FUTURE CIRCULAR COLLIDER

ABRIDGED VERSION OF THE PRESENTATION DOCUMENT FOR THE

Future Circular Collider project

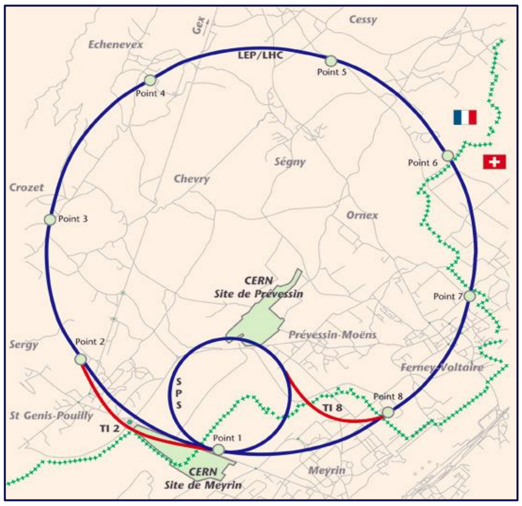
PUBLIC DEBATE IN FRANCE, ORGANISED BY THE COMMISSION NATIONALE DU DÉBAT PUBLIC, FROM **2 JUNE** TO **1 OCTOBER 2026**

PUBLIC CONSULTATION IN SWITZERLAND, ORGANISED BY INDEPENDENT ASSESSORS, FROM **18 MAY** TO **2 OCTOBER 2026**

CERN Rte

1. The project partners

1.1. CERN, THE SPONSOR OF THE FUTURE CIRCULAR COLLIDER (FCC) PROJECT



Current map of the CERN site and its two largest machines in operation, the Super Proton Synchrotron (SPS) and the Large Hadron Collider (LHC)

CERN, the European Laboratory for Particle Physics, was created in 1954. It is an intergovernmental organisation straddling the French-Swiss border a few kilometres from Geneva in Switzerland, with premises situated in Meyrin, Switzerland, and Prévessin-Moëns and Saint-Genis-Pouilly, France.

CERN's mission is to better understand what the Universe is made of and how it works by studying elementary particles[1], the smallest "grains" of matter known today. CERN's research is known as "fundamental", i.e. scientific work with the main objective of acquiring new knowledge.

To this end, CERN provides thousands of international scientists with a complex of particle accelerators enabling them to check the latest theoretical knowledge and make discoveries in particle physics. Particle accelerators are dedicated, first and foremost, to fundamental research but the technologies developed, especially at CERN, have led to real applications for society. And thanks to CERN's knowledge transfer policy, they are used in other fields, such as medicine, and underpin many research and development projects.

What is a particle accelerator ?

Accelerators propel charged particles, such as protons or electrons, at very high speeds, close to the speed of light. These particles are then hurled against a fixed target or other particles travelling in the opposite direction. Physicists study the resulting collisions in order to explore the tiny particles that emerge. When particles reach a high enough energy, something incredible happens - the collision energy is transformed into matter, in the form of particles, the most massive of which existed at the time of the primordial Universe, in the first moments after the Big Bang. This phenomenon, which only occurs at the very smallest scales, is described by Einstein's famous equation $E=mc^2$; in other words, matter is a concentrated form of energy and the two are interchangeable.

[1] Elementary particles are much smaller than atoms. They cannot be seen with the naked eye and accelerators and detectors are required in order to understand their behaviour.

1.2. RTE, OPERATOR OF THE PROJECT'S ELECTRICAL CONNECTIONS IN FRANCE

RTE - *Réseau de transport d'électricité* - operates France's national power grid. It is a public utility, responsible for ensuring a constant supply of electricity with the same service quality level throughout the country. RTE has been mandated by CERN to act as the power grid operator and, thus, the contracting authority for the infrastructure needed to provide electricity to the FCC, in accordance with the conditions laid down by French law.

2. Project overview

2.1. ORIGIN OF THE PROJECT

The Large Hadron Collider (LHC) is CERN's current flagship particle accelerator, and the world's largest. Since it was commissioned in 2008, it has brought about major discoveries such as that of the Higgs boson, which resulted in the 2013 Nobel Prize in Physics being awarded to Peter Higgs (United Kingdom) and François Englert (Belgium), who theorised the existence of the Higgs boson in the 1960s. The scientific programme of the LHC is expected to end around 2040, which is why the international scientific community is now considering the next steps[2].

This is the context in which CERN and RTE are communicating publicly, in Swizerland and France, on the Future Circular Collider (FCC) project[3], which foresees the construction of a new generation of particle colliders larger, more powerful and more precise than the current flagship, the LHC, and its predecessor LEP. The FCC's aim will be to explore the fundamental structure of matter, to push back the frontiers of physics and to continue to federate CERN's international scientific community.

2.2. SCIENTIFIC FRAMEWORK OF THE PROJECT

The **European Strategy for Particle Physics** (ESPP) is a framework document that sets out the scientific, technological and organisational priorities of the particle physics community in Europe. It is the result of an open and inclusive process, based on factual evidence and taking into account the global context of particle physics and developments in neighbouring fields.

The ESPP serves as a roadmap for the development of major projects such as the LHC, its upgrades and studies of future colliders such as the FCC. It is drawn up by the **European Strategy Group**, which brings together representatives from CERN's Member and Associate Member States, leading scientists and experts from other continents.

Following updates in 2013 and 2020, **the 2026 update of the ESPP was adopted by the CERN Council** at a special session in Budapest on 22 May 2026. Its recommendations are as follows:

- **The FCC-ee is the preferred option** for the next flagship collider at CERN, given the scope of the research programme it can support and its technological readiness level.
- **A 'descoped' FCC-ee is identified as the preferred alternative option** for the next flagship collider at

[2] In the years 2029 to 2040, the LHC will enter its high luminosity phase (HL-LHC), where all its systems will have been upgraded, increasing the number of collisions and thus the quantity of data collected. For more information: https://home.cern/fr/science/accelerators/hilumi-lhc/

[3] The FCC project website is available here: https://home.cern/science/accelerators/future-circular-collider/

CERN, i.e. a scenario with a lower cost and therefore lower scientific objectives.

- At the end of the operating period of the FCC-ee, **the tunnel and a large part of the infrastructure could be reused for a future hadron collider (FCC-hh),** which would offer direct discovery potential, in line with the community's ambition to undertake exploration at the highest possible energies.

For more information :

- European Strategy website: https://europeanstrategy.cern/
- Deliberation document for the 2020 update of the European Strategy for Particle Physics: https://cds.cern.ch/record/2720131
- Deliberation document for the 2026 update of the European Strategy for Particle Physics: https://cds.cern.ch/record/2957411?ln=fr

2.3. SCIENTIFIC AIMS OF THE FCC PROJECT

The aim of the FCC-ee project is to produce a very large number of electron-positron collisions at various energies in order to study the particles of the Standard Model[4], in particular the Z and W bosons, the Higgs boson and the top quark, with unprecedented precision and with collision energies ranging from 88 to 365 GeV[5]. One of the aims would be to measure the properties of these particles with much greater precision than is possible today, in order to search for clues to new physics beyond the Standard Model with a sensitivity never before achieved. In other words, the FCC-ee project will allow all the elementary particles in the Standard Model to be studied, and will at the same time open up the possibility of discovering new phenomena.

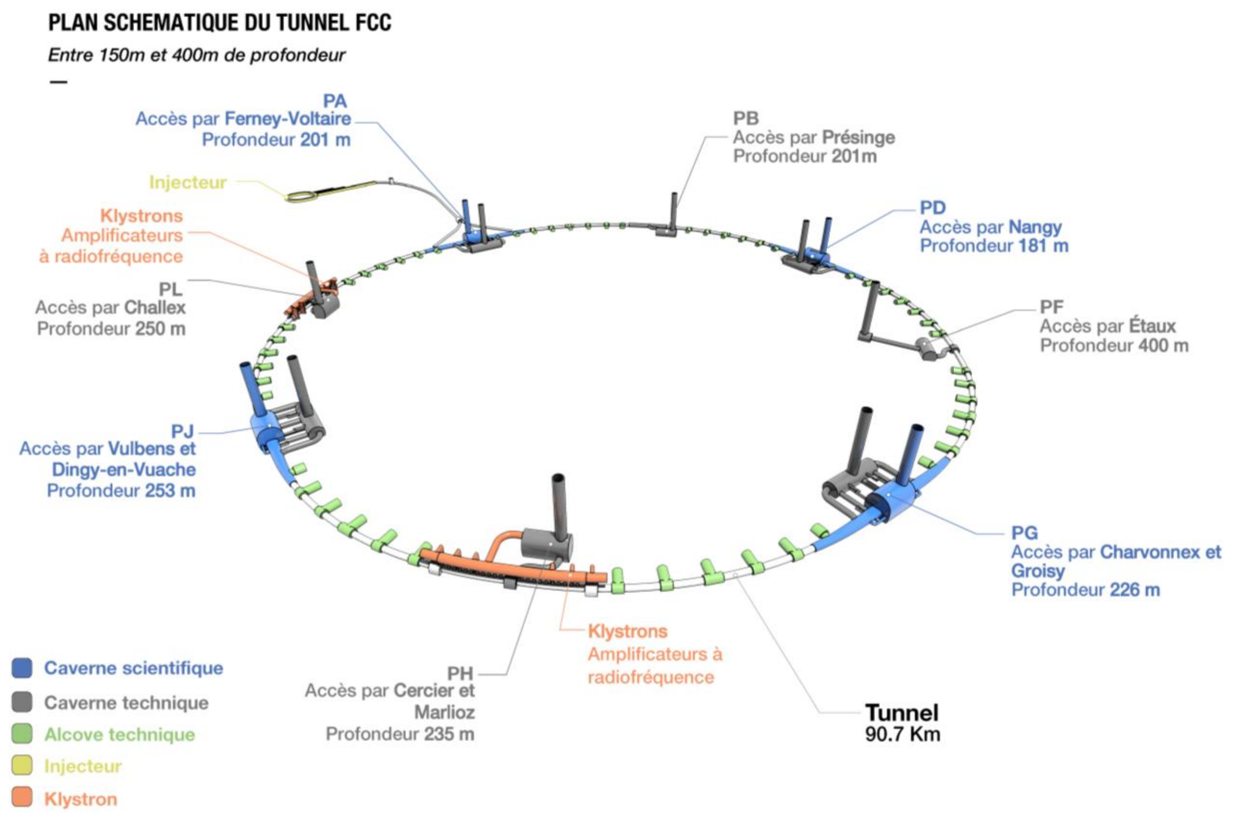
The basic design is a circular underground collider with a circumference of around 90.7 km and four interaction points to maximise the quantity and quality of data collected. The project uses tried-and-tested technologies while at the same time developing more efficient and energy-saving solutions, particularly in the radiofrequency and magnet fields.

The FCC-ee could be followed by the FCC-hh, a hadron-hadron (proton-proton) collider capable of reaching much higher energies (around 100 TeV[6]) in order to explore hitherto undiscovered phenomena. The tunnel and much of the infrastructure could be reused. The FCC-hh, which could replace the FCC-ee by 2070, is still at the research and development stage.

[4] The Standard Model is a collection of theories bringing together all of our current understanding about the behaviour of fundamental particles.

[5] GeV stands for gigaelectronvolt, a unit of energy used in particle physics.1 GeV = 1 billion electronvolts (10^{9} eV), i.e. 1 GeV = 10^9 eV = 1.6 10^-10 J

[6] TeV (teraelectron volt) is a unit of energy used in particle physics. 1 TeV = 1000 GeV = 1000 billion electronvolts (10^{12} eV)



Plan showing the FCC tunnel, between 150m and 400m in depth. Crédit : CERN

An interactive map is available on the FCC feasibility study website, showng the various subsoil investigations underway in certain places: https://fcc-faisabilite.eu/calendrier/

3. Key project figures

1 TRANSFRONTIER PROJECT
being studied in France (Ain Department and Haute-Savoie Department) & **in Switzerland** (in the Republic and Canton of **Geneva**)

A **construction project** Lasting about **8 YEARS**

Approximately 6.3 million m³ of materials to be excavated in situ over a period of about 5 years (equating to about 14.7 million tonnes) for the FCC facility

162 research institutes from **38 countries took part** in the **FCC** feasibility study

1 tunnel, 90.7 km in circumference, with a **5.5-m** internal diameter and a **6.5-m** external diameter

1 injector for the **FCC-ee**

Provisional **start date** of FCC-ee the FCC-ee in the **second half of the 2040s**

4 scientific sites on the surface giving access to the **4 underground experiment caverns**

4 technical sites on the surface giving access to the **underground facilities** and the accelerator for maintenance purposes

Investment of around **15 billion** Swiss francs or 16 billion euros d'investissement for the civil engineering and scientific facilities of the **FCC-ee machine**

12 underground caverns connected to the tunnel (2 per scientific site, 1 per technical site), at depths ranging from **180** to **400** m, each with an acces shaft to the surface

A **UNIQUE** UNDERGROUND FACILITY

12 SHAFTS
between **150** and **400 m** in depth

12 CAVERNS
between **180** and **400 m** in depth

90.7 KM
in **circumference**

8 SURFACE SITES FOR THE OPERATION OF THE **FCC MACHINE** AND ITS EXPERIMENTS

7 SITES IN **FRANCE**

1 SITE IN **SWITZERLAND**

1 INJECTOR to be built on CERN's existing site in Prévessin-Moëns

4. Alternatives

4.1. NON-IMPLEMENTATION OF THE PROJECT

One scenario is that no new collider project would be launched when the high-luminosity LHC (HL-LHC) programme comes to an end, in around 2040. If this were to happen, particle physics research would go into rapid decline thereafter. In the long term, CERN's activities would be mainly geared towards tourism and education. The transfer of knowledge and technology from CERN to society would suffer greatly.

Also, if the FCC does not go ahead**, another project of a similar type and order of magnitude could be launched elsewhere,** led by an individual country or an international consortium. Examples include the Circular Electron Positron Collider (CEPC) in China and the International Linear Collider (ILC) in Japan. Europe would lose its leadership in particle physics as a direct consequence.

4.2. REDUCING THE SCIENTIFIC SCOPE OF THE FCC-EE

Construction costs could be reduced by about 15%, which would significantly impact the scientific programme as the number of interaction points (underground experimental caverns) would be reduced from four to two. This scenario is being studied but would not make a great difference to the territorial impact of the project because, unless the circumference of the ring changes, the number of surface sites would remain the same.

4.3. OTHER ACCELERATOR PROJECTS AT CERN

Several other collider projects that could succeed the LHC are being studied:

> **a new-generation electron-positron (e+e-) collider, LEP3** (Large Electron-Positron 3), which could provide an experimental environment complementary to that of the LHC and could be built in the existing LHC tunnel at CERN.

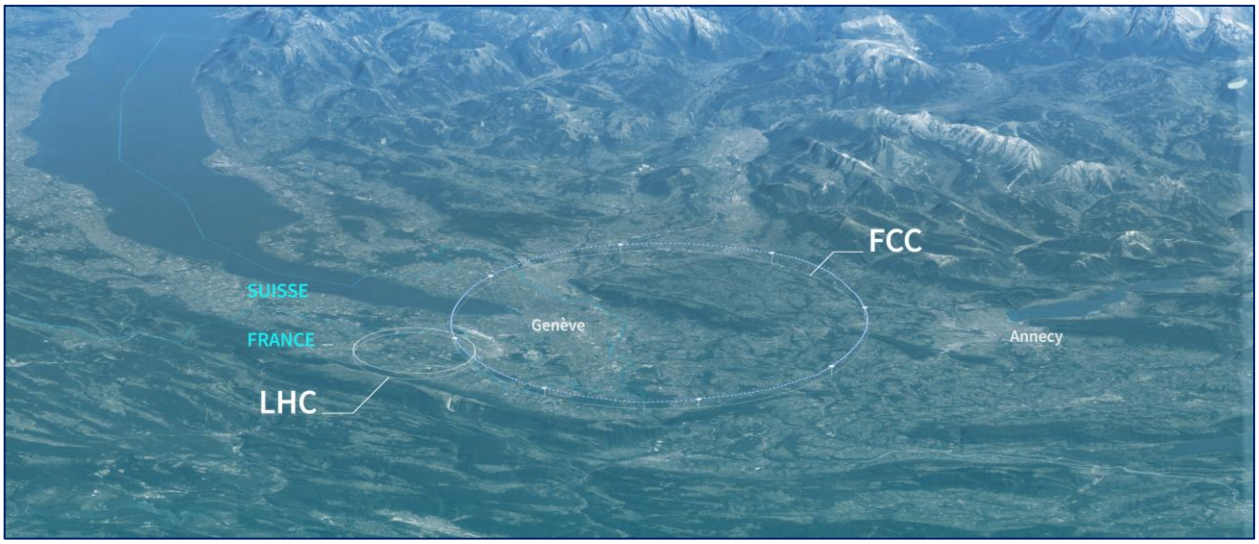
> **an electron-proton collider, the LHeC (Large Hadron-electron Collider)** would combine the proton beams from the LHC with a new linear electron accelerator.

Both of the above would re-use the LHC tunnel but have not been chosen due to constraints linked to the 27-km circumference of the current LHC tunnel.

The **linear collider** option has been ruled out for several reasons that make it uncompetitive from the scientific standpoint, the main one being that it would have only one interaction point, thereby limiting the number of experiments and the potential for cross-checking results; another reason is its luminosity, which is 10 to 1000 times lower than that of a circular collider. To collect an equivalent amount of data on the Higgs boson, the linear collider would have to operate for 50 years, compared to 15 years for a circular collider: it would thus consume far more energy and cooling water.

Other accelerator concepts, still at a much earlier stage of development (such as muon colliders) are also being studied but major scientific and technical developments are needed before they can be considered for operational implementation.

5. Project layout



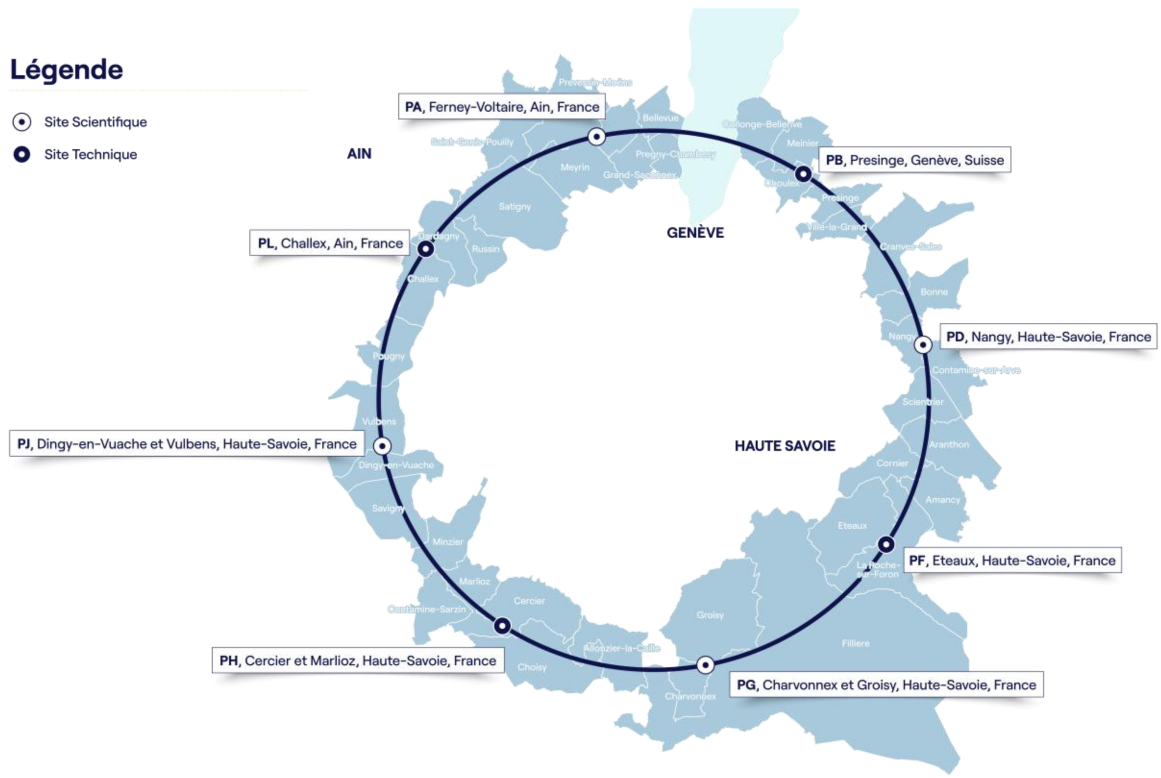
The FCC would be located in a circular underground tunnel under the Haute-Savoie and Ain departments in France and the canton of Geneva in Switzerland.

5.1. INITIAL PREPARATORY ANALYSIS AND FEASABILITY STUDY

A preliminary design study of a collider to follow the LHC at CERN was performed from 2014 to 2018. In 2020, with the initial results of this study in hand and following the recommendations of the European Strategy for Particle Physics, CERN's Member States launched a study to determine the technical and financial feasibility of a future circular collider.

The FCC feasibility study ran from 2020 to 2025. The results are available here: https://cds.cern.ch/record/2928194

5.2. THE CHOSEN TUNNEL PLACEMENT



Placement of the FCC

An iterative process led to the selection of the reference layout, following the "Avoid - Reduce – Compensate" principle; **nearly a hundred variants** were assessed against the following criteria:

> expected scientific performance;

> construction constraints (geology and subsoil, topography, accessibility, costs);

> environmental and planning issues (protected areas, urbanisation, access);

> possible synergies with CERN's existing infrastructure.

This approach was underpinned by field data and an ongoing dialogue with stakeholders, especially the Host States and the local authorities. An initial examination of the operational constraints allowed the least favourable sectors to be ruled out.

An in-depth analysis of sensitive environmental considerations (habitats, wildlife corridors, water, land-scapes, heritage) and potential impacts (noise, vibrations, dust, light) was then performed. Top priority was given to avoiding such impacts and then to reducing them.

6. Territorial and envrionmental challenges, impacts and spin-offs

The areas where the FCC project would be installed have various issues in common regarding the size of the populated area on both sides of the French-Swiss border. In the various communities through which the FCC will pass, the following considerations have been identified: **the areas are very attractive** to new inhabitants, the local authorities want to **introduce new forms of mobility** and thus reduce traffic congestion and improve the quality of the air, they would also like to **keep urban development under control and protect the environment;** finally, they are very keen to **rebalance the distribution of jobs and services** in the region.

A sustainable approach was adopted, with an eco-friendly design following the principles of "Avoid - Reduce – Compensate"

The "Avoid - Reduce - Compensate" (ARC) approach runs through every stage of the FCC project, from planning to impact assessment, right through to post-construction follow-up. It is in line with the regulatory framework in force at European and national level (EU Habitats Directive and the biodiversity laws in the two Host States).

The ARC approach is founded on three key principles:

> **Avoid**: prioritise a layout and construction methods that avoid sensitive or protected natural areas right from the design stage;

> **Reduce** the number of remaining unavoidable impacts by using techniques such as cut-and-cover, noise/visual barriers, ecological restoration and wildlife crossings;

> **Compensate**: when certain impacts cannot be avoided or sufficiently reduced, take compensatory measures to favour biodiversity elsewhere, in line with statutory requirements in France and Switzerland.

The FCC feasibility study mainly focussed on the "avoid" and "reduce" aspects of the ARC approach. Compensatory measures will be implemented if the project goes ahead, in line with the statutory provisions in force in the Host States, France and Switzerland, and in collaboration with local and national authorities. Depending on technical and economic factors, CERN could, for example, propose the re-wilding of certain areas after construction has finished, thus going beyond the statutory framework.

6.1. ELECTRICAL POWER SUPPLY AND SOURCES

During the **construction phase (estimated 2032-2040)**, energy requirements are estimated **at between 400 and 600 gigawatt-hours (GWh)**, mainly to run the tunnel boring machines used to excavate the tunnels in various types of soil and rock. Seven temporary connection points would be needed at future surface sites to operate the tunnel boring machines.

In the **operational phase**, energy requirements are estimated at an average of **1.3 TWh per year**. By comparison, the LHC, including experiments, currently consumes about 700 GWh per year when in operation.

CERN would be supplied by the French power grid, which was 95% carbon-free in 2025[7]. If the project goes ahead and subject to technical and economic feasibility, CERN will also study the possibility of long-term renewable energy supply contracts.

6.2. CONNECTIONS TO THE POWER GRID OPERATED BY RTE

CERN has requested RTE to study the feasibility of providing a **220 megawatt (MW) connection at three separate points. At this stage, RTE has performed a feasibility study** to examine the connection arrangements at three points of the FCC project. Connecting these three sites to the grid would call for the construction of several electrical structures.

The feasibility study will need to be followed by a technical and financial proposal defining the precise scope of the connections needed for the FCC project.

The three connections being considered are as follows:

- **PA: Ferney-Voltaire (Ain department)**: creation of a 400 000 V overhead or underground line approximately 5 km in length and extension of the RTE substation at Bois-Tollot where the connection would be made;
- **PF: Éteaux (Haute-Savoie department):** creation of a 225 000 V overhead or underground line approximately 6 km in length and extension of the RTE substation at Cornier;
- **PH: Cercier and Marlioz (Haute-Savoie)**: creation of two overhead lines of 225 000 V or 400 000 V depending on the solution chosen. Both options would require the construction of a new substation.

[7] RTE website (in French), status of electrical power production in 2025: https: //www.rte-france.com/actualites/bilan-electrique-2025-conditions-sont-reunies-permettre-france-accelerer-electrification

6.3. WATER SUPPLY AND SOURCES

At this stage of the studies, water requirements are estimated at **1.9 million cubic metres per year, on average during the operation phase, mainly to cool the accelerator**. By comparison, CERN's current water requirements are approximately 3 million cubic metres per year. Water is also required at certain times in the construction phase. Requirements will be estimated in due course, depending on the technology chosen for the tunnel boring machines. The working hypothesis is that the FCC will be supplied with untreated water from Lake Geneva by the Swiss utility Services Industriels de Genève (SIG), as is the case today.

To make the distribution of water along the entire length of the accelerator technically easier and financially more advantageous, two water supply points could be added in France, from the Arve river and/or from the Rhône. To this end, a specific territorial study would need to be conducted, including water resource management plans detailing the resources available and the planned usage, notably in the context of the changing climate. These water supply points would call for the construction of water filtration and treatment plants.

6.4. EXCAVATED MATERIALS (SPOIL)

The volume of spoil excavated in situ would be around 6.3 million cubic metres (14.7 million tonnes) over a period of around 5 years. Taking the swell factor into account, this could approximate to 8.1 million cubic metres over 5 years (the swell factor is the ratio of loose material volume to in-place volume).

The volume of spoil excavated in situ would be around 6.3 million cubic metres (14.7 million tonnes) over a period of around 5 years. Taking the swell factor into account, this could approximate to 8.1 million cubic metres over 5 years (the swell factor is the ratio of loose material volume to in-place volume).

In 2025, a strategy for the management and use of excavated materials was drawn up for the FCC feasibility study. Studies continue and a consultancy contract has been signed for the period March 2026 - March 2028 aimed at drawing up a preliminary spoil management plan, defining the following:

- Preliminary classification of the materials;
- Management of the polluted materials;
- Reuse and disposal options;
- Site inventory (reuse/disposal sites);
- Logistics at the surface sites;
- Transportation away from the sites, through the study of possible new rail links or conveyor systems;
- Regulatory framework and planning permission;
- Traceability and tracking of the materials;
- Risk analysis and mitigation measures;
- Estimate of costs.

Storage and management of the materials excavated during the construction phase

At this stage, no specific study has been carried out on intermediate storage because the nature and volume of materials to be stored will depend on the final choice of use/reuse processes. For information, the spoil will be sorted at the surface into three or more batches on the basis of a preliminary classification performed underground, as follows:

> one or several batches will be for polluted materials, in accordance with the statutory obligations of the Host States and depending on the nature of the pollution and the corresponding treatment process;

> another will be for fine-grained unpolluted materials (clay and sand);

> and a last batch will be for the remaining unpolluted materials.

The technical feasibility of two specific solutions for transporting the excavated materials has been explored.

The first is the creation of rail links – the technical and financial feasibility of this solution remains to be confirmed. Two sites would be particularly well suited:

> **PJ – Vulbens** : A new branch, 1.5 km in length, could be built on the existing railway line between Vulbens and Valleiry.

> **PL – Challex** : a new branch could be built from the existing, unused station at Collonges.

At this stage of the studies, it remains unclear whether rail connections at PA (Ferney Voltaire), PB (Presinge), PF (Eteaux) and PG (Groisy/Charvonnex) would be technically feasible. It does not appear to be feasible at PD (Nangy) and PH (Cercier) because no connections exist within a 10-km radius.

The second solution is to create conveyor systems – this would obviate the need for lorries and would thereby reduce the negative impact. Such systems could operate for up to 8 hours a day, 22 days a month. Case studies are in progress for the PG (Charvonnex) and PJ (Vulbens) surface sites. **It should be stressed that the conclusions of these two studies would also apply to the other surface sites**. If a preparatory phase of the project is launched, detailed technical design variants for the routes and conveyor technologies – under a construction hypothesis – would need to be developed for all eight sites and submitted for authorisation as part of the project's environmental authorisation procedure.

.

Several reuse channels have been identified and are being considered

- Some of the molasse could be used as a construction material in cut-and-cover structures, to create noise barriers or for agricultural and forestry paths.
- Consideration would be given to developing new construction materials incorporating a fraction of molasse (e.g. for shotcrete or compressed construction materials).
- An innovative method is being tested whereby the molasse could be transformed into reconstituted soil and used in wasteland rehabilitation, the development of recreational or forestry areas or the treatment of polluted or damaged soil, in line with the regulations in force in the Host States.
- The limestone, sand and gravel components could be reused in the production of lime, cement or concrete, possibly after treatment (sieving and washing).
- The materials could be reused for the development needs of the project (site roads, landscaping), for earthworks and re-wilding, and for the backfilling of quarries and mines, subject to compliance with the applicable environmental criteria.

6.5. INTEGRATION OF THE SURFACE SITES INTO LANDSCAPE

Different approaches to optimise and reduce the surface area of the various sites would be required to integrate them into the landscape. Where a residual impact remains, compensatory measures might be required, with a methodology (type, scale, implementation) that would vary from one site to another.

Should protected agricultural areas be lost, a number of options would be considered and discussed with the local authorities and stakeholders concerned.

6.6. CARBON FOOTPRINT

At this stage of the project, a full analysis of the FCC-ee life cycle has not yet been made. However, it would be carried out as the project moves forward, according to the following timetable:

- **2024**: studies of the civil engineering carbon footprint (underground and surface structures, not including the accelerator) and of the energy requirements;
- **2025-2026**: studies of the carbon footprint of the technical infrastructure, results expected by the end of 2026;
- **2027-2028**: studies of the carbon footprint of the accelerator (construction, operation).

An initial study has estimated that the construction phase will generate **1 million tCO_2(eq)**. Additional studies have revealed room for improvement and the possibility of reducing this estimated carbon footprint to **526,671 tCO_2(eq)**.

A provisional, partial carbon footprint of the FCC-ee project has been calculated in accordance with European standards setting out the requirements for calculating and reporting greenhouse gas (GHG) emissions associated with infrastructure projects, as follows:

	Carbon footprint in $tCO_2(eq)$
Construction phase	
Underground infrastructure	> 477 390
4 technical sites	> 17 546
4 experimental sites	> 31 735
Total construction phase	> 526 671
Operation phase - Energy consumption	
Footprint at 15 tCO2(eq)/GWh	> 305 250
Footprint at 25 tCO2(eq)/GWh	> 508 750

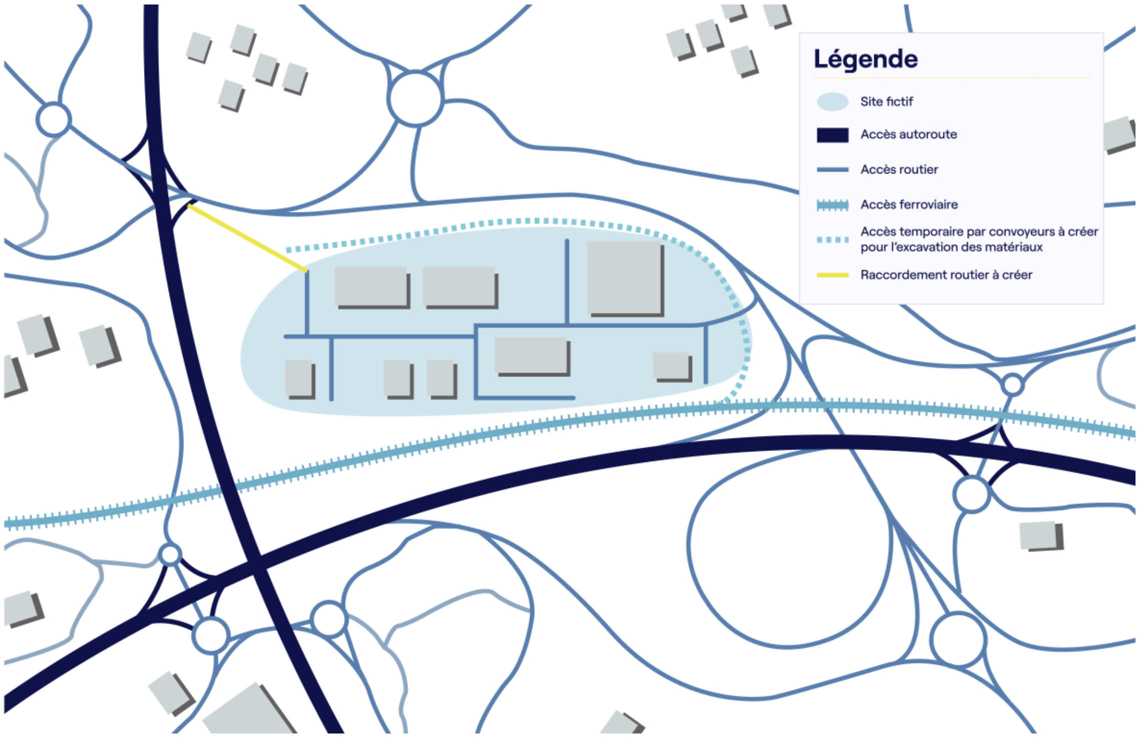
6.7. REGIONAL PLANNING IMPACT

6.7.1. Challenges for people transportation during the construction and operation phases

The Meyrin site in Switzerland and the Prévessin-Moëns site in France would remain CERN's main campuses, and **the number of people living in the region connected to CERN's activities would remain stable at about 9 000**. According to current, initial estimates the number of construction workers present at the worksites of each shaft would vary from 50 to 450 during the multi-year construction phase, from 2032 to 2040. The on-site presence of workers - and therefore the impact on people transportation - will depend on whether or not a tunnel boring machine is used, and on the solutions chosen for the transportation of the materials excavated. Temporary and permanent facilities could be created to provide access to the surface sites, or for transporting excavated and construction materials.

The number of people on site will also depend on how the work progresses, and a larger number of people will be needed between 2035 and 2038; over 1500 people will work across the 8 sites.

A **specific personnel mobility plan** can be drawn up only once the construction activities have been defined in greater detail. CERN could set up shuttle services between the FCC sites and urban centres, and these would also benefit the local population. Similarly, CERN's road infrastructure requirements could be pooled with public road improvement projects and thus contribute to enhancing people transportation.



Fictitious site - example of a site access road under consideration

The impact of the project in the operational phase depends on the transportation solutions adopted (infrastructure, public transport services, sustainable transport, etc.) and the type of site:

- **Technical sites**: the number of employees on site would be kept to a strict minimum, in line with operational requirements, so the impact on traffic would be negligible.
- **Scientific sites**: the upper scenario envisages small teams of up to 20 people. Transportation should be organised in such a way as to limit traffic to a few dozen cars per day entering and leaving each site.

6.7.2. Challenges for housing and public services

In the fields of housing and public services, urban development projects could be devised in parallel and developed in collaboration with the Host States. These could include the following:

- Emergency and safety services;
- Temporary accommodation for the construction phase and permanent accommodation for the operation phase;
- Improved school and after-school facilities;
- Health services etc.

6.8. MANAGING RISK ACROSS A LARGE AND DIVERSE REGION

6.8.1. Risk identified

In accordance with French and Swiss statutory requirements, CERN has launched a preliminary risk analysis, which will be updated as the project progresses. The aim is to identify accident scenarios that could arise during the construction and operation phases, distinguishing between two main categories of risk:

> **Technological and infrastructure risks** associated with CERN's facilities and activities: technical malfunctions, ionising and non-ionising radiation, presence of chemical products, fires, electrical incidents, malicious acts and cyberattacks;

> **Natural and climate risks** and the ability of the facilities to withstand them: vibrations, ground movements, flooding, landslides and seismic hazards. Geophysical studies carried out as part of underground investigations of the sites have improved our understanding of the subsoil and therefore of seismic and vibration risks. These site investigations were performed in collaboration with the University of Geneva, and the final results, expected by the end of 2026, should provide further information on this risk. In addition, it is planned for a specific vulnerability study to be attached to the environmental authorisation application file, examining the resilience of the facilities to flooding, landslides and climatic events, as well as the implementation of physical barriers and contingency plans.

6.8.2. Risk mitigation measures under study

In the construction phase, the key safety elements will be as follows:

> **Safety in the tunnel:** ventilation and evacuation procedure, and especially with the inclusion of refuge chambers;

> Road and workplace safety;

> **Environmental safety** through the environmental management of the worksites.

In the operation phase, CERN's safety policy would be extended to all the new FCC sites, focusing especially on four major areas:

> **Protection of the environment** through the deployment of a fully-fledged environmental monitoring system to continuously monitor aqueous discharges, noise, meteorological parameters and ionising radiation, with an initial-state analysis to be performed prior to commissioning.

> **Health and safety at work** through staff training and risk prevention.

> **Radioactive waste management**, in line with CERN's current radioactive waste management policy, which is governed by a tripartite agreement between the Organization and its two Host States (2010).

> **Emergency preparedness** through containment systems, secure evacuation equipment, regular drills and close cooperation with the emergency services.

7. Project implementation conditions

7.1. SCHEDULE

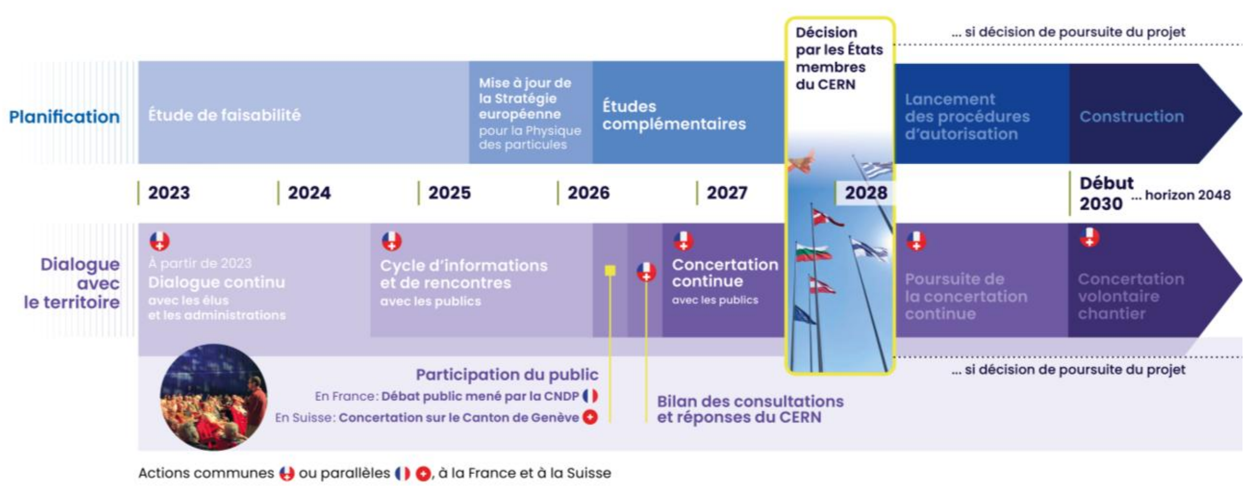
The provisional schedule for the FCC project is as follows:

- **2026 – 2028 :** Launch and development of the preliminary plan for the management of the excavated materials
- **May 2026:** Update of the European Strategy for Particle Physics
- **2027:** Launch of the environmental assessment and first definition of the architectural and landscape guidelines for the surface sites
- **2028 at the earliest :** Final “go/no-go” decision by the CERN Council, i.e. the Organization’s Member States, including France and Switzerland

If the decision is “go”:

- planning applications will immediately be initiated in France and Switzerland.
- **In the decade starting in 2030**: depending on the planning permission granted in France and Switzerland, construction work will begin.
- **Towards the end of the 2040s**: the FCC-ee would be commissioned.
- (provisionally) **In the decade starting in 2070**: the FCC-hh could be commissioned.

CALENDRIER DU DIALOGUE AVEC LE TERRITOIRE



7.2. PROJECT GOVERNANCE

7.2.1. Aims of the public debate and consultation phase

Two distinct participation mechanisms are being implemented: the "public debate" in France and the "public consultation" in Switzerland, both in line with the specific regulations and participatory democracy practices of each country.

The timelines are as follows:

- In France, under the auspices of the *Commission Nationale du Débat Public* (CNDP), from 2 June to 1 October 2026.
- In Switzerland, under the auspices of two third-party guarantors who are experts in the process, from 18 May to 2 October 2026. A consortium has been commissioned by CERN to organise and run the consultation process.

In this public debate in France and public consultation in Switzerland, CERN and RTE are committed to presenting the FCC project in all its detail to all stakeholders and to providing information on how it will be connected to the power grid in France.

All the feedback provided, both in France and Switzerland, will be considered by CERN equally, regardless of who gives it. CERN's response to the public participation process will be published no later than five months after it has ended. If the project goes ahead, the dialogue with the local population and with institutional stakeholders will continue, and further meetings will be organised to present the results of the studies as and when they become available.

To participate online :

- In France: https://www.debatpublic.fr/projet-accelerateur-particules
- In Switzerland: https://www.concertation-fcc-cern.ch/la-plateforme-du-cern-4008

7.2.2. The final investment decision remains to be taken

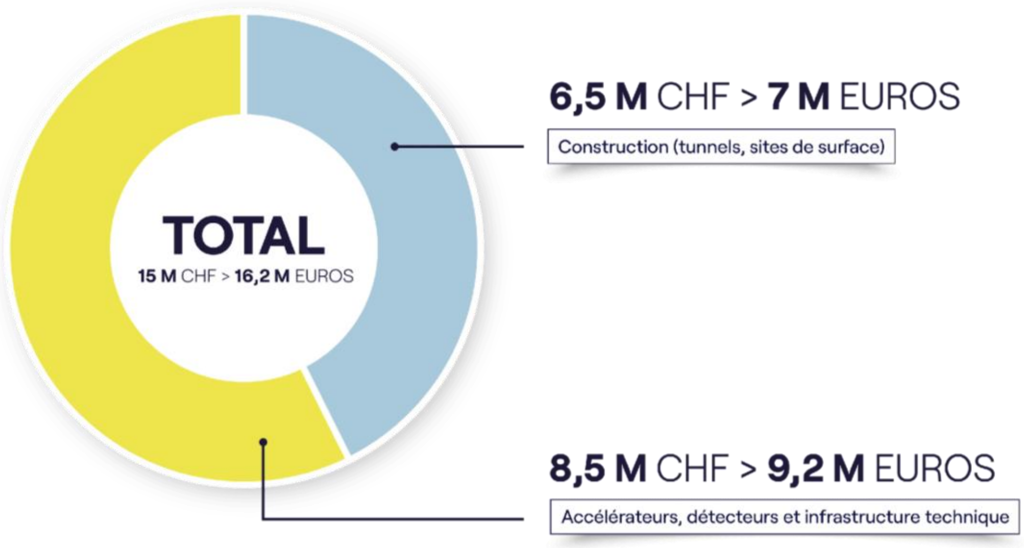
The FCC-ee project has not yet been given the green light. The "go/no-go" decision will be taken by the CERN Council in 2028 at the earliest. This decision will depend on the results of the studies, on the outcome of the consultation with the territories and the Member States, and on the project's funding plan. If the CERN Council decides to proceed with the project and with the submission of planning applications, everything will depend on whether the Host States grant planning permission.

7.3. ESTIMATED COST AND FINANCING

Estimated investment cost

It is planned to invest **15 billion Swiss francs (around €16.2 billion) over 15 years**.

Breakdown of investment costs for the FCC-ee project



Provisional funding plan

The project could be funded from CERN's annual budget with a 1.5% annual increase in the Member and Associate Member States' contributions for a limited period of eight years. The contributions of non-Member States would also be annual, agreed on the basis of their participation in the programme. The possibility of opening the project to private investors is also being studied. The feasibility and conditions of the funding plan are not yet known at this stage. These options could impact the way CERN is governed.