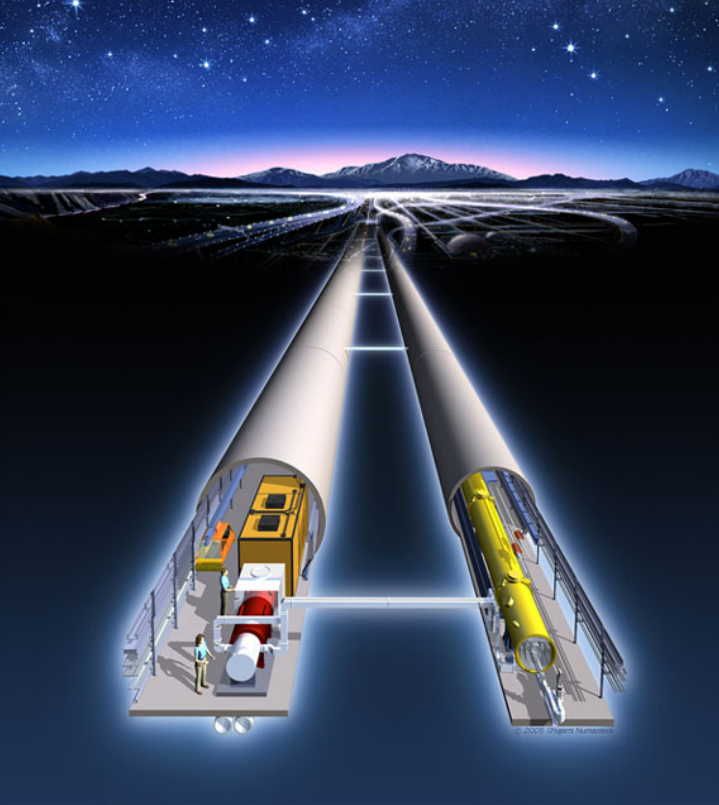


European Industries Potential Capabilities on Cryogenics for the Future ILC

P. Dauguet

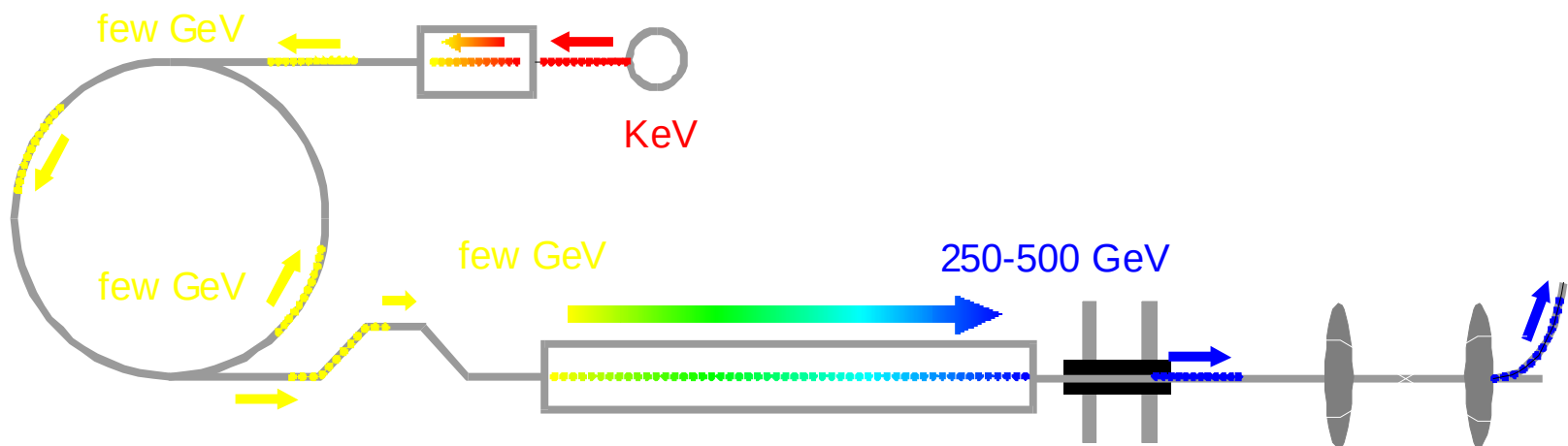
International Linear Collider



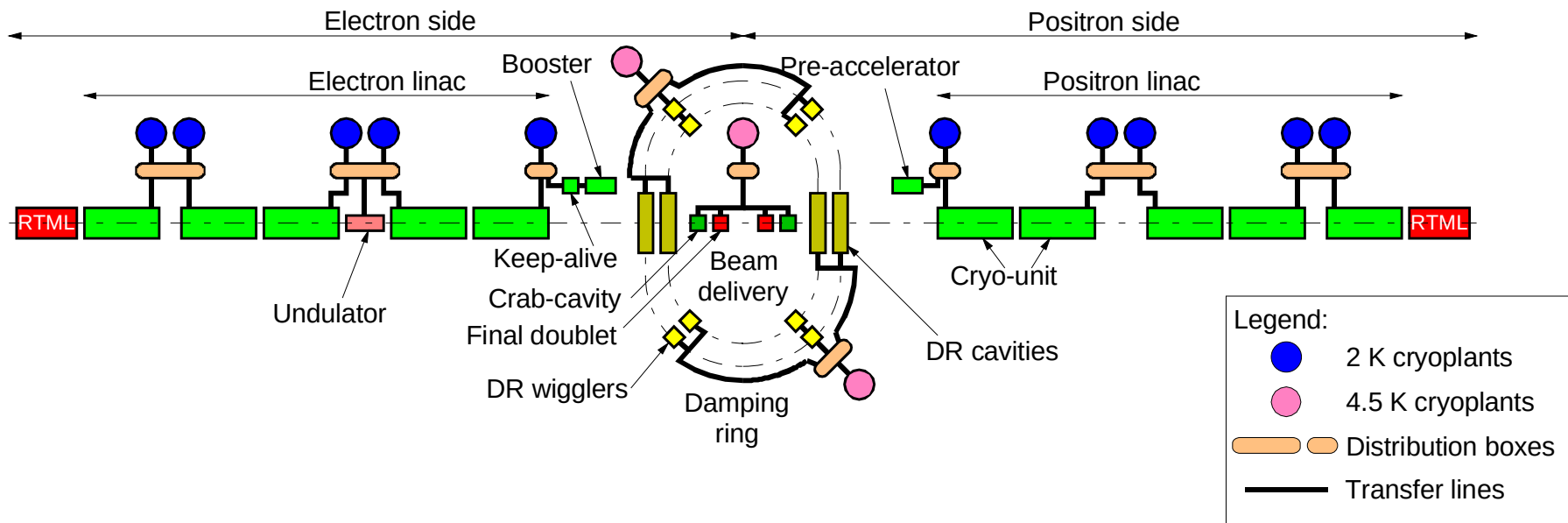
$e^+ e^-$ linear collider

Collision energy 500 GeV c.m. initially, later upgrade to 1 TeV c.m.

Overall length 47 km, of which 22 km linacs



ILC cryogenic layout (Phase 1)

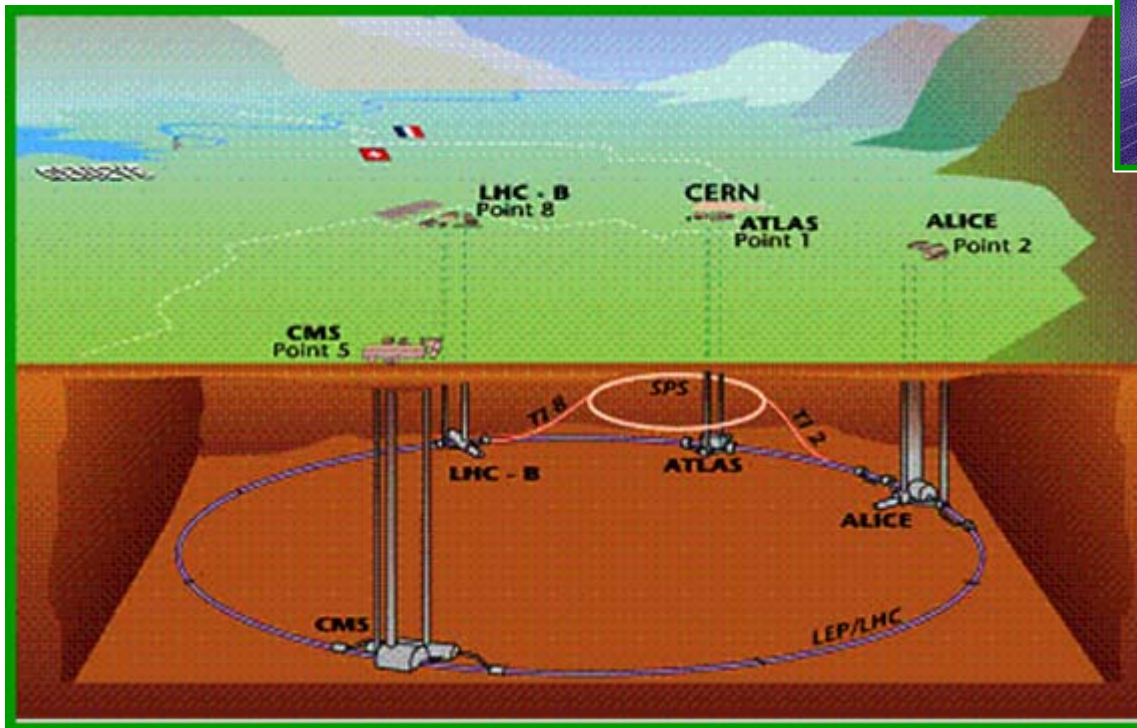
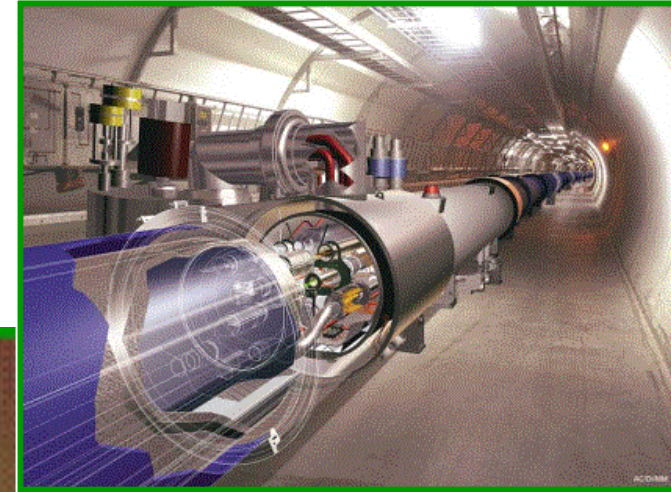


- Cryoplants: Ten 2 K cryoplants and three 4.5 K cryoplants
 - ✓ Total installed power: 211 kW @ 4.5 K including 37 kW @ 2 K
 - ✓ Size of largest plants: 20 kW @ 4.5 K including 3.7 kW @ 2 K
- Distribution
 - ✓ 26 distribution boxes and 132 string feed boxes
 - ✓ 10 km of compound transfer lines
- Inventory: ~100 t of helium

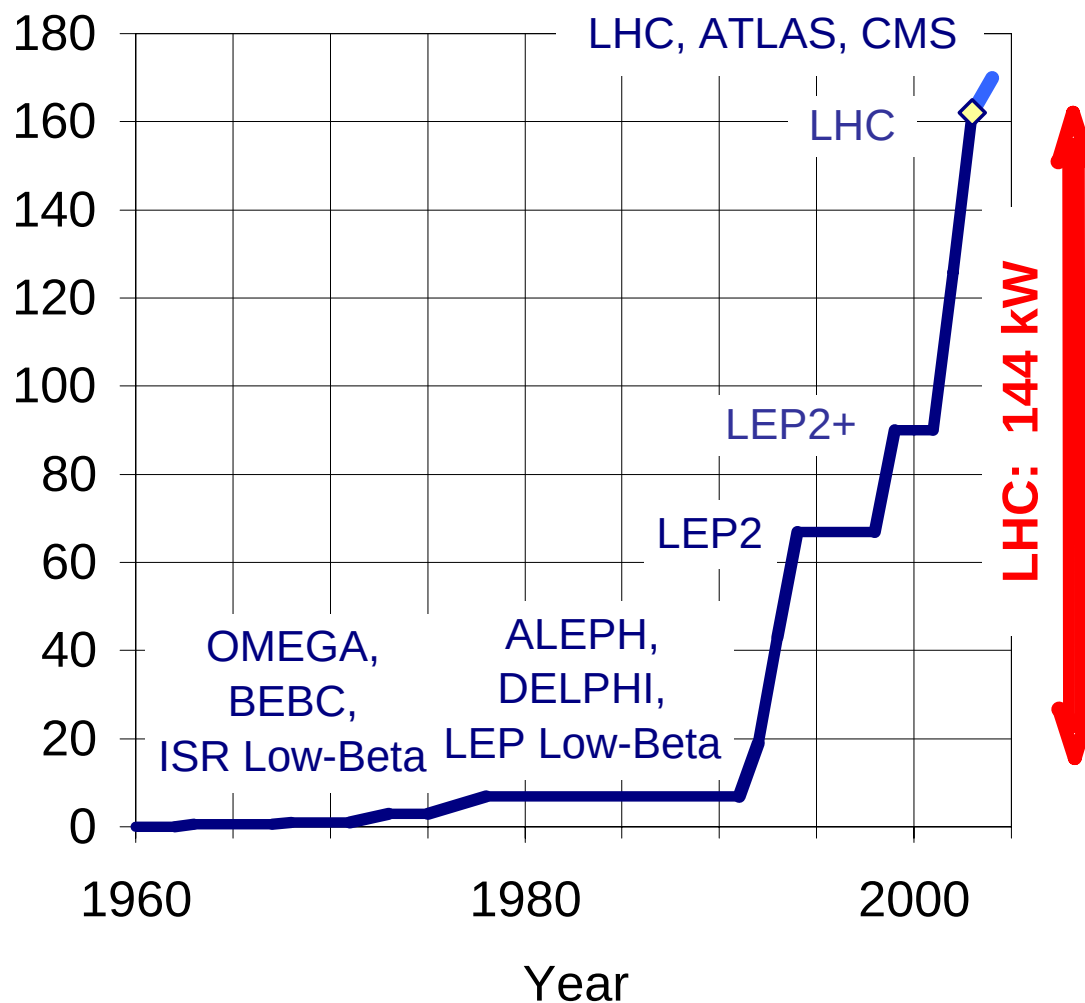
A similar project : LHC at CERN

LHC is the largest particle accelerator in the world.

Length : 27 km,
Cryo-magnets and cavities operated at 1.9 K
100 m below ground level.



LHC : the largest helium refrigeration system ever built

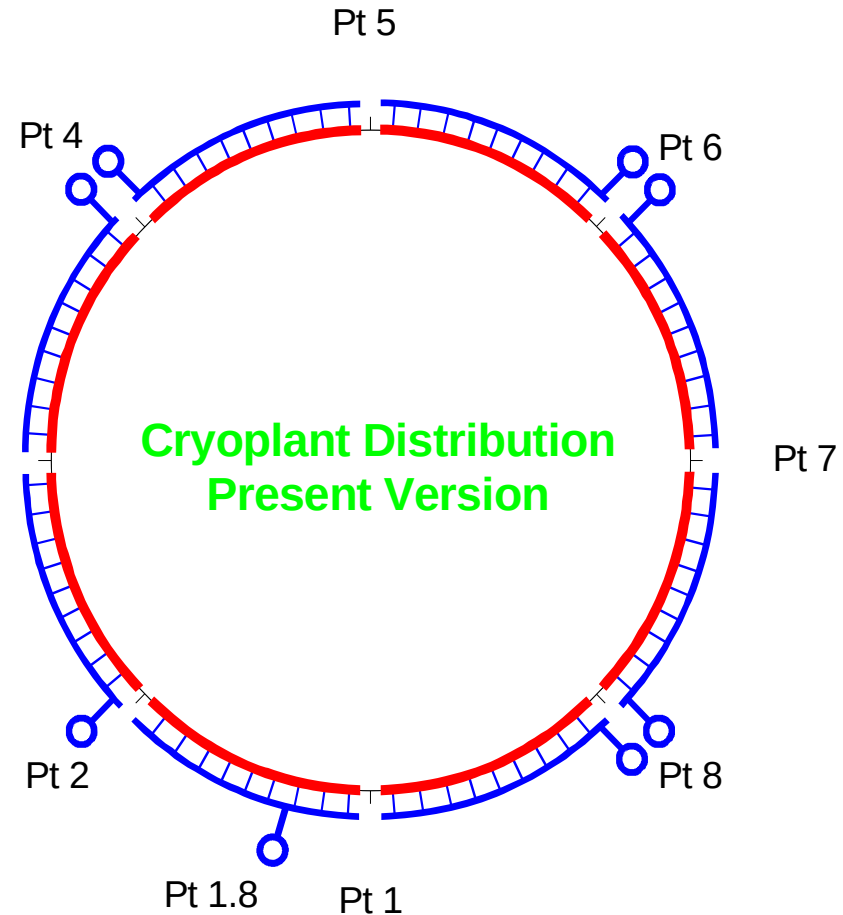
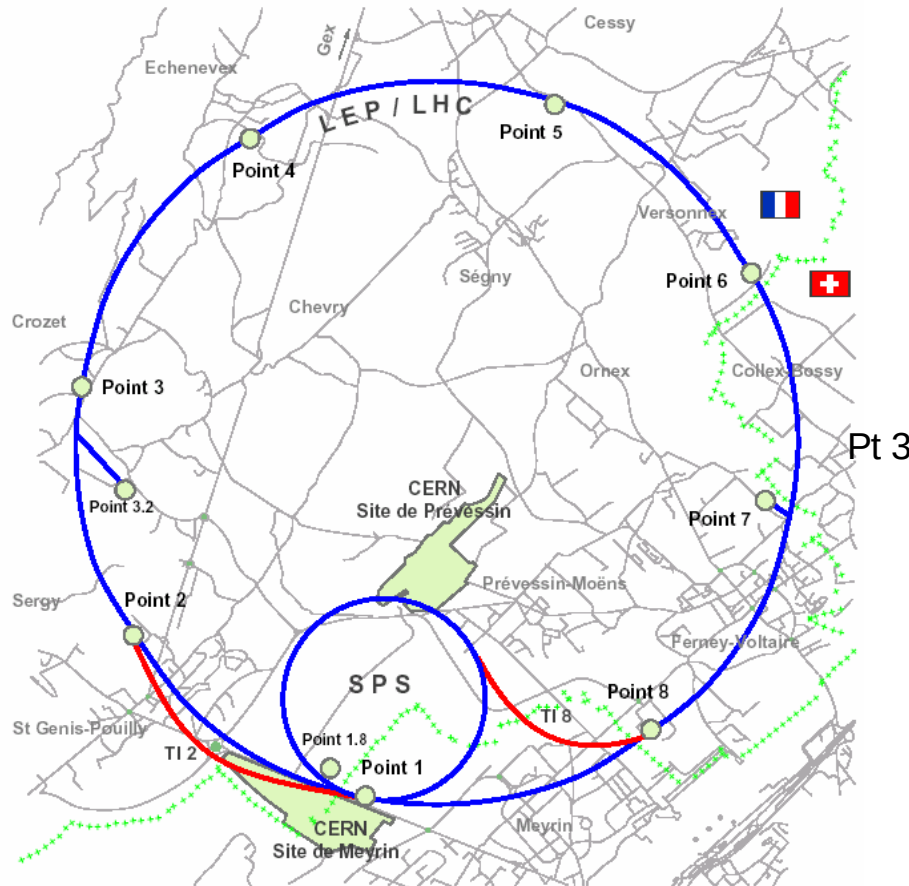


Layout of LHC Cryogenics

8 x 18kW @ 4.5 K - 8 x 2.4 kW @ 1.8K

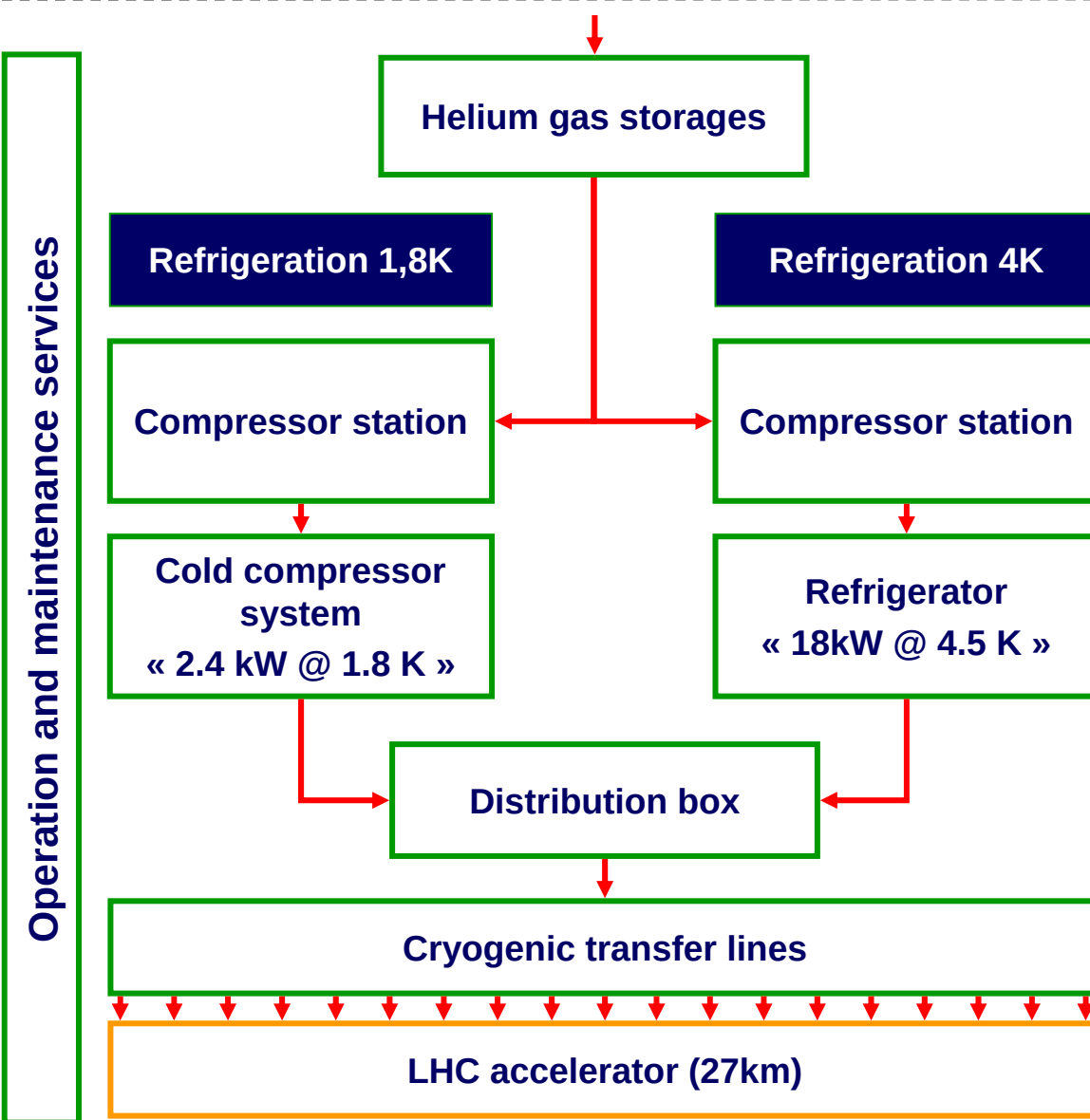
27 km of cryogenic transfer lines

36'000 t @ 1.9K - 130 t He inventory

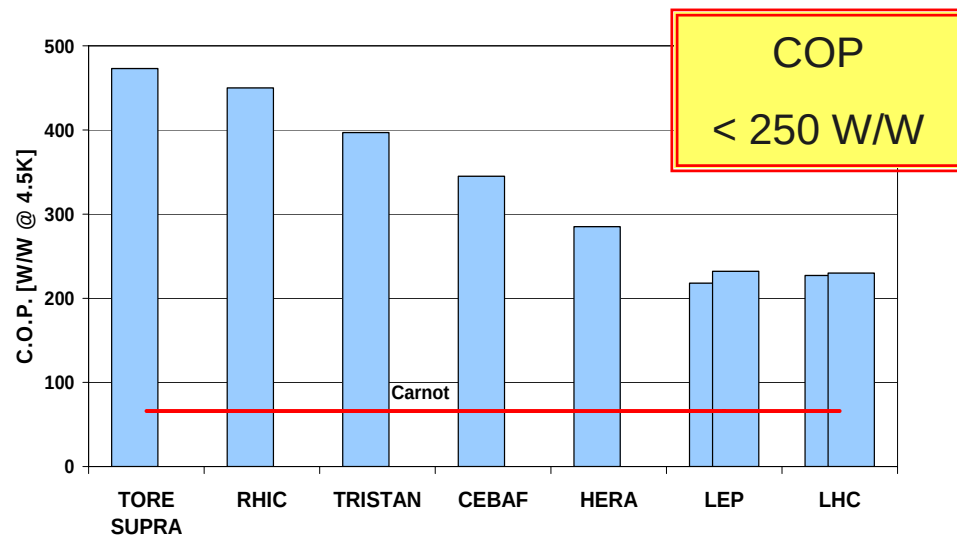


○ Cryogenic plant

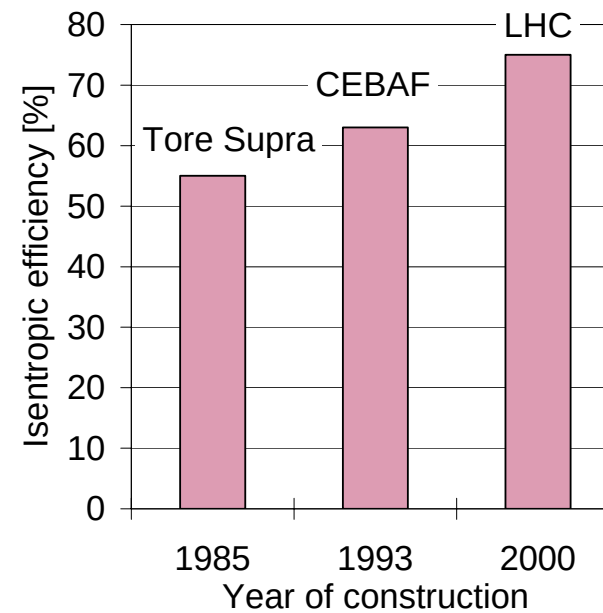
LHC cryogenics



18 kW @ 4.5 K Refrigerators



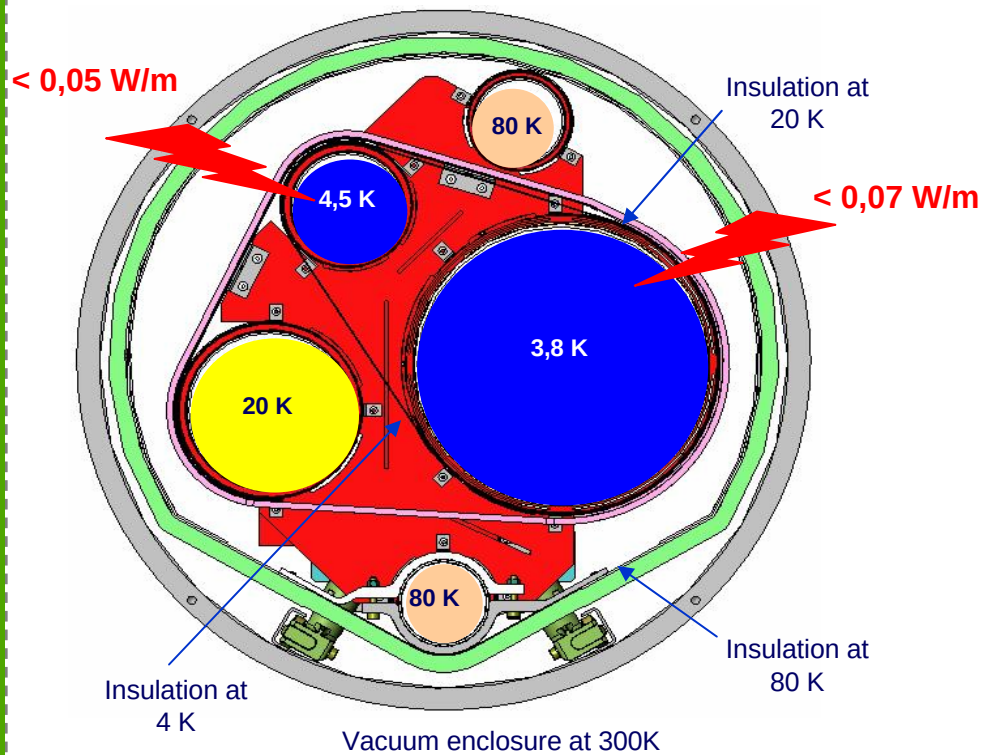
2400 W @ 1.8K Refrigeration units



5 Distribution valve boxes



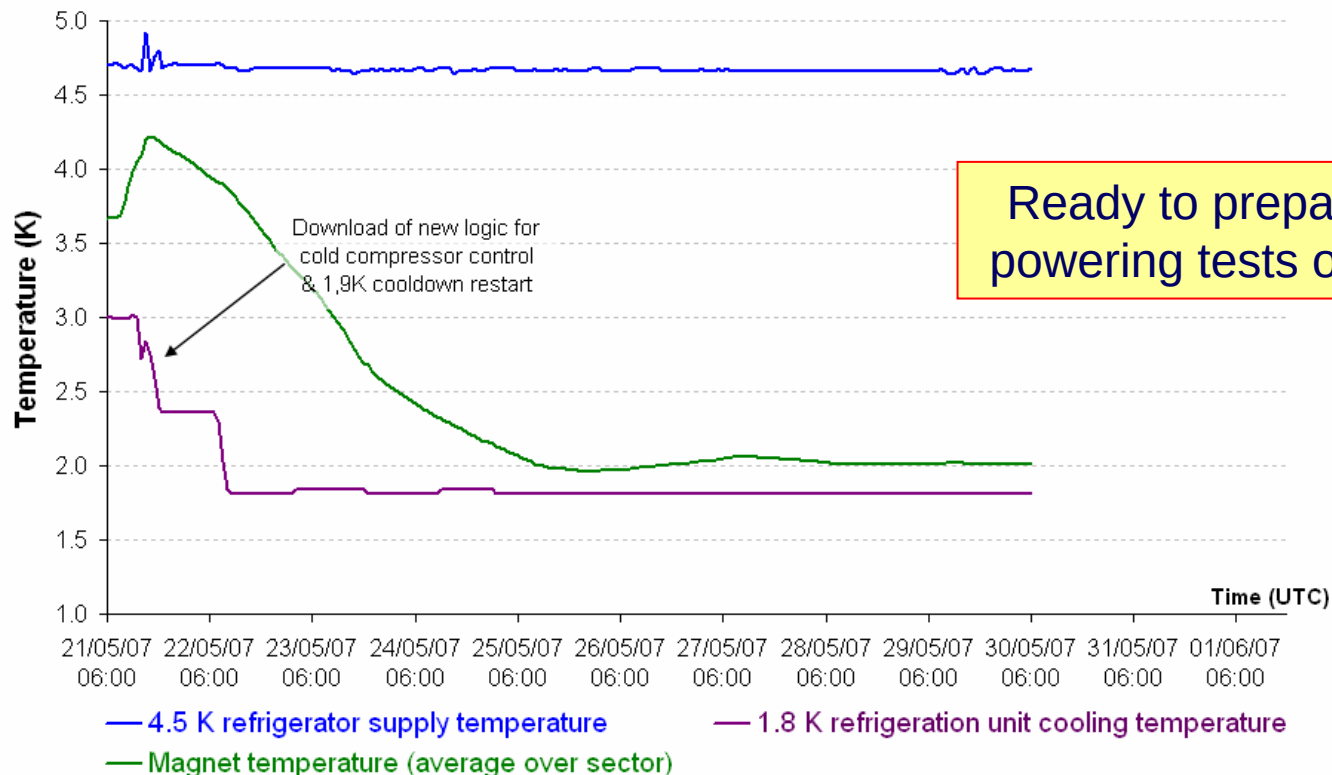
27 km of Cryogenic transfer lines with top performances



- The Largest distributed superfluid helium system in the world is operational at CERN
- ... Next step : ILC ...



LHC sector 78 - First cooldown - 1.9 K normal operation





**Thank you
for your
attention !**