

Fortum Power Division

Jukka Kähkönen

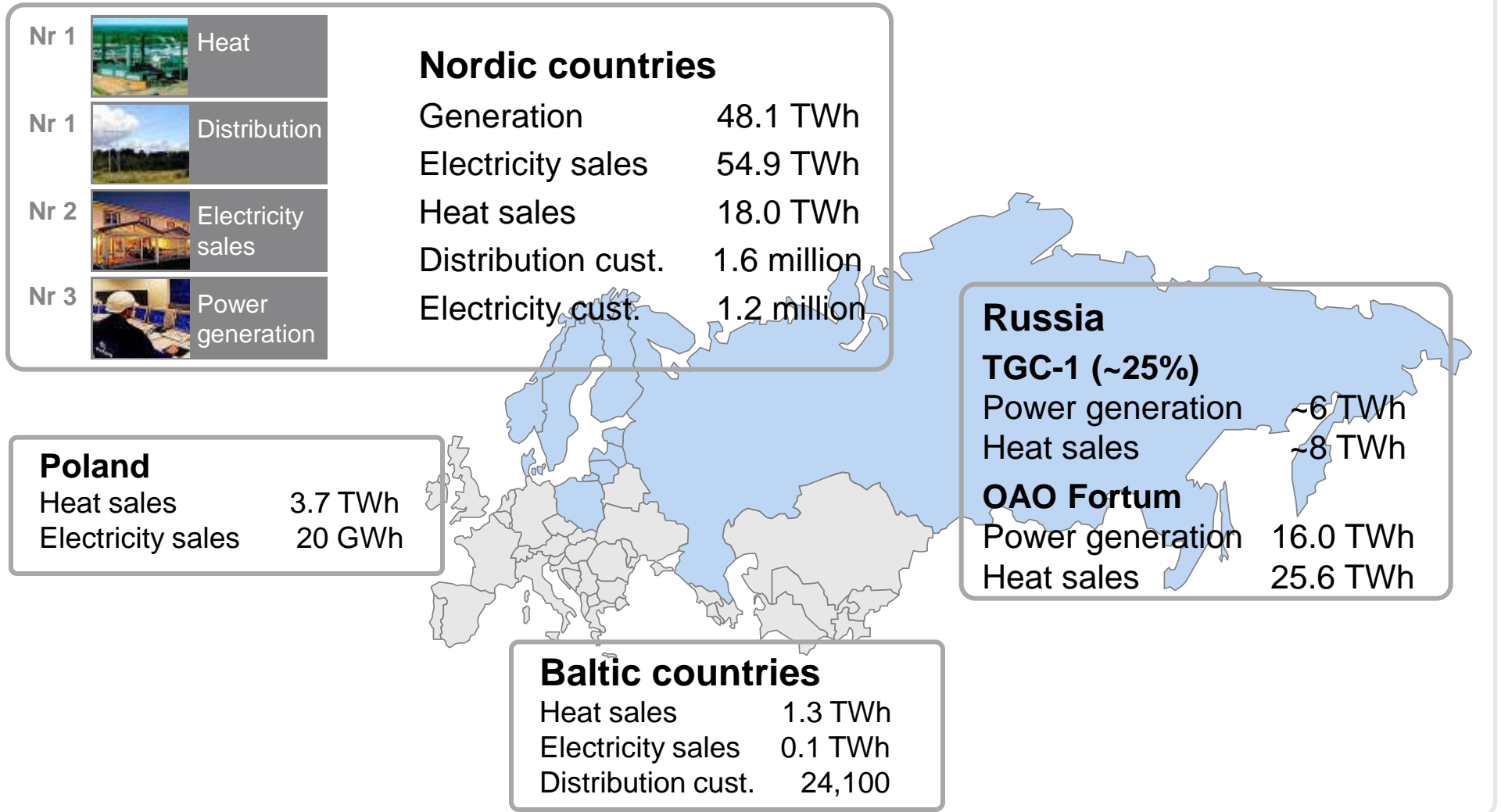
Email: jukka.kahkonen@fortum.com

Pentti Varpasuo

Email: pentti.varpasuo@fortum.com

Kick-off Workshop for AERB-USNRC Standard Problem Exercise,
30th June - 2nd July 2010, Mumbai, India

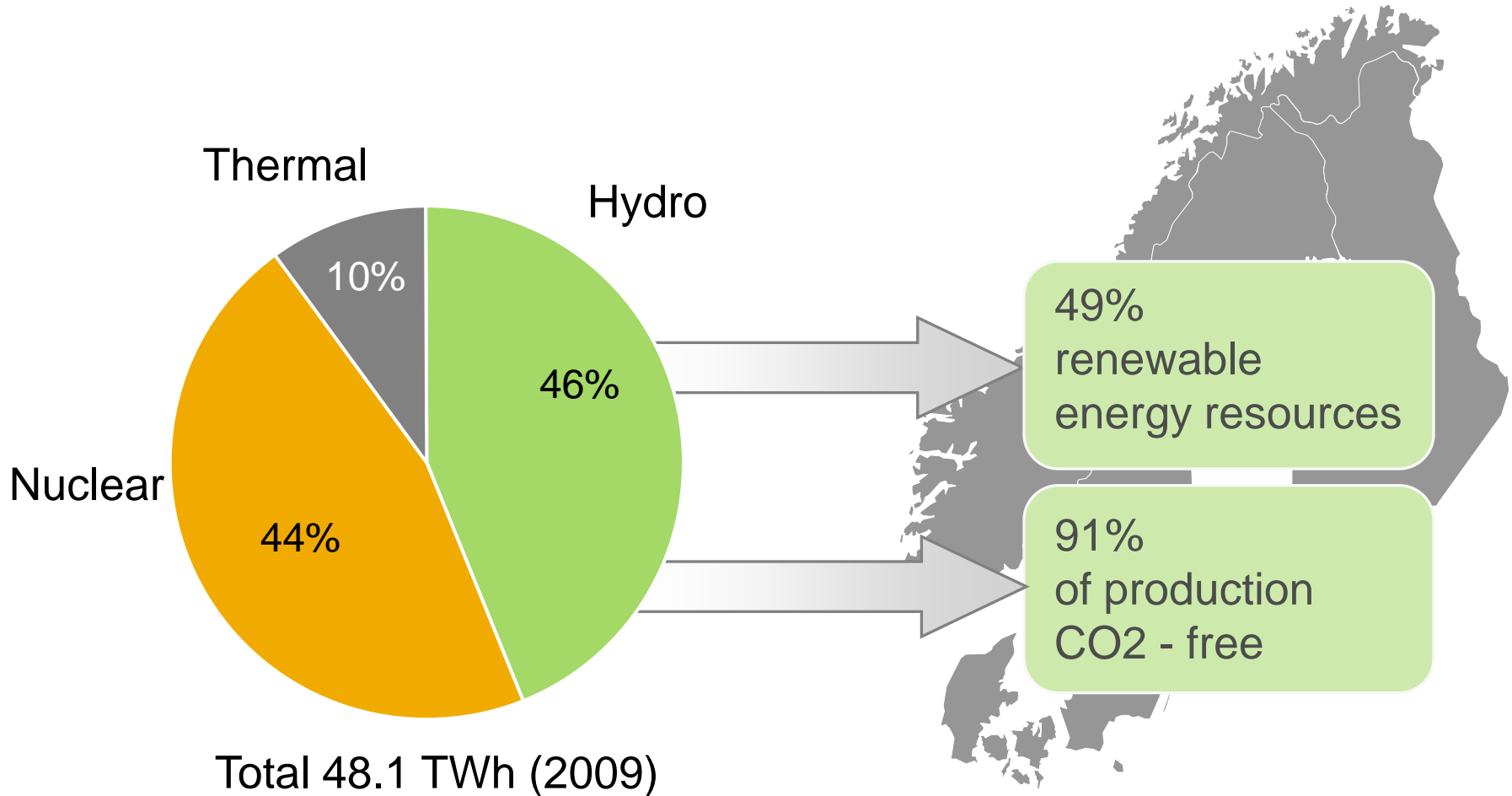
Our geographical presence today



Power Division's operational units

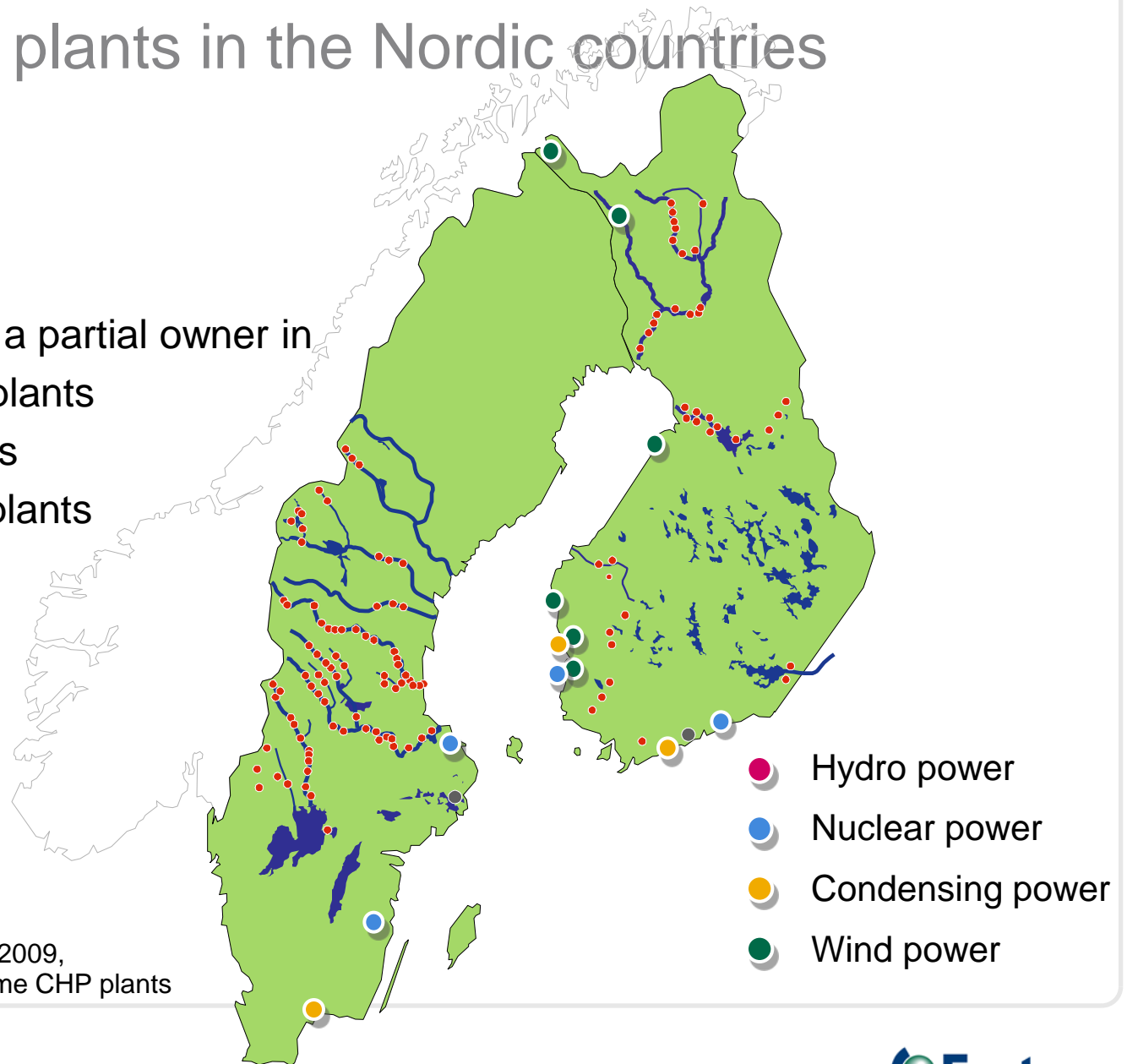


Fortum's power production in the Nordic Countries



Division's power plants in the Nordic countries

- Power Division owns or is a partial owner in
 - Ca 260 hydro power plants
 - 4 nuclear power plants
 - 3 condensing power plants
 - 6 wind power plants



Power Division power plants 31 December 2009,
Not including Fortum Heat and Fortum Värme CHP plants

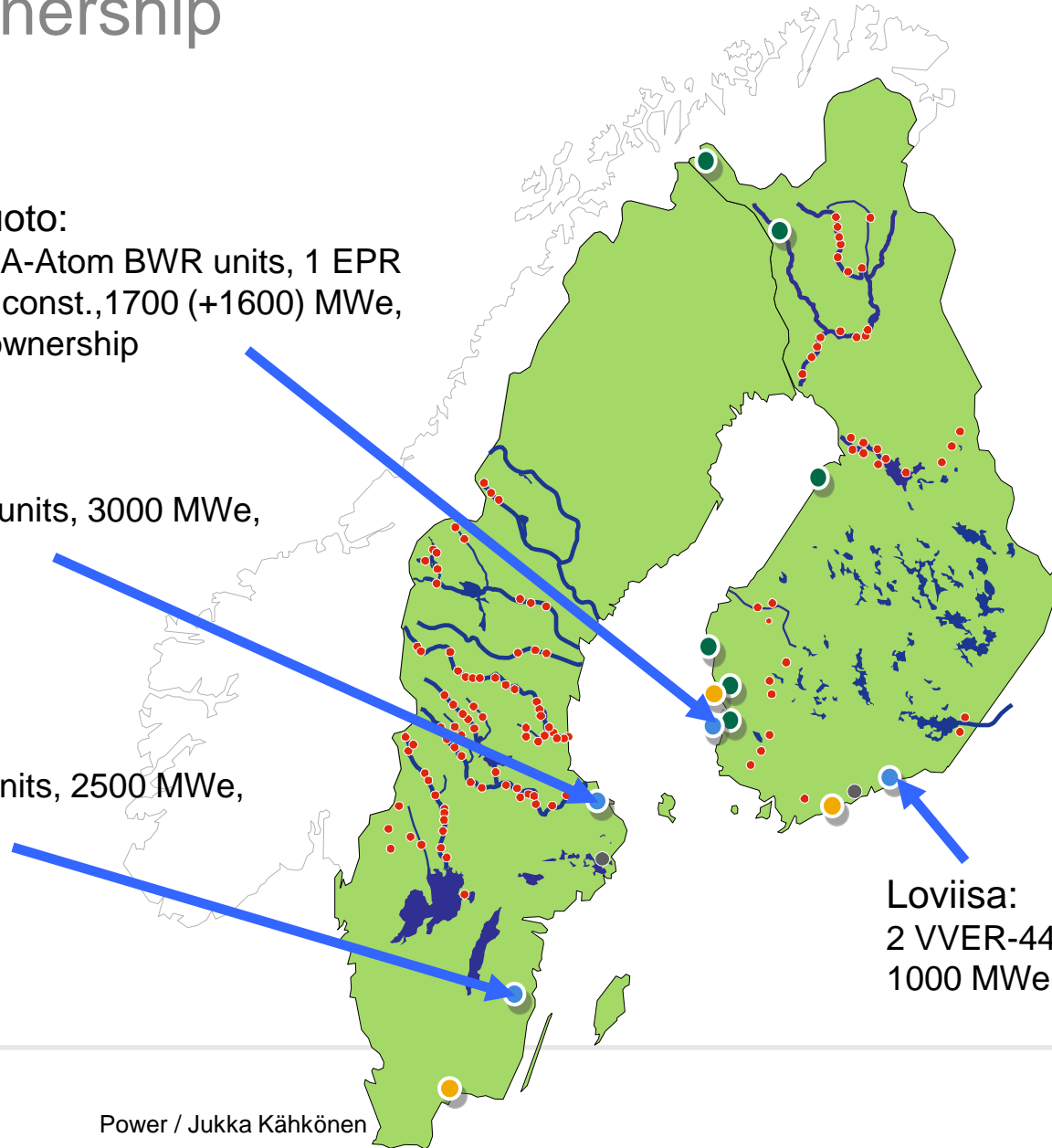
Nuclear ownership

Olkiluoto:
2 ASEA-Atom BWR units, 1 EPR
under const., 1700 (+1600) MWe,
27% ownership

Forsmark:
3 ABB-Atom BWR units, 3000 MWe,
22% ownership

Oskarshamn:
3 ASEA-ATOM BWR units, 2500 MWe,
46% ownership

Loviisa:
2 VVER-440 PWR units,
1000 MWe, 100% ownership



Employees 2010

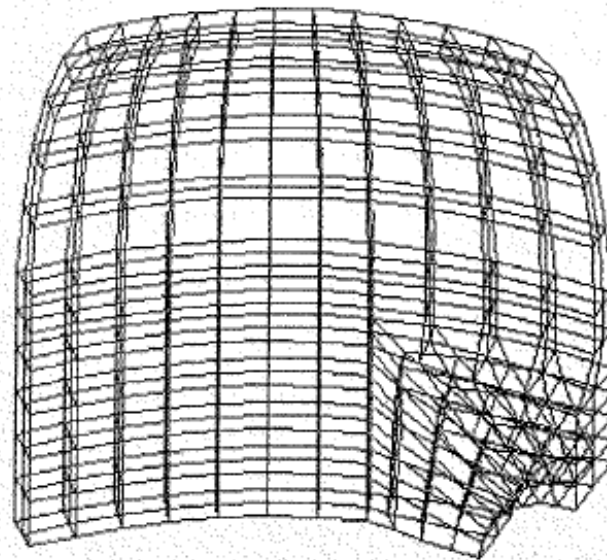
- Fortum Corporation: 13 500
- Power Division: 1700
- Nuclear related: 800
- Technical (engineering) support to nuclear power plants: 170
- Material and structural mechanics: 7

Our experience in containment analyses

- **1980: Juragua, Cuba**
 - VVER-440 plant type
 - hemispherical reinforced concrete containment
 - Plant was never utilized
 - Unit 1 80 percent completed
 - Unit 2 60 percent completed
- **1985: Loviisa 3, Finland**
 - Project postponed ... (Tshernobyl)
- **1992: Kola 3, Russian Federation**
 - projected canceled 1995
- **1995: Liaoning Unit 1, China**
 - site transferred later to Tianwan
- **2000: Tianwan, China**
 - Tianwan unit 1 connected to grid 2006
 - Tianwan unit 2 connected to grid 2007
- **2007: Loviisa 1 and 2, Finland**
 - Analysis of the replacement need for the steel containment anchoring bolts

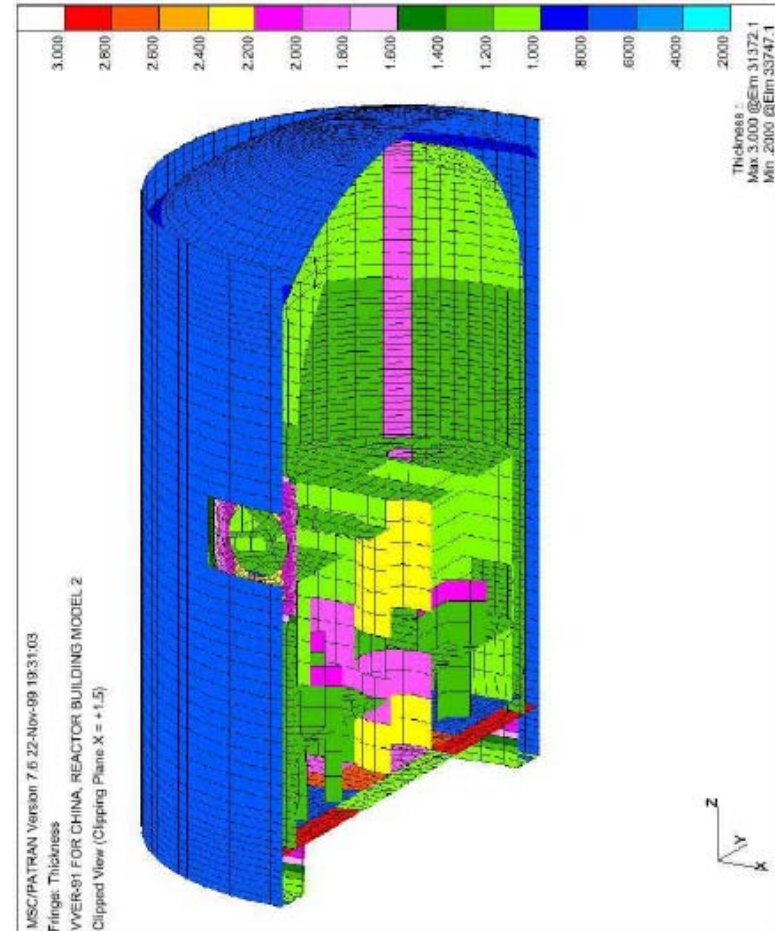
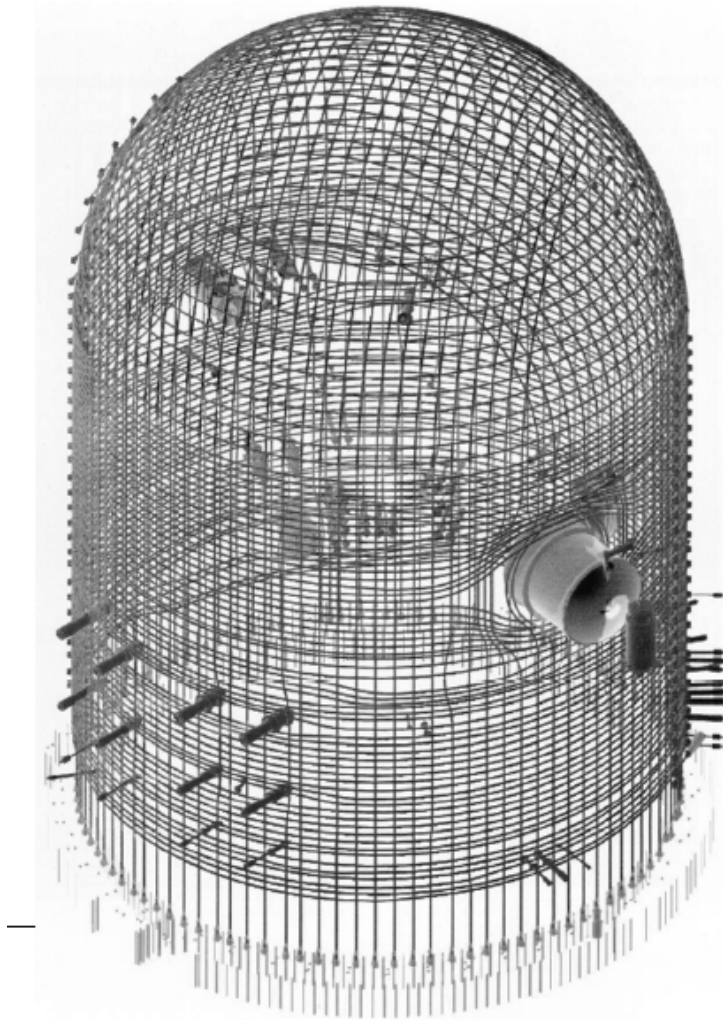
Modeling examples: Loviisa 3 (1985)

PRELIMINARY DESIGN OF A
VVER 440 MW NPS PRESTRESSED
CONCRETE CONTAINMENT BUILDING

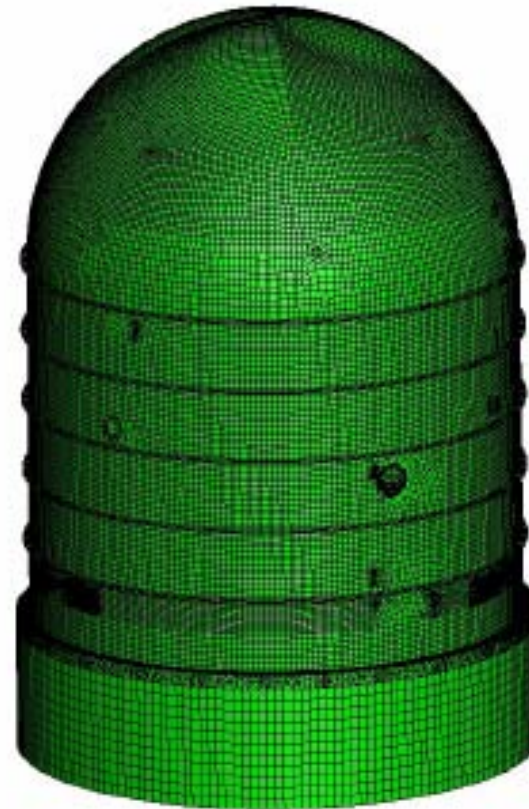
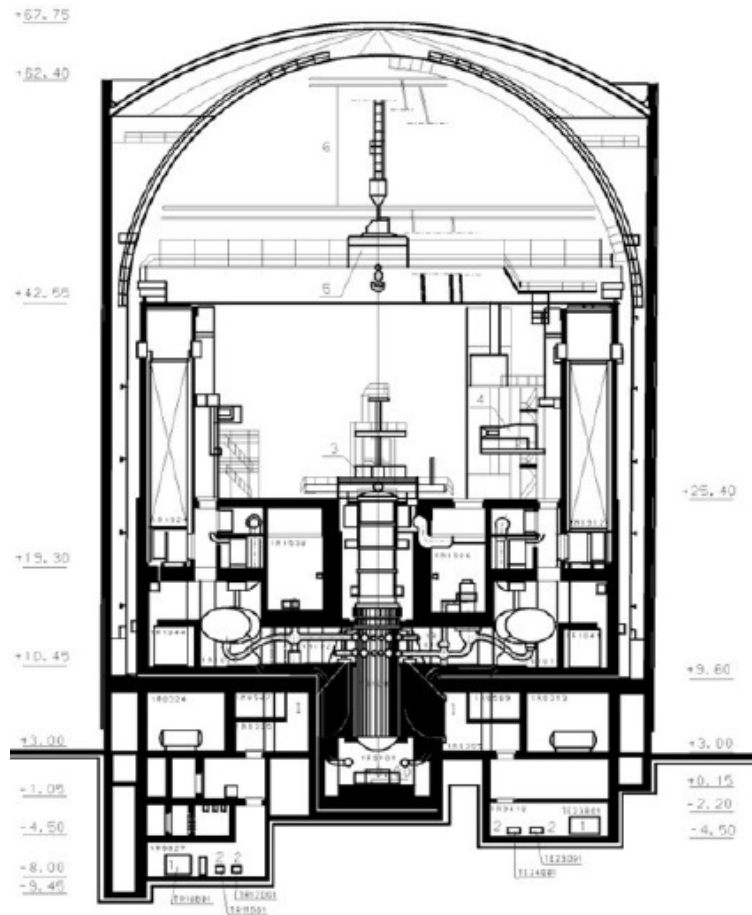


By
DR. P. VARPASUO
J. S. WHITCRAFT

Modeling examples: Tianwan (2000)

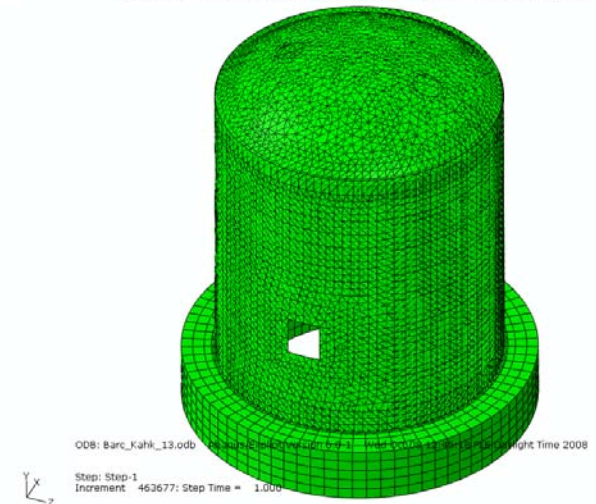
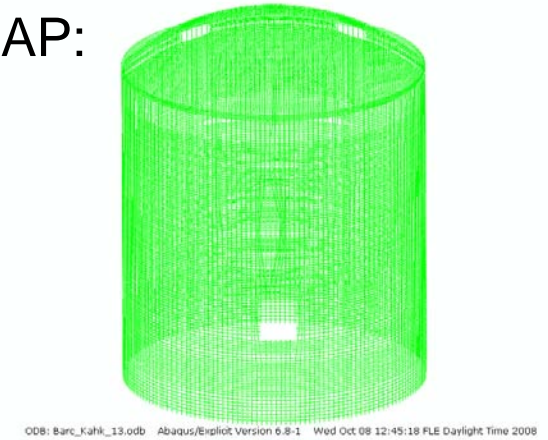
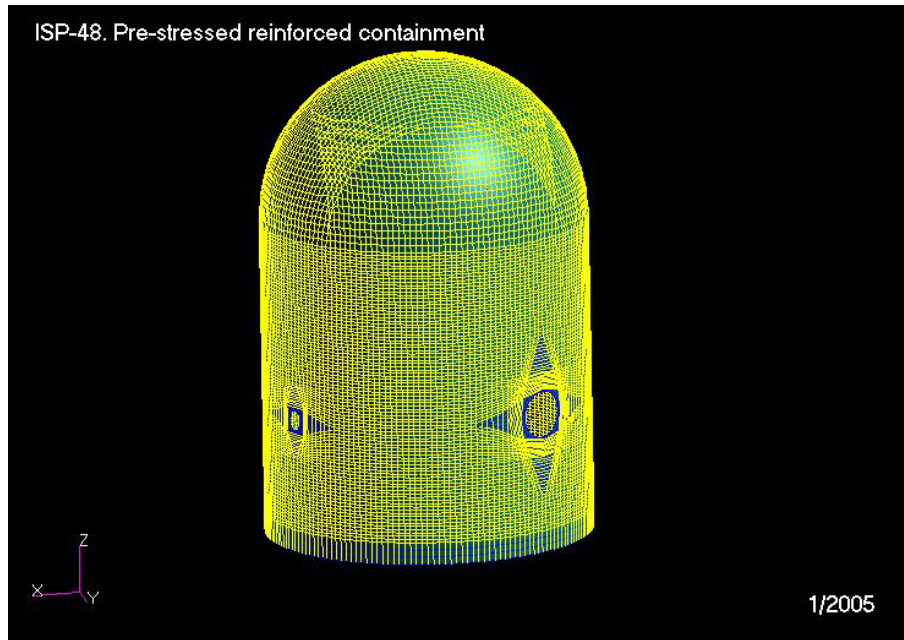


Modeling examples: Loviisa 1 and 2 (2007)



Participation in benchmark cases

- 2002-2005: ISP 48, CSNI/NRC/NUPEC/Sandia, USA
- 2008- : BARCOM, BARC, India
- 2010- : OECD/NEA IAGE CONCRETE GROUP CAP: Study on Post-Tensioning Methodologies in Containments



Thank you for your attention!