

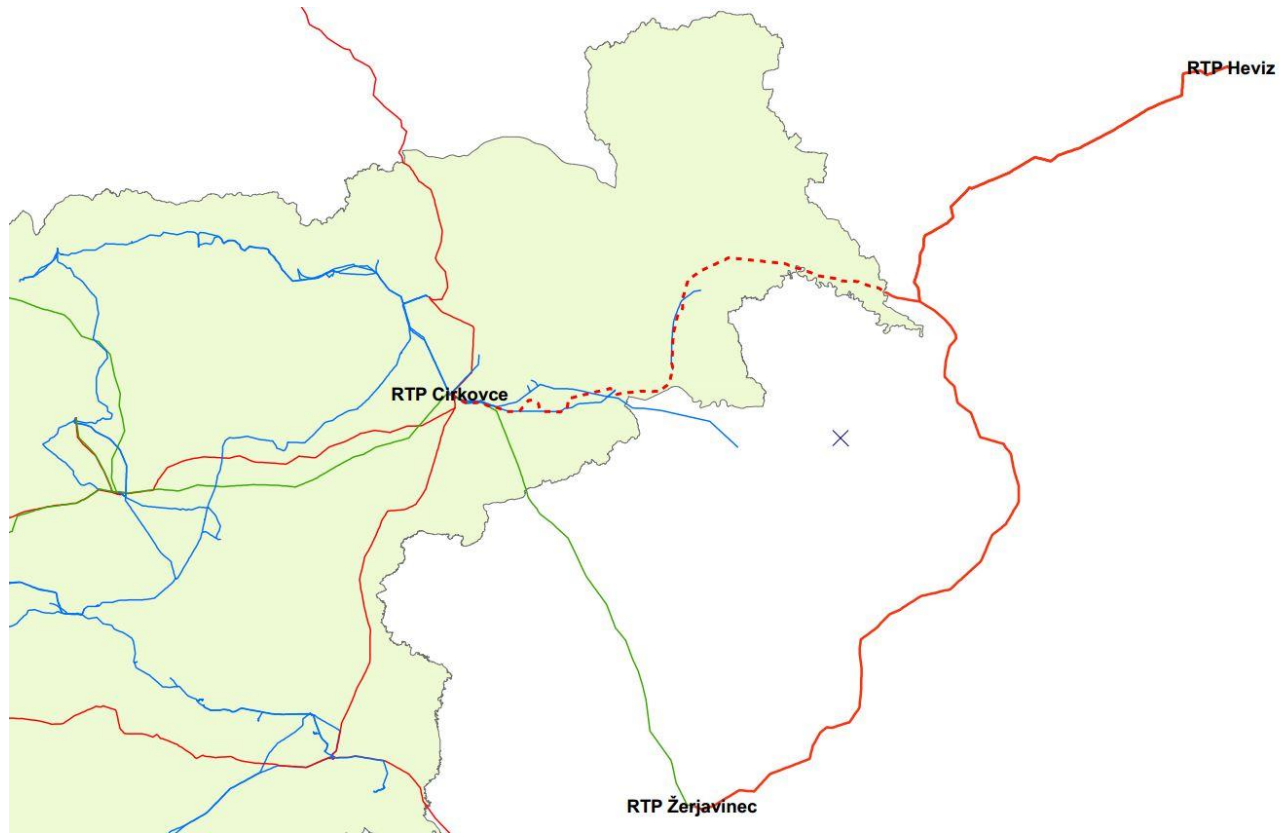
CIGRE SEERC WORKSHOP
Cavtat, 28. 5. 2024

OVERHEAD LINE
2X400 KV

**CIRKOVCE
PINCE**

AND SUBSTATION
400/110 KV CIRKOVCE

Marko Hrast



INTERCONNECTION BETWEEN SLOVENIA–HUNGARY–CROATIA

PLANNED SPATIAL ORDERS:

- a reconstruction and construction of substation 400/110-220/110 kV Cirkovce,
- construction OHL 2x400 kV Cirkovce–Pince,
- underground cabling of existing power lines in front of substation Cirkovce,
- construction of access roads,
- **reconstruction of existent crossed infrastructure,**
- **implementation of mitigation measures.**



OHL PARAMETERS:

- Length: 80,5 km
- Tower type: 264 pcs. double-circuit »barrel« and »donau«
- Conductor: 490-AL1/64-ST1A-three in a bundle
- Insulators: composite insulator
- Earth wire: OPGW (108 fibres)

Environmental and society driven issues

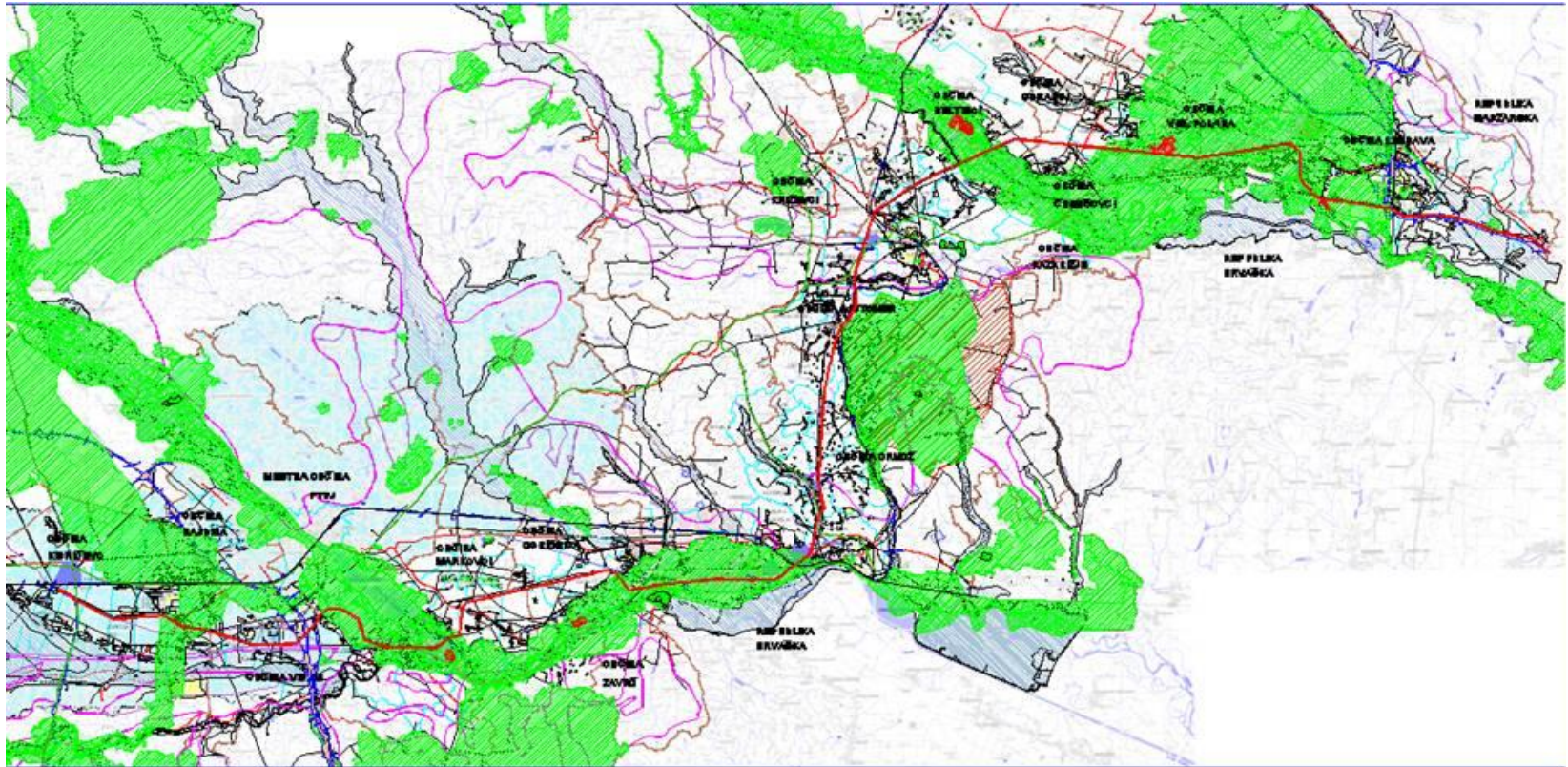
58% of the country is covered by forests

38% of area of the country is protected by Natura 2000

23% are Special Protection Areas (SPA)

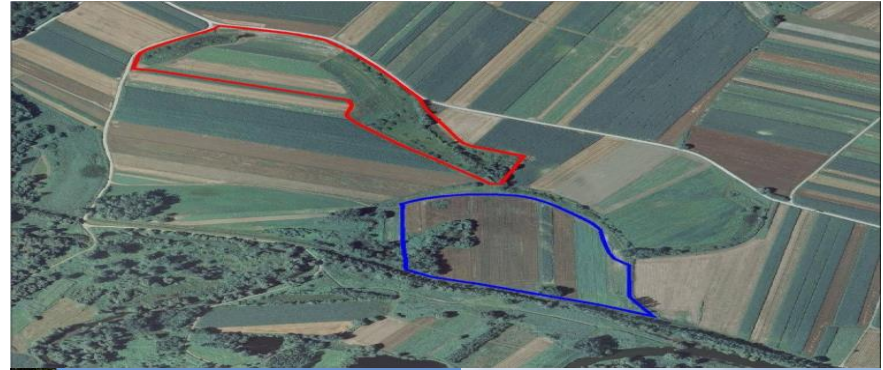
- Environmentally protected areas
 - Bird protected areas
 - Other protected habitats (wetlands, natural parks, protected forests..)
- Local communities
- Crossing infrastructure
- EMF

Natura 2000 and natural protected areas



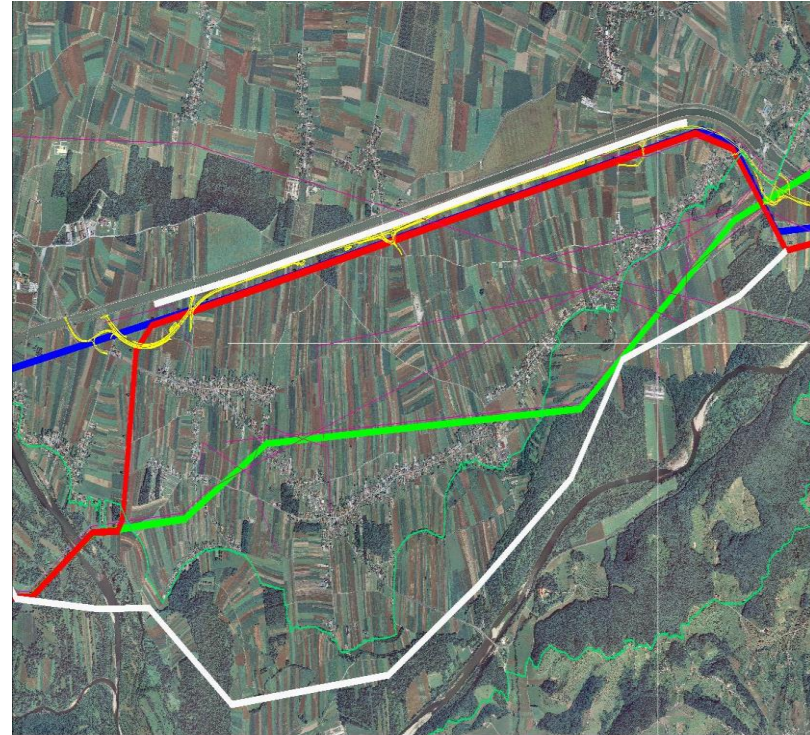
Bird protection mitigation measures

- Replacement habitats
 - Nesting grasslands
 - Water habitats
 - Forest habitats
- Anticollision measures
 - Bird diverters
 - Shape of towers
- Cabling MV lines



Habitats protection mitigation measures

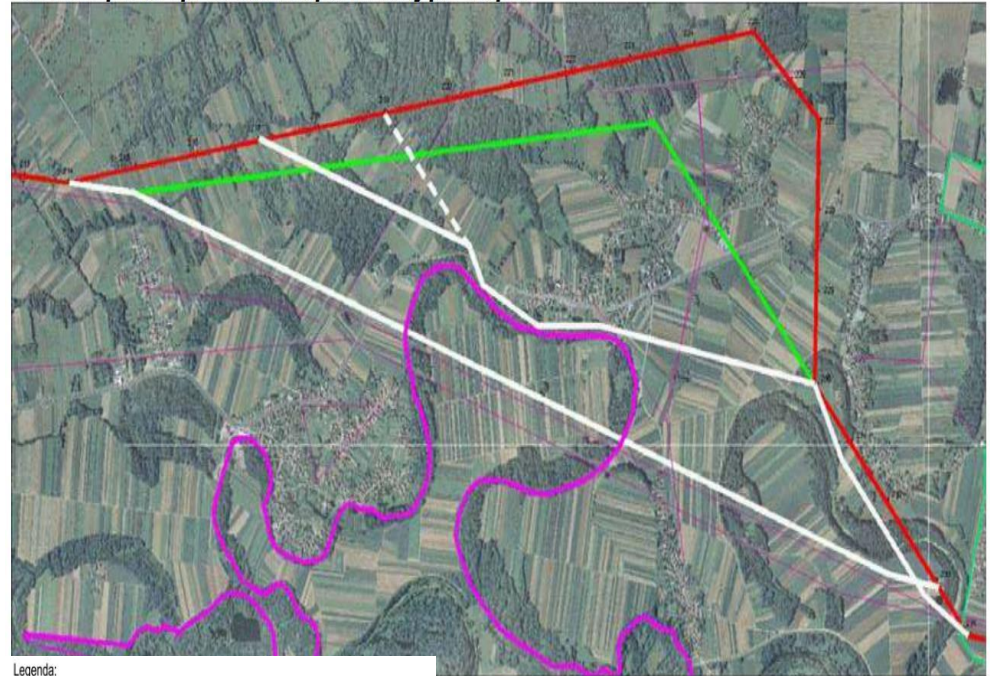
- Replacement habitats
 - Protected grasslands
 - Protected forests
 - 90 ha of replacement habitats
- Avoiding protected areas



Local communities

- Demands from local communities to distant line from villages
- HV line crossed the state border
- International agreement Slovenia – Croatia to cross the border

Grafični prikaz proučenih optimizacij pri Kapci



Legenda:

- varianta, primerjana v Študiji variant
- trasa, ki jo je potrdila Vlada RS in je bila prikazana v dopoljenem osnutku DPN
- poučene optimizacije s predlogi iz javne razgovor
- katastrska meja

Crossing infrastructure

- Crossing electric power lines: cabling LV and MV lines
- Crossing road and railway infrastructure
- Crossing telecommunication infrastructure
- Crossing mining area: gas wells and filling station



Electromagnetic fields - EMF

National legislation:

$B \leq 10 \mu\text{T}$

$E \leq 500 \text{ V/m}$

400 kV HV corridor:

$\pm 40 \text{ m}$ from HV axis

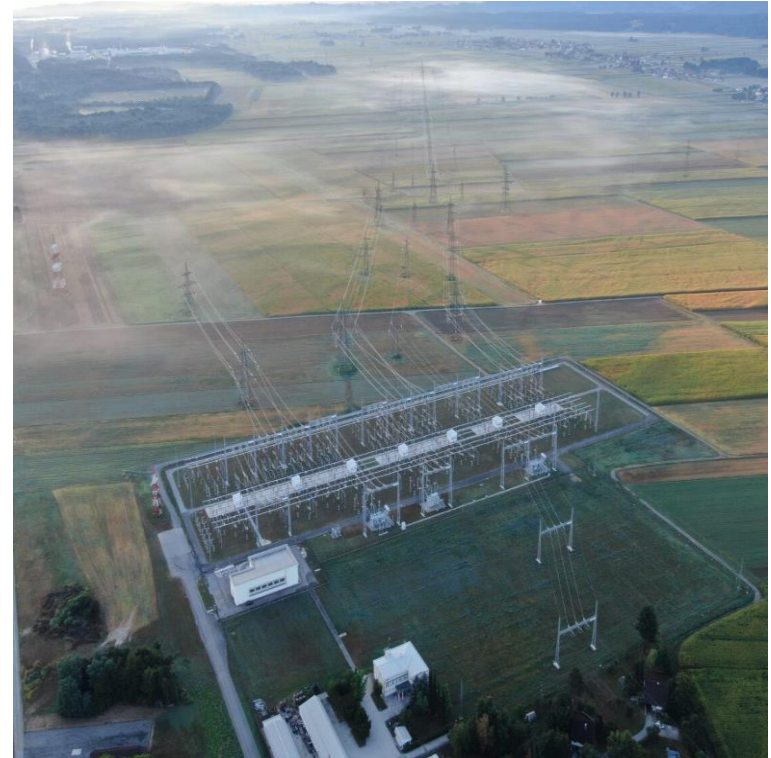
38 houses inside corridor –
mitigation measures for
decreasing EMF

2 houses buy-out and
demolished



Conclusions

Time consuming procedure:
From starting of project to
operation – 22 years;
23% of the total investment
costs for compensations and
mitigation measures;
Active communication with
stakeholders, local
communities, landowners,
ministries is crucial





Thank you for your
attention