

The 2026 European Strategy for Particle Physics Update

D. Bortoletto

- CERN Council approved in March 2024 the timeline for European Strategy for Particle Physics Update with a completion date in June 2026. Timeline driven by **physics and strategic consideration**:
 - **Physics landscape**: Exploration of the Higgs sector remains central
 - **Excellent progress on the FCC preparation**
 - FCC Feasibility Study mid-term report showed no showstoppers for FCC-ee as a first stage of FCC.
 - Study will be completed in March 2025
 - **Clearer view on the international landscape for future colliders**
 - No clear commitment for the ILC in Japan
 - US-P5 process indicated willingness to participate in an off-shore Higgs factory (ILC, FCC-ee).
 - US signed on April 27 [a joint agreement](#) with CERN stating the intention to participate in the construction of the FCC first stage (FCC-ee) should CERN's Member States decide to go ahead.
 - CEPC in China:
 - Accelerator Technical Design Report for CEPC released in Dec 2023.
 - Detector TDR planned for summer 2025.
 - Aim for approval of the project in the next 5-year funding cycle(s) with decision expected by end of 2025

- **Long timescales, long-term community engagement**
 - The gap between the end of the HL-LHC and the start of the next collider project should be minimised, to ensure continuity of expertise and commitment.
 - Wish of the young generation of physicists to have a clear vision of the future of our research field, as well as a credible timeline for the realisation of any future collider project
- **Strategy recommendations on the complementary physics programme** at CERN and beyond are important for establishing /upgrading relevant facilities

- In June 2024, the CERN Council established and approved the **remit of the European Strategy Group**
 - ”The aim of the Strategy update should be to develop a **visionary and concrete plan** that greatly advances human knowledge in fundamental physics through the **realisation of the next flagship project at CERN**. This plan should attract and value **international collaboration** and should allow Europe to continue to **play a leading role in the field**.”
- The ESG should take into consideration:
 - The **input of the particle physics community**;
 - The **status of implementation of the 2020 Strategy update**;
 - The **accomplishments over recent years**, including the results from the LHC and other experiments and facilities worldwide, the progress in the construction of the High-Luminosity LHC, the outcome of the Future Circular Collider Feasibility Study, and recent technological developments in accelerator, detector and computing;
 - The **international landscape of the field**

- The Strategy update should include the **preferred option** for the next collider at CERN and prioritised **alternative options** to be pursued if the chosen preferred plan turns out not to be feasible or competitive
- The Strategy update should also indicate **areas of priority for exploration complementary to colliders** and for other experiments to be considered at CERN and at other laboratories in Europe, as well as for participation in projects outside Europe.
- The ESG should review and update the Strategy and **add other items identified as relevant to the field**, including **accelerator, detector and computing R&D**, the **theory frontier**, actions to minimise the **environmental impact** and to improve the **sustainability** of accelerator-based particle physics, the strategy and initiatives to **attract, train and retain the young generations**, **public engagement and outreach**.

- **Strategy Secretariat: Organising and running the ESPP process**
 - Karl Jakobs (Strategy Secretary, Chair)
 - Hugh Montgomery (SPC Chair)
 - Dave Newbold (LDG Chair) until Dec 31, 2024; Mike Seidel from Jan 1, 2025.
 - Paris Spicas (ECFA Chair)
- **European Strategy Group (ESG): Preparation of the Strategy Document**
 - The Strategy Secretary (acting as Chair)
 - One representative appointed by each of the laboratories represented in the LDG (**STFC RAL, Newbold until Dec 31, 2024; Farrington from Jan 1, 2025**), including its Chair.
 - The CERN Director-General
 - The CERN Director-General elect
 - The SPC Chair
 - The ECFA Chair
 - One representative appointed by each CERN Member State (**Mark Lancaster for the UK**)
 - Invitees: President of CERN Council, one representative from each of the Associate Member and Observer States, one representative from the European Commission, the Chairs of APPEC, NuPECC and ESFRI, the members of the **Physics Preparatory Group**.

- **Physics Preparatory Group (PPG): collects input from the community, organises the Open Symposium, prepares the Briefing Book**
- “Secretariat”
- Four members appointed by Council on the recommendation of the SPC
- Four members appointed by Council on the recommendation of ECFA
- One representative appointed by CERN: Gianluigi Arduini.
- Two representatives from the Americas: Anadi Canepa (FNAL, US, exp.) and Rogério Rosenfeld (IFT, UNESP, Brasil, theo. /cosmology)
- Two representatives from Asia: Xinchou Lou (IHEP Beijing, China, exp.) and Yuji Yamazaki (Kobe U)

- Instead of having the members of the secretariat and the four “non-Europeans” serve as physics group conveners
 - Each group will have two co-conveners. One of the two is also a PPG member.
 - The two conveners coordinate all group activities (selection of sub conveners/Symposium/Briefing Book)
- The groups are:
 - Electroweak/Higgs Physics
 - Strong Interaction
 - Flavor Physics
 - BSM
 - Neutrino Physics and Cosmic Messengers
 - Dark Matter and Dark Sector
 - Accelerator Science and Technology
 - Instrumentation
 - Computing
- **Each group will have an ERC as the scientific secretary**
 - ECR defined as up to 10-years post-PhD. **Nominations should be submitted to Lydia Brenner (lydia.brenner@cern.ch) and the r-ECFA UK delate (D. Bortoletto) by 26.09.24**

- **Physics group conveners. PPG members marked in red.**



- **Statistics:**
 - **Gender: 12 men, 6 women**
 - **Geographic distribution:**
 - **Conveners; AT (1), B (0.5), CH (1), DE (2), ES (2), FR (3), IT (2.5), SE (1), SL (1), UK (2), CERN (2)**
 - **PPG; AT (1), B (0.5), CH (1), DE (1), ES (1), FR (1), IT (1.5), UK (1), CERN (1)**
- **Composition should be approved and endorsed by CERN Council Sep 26-27.**

- September 2024 Council
 - Council appointment of the members of the PPG
- December 2024 Council
 - Council decision on the **venues for the Open Symposium** and the **Strategy Drafting Session**
- 31 March 2025
 - Deadline for the submission of input from the community
- **23 – 27 June 2025**
 - **Open Symposium**
- End of September 2025
 - Submission of the “Briefing Book” to the ESG
- **01 – 05 December 2025**
 - **Strategy Drafting Session**
- End January 2026
 - Submission of the Draft Strategy Document to the Council for feedback
- March-June 2026 Council Sessions
 - Discussion of the Draft Strategy Document by the Council followed by the updating of the Strategy by the Council.

- The Remit of the European Strategy Group (ESG) specifies that the ESG should take into consideration several aspects of the HEP landscape, including, very importantly, “the input of the particle physics community”.
- A major component of this overall community input are the “national inputs”, which will be collected individually by each country (and in some cases by regions).
 - In this context, the information collected from the different countries will be most useful in informing the ESPP process if it is as coherent and as uniform as possible, when addressing the key issues
 - To assist with this, ECFA has put together a set of guidelines for the collection of the national inputs.
 - They are presented as suggestions meant to streamline the process across different countries: It is understood that each country will set its own process, schedule and questions to consider in forming a national view and submitting its input(s) to the Strategy.
- National inputs to the ESPP update can be sent at different points in time:
 - prior to the March 31 2025 deadline for submission of inputs to the ESPP;
 - after the March 31 2025 deadline but prior to the Symposium
 - after the Briefing Book is publicly available, in time for the Strategy drafting session on Dec 1-5 2025.
 - The final deadline for submissions for full consideration by the latter: Nov 14, 2025.
- The ECFA guidelines can be found at: <https://ecfa.web.cern.ch/ecfa-guidelines-inputs-national-hep-communities-european-strategy-particle-physics-0>

1. Organization of national and/or regional meetings

- One or two meetings are suggested (clearly, each country/region may decide to hold fewer/more meetings). These meetings would be most informed if they would occur after the corresponding information is released:
 - One meeting after March 31st, when all inputs to the ESPP are submitted.
 - One meeting after the release of the Briefing Book, at the end of September, and before the Drafting Session (first week of December).
- The meeting(s) could/should be co-organized by the RECFA delegate (Bortoletto for the UK) and the country's representative on the ESG (Lancaster for the UK)
- These meetings should be guided by a set of “standard questions” that should be considered by the communities.

2. The remit is explicit in its request that “The Strategy update should include the preferred option for the next collider at CERN and prioritised alternative options to be pursued if the chosen preferred plan turns out not to be feasible or competitive”

- Since this next collider will constitute the next major/flagship project for CERN, it is imperative that the HEP physics community provide explicit feedback on both the preferred and alternative options, along with the reasons for any specific prioritisation.

3. Questions to be considered by individual countries/regions in forming and furnishing a “national input” to the ESPP:

- a) Which is the preferred next major/flagship collider project for CERN?
- b) What are the most important elements in the response to (3a)?
 - Physics potential
 - Long-term perspective
 - Financial and human resource requirements: requirements and effects on other projects
 - Timing
 - Careers and training
 - Sustainability

c) Should CERN/Europe proceed with the preferred option or should alternative options be considered:

- If Japan proceeds with the ILC in a timely way?
- If China proceeds with the CEPC on the announced timescale?
- If the US proceeds with a Muon Collider?
- If there are major new (unexpected) results from the HL-LHC or other HEP experiment?

(d) Beyond the preferred option in 3a), what other accelerator R&D topics (e.g. high-field magnets, RF technology, alternative accelerators/colliders) should be pursued in parallel?

(e) What is the prioritized list of alternative options if the preferred one is not feasible (due to cost, timing, international developments, or other reasons)?

(f) What are the most important elements in the response to (3d)?

4) The remit given to the ESG also specifies that “The Strategy update should also indicate areas of priority for exploration complementary to colliders and for other experiments to be considered at CERN and at other laboratories in Europe, as well as for participation in projects outside Europe.” It would thus be most useful if the national inputs explicitly included the preferred prioritisation for non-collider projects. Specific questions to address:

- a) What other areas of physics should be pursued, and with what relative priority?
- b) What are the most important elements in the response to 4a)? (The set of considerations in 3b should be used).
- c) To what extent should CERN participate in nuclear physics, astroparticle physics or other areas of science, while keeping in mind and adhering to the CERN Convention? Please use the current level and form of activity as the baseline for comparisons.

- **There was only one bidder for the ESPP Symposium: 23-27 June 2025.**
 - Palazzo del Casinò, Venice, Italy (Same venue as the very successful EPS HEP 2017 conference)
 - this has still to be approved by Council (Sep 26-27).
- **First meeting of the ESG:**
 - Unfortunately, without the PPG members (who will be appointed by Council on Sep 26- 27) Wed 18 September
 - Inform country representatives + large lab directors + ex-officious (PoC, DG, etc)
 - Meeting of physics group conveners will be called soon after Council approval
 - Purpose of EDG meeting: Introduction to the process and guidelines for national inputs (and the questions to which we seek feedback)
 - and seek feedback/suggestions.



- Remembering Max Klein
- Max was the r-ECFA UK delegate from 2021 until 2022
- He was passionate about his role in ECFA and contributed to make the UK delegation more cohesive and effective.

- **Recall: a major component of the overall community input to the ESPP are the “national inputs”, which will be collected individually by each country (and in some cases by regions).**
 - To make these national inputs as coherent and as uniform as possible, we have
 - posted the **ECFA guidelines here**.
 - Reminder: They are suggestions meant to streamline the process across different
 - countries. It is understood that each country will set its own process, schedule and
 - questions to consider in forming a national view and submitting its input(s) to the
 - Strategy.
- **National inputs to the ESPP update can be sent at different points in time:**
 - Prior to the March 31 2025 deadline for submission of inputs to the ESPP;
 - After the March 31 2025 deadline but prior to the Symposium; Deadline: May 26 2025.
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 - Final deadline for submissions for full consideration by the latter: Nov 14, 2025.