



Elettra Sincrotrone Trieste



Elettra
Sincrotrone
Trieste

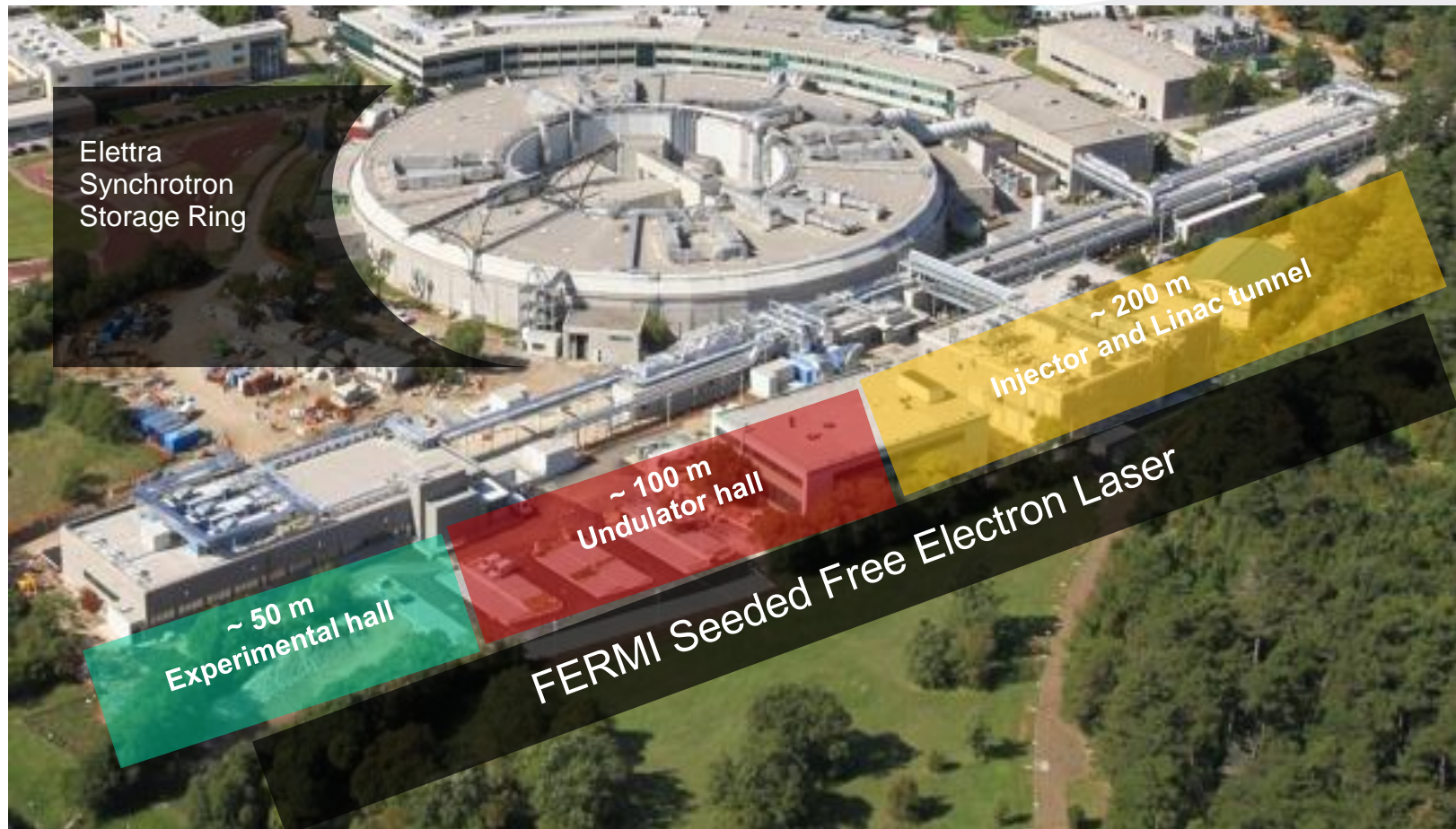
Three years of operation of the Elettra tri-generation plant

Roberto Visintini – Andrea Galimberti

The Elettra Center: two independent light sources

Elettra: a Storage Ring operating since 1994

FERMI: a seeded Free Electron Laser operating from 2012



Main TGP2 Milestones (2011-2012)



On-site Co-generation Experience at Elettra

Andrea Galimberti
Sincrotrone Trieste - Elettra

on behalf of
Infrastructure Group of Sincrotrone Trieste

with the collaboration of
Collini S.p.A. – Trento – Italy
Landi S.p.A. – Bergamo – Italy
Energytech G.m.b.H./S.r.l. – Bozen/Bolzano – Italy
UPB AS CH – Liestal – Switzerland
Trigenerazione S.r.l. – Padova – Italy
Bettiol S.r.l. – Treviso – Italy

EES, Lund October 13th-14th, 2011 A. Galimberti, ST



- 06/2011 Elettra SR connected to TGP1
- 07/2011 “Struver” dismantling
- 12/2011 Construction Completed
- 01-03/2012 Commissioning TGP2

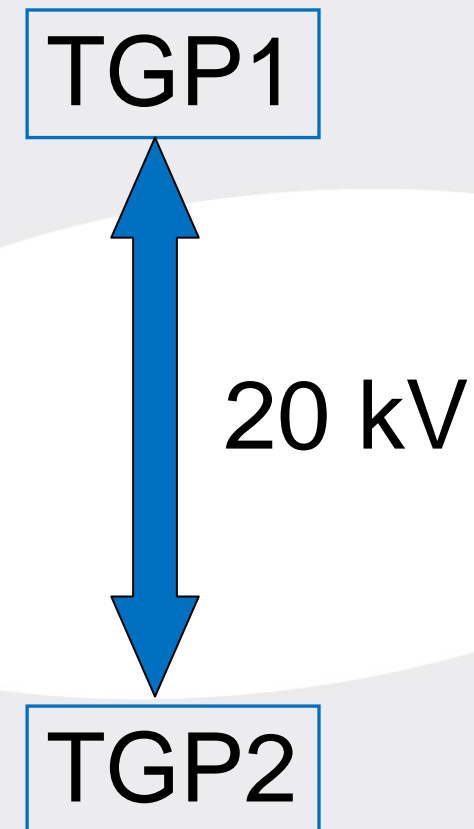


Current required power from UPS – TOTAL: 800 kW

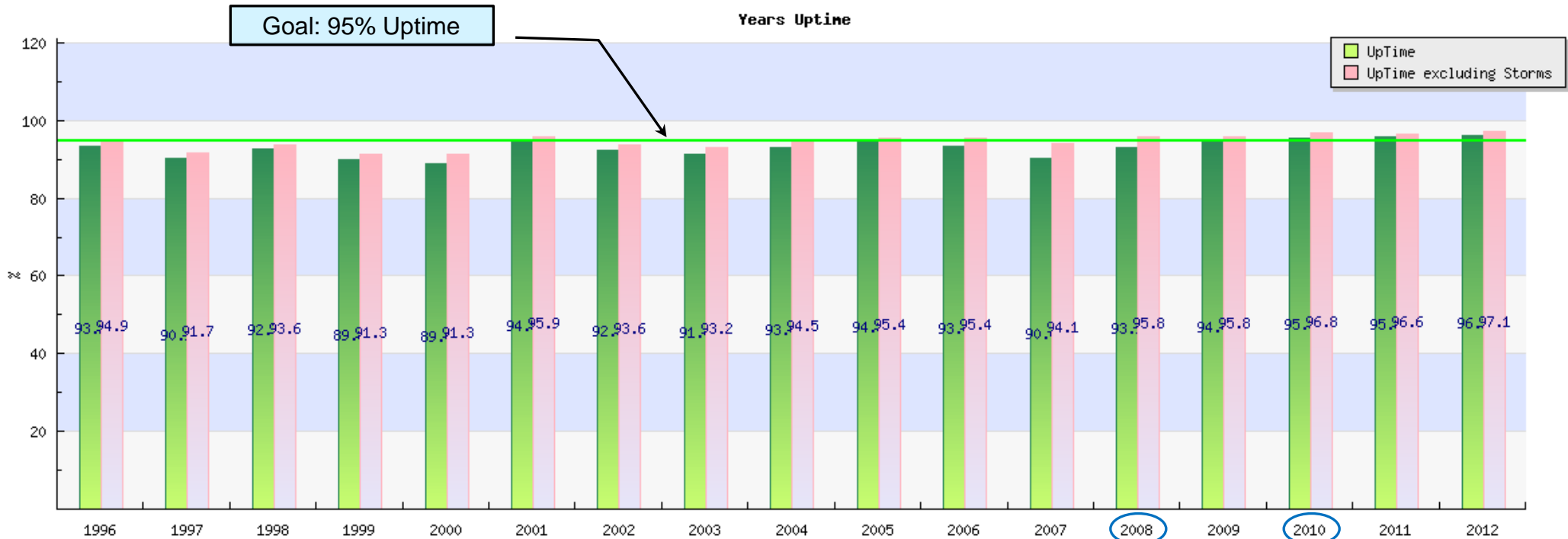
- Elettra: 500 kW
- FERMI: 300 kW

TGP (each plant):

- 3 Gas Engines (2 +1 redundancy)
 - Each engine at 75% nominal power
- Free-wheel UPS system (1 MW)
 - Voltage tolerance: $\pm 5\%$
 - Frequency tolerance: $\pm 1\%$
 - Max time range: 15 s



Uptime (i.e. “e-beam on”) 1996 – 2012



Full Energy Injector

Top-Up Injection

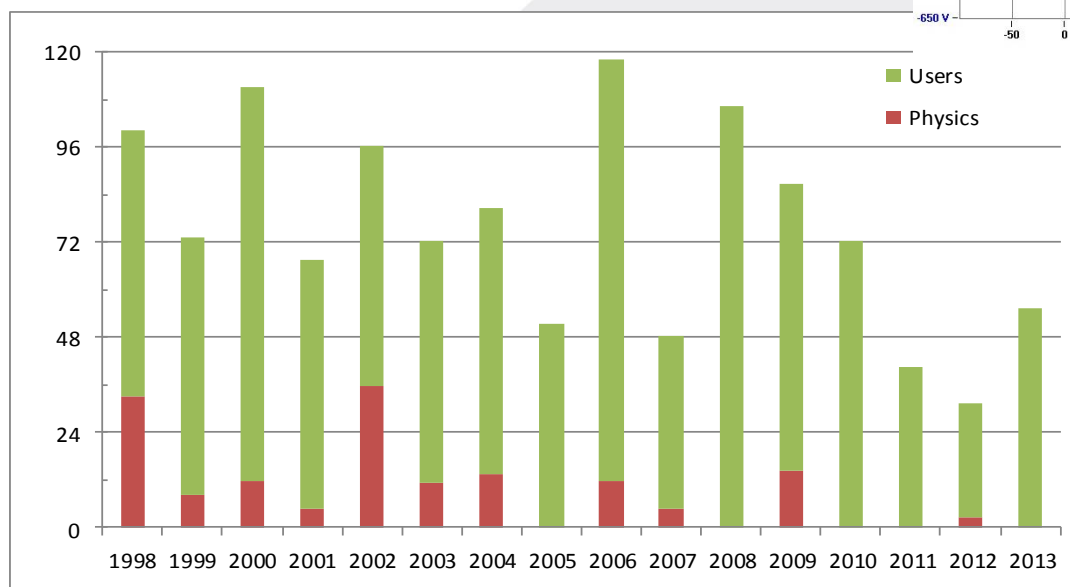
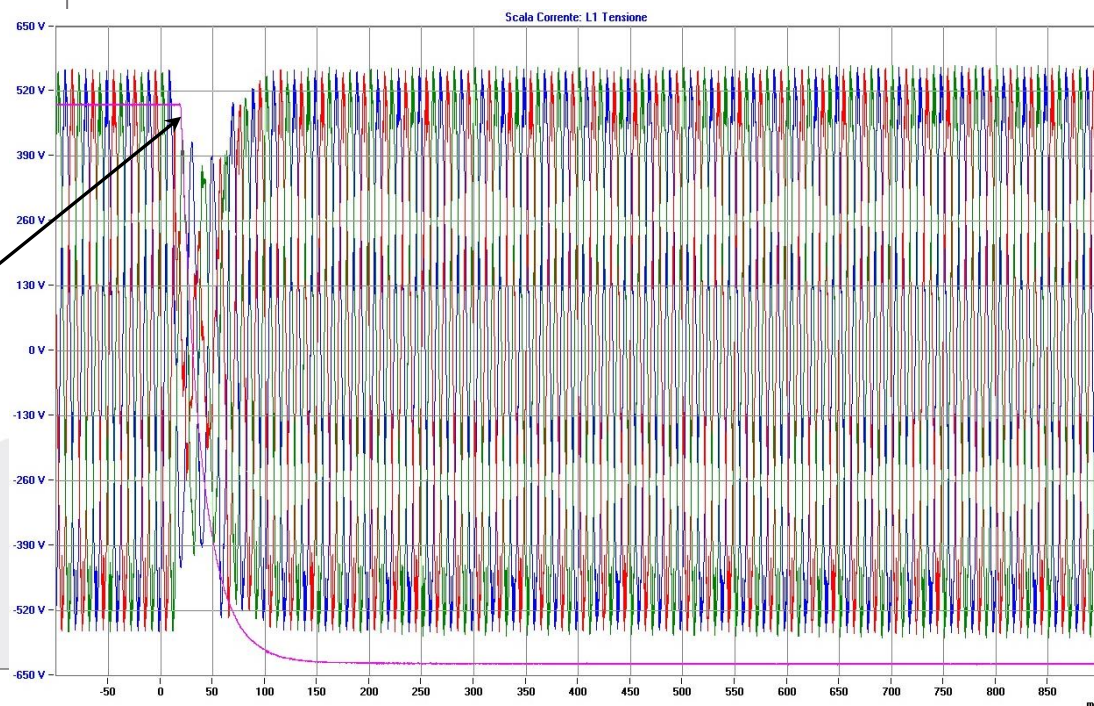
“Storms” affect the uptime by 1% to 2%

Actual Operability – 2

Mains Disturbances effects
(thunderstorms, etc.)

e-beam loss

3-Phase voltage drop on the mains (followed by a beam loss)



Down time hours due to disturbances on the mains during Users' and Machine Physics beam time

Faults and time to repair are included in downtime.

FERMI:

connected to TGP1 since its construction – no change

Elettra:

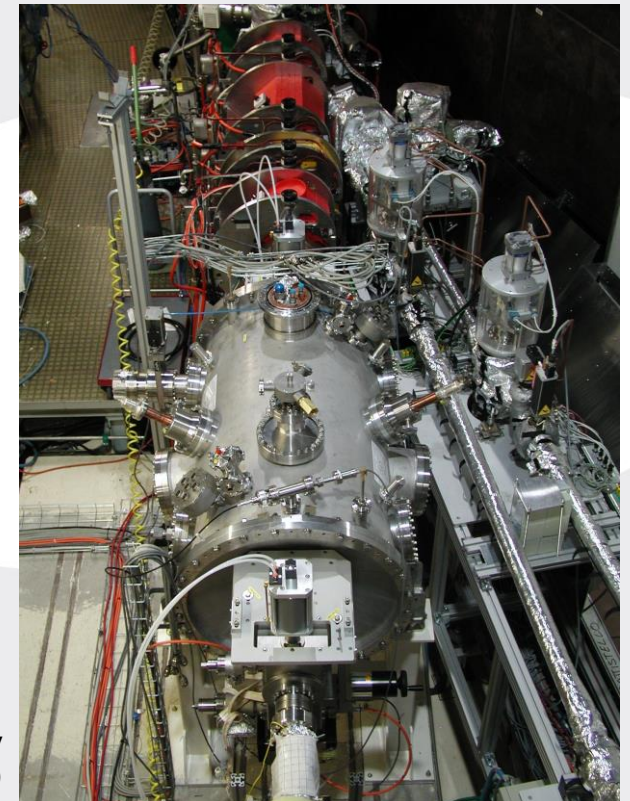
More available power from UPS



Additional sensitive devices are now protected from mains disturbances, SC- 3HC (Super Conducting – 3rd Harmonic Cavity)

Malfunctioning on SC-3HC:
from ~70 h in 2011 to 0 h in 2013

Super Conducting 3rd Harmonic Cavity
(during installation in SR)



More “critical devices” and next steps

- Magnet Power Supplies: ~ 2 MVA (@ 2.4 GeV)
- RF plants: ~700 KVA (incl. foreseen upgrades)

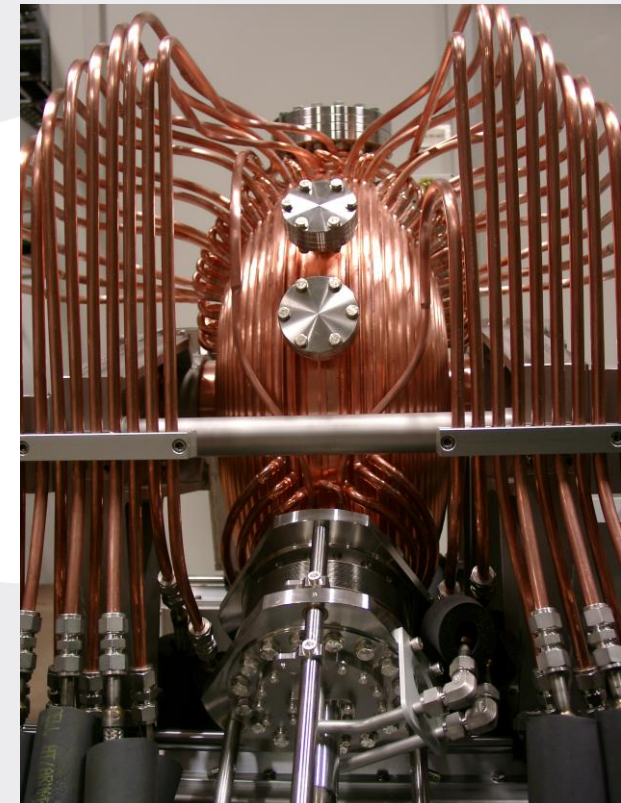
RF Plants

- 4 systems in SR (+ 1 in Booster)
- ~6-8% of downtime (e-beam loss)



- Feasibility study to put SR RF under TGP
- Re-arrangement = budget, time, impact on Elettra operations,...

Elettra SR Cavity



Stefano Krecic (Elettra SR Statistics)

Alessandro Martinolli (Electrical Plants data)

Cristina Pasotti (RF systems data)

Pietro Zupancich (SC-3HC data)



Elettra
Sincrotrone
Trieste

Thank you for your attention!



www.elettra.eu