ETIP Wind

EUROPEAN TECHNOLOGY & INNOVATION PLATFORM ON **WIND ENERGY**

Executive Committee meeting

November 2019

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Alexander Vandenberghe

ETIPWind secretariat

TIMING	AGENDA ITEM
09:15 – 09:20	Introduction Aidan Cronin, Executive Committee Chair
09:20 – 09:35	Terms of reference ETIPWind secretariat
09:35 – 09:45	Feedback from Advisory Group Mike Anderson, Advisory Group meeting chair
09:45 – 10:00	Technology Roadmap ETIPWind secretariat
10:00 – 10:15	Update on European R&I policy ETIPWind secretariat
10:15 – 10:30	Impact of REACH policy on wind energy Discussion
10:30– 10:45	BREAK
10:45 – 11:30	ETIPWind 2020 Work Programme Discussion
11:30 – 12:25	Aligning EU-wide and country-specific research agendas • Megavind (DK) - confirmed • Offshore Wind Innovation Hub (UK) - Confirmed • REOLTEC (ES) - Confirmed • Forschungsnetzwerk Erneuerbare Energien (DE) - Confirmed
12:25 – 12:30	AOB
12:30	End of meeting

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Introduction

Terms of Reference

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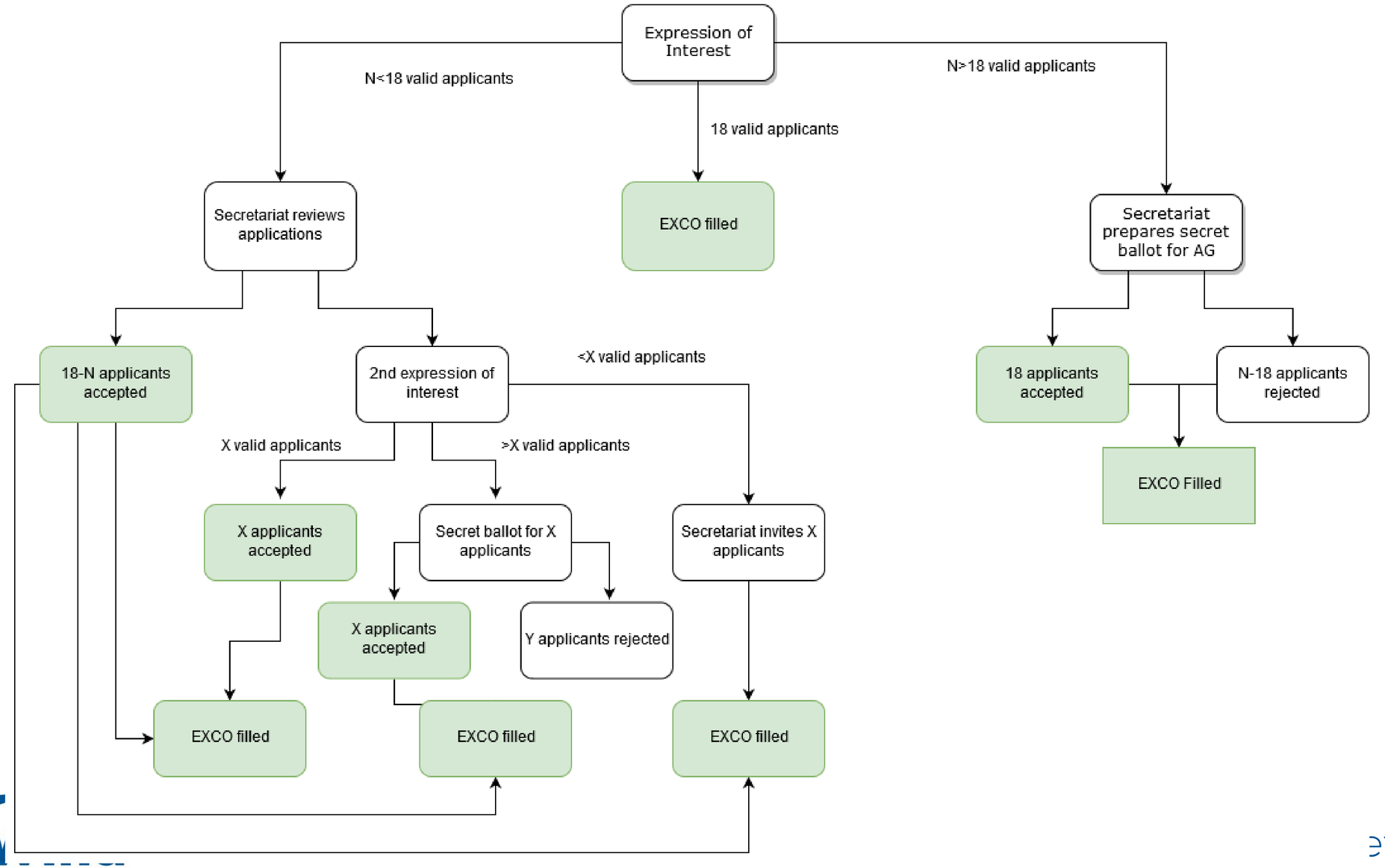
Updating the terms of reference

- Update description and objectives in line with ETIPWind contract
- Increase EXCO to 27 seats (9-18 vs 8-16)
- Election process for industry representatives (see next slide)
- 18 month terms for EXCO members (incl. chair)
- Decision by consensus or 2/3 majority
- Meeting attendance obliged for > 50% of meeting

EXCO industry representatives election

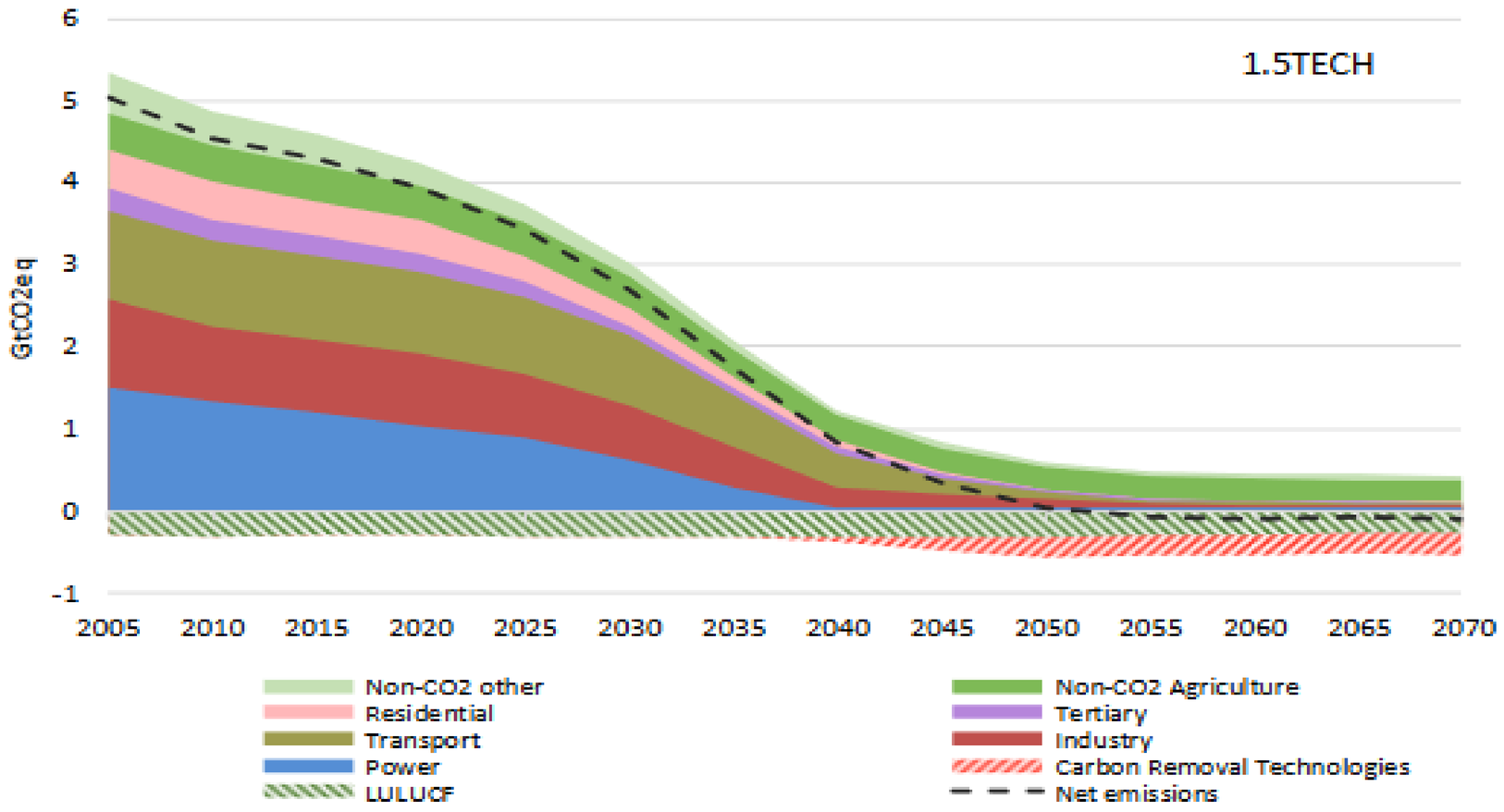


Feedback from Advisory Group

Structure

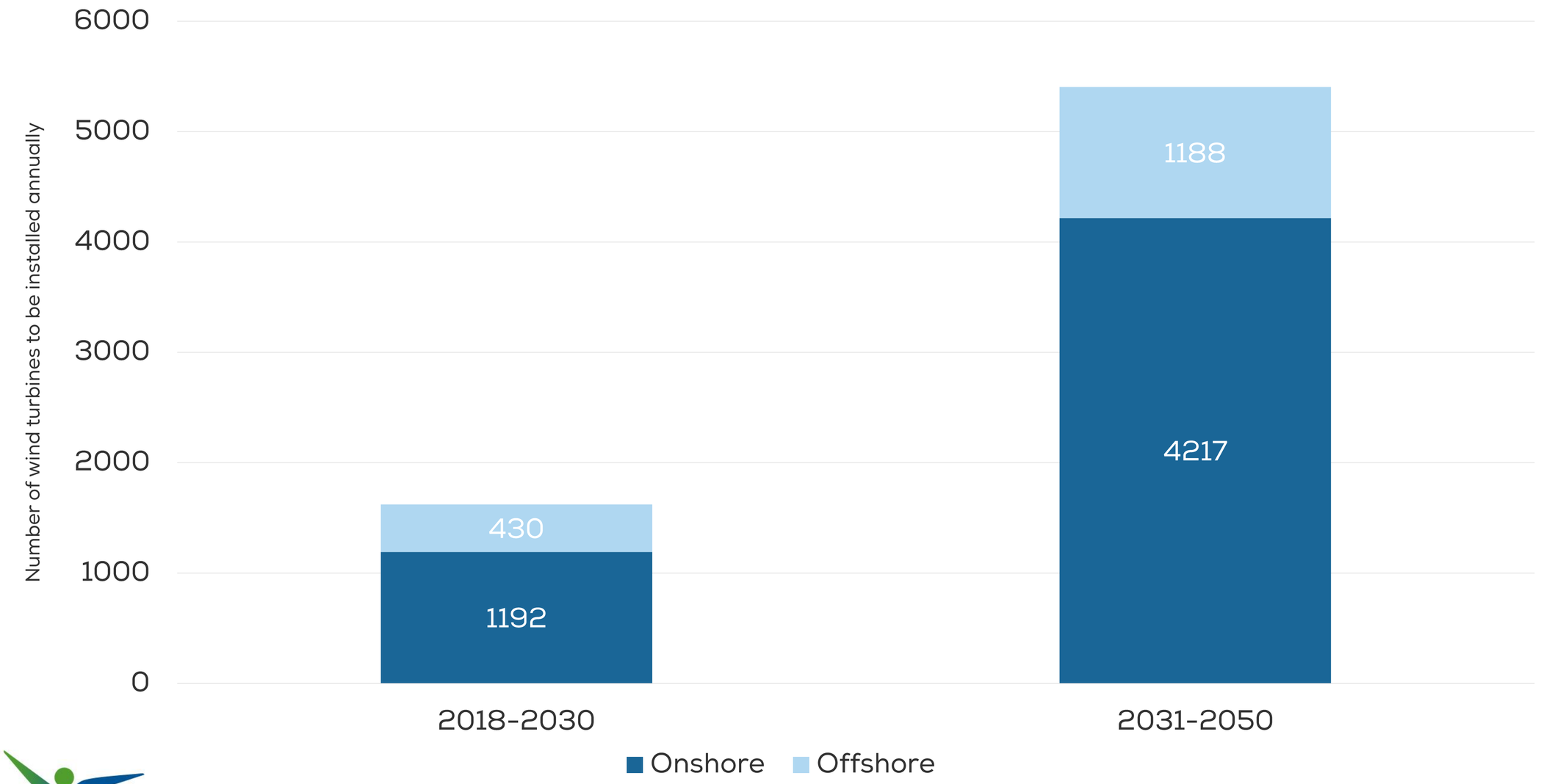
- Climate and energy policy.
- Renewables-based electrification.
- Challenge 1: Deploying volumes requires investments in:
  - Technology;
  - People; and
  - Infrastructure.
- Challenge 2: Towards a system fit for 100% renewables:
  - Integration into existing grid;
  - Get wind to become the backbone of future system,
- Collaboration with Academia.
- Conclusion.

LONG TERM STRATEGY (TOWARDS CARBON NEUTRALITY?)



Source: European Commission

R&I NEEDED TO ACCELERATE LARGE-SCALE DEPLOYMENT



Assumed average wind turbine nominal capacity: 4MW (onshore) and 10MW (offshore) for 2018-2030 and 6MW (onshore) and 16MW (offshore) for 2031-2050.

Anonymised survey collector

OBJECTIVE:

- Confidential collection and aggregation of sensitive data

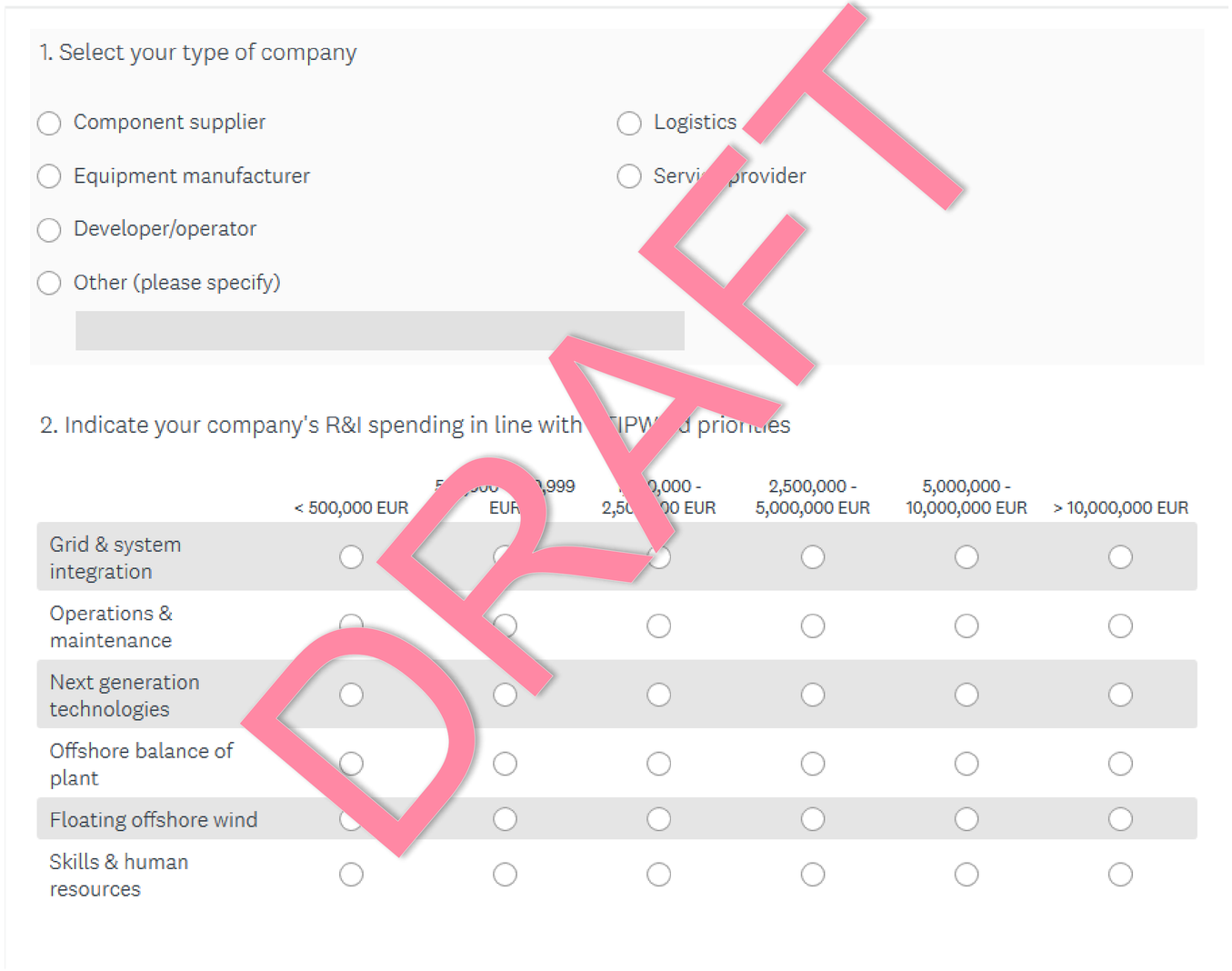
INPUT:

- Email addresses stored.
- New survey: anonymised user names generated.
- Data entered to unique URL protected by password generated with survey.

OUTPUT:

- Responses aggregated and only visible once minimum three responses.
- Minimum four responses needed to use data.

How would it work – option



1. Select your type of company

- ◯ Component supplier
- ◯ Logistics
- ◯ Equipment manufacturer
- ◯ Servi provider
- ◯ Developer/operator
- ◯ Other (please specify)

2. Indicate your company's R&I spending in line with TIPW d priorities

	< 500,000 EUR	EUR	2,50 0 EUR	2,500,000 - 5,000,000 EUR	5,000,000 - 10,000,000 EUR	> 10,000,000 EUR
Grid & system integration	◯	◯	◯	◯	◯	◯
Operations & maintenance	◯	◯	◯	◯	◯	◯
Next generation technologies	◯	◯	◯	◯	◯	◯
Offshore balance of plant	◯	◯	◯	◯	◯	◯
Floating offshore wind	◯	◯	◯	◯	◯	◯
Skills & human resources	◯	◯	◯	◯	◯	◯

ETIPWind Roadmap

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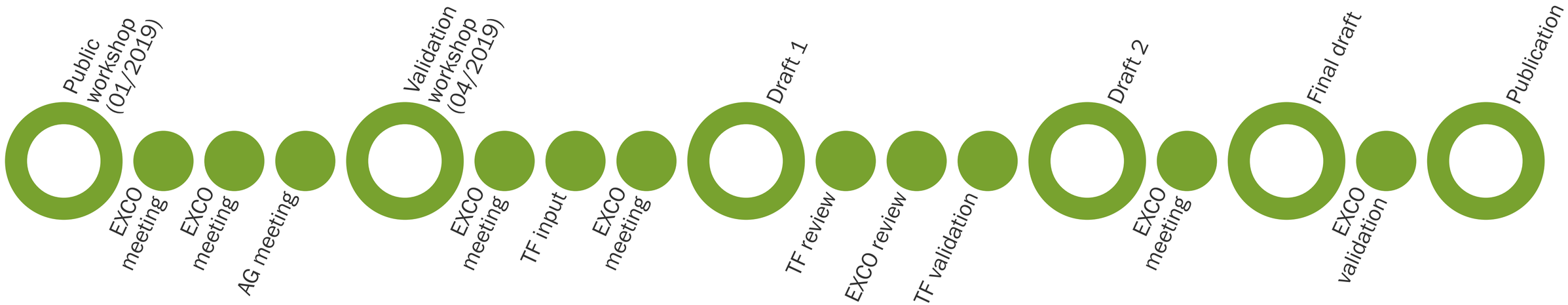
Why a roadmap?

- Target European Research & Innovation (R&I) policy.
  - Shape the *strategic* approach to R&I funding programmes.
  - Answer the call for specific contributions.

- Define sector-wide challenges and opportunities.
  - Identify specific areas for cross-sectoral collaboration.
  - Monitor progress and evolution in wind energy.

- Align industry and academia.
  - European Academy for Wind Energy (EAWE).
  - EERA joint programme on Wind (EERA JP Wind).

ETIPWind Roadmap



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Research & Innovation priorities 2020-2027

Technology Roadmap

- Grid & system integration
- Operations & maintenance
- Next generation technologies
- Offshore balance of plant
- Floating offshore wind
- Skills & human resources

Short-term 2020-2022	Medium-term 2023-2024	Long-term 2025-2027
• Integrated forecasting of power production & demand • Short-term energy storage	• Optimising transmission infrastructure	• Stable system with 100% RES
• Lifetime assesment and condition monitoring • Digital tools for control and monitoring	• Dynamic cable repair solutions • Digital solutions for smart operations • Predicting environmental parameters	
• Development and validation of components & materials • Blade recycling demonstration • Integrating wind energy in the surrounding natural and social environment	• Development of sustainable materials • Standards • Manufacturing processes	• Recycling methods for materials and components
	• Cabling and connections	• Cross-industry agreement and standards • Integrated optimised design plan • Verification of methods and procedures
• Lean production • Validation of design tools • Mooring and anchors • Dynamic electric cables • Control methods		
• Expand and harmonise wind energy teaching in Europe	• Boost wind energy higher education	
• Long-term energy storage	• Quantification of system services • Sustainable hybrid solutions	
• Robotic inspection and repair methods	• Decommissioning strategies and technology • Solutions for operating in extreme conditions	
• New transportation methods for large components	• Sensor technologies, diagnostics and response • Next generation generators • Noise reduction • Reliability of components	• Disruptive technologies
• Data availability & sharing • Serial production – analysis of substructure production processes	• Material durability and protection	
	• Integrated design process in supply chain	• Park level control
	• Joint academia-industry educational programmes	
• Multi-cultured wind farms • Modelling future system needs		
		• Supply chain logistics (decommissioning)
	• Floating installation, assembly and heavy maintenance	

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Example: circularity in the technology roadmap

Blade recycling (demonstration)

Short term | High priority

Description and scope

The volume of blades produced and delivered to the market has increased over the last many years due to the exponential growth of the wind energy sector. Many turbines will soon reach the end of their operational life and will have to be decommissioned. While there are good ways of recycling many of the metal parts of a wind turbine, there is still no industrialised method to recycle wind turbine blades as they have a complex material structure (resins, composites, etc.).

Hence, blades at the end of their designed lifetime often end up as landfill or incineration, which is a sub-optimal use of precious resources and materials. A large scale demonstration of recycling of wind turbine blades including business cases for industrialization hereof will improve wind turbine circularity, offer new opportunities for re-use of materials by other sectors and provide the wind energy sector and other composite heavy sectors with ready solutions to manage upcoming volumes of composite waste.

Recommended research actions

- Development of financial model for recycling of wind turbine blades.
- Assessment of different methods of recycling of wind turbine blades according to developed financial model.
- Demonstration of industrialised recycling of wind turbine blades scalable to the coming volumes of end-of-life blades.
- Demonstration of re-use of materials from recycled blades.

Milestones

- Industrial scale demonstration facility of composite waste recycling dedicated to wind turbine blades by 2022.
- Cross-sectoral pilot project on the re-use of recycled composite materials from wind turbine based by 2024.

Development of sustainable materials

Medium term | High priority

Description and scope

Wind turbine blades are composed out of many materials, but the majority of them are fibre reinforced plastics (FRP). Currently glass fibres are the most used reinforcement fibres, but carbon fibres have already been introduced for longer blades to reduce weight.

Most, if not all the resins used are thermoset type resins such as polyester, vinylester or epoxy. Recycling of FRP from past and current state of the art wind turbine blades is difficult due to the chemical bonds of the fibers with the plastic and resins.

New sustainable materials fit for use in blades for wind turbines must be developed. The development of these new sustainable materials must be performed in a circular economy framework securing future wind turbine blades, which are sustainable in relation to economy and resources.

Recommended research actions

- Mapping and evaluation of sustainable material system potential suitable for use in manufacture of wind turbine blades.
- Development of new high-performance materials matching or better outperforming current state of the art materials for wind turbine blades and securing full sustainable and easy recycle blades at end of life.
- Demonstration of the new developed materials in sustainable design of wind turbine blades.

Milestones

- Mapping and evaluation of sustainable material system potential suitable for use in manufacture of wind turbine blades completed.
- Development of new high-performance materials matching or better outperforming current state of the art materials for wind turbine blades completed.
- Demonstration of the new developed materials in sustainable design of wind turbine blades.

Recycling methods for materials and components

Long term | High priority

Description and scope

Multiple methods for recycling of fibre reinforced plastics (FRP) have been investigated, however only a few have a high technology readiness level (TRL) and have been demonstrated at commercial scale (pyrolysis and cement kiln). Full financial assessment of different methods of recycling of wind turbine blades is needed to find optimal solution for future volumes of end-of-life blades. Further market barriers for commercialisation of recycling of wind turbine blades/FRP have to be identified and eliminated to turn recycling of wind turbine blades into a profitable business to the benefit of society and environment.

Recommended research actions

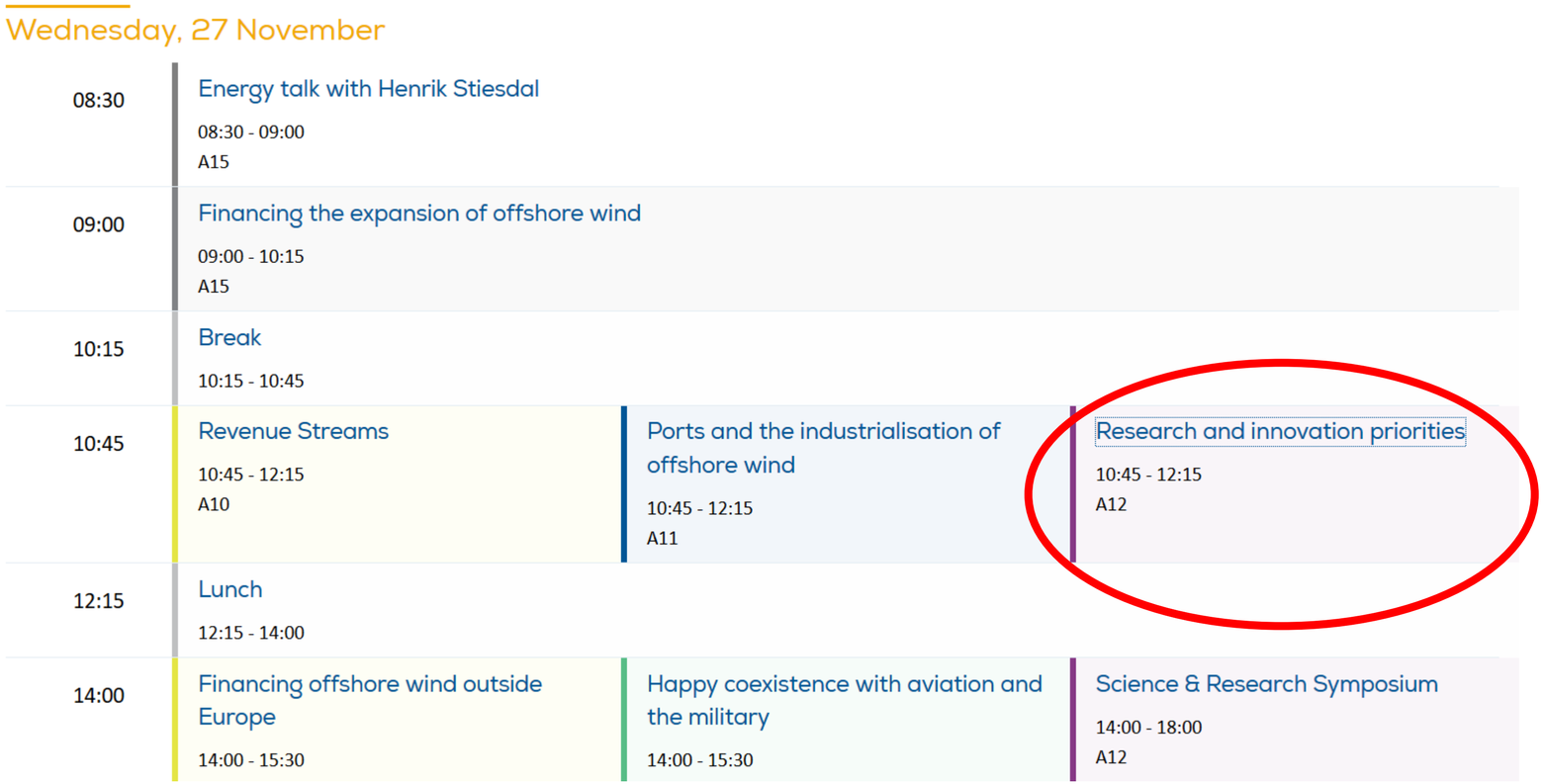
- Assessment of different recycling methods in a commercial and industrialised framework.
- Identify market barriers for comercialisation of recycling of wind turbine blades and generate recommendation to eliminate those.

Milestones

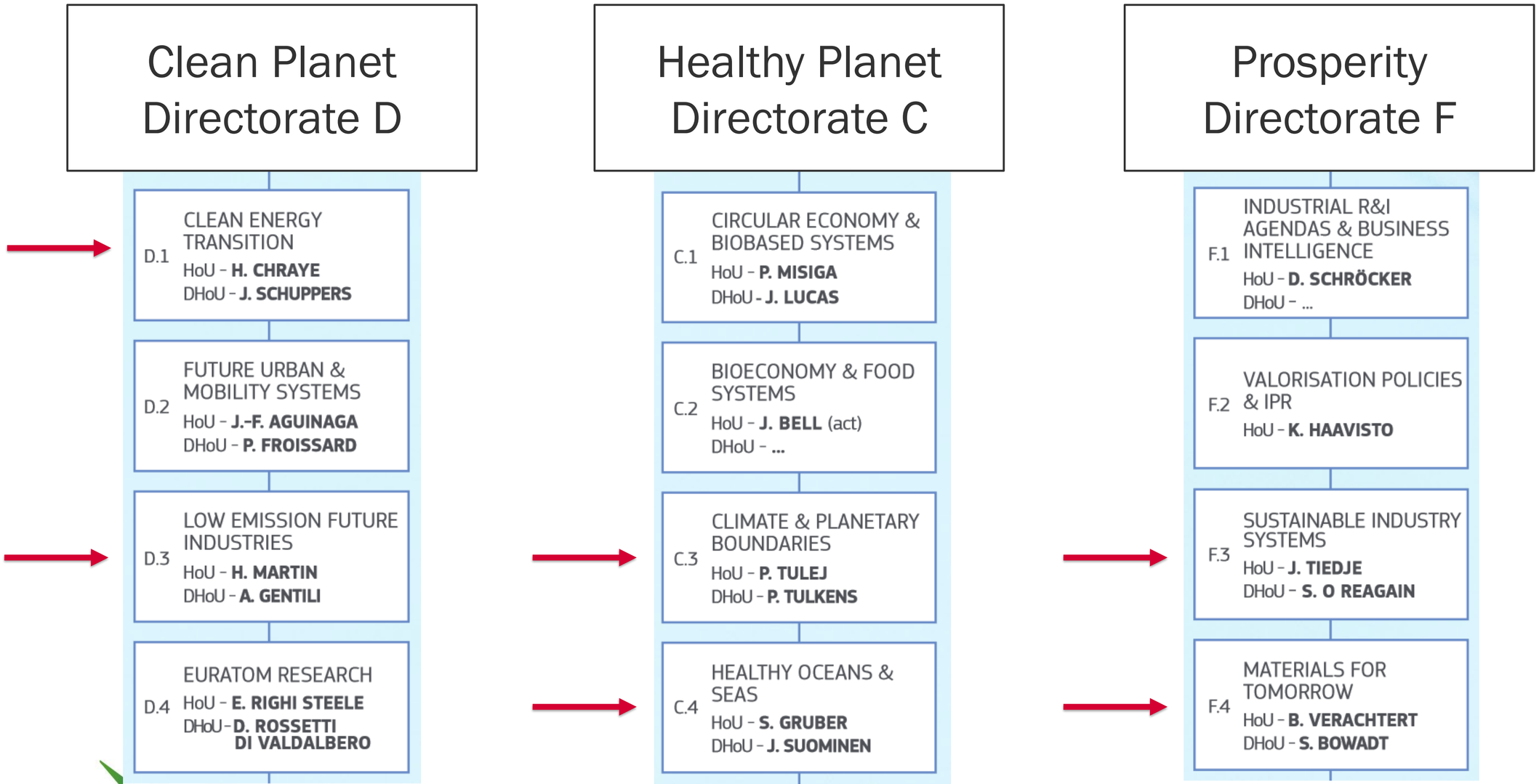
- Assessment of different recycling methods in a commercial and industrialised framework completed.
- Market barriers for commercialised of recycling of wind turbine blades identified.
- Recommendation to eliminate market barriers defined.

Dissemination to the sector

- Launch @ WindEurope Offshore 2019
- Press release
- Website (interactive)
- Social media posts



Dissemination to European policymakers (non-exhaustive list)



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EU Research & Innovation policy

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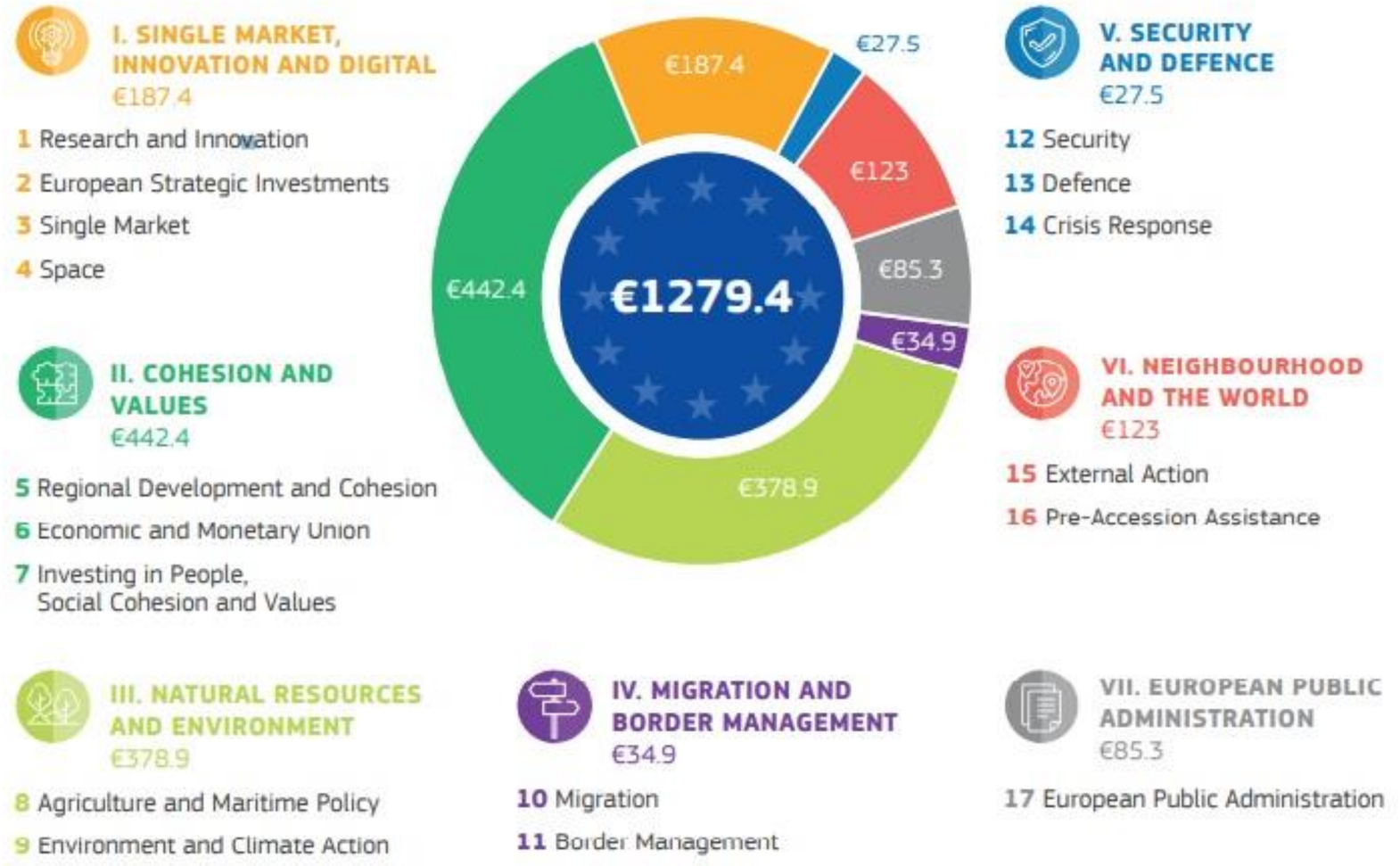
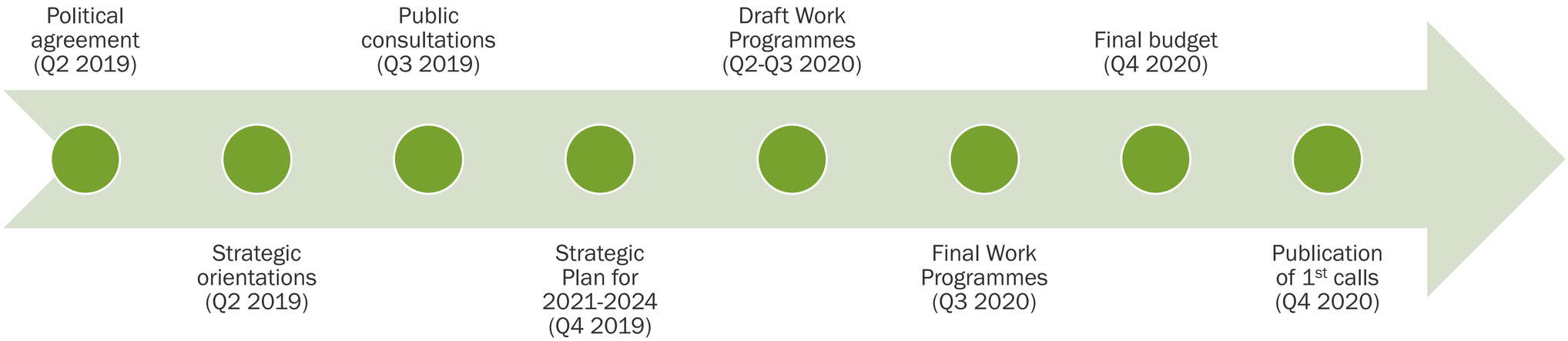
Proposed EU budget for 2021-2027



Source: European Commission

Horizon Europe timeline



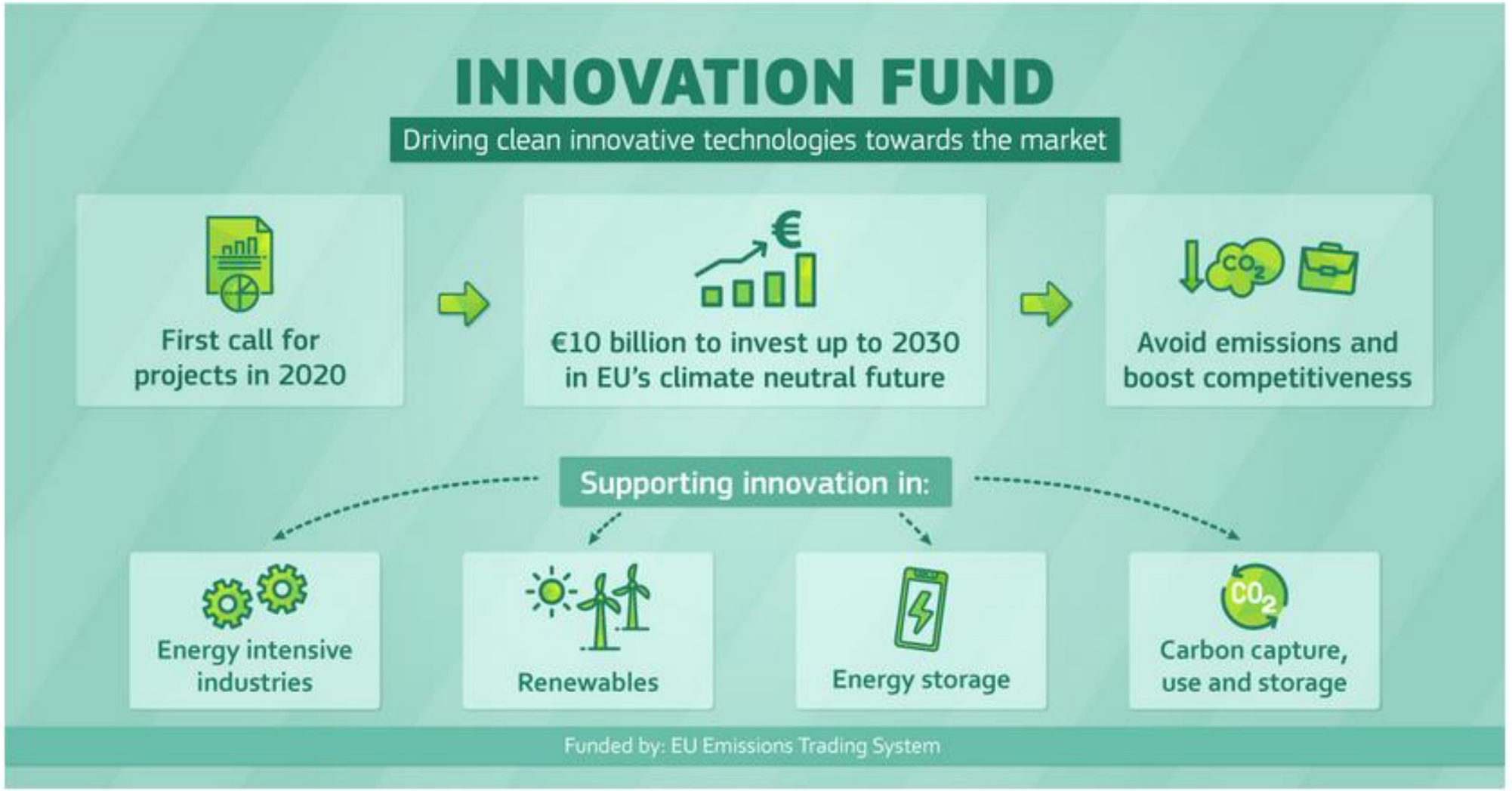
Horizon Europe proposed structure

Source: European Commission

Horizon Europe strategic plan on Climate, Energy & Mobility

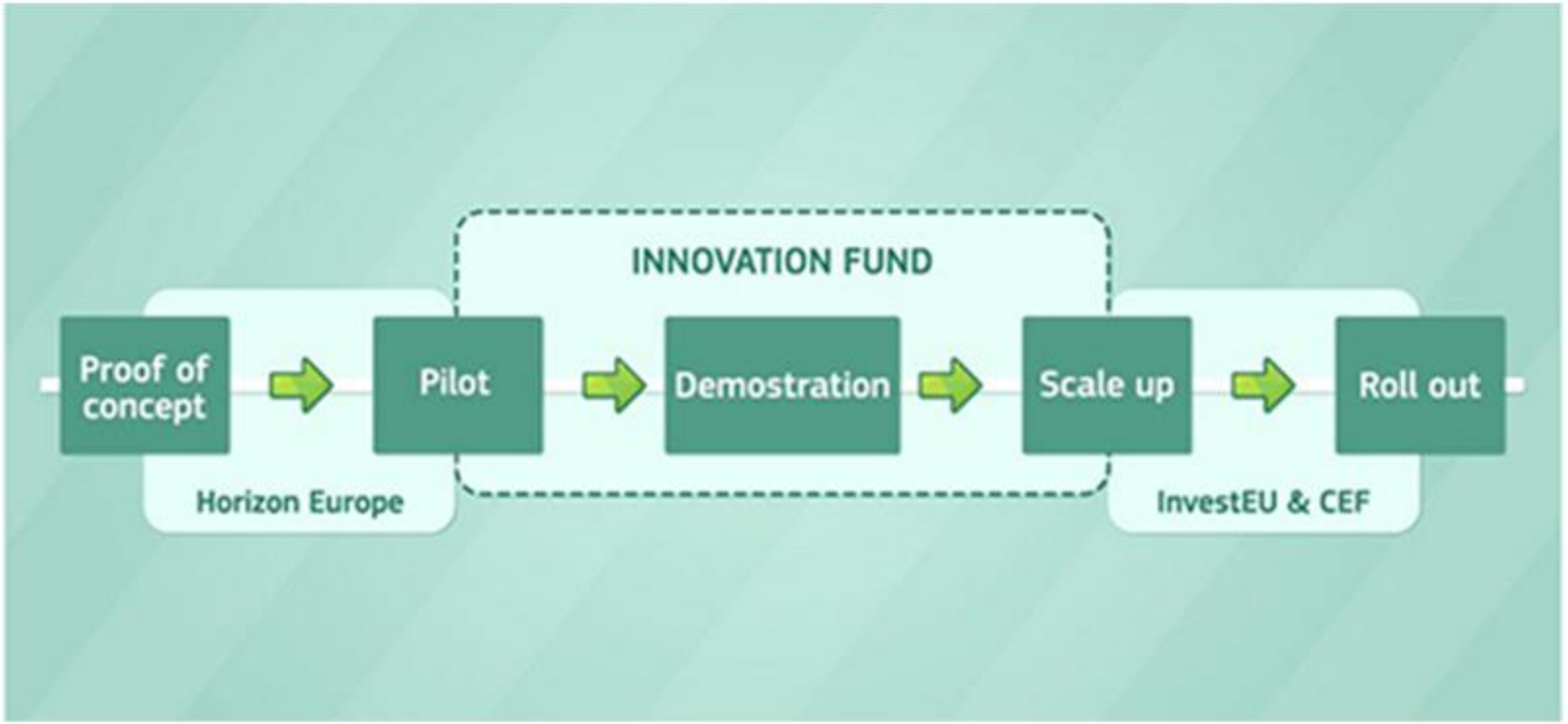
1. Climate science
2. Cross-sectoral solutions for decarbonisation
    1. Batteries
    2. Hydrogen
    3. Infrastructure (cities)
    4. Emerging breakthrough technologies (e.g. DACCS)
3. Net Zero-GHG emission energy system centred on renewables (RES)
    1. **Global leadership in RES** (support to wind and solar, portfolio diversification, fuels)
    2. Grids
    3. CCSU (in power sector and industry)
    4. Energy Storage
4. Demand side solutions
5. Low carbon transport
6. Smart mobility

Innovation Fund



Source: European Commission, DG CLIMA

Innovation Fund



Source: European Commission, DG CLIMA

Innovation Fund – our five recommendations

1. Align with the wind industry's recommendations from **strategic research and innovation agenda** (SRIA);

2. Address the so-called "**valley-of-death**" in financing (the period between demonstration and final investment decision);

3. Provide **fit-for-purpose upfront investment** as early as possibly in the project;

4. Include **thresholds** for funding; and

5. Focus on **replicable projects** that boost **industrial competitiveness**.

Impact of Reach policy

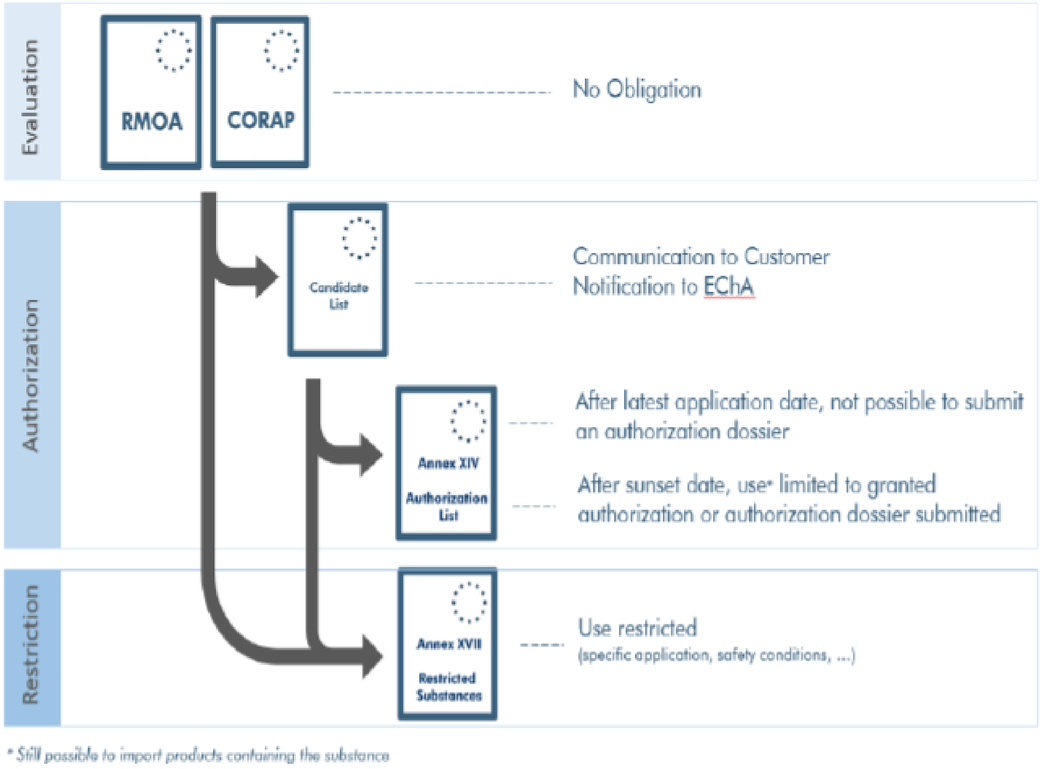
Lead subject to REACh authorisation?: State of play

- **REACH Regulation (EC 1907/2006):**

  Legal framework governing the safe use of chemicals in the internal market. It concerns the 'Registration, Evaluation, Authorisation and Restriction of Chemicals.'
- **Authorisation:**

  REACH mechanism designed to deal with the risks assumed to be presented by substances of very high concern ('SVHC').
- Process for SVHC inclusion in authorisation annex:
  - (i) identification as an SVHC,
  - (ii) inclusion on 'Candidate list',
  - (iii) prioritization, and
  - (iv) inclusion in Annex XIV REACH.

➢ ***SVHCs on the REACH authorisation Annex (XIV) cannot be placed on the market for use, or to be used, in the EU unless the company has been authorised to do so.***



Source: EuropaCable

Lead subject to REACh authorisation?: State of play

Lead

- was identified as an SVHC because it is Reprotox Category 1A
- was included on the Candidate List on 27 June 2018
- is very likely to be part of ECHA's next (10th) prioritisation recommendation (Spring 2020)

➢ *If prioritised, European Commission may decide to include Lead in Annex XIV authorisation annex based on technical and socio-economic criteria. Accordingly, unless authorised, Lead could not be placed on the market for use, or to be used, in the EU as of 2024.*

Timeline: Fast Track Scenario

Source: EuropaCable

Lead use forecast

Year	DC LAND System km			DC Submarine System km			Grand TOTAL
	320kV	>320kV	Total	320kV	>320kV	Total	
2019	100	-	100	1,057	1,618	2,675	2,775
2020	103	-	103	1,747	2,660	4,407	4,510
2021	103	1,870	1,973	2,340	1,750	4,090	6,063
2022	-	2,403	2,403	2,110	1,273	3,383	5,786
2023	330	2,483	2,813	2,855	1,265	4,120	6,933
2024	330	2,484	2,814	2,870	1,345	4,215	7,029
2025	150	-	150	1,325	1,105	2,430	2,580
2026	510	-	510	1,200	690	1,890	2,400
2027	360	30	390	570	430	1,000	1,390
2028	-	30	30	1,710	270	1,980	2,010
2029	-	-	-	1,640	70	1,710	1,710
Total	1,986	9,300	11,286	19,424	12,476	31,900	43,186

Source: EuropaCable (in the context of the ENTSO-E TYNDP 2018)

Reach and export cables

Lead is currently used in all export submarine cables and in some underground cables. Specifically for export cables, the **current standard prescribes lead to pass the certification.** If the result is negative the EC would **prohibit the use of lead for manufacturing** of cables and other gods starting effectively **in 2024**, however this wouldn't immediately apply to cables imported (manufactured outside Europe) but to prohibit this a different regulation needs to be on place. Europacable is currently working with the International Lead Association but they are also preparing their own response in case the result is negative.

Development of lead-free cables (at similar cost levels) by 2024 is a medium priority within the ETIPWind Roadmap. What is the current technology readiness level of lead-free cables? How realistic is wide-spread market uptake of lead-free alternatives by 2024 and by 2030?

In a scenario where European cable manufacturers are banned from making lead-based export cables lead, but companies from the wind energy sector can still use lead-based export cables (by an individual “authorisation of use”). What would the overall cost impact of importing export cables, notably from China, be?

2020 Work Programme

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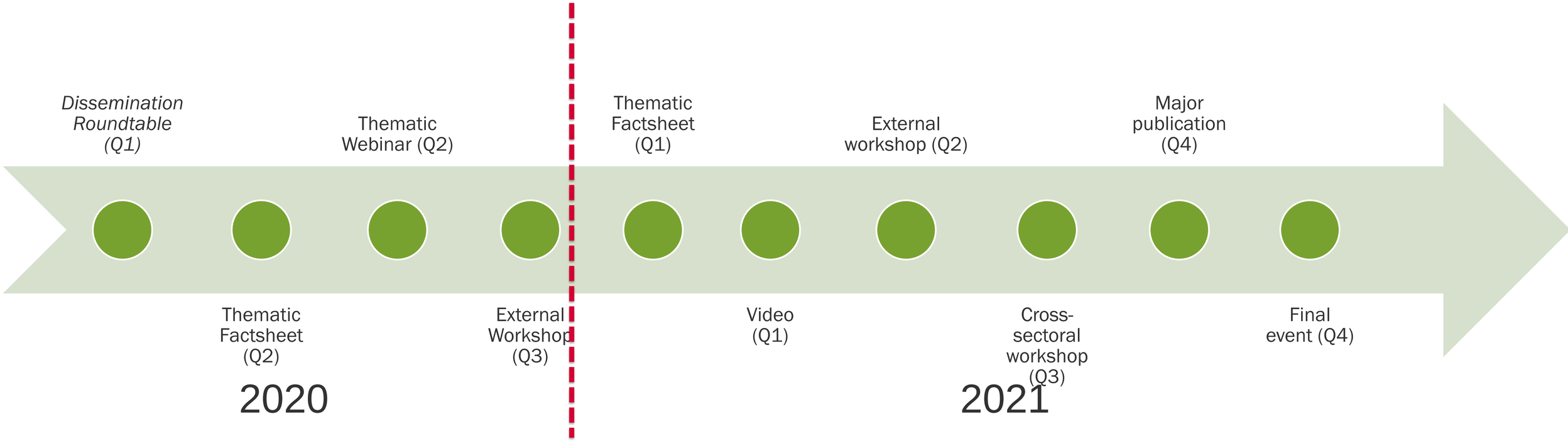
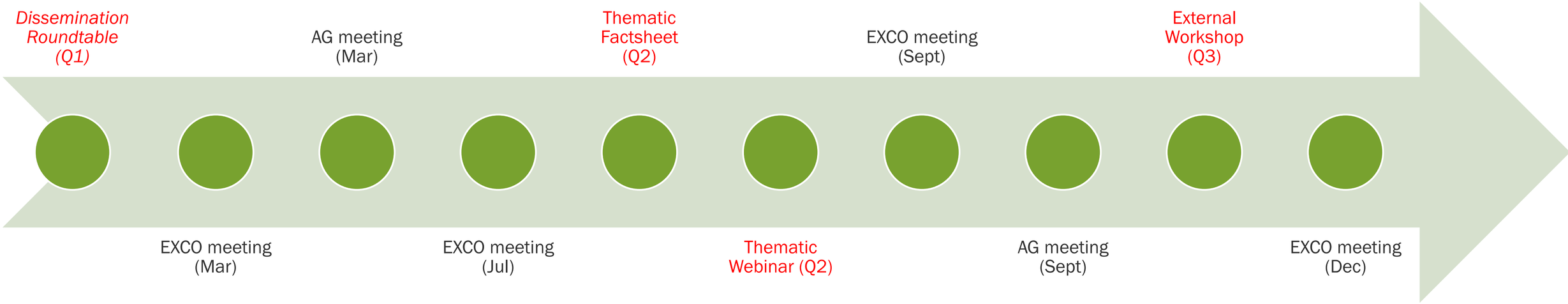
ETIPWind project milestones



ETIPWind 2020 activities



For decision

- Delivery of thematic factsheet & webinar
- Large workshop (synergies with EERA JP Wind annual event/Torque?)
- Scoping of 2021 publication
  - Wind Energy the facts – 2021?
  - Blue print of industrial policy for wind energy?
- Define messages for video

Aligning EU-wide and country-specific research agendas

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Thanks for your attention

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PLATFORM ON **WIND ENERGY**

Join the conversation
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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 826042