

# Global Future Circular Collider (FCC) Study

## Goals and Governance



# Why

- **Push the energy frontier** beyond LHC
- **High priority** item within the **European Strategy** for Particle Physics
- Timely
  - lead times for R&D very long
  - LHC physics program for ~20 years
- Need for a project plan when results from LHC (and other facilities) indicate direction to go

# What

- Technical / Conceptual Design Reports for linear  $e^+e^-$  colliders exist: ILC and CLIC
  - Japan interested in housing ILC
  - Europe and CERN: participation in both endeavours will be continued
- Need to go beyond present energy frontier  
→ **circular high energy collider**

# How

- Exploitation of **all options** for such a project (hh – ee – ep) **within one study**
- **Global Collaboration** for the **study of Future Circular Collider options** (similar to the CLIC collaboration)
- Hosted by CERN

# Scope (i)

A conceptual design study of **options for a future high-energy frontier circular collider** at CERN for the post-LHC era shall be carried out, implementing the request in the 2013 update of the European Strategy for Particle Physics.

Many results of the study will be **site independent**.

The design study shall be organised on a **world-wide international collaboration** basis under the auspices of the **European Committee for Future Accelerators (ECFA)** and shall be available in time for the next update of the European Strategy for Particle Physics, foreseen by 2018.

# Scope (ii)

The main emphasis of the conceptual design study shall be the long-term goal of a hadron collider with a centre-of-mass energy of the order of 100 TeV in a new tunnel of 80 - 100 km circumference for the purposes of studying physics at the highest energies.

The conceptual design study shall also include a lepton collider and its detectors, as a potential intermediate step towards realization of the hadron facility. Potential synergies with linear collider detector designs should be considered.

Options for e-p scenarios and their impact on the infrastructure shall be examined at conceptual level.

The study shall include cost and energy optimisation, industrialisation aspects and provide implementation scenarios, including schedule and cost profiles.

# The FCC Collaboration

Organisations working together to carry out the conceptual design study, leading to a set of Conceptual Design Report volumes

- Circular energy frontier **collider designs**
- **Physics cases** for collider options & experiments
- **Key parameters** of collider options & experiments
- **Infrastructure** concepts
- **Detector** concepts
- **Identify**, launch and coordinate **R&D programmes**
- Identify **synergies with other** high-energy frontier **studies**
- **Cost** estimates, **implementation** scenarios

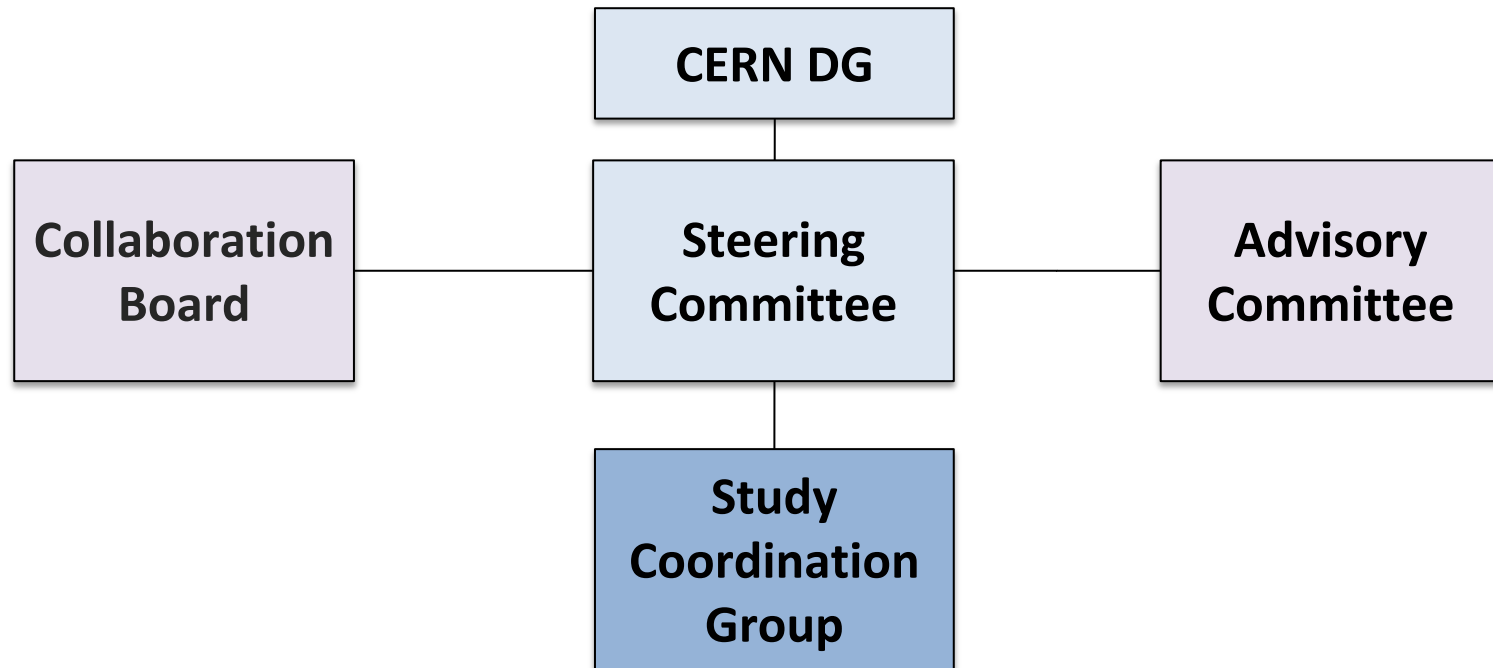
# Host Organisation

CERN is legal entity organising the study. Participates in the study as collaboration member and appoints study leader

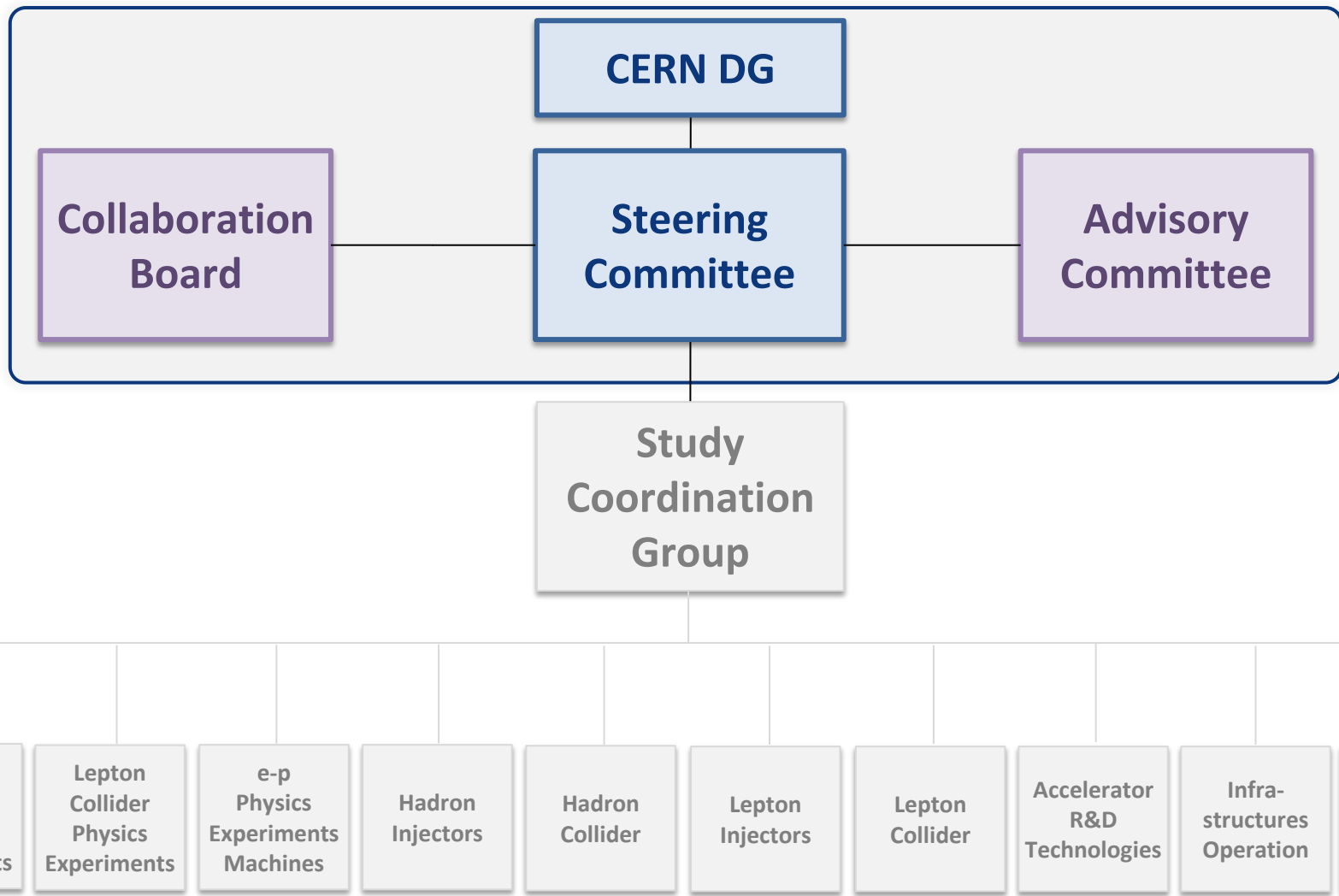
- **Establish organisational framework** to carry out study
- **Set up international collaboration**
- **Identify** required **R&D actions**
- **Monitor compliance** of collaboration members
- **Collect, review, verify reports and deliverables**
- **Transmit** relevant **information** to any party concerned
- **Administer** member **contributions and external funding**



# FCC Structure

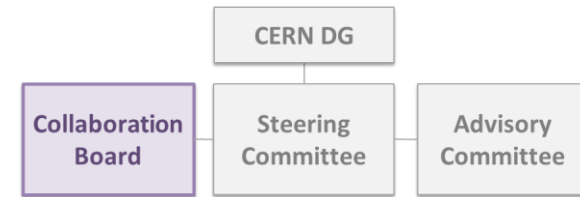


# FCC Governance Structure



# Collaboration Board

Aim at geographically well-balanced and topically complementary network of contributions



- Tasks:
  - Identify and review **resource needs**
  - **Find matches** within collaboration
  - **Nominate Steering Committee** in agreement with CERN DG
- Meet: once per year
- Composition:
  - One **representative per** collaboration **participant**
  - **Chair elected** from participant organisations
  - **Voting** with **simple majority**

# Steering Committee

Supervisory and main governance body acting on behalf of the collaboration



- Tasks:
  - **Ensure implementation of collaboration board decisions**
  - **Formulate strategy scope, individual goals and work program**
  - **Monitor** efficient carrying out of the study, **report to CB and DG**
- Meet: four times per year
- Composition (up to 9 members):
  - **ECFA** representative and **Collaboration Board chair**
  - Two **representatives of host** organisation
  - Up to **five further members** of Collaboration Board, leading to **well-balanced**, world-wide **geographical distribution**

# Advisory Committee

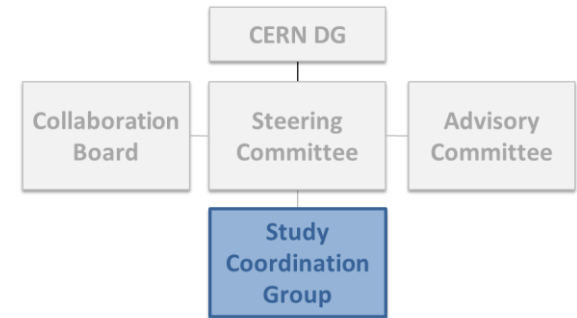
Facilitate major technical decisions of the Steering Committee



- **Tasks:**
  - **Review** scientific and technical progress
  - Submit scientific and technical **recommendations to Steering Committee**
- **Meet: once per year**
- **Composition:**
  - Up to two **external experts** for relevant domains (accelerators, particle physics, experiments & detectors, engineering, key technologies)
  - Members **proposed by Steering Committee**
  - Members **appointed by Collaboration Board**

# Coordination Group

Executive body of the project



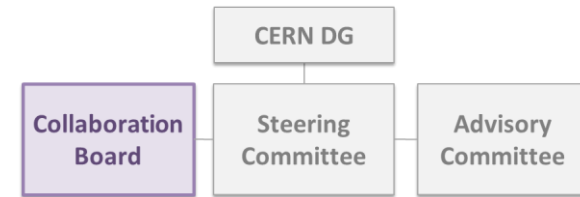
- Tasks:
  - **Coordinate work packages**
  - Day-to-day management
  - **Assist and facilitate work of Steering Committee**
- Meet: once per month
- Composition:
  - Members **proposed by host** organisation
  - Members **appointed by Steering Committee**
  - **Chaired by Study Leader**

# Conclusions

- The FCC conceptual design study, includes two large machine studies (hh, ee), as well as three detector and physics options (hh, ee, he).
- The Coordination Group and Study Team will face a large parameter area and a challenging overall optimisation process.
- Intensive and frequent exchange between Coordination Group and the Governance Structure will be essential in this process.
- The proposed FCC organisation structure is well adapted to these challenging tasks.

# Interim Collaboration Board Chair

Interim Chairperson for Collaboration Board, to bridge formation phase until March 2015 FCC annual workshop



- By 3<sup>rd</sup> September 2014, 16 institutes had joined the collaboration by signing the MoU, while discussions are ongoing with several other potential collaboration partners.
- In order to advance as fast as possible with the further organisation of the collaboration, an interim Collaboration Board chair person was selected out of the 16 institutes.
- This structure should remain in place until the first annual FCC meeting scheduled for March 2015, when a definite FCC governing structure should be established.
- **Prof. Leonid Rivkin of EPFL has been confirmed for this role by all 16 institutes.**