



News from CERN and CERN Council (since summer 2018)

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with input also from

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(EPF Lausanne)

- The CH Delegation to CERN Council
- Main recent elections/appointments
- Search for the next Director General
- Finances (MTP and CBD)
- CERN enlargement process
- The European Strategy Update
- LIU and LS2
- LHC and other experiments
- Events CERN – Switzerland

□ Delegation from Switzerland to CERN Council (since Jan 2019):

— Dr. **Gregor Häfliger** (Vice Director SERI = State Secretariat for Education, Research & Innovation)

- successor of Bruno Moor

— Dr. **Xavier Reymond** (SERI) – Deputy to G. Häfliger as head of the delegation

— Prof. **Günther Dissertori** (ETHZ)

- successor of Prof. Olivier Schneider
- also attending meetings of the Scientific Policy Committee



□ Swiss members of Finance Committee:

— Mr **Laurent Salzarulo** (SERI = State Secretariat for Education, Research & Innovation)

— Ms **Mélanie Golliard** (FFA = Federal Finance Administration)



□ Advisors:

— Mr **Can Tutumlu** (FDFA = Federal Department of Foreign Affairs)

- member of the CERN enlargement policy WG; successor of Mr. Jacques Ducrest

— Mr **Patrick Pardo** (« Swiss mission », FDFA)

- Mr. Pardo retired very recently, now succeeded by **Samir Yeddes**
- also Swiss representative in CERN's Tripartite Employment Conditions Forum (TREF)



— Council:

- Dr. **Ursula Bassler (FR)** elected as **president** for a 1st one-year term starting in Jan 2019
- Prof. **Peter Levai (HU)** and Prof. **Jochen Schieck (AT)** elected as **vice-presidents** for a 1st one-year term starting in Jan 2019 and Jul 2019, respectively

— Scientific policy committee:

- Prof. **Keith Ellis (UK)** re-appointed as **chair** for a 3rd one-year mandate starting on Jan 2019
- New SPC members for a 3-years period:
H. Aihara (JP) and **J. Wessels (DE)**
 - NB: current CH SPC member: **Prof. Laura Baudis**

— Finance committee:

- Mr **Ossi Malmberg (FI)** re-elected as **chair** for a 3rd one-year mandate starting in Jan 2019
- Mr **Umberto Dosselli (IT)** elected as **chair** for a 1st one-year mandate starting in Jan 2020

— Pension Fund Governing Board

- Ms **Charlotte Jamieson (UK)** appointed as chair as of Nov 1st, 2019



Search for the next DG

— **Current Director General: Dr. Fabiola Gianotti**

- Her five-year term will end on Dec 31st, 2020

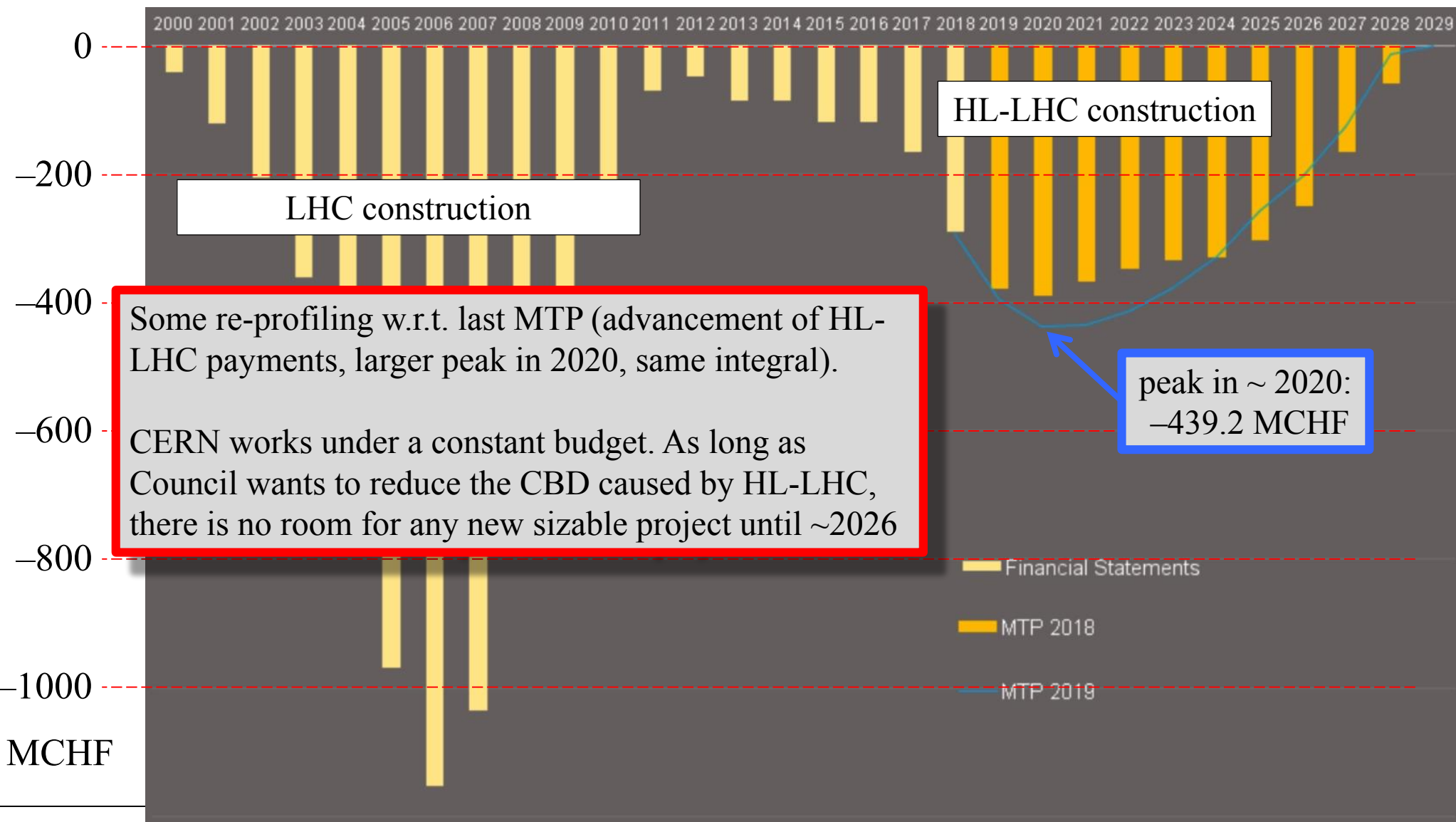
— **In its March Session:**

- Council decided to implement the existing rules for the search of a new DG
- Council approved a qualification profile, the text of the advertisement, and instituted a **Search Committee (SC)**
 - 1 external member, 4 SPC members, the SPC chair, the Council President and the two Council Vice-Presidents, the Chair of the Finance Committee

— **Timeline:**

- Nominations by end of May
- June Council Week: Long list of candidates shown to Council delegations, on request
- The SC will select a subset of candidates from this long list and interview them in the summer
- The SC will present a short-list (of order 3) to the Council, that will interview those
 - in the past, a straw vote followed those interviews
- **Nov 6, 2019:** an **extraordinary Council** meeting has been fixed, with a view to converging on a single candidate to be appointed as the next DG in Dec 2019.

Medium Term Plan (MTP) and Cumulative Budget Deficit (CBD)



□ CERN Contribution to CHART:

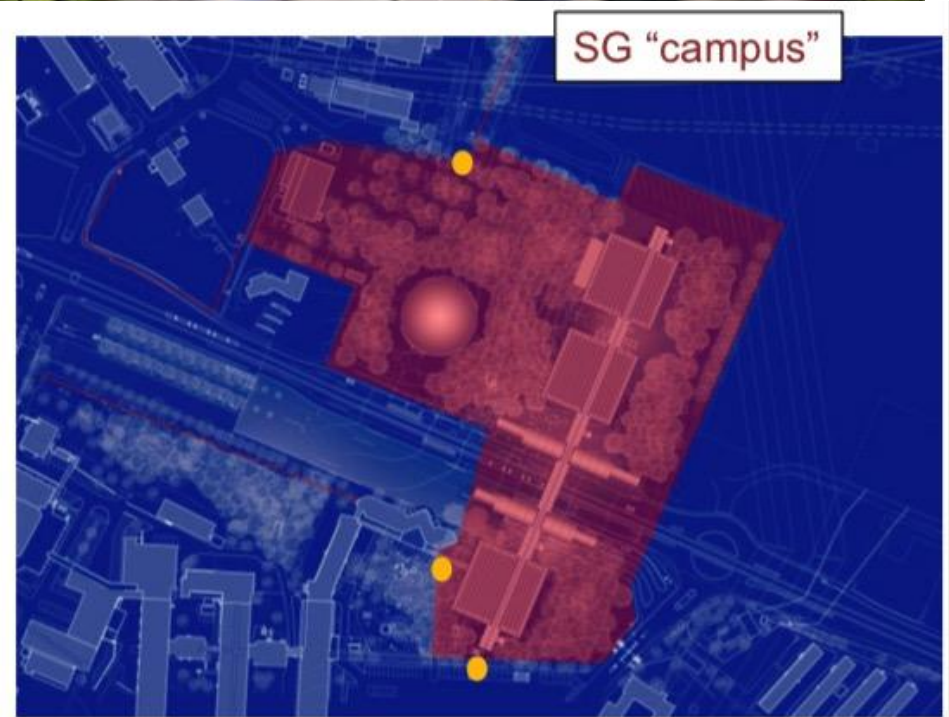
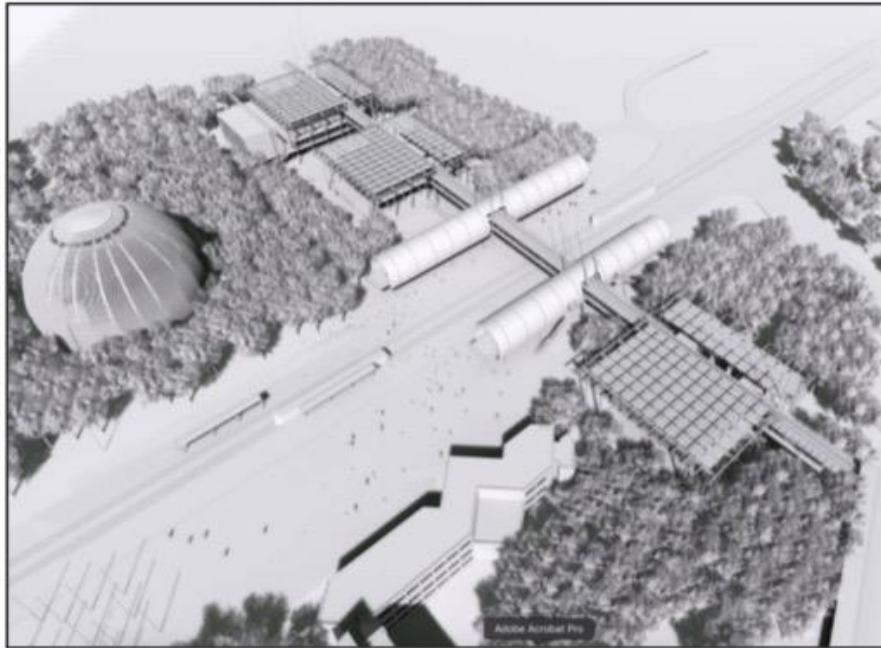
- **CHART** : Swiss Accelerator Research & Technology
- see dedicated presentations by C. Senatore and T. Pieloni on Monday
- Participating/contributing Institutions:
CERN, EPFL, ETHZ, PSI, UNIGE - ETH Council, SERI
- Total Programme Budget: 41 MCHF, 2019 – 2024
- Dec 18: CERN Finance Committee agreed to negotiate a 5-year collaboration agreement on FCC R&D work with the four Swiss institutes participating in CHART, for a total amount of direct contributions from CERN of max. 7.5 MCHF, with the understanding that CERN will provide personnel and material for an additional value of 7.5 MCHF

□ Special Swiss contribution to the Neutrino Platform : 2.3 MCHF

- covers in-kind contributions, through CERN, to the infrastructure of the LBNF facility and DUNE experiment in the US (cryogenics for detector #1 – argon condensers, phase separators and related piping, valves and instrumentation)
- Announced in letter by State Secretary M. Hirayama to the US DOE, 5.6.2019
- Approved by CERN Council in June, for being added to the CERN 2020 Budget

□ CH Member State contribution to the CERN budget 2020 : 47.5 MCHF

- a hub for education, training and outreach, to be built around the Globe, aiming at satisfying the $> 300'000$ visit requests per year
- 7000 m², incl. 1000-seat auditorium



- total funding secured so far: **59.5 MCHF** out of **79 MCHF total cost**
- contribution of 45 MCHF from the FCA Foundation (Fiat Chrysler Automobiles, Fondazione Agnelli)
- additional donations by Loterie Romande, Göhner Foundation (CH) and others
- Drawings to be frozen end of June
- Great progress on technical aspects and building permit, with full support of the Canton
- On schedule to **start construction Q3 2020, inauguration end 2022**



Press event on 8 April
at CERN attended by
R. Piano (main architect)
J. Elkann (FCA, main donor)
A. Hodgers (President of
Conseil d'Etat of Geneva)

□ **New member:**

Serbia is Full Member State since 24.3.2019



□ **Current membership**

(with new members since start of enlargement process in 2010)

23 Member States

Israel 2014, Romania 2017, Serbia 2019

+ 2 Associate Member States in the pre-stage to membership

Cyprus 2016, Slovenia 2017

+ 5 Associate Member States

Turkey 2015, Pakistan 2015, Ukraine 2016, India 2017, Lithuania 2018

+ 6 Observers (3 states and 3 organisations)

JINR 2014

- **State progressing towards Membership:**
 - **Estonia:** applied to become full member → Fact-Finding Task Force visited the country in Dec 2018; Mar 2019: Council gave authorisation to transmit to Estonia the Draft Agreement for granting Associate Membership as the pre-stage to Membership; likely that final Agreement can be submitted to Council in September 2019
- **States progressing towards Associate Membership:**
 - **Croatia:** applied in May 2014, agreement signed in Feb 10, ratified by Croatian Parliament on June 14, 2019 – **Croatia expected to join in July 2019**
 - **Brazil:** model agreement stalled on Brazilian side since end 2013
- **Recent development:**
 - In his visit to CERN on 10 June, Prime Minister D. Medvedev announced that the Russian Federation is now considering to become full Member of CERN
- **~50 International Cooperation Agreements (ICA)**
- **Council decided to set up a working group to review certain aspects of the geographical enlargement policy of 2010**
 - mandate includes policy, financial and procedural issues
 - CH delegation provided important input to the draft document that was discussed in the recent March and June Council sessions

□ See dedicated presentation by Jorgen D'Hondt earlier this week!

- <http://council-strategygroup.web.cern.ch/council-strategygroup/>
- <http://europeanstrategygroup.web.cern.ch/EuropeanStrategyGroup/>

□ Next update of ESPP in 2020

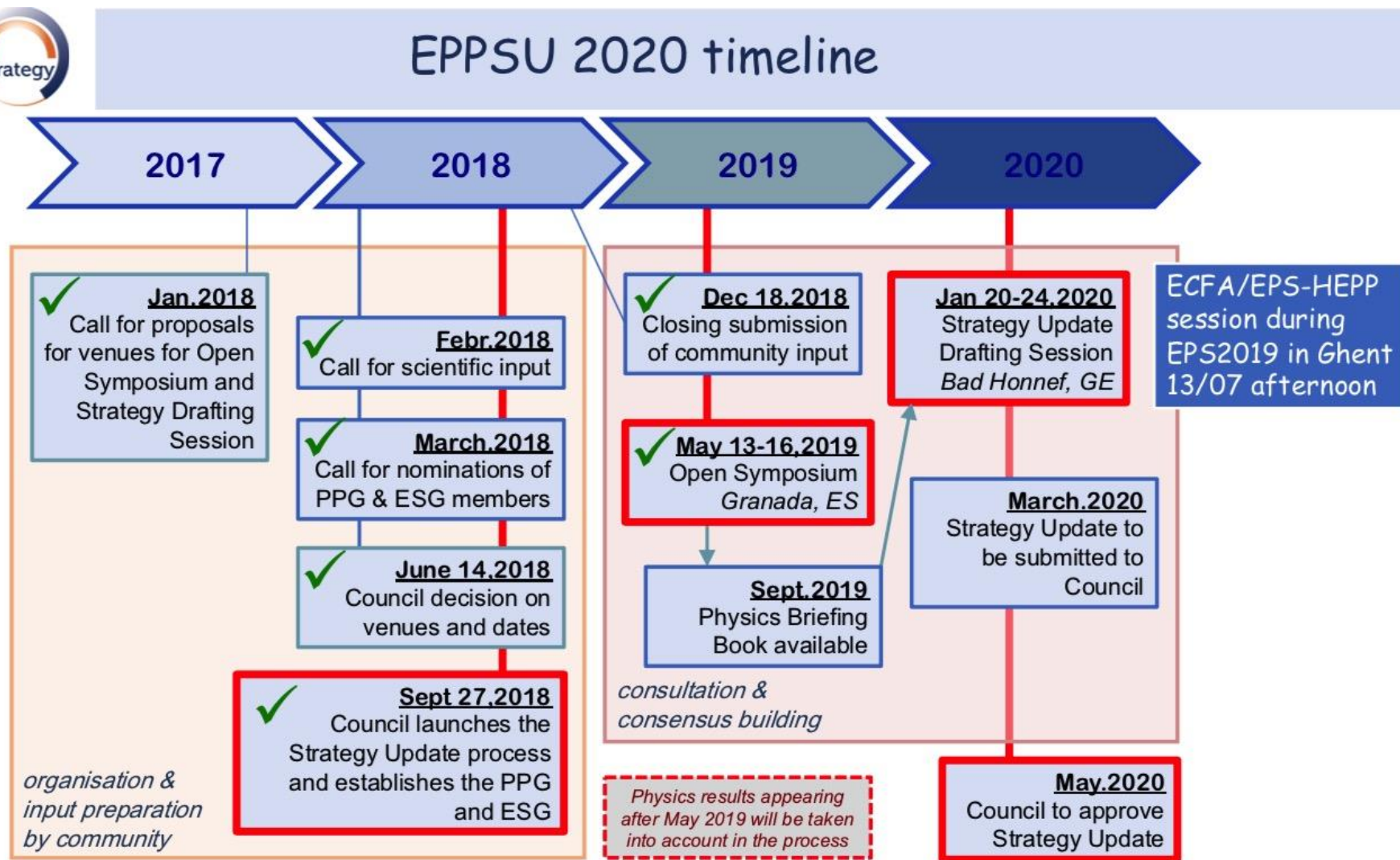
—will be driven by the following **Strategy Secretariat**, appointed by Council:

- **Prof. Halina Abramowicz, Strategy Secretary**
- Prof. Keith Ellis (as chair of CERN Scientific Policy Committee)
- Prof. Jorgen D'Hondt (as chair of ECFA)
- Prof. Leonid Rivkin (as chair of the European Laboratory Directors group)

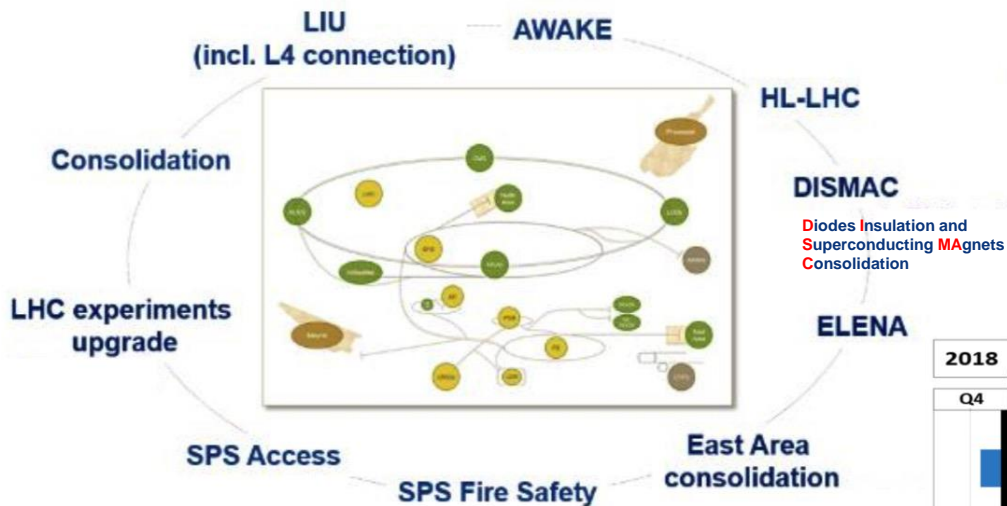
□ Recent town-meeting in Granada

—Again, see report by Jorgen

—Similarly, a status report given by H. Abramowicz at the June Council meeting

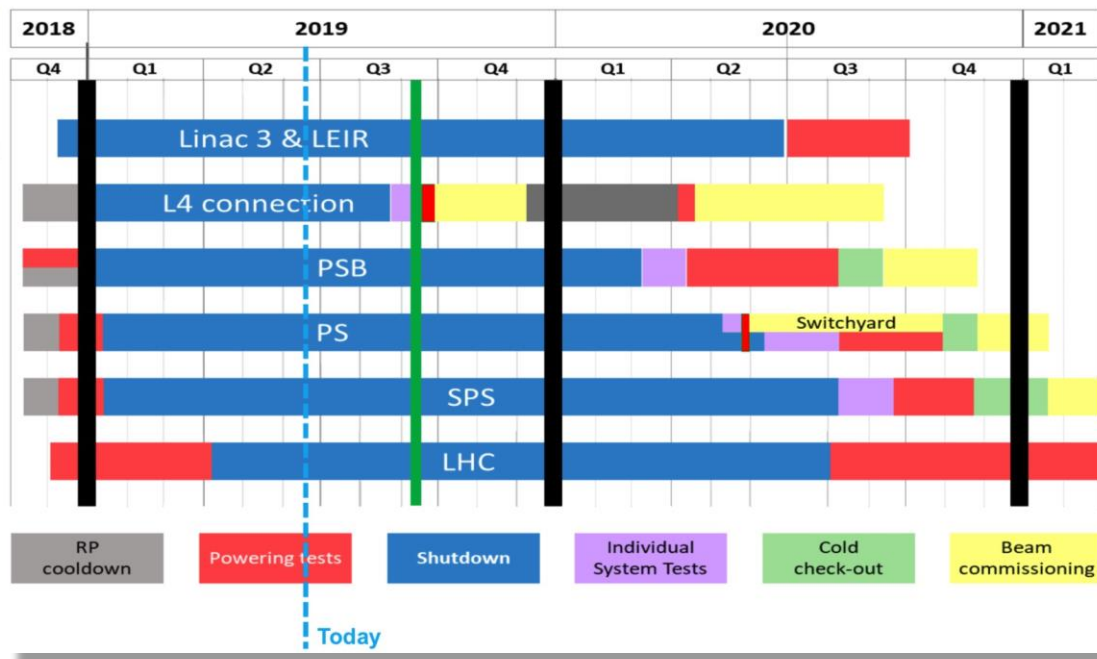


The main projects during LS2



- LS2 dominated by LIU project
- HL-LHC civil engineering:
 - on schedule at P1, ~5 weeks delay at P5
- LHC cryo-magnet consolidation:
 - 22 magnets, 13 already re-installed

<https://lhcdashboard.web.cern.ch/lhcdashboard/ls2>



Overall schedule: « so far so good »



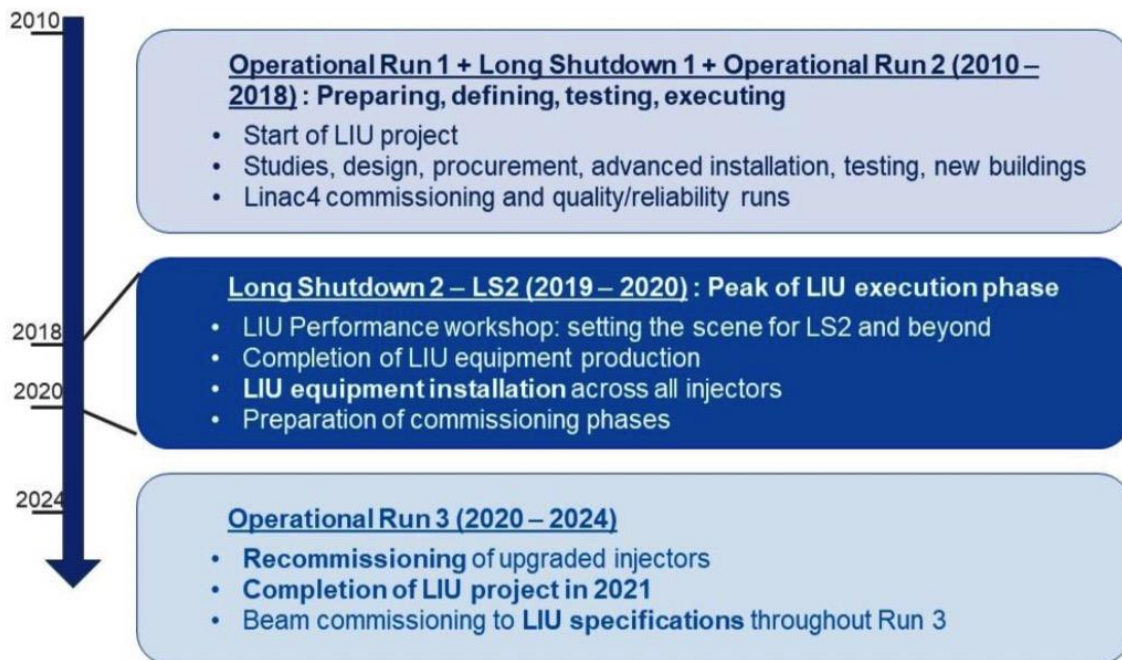
Safety First



Quality second



Schedule third



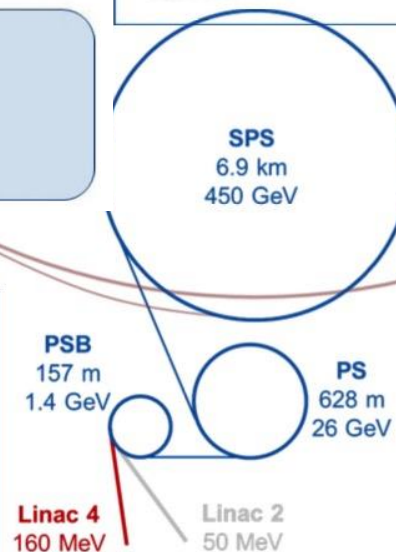
SPS upgrade

- **Main RF system upgrade** (new solid state power plants – 2 x 1.6 MW)
- **Impedance mitigation** to improve beam stability
- More robust **beam dump and protection devices**

- Increase injector reliability and lifetime to cover HL-LHC run (until ~2040) closely related to consolidation program
- Increase intensity/brightness in the injectors to match HL-LHC requirements
- **Excellent project advancement**

PSB upgrade

- **H⁺ charge exchange injection** at 160 MeV → improved beam brightness (weaker space charge forces)
- **Energy : 1.4 GeV → 2 GeV**
 - New main power supply
 - New RF systems



Linac 4, has been built to take over.

- Higher energy **160 MeV**
- Acceleration of **H⁺ ions** (charge exchange H⁺→p⁺ in the PSB)

Construction **completed in 2017**

- Extensively tested in 2017-2018
- Ongoing **work in LS2 to connect it to the rest of the chain**

Excellent Progress everywhere, but...

□ ATLAS

- New Small Wheel installation on critical path even for one wheel
- FTK: manpower not available to produce full-fledged system; discussing whether to install down-scoped FTK (higher p_T -cutoff)

□ CMS

- Muon detector installation GE1 and GE2 time critical

□ LHCb

- Upstream Tracker electronics (SALT-chip) resolved; UT installation remains on critical path

□ ALICE

- CRU electronics order for TPC in India delayed; way forward will have to be settled by end of June

□ LS3 (2024–2026): ATLAS and CMS Phase-2 upgrades

- Technical details: See talk by Stefanos Leontsinis on Monday
- **Total costs** (ATLAS – 269 MCHF, CMS – 279 MCHF) and « **money matrix** » (sharing of tasks and financial responsibilities) finalized and approved at the Resources Review Board (**RRB**) meeting in Oct 2018
- Detailed **MoUs** are in the process of being signed by CERN and Funding Agencies
- Latest addition in terms of **TDR: MIP Timing Detector of CMS**
- First reports from two **Phase2 Upgrade Groups (P2UG)**
 - Tasked to monitor the progress of the Phase2 upgrades of ATLAS and CMS
- Some examples of **concerns**: a single vendor for almost 1000 m² of Silicon Sensors (ATLAS and CMS trackers, CMS HGCALE), with impact on sensor delivery schedule; delays in ASIC deliveries

□ **Cost and Schedule Review (Machine and Experiments) in Nov 2019 !**

□ LS4 (~2030): possible LHCb upgrade II

- EoI subm. in 2017, “Physics case” doc. Subm. in 2018 (CERN-LHCC-2018-027)
- LHCb has now the green light from the LHCC to proceed to the TDRs (≥ 2020)
- The case for the upgrade was very well received at the ESPP meeting in Granada

□ **Recent ProtoDUNE** (pres. by M. Nessi to SPC in March 2019)

- single-phase prototype took beam beginning in August 2018 and has recorded over 4 million beam events and over 20 million cosmic events - “text-book style” event displays! The electron drift lifetime is in excess of 7 ms, and most likely above the goal of 10ms.
- For the dual-phase detector the final installation is ongoing. This is the first real large-scale demonstrator of the dual-phase technology. It was stated that it requires more R&D on the stability of the electron multiplier.

□ **Physics Beyond Colliders** (pres. by C. Vallée to SPC in March 2019)

- complementary to high-energy colliders and other initiatives in the world. Very broad and rich landscape covered, such as EDM, hidden sectors or axion-like part.
- Examples of proposals : NA61++ (heavy-ion fixed target), extensions of COMPASS (QCD and proton radius studies), MUonE (elastic electron-muon scattering, muon $g-2$), NA64++ (dark photon), NA62++ (dark sector), KLEVER (rare K decay), SHiP (dark sector), TauFV (tau to 3 mu decay) etc.
- Beam Dump Facility with SHiP/TauFV: statement was made that the project is considered to be mature for an implementation decision, pending guidelines from the European Particle Physics Strategy Update.

□ Status and Plans for ASIC developments at CERN

- Pres. by M. Campbell to the SPC in May 2019
- report from the CERN-HEP IC Design Platform and Services (CHIPS) working group, highlighting the ubiquity of ASICs in HEP, the status of those currently in use at CERN, and the need for the HEP community to rise to the challenges posed by increasingly complex modern technologies.
- A new action plan had been developed in order to improve the technology support and foundry services provided by the Microelectronics (EP-ESE-ME) section in the Experimental Physics department and mitigate the risks posed by the problematic ASICs recently identified at the LHC experiments.

□ Muon Collider (pres. by D. Schulte to the SPC in June 2019)

- review of both the Proton-Driven and the Low EMittance Muon Accelerator (LEMMA) proposals for a muon collider
- Interesting: Daniel has discovered two mistakes in the LEMMA calculations that could have significant impact on the achievable luminosity – to be checked by the LEMMA proponents

□ June 2019: Visit of State Secretary M. Hirayama to CERN

- Accompanied by G. Häfliger
- Meeting with CERN management



□ During Council week in March

- Meeting of the CH Council Delegation with Swiss CERN staff, exchange of informations, Q&A

□ Dec 2018: Visit to CERN by Mr. Ueli Maurer, Vice President of the Federal Council, Head of the Federal Department of Finance

