"Green Energy Investment Prospects in SE Europe"

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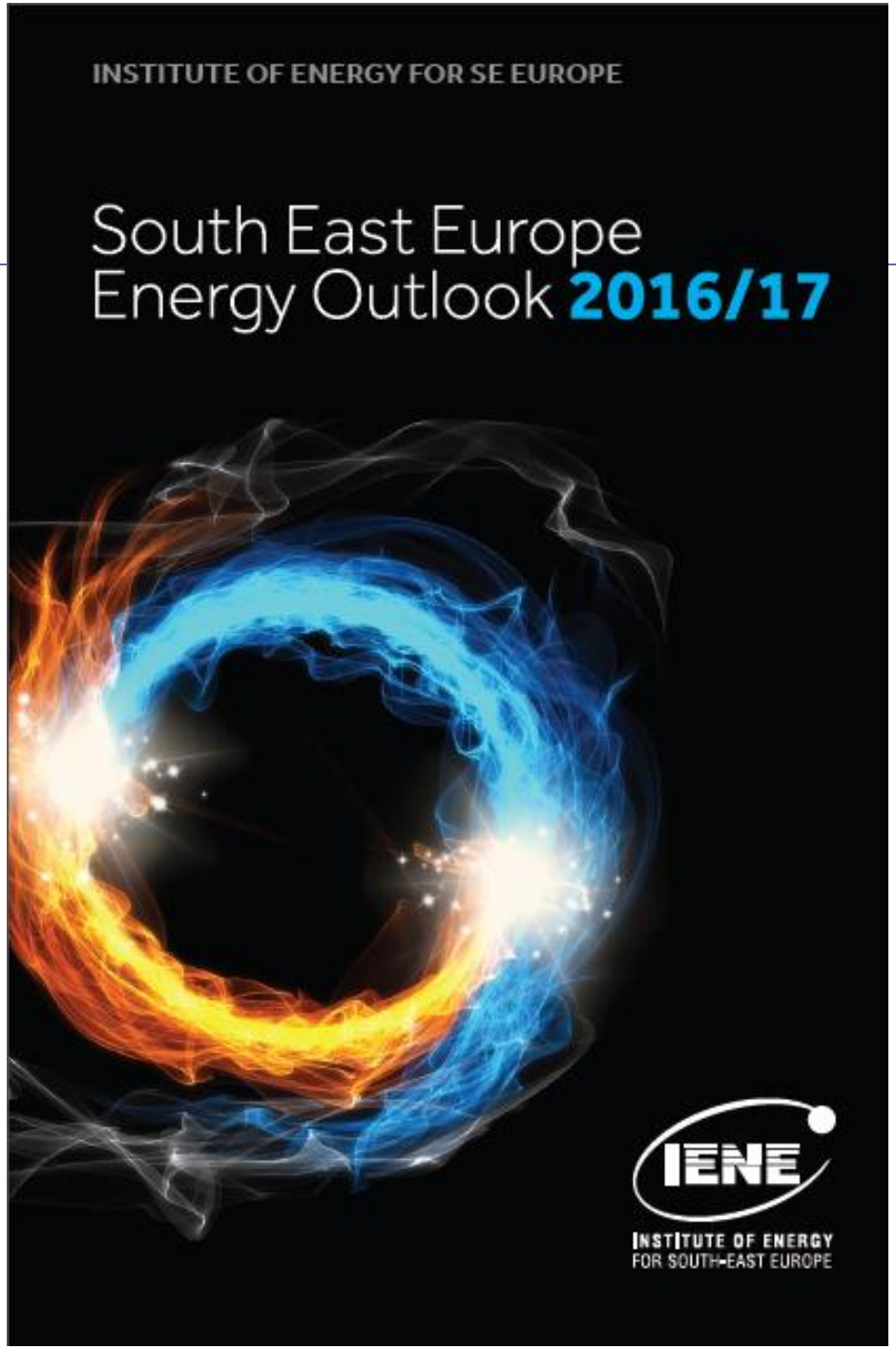
The SE European Region Defined

Core Countries

- Albania
- BiH
- Bulgaria
- Croatia
- Cyprus
- FYROM
- Greece
- Kosovo
- Montenegro
- Romania
- Serbia
- Slovenia
- Turkey

Peripheral Countries

- Egypt
- Hungary
- Israel
- Italy
- Lebanon
- Moldova
- Syria
- Ukraine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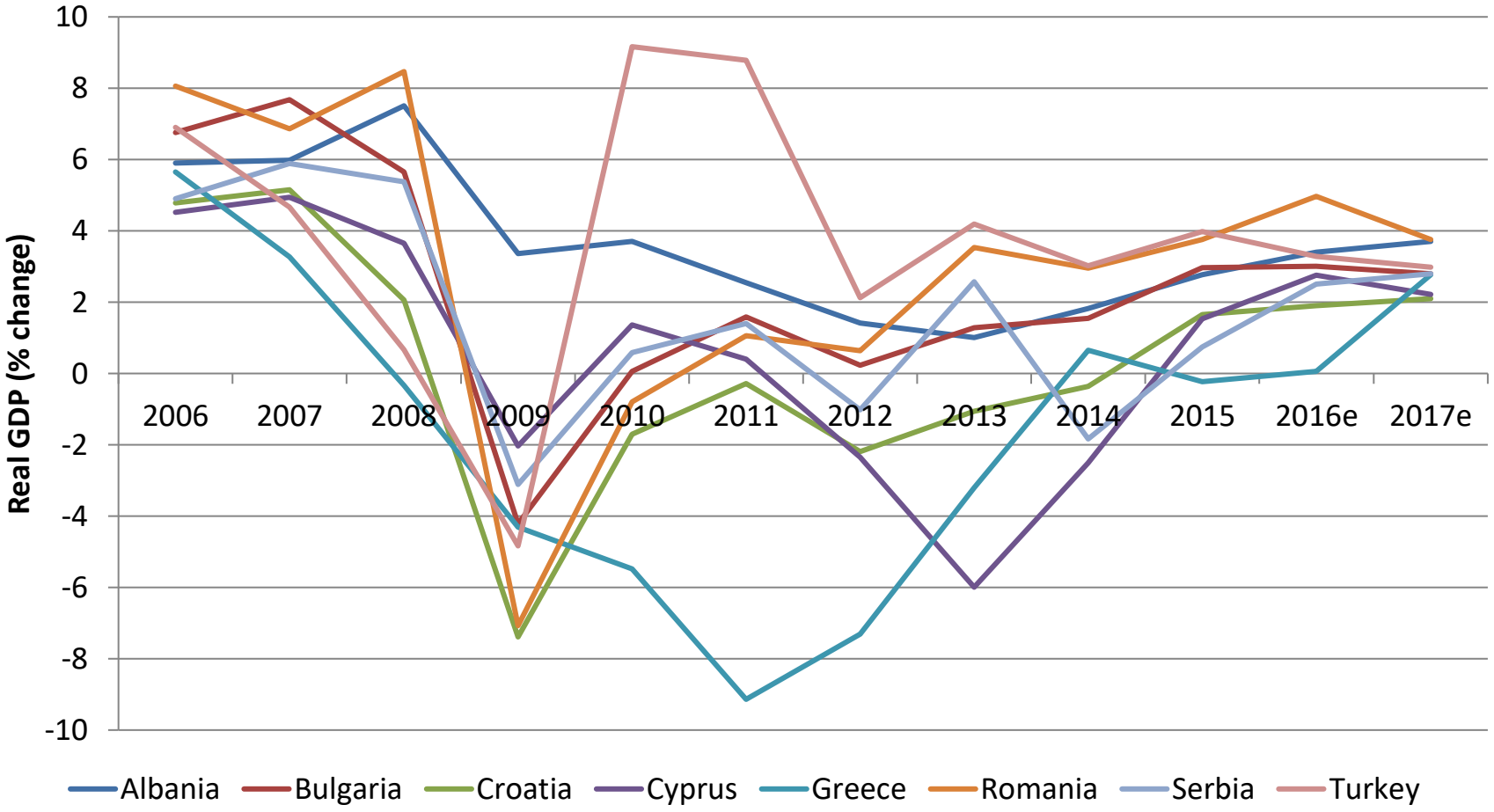
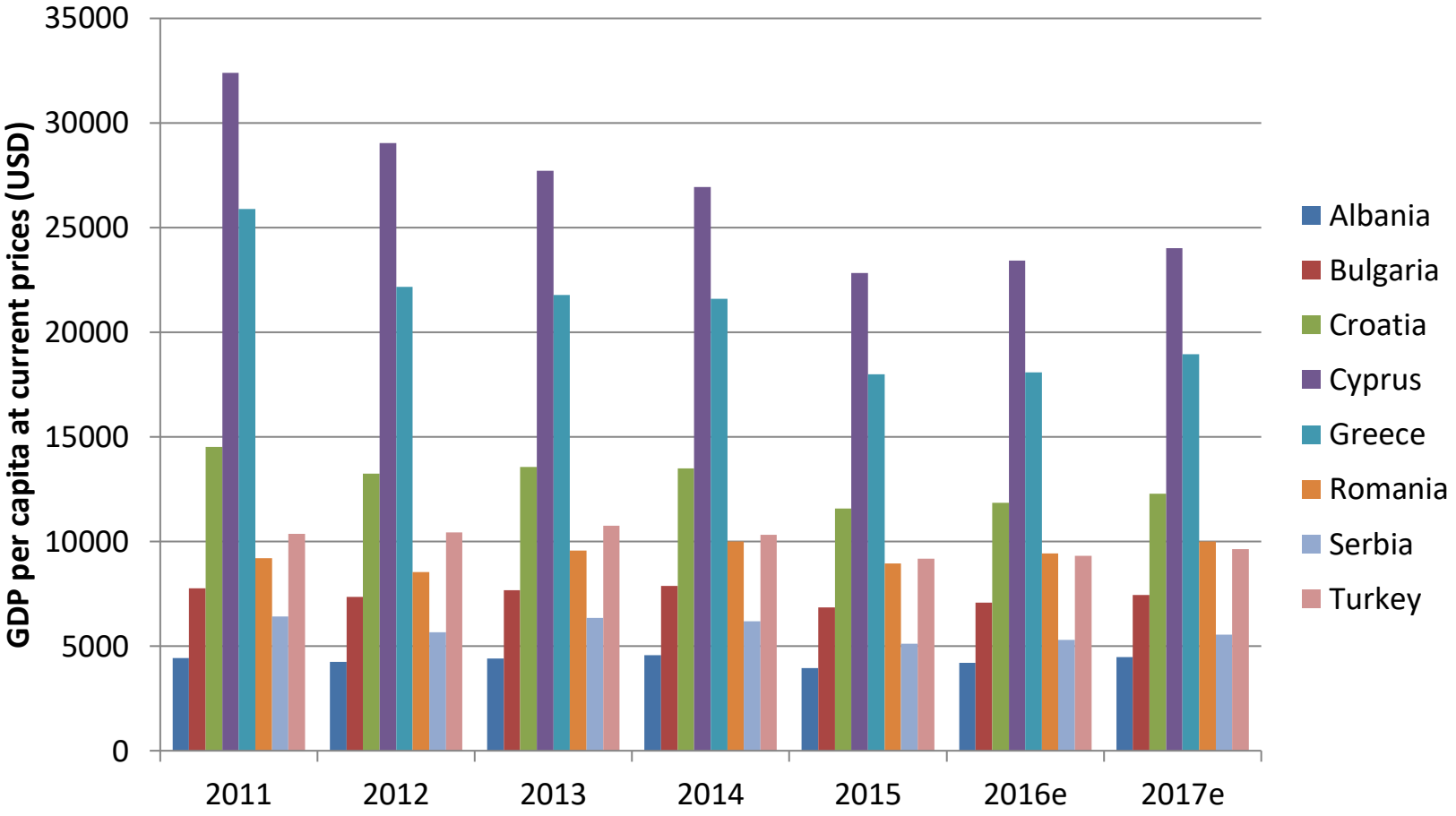
The Economies of SE Europe – Real GDP



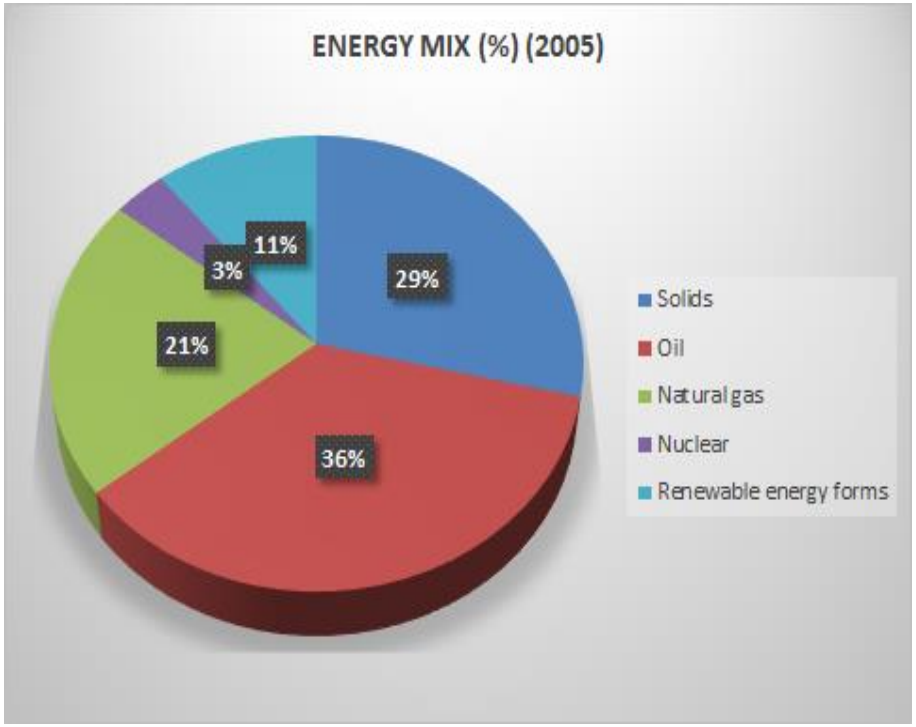
Source: World Economic Outlook Database (IMF, October 2016) and IENE

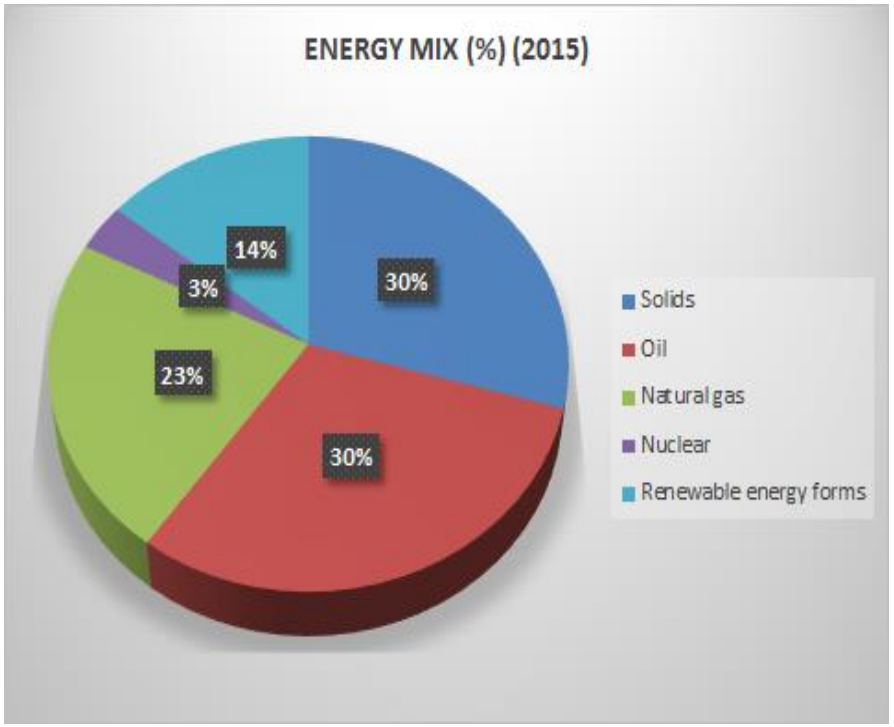
The Economies of SE Europe – GDP per Capita



Source: World Economic Outlook Database (IMF, October 2016) and IENE

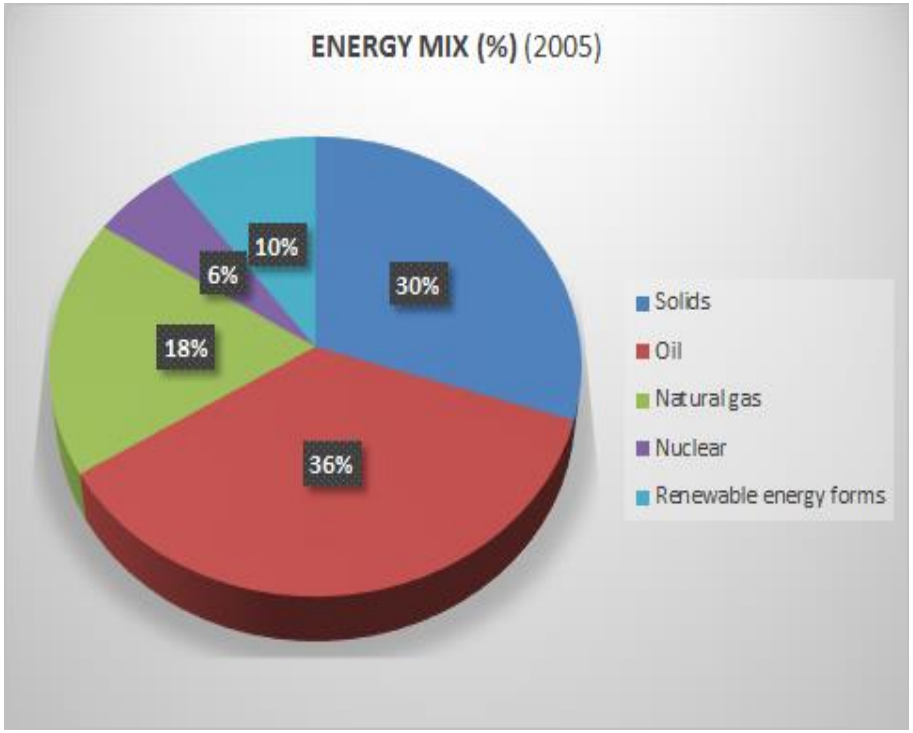
SE Europe: Gross Inland Consumption by Source, **Including Turkey** (2005 and 2015)

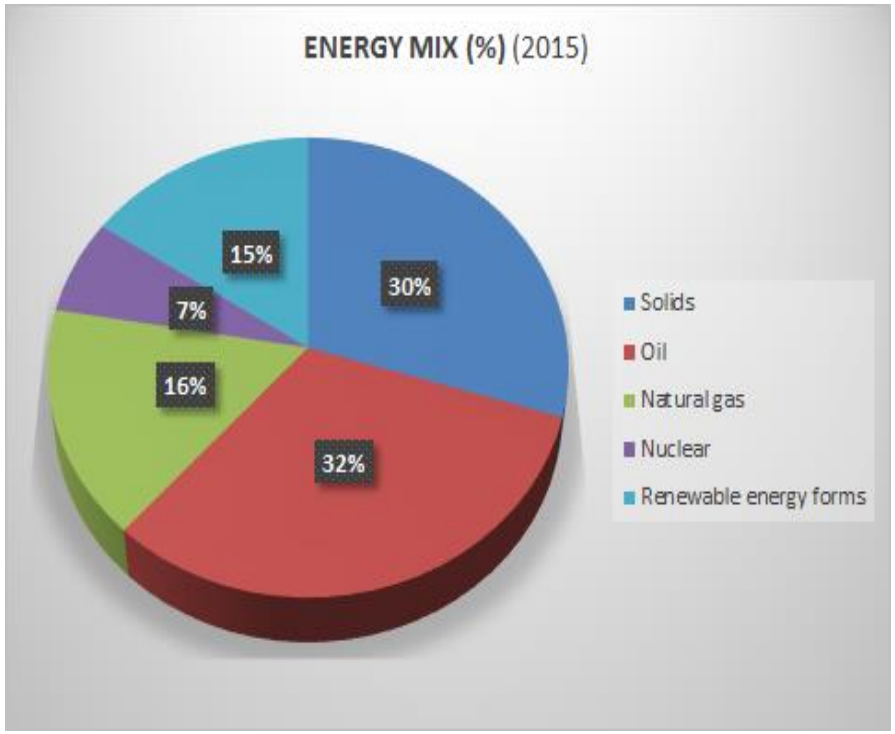




Source: IENE study "South East Europe Energy Outlook 2016/2017", Athens, 2017

SE Europe: Gross Inland Consumption by Source, **Without Turkey** (2005 and 2015)





Source: IENE study "South East Europe Energy Outlook 2016/2017", Athens, 2017

SE Europe - Current Situation

The SE European region is characterized by distinctly different (in terms of structure and operation) and frequently segregated energy markets in various stages of development:

- The **EU member states (Greece, Romania, Cyprus, Bulgaria, Croatia and Slovenia)** have implemented several steps toward the smooth adaptation of EU energy and environmental policies and directives

- The **West Balkan countries (Serbia, Bosnia & Herzegovina, Montenegro, Kosovo, FYROM)** are in a transition process within the Energy Community framework.

- **Turkey:** With a rapidly growing economy, Turkey has become one of the fastest growing energy markets in the world. Projections show that demand growth trend will continue.

West Balkans (I)

Albania

- Albania passed the Law on Promotion of the Use of Energy from Renewable Sources
- The main support scheme for energy generated from renewable energy sources in Albania has been a feed-in tariff which has been applied only to small hydro power plants with the capacity of less than 10 MW
- Renewable energy has not been given priority in regards to grid connection.

Bosnia & Herzegovina - Growing renewables share in energy mix

- Ten new small hydropower and five solar plants in the Republic of Srpska to be completed by the end of 2017
- The Republic of Srpska should build two wind farms in Herzegovina, the southern region of BiH
- Construction of the wind farm Hrgud, with the installed capacity of 48 MW
- Wind farm, Trusina, will be built in the municipality of Nevesinje. Its installed capacity will be 50 MW
- A concession contract for the construction of 8 more turbines within the Plocno wind farm, with a combined capacity of 48 MW
- The target for wind energy is very conservatively capped at 350 MW until 2019

West Balkans (II)

Croatia - Renewable Energy Future in Question

- To maintain the status quo and postpone until 2018 the implementation of the Law on Renewable Energy Sources
- Retroactive introduction of excise taxes on renewable energy
- Croatia increased in September the incentive fees aimed at stimulating the production of renewable energy, in turn slightly raising electricity bills for consumers. The fee - a fixed price for energy consumed - will be raised to 0.11 kuna from 0.04 kuna per kilowatt-hour.
- Croatia together with Bulgaria and Romania met in 2015 its target share of energy from renewable sources in gross final consumption of energy
- Since 2007, when the renewables support scheme was introduced, Croatia added more than 600 MW in green energy capacity.

FYRO Macedonia

- Support schemes for various technologies have been adopted
- The targets on capacities imposed for several types of renewable sources until 2020 have to be revised
- Steps have been taken to remove some of the barriers related to administrative procedures
- Deadlines have been shortened and unnecessary procedural steps have been abolished
- No clear mechanisms for coordination of the different authorities

West Balkans (III)

Kosovo - more effort should be made

- Kosovo should make more investments in the energy sector, and add further generation capacity from both thermal and renewable energy sources, in order to become able to plan the decommissioning of the country's two coal power plants
- The energy reforms recently implemented by the local government are not sufficient to improve the country's troubled power market
- Kosovo is expected to add 240 MW of power generation capacity from renewables, of which only 10 MW is for solar PV, while wind and biomass will account for 150 MW and 14 MW, respectively. Solar had only a few hundred kW connected to the grid as of the end of 2015

Montenegro - RES, become political issue

- Government increased the tariff subsidy for electricity from renewable energy sources and high efficiency cogeneration from 0,12 to 0,47 eurocents per kWh
- The tariff is paid by citizens through their electricity bills
- Electricity bills in 2017 will stay on the level of 2016
- France's Akuo Energy and Austria's Ivicom plan to start the operation of the 72 MW Krnovo wind farm
- The national target of 33 percent of energy from renewables has already been reached. Montenegro already reached its EU 2020 target.

Serbia - focus on wind energy

- Made some progress in upgrading its renewable energy framework
- Serbia is not on track to meet its 2020 targets of 22%.
- Serbia currently is building wind farms with a combined installed capacity of 483 MW
- The first wind farms with a combined capacity of 17 MW have already started operating in Serbia

East Balkans – Greece – Cyprus

Cyprus

- The government of Cyprus is planning to establish the renewable energy agency that will draft and implement a national renewable action plan
- Cyprus' 2020 target is 13 percent share of energy generated from renewable energy sources in gross final energy consumption, including electricity, heating, cooling and transport. The share of RES in total consumption reached 10.5% in 2016.
- From the beginning of 2017, the tariff subsidy on electricity bills doubled, from 0.5 to 1 eurocent per kWh
- The RES fund owes to the Electricity Authority of Cyprus EUR 15 million. The fund's expected revenues for 2017 stand at EUR 50.67 million

Greece - New renewable energy law provides feed-in premiums and introduces tender schemes for PV

- A new RES law (L.4414/2016) was voted by the Greek Parliament in August 2016.
- The new policy framework abandons the feed-in tariff (FIT) policy in favour of a feed-in premium scheme for systems over 500 kWp
- The feed-in premium will be valid for 20 years. The new law does not apply to Greece's non-interconnected islands.
- Greece Records Second Best Year in Wind Power Installations in 2016
- New RES projects calculated to total 1.2 to 1.5 billion euros between the 2018-2020 period. The proposals include tenders and licensing of wind farms and photovoltaic panels totaling 1,300 MW.

Net Metering

- Greek government has signed in May 2017 the virtual net metering provisions into the law.
- The country's electricity market is changing rapidly and electricity bills will most possibly increase further. Private investors with transparent investment plans will be far more efficient to adopt net metering PV.
- According to LAGIE, the country did not install new solar PV capacity in 2016.

East Balkans, Romania – Bulgaria

Romania

- Romania has left the ranking of the 40 most attractive markets in the world for renewable energy investments
- The Romanian power system seems to need to digest the massive injection of uncontrollable production capacities put into operation before December 31, 2016
- Romania Removes 12-Month Expiry Date for Green Certificates
- Romania Introduces New State Aid Scheme to Support Geothermal Development

Bulgaria

- Bulgaria is among the European countries that have announced the achievement of the objectives of the "Europe 2020" strategy on renewable energy
- The sector is said to be in crisis and unsustainable
- Retroactive measures against renewable energy operators have been taken
- Bulgarian electricity grid operator ESO said a total of 1,506 MW of new capacity is planned to be completed in Bulgaria by 2026
- One of Europe's biggest solar parks with an installed capacity of 180 MW is expected to be implemented by 2022 in Devnya, a town in Varna Province, Northeastern Bulgaria
- Renewable energy output is expected to increase to 7,379,800 MWh in 2026, from 5,884,800 MWh in 2017.

Turkey – RES Tops Energy Agenda

- Turkey's renewable energy market has been expanding rapidly since the Renewable Energy Law was enacted in 2005
- By developing a structured system for renewable energy investment, Turkey is allowing investors to bypass the usual risks.
- Over the past two years, $1.9 billion have been invested in the country's energy sector. As many as 30 percent of these funds are invested in the development of renewable energy sources.
- The Turkish Ministry of Energy and Natural Resources (MENRA), the state aims to increase wind generation to 10,000 MW and solar generation to 3,000 MW by 2020.
- In October 2016, a regulation on renewable energy zones (REZs) was introduced (a reverse auction). This allowed structured investments in green power sources, supported by an incentive scheme for licensed renewable energy generation. REZs are expected to overcome the existing financing difficulties facing renewable energy projects
- A strong RES growth is expected in Turkey. According to the Turkish 'National Renewable Energy Action Plan' the target for renewable energy generation capacity was set to 61GW by 2023; mostly in the forms of hydro, wind and solar generation. Turkey plans to have 34GW of hydro generation capacity; 20GW of wind; 5GW of solar; and 1GW in both geothermal and biomass generating capacity by 2023. Geothermal energy will play a small part too, increasing to 600 MW within a decade. These goals would require a sevenfold increase in non-hydro renewables output in less than a decade. The country also aims to be meeting 10% of the energy needs of its transport sector through renewable energy by 2023.

Further RES Growth in SE Europe Hindered (I)

For a number of reasons, RES growth in SE Europe could not be sustained and has been flat over the last three years:

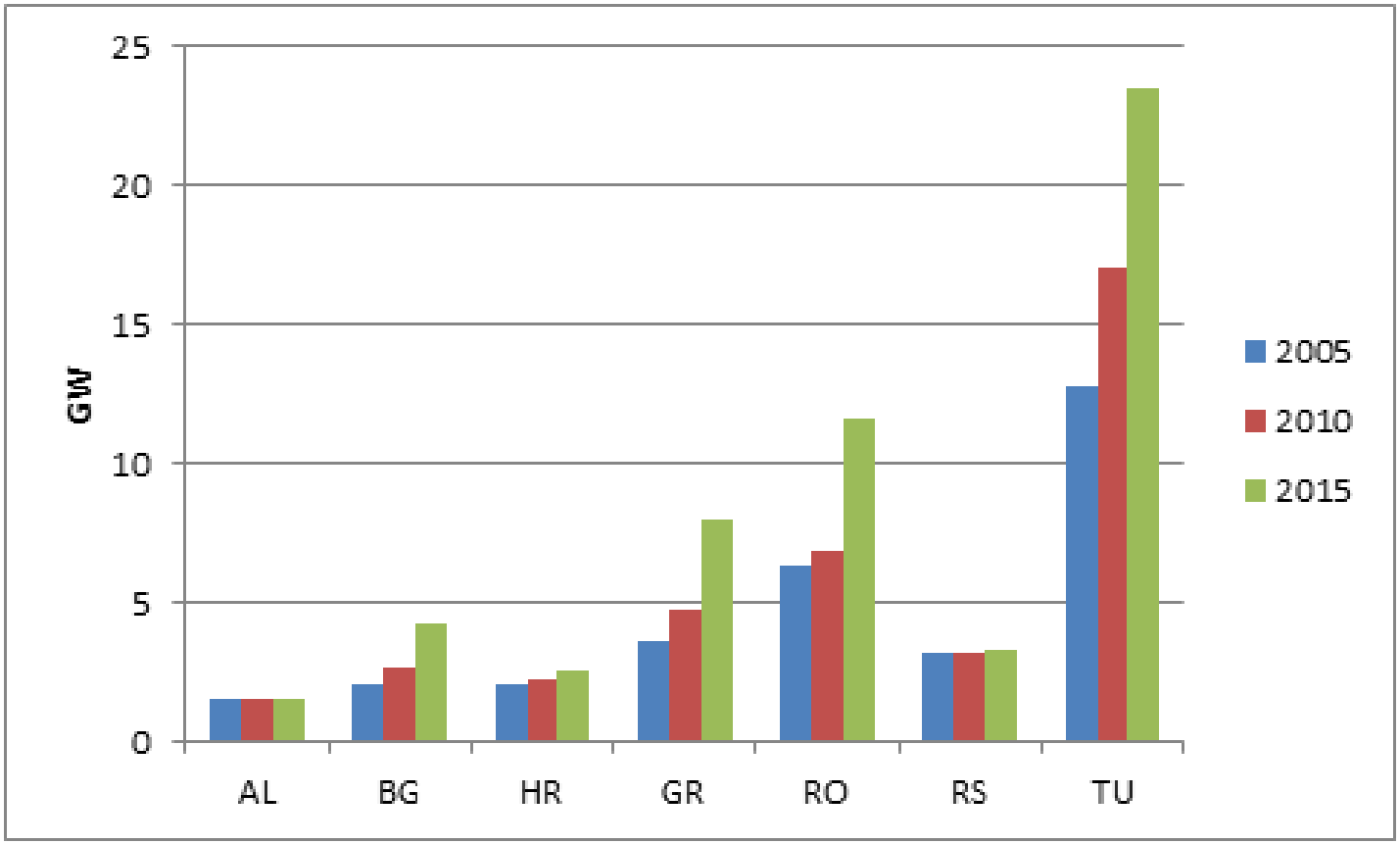
- **Greece** and **Bulgaria** introduced exceptionally high FiTs without a proper financial analysis and cash flow projections showing the impact that RES would have on the national accounts and electricity market operation over a long time period.
- This rapid and unplanned buildup of RES based on high FiTs had a dramatic impact on the electric system leading to large financial deficits for the market operator with big payments delays to producers.
- **Bulgaria** currently has an overcapacity problem and is exporting electricity to Turkey, Greece and the rest of the Balkans, meaning there is little motivation for investment in yet more RES generation capacity.
- **Romania** decided to slash incentives for renewable electricity generation following a dramatic boom in the sector between 2010 and 2013. Bucharest's generous "green certificate" incentive scheme attracted numerous international investors from Europe and Asia, in addition to local companies.
- **Greece** has two main support mechanisms for renewable energy: a feed-in tariff and investment subsidies. The actual impact of such measures has been limited, not because of the lack of incentives, but largely due to lengthy administrative processes. The latest legislation addresses those challenges and might significantly improve market development.

Further RES Growth in SE Europe Hindered (II)

- The cutbacks have raised questions about whether countries in the region will meet medium- and long-term renewables targets. The above abrupt changes to incentive schemes have discouraged many investors and it is uncertain whether they can be lured back.

- A strong RES growth is expected in **Turkey**. According to the Turkish 'National Renewable Energy Action Plan' the target for renewable energy generation capacity was set to 61GW by 2023; mostly in the forms of hydro, wind and solar generation. Turkey plans to have 34GW of hydro generation capacity; 20GW of wind; 5GW of solar; and 1GW in both geothermal and biomass generating capacity by 2023. Geothermal energy will play a small part too, increasing to 600 MW within a decade. These goals would require a sevenfold increase in non-hydro renewables output in less than a decade. The country also aims to be meeting 10% of the energy needs of its transport sector through renewable energy by 2023.

RES Growth in Selected SEE Countries



Source: IENE study "South East Europe Energy Outlook 2016/2017", Athens, 2017

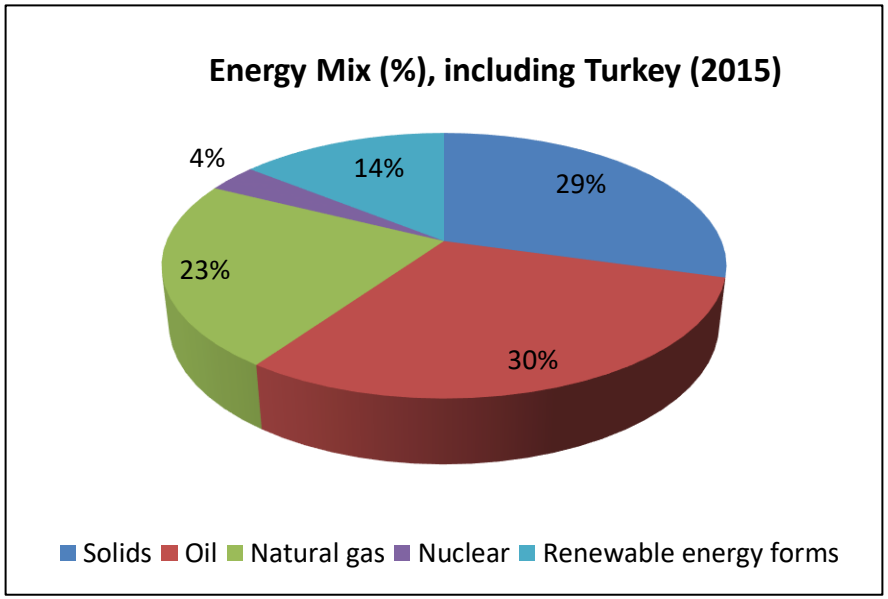
RES Development for Power Generation in SE Europe (2015)

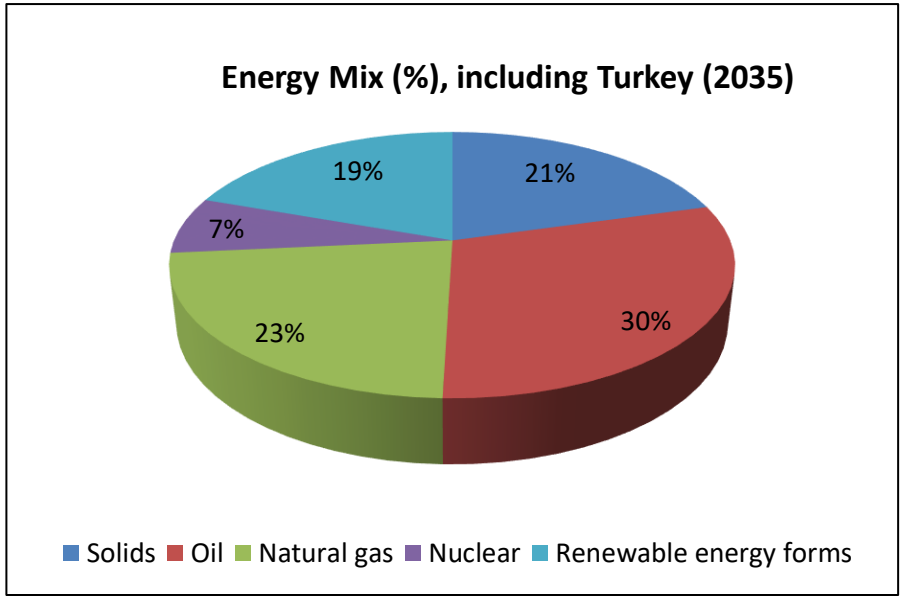
Countries	Wind (MW)	PV (MW)	SmH+ Hydro Large (MW)	Deep Geothermal	Biomass RES (MW)	Total Power Capacity	Total RES Capacity (%) (MW)	Installed
Albania	0.0	0.0	1.800	0.0	0.0	1.800	1.878	96%
Bosnia & Herzegovina	0.0	0.0	2.058	0.0	0.0	2.058	4.021	51%
Bulgaria	691,0	1.020	3.400	0.0	1,8	5.113	15.650	33%
Croatia	422,7	32,2	2.187	0.0	0.0	2.631	4.995	52%
Cyprus	157,0	64,8	0.0	0.0	9,7	231,5	1.740	13%
FYROM	37,0	0.0	581,0	0.0	0.0	618,0	1.987	31%
Greece	2.150	2.600	3.435	0.0	46,0	8.221	17.762	46%
Montenegro	0.0	0.0	660	0.0	0.0	660,0	886	74%
Romania	3.129	1.312	6.232	0,05	70,0	10.743	24.637	43%
Serbia & Kosovo	20,0	5,0	2.910	0.0	0.0	2.935	8.710	34%
Slovenia	3,4	257,0	1.270	0.0	0.0	1.530	4.183	36%
Turkey	4.718	54,8	23.661	600,0 (2016)	130,0	29.164	72.050	40%
Total	**11.328**	**5.346**	**48.194**	**600.05**	**257,5**	**65.704,5**	**158.499**	**41%**

Source: IENE study "South East Europe Energy Outlook 2016/2017", Athens, 2017

Regional Energy Mix: What Lies Ahead?

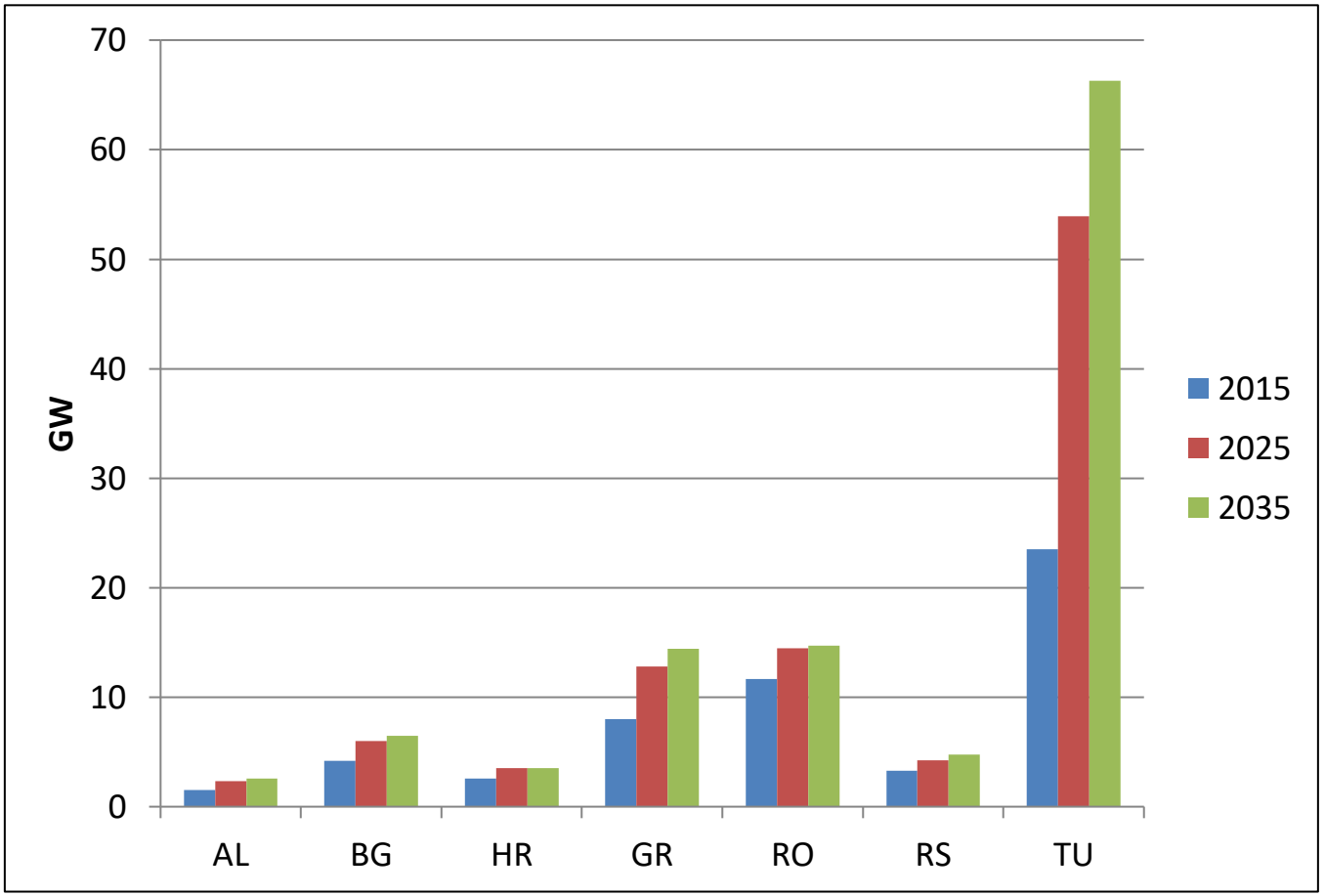
- The region's changing energy mix (Comparison between 2015 and 2035)
  - Substantial changes are foreseen over next 20 years with lower use of coal (lignite), stable contribution of gas and oil, more RES penetration and higher use of nuclear power.





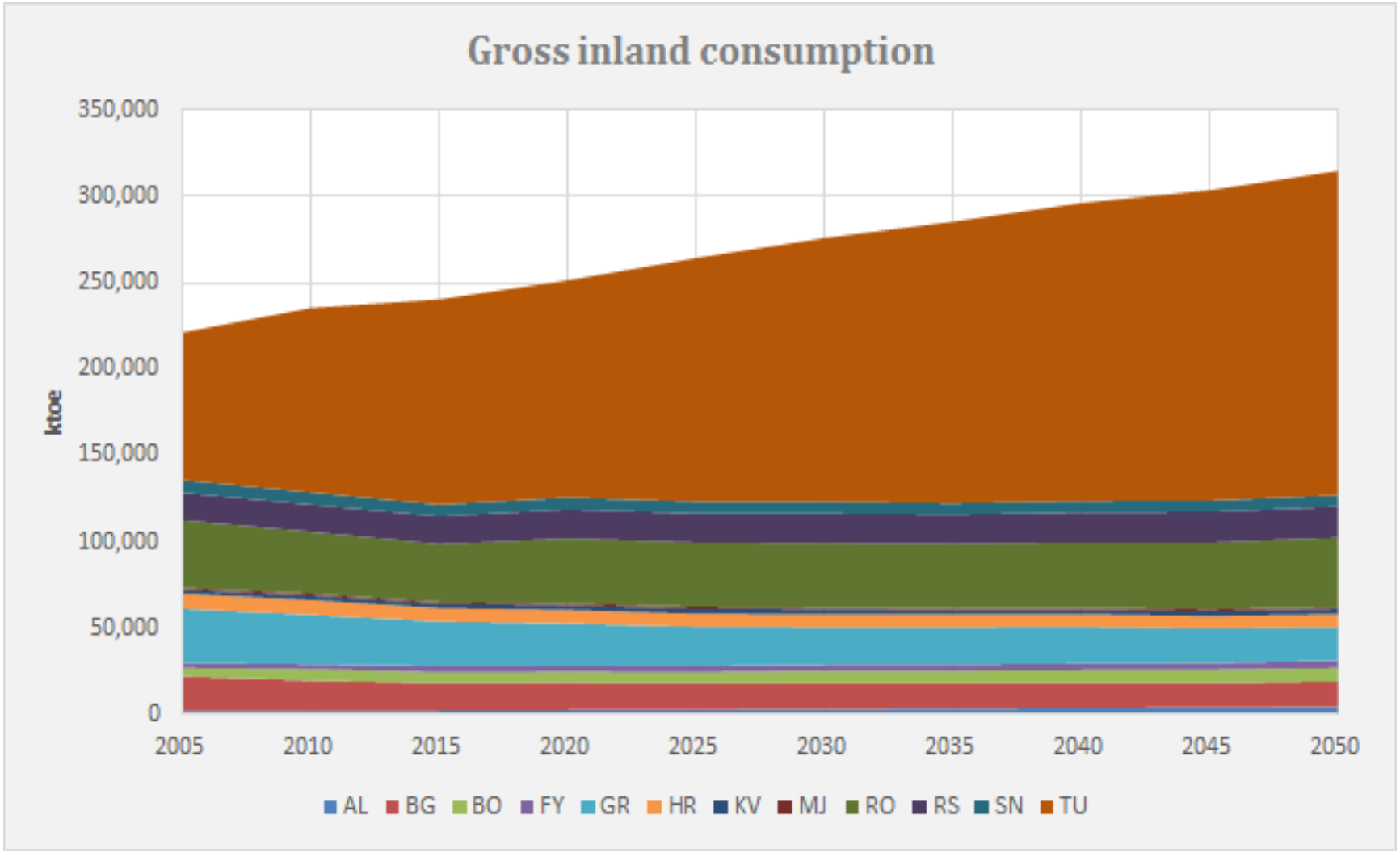
Source: IENE study "South East Europe Energy Outlook 2016/2017", Athens, 2017

SE Europe: Net RES Generation Capacity in 2015, 2025 and 2035



Source: IENE study "South East Europe Energy Outlook 2016/2017", Athens, 2017

SE Europe: Gross Inland Consumption, **including Turkey** (2005-2050)



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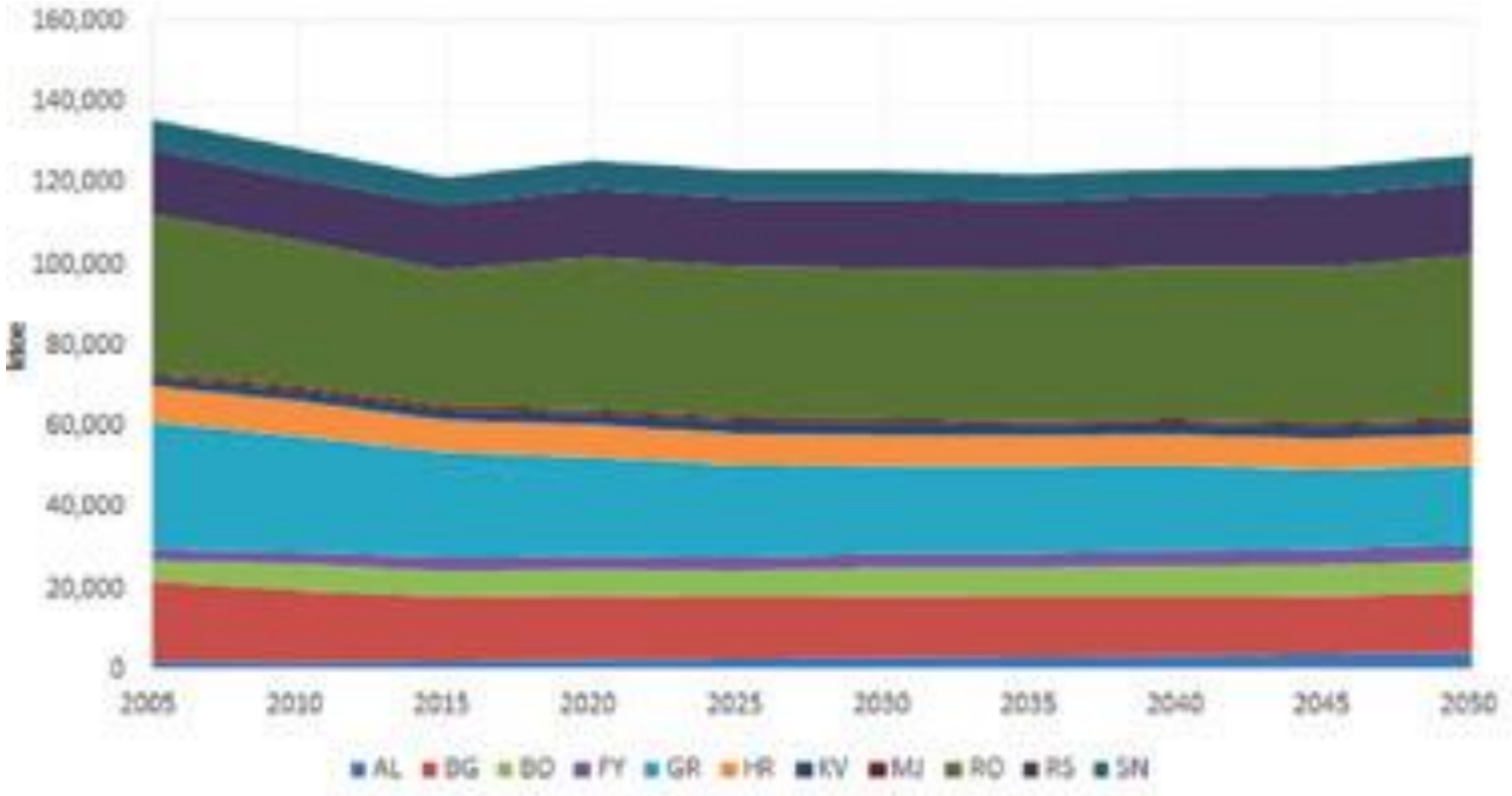
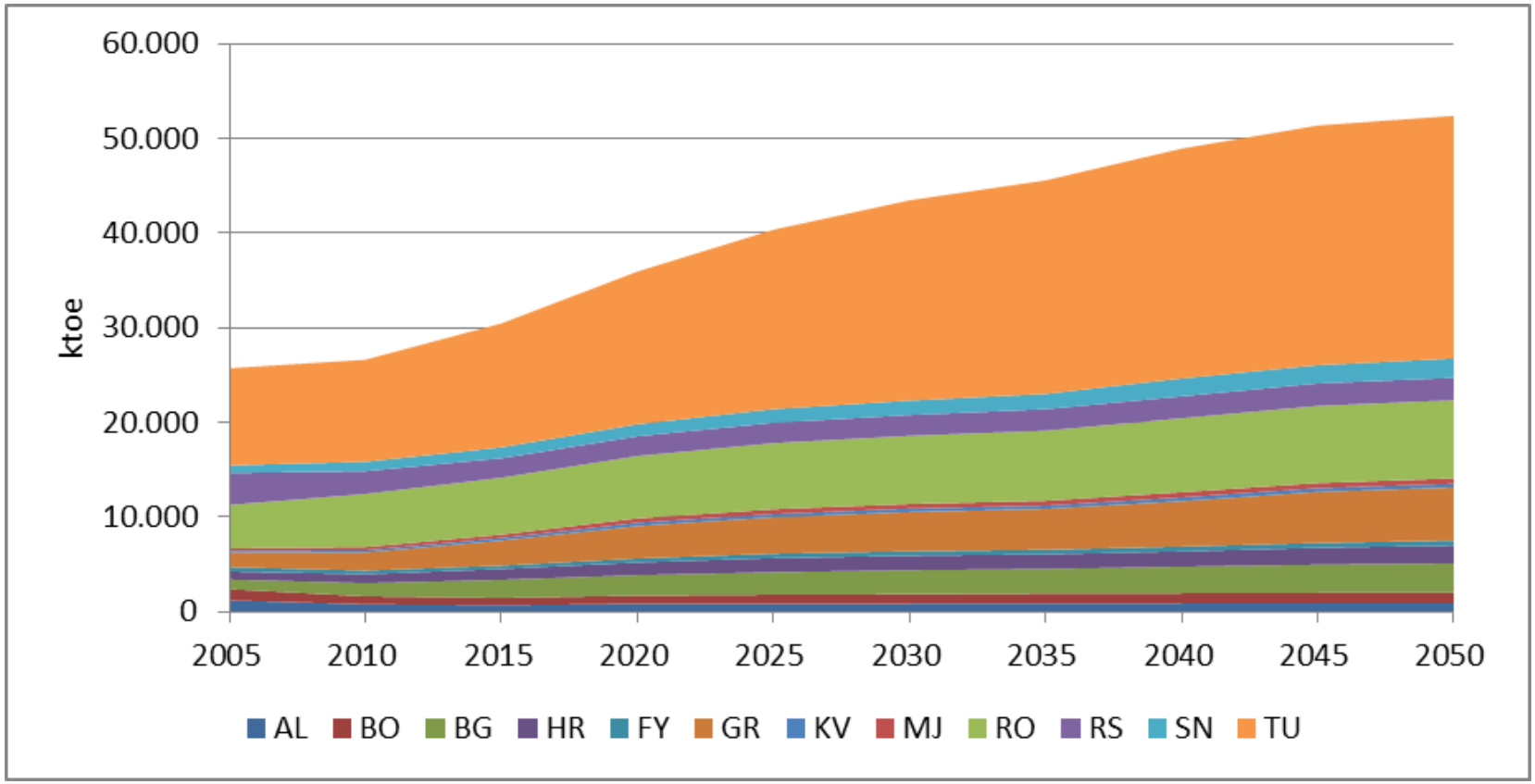


Source: IENE study “South East Europe Energy Outlook 2016/2017”, Athens, 2017

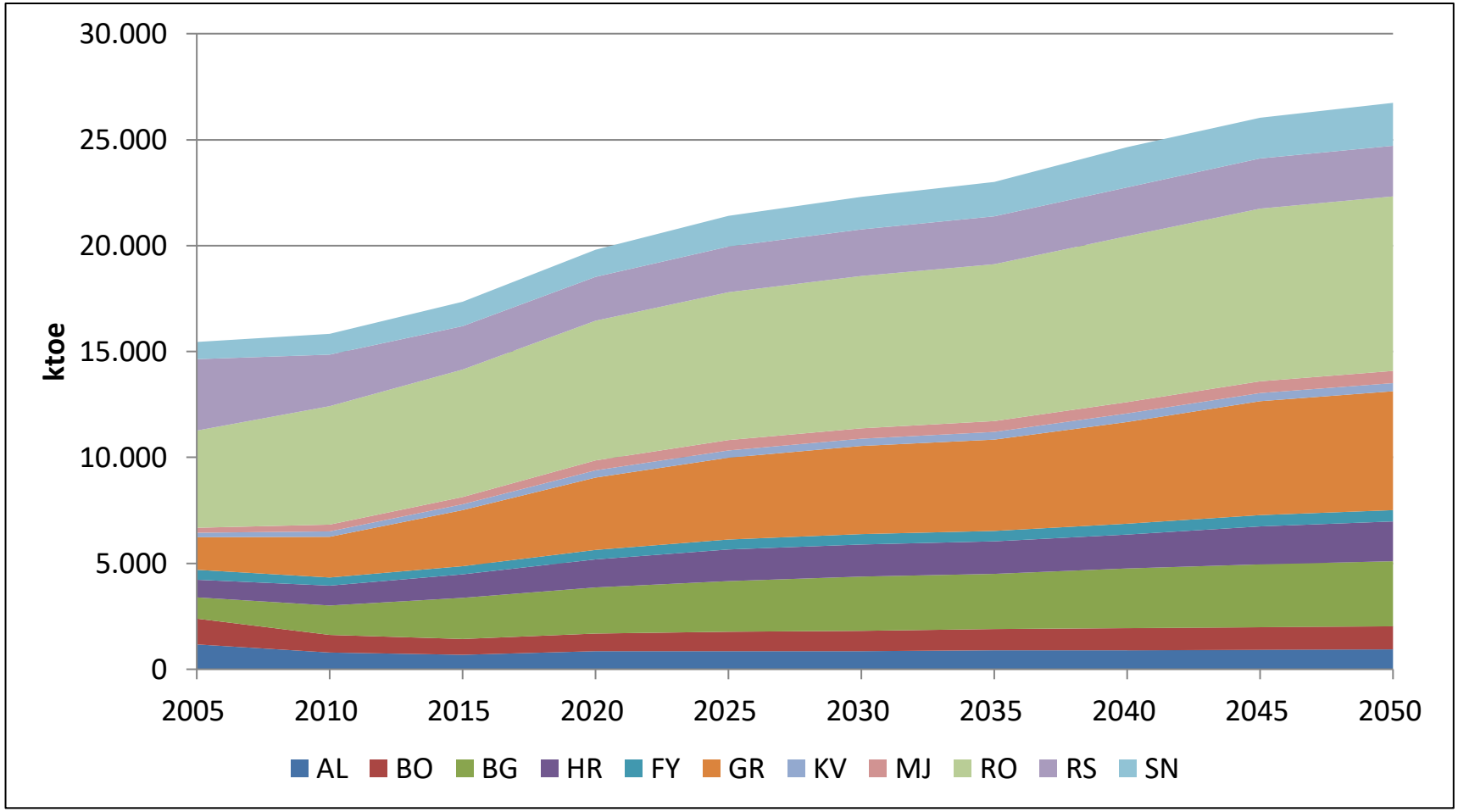
SE Europe: RES in Gross Final Energy Consumption*, **including Turkey** (2005-2050)



*including the part of electricity and heat generated by RES

Source: IENE study "South East Europe Energy Outlook 2016/2017", Athens, 2017

SE Europe: RES in Gross Final Energy Consumption*, **without Turkey** (2005-2050)



*including the part of electricity and heat generated by RES

Source: IENE study "South East Europe Energy Outlook 2016/2017", Athens, 2017

SEE Energy Investment Outlook 2016-2025

- The **investment prospects** in the energy sector of SE Europe over the next 10 years can only be described as **positive**.

- In terms of planned investments, a group of **five countries (i.e. Turkey, Bulgaria, Romania, Serbia, Greece)** appear to be moving **much faster than others** in attracting the needed investment for a variety of energy projects, while progress in the rest of the countries is moving more slowly.

- The region as a whole can be considered as presenting **attractive business opportunities in almost all branches of the energy sector**. The present analysis shows that investment in the energy sector will be spread as follows between countries and interregional projects. This analysis involves **two scenarios:**
  - An **optimistic one** (with an average real GDP growth of 3% over 2016-2025 and maximum investments) and
  - A **reference one** (with an average real GDP growth of 1% over 2016-2025 and substantial part of investments).

Findings of SEE Energy Investment Outlook 2016-2025 per country

SEE Countries	Scenario A: Total Investments (in million euros)	Scenario B: Total Investments (in million euros)
Albania	7,460	8,258
Bosnia & Herzegovina	8,722	10,060
Bulgaria	11,050	12,663
Croatia	8,525	9,178
Cyprus	7,350	8,769
FYROM	3,400	4,373
Greece	23,300	30,192
Kosovo	2,605	3,377
Montenegro	2,400	3,653
Romania	20,630	22,716
Serbia	11,260	13,527
Slovenia	3,185	4,891
Turkey	124,935	141,623
TOTAL	**234,822**	**273,280**

Source: IENE study "South East Europe Energy Outlook 2016/2017", Athens, 2017

Findings of SEE Energy Investment Outlook 2016-2025 per sector

Sector	Total Investment (in million euros)	
	Scenario A	Scenario B
Oil Upstream (Research, Exploration and Production)	25,450	32,288
Oil Downstream/Midstream (incl. liquid biofuels)	13,340	18,757
Electricity		
Thermal Plants		
Nuclear Plants	139,473	146,369
Lignite Mine Development		
Grids - Upgrade and Expansion		
HV Transmission Lines		
Gas		
Main and branch gas pipelines		
Gas Storage	16,550	26,460
Town grids		
LNG Terminals and Liquefaction plants		
RES (Wind, PV, Biomass, Mini Hydro, Geothermal)	40,009	49,406
TOTAL	**234,822**	**273,280**
Intraregional Mega Projects		
Oil Pipelines	-	1,000
Gas Pipelines	33,350	51,361
Electricity Interconnectors	4,700	7,150
Grand Total	**272,872**	**332,791**

Source: IENE study "South East Europe Energy Outlook 2016/2017", Athens, 2017

Investment Prospects per RES sector in SE Europe over 2016-2025 (in Million Euros) (Reference Scenario)

	Hydro	Wind	PV	CSP	Biomass (including liquid biofuels)	Geothermal	**Total**
Albania	3,120	250	250	-	260	-	**3,880**
BiH	2,190	632	935	-	160	-	**3,917**
Bulgaria	380	300	200	-	120	-	**1,000**
Croatia	750	500	50	-	60	85	**1,445**
Cyprus	-	250	350	200	300	-	**1,100**
FYROM	1,150	90	10	-	20	-	**1,270**
Greece	500	5,500	2,000	200	700	300	**9,200**
Kosovo	300	190	10	-	45	-	**545**
Montenegro	720	160	30	-	100	-	**1,010**
Romania	1,900	640	150	-	280	-	**2,970**
Serbia	1,340	665	150	-	30	10	**2,195**
Slovenia	325	50	70	-	15	-	**460**
Turkey	11,350	10,500	6,000, including CSP	-	3,200	1,200	**32,250**
Total	**24,025**	**19,727**	**10,205**	**400**	**5,290**	**1,595**	**61,242**

Sources of Finance vs Country Risk (I)

- The **main sources of finance** for planned energy infrastructure projects in SE Europe include:
  - Government/own resources
  - International Financial Institutions (IFIs)
    - European Commission
    - European Bank for Reconstruction and Development (EBRD)
    - European Investment Bank (EIB)
    - World Bank
    - German government-owned development bank KfW
    - European Western Balkans Joint Fund (EWBJF)
    - International Development Association (IDA)
  - Commercial banks/private investors
  - Financial facilities for investments in energy efficiency and renewable energy

Sources of Finance vs Country Risk (II)

- However, the implementation of a set of planned energy projects in SE Europe may be hindered by the **high Country Risk** of several SEE countries and the **increased cost of capital**.

Country	Moody's ratings	S&P ratings	Fitch ratings
Albania		B1 (August 2014)	B+ (February 2016) n.a.
Bosnia and Herzegovina	B3 (February 2016)	B (November 2011)	n.a.
Bulgaria	Baa2 (June 2015)	BB+ (December 2014)	BBB- (December 2016)
Croatia	Ba2 (March 2016)	BB (January 2014)	BB (July 2016)
Cyprus	B1 (November 2016)	BB (September 2016)	BB- (October 2016)
FYROM	n.a.	BB- (May 2013)	BB (August 2016)
Greece	Caa3 (October 2016)	B- (January 2016)	CCC (September 2016)
Montenegro	B1 (May 2016)	B+ (November 2014)	n.a.
Romania	Baa3 (December 2015)	BBB- (May 2014)	BBB- (July 2016)
Serbia	n.a.	BB- (August 2012)	BB- (December 2016)
Slovenia	Baa3 (September 2016)	A (June 2016)	A- (September 2016)
Turkey	Ba1 (September 2016)	BB (July 2016)	BBB- (August 2016)

Source: IENE study "South East Europe Energy Outlook 2016/2017", Athens, 2017

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