



Funding instruments for battery manufacturing under the Innovation Fund

Stakeholder workshop, 25 April 2024
Brussels and online meeting

Agenda

1. Welcome and Outlook on battery manufacturing in the EU and introduction to live poll
2. Presentation of the Innovation Fund and “regular grants”
3. Presentation of Innovation Fund
4. Presentation of EIB financial instruments supported through the Innovation Fund
5. Feedback from stakeholders on instruments available under the Innovation Fund: overview of survey results, statements from stakeholders and discussion

Welcome and Outlook on battery manufacturing

- 1 Welcome and Outlook on battery manufacturing
- 2 Innovation Fund and “regular grants”
- 3 IF auctions
- 4 EIB instruments
- 5 Feedback from stakeholders



Fraunhofer Institute for Systems and
Innovation Research ISI



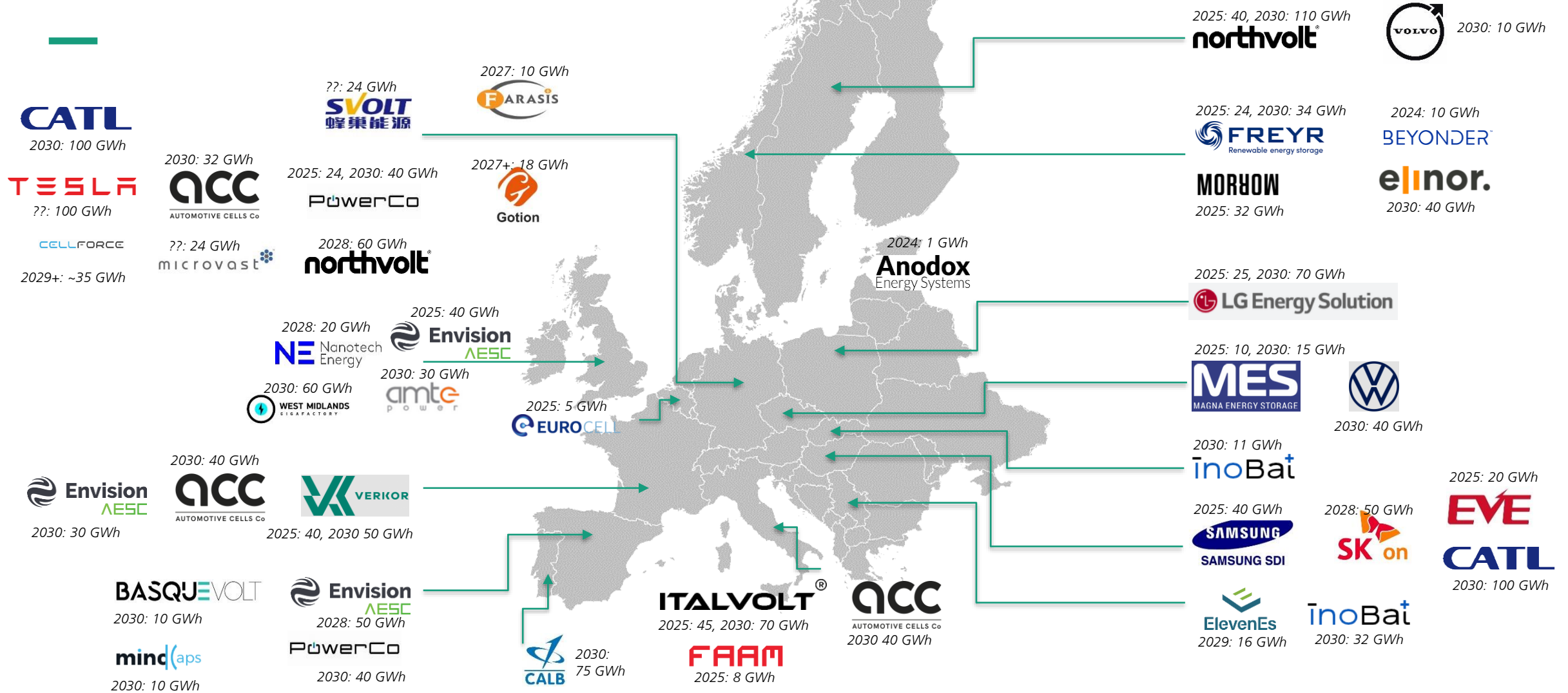
Stakeholder Workshop on Innovation Fund for batteries manufacturing

Outlook on battery manufacturing in the EU

Anne HELD, Jan GEORGE (Fraunhofer ISI)

Brussels, 25/04/2024

Battery manufacturing capacity in Europe - announcements

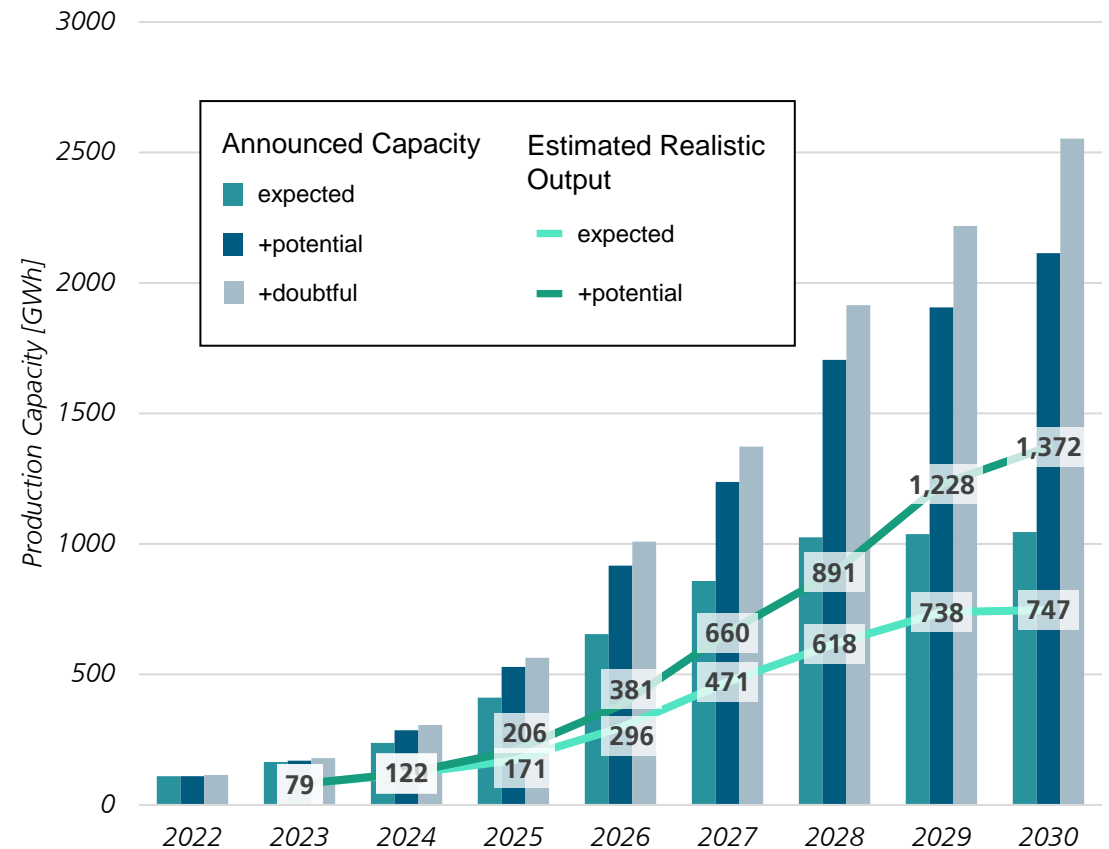


No claim to completeness, status 2023

What is the expected ramp-up of battery cell manufacturing in the EU until 2030?

Estimates from Fraunhofer ISI Database

- Scope: EU incl. UK, Norway and Serbia
- Based on public announcements for maximum capacity of cell manufacturing
- Three categories determine the likelihood of realisation: **expected**, **potential**, **doubtful** depending on the source of information
- Expert assessment of production delays and production control for estimation of output in two scenarios: **expected** and **potential**
- Analysis indicates that cumulative cell production output of 1 TWh in 2030 seems possible
- **What are potential risks to those new capacities actually being realized?**

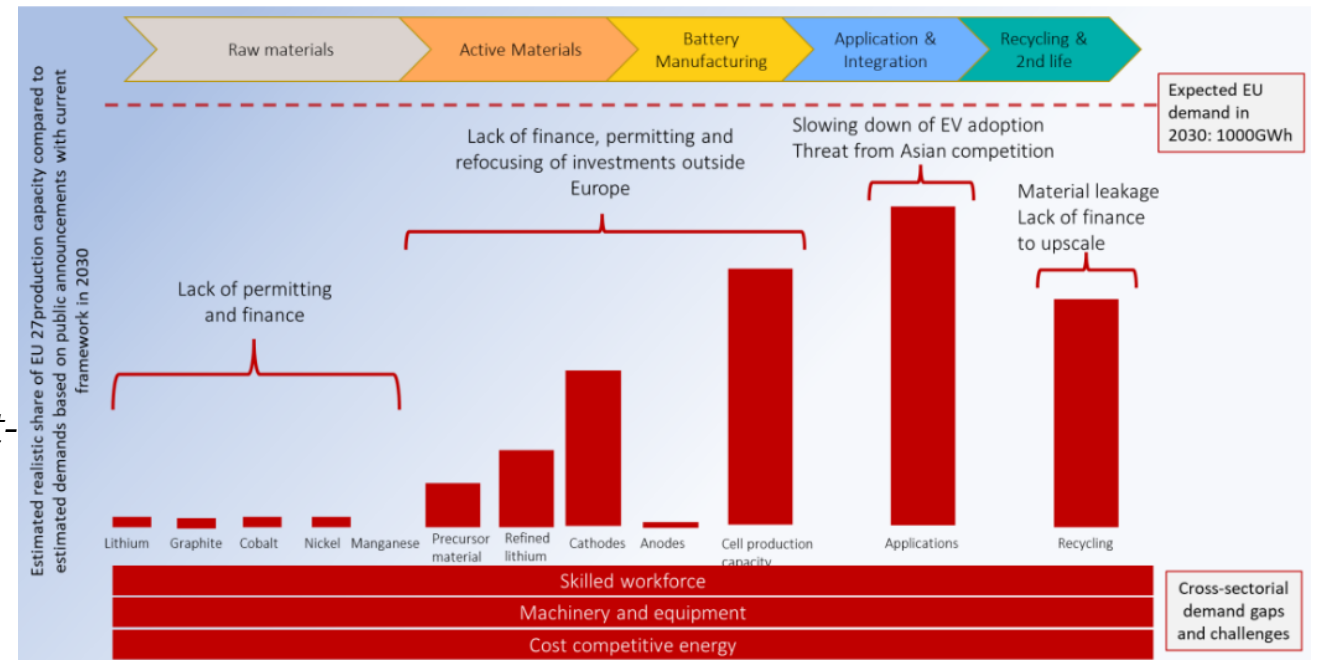


Source: Fraunhofer ISI Cell Production Database - based on public announcements of cell manufacturers, and additional "market intelligence"

Are capacity gaps emerging in the supply chain upstream of manufacturing in the EU?

Zooming into the battery value chain

- Large gaps between EU domestic production and demand anticipated in
 - Raw materials
 - Anodes
 - Precursor material
- Heterogeneous contractual situation (long-term, short-term) for material supply and dependencies on raw materials
- Strong cost competition e.g. from Asia with more vertical integration of material supply, processing and manufacturing, subsidies in non-EU countries

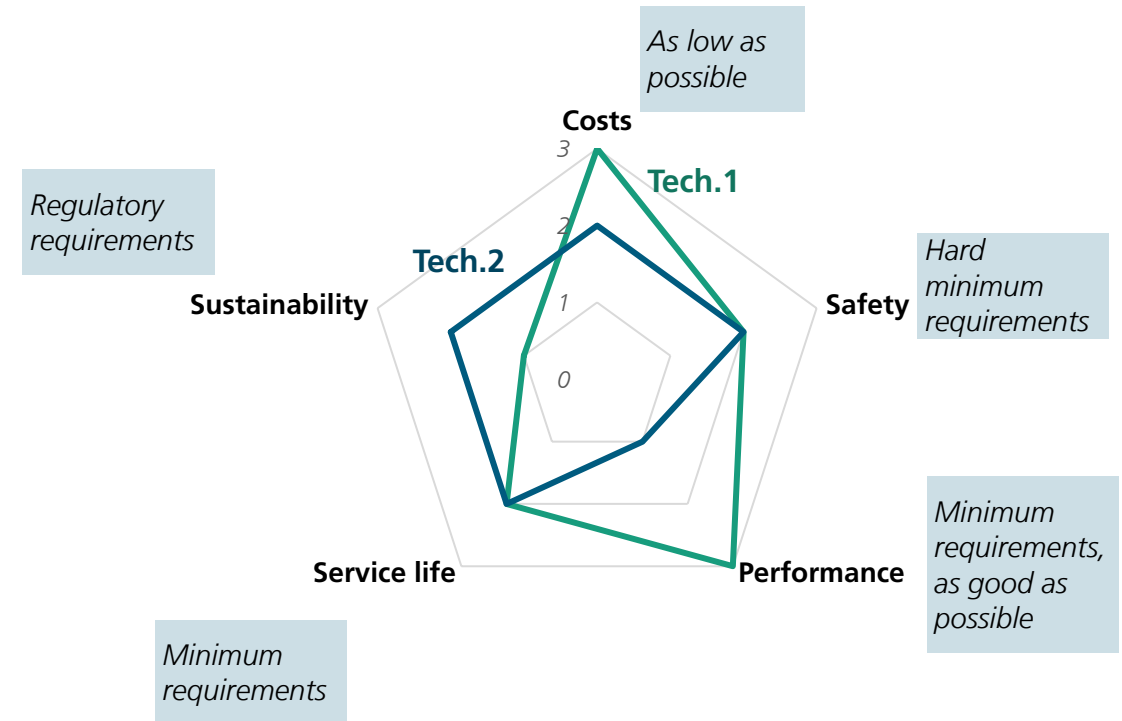


Which focus should be set for battery support within the Innovation Fund?

Battery cells are heterogeneous - Diverse application requirements determine cell technology

- *Safety (Mobile or stationary application? Shock and vibration? People close to the battery?)*
- *Performance (Energy density, fast charging, low/high temperature operation)*
- *Service life (High duty application, standby application, service life of application, ...)*
- *Sustainability (carbon footprint of cell production or supply chain, recyclability, input material)*
- **To what extent should battery support be tailored to specific application and sustainability requirements?**

Schematic assessment of cell technologies

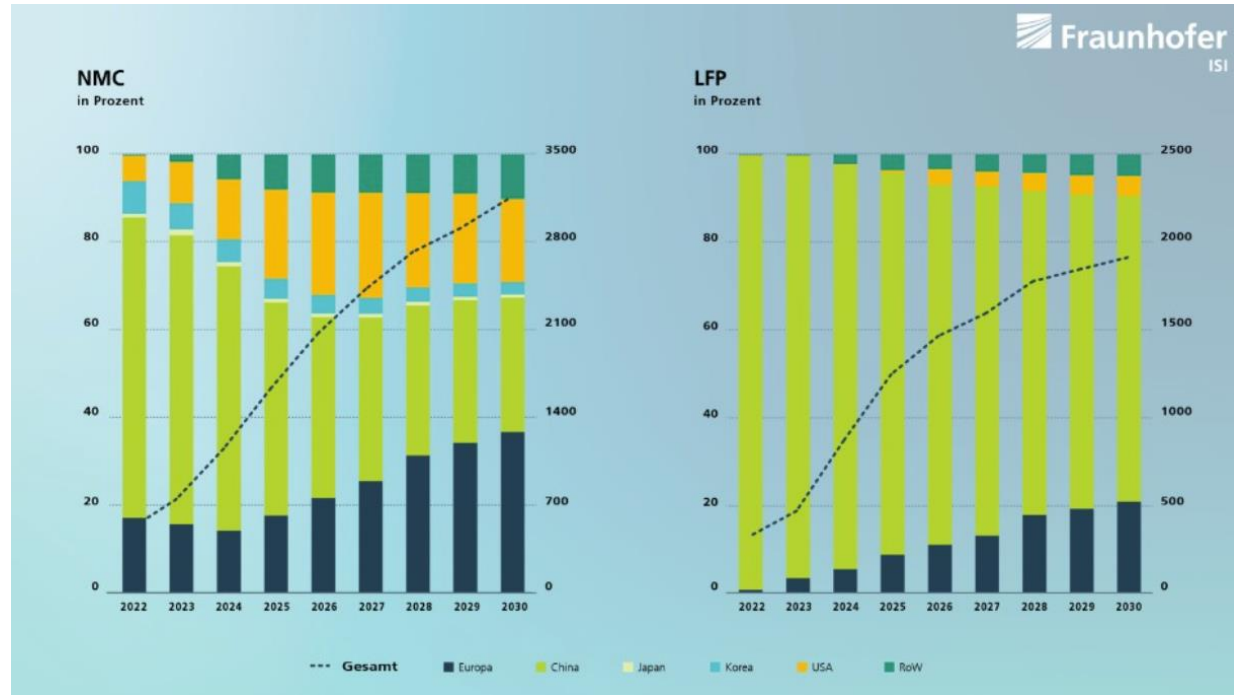


Source: own illustration.

Where will different cell technologies be produced globally?

Despite R&D efforts on cell chemistry, two technologies are expected to dominate the battery market:

- **NMC - Lithium-Nickel-Mangan-Cobalt-Oxide** → higher energy density, more expensive, contains cobalt
- **LFP - Lithium Iron Phosphate** → lower energy density, less expensive, less critical raw-material intensive
 - Regional differences in the predominance of certain cathode materials:
 - Europe: Cell production focused on NMC
 - China: Cell production shifting to LFP for majority of vehicle segments
 - Additional innovative technologies to be considered?
 - **What types of battery cells are expected to lead cell production in Europe and how should the EU position itself on technologies?**

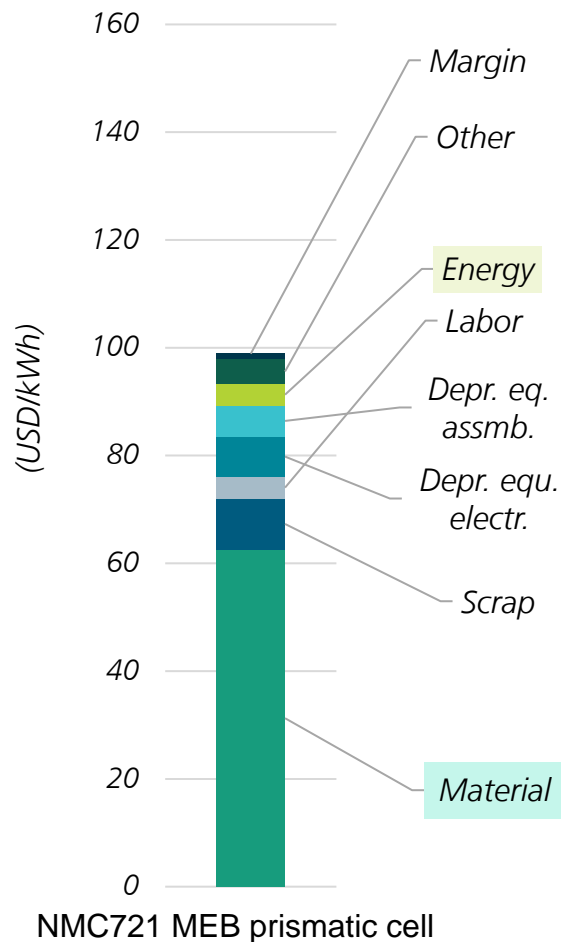


Source: Fraunhofer ISI Cell Production Database - based on public announcements of cell manufacturers, and additional "market intelligence"

Material cost determine the largest cost share of battery cell manufacturing

Cell technology determines material and manufacturing costs

- Costs depend on technology (i.e. NMC vs. LFP) and performance
- Supply conditions and dependencies on raw material costs vary among manufacturers depending on the terms of contract
- Fluctuating raw material costs limit the validity of a reference price for a particular technology
- No uniform reference price for materials
- ➔ **With only few exceptions, there is no international market price for "battery cells"**
- **How can the level of support be anticipated?**



Source: Data from Fraunhofer ISI, in Q1 2024

Margin (→ price)

- high USP
- vs.
- commodity

Location

- Energy cost
- Labor cost

Scale

- Supply conditions
- Depreciation cost
- R&D cost

Scrap

- Process control
- Process experience
- Size of the cells

Technology / materials

- Raw material costs
- Safety features, stability, electrolyte, separators, ...

Can support from the Innovation fund boost EU battery cell manufacturing?

➤ When is public support generally needed?

- *Close the profitability gap (costs or 3rd countries subsidies)*
- *Reduce risk and improve bankability*
- *Other aspects (resilience, R&D, sustainability)*

➤ Where is the support needed and where can trade-offs be made?

- *Limited budget of €3 bn (in the next 3 years) for battery support under the IF should be spend most effectively with long lasting and spillover effects*
- *Part of the value chain: supply chain upstream vs. cell manufacturing*
- *Type of actors: giga factories of incumbent technologies vs. new ventures with emerging technologies*
- *Type of payment: operational support vs. investment support*
- *Market readiness level: R&D vs. production*

Survey is available here:



Live polling with questions about project pipeline and preference for funding instrument features – Overview (I)

12 questions, both multiple-choice and free text - 10 to 20 minutes

- I. Your background and your planned production projects along the value chain in Europe. Let us know what your goals and planned investments are.*
 - *Positioning along the value chain*
 - *Planned production capacities*
 - *Planned project and operating costs*
 - *Planned Entry into Operation*

- II. Key challenges for battery manufacturing in Europe (cost, supply, financing, knowledge, ...). Let us know about the most pressing pain points.*
 - *Differences between production steps along the value chain (raw materials, precursor, ...)*
 - *Key financing problems*
 - *Price / cost relations and gaps in European production*

Survey is available here:



Live polling with questions about project pipeline and preference for funding instrument features – Overview (II)

12 questions, both multiple-choice and free text - 10 to 20 minutes

III. Need for public support along the battery value chain; Most suitable support mechanism + features. Let us know how you would use support tools and how we can improve them.

- *Grants, loans, venture debt, hybrids*
- *CAPEX, OPEX support*
- *Spillover effects*

IV. Eligibility criteria and award. What is particularly important in European battery production?

- *Technology and application baskets (chemistry, EV, stationary, ...)*
- *Performance, sustainability, supply chain resilience, ...*

Survey is available here:



Introduction to IF and “regular” grants

Ewelina DANIEL, Policy Officer, DG CLIMA

- 1 Welcome and Outlook on battery manufacturing
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INNOVATION FUND

Deploying innovative net-zero technologies for climate neutrality

Funded by the EU Emissions Trading System



€40 billion* available between 2020-2030



grants awarded through regular calls and auctions



avoid GHG emissions, boost competitiveness

supporting innovation in:



Energy-intensive industries



Renewable energy



Energy storage



Carbon capture, use and storage



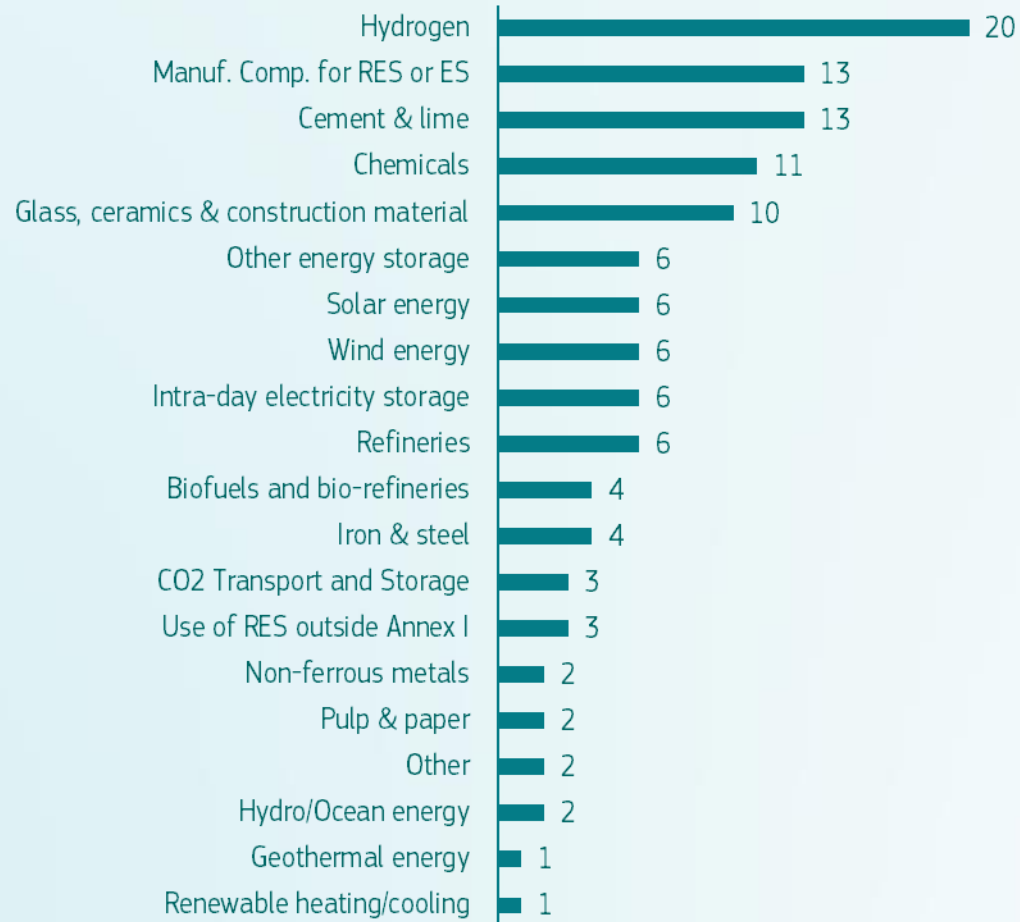
Net-zero mobility and buildings

*based on a carbon price of €75/tonne

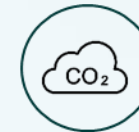
Portfolio of ongoing and selected projects

2020 LSC, 2020 SSC, 2021 LSC, 2021 SSC, 2022 LSC*, 2022 SSC*

Projects by sector



24
Countries*



444 Mt
CO2 eq to be
avoided*



€ 6.56 Billion
EU granted +
under contracting



Projects:
101 ongoing +
20* under contracting

**Data includes ongoing projects and preselected proposals from SSC-2022+ one from reserve list LSC-2022 and two LSC-2022 currently under GAPs*

Innovation Fund 2023 call in a nutshell

Timeline

- Deadline for application: 9 April 2024
- Results to be announced: November 2024
- Grant Agreement signature: February 2025
- Financial close has to be reached in 4Y from Grant Agreement signature

Grant distribution

- LUMP-SUM contribution grant up to 60% of relevant costs
- Up to 40% of grant at financial close
- Remaining amount of at least 60% after financial close
- At least 10% after Entry into operation
- Based on project reporting and CINEA monitoring

Early results:

- 337 project proposals received
- Call is 6 times oversubscribed (in terms of budget)

Topic	Topic budget
Large-scale projects	EUR 1 700 million
Medium-scale projects	EUR 500 million
Small-scale projects	EUR 200 million
Clean-tech manufacturing	EUR 1 400 million
Pilot projects	EUR 200 million
IF23 Call Total Budget	EUR 4 billion + 20% flexibility reserve

Cleantech Manufacturing Topic

The following **activities can be funded** under this topic:

- Developing facilities for producing **components/final equipment** in:
 - **Renewable energy** installations (e.g., wind, solar, geothermal).
 - **Electrolysers** and **fuel cells**.
 - **Energy storage** solutions for stationary and mobile use for intra-day and long duration storage.
 - **Heat pumps** for various uses.
- Topic is targeting those **components and materials (except mining activities) that are a significant factor** in the performance and/or cost of the final equipment.
- Scope includes **recycling or reusing critical materials** used in the mentioned equipment or components.
- Equipment and components can be sold on the EU market and in third countries.
- Promote innovation in **cleantech manufacturing/production processes** and **final product improvements**.

Key eligibility criteria

- Participants have to be **legal entities**; can be established anywhere in the world.
- Projects must be located in the EEA (EU Member States and Iceland, Liechtenstein, and Norway). Projects may also be located in Northern Ireland on the condition that they concern the generation, transmission, distribution or supply of electricity.
- The project must:
 - Reach **financial close within four years** after grant signature (maximum time to financial close)
 - **Operate at least** (minimum GHG emission avoidance monitoring period) **five years** after entry into operation
 - Except Small Scale Projects and PILOTS – at least **three years** after entry into operation
- Maximum grant amount **must not exceed 60% of the relevant costs**
- Eligible activities are listed in topic scope
- “Start of works” requirement

Projects do not compete on costs only

5 Award Criteria + Bonus Points

Degree of innovation

- Innovation beyond state of the art (see Annex 1 of call text) at European level (except SSP – European or national)

GHG emission avoidance potential

- Absolute
- Relative
- Quality of the GHG emission avoidance calculation and minimum requirements

Project maturity

- Technical
- Financial
- Operational

No completion bond

Replicability

- Efficiency gains
- Further deployment
- Resilience of EU industrial system
- Multiple environmental impacts
- Knowledge sharing

Cost efficiency

- Cost efficiency ratio
- Quality of the cost calculation and minimum requirements

Degree of Innovation

- Innovation Fund aims at supporting projects beyond incremental innovation
- Under this award criterion innovation in performance of batteries can be claimed (e.g. energy density, drive range offered, durability, but also carbon footprint)

Very low / incremental innovation

Intermediate or strong

Very strong or breakthrough

Incremental innovation: minor changes or improvements to existing products, processes or business models; implies limited new knowledge / technology; such projects **will not be retained.**

Intermediate or strong: new or considerably changed technologies or processes or business models; novel combinations of mature technologies; scale-up of innovative technologies

Very strong or breakthrough: completely new technologies or processes or business models; innovations leading to significant changes that transforms entire markets or industries or creates new ones

GHG emission avoidance potential

Absolute GHG emission avoidance

Relative GHG emission avoidance

Quality of the GHG emission avoidance calculation and minimum requirements

- The **relative GHG emission avoidance** must be at least **50%**.
- **GHG emissions avoidance calculator** (mandatory annex), templates available
- For batteries manufacturing **emissions from battery use are assessed**.
- Low carbon footprint of batteries can be used to claim a Bonus Point “other GHG emissions”

Cost efficiency and cumulation

**Requested Innovation Fund grant
+ other public support ***

**Absolute GHG emission
avoidance**

During 10 years after entry into operation

**Project need to demonstrate
funding gap (“relevant costs”)**

**Maximum requested IF grant is
60% of total relevant costs**

**Applicants choosing not to apply
for the maximum grant will be
more competitive when ranked
against other applicants in ‘cost
per unit performance’ metric.**

Cost efficiency ratio must be lower or equal than **200 €/t CO₂-eq**

(*) Other public support must impact the same project (i.e. **the case of cumulation**) and include State aid or funding from the other EU funding programmes

Cumulation rules apply

Battery manufacturing projects awarded so far

Raw materials

- **ELAN:** Upscaling Vianode innovative synthetic graphite production technology (LSC)

Battery components

- **Green Foil project:** Low CO₂ footprint battery foil for Li-ion battery
- **Listlawelbattcool:** An energy and resource efficient battery cooler technology

Battery cells

- **Giga Arctic:** Building a European future for clean batteries to accelerate the renewable energy transition (LSC)

Battery packs and modules

- **NorthSTOR PLUS:** Industrialising Green Optimised Li-ion Battery Systems for ESS (LSC)
- **NorthFlex:** Decarbonising temporary power & flexible storage (batteries packs)

Battery recycling

- **ReLieVe:** Recycling Li-ion Batteries for electric vehicles (LSC)
- **BBRT:** BASF Battery Recycling Tarragona (LSC)
- **CarBatteryReFactory:** Assembly plant for storage systems based on second-life car batteries.

Summary

Benefits

- Fast launch.
- Larger application scope - **projects from the whole supply chain (excluding raw materials mining) could apply.**
- Possibility of a **dedicated topic for battery manufacturing**
- Number of projects already applying in the past show good spread in terms of geography and position in the supply chain.
- Grants are disbursed upon the achievement of project milestones – **up to 40% before the Financial Close allowing to support construction cashflows.**
- **Projects in battery technology can compete not only on costs but also on performance and sustainability that will be delivered by their innovativeness.**
- **Cumulation with State aid or other EU funding is allowed (cumulation rules have to be observed).**
- **Seal of Sovereignty is possible (in line with STEP Regulation)**

Challenges

- **More complex application process**
- **Reporting more complex (on milestones)**
- **No completion bond required, less guarantee to reach Financial close and Entry into Operation.**
- **Grants cover up to 60% of the funding gap (to be demonstrated) and rules on cumulation with other public funding have to be observed**

Vianode project presentation

Andreas Forfang, Vice president of Vianode for Sustainability and ESG

With project ELAN, Vianode is transforming battery anode graphite with a new technology

How synthetic graphite is produced today



Vianode breakthrough solution



- ~90% reduction in CO2 footprint to 1.9 kg. CO2e / kg.
- Reduced energy consumption
- EV product quality
- Scalable solution that can meet current and future battery demand
- Suitable for recycling

With project ELAN, Vianode is transforming battery anode graphite with a new technology

How synthetic graphite is produced today



Vianode breakthrough solution



- 🏆 Degree of Innovation
- 🏆 Emission Avoidance
- 🏆 Technical Maturity
- 🏆 Operational Maturity
- 🏆 Scalability
- 🔨 **Financial Maturity**

ELAN was awarded EUR 90 million in 2023 to upscale Vianode's technology

- Fill supply/demand gap for anode materials in Europe
- Supply premium quality graphite produced in the cleanest possible way
- Build European industrial leadership and contribute to strategic autonomy
- Avoid 6.6 million tons of CO2 over 10 years



The ELAN site in Bamble, Norway is being prepared and the facility is planned to be operational in 2027, producing 65,000 tons per year



Vianode

vianode.com

Northvolt project presentation

Nils Gabrielsson, Director of Public Funding and Innovation Programs at Northvolt



northvolt

NorthSTOR+

Innovation Fund Large Scale 2021

Nils Gabrielsson, Director Public funding and innovation programmes, corp. finance





Northvolt Battery Systems | Dwa site

📍 GDAŃSK, POLAND

Industrialization and assembly plant for battery modules and energy storage solutions.

2023

COMMERCIAL OPERATIONS
BEGIN

12 GWh

BATTERY SYSTEMS ANNUAL
PRODUCTION CAPACITY

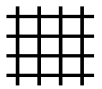
25,000 m²



NorthSTOR+



Voltrack



Grid



Peak Shaving



Time Shifting



Energy Trading



- The NorthSTOR+ project introduces a new ESS battery system technology, with the lowest life-cycle carbon footprint, compared to other solutions as well as competitive TCO.
- Each unit will have an installed capacity of 1.1 MWh with applications in intra-day energy storage, e.g. electricity peak-shaving, load levelling and renewable integration applications.

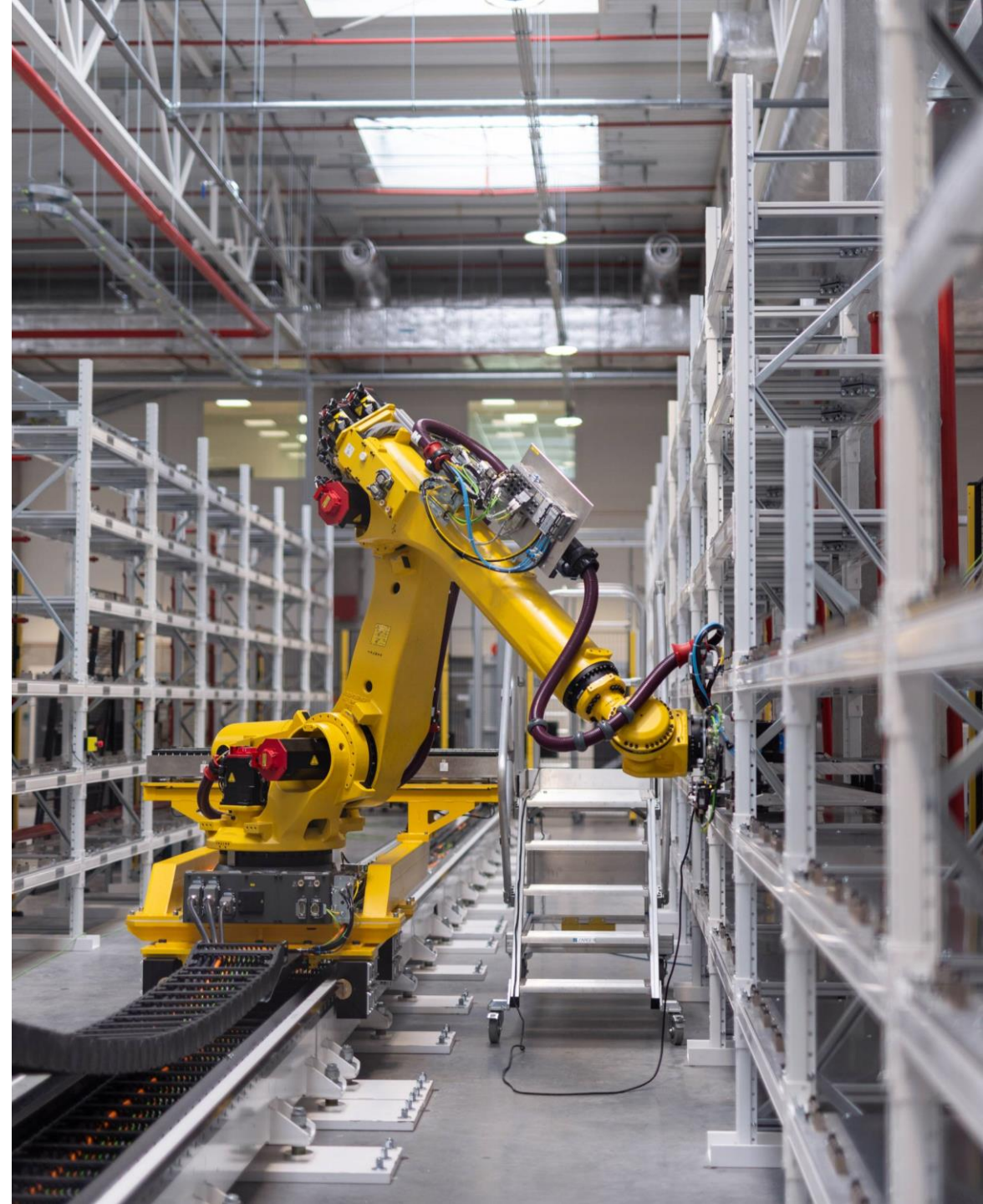


- At steady state, ~6 GWh of battery storage capacity will be manufactured annually.
- Estimated GHG emissions avoidance: up to 34,5 m tCO_{2eq} over 10 yrs of operation.

- Project CAPEX is ~€200m and the Innovation Fund grant c. €75,5 m.
- 1st line was commissioned in Q4 2023, second line planned for Q1 2025.

Financing context and key value of the Innovation Fund

- 1 First European mover in ESS
- 2 New technology / chemistry
- 3 Significant CAPEX
- 4 Low / no bankability of off-take agreements



Innovation Fund auctions

Johanna SCHIELE, Policy Officer, DG CLIMA

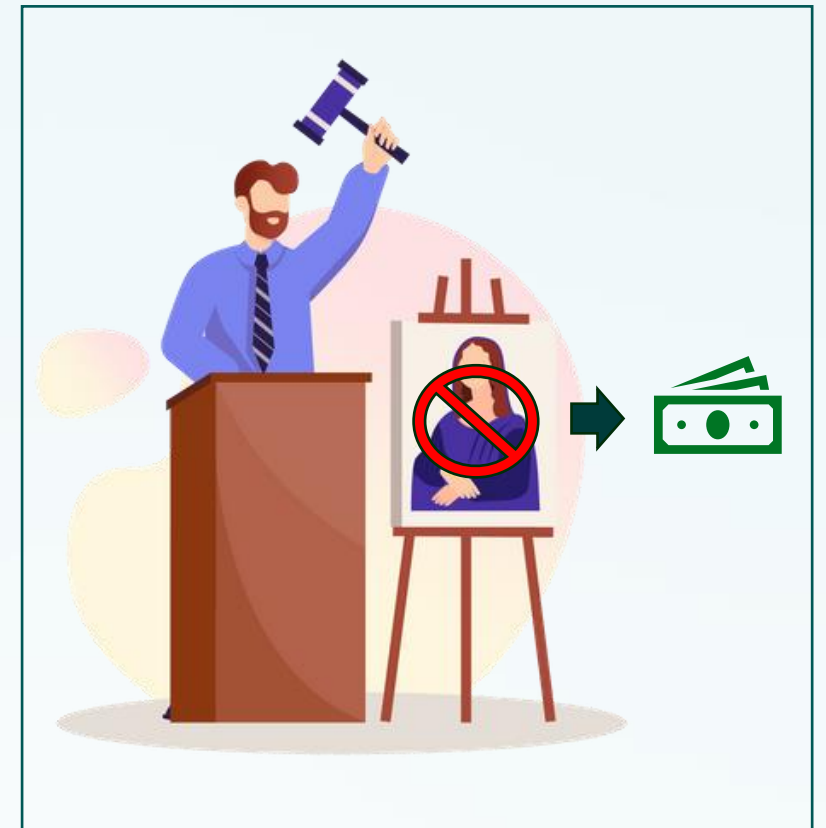
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What is an auction in the context of a subsidy?

- An auction is a process in which goods or services are offered for bidding.
- In the case of a subsidy scheme, what is auctioned is *not the product itself*, but rather a *subsidy* for the specific activity or product.

Examples:

- 1) Renewable energy auctions e.g. in Poland, Germany or UK.
 - 2) EU-wide renewable H2 auction under the Innovation Fund
- Typically, bidders requiring the *lowest* public subsidy for an auctioned activity or product will win the subsidy.



Since when and how are auctions under the Innovation Fund a possible financing instrument?

- Since the latest ETS Directive Revision ([Directive \(EU\) 2023/959](#)), IF support can be awarded through:

*“competitive bidding [i.e. auctions] leading to the award of **Contracts for Difference, Carbon Contracts for Difference or fixed premium contracts.** [...] In the case of support provided through competitive bidding [...], up to **100% of the relevant costs** of projects may be supported”*

- In November 2023, the Innovation Fund launched the first EU-wide auction for renewable hydrogen production, which will be discussed as a case study on auctions as a financing instrument under the IF in the following slides.

Key differences between auctions and regular grants

Regular grants

- Coverage of up to 60% of relevant cost possible.
- Reliance on relevant cost calculation / financial model to determine funding gap.
- Payments before entry into operation possible. Some construction risk taken by the IF.¹⁾
- Milestone-based payments. Flexibility in the definition of milestones.
- Due diligence fully covered through application & evaluation process.
- Possibility to support different sections of the value chain in single call.



Auction



- Coverage of up to 100% of relevant cost possible.
- Reliance on strong competition to reveal funding gap & avoid overcompensation.
- No payments before entry into operation. Construction/tech risk remains with private sector.¹⁾
- Output-based payments of certified and verified production.
- Due diligence can be partially rolled onto completion guarantee (“forfeited deposit” in ETS Directive).
- Need to focus on one uniform auctioned good.



Auction case study: IF renewable hydrogen pilot auction

Objectives in designing the auction:



Reducing the cost gap between renewable and fossil hydrogen in the EU



Allowing for **price discovery** and **market formation** in renewable hydrogen



De-risking European hydrogen projects

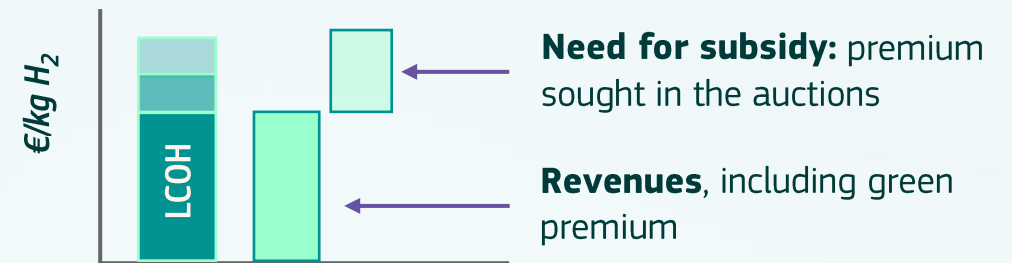


Reducing administrative burdens

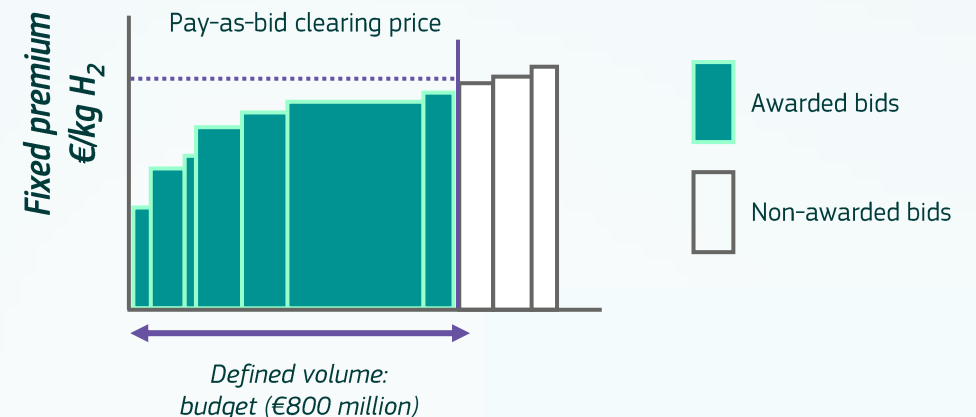
Design chosen to reach those objectives

- Auctioned good: **RFNBO hydrogen**
- Support in form of a **fixed premium** in €/kg of renewable hydrogen produced over **10 years**
- Bids **ranked on price** – budget allocated to projects with the lowest specific support requirements
- **Pay-as-bid** (no indexation to inflation)
- Other award (“qualification”) criteria assessed **pass/fail**
- **Completion bond of 4%** of the requested subsidy as “deposit” to enter the auction
- **Output based support**, upon verified and certified production of RFNBO volumes (no payments before entry into operation)
- **Ceiling price** of EUR 4.5
- **Max. 5 years to reach entry into operation**, otherwise termination and completion bond called
- **Semi-annual** payments
- No cumulation with other public support

Fixed-premium auction



Bids ranked on price only



Qualification requirements checked on pass/fail basis, ranking and clearing based on price only

“Relevance and quality” qualification criteria

Renewable electricity sourcing strategy

Hydrogen off-take and price hedging strategy

Electrolyser procurement strategy

Plan to receive environmental permits on time

Plan to receive grid connection permits on time

Completion guarantee letter of intent

Ranking on lowest bid price (EUR/kg of H₂)



Preliminary results of the first hydrogen pilot auction

- **132** bids (strong level of competition which is required for price discovery in an auction).
- From **17** different European countries.
- All bids taken together provide for a total planned **electrolyser capacity of 8.5 Gwe** and a total production **volume of 8.8 million tonnes** of RFNBO hydrogen.

More detailed information will be shared publicly once the evaluation concludes (press release expected 30.4.2024)

Back to batteries: How does battery manufacturing differ from H2 or power auctions?

Hydrogen / renewables



Battery manufacturing

Possible ways to address

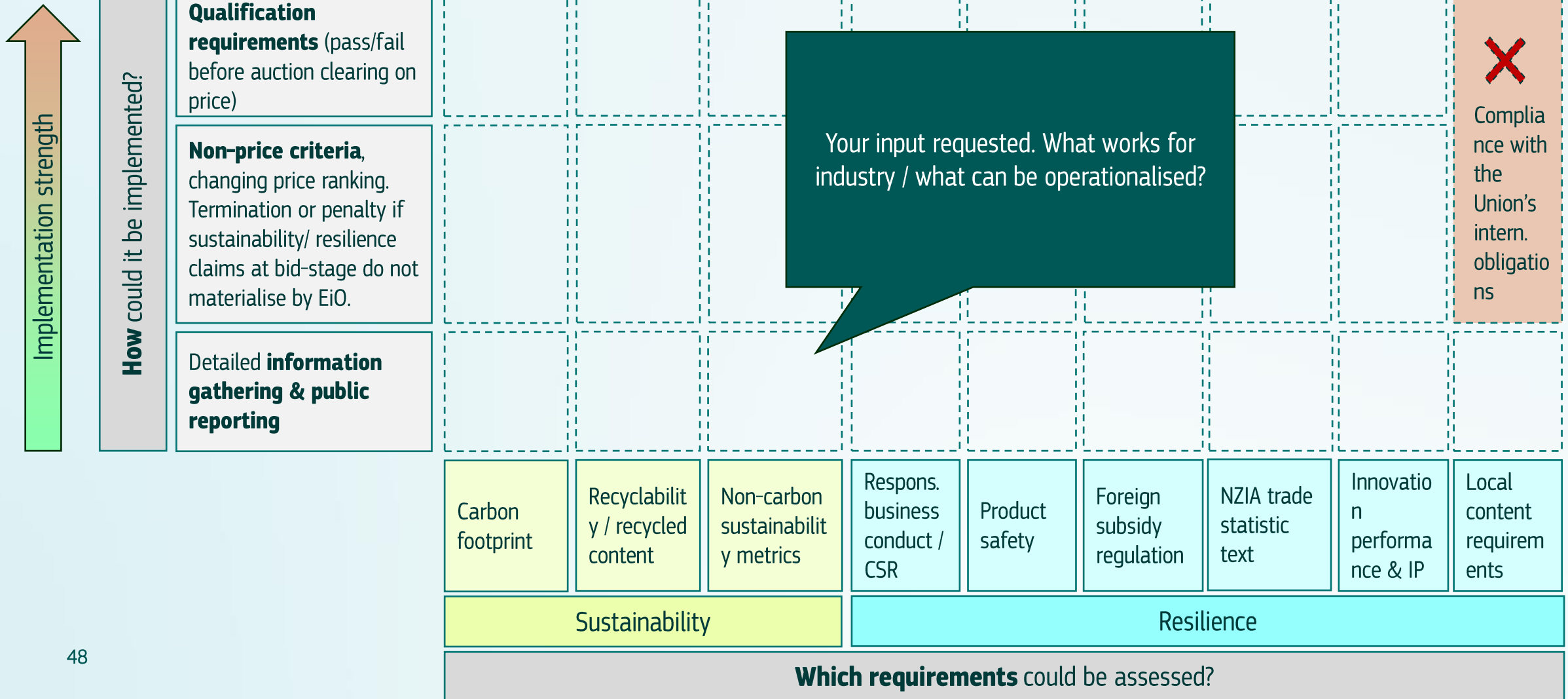
- Homogenous, uniform good (1kg/H2 = 1kg/H2).
- Expectation of competition allowing for auction mechanism to reveal cost gap & avoid overcompensation.
- Smooth or “continuous” bid curve with small enough bids relative to budget.
- Relatively low tech/construction risk. Promise of payment during operational phase enough to leverage private pre-financing for construction phase.



- “Battery” is not a uniform good.
- Competition in manufacturing more limited / fewer players in Europe.
- For gigafactories, large bids with stocky supply curve.
- **? Question to the room:** Are post-EiO payments enough to de-risk battery manufacturing projects? (very low error margin on battery chemistry, scale up risks...?)

- “GWh of capacity produced” in principle comparable. Closer definition of battery type or min. requirements to avoid “race to the bottom” on price. **BUT:** auction not possible for different goods across value chain.
- Strict price ceiling; clear threshold for cancelling the auction in case of undersubscription; attracting new market entrants/projects to bid.
- Max. individual bid volume ceilings; higher individual auction budget = fewer rounds given overall budget; addressing smaller projects as well as gigafactories.
- Identify with project developers and banks if this is really a problem in the first place. Additional, early DD by banks for completion bond.

How could resilience and sustainability requirements be assessed in an auction?



Pros and cons of running an auction for battery manufacturing in the EU

Benefits

Challenges

-
- | | | |
|---|---|--|
| <ul style="list-style-type: none">• Application process and evaluation are simpler and faster. | ↔ | <ul style="list-style-type: none">• Time to launch auction will take longer. |
| <ul style="list-style-type: none">• Focus on price competition for a single auctioned good, e.g. battery cells or modules. | ↔ | <ul style="list-style-type: none">• Does not directly target support along the whole value chain, only through upstream spillover of the downstream auctioned good. |
| <ul style="list-style-type: none">• Payments are simplified, linked proportionally to production (e.g per kWh of battery capacity) and delivery, not project milestones. | ↔ | <ul style="list-style-type: none">• Payments will only be received by the project upon certified and verified production. The mechanism does not directly solve challenges around pre-financing or construction risk. |
| <ul style="list-style-type: none">• Possibility to obtain a grant matching the entire funding gap – “100% of relevant cost” - no need for stacking additional aid. | ↔ | <ul style="list-style-type: none">• No cumulation of aid to ensure level playing field across the EEA |
-
- | | | |
|--|--|---|
| <ul style="list-style-type: none">• Auction would have similar effect to US IRA tax credits, i.e. fixed support per kWh of batteries output, although less budget. | | <ul style="list-style-type: none">• Auctions require a homogenous product, so price/unit is a comparable unit. Batteries are not homogenous, and no official certification for minimum standards exists yet. |
| <ul style="list-style-type: none">• A completion bond will be required to enter the auction, enhancing probability of project completion and allowing for more streamlined application process. | | <ul style="list-style-type: none">• Question mark around sufficient competition. Auction without sufficient competition subject to automatic cancellation.• Projects mostly compete on costs only. Battery Regulation would provide product standards and thresholds, but not before 2028. |

European Investment Bank instruments

EIB

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Blended finance products in cooperation with the EIB under the Innovation Fund Stakeholder workshop



European
Investment Bank

25 April 2024

European Investment Bank



World's largest multilateral lender.



The lending arm of the European Union.



Supports EU policy goals through strategic investments.



Addresses market failures.



Lending provider of climate finance.



Offers loans, guarantees, equity investments and advisory services.



Supports climate action, development, cohesion, SMEs and innovation.

EIB Cooperation with the Innovation Fund on Batteries







- **Batteries** are a **strategic element** of EU's clean and digital transition, bolstering EU's **resilience, strategic autonomy** and **competitiveness**.
- EU's policy goal is to become a **global leader** in sustainable battery production and use.
- **Financial instruments** are a powerful **tool** in enabling EU's ambition to build up battery technology and production capacity in the EU.

INNOVATION FUND

Driving clean innovative technologies towards the market

Supporting Innovation in:

-  Energy intensive industries
-  Renewables
-  Energy storage
-  Carbon capture, use and storage



- A budgetary guarantee from the EC to EIBG and other implementing partners to support an umbrella of policy objectives for Investments in 2021-2027 MFF, including the area of **batteries**.
- Additional **boost** to investment, innovation, job creation in EU.

EIB Project Finance (PF)

A Reliable Partner to Innovative and Ambitious Players

As the EU climate bank, EIB offers stable and reliable funding to large corporates and developers involved in the Battery Value Chain



- The EIB supports large sponsors launching **large scale projects with a strong innovation component**, but also helps smaller companies undertaking ambitious **development projects or research programs**.
- Excellent working relationship with **public sector stakeholders, NPBs and ECAs**.
- The EIB works closely with the European Commission to provide **thematic products and with higher risk bearing capacity to support innovation**.



- EIB is considering the **broadest support possible**: projects can be on-balance sheet financed or project financed (limited recourse) through various products addressing different risk profiles.
- Ability to **step up lending volume** when debt markets are contracted. Offers comfort to developers who will not fall short of financing.
- **Financial advantage** due to leading position as AAA-rated (green) bond issuer.

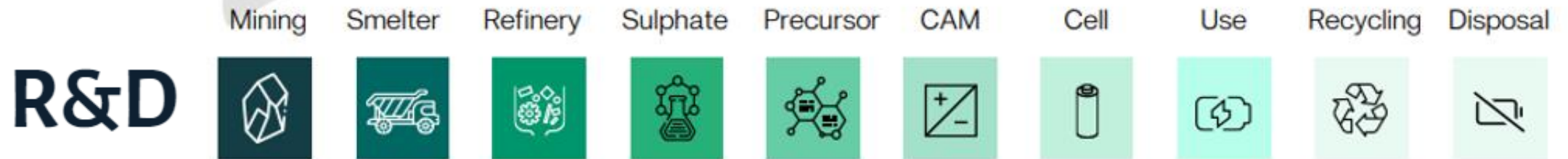
EIB Battery Lending: Northvolt



From start-up to scale-up: Europe's first homegrown gigafactory:

- Early EIB support to Northvolt's demo line in Västerås (March 2018) and initial phase of the 16 GW Skellefteå gigafactory (July 2020).
- Followed by EIB support to Expansion of Northvolt's gigafactory up to total 60 GW in Northern Sweden, with a total lending package to slightly over €940m (December 2023).
- The lending package for the expansion is part of a \$5 billion non-recourse project financing, the biggest green debt deal in Europe to date, and will support expansion of Europe's first circular battery production gigafactory, Northvolt Ett, in Skellefteå, Sweden.
- The EIB financing is backed by the Swedish National Debt Office and the European Commission's InvestEU programme, & partially intermediated through commercial banks participating in the project financing.

EIB's Support to the Battery Supply Chain



• R&D:

- **Innovative companies** active in R&D along the battery value chain with R&D financings using corporate finance.

• Mining, smelter / refinery:

- Business Pipeline for Project Finance includes **Lithium, Manganese, Vanadium** and **Natural Graphite** extraction and/or processing projects.

• Sulfates and Pre-cursor (p-CAM) manufacturing:

- Northvolt gigafactory & Expansion (PF)

• Battery active materials / CAM - Anode:

- **Umicore:** first CAM plant in the EU (Corporate)
- Northvolt gigafactory & Expansion (PF)

• Cell manufacturing:

- Northvolt gigafactory & Expansion (PF)
- LG Chem (Corporate), Envision-Renault Douai (PF)
- Verkor (PF)

• Recycling:

- Northvolt gigafactory & Expansion (PF)

Project Finance Structure: Benefits and Challenges



BENEFITS

- **Quick ramp-up**, mostly on **green field sites**, providing **clean slate**, which often translates to a **first-mover advantage** when **implementing new technologies**.
- If the **business idea** is **robust**, it provides an **excellent opportunity to raise capital** through **equity** (from diverse investors, including **industrial and strategic financial investors**) and **debt**.
- **Benefitting from public support** (EIB, but also ECAs and other **public bodies** in **attracting FDI**).



CHALLENGES

- **Strong offtake** support necessary to ensure bankability.
- **Complex PF documentation and increased controls**.
- **Reflecting traditional PF tools** in a business environment, which has been used to **maximize the flexibility of purchasers/offtakers**, which **traditionally imposed few constraints**.
- **Substantial Technical Risk** needs effective mitigation & management.
- **Significant Funding Challenge** – Sponsors seeking to maximise senior debt facilities (ECA, EIB & InvestEU).
- **Enhanced profitability** – Grant funding improves Equity IRR and has been backstopped by sponsors on recent projects.

EIB Venture Debt (VD)

Achieving an Efficient Battery Value Chain Funding Ecosystem

**A CHAIN IS ONLY AS STRONG
AS ITS WEAKEST LINK**



The Weakest Links of Scale-up Funding Identified



On the public side, Europe lacks the growth equity, commercial debt and project finance to meet the needs of first-of-a-kind (FOAK) plants. The fundraising successes of Sweden's **H2 Green Steel** and French battery gigafactory developer **Verkor** showed that newcomers can stack various types of capital (equity, debt, guarantees and subsidies) to finance multi-billion FOAK projects, but these are still exceptions, not the norm in Europe.



Cleantech
for Europe

CLIMATE & STRATEGY
PARTNERS

TECH FOR
NET ZERO

Brussels, 25 October 2023

At this critical “scale-up” stage, European cleantech companies need to shift from raising tens of millions of euros in venture capital to validate their technologies, to billions of euros in mainly debt instruments to build large-scale plants. And while most of the investment will need to come from industry and capital markets, the public sector has a key role to play in de-risking the initial steps of the deployment of technologies. Today, traditional financing options do not adequately address the unique challenges associated with financing hardware-intensive projects, which is why Europe is suffering from a major cleantech investment gap.



The transformation of research into patents and innovative start-ups requires more action, including on financing. To bridge the financing gap for cleantech start-ups, EU financial instruments are vital. While private investment in cleantech is on the rise, it must further increase to realise the EU's ambitious manufacturing goals, with public finance playing a pivotal role in scaling up manufacturing and attracting private capital.

Environmental
Finance

Channels ▾ Events Awards Sustainable Debt ESG Data Natural Capital

Home / Market insight / Financing the 'missing middle' for climate tech

27 November 2023

Financing the 'missing middle' for climate tech

[It's time for a European cleantech investment plan - Tech.eu](https://tech.eu)

[Briefing: Is European cleantech on track for net zero? A question of finance | ECNO \(climateobservatory.eu\)](https://climateobservatory.eu)

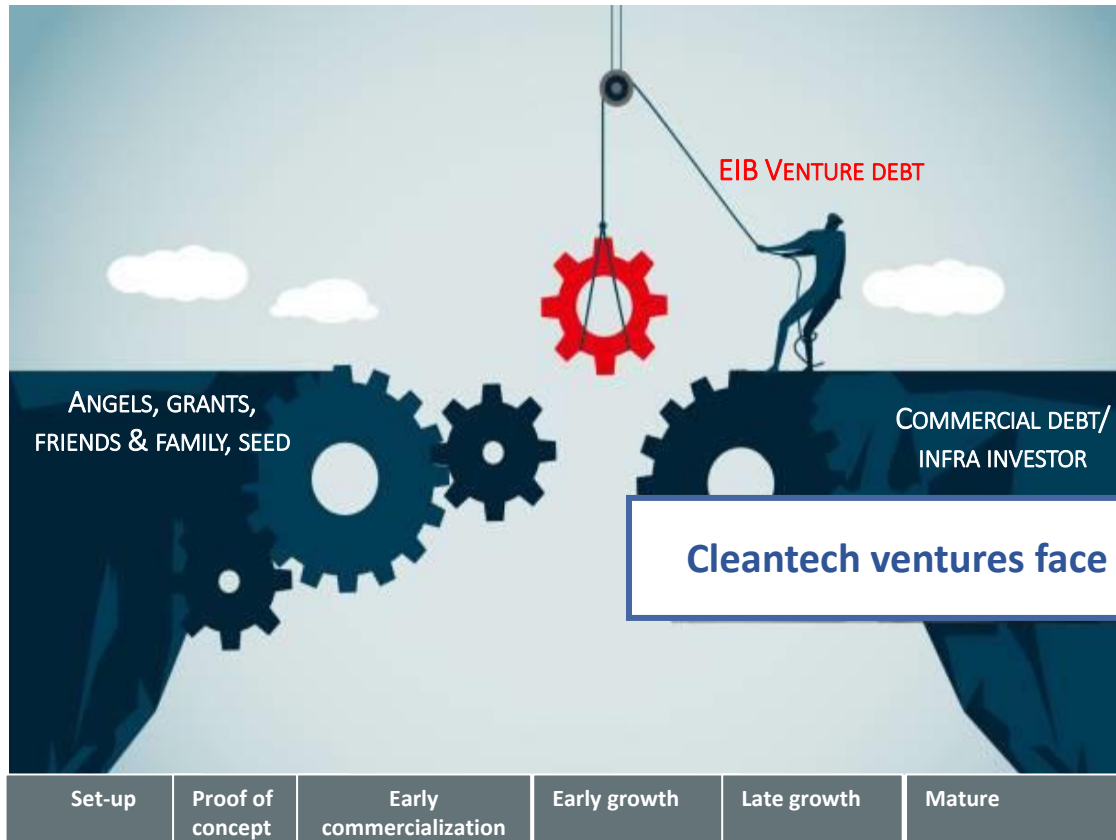
[Financing the 'missing middle' for climate tech :: Environmental Finance \(environmental-finance.com\)](https://environmental-finance.com)

From Lab to Gigafactory: Building the Champions of Tomorrow

VENTURE DEBT ALLOWS CAPITAL INTENSIVE COMPANIES TO SCALE UP AND REACH GF STAGE



Understanding the Gap within the Funding Gap



- Availability of early-stage funding means companies can raise Seed and Series A capital to prove their business.
- This is sufficient for capital-light companies (e.g. software) to prove customer traction and subsequently raise from a large pool of generalist capital.
- However, given the nature of the cleantech sector, a large proportion of its ventures need to make major investments in hardware to reach proof of concept.

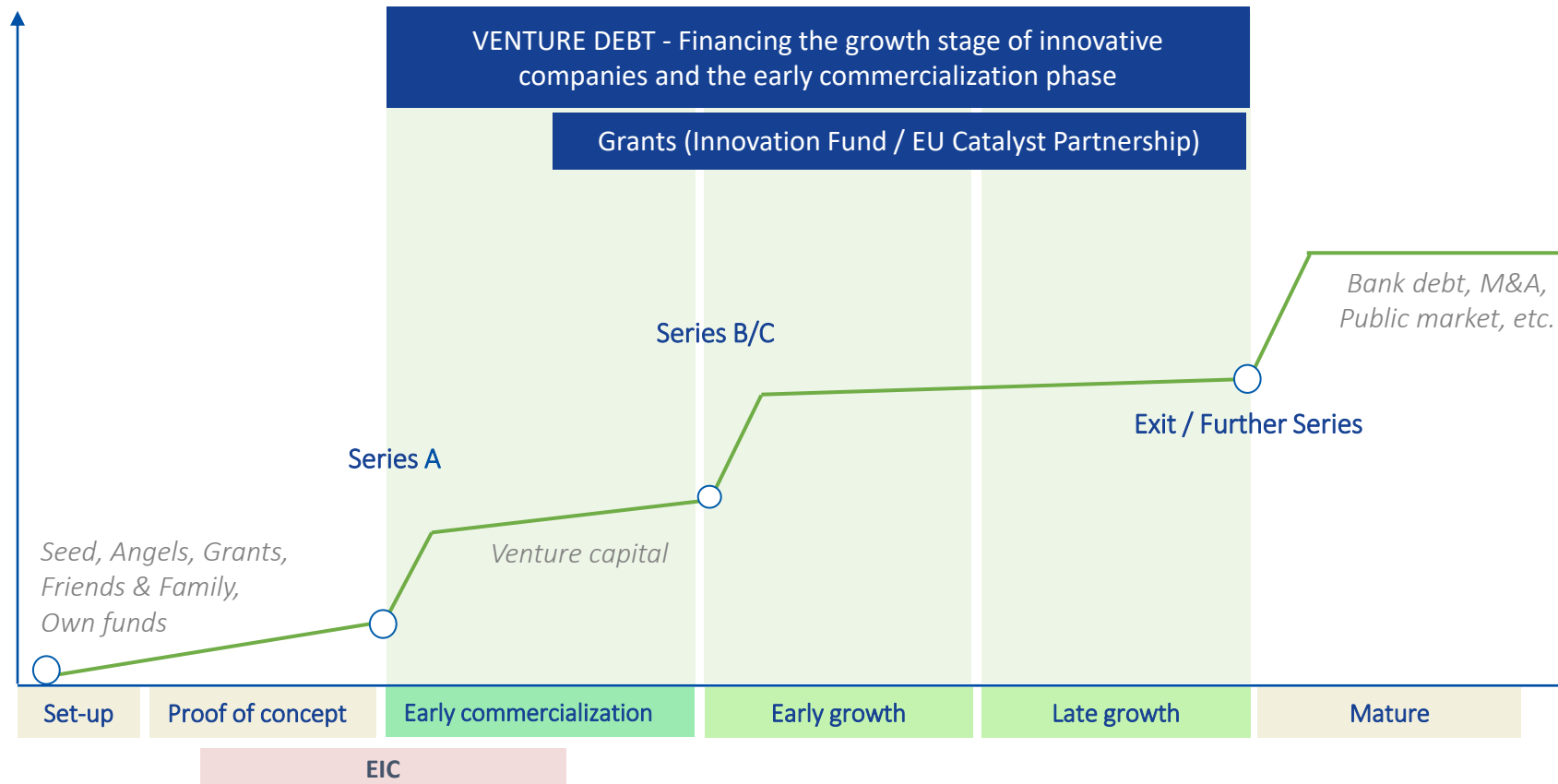
Cleantech ventures face higher capital barriers when trying to prove their technologies

- Insufficient Series B+ investors have the appetite for such a **hardware approach** and to shoulder the risks of a first-of-a-kind project...

Growth Capital in the Lifecycle of a Company

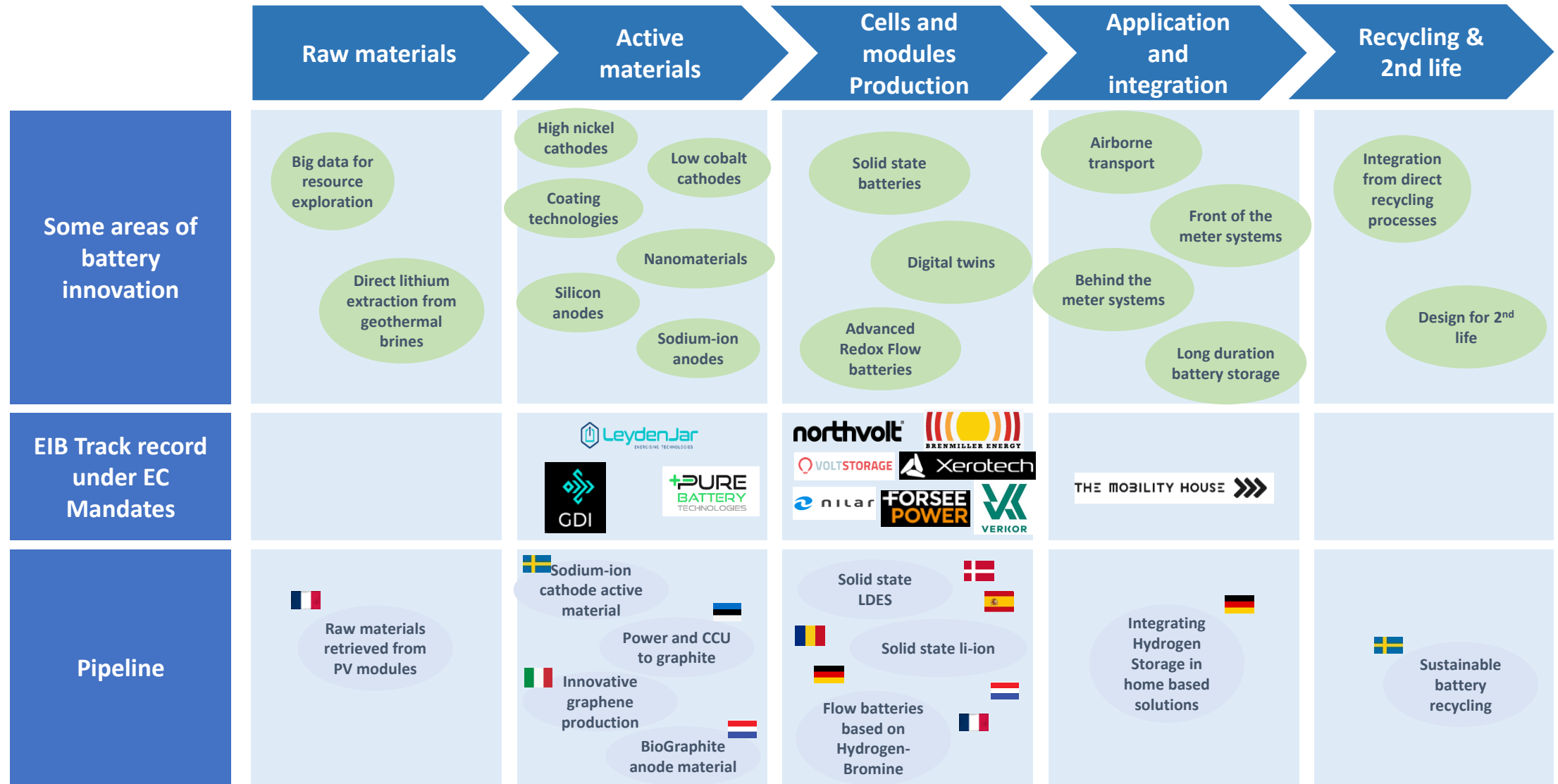
BRIDGE TO BANKABILITY

GROWTH STAGE AND EARLY COMMERCIALIZATION MARKET FINANCING GAP



- + Speed of execution
- + Long tenor
- + Large tickets
- + Investor stability
- + Flexible terms
- + Quality stamp
- + De-risking

Battery Manufacturing: Innovation Across the Value Chain



Verkor - Illustration

Verkor

Battery manufacturing

Sector: Cleantech (energy)

Country: France

Committed amount: EUR 49m

Structure: 2 tranches, amortising (8 years with 3 years grace period)

Pricing: interest (cash) + equity kicker in the form of an upside fee due at the successful financial close of the gigafactory

Products / Technology

- French company with the ambition to become a leading battery manufacturer. It employed more than 100 people at signature.

Technology application

- EUR 49m financing to build and operate the Verkor Innovation Center (VIC), a demo line and R&D laboratory, prior to moving to a 16 GWh gigafactory expected to operate by 2026. The VIC started its operations at the end of 2022 and houses a demo line for battery cell production with a capacity of ca. 150 MWh per year, an R&D center, testing and module prototyping facilities, and a training center.

Competitive advantages

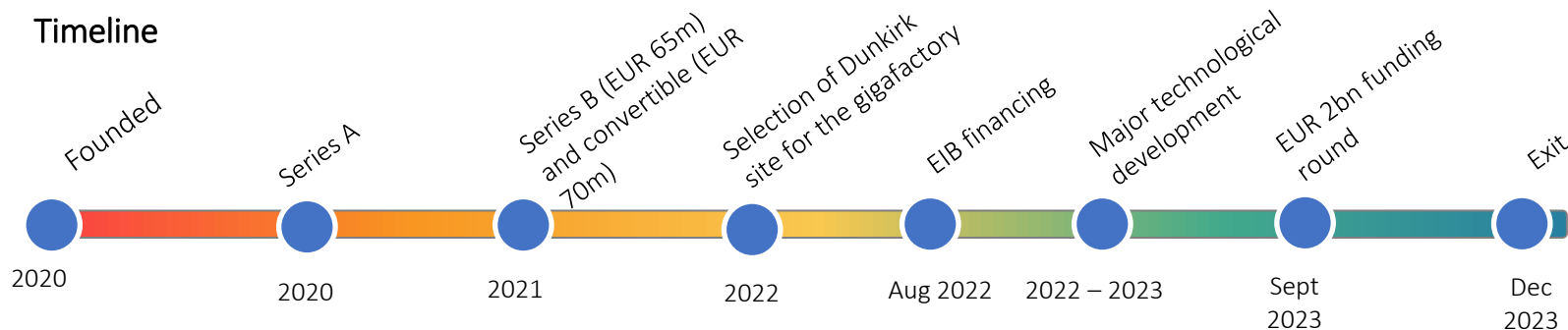
- Batteries have been identified as a strategic value chain.
- Strong market momentum especially in the automotive industry.
- Strong strategic partnerships, in particular with Renault, which is also a major shareholder.

Existing investors / financing

- Founders and employees (20.4%), Strategic investors (41%) including Renault (23.7%), Financial investors (38.6%).
- In addition to the EIB investment loan, the Project was funded through equity, convertible notes and commercial debt backed by BPI France.



Timeline



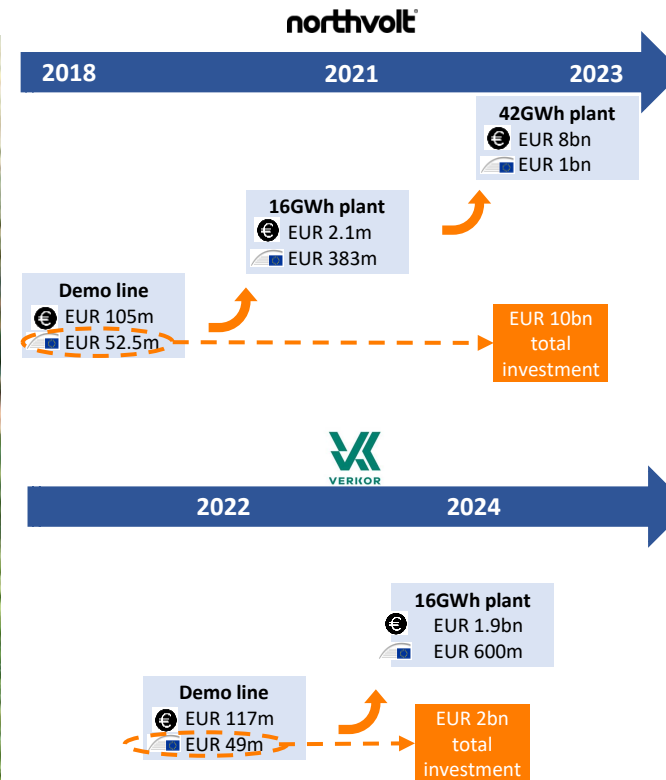
Impact of the financing

- Improvements in the manufacturing process of batteries, pushing digitalization and industry 4.0.
- Verkor targets a capacity of 50 GWh by 2030 thanks to further gigafactories to meet growing demand for electric vehicles and stationary storage. It plans to place Industry 4.0 as a key pillar in its gigafactory to secure efficiency, quality and modularity thanks to interconnectivity, big data and smart automation.
- The VIC was a stepping stone and key building block to unlock the Giga factory and its financing.
- Exited in December 2023 with an IRR of 19.6% and a cash on cash of 1.15x.

Why Topping Up the InvestEU Green Transition x Batteries

SIMPLE, IMPACTFUL... AND NEEDED

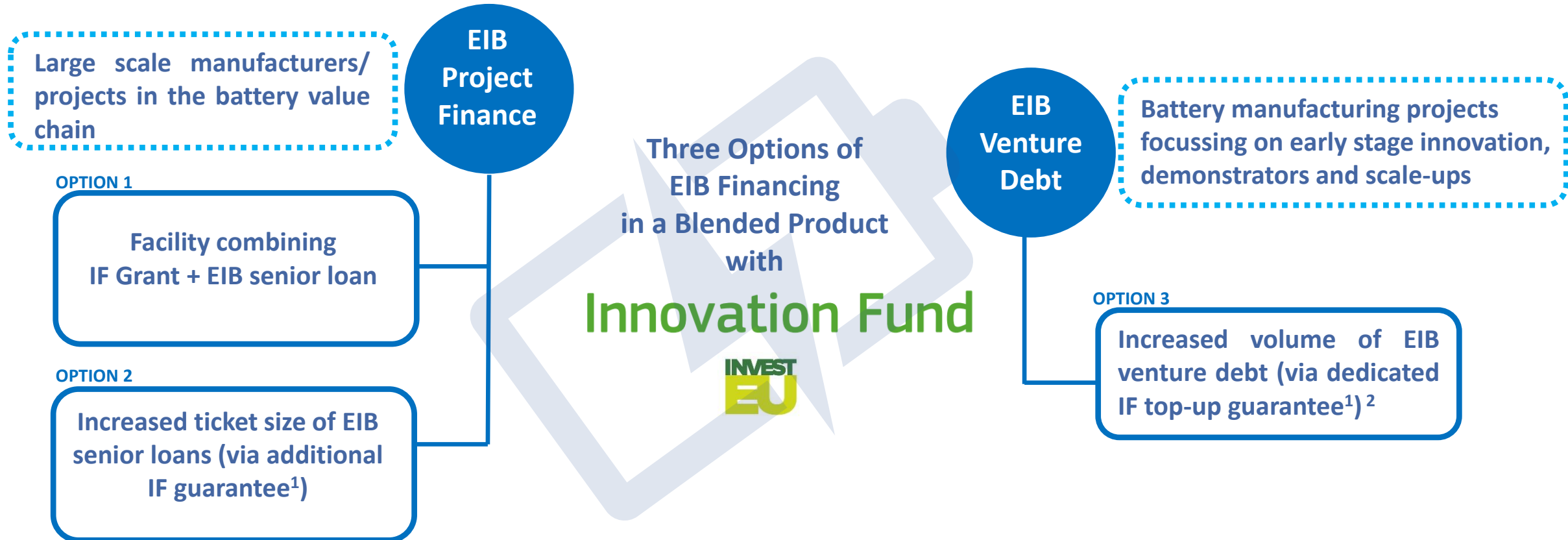
ALLOCATE DEDICATED RESOURCES TO BATTERY INNOVATION TO SECURE COMPETITIVENESS



- + Market gap/Additionality
- + Simple to formalize
- + Sizable pipeline (EUR 300-500m)
- + Scarcity of resources
- + Ability to combine with IF Grants - immediately
- + EIB Track Record & Ecosystem (bridge to PF/Corporate)

Options to Blend EIB PF and VD with the Innovation Fund

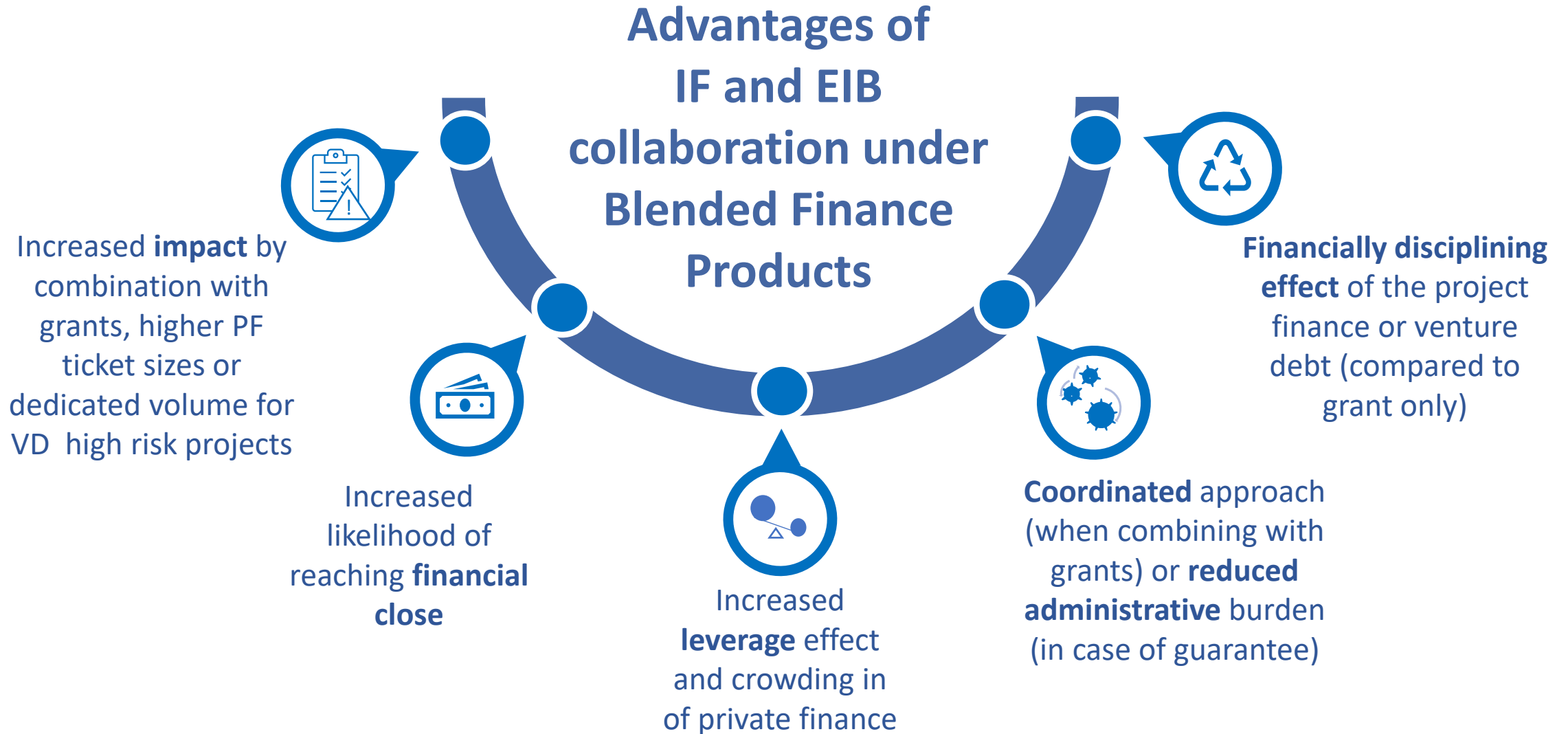
EIB Blended Finance Products



⁽¹⁾ For the avoidance of doubt, the guarantee is not on the project. It is provided to the EIB (with support of the Innovation Fund) for an InvestEU portfolio to support higher tickets of project finance or increased volume of venture debt to the battery projects.

⁽²⁾ EIB VD can be combined with IF Grants (further streamlining could be considered).

EIB Blended Finance Products - Advantages



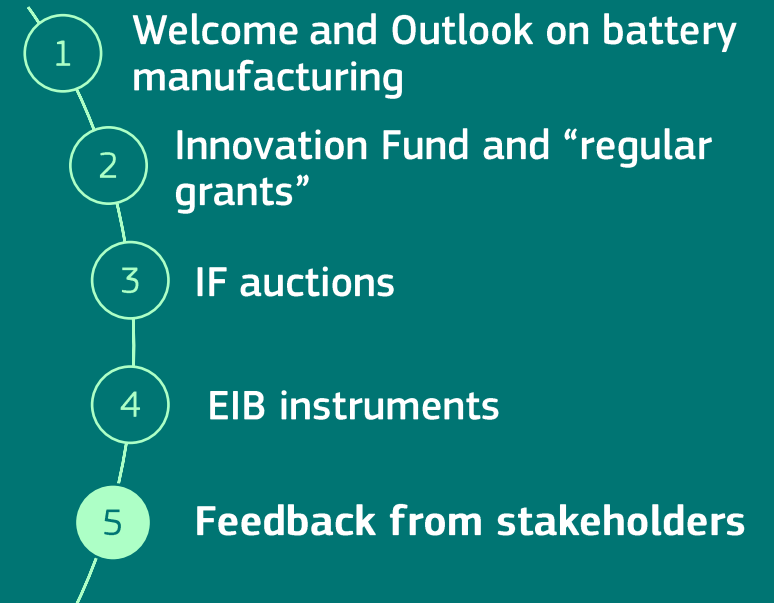
A photograph of a modern glass skyscraper at sunset. The building's curved facade and steel framework are visible on the right side. The sky is a mix of blue, orange, and pink, with the sun low on the horizon. The text 'THANK YOU!' is centered in white. In the background, there are silhouettes of trees and a distant city skyline.

THANK YOU!

Feedback from stakeholders

Stefanie Hiesinger, Head of Unit, DG CLIMA

Emma Krause, Senior Consultant,
Guidehouse





Fraunhofer Institute for Systems and
Innovation Research ISI



Stakeholder Workshop on Innovation Fund for battery manufacturing

Live Polling – Preliminary results

Emma Krause, Guidehouse

Brussels, 25/04/2024

Input on support from the Innovation Fund for EU battery cell manufacturing

Live poll open for your responses for additional responses until EOD 02/05/2024

- When is public support generally needed?
- Where is the support needed and where can trade-offs be made?
- What support tools are needed and how can existing mechanisms be improved?
- What is particularly important in European battery production?

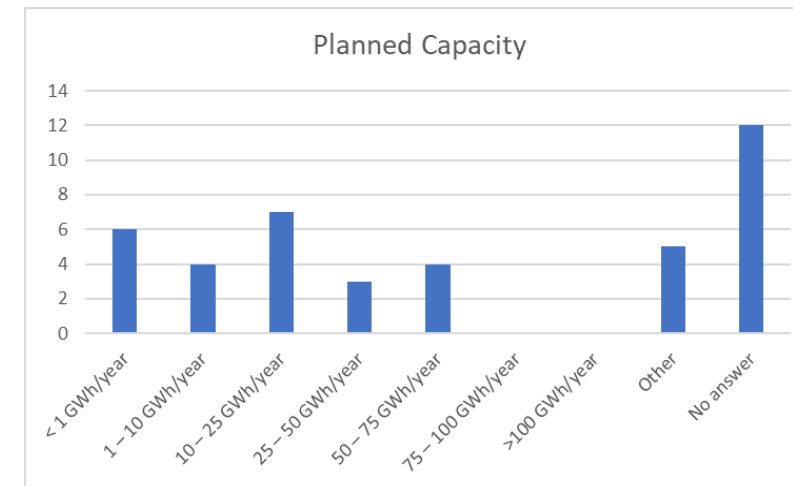
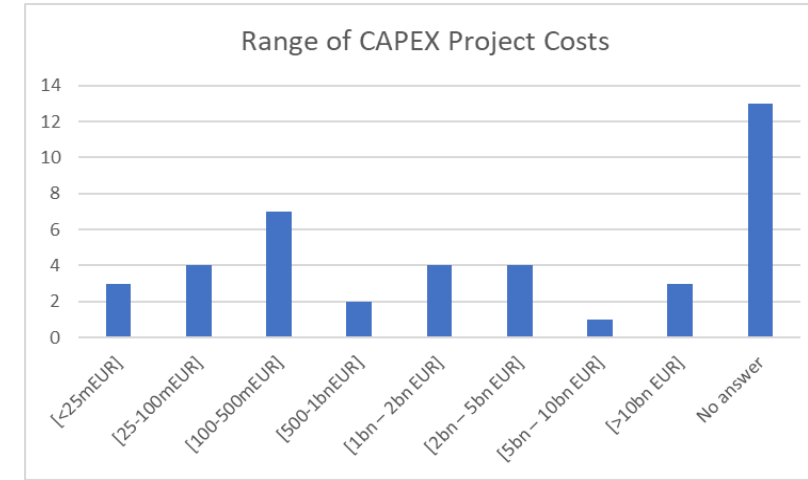
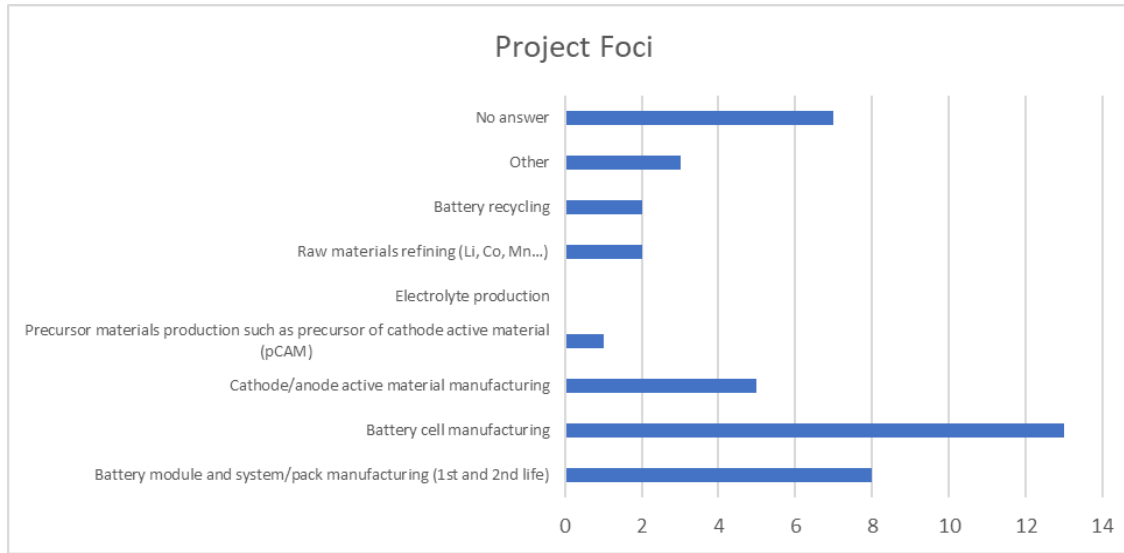
Access survey using this QR code



Input on planned projects and investments

Questions 1. a) – f)

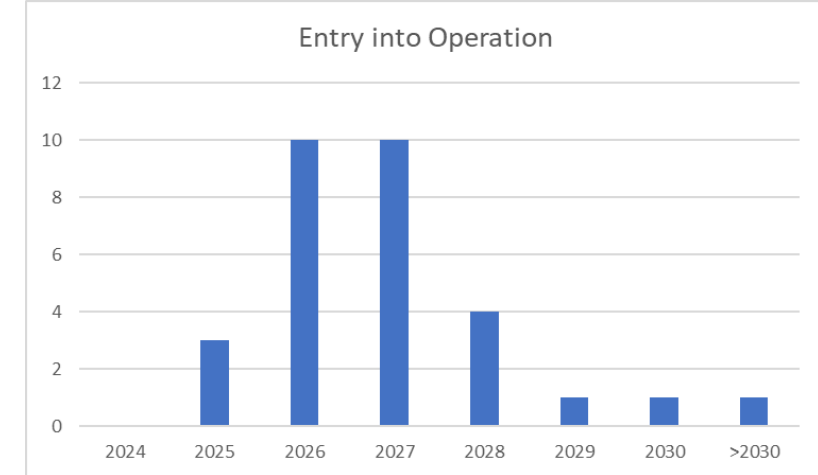
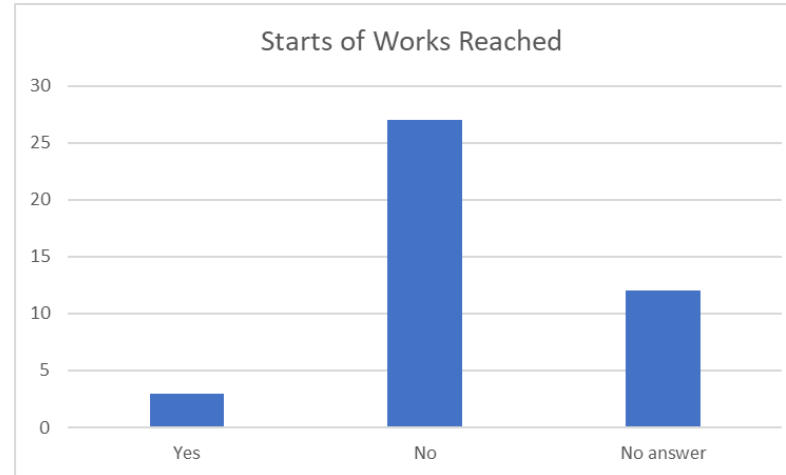
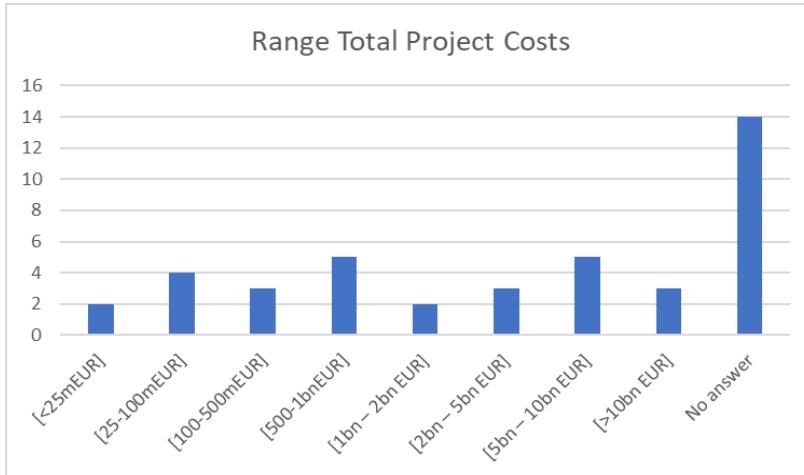
31 projects



Input on planned projects and investments

Questions 1. a) – f)

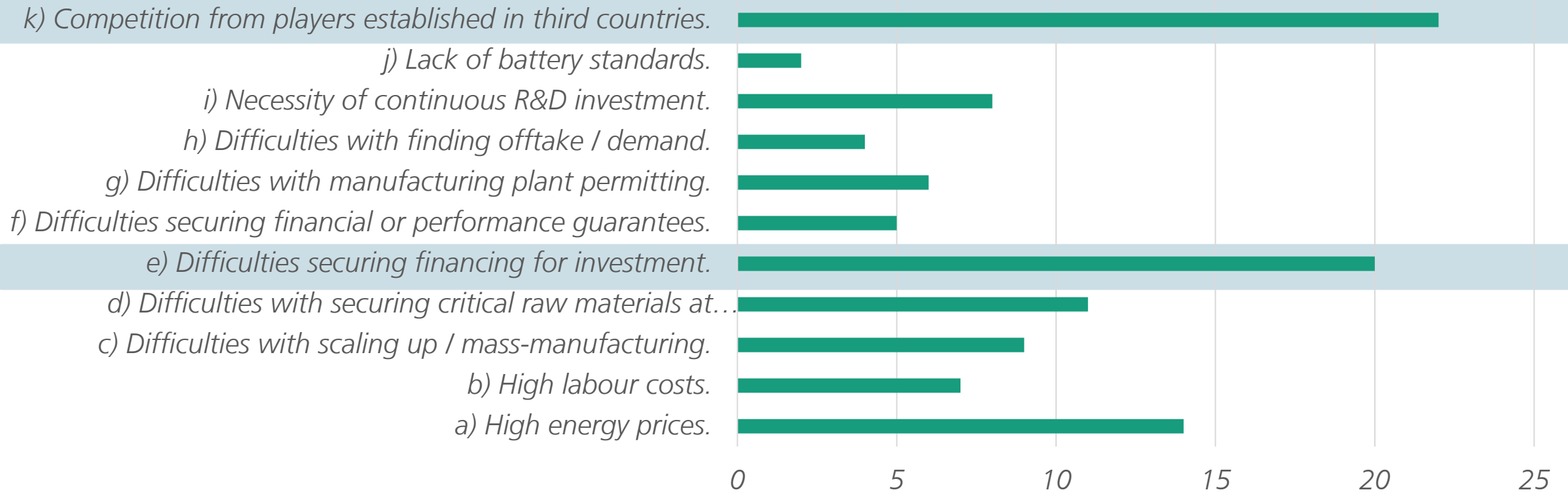
31 projects



Input on key challenges

Questions 2 - 4

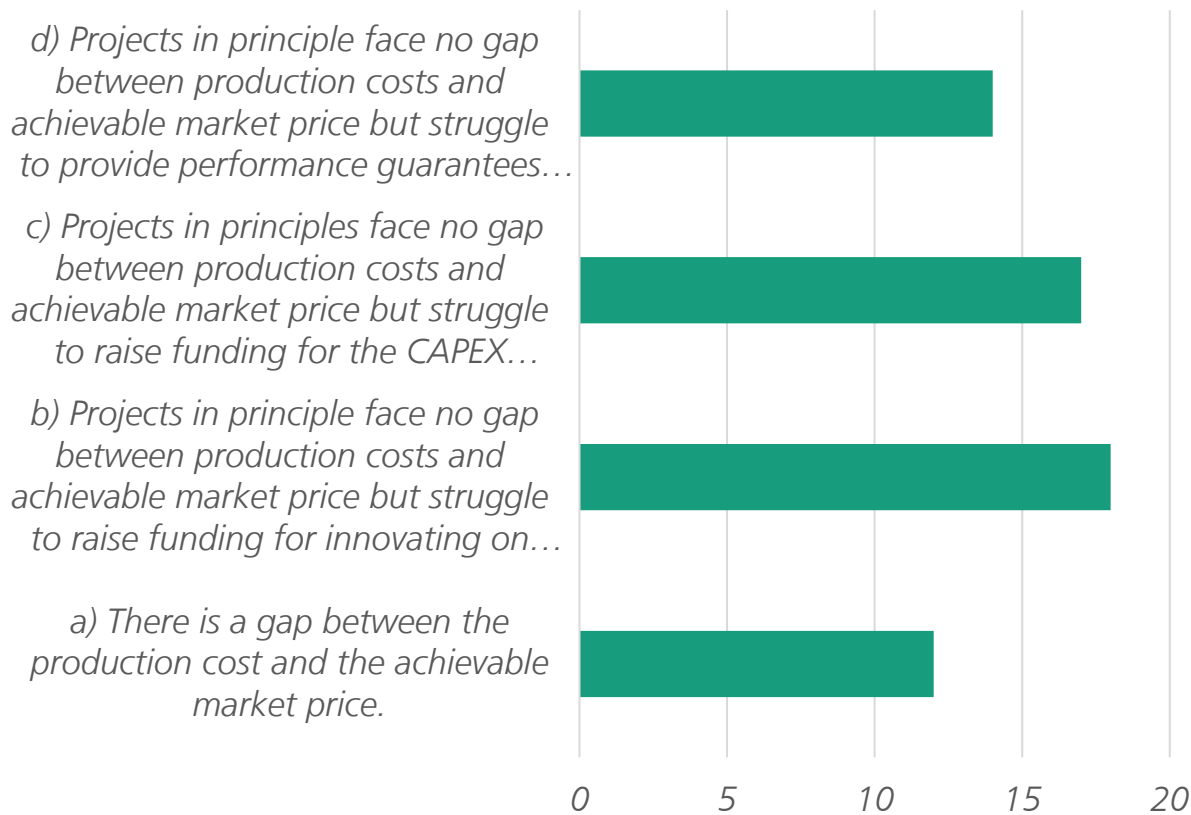
Key challenges



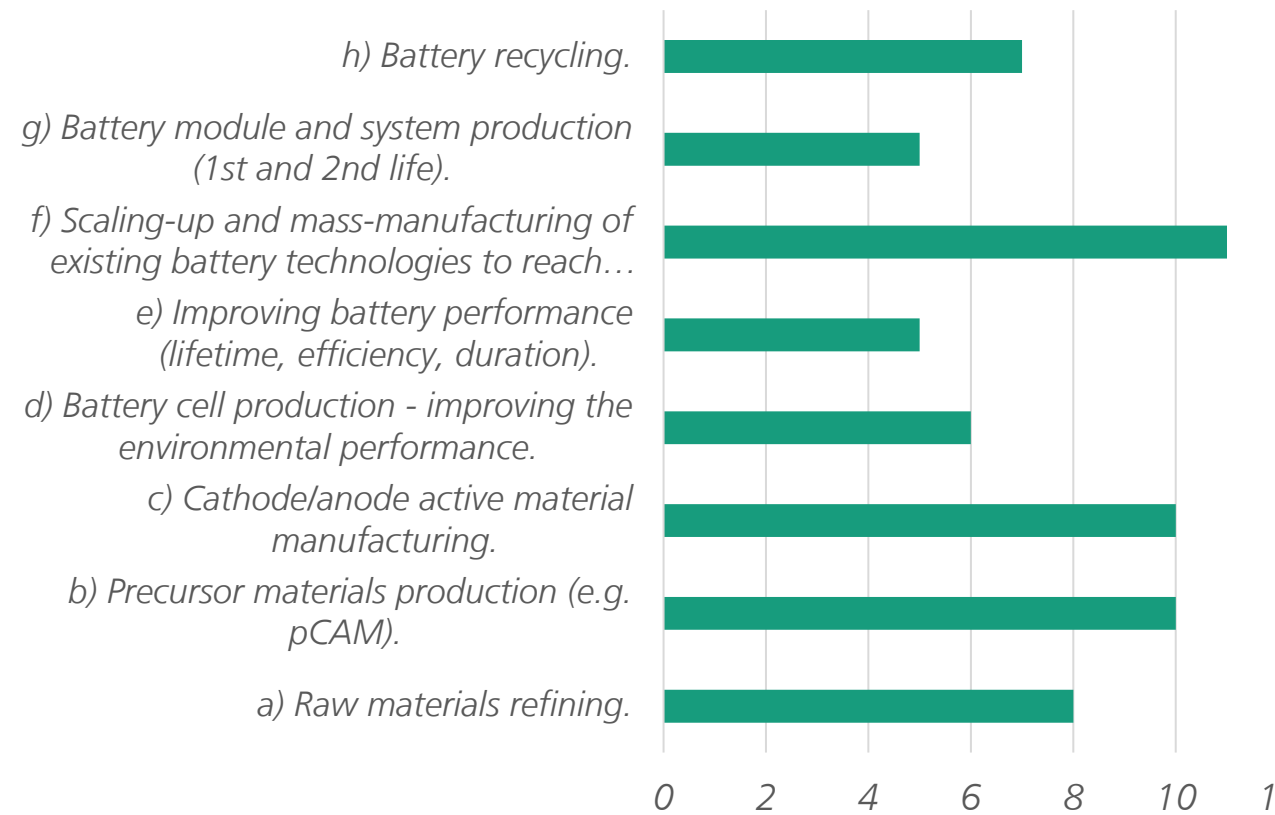
Input on key challenges

Questions 2 - 4

Key financing problems



Section of the value chain that needs highest amount of support

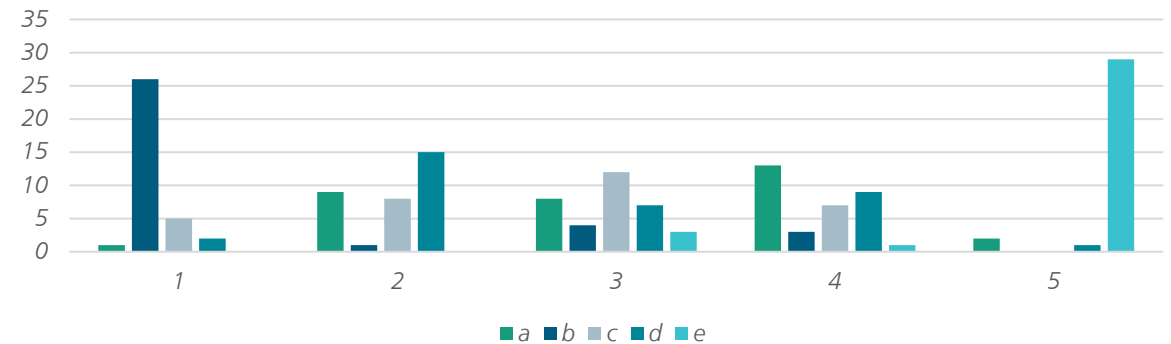


Input on support mechanism + associated features

Questions 5, 6, 7, 9, 10, 11

- **Mechanism best suited to support the battery manufacturing sector** (ranking)
- **Key financing problems** (ranking)
- **Features most important for a support mechanism** (ranking)
- **Instrument would apply for based on existing projects** (single choice)
- **Improving existing grants** (single choice)
- **Auctioned good for grant** (single choice)

5. Having read the options paper associated with this event, which support instrument under the IF would you consider best suited to support the battery manufacturing sector? Please keep in mind the limited maximum available budget. Please rank the follow

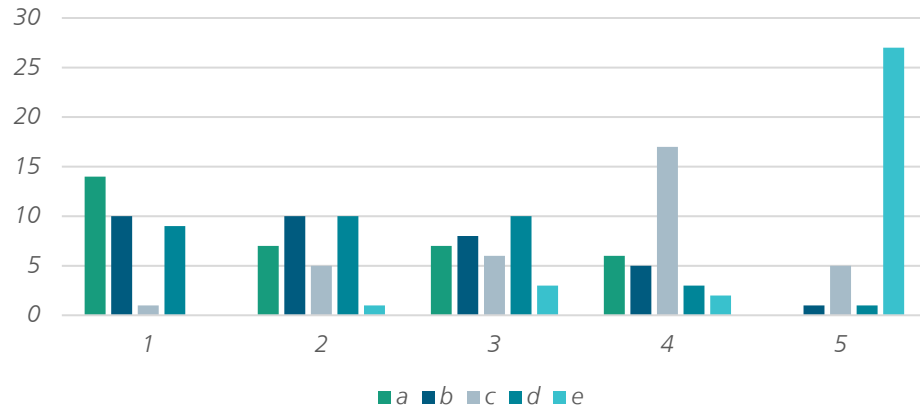


- a) Grants in the form of a fixed-premium awarded through an auction for one specific product in the battery value chain.
- b) "Regular" grants with a dedicated budget envelope for projects along the battery value chain awarded through the regular IF's award criteria.
- c) Additional venture debt or regular loans from the EIB for projects along the battery value chain.
- d) A facility combining EIB loans with IF grants.
- e) other type of support mechanism

Input on support mechanism + associated features

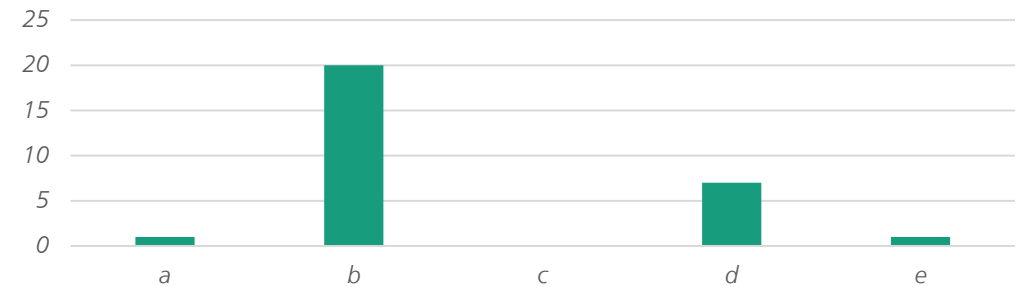
Questions 5, 6, 7, 9, 10, 11

6. What would you consider to be the most important features of a support instrument under the Innovation Fund? Please rank the following in order of importance:



- a) Possibility to cumulate with other sources of public funding (State aid, EU funds).
- b) Possibility to frontload part or all of the funding.
- c) Possibility to finance OPEX.
- d) Possibility to finance CAPEX.
- e) Existence of spill over effects.
- f) Other

9. For your project (if you replied positively to Question 1), which instrument would you apply to?

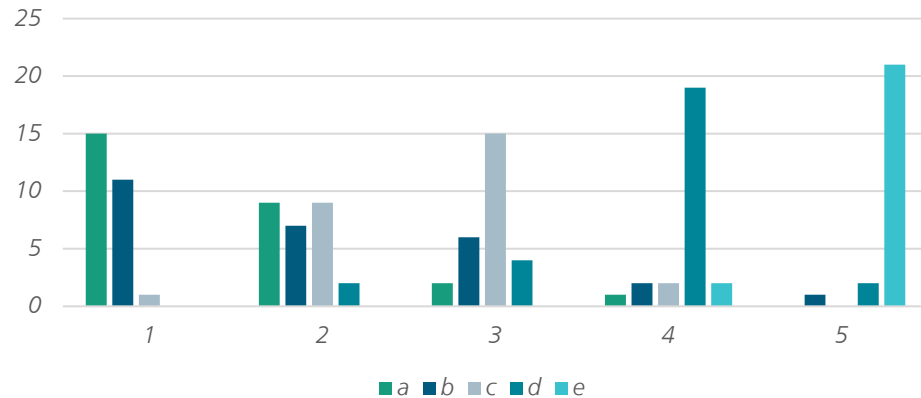


- a) Grants in the form of a fixed-premium awarded through an auction for one specific product in the battery value chain.
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- c) Additional venture debt or regular loans from EIB for projects along the battery value chain
- d) A facility combining EIB loans with IF grants.
- e) Other

Input on support mechanism + associated features

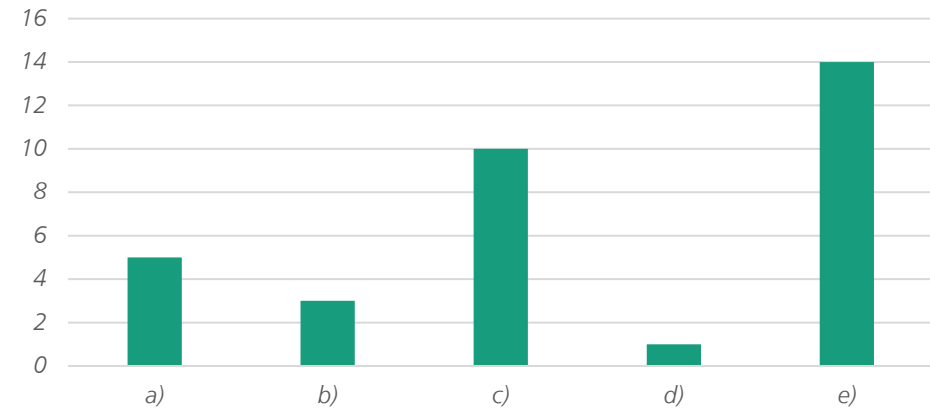
Questions 5, 6, 7, 9, 10, 11

10. How could the existing, "regular" Innovation Fund grants be made more accessible for battery manufacturing?



- a) Open a dedicated manufacturing topic for the battery value chain with an earmarked budget.
- b) Simplify the application process e.g., by providing more templates for mandatory documents.
- c) Provide clarity on cumulation with other types of public funding.
- d) Award "Seal of sovereignty" and facilitate access to other funding.
- e) Award "Seal of sovereignty" and facilitate access to other funding.

11. If the fixed premium auction was to be developed to support the battery manufacturing what auction good should be supported?

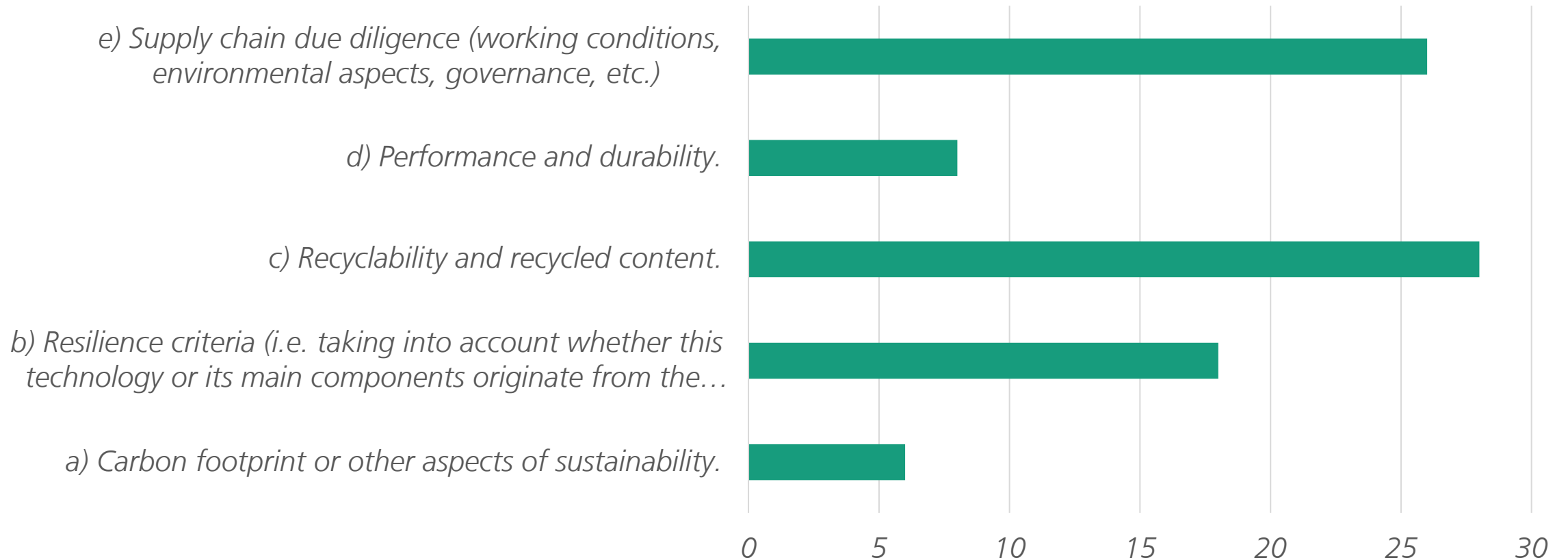


- a) Battery cell of stationary batteries.
- b) Battery module of stationary batteries.
- c) Battery cell of electric vehicles batteries.
- d) Battery module of electric vehicles batteries.
- e) The product would need to be defined in more detail (which use, cell or module but also types of chemistry, performance factors and carbon footprint).

Input on eligibility criteria and award

Questions 8, 12

Criteria for new funding instruments



Thank you for your attention!

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