Technology options for the accelerator powering

The accelerator powering chapter is focused on the design of a system that is capable of providing the very high power to the resistive magnets. The preliminary specifications for the design of the powering system are reported in Figure 1 Preliminary specification for the dimensioning of the powering system

	RCS1	RCS2	RCS3	RCS4
Inj Energy [GeV]	63	314	750	1500
Acc. length [km]	5.99	5.99	10.7	35.0
Res. mags Lm [km]	3.65	2.54	4.37	20.38
Binj in gap [T]	0.36	−1.8	−1.8	−1.8
Bextr in gap [T]	1.8	1.8	1.8	1.8
B ramp time Tramp [ms]	0.35	1.10	2.37	6.37
Trepetition [ms]	200	200	200	200
Dipoles Gap w [mm]	100	100	100	100
Dipoles Gap h [mm]	30	30	30	30
Dipoles Egap@Bext [MJ]	14.1	9.8	16.9	78.8
Dipoles Etot@Bext [MJ]	21.2	14.7	25.3	118.2
Dipoles Pmax [GW]	111	54	43	74

Figure 1 Preliminary specification for the dimensioning of the powering system

The key performance drivers are directly related to the total energy and power to be delivered to the magnets, but also to the tracking accuracy that will have to be guaranteed.

Two main powering schemes will be considered for the task. They are identified as Full Wave (left) and Commutated (right) resonance.

Due to the high powers involved, several separated circuits will be required. The Circuital simulation of these and the development of a congruent control strategy is an important milestone in this activity.

The dimensioning rules of all the components will be studied. These include the energy storage elements (capacitors and inductance) and the power electronics devices (Thyristors and IGBTs).

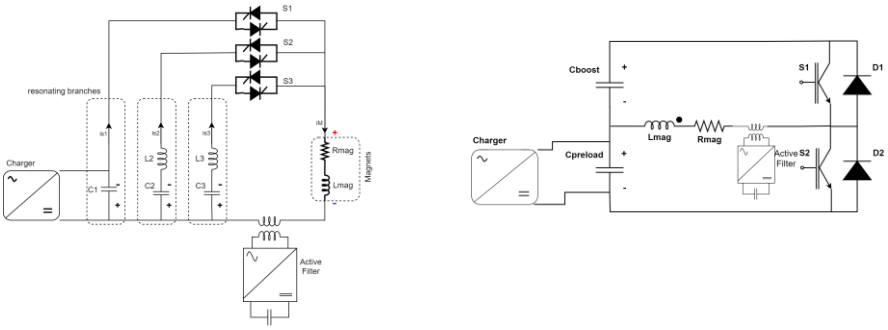

Figure 2Full wave (left) and commutated (right) resonance power schemes

The activity is part of the task3 of magnets work package. The overall working plan for task3 including activities of resistive magnets design is enlisted in the overall workplan provided with the review material