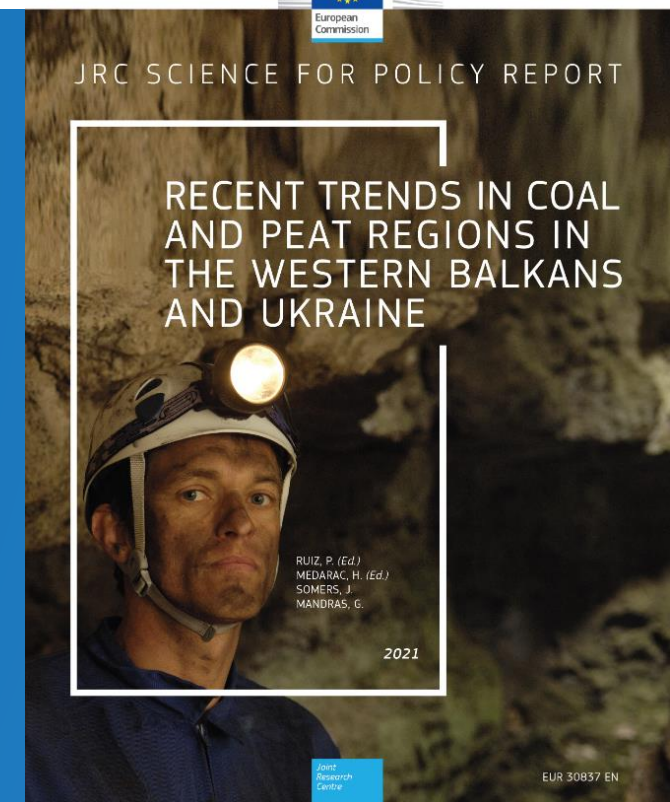


Coal and Peat in the Western Balkans and Ukraine

Dr Hrvoje Medarac



12th Energy Planning and Modelling of Energy Systems 2021

22/12/2021

European Commission Joint Research Centre

Science and knowledge service

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Currently recruiting: 6 Contract Agent vacancies open in Petten (3 in Unit JRC.C7)

<https://recruitment.jrc.ec.europa.eu/>

Why?

EU policy

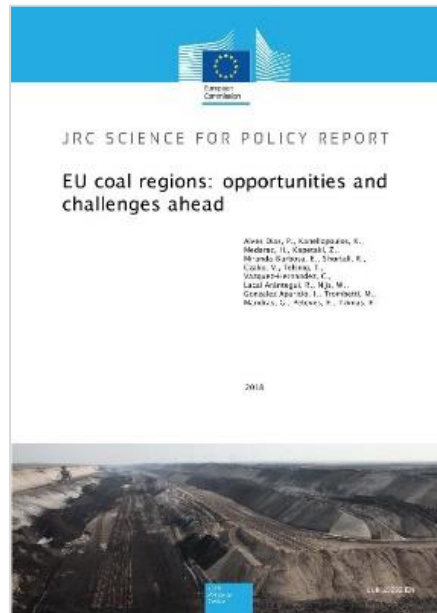
- 2050 target: Europe as climate neutral continent
- 2030 target: 55% reduction of GHG emissions
- Decarbonisation of power sector in EU

Western Balkans and Ukraine

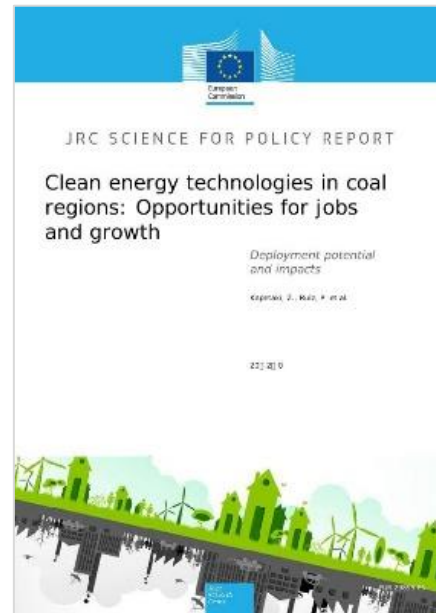
- Members of the Energy Community- need to implement core EU energy legislation
- Sofia Declaration at the Western Balkans Summit (2020)- 2050 climate commitments
- 21st EU-Ukraine Summit (2019)- progressive integration of UA to EU energy market

Research context- cooperation with DG ENER

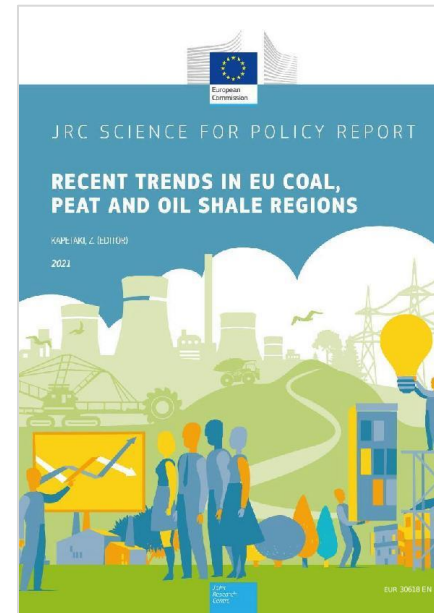
Series of Science for Policy Reports on Coal Regions in Transition



2018: EU coal regions: opportunities and challenges ahead (Alves Dias et al, 2018)



2020: Clean energy technologies in coal regions: Opportunities for jobs and growth (Kapetaki et al, 2020)

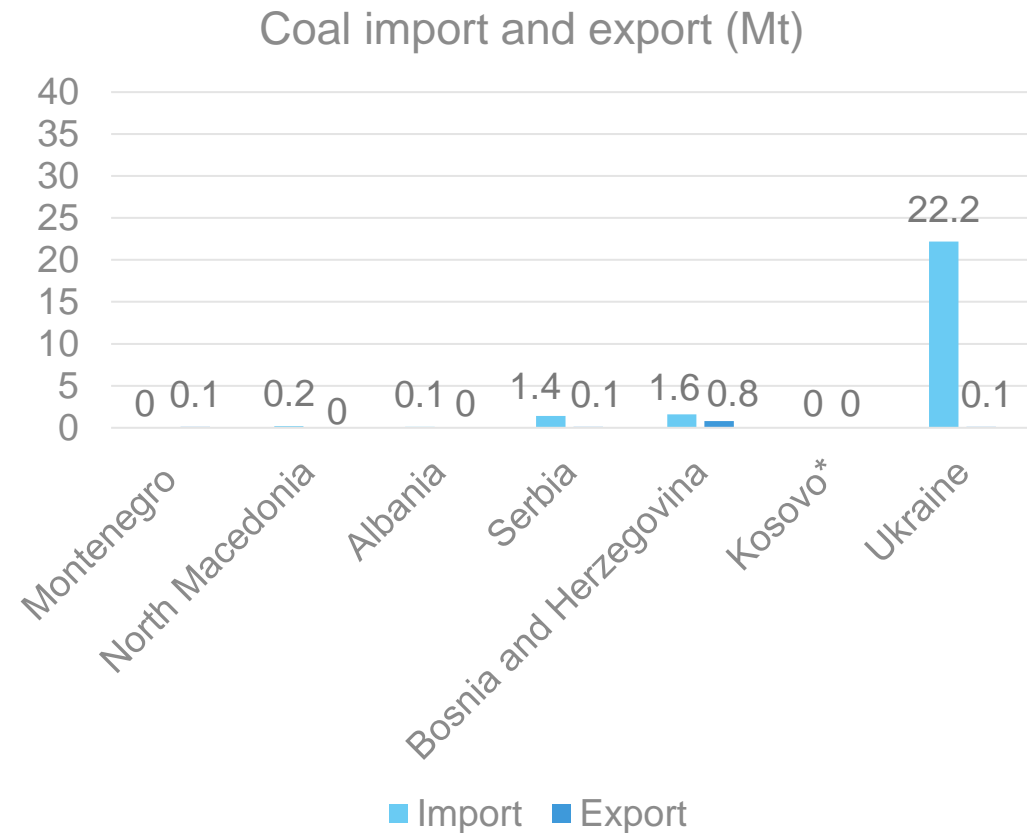
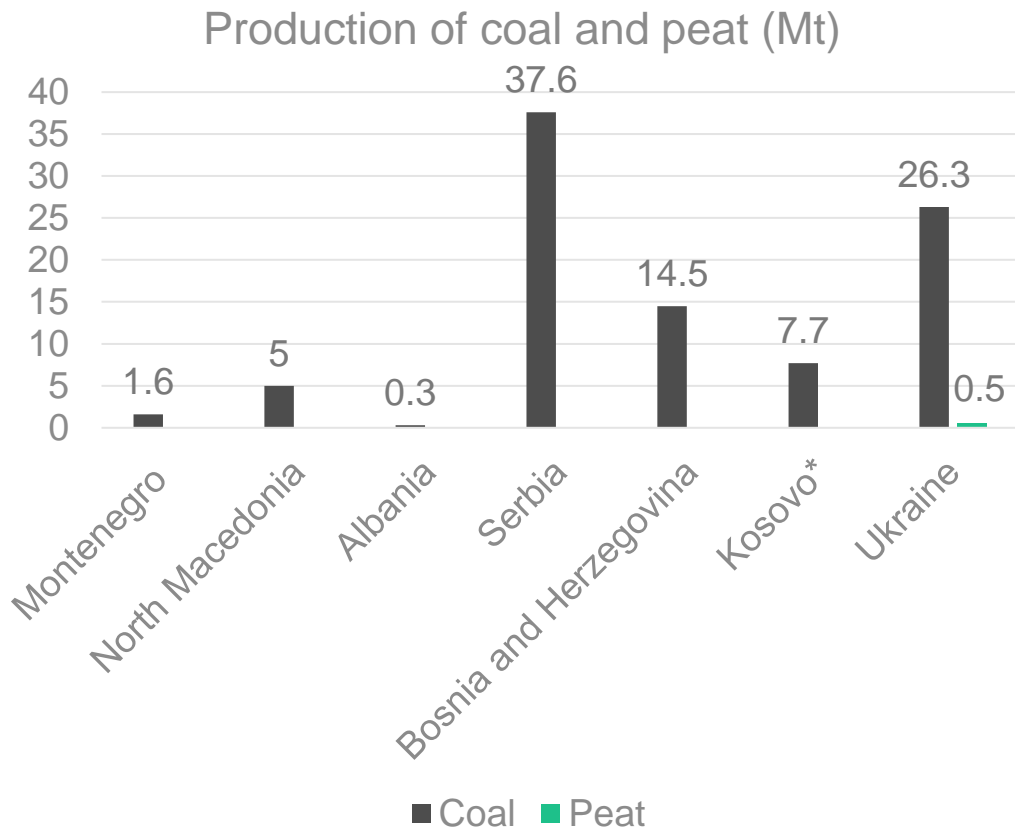


2021: Recent trends in EU coal, peat and oil shale regions (Alves Dias et al, 2021)



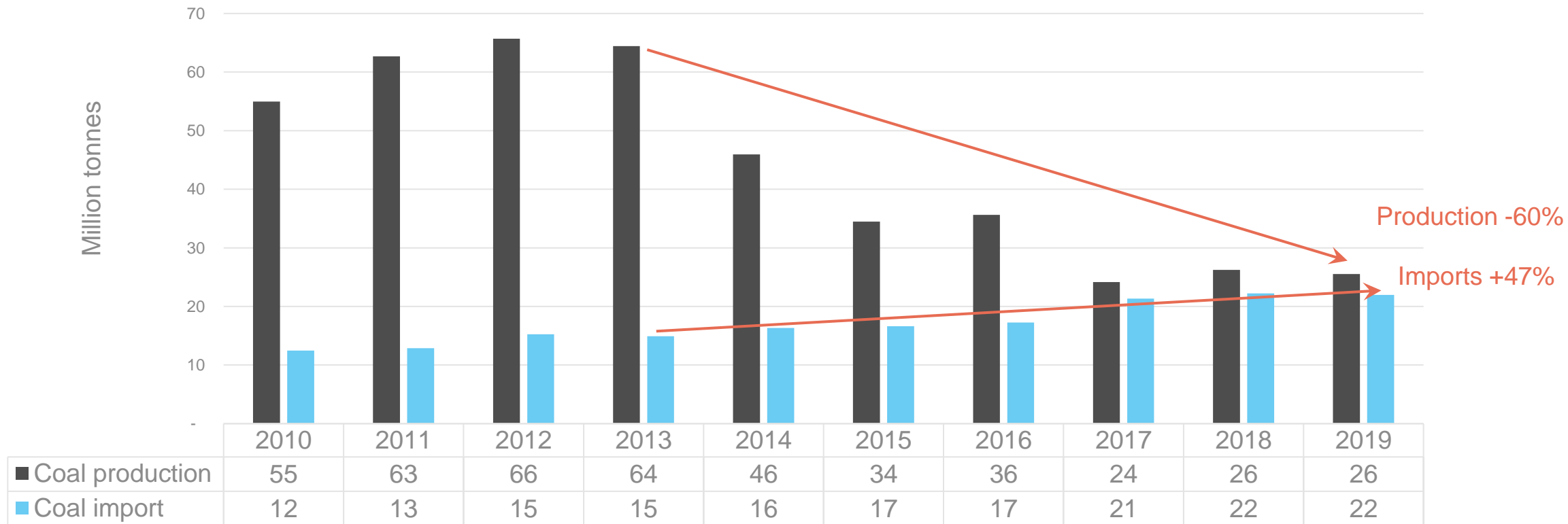
2021: Recent trends in coal and peat regions in the Western Balkans and Ukraine (Ruiz, Medarac et al, 2021)

2018 Coal and Peat Statistics (Eurostat)



Historical coal production and imports in Ukraine

Coal production and imports in Ukraine



Beginning
of conflict

New
energy
strategy



Coal mines

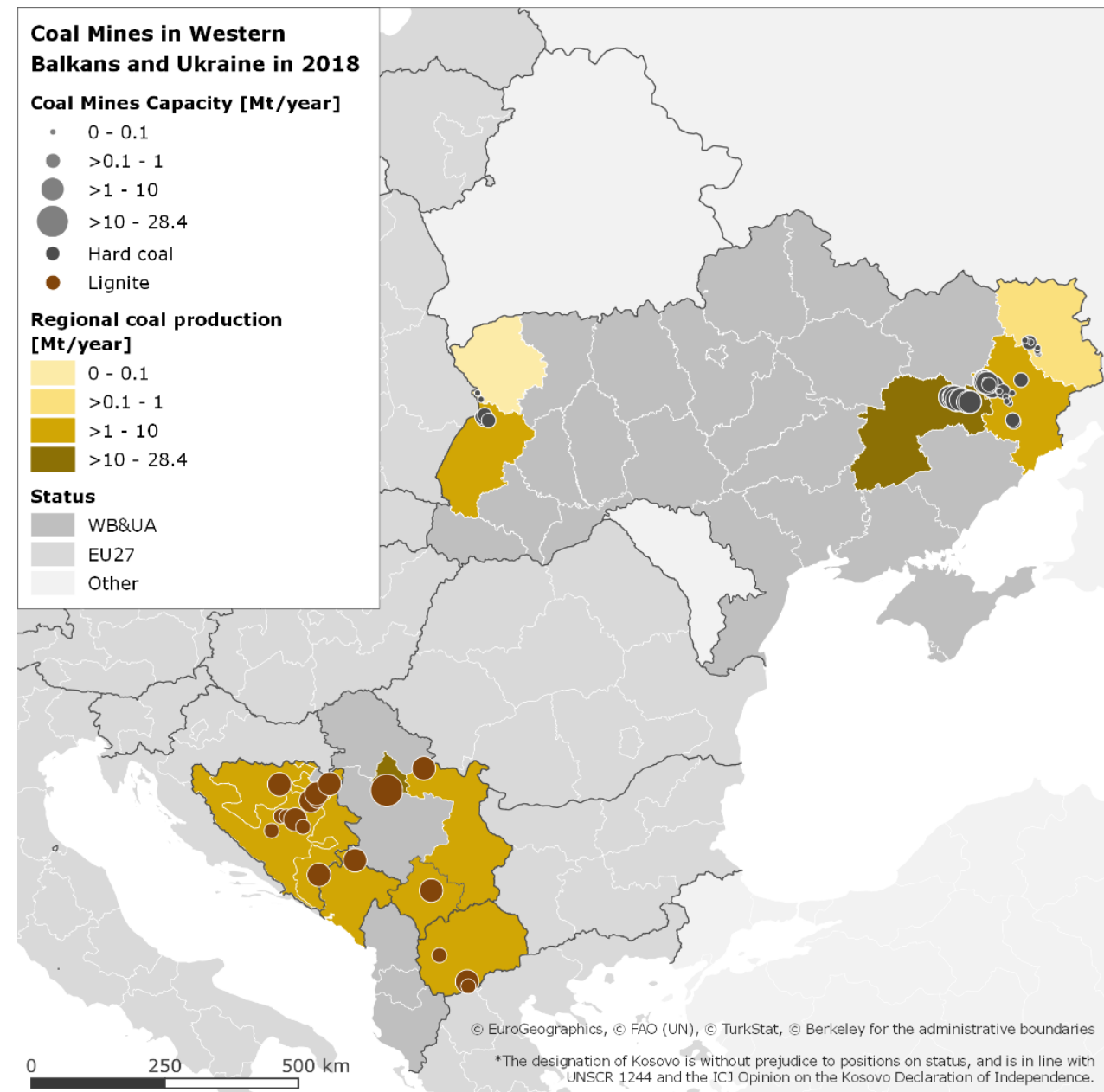
65 mines in 12 regions

93 Mt of coal produced in 2018

- Hard coal- Ukraine
- Lignite- Western Balkans

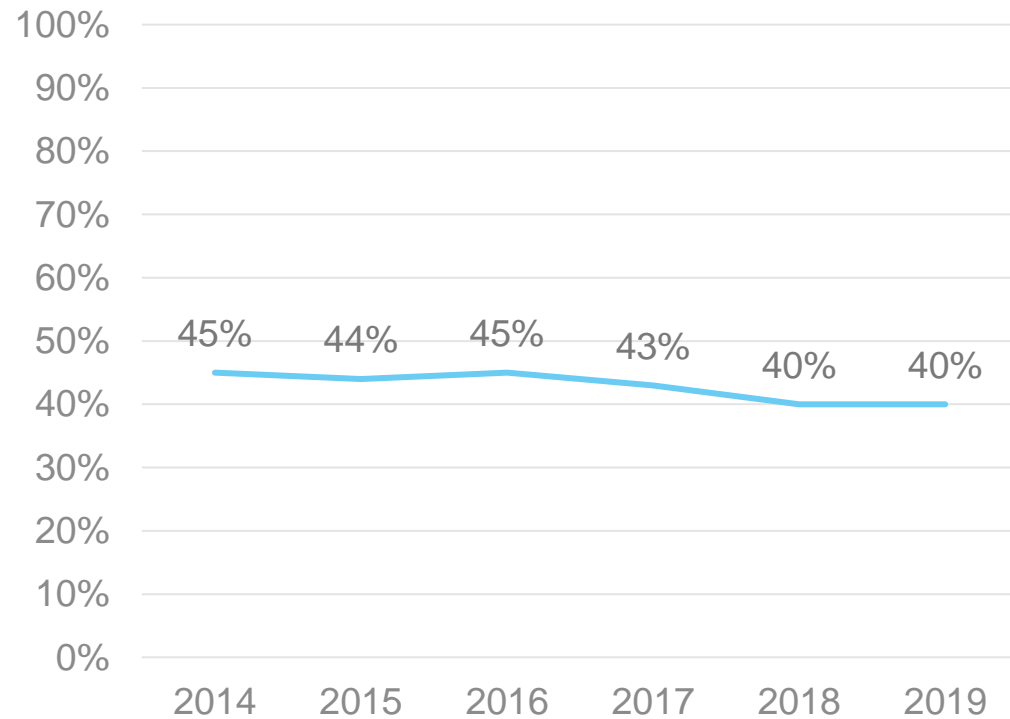
Largest mines

- Serbia (28.4 Mt and 8.6 Mt)
- Kosovo* (7.7 Mt)

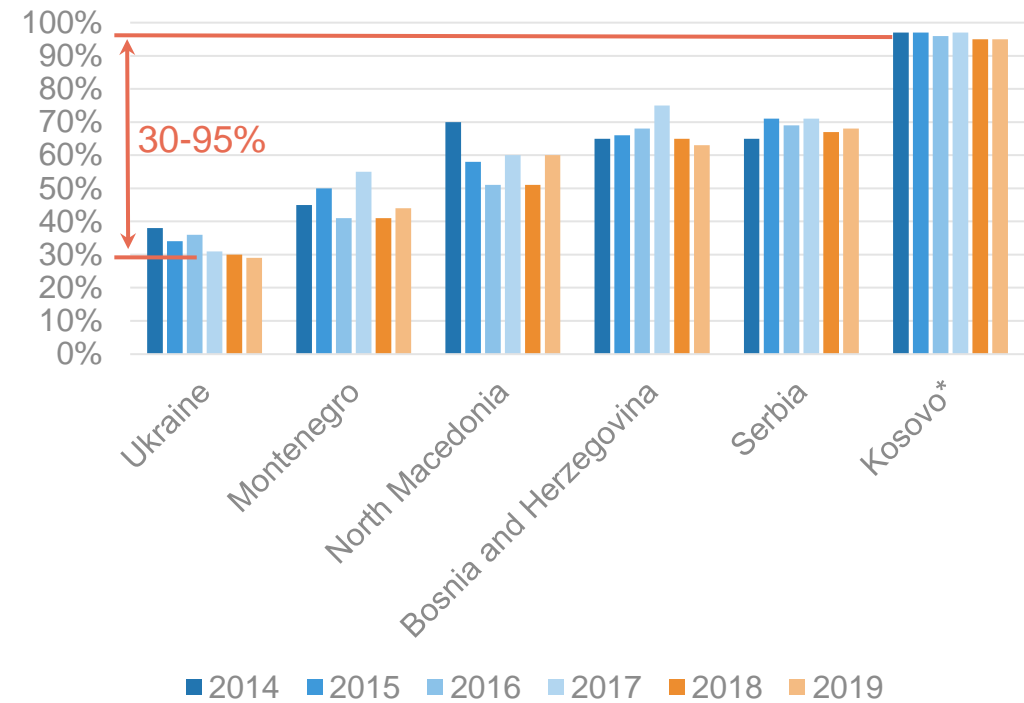


Coal in power generation

Share of coal in power generation in WB&UA

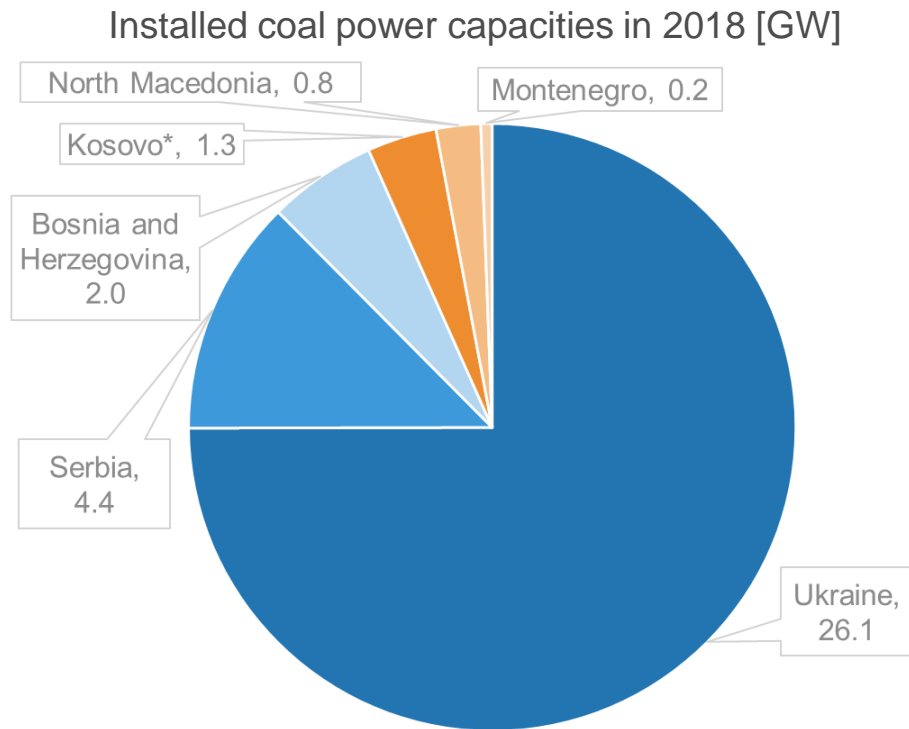


Evolution of share of coal in power generation from 2014 to 2019

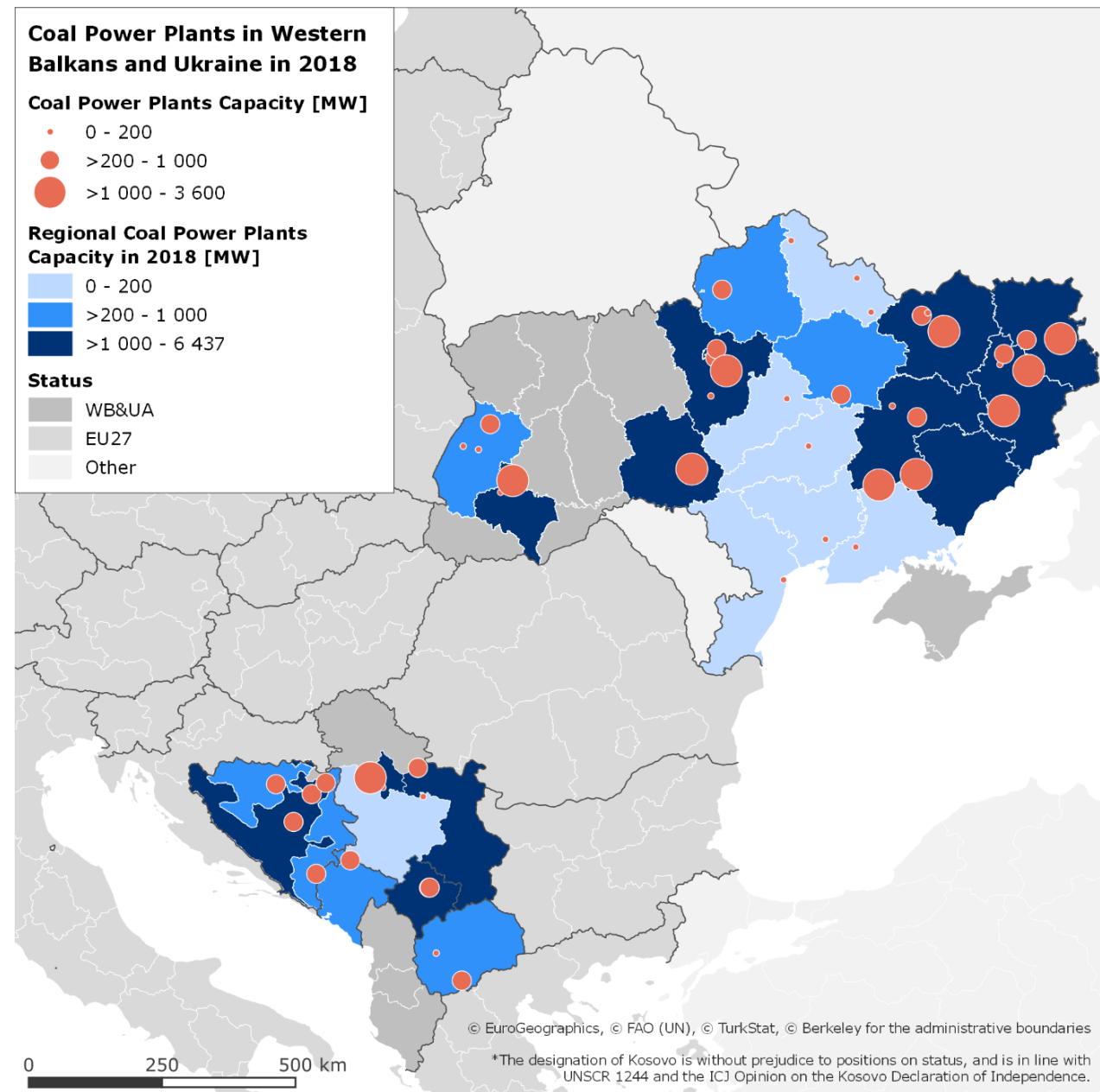


Coal power plants

52 power plants (35 GW) in 26 regions

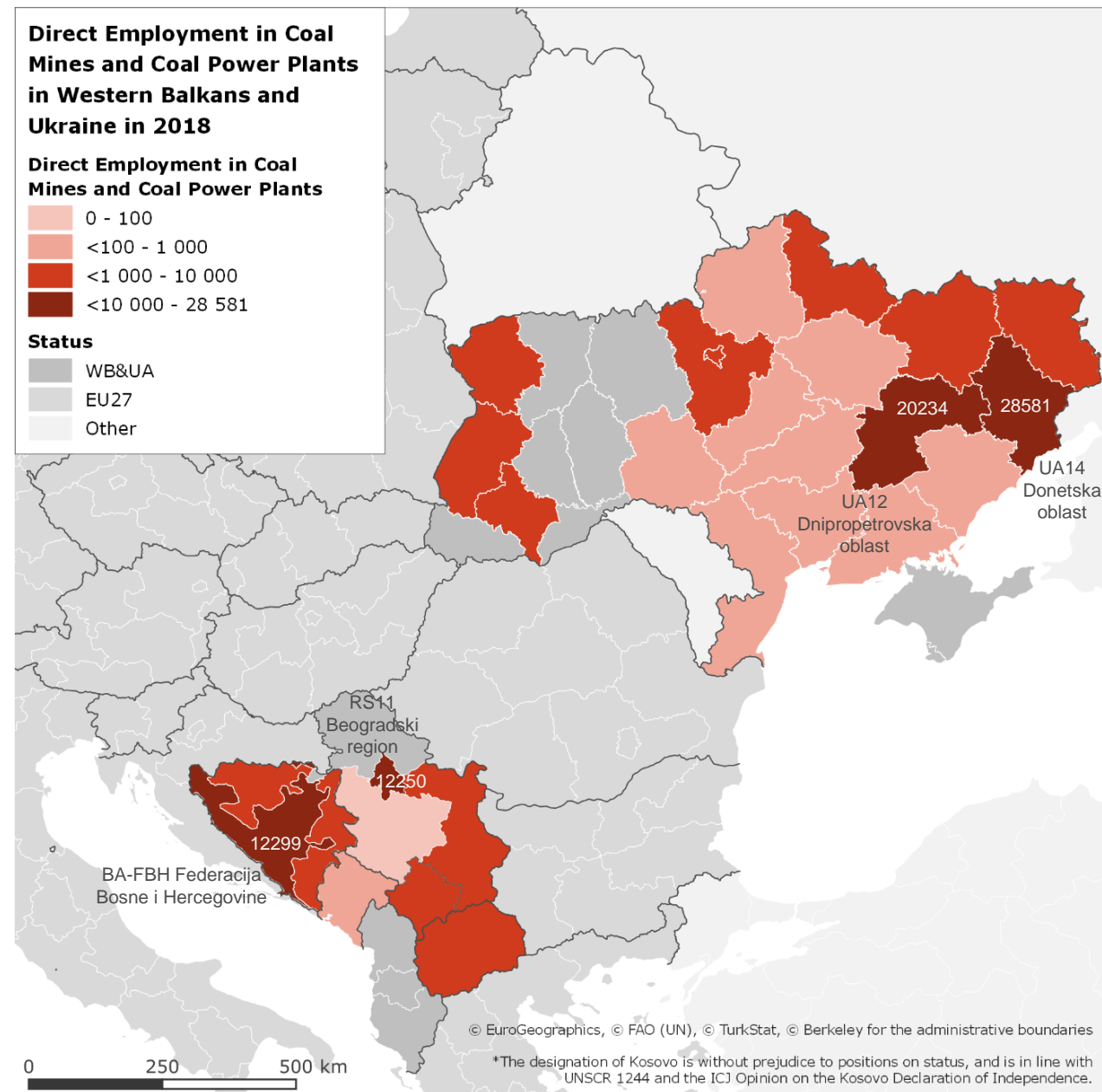


*under UN Security Council Resolution 1244/99



Direct employment in the coal sector in 2018

| Number of jobs | Mining jobs | Power plant jobs | Overall jobs |
|------------------------|---------------|------------------|----------------|
| Ukraine | 55 599 | 40 749 | 96 348 |
| Bosnia and Herzegovina | 14 472 | 2 466 | 16 938 |
| Serbia | 12 331 | 2 931 | 15 262 |
| Kosovo* | 3 249 | 1 482 | 4 731 |
| North Macedonia | 2 980 | 678 | 3 658 |
| Montenegro | 750 | 171 | 921 |
| TOTAL | 89 381 | 48 477 | 137 858 |

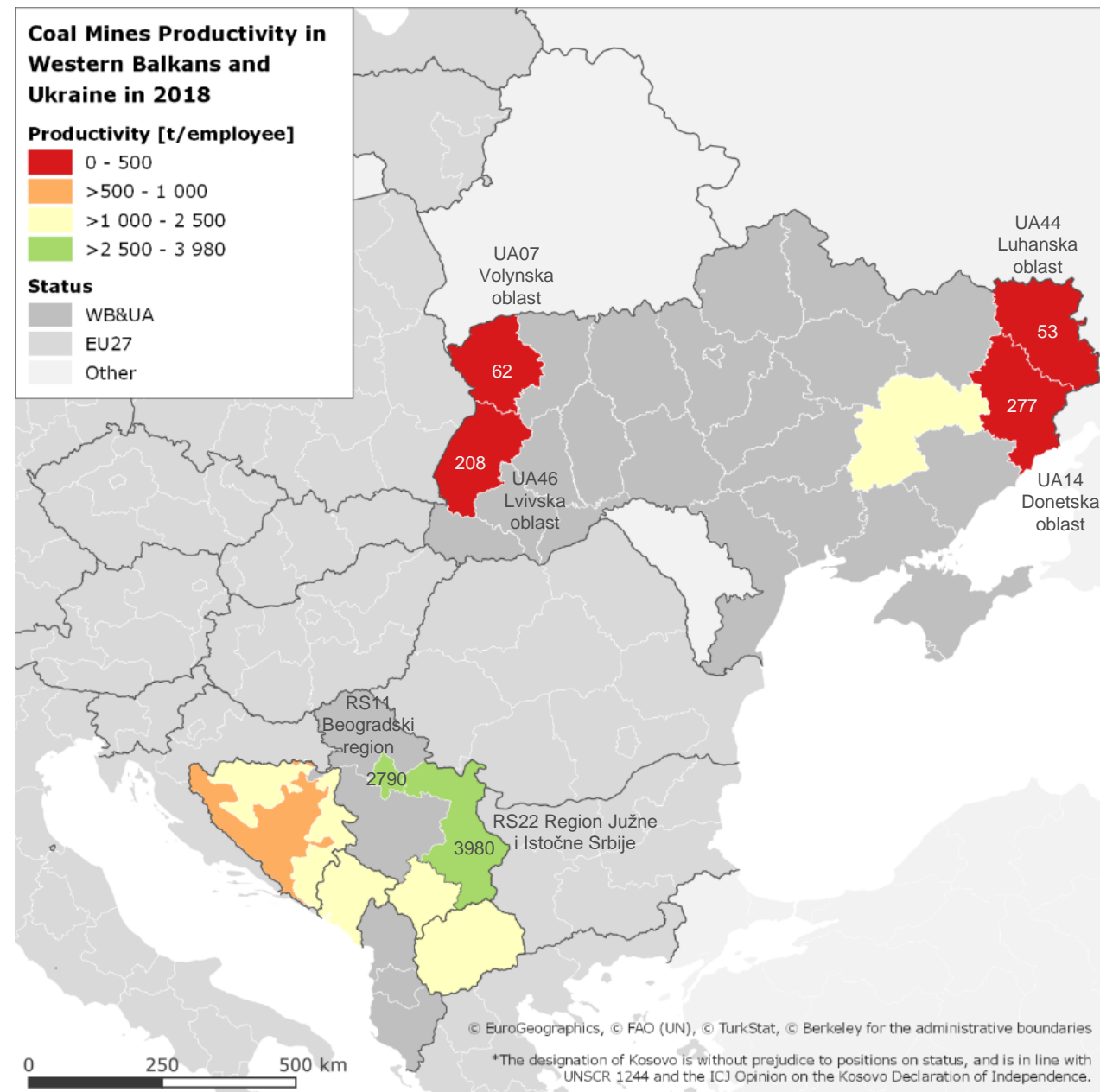
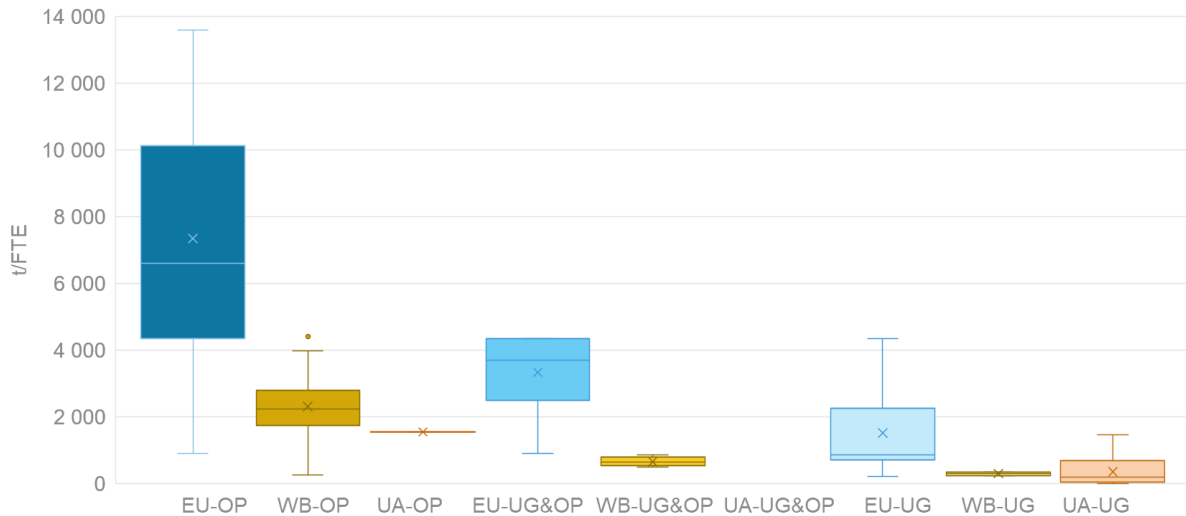


Coal mining productivity

Significantly lower productivity than in EU (755 t/FTE compared to 4 730 t/FTE)

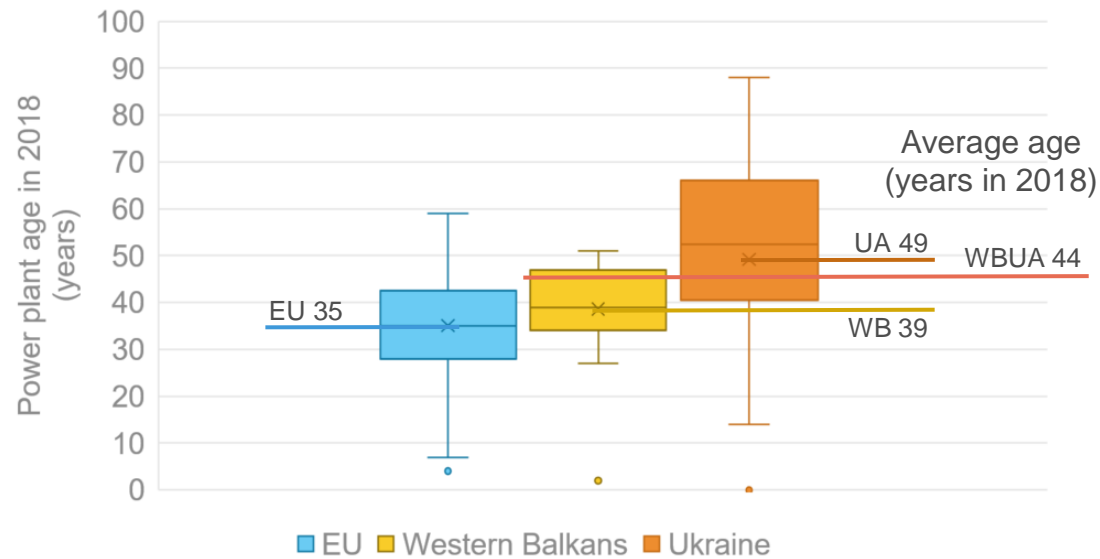
Lower productivity in Ukrainian regions (389 t/FTE) than in Western Balkans (1632 t/FTE)

Productivity distribution for underground (UG), open pit (OP) and mixed (UG&OP) mines in the EU, Western Balkans (WB) and Ukraine (UA) mines

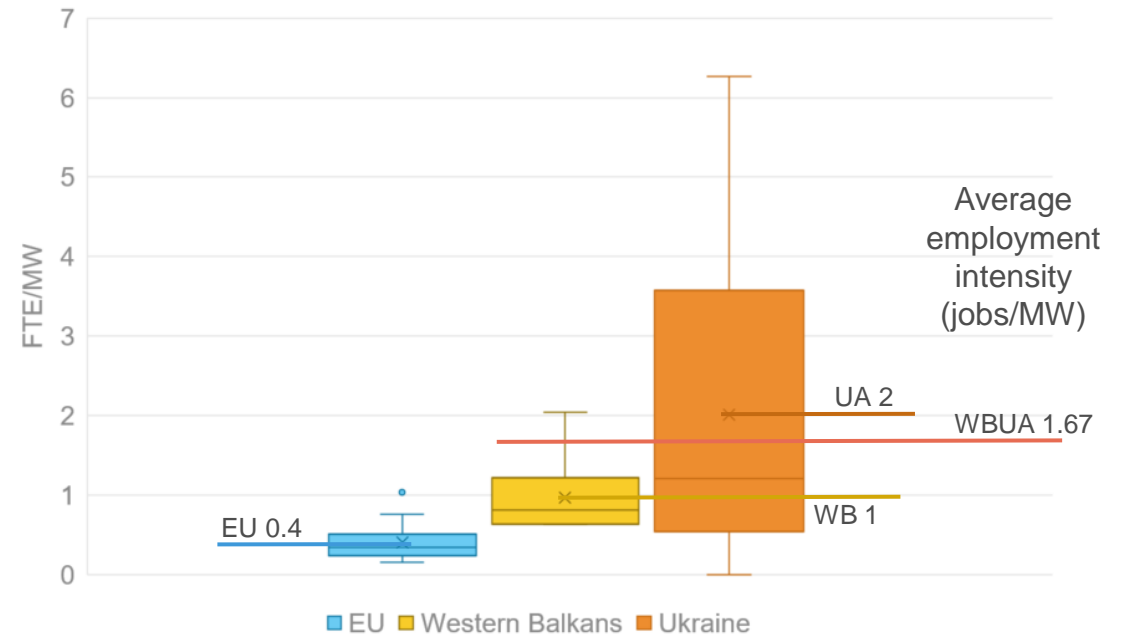


Benchmark of coal power plants

Average age 44 years in 2018 (35 in EU)

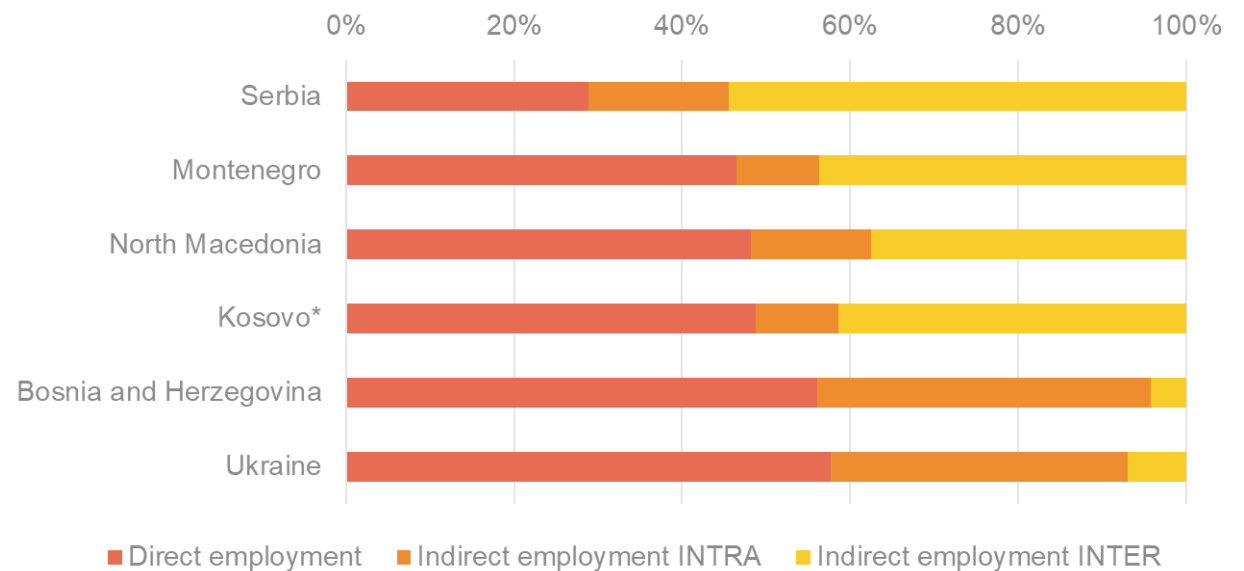


Higher employment intensity
(1.67 jobs/MW compared to 0.4 jobs/MW in EU)



Indirect employment in the coal sector in 2018

| Number of jobs | Intra-regional | Inter-regional | Total indirect jobs |
|------------------------|----------------|----------------|---------------------|
| Montenegro | 195 | 866 | 1 061 |
| North Macedonia | 1 084 | 2 843 | 3 927 |
| Serbia | 8 878 | 28 830 | 37 708 |
| Bosnia and Herzegovina | 11 988 | 1 262 | 13 250 |
| Kosovo* | 946 | 4 021 | 4 967 |
| Ukraine | 58 786 | 11 698 | 70 484 |
| TOTAL | 81 877 | 49 522 | 131 398 |

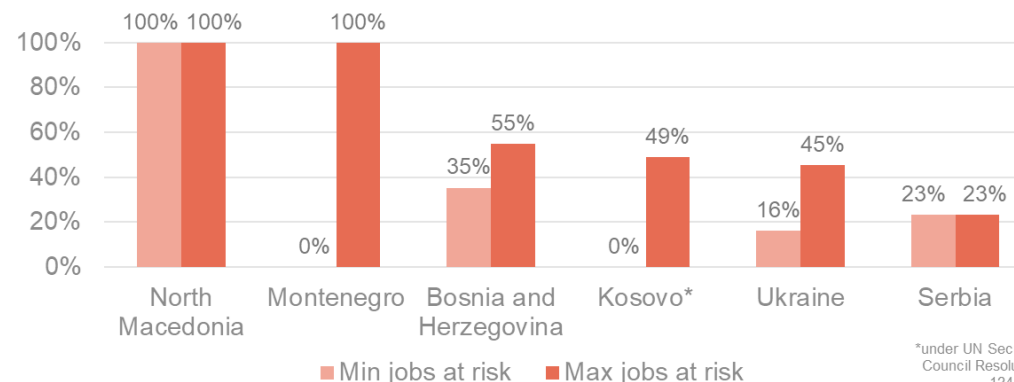
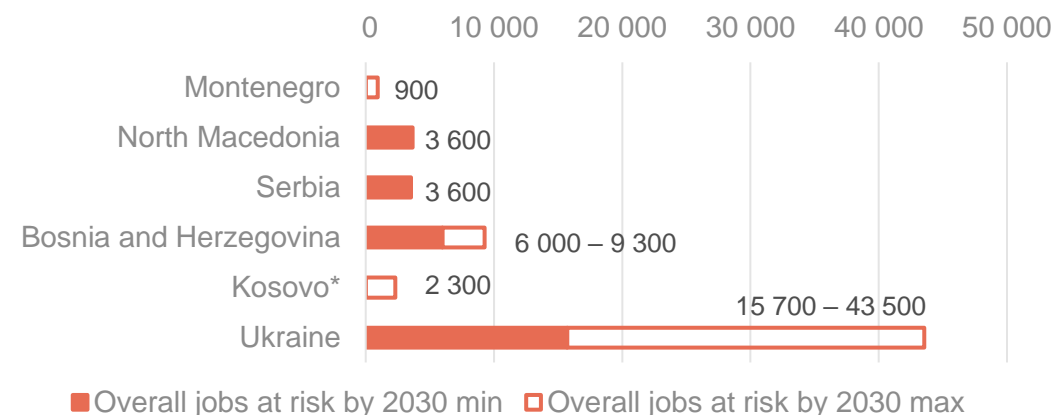


*under UN Security Council Resolution 1244/99

Future developments for the coal sector

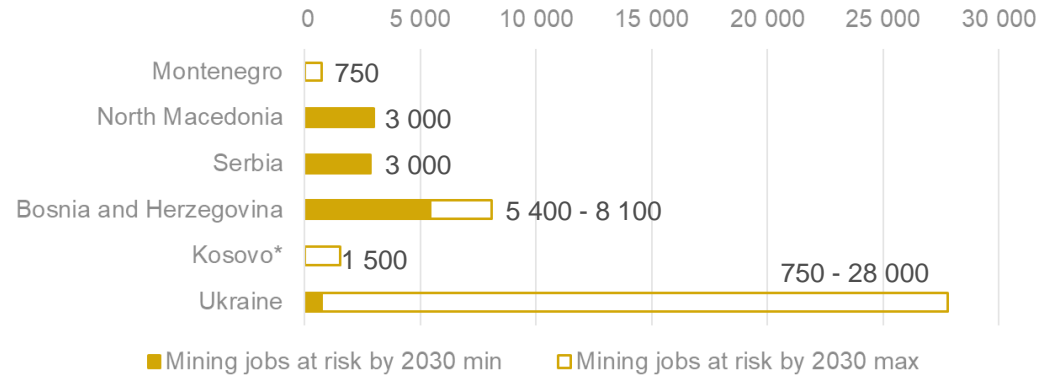
Based on national energy strategies (2014-2020)

| 2030 jobs foresights | LOW job risk foresight | HIGH job risk foresight |
|-------------------------------|---|---|
| Montenegro (2014) | Pljevlja I closed until 2035 (new government plan) | Pljevlja I closed before 2030 (exceeded 20 000 h limit from IED) |
| North Macedonia (2020) | Full coal phase-out by 2027 (NECP) | |
| Serbia (2015) | Decommissioning all coal power plants below 300 MW until 2024 (strategy) | |
| Bosnia and Herzegovina (2017) | Power plants Tuzla 3 and 4 and Kakanj 5 and 6 decommission before 2030 (strategy) | Power plants Tuzla 3, 4 and 5, Kakanj 5 and 6 and Gacko decommission before 2030 (strategy) |
| Kosovo* (2017) | Kosovo A refurbished and still operational in 2030 (strategy) | Kosovo A decommissioned in 2023 (strategy) |
| Ukraine** (2017) | Imported coal decommissioned first (saving mining jobs) | Decommissioning of all coal power plants based on age (survival of better plants) |

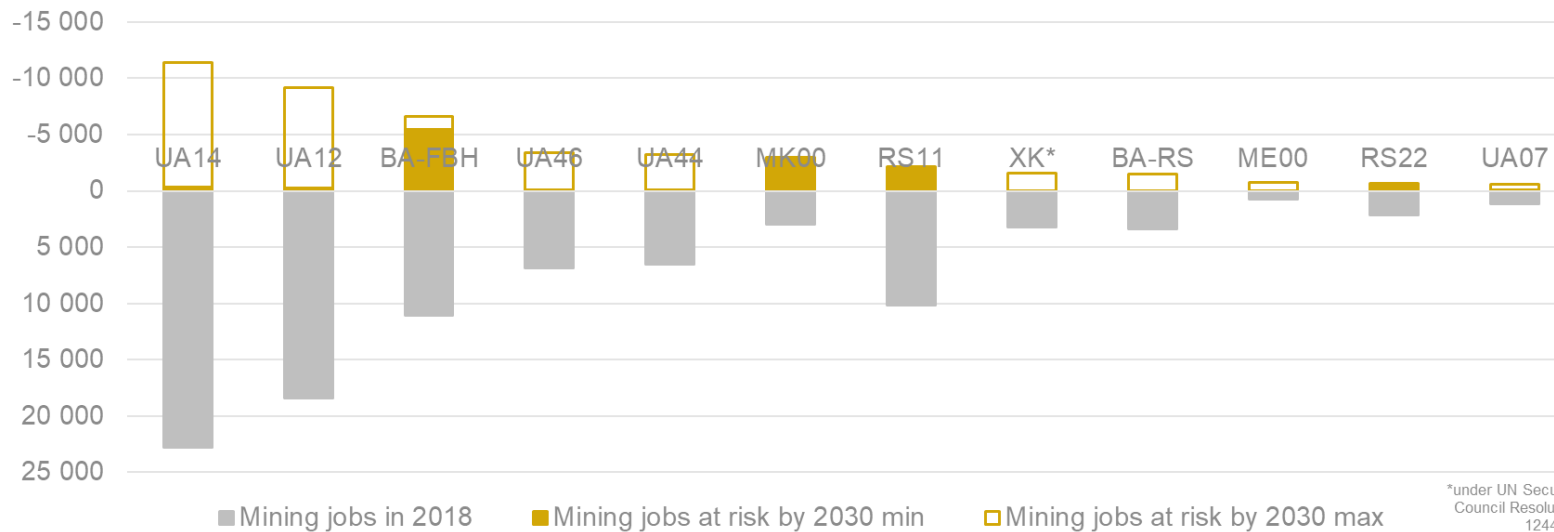


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Jobs at risk in coal mines

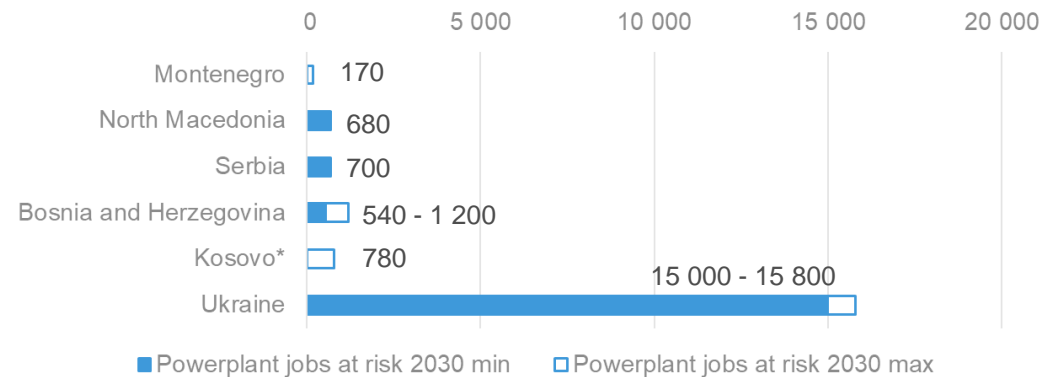


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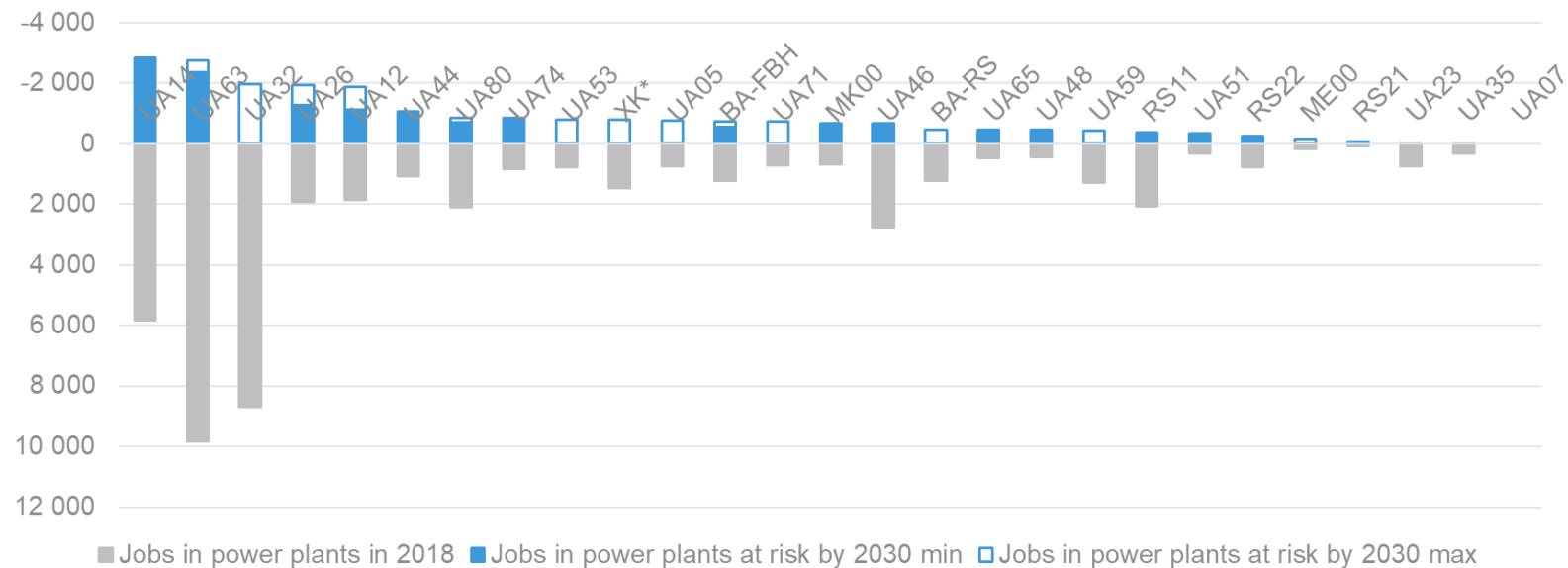


*under UN Security Council Resolution 1244/99

Jobs at risk in coal power plants

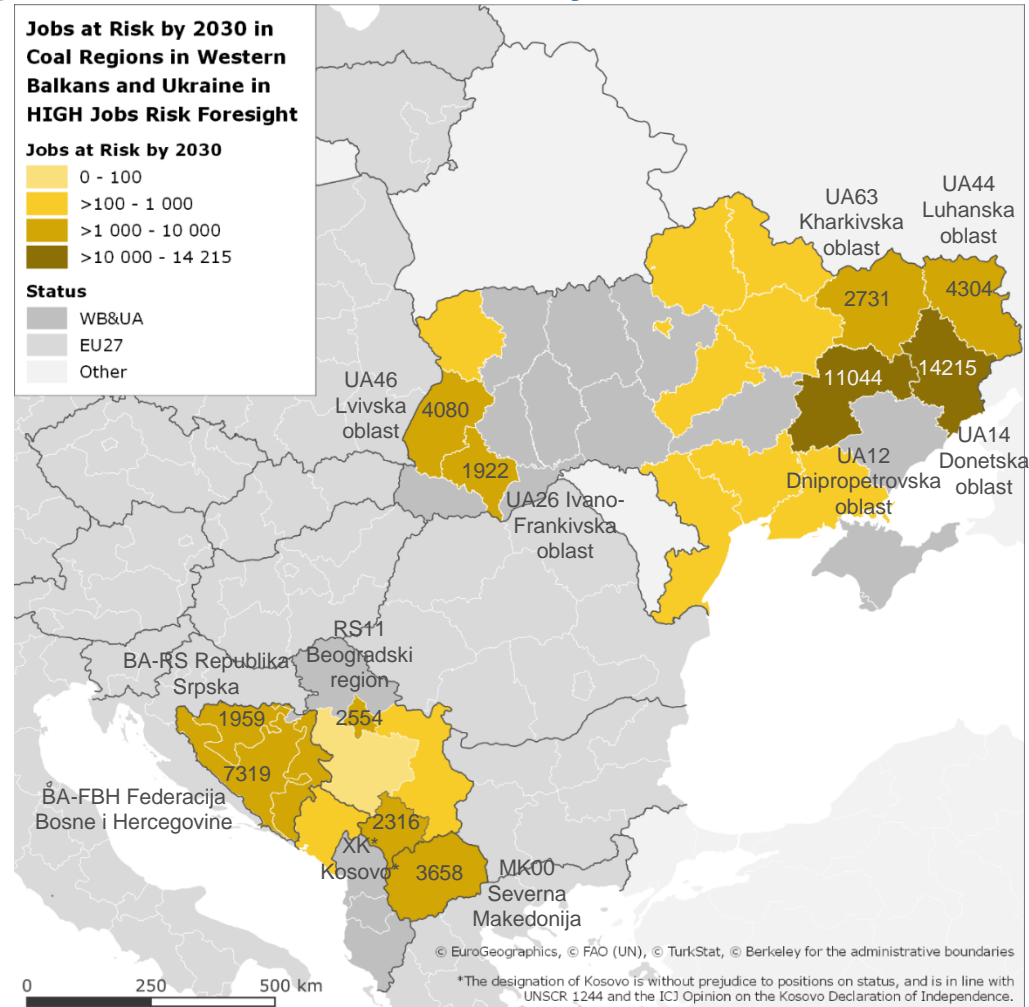
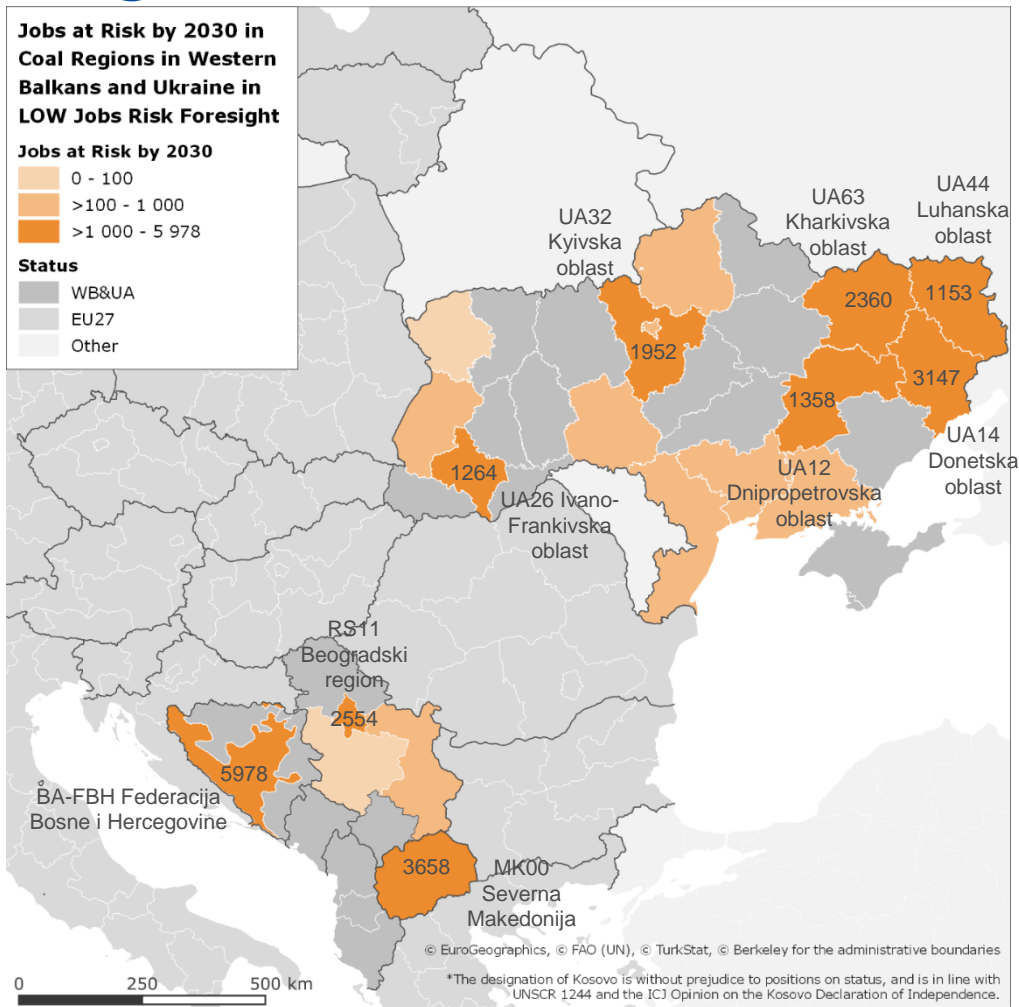


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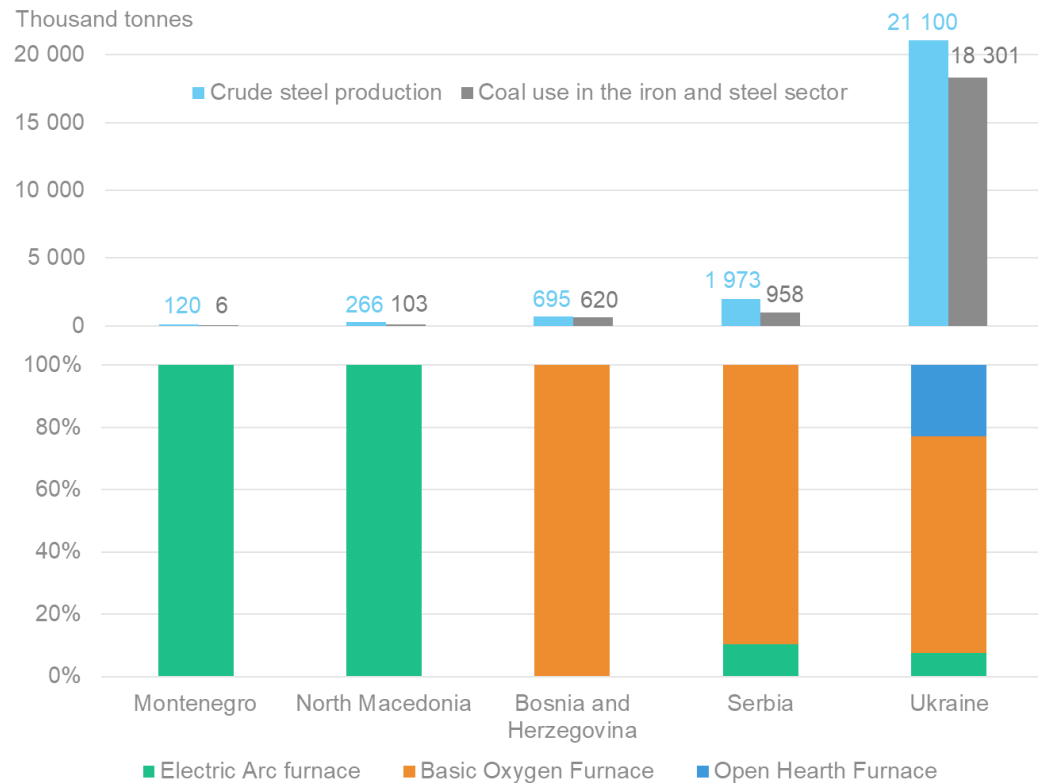
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Regional distribution of jobs at risk by 2030

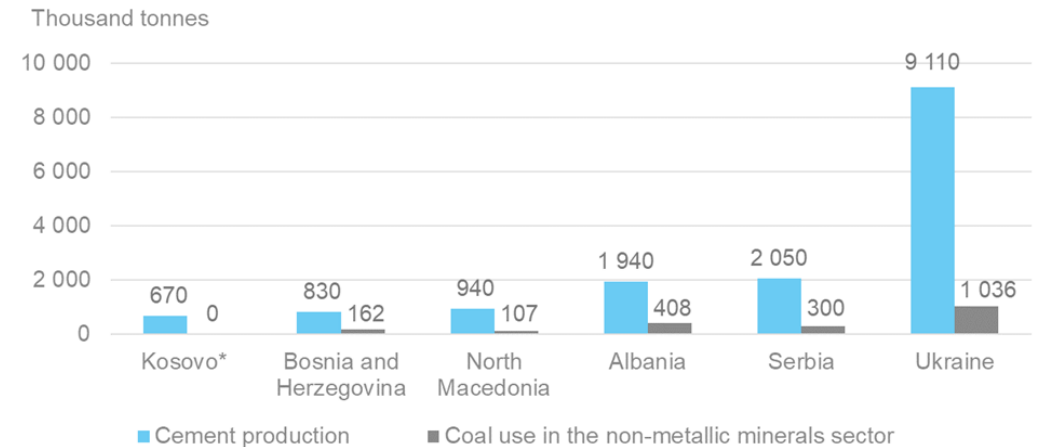


Carbon intensive industries

Iron and steel industry



Cement industry



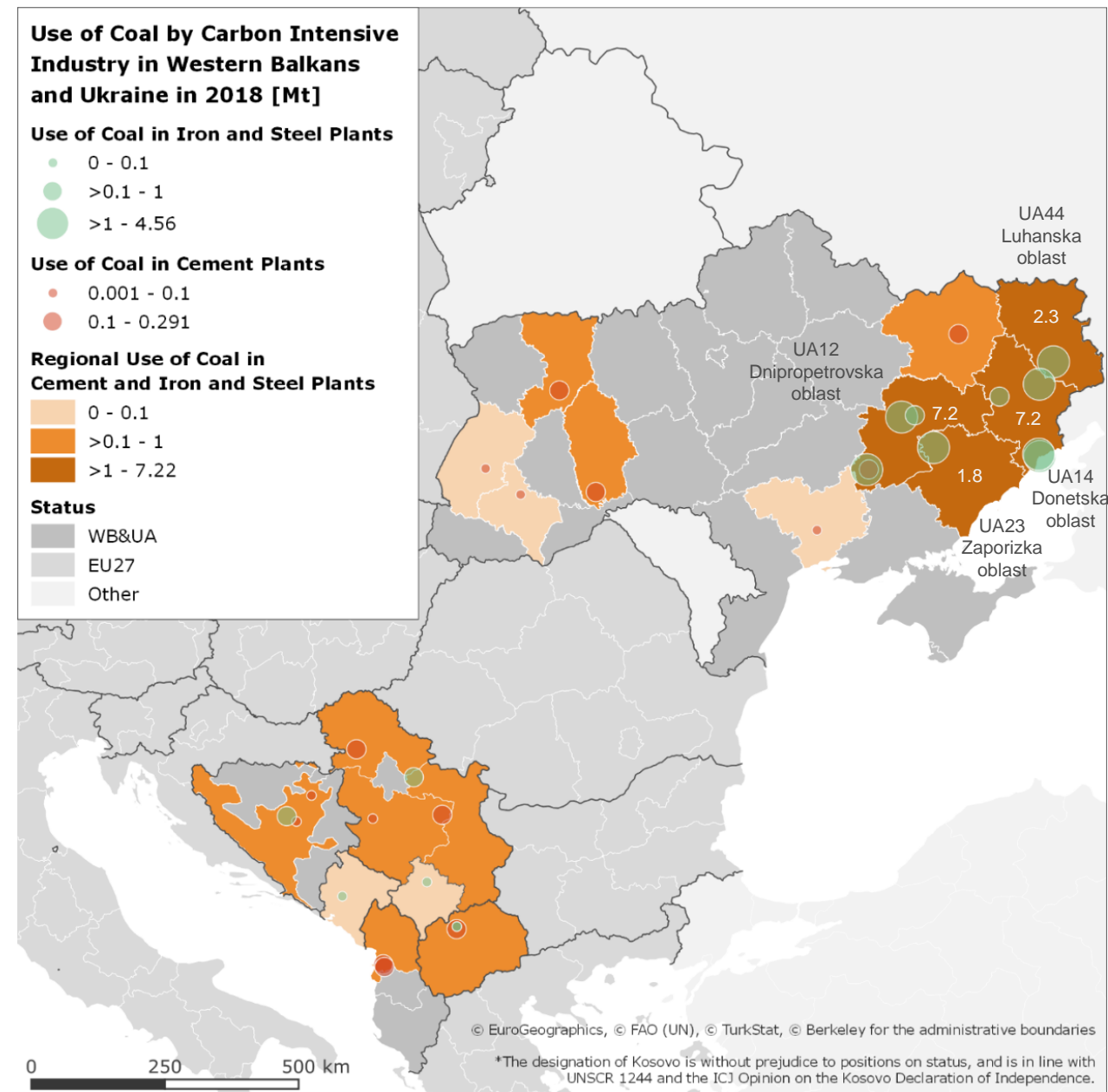
Carbon intensive industries

The most intensive use of coal for industry happens in the Eastern regions of Ukraine

(for iron and steel production)

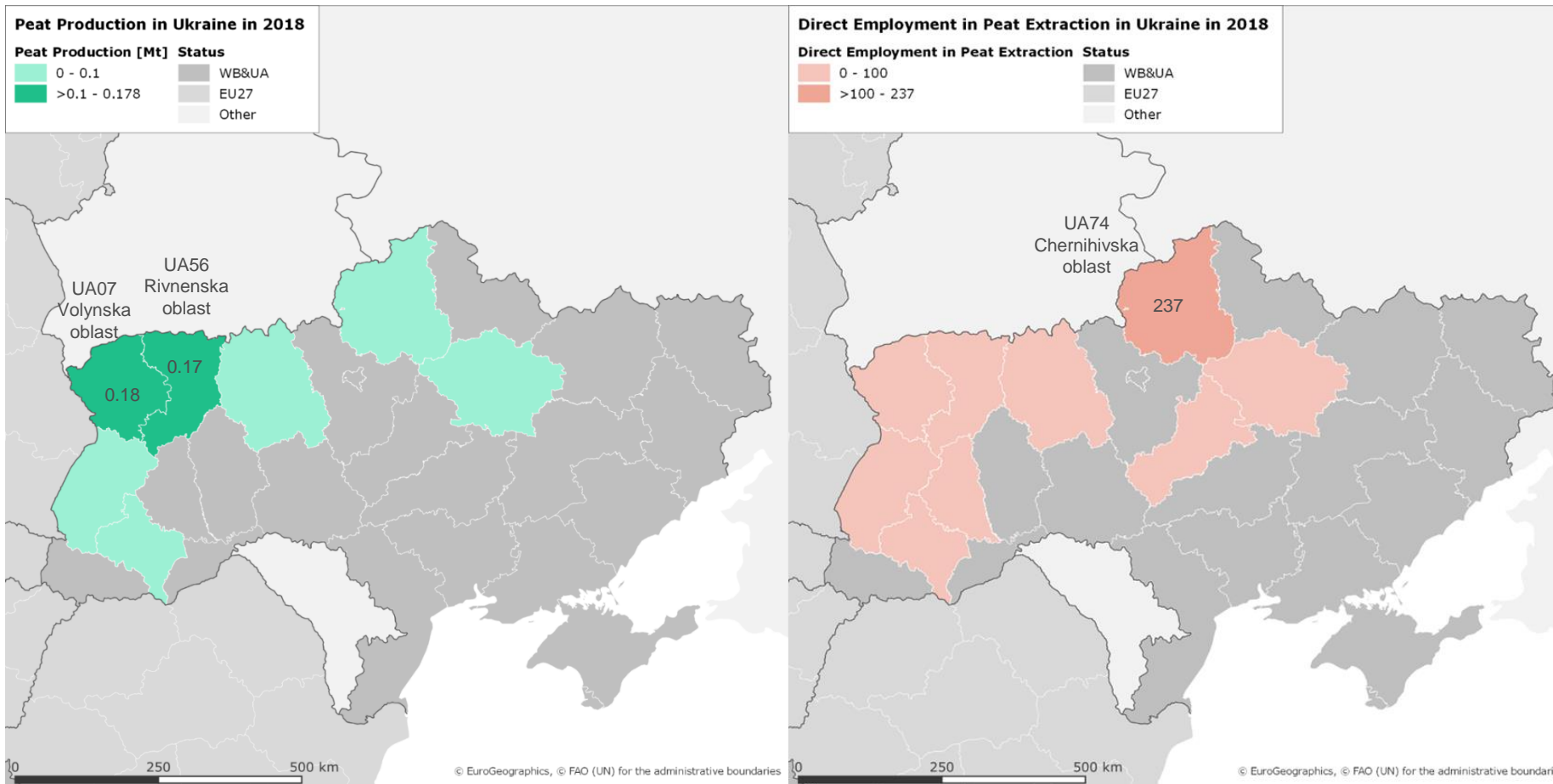
Western Balkans:

- all regions below 1Mt/year



Peat in Ukraine

0.6 Mt of peat produced in 2018 by around 500 employees



Key points

1. 93 Mt of coal produced in 2018 (like 20% of EU coal production)
2. 40% of power generated from coal (20% in EU)
3. 138 000 employees in the coal sector (like 2/3 of EU coal sector)
 - Geographically: 96 500 in Ukraine and 41 500 in Western Balkans
 - By sector: 89 500 in coal mining and 48 500 in coal power plants
4. Less productive mines and older power plants than in EU
5. Between 29 000 and 64 000 jobs at risk by 2030
6. 20 Mt of coal for iron and steel compared to 2 Mt for cement production
7. Use of peat is negligible compared to use of coal

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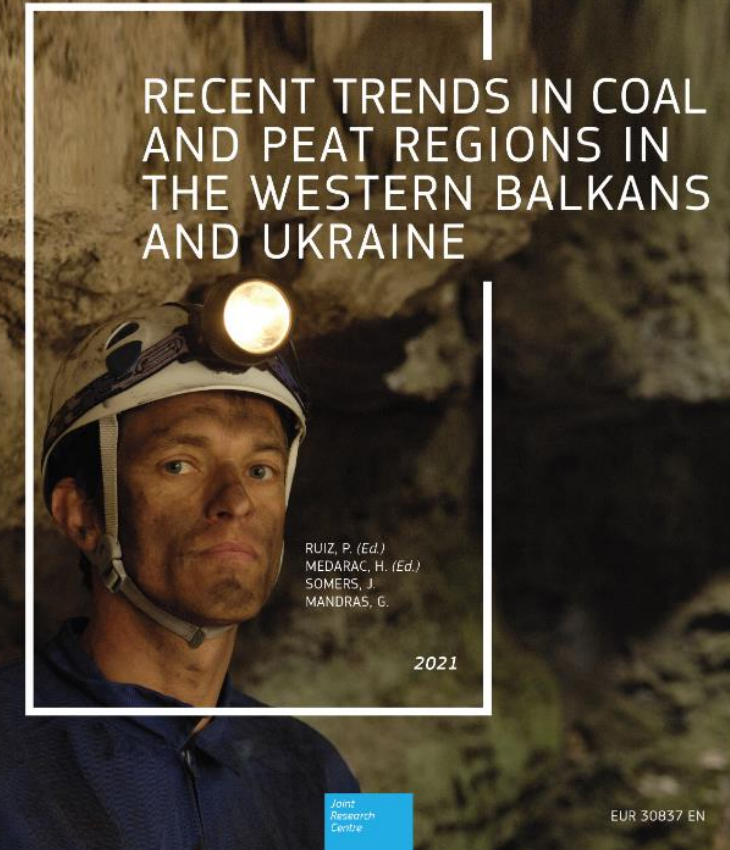
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