



Electrocution and mitigation measures applied in Bulgaria

Volen Arkumarev

Bulgarian Society for the Protection of Birds / BirdLife Bulgaria



Background

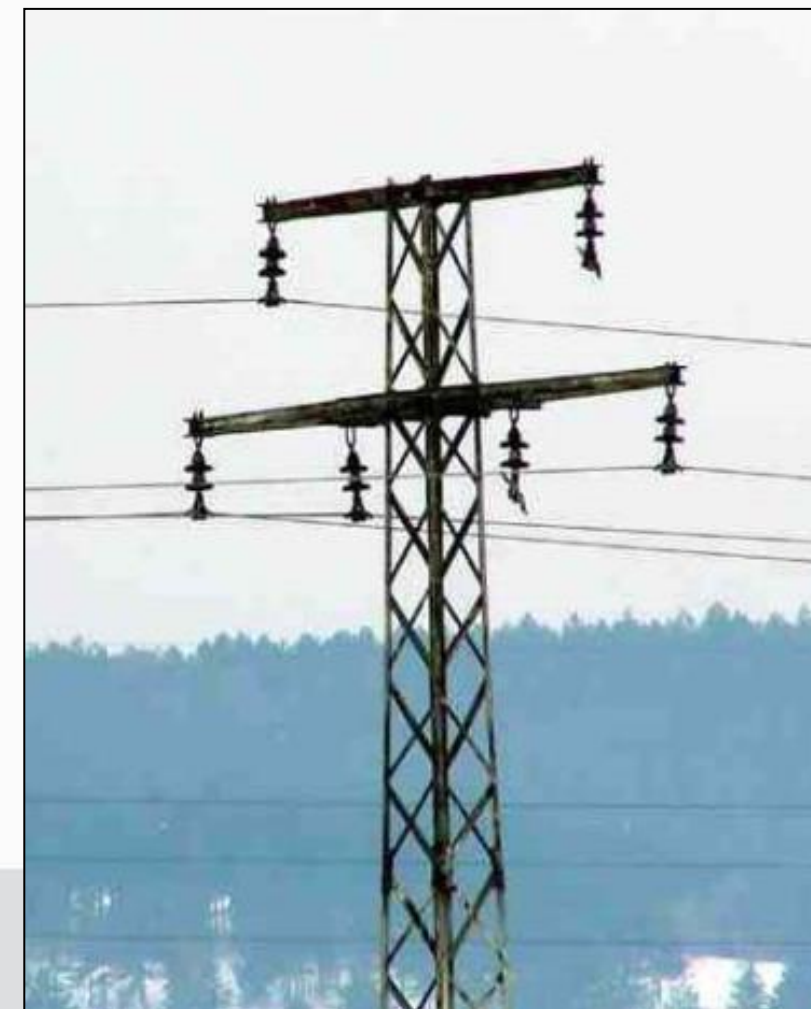
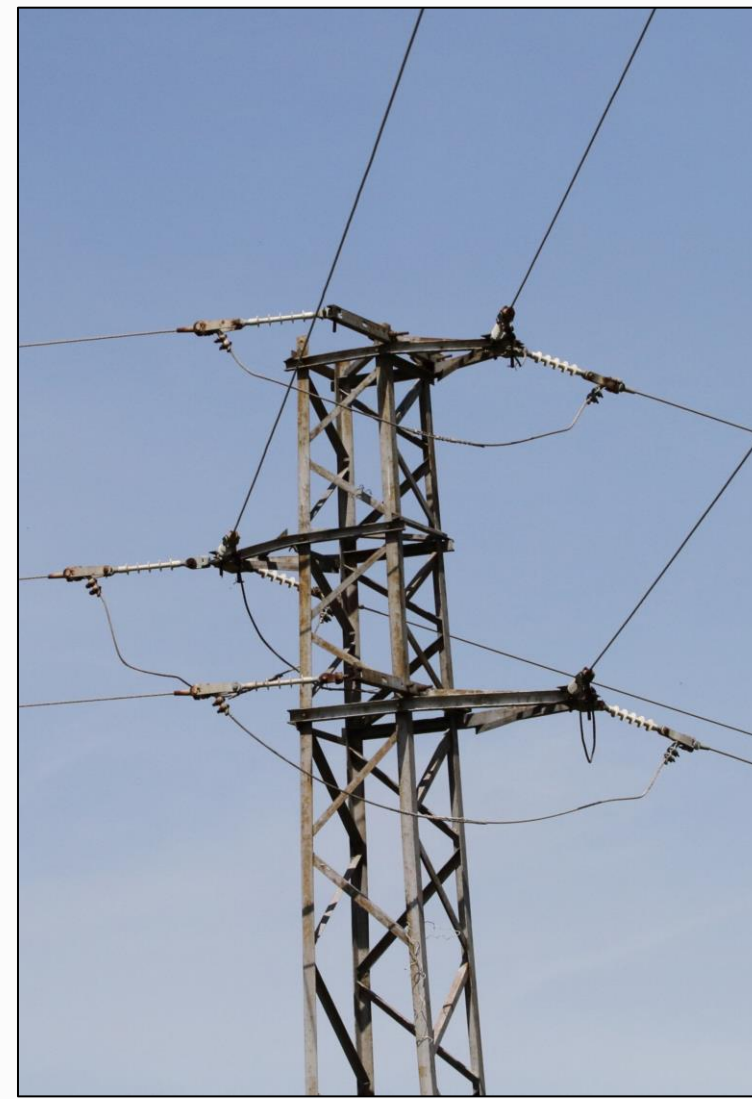
- 110,000 km medium voltage overhead power lines
- Majority of electric poles are regarded as hazardous to wild birds
- No quantitative data about mortality rate of wild birds as a result of electrocution and collision prior 2008





BSPB

Which MV poles are most hazardous?





Power lines retrofitting for Saker Falcons

- LIFE Save the Raptors (2009-2013): 595 insulated poles
- LIFE for the Burgas Lakes (2010-2014): 60 insulated poles and 796 diverters
- LIFE Saker Falcon in HU, SK, RO and BG (2010-2014): 440 insulated poles
- LIFE for Safe Grid (2013-2018): 2,340 insulated poles, 70 km of overhead power lines have been replaced by 43 km of underground cable, 42 km of aerial bare conductors have been replaced with insulated ones (PAS system)
- OPE Saker Falcon (2021-2023): 300 insulated poles
- OPE Imperial Eagle (2021-2023): 848 insulated poles



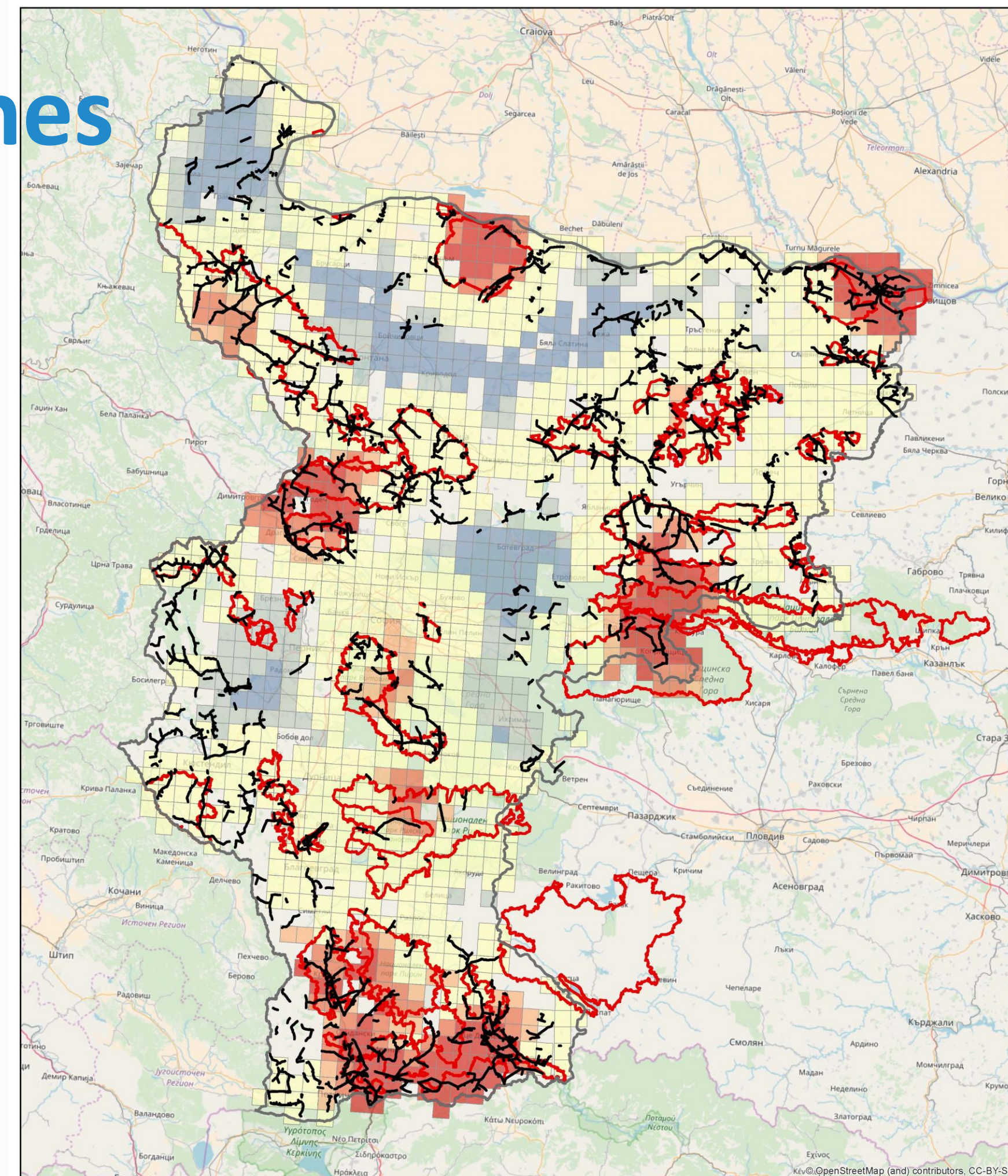
Powerlines retrofitting for other globally threatened birds

- **LIFE The Return of the Neophron (2011-2016):**
397 insulated poles in BG and 66 in Greece
- **LIFE RE Vultures (2016-2021):**
167 insulated poles and 150 diverters
- **LIFE for Safe Flight (2017-2023):**
500 diverters



LIFE Birds on Power Lines (2017-2024)

- Identification of the most hazardous power lines in W Bulgaria
- Insulation of 5,400 pylons (3,684 so far)
- Installment of 3,600 “bird diverters” (2,782 so far)
- Placing 900 White Stork nesting platforms (941 installed)
- Development of bird-safe pylon standards for Bulgaria and production and mounting of 40 prototype pylons (20 pin-type and 20 metal-frame type) to be tested in real conditions (standards for pin-type pylons are ready for testing)



Легенда

— Линии	Cold Spot - 95% Confidence
□ Територия на ЧЕЗ	Cold Spot - 90% Confidence
□ Защитени зони за птиците	Not Significant
Hot spot (Анализ на ниво 5 км с реални данни)	Hot Spot - 90% Confidence
Gi_Bin	Hot Spot - 95% Confidence
□ Cold Spot - 99% Confidence	Hot Spot - 99% Confidence

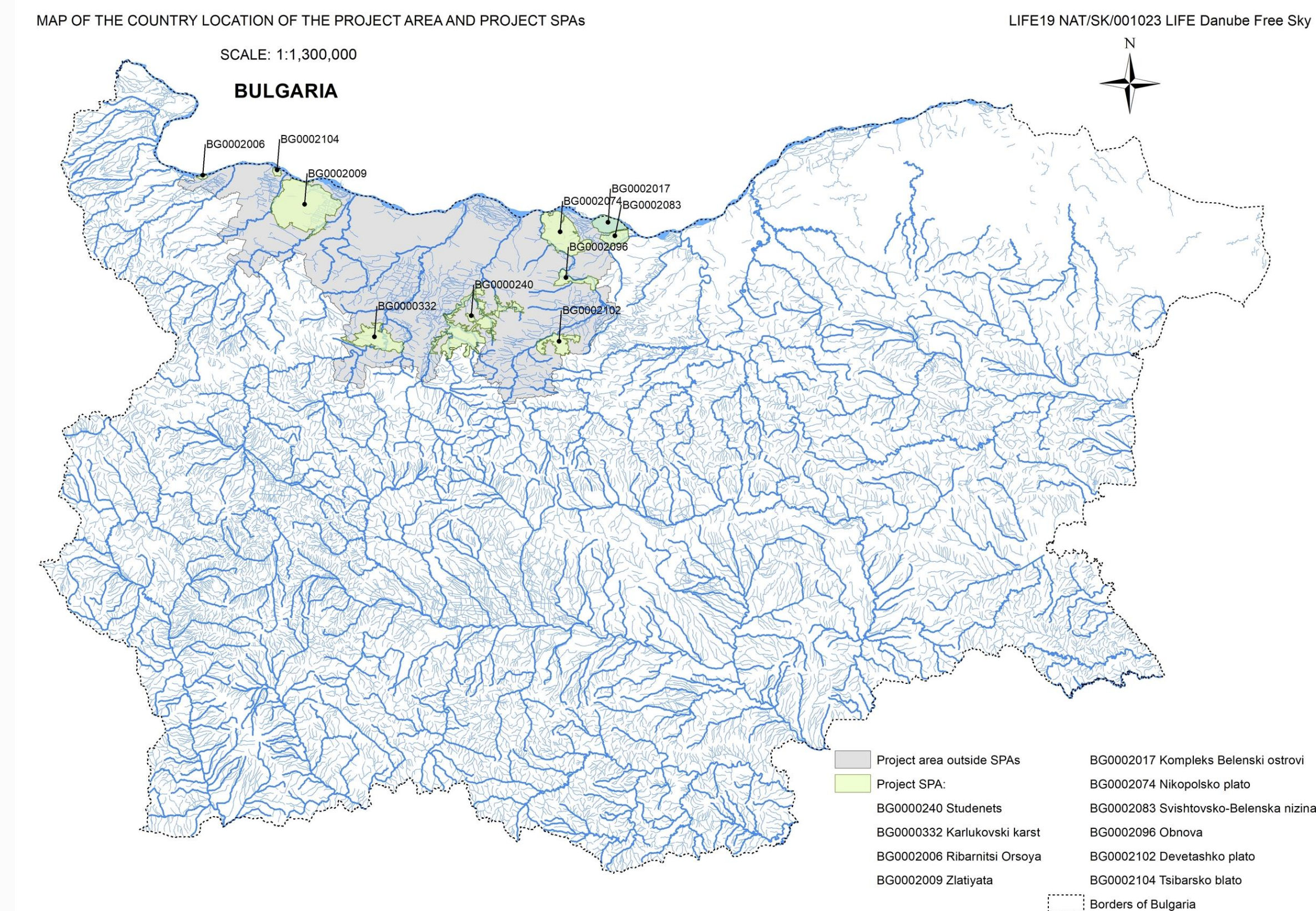




LIFE Danube Free Sky (2020-2026)

12 target species in 7 countries
15 partners

- Field survey for identification of the most hazardous powerlines is ongoing in 10 SPAs in BG
- 1,200 pylons to be insulated in BG (490 so far)
- 1,350 diverters to be installed in BG (520 so far)

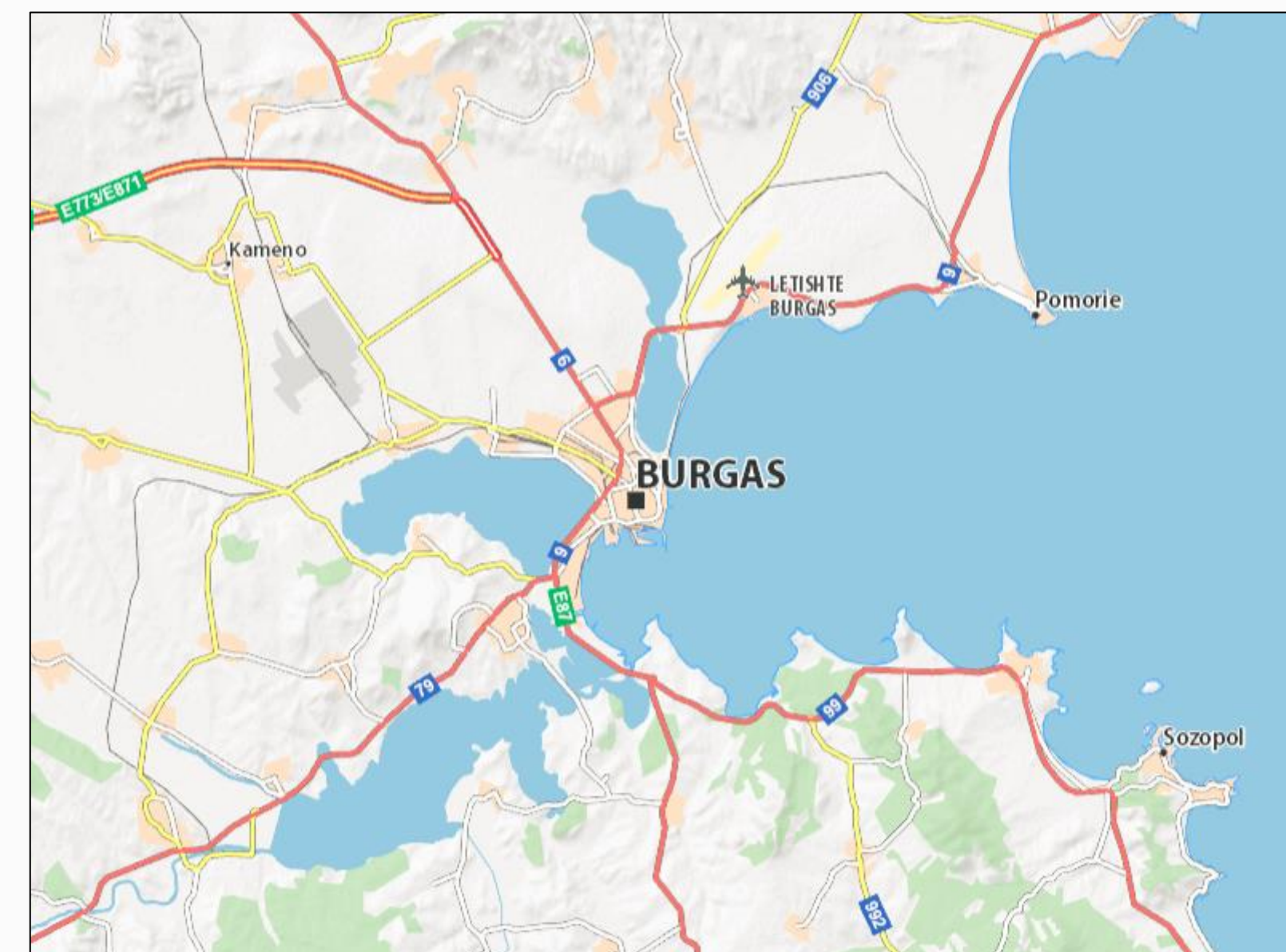


www.danubefreesky.eu



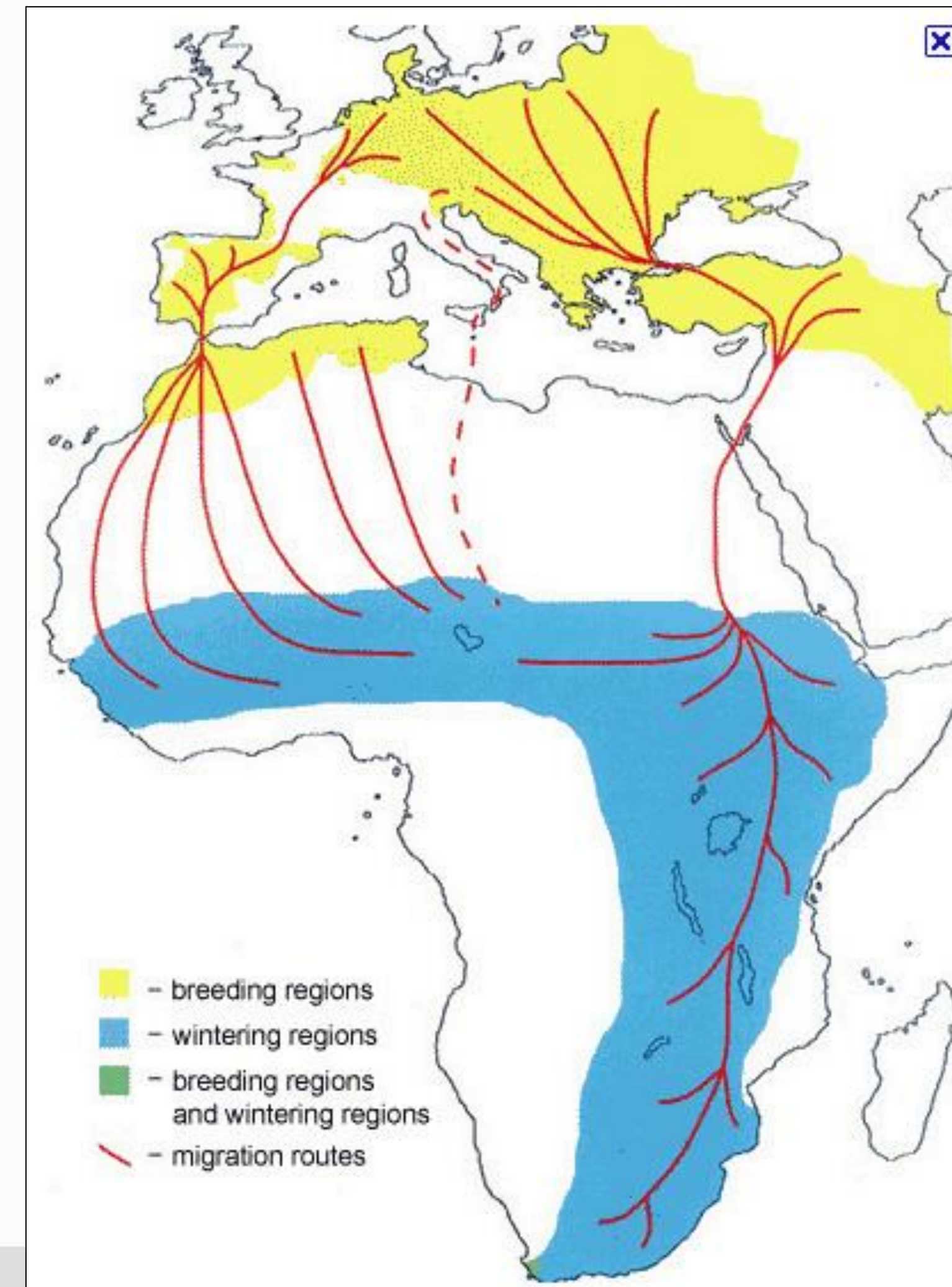
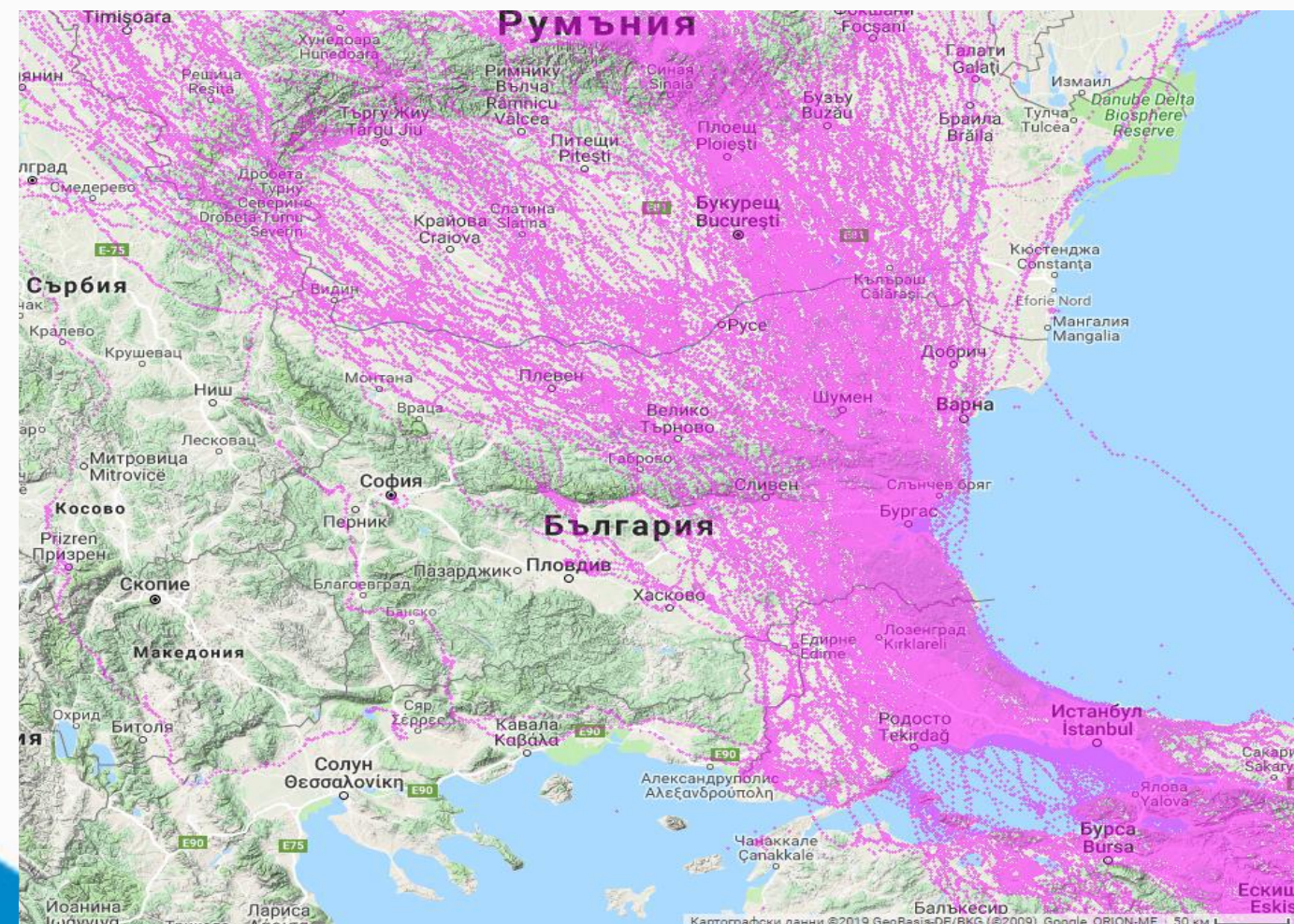
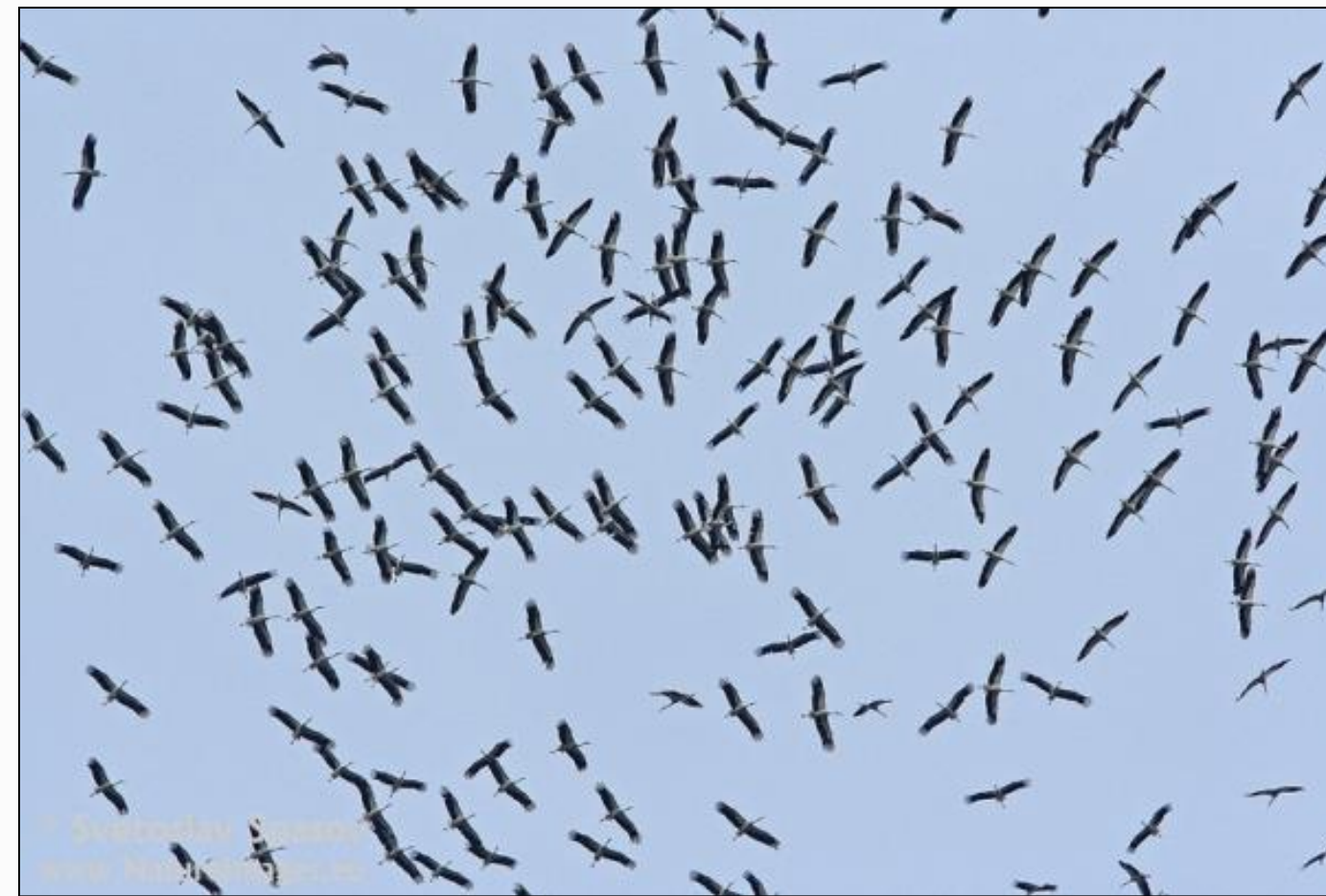
LIFE Safe Grid for Burgas (2021-2026)

- Large city with industrial areas
- Dense grid of power lines
- Concentration of large numbers of water birds around the lakes
- Bottleneck site along *Via Pontica* bird migration route





240,000 White Storks and
60,000 raptors cross Burgas area each autumn





Electrocution is the major threat for
storks and raptors





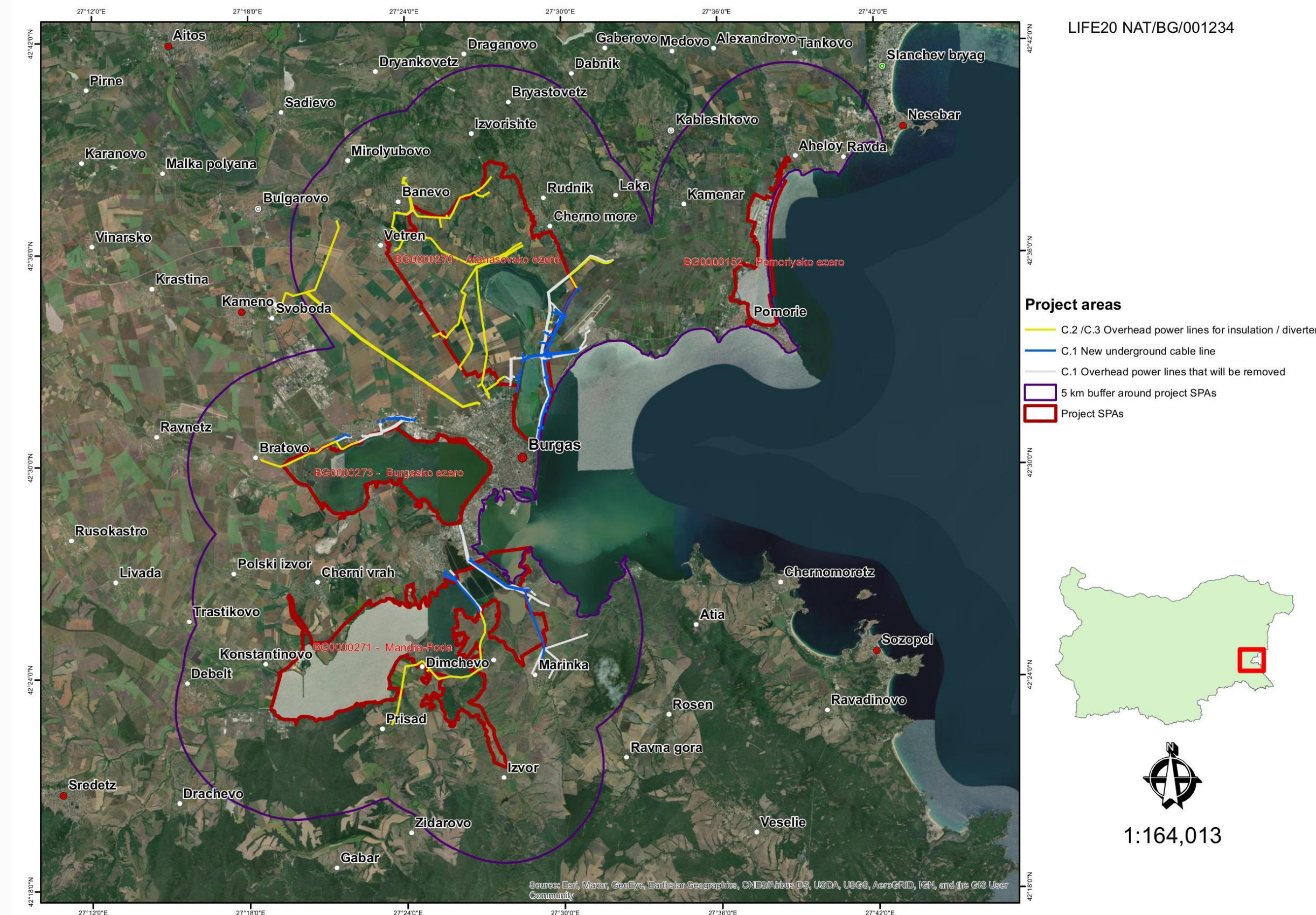
Collision is the major threat for the pelicans





LIFE Safe Grid for Burgas (2021-2026)

- 58 km of overhead power lines will be dismantled and replaced with around 52 km underground cables
- 200 km overhead power lines will be retrofitted by insulation of 2,000 pylons (1,278 so far)
- 75 km of aerial conductors (25 km of triple power lines) in priority areas will be marked with 2,000 bird diverters (360 so far)

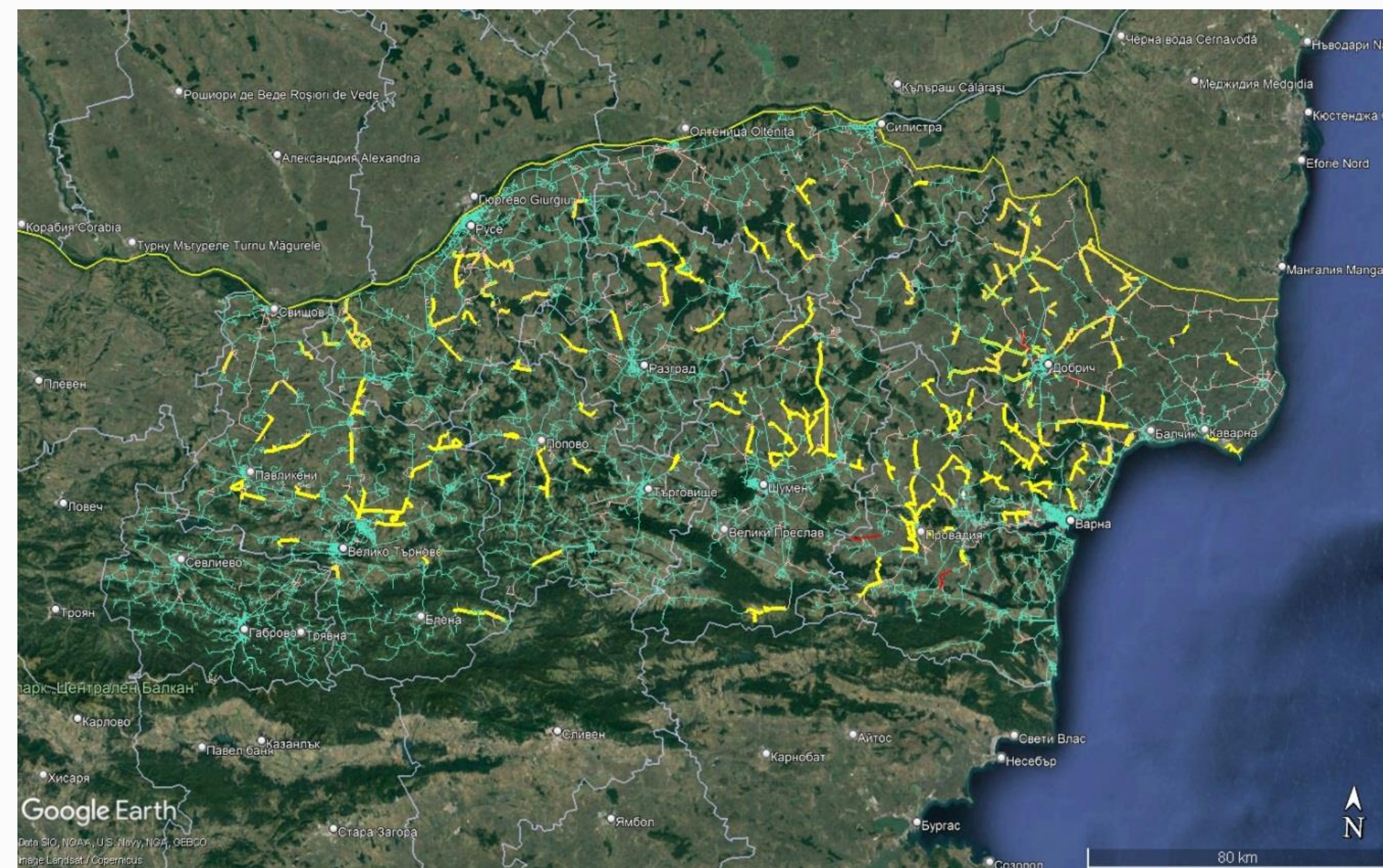




LIFE NE BG Safe Sky (2022-2027)

1,000 km overhead power lines will be retrofitted by insulation of 10,000 pylons

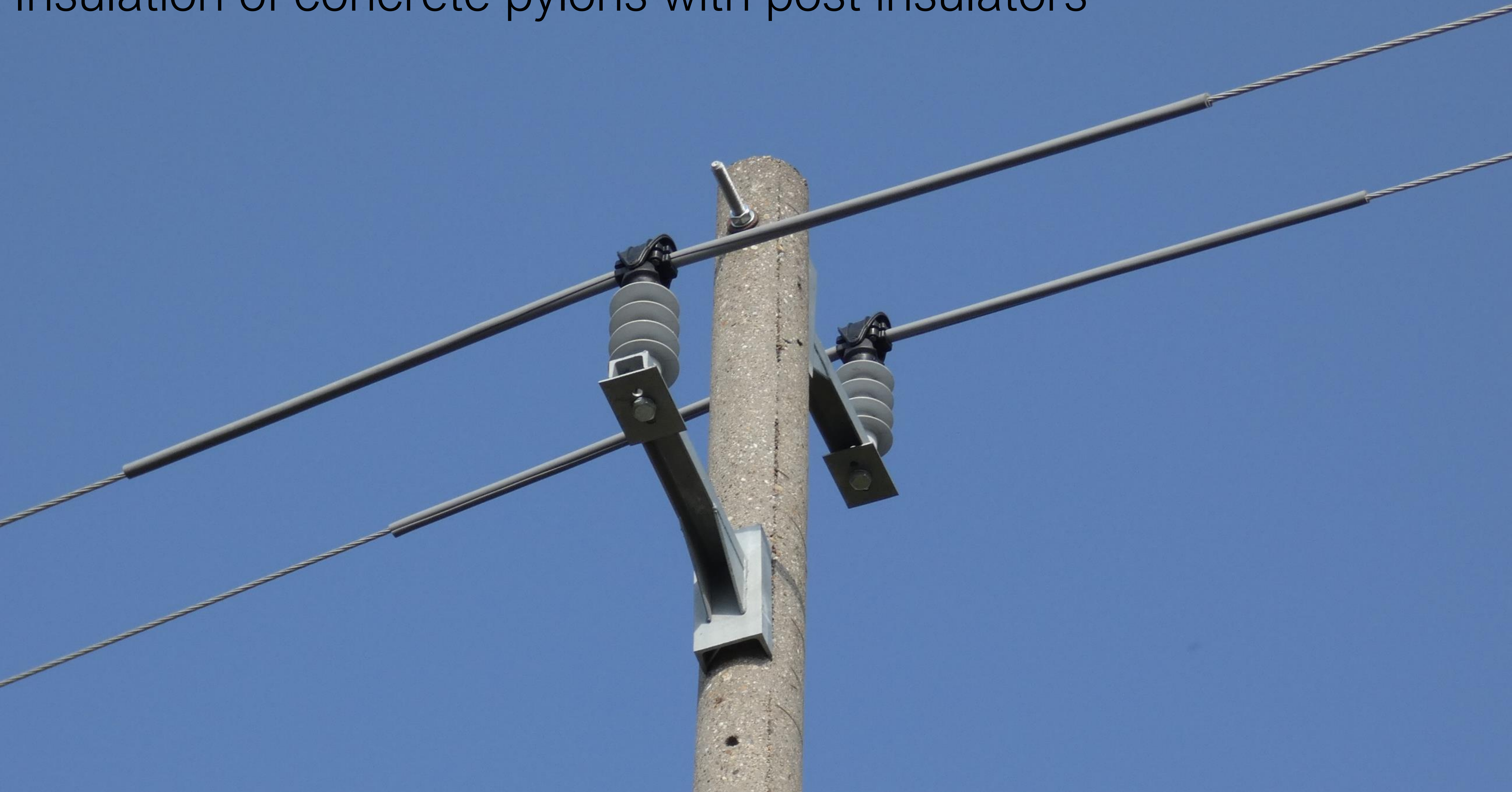
150 km of aerial conductors (50 km of triple power lines) in priority areas will be marked with 5,000 bird diverters





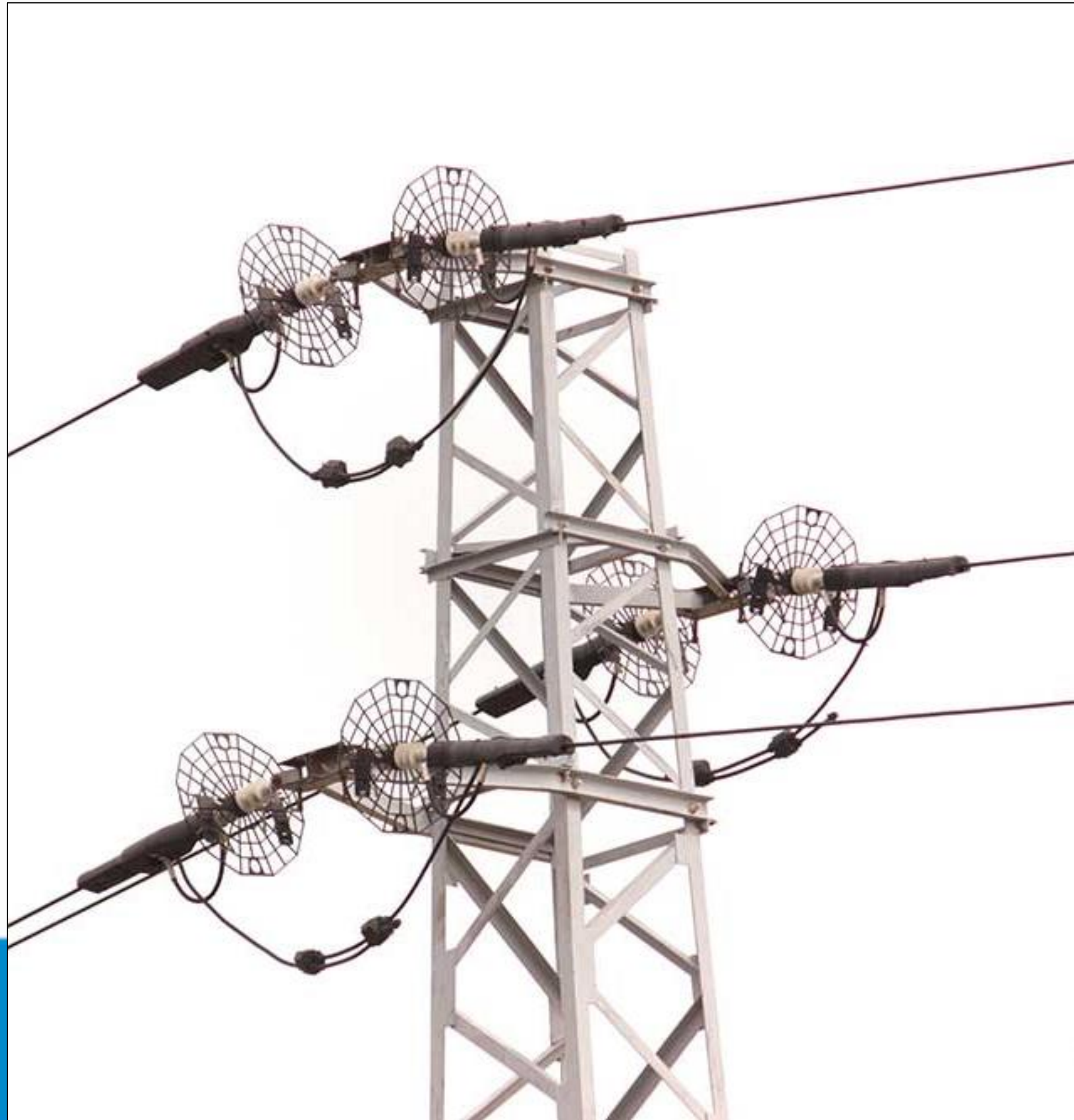
Insulation of concrete pylons with post insulators

Insulation of concrete pylons with post insulators





Insulation of metal-frame pylons with tension insulator strings / switch towers / PAS system



Insulation of pylons with suspension insulators





Bird-safe prototype pylon



Bird diverters installed to prevent collision





Summary for the period 2008-2023

Saker Falcon

- 740 insulated pylons

Imperial Eagle and Saker Falcon

- 2,935 insulated pylons
- 43 km underground cable
- 42 km insulated aerial conductor

Egyptian and Griffon Vultures

- 1,023 insulated pylons
- 150 diverters

Dalmatian Pelican

- 2,729 diverters

Other threatened birds

- 606 insulated pylons
- 2,229 diverters



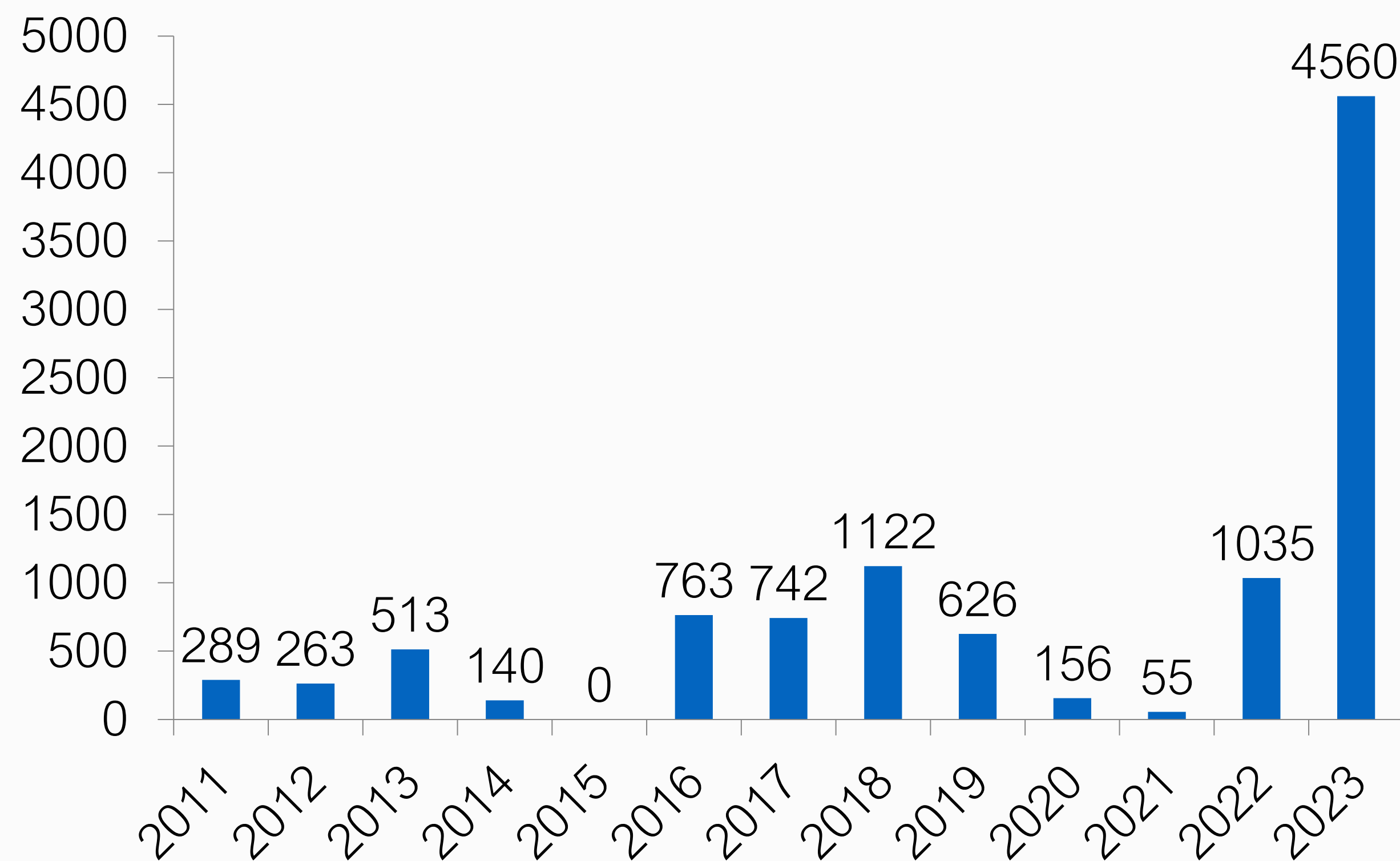
Summary for the period 2008-2023

Within BSPB projects:

- 10,240 pylons have been insulated
- 5,108 diverters have been installed
- 42 km bare aerial conductors replaced with insulated ones
- 43 km underground cable replaced 70 km overhead power lines

In total: **1,150 km** of hazardous power lines have been retrofitted in Bulgaria

Number of insulated poles per year



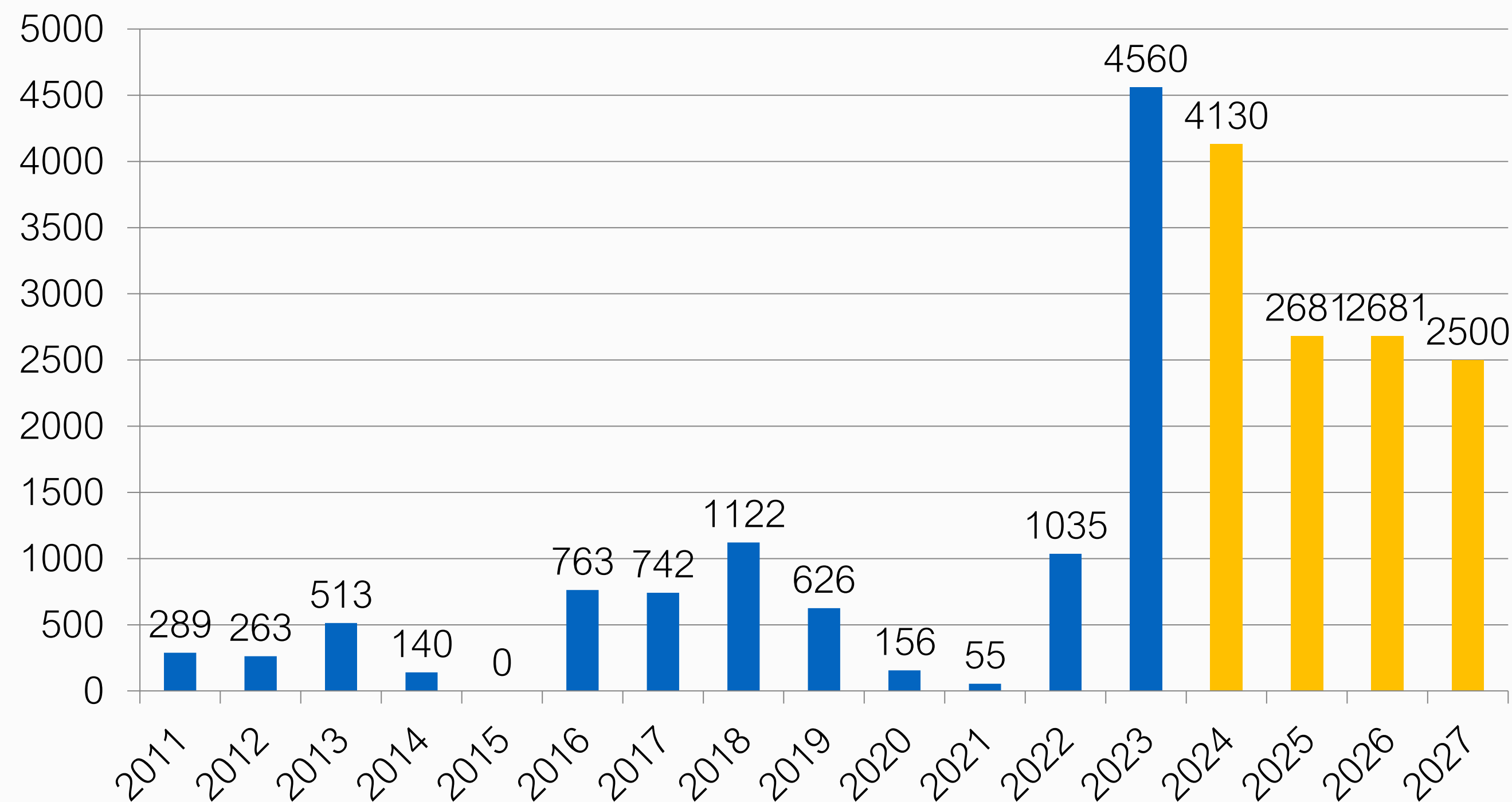


Projection for the period 2024-2027

Number of poles to be insulated
(underground cable not included)

- 11,991 pylons to be insulated
- 6,849 diverters to be installed
- 58 km overhead power lines converted in underground cables

Additional **1,325 km** of hazardous power lines to be retrofitted in Bulgaria in the next 4 years.



2,475 km retrofitted power lines by the end of 2027

Insulation of powerlines along the Egyptian Vulture flyway



Pilot insulations in:

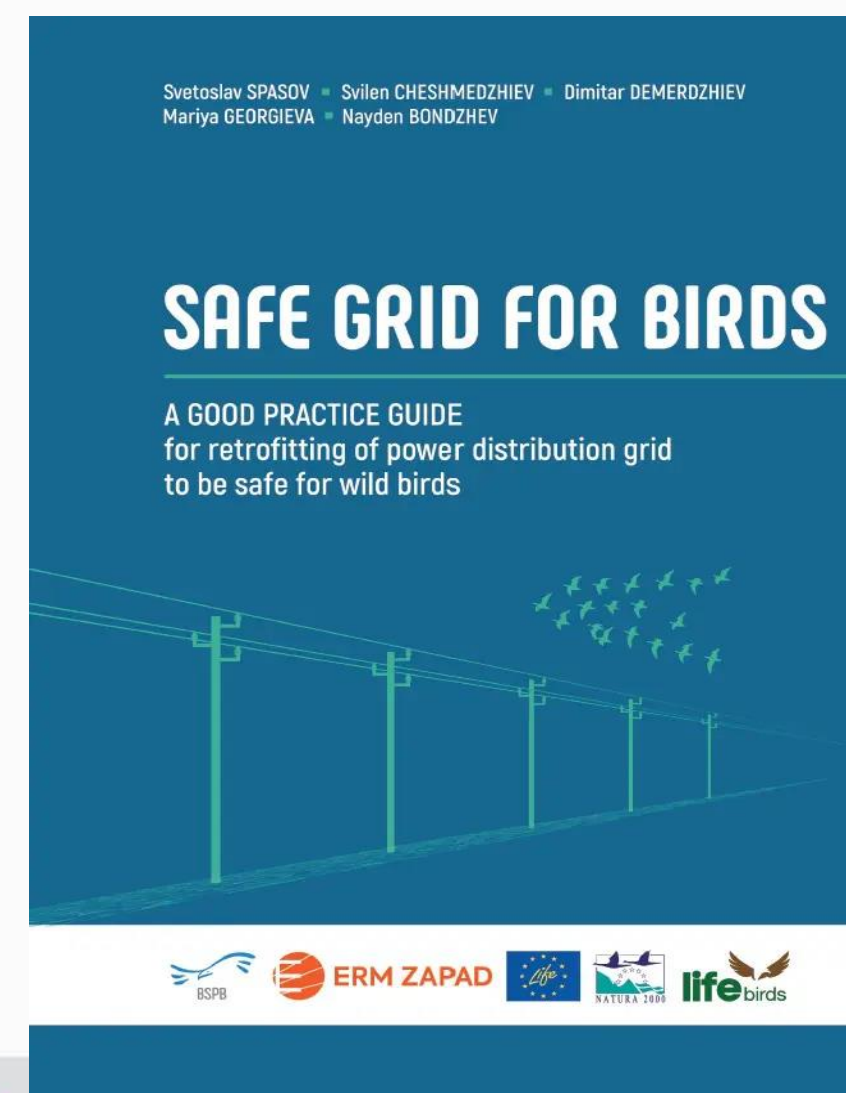
- Jordan
- Saudi Arabia
- Ethiopia
- Turkey



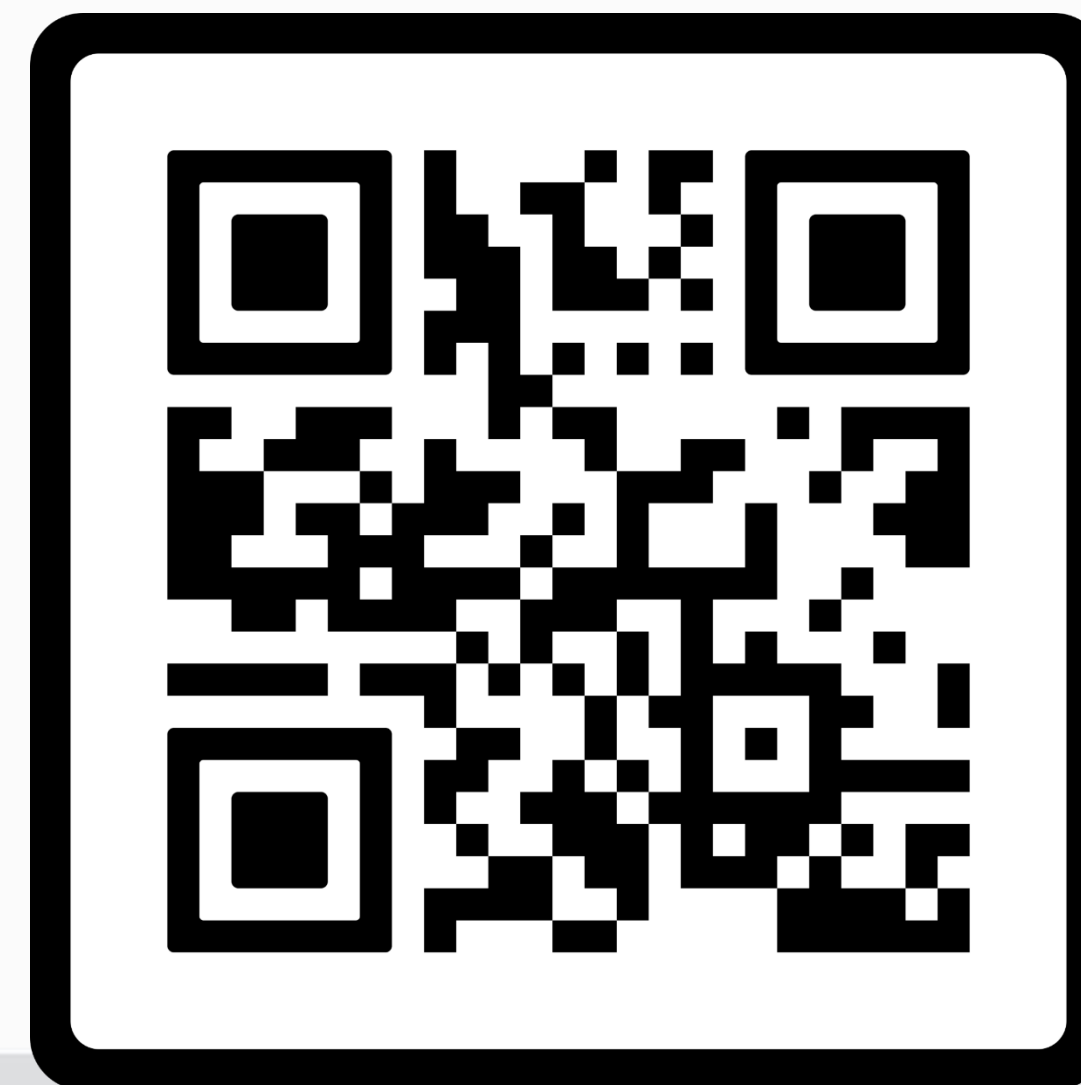


A complete solution to the conflict between wild birds and electric infrastructure in Bulgaria requires further cooperation of all key stakeholders:

- state authorities**
- electric distribution companies**
- NGOs**
- scientific community**



[свали](#)



[download](#)

For more information:
svetoslal.spasov@bspb.org
www.bspb.org