Stakeholder Survey Analysis
Fusion Expert Group Opinion Paper
"Towards the EU Fusion Strategy"

Fusion for Energy
Update: 5 June 2025

Contents

Executive Summary

On 7 April 2025 the European Commission published the **Fusion Expert Group's (FEG) Opinion Paper "Towards the EU Fusion Strategy"**[1]. To obtain the views of its stakeholders, Fusion for Energy (F4E) carried out a survey between 17 April and 9 May 2025. A total of 42 organisations across 15 countries responded, representing a diverse cross-section of the fusion community (industry suppliers, large energy companies, private fusion startups, research institutions, etc.).

Overall, respondents strongly support the Opinion Paper's key recommendations – notably the continued commitment to ITER, the development of a competitive European fusion industrial ecosystem, the establishment of a fit-for-purpose regulatory framework, and the drive toward fusion commercialisation – while offering constructive feedback and criticism on aspects of implementation and emphasis.

Common themes emerged throughout the survey responses:

- **Widespread Support with Nuance:** Virtually all respondents agreed with the general strategic vision outlined by the FEG. Over 90% of those who provided input on each major pillar were supportive of the recommendations in principle, with only a handful of dissenting opinions. However, many stakeholders coupled their support with suggestions or caveats, indicating *how* the strategy should be executed (for example, calling for clear funding mechanisms or timeline acceleration).

- **Focus on Industrialisation and Private Sector Involvement:** A recurring message was the need to better integrate Europe's private sector and SMEs into the fusion programme. Stakeholders urged concrete measures to build a robust innovation ecosystem – such as dedicated funding for fusion start-ups, streamlined procurement processes, and stronger industry partnerships – to ensure Europe's research advances translate into industrial and commercial success.

- **Regulatory and Governance Reforms:** Respondents stressed that achieving the strategy's goals will require adapting Europe's frameworks. They emphasized establishing an appropriate regulatory, safety, and licensing regime for fusion (distinct from fission) as a high priority, and many supported revising governance structures to improve coordination. Stakeholders highlighted the future role of F4E as crucial, suggesting that F4E could take on an expanded mandate in facilitating a programme for DEMO[2] and supporting commercialisation of fusion, in close synergy with EUROfusion and other bodies.

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1 European Commission: Directorate-General for Research and Innovation, *Fusion Expert Group opinion paper – Towards the EU fusion strategy*, Publications Office of the European Union, 2025, **https://data.europa.eu/doi/10.2777/3510421**

2 DEMO (DEMOstration fusion power plant) is taken to mean a pilot fusion power plant designed to demonstrate the feasibility of generating net electricity from fusion energy.

- **Urgency in Market Entry & Competition:** While optimistic about fusion's potential, stakeholders cautioned that Europe must act decisively to secure a leadership position. They noted that other countries (e.g. US, UK, China) are rapidly advancing private fusion initiatives; Europe should expedite efforts toward a demonstration power plant and avoid over-reliance on ITER's timeline. Many respondents signaled **readiness to contribute** to these goals – about two-thirds indicated their organisation is prepared to support fusion development through technology, services or other means – but they seek clearer opportunities and frameworks to do so.

- **International Collaboration and European Leadership:** Strong support was expressed for international cooperation as a means to accelerate progress and share risks. Respondents view global partnerships (with "trusted partners" like the US, Japan, UK, etc.) as vital, provided European know-how and supply chains are strengthened in parallel. Stakeholders want Europe to collaborate globally **without falling behind** – meaning cooperation should go hand-in-hand with building Europe's own capabilities and protecting its interests (e.g. intellectual property and market competitiveness).

In summary, the stakeholder feedback validates the FEG's strategic pillars and offers valuable insights on priorities. The fusion community is broadly aligned with the vision of moving expeditiously from ITER to a European fusion power demonstrator and beyond. The survey responses suggest focusing on practical enablers: **investing in innovation and industry, developing a tailored regulatory environment, securing resources and political commitment, and empowering F4E and other institutions to drive the strategy forward.** By addressing these areas, the European fusion initiative can build on consensus support and maintain momentum toward fusion energy's commercial reality.

1. Respondent Demographics

A total of **42 organisations** participated in the survey. These respondents represent a balanced mix of stakeholders in the European (and international) fusion landscape. Key demographic highlights include the types of organisations, their geographic distribution, and their familiarity with the FEG Opinion Paper.

As shown in figure 1, the largest group (50%) consists of **fusion supply-chain small/medium enterprises (SMEs)** – companies supplying components, engineering services, or specialized technology to fusion projects. Additionally, **14%** of respondents were **large industrial or energy companies** (major firms with significant resources, often already involved in energy or nuclear projects), and another **14%** were **private fusion development companies** (start-ups/SMEs devoted to developing fusion reactors or related tech). Research institutions and universities made up about **12%**, reflecting the academic R&D stake in fusion. The remainder included **industry associations** (5%) and **public sector bodies** such as government agencies or research funding organisations (5%). This spread indicates that the survey captured input from the full spectrum of fusion stakeholders – from innovators and suppliers up to big industry and public authorities – with a predominance of private-sector voices (roughly 70% of respondents were from private entities, versus ~24% public and a few mixed or non-profit).

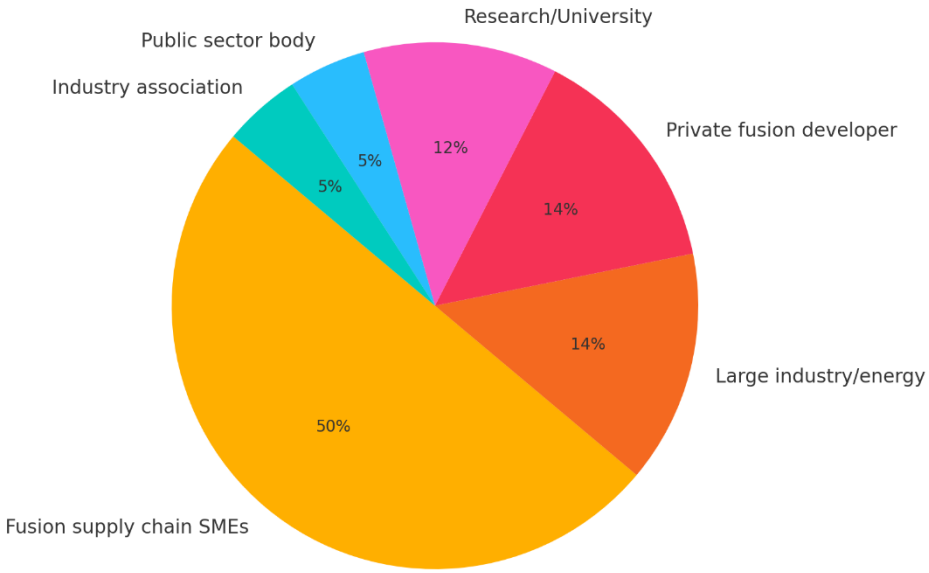

Figure 1: Distribution of survey respondents by type of organisation

As shown in figure 2, the respondents hail from **15 different countries**, predominantly EU Member States. Notably, **Germany and Spain** were each home to the highest number of responding organisations (7 each, ~17% each of the total). Other well-represented countries included **France, Italy, and the Netherlands** (4 respondents each), as well as **Sweden and Poland** (3 each). Several countries had one or two organisations participating, including Belgium, Hungary, Romania, Greece, Slovakia, Luxembourg, Malta, and **one from the United States** (indicating some international input beyond Europe). This broad geographic mix

suggests the feedback encompasses perspectives from established fusion hubs (e.g. France with ITER, Germany with a strong industrial base) and emerging players or smaller programmes across Europe. It also underlines a pan-European interest in the fusion strategy, with both Western and Eastern EU countries contributing (for example, Poland and Romania are involved via new projects like IFMIF-DONES and others).

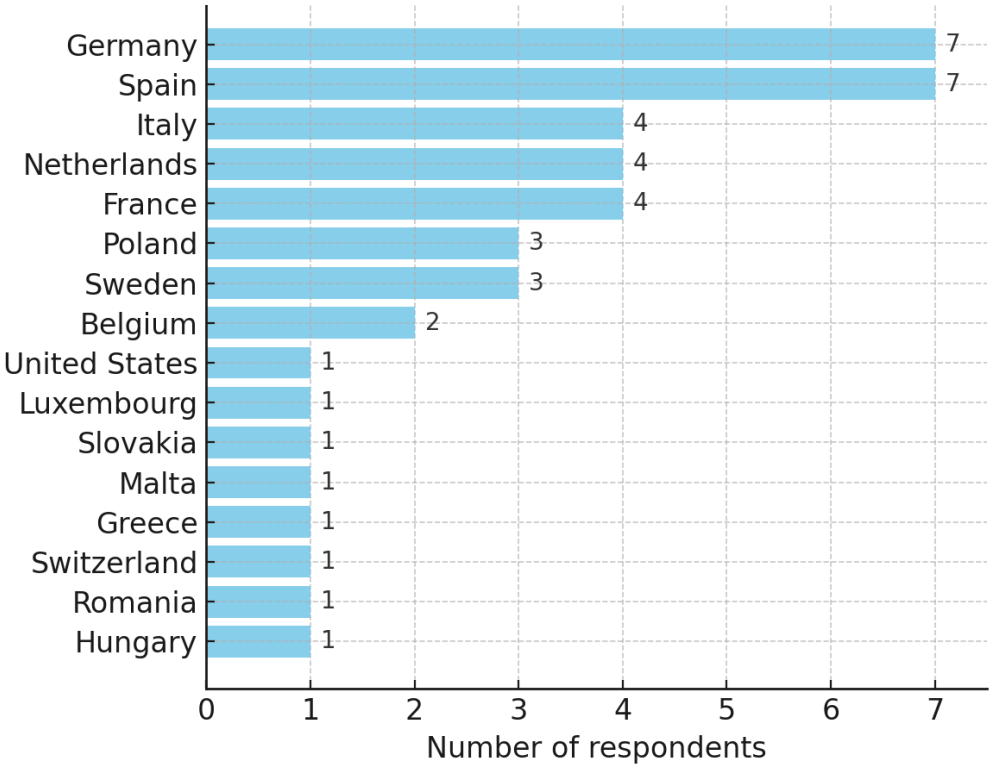

Figure 2: Distribution of respondents by country of headquarters

Familiarity with the FEG Opinion Paper: About two-thirds of respondents were already acquainted with the Opinion Paper's content. **50%** reported that they had read the paper in full, and an additional **14%** had at least reviewed its main points. The remaining one-third had little or no familiarity prior to the survey, which is not unexpected given the paper's recent publication. Even so, many of those not initially familiar still engaged with the survey's specific questions, indicating that the key themes (ITER, innovation ecosystem, regulation, etc.) resonate broadly. This also suggests an opportunity for further dissemination of the FEG Opinion Paper to stakeholders who might have interest but had not seen it, as several respondents noted they were learning about aspects of the strategy through the survey itself.

Overall, the demographic profile of the survey respondents demonstrates a **diverse and representative stakeholder engagement**. There was strong participation from the industrial supply chain and private fusion ventures – the groups critical for implementation of a fusion strategy – alongside input from research and public institutions that shape the programme's direction. Such a mix enriches the feedback, covering practical, technical, and policy-oriented viewpoints. In the following sections, we analyse the responses by thematic pillar, highlighting common perspectives and distinguishing viewpoints by stakeholder type where relevant.

2. Analysis by Thematic Pillar of the FEG Opinion Paper

The Fusion Expert Group's (FEG) Opinion Paper is structured around several key pillars. The survey asked stakeholders for their views on each of these thematic areas. In general, respondents showed strong alignment with each pillar's recommendations, with variations mainly in the emphasis or additional suggestions. We detail the feedback for each pillar below:

Pillar I: ITER – The Way

Summary of feedback: Stakeholders overwhelmingly reaffirmed the central importance of ITER in the European fusion roadmap. Most respondents view **ITER as the cornerstone project** that must succeed in order to enable subsequent steps toward fusion energy. At the same time, some cautioned that Europe's strategy should not become *overly* reliant on ITER's schedule and outcomes – they argue for pursuing parallel efforts to ensure timely progress toward a fusion power plant. In quantitative terms, about three-quarters of respondents who answered this question expressed clear support for the Pillar I recommendations, with only ~5% voicing outright disagreement and roughly 15–20% offering no comment. This indicates broad endorsement of ITER's role, tempered by a desire to mitigate risks associated with ITER's long timeline and international complexity.

Strong support for ITER's role: Most respondents agreed that **continuing commitment to ITER is vital**. Industrial stakeholders, in particular, highlighted ITER as a driver of innovation and a source of valuable know-how. Several industry suppliers noted that *"ITER is fundamental"* and that they are already seeing benefits from ITER in terms of technology development and business opportunities (e.g. new demands for high-tech components) – reinforcing the idea that ITER underpins the growth of a fusion industrial base. Research-linked respondents also emphasized ITER's scientific mission, often echoing that ITER's success is crucial to demonstrate net energy gain and thus validate the fusion concept at power-plant scale. No respondent suggested abandoning or downplaying ITER; even the more critical voices acknowledged **ITER as a necessary step** for fusion development.

Caveats – timeline and over-reliance: While supportive, many respondents included caveats focusing on **ITER's schedule and the need for parallel progress**. A common sentiment was that Europe should **ensure ITER's lessons are applied as soon as possible** and avoid letting ITER delays hold back other work. For example, respondents from companies closely following ITER's progress commented that the timeframe for achieving ITER's full performance (e.g. the goal of Q≥10 fusion gain by ~2044) might be too slow, and suggested the EU plan for an earlier start on DEMO. A few **private fusion enterprises** expressed concern that the Opinion Paper *"centers ITER as the foundation of European fusion, treating private industry as subordinate"*. These respondents argue that **alternative approaches (private fusion projects or smaller-scale devices)** should be more prominently incorporated into the EU strategy, rather than waiting solely for ITER results. For instance, one such respondent noted that their concept does not rely on ITER's progress at

all and urged the EU to support multiple pathways in parallel. This perspective, while in the minority, highlights the **tension between a singular reliance on ITER and a more diversified approach**.

While ITER is widely recognised as essential to Europe's fusion strategy, **several respondents questioned its governance and accessibility**. One respondent noted, "Delays in fusion development are encoded as long as strategic decisions are made by the same circle of people and institutions." Others expressed frustration with entry barriers: "**We have found it challenging to engage in ITER-related projects… tenders appear to be highly tailored to companies already involved**." Some also criticised the lack of flexibility in testing parallel or complementary technologies under ITER's umbrella. There were concerns that while the operational goal of 2035–2040 is realistic, more attention is needed on tritium management and system versatility: "If we are not able to manage the tritium 'waste', we will not be allowed to operate."

Industry involvement and technology transfer: Many stakeholders specifically praised the Pillar I recommendation to leverage ITER for developing Europe's industrial capabilities. They "**fully agree**" with actions like promoting industrial collaboration through ITER and transferring technologies and skills from ITER to the private sector. Several suppliers and engineering firms gave examples of how ITER has enabled them to innovate (for example, improving manufacturing techniques or expanding expertise in nuclear-grade components), and they want this to continue. Some suggested creating even more opportunities for European SMEs within ITER: e.g. additional prototyping programmes or test beds using ITER's infrastructure. The positive feedback on this point indicates that stakeholders see ITER not just as a scientific experiment, but as a **springboard for European innovation** – aligning well with the FEG's strategic intent.

Concerns about ITER's recent baseline and geopolitical context: A couple of respondents raised **specific criticisms** under this pillar. One was unhappy with the new ITER baseline schedule (presumably referring to recent delays or changes in project timelines), stating that they *"do not agree with the new ITER baseline"* and that many challenges remain – essentially urging realism about ITER's schedule. Another noted that the **geopolitical situation** (possibly alluding to issues like the international partnership strains or supply chain disruptions) *"is not beneficial for ITER"*, hinting that Europe should plan accordingly (for example, by securing supply chains or considering scenarios where some partners might not deliver on time). Although these points were isolated, they underscore a awareness among stakeholders that ITER faces external risks, and thus **contingency planning** is wise.

In summary, **Pillar 1 (ITER)** received strong endorsement as "the way" forward in the near term. The community's advice is to **stay the course with ITER, but with eyes open**: support and complete ITER, maximize its benefits (knowledge transfer to industry, training of scientists/engineers, etc.), and simultaneously prepare for next steps so that Europe can move to DEMO without unnecessary delay. The feedback suggests stakeholders are confident in ITER's value, provided that European strategy remains agile around it – incorporating ITER's outcomes as they emerge and not losing momentum if challenges arise.

Pillar II: Research, Innovation, and building a Competitive Industrial Ecosystem

Summary of feedback: Stakeholders were highly enthusiastic about Pillar 2's focus on building a **competitive European fusion innovation and industrial ecosystem**. This pillar's objectives – boosting R&D, fostering public-private collaboration, and developing a skilled, competitive supply chain – resonated strongly with respondents across all organisation types. Many called this aspect of the strategy "absolutely essential" for Europe to achieve fusion energy. Roughly 80% of respondents gave supportive feedback on Pillar 2, and none disagreed with its importance. However, **numerous suggestions were offered on how to effectively realize these goals**, including concrete proposals for funding mechanisms, widening participation to more players (geographically and to new entrants), and ensuring technology-neutral support for various fusion concepts. In other words, stakeholders agreed on the "what" of this pillar and devoted their comments to the "how."

Unanimous agreement on importance of innovation & industry development: There was a clear consensus that **Europe must strengthen its fusion R&D and industry base**. Respondents frequently stressed that *"research and innovation are the keys"* to fusion – without sustained R&D, higher technology readiness levels (TRLs) cannot be achieved, and without industry, even high-TRL ideas cannot be built. Many applauded the Opinion Paper for prioritising the creation of a **competitive industrial ecosystem**, calling it "a must" and "very positive." Representatives of large industry and SMEs alike supported coordinated R&D efforts, noting that partnership between laboratories, universities, and companies will drive the advances needed in materials, components, and engineering techniques for fusion. The inclusion of this pillar was described as *"a very good initiative"* to align European capabilities toward a common goal.

Many agreed with the call for industrial engagement and diversified approaches, but felt the proposed mechanisms were insufficient. A prominent private actor described the pillar as a ***"missed opportunity"*, saying it *"fails to present concrete mechanisms to support private fusion companies as independent drivers of innovation."*** Others warned of funding dilution: *"There is a high risk… all activities get not enough budget to speedily develop the concept to a pilot fusion power plant."* While the ambition for inclusivity was appreciated, some felt support tools for SMEs and private developers remain underdeveloped: *"We would welcome greater support for technology maturation pathways and funding mechanisms that can bridge the gap from lab to fab."*

Need for concrete support measures: A prevalent theme was the call for **tangible programmes and resources** to implement Pillar 2. Several respondents pointed out that the Opinion Paper's recommendations, while sound, are *"overly general"* on this pillar and *"fail to define the means"* to build the competitive ecosystem. They urged more detailed planning such as dedicated funding instruments for fusion innovation. For instance:

- **Funding for SMEs and start-ups:** Many stakeholders, especially SMEs themselves and industry associations, highlighted financing as a critical issue. One respondent noted that *"financing is a key issue to be addressed for private SMEs"* in the fusion

supply chain. The general sentiment is that small companies and new ventures face difficulties accessing funds for fusion-specific development (since current EU funding is often channelled via EUROfusion or large programmes). Suggestions to remedy this included creating new grant schemes or investment programmes targeted at fusion innovators, possibly managed by F4E or another body, and ensuring that private companies can compete for R&D calls (e.g. technology demonstration projects) on equal footing with traditional research institutes. There was also mention of supporting SMEs in **widening countries** (less represented EU countries in the fusion programme) through dedicated innovation calls, to broaden the industrial base.

- **Open up the ecosystem to new players:** Respondents urged that the current fusion community (which has historically been somewhat insular, centred around EUROfusion labs and ITER contractors) should be opened to **more participants, including non-traditional players**. They believe this would inject fresh ideas and competition. One comment explicitly said the recommendations *"should explicitly include the need to open the current fusion ecosystem"* – implying that new private ventures, perhaps even those pursuing alternative concepts like inertial fusion or advanced stellarators, should be welcomed and integrated into European plans. In this vein, **technology neutrality** was raised by multiple respondents: Europe's strategy should not exclude any fusion approach that could be viable. A concrete example given was the **Divertor Tokamak Test (DTT) facility** in Italy – a respondent noted this public-private project as important but not noted in the FEG paper. Similarly, another respondent lauded the support for **inertial confinement fusion (ICF)** in the paper and wants to see synergy between magnetic and inertial fusion efforts. Overall, there is support for a *portfolio approach* to fusion R&D, ensuring Europe invests in a range of promising technologies (provided they align with the strategic goals).

- **Industry integration into R&D programmes:** Some respondents pointed out procedural or structural obstacles that need fixing. For example, one mentioned that the current **EUROfusion structure poses challenges for private companies** to engage, even when calls for industry participation exist. They imply that bureaucracy or consortium models might be hindering agile collaboration with industry. Another suggested an **independent body** (akin to the European Research Council's model) to oversee the fusion roadmap selection of projects, which would be a significant governance shift aimed at transparently picking the best ideas (potentially giving industry-led proposals a fair shot). While not everyone went into such detail, the underlying request is for **more streamlined, industry-friendly mechanisms** in European fusion R&D – whether that means adjusting EUROfusion's role, adding new coordination bodies, or specific industry advisory panels.

Emphasis on partnerships and knowledge sharing: Many respondents agreed that building the ecosystem requires **close collaboration between academia and industry**. They support measures like joint innovation programmes, public-private partnerships, and training initiatives. One respondent noted that their company had opportunities to develop new manufacturing steps by working with F4E and EUROfusion – a positive example to replicate. Another wrote that *"partnership and innovation should be key within this ecosystem,"* underlining collaboration culture as important as funding. There was also a recommendation

to ensure *"harmonised standards"* across Europe (e.g. common codes for fusion engineering) to facilitate cooperation and a level playing field for industry. This ties into Pillar 3 (regulation), but from the perspective of enabling easier industrial participation across countries.

Taxpayer value and efficiency: A few respondents touched on making sure the significant investment in fusion yields value. One mentioned the need to *"critically assess how the taxpayers' money is spent"*, suggesting that while they support big spending on fusion innovation, it must be managed efficiently and with accountability. This indicates stakeholders are aware of the importance of demonstrating returns (scientific, economic) on fusion funding – something that robust industry involvement can help achieve by translating research into tangible outputs.

In summary, **Pillar 2 (Innovation and Industrial Ecosystem)** was greeted as a cornerstone of the strategy. The community strongly believes that **Europe's success in fusion depends on energising its innovation pipeline and industrial capacity now**. The feedback converges on a message: the ideas in the Opinion Paper are correct, but they must be backed by action – funding programmes for companies, inclusive processes for new players, and practical partnerships. If these are put in place, stakeholders feel confident that Europe can build a world-leading fusion ecosystem, leveraging its scientific excellence into industrial leadership. This pillar also links closely with Pillar 4 (market entry): respondents see a direct line from supporting innovation today to achieving a fusion power plant in the future.

Pillar III: Fusion Regulatory Framework

Summary of feedback: There was near-universal agreement among respondents that establishing a **dedicated fusion regulatory framework** is urgent and important. Pillar 3, which addresses the need for appropriate regulation, safety standards, and licensing processes for fusion, garnered **strong support with very few reservations**. Many stakeholders echoed the paper's point that fusion should not be shoehorned into existing nuclear regulations but rather have a tailored approach proportional to its risks. Key themes in the feedback include calls for a **harmonised EU-wide regulatory approach**, the idea of creating *new fusion-specific regulatory institutions or committees*, and ensuring that regulatory development keeps pace with technological progress so as not to become a bottleneck. In quantitative terms, essentially all respondents who commented on Pillar 3 were supportive; none opposed the notion of adapting the regulatory framework for fusion, and about 17% provided no specific comment (often because it might be outside their expertise). This consensus highlights that **addressing regulation and safety is seen as a critical enabler for fusion's next steps**.

Support for a harmonised fusion regulatory framework: Stakeholders strongly endorsed the recommendation for a **clear, unified regulatory framework across Europe** for fusion energy. Many stated that a "*dedicated European regulatory approach to fusion is needed*" – one that recognizes fusion's differences from fission (for example, fusion reactors have no high-level long-lived radioactive waste, and no risk of meltdown in the same way). Respondents agreed that the framework should be **risk-informed and proportionate**. A notable number of comments favored distinguishing fusion from the conventional nuclear

regulations to avoid unnecessary hurdles: as one put it, *"create a dedicated regulation, different from the one of traditional nuclear reactors."* There is concern that if fusion were regulated exactly like fission power plants, it could impose requirements that are not pertinent and that could slow innovation.

Several respondents welcomed the idea mentioned in the Opinion Paper of possibly establishing a **European Fusion Regulatory Body or Authority**. One described the concept of a Europe-wide fusion regulatory body as *"a brilliant idea,"* seeing it as a way to ensure consistency and pooling of expertise. This suggests stakeholders see value in coordination at the EU level rather than each country developing entirely separate fusion regulations. Indeed, phrases like *"harmonised EU fusion safety framework"* were common, with respondents noting this would help avoid divergent national rules that complicate multi-country projects or supply chains. **Industrial contributors** particularly want a predictable regulatory environment across member states, which would facilitate design and certification of components for fusion reactors in a pan-European market.

Need for urgency and clarity: Respondents emphasized **timeliness** – i.e., regulatory development must keep pace with fusion R&D. As one respondent noted, the EU should *"outline regulatory [...] aspects as soon as possible"* in the fusion strategy. The rationale is that clear regulations and licensing criteria will influence the design of DEMO and other devices; if these are defined early, developers can incorporate them rather than face delays later. Some also mentioned that demonstrating **safety** to the public and authorities is crucial for societal acceptance of fusion power; having a well-defined regulatory regime will help in communicating and ensuring that fusion plants will be operated safely.

Many highlighted specific aspects that a fusion regulatory framework should cover:

- **Codes and standards:** It was frequently mentioned that developing targeted **technical codes, standards, and guidelines** for fusion is a must. For example, new standards for materials in fusion environments, or codes for the unique tritium handling and magnetic systems of fusion reactors. Respondents agree that work on these standards should start now (some efforts are already underway internationally), with Europe taking a lead where possible.

- **Licensing process:** Stakeholders want clarity on how a fusion pilot plant or commercial reactor would be licensed. Will there be a special licensing process distinct from a nuclear fission plant? Some suggested that a *"risk-proportional regulatory framework tailored to fusion"* should translate into a licensing approach that focuses on the real hazards (like tritium management, neutron activation of materials, etc.) without imposing irrelevant procedures. Several respondents implied that the **paper should have given more detail** on this, indicating that in follow-up, defining the roadmap for licensing DEMO will be crucial.

- **Timeline and coordination:** A few cautioned that achieving a unified approach is complex. For instance, one noted it may be *"very complicated to have a global 'unified' regulatory approach"* but still necessary to **ensure compatibility** (perhaps globally, not just within EU). Another remarked that while EU-wide rules are good, they must not overly constrain individual countries' ability to proceed with their own DEMO

projects or facilities ("it cannot limit countries to react" if they need to, one wrote). This reflects a desire for a balanced approach: harmonisation, but with enough flexibility that national regulatory bodies (which ultimately license facilities on their soil) can act efficiently. It points to the importance of **early dialogue between EU-level entities and national nuclear regulators** to define fusion regulation jointly.

Inclusion of stakeholders in regulatory development: Respondents also believe that developing the fusion regulatory framework should involve the right expertise. An industrial respondent suggested that *"the fusion industry should be consulted"* and involved alongside public authorities in crafting regulations. This would ensure the rules are practical and informed by on-the-ground technical realities. There is also recognition that international collaboration can help – e.g. aligning with efforts in the US or UK where similar regulatory discussions are happening – which ties into Pillar 4 (international cooperation). Indeed, one respondent commented that the fusion framework should be harmonized within the EU *and aligned internationally* so that, for example, a device approved in Europe wouldn't face completely new hurdles elsewhere and vice-versa.

Minor concerns and points: Virtually no one argued against the need for a new regulatory approach. The only nuances were:

- Some comments that the Opinion Paper was perhaps short on detail here (stakeholders want to see concrete follow-up on how exactly the EU will create this framework and who will lead it) *"The recommendations are too vague and lacking a clear path toward implementation,"* said one respondent.

- Ensuring that any new regulatory bodies do not simply add bureaucracy without benefit. (This was not explicitly stated for Pillar 3, but some governance comments in Pillar 5 relate to avoiding too many new committees – the same principle would apply if a new regulatory agency is created, it must have a clear purpose.)

- A couple of respondents noted that **fusion regulation must also consider global safety/security issues**, like non-proliferation. One person agreed with the FEG's position on risk and non-proliferation measures – meaning they support the idea that while fusion doesn't use fissile material, it should still be safeguarded appropriately (fusion devices could, in theory, be misused to produce weapons-usable material if designed for that purpose). The takeaway is that the framework should be comprehensive, covering environmental, safety, and security aspects tailored to fusion.

In conclusion, **Pillar 3 (Regulation, Safety, Licensing)** received a **resounding nod of approval** from stakeholders. They view a fit-for-purpose regulatory framework as not just necessary, but as a potentially "enabling" step that will smooth the path to building fusion power plants. The feedback calls for Europe to move quickly on this front, possibly by setting up specialized working groups or a central regulatory body, to deliver harmonised standards and processes. This will ensure that when DEMO or commercial projects are ready, regulation will not be a roadblock but rather a well-prepared pathway ensuring safety and public trust.

Pillar IV: International Cooperation

Summary of feedback: Stakeholders widely affirmed the **importance of international collaboration in achieving Europe's fusion goals**. About two-thirds of respondents provided comments on this pillar, with a strong majority expressing supportive views. The feedback highlights a nuanced perspective: while international partnerships are seen as **vital for accelerating fusion progress**, respondents also emphasized the **need to balance cooperation with the protection and advancement of European capabilities**. There was also a call to ensure strategic alignment – choosing the "right partners" and focusing on mutual benefit without compromising Europe's competitiveness or autonomy.

Strong support for collaboration with trusted partners: The majority of responses praised the FEG Opinion Paper's stance on international cooperation. Stakeholders cited benefits such as sharing risks, pooling expertise, and avoiding duplication of efforts. Specific partners mentioned positively include the United States, United Kingdom, and Japan – countries seen as technologically advanced and philosophically aligned with Europe. One respondent noted, "We believe that building strong ties with trusted international partners will accelerate progress and reduce costs." Many see global cooperation as especially useful for tackling shared technical challenges, like tritium management or advanced materials testing.

Caution against over-reliance and technology leakage: Some respondents offered more critical or measured views, warning that international cooperation must not come at the expense of European leadership. A few stakeholders raised concerns about past failures or imbalances in joint ventures and urged the EU to ensure that collaborations do not lead to a loss of control over strategic technologies. One comment stated, "This is less important. We have seen the failure of international projects," while another asked pointedly, "International cooperation with whom?" This indicates that cooperation must be based on clear criteria and careful partner selection.

Call for reciprocal benefits and strengthened European supply chains: Several participants advocated for an approach where Europe engages globally but retains a strong home base. This includes protecting intellectual property, supporting European industry's participation in international projects, and ensuring that benefits flow back into the EU ecosystem. For example, one stakeholder wrote, "International cooperation is very much supported, provided it does not dilute Europe's industrial advantage." Respondents supported partnerships that expand business opportunities for European companies abroad and bring lessons and capabilities back into Europe.

Focus areas for cooperation: Respondents identified specific areas where international cooperation would be especially valuable:

- Joint R&D on critical systems (e.g. breeding blankets, materials testing)
- Regulatory convergence and safety frameworks
- Sharing of test facilities and experimental infrastructure
- Global road mapping and coordination to avoid duplication

These areas reflect a pragmatic approach: collaborate where it makes sense, especially on expensive or pre-competitive activities, while maintaining a focus on delivering a competitive European fusion power plant.

Summary of stakeholder sentiment: A simple qualitative analysis of the responses found that:

- ~65% of responses were clearly supportive of international cooperation
- ~25% were mixed or offered critical caveats
- ~10% were neutral or gave no substantive comment

This overall positive tone aligns with other pillars: stakeholders want to see Europe lead globally by example, partner with like-minded actors, and build a cooperative ecosystem without sacrificing strategic interests.

In summary, international cooperation is seen as a vital enabler for Europe's fusion ambitions – but not a substitute for European capacity. Stakeholders encourage the EU to pursue global partnerships that align with its values and needs, while ensuring such engagement enhances – rather than compromises – Europe's technological sovereignty and market readiness.

Pillar V: Revised Governance

Summary of feedback: Stakeholders broadly acknowledge that Europe's fusion programme governance needs reform, with many welcoming the proposed changes in the Fusion Expert Group (FEG) Opinion Paper. Overall sentiment was more positive than negative – most respondents agree that a **streamlined, clearer governance structure** is essential to drive the EU's fusion efforts forward. However, there is a notable undercurrent of concern that simply adding new committees or layers could create **unnecessary bureaucracy**. Roughly 70% of survey participants provided input on this pillar, and virtually none opposed the need for governance updates. About half of those giving feedback explicitly supported the Pillar V recommendations or agreed with them in principle, while around one-fifth voiced significant reservations about certain aspects. The remainder offered mixed or conditional support. In quantitative terms, this means **over two-thirds of respondents signalled approval for governance reform**, although often coupled with caveats, and only a small minority were critical of the overall direction (primarily cautioning *how* changes should be implemented, rather than rejecting the idea of change). Overall, the feedback indicates **strong consensus that governance must evolve**, tempered by warnings to ensure the reforms are executed in an effective, inclusive way.

Thematic analysis: Several recurring themes emerged in the feedback on revised governance:

- **Streamlining structures and clarifying roles:** A dominant theme is the need to simplify the complex European fusion governance landscape. Respondents from all groups noted that the current setup – involving the European Commission (with split responsibilities between DG Energy and DG Research), Fusion for Energy (F4E),

EUROfusion, Member State agencies, and advisory bodies – is **fragmented with overlapping responsibilities**. This fragmentation leads to coordination challenges and inefficiencies, as evidenced by past difficulties (some pointed to ITER as an example of what happens when governance is convoluted). Many stakeholders echoed the view that a **"clearly defined central authority"** or at least a much more coherent structure is needed to steer the fusion programme. They supported the FEG's call for an **European Fusion Coordination Committee (EFCC)** and other mechanisms *in principle* but stressed that these must come with well-defined mandates to avoid simply adding more actors to an already crowded field. In the words of one participant, governance reforms should "**provide clarity for all stakeholders: clearly define responsibilities of EC, F4E, EUROfusion, and [the nascent] EFSP** (European Fusion Stakeholder Platform under the GO4FUSION Coordinated Support Action) so industry understands who does what and how to engage." Another respondent suggested even more boldly that Europe consider establishing **"one main EU body to coordinate fusion R&D, strategy, funding, and collaboration – similar to the US DOE's Fusion Energy Sciences office"**. This reflects a widespread desire for *simplification*: fewer parallel committees and a more focused leadership structure that can make decisions efficiently.

- **Avoiding bureaucracy and committee proliferation:** Hand-in-hand with calls for streamlining was a strong caution against creating *too many new committees or layers* that might duplicate efforts. Several stakeholders worry that the proposed new platforms (like the EFSP) or committees could **"add complexity without solving issues."** One respondent quipped bluntly that, *"if you don't want to solve a problem, have a committee to analyze it,"* expressing skepticism that multiplying bodies would lead to real progress. This sentiment – that governance reform should not devolve into bureaucratic expansion – was echoed by others in more formal terms: for instance, an industry association warned of **"significant concerns with [some] governance proposals,"** specifically referencing the EFSP, and urged that any new entity must have a clear value-add. The prevailing message is that new coordination forums are welcome only if they **streamline decision-making rather than complicate it**. Stakeholders want to ensure that *revised governance focuses on action and results, not meetings*. In practical terms, this means carefully delineating the roles of new groups like the EFCC (European Fusion Coordination Committee) and EFSP to prevent overlap with existing organizations. A few pointed out that the EU already has networks for fusion industry and stakeholders (for example, industry associations); rather than **"sidelining or duplicating"** these, the governance model should integrate them. As one private company put it, *"existing organizations… should be fully integrated into the governance framework, rather than duplicated. The focus should be on streamlining – not multiplying – bodies."* The underlying theme is a preference for **lean governance** that cuts through red tape – *"Less bureaucracy, more real work,"* as one respondent succinctly stated.

- **Industry inclusion and co-leadership:** A major point of emphasis, especially among private sector respondents, is that the new governance must give industry a **true seat at the table**. There is appreciation that Pillar V recognizes the need to involve industry

(e.g. through the proposed EFSP) but also caution that this should not be tokenistic. Multiple industry players insist on **meaningful inclusion** of the supply chain and private fusion companies in strategic decision-making – effectively a *co-leadership role* alongside public authorities, rather than being consulted only after decisions are made. ***"Governance must be transparent, streamlined, and inclusive – ensuring industry has a co-leadership role rather than being relegated to post-facto consultation,"*** urged one representative from an industry association. This view stems from the evolving nature of fusion: as it moves from pure research into the realm of industrial development, companies feel they should help drive the agenda, not just follow it. Several respondents welcomed the concept of an EFSP or similar forum as a way to institutionalize industry's voice, noting that they **"value the proposed EFCC and EFSP for fostering collaboration and integrating industry perspectives."** At the same time, they want these platforms to have teeth. One SME noted that while they *"endorse the recommendations in Pillar V…advocating for a restructured governance framework,"* it is crucial that any stakeholder platform truly **empowers smaller companies and those from widening countries** to participate, rather than being dominated by the usual large players. This ties to a broader theme of **widening participation**: ensuring the governance model isn't just inclusive in name but actively brings in diverse contributors (private firms big and small, from all member states). Some suggested that existing industry associations could be leveraged rather than reinvented. In any case, the clear message is that industry wants a prominent, formal role in shaping Europe's fusion strategy under the new governance – reflecting the fact that fusion development is increasingly a commercial endeavour, not just a government-funded science project.

- **Role of F4E and EUROfusion – cohesion vs. separation:** A significant amount of commentary centered on the respective roles of F4E (Fusion for Energy) and EUROfusion in a revised governance landscape. Currently, F4E (an EU Joint Undertaking) is primarily the **implementing agency for ITER procurement** and associated projects, while EUROfusion is a consortium managing the EU's fusion R&D programme (largely laboratory research). Stakeholders generally agree that these roles need better coordination, especially as Europe prepares for **DEMO** (the demonstration power plant) and beyond. Many respondents see F4E as having a pivotal part to play in the future: they view it as the logical entity to take on **an expanded mandate** to coordinate Europe's fusion programme toward DEMO and commercialization. This is partly because F4E has a legal personality and project management experience, whereas EUROfusion in its current form is not a legal entity and faces constraints (for example, difficulty attracting and retaining talent under short-term contracts, and a governance structure where its General Assembly is composed of the very beneficiaries of its funding). One respondent noted that the structure of EUROfusion structure of the organisation is perceived by some stakeholders as self-referential, with decision-making concentrated among funding recipients, arguing that EUROfusion **should be turned into a legal entity** with an independent governance board. This would professionalize its operations, enable longer-term employment of staff, and avoid conflicts of interest. Many others concur that **EUROfusion's scope should remain focused on research** and that it should perhaps continue to exist

separate from F4E – but under a clearer framework. The FEG's recommendation to establish the EFCC (European Fusion Coordination Committee) to oversee all fusion activities is seen as a step toward aligning F4E and EUROfusion, but respondents stress it must come with decisions on **who leads DEMO**. The prevalent view is that when it comes to building and delivering a DEMO plant, **F4E should take the lead**, leveraging EUROfusion for scientific expertise – not the other way around. As one stakeholder familiar with the situation put it, *"it would be natural if F4E would coordinate the EU fusion programme"* given EUROfusion's limitations. In practice, comments suggest a **phased approach**: let EUROfusion continue to handle early-stage research and generational plasma science, but as the programme shifts toward prototype development (higher TRLs and industrial deployment), **gradually transition leadership to F4E**. This approach would capitalize on F4E's project management capacity and supplier network, while retaining EUROfusion's scientific strengths in a supporting role. Importantly, whatever model is adopted, respondents call for it to be decided **"well in time"** – Europe must plan the F4E–EUROfusion relationship for DEMO now, not last-minute, to avoid governance confusion when the project ramps up. In summary, stakeholders support a governance model where F4E and EUROfusion work in sync but with **distinct, complementary roles** (and possibly a new legal status for EUROfusion), overseen by a high-level committee (EFCC) that ensures they are aligned with each other and with industry and policy goals.

- **Funding mechanisms and support for innovation:** While not the core of Pillar V, a number of respondents brought up funding in the context of governance – essentially arguing that *how* decisions are made and *who* is at the table will directly impact the resources available for fusion development. A recurring point was that the governance reforms should aim to **open funding channels for private companies and new ventures**. Several industrial stakeholders noted that today's setup makes it **"particularly difficult for newly established companies… to access funding for innovative products"** under EU fusion programmes. They urge that any new governance body (like EFSP or EFCC) prioritize creating simpler, more flexible funding instruments – for example, **small grant programmes, co-funding schemes, or public-private partnerships** – that can rapidly support promising fusion start-ups or suppliers. One SME respondent specifically highlighted the need for *"targeted assistance for SMEs in widening countries"* under a revised governance, suggesting that the new framework tap into diverse funding sources (such as European Investment Bank loans or Important Projects of Common European Interest, as mentioned in the Opinion Paper) but **streamline the process to access them**. This reflects frustrations with existing funding bureaucracy; one respondent compared it to dealing with the European Space Agency's convoluted structure, implying lessons should be learned to avoid stifling innovation with red tape. Another stark comment encapsulated the high stakes: *"Without dedicated, targeted EU funding for private fusion technologies, Europe will be a buyer and not an owner of one of this century's most strategic technologies."* In other words, governance reform shouldn't just rearrange committees; it must also enable Europe to **mobilize investment** in fusion effectively, or else risk falling behind global competitors. This is seen as a matter of competitiveness: the governance must facilitate (not hinder) Europe's ability to bring

fusion innovations to market by marshalling both public and private capital. On a related note, some respondents touched on **regulatory support as part of governance** – e.g. the European Commission's role in harmonizing fusion regulation (tying to Pillar III) – arguing that governance reforms should ensure **regulators and policymakers are in sync** with the technical programme. A few called for the Commission to use existing instruments (like the Euratom framework) to help integrate fusion into broader EU innovation and industrial strategies. The overarching theme is that revised governance should create an environment where **innovation is nurtured and rewarded** – through accessible funding, supportive regulations, and active involvement of all stakeholders in decision-making.

- **Transparency and accountability:** Lastly, respondents emphasized that whatever new governance structure emerges, it must operate with greater transparency and clear accountability. There was criticism that the FEG itself, being composed solely of Member State nominees, operated somewhat opaquely (for example, it was noted that the FEG had *"no transparency or private-sector input"* in its workings). Stakeholders call for the new EFCC (or any high-level steering group) to practice openness – for instance, *publishing meeting minutes or outcomes*, and allowing observer participation from industry or other stakeholder representatives. This transparency is seen as key to building trust in the governance: stakeholders want to **know how decisions are made and by whom**. Along with transparency comes accountability: many voiced that each body's remit should come with defined **deliverables and metrics for success**. For example, if an EFSP is created to facilitate stakeholder dialogue, it should have a clear purpose (such as producing annual recommendations or tracking industry involvement progress) and report on its achievements. Similarly, respondents feel the **European Commission should take a strong coordinating role** – ensuring the various pieces of governance work together – but also respect the principle of subsidiarity (national roles). Some feedback suggested the Commission focus on enabling collaboration and setting common goals, rather than micromanaging, thereby holding the system accountable to strategic targets without stifling initiative. In summary, stakeholders want a governance system where **responsibilities are clear, actions are visible, and each actor can be held to account** for advancing Europe's fusion mission.

Conclusions and recommendations: The stakeholder feedback on Pillar V suggests several clear directions for policy and implementation. First, there is **strong endorsement for reforming the European fusion governance** – stakeholders believe it is crucial to meeting the EU's fusion ambitions. Therefore, the recommendation is to **move forward decisively with the governance changes**, rather than maintain the status quo. However, in doing so, policymakers should heed the nuances raised:

- **Keep governance simple and focused:** Avoid creating a proliferation of new entities without pruning or consolidating old ones. Every new committee or platform should have a **well-defined purpose and distinct role**. If an existing body can perform the function, consider empowering it instead of inventing a parallel structure. In practice, this might mean formally incorporating industry associations into the process (e.g. have them be part of the EFSP or EFCC) rather than duplicating their role. It also means

ensuring the EFCC (the high-level coordination committee) has the authority to *streamline* decisions, not just debate them.

- **Ensure meaningful industry integration:** It is recommended to give industry representatives a **formally recognized role in governance**, such as seats on the EFCC or a strong voice in the EFSP. This goes beyond consultation – it implies shared decision-making in areas like setting R&D priorities, defining demo project plans, and structuring public-private partnerships. An inclusive governance model will harness the agility and innovation of the private sector. Concretely, the Commission and F4E/EUROfusion should set up mechanisms for regular industry input (e.g. quarterly stakeholder forums, industry co-chairs on working groups, etc.). The feedback suggests that failing to do so could alienate the very actors needed to commercialize fusion. As fusion shifts toward industrialization, **public-private co-leadership** should become a guiding principle of governance.

- **Clarify the F4E and EUROfusion mandates early:** A key recommendation is to delineate the future roles of F4E and EUROfusion as soon as possible, ideally by establishing a **unified programme roadmap** governed by the EFCC. For example, the EFCC (with Commission oversight) could assign F4E the lead role for DEMO implementation and industry engagement, while EUROfusion leads scientific research – with both reporting into the EFCC to ensure coherence. Additionally, exploring the **legal status upgrade of EUROfusion** (from a consortium to a legal entity) could address many concerns raised: it would improve accountability, allow it to directly employ talent, and remove the conflict of interest in its governance. The survey feedback points to making EUROfusion more structurally robust, or alternatively, folding some of its project-management functions into F4E. Either path requires careful planning, but the recommendation is to start that restructuring process now. The **long-term vision** should be a governance where Europe speaks with one voice on fusion: perhaps a single programme authority or a tightly coordinated dual structure. Stakeholders clearly want no ambiguity about “who is in charge” when Europe moves to build a prototype power plant.

- **Cut red tape and support newcomers:** Implementation of Pillar V should prioritize reforms that lower barriers for participation in the European fusion effort. This could include simplifying F4E’s procurement and contracting procedures (a point noted by industry respondents) – for instance, creating *smaller, faster contract vehicles* for R&D services so that SMEs and start-ups can bid, instead of only large ITER-scale contracts. Another idea from the feedback is to establish a **fusion-specific innovation fund or procurement initiative** under the new governance framework, encouraging labs and companies to source from European providers. By making processes more agile and “innovation-friendly,” the governance will actively drive results, not just oversee them. The recommendation is for F4E and the Commission to review internal rules and identify where they can be made more flexible or tailored to fusion’s emerging needs (while still maintaining accountability for public funds).

- **Maintain transparency and accountability:** To address concerns about opacity, the new governance bodies (like the EFCC and EFSP) should operate with a culture of

openness. This could include publishing their **terms of reference, membership, and meeting outcomes**. The FEG Opinion Paper process highlighted a desire for more visibility – following through by making the new structures transparent will build trust with stakeholders. Additionally, setting **clear goals** (e.g. “by 2025, establish X; by 2030, achieve Y in DEMO preparation”) and assigning responsibility will help avoid the sense that committees meet with no tangible progress. Essentially, governance reform should come with a built-in progress tracker: stakeholders want to see that the new system delivers better results than the old. For example, a target could be that by next year the EFCC produces a single integrated European fusion programme plan, which would be a concrete output of revised governance.

- **Leverage the European Commission’s coordinating power:** The feedback implicitly and explicitly suggests that the European Commission should play the role of an **honest broker and enabler** in the governance. The Commission can ensure that various arms (energy, research, finance) are aligned and that Member States stay committed to the joint strategy. One recommendation is for the Commission to use existing frameworks (like Euratom committees) to facilitate discussions between national authorities on regulatory harmonization, avoiding duplication of regulatory efforts – this ties governance to regulatory progress. Another is to integrate fusion into broader EU initiatives (for example, include fusion projects in the Green Deal or Innovation Fund where appropriate), which requires Commission advocacy. Essentially, the Commission should use its convening power to keep the **big picture cohesion**, while leaving execution to the specialized bodies (F4E, EUROfusion, etc.). This balance will respect subsidiarity (national roles in regulation, for instance) but still drive a unified strategy.

In conclusion, the stakeholder survey feedback on Pillar V “Revised Governance” provides a **mandate for change – with conditions**. Stakeholders want to see a more cohesive, industry-inclusive, and efficient governance structure steering Europe’s fusion programme. They largely agree with the vision put forward by the FEG but urge that it be implemented in a way that genuinely streamlines processes and empowers all the key players (industry included). The core takeaway for policymakers is that **revised governance should not be an end in itself** – it is a means to accelerate fusion development. If done right, it will break down silos between institutions, bring fresh voices into the conversation, and ultimately help Europe maintain a leading edge in the global race for fusion energy. The survey responses suggest optimism that this can be achieved: many stakeholders stand ready to contribute under a better governance system (indeed, about two-thirds indicated their organisation is ready to help meet the strategic goals). By incorporating this feedback – keeping the governance lean, inclusive, clear, and action-oriented – the EU can ensure that the new structures truly support the ambitious timeline and objectives of the fusion roadmap. As one respondent affirmed, *“we share most of the recommendations”* in this pillar – now the task is to carry them out in practice, ensuring that Europe’s fusion enterprise is equipped with a governance fit for the exciting but challenging journey from research to reality.

Additional Pillar: Market Entry and Commercialisation

Summary of feedback: This analysis addresses the theme of **market entry and commercialisation of fusion** – essentially, how Europe can translate fusion R&D (including ITER and eventually DEMO) into a viable energy source in the marketplace. While the original Opinion Paper's Pillar IV focused on international cooperation and Pillar V on governance, stakeholders frequently discussed market entry issues across their responses. **There is a strong shared aspiration among respondents to see fusion energy move from scientific experiment to commercial reality**, and they underscored several requirements to make this happen: securing investment, involving the private sector, clear roadmaps to a prototype power plant, supportive regulation (linked to Pillar 3), and proactive risk management of timeline challenges. Many of these points were raised in context of other pillars, but collectively they form a picture of what stakeholders believe is needed for successful commercialisation. Notably, around two-thirds of respondents indicated that their organisations are ready to contribute to Europe's fusion goals – a positive sign of engagement that will be crucial for market entry. Below we synthesise the key insights related to fusion market entry and commercial deployment.

Urgency and timeline for demonstration plants: A significant number of stakeholders stressed **urgency in moving toward a fusion pilot plant (DEMO) and eventually commercial reactors**. They are conscious of the timeline – for instance, that the European roadmap envisions a DEMO by around the 2050s – and several voiced that this **needs to be accelerated if possible**. Comments such as *"2035–2040 is more realistic"* for a fusion power prototype, or *"ten to fifteen years can be spent like a burning match"*, illustrate concerns that the current pace may be too slow. Particularly, representatives from private fusion companies and some forward-looking industry players argued that Europe should **aim for a sooner deployment of a DEMO prototype power plant**, even if initially at modest power output, to secure a leadership position. The rationale is that demonstrating electricity from fusion, even at pilot scale, by the 2030s would galvanise further investment and public support. On the other hand, respondents also realistically noted that ITER's results (post-2035) will feed into DEMO design; thus, a balance must be struck between ambition and technical readiness. The overall tone is one of *impatience in a constructive sense* – stakeholders are eager to see fusion energy contributing to the grid and want European strategy to actively drive this transition rather than passively wait.

Private sector involvement and public-private partnership: A unanimous point was that **commercialisation will require strong private sector involvement** – not just in providing technology, but also capital. Many respondents believe that Europe should cultivate its burgeoning **fusion startup scene and industrial investors** so that by the time DEMO is built, there are multiple actors capable of taking fusion to market. In their answers:

- They applauded recent moves to engage private fusion companies (some mentioned the European Fusion Industry Associations and similar initiatives) and called for expanding these. Several private companies themselves outlined how they are *"ready to contribute"* with their own investments and efforts, and in fact are already pursuing alternative concepts. One wrote that Europe needs to *"shift mindset to see concepts*

outside of ITER not as 'alternatives' but as parallel approaches" if a 2040 pilot plant is the goal. This suggests integrating private-led projects (like advanced stellarators, compact tokamaks, inertial fusion ventures, etc.) into the European strategy to speed up market entry.

- **Funding and risk-sharing:** Respondents noted that achieving fusion commercialisation will likely require **new funding models**, including public-private partnerships. A couple of industry respondents hinted that the current F4E/EU budget is very focused on ITER and insufficient to support broader fusion development – one mentioned it's *"particularly difficult for newly established companies… to access funding for innovative products"* under the status quo. They advocate for mechanisms where public funding can de-risk private investment in fusion (for example, matching funds for pilot projects, or milestone payments for fusion startups achieving certain results). The idea is to leverage **private capital** – which is increasingly flowing into fusion globally – by providing a supportive policy and funding environment in Europe.

- **Market incentives:** Some stakeholders touched on the need for market pull measures. For instance, setting long-term EU energy goals that include fusion can send a signal to industry. Also, ensuring that fusion is included in clean energy financing taxonomies or the EU's Net Zero Industry framework was mentioned in one detailed response, which argued that maintaining a European supply chain for fusion aligns with broader strategic autonomy goals. This implies that fusion should be positioned as part of Europe's future green energy mix, potentially qualifying for incentives similar to renewables when it nears deployment.

Regulation and licensing as a gate to market: As discussed under Pillar 3, respondents view regulation as a critical factor for market entry. They reiterated that **without a clear and practical licensing process, a fusion power plant cannot enter the market**. Therefore, many tied the success of commercialisation to the prompt establishment of fusion regulations. One can interpret their strong support for a dedicated regulatory framework as being driven by the desire to avoid a scenario in the 2040s where DEMO is ready to operate but is bogged down by regulatory uncertainty. In effect, stakeholders are saying: *lay the regulatory groundwork now, so it doesn't delay market entry later.* They also connected this with public acceptance – a well-crafted safety regime will help assure the public and investors that fusion power plants can be run safely, which in turn smooths the path to commercial operation.

Competition and global landscape: Stakeholders are acutely aware that **fusion development is global and competitive**, which influences market entry. In their comments on international cooperation (Pillar 4 of the original paper), while supportive of collaboration, several warned that *"Europe must not fall behind its competitors"*. This underpins their sense of urgency. The mention of specific countries like the USA, UK, and China was often in the context of noting those nations' aggressive fusion programmes (especially through private companies). For example, some respondents noted the influx of funding into U.S. fusion start-ups or the UK's plans for a fusion pilot plant (STEP) by 2040. The implication is that **if Europe moves too slowly or remains too bureaucratic, the market could be dominated by non-European players** when fusion power becomes viable. To avoid that, Europe should encourage innovation at home and even **participate in international projects** to stay at the

cutting edge. One respondent recommended that EU industry be supported to access all potential business opportunities arising from fusion globally – i.e., European companies should be helped to compete for work in overseas fusion projects as well, which in turn builds their capabilities for a future European DEMO. This is a strategic view that treating fusion commercialisation partly as a race (friendly, but a race nonetheless) will incentivise progress.

Stakeholder readiness to contribute: Notably, when directly asked if they would be ready to contribute to the strategic goals (essentially the road to commercial fusion), a majority of organisations responded positively. Around **67% said "yes"** – and many of these outlined how: providing expertise, investing in R&D, offering facilities for testing, training personnel, forming partnerships, etc. About 7% said "no" (or not at this time), and the rest were uncertain or did not respond, often because they felt they needed more clarity on the strategy to commit. This is a strong indication that **the European fusion community, especially industry, is eager to engage in the next steps**. For example, companies mentioned contributions like developing materials for tritium breeding, engineering services for future reactors, or joining consortiums for DEMO. This readiness is a huge asset for Europe – essentially an existing base of committed stakeholders who can drive market entry if mobilised through the right frameworks. It also shows that stakeholders view the strategy not just as a government plan but something they are part of; they are looking for signals and opportunities to jump in (be it through contracts, projects, or co-investment initiatives).

Key requirements for market entry (as voiced by stakeholders): Bringing together the various threads, respondents highlighted a few key requirements that Europe's strategy should ensure for successful fusion commercialisation:

- **A clear roadmap and decision-making** for DEMO: Several respondents wanted to see a more concrete plan for DEMO – when, how, and who will execute it. Some governance-related feedback (next section) suggests giving F4E a central role in DEMO. Stakeholders feel a defined project with roles for industry will help galvanise efforts.

- **Sufficient and sustained funding**: Both public funding and leveraging private investment must be planned. The need for "long-term commitment from the EU" was mentioned, meaning multi-decadal political and financial support so that DEMO and subsequent steps are not stymied by budget shortfalls.

- **Risk management and flexibility**: Plan for contingencies (ITER delays, technology shortfalls) by having parallel development tracks. Embrace innovative smaller projects that could speed up learning. Essentially, don't put all eggs in one basket when it comes to achieving a commercial reactor.

- **Skilled workforce and supply chain**: As fusion projects grow, having enough skilled engineers, technicians, and a robust supply chain will be vital. While not heavily discussed in survey responses, this is implicit in the ecosystem comments. One respondent did touch on the need for a *"skilled workforce"*. Training programmes and retaining talent in Europe will be important so that when commercial deployment begins, human resources are not a limiting factor.

In summary, **Pillar 4 (Market Entry and Commercialisation)** is seen not as a distant afterthought but as a goal that must shape decisions today. Stakeholders are pushing for Europe to position itself for successful fusion commercial deployment through proactive measures now – in funding, regulation, partnerships, and project planning. The survey reveals optimism that fusion can be commercialised in the foreseeable future (many explicitly imagine fusion in Europe's energy mix by mid-century), but also realism that this will require a concerted, inclusive effort. The good news is that the industrial and research communities express **both willingness and concrete ideas to help make it happen**. Incorporating this feedback, the EU fusion strategy can ensure that the step from experiment to market is not left to chance but is diligently prepared.

3. On Fusion for Energy's Role

Fusion for Energy (F4E), as the European Joint Undertaking for ITER and the Development of Fusion Energy and its role within the EU fusion programme was the subject of an additional free-text survey question beyond the FEG Opinion Paper's core pillars. Stakeholders were asked for their views on F4E's future role in the European fusion programme. The feedback indicates that **F4E is seen as a pivotal institution moving forward**, and many respondents envision an expanded or evolved role for F4E as Europe transitions from ITER construction to DEMO and commercialisation. **Common themes** in the responses include leveraging F4E's expertise for DEMO, improving support to industry (especially SMEs and new fusion companies), clarifying the interface between F4E and EUROfusion, simplifying procedures, and ensuring F4E continues to facilitate collaboration and knowledge transfer. Not a single respondent suggested reducing F4E's role; the discussion was centred on how F4E could **do more and do it effectively**. Approximately two-thirds of respondents offered substantive views on F4E's future, while the remaining third had no additional comments (often stating F4E's current role is clear or sufficient). Below we summarise the key suggestions and expectations expressed:

- **Industrial Catalyst and Partner:** A dominant theme was F4E's role in **bridging between the public fusion programme and industry**. Respondents want F4E to **proactively foster industrial involvement** in fusion:
    - Several called on F4E to **support European industry (especially SMEs)** in seizing fusion opportunities. For example, one respondent said F4E should *"foster industrial collaboration and support SMEs… providing clear vision, support, [and] contracts that do not shift all risks to the weakest"*. This reflects a concern that smaller companies can be overwhelmed by the risk and complexity of fusion contracts; F4E could mitigate this by structuring contracts more favourably, offering guidance, and maybe co-funding R&D with SMEs.
    - There were suggestions that F4E use its network and knowledge to **accelerate the growth of private fusion companies in the EU**. For instance, by sharing technical know-how from ITER, providing access to facilities or test infrastructure, and even helping coordinate between governments and private ventures. One detailed suggestion was that *"everything built or learned for*

ITER should be used to speed up the development of EU-based [fusion] majors", indicating that F4E should repurpose ITER technology for the benefit of European start-ups and spin-offs. Another point was that F4E could become a channel for **government support to specialised fusion supply chain companies** – potentially acting almost like an incubator or funding agency for key industrial capabilities that won't thrive on purely commercial demand until fusion projects multiply.

- F4E's unique position as a public body with deep technical insight was mentioned as ideal for shaping **public-private collaboration frameworks**. It complements industry associations by having hands-on project experience. Respondents feel F4E can convene stakeholders, set common goals, and ensure that private sector efforts align with Europe's strategy – effectively becoming a *partner* to emerging fusion companies. For example, one said F4E should act as a partner not only to public labs but also to *"emerging fusion companies aiming to deliver deployable energy systems"*.

- It was also noted that F4E should help maintain a strong **European supply chain**. Stakeholders value that F4E has developed a network of suppliers via ITER, and they want this sustained and expanded for future projects. This ties into broader EU industrial policy: a resilient supply chain will ensure Europe reaps economic benefits from fusion and isn't dependent on external providers when fusion tech enters commercialization.

- **Leading DEMO and Next-Step Projects:** Many stakeholders believe F4E should **take a leading role in the realization of DEMO**, the EU's demonstration fusion power plant. Given F4E's project management experience from ITER, respondents feel this expertise should be applied to coordinating DEMO's design, procurement, and construction. In the survey, there were remarks like F4E's role is *"fundamental… overseeing the development and integration of various fusion technologies"* and that its continued leadership is *"essential for maintaining momentum"*. Some suggested that as ITER construction winds down and DEMO activities ramp up (currently managed by the EUROfusion consortium), there should be a **gradual transfer or sharing of responsibility** with F4E. Co-location of F4E and EUROfusion staff in Garching is noted as an asset for this transition. The overarching idea is that F4E should become the **driving force for Europe's next big fusion project** (DEMO), ensuring that lessons from ITER are carried forward and that DEMO benefits from a centralised, experienced project team. This would likely require a mandate from the European Commission and alignment with EUROfusion on roles, but respondents clearly see F4E as the logical organisation to eventually prepare for fusion power facilities on behalf of Europe.

- **Clarifying and Expanding Mandate:** Multiple responses touched on the relationship between F4E, EUROfusion, the Fusion Expert Group, and the European Commission. Right now, mandates can appear overlapping or unclear (for example, F4E manages hardware and procurement, EUROfusion coordinates R&D and DEMO design, the Commission sets strategy through FEG). Some stakeholders found this *"blurred,*

creating inefficiencies and confusion". The advice is that **F4E's future role must be clearly defined** in this landscape:

  - Some advocated for an **expanded F4E mandate** where F4E evolves into the **central fusion implementing organisation for Europe**. One respondent put it as F4E becoming *"the central authority for fusion in Europe"* not only technically but also for **regulatory guidance and oversight**. The reasoning is that F4E, having operational experience from ITER, is well-placed to guide how fusion projects are executed. This would be a broadening from its current procurement-focused role to a comprehensive programme coordinator role.

  - In line with that, a respondent familiar with EUROfusion's operations suggested it would be "natural if F4E would coordinate the EU fusion programme" due to EUROfusion's limitations (not a legal entity, etc.). This hints at possibly consolidating activities or having F4E handle more of the programme that EUROfusion has difficulties to do as a consortium of laboratories.

  - On the other hand, one industry association voice warned against simply layering new entities. They expressed *"significant concerns with [some] governance proposals"* – referring to the creation of a European Fusion Stakeholders Platform (EFSP) – implying it might add complexity without solving issues. This suggests that if F4E's role is expanded, maybe some other bodies or committees should be streamlined to avoid duplication. Essentially, **strengthen F4E's remit but simplify the overall governance structure**.

  - Another concrete view was that F4E's role relative to EUROfusion in DEMO should be planned "well in time" and executed gradually. The presence of F4E's branch at the EUROfusion site is seen as helpful. This indicates support for a transitional approach: let EUROfusion continue leading EU lab research, but as the programme shifts to building a machine (DEMO), let F4E increasingly take charge, leveraging EUROfusion's scientific input.

- **Streamlining processes and accessibility:** Several respondents urged F4E to **simplify its procedures** to allow broader participation, especially by new entrants and smaller companies. Comments like *"simplify procedures to be involved in the project"* reflect a perception that F4E's current procurement processes (which can be quite formal, suited to large ITER contracts) might be too cumbersome or exclusive for smaller-scale innovation activities. Stakeholders suggested making these more agile or creating different tracks for engaging small high-tech firms (for example, open challenges, quicker contracting for R&D services, etc.). This avoids bureaucratic hurdles that deter cutting-edge tech firms from contributing to fusion through F4E.

- **Maintaining continuity and expertise:** Stakeholders also value what F4E has built over the last decade: a team with deep fusion project experience and a repository of knowledge. They believe F4E should **carry this forward into new areas**. For instance, one noted F4E's *"deep understanding of the European supply chain"* as a key asset. Others pointed out that F4E has learned how to manage complex international contracts and technology development – skills that will be needed for

DEMO. Thus, F4E should ensure continuity of its expertise and perhaps broaden it by hiring or collaborating in new domains (such as licensing or power plant operation expertise) as fusion progresses. This continuity also applies to knowledge management: F4E should capture and disseminate ITER lessons to the broader community (through workshops, reports, etc.) so that Europe benefits.

- **Positive feedback and current initiatives:** It's worth noting that a few respondents explicitly praised F4E's recent efforts to engage more with industry. One wrote, *"We appreciate the role that F4E is taking in engaging more with the industry… We value the work F4E is doing towards a more synergistic collaboration with industries."* This indicates F4E's initiatives like industry days, partnering with industrial alliances, or tech transfer activities are being noticed and should be continued or expanded. Respondents also see F4E as having a central role in **enabling technologies** (such as materials or systems developed for fusion that could be marketed elsewhere). They think F4E should contribute to bringing such technologies to market faster from an industrial perspective, which aligns with EU goals like the Net Zero Industry Act.

In summary, stakeholders are saying: **F4E has done a good job in its current remit (ITER & procurements) and is trusted to do more**. Looking ahead, they envision F4E as:

- A champion and facilitator for industry and innovation (making sure European companies, big and small, are fully engaged and supported in fusion endeavours),
- In the longer-term the main organiser of Europe's next fusion projects (particularly a programme in support of DEMO),
- A coordinator that helps streamline the overall programme governance (potentially taking on tasks that are fragmented elsewhere),
- A source of continuity, expertise, and even regulatory knowledge as fusion moves into new phases.

For F4E and policy makers, this feedback is a strong endorsement, but also a challenge: **F4E will need to adapt and grow** to meet these expectations. It may require internal changes (adding new competencies), external changes (e.g. adjustments in its mandate via its statutes or Euratom decisions), and of course, resources to fulfil an expanded role. Importantly, no respondent argued for diminishing F4E's role The surveyed community seems to see F4E as central to implementing the EU Fusion Strategy and wants it to be empowered accordingly.

4. Conclusions

The stakeholder survey results provide a clear and coherent message: **there is broad alignment with the FEG's vision for a European Fusion Strategy, coupled with a desire for actionable steps to implement that vision.** Industry, research, and public sector participants all voice strong support for the key pillars – ITER, innovation & industry, regulation, and enabling commercialisation – and they offer constructive insights to ensure success. Several **key conclusions** emerge from the analysis:

- **Broad Consensus on Strategic Direction:** Virtually all respondents agree on the importance of ITER as the near-term cornerstone and on accelerating efforts toward fusion electricity (through DEMO and beyond). Only a very small minority expressed fundamental disagreement with the strategy, and even those were advocating alternative approaches to achieve the same overall goal (fusion power). This consensus is a valuable asset – it means initiatives under the EU fusion strategy are likely to find cooperation rather than resistance from stakeholders.

- **Focus Shifting from Why to How:** Since stakeholders agree on *what* needs to be done, their feedback zeroes in on *how* to do it. The survey responses consistently call for **concrete measures and clarity in execution**:

    - Turning high-level recommendations into specific programmes (funding for SMEs, new regulatory bodies, DEMO project plans, etc.),
    - Streamlining governance and processes so that various actors (F4E, EUROfusion, private companies, national agencies) work efficiently together,
    - Setting timelines and allocating responsibility (for instance, deciding F4E's expanded role for DEMO, or initiating regulatory development immediately). In essence, stakeholders are looking for an actionable strategy. The Opinion Paper has set the direction; now implementation plans are needed, and the community is eager to see those plans formulated and put into practice.

- **Empowerment of Industry and New Players:** A recurrent conclusion is that **Europe's fusion effort must become more inclusive of the private sector** to succeed. This includes existing industrial suppliers and engineering firms, as well as the new wave of fusion start-ups. Stakeholders are effectively asking the European Commission and F4E to *"unlock the door"* for greater industrial participation – through funding opportunities, partnerships, and removing unnecessary barriers. They see this as crucial for innovation, for building a supply chain, and ultimately for commercialization. The survey indicates a high level of readiness from industry to step up; it will be important for the EU to harness this by implementing the suggestions (e.g. an industrial support plan as part of the fusion strategy).

- **Importance of Regulatory and Political Support:** The feedback underscores that technical progress alone is not enough – **regulatory clarity and sustained political/financial commitment are equally important**. Respondents are asking for the EU to put in place the laws, guidelines, and oversight that will govern fusion energy. This is not a trivial task, but the consensus is that it's urgent and should be addressed in parallel with technical R&D. Additionally, stakeholders call for long-term commitment (predictable funding, continuity between framework programmes) to give confidence that DEMO and other large endeavours can be seen through. Fusion projects span decades, and the community wants assurance that the EU will maintain support across political cycles. Given the positive consensus, now is an opportune time for policymakers to cement that support with tangible actions (such as proposing dedicated fusion funding instruments or regulatory initiatives under Euratom).

- **Fusion for Energy (F4E) as a Central Pillar of Implementation:** One of the clearest messages regarding governance is the pivotal role of F4E. Stakeholders essentially view F4E as the *natural vehicle* to carry out much of the fusion strategy – if appropriately mandated and resourced. The conclusion here is that **strengthening and evolving F4E's role** should be part of the strategic plan. For the European Commission and F4E's Governing Board, this may mean reviewing F4E's activities to start preparing a programme in support for DEMO, industrial engagement, and other tasks complementing its core work on ITER. The survey's insights can guide what changes are needed: e.g., ensuring F4E has mechanisms to fund innovation and creating joint structures with EUROfusion for DEMO. By acting on this, the EU can avoid fragmented efforts and instead channel work through an organisation that stakeholders already trust and collaborate with.

- **International Cooperation with a Competitive Edge:** Stakeholders strongly favour continued international cooperation – it's seen as beneficial and necessary. The conclusion is that Europe should both **lead and collaborate** lead in areas of its strength and collaborate to leverage global knowledge and resources. Importantly, cooperation must be balanced with safeguarding Europe's competitiveness. The community wants Europe to be generous in sharing for mutual progress, but also assertive in ensuring it remains a top-tier player. This might translate into pursuing new international partnerships (for example, with countries that are not part of ITER, or with private international consortia) while also bolstering European capabilities. Maintaining this balance will be a key strategic consideration going forward.

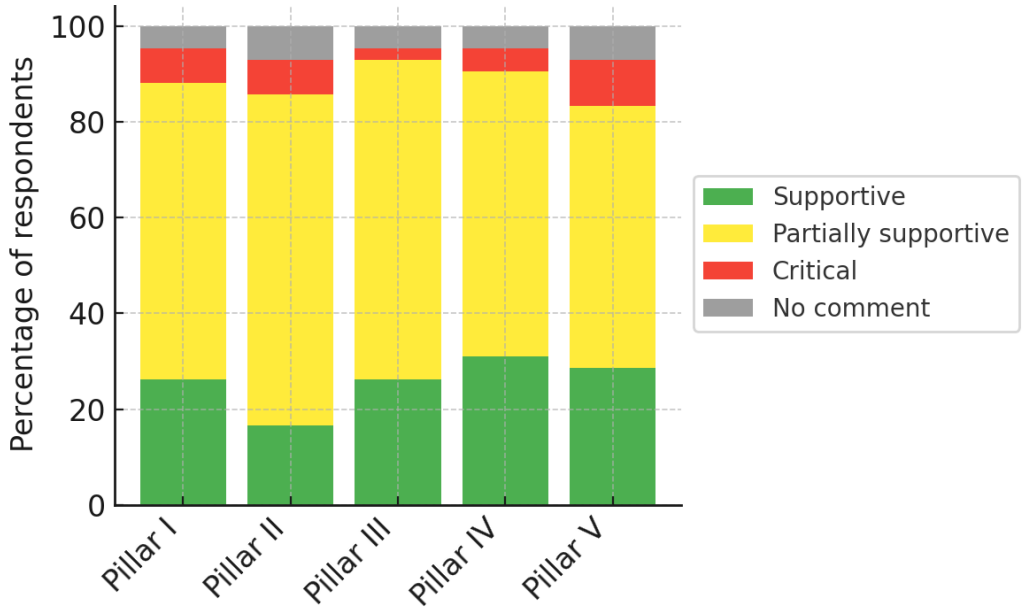

Figure 3: Overview of respondents' general stance by pillar of the Opinion Paper (based on qualitative analysis of survey answers).

An overview of **respondents' general stance by pillar of the Opinion Paper** is provided in figure 3 above. Each bar represents 100% of the respondents who answered the question on that pillar, broken down into categories of sentiment. Green indicates fully supportive

responses; yellow indicates partially supportive or neutral responses (e.g., agreement with some suggestions or minor reservations); red indicates critical or opposing responses; grey indicates no explicit response, or no opinion given on that pillar. For each pillar most respondents were supportive (green and yellow segments). Explicitly critical viewpoints were very few (red segments), and a modest fraction did not comment on certain pillars (grey). This visual summary reinforces the finding that stakeholder sentiment towards all pillars of the fusion strategy is predominantly positive.

In conclusion, the **stakeholder survey validates the direction of the Fusion Expert Group's Opinion Paper and provides actionable feedback**. The respondents are essentially saying: *"We agree with the plan – now let's make it happen, together."* They urge moving from opinion to implementation, with emphasis on practicality, inclusion, and urgency.

The tone of the responses is largely optimistic: stakeholders see **fusion as a transformative opportunity for Europe** and are ready to contribute. By heeding their input, European decision-makers can ensure the fusion strategy is not only ambitious in vision but also effective in execution – accelerating the day when **fusion energy contributes to Europe's energy mix and industrial competitiveness**.

Annex: List of Respondent Organisations

(42 organisations responded to the survey. They are listed below in alphabetical order. No individual responses are attributed to specific organisations in this report.)

- ADVANCED SIMULATION TECHNOLOGIES S.L.
- ATG Europe
- Bimo Tech Sp. z o. o.
- Calsens S.L
- Chalmers University of Technology (INFRAfusion)
- De Pretto Industrie
- Eni SpA
- European Fusion Association (EFA)
- FEInn – Frontiers in Energy Innovations GmbH
- FINCANTIERI
- Frencken Europe
- Fusion Europe
- GEMS Engineering
- Gauss Fusion GmbH
- Heinzinger electronic GmbH
- Helion Energy
- IFMIF-DONES España
- KRP Mechatec GmbH
- Kusters & Bosch Fijnmechanische Industrie B.V.
- Kyoto Fusioneering GmbH
- Lodz University of Technology
- Luma Wire Tech
- Mirion Technologies (Premium Analyse)
- National Center for Nuclear Research (NCBJ, Poland)
- National Research & Development Institute for Cryogenic and Isotopic Technologies – ICSI Rm. Valcea
- Next Step Fusion
- Novatron Fusion Group
- Orano
- PHOTONIS France
- PPA ENERGO
- PPC
- Proxima Fusion
- ROMPAL INGENIEROS S.A.U.
- SAES Getters SpA
- Safran Electronics & Defense Spain SLU
- Somni Solutions
- Spie Batignolles Génie Civil
- Stirling Cryogenics B.V.
- TRUMPF SE + Co. KG
- Tiefbohrbär GmbH
- University of Seville
- Xjenza (Research and Innovation Agency Malta)