Heliotron reactors are characterized by a pair of helical coils with large major radius but moderate aspect ratio, which give us different approaches for power plants from tokamak reactors. Based on the recent experiment results of LHD and the technology-cost basis of magnets developed for LHD and ITER construction, the design window analysis has been carried out. We found that the Heliotron reactors have the technically and economically attractive design windows, where the major radius is increased as large as for the sufficient blanket space, but the magnetic stored energy is decreased to reasonable level because of lower magnetic field with the convenient physics basis of H factor near 1.1 and $\beta$ of 5%.

For searching design windows of Heliotron reactors and for discussing their potential as power plants, we have developed a mass-cost estimating model linked with system design code- HeliCos. The major relationships between plasma parameters and reactor parameters are identified. The main calculation flows and issues to be considered are shown in Fig. 1.

Figure 2 show the COEs (cost of electricity) of Heliotron reactors which depend on plasma major radius $R_p$, coil pitch parameter $\gamma$ and $\beta$, show the bottom near $R_p=15−15.5m$ with blanket space condition $\Delta d=1.1m$.