

# **IETS TCP ANNEX PROPOSAL**

## Knowledge sharing on Industry Transition Roadmaps

Proposal for Task 1: Assessment studies

Proposed by ADEME (French Environment and Energy Management Agency)

# IETS TCP ANNEX PROPOSAL

## Development of Industry Transition Roadmaps

### About the IETS TCP

The Industrial Energy-related Technologies and Systems (IETS) is one of IEA's over 40 Technology Collaboration Programs (TCP). The IETS program focuses on energy use in a broad range of industry sectors, uniting IEA activities in this area. The program was established in 2005 as a result of a merger, revamping and extension of activities formerly carried out by separate individual programs. The former programs for Pulp & Paper and for Process Integration are now parts of the IETS. The new program is still under development, with several new activities starting up. The specific objective of IETS is to allow OECD Member countries and OECD non-Member countries to work together to foster international co-operation for accelerated research and technology development of industrial energy-related technologies and systems, with a main focus on end-use technologies, taking into account other relevant IEA activities. Through its activities, the program will increase awareness of technology and energy efficiency in industry, contribute to synergy between different systems and technologies, and enhance international cooperation related to sustainable development. The Participants will implement a wide range of co-operative activities in the fields of:

- Scientific research.
- Technology and systems research, development, demonstration and deployment.
- Technology and systems.
- Technology and systems assessment of policies and consequences.
- Information dissemination.

The IETS presently has ten active member countries: Austria, Canada, Denmark, France, Germany, Italy, Netherlands, Norway, Portugal and Sweden. Other countries may join the IETS to take part in the TCP.

### About ADEME

As an IETS TCP member, France is represented by ADEME (French Environment and Energy Management Agency), the contracting party. ADEME is active in the implementation of public policy in the areas of the environment, energy and sustainable development. ADEME provides expertise and advisory services to businesses, local authorities and communities, government bodies and the public at large, to enable them to establish and consolidate their environmental action. As part of this work, the agency helps finance projects, from research to implementation, in its areas of action. The four vocations of the agency are:

- **Developing knowledge:** ADEME organizes and contributes to the financing of research and innovation and to establishing and coordinating observation systems to better understand how industries are changing.
- **Convincing and mobilising:** Because public information and awareness are essential to the success of environmental policies, ADEME implements communication campaigns to change mindsets, behaviours and purchasing and investment practices.
- **Advising:** ADEME acts in an advisory capacity to direct the decisions of actors in society and the economy, establishing tools and methods that suit their needs. Direct dissemination via expert advisers is a major way in which it provides its expertise.
- **Assisting with implementation:** ADEME provides graduated financial support and promotes the implementation of regional and national references.

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## 1. Background

Growing concerns about climate change and the need for deep reduction in global greenhouse gas (GHG) emissions has been leading decision-makers such as governments and industry leaders to come up with consistent decarbonisation strategies. These strategies often rely on long-term scenarios describing what emission reduction pathways should be and could be followed compared to Business-As-Usual (BAU) trajectories.

The development of roadmaps can be undertaken from various perspectives and scales. For instance, some roadmaps explore the cross-sectoral application of different low-carbon technologies at the global level, which is the case for the IEA Technology Roadmaps on Carbon Capture and Storage [1] [2] [3]. Other roadmaps narrow their scope at a national and sectoral level such as the “Industrial Decarbonisation and Energy Efficiency Roadmaps to 2050” published by the UK government [4]. In the end, the expected outcome of a roadmap is to provide sufficient insights that will translate into informed policy and business decisions.

## 2. Purpose and objectives

The proposed aim of this Annex is to share best roadmap practices that contribute to provide an in-depth understanding of the optimal emission reduction pathways as well as key challenges and opportunities. This work will be undertaken through the review and analysis of key roadmap criterias as well as past and existing national experiences on the development of industry strategies. ADEME will be drawing on the roadmap processes and mapping factors established by the Leadership Group for Industry Transition (LeadIT) with which regular exchanges will be maintained throughout the project. The LeadIT is an initiative launched by the Governments of Sweden and India at the UN Climate Action Summit in New York in September 2019. The purpose of the Leadership Group is to:

- **Provide policy and decision support for industrial development and transition:** supporting industry transition roadmaps towards net-zero emissions that cover innovation, policy and finance along the value chain.
- **Share know-how, innovation and technology:** providing a platform for sectoral and cross-sectoral learning, and for action to promote effective innovation systems, market demand and business models for commercialization of new technologies.
- **Convene high-level dialogues:** enabling collaboration between political and industry decision makers, particularly with respect to tackling issues that arise across sectors and along value chains.
- **Strengthen NDCs:** supporting the implementation of the Paris Agreement through roadmaps and other frameworks that identify policy actions and private initiatives that reinforce one another.
- **Facilitate financing of transitions:** connecting transition projects to climate and development finance.
- **Support a just, equitable and prosperous transition:** ensuring transition roadmaps to net-zero emissions that support regional prosperity, decent jobs and gender equality.

The final deliverable could take the form of a technical toolkit on industry roadmaps and **this Annex will also be an opportunity to develop a network of national industry experts** that should both facilitate further international collaboration. Although horizontal analysis might come into play, **the Annex will target national sectorial or sub-sectorial roadmaps** (e.g. transition of the chemical industry in Germany). The project should also leverage existing resources and publications from the IEA and the IETS TCP such as the final report on Deep Decarbonization in Industry [5] and the Annex XV on Industrial Excess Heat Recovery [6] and other international initiatives such as the Deep Decarbonisation Pathway Project [7] and the Re-Invent Project [8].

### 3. Activities in Task 1

The purpose of Task 1 will be to identify the most fundamental factors and questions to address when developing a sectorial roadmap. In fact, industry roadmaps may differ widely according to their geographic scale, their time horizon (e.g. “Queensland Advanced Manufacturing 10-year Roadmap and Action Plan Invested in Queensland Manufacturing” [9]), their long-term objectives (e.g. “Unlocking growth opportunities in the Australian chemical industry” [10]), in their level of description [11]. **This work should lead to an agreed methodology for classifying and comparing industry roadmaps. The purpose is not to create a roadmap ranking system.** Many of these key factors have already been identified by the LeadIT as listed and described in section 3.1 below.

#### 3.1. Mapping factors

A short description of each factor along with a first reflection on what they might encompass are provided below:

- **Vision and key targets:** Roadmaps are usually rooted in a national policy context and objectives. Prompted by an international agenda on climate change, many countries have set out a vision to reach carbon neutrality by mid-century or ambitious emission targets at least. These visions can be taken as a roadmap input as illustrated by the “Roadmap for the Dutch Chemical Industry towards 2050” [12] which ambitions are said to be aligned with the EU and Dutch climate targets. The aim(s) of the industry roadmap should be well-defined and formulated in the beginning of the report even though it does not necessarily make the aim itself relevant or realistic. In the absence of a clear guiding principle prior to designing scenarios, there might be a risk of conflicting objectives and inconsistent narratives. The most common roadmap objectives include reducing GHG emissions, energy consumption, creating jobs, fostering growth and unlocking business opportunities such as The Philippine Manufacturing Industry Roadmap [13] and the CSIRO Advanced Manufacturing roadmap [14]. Several objectives can be formulated in the same roadmap such as “The Norwegian Process Industries’ Roadmap – Combining Growth and Zero Emissions by 2050” [15].
- **Mitigation and transition measures:** Possible mitigation measures refer to the direct (and most often technical) levers that will steer the sector toward a transition pathway. In that respect, roadmaps call for several concepts and pillars such as energy efficiency or circular economy. Some roadmaps can even focus on R&D and innovation in a specific field as illustrated by the Austrian roadmaps “Energy Research and Innovation Strategy” [16] and “R&D Roadmap Energy Efficiency in the Textile and Food Industry” [17]. In addition, if the roadmap considers to reduce imports or exports as part of a national strategy, the report should explicitly identify key trading partners (i.e. countries) that will be affected and quantify the change in trade volumes. This way, countries that would be indirectly impacted can take this information as an input in their own national road mapping activity.
- **Strategies to operationalise roadmaps:** If the previous mapping factor answers the question “what to do?”, the goal of this factor is to answer the question “how to do it?”. Indeed, putting mitigation and transition measures into practice requires to formulate tangible and targeted recommendations. These can include changing taxes, allowing subsidies to encourage the uptake of a technology, more stringent obligations or prohibitions, R&D collaboration programs or even increasing support for low-carbon materials as recommended by the Swedish Steel Producers’ Association in its climate roadmap for a fossil-free steel industry [18].
- **Finance and technology needs:** Most industry roadmaps conclude on different possible technological pathways that can contribute to reach emissions reduction targets and often, ranges of investments are estimated. Technologies can be mature and implemented quickly provided

appropriate market and regulatory conditions are deployed while some technologies can be at an earlier R&D stage and could potentially be available only in the mid to long-term. Even though deep emissions reduction could be unlocked in the future, roadmaps relying on such technologies to achieve their targets could be risky strategies if the solution proves to be more difficult or longer to scale up than expected. Therefore, roadmaps should ideally try to gauge the chances of success of a technological pathway. This mapping factor could also be the chance to analyse the possible articulations between horizontal roadmaps and vertical national roadmaps. Indeed, horizontal roadmaps such as the Australian “National Hydrogen Roadmap” [19] focus on a specific technology and could be leveraged to feed a national sectorial roadmap provided sufficient details about the uptake conditions of the technology are provided. In addition to the sectorial roadmaps on the glass and ceramic industries for instance, the UK “Industrial Decarbonisation and Energy Efficiency Roadmaps to 2050” has also included a cross-sectorial analysis on the role and impact of different technologies such as electrification or biomass in the overall strategy [4]. Indeed, the additional benefits of a national sectorial analysis compared to a horizontal roadmap is to assess the applicability of certain abatement solutions within a specific national context. For example, the use of biomass to decarbonise the fuel mix is only relevant if it does not contribute to deforestation which allows to cull certain regions of the world or, the substitution of clinker with blast furnace slag or fly ash in cement can be considered to a certain extent provided the country legislation approves the use of such types of cement to make concrete. Some scenarios explore the transition of a specific sector that could indirectly trigger strong industrial challenges and deep transformations as illustrated by the socio-economic assessment of a low-carbon transportation system in Italy [20]. For a low-carbon transition of transport system, the authors highlight the importance for the Italian auto industry to innovate and to develop EV charging infrastructures.

- **Sectors and industries:** Depending on the national industry context, emission sources and the possible means of actions, some sectors might attract more attention than others and could constitute a roadmap of its own. For example, KonKraft (a consortium of Norwegian oil & gas industries) has proposed a roadmap dedicated to the Norwegian petroleum industry to 2050 [21]. Such a roadmap would only make sense in a heavy oil producing country like Norway and unlike most of the other European countries. Conversely, some sectors may not require a roadmapping process as for Denmark. The country has few heavy industries such as Iron & Steel due to limited natural resources and the major industries are chemicals, pharmaceuticals and bioengineering [22]. This mapping factor (“Sectors and industries”) could even be extended to the scope, timeframe and geographic perimeter of a roadmap. In fact, strategies can be designed at a macro (e.g. the entire economy) or sub sectorial level (e.g. the mining industry), can span a short or long-term time horizon and can cover a perimeter larger than national borders as illustrated by the “Kingdom of Denmark Strategy for the Arctic 2011-2020” [23].
- **Actors leading and commissioning roadmaps:** Identifying these is necessary to gain an insight into the perspective from which the roadmap is conducted as the interests of governments and industries can sometimes be conflicting. Secondly, the conclusions and recommendations of the report could also be tailored according to a targeted public. Industry leaders, policy makers, academics and the public will have different roles to play in the transition according to their specific means of action. Delivering appropriate key messages to a specific audience is likely to accelerate and enhance the possible fallout of a roadmap.
- **Origin of the roadmap:** backtracking the roadmapping steps leads to the root causes that originated it and sheds light on what has motivated the exercise. This mapping factor takes a step further than the previous one as it aims to understand the reasons that sparked the roadmap instead of just the entities encouraged by these very reasons. Although people’s will to preserve themselves and thus to mitigate climate change constitutes the common fertile ground for any environmental action, it

is more about identifying the tipping point where developing a roadmap appears to be obvious. For instance, regional issues regarding circular economy can trigger the need for a medium to long-term strategy (as per the “Lombardy Roadmap for Research and Innovation on Circular Economy” [24]) which can then possibly lead to a broader national sectorial roadmap.

- **Process and methodology used to develop a roadmap:** Depending on the means of action and available resources, a roadmap can be developed from various approaches. Although a roadmap could be conducted on a qualitative narrative, there are usually a minimum input data and information required to design insightful scenarios. These include, but are not limited to, general documentation to understand the industry process, annual production, emissions and energy consumption, review of all available technologies and their cost, impact of an abatement solution on emissions and energy consumption. Ideally, a roadmap should also show a sufficient level of understanding of the surrounding elements interacting with the industry and reflect on the upstream and downstream impacts of the transition. In the cement clinker industry for example, the main decarbonisation solutions are often well documented (e.g. CCS, reducing the clinker-to-cement ratio, fuel switching). Yet, when developing scenarios for the cement clinker industry at a national level, key questions arise: availability of CO<sub>2</sub> storage, availability of biomass and alternative fuels, potential need of blast furnace slag from the steel industry to substitute clinker, legislation barriers regarding cement composition and properties, impacts of a technology on the employment, market structure and international competitiveness, energy and carbon price.
- **Roadmap assimilation:** Ultimately, heavy industries are those that will make the transformations and investments required to lead the transition. Hence, for a roadmap to deliver results, companies need to be able to assimilate it and to respond to the proposed vision by materializing it into their business decisions accordingly. Companies may respond differently to a roadmap depending for instance if it is a government-led initiative that translates into a new regulatory framework or if it is a series of commitments and recommendations formulated by an industry association. The stakeholder engagement strategy also needs to be examined as it strongly influences the position of companies in the process and eventually, how they will translate the roadmap into action. Note that stakeholder engagement is also closely linked to the roadmap communication strategy, should there be one.

### 3.2. Roadmap methodologies: asking the “why” and “how”

Participants should contribute by answering as thoroughly as they can the questionnaire below that has been designed to extract as much “meta-information” as possible. This questionnaire is still under construction and part of the work should be to discuss additional relevant questions.

*For roadmap producers:*

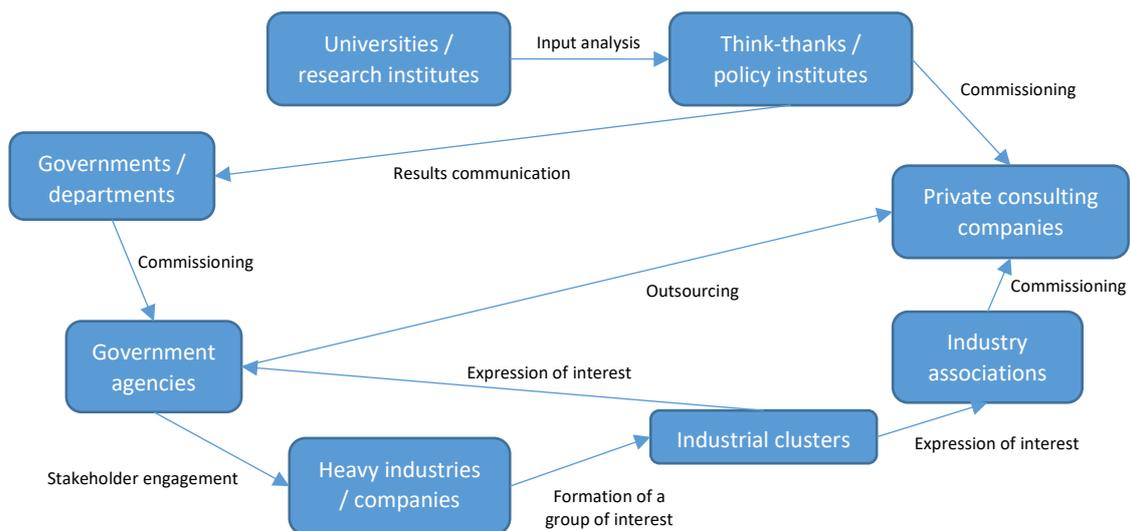
- About the roadmap(s) you were/are involved in, would you please fill out the following information:
  - Sectors and industries:
  - Vision and key targets:
  - Strategies to implement the roadmap:
  - Policy needs to implement the roadmap:
  - Finance and technology requirements:
  - Actors leading and commissioning the roadmap:
  - Process and methodology used:
  - Mitigation and transition measures:
- How did the idea of the roadmap originate and what ecosystem of actors (technical centres, government agencies, consulting companies ...) were involved in the development?
- Did you feel that the targeted audience has assimilated the roadmap? What evidence can you provide to justify it?
- What difficulties did you face during the roadmapping exercise? Did you lack resources or methodology inputs?
- Do you feel that the roadmap has delivered on concrete results in the industry and if so, what are they?
- Have you adopted a communication strategy for your roadmap to further disseminate your work and if so, what action did you undertake? Possible answers could be: webinar presentation, publish in peer-review journals, organise dedicated workshops ...
- Have you ever had to find an articulation between a national industry roadmap (e.g. the decarbonisation of the steel industry) and a horizontal roadmap (e.g. the role of hydrogen or CCS in the decarbonisation of the heavy industry)? If so, how did you proceed?
- When developing a future scenario within a country or region, have you ever had to make assumptions regarding the evolution of other countries (e.g. the scenario includes the possibility to increase or decrease material exchanges with another country or the industry relies on exporting CO<sub>2</sub> in another country to store it in a geological formation). If so, how did you deal with the world “outside” of the boundaries?

*For roadmap receivers (mainly industrials and policymakers):*

- How do **national sectorial roadmaps** (e.g. decarbonisation of the Italian steel industry) influence your business or policy decisions?
- How do **national horizontal roadmaps** (e.g. hydrogen deployment in Portugal) influence your business or policy decisions?
- What do you find most useful in these roadmaps and why? Possible answers could be : the results, the construction process itself, technical information it contains, the opportunity to dialogue with new entities ...

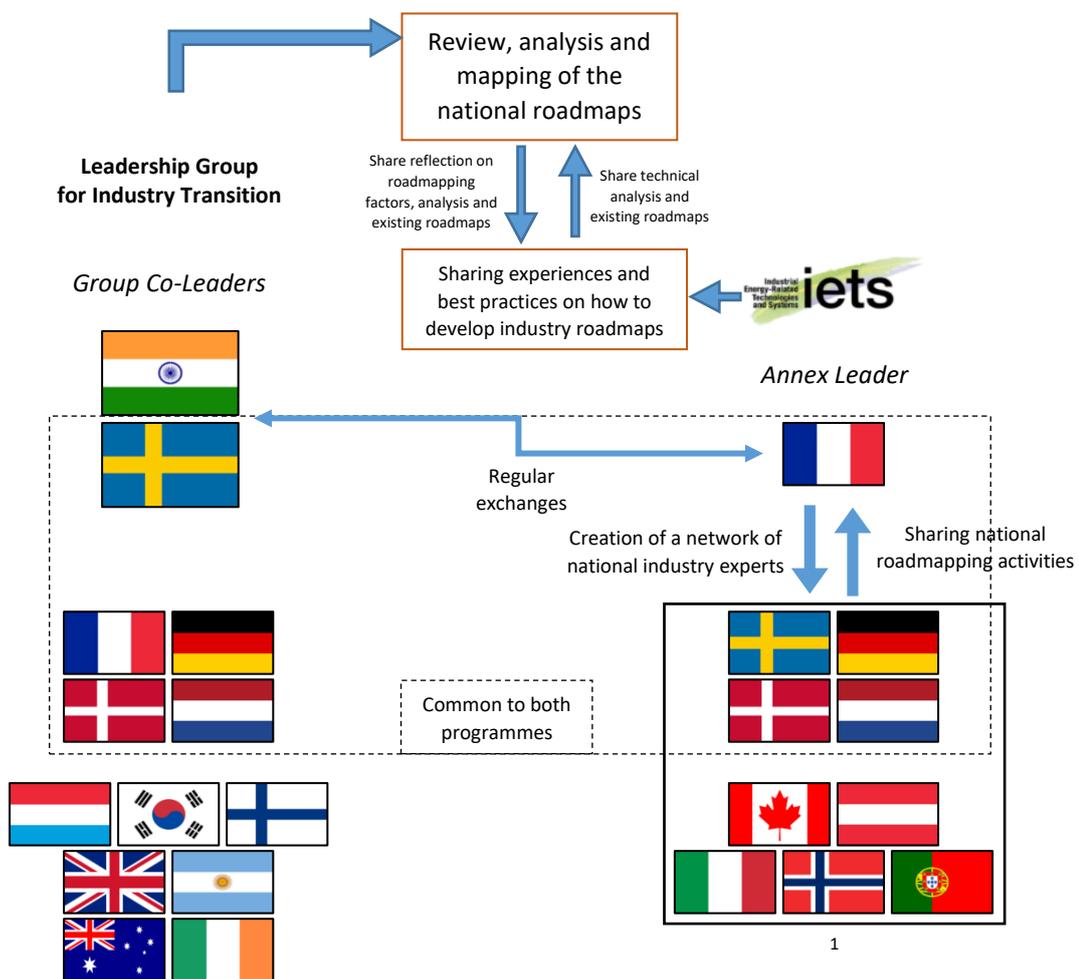
- How would you qualify the collaboration between the industry and the government in your country? What historical or cultural reasons would explain it and how would that affect a roadmapping exercise?
- Looking back in the past at how the industry sector has already transformed, can you identify the main forces that have driven these transformations (e.g. consumer behaviour, climate change physical impacts, international competition, resource scarcity ...)? Can you spot any influence of a roadmapping initiative?
- Do you have any record of a past roadmapping exercise you were somehow involved in and how far are the projections made from today's reality? Can you identify reasons why it might not have evolved as planned? Possible answers could be : recommendations were not followed, estimations were wrong, unforeseeable crisis or events occurred ...
- Have you (industrial company) conducted a roadmapping exercise collectively with other companies from your sector, as part of an industry association for instance? If so, how has it helped your company to plan a long-term strategy?
- Do you (industrial company) have any difficulty in dialoguing with other competing companies from your sector and why?
- Have you ever discovered an external work involving your sector you had no knowledge of? If so, what was your reaction?
- Have you ever been confronted to several roadmaps with conflicting results or recommendations? If so, what was your reaction?

Following a first wave of interviews, it appeared that a roadmap development usually involves the same types of actors interacting differently. One of the objectives of this questionnaire will be to describe the nature of the interactions between the different stakeholders involved in the identified roadmaps and the timeline associated in such a way to display and compare the birth of different roadmaps. This could be completed by positioning the different actors on a scheme linked by a type of interaction as illustrated on the example below. **When relevant, this kind of scheme along with a description of the storytelling behind a roadmap should be provided.**



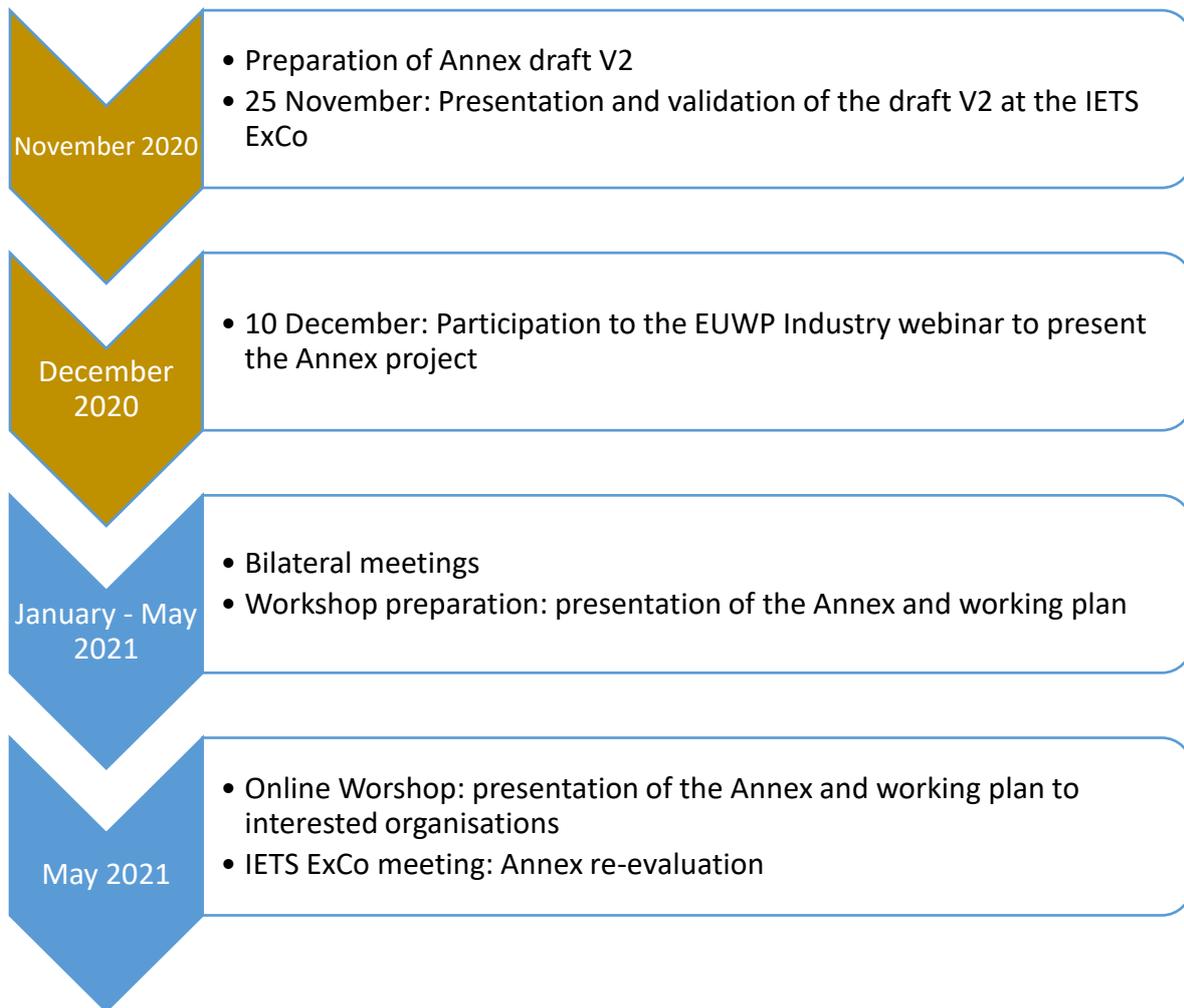
## 4. Expected roles of the participants

As part of Task 1 that will be launched during Q1 2021, **participating countries are expected to answer a questionnaire (see section 3.2 above) on identified mapping factors and national roadmapping experiences** that will provide an overview on key aspects, questions and differences between countries. As part of the questionnaire, the experts should also contribute by providing a reflexion on what main ingredients can help deliver a fruitful and impactful roadmap in their country and conversely, what should avoided. Prior to that, main organisations and experts working on sectorial roadmaps from each country will be identified and contacted with the help of contracting parties members of the IETS TCP. ADEME will collect the answers from this questionnaire and will provide an analysis of the results as part of Task 2. These will also be shared and discussed with the LeadIT. In addition to the report, a final restitution in the form of a seminar will be proposed during Q4 2021.



<sup>1</sup> Participants' confirmation in pending

## 5. Preparation of the Annex work



## 6. Task 1 working plan

2021-2022	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	Jul.	Aug.
Task 1 official kick-off	■											
Work planning with the LeadIT	■	■										
Questionnaire and meeting preparation		■	■									
Bilateral meetings and input collection			■	■	■							
Report drafting				■	■	■						
First draft issue						■						
Draft reviewing						■	■	■	■			
Workshop preparation						■	■	■	■	■	■	
Restitution workshop											■	■
Task 2 preparation											■	■

## 7. Dissemination

### 7.1. Dissemination

- General information about the Task will be uploaded on the website of IETS by the IETS secretariat.
- Results from the Task (as above) will be available on the IETS website as well as disseminated by the Annex Manager, to target stakeholders, based on send lists from participants.

### 7.2. Intellectual property rights

- All main results from the Task, including outcomes from workshops shall be open. Parties participating in the Task, however, may decide if a small part of a report shall be confidential.
- Any uploaded / shared material shall mention the original author. Unless otherwise stated and agreed, the author agrees that the material may be used and copied without restriction.

## 8. Duration of the Task

This Task shall enter into force on **1<sup>st</sup> January 2020**, be re-evaluated at the **32<sup>nd</sup> IETS ExCo meeting in May 2021** and shall remain in force for a period of two years until **31<sup>st</sup> of December 2022**.

## 9. Funding

Each participant will bear the costs of its own participation in the Task, including necessary travel costs. The cost of organizing working meetings will be borne by the host country.

Each Participant shall bear all the costs incurring in carrying out the Task activities, including reporting and travel expenses. The Participants agree on the following funding commitment:

- Each task Participant (country) will contribute to this Task a minimum of 6 working days for the year 2021 corresponding to:
  - 0.5 day for kick-off presence
  - 4 x 0.25 day = 1 day of working webinar
  - 1 day of bilateral meeting and/or or filing questionnaire
  - 1.5 day for writing a one-page summary on the roadmap development
  - 1 day of report reviewing
  - 1 day of presence for the restitution workshop
- Each participant should bear the cost for one in-presence meeting in a European city.

## 10. Obligations and Responsibilities of the Participants

Elliot MARI, ADEME, is designated Annex Manager and Manager for Task 1. Therefore, Annex Manager and Task Manager shall refer to the same person in this case. Changes in the task/subtask leaders may be agreed by the Executive Committee, acting by consensus of the participants.

The Annex Manager shall be responsible for:

- Coordinating the work performed under the first task
- Prepare a detailed work plan
- Maintaining regular exchanges with the LeadIT to articulate the initiatives and create synergies.
- Collecting answers and conducting the roadmaps' analysis

- Provide semi-annual status reports to the participants
- Conduction dissemination activities and promoting a network of roadmapping experts
- Organize workshops and necessary intermediate meetings
- Edit the workshops proceedings and the final Summary and major findings of the Annex

Each Task participant must make a significant contribution to the Tasks/subtasks. The obligations of the participants are also:

- **At least one roadmap of any type mentioning a heavy industry sector should have been produced or is currently under development by an organisation in the country.**
- Active participation in the workshops
- Preparation of necessary presentations and working documents for the completion of the Task including country specific reports
- Review of the documents and draft of the final report
- Each Task participant (country) shall contribute to this Task with a minimum effort of 6 working days per year **essentially through the sharing of past and ongoing national roadmapping activities.**
- Where multiple organizations from the same country are involved, they must agree on whether the contribution is a coordinated contribution (min 6 working days/year), or separated contributions (min 6 working days/year each).

## 11. Information and Intellectual property

**Executive Committee's Powers:** the Executive Committee, acting by unanimity, in conformity with this Task, shall determine the publication, distribution, handling, protection and ownership of information and intellectual property arising from this Task.

**Right to Publish:** the Participants shall have the right to publish information provided to or arising from their Task, except for proprietary information.

**Proprietary Information:** for the purposes of this Task, proprietary information shall mean information of a confidential nature such as trade secrets and know-how (for example, computer programs, design procedures and techniques, chemical compositions of materials, or manufacturing methods, processes or treatments) which is appropriately marked provided that such information:

- Is not generally known or publicly available from other sources
- Has not previously been made available by its owner(s) to others without obligation concerning its confidentiality; and
- Is not already in the possession of the recipient Participant(s) without obligation concerning its confidentiality.

It shall be the responsibility of each Participant supplying proprietary information, and of the Task Manager, to identify such information as proprietary and to ensure that it is appropriately marked.

The Participants and the Task Manager shall take all necessary measures in accordance with this paragraph, the laws of their respective countries and international law to protect the proprietary information provided to or arising from this Task.

**Production of Relevant Information by Participants:** each participant agrees to provide to the Task Manager all previously existing information, and information developed independently of the Task, which can assist or is needed by the Task Manager to carry out its functions in this Task, which is freely

at the disposal of the Participants, and the transmission of which is not subject to any contractual and/or legal limitations, under the following conditions:

- The Participant will make such information available, at its own costs, provided that such costs are not substantial
- If substantial costs are necessary for the Participant to make such information available, the Task Manager and all Participants will determine the charge of the costs for each participant, upon approval of the Executive Committee.

**Use of Confidential Information:** if a Participant has access to confidential information which would be useful to the Task Manager in carrying out the studies, assessments, analysis or evaluations described in this Task, such information may be communicated to the Task Manager but shall not become part of any report or other form of documentation issued as part of this Task, nor shall it be communicated to the other Participants, except as may be agreed between the Task Manager and the Participant who supplies such information. This information has to be marked clearly as “confidential”.

**Acquisition of Information for the Task:** each Participant shall inform the Task Manager of the existence of information that can be of value to the Task, but which is not freely available, and each Participant shall endeavour to make such information available to the Task under reasonable conditions, in which event the Executive Committee may, acting unanimously, decide to acquire each information.

**Reports on Work Performed under the Task:** the Task Manager shall prepare reports on all work performed under the Task and the result thereof, including studies, assessments, analysis, evaluations and other documentation, but excluding proprietary information.

**Copyright:** the Task Manager, or each Participant for its own results, may take appropriate measures necessary to protect copyrightable material generated under this Task. Copyright obtained shall be the property of the Task Manager, for the benefit of the Participants provided, however, that Participants may reproduce and distribute such material, but shall not publish it with a view to profit, except as otherwise provided by the Executive Committee.

The Contracting Parties understand and agree that the name, acronym and emblem of the IEA has been notified to the World Intellectual Property Organisation (WIPO) Secretariat according to Article 6 of the Paris Convention for the Protection of Industrial Property, as amended on 28 September 1979. The Contracting Parties further understand and agree that the OECD/IEA shall retain the copyright to all IEA deliverables, materials or publications published or to be published by the IEA or jointly by the IEA and a third party to this Annex. Should the Contracting Parties use any such deliverables, materials or publications they shall give full acknowledgement to the OECD/IEA as being the source of the material with a copyright notice in the following form: © OECD/IEA, (year of publication).

**Authors:** each Participant shall, without prejudice to any rights of authors under its national laws, take necessary steps to provide the co-operation from its authors required to carry out the provisions in this paragraph. Each Participant shall assume the responsibility to pay awards or compensation required to be paid to its employees according to the laws of its country.

## 12. Annex and Task Management

The Annex and Task 1 will be managed by :

Elliot MARI

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## 13. Annex participants by country

The following list provides an overview of confirmed and tentative Annex participants. The final list of participants will be compiled at the start of the Annex. During the course of the Annex, new participants are allowed to join only by unanimous decision by the Annex participants, and the approval of the IETS Executive Committee.

Country	Participation	Contact	Organization
<b>Austria</b>	?		
<b>Canada</b>	?		
<b>Denmark</b>	No		
<b>France</b>	Yes	Elliot MARI	ADEME
<b>Germany</b>	?		
<b>Italy</b>	?		
<b>Netherlands</b>	?		
<b>Norway</b>	?		
<b>Portugal</b>	?		
<b>Sweden</b>	?		

## References

- [1] IEA, "Technology Roadmap - Carbon Capture and Storage 2013," 2013.
- [2] IEA, "Technology Roadmap - Carbon Capture and Storage in Industrial Applications," 2011.
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