

# 3<sup>rd</sup> HL-LHC/LIU Cost and Schedule Review

## 26<sup>th</sup> – 28<sup>th</sup> March 2018

### 1 INTRODUCTION

---

At the request of the Management of CERN, two extensive Cost and Schedule Review of both the LIU and HL-LHC projects were carried out in [March 2015](#) and [October 2016](#).

The latest International Review was conducted by the CERN Machine Advisory Committee members (CMAC)<sup>1</sup>, helped by reviewers<sup>2</sup> called to cover some specific items of the review.

The baseline of both projects, which includes the scope description, the schedule and the cost, was assessed. The assessment was taking into account the technical developments that were still ongoing, including how risks and uncertainties are managed.

The final report and recommendations provided by the review committee in October 2016 are annexed to this document.

The management of CERN is now calling a third Cost & Schedule review of the LIU and HL-LHC projects. This review will be organized at CERN between the 26 and 28 of March 2018.

### 2 CHARGE OF THE REVIEW

---

The scope, schedule and cost of both projects and their evolution since the 2<sup>nd</sup> Cost & Schedule review of October 2016 will be assessed by the review committee. In particular, the charge to the review team will focus on the following topics:

- Projects status and progress, in particular the identification of critical pieces of hardware from a schedule or cost point of view (where we are);
- Baseline changes since the previous C&S review, reasons for these changes and impact on the scope, schedule and cost (what has changed);
- Comment on the strategy and assess the impact on schedule and resources for critical items;
- Global evolution of the cost and schedule of both projects, of the level of risks and uncertainties (what is the global status).

---

<sup>1</sup> CMAC members: W. Fischer (BNL, Brookhaven National Laboratory); S. Gourlay (LBNL, Lawrence Berkeley National Laboratory); N. Holtkamp (Chair of the review, SLAC National Accelerator Laboratory); K. Oide (KEK, High Energy Accelerator Research Organization in Japan); M. Seidel (PSI, Paul Scherrer Institute); P. Vedrine (CEA-Saclay, Commissariat à l'énergie atomique et aux énergies alternatives);

<sup>2</sup> Additional review committee members were: C. Neumeyer (PPPL, Princeton Plasma Physics Lab); M. Bei (FZJ, Forschungszentrum Jülich); S. Bousson (IPNO-IN2P3, IPN Orsay); T.J. Peterson (SLAC, National Accelerator Laboratory); T. Watson (ITER, International Thermonuclear Experimental Reactor); A. Yamamoto (KEK, High Energy Accelerator Research Organization in Japan).

### 3 SESSIONS

---

The C&S review of March 2018 is organized over three days through plenary and parallel sessions.

The following preliminary agenda is proposed ([Indico agenda](#)):

Day 1 Morning	Plenary Session addressing the status of both projects and providing an overview of the HL-LHC and LIU projects and their current challenges.
Day 1 Afternoon	Parallel Sessions addressing baseline changes and their impact on cost and schedule of both projects sub-systems: Session 1: LIU project Session 2: HL-LHC – Magnets, powering and cryogenic systems Session 3: HL-LHC – Superconducting RF and other accelerator systems Session 4: HL-LHC – Technical Infrastructure, integration and (de)installation
Day 2 Morning	Parallel Sessions – continued Session 1: LIU project Session 2: HL-LHC – Magnets, powering and cryogenic systems Session 3: HL-LHC – Superconducting RF and other accelerator systems Session 4: HL-LHC technical infrastructure, integration and (de)installation
Day 2 Afternoon	Plenary Session: HL-LHC and LIU cost, schedule and EVM
Day 3	Close-out preparation / Close-out

### 4 REVIEW COMMITTEE

---

The review will be conducted by the CERN Machine Advisory Committee members and additional experts.

The composition of the committee and the distribution across the parallel sessions is proposed to be the following:

Session 1: LIU Project	W. Fischer, M. Bei, M. Pedrozzi
Session 2: HL-LHC – Magnets, powering and cryogenic systems	S. Gourlay, T. Koseki, P. Vedrine
Session 3: HL-LHC – Superconducting RF and other accelerator systems	M. Seidel, A. Yamamoto, Q. Qin
Session 4: HL-LHC/LIU – Cost, Schedule and EVM, HL-LHC technical infrastructure	N. Holtkamp, C. Neumeyer, T. Watson