Conceptual Design of a Free Electron Laser System as a Laser Fusion Reactor Driver, E.L. SALDIN, E.A. SCHNEIDMILLER, YU.N. ULYANOV, ASC (Samara, Russia), M.V. YURKOV, JINR (Dubna) - This report presents the further development of a concept of a FEL based driver for commercial inertial confinement fusion reactor. We have shown technical feasibility of constructing a laser system with the following parameters: laser light wavelength 0.5 μm, flash energy 3.5 MJ, repetition rate 10 pps and net efficiency 10%. It becomes possible due to the use of multi-channel, multi-stage FEL amplifier with diaphragm focusing line. The driving beam for the FEL amplifier is produced by accelerator complex consisting of four 3 GeV RF linear accelerators operating at a frequency of 500 MHz. Peculiar feature of the scheme is that it requires relatively low current RF accelerators (with the average over macropulse current about 4 A). Also we analyse in detail technical feasibility of the proposed scheme and estimate the cost of the driver.