25th National Energy Conference
ENERGY+DEVELOPMENT
1-2 December 2021

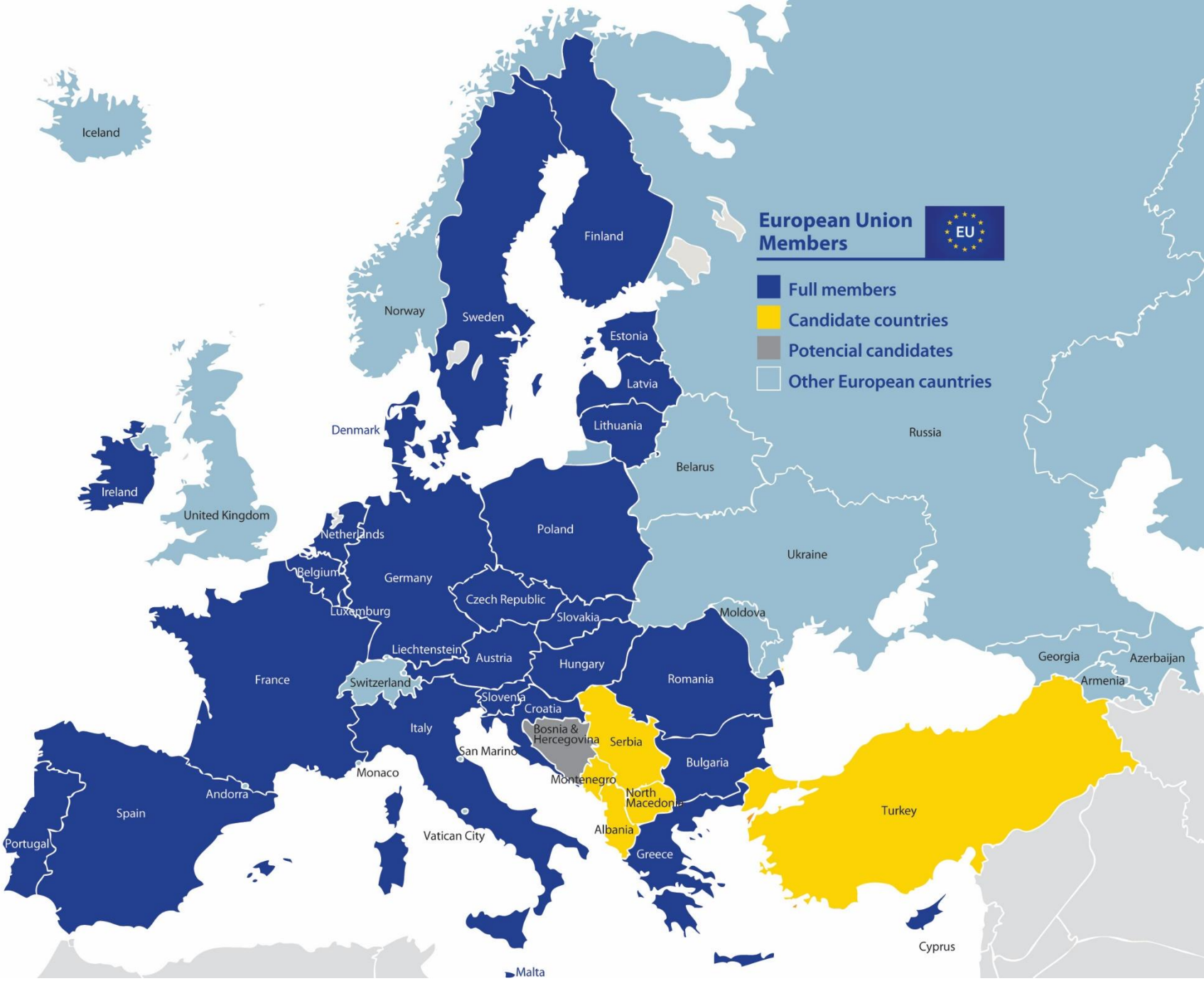
Energy Transition and the Need for Achievable Solutions

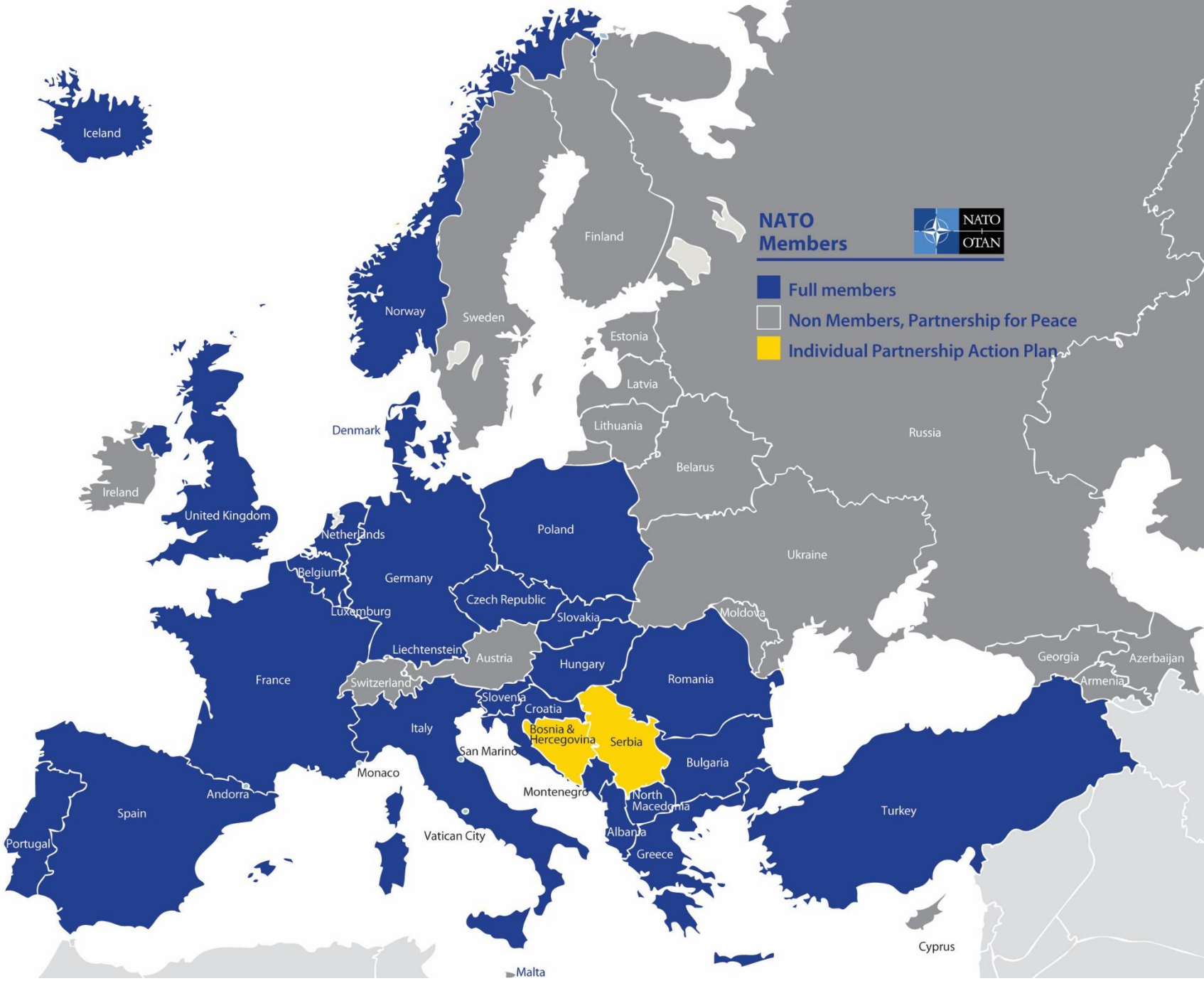
Serbia and Western Balkans in Perpetual Transition

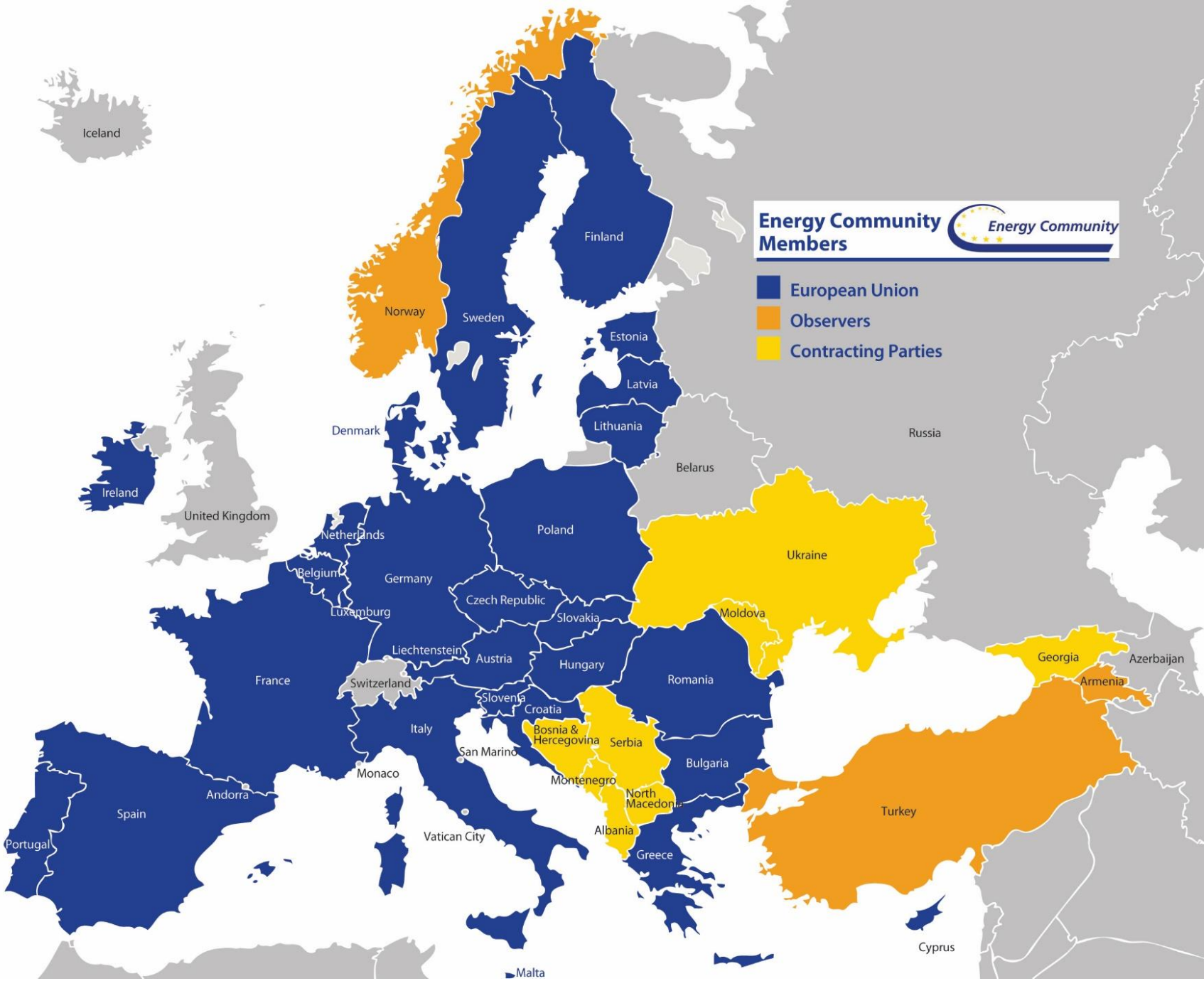
"Challenges and Prospects of the Energy Market in SE Europe"

Mihailo Mihailović, Serbia

Athens, December 01, 2021


European Union Members
EU
Full members
Candidate countries
Potencial candidates
Other European cauntries
Iceland
Norway
Sweden
Finland
Estonia
Latvia
Lithuania
Russia
Belarus
Denmark
Ireland
United Kingdom
Netherlands
Poland
Ukraine
Belgium
Germany
Czech Republic
Luxemburg
Slovakia
Moldova
Liechtenstein
Austria
Hungary
Romania
Georgia
Azerbaijan
Armenia
France
Switzerland
Slovenia
Croatia
Italy
Bosnia & Hercegovina
Serbia
San Marino
Bulgaria
Monaco
Montenegro
Andorra
North Macedonia
Spain
Turkey
Albania
Vatican City
Portugal
Greece
Cyprus
Malta


NATO Members
NATO OTAN
Full members
Non Members, Partnership for Peace
Individual Partnership Action Plan
Iceland
Norway
Finland
Sweden
Estonia
Latvia
Lithuania
Russia
Belarus
Denmark
Ireland
United Kingdom
Netherlands
Poland
Ukraine
Belgium
Germany
Czech Republic
Slovakia
Moldova
Luxemburg
Liechtenstein
Austria
Hungary
Romania
Georgia
Azerbaijan
Armenia
France
Switzerland
Slovenia
Croatia
Italy
Bosnia & Hercegovina
Serbia
San Marino
Bulgaria
Monaco
Andorra
Montenegro
North Macedonia
Spain
Albania
Turkey
Portugal
Vatican City
Greece
Cyprus
Malta


Energy Community Members
Energy Community
European Union
Observers
Contracting Parties
Iceland
Norway
Sweden
Finland
Estonia
Latvia
Lithuania
Denmark
Russia
Belarus
Ireland
United Kingdom
Netherlands
Poland
Ukraine
Belgium
Germany
Czech Republic
Luxemburg
Slovakia
Moldova
Liechtenstein
Austria
Hungary
Georgia
Azerbaijan
France
Switzerland
Romania
Armenia
Slovenia
Croatia
Italy
Bosnia & Hercegovina
Serbia
San Marino
Bulgaria
Monaco
Montenegro
Andorra
North Macedonia
Spain
Turkey
Albania
Portugal
Vatican City
Greece
Cyprus
Malta

Serbia – Country Context Overview

- Situated in the heart of Balkan peninsula with all corridors connecting CEE and SEE
- Historically Serbia is always in transition-survival mode
- Sovereign, non-aligned, independent and military neutral position
- Serbia and Yugoslavia have always been the subject of interest of the great powers (both in creation and in disintegration)
- National long term strategy: full membership in EU
- Coherence with EU foreign policy – about 60%
- Good relations with Russia and China

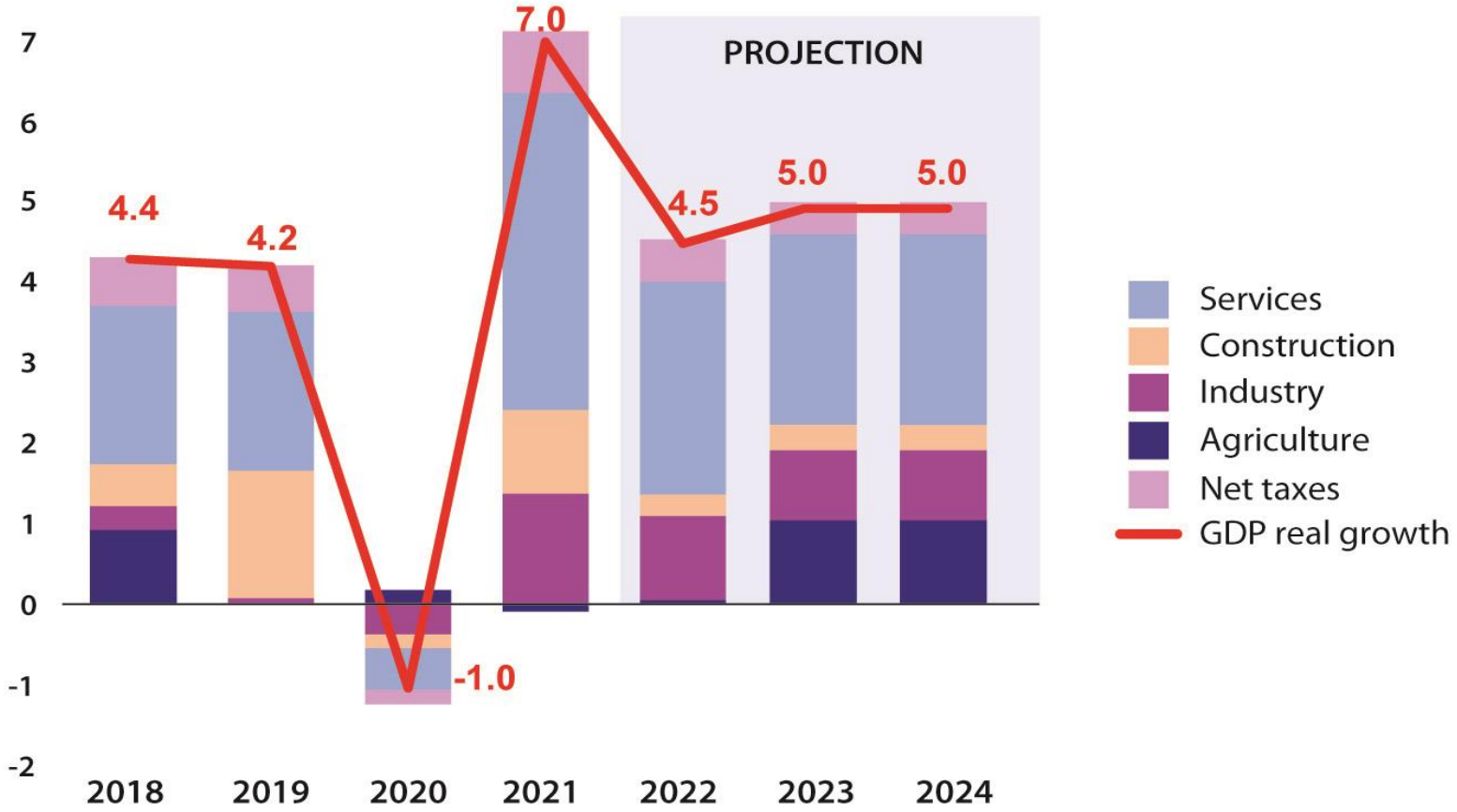
- Macroeconomic stability and good recovery from the impact of the COVID-19 crisis
- Rapid progress in economy - actual growth rate 7% - 2021 - public debt 58%
- Foreign Direct Investment in 10 months of 2021 reached €3,1b (60% of Western Balkans)
- Newly discovered reserves of gold, copper and lithium promise new business

- Serbia is the "Silicon Valley of the Balkans"
- The first non-EU country to join platform for Smart Specialization Strategy
- Leader in the regional economic opening: "*The Balkans to the Balkan people*"
- Active participation in EU migrant crisis
- Long dispute with province of Kosovo* & Metohija
- Demographic imbalance – some 50 000 Serbs per year flow to the West

* This designation is without prejudice to positions on status, and is in line with UNSCR 1244

Serbian Economy 2018-2024

Serbia - Real GDP growth rate and midterm projection - November 2021



Source: Ministry of Finance , Republic of Serbia

Very good post-Covid-19 growth in 2021 as result of:

- **powerful growth of Foreign Direct Investment,**
- **robust investing in infrastructure,**
- **increase in export, construction and mining.**

Serbia Energy Context Overview

- Energy dependence ~35%, thanks to domestic lignite, mostly in imported gas and oil
- Self-sufficient in electricity and have long-term import contracts for NG and oil
- The current estimated number of emergency oil reserve days is 40
- In the current crisis in Europe's energy markets, Serbia is energy stable

- Main energy enterprises are still state owned
- Energy markets are partially open: oil (100%), electricity and gas (50-50%)
- Prices of power for households are regulated and at the lowest level in Europe.
- Vulnerable customers are protected

- "Balkan Stream" natural gas transitional pipeline is fully operational - 12,25 bcm/y
- The underground gas storage Banatski Dvor is operational and securing NG supply

- Some energy and climate laws have been adopted (2021), as the basis for future actions
- Serbia has achieved and overachieved EnC set target of electricity interconnectivity level
- Organized day-ahead market - Power Exchange SEEPEX was established in 2016, in partnership between EMS and EPEX SPOT
- Functional "Guarantees of origin" system has been implemented to attract investment in RES
- Still suffering from relatively high pollution levels
- Ongoing activities for transition to green energy and economy – large gaps in technologies and policies
- High level of alignment with the EU acquis on security of supply, but still behind in implementation of market, environmental and climate regulations

EU's Energy Transition - "Now or never"

The EU is a global leader in the transition towards climate neutrality, in order to protect people and the planet against the threat of dangerous climate change.
While only accounting for 8% of global CO2 emissions, the EU recognises its responsibility for a higher share of cumulative emissions.

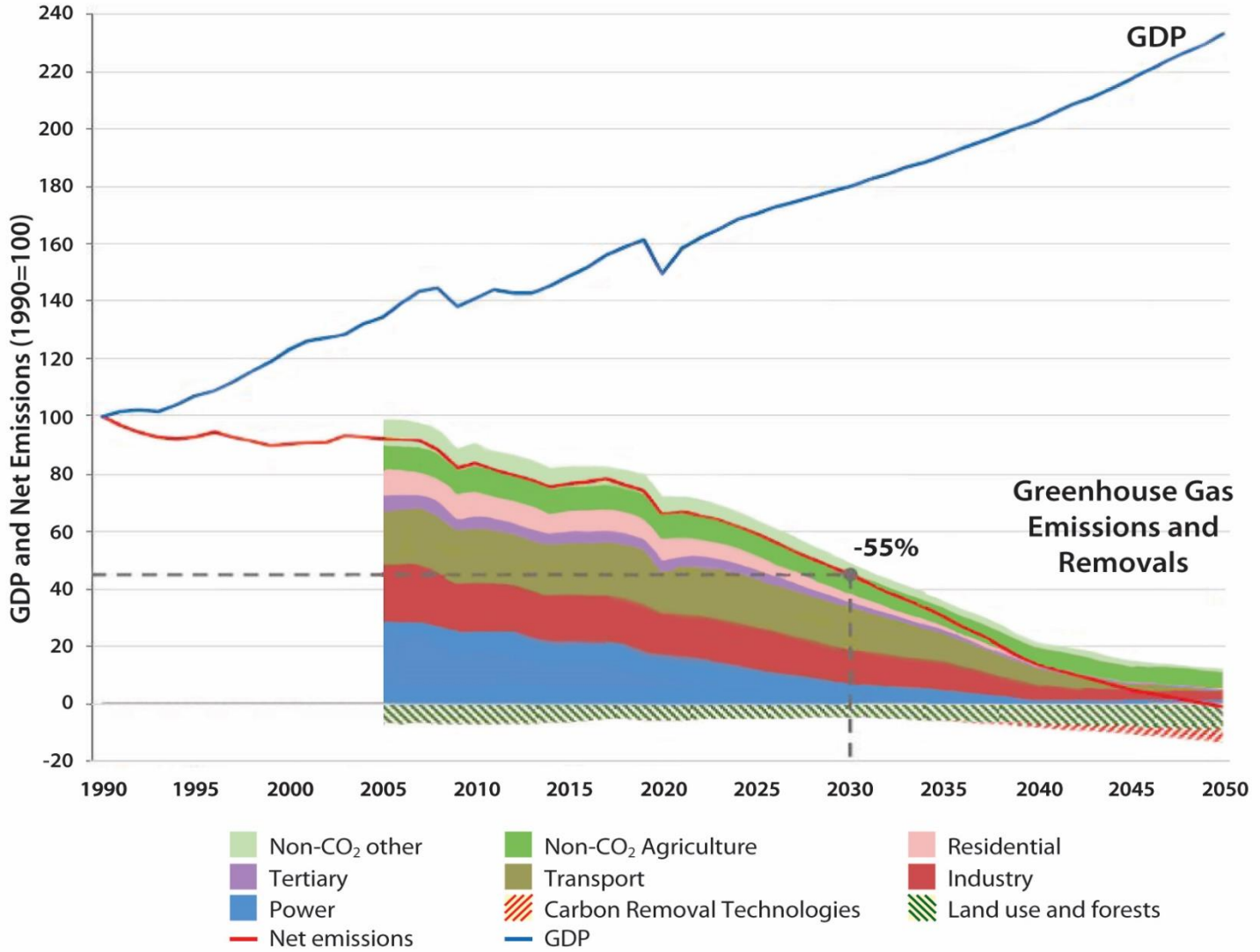
Energy use accounts for 75% of the EU's emissions, so the transformation and reshaping of energy system is central to climate ambitions.

The EU ETS (from 2005) covers large power stations, large industrial plants, large district heating plants and aviation, representing about 40% of total EU emissions. It is a cornerstone of the EU's climate policy.
EU's Climate Law has entered into force on 29 July 2021 .
Targets and policy tools in "Fit for 55" (2021) making the EU climate neutral by 2050:

- **Reduce GHG emission by at least 55% by 2030 compared to 1990 level**
- **Boost RES in energy mix by 40% by 2030**
- **Overall reduction of final and primary energy consumption 36-39% by 2030**
- **Extension of the EU emissions trading system to shipping, road transport and buildings**
- **Gradual imposing CBAM - Carbon Border, Adjustment Mechanism - putting a price on imports goods based on their carbon content in production – in place as of 2026**
- **Revision of the emission standards for new cars and vans – pathway to zero-emission mobility**
- **Mandatory targets for new and alternative fuels and associated infrastructure**
- **40 GW of renewable Hydrogen electrolysers and 10 mil.t "green hydrogen" produced in EU till 2030**
- **Ambitions for expansion natural carbon sinks - Forest Strategy and biodiversity friendly practices**
- **The new Social Climate Fund - social compensation - will help EU citizens to invest in EE, cleaner mobility, new H/C**

EU - Climate Target Plan

EU's Pathway To Climate Neutrality

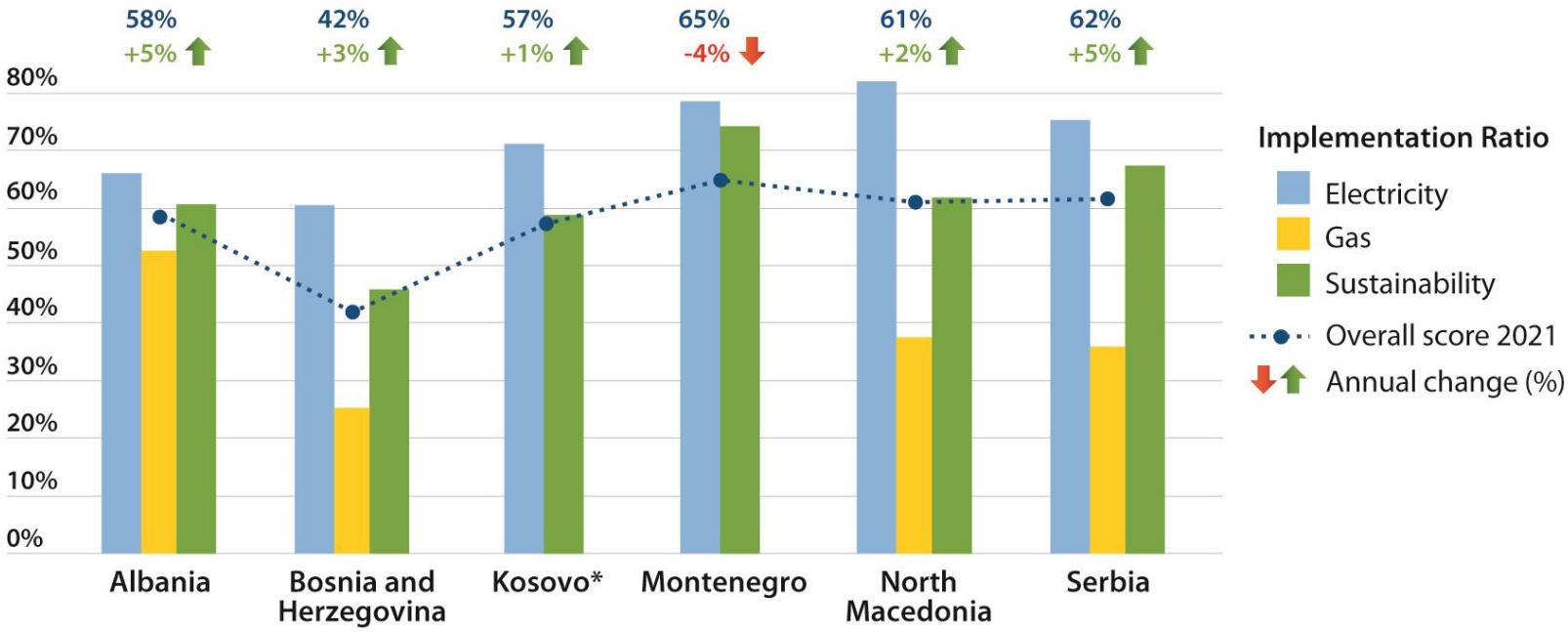


Source: European Commission

Serbia and WB6 - Implementation of EU's acquis

Key values the Energy Community is built on: integrated markets and decarbonisation
EU - Energy Community acquis, mechanism of political measures, covers legislation on electricity, gas, oil, infrastructure, renewable energy, energy efficiency, competition and state aid, environment, statistics, climate and cyber security.
In the last EnC Implementation Report (2021) contracting parties in Western Balkans achieved modest progress in their energy and climate sectors.

Implementation Performance by Western Balkan countries 2021

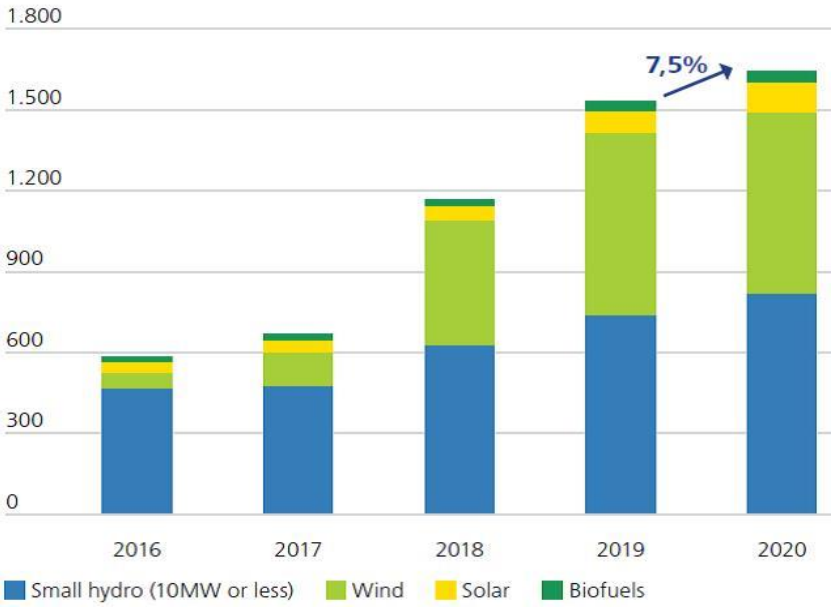


Source: Energy Community – Implementation Report 2021
* This designation is without prejudice to positions on status, and is in line with UNSCR 1244

Energy Efficiency and RES Development in WB6

Implementation of EE 2020 targets

Newly installed RES generations capacities (excl. large hydro) in MW, 2020



Source: Compiled and calculated by the Energy Community Secretariat

*This designation is without prejudice to positions on status, and is in line with UNSCR 1244

Implementation of EE measures and deployment of RES in WB6 are moderately/well advanced (2021).

In the Western Balkans, the building sector is the largest final energy consumer with approximately 43% of total energy consumption. Renovating buildings to meet the minimum energy performance requirements can achieve energy savings by 40% in the building sector.

The fast growing of non-dispatchable capacities (wind, solar), will require additional market flexibility options and strengthening transmission and distribution network.

Coal Sector in Western Balkans

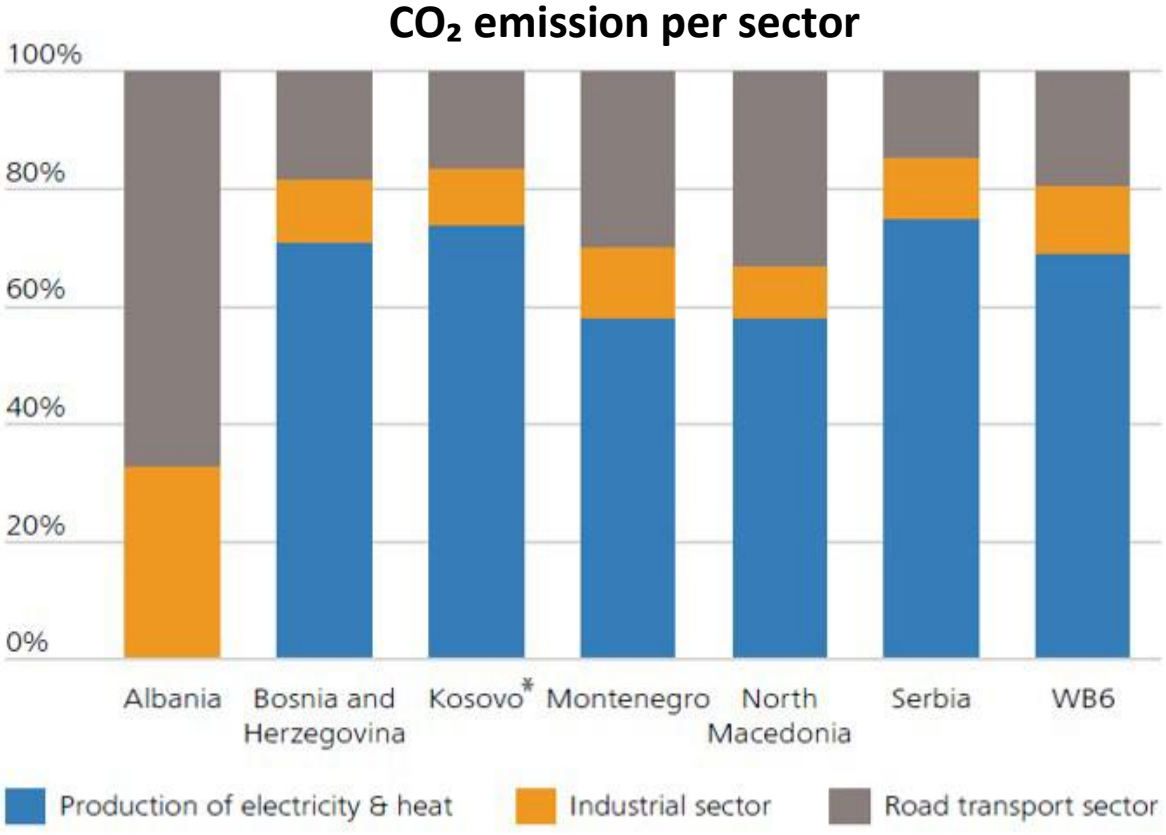
- Coal is by far most used fossil fuel in the Western Balkans
- Serbia and WB are highly dependent on coal in the power mix
- There are 18 mines in WB6 with total production of 66,5 mil.t (2018)
- TPP on coal in WB6 (8,8 GW) are: Serbia-4,4, B&H-2, Kosovo*-1,3, NM-0,8, Montenegro-0,2
- Number of overall jobs in coal mines and coal power plants in WB is 41.420
- Indirect jobs related to coal and power production is estimated at more than 50.000
- Employment intensity in WB TPP's is 1 FTE/MW compared to 0,4 FTE/MW in the EU
- WB6 emits about 134 $MtCo_2eq$ (2018) - around 90 Mt is coming from coal combustion
- According to Energy Community estimates, the WB6 could have a gradual introduction of the national carbon tax from 2025, and be ready to join the EU ETS system in 2030.

Share of coal in Power Generation in 2018

	Gross electricity Generation (GWh)	Electricity Generation from coal (GWh)	Share of coal in Electricity Generation
Albania	8 553	0	0%
Bosnia & Herzegovina	19 160	12 437	65%
Kosovo*and Metohia	5 915	5 601	95%
Montenegro	3 811	1 555	41%
North Macedonia	5 607	2 840	51%
Serbia	37 426	25 020	67%

Source: JRC Recent trends in coal and peat regions
*This designation is without prejudice to positions on status, and is in line with UNSCR 1244

CO_2 Emission in WB6



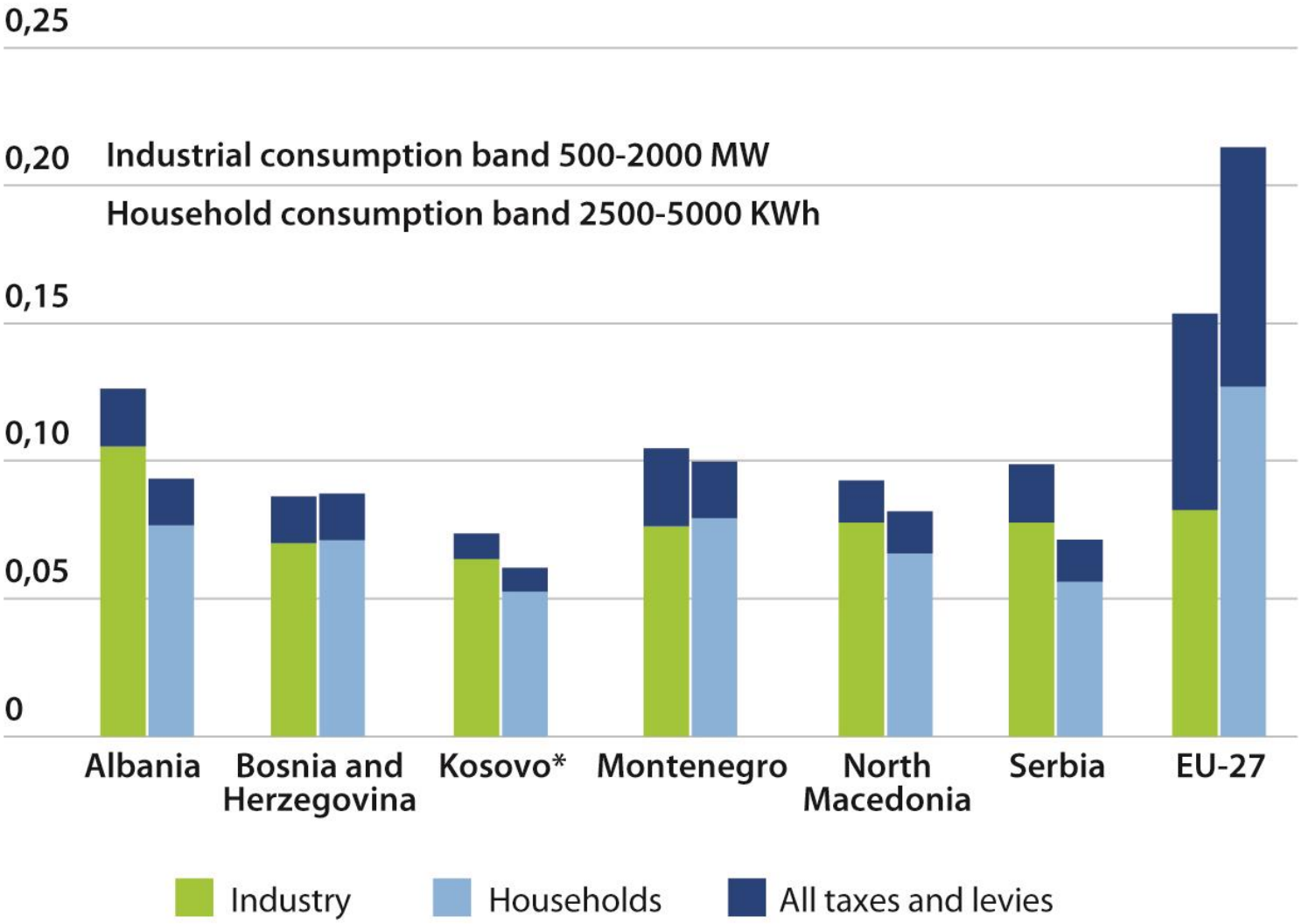
Source: Compiled and calculated by the Energy Community Secretariat

* This designation is without prejudice to positions on status, and is in line with UNSCR 1244

About 70% of total emission in WB6 is coming from electricity and heat production. Current carbon emission footprint in WB6 is critically higher than average in EU 27. Gradual Carbon Pricing combined with full market integration, both in gas and electricity, is the essential condition for smooth transition to low emission profile.

Electricity Prices in WB6 and EU

Consumer's electricity prices, I semester 2020 in EUR/KWh



Source: Eurostat database

*This designation is without prejudice to positions on status, and is in line with UNSCR 1244

Serbian Energy Transition 1

- Energy transition and decarbonisation – a unique challenge and requires effort
- Transition goals are indisputable – most favorable ways of achieving them may differ
- Starting points are different and no "one size fits all"
  - diversity in history and geography,
  - political and social environment,
  - economical strenght,
  - technological capacity,
  - availabilty of funds.

- Serbia is significantly late in developing structured energy transition plan
- The Law on Climate Change (March 2021) prescribes adoption of Low Carbon Development Strategy with an Action Plan within two years
- In April 2021, Serbia adopted a package of important energy laws, including new laws on renewables and energy efficiency

- Five important documents are in development – mutual harmonization expected in 2022:
  - The new NDC2 under Paris Agreement
  - 2nd Biennial Report and 3rd National Communication under UNFCCC
  - NECP - development of targets and the trajectories up to 2030
  - National Energy Strategy up to 2040 with projection to 2050

- The main actors in energy transition are:
  - Government – set up radical goals and implement reorientation of policy
  - Businesses – some goals require substantial financial resources
  - Consumers – to be successful, transition has to be fair and socially acceptable for all

Serbian Energy Transition 2

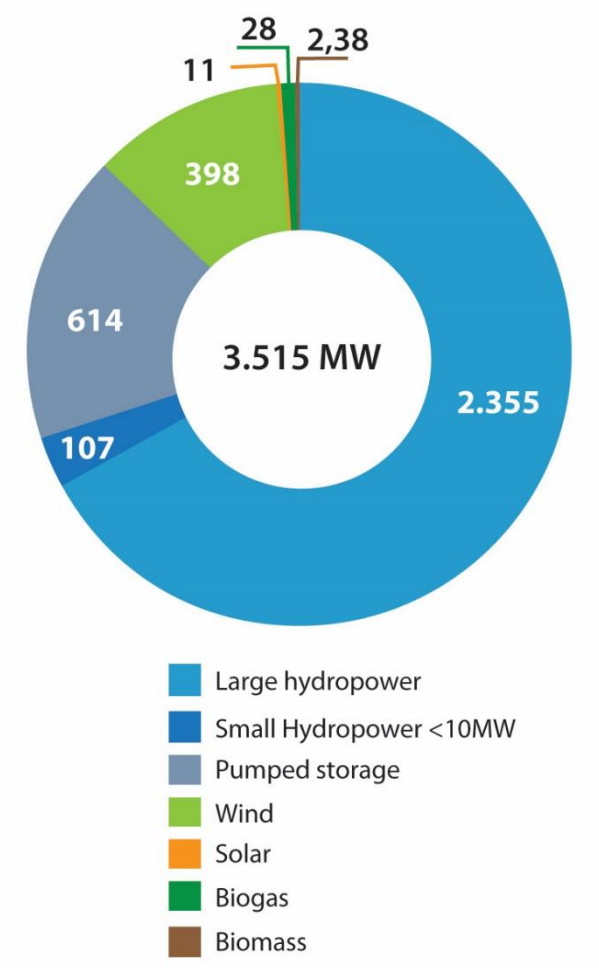
- Decarbonisation of the planet is the high political decision
- 3 key factors determine level of exposure of Serbian energy sector to external influences:
  - Accession and integration to EU
  - High and growing import dependence of the gas and oil
  - UN Paris Agreement on climate change
- Managing and shaping energy-climate transitions requires inevitable reforms in electricity production and coherent country-mix of macroeconomic, industrial and labour policies
- Mix of policy instruments available:
  - reducing and phase-out of coal power production,
  - cleaning up of energy-intensive industry,
  - reducing emissions from transport, agriculture, buildings

- Many significant uncertainties: economic trends, commodity prices, market design, climate change management, geopolitics, CCS, hydrogen, nuclear, energy storage innovations, decentralisation, affordability, land and water availability.

- Mature and achievable measures and direct action priorities are:
  - Introduction of national CO_2 taxes (2025) and pathway to EU ETS (2030)
  - Gradual reduction of coal in power-production, phase-out old stations (2025-2040)
  - Increased RES in power and heat production
  - Large scale of Energy Efficiency measures in the whole society
  - Increased use of Natural Gas, CHP production, gas storages
  - Development of energy storages and demand-response options
  - Reconsidering of the nuclear option in power generation
  - Introduction the new technologies: CCS, Batteries, Hydrogen …

Serbia - RES Development

Total Capacities of RES in Power Generation - 2020 (MW)



Source: Energy Community

- Far from reaching RES target of 27% in FEC in 2020
- Lagging in all three sectors: electricity, heating and cooling and transport
- In 2019 target was 25,6% - reached 21.4% of FEC
- Significant expansion of wind generation in 2020
- Stagnant state in the PV installations
- Most of new RES projects owned by private investors
- EPS just started investing in solar and wind
- Electricity as a carrier will require a better grid and the ability to store energy
- Installed RES - 3314 MW on transmission and 201 MW on distribution level
- The new net-metering scheme for prosumers was launched in September 2021
- 1st auction for market premium (400 MW quota for wind generation) will be held before end 2021
- Next RES auction (solar & wind) planned - Feb 2022

Natural Gas – Bridge Fuel for Serbia

In the search for the optimal trajectory of the energy transition, NG has a role as transitional and supportive fuel for medium-term (by 2030) and later.

- **NG is the cleanest fossil fuel in terms of emissions**
- **Can be stored in large quantities and provides flexibility**
- **NG is used for power and heat generation and in industrial processes**

- **Currently Serbia consumes about 2,5 bcm/y**
- **Sufficient gas quantities secured through Balkan Stream extension of the Turkish Stream**
- **Main supplier of NG is Russian Federation via Bulgaria and Hungary**
- **Serbiagas (49%) and Gazprom (51%) have completed the Banatski Dvor natural gas storage with active volume of 450 mcm.**
- **Project partners are working on the Banatski Dvor UGS expansion up to 750 mcm**
- **This UGS facility ensures natural gas security supply for Hungary, Serbia and B&H**
- **Currently there is reserves for 15 days of maximum utilisation**

- **Current price is USD 270/1000m³.**
- **Russia-Serbia agreement - As of December 01, 2021 - price fixed for next six months**
- **Long term, multi-year contract will be negotiated with Russian partners**

Serbia-Natural Gas-Transitional and Supportive fuel

BALKAN STREAM

- **Turkish Stream extension**
- **Bulgaria - Serbia - Hungary**
- **Zaječar - Horgos**
- **403 km in Serbia**
- **12,87 bcm/y**
- **4 exits in Serbia**

INTERCONECTOR SRB-BUL

- **Niš - Sofia**
- **Length 171 km**
- **1,8 bcm/y**
- **Mid 2022**

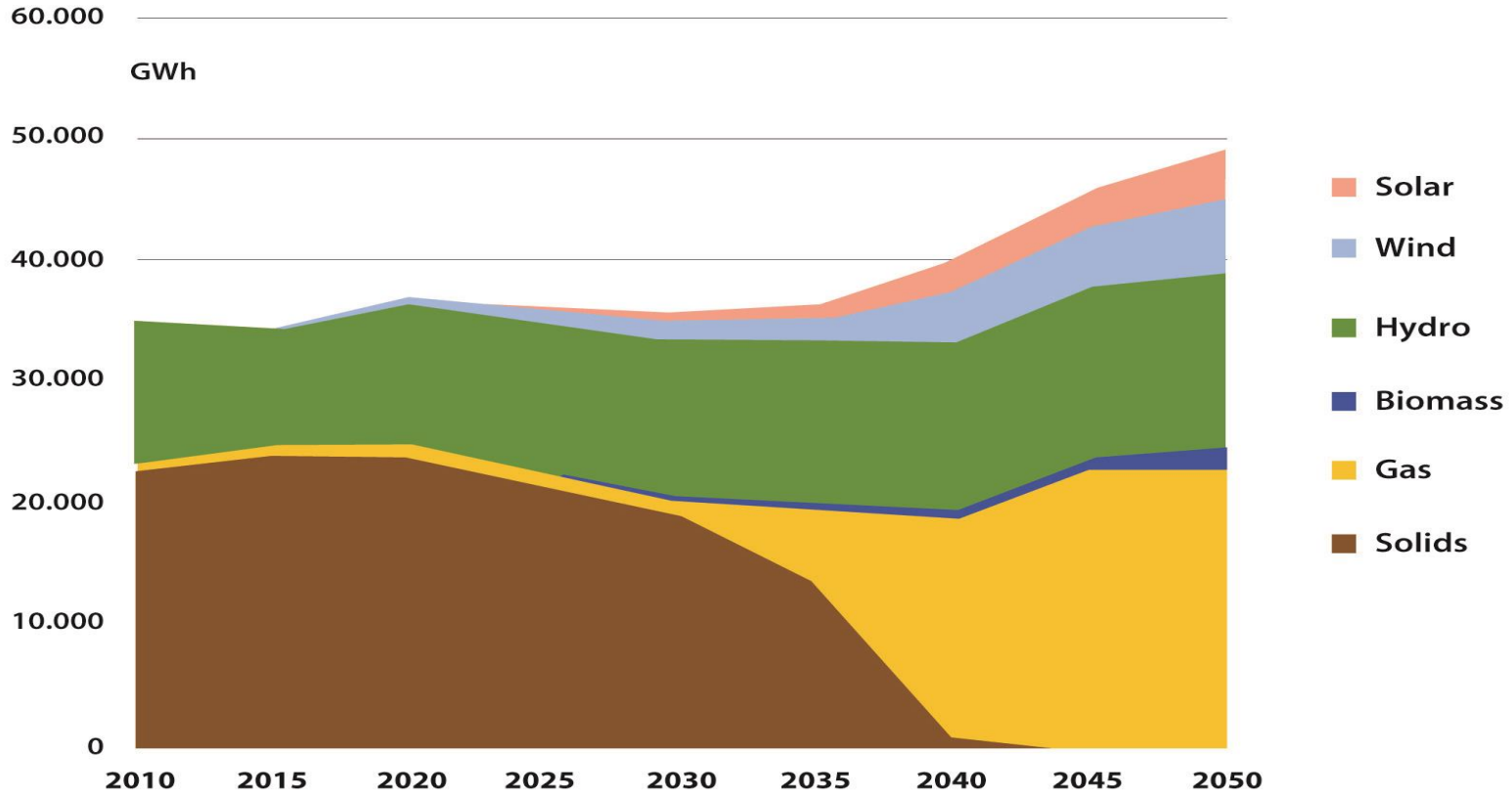
FUTURE PLANS

- Interconnector SRB – ROU
  Mokrin - Arad, 1 bcm
- Interconnector SRB – CRO
  Futog - Sotin, 1,5 bcm

Serbia - Planned Power System Production Structure

- To secure global net zero by mid-century and keep 1.5 degrees within reach, coal has no more part to play. Cutting financing for new coal power plants is an agreement at COP26 summit.
- For Serbia's energy mix, natural gas is a realistic and affordable energy source to replace coal
- The reasons for using gas-fired thermal power plants would cease to exist with eventual commissioning of Nuclear Energy or other primary energy sources.

Structure of Power Generation – GWh – M2 Scenario



Source: M2 Scenario in Serbian Draft of Low Carbon Development Strategy

Reconsidering Nuclear Option

- Nuclear power provides predictable, reliable, cost-effective and competitive low-carbon electricity in 32 countries as a direct alternative to coal.
- Share of nuclear energy in the total electricity production in EU is approximately 25%.

- The Chernobyl (1986) and Fukushima (2011) nuclear power plants accidents had a substantial impact on nuclear emergency planning.
- Serbian public fears the risk of potential catastrophic accidents and does not support implementation of nuclear energy.
- Yugoslavia (1989) introduced still valid moratorium on nuclear power plant construction and development, similar to Italy.
- Pro-nuclear European Union (EU) countries want nuclear energy to be classified as green energy to pave the way for investments.

- Romanian Nuclearelectrica has signed agreement with US based NuScale Power in deployment of SMR – Small Modular Reactor technology. A first scalable 6 module, 462 MW will be deployed in Romania as early as 2027/2028.
- Bulgaria's BEH signed MoU with NuScale in planning new SMR installation.
- France is preparing to be exporter of new SMR technology with building mini-plants able to produce 340 MW in order to replace coal plants all over the world.
- Serbia is ready to be minority shareholder and pay up to 15% in construction of new nuclear plant Paks II in Hungary (2x 1200 MW).

EU supports WB6

- Energy transition and decarbonisation is a trans-boundary challenge and requires effort by every country. Commitments and dynamics of transition must reflect national interests.
- Strategic optimum of the community of states is not always a optimum for each of the members due to significant differences in natural, economic and other conditions.

- WB countries said they will adopt energy and climate ambitions that match EU's targets.
- WB countries energy sector transition process started 2006 (Energy Community).
- Decarbonisation will bring a change to the country power production, along with large gaps in other technologies and policies – harmful for security of supply and pricing.

- Pressure from 10 EU members to revise "Taxonomy rules" – open door for nuclear energy
- Similar pressure from SEE not to penalize NG as fuel with smaller carbon footprint

- In Oct.2020, the EC prepared a Green Agenda and Economic and Investment Plan for WB6
  - Support of climate action reforms, digital transition, implementation of reforms towards EU membership and connection of the region with EU single market
  - Investment package EUR 9 billion in grant funding and EUR 20 billion in investments, leveraged by the new Western Balkans Guarantee Facility

- By signing the Sofia Declaration on the Green Agenda (2020), the WB 6 countries have committed themselves to actively participating in the implementation of the Green Plan for the Western Balkans and achieve climate neutrality together with the EU by 2050

Green Agenda for Serbia

- **Serbia understands and is aware of the global needs of energy transition. Such a transformation will bring about technological and structural changes in society as a new industrial revolution.**
- **The Republic Serbia has not yet formally offered its final documents (to be during 2022) which creates a strategy of change and a transitional "road map" with time and step targets.**

- **No more status quo for old fashioned state-owned enterprises. They will have to rebrand the core business, and become competitive enterprises on the open single market of the EU.**
- **Since the coal displacement is now a political priority in EU, Serbia has to prepare realistic scenarios of diversifying the technology mix with clean energy sources.**
- **In the mid-term is evidently that Serbia will turn to RES and less carbon intensive fuels (Natural gas), but it is trying to secure sources of "any kind" (Nuclear).**
- **The transformation should be accompanied by measures that will make the transition fair and socially responsible.**

- **It is of great importance for Serbia to engage domestic science and profession in finding optimal ways of transition that meet the interests of Serbian consumers and the population, and to preserve the ability to independently decide on issues and ways of energy transition.**
- **In recent history the country has amply demonstrated its capacity to manage all types of disasters, such as the NATO bombardment in 1999, the financial crisis in 2008, the migration crisis in 2015 and, of course, the recent COVID-19 pandemic.**
- **Serbia has a good human potential, experience, courage and willingness to make this necessary transition but also to use the historic chance to make its economy and energy services more secure, cleaner and healthier for future generations.**

Serbia on the way to successful energy transition

For small nations, knowledge, awareness and courage are most important resources

Thank you for your attention