

Proton Parameters for 2.4 MW

P. Derwent, S. Holmes, I. Kourbanis, V. Lebedev
2 June 2014

This note documents the various possible proton scenarios to achieve 2.4 MW on the LBNE target. Input assumptions are a 1.2 second cycle for a 120 GeV extraction energy and 15e13 protons per cycle. Slip stacking is not feasible at these intensities and a new 8 GeV source providing the required intensity per bunch is assumed to be in operation. For a 15 Hz source, the minimum cycle time is 0.4 seconds. For a 20 Hz source, the minimum cycle time is 0.3 seconds.

Proton Intensities

The proton energy, the number of protons per cycle, and the cycle time give target power:

$$P = 0.0016 \frac{E N}{t} \text{ MW}$$

where E is in GeV, N is in 1e13, and t is in seconds. For the following table, cycle times correspond to realistic MI ramps and have been rounded to the nearest 1/20 of a second.

Energy (GeV)	Intensity (1e13)	Cycle Time (sec)	Power (MW)
120	15	1.2	2.4
110	15	1.1	2.4
100	15	1.05	2.29
90	15	0.95	2.13
80	15	0.9	2.13
70	15	0.8	2.1
60	15	0.7	2.06
50	15	0.65	1.85
40	15	0.55	1.75
30	15	0.45	1.6

