

ECFA goals and structure

ECFA = European Committee
for Future Accelerators

1. AIMS

Long-range planning of European high-energy facilities - accelerators, large-scale facilities and equipment - adequate for the conduct of a valid high-energy research programme by the community of physicists in the participating countries and matched to the size of this community and to the resources which can be put at the disposal of high-energy physics by society.

Duplication of similar accelerators should be avoided and international collaboration for the creation of these facilities should be encouraged if essential and efficient for attaining the purpose. Equilibrium between the roles of international and national laboratories and university institutes in this research, and a close relation between research and education in high-energy physics and other fields.

Adequate conditions for research and a just and equitable sharing of facilities between physicists, irrespective of nationality and origin, as conducive to a successful collaborative effort.

2. ACTIVITIES

To achieve these aims ECFA can engage in - among others - the following activities:

1. regular meetings of Restricted and Plenary ECFA;
2. ad hoc symposia and conferences sponsored or organized by ECFA;
3. study groups, set up by ECFA, or jointly with other organizations, for special problems;
4. demographic studies of the high-energy physics community and resources in the ECFA participating countries, repeated at regular intervals, by means of visits to the participating countries by Restricted ECFA;
5. monitoring of the ongoing implementation of the European Strategy for Particle Physics in the CERN Member States under activity (d), presentation of corresponding status reports to the European Strategy Session of Council.

3. STATUS

ECFA is advisory to CERN Management, CERN Council and its Committees, and to other organizations, national or international.

4. PARTICIPATING COUNTRIES

Traditionally, physicists from the European countries which are Member States of CERN participate in ECFA. CERN is also considered as a "participating country". Plenary ECFA may on request extend participation to physicists from other European countries associated to CERN. Any participating country is free to leave ECFA on six month's notice given at a Plenary ECFA meeting. Admission of a new participating country is decided by Plenary ECFA.

Plenary ECFA

Plenary ECFA decides on all ECFA activities, appoints the Chair and Secretary, approves the final reports of the working groups and terminates their activities, decides on admission of new observers, and makes recommendations to outside organizations. Plenary ECFA appoints members for a total maximum period of six years after nomination by their country. While the members so chosen should be able to represent the views of the high-energy physics community of their country, they are members of Plenary ECFA as individuals. Plenary ECFA normally holds two meetings per year. Meetings are public unless otherwise decided

Restricted ECFA

Restricted ECFA is composed of one member per country, appointed for at most two three-year periods. Restricted ECFA assists and advises the Chair and the Secretary in the current running of ECFA, and acts as the communication channel to each participating country, its physics community and national institutes and authorities.

Restricted ECFA Composition

Chair	Prof. Paris Spichas	Appointed Jan. 2024
Secretary	Dr Lidija Zivkovic	Appointed July 2024
Members		
Austria	Dr Thomas Bergauer	Appointed Jan. 2024
Belgium	Prof. Nick van Remortel	Appointed July 2018
Bulgaria	Prof. Mariyan Bogomilov	Appointed July 2022
Croatia	Dr Dinko Ferencek	Appointed July 2024
Cyprus	Prof. Panos Razis	Appointed Oct. 2017
Czech Republic	Dr Jana Bielcikova	Appointed Jan. 2022
Denmark	Prof. Mogens Dam	Appointed Jan. 2018
Finland	Prof. Panja Luukka	Appointed Jan. 2024
France	Dr Gregorio Bernardi	Appointed Jan. 2023
Germany	Prof. Heiko Lacker	Appointed July 2021
Greece	Prof. Dimitrios Sampsonidis	Appointed Jan. 2024
Hungary	Dr Ferenc Siklér	Appointed Jan. 2021
Italy	Dr Sandra Malvezzi	Appointed Jan. 2024
Israel	Prof. Eilam Gross	Appointed Jan. 2018
Netherlands	Prof. Stan Bentvelsen	Appointed Jan. 2015
Norway	Prof. Farid Ould-Saada	Appointed Jan. 2024
Poland	Prof. Justyna Łagoda	Appointed Jan. 2021

Portugal	Prof. Patricia Conde Muino	Appointed July 2020
Romania	Dr Gabriel Stoicea	Appointed July 2021
Serbia	Prof. Lidija Zivkovic	Appointed Jan. 2022
Slovakia	Dr Pavol Stríženec	Appointed May 2016
Slovenia	Prof. Marko Mikuž	Appointed July 2018
Spain	Prof. Celso Martinez Rivero	Appointed Jan. 2021
Sweden	Prof. Arnaud Ferrari	Appointed July 2023
Switzerland	Prof. Rainer Wallny	Appointed Jan. 2024
Türkiye	Prof. Erkcan Özcan	Appointed Jan. 2022
United-Kingdom	Prof. Daniela Bortoletto	Appointed July 2022
Ukraine	Dr Igor Kyryllin	Appointed July 2024
CERN	Dr Richard Hawkings	Appointed Jan. 2024
Ex-Officio Members		
CERN	Dr Fabiola Gianotti Prof. Joachim Mnich	Appointed Jan. 2016 Appointed Jan. 2021
LDG	Prof. Dave Newbold	Appointed Jan. 2021
Observers		
EPS-HEPP Board Chair	Prof. Fabio Maltoni	Appointed Aug. 2023
ApPEC Chair	Dr Andreas Haungs	Appointed Jan. 2021
NuPECC Chair	Prof. Marek Lewitowicz	Appointed March 2018
Early Career Researchers (ECR)	Lydia Brenner	Appointed Feb. 2021

RECFA and PECFA meetings in 2024 and 2025

- **RECFA country visits in 2024:**
 - Switzerland (PSI): March 7-8
 - Sweden (Lund): May 15-16
 - UK (London): Sep 13-14
 - Serbia (Belgrade): Nov 29-30
- **RECFA country visits in 2025:**
 - Bulgaria (Sofia): Mar 8-9, 2025
 - Finland (Helsinki): May 30-31, 2025
 - Belgium (Brussels): Sep 12-13, 2025
 - Turkey (TBC): ~Nov 2025 (TBC)
- **PECFA meetings in 2024:**
 - Frascati: Jul 4-5, 2024.
 - CERN: Nov 14-15, 2024.
 - Reports from HET Workshop; EDP; ESPP update (PPG appointments etc)
- **PECFA meetings in 2025:**
 - EPS HEP Conference: Jul 7-11, 2025
 - CERN: Nov 13-14, 2025

Example of ECFA recommendation letter to the Minister

- [REDACTED] a founding member of CERN, has been experiencing a somewhat low return on investment over the last few years, both in supply and service contracts as well as in staff/fellow/student positions, though roughly commensurate with the fraction of CERN users from [REDACTED]. We also note that the number of [REDACTED] applicants to CERN openings has been quite low. It would be beneficial to advertise CERN, its activities and needs. In addition, the [REDACTED] initiative has an important role in advertising work at CERN and in fostering [REDACTED] industry's participation in CERN procurements, by identifying [REDACTED] companies matching CERN needs and providing support throughout the process. We recommend continuing strong support for [REDACTED].
- We note that the current funding model for individual research projects and research infrastructures operates on short-term (four/five-year) cycles. This scheme does not match the requirements for maintaining an effective participation in large-scale, long-term international infrastructures. Among others, an important missing element is adequate and sustained financial support for technical staff at universities for the computing, instrumentation, maintenance and operational needs of large-scale experiments. It is imperative that [REDACTED] preserve its competent staff and expertise in the development of research infrastructures and accelerator physics. We recommend reviewing the funding framework for infrastructures, to better adapt it to the needs of high-energy physics projects.
- A long-standing recommendation of ECFA to the countries visited is that their High Energy Physics (HEP) communities organise themselves, fostering synergies across groups and projects and speaking coherently with the funding agencies. In Sweden, this is the case for groups on LHC experiments via the successful [REDACTED] consortium, though still bound to the short-term funding cycles. We are very pleased by and supportive of the current initiative to form a national organisation for accelerator-based research and instrumentation. This would allow for the coordination of accelerator-based research, better contributions to large-scale and long-term international infrastructures and maintaining technical competence at the national level. Following the last ECFA visit to [REDACTED], it was pointed out that accelerator-based research activities could be better coordinated through a coherent national initiative involving both universities and accelerator facilities. We reiterate this suggestion, and

1. Brief Update on the 2021 ECFA Detector R&D Roadmap

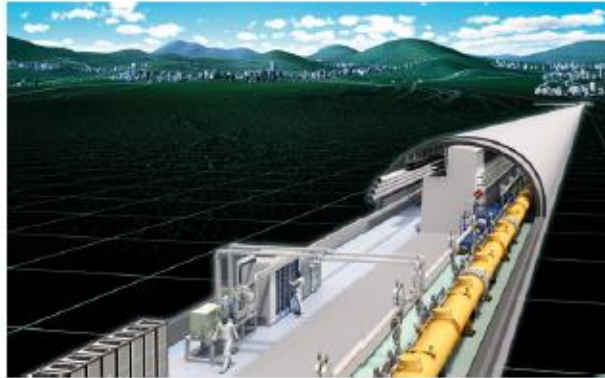
- Q4 2022:** Detector R&D Roadmap Task Forces organise community meetings to establish the scope and scale of the community wishing to participate in the corresponding new DRD activities (✓)
- Q1 2023:** DRDC mandate and composition defined by CERN management
(lot of progress, but not yet completed)
- EDP mandate plus membership updated (✓)
- Q1-Q2 2023:** Develop the new **DRD proposals** based on the detector roadmap and community interest in participation, including light-weight organisational structures and work plan for R&D programme to start in 2024
- Q3 2023:** **Review of proposals by DRDC** leading to recommendations for formal establishment of the DRD collaborations
- Q4 2023:** Discussion of approval by the CERN Research Board
- Q1 2024:** New structures operational, ramp-up of resources throughout 2024 – 2025

...cf next talk from Didier

2. ECFA Study on Physics, Experiments and Detectors at a Future e^+e^- Factory

“ECFA recognizes the need for the experimental and theoretical communities involved in physics studies, experiment designs and detector technologies at future Higgs factories to gather. **ECFA supports a series of workshops** with the aim to **share challenges and expertise, to explore synergies in their efforts** and to respond coherently to this priority in the European Strategy for Particle Physics (ESPP).”

Goal: bring the entire e^+e^- Higgs factory effort together, foster cooperation across various projects; collaborative research programmes are to emerge



ECFA Panels: Higgs-EWK-Top (HET) Factory Study (I)

- **Web page:** <https://ecfa.web.cern.ch/ecfa-study-higgs-ew-top-factories>
- **Reminder of charge:**
 - Based on the recommendations of the [ESPP Update], ECFA is organising a series of workshops on physics studies, experiment design and detector technologies towards a future electron-positron Higgs/EW/Top factory.

The aim is to bring together the efforts of various e^+e^- projects, to share challenges and expertise, to explore synergies and to respond coherently to this high-priority strategy item.
 - **Goal:** update contribution sent to Snowmass exercise and write up in an ECFA Report (White Paper or CERN Yellow Report) by Dec 2025.
 - **Editors:** A. Robson and C. Leonidopoulos
 - **New plan, given ESPP timescale:**
 - Finalize the work until ~end 2024; compiling Report: Oct 2024-Jan 2025.
 - Submit ECFA HET Factory Report to ESPP update process: end March 2025
- **Working Groups:**
 - **WG 1, Physics Potential:** Jorge de Blas (Univ. Granada), Patrick Koppenburg (Nikhef), Jenny List (DESY) and Fabio Maltoni (UC Louvain / Bologna)
 - **WG 2, Physics Analysis Methods:** Patrizia Azzi (INFN-Padova / CERN), Fulvio Piccinini (INFN Pavia) and Dirk Zerwas (IJCLab/DMLab)
 - **WG 3: Detector R&D:** Mary Cruz Fouz (CIEMAT Madrid), Giovanni Marchiori (APC Paris) and Felix Sefkow (DESY)

3rd ECFA workshop on e⁺e⁻ Higgs, Top & ElectroWeak Factories

9–11 October 2024

Sorbonne Université, Campus des Cordeliers, Paris



International Advisory Committee

- Patricia Conde Muñoz (IST/LP)
- César Martínez Rivera (Madrid)
- Dénes Cormaço (IMZP2)
- Joachim Alwall (CERN)
- Mogens Dam (Copenhagen NBI)
- Alessandro Nischi (ROME 0)
- Arnoud Ferrari (Stockholm)
- Aidan Robinson (Glasgow)
- Juan Foster (Valencia)
- Frank Simon (KIT)
- Elean Gress (Tel Aviv)
- Paris Sphar (Athens, CERN, Chai)
- Jürgen D'Hondt (VUB Brussels)
- Steinar Stenlund (CERN)
- Christophe Gosselin (CESY)
- Roberto Tenchini (Pisa)
- Patrick Janot (CEPH)
- Guy Wilkinson (Oxford)
- Alan Khan (Liverpool)
- Andrea Wulzer (Lausanne)
- Christos Leontiadopoulos (Edinburgh)

Local Organizing Committee

- Gregorio Bernardi (CNRS/IN2P3, Chai)
- Zolt El Bior (IPHC Strasbourg)
- Catherine Boccart (L2IT Toulouse)
- Giovanni Marchionni (APC Paris, co-Chair)
- Gaëlle Boudoul (IP2I Lyon, AICP)
- Stéphane Morin (LPC Clermont-Ferrand)
- Vincent Bouché (ILR Palaiseau)
- Nicolas Marange (IUCLab Orsay, co-Chair)
- Paul Colas (IRFU, CEA/Saclay)
- Luc Poggiani (LPNHE Paris)
- Marco Delmastro (JAPP Anancy)
- Suzanne Gossez-Sharkas (IP2I Lyon)
- Jean-Baptiste De Vivie (IPSC Grenoble)
- Maxim Troy (IRFU, CEA/Saclay)
- Fares Djarrar (ICPPM, Marseille)

<https://indico.in2p3.fr/e/ecfa2024>



Science et Société: le projet FCC, le Futur Collisionneur Circulaire de particules élémentaires du CERN

8 octobre 2024
Campus des Cordeliers, Paris, Metro Odeon
Fuseau horaire Europe/Paris

Entrer le texte à rechercher 🔍

- Accueil
 - Ordre du jour
 - Inscription
 - Contact
- ✉ gregorio.bernardi@in2p...

Séminaire d'information sur la faisabilité du FCC, le Futur Collisionneur Circulaire au CERN.

Lors de la dernière stratégie européenne pour le futur de la physique des particules élémentaires, le CERN a reçu le mandat, par ses États membres, d'étudier la faisabilité d'un Futur collisionneur circulaire ou FCC. Le FCC serait un collisionneur de particules de nouvelle génération installé dans un tunnel souterrain de 91 km qui serait creusé en profondeur sous les départements de l'Ain et de la Haute-Savoie en France, ainsi que le canton de Genève, en Suisse. Le FCC succéderait au Grand Collisionneur de Hadrons (LHC) dont le programme de recherche s'achèvera au début des années 2040

+ ECR workshop on 8/1 (afternoon)

205 inscrits

Extracts of the agenda (1st and 3rd day)

Wednesday 9/10

	Registration		
	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>		
	08:30 - 09:00		
09:00	News from the local organizers		
	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>		
	09:00 - 09:10		
	Welcome from IN2P3 and IRFU		
	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>		
	09:10 - 09:25		
	ESPPU process and timeline; goals of the workshop		
	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>		
	09:30 - 09:40		
	The need for a Higgs, Electroweak, and Top factory		
	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>		
10:00	09:45 - 10:10		
	Software for future colliders		
	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>		
	10:15 - 10:30		
	coffee break		
	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>		
	10:30 - 11:00		
11:00	Overview on low mass sc... <i>Tania Robens</i>	Measurement of hadronic ... <i>Alexis Maloizel</i>	Reimagining Electron-Pos... <i>Graham Wils...</i>
	Search for additional Higg... <i>Ahne-Marie ...</i>	Strange tagging with ILD f... <i>Dr Taikan Su...</i>	CMOS R&D targeting a ver... <i>auguste bes...</i>
	Search for invisible decay... <i>Aman Desai</i>	Detector impact on flavou... <i>Andrea Scia...</i>	Precision studies of quan... <i>Juan Alcara...</i>
		Probing New Physics at fu... <i>Redamy Per...</i>	Large area low-power Mo... <i>Yanyan Gao</i>

Friday 11/10

09:00	Generators and Theory developments needed for HET physics	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	09:00 - 09:25
	Towards detectors for HET factories / tracking and vertexing systems	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	09:30 - 09:50
10:00	Towards detectors for HET factories / calorimeter and PID systems	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	09:55 - 10:15
	Towards detectors for HET factories / electronics, mechanics, integration	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	10:20 - 10:40
	coffee break		
11:00	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>		10:45 - 11:15
	WG1 (physics potential):Subgroup-1 report/plans	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	11:15 - 11:25
	WG1 (physics potential):Subgroup-2 report/plans	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	11:30 - 11:40
	WG1 (physics potential):Subgroup-3 report/plans	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	11:45 - 11:55
12:00	WG1 (physics potential):Subgroup-4 report/plans	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	12:00 - 12:10
	WG1 (physics potential):Subgroup-5 report/plans	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	12:15 - 12:25
	Poster prizes and 10min talks by two winning posters	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	12:30 - 12:55
13:00	lunch break		
	ECFA Report: plans from WG3; discussion	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	15:05 - 15:20
	Next steps and timelines for ECFA Report; approval process	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	15:25 - 15:35
	Discussion: what is missing; how to engage in ESPPU process	<i>Amphi Farabeuf, Campus des Cordeliers, Paris, Metro Odeon</i>	15:35 - 15:50

**Next update of the ESPP
(European Strategy for Particle Physics)**

Update of the European Strategy

In March 2024, the CERN Council approved the timeline for the next update of the European Strategy for Particle Physics with a completion date in June 2026

The proposed timeline is determined by physics (LHC, HL-LHC, results from other colliders) and strategic considerations:

- **Physics landscape:** physics results from the LHC and other colliders, HL-LHC upgrades ongoing, exploration of the Higgs sector remains central

- **Excellent progress at CERN and beyond on the preparation for future colliders**

* **FCC Feasibility Study**

(mid-term report presented, excellent progress on the technical side - no showstoppers identified for an FCC-ee as a first stage of an integrated FCC programme)

Planned to complete the study in March 2025

* **Clearer view on the international landscape for future colliders**

- ILC in Japan as a global project; so far no commitments
- P5 process in the US (→ participation in an off-shore Higgs factory (ILC, FCC-ee))
- Technical Design Report for CEPC in China released in Dec 2023;
Aim for adoption of the project in the next 5-year funding cycle(s) in 2025

→ Very relevant information will become available by the end of 2025

Remit of the European Strategy Group (ESG)

- *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)
Paris Spicas (ECFA Chair)

European Strategy Group (ESG)

Preparation of the Strategy Document

- The Strategy Secretary (acting as Chair)
- One representative appointed by each CERN Member State
- One representative appointed by each of the laboratories represented in the Large Particle Physics Laboratory Directors Group (LDG), including its Chair
- The CERN Director-General
- The CERN Director-General elect
- The SPC Chair
- The ECFA Chair
- 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

- Strategy Secretary (acting as Chair)
 - **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**
 - Two representatives from the Americas and two representatives from Asia (appointed by the respective regional representatives in ICFA)
- The SPC Chair
 - The ECFA Chair
 - The LDG Chair

Timeline

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**

Call for proposals to host these events have gone out;
Dates of both events have been fixed

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.

Community Involvement

- Input and involvement of the community is important!
(... and explicitly asked for in the remit)

Goal must be to reach a consensus in the community on the way forward for our field

- There are several ways the community should provide input:

(i) Submission of input from the community by 31 March 2025

Input from projects (FCC, CLIC, ..., Muon Collider, ..., theory, ...) expected

Input from national communities expected (process has already started in several countries)

....

→ Key input will become available only at that time

- * Final report on FCC feasibility study (including progress on financial feasibility)
- * Important input from alternative projects
- * Reports on accelerator R&D, detector R&D, ...
- * ...

Therefore, we see a need for further community input (at the basis of national input) at later stages

Community Involvement (cont.)

(ii) Open Symposium 23 – 27 June 2025

In addition to plenary (and parallel) presentations, this Symposium should be organised such that there is room for discussions

(iii) Based on the collected input (March 2025) and Briefing Book (Sept. 2025) **further input from the national communities is welcome**

A proposal on how to collect and structure this input is presented by ECFA

Summary on Community Input

31 March 2025

Deadline for the submission of input from the community

Further input from national communities

23 – 27 June 2025

Open Symposium

End of September 2025

Submission of the “Briefing Book”

Further input from national communities, deadline 14 Nov 2025

01 – 05 December 2025

Strategy Drafting Session

Important considerations

- In this Strategy Update process we must converge on a preferred option for the next collider at CERN plus alternative options (prioritised)

This may imply as well strong focus on certain R&D lines

→ It will provide the basis for a decision on construction of the next major collider at CERN by Council in 2027/28

- In addition to input from the community at large, we must make sure that input for all plausible options for the flagship project (large collider) will be obtained by 31 March 2025
- In addition other areas of physics must be covered;
Also here, we are asked to define priorities

- *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

Baseline and possible alternative scenarios

Current baseline – justified by 2020 Strategy – :

FCC integrated programme (FCC-ee followed by a hadron collider of at least 100 TeV)

Possible alternative scenarios (for next collider, following the HL-LHC)

- Realisation of a lower-energy hadron collider (50 – 80 TeV) on an earlier timescale (2050 – 2055)
- Linear Collider at CERN (CLIC, ...)
- Muon Collider at CERN
- Further exploitation of the LHC physics programme, eventually with the addition of e-h collisions
- ...

Non-exhaustive list, other scenarios may come up and be proposed by the community

Required input on baseline and alternative scenarios

FCC integrated programme: Input via FCC Feasibility Study final report

(technical feasibility, physics potential, environmental impact, ..., update on the financial feasibility)

In addition: reports from review committees will appear later in 2025

Lower-energy hadron collider

Two important inputs are needed:

- (i) When will HFM magnets, e.g. accelerator magnets of 12 T, become available?
What technology? What price tag? Required R&D? To what extent can timeline be accelerated?
Input from → LDG + HFM Collaboration (Accelerator Roadmap) + international experts(?)
- (ii) Physics potential of a 91 km hadron collider with e.g. 8.3 T and 12 T magnets

Will it be covered by the FCC input?

Or is a dedicated working group needed? ECFA?

- **Linear Collider at CERN (CLIC, ...)**
Input via “Linear Collider community”
(technical feasibility, physics potential, what energies, energy upgrades?, timeline, **cost update**, environmental impact)
- **Muon Collider at CERN**
Input via “Muon Collider community”
(technical feasibility, physics potential, R&D steps, timeline – for R&D and construction -, cost, environmental impact)

- 400-page report made public by Mario Draghi on Monday 9 September 2024
 - Handed to Ursula von der Leyen (European Commission president) for subsequent action
 - Urges the EU to invest 800 billion euros annually [with specific guidance]
 - To close the economic gap between the US and **China** (consistently seen as a threat throughout the report)
- CERN mentioned 19 times in the report, FCC mentioned 3 times!
 - No mention of ILC, CLIC, muon colliders, AWAKE, gravitational waves, etc.
- Excerpts (see p.236 and p.252) - as important as White House/CERN statement last April

The CERN success story

The Large Hadron Collider has propelled CERN to global leadership in particle physics – a mantle that has shifted from the US to Europe – and it stands as CERN’s flagship facility. One of CERN’s most promising current projects, with significant scientific potential, is the construction of the Future Circular Collider (FCC): a 90-km ring designed initially for an electron collider and later for a hadron collider. Chinese authorities are also considering constructing a similar accelerator in China, recognising its scientific potential and its role in advancing cutting-edge technologies. If China were to win this race and its circular collider were to start working before CERN’s, Europe would risk losing its leadership in particle physics, potentially jeopardising CERN’s future.

Invest in world-leading research and technological infrastructure

We have already discussed the remarkable returns from the creation of the European Organization for Nuclear Research (CERN) and emphasised that the future of CERN is at risk due to China’s progress in emulating one of CERN’s most promising current projects, the Future Circular Collider (FCC). Refinancing CERN and ensuring its continued global leadership in frontier research should be regarded as a top EU priority, given the objective of maintaining European prominence in this critical area of fundamental research, which is expected to generate significant business spillovers in the coming years.

Ursula von der Leyen speech at 70 years CERN anniversary (1st October 2024)

Today, I would like to draw three lessons from the story of CERN. The first one is that scale matters. No European country alone could have built the world's largest particle collider. CERN has become a global hub because it rallied Europe. And this is even more crucial today. We are competing with giants. China is planning a 100-kilometre accelerator to challenge CERN's global leadership. Therefore, I am proud that we have financed the feasibility study for CERN's Future Circular Collider. This could preserve Europe's scientific edge, and it could push the boundaries of human knowledge even further. As the global science race is on I want Europe to switch gear.

To do so, European unity is our greatest asset. Horizon Europe is the largest research investment programme in the world. Its crown jewel is the European Research Council – that financed research that resulted in 14 Nobel Prizes. We must invest in this. This is why I want to increase research spending in our next budget – just as you wished, Fabiola. But I also want to make it easier for you to access this funding. We have to focus our efforts on breakthrough innovation, as proposed by the Draghi report. Our scientists must be able to find the resources they need – right here in Europe. This is a must, and we should focus exactly on this task.

The second lesson of CERN is that if you want to compete more, you have to collaborate more

Third lesson: Your core mission at CERN has always been fundamental research. But all along your history, you have produced countless positive spillovers for our society and economy. It is thanks to CERN that we have the world wide web....

