

- All projects must demonstrate at least preliminary evidence of an improved cradle-to-gate and cradle-to-grave lifecycle assessment, when compared to fossil carbon derived plastics and current additives.
- This lifecycle assessment must take account of environmental, social and economic considerations. The resulting materials and associated processes must over their lifecycle:
  - Reduce energy consumption and the carbon footprint
  - Reduce water consumption and associated environmental footprint
  - Enhance biodegradability, compostability or reusability

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Specific objectives (V):

- Proposals must also include one or more **enhanced functional characteristics** for use in the food value chain while minimising or potentially eliminating the harmful effects with a view to:
  - increasing shelf life and retaining the nutritional properties of packaged food, and
  - enhancing the productivity and functionality of agricultural films
- This could include the use of smart functionalities in responding to environmental conditions and the use of biodegradable electronic features.

Specific objectives (VI):

- Irrespective of starting point, the resulting outputs of the projects must be shown to be effective for their intended application with, at the very least, a lab-based demonstrator i.e., **reach TRL 4 or above**.

Expected outcomes and impacts (I):

- The projects selected under this Challenge are expected to collectively provide a portfolio of environmentally friendly materials and use cases informed by availability, efficiency and end functionality.

Expected outcomes and impacts (II):

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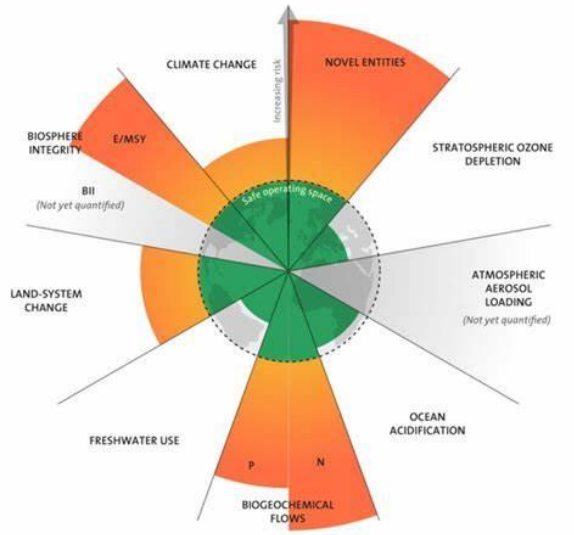
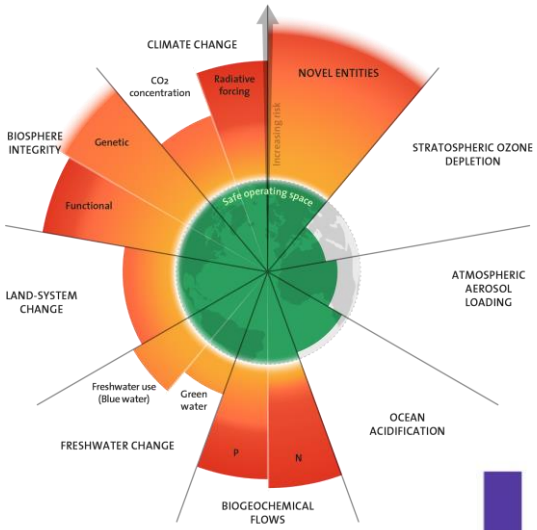
- The successful implementation of these Challenge projects will lead to a paradigm shift in the food and agriculture sector.
- In the medium-term that woud be the **development of a new group of nature-inspired materials** that are commercially viable, environmentally sound and support moves towards a more circular, resource efficient and environmentally sustainable economy.

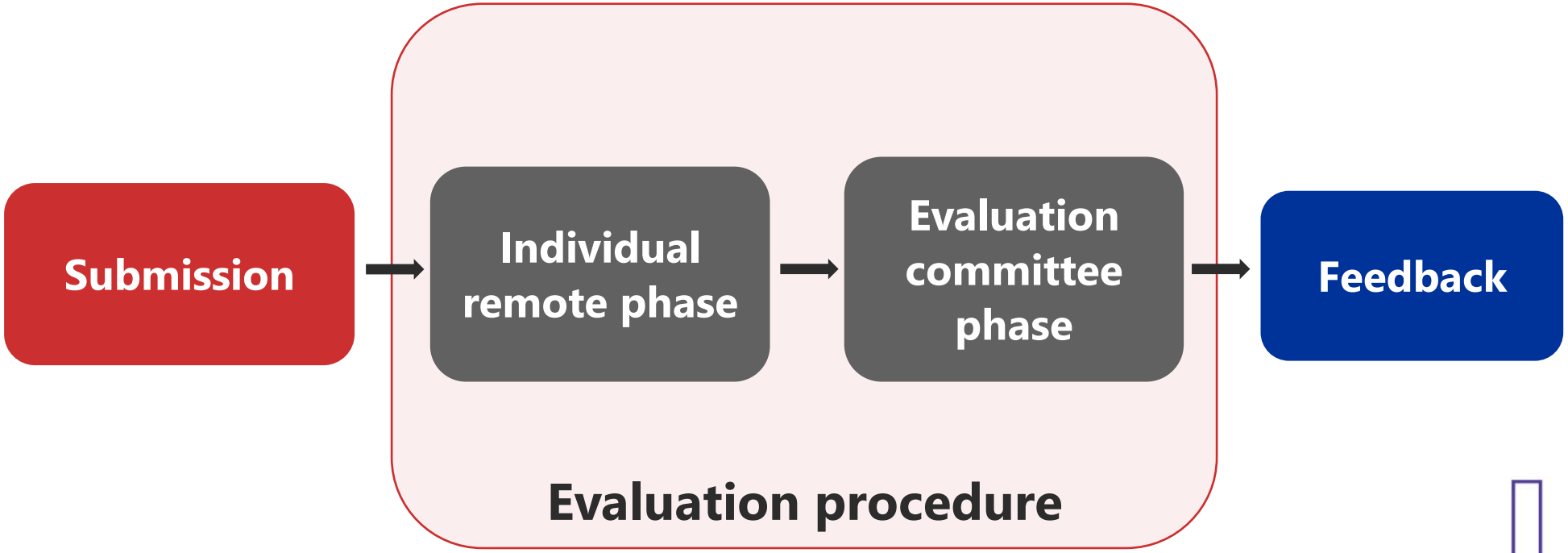


Rockstrom et all, 2009



"Azote for Stockholm Resilience Centre, based on analysis in Richardson et al 2023".

Information relevant to Step 2 evaluation



Portfolio considerations (I)

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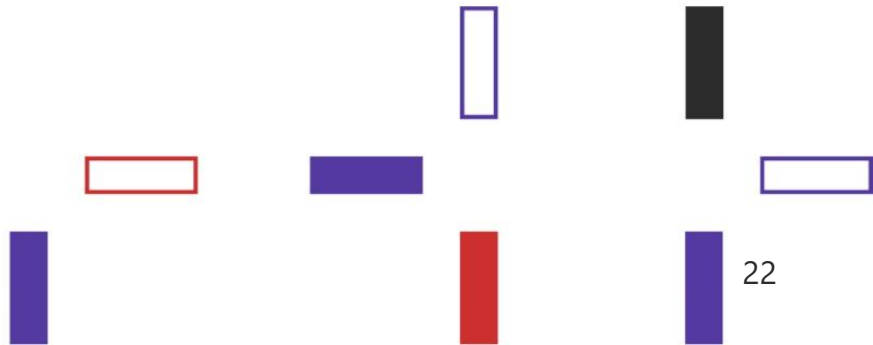
CATEGORY	SHARED COMPONENTS
1. Bio-based sources and raw materials	i. Polymers extracted from nature (e.g., cellulose, chitin, lignin, keratin). ii. Nature-inspired polymers (e.g., through synthetic biology, microbial, fungal and plant materials). iii. Synthetic polymers from biobased monomers and raw materials.



Portfolio considerations (II)

European Innovation Council

CATEGORY	VALUES/COMPONENTS
2a. Food packaging materials regarding their properties	a) different mechanical properties (rigid, semi-rigid, flexible) b) different thermal properties (e.g., exposure to heating or cooling during transport/storage) c) different wetting properties (wettability toward water, from hydrophilic to highly hydrophobic) d) different barrier properties toward different gases (porosity and free volume control for gas diffusion minimization/maximization) e) different properties regarding visible light transmission (transparent, non- transparent) f) different structural function (e.g., standalone, inner/outer coating layer)

Portfolio considerations (III)

CATEGORY	VALUES/COMPONENTS
2b. Films for agriculture	a) Films for polytunnels b) Films for mulch

Portfolio considerations (IV)

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- The portfolio aims to cover a wide range of possible uses in the food system.
  - While building the portfolio, an emphasis will be given on proposals covering the application in food packaging.
  - Projects with strong capacity for use beyond food and agriculture (e.g. packaging for pharmaceuticals) will also be encouraged and prioritised.
- Within and among these areas, the evaluation committee will look at shared components or potential complementarities among the projects
- Funded projects will work together on development of a robust approach to measure the lifecycle impacts.

Proactive portfolio management

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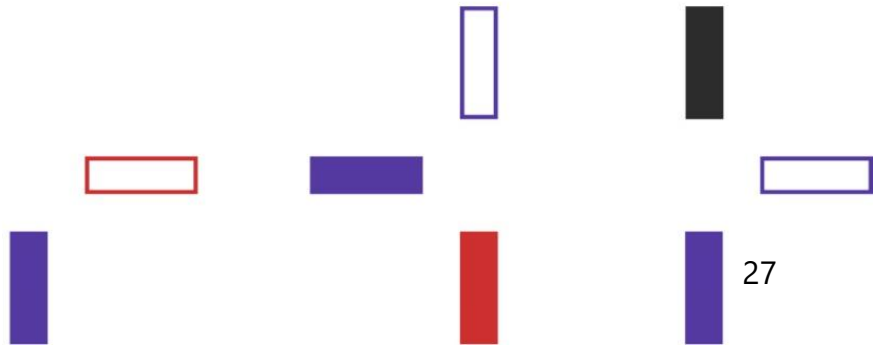
- Technological:
  - Project A and B compare results, and need to develop benchmarks
  - Project C uses results of Project D
  - E and F carry out additional research work together to gain useful knowledge, for instance for life-cycle-analysis
- Regulatory:
  - Are there any obstacles which make it impossible at this moment to use the project results on the market? How can this be addressed by the time the innovation reaches the market?
- Exploitation:
  - What are different ways of exploiting research results
  - Who is interested in the technologies? Build stakeholder networks
  - Common dissemination actions

What we want - Principles

Agri-food Challenge Proposals are defined

- using holistic approach,
- using life-cycle approach,
- to foster the EU technological autonomy and leadership,
- with an account of EU strategic plans and relevant initiatives.
  - EU Soil mission
  - EU Green Deal,
  - Farm to Fork strategy,
  - Fit for 55, and
  - REPowerEU policy actions.



What we don’t want - Long-term detrimental effect

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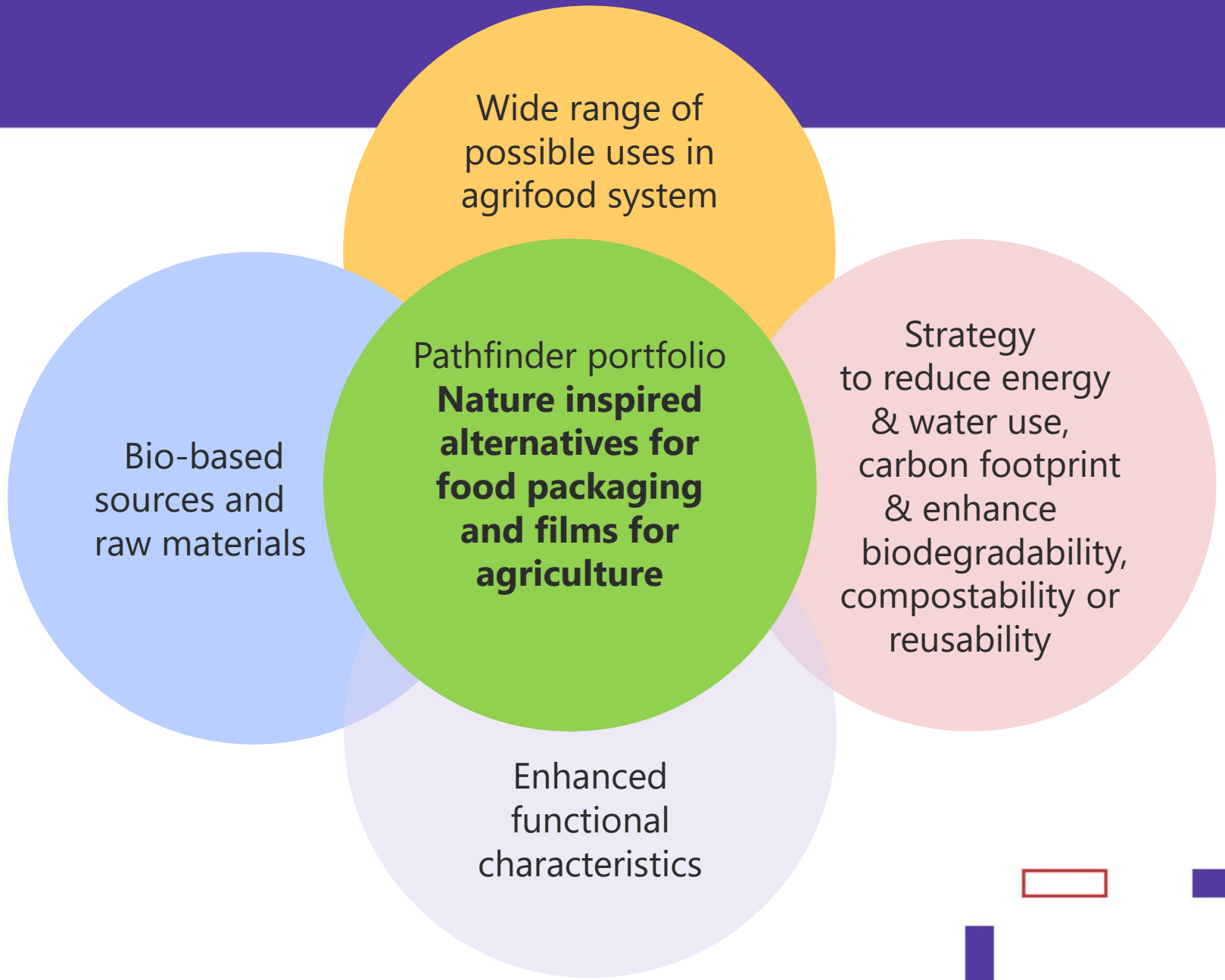
- Dichlorodiphenyltrichloroethane was first synthesized in 1874 by Othmar Zeidler under the supervision of Adolf von Baeyer (recipient of the **Nobel Prize** in Chemistry in 1905).

- Swiss chemist Paul Hermann Müller discovered the high efficiency of Dichlorodiphenyltrichloroethane as a contact poison against several arthropods in 1939 and was awarded the **Nobel Prize** in Physiology or Medicine in 1948 for that.
- From 1950 to 1980, was extensively used in agriculture as Anofex, Cezarex, Chlorophenothane, Dicophane, Dinocide, Gesarol, Guesapon, Guesarol, Gyron, Ixodex, Neocid, Neocidol and Zerdane. More than 40,000 tonnes each year worldwide, in total more than 1.8 million tonnes have been produced globally since the 1940s.
- In the 1970s and 1980s, agricultural use was banned in most developed countries, beginning with Hungary in 1968, USA in 1972, UK in 1984.
- The story of DDT


Wide range of possible uses in agrifood system
Bio-based sources and raw materials
Pathfinder portfolio
Nature inspired alternatives for food packaging and films for agriculture
Strategy to reduce energy & water use, carbon footprint & enhance biodegradability, compostability or reusability
Enhanced functional characteristics

Budget and application deadline

European Innovation Council

- Indicative budget: €24 million
- Grant size: up to €4 million
- The funding rate of this grant is 100% of the eligible costs.
- Work Package on portfolio activities: 10 person-months
- Application deadline: 16 October 2024 at 17:00 Brussels local time

4 million € question

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European Commission | CORDIS EU research results

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HORIZON 2020

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ID: 723365

From: 1 May 2017 to: 31 July 2021

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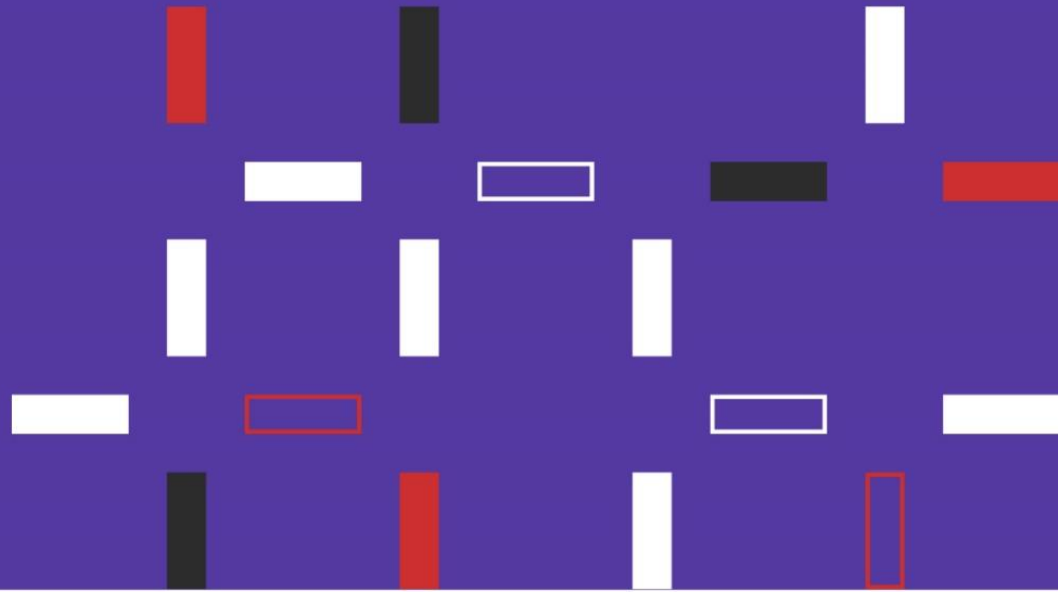

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Pascal Xavier

Cordinateur du projet “DESIRE4RU”

Pathfinder Challenge 2023 “ Sustainable Electronics”

DESIgning and REcycling sustainable Electronic boards for a EUropean circular economy

HORIZON-EIC-2023-PATHFINDERCHALLENGES-01-04

European Innovation Council

Funded by the European Union

Challenge « responsible electronics »

Global objective: DESIRE4EU aims at revolutionize the life-cycle of electronic devices by introducing **bio-based processes and materials** both in their **design, fabrication and end-of-life** phases in order to get **fully circular and sovereign European electronics value chains**.

8 partners – 4 years – start date: 1st September 2024 – 4M€

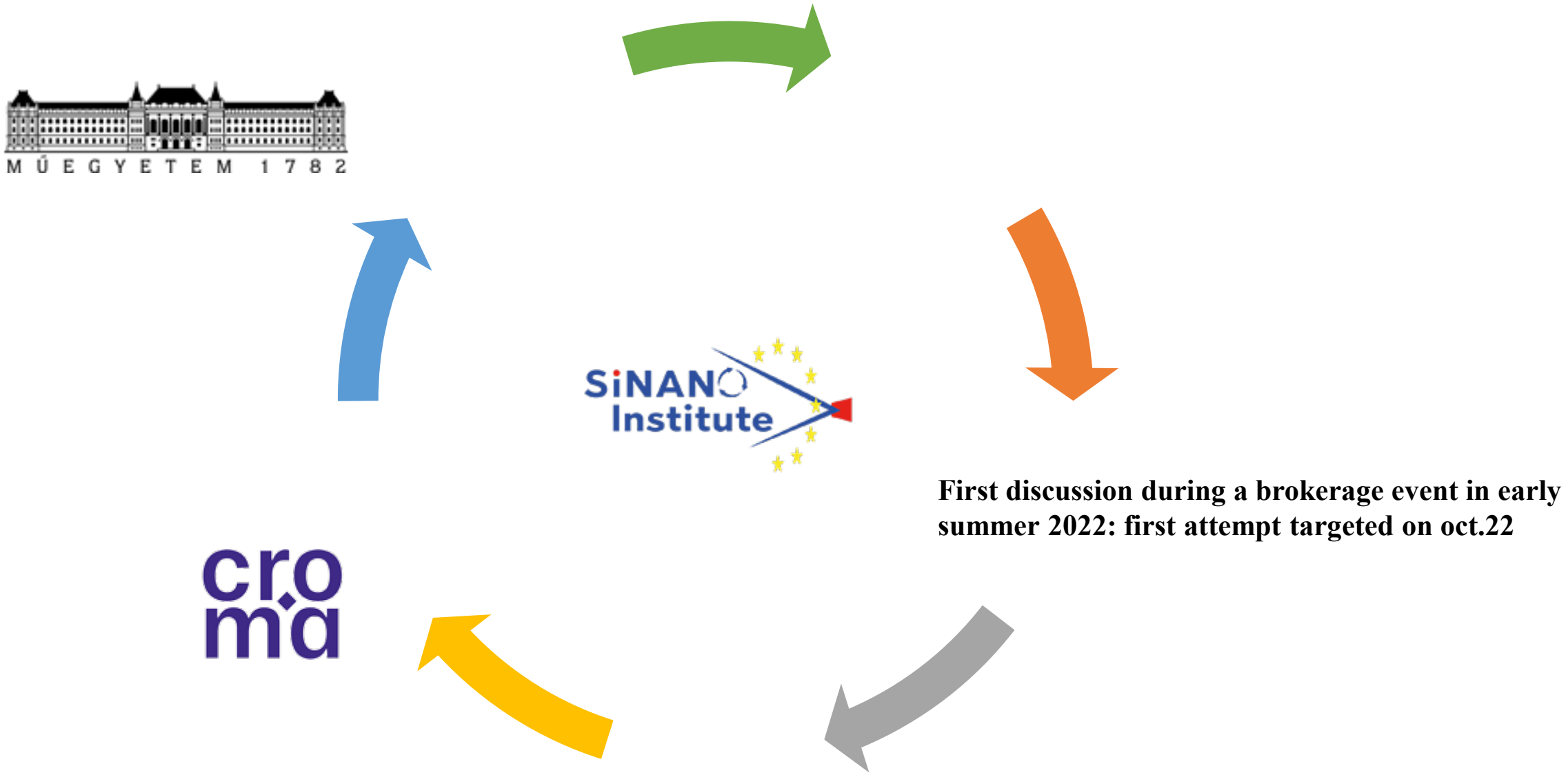
Funding from the 2023 MRSEI program

- → DRIVE support and ANR meetings
- → Help from a consultancy agency (Wavestone)

AGENCE NATIONALE DE LA RECHERCHE ANR

4 SMART specific objectives O(x)

O(1): Deliver TRL4 industrially credible bio-based multilayer PCB circuits (WP2 and WP4)
O(2): Time-efficient eco-friendly bioleaching process (WP3)
O(3): Enabling circularity by design (WP3 and WP4)
O(4): Demonstrator as a proof-of-concept (WP4, WP5 and WP1)



First discussion during a brokerage event in early summer 2022: first attempt targeted on oct.22


MESHINING ENGINEERING
MŰEGYETEM 1782
First attempt withdrawn: no big company on board
SiNANO Institute
AB Chimie
PCB's protection
UCLouvain
G2Elab
Grenoble Génie Électrique
Grenoble Electrical Engineering
croma
IGE
CERAG
Université Grenoble Alpes
GRENOBLE INP UGA
GRENOBLE INP ENTREPRISE


AB Chimie
PCB's protection
ALBA PCB
GROUP
MŰEGYETEM 1782
SiNANO Institute
ARDUINO
UCLouvain
Second attempt: EIC pathfinder open on march 23 + application for ANR MRSEI: both failed but interesting ESR
GRENOBLE INP UGA
G2Elab
Grenoble Génie Électrique
Grenoble Electrical Engineering
croma
CERAG
Université Grenoble Alpes
IGE
GRENOBLE INP ENTREPRISE
MESHINING ENGINEERING


AB Chimie
PCB's protection
ALBA PCB
GROUP
MŰEGYETEM 1782
SiNANO Institute
MRSEI OK (3rd wave 23)
+ 3rd attempt: EIC
pathfinder challenge on
oct. 23: success!
ARDUINO
UCLouvain
GRENOBLE
INP
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IGE
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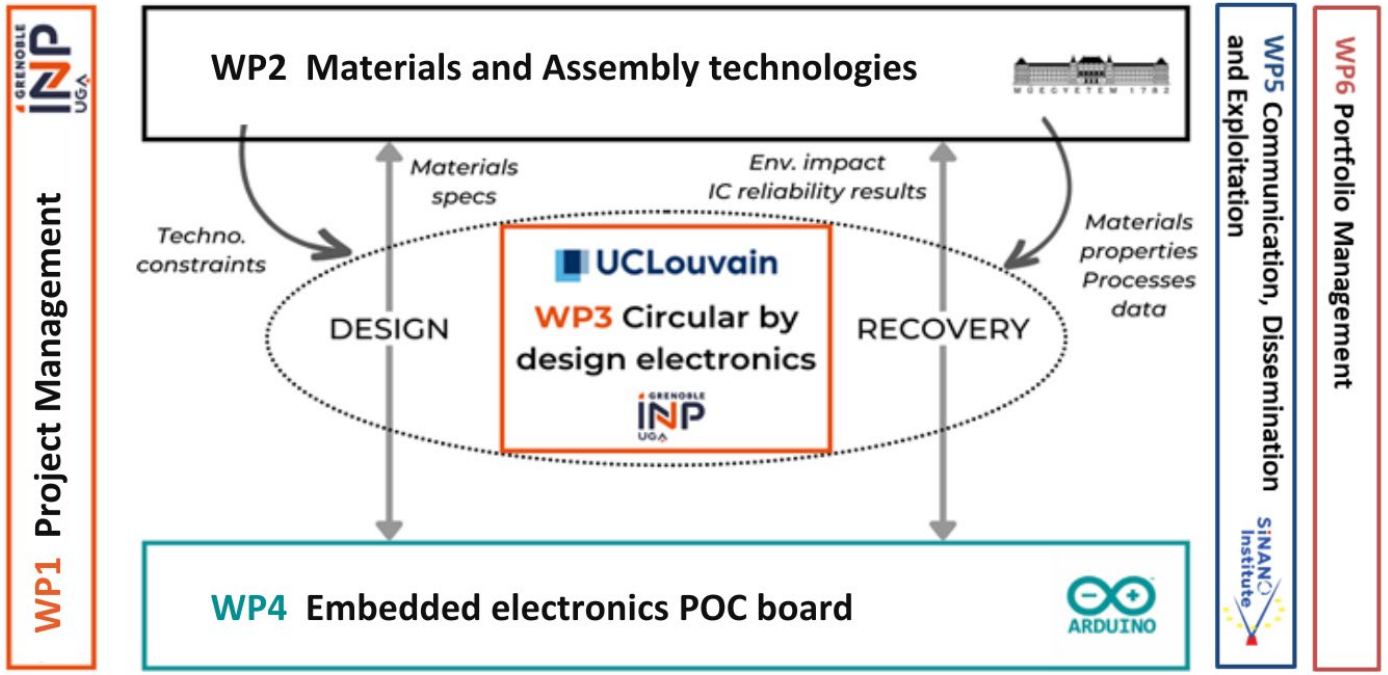
ENTREPRISE
MESHINING ENGINEERING



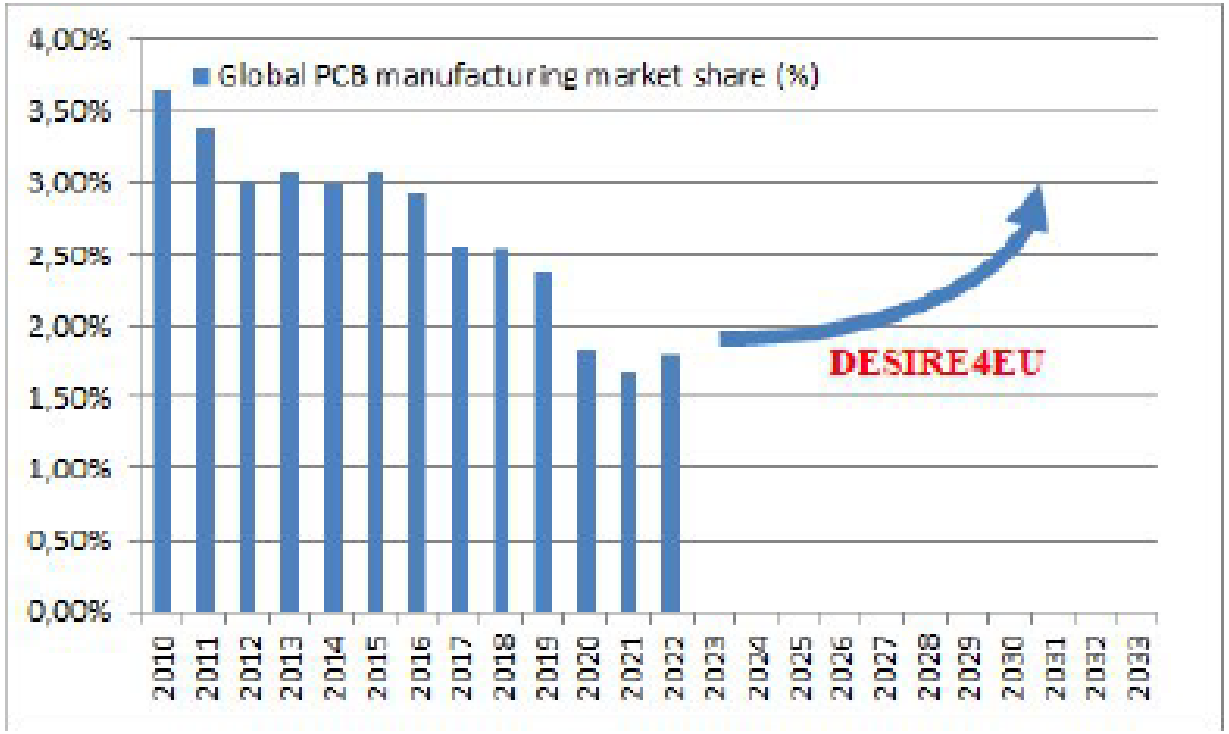
WP	Title	N	Name	Leader	Gender	Start	End
1	Project Management	1	GINP	P. Xavier	M	1	48
2	Materials and assembly technologies	5	BME	A. Géczy	M	1	48
3	Circular by design electronics	1	GINP	K. Samuel	F	1	48
4	Embedded electronics POC board	11	ARD	D. Cuartielles	M	12	48
5	Communication, Dissemination, Exploitation & Portfolio activities	7	SINANO	P. Caulier	F	1	48
6	PORTFOLIO MANAGEMENT	1	GINP	P. Xavier	M	1	48

To emphasize the interdisciplinary character of the project, WP3 co-leader is Jean-Pierre Raskin (Male) from UCL.

+ **Advisory Board** and 5 managers for finances, IP, Exploitation and **Portfolio activities**
+ **Project Officer :** Nikolaos Kyrloglou & **Portfolio Manager :** probably Isabel Obieta

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101161251

EIC means innovation → A 10 years pathway



Value in % of total	Global production value 2022	USD value (M€)	European production value 2022	EUR value (M€)	Potential market (M€)
Consumer Electronics	13,2%	12,871	2,5%	43,95	44
Automotive + mobility	10,1%	9,848	14,5%	254,91	30
Industrial, Automation, Building Tech., M&C	13,4%	13,066	44,1%	775,278	250
Telecom/Datacom/Communication	29,4%	28,666	4,2%	73,836	30
Servers/Computers/Data Storage	19,7%	19,208	0,9%	15,822	7
Medical	2,6%	2,535	10,5%	184,59	20
Military/Aviation_Space	4,2%	4,095	8,1+4,8%	226,782	0
Others	7,4%	7,215	10,4%	182,832	55
		97 505		**1 758**	**436**

MINISTÈRE
DE L'ENSEIGNEMENT
SUPÉRIEUR
ET DE LA RECHERCHE
Liberté
Égalité
Fraternité

horizon europe

Pour poser vos questions

Rendez-vous sur sli.do → **#EICPathfinder** ou