

ESPP a view from ECFA-UK

D. Bortoletto

- **Restricted ECFA:** one member per country, appointed for at most two three-year periods, who acts as the communication channel to each participating country, its physics community and national institutes and authorities.
 - D. Bortoletto
- **Plenary ECFA:** ECFA appoints members for a total maximum period of six years after nomination by their country. While the members 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.
 - Daniela Bortoletto, Joel Goldstein, Haroon Rafique, Aidan Robson, Michael Spannowsky, Williams, Matthew Wing + labs directors (Sinead Farrington, Peter McIntosh)
- **ECFA ECR Panel:** Estifa'a Zaid, Harriet Watson, Aidan Wiederhold, Alison Elliot (RAL), Ben Hounsel (Daresbury)

- Latest PECFA meeting in Amsterdam focused on the FCC and ESPP (<https://indico.cern.ch/event/1567686/timetable/?view=standard>)
- Afternoon session on Thursday devoted to FCC reports:
 - FCC status by Frank Zimmerman
 - FCC PED: From the Strategy Update to the project approval (and beyond) by Patrick Janot
- Morning session on Friday devoted to a review of the ESPP
 - Presentation of ESPP highlights by K. Jakobs
 - Status of CERN and plans in the post-ESPP era by M. Thomson
 - Accelerator R&D roadmap in the post-ESPP era by M. Seidel
- ECFA meetings used as a checkpoint for reviewing the DRD collaborations in light of the ESPP update.
 - This PECFA meeting:
 - ECFA Detector Panel Report by Giuliana Rizzo
 - 4 DRDs (1, 3, 4 and 6), as directly linked to FCC-ee and with three of them providing updates to the DRDC in November
 - November PECFA meeting at CERN (19–20 November) — 4 others (DRDs 2, 5, 7 and 8)

The path is set...

Council gives CERN a mandate to prepare FCC-ee for a 2028 decision

Council resolution on European Strategy invites the CERN management:

- (20) to use the Strategy update as input for its Medium-Term Plan and the ongoing studies towards the FCC-ee as the possible next flagship project at CERN; ✓
- (21) to initiate discussions with the relevant authorities and entities in the Member and Associate Member States, as well as non-Member States and the European Union, with a view to obtaining pledges of additional cash and/or in-kind contributions to the cost of constructing and operating the FCC-ee, and, on this basis, to develop a financially feasible funding plan for the possible FCC-ee project; ✓
- (22) to provide annual reports on the implementation of the Strategy update and the necessary information to support national decision-making processes; and
- (23) to make every effort to ensure that the Council is in a position by 2028 to take a decision on the FCC-ee, taking into account elements such as the scientific, technical and financial feasibility of the project.

This clear mandate from CERN Council is a major step forward

Planned FCC Phases:

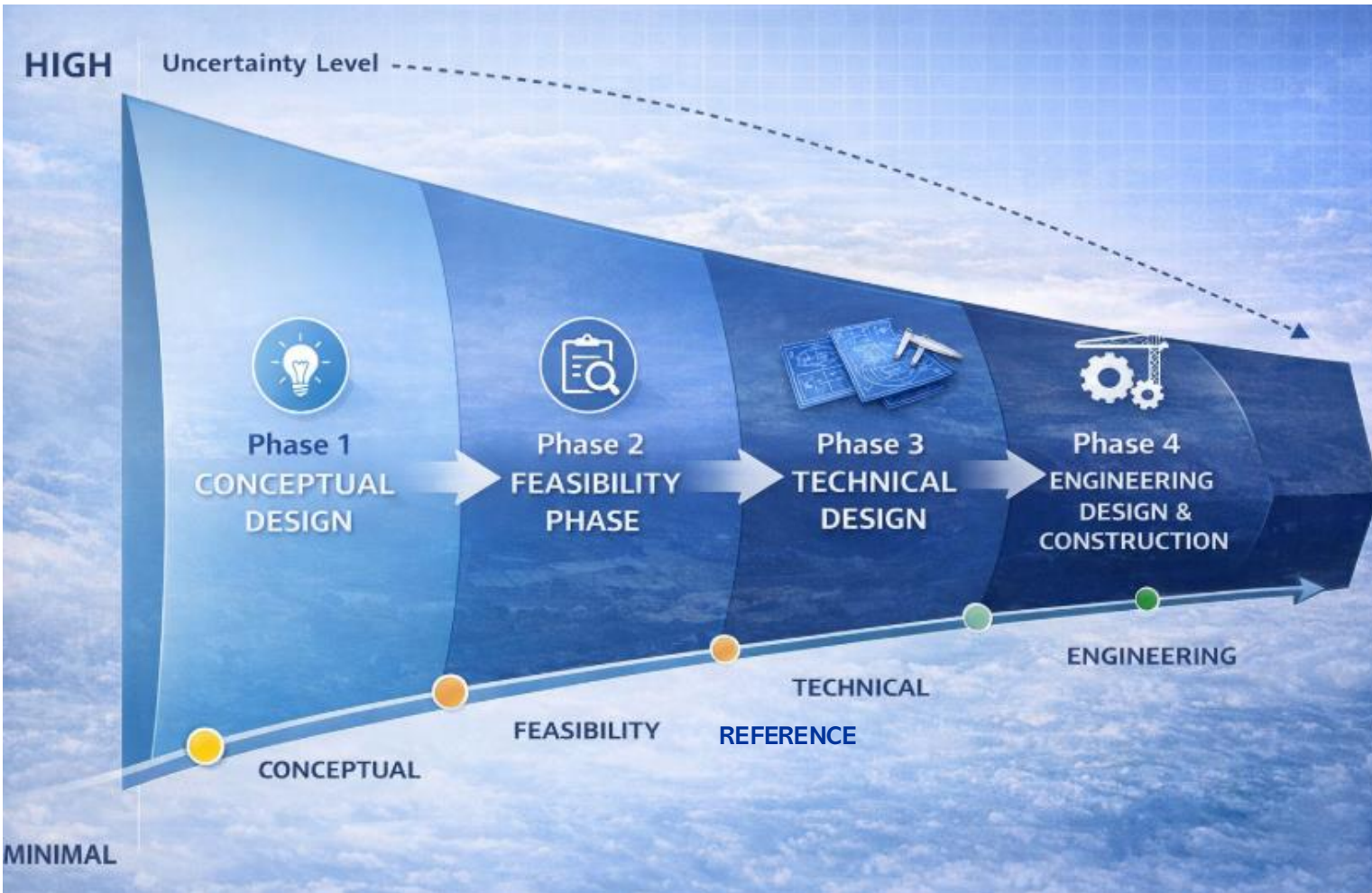
- 2026-2028: Reference Design Phase (previously referred to as pre-TDR Phase)
- 2029-2033: Technical Design Phase
- 2033- : Project Implementation

Draft proposed “Council-level” Milestones

- Mar 2026: discussion of Reference Design Phase scope and deliverables
- **Jun 2026: Council approval of the FCC-ee Reference Design Phase**
- Sep 2026: input from Council on requirements for project approval
- Dec 2026: decision in Council on the main features of the funding model
- Mar 2027: decision on FCC governance model – following a discussion at a Council Retreat
- Jun 2028: final review of Reference Design Phase
- after June 2028: ready for a decision on FCC-ee



From Feasibility Study to Project Realisation



Following positive results of Feasibility Study and European Strategy process, **FCC moves towards technical design**

Expertise across CERN and from collaboration partners required to deliver integrated technical design, with cost estimate and schedule, bearing in mind project authorisation processes, societal acceptance, & procurement strategy

- **2026-2028 Reference Design Phase**
- **2029-2032 Technical Design Phase**

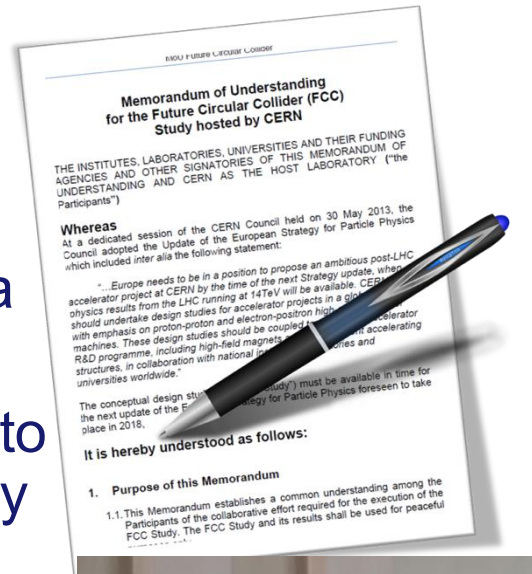
Aiming for project decision by CERN Council after the Reference Design Phase

Reference Design Documentation by Q1 2028 to enable CERN Council decision on project realisation:

- Integrated technical baseline
- Resource-loaded project master schedule
- Updated cost estimate with uncertainty
- Project-wide risk register
- Procurement strategy (incl. in-kind contribution opportunities)



- A **consortium** of partners based on a Memorandum Of Understanding (MoU)
- Working together on a **best effort basis**
- **Incremental & open** to academia and industry
- Individual **projects** defined in **specific addenda**



8-12 June

FCC WEEK 2026

Helsinki Finland

Venue: Fabianinkatu 33
University of Helsinki
Main Building

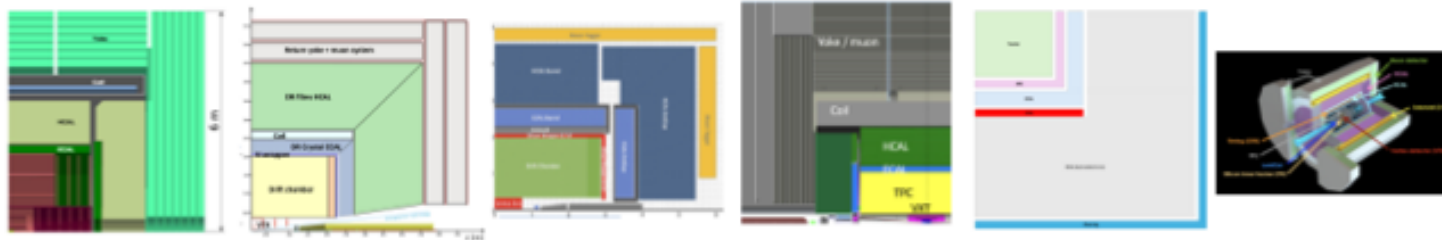
Frank Zimmermann

PED Objectives during the RDP

- The PED highest priorities therefore become quite concrete
 - Consolidation of the interaction region layout, detector integration, and beam-induced
 - Background mitigation
 - Optimised procedures for $\sqrt{s}$ calibration and for effective operation at $\sqrt{s} = 125$ GeV
 - Finalising the common software/analysis framework and developing a common computing architecture
 - Realistic implementation of algorithms to control the experimental systematic uncertainties for
 - the most demanding measurements, and consolidation of the pertaining requirements on detectors, collider, and theory
 - Engagement of the theory community to address theory challenges and nurture the young generation
 - Continue developing the high-energy physics international community
- TODAY
 - Proposals for staging implementation and for an improved staged/descoped FCC-ee
 - Prepare to answer call for (at least 4) documented EoI's for FCC-ee detector concepts by Q1/Q2 2028

Detector concepts

- Already six detector concepts under study – they are not experiment collaborations
 - Two new concepts, ALFA and AGORA, have been presented during the FCC Week in Helsinki
 - A healthy situation at this point of the studies – more concepts are welcome



	CLD	IDEA	ALLEGRO	ILD	ALFA emerging	AGORA from CEPC, new for FCC-ee
Vertex	Si	MAPS (ITS-3 like)	MAPS (ITS-3 like)	Si	MAPS (ITS-3 like)	MAPS
Tracker	Full Si	Drift Chamber + Si strip	DCH / Straw / SciFi + Si	TPC + Si strips	All MAPS	TPC + Si strips
ECAL	Si-W highly granular	Crystals w. DR	Noble Liquid (LAR)	Si-W highly granular	GRAINITA (crystal grains)	Crystals
HCAL	Scint. sampling	Fibre DR	TileCal (steel/scint.)	Scint. or RPC	Tile DR + steel yoke	Glass scint. + steel
Muon	RPC in iron yoke	μ RWELL	TBD	Scint. in iron yoke	TBD	Scint. in yoke
PID	RICH (option)	tracker dN/dx (+ TOF)	tracker dN/dx (+ TOF)	tracker dN/dx (+ TOF)	Čerenkov ARC	tracker dN/dx (+ TOF)
Coil	Outside HCAL	Inside HCAL	Inside HCAL	Outside HCAL	Inside HCAL	Outside HCAL
B-field	2T	2T (3T HTS R&D)	2T	3.5 T $\rightarrow$ 2-3 T	3T	3T

Detector concepts now need to mature into credible EoIs

- Aim to produce (≥ 6 , then) documented detector EoI's by Q1/Q2 2028

- We suggest that ECFA organises a series of Evian-like workshops
 - Maybe on the model of the three successful Higgs/EW/top factory workshops
 - Starting immediately after the approval (Q2 2028)
- This series of workshops would be intended to
 - Provide a forum to working groups and to already forming proto-collaborations
 - Discuss in depth experimental ideas between the various groups
 - Review the different propositions
 - Check the compliance to physics requirements
 - Verify the compatibility with collider constraints
 - Discover advantages, disadvantages, and maybe also similarities
 - Encourage mergers towards four robust experiment LoI's
 - Form four collaborations no later than end 2029 - beginning 2030
- Altogether, the announcement of such a clear plan from ECFA to the community
 - Would be a strong incitement to generate the missing resources
 - Would encourage a structured community building in line with the FCC-ee timeline

DRD Strategic alignment with updated ESPP

- DRDs approved for initial period of three years → re-approval process in next months
 - [Guidance for re-approval process by T. Bergaur @ DRD-MF meeting, April 2026](#)
- The DRDC requests two documents for re-approval:
 - Status Report: max 5 pages
 - Proposal Update: max 10 pages + tables
- **DRDs expected to reflect the Updated Strategy in their R&D programs for the next planning cycle**
 - “Clearly highlight and prioritise developments aiming for FCC-ee experiments, based on the European Strategy outcome (*for the relevant DRDs*)”
 - For DRDs less directly connected to FCC-ee, the identification of the flagship project is less constraining
 - Ongoing and funded programs should continue in the near term
- **Initial ideas/plans expected to be shown by DRDs their ECFA plenary presentations**
 - today DRD1, 3, 4, 6 and in November DRD2, 5, 7, 8

Collaboration	Re-approval	Initial approval
DRD 1,2 4 & 6	Nov 2026	Dec 2023 [RB 247]
DRD 3*, 5 and 7	March 2027	June 2024 [RB 249]
DRD 8	Nov 2027	Dec 2024 [RB 251]

*) full approval following earlier preliminary approval

23 April 2026

Thomas Bergaur

2

Document 2: Proposal



This document should outline the **plan for the next approval period** and must include:

- **High-level technological goals** for the next period
- An **updated work plan** including a list of WPs, each with milestones, deliverables and resource estimates for the period 2027-2029. Include **realistic funding estimates** based on preliminary/informal interactions with funding agencies!
- Include some perspective (with fewer details) for the **periods after 2029**.

Clearly highlight and prioritise developments **aiming for FCC-ee experiments**, based on the European Strategy outcome (for the relevant DRDs)

Conclusion

- **ESPP has provided a clear mandate**
 - FCC-ee enters the **Reference Design Phase (2026–2028)**
 - Focus shifts from feasibility studies to project preparation
- **The next two years are critical**
 - Mature the technical design
 - Develop realistic cost, schedule and governance
 - Build international commitments
- **Detector community must respond**
 - DRDs should align R&D priorities with FCC-ee
 - Detector concepts should evolve into strong Expressions of Interest by 2028
 - Community organisation is becoming as important as technology
- **Role of ECFA**
 - Coordinate the European detector community
 - Support convergence towards viable detector collaborations
 - Provide checkpoints on progress towards FCC-ee

Schedule presented at the end of the Feasibility Study

