

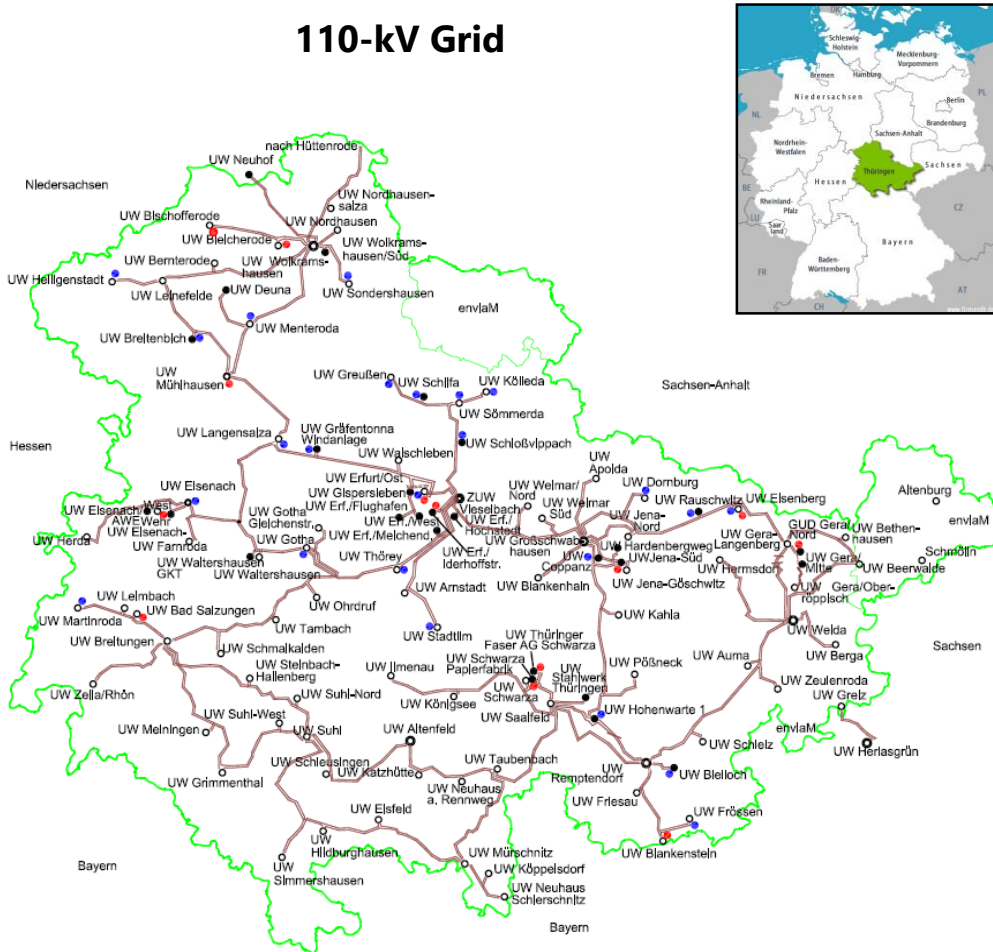
# Digitalisation of the Distribution System Operation

**Florence Forum's session 4.1 on Digitalisation of Energy**

Dr.-Ing. Michael Agsten  
May 31, 2018

# Overview of the DSO „TEN Thüringer Energienetze“

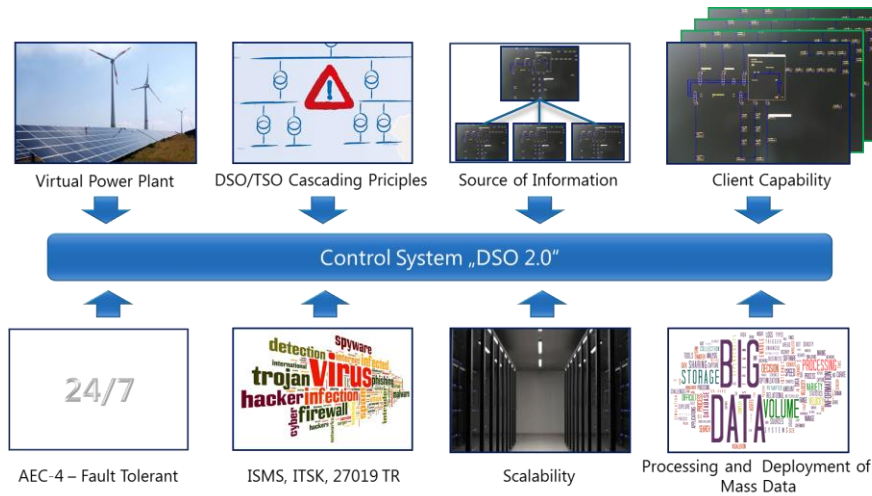
## 110-kV Grid



## Facts

Overall Circuit Length	32.646,8 km
HV-Circuit	2.856,6 km
MV-Circuit	12.648,7 km
LV-Circuit	17.141,5 km
Directly supplied customers	333.988
380/110 kV Substations	7
110-kV/MV Substations	91
MV/LV Substations	6.923
Renewables	~3,5 GW
thereof at the 2nd level DSOs	~0,75 GW

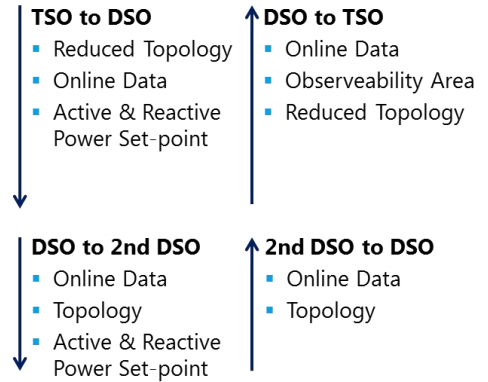
# Four Examples: Ongoing DSO Digitalisation Projects



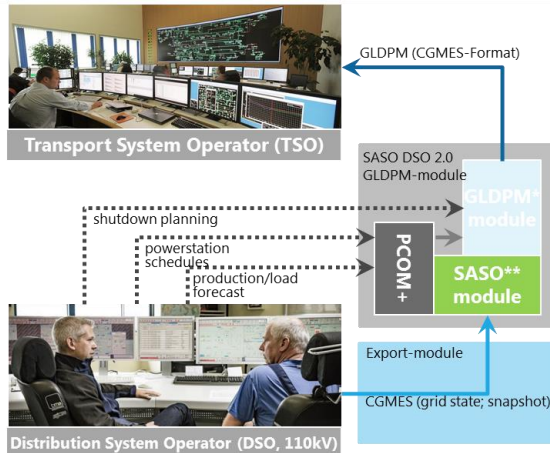
## Inter Control Center Communication



## Online Data Exchange „Energy Information Network“



## 48h Planning System / GLDPM



## DSO Control Reserve Pilot



# Requirements on Standards & Interoperability

- Complex ICT systems must communicate and interwork on all levels within the same implementation depth (e.g. CGMES, TASE.2, ISO 15118)
- Interoperability is therefore a crucial factor in the success of modern technologies
- ICT standards have to facilitate interoperability between products in a multi-vendor, multi-network and multi-service environment
- Despite existing standards, their hardware/software implementation depth influence the digitalisation success & pace