Revised 30 January 2007

These estimates of the maximum physics beam time, energy and luminosity in 2007-2010 have been put together, ***for computing capacity planning purposes only.***

The beam time estimates for 2007/08 are my conclusions from a meeting with Jos Engelen, Lyn Evans, Steve Myerrs and the computing coordinators on 12 July, with a ramp to the TDR assumption of 10^7 seconds for protons in 2010.

The energy is taken simply as 450+450 Gev in 2007 and 7+7Tev in later years.

The luminosity estimates are taken from presentations at Chamonix 2006 and the June meeting of the LHC Commissioning Working Group (see note by Jürgen Knobloch below).

year	***energy***	***proton luminosity***	***physics beam time***
2007	450+450 GeV	$5x10^{30}$	protons - 26 days at 30% overall efficiency ➔ $0.7*10^6$ seconds
2008	7+7 TeV	$0.5x10^{33}$	protons - starting beginning July - $4*10^6$ seconds ions - end of run - 5 days at 50% overall efficiency ➔ $0.2*10^6$ seconds
2009	7+7 TeV	$1x10^{33}$	protons:50% better than 2008 ➔ $6*10^6$ seconds ions: 20 days of beam at 50% efficiency ➔10^6 seconds
2010	7+7 TeV	$1x10^{34}$	TDR targets: protons: ➔ 10^7 seconds ions: ➔ integrated Luminosity =$1nb^{-1}$ (10^6 seconds at L=$10^{27}cm^{-2}sec^{-1}$)

Les Robertson
30 January 2007

Information on luminosity estimates assembled by Jürgen Knobloch

An interesting document concerning LHC commissioning is from R. Bailey:
http://ab-div.web.cern.ch/ab-div/Conferences/Chamonix/Chamx2006/PAPERS/RB_1_01.pdf

He gives Luminosities for four stages:

- Stage 1 (pilot run) : L=5x10**30
- Stage 2 (75ns op.) : L=2x10**32
- Stage 3 (25ns phase 1) : L=1x10**33
- Stage 4 (25ns phase 2) : L=1x10**34

There is also an LHC Commissioning Working Group: http://lhccwg.web.cern.ch/lhccwg/

In their meeting of 28.06.2006, R. Saban presented "A look at 2008": http://lhccwg.web.cern.ch/lhccwg/Meetings/2006.06.28/LHCCWG%20060628.ppt. From this I conclude that the most likely physics start in 2008 is mid-July (it could also be end-May).

From the slides of R. Bailey at the same meeting: http://lhccwg.web.cern.ch/lhccwg/Meetings/2006.06.28/LHC%20Schedule.ppt one can get some idea on how the stages mentioned above are distributed in time (slide 8):

- Stage 1: 50% of 2008 running
- Stage 2: 25% of 2008 running
- Stage 3: 25% of 2008 running

Putting this together would give on average L=0.5x10**33.

The installation of dilution kickers (MKB) takes place in this schedule only at the end of 2009; ergo the 2009 run will be "Stage 3" - L=1x10**33.

Other information on the LHC-web (http://lhc-commissioning.web.cern.ch/lhc-commissioning/) may give some more optimistic view - a factor 2 better.

This would bring 2009 to L=2x10**33 - which is the assumption made in the TDR; and 2008 to L=1x10**33.