



CERN scientific strategy: 3 main pillars

Full exploitation of the LHC:

- ❑ successful operation of the nominal LHC (Run 2, LS2, Run 3)
- ❑ construction and installation of LHC upgrades: LIU (LHC Injectors Upgrade) and HL-LHC

Scientific diversity programme serving a broad community:

- ❑ current experiments and facilities at Booster, PS, SPS and their upgrades (Antiproton Decelerator/ELENA, ISOLDE/HIE-ISOLDE, etc.)
- ❑ participation in accelerator-based neutrino projects outside Europe (presently mainly LBNF in the US) through CERN Neutrino Platform

Preparation of CERN's future:

- ❑ vibrant accelerator R&D programme exploiting CERN's strengths and uniqueness (including superconducting high-field magnets, AWAKE, etc.)
- ❑ design studies for future accelerators: CLIC, FCC (includes HE-LHC)
- ❑ future opportunities of scientific diversity programme ("Physics Beyond Colliders" Study Group)

Important milestone: update of the European Strategy for Particle Physics (ESPP), to be concluded in May 2020

CLIC roadmap

2013 - 2019 Development Phase

Development of a Project Plan for a staged CLIC implementation in line with LHC results; technical developments with industry, performance studies for accelerator parts and systems, detector technology demonstrators

2020 - 2025 Preparation Phase

Finalisation of implementation parameters, preparation for industrial procurement, Drive Beam Facility and other system verifications, Technical Proposal of the experiment, site authorisation

2026 - 2034 Construction Phase

Construction of the first CLIC accelerator stage compatible with implementation of further stages; construction of the experiment; hardware commissioning



2019 - 2020 Decisions

Update of the European Strategy for Particle Physics; decision towards a next CERN project at the energy frontier (e.g. CLIC, FCC)

2025 Construction Start

Ready for construction; start of excavations

2035 First Beams

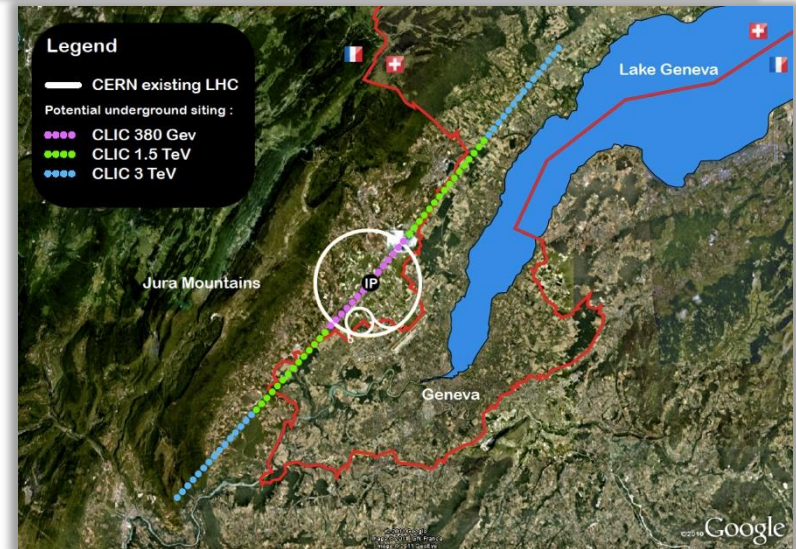
Getting ready for data taking by the time the LHC programme reaches completion



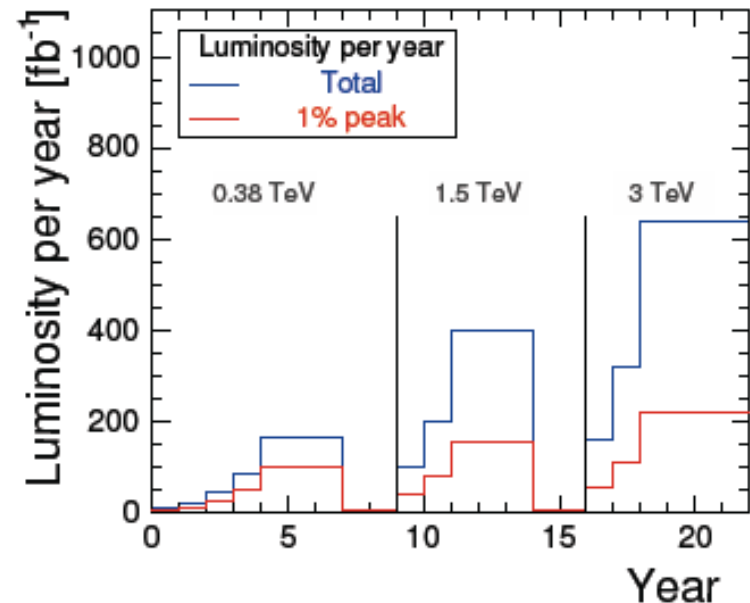
Goal for next strategy update (end 2018): Present a CLIC project that is a “credible” option for CERN beyond LHC, a Project Implementation Plan.

Guidelines used internally:

- Adapt to physics results – LHC mostly – taking into account LHC at 13-14 TeV as results become available (be flexible)
- Physics no later than 2035, solid luminosities from Higgs/top at 380 GeV (drivebeam and klystrons) to 3 TeV (staging)
- Initial costs compatible with current CERN budget level (order LHC+50%) (staging)
- Upgradable in 2-3 stages over a 20-30y period, without major (max 3-4 years) operational breaks, and with upgrade costs also in reasonable agreement with current budget level.
- Cover accelerator, detector, physics



Parameter	Unit	380 GeV	3 TeV
Centre-of-mass energy	TeV	0.38	3
Total luminosity	$10^{34}\text{cm}^{-2}\text{s}^{-1}$	1.5	5.9
Luminosity above 99% of \sqrt{s}	$10^{34}\text{cm}^{-2}\text{s}^{-1}$	0.9	2.0
Repetition frequency	Hz	50	50
Number of bunches per train		352	312
Bunch separation	ns	0.5	0.5
Acceleration gradient	MV/m	72	100
Site length	km	11	50



Over the last year the LC study organisation has changed in preparation of the European Strategy Update report. We put more emphasis on implementation studies related to the entire CLIC machine.

We still have the project organised in four main activities, each with a group of individual WPs and WP leaders:

1. Beamdynamic and design - D.Schulte
2. X-band included high off klystron studies - W.Wuensch
3. Linac systems: Main Linac module and Drive Beam front end - S.Doebert
4. Technical systems and studies - N.Catalan

General work-packages and budgets – S.Stapnes:

The studies at ATF2 and in light sources are WPs under General activities. ILC/LCC support activities likewise. CTF3 closedown and CLEAR preparation are also under this general heading with WPs lead by R.Corsini.

Five new implementation working groups preparing for the ESU have been started (<https://indico.cern.ch/category/4337/>) – some of which also existed ahead of the CDR in 2012:

1. Civil Engineering & Infrastructure and Siting WG (CEIS) (lead J.Osborne) ([mandate](#))
2. **Cost, Power and Schedule (lead S.Stapnes) (Detailed costing of a 380 GeV machine - DB and klystrons - plus additional stages beyond)**
3. **Main Linac Hardware Baselining (lead C.Rossi) (Optimised module technical design and surrounding infrastructure in the tunnel, considering the entire lifetime of a module including commissioning, installation, conditioning, operation, rework, replacements etc.)**
4. **Baseline parameters and design (lead D.Schulte) (Designs and parameters for 380 (DB and klystrons) GeV, 1.5 TeV and 3 TeV)**
5. Novel Accelerator methods for future stages of CLIC (lead E.Adli) ([mandate](#))

The WGs have ~10-15 core members as needed to cover the subject, and meet every 4-6 weeks in open meetings (to all coll. members). Costing meetings are closed.

See implementation meetings every Friday 9-11 at indico link above.