

Some (mostly old) news

□ Outline

- ◆ FCC Roadmap 2021-2040
- ◆ Possible governance 2021-2026
- ◆ H2020 FCC Innovation Study 2020-2024
- ◆ 4th FCC Physics Workshop
- ◆ EPJ+ Special Issue on FCC-ee challenges

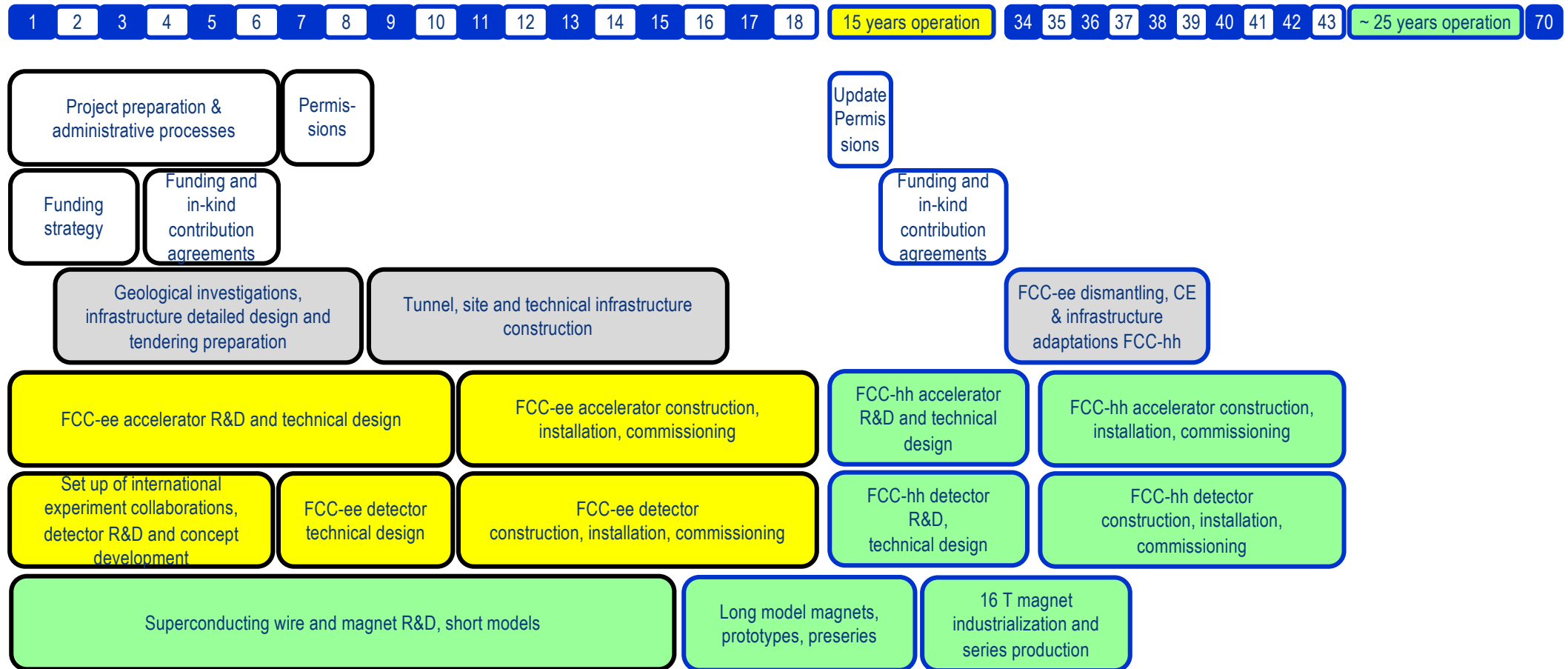


FCC Roadmap defined by ESU 2020

- **ESU 2020, CERN-ESU-013, High-priority future initiatives**
 - ◆ An electron-positron Higgs factory is the highest-priority next collider. For the longer term, the European particle physics community has the ambition to operate a proton-proton collider at the highest achievable energy.
 - ◆ Europe, together with its international partners, should investigate the technical and financial feasibility of a future hadron collider at CERN with a centre-of-mass energy of at least 100 TeV and with an e^+e^- Higgs and EW factory as a possible first stage. Such a feasibility study of the colliders and related infrastructure should be established as a global endeavour and completed on the timescale of the next Strategy update.

- **ESU 2020, CERN-ESU-014**
 - ◆ It is important to launch a feasibility study for such a collider to be completed in time for the next Strategy update, so that a decision as to whether this project can be implemented can be taken on that timescale. **The feasibility study should involve the following aspects: the possibility of construction such a large infrastructure in the vicinity of CERN, the financial plan to complete and operate a project of this scale with international partners, its governance, and the handling of the energy consumption.**
 - **FCC integrated programme prepares for both: e^+e^- Higgs and EW factory as a possible first stage, and highest energy hadron collider at ultimate goal.**

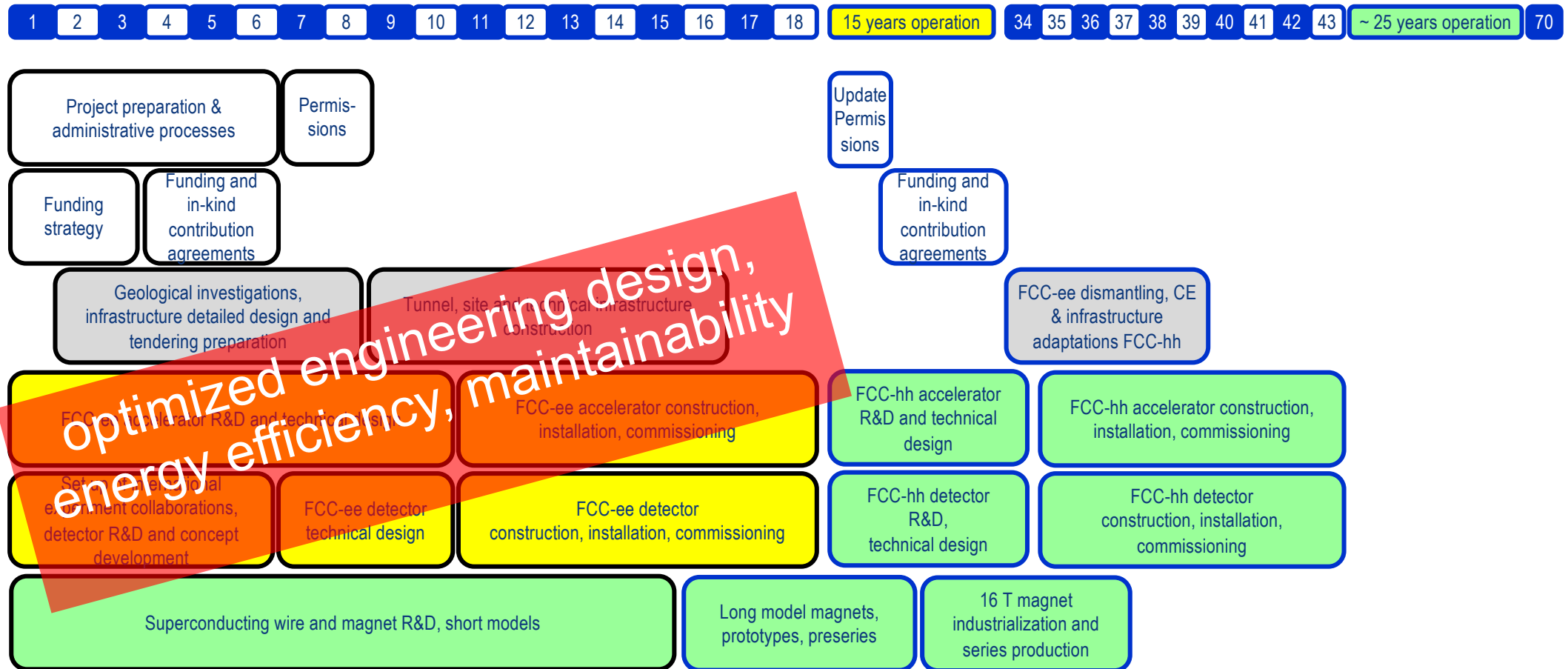
FCC integral project technical schedule



□ Preparation of a single scenario for 2025/26

◆ Stage 1: FCC-ee; Stage 2: FCC-hh

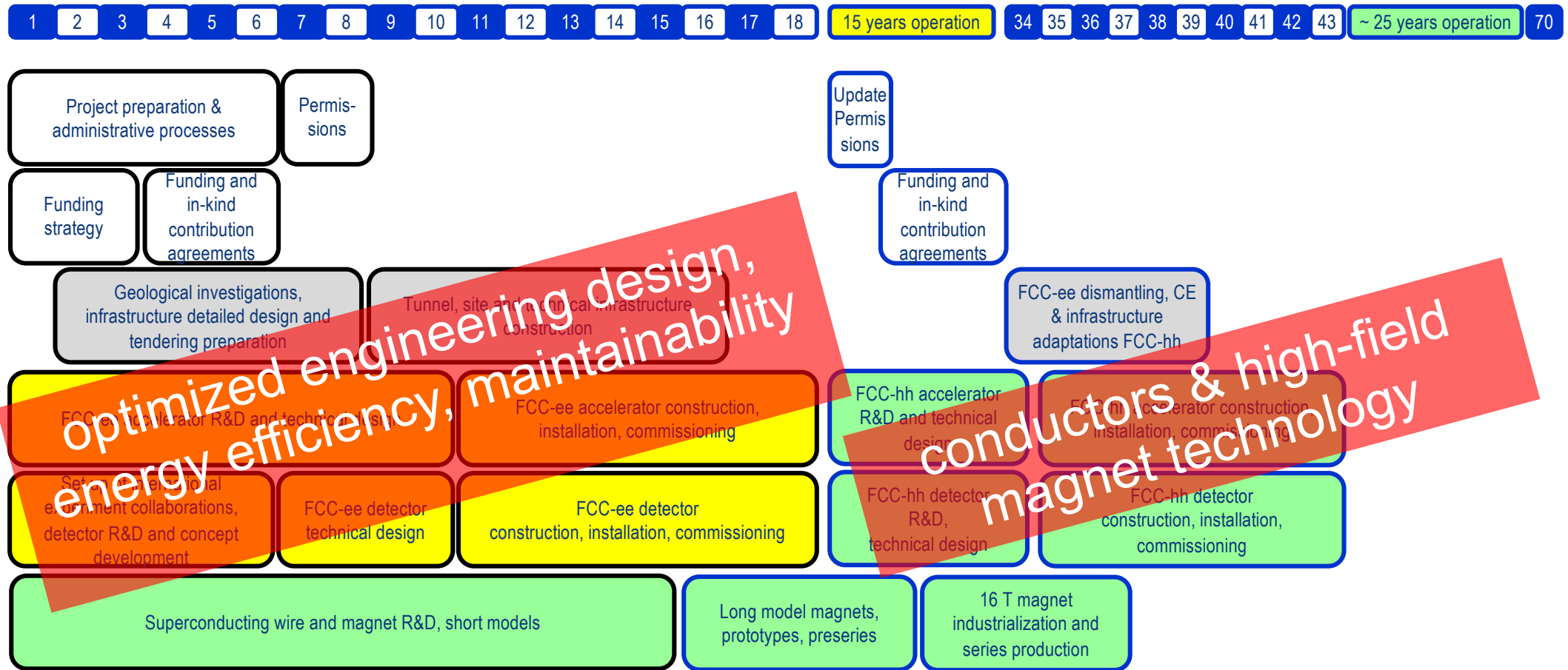
FCC integral project technical schedule



□ **Preparation of a single scenario for 2025/26**

◆ **Stage 1: FCC-ee; Stage 2: FCC-hh**

FCC integral project technical schedule



□ Preparation of a single scenario for 2025/26

◆ Stage 1: FCC-ee; Stage 2: FCC-hh

FCC project milestones for the next 20 years

Infrastructure and Machine

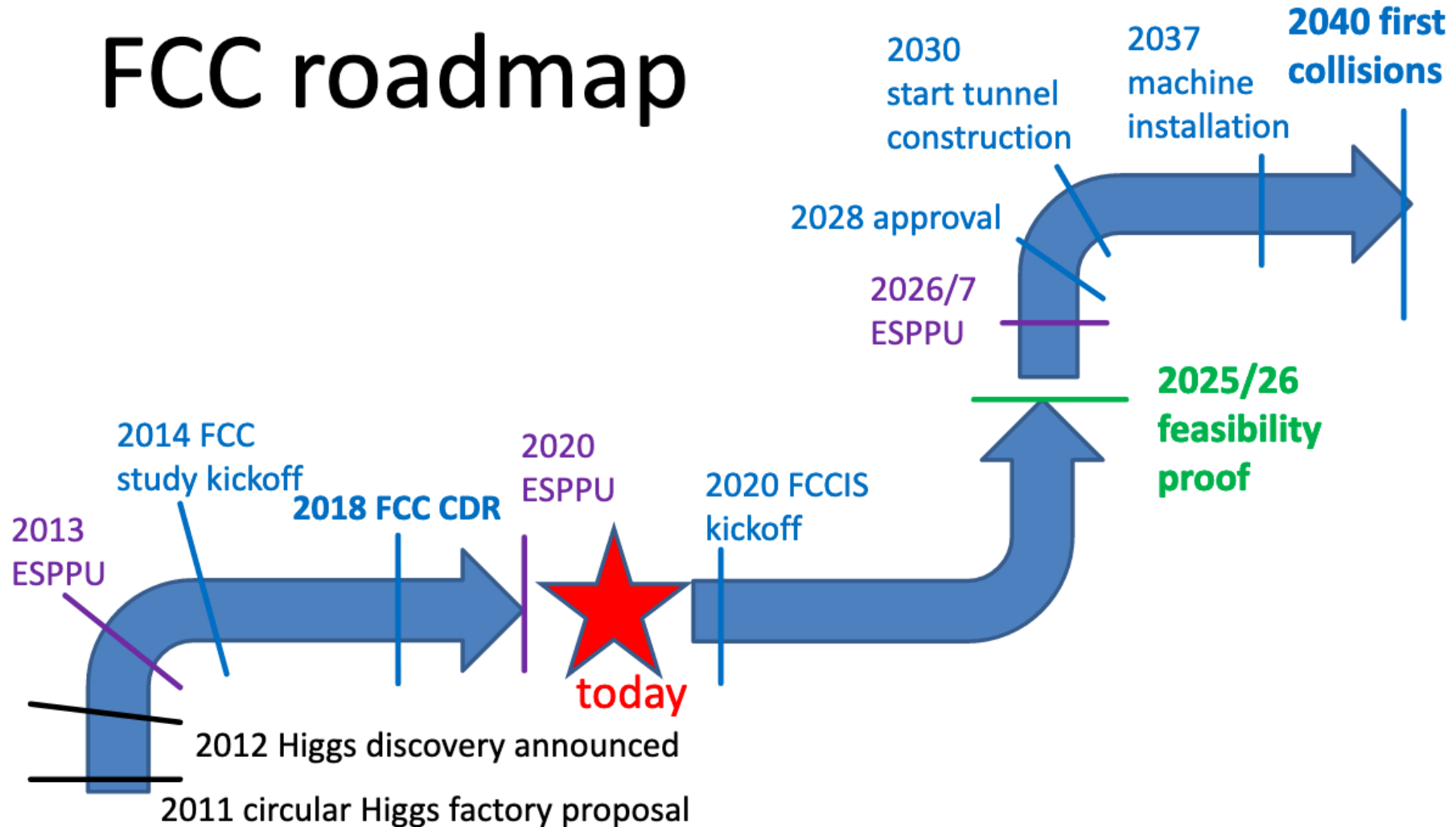
Physics, Experiments, Detectors

(exact dates to be discussed in the coming months)

Milestone / activity	Target date	Possible timeline
First e^+e^- collisions in FCC-ee	2040	FCC-ee detector commissioning
Start machine installation	2037	Start FCC-ee detector installation
Tunnel completion	2035/36	
Start tunnel construction	2030	Start FCC-ee detector construction
Project approval	2028	FCC-ee Detector TDR's and approvals
Next ESPPU	2026/27	
Key prototypes (feasibility proof)	2025/26	FCC-ee Proto-collaborations and Lol's
CDR++/TDR (feasibility proof)	End 2025	CDR++ (Common work) Physics, Software, Technologies, R&D

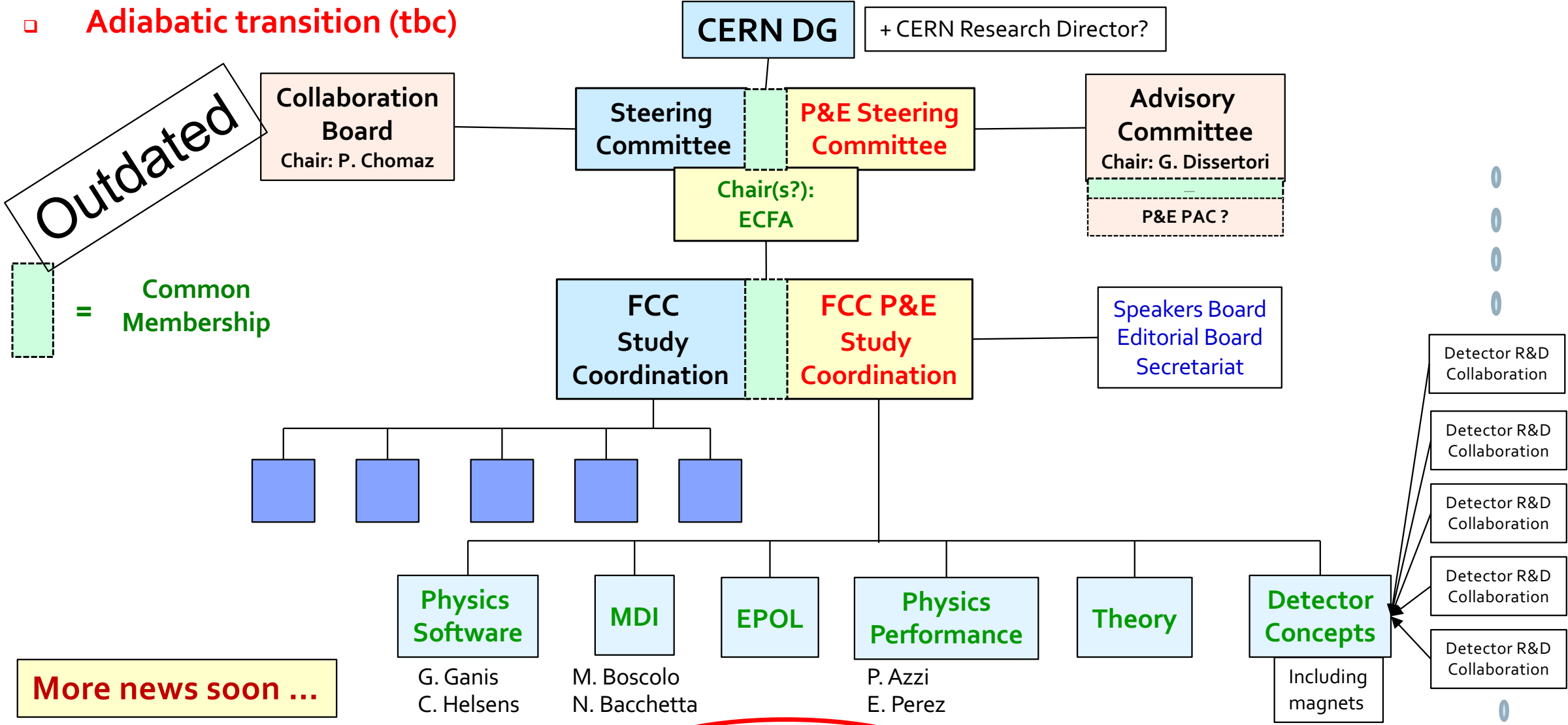
FCC Roadmap

FCC roadmap

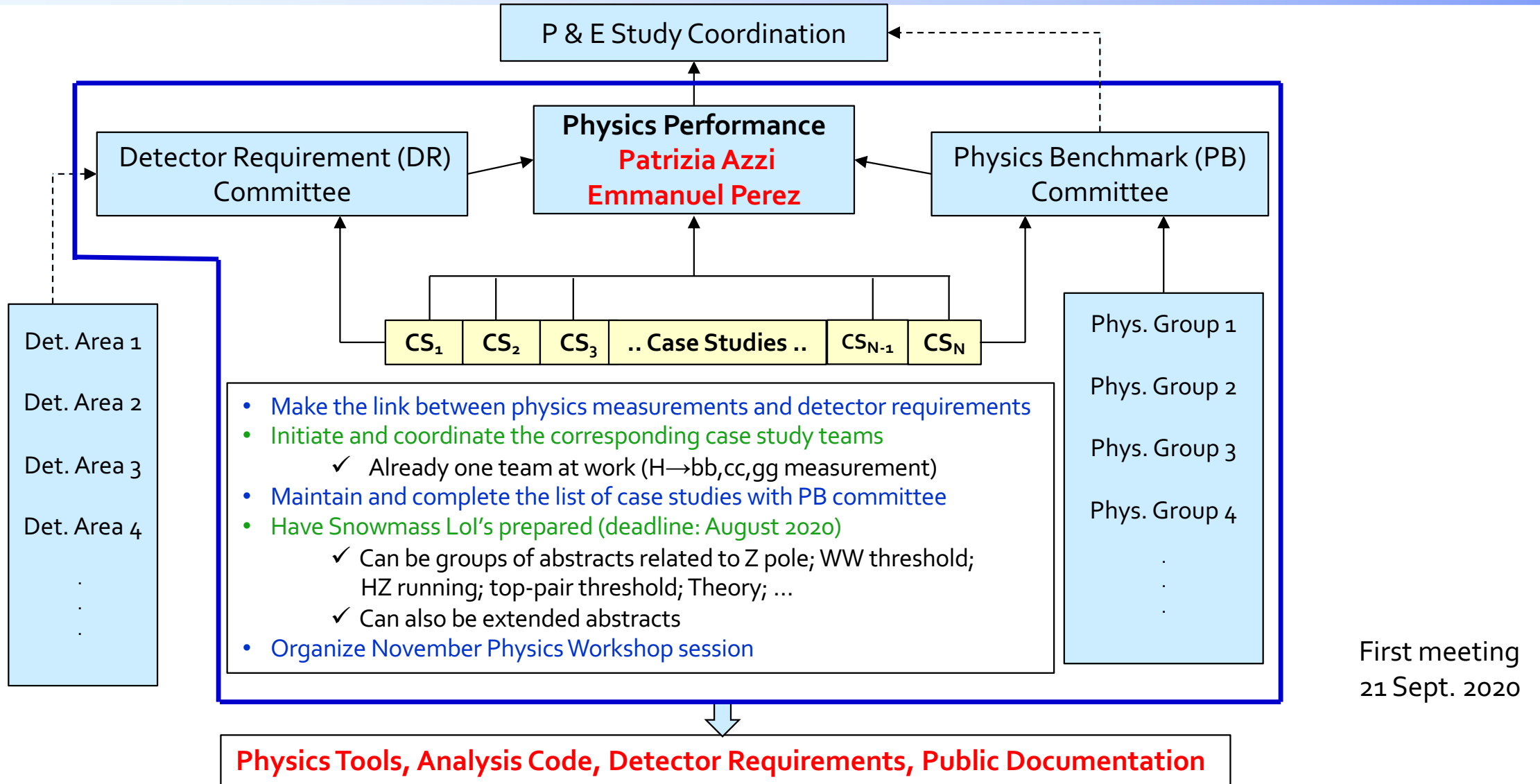


Possible Governance in 2021-2026 – In the work

Adiabatic transition (tbc)



Physics Performance group & coordinators



Physics Performance group and coordinators

- **Emmanuel and Patrizia are already at work. Please contact them**
 - ◆ If you want to participate in a case study / Snowmass Lol listed in <https://www.overleaf.com/read/nknybgrqqwbp> and <https://indico.cern.ch/event/951830/>
 - ◆ If you want to be contact for a benchmark measurement / case study
 - ◆ If you want to propose a new benchmark measurement / case study
 - One of the *raison d'être* of the group is to develop a common working environment, and to mutualize the work for common analysis tools in FCCSW

- **The Physics Group conveners are the backbone of the Physics Benchmark committee**
 - ◆ The physics group mandates should be updated for the period 2021-2026
 - The PB committee must be able to fully contribute to the development of a wide international participation to FCC
 - ◆ New physics groups may be useful (tau physics, long-lived particles, FCC-hh physics, ...)
 - ◆ The existing physics group conveners may be either prolonged or replaced

Physics groups: Nominations wanted !

□ Current/Previous organization (not all conveners are active)

Physics and Experiment Studies coordination

A. Blondel, P. Janot (EXP), C. Grojean, M. McCullough, M. Mangano, J. Ellis (TH)

*Black = exp.
White = th.*

EW Physics with Z's and W's

J. Alcaraz, P. Azzurri, E. Locci
A. Freitas

Higgs properties

M. Klute, K. Peters
C. Grojean

Top quark physics

P. Azzi, F. Blekman

$ee \rightarrow H$

D. d'Enterria

QCD and $\gamma\gamma$ physics

D. d'Enterria
P. Skands

Flavours physics

S. Monteil
J. Kamenik

New physics

M. Pierini, C. Rogan
M. McCullough, S. Heinemeyer

Global Analysis

Synergies
J. De Blas

Precision Calculations

J. Gluza, A. Freitas

◆ By 15 September, we would like to receive

- Your proposals of new physics groups (tau, LLP, ...)
- Your nominations (including self) for physics group conveners

→ Current conveners who want to continue should of course let us know

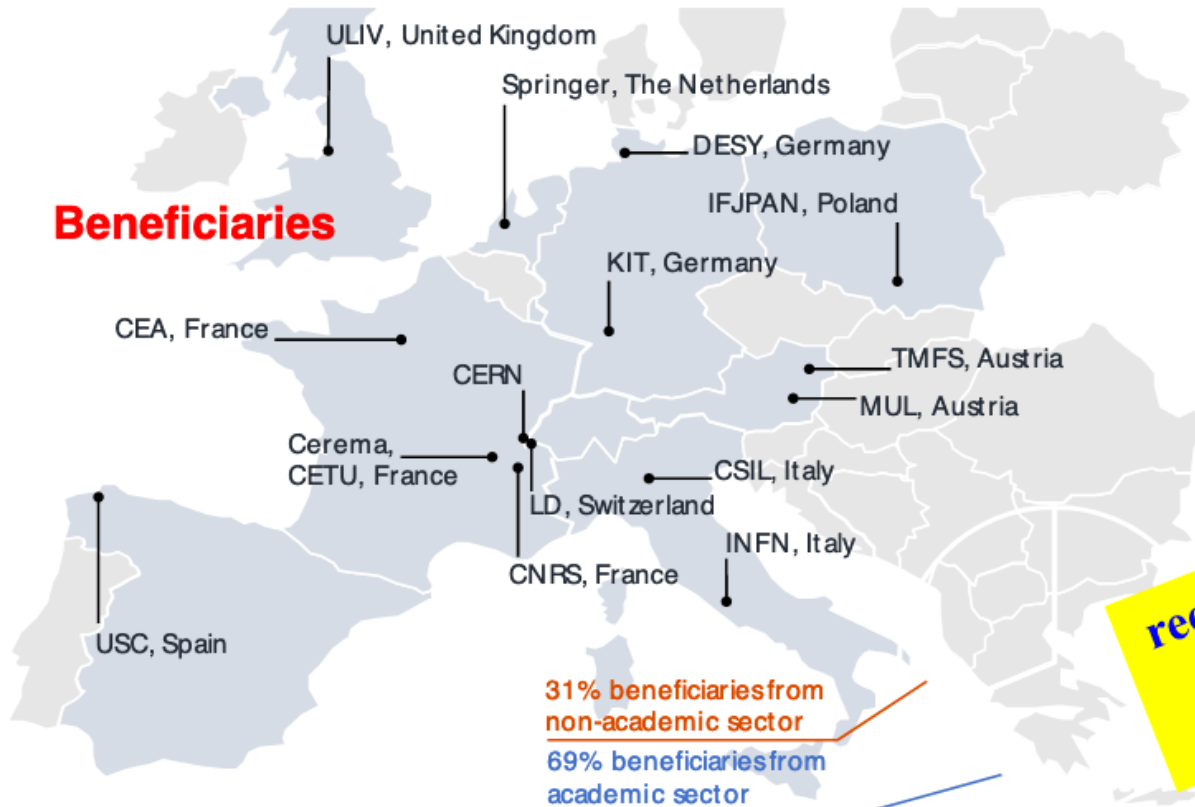
Some have already said they could not continue as conveners

→ Most urgent part of the mandate will be to enlarge international participation

**Deadline extended
until 15 October**

H2020 FCC Innovation study 2020-2024

Beneficiaries



Partners

- D.R.R.T. (F)
- Etat de Geneve (CH)
- DOE (US)
- BINP (Ru)
- U Oxford (UK)

recently accepted for funding by the European Commission with the highest achievable score

Design optimisation, construction planning, environmental impact assessment, management of excavation materials, user community building and public engagement, socio-economic impact,...

Preparatory work with Host States



General secretariat of the region Auvergne-Rhône-Alpes and notified body “Centre d'études et d'expertise sur les risques, l'environnement, la mobilité et l'aménagement” CEREMA



Working group with representatives of federation, canton and state of Geneva and representation of **Switzerland** at the international organisations and consultancy companies

- Administrative processes for project preparatory phase developed.
- First review of tunnel placement performed.
- Requirements for urbanistic, environmental, economic impact, land acquisition and construction permit related processes defined.
- **Ongoing: common optimization of collider tunnel and surface site infrastructure implementation.**



FCC-IS Kick-Off Meeting (9-13 Nov)

- Monday Morning Plenary Session – see <https://indico.cern.ch/event/923801/>

Day	Monday 9 November		
Room	Plenary		
Time	(Chair: Joachim Mnich, tbc)		
08:45-09:00	Jorgen d'Hondt (tbc)	Welcome	
09:00-09:30	tbd	Host states address (FR)	Host states address (CH)
09:30-10:00	U. Bassler (tbc)	Update of the European Strategy for Particle Physics	
10:00-10:30	F. Gianotti	CERN vision and goals until next strategy	
10:30-11:00	Coffee Break		
11:00-11:30	C. Grojean	FCC-ee physics motivation	
11:30	M. Benedikt	FCCIS Project Overview	

FCC Physics Workshop at a glance (10-13 Nov)

Monday 9 November		Tuesday 10 November				Wednesday 11 November				Thursday 12 November				Friday 13 November	Time	Room													
Registration @	Plenary 222/R-001 Filtration Plant		Parallel 1/1' (Physics experiments and detectors PE&D) 40/S2-D01 Salle Dirac		Parallel 2 (WP2) 2/R-030 30 seats	Parallel 3 24/1-016 20 seats	Parallel 4 4/S-056 20 seats	Parallel 1/1'/1'' (Physics, Experiments and detectors PE&D)		Parallel 2 (WP1) 40/S2-C01 Salle Curie		Parallel 1/1'/1'' (Physics) 222/R-003 30 setas		Parallel 2 6/R-012 40 seats	Plenary 40/S2-B01 - Salle Bohr														
	F. Gianotti (CERN)	Welcome		FCC-ee PE&D		FCC-ee Optics		Placement optimisation (WP3)		FCC-INT physics		J. Gutleber (CERN)	Management of publications		Pheno: Higgs physics (part 1)		FCC-ee detectors PID B	FCC-ee detectors Vertex Detector A	FCC eh Detector	Mining the Future Planning meeting (WP3)		FCC-ee/hh/eh new contributions		08:30-09:00					
	tdb (tdb)	Host states address (FR)	Host ates address (CH)									J. Gutleber (CERN)	Management of data								R. Galler (MUL) & J. Gutleber (CERN)				09:00-09:30				
	tdb (tdb)	Update of the European Strategy for Particle Physics				tdb (tdb)		P. Boillon (Cerema)				J. Gutleber (CERN)		Project management environment												09:30-10:00			
	tdb (tdb)	Keynote talk Topic tdb		Coffee Break				Coffee Break				Coffee Break				Coffee Break										10:00-10:30			
	Coffee Break																										10:30-11:00		
	tdb (tdb)	FCC-ee physics motivation		Pheno QCD, EW	FCC-ee PE&D	FCC-ee Optics		Environmental Evaluation (WP3)		Pheno: Flavour and BSM part 1		FCC-ee PE&D Physics performance process, software, analysis, benchmarks		M. Mooslechner (TMFS)	Communication Strategy (WP5)		Pheno: Higgs physics (part 1)		FCC-ee detectors Calorimeter B	FCC-ee detectors Tracker A	FCCnow Proceedings Planning Meeting (WP5)		Pheno EFTs		FCC-ee/hh/eh new contributions, synergies and complementarity	11:00-11:30			
	J. Gutleber (CERN)	FCCIS Project Overview				tdb (tdb)		M. Sauvain (LD)						P. Charitos (CERN)		Engagement and communication plans (WP5)						C. Caron (SN) & P. Charitos (CERN)				11:30-12:00			
	Lunch Break		Lunch Break				Lunch Break				Lunch Break				Lunch Break												12:00-12:30		
	Lunch Break		Lunch Break				Lunch Break				Lunch Break				Lunch Break												12:30-13:00		
Lunch Break		Lunch Break				Lunch Break				Lunch Break				Lunch Break												13:00-13:30			
tdb (tdb)	WP2 (FCC-ee Collider Design)		Pheno QCD and EW Part 1	Joint FCC-ee Accelerator and Experiments session		MATEX Workshop (WP3)		Socio-economic impact analysis (WP4)		Pheno Flavour and BSM (part 2)		FCC-ee MDI EPOL Monochromatization	FCC-ee detectors Calorimeters A	G. Roy (CERN)	Administrative Processes (WP3)		Pheno: Higgs Physics Part 2		FCC-ee detectors Luminosity	FCC-ee detectors Trackers B	FCCWeek 2021 Proceedings Planning Meeting Proceedings (WP5)		WG/TH summaries, next steps, discussion and Wrap-up		13:30-14:00				
J. Gutleber (CERN)	WP3 (Integrate Europe)				L. Ulrici (CERN)		E. Sirtori (CSIL)														C. Caron (SN) & P. Charitos (CERN)				14:00-14:30				
S. Vignetti (CSIL)	WP4 (Impact & Sustainability)		Coffee Break				Coffee Break				Coffee Break				Coffee Break										15:00-15:30				
Coffee Break																												15:30-16:00	
M. Benedikt (CERN)	Governance and Management structures (GA/CA)		Pheno QCD and EW Part 2	ECFA detector R&D road map	FCC-ee other		MATEX Workshop (WP3)		Regional benefits work plan (WP4)		Pheno Higgs physics (part 1)		FCC-ee MDI EPOL Monochromatization	FCC-ee detectors PID A	Overleaf Training Group 1		Higgs Physics part 3		FCC-ee detectors Electronics Trigger DAQ/online processing	FCC-ee detectors Vertex detector B	Overleaf Training Group 2				16:00-16:30				
C Collaboration Board Chair Name tdb (tdb)		General Assembly		Overview of goals and first set of detector and th requirements		tdb (tdb)		L. Ulrici (CERN)		R. Creszenzi (LSE)																16:30-17:00			
				Round table discussion: "engaging exp and th communities"												Draw me a detector (TBC)										17:00-17:30			
																										17:30-18:00			
Welcome reception																												18:00-18:30	

FCC Physics Workshop: Status of things

- **Already 179 participants, as of today 2pm.**
 - ◆ **Please register !**

- **The meeting will be remote – zoom details will be known in due time**
 - ◆ **But we keep the possibility of meeting in person for people present on site**
 - **Rooms have been secured**

- **All pheno/theory talks are confirmed, all speakers are known (Michelangelo)**

- **For detector and experiments (Alain, Mogens)**
 - ◆ **Met with Program Advisory Committee at the beginning of the month**
 - ◆ **Conveners for MDI, Physics Performance, Detector sessions at work**
 - **Detailed programme to appear on indico at the end of this month (30/09)**

<https://indico.cern.ch/event/932973/>

Experiments and Detectors Advisory Committee

□ Workshop Programme Advisory Committee

name	institute	sent	answ Y/N
Greg Bernardi	FCC-IN2P3	Y	Y
Aleksan	FCC-CEA	Y	Y
Rainer Wallny	CHIPP	Y	Y
Franco Bedeschi	FCC-INFN	Y	Y
Christos Leonidopoulos	FCC-UK	Y	Y
Tadeusz Lesiak	FCC-PL	Y	Y
Beate Heinemann	DESY	Y	Y
Felix Sefkow	AIDA	Y	Y
Paolo Giacomelli	AIDA	Y	Y
Christian Joram	CERN-EP	Y	Y
Jorgen D'Hondt	ECFA	Y	Y
Joel Butler	DPF + Fermilab	Y	Y
Young Kee Kim	DPF, Chicago	Y	Y

name	institute	sent	answ Y/N
Sarah Eno	Maryland	Y	Y
Dmitri Denisov	BNL	Y	Y
Maria Chamizo	BNL	Y	Y
Frank Simon	Munich MPI	Y	Y
Yuriy Tikhonov	BINP	Y	
Jochen Schieck	Vienna	Y	Y
Paula Eerola	Helsinki	Y	Y
David Milstead	Stockholm	Y	Y
Richard Brenner	Uppsala	Y	Y
Farid Ould-Sada	Oslo	Y	Y
Anna Lipniacka	Bergen	Y	Y
Jorge F. de Troconiz	Spain	Y	Y
Mario Kadastik	Estonia	Y	Y
Stan Bentvelsen	NIKHEF	Y	Y

Experiment & Detector session conveners

SESSION	present timing (indicative)	conveners	Name	Type	Login	Email
Alain, Patrick			BEDESCHI, Franco	Email		bed@fnal.gov
FCC-ee Physics performance session	Wednesday 11-12:30	Patrizia Azzi Emmanuel Perez	BESSION, Auguste	Email		abession@in2p3.fr
			GRANCAGNOLO, Francesco	Email		franco.grancagnolo@le.infn.it
MDI, Polarization, Monochromatization	Tuesday 13:30-15:00	Nicola Bacchetta	ALEKSA, Martin (EP-ADO-AM)	Person	ALEKSA	Martin.Aleksa@cern.ch
	Wednesday 14-15:30	Manuela Boscolo	AZZI, Patrizia (EP-UCM)	Person	AZZI	Patrizia.Azzi@cern.ch
	Wednesday 16-17:30	Angeles Faus Golfe Jorg Wenninger	BACCHETTA, Nicola (EP-UCM)	Person	BACCHETT	Nicola.Bacchetta@cern.ch
FCC-ee detectors: calorimeters	Wednesday 14-15:30	Martin Aleksa	BLONDEL, Alain (EP-UGC)	Person	BDL	Alain.Blondel@cern.ch
	Thursday 11-13:00	Franco bedeschi	BRENNER, Richard (EP-UAT)	Person	BRENNER	Richard.Brenner@cern.ch
FCC-ee detectors: PID	Wednesday 16-18:00	Guy Wilkinson	COLLINS, Paula (EP-LBD)	Person	COLLINS	Paula.Collins@cern.ch
	Thursday 9-10:30	Stéphane Monteil	DAM, Mogens (EP-UAT)	Person	DAM	dam@nbi.dk
			DANNHEIM, Dominik (EP-DT-TP)	Person	DANNHEIM	Dominik.Dannheim@cern.ch
FCC-ee detectors: Vertex detector	Thursday 9-10:30	Auguste Besson	FAUS-GOLFE, Angeles (EP-UC3)	Person	AFAUS	Angeles.Faus.Golfe@cern.ch
	Thursday 16-17:30	Paula Collins Andreas W. Jung	JANOT, Patrick (EP-CMG)	Person	JANOT	Patrick.Janot@cern.ch
			JOST, Beat (EP-LBC)	Person	JOST	Beat.Jost@cern.ch
FCC-ee detectors: Tracker	Thursday 11-13:00	F. Grancagnolo	JUNG, Andreas (EP-UCM)	Person	ANJUNG	andreas.werner.jung@cern.ch
	Thursday 14:00-15:30	Dominik Dannheim Bernhard Ketzer	KETZER, Bernhard (EP-UFT)	Person	KETZER	Bernhard.Ketzer@cern.ch
			LEONIDOPOULOS, Christos (EP-UAT)	Person	CLEONIDO	christos.leonidopoulos@cern.ch
FCC-ee detectors Luminosity monitor	Thursday 14-15:30	Mogens Dam xx	MONTEIL, Stephane (EP-ULB)	Person	MONTEILS	monteil@in2p3.fr
			NEUFELD, Niko (EP-LBC)	Person	NEUFELD	Niko.Neufeld@cern.ch
FCC-ee TDAQ, Electronics	Thursday 16-17:30	Christos Leonidopoulos Richard Brenner Niko Neufeld, Beat Jost	PEREZ, Emmanuel Francois (EP-CMG-OS)	Person	EPEREZ	Emmanuel.Perez@cern.ch
			WENNINGER, Jorg (BE-OP-LHC)	Person	JWENNING	Jorg.Wenninger@cern.ch
			WILKINSON, Guy (EP-ULB)	Person	WILKIN	Guy.Wilkinson@cern.ch

EPJ+ Special Issue on FCC-ee Challenges

- **Being prepared at the occasion of the FCC-IS Kick-Off meeting**
 - ◆ Introduction
 - ◆ Part I: New accelerator technologies
 - ◆ Part II: Physics Opportunities and Challenges
 - https://docs.google.com/document/d/1huHehEo5at3_sKtLL8DdesigniziRiYGhAh4_KjvM_uo/edit?usp=sharing
 - ◆ Part III: Theory Challenges
 - ◆ Part IV: Software Developments and Computational Challenges
 - <https://docs.google.com/document/d/1lwXzlx76gbRZSRznVYKWWN7Sx5RAsYTncCiQnsx2z2s/edit?usp=sharing>
 - Will add abstracts for Part I and III in an updated version of these slides.

First draft expected to be ready by end of October

Coming next ?

- **We should now take up these challenges as soon as possible**
 - ◆ In view of the FCC Physics, Experiments and Detectors CDR++
 - With enough common material, common software, and common knowledge for proto-collaborations to progressively take over
- **Can only be done with an active participation of national institutes**
 - ◆ France and **Italy** well established already (Contact G. Bernardi, R. Aleksan, **F. Bedeschi**)
 - ◆ UK had their first meeting on 11 September (Contact G. Wilkinson, C. Leonidopoulos)
 - ◆ Spain will have their next future collider gathering on 7 October with, for the first time, a two-hours FCC session (Contact Juan Alcaraz)
 - ◆ Poland plan a FCC information day at Epiphany conference in January (Contact T. Lesiak)
 - ◆ Switzerland well in the FCC-INT roadmap
 - ◆ Green light was given by CERN DG for the creation of a EP/FCC group (Contact P. Janot)
 - ◆ Discussions started with Germany, USA, Austria, Belgium, Netherlands, Estonia, etc.
- **Feel free to get in touch with the above contacts, or let us know if interested !**