



Linac4 Status and Schedule



1

February 2013
M. Vretenar

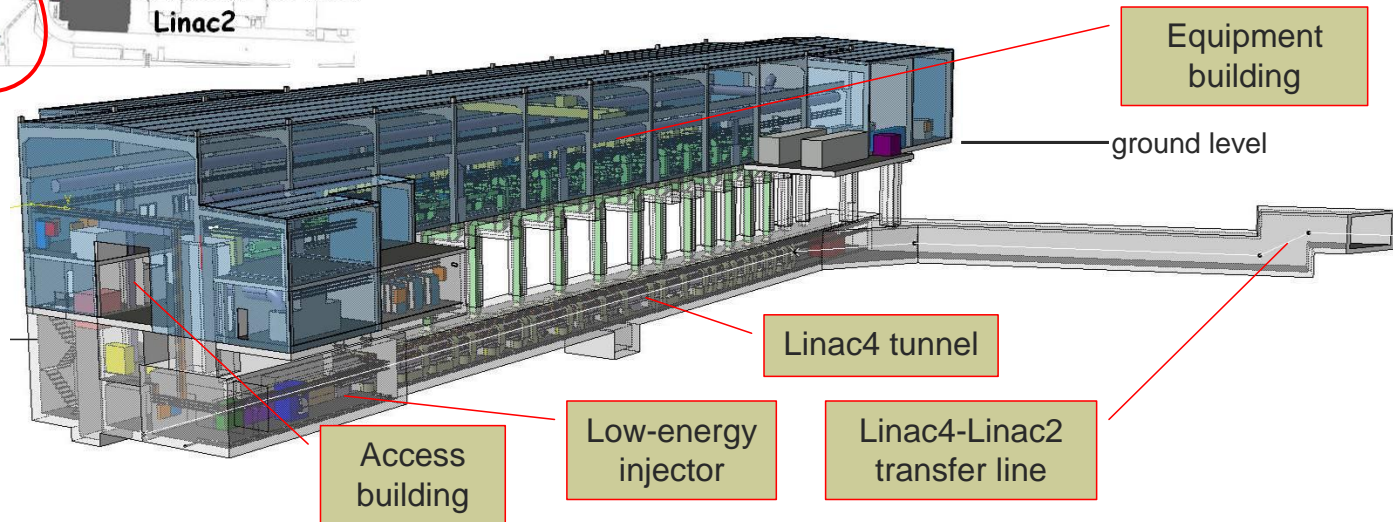
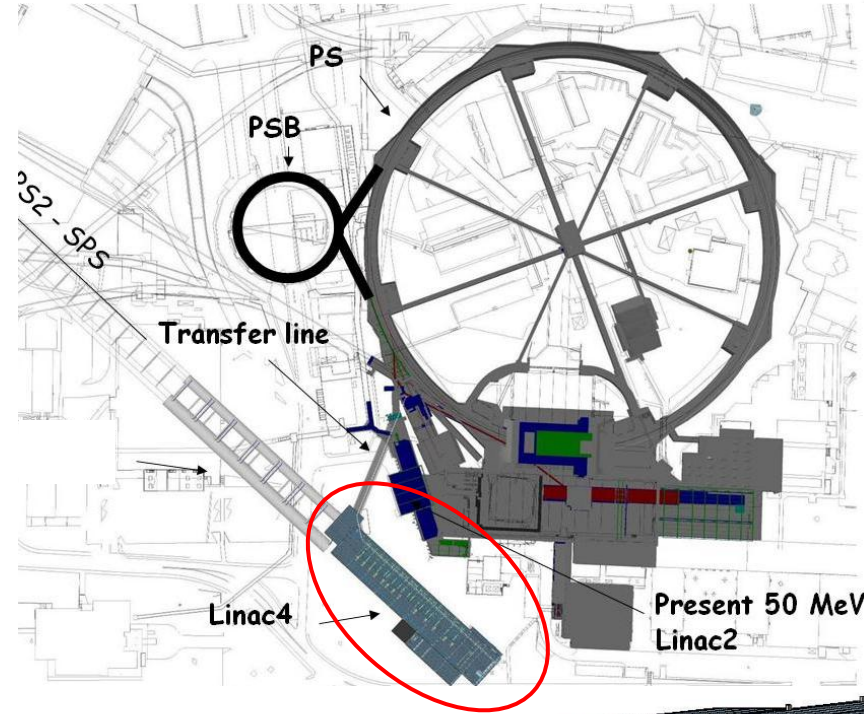
PIMS Production
Meeting



Low injection energy into the PSB is the first and most severe limitation to intensity from the LHC injectors →

Decision (CERN Council, June 2007) to build a new linac (Linac4) to increase PSB injection energy from 50 to 160 MeV and pass from proton to H^- injection.

Advanced design:	2007-2008
Building construction:	2008-2010
Infrastructure installation:	2011-2012
Commissioning:	2013-2015

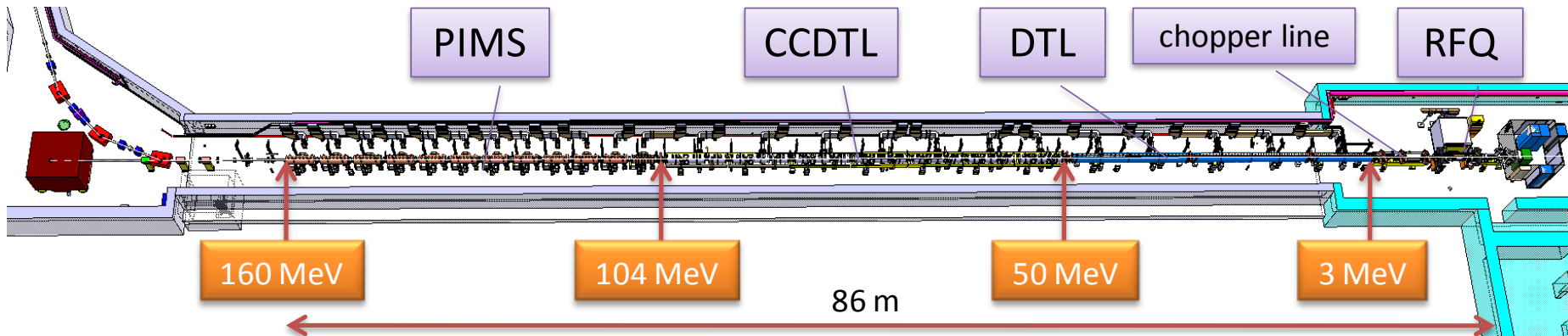


Normal-conducting linear accelerator, made of:

1. Pre-injector (source, magnetic LEPT, 3 MeV RFQ, chopper line)
2. Three types of accelerating structures at 352 MHz (increasing sequences of identical cells and decreasing number of focusing quadrupoles).
3. Beam dump at linac end, switching magnet towards transfer line to PSB.

No superconductivity (not economically justified in this range of β and duty cycles);
 Single RF frequency 352 MHz (standardised RF allows considerable cost savings);
 Beam focusing with combination of permanent quadrupoles (PMQ) and conventional ones (EMQ).

	Energy [MeV]	Length [m]	RF Power [MW]	Focusing
RFQ	0.045 - 3	3	0.6	RF
DTL	3 - 50	19	5	112 PMQs
CCDTL	50 - 102	25	7	14 PMQs, 7 EMQs
PIMS	102 - 160	22	6	12 EMQs



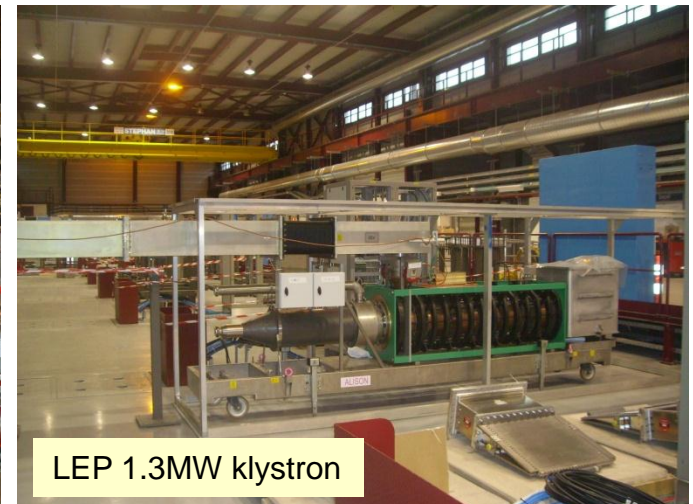
- Waveguide network (including circulators) installed
- All cabling completed
- 8 klystrons installed (/17)
- LLRF room infrastructure completed



LLRF room



New 2.8MW klystron



LEP 1.3MW klystron



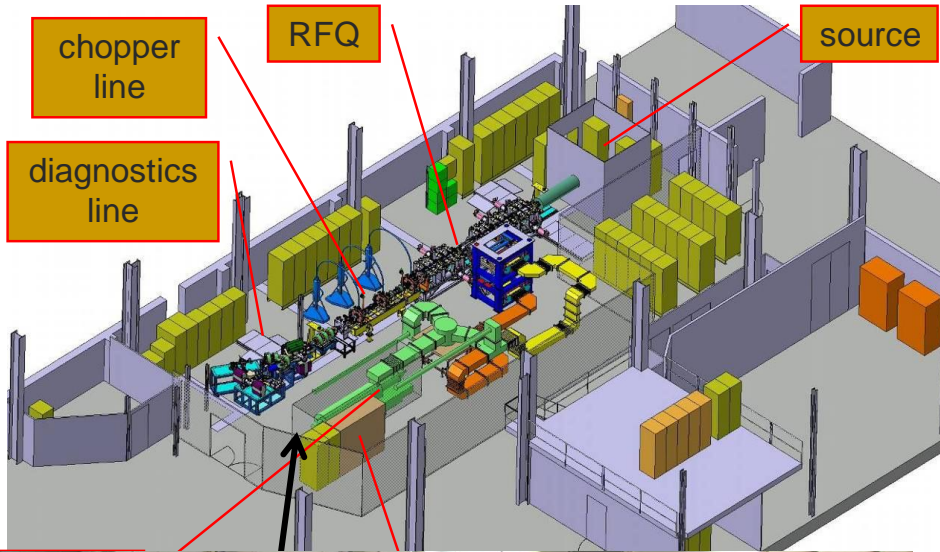
Linac4 tunnel



5

- Waveguide network completely installed
- Cabling and piping completed
- Ion source Faraday cage, LEBT support and 1st solenoid installed

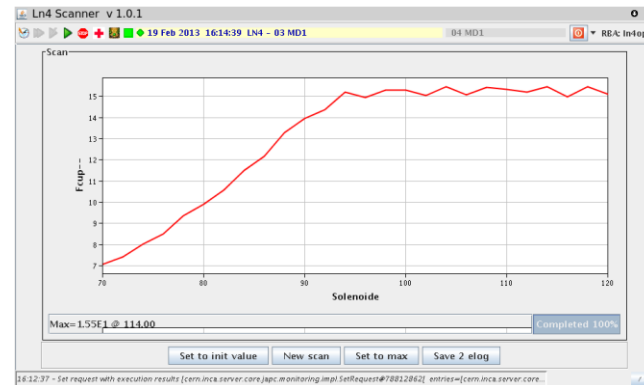




3 MeV TEST STAND for characterization of low-energy section, starting beam operation now; will be moved to Linac4 in Summer 2013

- ☞ Ion source and LEPT;
- ☞ RFQ;
- ☞ Chopping line (to be added later);
- ☞ Complete beam diagnostics line.

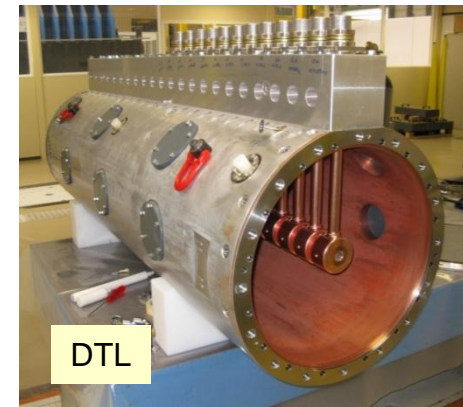
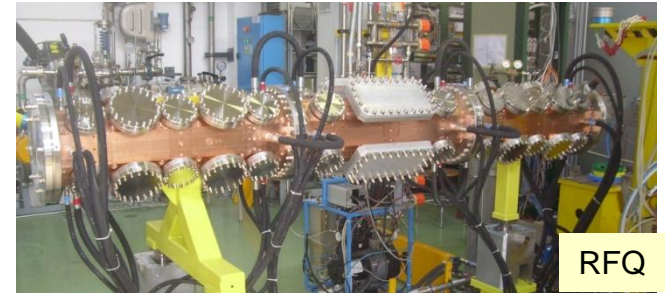
Beam tests until May 2013



1st H- beam,
15 mA,
19.02.2013

RFQ 250 kW (/500 kW) on 24.02.2013

- RFQ completed and installed in the 3 MeV test stand, under conditioning.
- New ion source being tested in both H- and proton modes.
- First two 2.8 MW klystrons (CPI and Thales) tested and installed, the remaining 6 to be delivered in 2013.
- Modulator prototype tested, series being delivered.
- 1st DTL tank section (half Tank 1) completed and aligned. Components for other sections in production or being delivered.
- 2 batches of 4 CCDTL modules from BINP Novosibirsk received and being assembled or tested.
- Final large orders (magnets) placed, production so far on schedule.

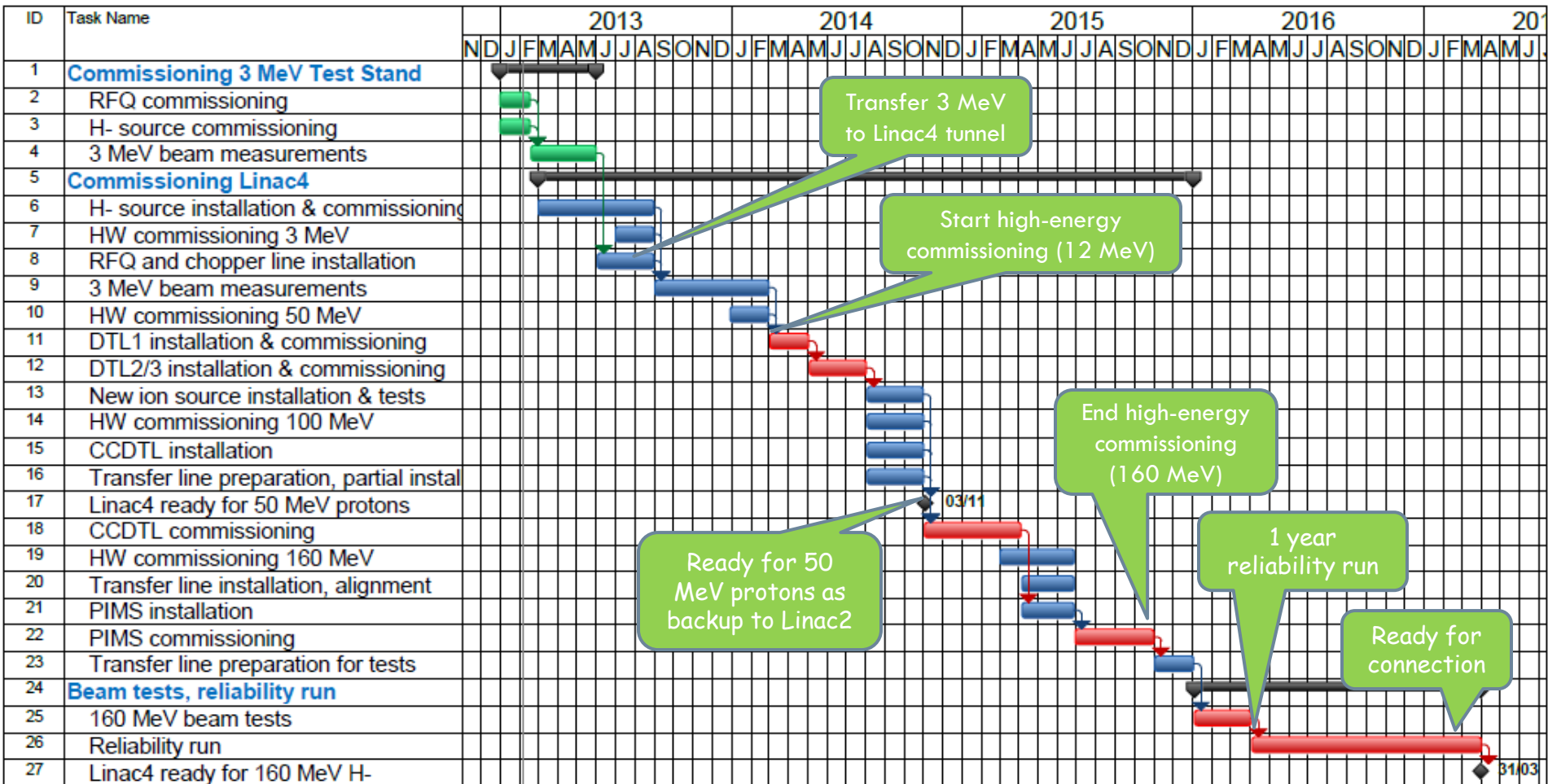




Linac4 Masterplan



2013/16 Masterplan, adapted to limited availability of resources during Long Shutdown 1 (2013/14)



Options for connection to the PS Booster:

- a) Long Shutdown 2 (2018?) or b) intermediate length shut-down after end 2016