

August 2022

National Innovation Pathway Round-up

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National Innovation Pathway Round up – France

Introduction

Mission Innovation members agreed to develop **National Innovation Pathways (NIPs)** to describe and build collective understanding on how each member plans to pioneer clean energy technologies to meet their climate and energy goals.

Each member has their own approach to developing and identifying innovation needs and priorities, with some already having undertaken extensive strategy development. The Roundup provides a **single location of summary information on countries' innovation priorities** utilizing existing sources of information so members and interested stakeholders can easily find key information of interest.

All MI members were asked to provide answers to a survey (Annex A) providing as much information as possible, with some questions being optional. The survey asked questions relevant to each element of the National Innovation Pathway described in the Joint Launch Statement:

1. Energy transition scenarios and priority national-level energy innovation needs / priorities until at least 2030;
2. Strategies or national-level plans to address these energy innovation needs / priorities, including institutional design and working internationally
3. Information on how Members will measure innovation outcomes and innovation ecosystem developments;
4. Members' preferred modes and methods of collaboration; and
5. Any further supporting evidence that was used to identify the energy innovation needs / priorities, such as analysis of domestic competitiveness, economic opportunities or national level climate and clean energy plans.

Members will be asked to refresh this document annually if significant changes to national policy have taken place.

1. Clean Energy Innovation Strategy

1.1 Summary

The France 2030 plan presented by the President of the Republic in October 2021 has one ambition: to prepare the France of tomorrow. It is a tool that enables France to develop the industries and create the jobs that will allow us to respond together to the major ecological and energy transitions.

This plan is structured around major societal objectives, which include the decarbonisation of our production methods (energy, industry) and the improvement of the quality of life (sustainable cities, innovative buildings, energy efficiency).

With €10.3 billion in the energy sector, this is an unprecedented effort for research, innovation and industry that will make it possible to support both capacity investments and highly innovative and disruptive projects in areas where France is already at the technological frontier.

The France 2030 plan absorbs the previous investment programme for the future. In addition to strengthening investment in innovation and R&D, this plan aims to support manufacturers in critical segments of the industry. Thus, France 2030 supports investment along the entire technology development continuum (low TRL to high TRL).

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1.2 Methodology

The governance principles at the heart of France 2030 are disruptive innovation, trust in emerging actors, efficiency and transformation of territories, evaluation and agility.

The France 2030 plan dedicates

- 50% of its expenditure on decarbonising the economy,
 - 50% to innovative emerging players, with no environmentally unfavourable expenditure (in the sense of the Do No Significant Harm principle),
 - Accepting risk-taking and failure with the application of the "Fail fast, learn fast" principle,
 - Compared to previous plans and to the logic of the 4 previous investment programmes (PIA), based essentially on innovation, the France 2030 plan proposes a vision of industry for 2030,
 - France 2030 is intended to be flexible, with close steering and monitoring tools to adjust the course as the work progresses,
 - The France 2030 plan is managed interministerially, in particular by strategy coordinators attached to the General Secretariat for Investment.
- For more information, please visit our website:
www.gouvernement.fr/presse-et-reseaux-sociaux

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Table 1: RELEVANT DOCUMENTS AND POLICIES

Document or policy name	Description of the document or policy	Specific outcomes, goals or targets identified in the document or policy	Year
France 2030 :Focus on renewable energy	The renewable energy strategy consists of developing innovative solutions in the field of photovoltaics, floating wind power and energy networks and facilitating and accelerating the development of new technologies.	<p>Production of several GW of solar panels per year in France</p> <p>Objective of deploying 40 GW of offshore wind turbines in France by 2050</p> <p>Develop a flexible and massively digitalized energy network industry</p> <p>Target of 33% renewable energy in the energy mix by 2030 with a 40% share of renewable electricity in electricity production.</p>	2030
France 2030 – Focus on decarbonising industry	<p>The strategy on decarbonisation of industry is structured around 3 objectives:</p> <ul style="list-style-type: none"> - Industrialise existing low-carbon solutions while continuing to innovate; - Strengthen the links and synergies between the players in the sector 	support the development of decarbonised processes to achieve our commitment to reduce greenhouse gas emissions in this sector by 35 % between 2015 and 2030	2030

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	- Train more young people and professionals in decarbonisation-related professions, particularly those that are not very attractive at present		
France 2030 – Focus on nuclear	The strategy is to strengthen innovation in the nuclear sector on SMR, waste management and multi-recycling	By 2030 : Launch a preliminary project for an SMR reactor, finance a prototype of an innovative nuclear reactor allowing for better management of radioactive substances, develop multi-recycling solutions	2030
France 2030 – Focus on decarbonated hydrogen	The strategy consists of supporting the production of decarbonised hydrogen until it becomes competitive, supporting the industrial equipment sectors	Decarbonising industry by developing a French electrolysis industry Develop heavy mobility with decarbonised hydrogen Supporting research, innovation and skills development in order to promote the uses of tomorrow	2030

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2. Clean Energy Innovation Priorities

2.1 Overview of Clean Energy Innovation Priorities

Table 2: CLEAN ENERGY INNOVATION PRIORITIES

Innovation priority	Focus of innovation activity (tick all that apply)	Targets/Goals (if applicable)	Technologies or topics of interest	Planned demonstration Investments (include budget years and indicate if domestic or international spending where possible)
Hydrogen	<input checked="" type="checkbox"/> Early-stage research <input checked="" type="checkbox"/> Applied research <input checked="" type="checkbox"/> product development <input checked="" type="checkbox"/> Demonstration <input type="checkbox"/> Commercialisation Other: <u>deploying hydrogen industry</u>	Hydrogen: To change scale to reach profitability and to reinforce the industrial character of the French offer to create a French electrolysis industry to decarbonise industry by replacing hydrogen of fossil origin to develop hydrogen mobility with key technological bricks to develop large-scale territorial projects on the national territory by encouraging the sharing of uses of tomorrow by supporting R&D and innovation to reduce costs and develop equipment for these new uses.	All the technological building blocks necessary to achieve the objective : Electrolysers, Hydrogen storage,...	€ 3,7 bn of which € 3.2 bn IPCEI.

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Renewable energy	<p>X Early-stage research X Applied research X product development X Demonstration <input type="checkbox"/> Commercialisation Other: <u>deploying renewable industry</u></p>	<p>New high efficiency and high stability solar cell with efficiency</p> <p>deploying a floating wind energy industry</p> <p>developing a flexible and massively digitalised energy network industry</p>	<p>Next generation PV</p> <p>Floating wind turbine Flexible energy network industry</p> <p>Support the industrialisation of renewable energies</p>	€ 1 bn .100% domestic
Nuclear	<p>X Early-stage research X Applied research X product development X Demonstration <input type="checkbox"/> Commercialisation Other:</p>	<p>To launch a preliminary project for an SMR reactor,</p> <p>to finance a prototype of an innovative nuclear reactor allowing for better management of radioactive substances</p> <p>to develop multi-recycling solutions</p>	<p>Small modular reactor, Multi-recycling, Waste management</p>	€ 1 bn .100% domestic
Decarbonising industry	<p>X Early-stage research X Applied research X product development X Demonstration <input type="checkbox"/> Commercialisation Other:</p>	<p>Industrialise existing low-carbon solutions while continuing to innovate;</p> <p>Strengthen the links and synergies between the players in the sector</p> <p>Train more young people and professionals in decarbonisation-related professions, particularly those that are not very attractive at present</p>	<p>improving energy efficiency</p> <p>use of renewable energy</p> <p>tuse of waste as a source of energy or material</p> <p>Carbon Capture, Utilization, and Storage</p>	€ 5 bn .100% domestic

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2.2 Tracking Progress (Optional)

2021 and 2022 were marked by the announcement of the France 2030 Investment Strategy. One of the main contributions of this new strategy is the possibility of financing industrialisation, in addition to the innovation aspects already covered by the future investment plans.

Steering the France 2030 plan requires an appropriate organisation. To this end, national coordinators are responsible for coordinating action and establishing roadmaps and indicators.

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3. International Collaboration (Optional)

International collaboration is possible in the France 2030 plan. Projects with international actors are considered on a case-by-case basis.

Europe is one of the fundamental building blocks of larger innovation projects via its tools such as PIIEC (Hydrogen, Battery...), the Innovation Fund and Horizon Europe.

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4. National Energy Innovation Ecosystem (Optional)

SGPI :

The General Secretariat for Investment (SGPI) is responsible, under the authority of the Prime Minister, for ensuring the consistency and monitoring of the State's investment policy through the deployment of the France 2030 plan.

The SGPI works closely with the ministries responsible for the themes of the France 2030 investment programme. The Ministry of Energy Transition is responsible for the strategy for decarbonised energy, hydrogen and the decarbonisation of industry.

France 2030 is being implemented by 4 operators:

The National Research Agency (ANR), The Agency for Ecological Transition (ADEME), The Public Investment Bank (Bpifrance) and the Caisse des Dépôts. The operators are responsible for implementing the calls for projects, carrying out project appraisals and proposing funding arrangements to the governance.

www.gouvernement.fr/presse-et-reseaux-sociaux

CEA :

The French Alternative Energies and Atomic Energy Commission (CEA) is a key player in research, development and innovation especially in low carbon energies (nuclear and renewable energies) and technological research for industry. The CEA participates in the implementation of collaborative projects with many academic and industrial partners.

<https://www.cea.fr/english>

IFPEN :

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IFP Energies nouvelles (IFPEN) is a major research and training player in the fields of energy, transport and the environment. From research to industry, technological innovation is central to all its activities.

<https://www.ifpenergiesnouvelles.com/>

ITE :

The Institutes for Energy Transition (ITE) are interdisciplinary platforms in the field of decarbonised energies, bringing together the skills of industry and public research in a logic of public-private co-investment and close collaboration between all the players, which should make it possible to strengthen the ecosystems formed by the competitiveness clusters.

We have 7 ETIs:

- **Efficacity** (energy and ecological transition of cities) : <https://efficacity.com/>
- **Supergrid** (high voltage, transmission, power conversion and direct current sector) : <https://www.supergrid-institute.com/>
- **Vedecom** (sustainable mobility : ecological, automated and shared) : <https://www.vedecom.fr/?lang=en>
- **IPVF** (photovoltaic cells) : <https://www.ipvf.fr>
- **INES2S** (develop an industrial sector in France for the integration of photovoltaic solar energy) : <https://www.ines-solaire.org/>
- **FEM** (offshore renewable energies) : <https://www.france-energies-marines.org/en/the-institute/>
- **Nobatek INEF4** (Energy and Environmental Transition in Construction) : <https://www.nobatek.inef4.com/en/>

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Annex A – National Innovation Pathway Roundup Survey Questions

1.1 Summary: Please provide a summary of your national clean energy innovation strategy i.e. the overall policies, framework and/or goals that help to define the innovation priorities you will describe in Section 2. We recommend including information about your national climate or energy targets (such as NDCs or renewable energy targets) as well as national innovation strategies and policies. You can share links to relevant documents in Table 1.

1.2 Methodology: Please describe the methodology to develop your national clean energy innovation strategy such as analysis, modelling or stakeholder engagement and include any links to relevant documents in Table 1. This will be used to help share learning between members.

2.1 Overview of Clean Energy Innovation Priorities: Please provide a list of your national clean energy innovation priorities (i.e. specific technologies, sectors or needs). Please complete Table 2 to provide information about where you are focusing in the innovation cycle for each priority; any targets or goals; RD&D interests; current allocated budgets (including specific demonstration funding) and links to relevant strategies or reports. In the text box following please provide a brief description of how you plan to respond to each innovation priority in the coming years, such as through future plans over the next 3-10 years to mobilise further investments for innovation, launch new major programmes and timelines for major demonstration projects.

2.2 Tracking Progress: Please describe how you plan to measure progress towards addressing your identified energy innovation priorities. Please describe any governance processes to manage and review energy innovation efforts and, where able, please list

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tracking indicators that are commonly used (e.g. such as patents, publications, rates of company formation, follow-on capital and private co-investment, technology performance upgrades).

3. Private Sector Engagement: Please can you describe your strategic approach and priorities to engagement with the private sector to address the clean energy innovation priorities identified in section 2. This could include for instance prioritising co-funding of RD&D initiatives; incubator/accelerator programs that are funded (in part or fully) by the private sector; tax credits and other fiscal incentives; initiatives that the private sector can engage with, grants, de-risking instruments such as loan guarantees etc.

4. International Collaborations: Please describe your strategic approach to international collaboration to tackle your clean energy innovation priorities (e.g. do you have an international strategy, or particular types of collaboration you are prioritising).

5. National Energy innovation Ecosystem: Please provide an overview of your national institutions, funders and organisations and describe how they contribute to tackling the innovation priorities identified in Section 2. Please either provide this information in the box or complete Table 3.

6. Further Supporting Information: Please add below any further information about your national energy innovation needs or approaches to tackling these that has not been covered above.



Mission Innovation – Catalysing Clean Energy Solutions For All