Status of the SLHC-PP

Roland Garoby

4 February, 2010

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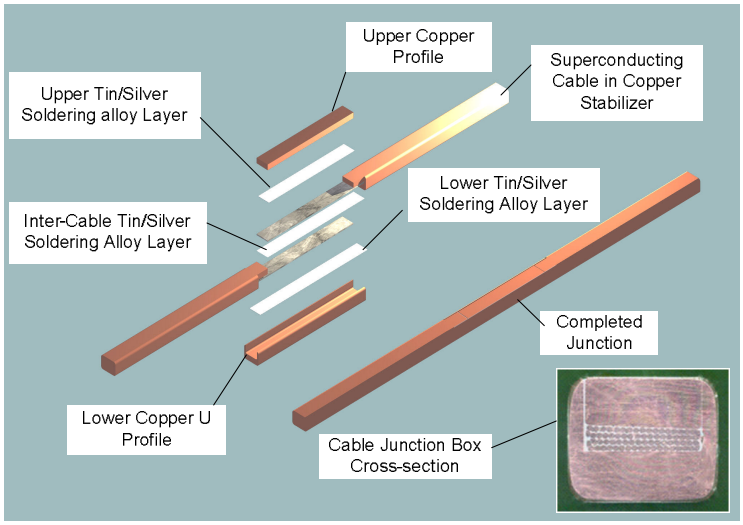
Outline

1. LHC context
2. SLHC-PP milestones & deliverables …
3. Progress in sLHC management
4. SLHC-PP management report
5. Perspectives
6. Annual meeting: goals and schedule

1. LHC context

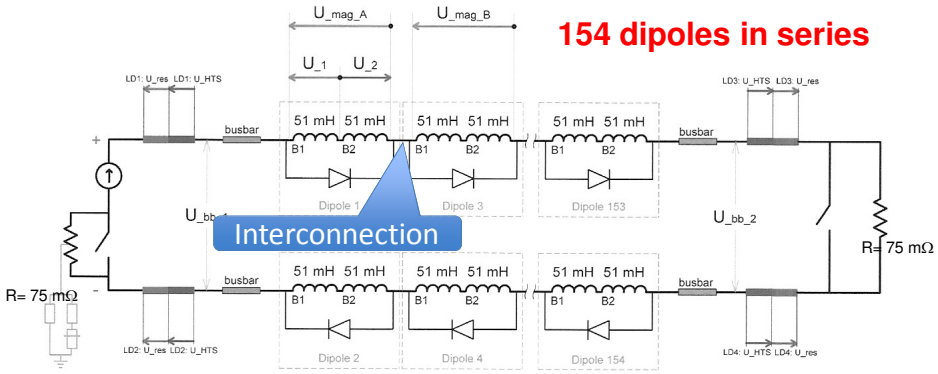
Turning-on the LHC is not trivial…

The culprit…



Dipoles current supply scheme

http://cern.ch/SLHC-PP



L= 15 Henrys ➔ Time constant ~ 100 s

The result in sector 3-4 (1/2) …

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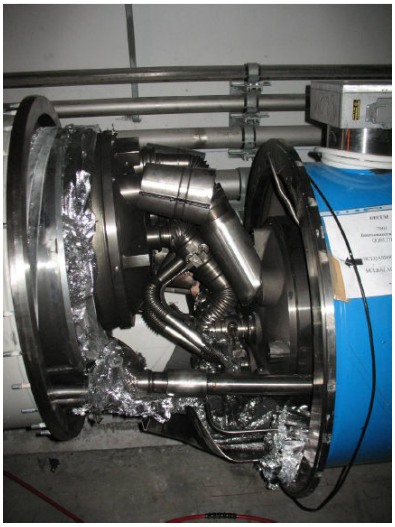
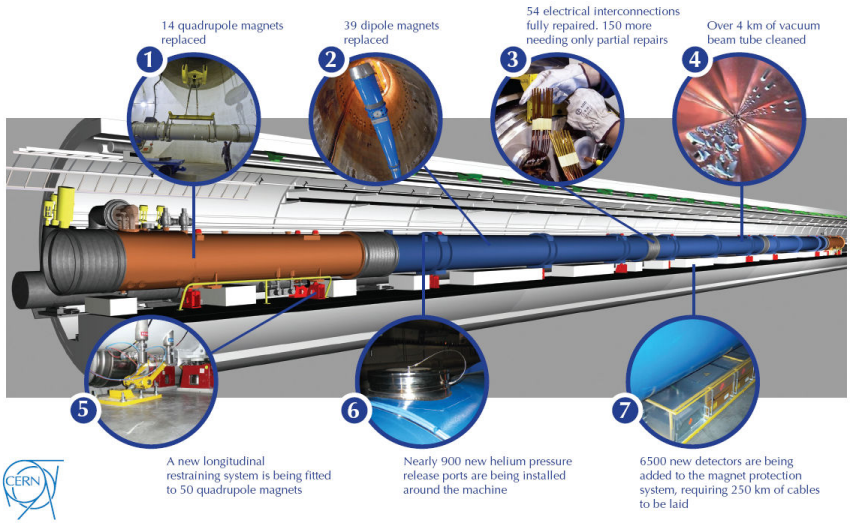


The result in sector 3-4 (2/2) …

http://cern.ch/SLHC-PP

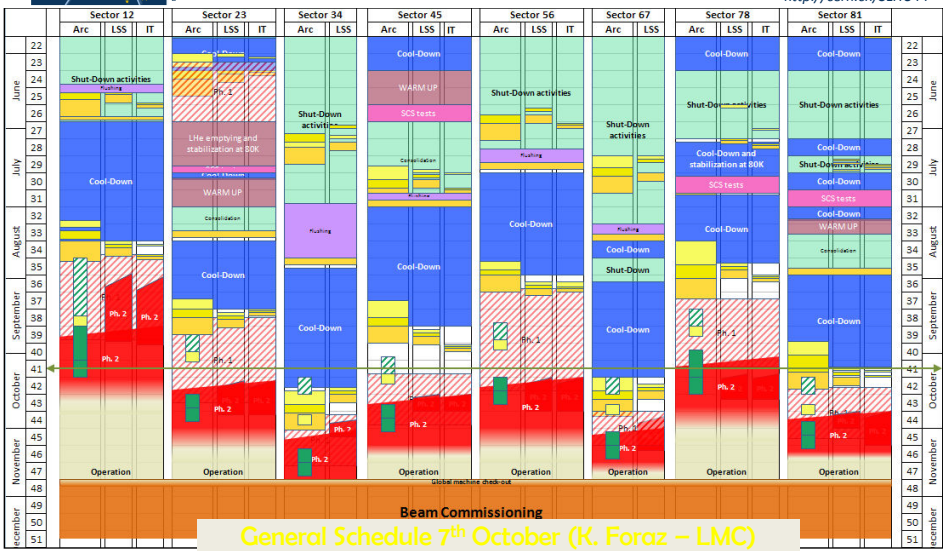
Repair and consolidation work

http://cern.ch/SLHC-PP



(Simplified) planning with re-start

http://cern.ch/SLHC-PP



General Schedule 7th October (K. Foraz – LMC)

2. SLHC-PP milestones & deliverables

http://cern.ch/SLHC-PP

- Reduced CERN resources
- Increased requirements

Milestones (until end of 2nd year)

http://cern.ch/SLHC-PP

First year of the project:

Number	Milestone title	Delivery month	Comment	Link
1.1	Kick-off meeting	M03	Presentations on SLHC-PP web site	Agenda
6.1	Qualification of magnet components	M08	Qualification document published	Report
3.1	Schedule for the R&D phase	M09	Schedule document	Report
6.2	Basic Magnet design	M10	Magnet design report	*Word Template*
1.2	First Annual SLHC-PP Meeting	M12	Presentations on SLHC-PP web site	Agenda
5.1	Compilation and evaluation of design parameters and details relevant for the assessment of radiological impact; Identification of critical parameters and potential design constraints	M12	Meeting with stakeholders in accelerator and experiments, to define an agreement on design parameters	Report

Second year of the project:

Number	Milestone title	Delivery month	Comment	Link
7.1	List of required improvements for the design of the high duty factor plasma generator to function at a high duty factor	M14	Report approved by partners	Report
2.1	Financial management system (initial version)	M18	Initial version released	Report
4.1	Upgrade Project Scope defined	M18	Report published	Report
6.3	Complete cold mass design	M18	Design Report published	Template
6.4	Complete cryomagnet design	M22	Design Report published	
6.5	Cryogenic and power test of the model	M22	Test report published	
1.3	Second Annual SLHC-PP Meeting	M24	Presentations on SLHC-PP web site	
2.2	EVM software (initial version)	M24	Initial version released	
3.2	Upgrade project structures adapted to the implementation phase	M24	Documented as WEB structure	

Deliverables (1st year)

http://cern.ch/SLHC-PP

Number	Deliverable title	Nature	Delivery month	Link
1.2.1	SLHC-PP web-site operational (intranet + public pages)	O	M03	Report
3.1.1	Project management structure and review office for R&D phase in place	O, R	M06	Report
2.2.1	Functioning collaboration communication structure	O	M12	Report
2.2.2	Project web site linked to the technical databases: Machine layout database, hardware baseline database, project notes and reports	O	M12	Report
4.1.1	Project Structures for construction of systems and sub-systems	O, R	M12	Report
4.2.1	Personnel and working practices of the Technical Coordination unit in place	O, R	M12	Report
6.1.1	Basic design of the triplet	R	M12	Report 1 & 2
7.1.1	Finite element thermal study of the Linac 4 design source at the final duty factor	R	M12	Report
7.2.1	In depth characterisation of the two tuners plus cavities developed in the frame of the "HIPPI" JRA , FP6 (tuner/cavity characteristics)	R	M12	*Word Template*
8.1.1	Evaluation report on DC-DC conversion technologies	R	M12	Report
8.2.1	Evaluation report on generic serial powering studies and specification of serial powering components	R	M12	Report

Deliverables (2nd year)

http://cern.ch/SLHC-PP

Number	Deliverable title	Nature	Delivery month	Link
1.1.1	Periodic Report (progress of work + use of resources + financial statement)	R	M14	**Report**
4.2.2	Key structural requirements (information repository, tools, coordination framework, safety and quality systems, integration office) and scheduling and reporting mechanisms in place	O, R	M18	**Report**
6.2.1	Construction of the model	D	M18	Template
7.1.2	Design of a high duty factor plasma generator	R	M18	**Report**
7.2.2	Design of RF system architecture including modelling of RF components, simulation of the RF system and simulation of beam dynamics of the full LINAC; RF system and high power modulator specifications	R	M18	Template
3.2.1	Document the technical scope of the upgrade including an initial cost-estimate	R	M24	
5.1.1	Validation of simulation tools with measurements at LHC	R	M24	
5.1.2	Estimation of radiation and activation levels for critical areas of the experiments at SLHC	R	M24	
5.2.1	Estimation of radiation and activation levels for critical areas of SLHC and its injectors	R	M24	
6.2.2	Assessment of the design	R	M24	
8.2.2	Custom serial powering circuitry and evaluation of generic high-current serial powering ASIC	P,R	M24	

3. Progress in sLHC management

http://cern.ch/SLHC-PP

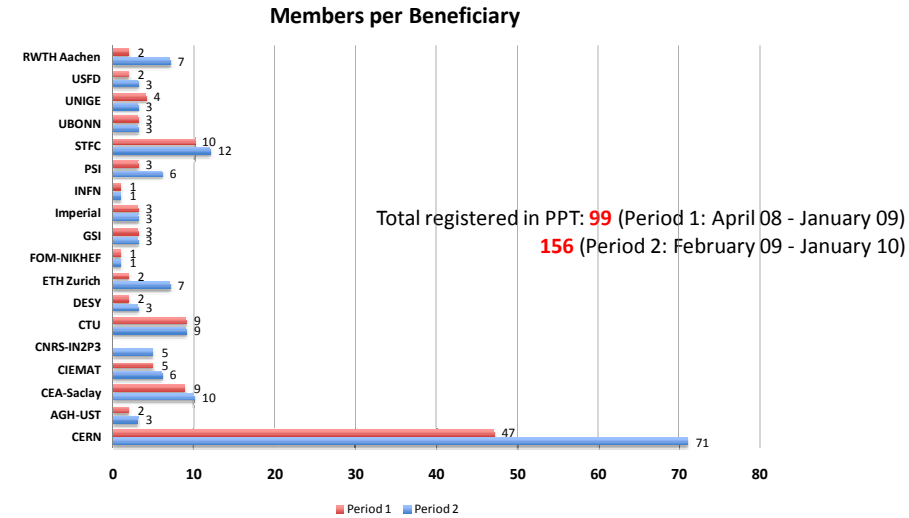
- **sLHC Web site**
- **New series for sLHC reports & project notes on the CERN Document Server**
- **Structured storage for all documentation (e.g. SPL) in EDMS**
- **Structured filing of all meetings (e.g. SPL) in Indico**

4. SLHC-PP management report

http://cern.ch/SLHC-PP

SLHC-PP Membership

http://cern.ch/SLHC-PP



Total registered in PPT: **99** (Period 1: April 08 - January 09)
156 (Period 2: February 09 - January 10)

SLHC-PP Membership

http://cern.ch/SLHC-PP

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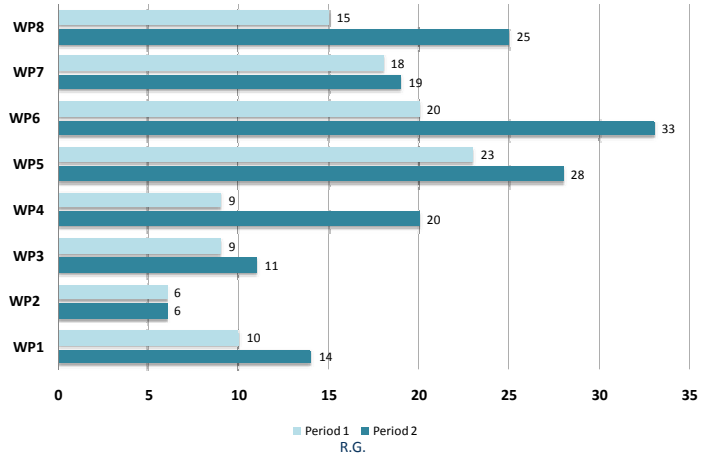
156 (Period 2: February 09 - January 10)

Members per WP



Personnel Expenses
April 08 – Dec 09

http://cern.ch/SLHC-PP

PM from Worked Hours reported in PPT

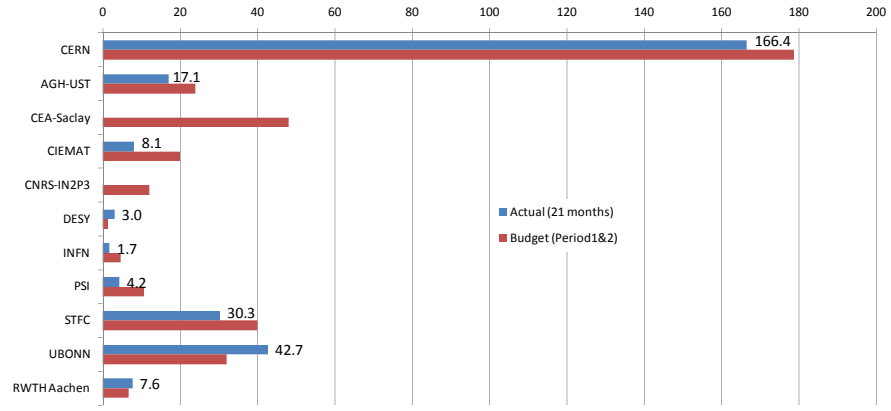
Assumption: flat spending profile *(year budget = total/3)*

WP	P-M	P-M reported / P-M budgeted for Period 1 & 2	P-M reported / P-M budgeted for whole Project
1	36	110%	73%
2	17	50%	34%
3	57	84%	56%
4	71	119%	79%
5	82	106%	71%
6	70	55%	37%
7	64	53%	35%
8	147	114%	76%
SUM	545	84%	56%

Full SLHC-PP project has 976 PM in Annex-I

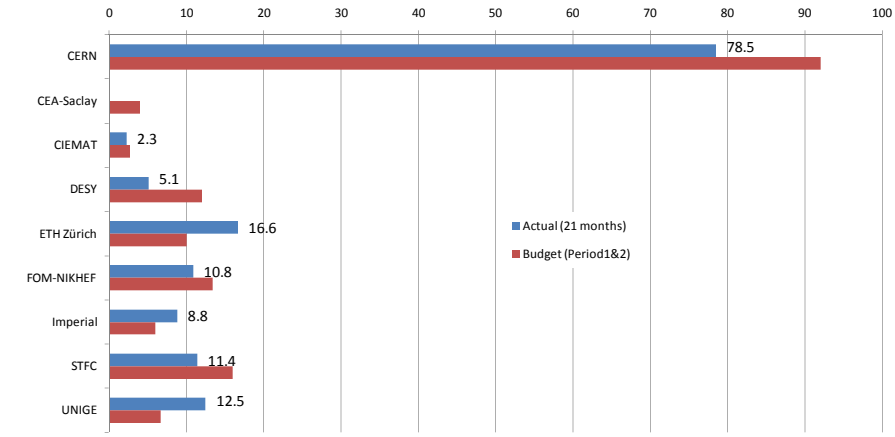
PM for RTD Activities (WP 6 ,7, 8)
April 08 – Dec 09

http://cern.ch/SLHC-PP



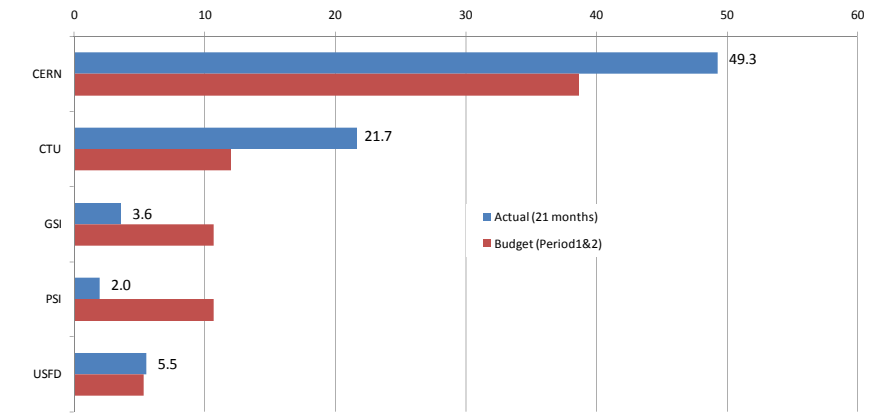
PM for Coordination Activities (WP 2, 3, 4)
April 08 – Dec 09

http://cern.ch/SLHC-PP



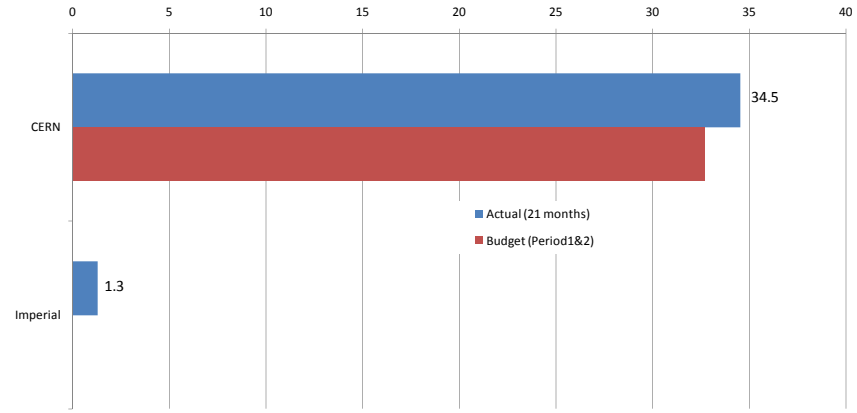
PM for Support Activities (WP5)
April 08 – Dec 09

http://cern.ch/SLHC-PP



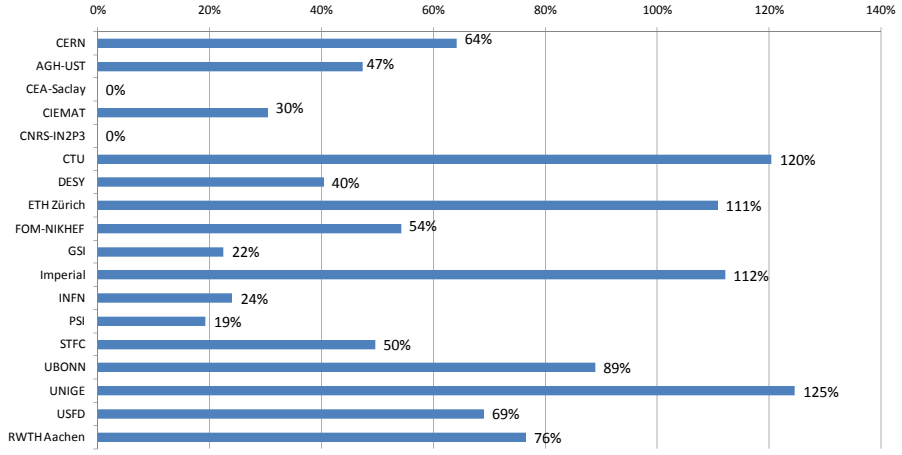
PM for Management Activities (WP1)
April 08 – Dec 09

http://cern.ch/SLHC-PP



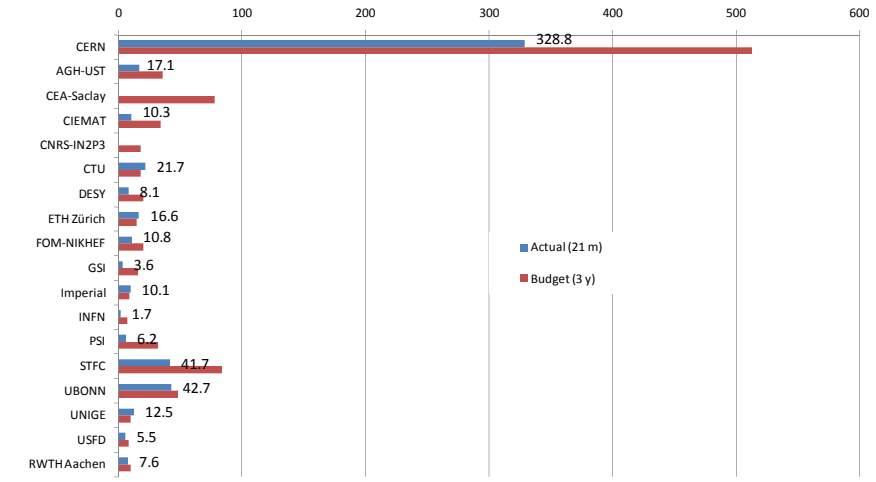
PM / Partner
Actual (21m) / Budget (3 y)

http://cern.ch/SLHC-PP



PM / Partner
Budget (3 y) VS Actual (21 m)

http://cern.ch/SLHC-PP



5. Perspectives

- The road will be long…

First public announcement (Feb. 3) after Chamonix 2010

Better in the long run

Last week, the Chamonix workshop once again proved its worth as a place where all the stakeholders in the LHC can come together, take difficult decisions and reach a consensus on important issues for the future of particle physics. The most important decision we reached last week is to run the LHC for 18 to 24 months at a collision energy of 7 TeV (3.5 TeV per beam). After that, we'll go into a long shutdown in which we'll do all the necessary work to allow us to reach the LHC's design collision energy of 14 TeV for the next run. This means that when beams go back into the LHC later this month, we'll be entering the longest phase of accelerator operation in CERN's history, scheduled to take us into summer or autumn 2011.

What led us to this conclusion? Firstly, the LHC is unlike any previous CERN machine. Because it is a cryogenic facility, each run is accompanied by lengthy cool-down and warm-up phases. For that reason, CERN's traditional 'run through summer and shutdown for winter' operational model had already been brought into question. Furthermore, we've known for some time that work is needed to prepare the LHC for running at energies significantly higher than the 7 TeV collision energy we've chosen for the first physics run. The latest data show that while we can run the LHC at 7 TeV without risk to the machine, running it at higher energy would require more work in the tunnel. These facts led us to a simple choice: run for a few months now and programme successive short shutdowns to step up in energy, or run for a long time now and schedule a single long shutdown before allowing 14 TeV (7 TeV per beam).

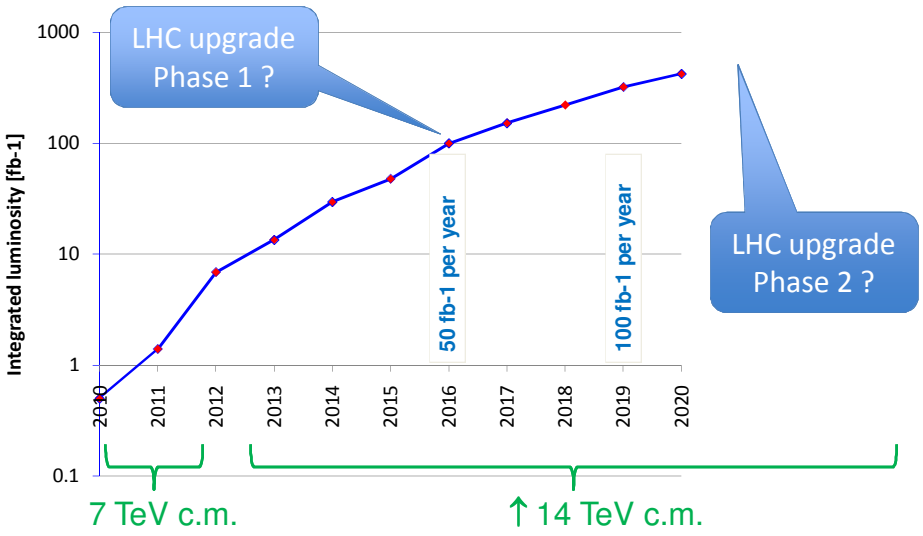
A long run now is the right decision for the LHC and for the experiments. It gives the machine people the time necessary to prepare carefully for the work that's needed before allowing 14 TeV. And for the experiments, 18 to 24 months will bring enough data across all the potential discovery areas to firmly establish the LHC as the world's foremost facility for high-energy particle physics.

I'd like to invite you all to the summary of the Chamonix workshop on Friday 5 February at 14:00 in the Main auditorium. See: http://indico.cern.ch/conferenceDisplay.py?confId=83135

Steve Myers

LHC performance estimate (© M. Lamont @ Chamonix 2010)

http://cern.ch/SLHC-PP



6. Annual meeting

http://cern.ch/SLHC-PP

- Goals:
  - Discuss progress and plans for the 3rd year
  - Prepare for the second official annual report
  - Announce public SLHC outreach event on May 7 at CERN

6. Annual meeting (day 1)

http://cern.ch/SLHC-PP

Thursday 04 February 2010 top↑

09:15->*11:00* Plenary Session (Auditorium)		
09:15	Welcome (15')	Ramón Gaiela (CIEMAT)
09:30	Performance of the ATLAS detector with the first collision data (30')	Stephen Haywood (Particle Physics)
10:00	Performance of the CMS detector with the first collision data (30')	Romain Rougny (Universiteit Antwerpen-Unknown-Unknown)
10:30	Overall status of SLHC-PP (30')	Roland Garoby (CERN)
11:00	Coffee break (15')	
11:15->*12:50* Plenary Session (Auditorium)		
11:15	The LHC commissioning (45')	Mike Lamont (CERN)
12:00	Status Linac4 project (25')	Alessandra Lombardi (CERN)
12:25	Status new inner triplet project (25')	Stephan Russenschuck (CERN AT-MEL-EM)
12:50	Lunch (1h55')	
14:45->*18:45* Parallel Sessions: WP (Rooms B and C)		
14:45	WP 2: Coordination for the SLHC accelerator implementation (1h00') (Room B)	Thomas Otto (CERN SC-RP)
14:45	WP 8: Tracking detector power distribution (1h00') (Room C)	Wladyslaw Dabrowski (AGH Univ. of Science & Technology-Unknown-Unknown)
	• Introduction (05')	Wladyslaw Dabrowski (AGH Univ. of Science & Technology-Unknown-Unknown)
	• Serial powering for pixels (15')	Fabian Huegging (Univ. Bonn)
	• Regulator test and stave emulator (15')	Laura Gonella (Univ. Bonn)
	• Serial Powering Updates (15')	Giulio villani (Rutherford Appleton Laboratory)
	• Discussion (10')	
15:45	WP 3: Coordination for the S-ATLAS experiment implementation (1h00') (Room B)	Steinar Stapnes (Fysisk Institutt, Oslo)
15:45	WP 6: Development of Nb-Ti quadrupole magnet prototype (1h00') (Room C)	Stephan Russenschuck (CERN AT-MEL-EM)
	• Status fo the CEA activities. (15')	Maria Durante (CEA Saclay)
	• Development of a sextupole corrector for the new inner triplet. (15')	Iker Rodríguez (CIEMAT)
	• Advances in the design of orbit and multipole correctors. (15')	Mikko Karppinen (CERN)
	• Round table discussion on planning and milestones. (15')	
16:45	WP 4: Coordination for the CMS2 experiment implementation (1h00') (Room B)	Jordan Nash (Imperial College)
16:45	WP 7: Development of critical components for the injectors (1h00') (Room C)	Richard Scrivens (CERN)
17:45	WP 5: Radiation protection and safety issues for accelerator and experiments (1h00') (Room B)	Thomas Otto (CERN SC-RP)
18:45	Coffee break (15')	

19:00->*20:00* Governing board (institutional representatives) (Room B)

6. Annual meeting (day 2)

http://cern.ch/SLHC-PP

Last minute change

Friday 05 February 2010 top↑

09:00->*10:45* Plenary Session (Auditorium)		
09:00	Spanish activities and developments for future accelerators and detectors (30')	Juan Fuster Verdu (IFIC-Valencia)
09:30	Accelerator activities at CIEMAT (30')	Fernando Toral (CIEMAT)
10:00	The ALBA synchrotron at CELLS (30')	Francis Perez (ALBA Synchrotron)
10:30	Preparation of the annual report (15')	Duccio Abbaneo (CERN)
10:45	Coffee break (30')	
11:15->*13:15* Plenary Session: Status of WP (Auditorium)		
11:15	Status of WP 2: Coordination for the SLHC accelerator implementation (15')	Thomas Otto (CERN SC-RP)
11:30	Status of WP 3: Coordination for the S-ATLAS experiment implementation (30')	Nigel Hessey (NIKHEF)
12:00	Status of WP 4: Coordination for the CMS2 experiment implementation (30')	Jordan Nash (Imperial College)
12:30	Status of WP 6 Development of Nb-Ti quadrupole magnet prototype (45')	Stephan Russenschuck (CERN AT-MEL-EM)
13:15	Lunch (1h30')	
14:15->*15:30* Plenary Session: Status of WP (Auditorium)		
14:15	Status of WP 5: Radiation protection and safety issues for accelerator and experiments (25')	Thomas Otto (CERN SC-RP)
14:40	Status of WP 7: Development of critical components for the injectors (25')	Richard Scrivens (CERN)
15:05	Status of WP 8: Tracking detector power distribution (25')	Wladyslaw Dabrowski (AGH Univ. of Science & Technology-Unknown-Unknown)
15:30->*15:45* Plenary Session (Auditorium)		
15:30	SLHC-PP public event in 2010 and Conclusions (15')	Roland Garoby (CERN)

15:45->*16:45* Webcast from the Chamonix-Conference. (Auditorium)

16:45->*16:50* End of Meeting

I wish you a lively and productive meeting!