



**FUSION
FOR
ENERGY**

The EU in-kind contribution to the ITER Cryoplant

Cryoplant workshop - 2nd October 2009

Marc Simon – Jarl Buskop (F4E)



china eu india japan korea russia usa

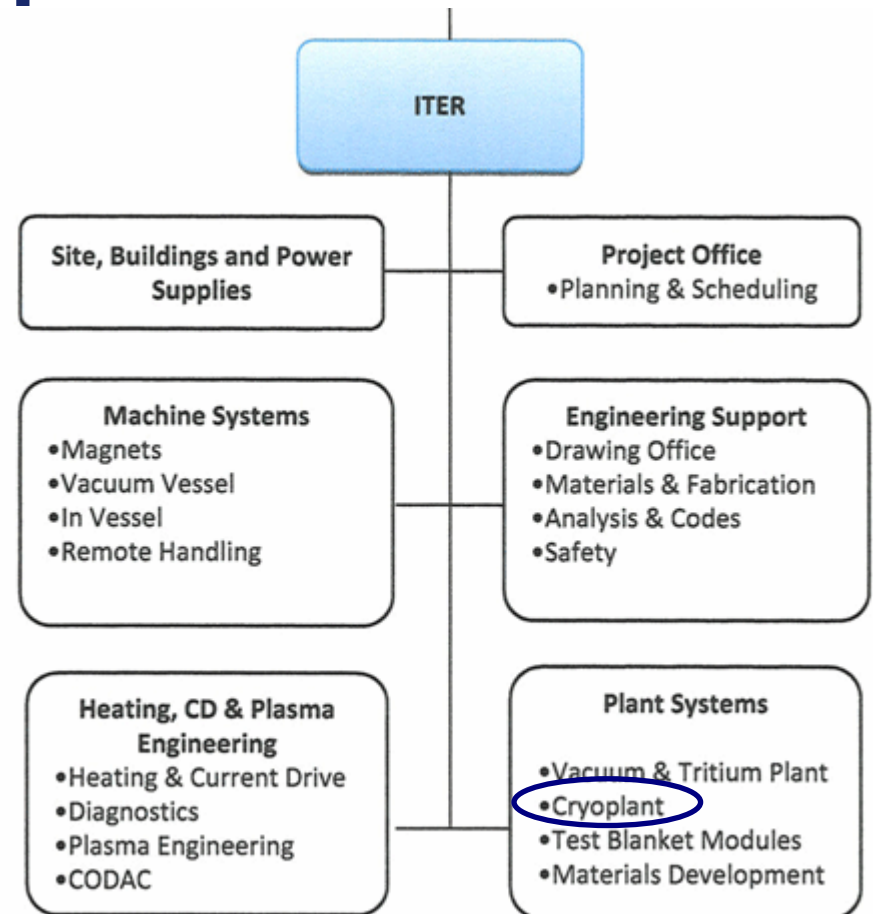


Content

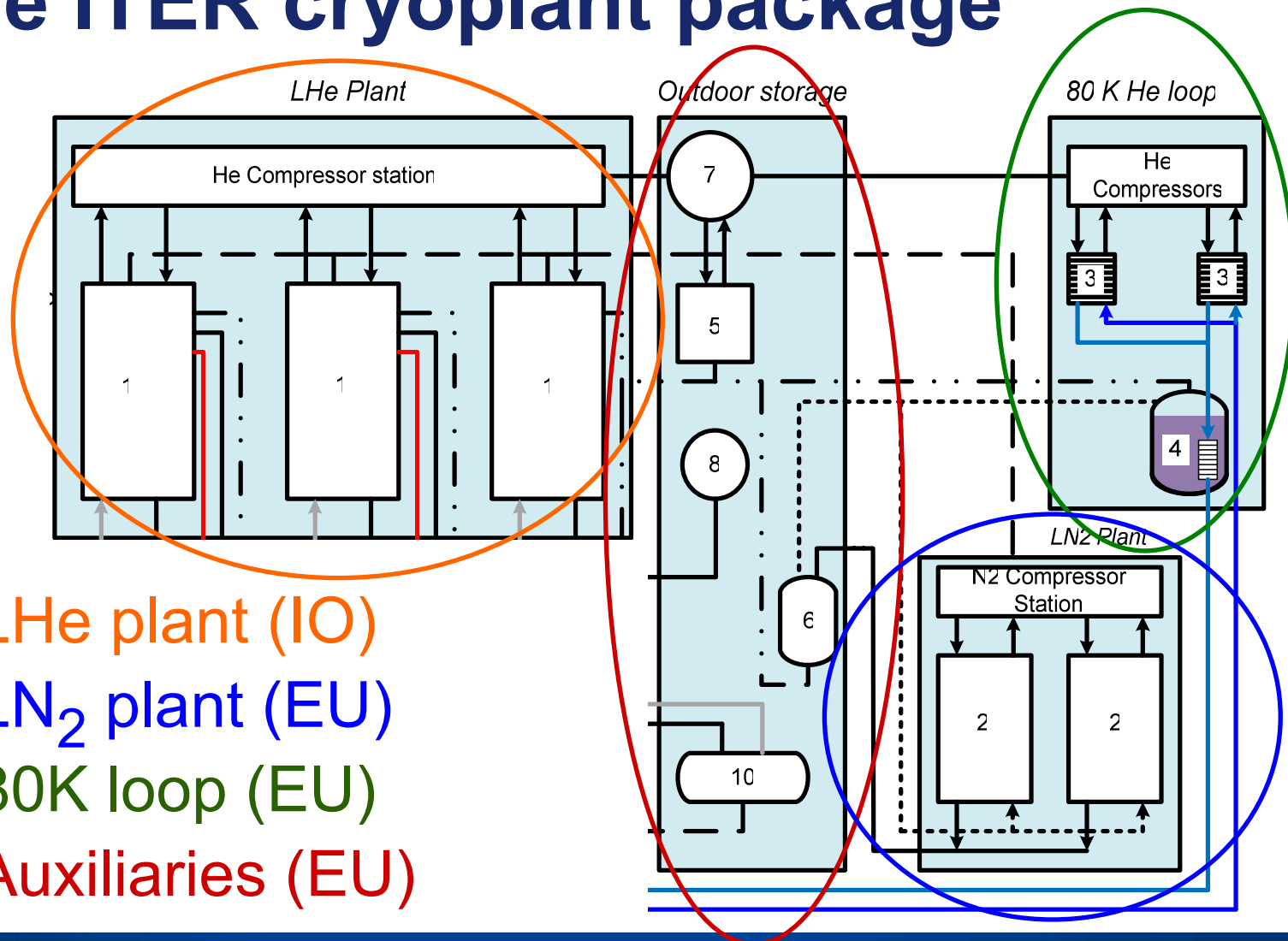
- Fusion for Energy Cryoplant group
- The EU cryoplant package
- Current status
- Industrial needs
- How you can get involved

F4E Cryoplant team

- Part of F4E/ITER department /Plant systems
- Currently 2 members
 - Jarl Buskop
 - Marc Simon
- Will grow through to 2012



The ITER cryoplant package



- LHe plant (IO)
- LN₂ plant (EU)
- 80K loop (EU)
- Auxiliaries (EU)

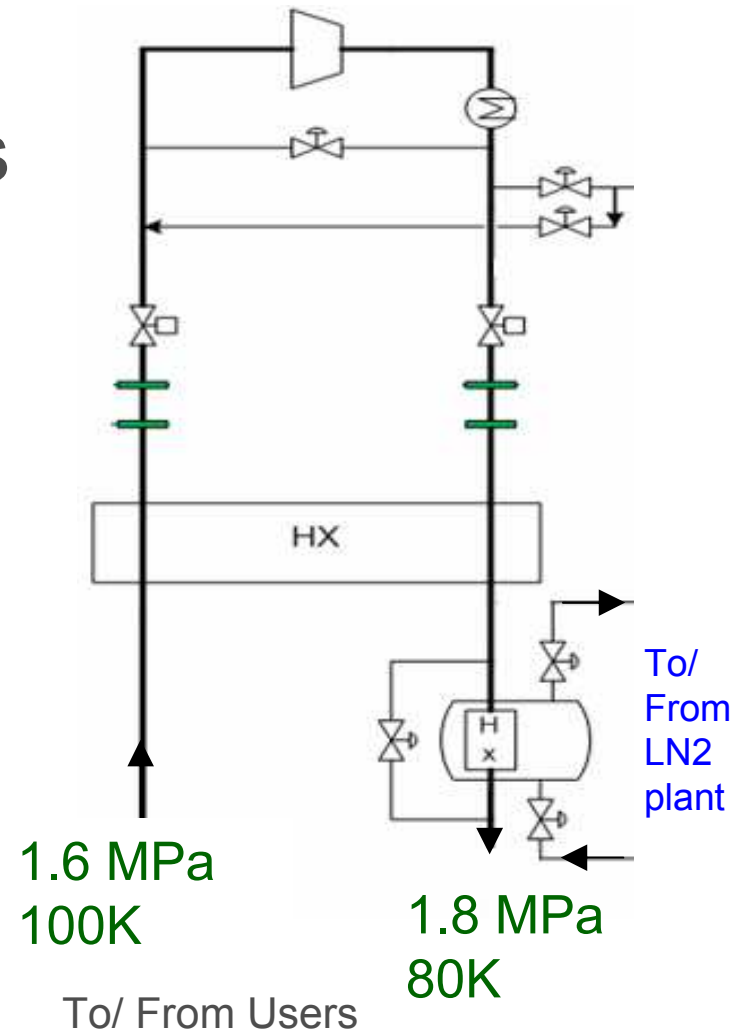
LN₂ plant overview

- Main users (estimated peak load @ 80K)
 - 80K loop for thermal shields (750 kW)
 - LHe plant precooling (300 kW)
 - Helium purification unit (30 kW)
- Current baseline design (incl. margins)
 - 2 x 650 kW @ 80K
 - Closed loop system

80K loop overview

- Used for thermal shields cooling
- Current baseline
2 x 450 kW @ 80K
- Design options under investigation

Current 80K loop PFD



Storage tanks

Gas management policy under development

He inventory : **24 t**

Warm vessels
5300 m³ 2 MPa
≈ 16 t

LHe dewar
15 m³ 0.12 MPa
≈ 2 t

80K Tanks
720 m³ 2 MPa
≈ 7 t

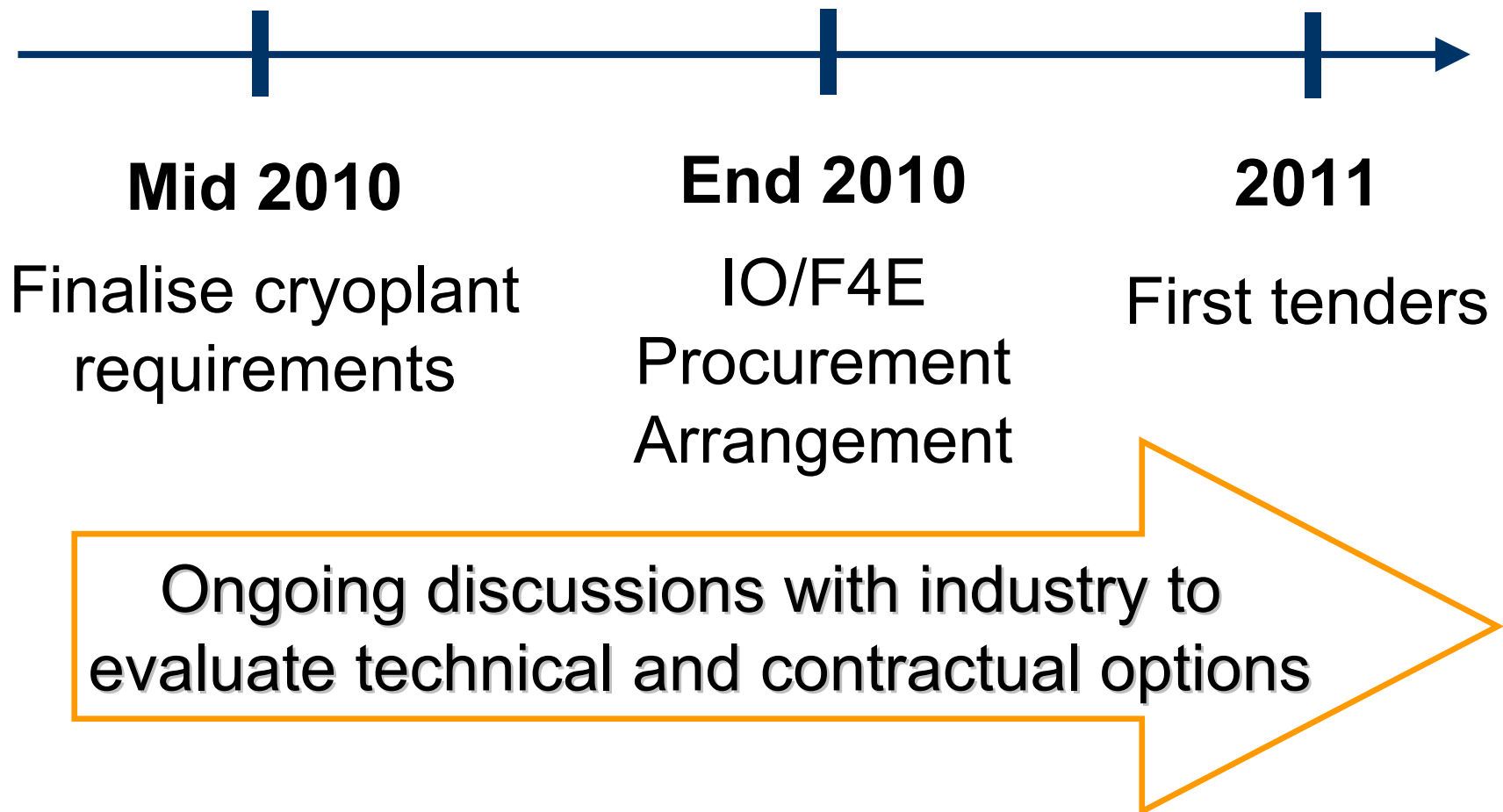
+ LN₂ storage : 100 m³

Other auxiliary systems

- Helium dryers
 - At the outlet of He cryoplant compressors
 - 3 units
 - He flow \approx 2 kg/s maximum
- He purification system
 - Dual LN₂ trap
 - Current baseline : 250 g/s of Helium



Current status





What do we need ?

- Rotating machinery
- Cold boxes
- Pressure and cryogenic storage vessels
- Local control systems

Integrated LN2 plant, 80 K loop, auxiliaries or their sub-components & integration →

Depending on capabilities of market parties

How you can get involved

- Get in contact with us directly or through your Industrial Liaison Officer

www.fusionforenergy.europa.eu

F4E Home > Procurements and Grants > Procurements
> Industrial Liaison Officers

- Keep informed through your national ILO, the F4E website, industrial workshops...
- Large contracts → contact potential partners



Conclusion

- Fusion for Energy is responsible for the supply of half of the ITER cryoplant
- Fusion for Energy will need industrial partners for the supply of components and to support the design, installation and commissioning of the system
- Major tenders will be launched from 2011