

Site Visit Preview: Reconstruction of 110 kV plant in EL-TO Zagreb



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**VAR Partner Day 2022
9th Value Added Reseller Partner Day September 12-14 | Zagreb, Croatia**

Company overview



KONČAR GROUP
14 companies and
1 affiliated company



SALES REVENUE
477 million EUR (2021)



PEOPLE
4100+

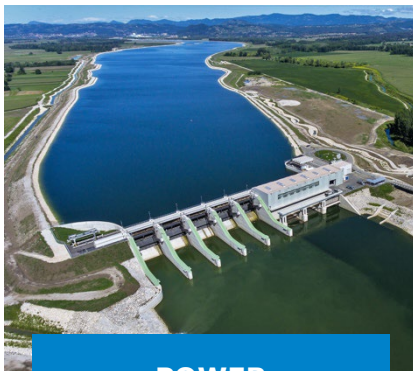


EXPORT
62% (2021)

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Globally recognized business areas



**POWER
GENERATION**



**POWER
TRANSMISSION AND
DISTRIBUTION**



**RAIL
SOLUTIONS AND
INFRASTRUCTURE**



**DIGITAL SOLUTIONS
AND PLATFORMS**

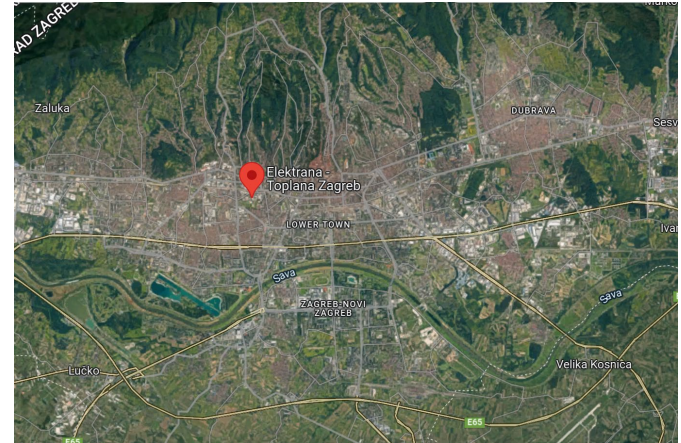
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EL-TO ZAGREB

General information

- Important electricity production plant since 1907
- 1954 marks beginning of heat and steam production and distribution (first delivery to R. Končar)
- Primary production heat 439 MWt
 steam 180 t/h
- Secondary production electricity 90 MWe
- Energy source natural gas, fuel



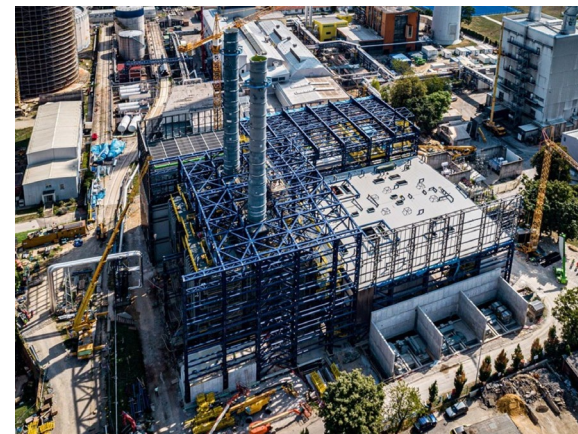
EL-TO ZAGREB

New Combined Cogen plant

- Replacement of old facilities
- Investment from EIB + EBRD 120M EUR
- Production

electricity	150 MWe
heat/steam	118 MWt
- Efficiency 90%
- Natural gas saving 25%
- Lower GHG emissions

SO2	-95%
NOx	-57%
particles	-84%



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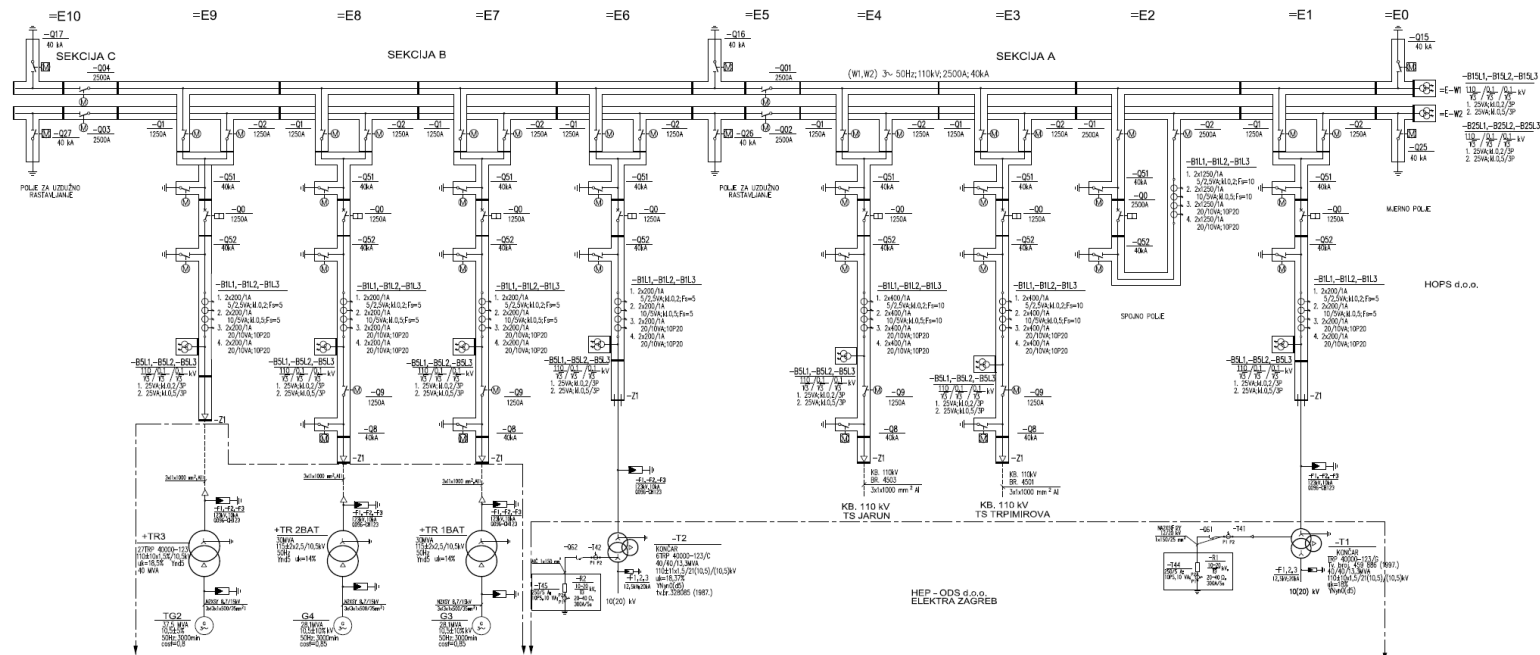
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Reconstruction of 110 kV plant

Project details

- Scope of the project:
 - replacement and extension of 110kV GIS plant (15 bays)
 - Installation of new Control & Protection systems
 - Installation of new SCADA system
 - Design
 - FAT
 - Functional testing, Commissioning
- Planned project duration: 17 months
- Project duration: 02/2019 - 04/2020 (12 months)
- All works must be carried out without jeopardizing continuous electricity and heat production and distribution to customers (3 phases).
- Aggravating circumstances: COVID outbreak, Zagreb Earthquakes
- Special coordination between HOPS (TSO), HEP-ODS (DSO) and HEP Proizvodnja (EL-TO owner)

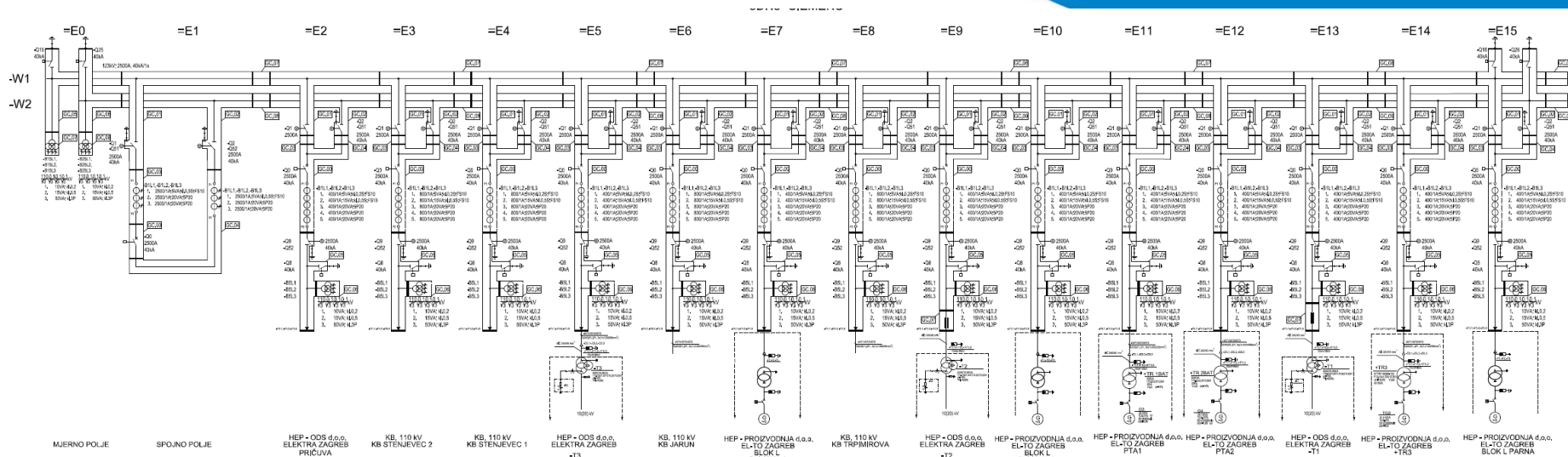
Reconstruction of 110 kV plant *SLD - old*



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Reconstruction of 110 kV plant

SLD - new



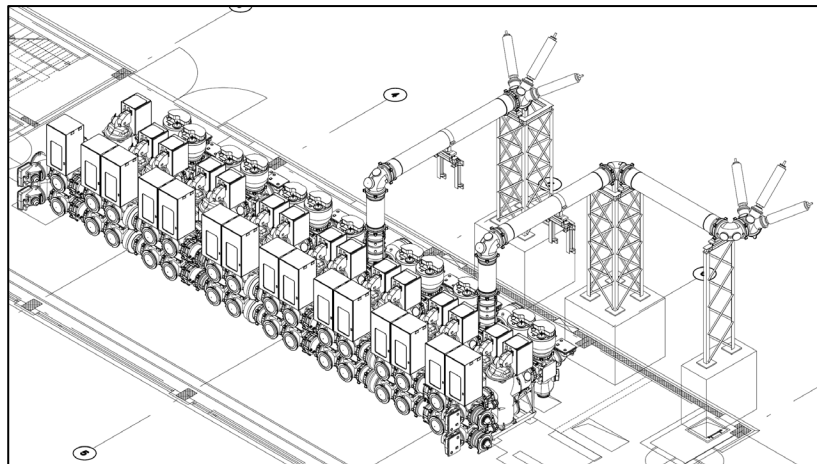
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Reconstruction of 110 kV plant

New 110kV GIS

Manufacturer:	Siemens Energy
Type:	8DN8
Nominal system voltage:	110 kV
Rated system voltage:	123 kV
Busbar:	double system
Rated frequency:	50 Hz
Rated continuous current:	2500 A
Rated short-circuit breaking current:	40kA
Rated short-circuit making current:	100kA

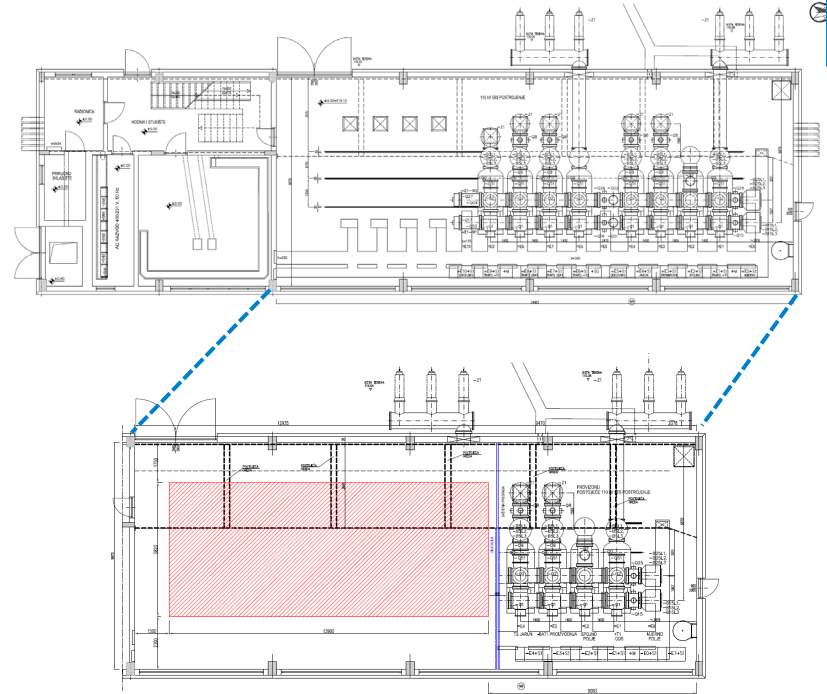


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Reconstruction of 110 kV plant

Special technical requirements

1. Requirements for safe operation in seismic active area (Recent activity: 22/03/2020 5.5 M_L and 29/12/2020 6.2 M_L)
2. Requirements for installation in existing building (dimensions, loading of beams, loading during installation, crane lift capacity)
3. Requirements for continuous operation during maintenance and fault clearance (one busbar and adjacent bays in operation)
4. Requirements for continuous operation during dielectric testing (both busbars, adjacent bays in operation and testing bay disconnected by DSQ)



Reconstruction of 110 kV plant

New Control & Protection system

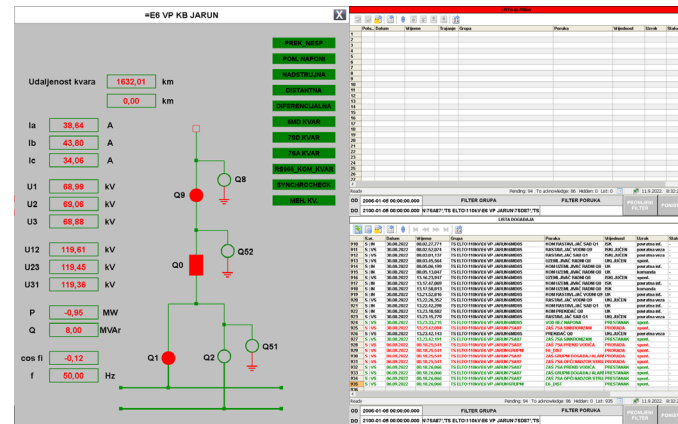
Control system configuration:

- BCU (Transformer/Generator bay)
- BCU (Line bay)
- SCADA system
(dual configuration, 6000 data points,
IED com. IEC 61850-8,
CC com. IEC 60870-5-104 Master/Slave
Cyber security IEC 62443
MODBUS, SNMP)
- LAN communication
- SCADA servers
- GPS Time server
- Common signalisation

6MD85 11 pcs.
6MD85 6 pcs.

SICAM PAS + SCC

RS900, RSG2100,
RMC30
MIC-7500, KONČAR
LANTIME M300,
MEINBERG
SICAM A8000

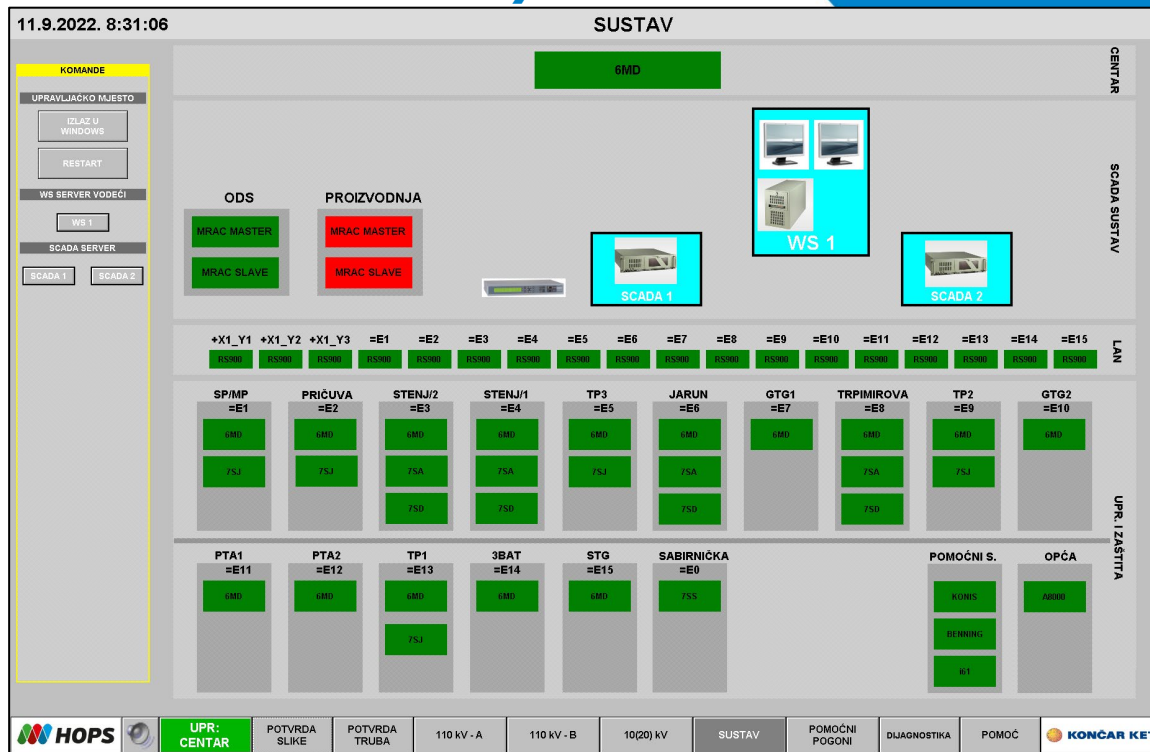


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New Control & Protection system



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New Control & Protection system

Protection system configuration:

- | | | |
|-------------------------------|---------|---------|
| • Distance Protection | 7SA85 | 5 pcs. |
| • Line Differential | 7SD87 | 6 pcs. |
| • Overcurrent protection (TR) | 7SJ82 | 5 pcs. |
| • Overcurrent protection | 7SJ82 | 2 pcs. |
| • Busbar protection | 7SS5220 | 1 pcs. |
| | 7SS5231 | 17 pcs. |



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Customer benefits

1. New modern GIS system solution
2. More power evacuation routes (new 150 MWe)
3. Utilization of existing location (15 bays)
4. New modern Control & Protection system based on IEC 61850
5. Flexible and scalable SCADA system for future extension requirements
6. Reliable dual configuration SAS with cyber security features

Contact

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