



Austrian Power Grid Current Developments

**SEERC Meeting Prague
15th-16th March 2017**

Data and facts about APG

- APG is certified as ITO (Independent Transmission Operator)
- APG is 100% owned by VERBUND AG
- ~ 460 employees (2015)
- System length 6.971 km, thereof:
 - 380 kV 2.577 km
 - 220 kV 3.212 km
 - 110 kV 1.182 km
- About 12.000 towers
- 63 substations
- 27.160 MVA transformer output
- 46.164 GWh transport volume
- Appr. 12.000 schedules/month for imports and exports

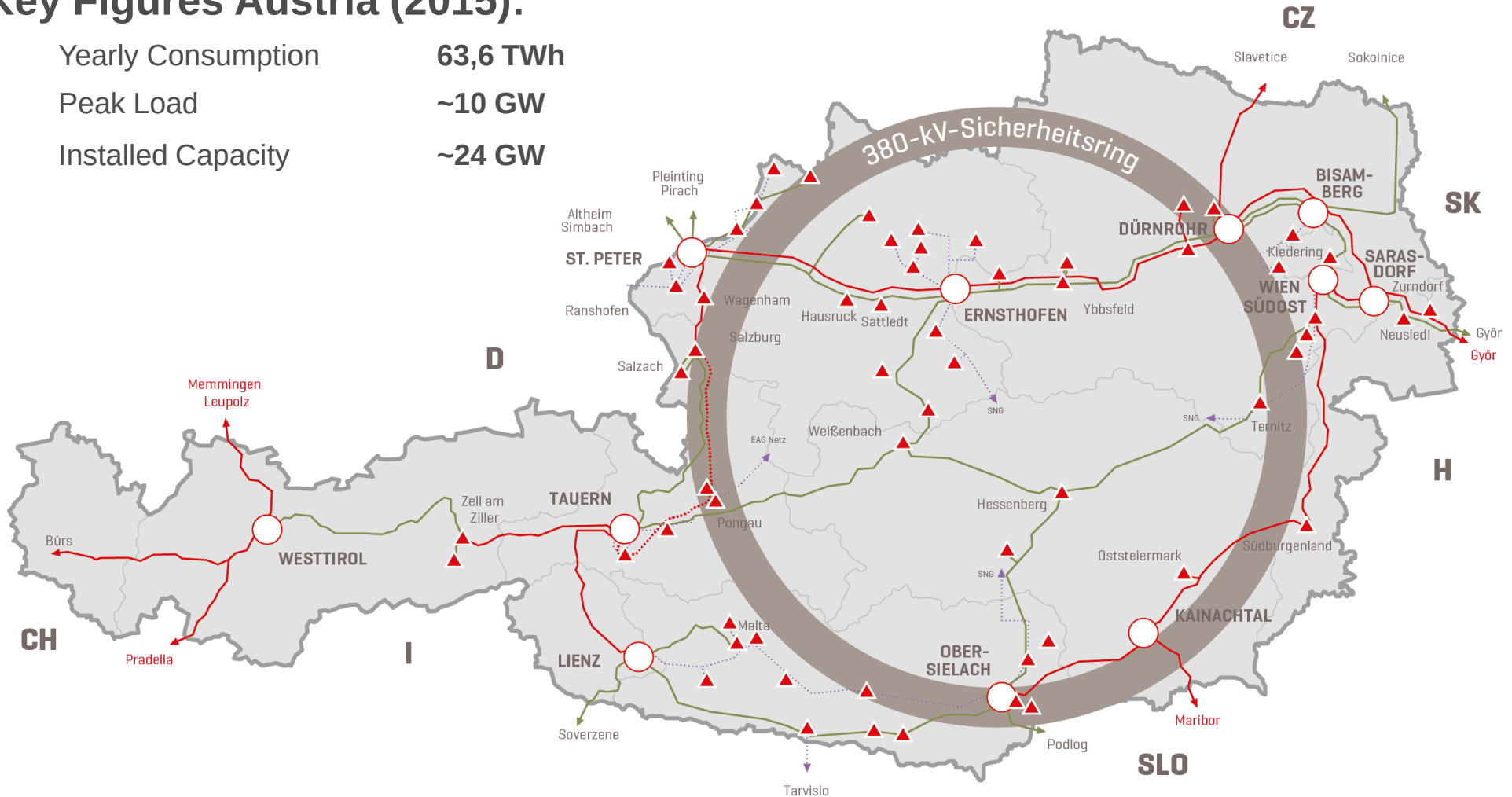


APG's High Voltage Grid



Key Figures Austria (2015):

- Yearly Consumption **63,6 TWh**
- Peak Load **~10 GW**
- Installed Capacity **~24 GW**



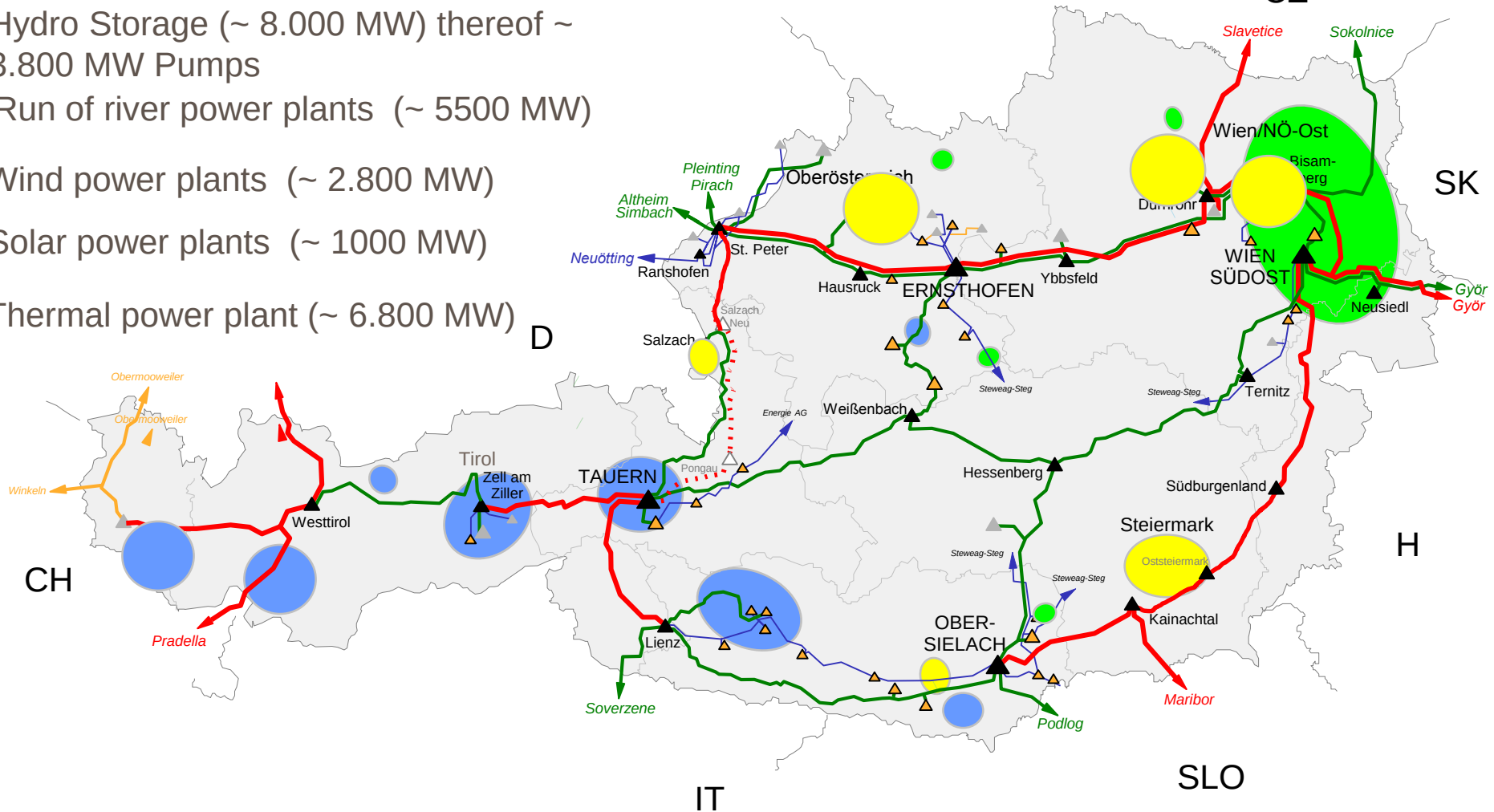
The Electricity System Of Austria



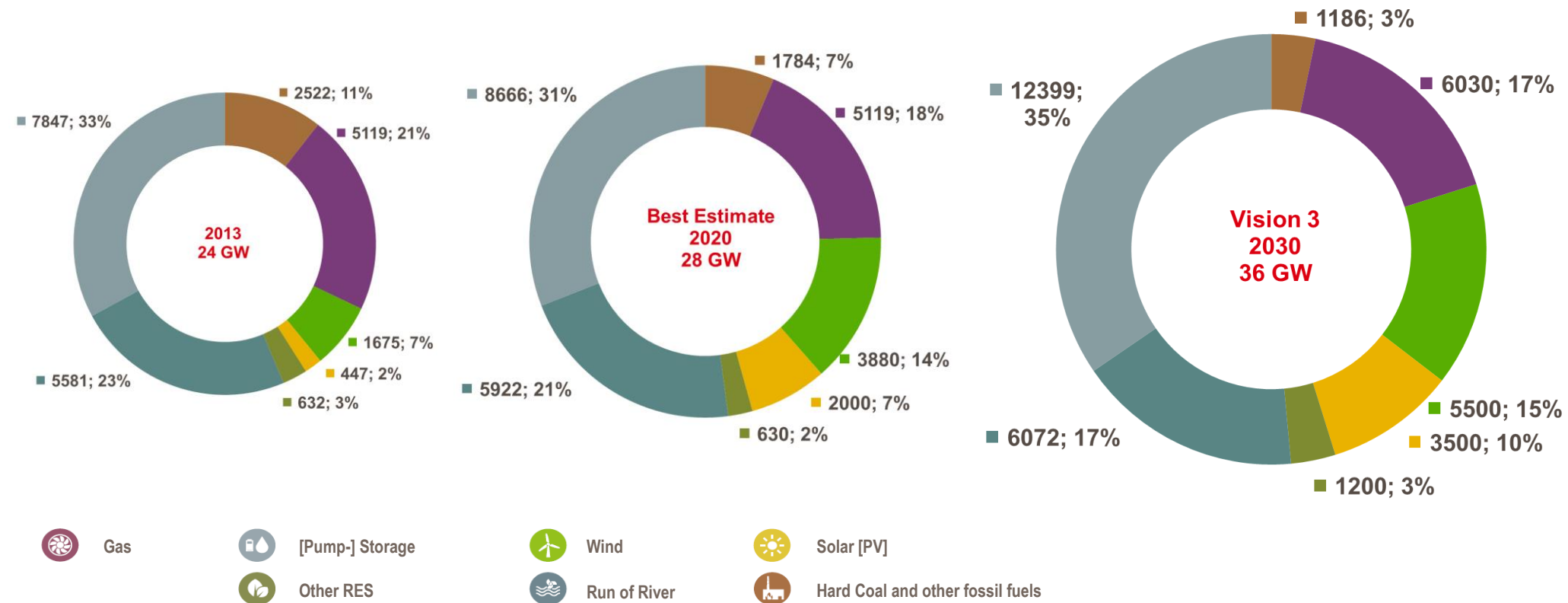
 Hydro Storage (~ 8.000 MW) thereof ~ 3.800 MW Pumps
 Run of river power plants (~ 5500 MW)

 Wind power plants (~ 2.800 MW)
 Solar power plants (~ 1000 MW)

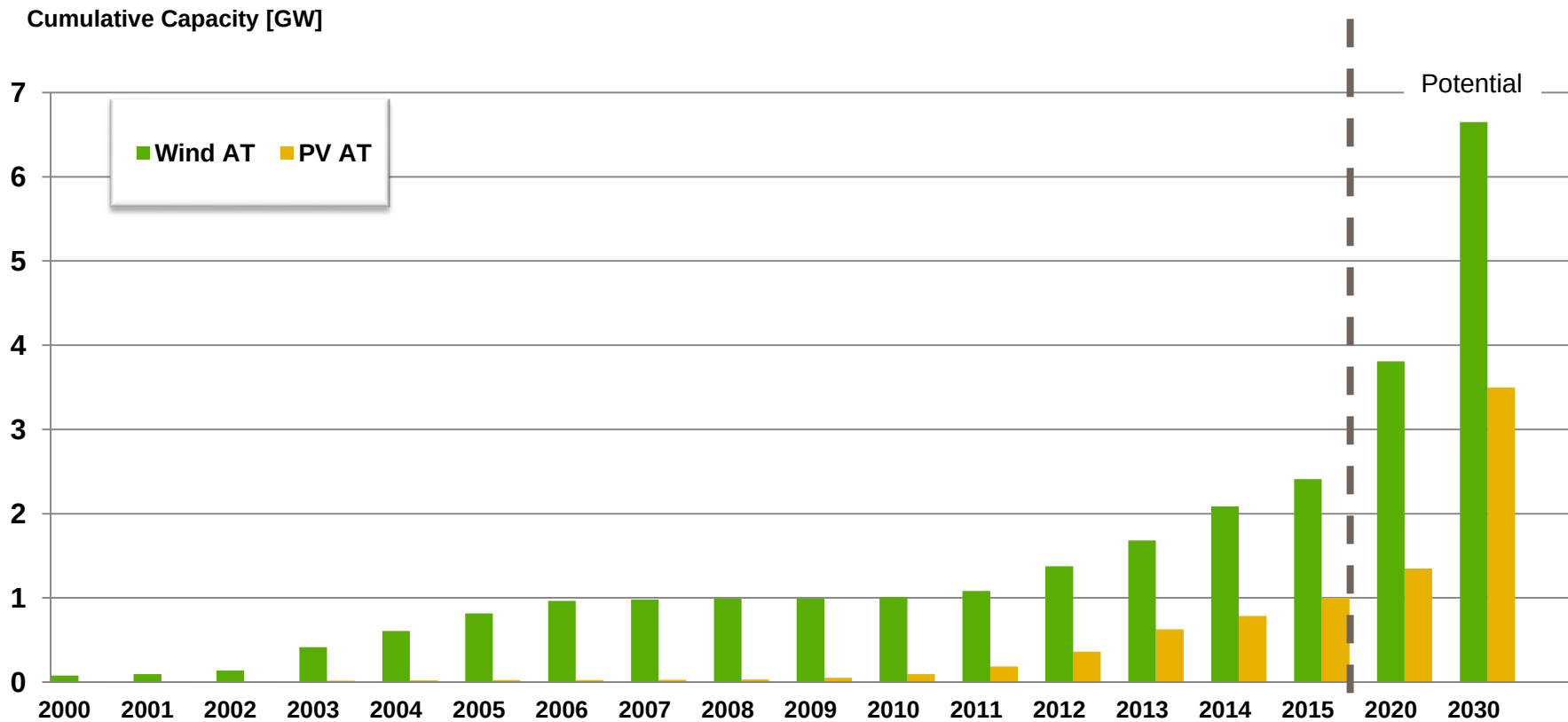
 Thermal power plant (~ 6.800 MW)



Development NET Generation Capacity AT In AT Based On TYNDP 2016



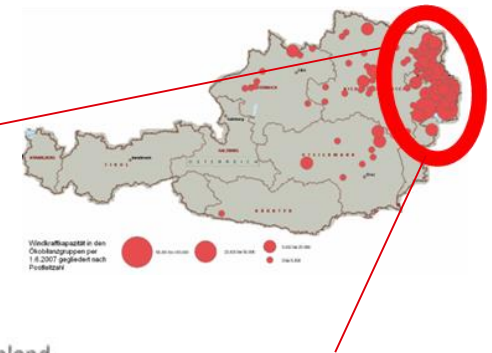
Development Wind & PV in Austria



Divergent Scenarios - Technology Roadmap for PV in
AT (June 2016): **9,7 GW PV until 2030**

Increasing Volatilities Change Grid Characteristics

Example: Burgenland, Eastern Austria



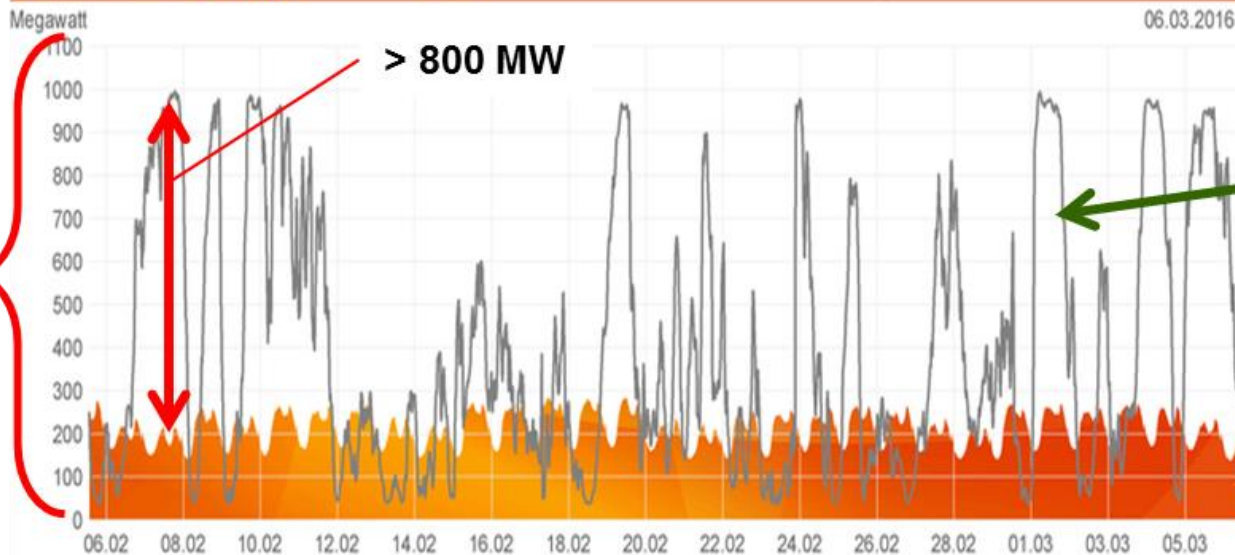
24 Stunden 30 Tage



Stromverbrauch Burgenland



Stromerzeugung Burgenland



Source: <http://www.netzburgenland.at/>

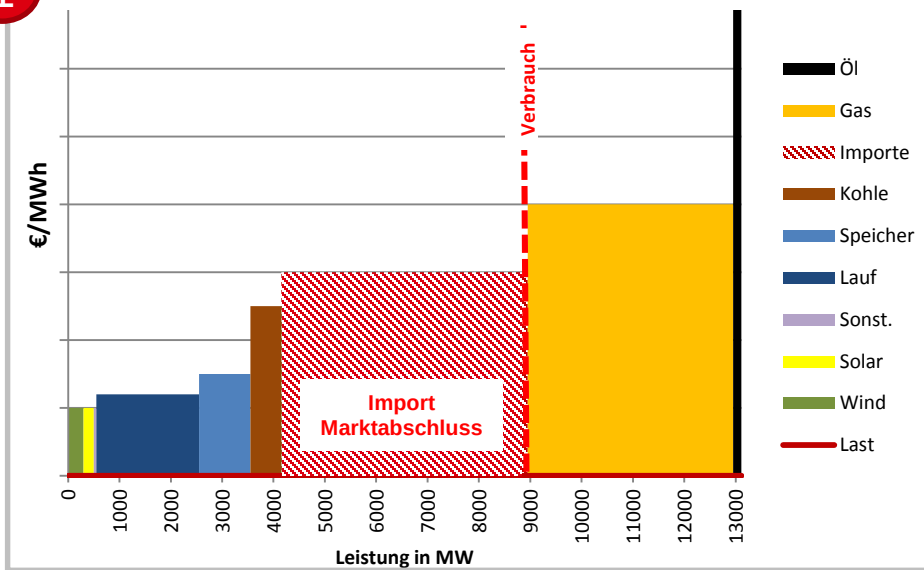


Wind-Infeed
Burgenland

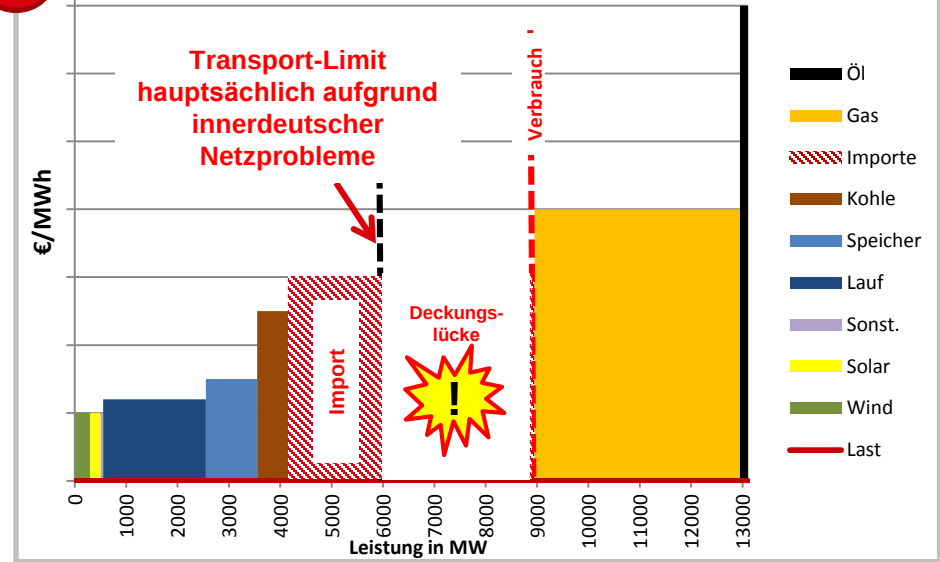
Consumption
Burgenland

Principle Market Mechanism

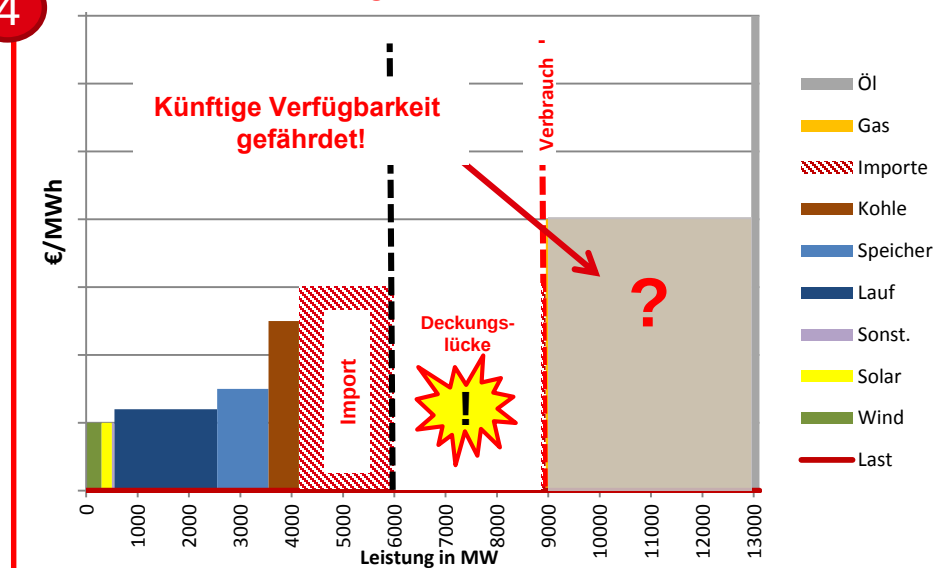
1 Verbrauchsdeckung AT - Marktabschluss



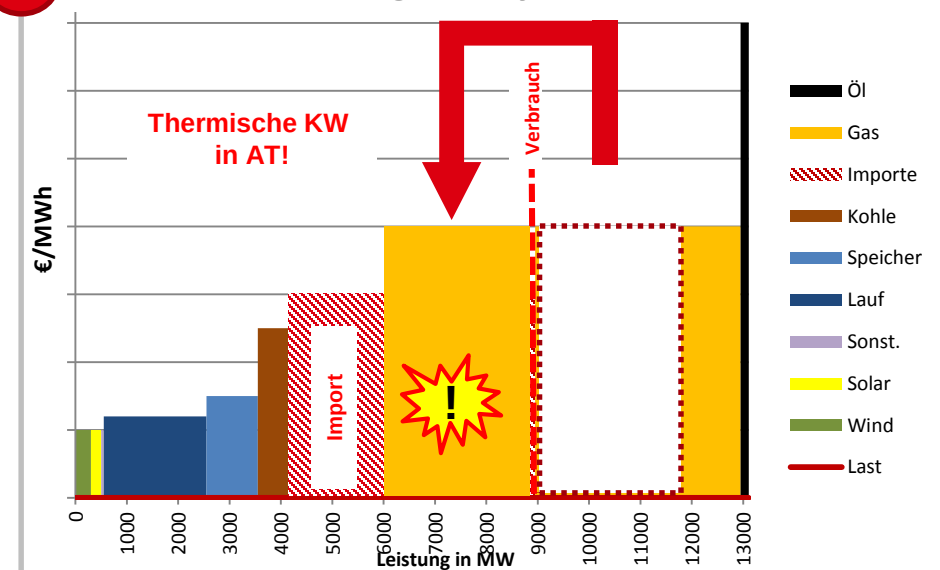
2 Verbrauchsdeckung AT - Physikalisch



4 Verbrauchsdeckung AT – ausreichend Kraftwerke?

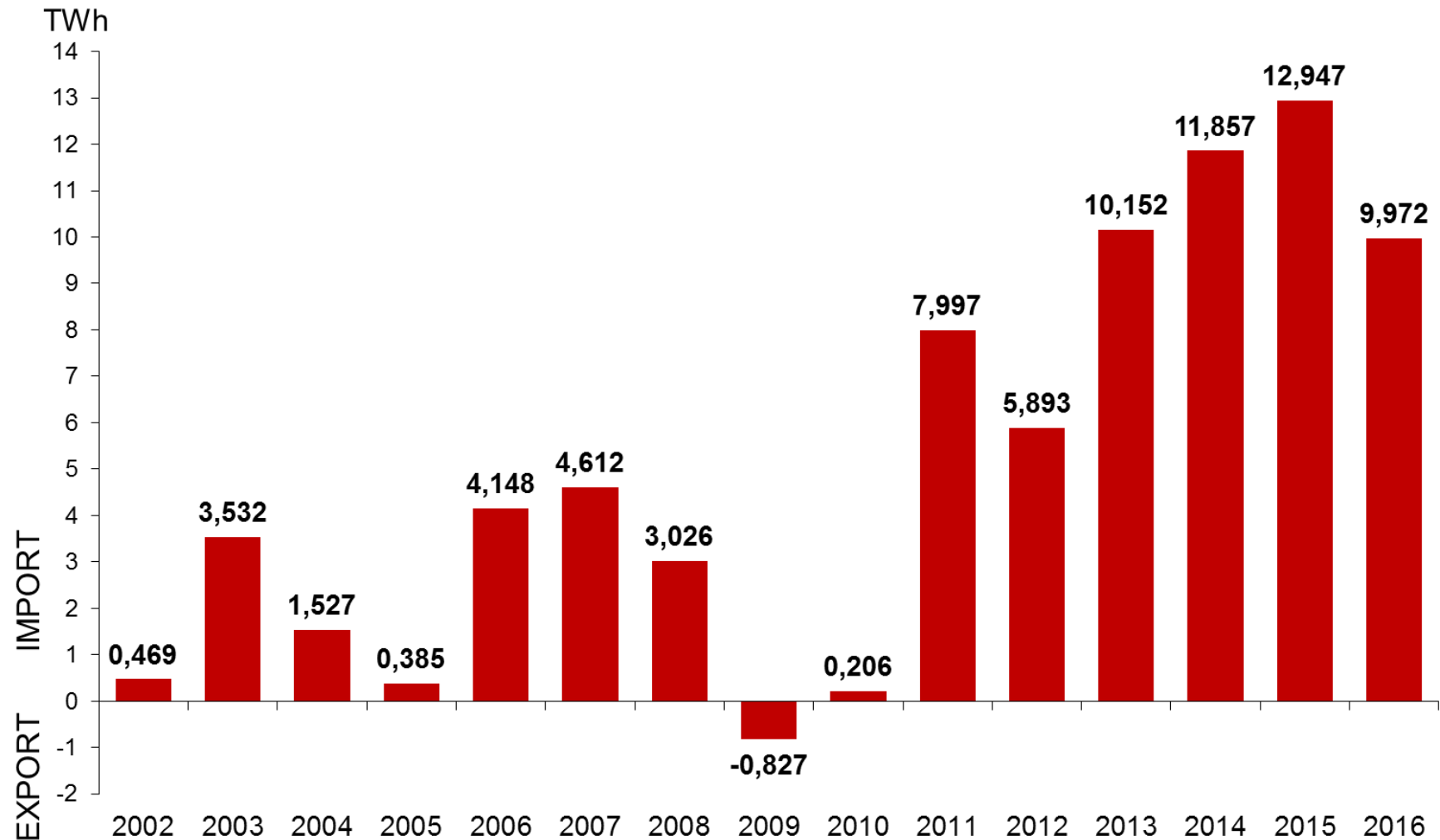


3 Verbrauchsdeckung AT - Systemreserve



Import/Export Control Zone APG

Yearly Volumes according to schedules



Import/Exportmaxima an der Grenz DE-AT

▨ Importmaximum (day-ahead)

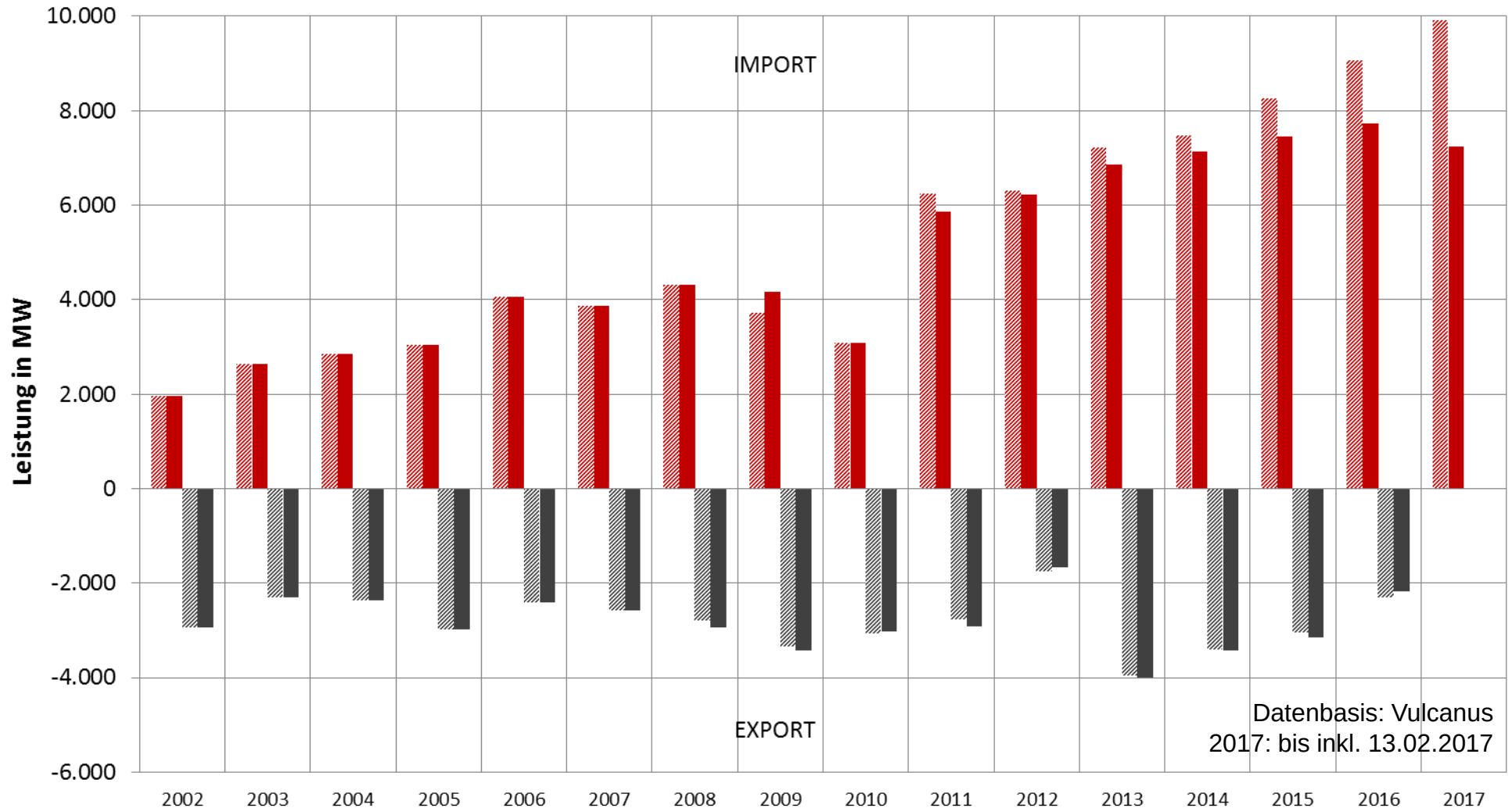
■ Importmaximum (realisiert)

▨ Exportmaximum (day-ahead)

■ Exportmaximum (realisiert)



~10.300 ----- Thermische Übertragungskapazität AT/DE -----



Exchange with Control Zones— Schedules and NTC, before Redispatch

von 01.01.2017 00:15 So

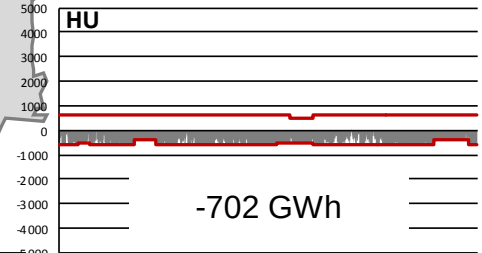
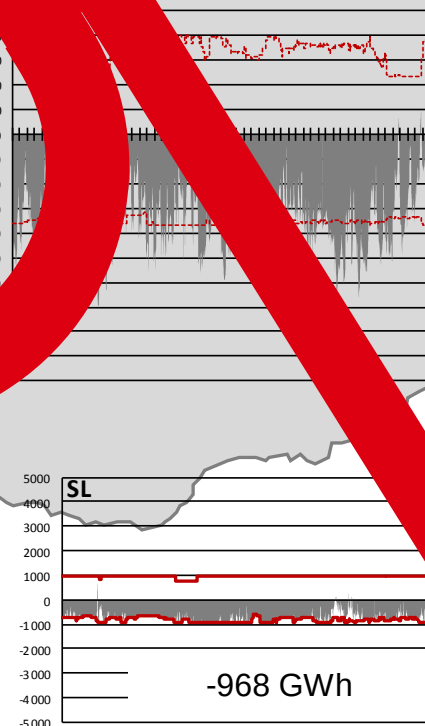
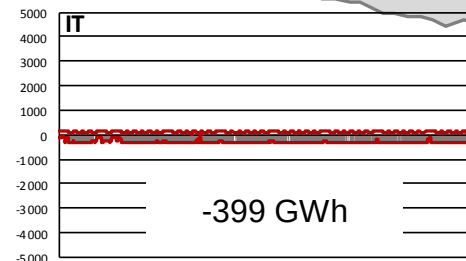
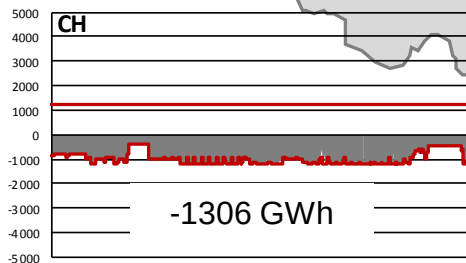
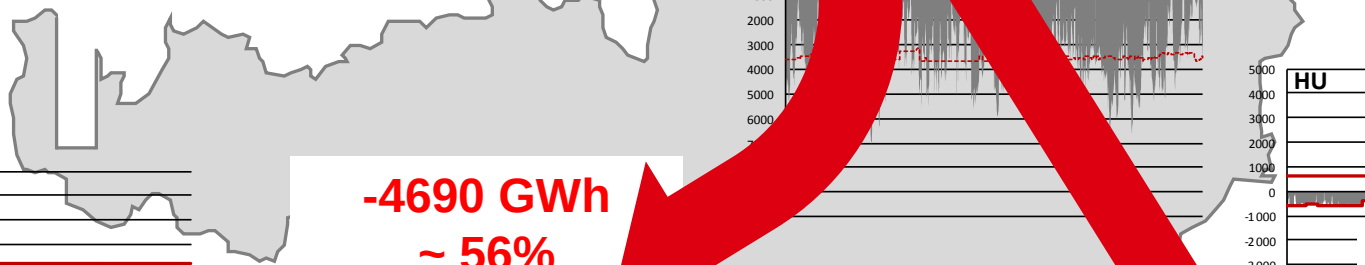
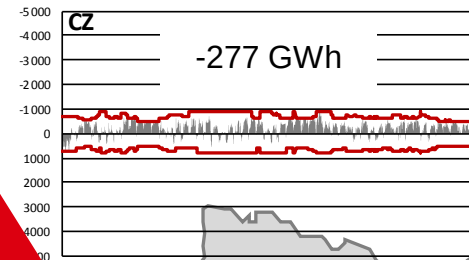
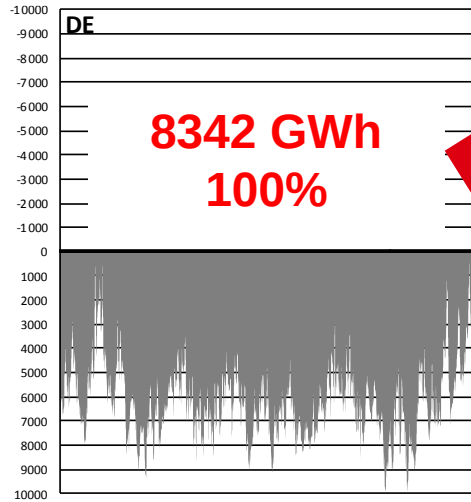
bis 26.02.2017 00:00 So

Einheit: MW

+...Import, -...Export

real. Fahrpläne
(ohne Istwertumschaltungen)

NTC



-3652 GWh
~ 44%

AUSTRIAN POWER GRID AG

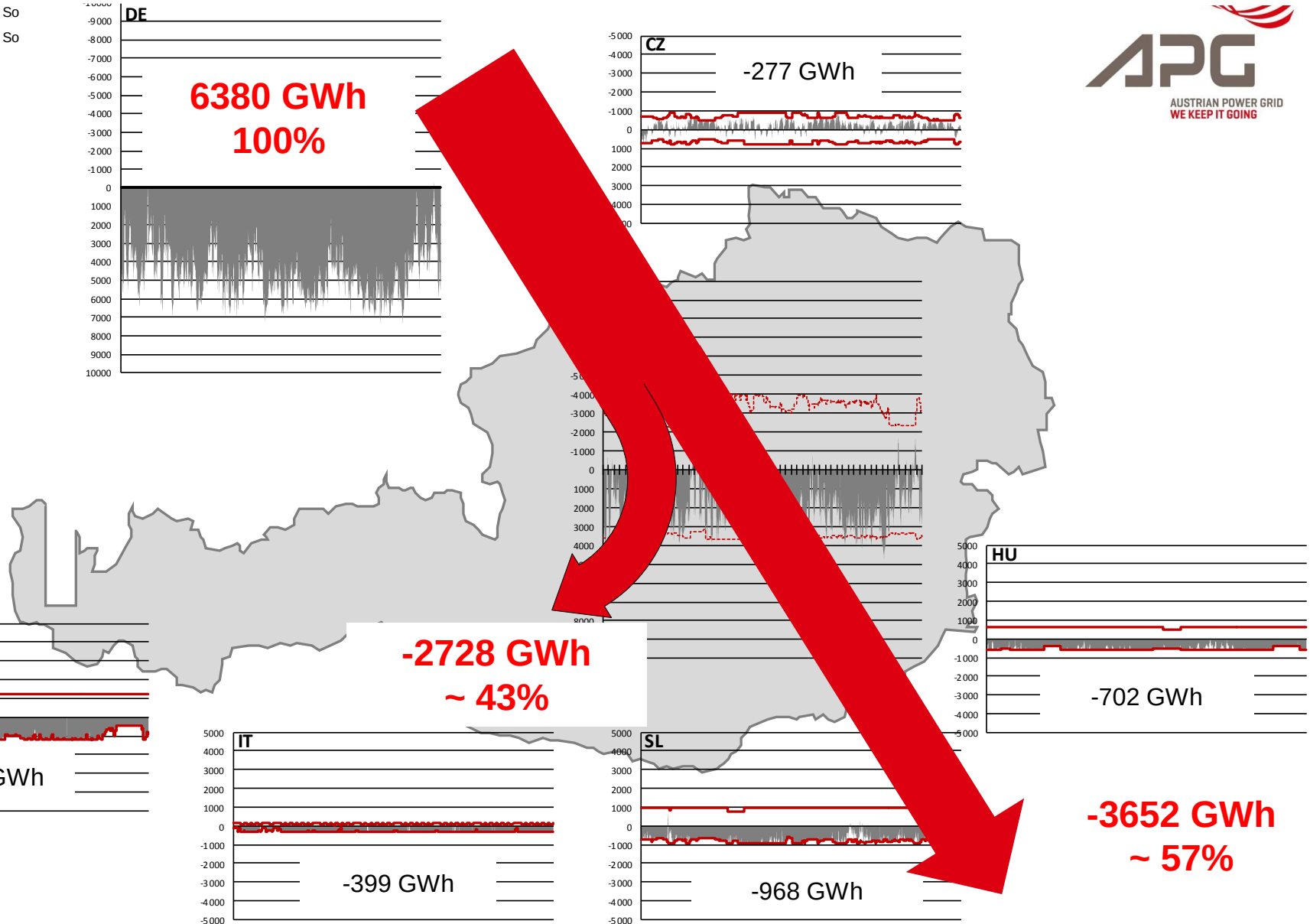
27.04.2017

Exchange with Control Zones— Schedules and NTC, after Redispatch

von 01.01.2017 00:15 So
bis 26.02.2017 00:00 So
Einheit: MW

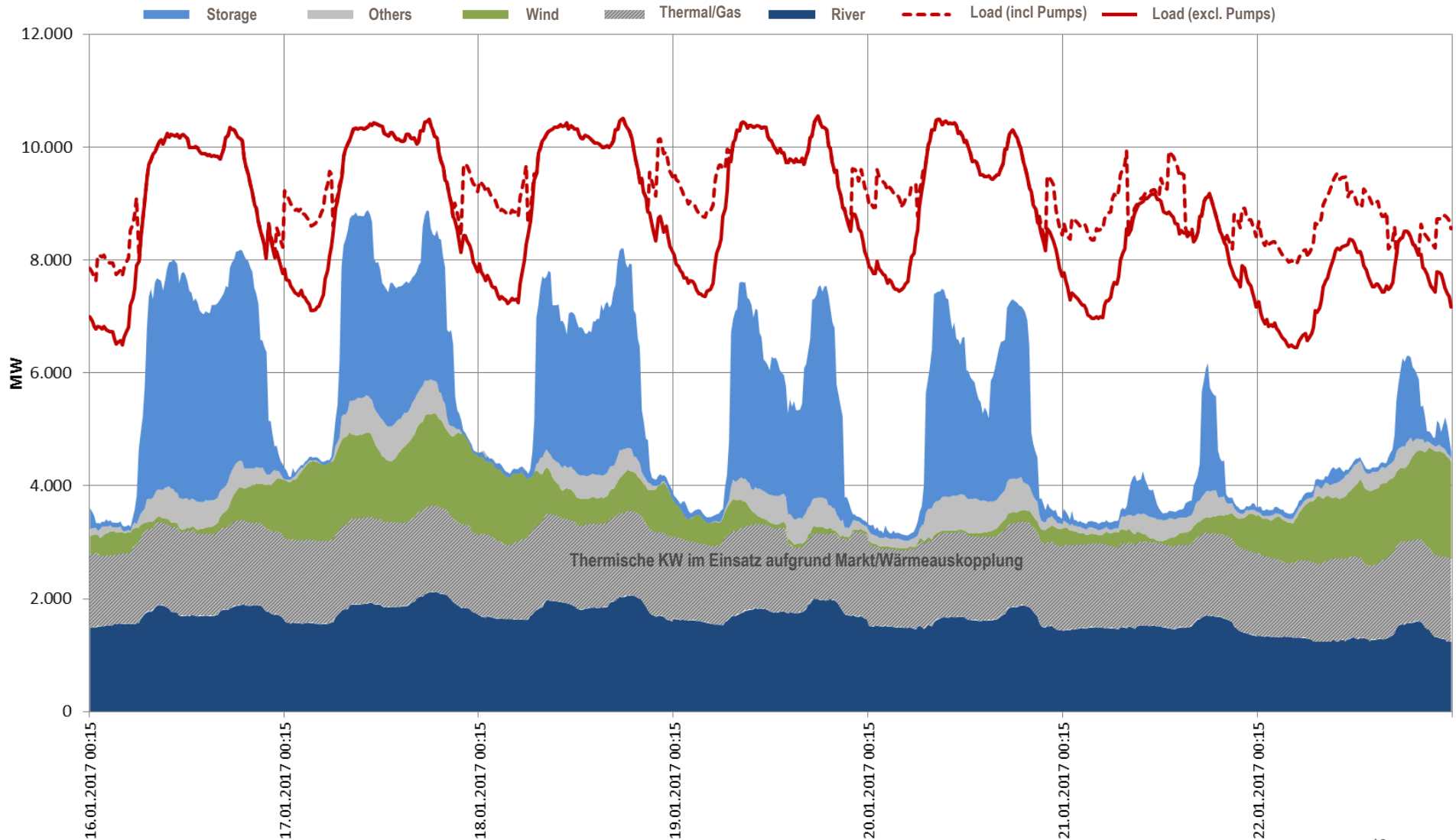
+...Import, -...Export
real. Fahrpläne
(ohne Istwertumschaltungen)

NTC

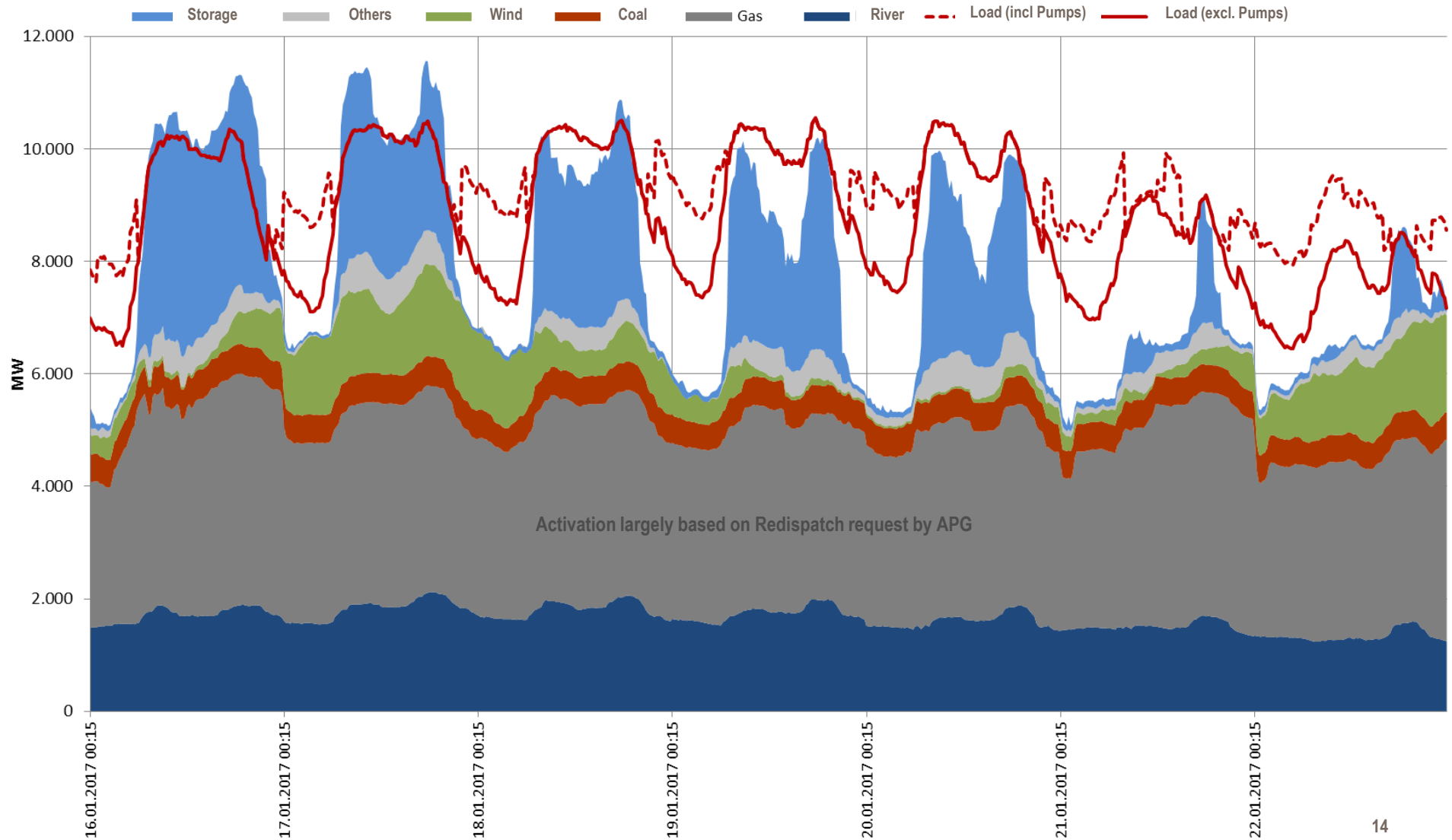


Covering Demand During Week 3 2017

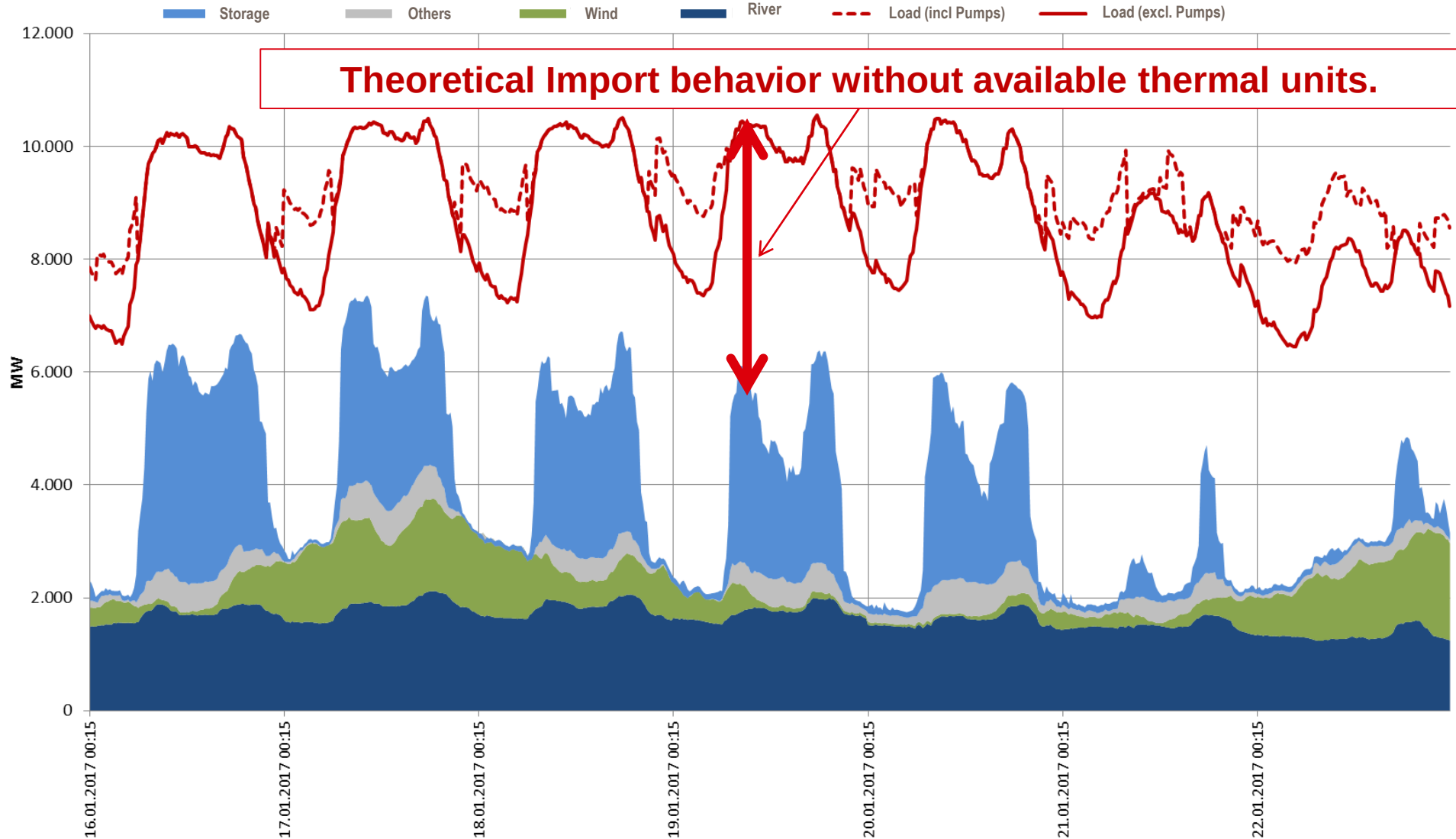
Market Results (Simplified)



Physical Coverage Of Demand During Week 3 20, incl. Redispatch



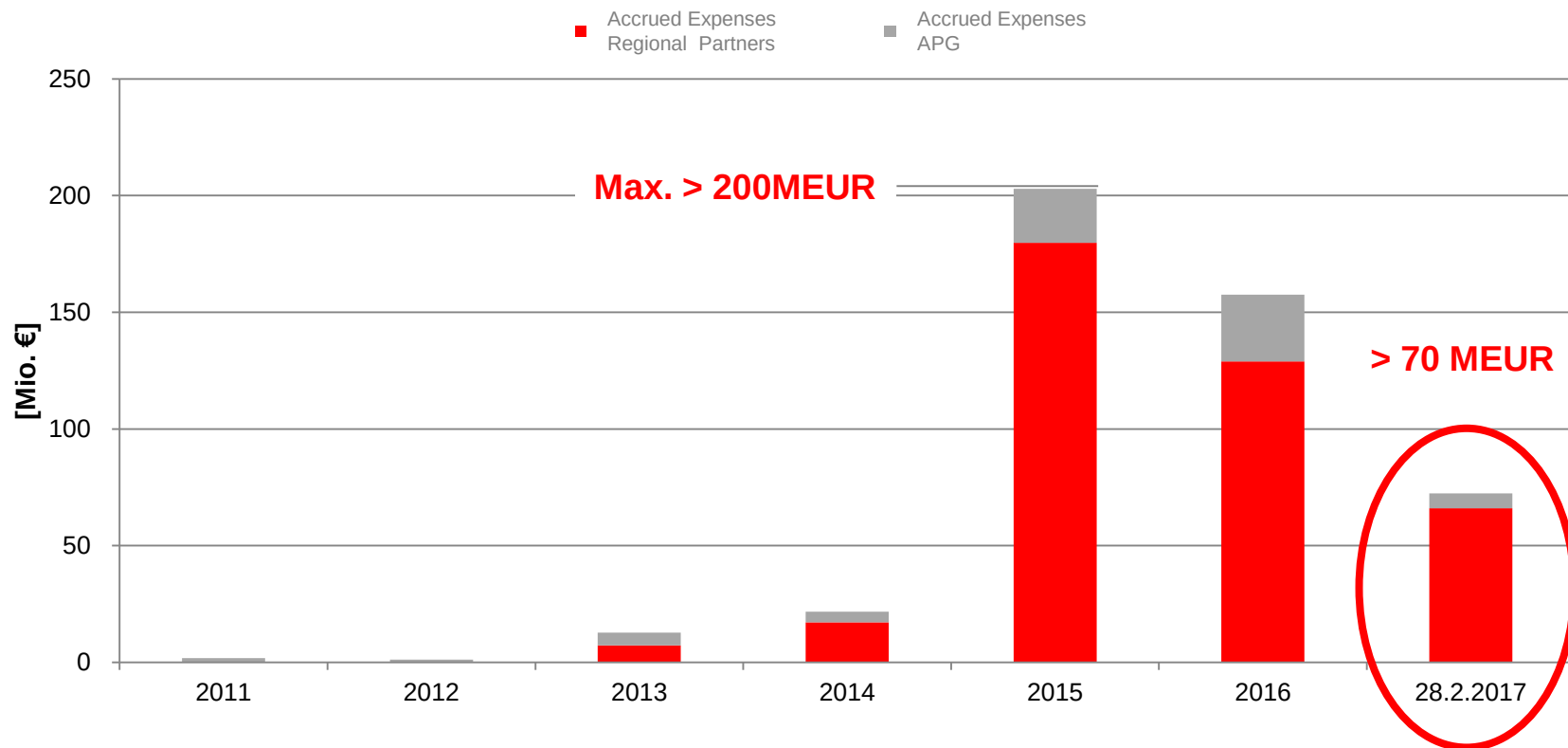
Physical Coverage Of Demand During Week 3 20, Assuming No Thermal Generation



Congestion Management – Development of Costs, Volumes



Redispatch Costs since 2011



APG's Grid in 2030...



Cluster

A

1 Salzburg line (Part of 380-kV-Circle)

2 German line (hub St. Peter)

B

3 Wind Power Plant Integration East

C

4 Grid region Corinthia (Part of 380-kV-Circle)

5 Italien line (Lienz-Veneto)

6 Grid Region Tyrol (Grid enhancement)

D

7 Upgrade to 380-kV (TyrolWest-Memmingen)

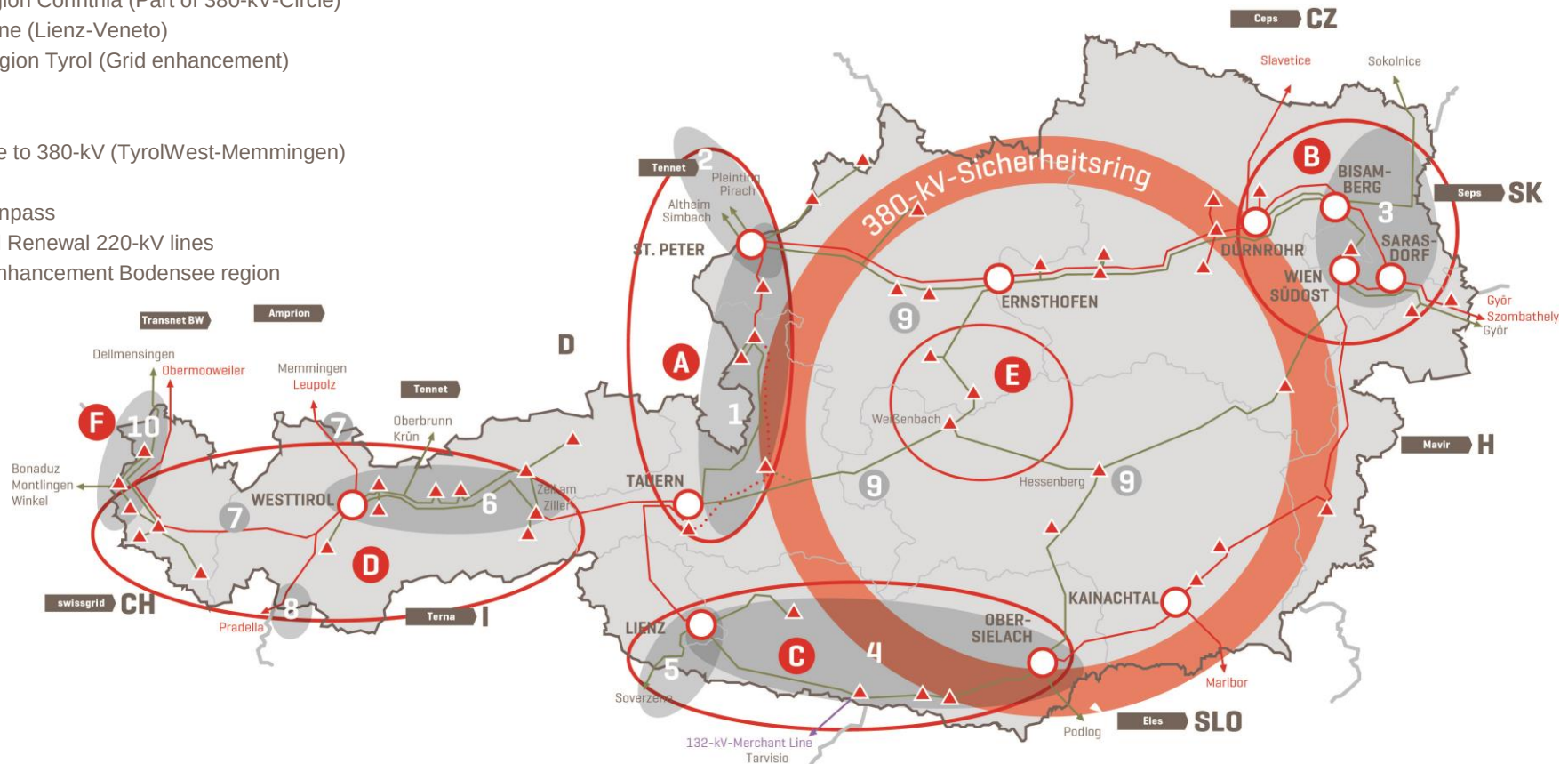
E

8 Reschenpass

9 General Renewal 220-kV lines

F

10 Grid enhancement Bodensee region

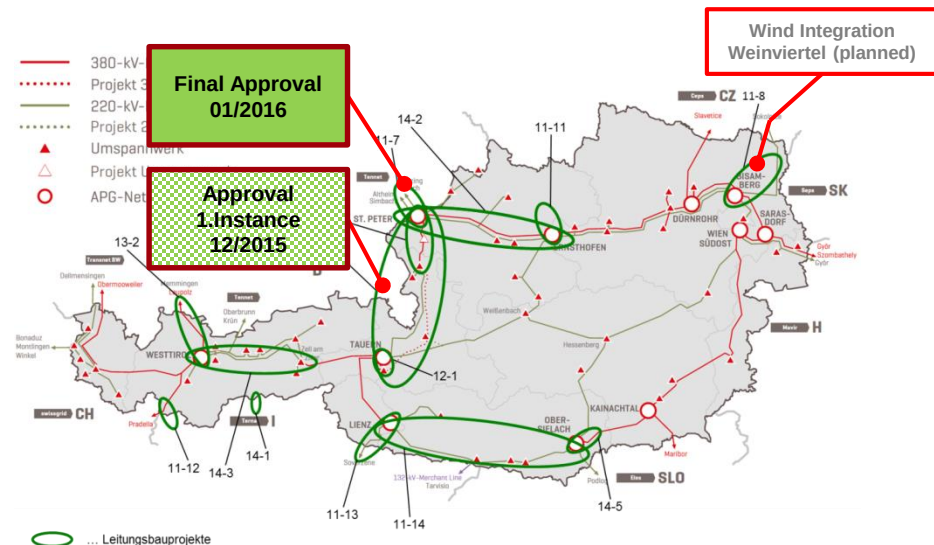
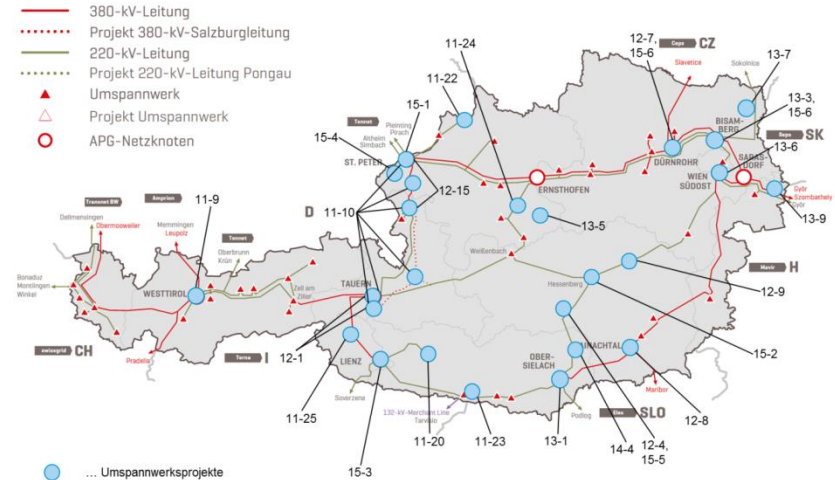


Network Development Plan of APG



- **Total investment AT ~ est. 2,4 bill. €**
- Planning horizon: **2017-2026**
- New lines: est. **370 km***
- Upgrade of lines: est. **390 km***
- New projects and extensions/upgrades of many substations:
est. **150 new bays** on 380-/220-/110-kV
- est. **35 new transformers**
- In line with pan European “Ten Year Network development Plan”

* Corridor length



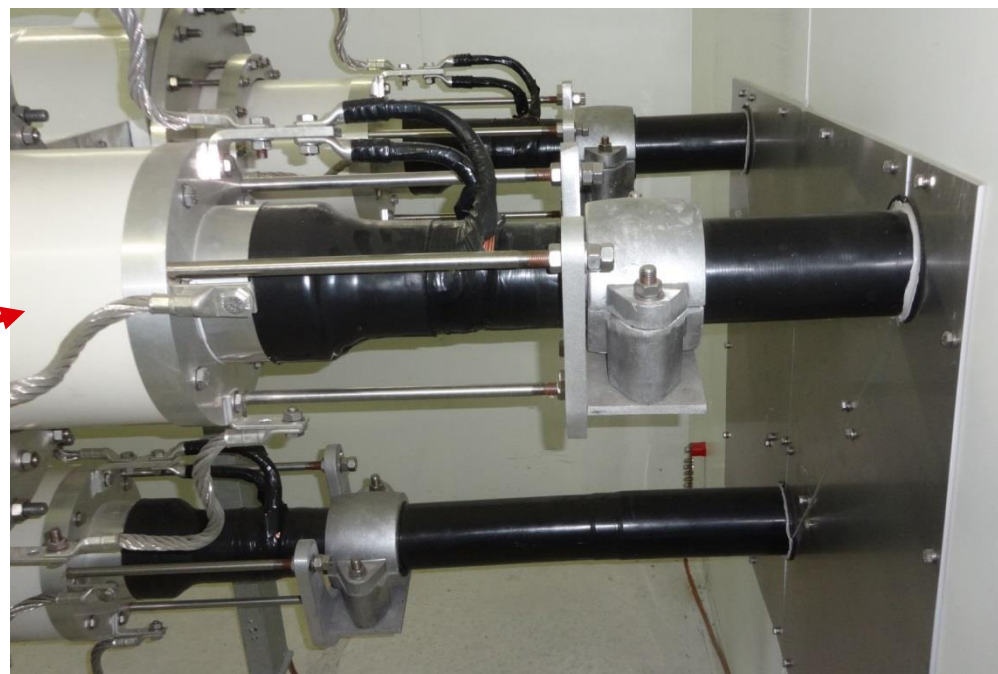
backup



12.06.2016 Ausfall PST Tauern (Fehlerhafter SF₆-Kabelendverschluss in der Schaltanlage des PST)



IBN der Anlage: 01.12.2006



Kabelstecker mit Kabel

