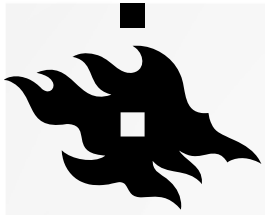


EUROPEAN PARTICLE PHYSICS STRATEGY UPDATE 2020

HIP staff meeting 3.12.2020/Paula Eerola

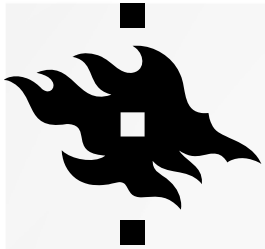


STRATEGIC PLANNING

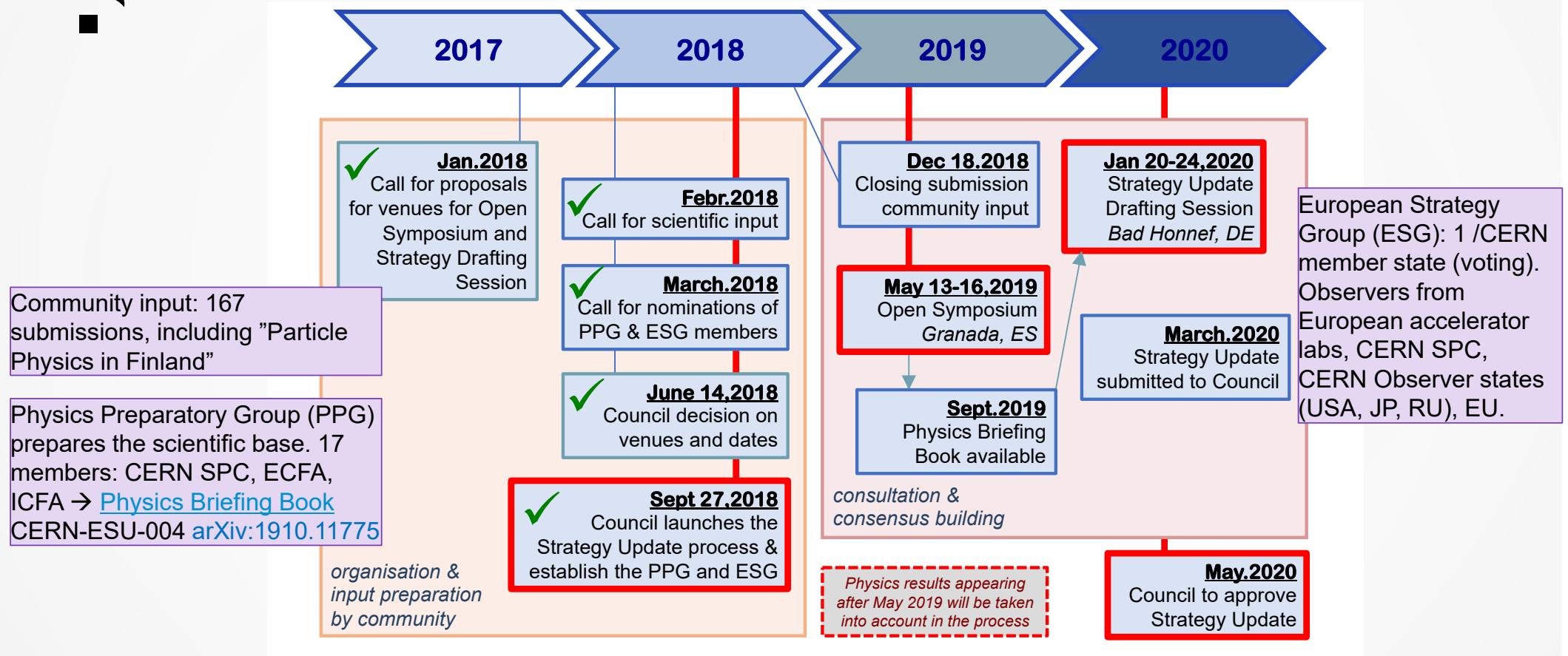
- ■ European Particle Physics Strategy [2006](#) → Update [2013](#) → Update [2020](#). <https://europeanstrategy.cern/>

Main points in the 2020-strategy:

- Major ongoing, already approved activities:
 - Full exploitation of the LHC and the high-luminosity LHC (HL-LHC), including flavour physics and the quark-gluon plasma → to 2030's
 - Continued support to long baseline experiments in Japan and in the US, in particular the Long-Baseline Neutrino Facility (LBNF) and the Deep Underground Neutrino Experiment (DUNE)
- High priority future initiatives:
 - Higgs-factory: future accelerator technologies; investigate the feasibility of a future hadron collider (FCC) at CERN with a cms-energy of at least 100 TeV and with an e+e- Higgs and electroweak factory as a possible first stage (FCC-ee). Support to ILC in Japan, in that case CERN would go directly to FCC-hh (proton-proton).
 - Scientific diversity, smaller facilities, detector development, scientific computing, open data
 - Societal impact and environmental sustainability.



STRATEGY UPDATE PROCESS 2018-2020





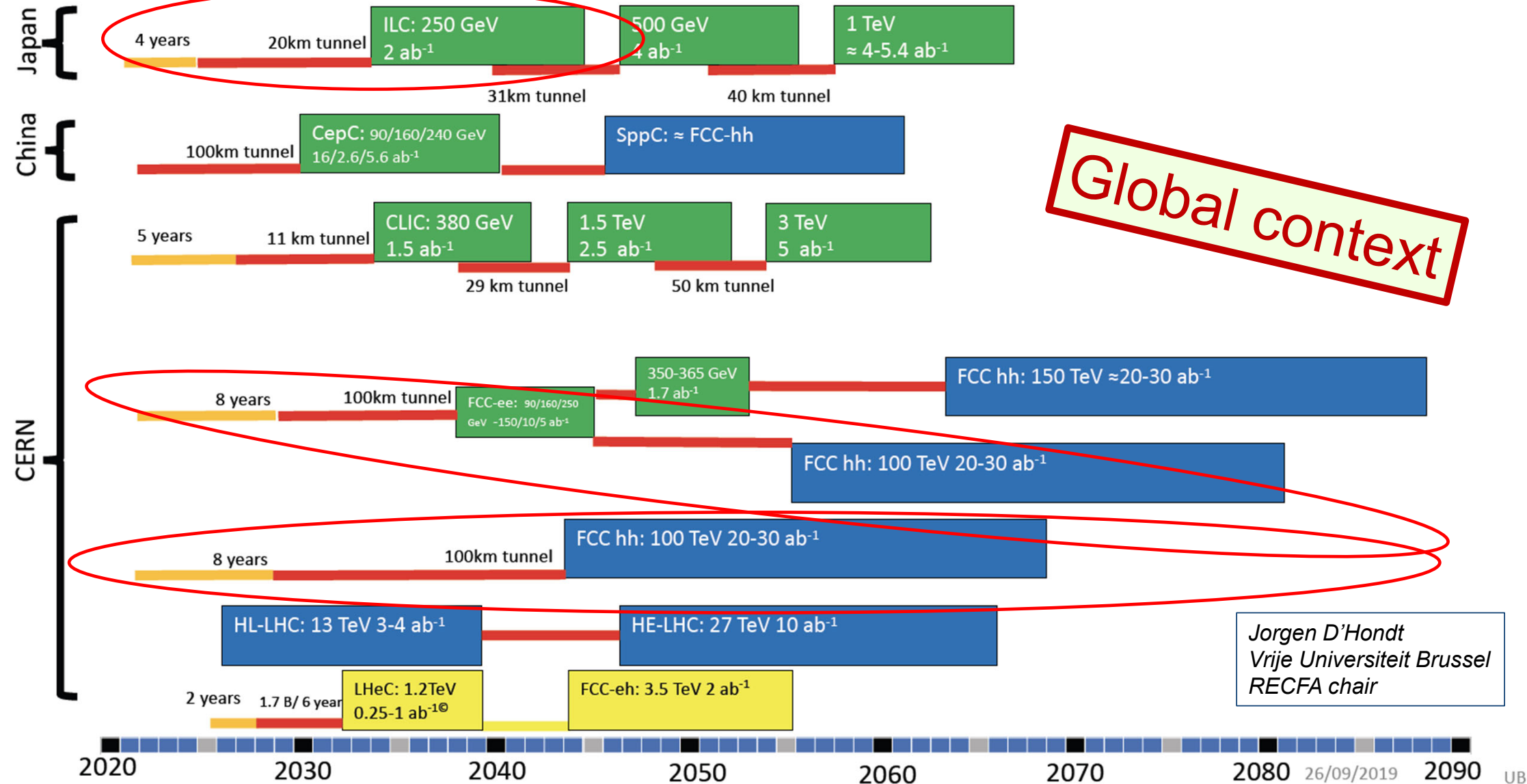
2020-STRATEGY

- The 2020 strategy's main message: outlines the long-term sharing of responsibilities globally (all the way to 2080's)
- This is the so-called baseline plan for CERN's future accelerator after LHC. The goal is to have a new operational accelerator at CERN in the 2040's, without leaving a long gap after the LHC (operational till about 2035)
- The 2020's strategy guides the more concrete 2021-2026 CERN mid-term plan
- Next strategy update 2026 → approval of the next accelerator project 2030 → then more concrete development, prototyping, piloting
- Tunnel + FCC in the 2040-50's: 5.9 -10.5 BCHF. Must be achieved outside the normal CERN budget with extra investments:
 - Extra voluntary contributions by the CERN member states, specially host countries (CH, FR), and contributions from the non-member states
 - EU, donations, etc.

Possible scenarios of future colliders

- Proton collider
- Electron collider
- Electron-Proton collider

- Construction/Transformation: heights of box construction cost/year
- Preparation



Global context

Jorgen D'Hondt
 Vrije Universiteit Brussel
 RECFA chair

2020-2040
HL-LHC era

2040-2060
Z/W/H/top-factory era

2060-2080
energy frontier era

our
technology

SCRF ~ 30 MV/m
B ~ 11 T

SCRF ~ 50 MV/m
B ~ 14 T
plasma demo
muon demo

SCRF ~ 70 MV/m
B > 16 T (HTS?)
plasma collider
muon collider

other
technology

AI for new physics
quasi-online analysis
digital imaging
new transistors

quantum computing
self-learning simulation

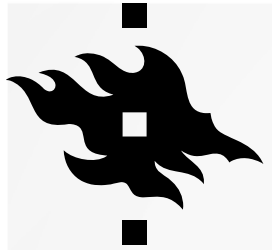
...

societal
threats

eco friendly gases
careers at mega-
research facilities

energy consumption
long-term engagement
global vs sustained
collaboration

human vs machine



DISCUSSION