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# How to bolster BiH's long term growth and shift the energy mix toward renewable sources?

BOSNIA AND HERZEGOVINA

Country Economic Memorandum



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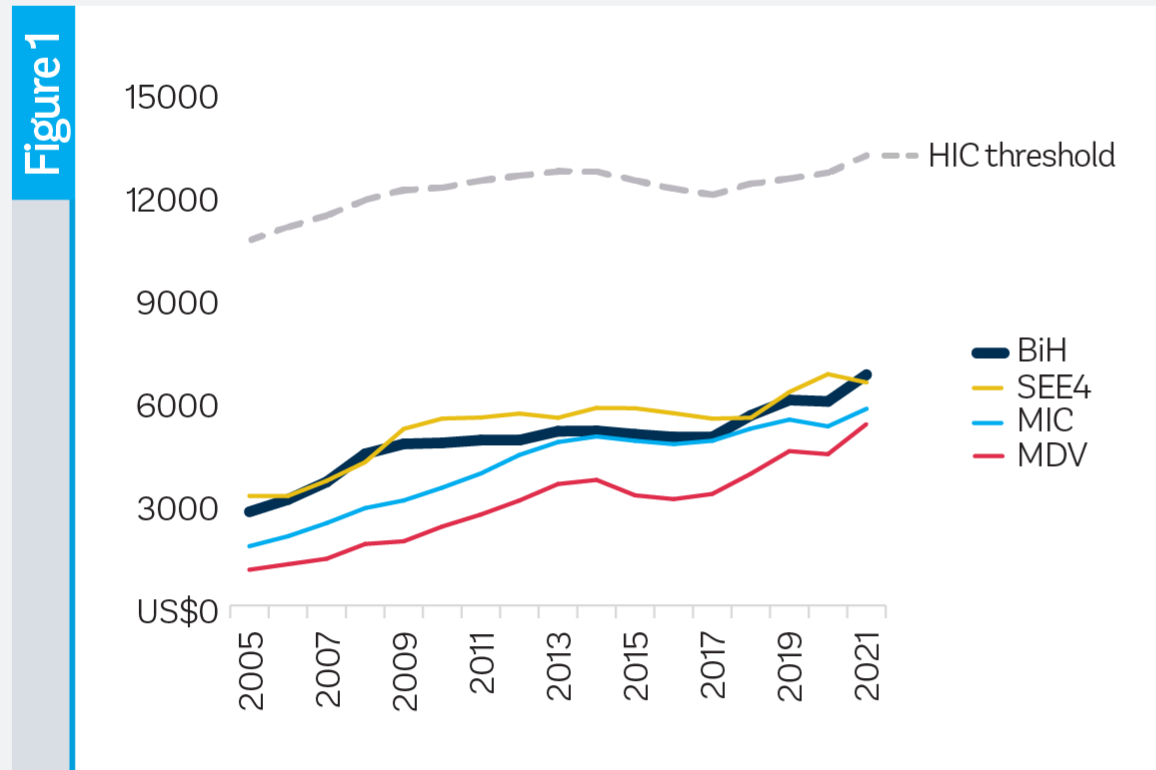




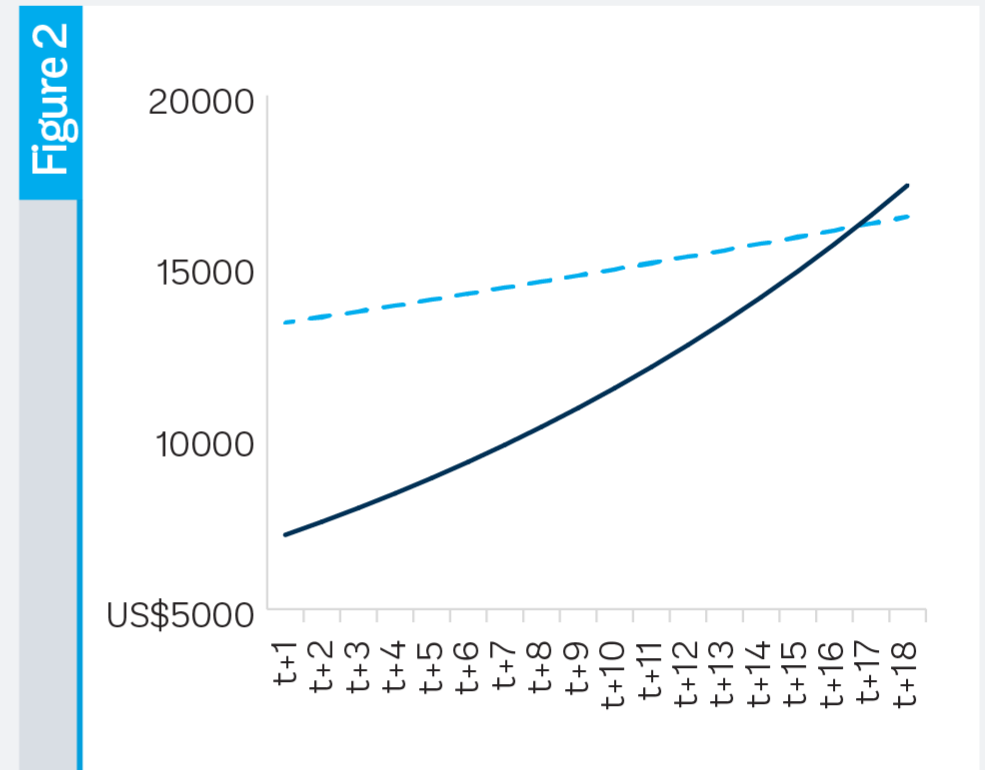
# I. Development successes

# Development successes

- Progress toward high income country (HIC) status is good, based on pc GNI



Progress toward HIC

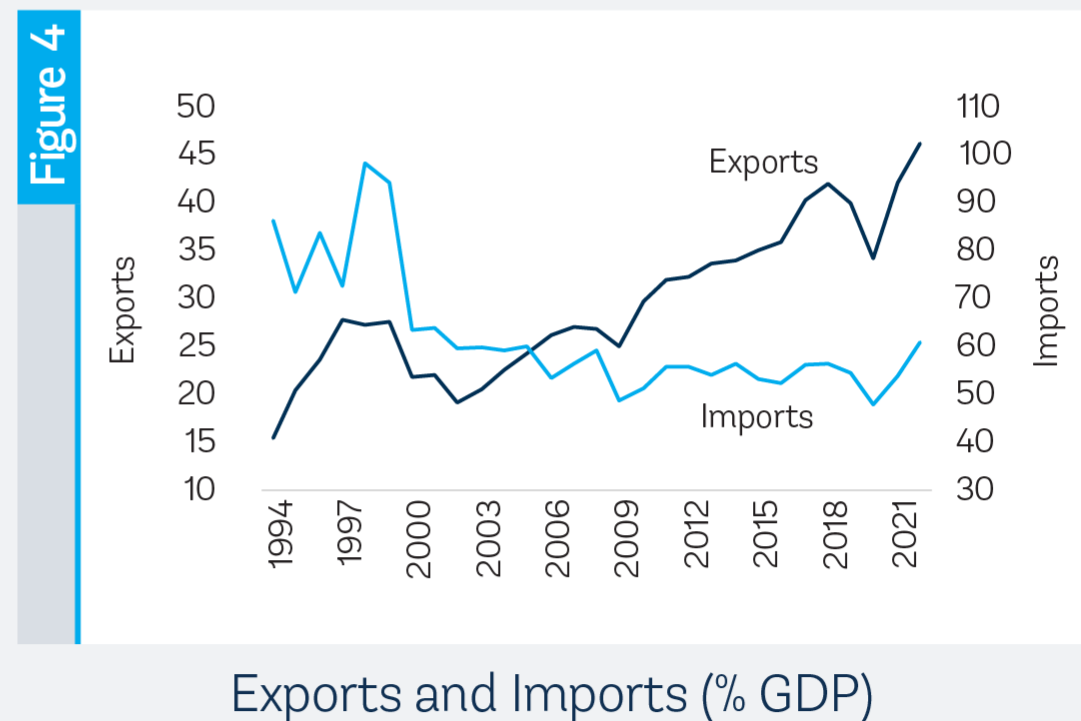
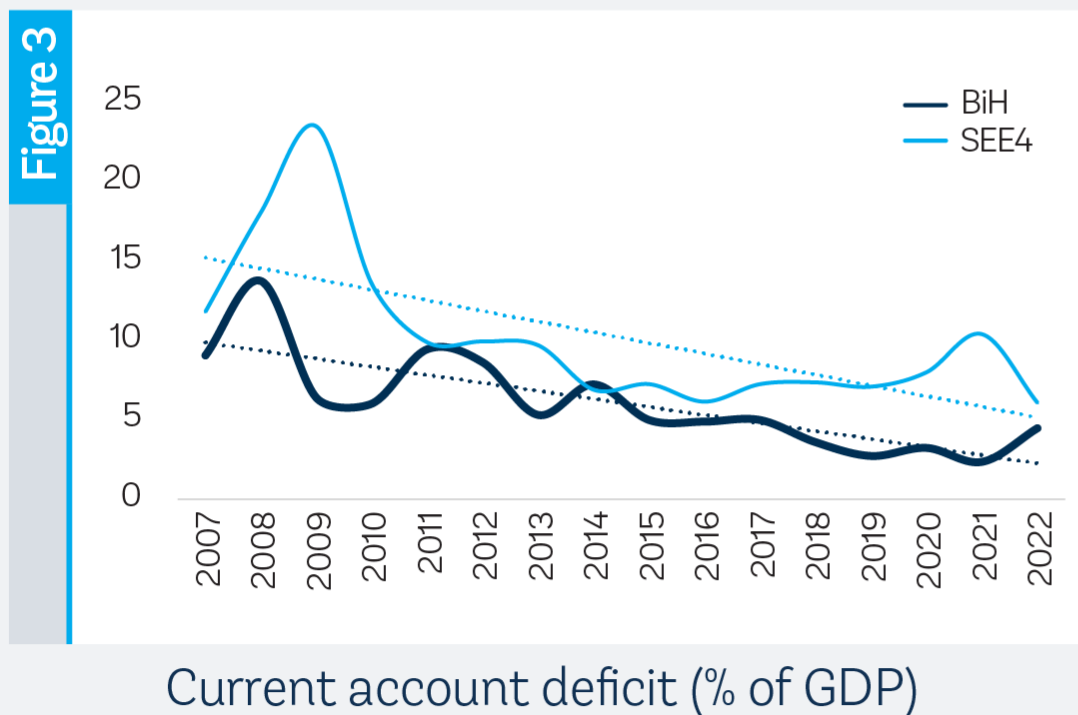


Achieving HIC status





- Unemployment rate has declined significantly
- Low inflation thanks to currency board
- Fiscal surpluses from 2015 to 2019 led to manageable public debt level thanks to ITA
- External current account has dropped from double digits to lower single digits

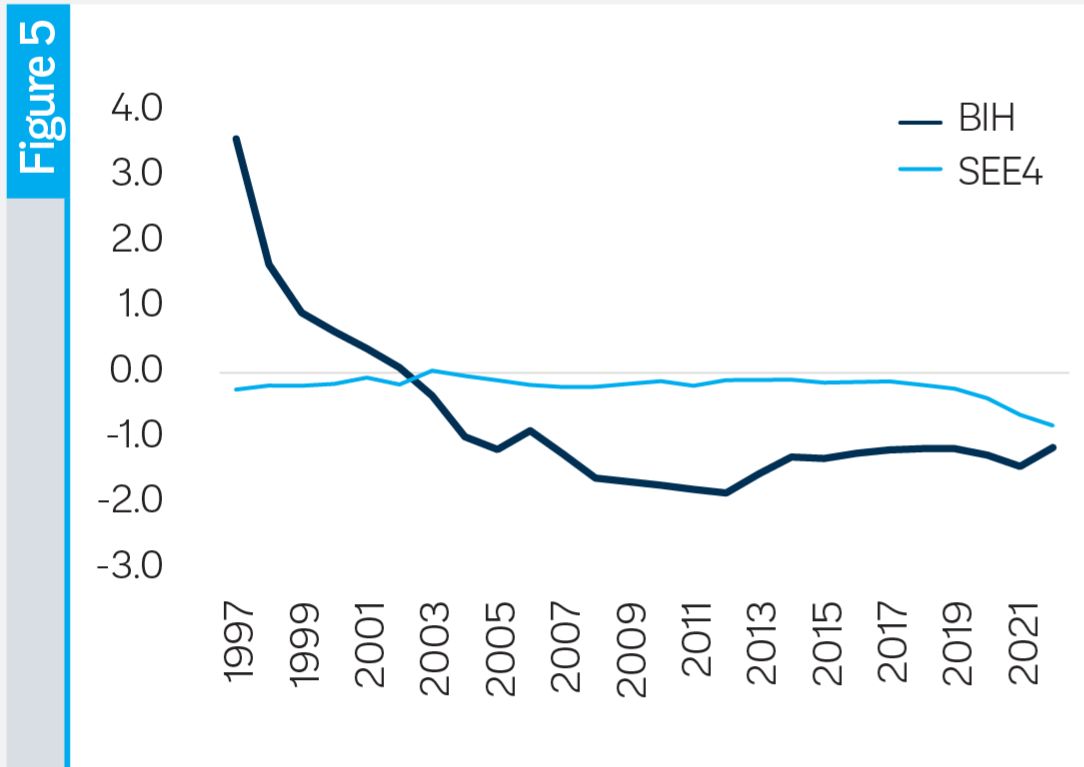


# II. Growth challenges

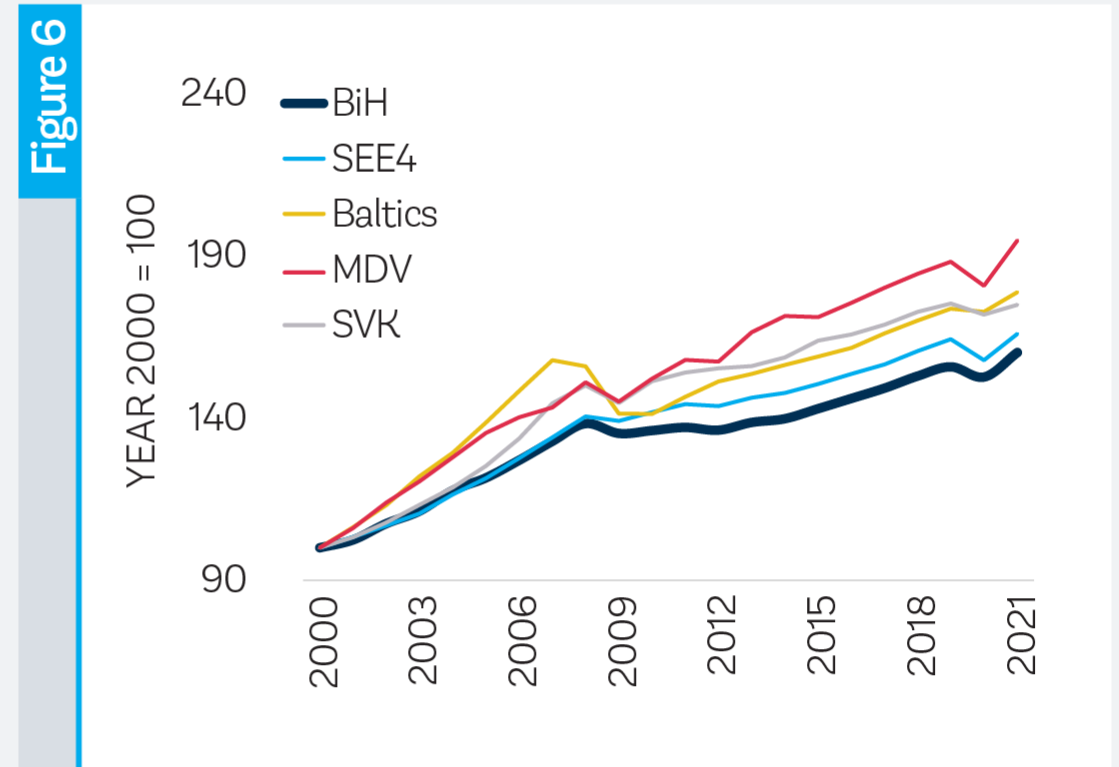


# Growth challenges

- Real income per capita has risen largely due to outmigration ; cumulative real output below peers



Population growth (in %)

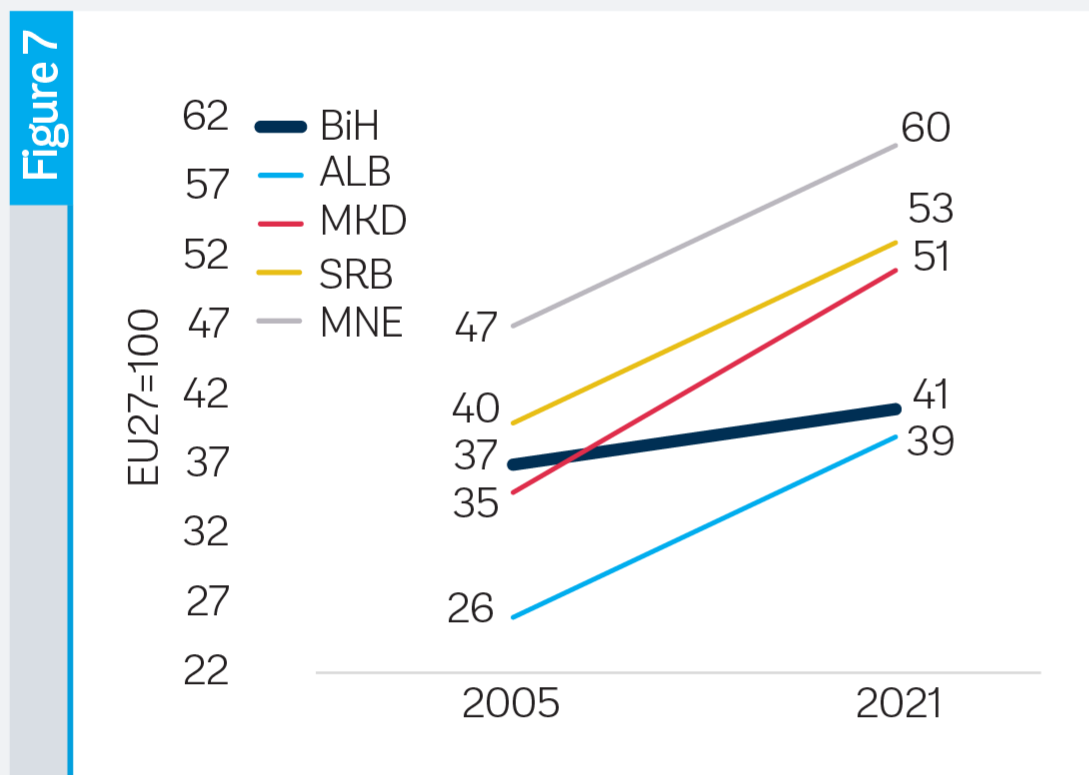


Cumulative real output growth  
(in constant 2015 US\$)

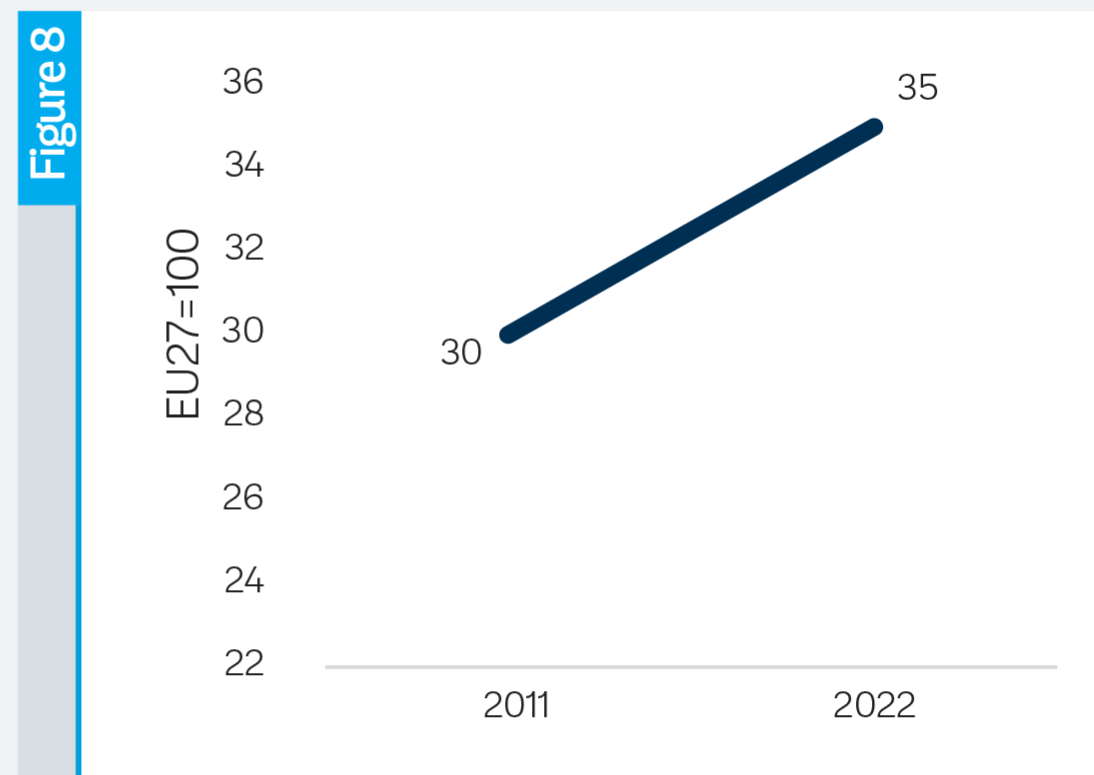


- BiH's convergence with EU27 slowest in the region; updated Eurostat data show an even slower convergence

## Real per capita consumption compared to average EU27 country

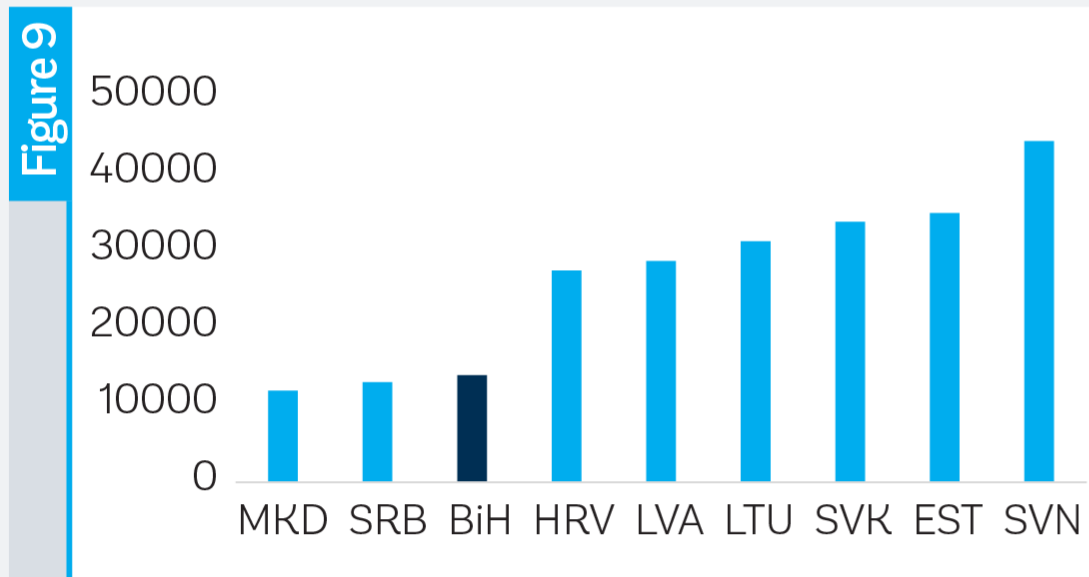


Eurostat old

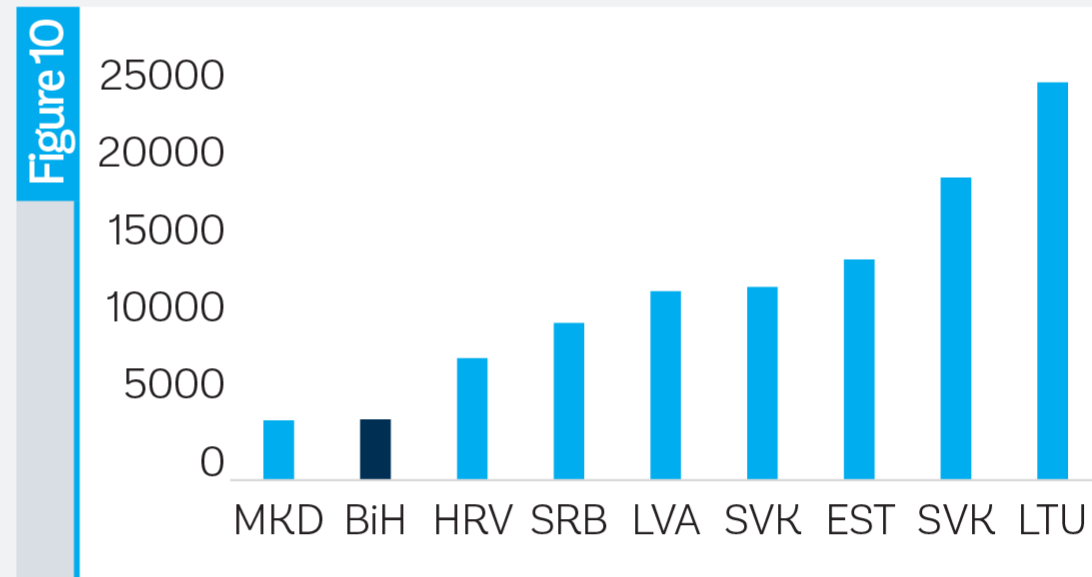


Eurostat new

- Labor productivity remains well below many aspirational peers
- Capital deepening needed – access to financing
- Business density and dynamism is low
- Public sector absorbs most of the qualified labor force



Labor productivity (value added per worker)



New firms per million inhabitants



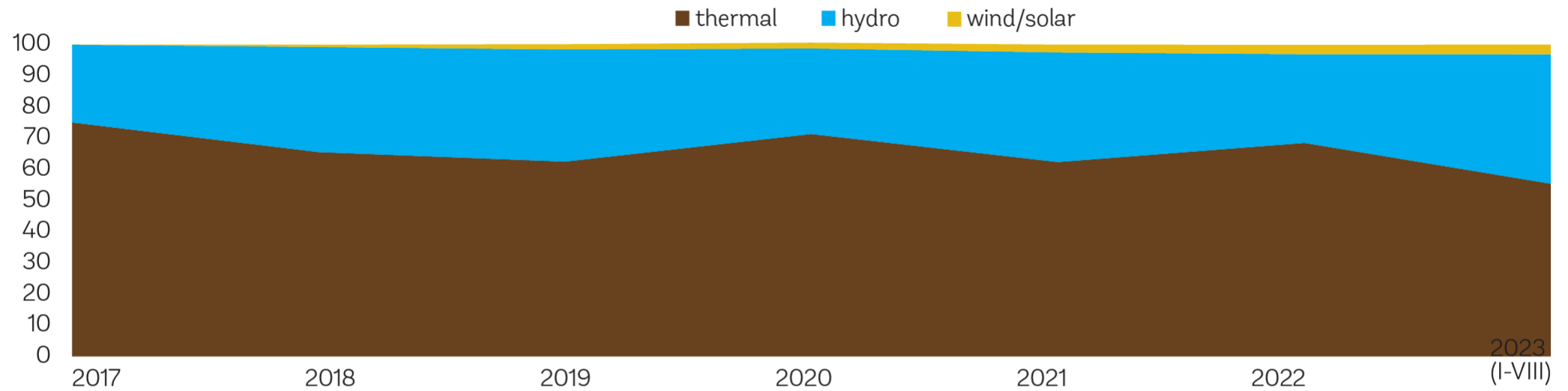
# III. Carbon Border Adjustment Mechanism (CBAM)



# CBAM



Figure 11



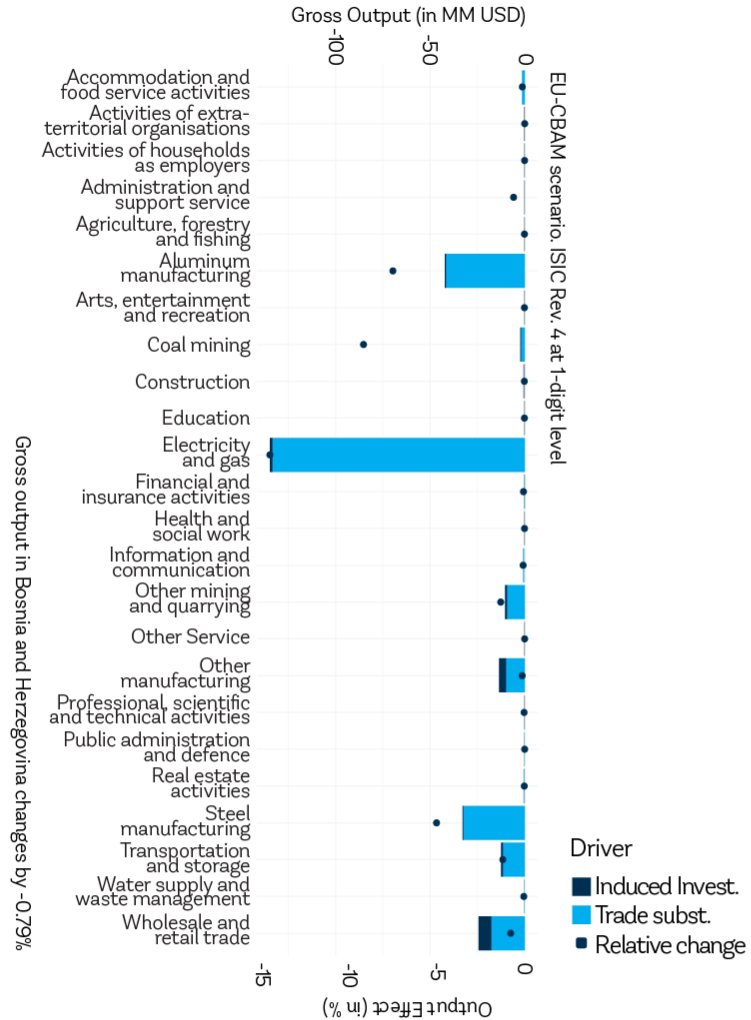
Energy mix

	2026	2027	2028	2029	2030	2031	2032	2033	2034
Phasing out of EU ETS	2.5%	5.0%	10.0%	22.5%	48.5%	61.0%	73.5%	86.0%	100.0%

CBAM gradual introduction

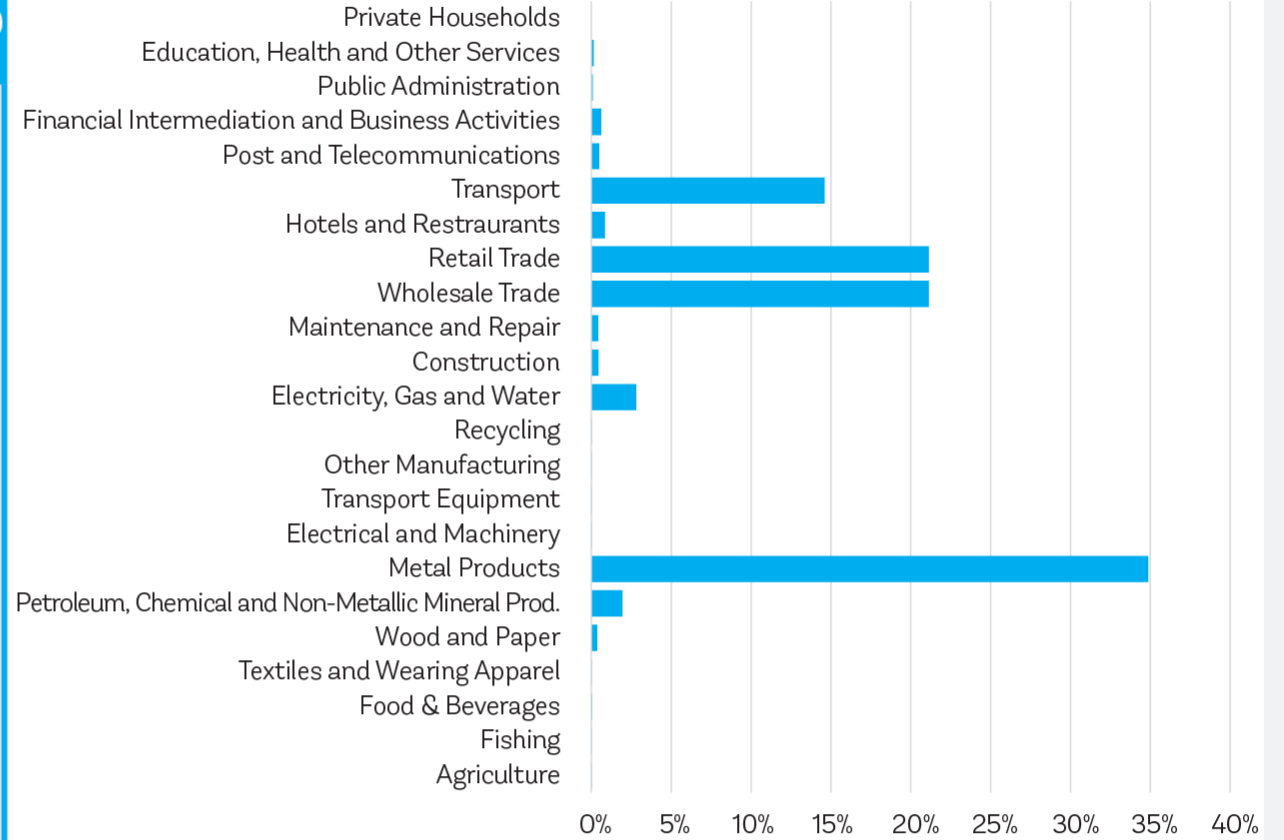


Figure 12



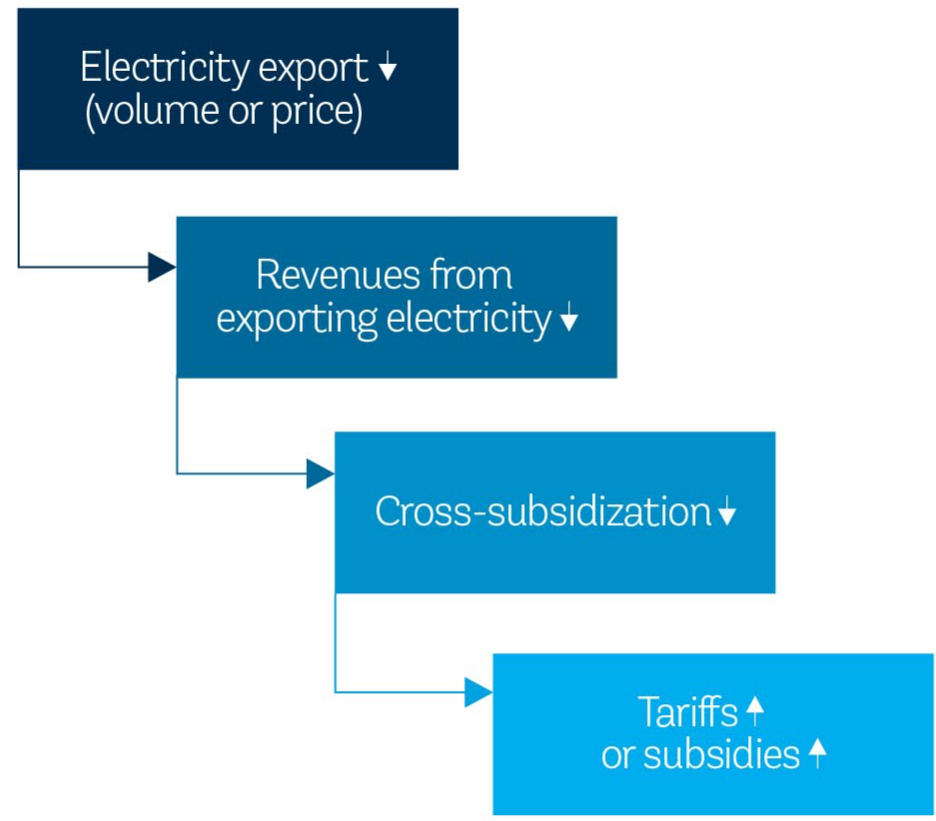
Sectoral output loss

Figure 13



Difference in labor demand

Figure 14





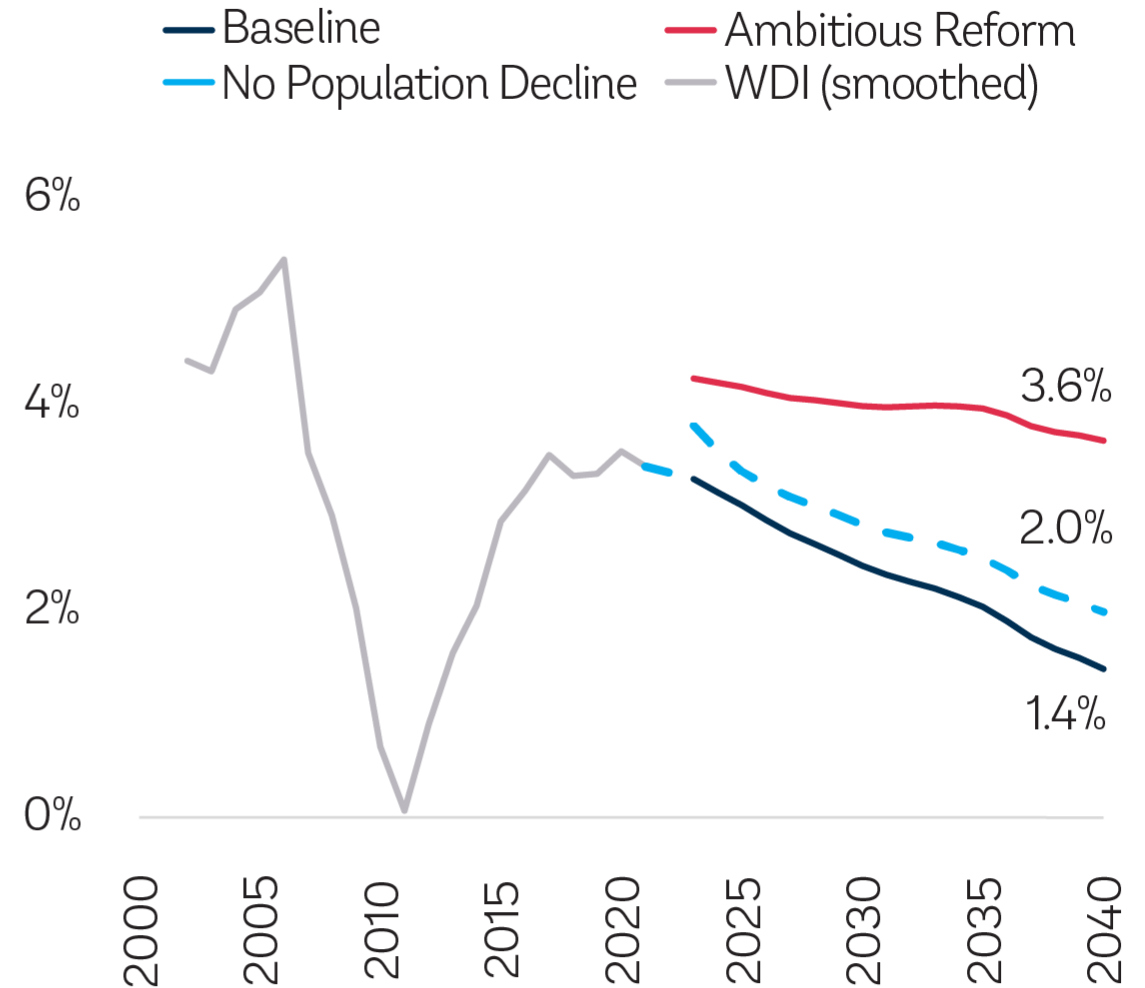


# IV. Challenges of long-term growth in BiH

## WB view on longer term growth challenges

- Escalating challenge if long-term growth is left unaddressed through deep structural reforms

Figure 15



# Why are structural reforms necessary?

- Population declining – impact on productivity and growth
- Total Factor Productivity decelerates
  - institutional barriers + regulatory burden
  - skills gap
  - low capital deepening in firms
  - lack of competition
  - large SOE footprint (inhibits market entry, lack of entrepreneurial incentives, resource misallocation)
- CBAM: export competitiveness, export volumes and prices, employment



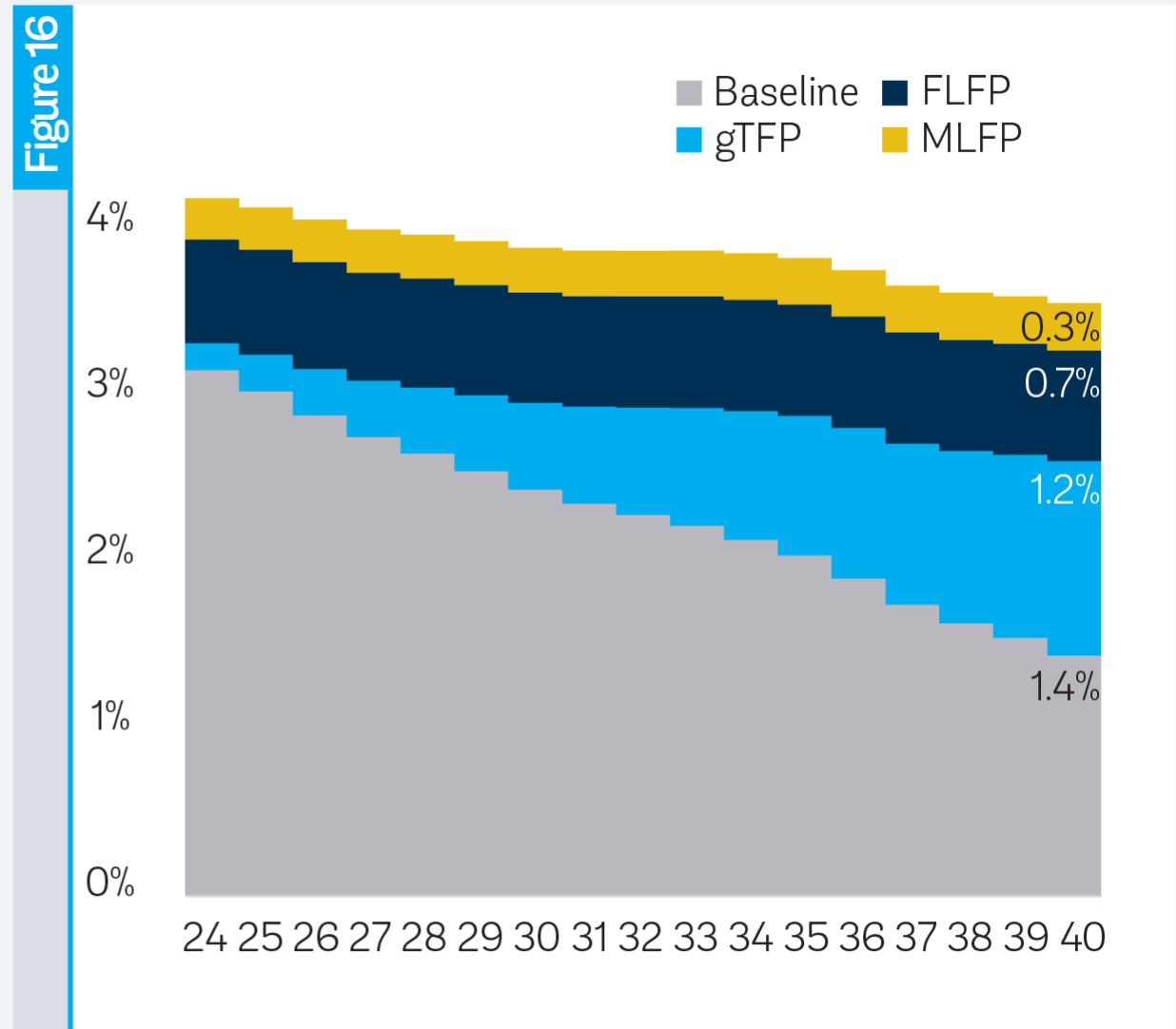




# V. Policy Measures

# Reform areas

- I. Promising areas of reform: activate female labor force participation and enhance male labor force participation (yellow and dark blue area)
- II. Enhance total factor productivity (efficiency of input utilization, light blue area)



I. Sound macroeconomic management and digitalization	II. Labor market development	III. Unleash firms' productivity potential	IV. Ease access to finance
Construct macro-structural model	Introduce Social Card	Reduce SOE footprint	Develop policies and pilot financial instruments targeting specifically women-owned businesses
Establish independent Fiscal Body within BiH Fiscal Council	Reduce the tax wedge	SOE: better controls and supervision in established central units in the entity's MoF	i) address impediments to leasing; ii) remove constraints of invoice finance
Promote digitalization at BiH and entity level, as well as BD	Adjust the labor code and labor taxes to incentivize formalizing temporary workers	Reduce administrative barriers	
	Increase female laborforce participation	Aligning regulatory framework with EU and strengthen quality control infrastructure	



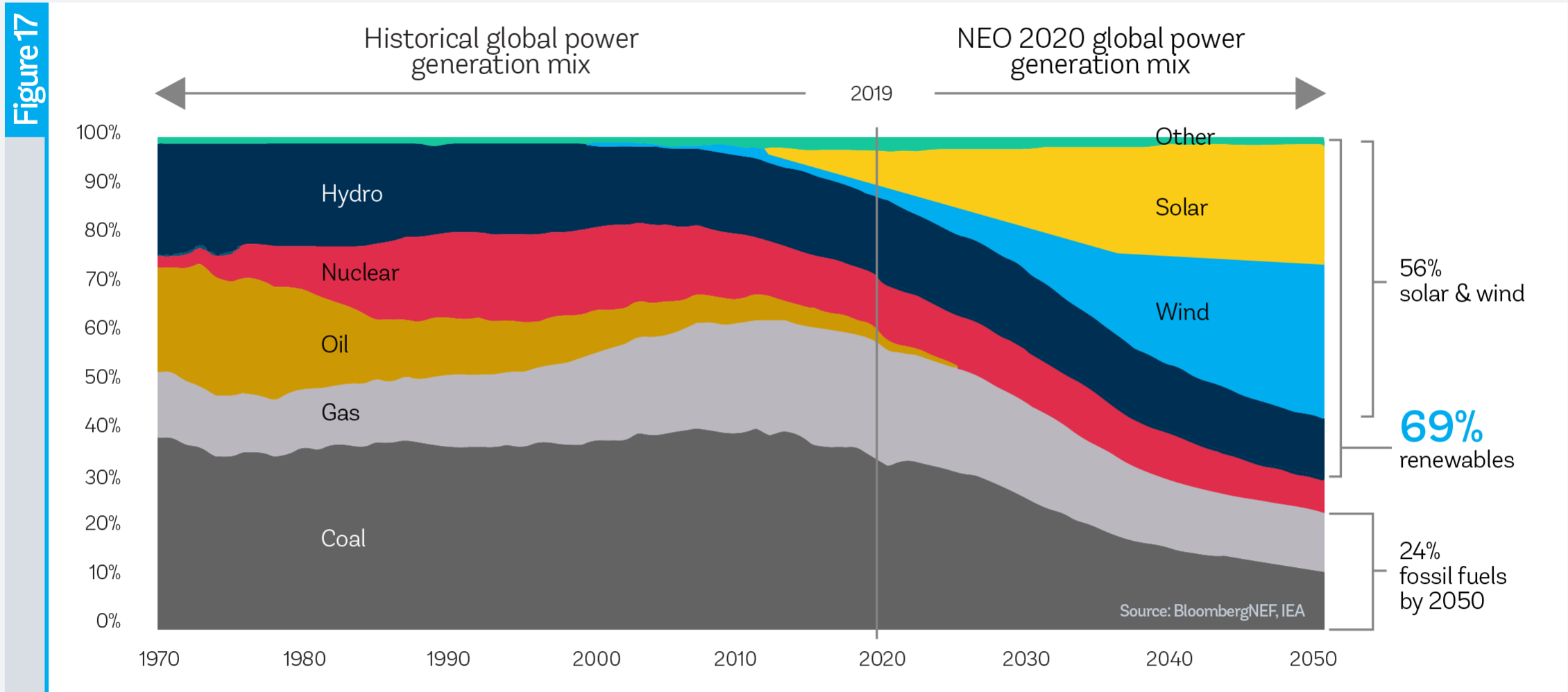


# VI.

## Energy transition



# A global perspective – the transition is already happening...



## Regional context

- In BiH and the Western Balkans, the negative consequences of high fossil fuel dependency, high energy intensity and outdated technology are visible beyond the direct economic impacts.
- Coal combustion is the second largest source of PM 2.5 emissions in the region
- Carbon intensity of power is 2-3 times higher in the Western Balkans than in the EU27, especially in Kosovo, Serbia, and BiH





- In 2019, annual mortality rates due to PM 2.5 air pollution in the Western Balkans were more than double the EU27 average, with mortality rates in BiH 140 percent above those in the EU27 average

- Renewables' trends indicate that the risk of further carbon lock-in in the power sector is much higher in BiH, compared to, for example, Albania and North Macedonia

	RE in power generation	Carbon intensity of power (grams CO2/kwh)	Trend for RE in power mix
Albania	100	24(2020)	→
Bosnia and Herzegovina	28.5	489(2021)	↘
Kosovo	5.2	778(2020)	→
Montenegro	52.2	336(2021)	↘
North Macedonia	24.4	487(2021)	↗
Serbia	21.9	549(2021)	→
EU27	38	265(2020)	→



# International legal obligations

As an EU candidate, BiH is required to align domestic policies with the Paris global commitments, EU's energy commitments, the Sofia Declaration, and other environmental and climate legislation, while at the same time avoiding adverse impacts of the EU's Carbon Border Adjustment Mechanism (CBAM).





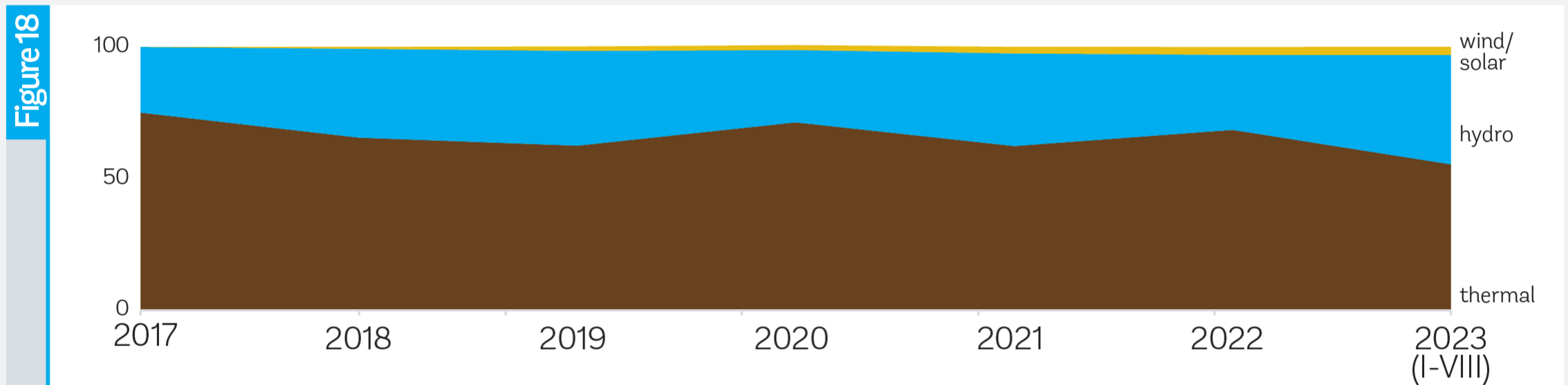


BiH made these **international commitments** in November 2020, via the Sofia Declaration:

- Committing to align with the EU's Green Agenda and work towards the 2050 target of a carbon-neutral European continent together with the EU.
- Committing to a number of specific actions including introducing carbon pricing instruments and aligning these with the EU Emissions Trading Scheme (ETS);
- Gradually phasing out coal subsidies.
- Enshrining the Contracting Parties' participation in the EC's Platform for Coal Regions in Transition.
- In parallel, BiH needs to comply with Energy Community Treaty's provisions

## Power sector of Bosnia and Herzegovina – the background

Close to 70 percent of primary energy generation in BiH is from coal extracted from loss-making coal mines with large, accumulated arrears



The BiH power sector is dominated by ageing (older than 40 years) coal-fired thermal power plants, with 45 percent of capacity provided by TPPs. On average, more than 2/3 of generation is coal-based.

Compliance with international obligations entails **phasing down of around 2 GW** of coal-fired capacities and gradual closure of coal mines

Decarbonization/transition to a low carbon economy is a key challenge for BiH with significant risks but also **significant opportunities**.

The system-level changes required and the whole-of-society impacts that decarbonization will bring about mean that the governments in BiH should have already started preparations



# Power sector of Bosnia and Herzegovina – main challenges

Inefficiencies in wholesale and retail power markets.

The Power Exchange is yet to be established.

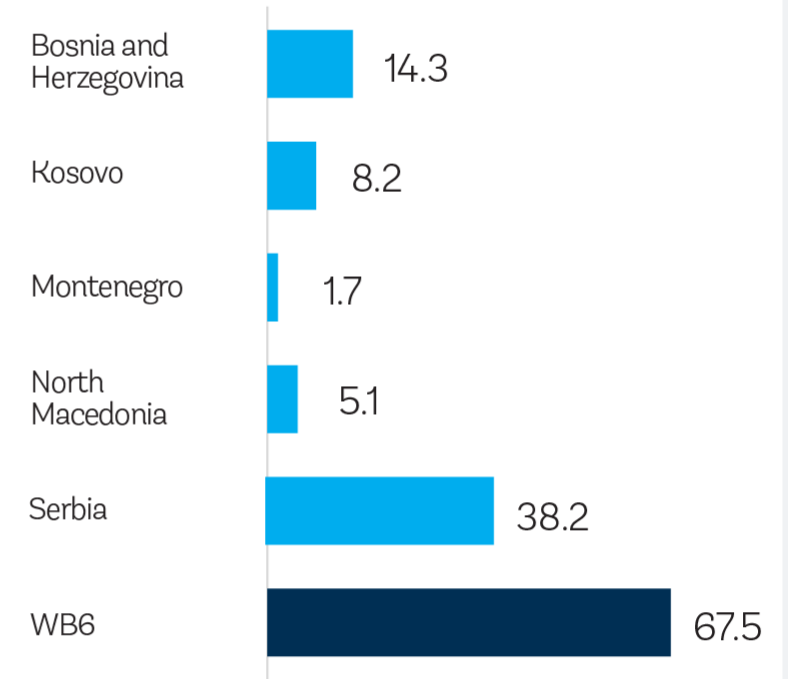
Lengthy permitting procedures, land ownership, and E&S issues lead to absence of private sector to scale-up investments in renewables and hydros.

RE potential is substantial, **but**:

- For some of the most strategic hydro projects, domestic and regional political will be required to see these important energy transition projects succeed.
- For wind and solar, the main constraints are the high geographical concentration of viable wind and solar potential and a lack of transmission network to accommodate increased intermittent renewables
- Biomass can play a role in the decarbonization, but more work needs to be done (1-2 pilot projects) to establish reasonable expectations and economics as well as supporting policies

Figure 19

Coal production across Western Balkans (mil MT)



Reference years:  
BiH–2020 for F BiH, 2016–2019 for RS,  
Kosovo –2015, Montenegro –2020,  
North Macedonia –2019, Serbia –2016





BiH is the **second largest coal producer and consumer** in the Western Balkan region, after Serbia:

- Both ERS and EPBiH are facing significant challenges in operating their mines and the utilities cross-subsidize the poor financial performance of its mines.
- This is due to sizable liabilities associated with taxes, social security contributions, and concession fee arrears, exceeding by far the annual revenues of the mines

## CBAM: design and regional developments

Worldwide, 68 carbon pricing instruments are operating, covering 23 percent of global emissions. Pricing mechanisms comprise carbon or energy taxes:

- where **prices are set**, emission reductions or emission trading are the outcome;
- where the **emission quantity** is set, prices are the outcome of the market process.



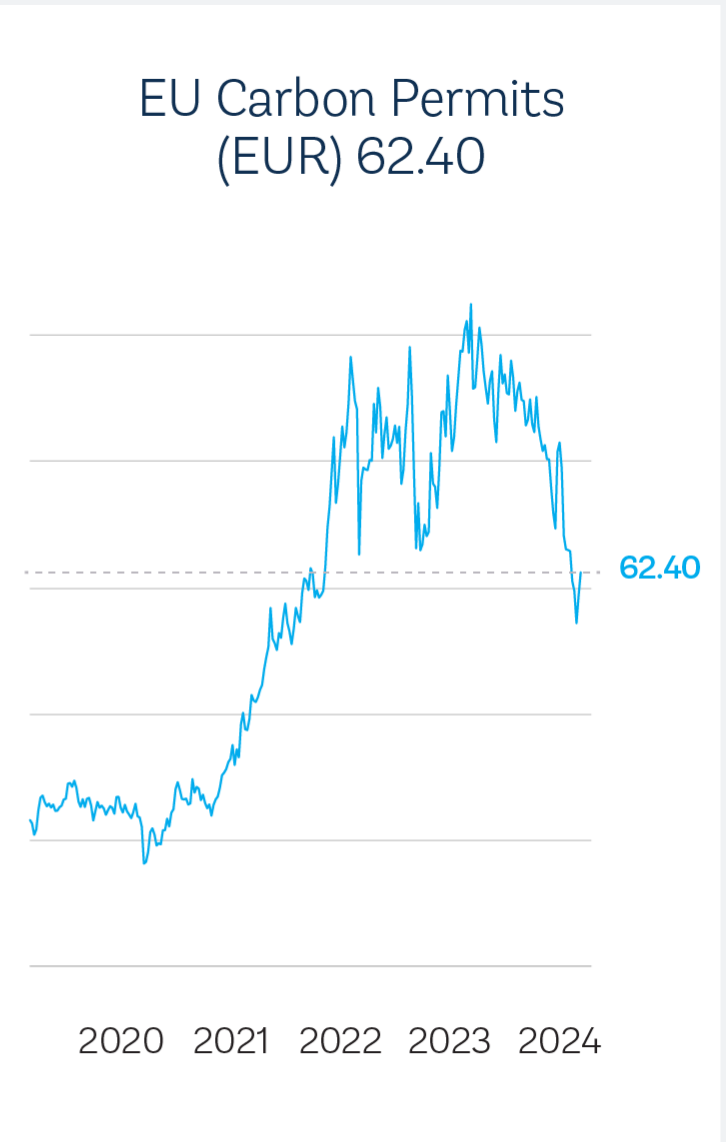
The CBAM is similar to the ETS as it relies on the same principle of putting a price on carbon:

- The carbon price within the ETS serves as a reference for determining the carbon cost of imported goods.
- CBAM aligns the carbon price for domestic and imported products, creating a level playing field for EU industries

In 2005, the EU introduced the ETS, a market-based approach used to control GHG emissions that sets a cap on the total amount of emissions allowed from certain sectors or industries.

Carbon prices were hovering around EUR 80/tonne of CO<sub>2</sub>e in 2023 but have dropped to EUR 60/tonne in February 2024

Figure 20



## Possible pathways of changes in energy generation and mining assets

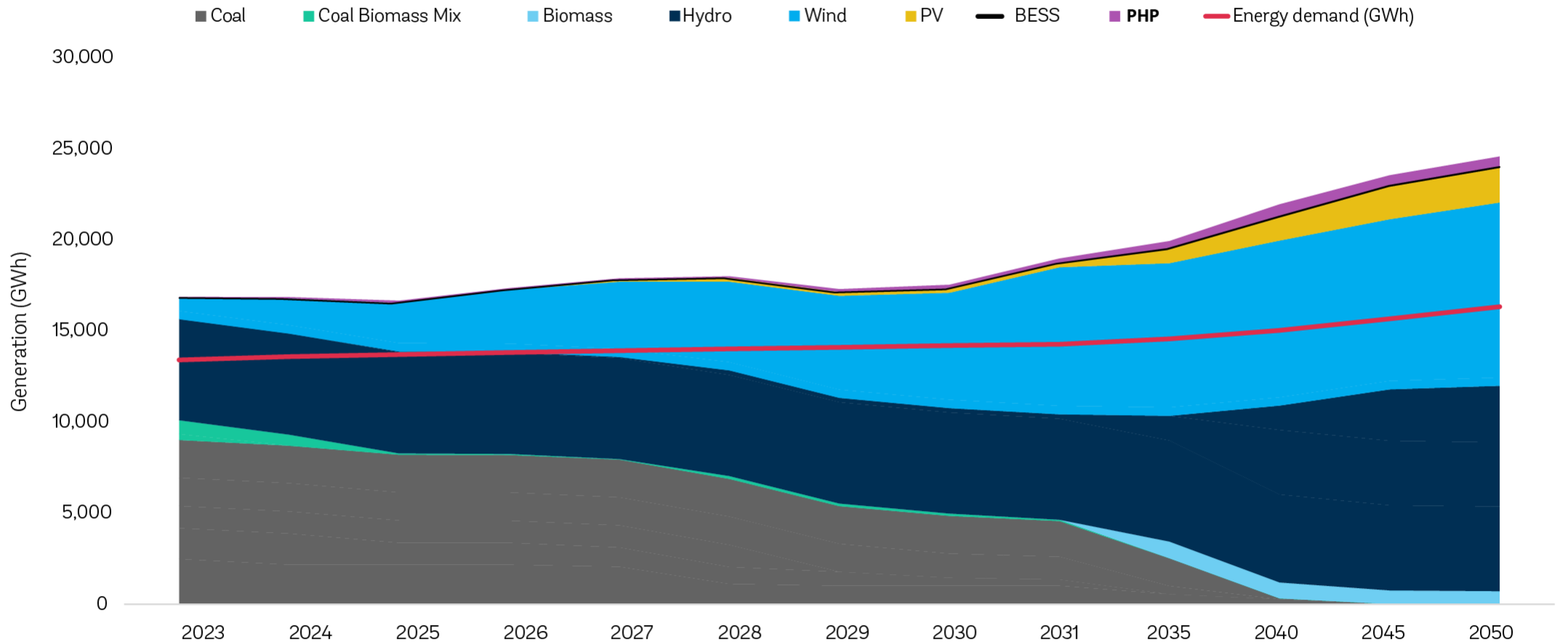
- In 2022, the World Bank carried out a Least Cost Planning (LCP) study to determine the optimum power generation mix for BiH over the period 2023-2050, considering three main scenarios:
  - Baseline -- 0.75 percent growth of electricity demand per year
  - Decarbonization -- Similar to the Baseline scenario and added more stringent targets of CO2 emissions.
  - Energy Security -- Similar to the Decarbonization scenario and added secured reliance on domestic energy sources while continuing BiH's trade with neighboring countries
- The three scenarios reflect the most likely electricity demand trajectories in BiH, and their outputs specify the optimum power generation mix that would satisfy this demand

	Baseline	Decarbonization	Energy Security
Key features	0.75% demand growth	stringent CO <sub>2</sub> targets	reliance on domestic energy sources
Total generation (GWh)	563,582	516,017	537,895
Total demand (GWh)	410,631	410,631	410,631
Total capacity added (MW)	5,028	4,656	6,162
Total investment (USD million)	6,557	5,867	7,509
Import costs (USD million)	2,540	3,690	2,299
Export revenue (USD million)	13,315	11,682	12,808
NPV of system cost (USD million)	4,776	4,237	4,595



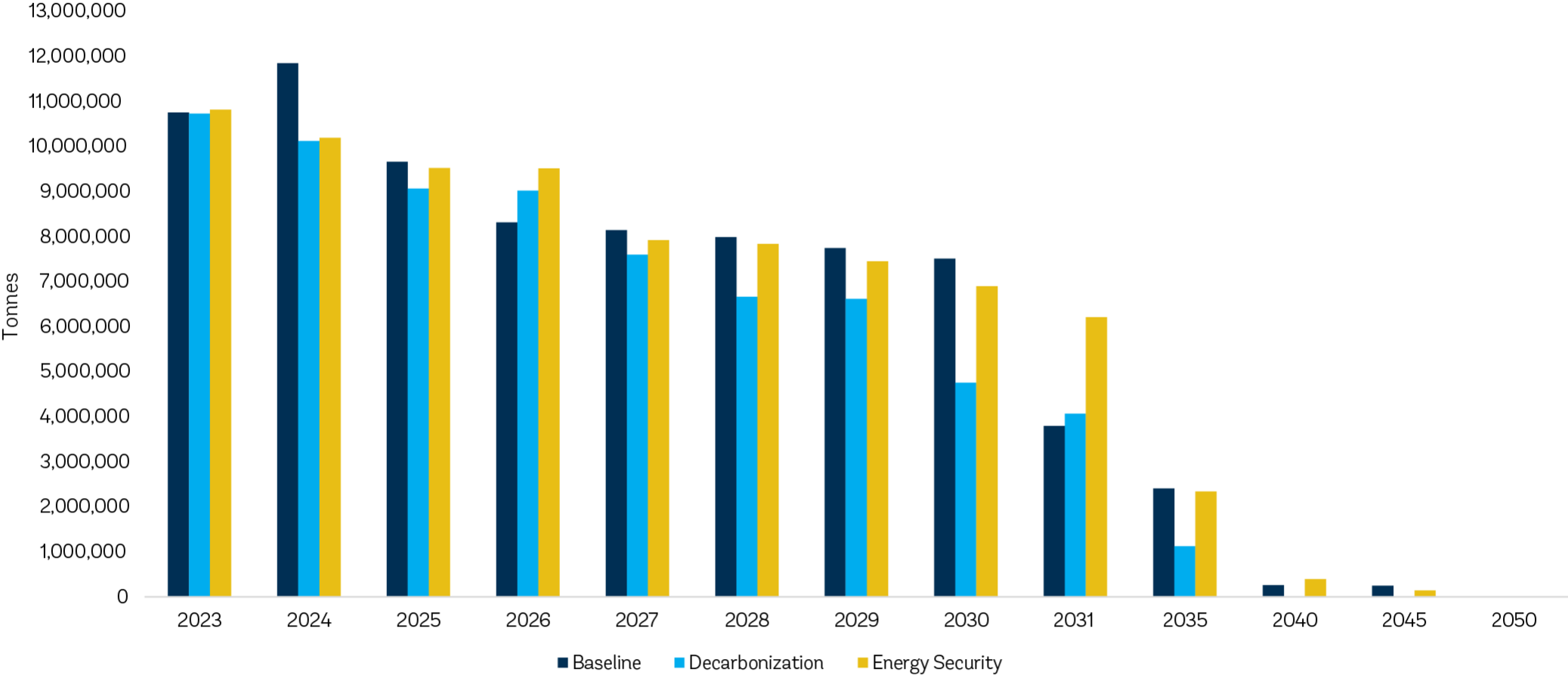
# Energy security scenario – generation mix

Figure 22



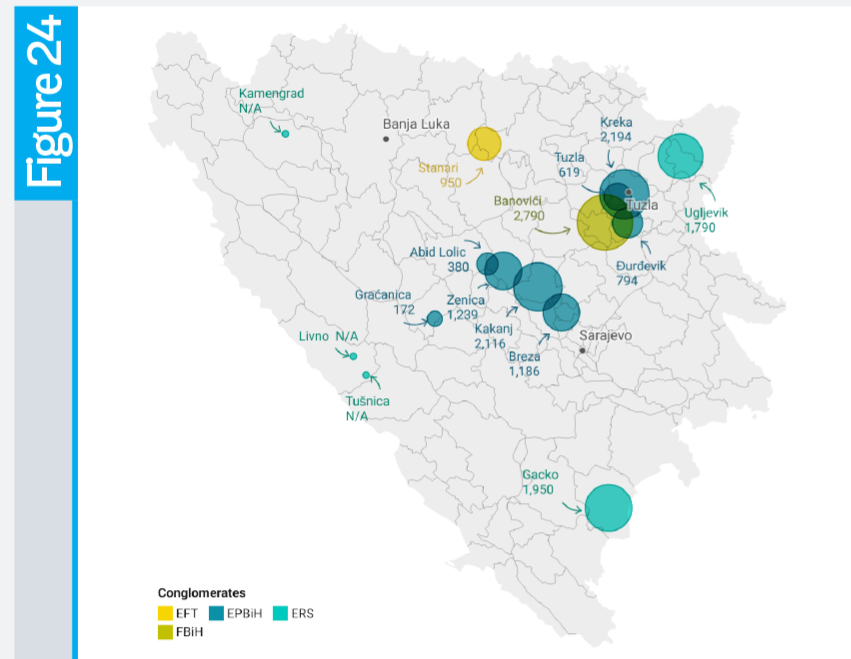
# Alternative energy pathways – coal consumption

Figure 23

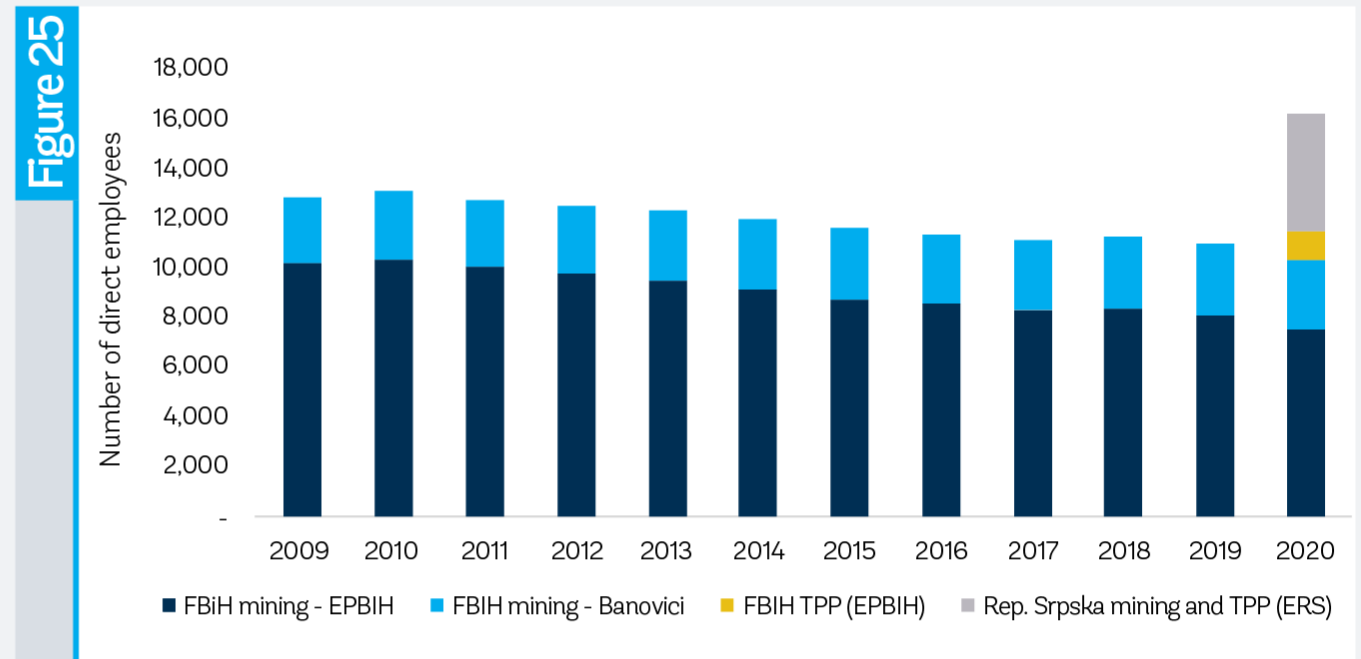


# Managing the Impacts: Number of direct coal sector jobs at risk: more than 10,000 in FBiH, 4,700 in RS

Direct coal mine and TPP employment (2020)



Direct employment in coal mining and TPPs

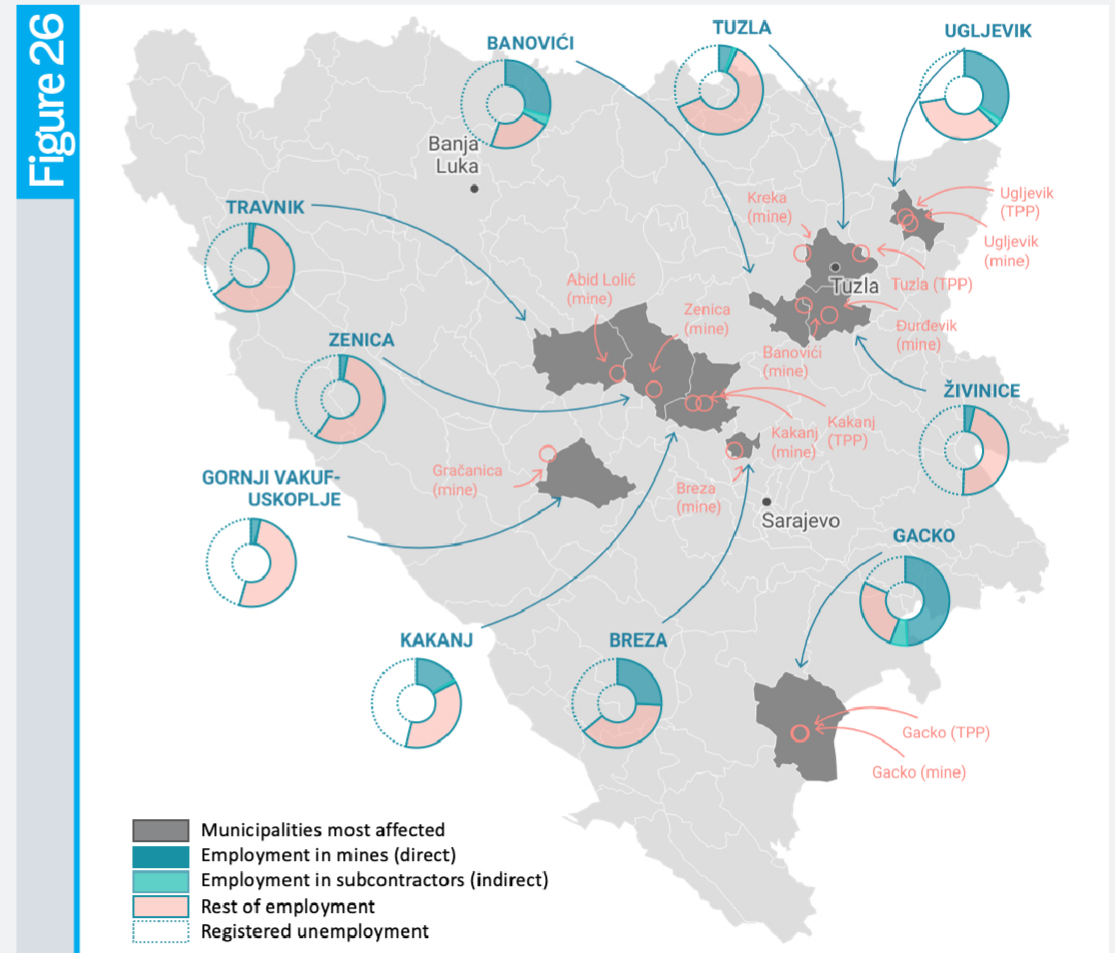


Note: Employment data from Gacko, Ugljevik and Stanari, all located in Republika Srpska, was available only for 2020.

Source: Authors' own elaboration using administrative data from the mine and power plant operators

# Coal-related employment is dominant in relatively few municipalities

- Vulnerable to economic fall-out from mine closure due to:
  - dependence on coal activity
  - already high unemployment
- Indirect job estimates exclude those employed in local private firms that are also likely to lose business under coal phase-down





## Cost Benefit Analysis of the Just Transition

- In 2022-23, the World Bank completed a cost-benefit analysis (CBA) model to provide an estimate of the costs and net benefit of a Just Transition away from coal for BiH:
- total costs were categorized into asset decommissioning, land reclamation and repurposing, social support, and renewable energy investments.
- Total benefits included: healthcare co-benefits, net power export revenue income and repurposed land value growth. Like benefits, total impacts on healthcare, BiH revenue and subsidies, and economic activities were also quantified.


- The Just Transition away from coal provides a net positive benefit in all scenarios. The baseline scenario provides the largest NPV of costs at USD 3.4 billion, while a decarbonization scenario provides an NPV of costs at USD 2.1 billion and an energy security scenario USD 1.3 billion NPV.



## Conclusions and policy options

- As an EU candidate, BiH is required to align domestic policies with the Paris Treaty, EU's commitments, the Sofia Declaration, and other environmental and climate legislation, at the same time avoiding adverse impacts of the CBAM
- Multiple factors such as coal-based energy dependency, ageing energy infrastructure, low coal mining efficiency, and the introduction of CBAM, leading to output losses of electricity sector of 15 percent, are making it harder to delay transition.



- 
- BiH's long-term energy mix can make strategic use of BiH's natural resources. Coal is being replaced by a mix of hydropower, wind, solar and, potentially, biomass:
    - » Both wind and solar PV are part of the optimum generation mix; wind estimations range from 2,390-3,180 MW, while solar PV reaches up to 1,780 MW, depending on a scenario.
    - » Hydropower is a strategically important option for BiH and needs to be developed. Storage hydro is particularly competitive in the case of Energy Security, when firm capacity and balancing needs should be satisfied from domestic sources.
  - Driven by CO2 prices, operation of coal-fired plants gradually becomes uneconomical in all scenarios between 2030-2035. Post 2035, operation of all coal plants in BiH either completely stops or they continue operating at very low capacity factors.
  - The CAPEX values required to meet the demand in BiH by 2050 range from USD 5.87 billion in Decarbonization to USD 7.51 billion in the Energy Security scenario.





- Despite the challenges, BiH has the opportunity to model a Just Transition of its energy sector, with a focus on coal phase down and clean energy optimization. Based on estimates from the LCP study, the decarbonization option makes economic sense with an NPV of USD 3.4 billion.
- Supporting a Just Transition in the coal mines will require significant investments to clear social arrears, responsibly close mines and transition the coal regions economically.
- A Just Transition will require considerable coordination across all levels of government and between Ministries. Inter-ministerial coordination and local level Just Transition structures will be crucial to create transparency, share information, plan and deliver on agreed Just Transition plans.





- A starting point will be the need for a comprehensive Just Transition Plan at the entity levels which forecasts all impacts and seeks to address them in a systematic way. Even if impacts will be localized given the high concentration of coal-related employment in relatively few municipalities, concerted policy measures will be needed to:
  - support local labor demand to absorb the local economic shock on employment and on business activities linked to the mines,
  - provide adequate social and economic support to affected workers,
  - strengthen the capacity of the public employment services to absorb the increase in need for employment services and better support the transition of affected workers;
  - engage with communities in a regular fashion; and
  - work with utilities, mines and the government to diversify mining land uses for new productive use.

