
IENE
INSTITUTE OF ENERGY
FOR SOUTH EAST EUROPE
South East Europe
Energy Outlook
5th SE Europe Energy Dialogue,
Thessaloniki, 2 - 3 June 2011
Study Presentation

Raison d’ être

- The need to understand the geopolitical and geographical sphere within which IENE operates
- Identify and evaluate the major energy policy challenges of the region
- Identify key investment and business opportunities in the energy sector of SE Europe
- Quantify the required investment for energy infrastructure projects by 2020

The South East Region Defined

I. Study Goals and Objectives

- Present and analyse the economic and political background of the region
- Describe the regional integration process and EU expansion impact on regional energy markets
- Energy analysis on a country by country basis
- Energy analysis on a regional basis:
  - *Oil upstream*
  - *Oil midstream and downstream*
  - *Natural Gas (upstream and downstream)*
  - *Power generation*
  - *Electricity transmission and distribution*
  - *Energy Efficiency*
  - *Renewable Energy Sources*
- The role of interconnectors in electricity, natural gas and oil
- Energy market liberalisation process
- Environmental Climate Change and energy security considerations
- Current and future investment potential of the region

II. Study Organisation

- **Study and Analysis Capability**
- In-house study and analysis capability seriously expanded to accommodate study requirements

- **Project Study Group**
- Five people in-house core team
- 15 external contributors (various chapters, country profiles and country investment information)
- Cooperation with Prof. Pantelis Kapros of NTUA on energy demand forecasts for SE Europe (Chapter 13)

III. Methodology

- Scope definition by Study Group
- Study guidelines agreed following initial research and consultations within the Institute
- Selection and briefing of contributors*
- Information gathering from:
  - Published sources
  - Visits to various countries
  - Meetings with selected companies and individuals active in the region
  - Series of IENE regional seminars (Tirana: Jan. 2009, Sofia: April 2009, Sofia: May 2010, Plovdiv: Feb. 2011)
  - Participation in regional Forums and Conferences (Energy Community, IEA, BBSPA)
  - Series of IENE's S.E. Europe Energy Dialogue Meetings (2007-2010)
- Analysis and synthesis by Study Group

**Study Contributors have come from: Greece, Albania, Croatia, Bosnia - Herzegovina, FYROM, Montenegro, Serbia, Bulgaria, and Turkey.*

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SOUTH EAST EUROPE ENERGY OUTLOOK

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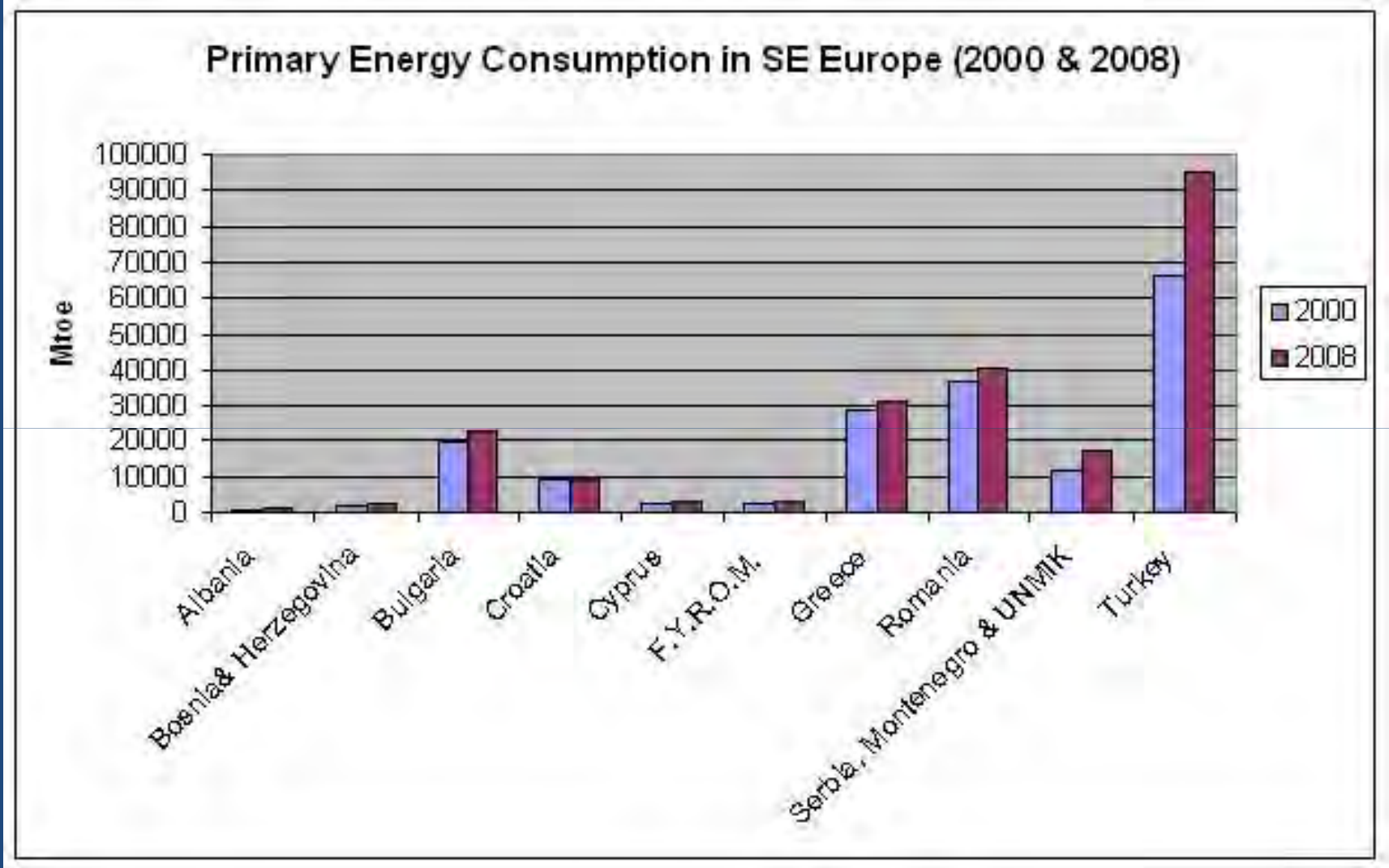
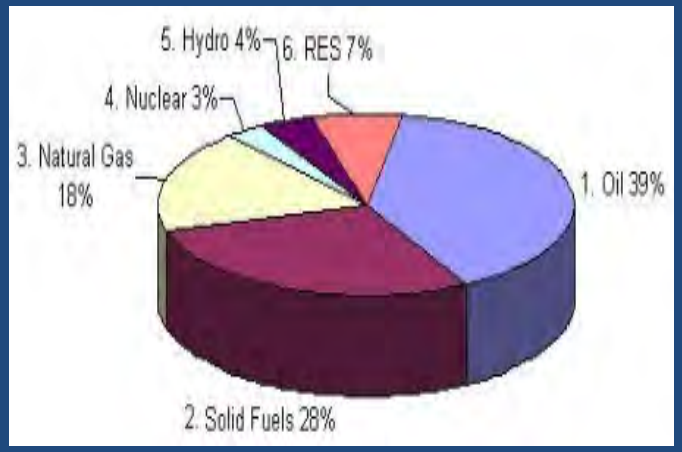
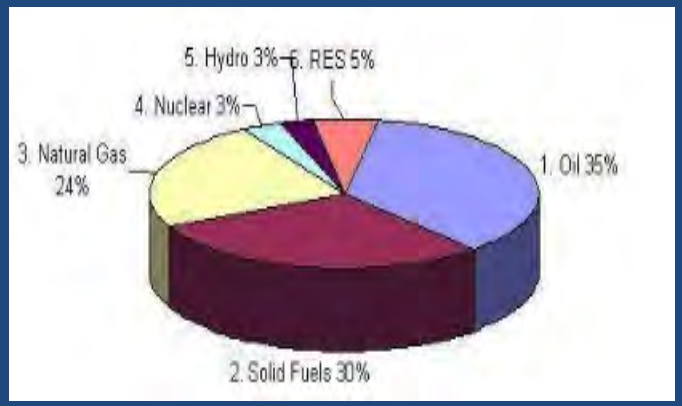
SE Europe Basic Economic & Energy Parameters (2008)

- Population 137.02 million
- GDP 1.585.6 USD billion
- Installed Electricity Capacity 110.926 MW
- Oil Consumption 1.759.050 bbl/day
- Oil Production 168.650 bbl/day
- Gas Consumption 69.95 BCMs
- Gas Production 14.84 BCMs

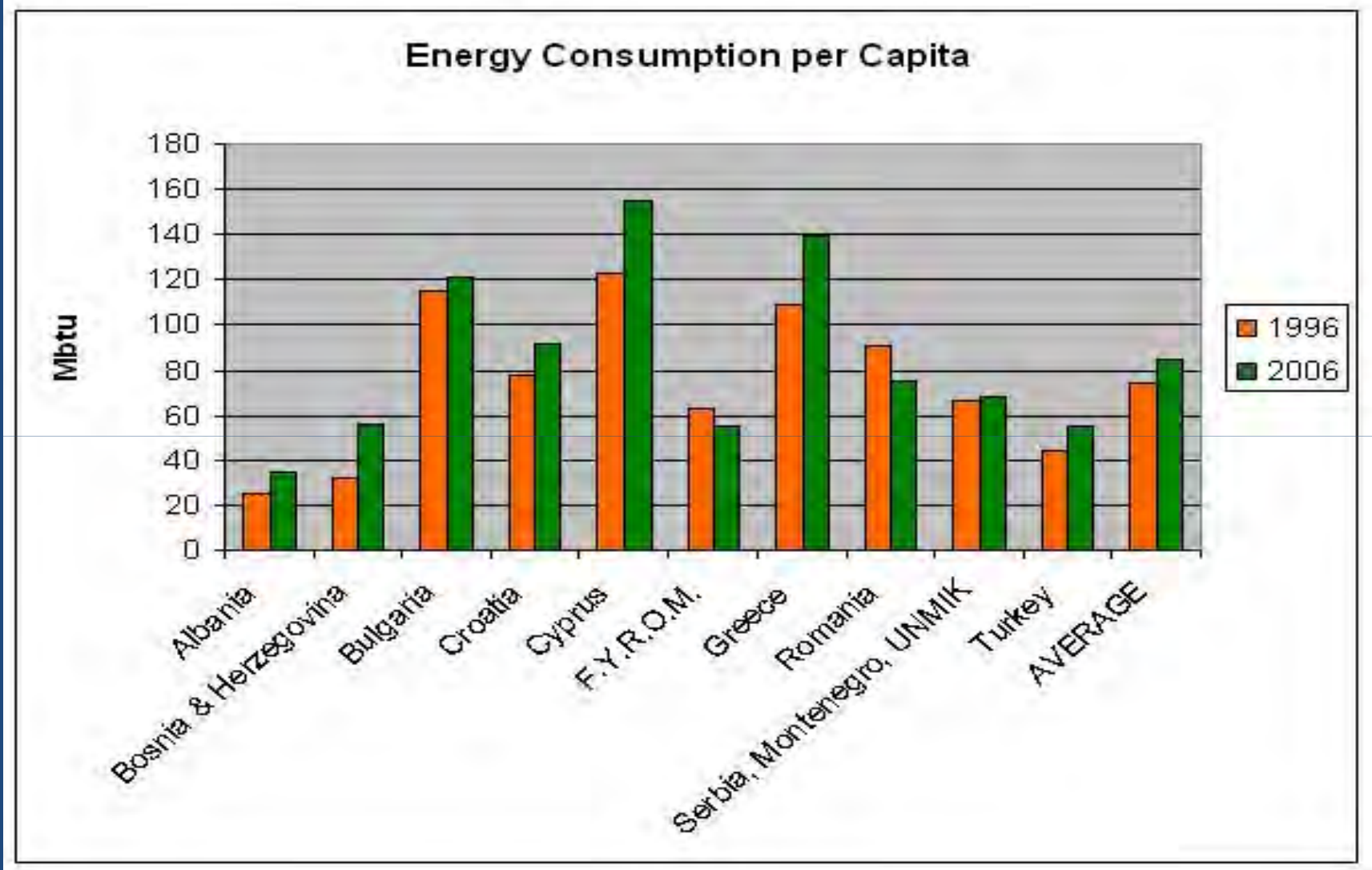

Primary Energy Consumption in SE Europe (2000 & 2008)
Mtoe
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
2000
2008
Albania
Bosnia& Herzegovina
Bulgaria
Croatia
Cyprus
F.Y.R.O.M.
Greece
Romania
Serbia, Montenegro & UNMIK
Turkey



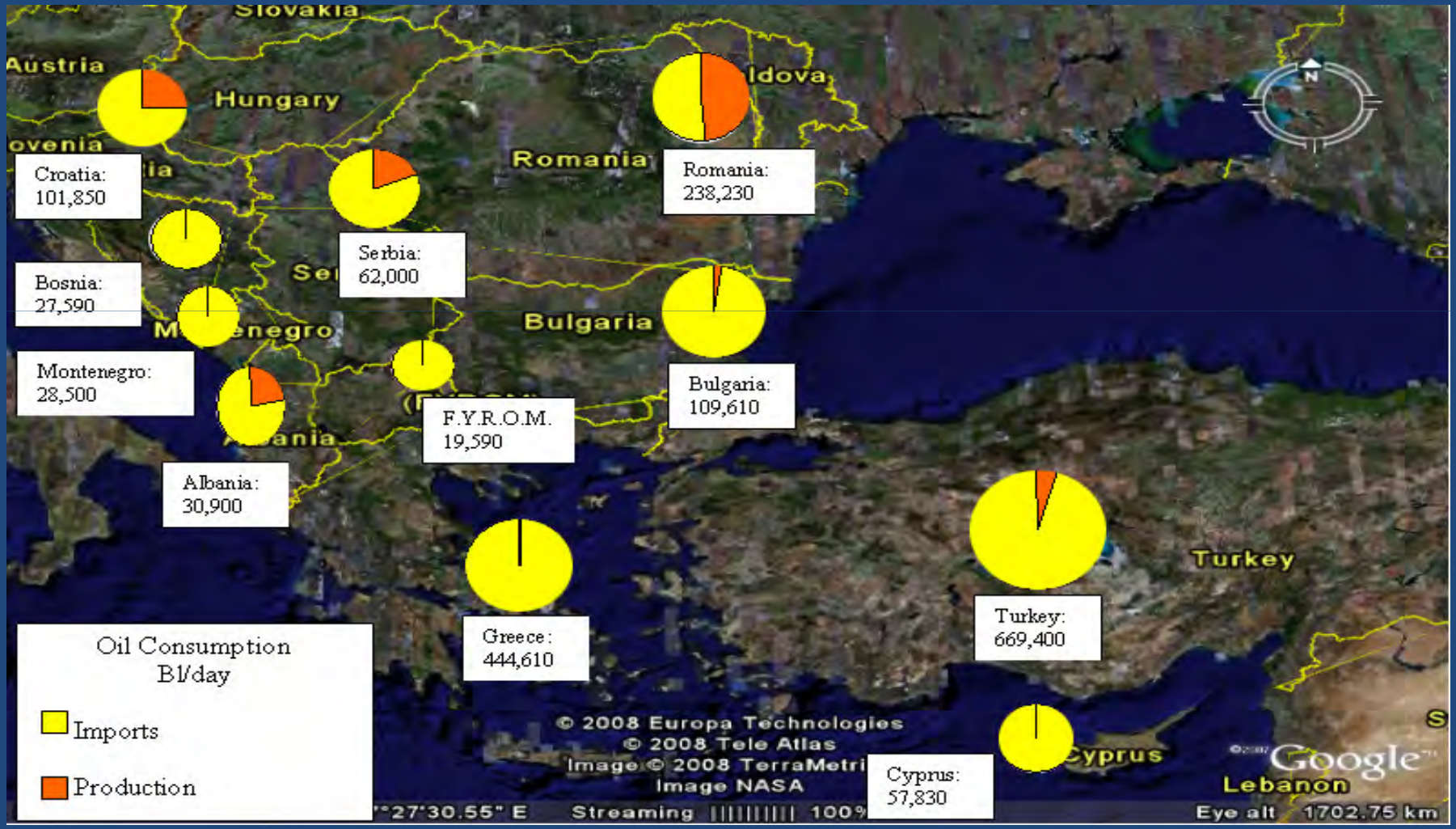
Total Primary Energy Consumption shares in SE Europe (2000)



Total Primary Energy Consumption shares in SE Europe (2008)

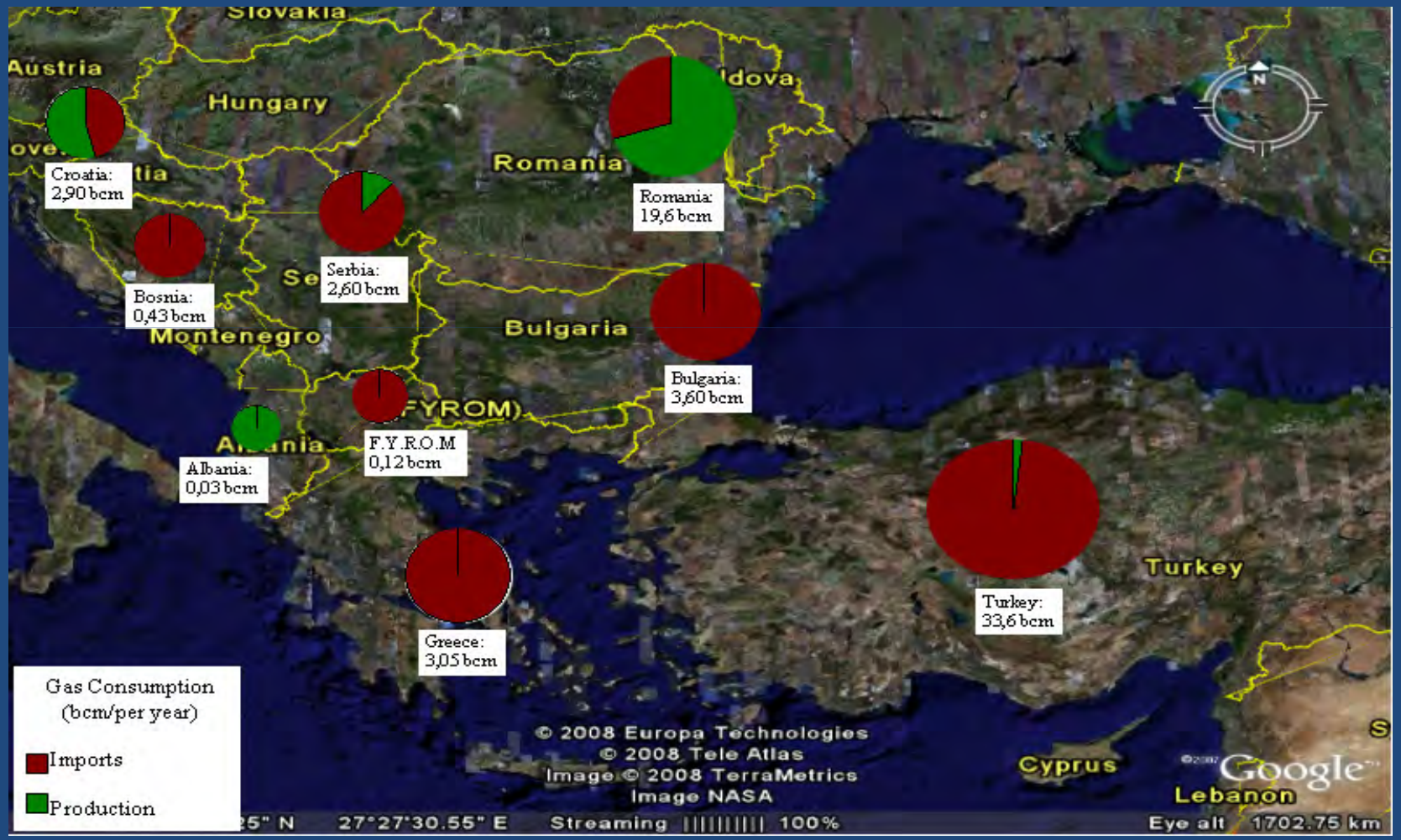

Energy Consumption per Capita
Mbtu
180
160
140
120
100
80
60
40
20
0
1996
2006
Albania
Bosnia & Herzegovina
Bulgaria
Croatia
Cyprus
F.Y.R.O.M.
Greece
Romania
Serbia, Montenegro, UNMIK
Turkey
AVERAGE

South-East Europe Net Oil Import Dependency (2008)



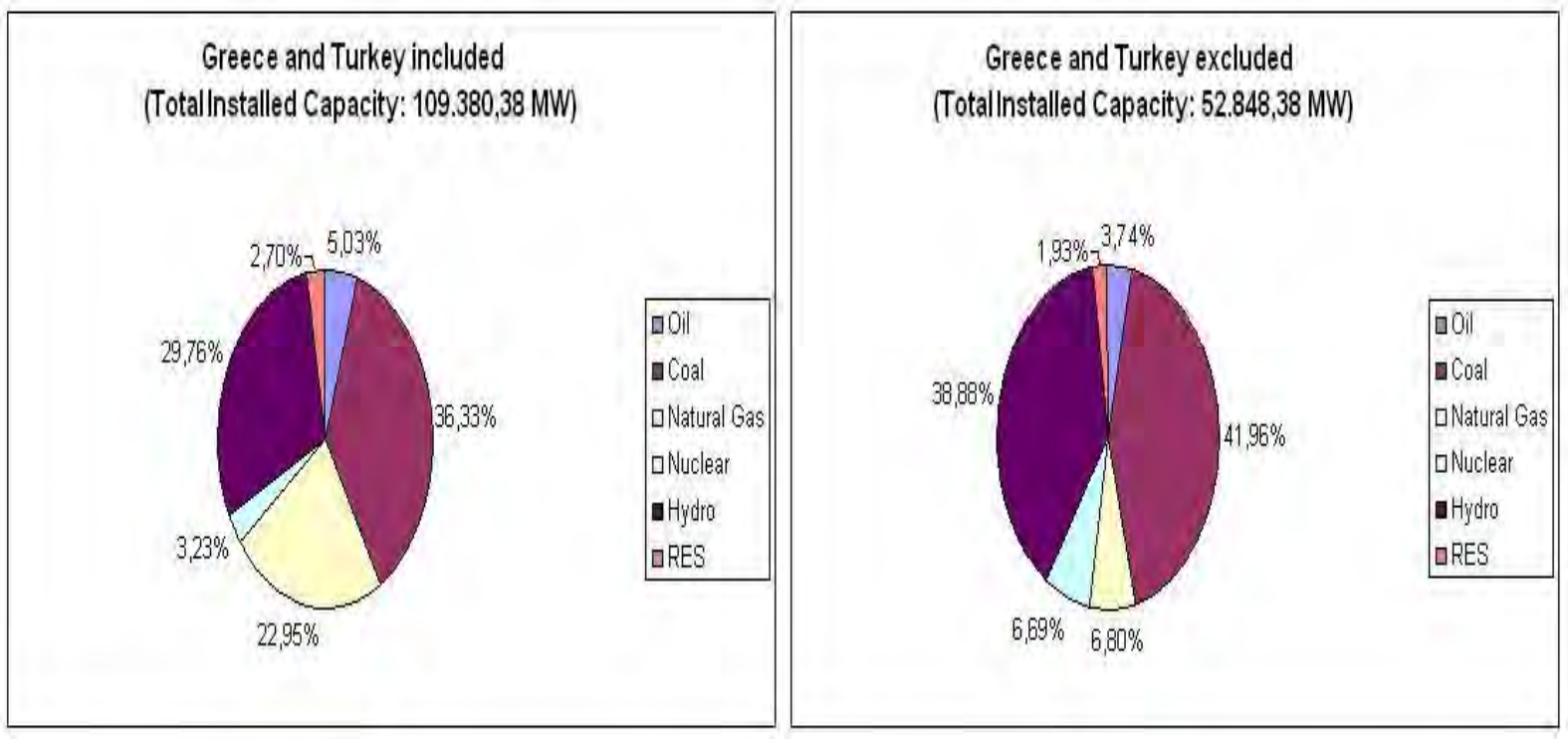
Refining Capacity in S.E. Europe (2009)

South-East Europe Natural Gas Import Dependency (2008)

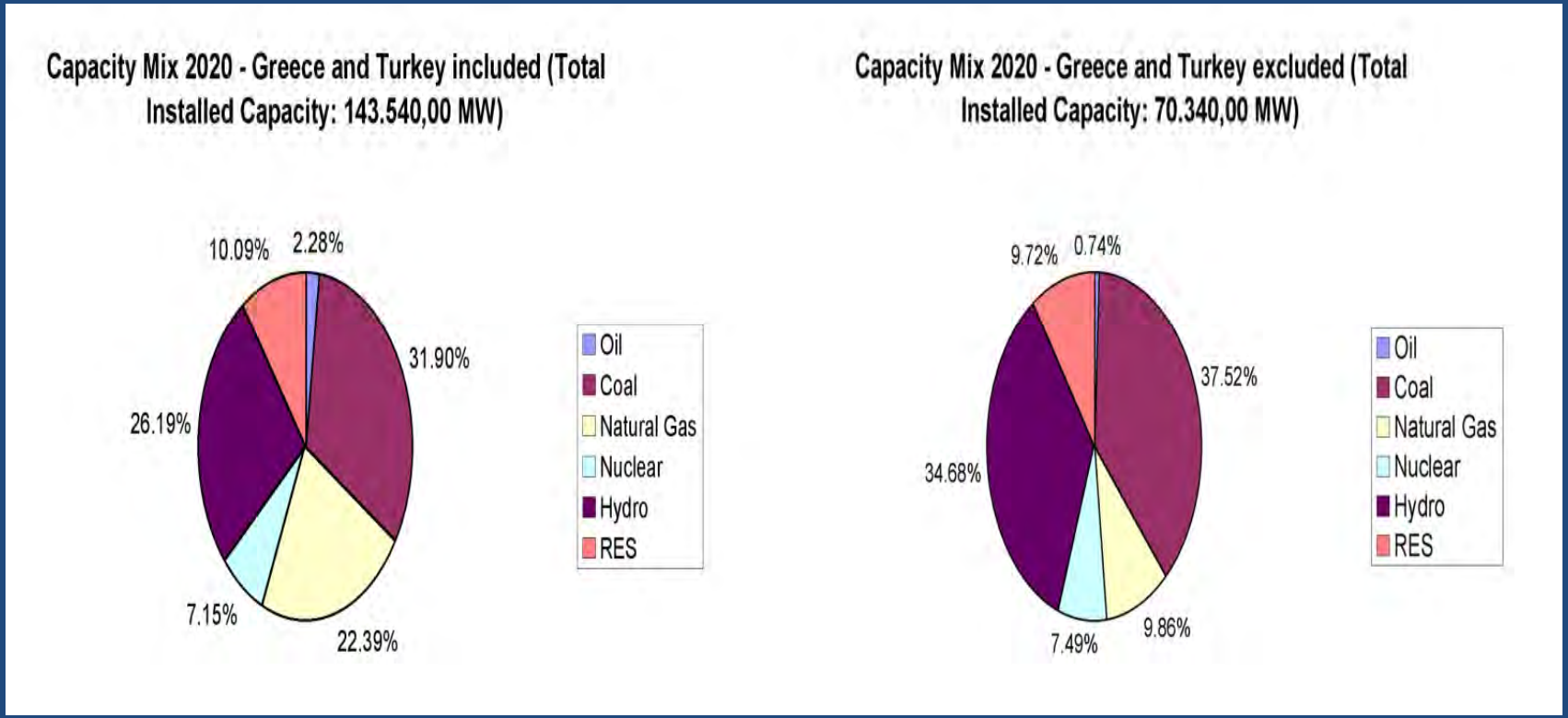


Installed Electricity Capacity (2009)

Capacity mix in S.E. Europe (2010)



Capacity mix in S.E. Europe for 2020



Key Energy Challenges

- Over dependence on petroleum and coal consumption
- High level of hydrocarbon import dependence
- Low level of import diversification, especially for natural gas
- Small RES penetration in overall energy mix
- Unsatisfactory level of energy efficiency, including high CO2 emission levels
- Limited oil and gas pipeline interconnections

Country Energy Profiles

- *Albania*
- *Bosnia and Herzegovina*
- *Bulgaria*
- *Croatia*
- *Cyprus*
- *FYROM*
- *Greece*
- *Kosovo*
- *Montenegro*
- *Romania*
- *Serbia*
- *Turkey*

The EU Angle: Energy Infrastructure Strategy for 2020

European Council Decision of 4 Feb 2011:

- Completing the internal market **by 2014 –** cooperation of ACER, ENTSOs, Commission
- Infrastructure is key for achieving 20-20-20 targets **by 2020**
- Ending isolation of energy islands **by 2015**
- **Financing for infrastructure:** mainly market-based complemented by limited public funds, notably for security of supply/solidarity
- Streamlining and improving **authorization** procedures

The EU Angle: Impact of EU decisions on the region

- EU decisions and Directives will have an impact on SE Europe Energy developments by : 2014,2015, 2020

  and will affect:

- energy strategy, energy mix
- energy infrastructure
- energy demand

The EU Angle: The Importance of Gas

- Gas has a role to play in the energy future of Europe
- Value of gas with regards to CO2 emissions, flexibility, in storage and generation
- EU gas market is an attractive regional market that opens up to international gas trade
- Industry is the driver for investments
- Gas industry is responsible for the creation of a real flexible gas market in the EU
- EU acknowledges the key role of physical infrastructure and the access to diversified supplies

Linking the EU to new gas sources – Energy Security for the EU and its neighbours

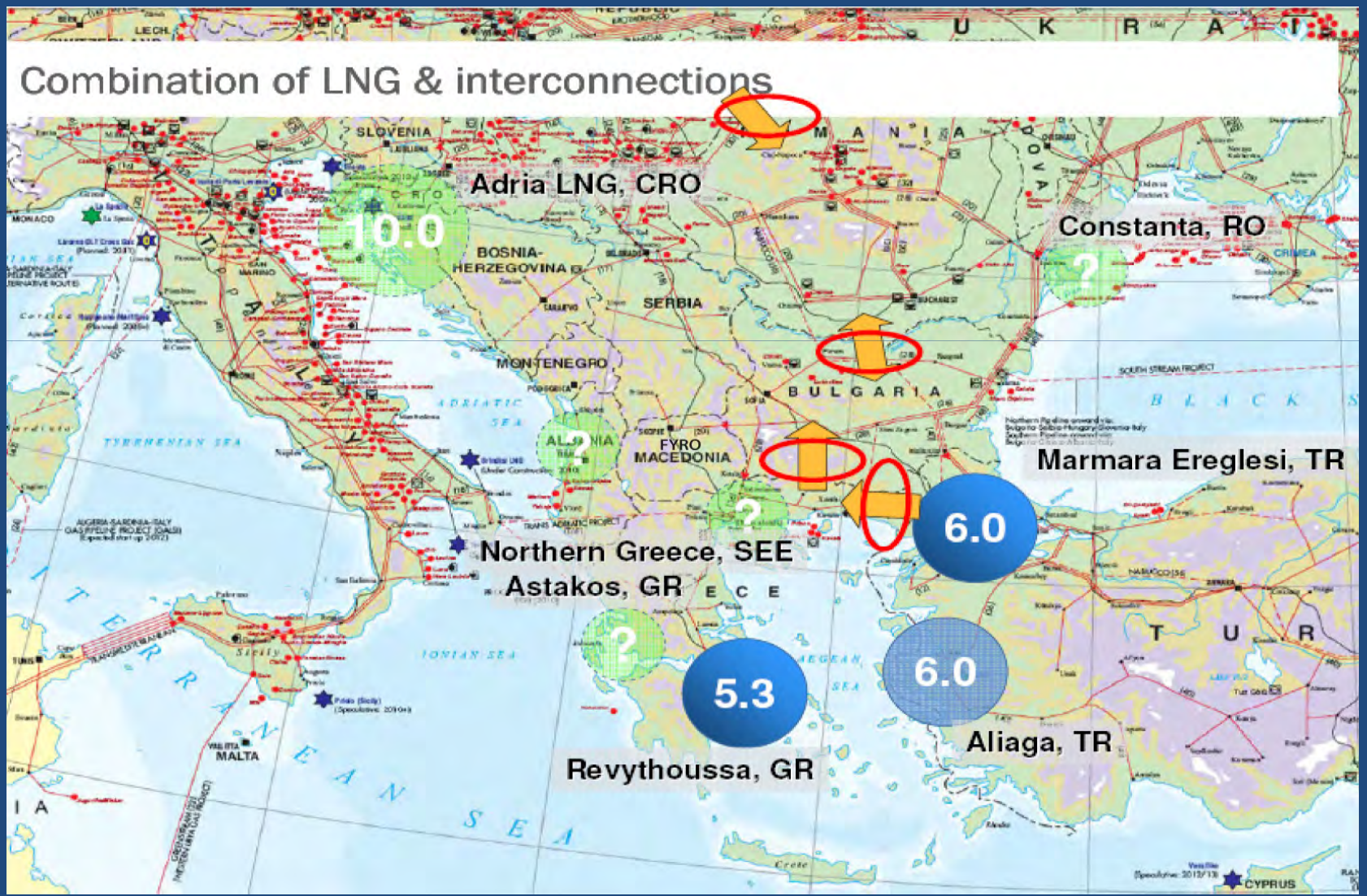
- Development of transit countries to **stable** economies and **rule of law**
- Aegean – Adriatic – Baltic – Black **(2A2B)** Plan (North South Interconnections)
- Development of **Southern Eastern Europe's gas market:** Interconnections, Regulatory Work, Energy Community Gas Ring and establishment of gas hubs
- Good **investment** opportunities through solid **regulatory framework**
- Contribute to **Caspian and Middle-East** countries **development**
- Contribute to the development and implementation of an **EU external energy policy**

South Corridor Inter-Regional Pipeline Projects

The South Corridor Gas Pipeline Projects

Project	Shareholders	Distance	Cost	Capacity	Secured Investment	Completion Date
Nabucco	**BOTAS, BUGARGAZ, TRANSGAZ, MOL, OMV, RWE, each with a share of 16.67%**	**4.042 km**	**€7,9 bn** to expand to **€14 bn** after Iraqi expansion	**31 bcm/y**	**€ 200 million**	**2016-2017**
ITGI / IGI Poseidon	**DEPA (50%), Edison (50%)**	**807km** of which **590 km** Onshore, & **217km** for IGI	**€1,3-1,5 bn.** due to expand to cover cost of upgrading **Turkish NGTS**	**12 bcm/y**	**€ 100 million**	**2016-2017**
TAP	**EGL (42,5%), Statoil (42,5%) & E.ON (15%)**	**520km** from Thessaloniki to Otranto but may have include a new line from Evros to Thessaloniki a distance of app. **340 km**	**€1,5 bn.** according to **EGL** estimates but due to expand to cover cost of upgrading **Turkish & Greek NGTS**	**10-20 bcm/y**	**0**	**2016-2017**
South Stream	**GAZPROM (50%), ENI (50%), of which 10% may go to EDF and up to 15% to BASF /Wintershall**	**2.500 km** of which offshore **900km** connecting Anapa to Baumgarten	**€15,5 bn.** of which **5,5 bn.** for offshore	**63 bcm/y**	**0**	**2015**

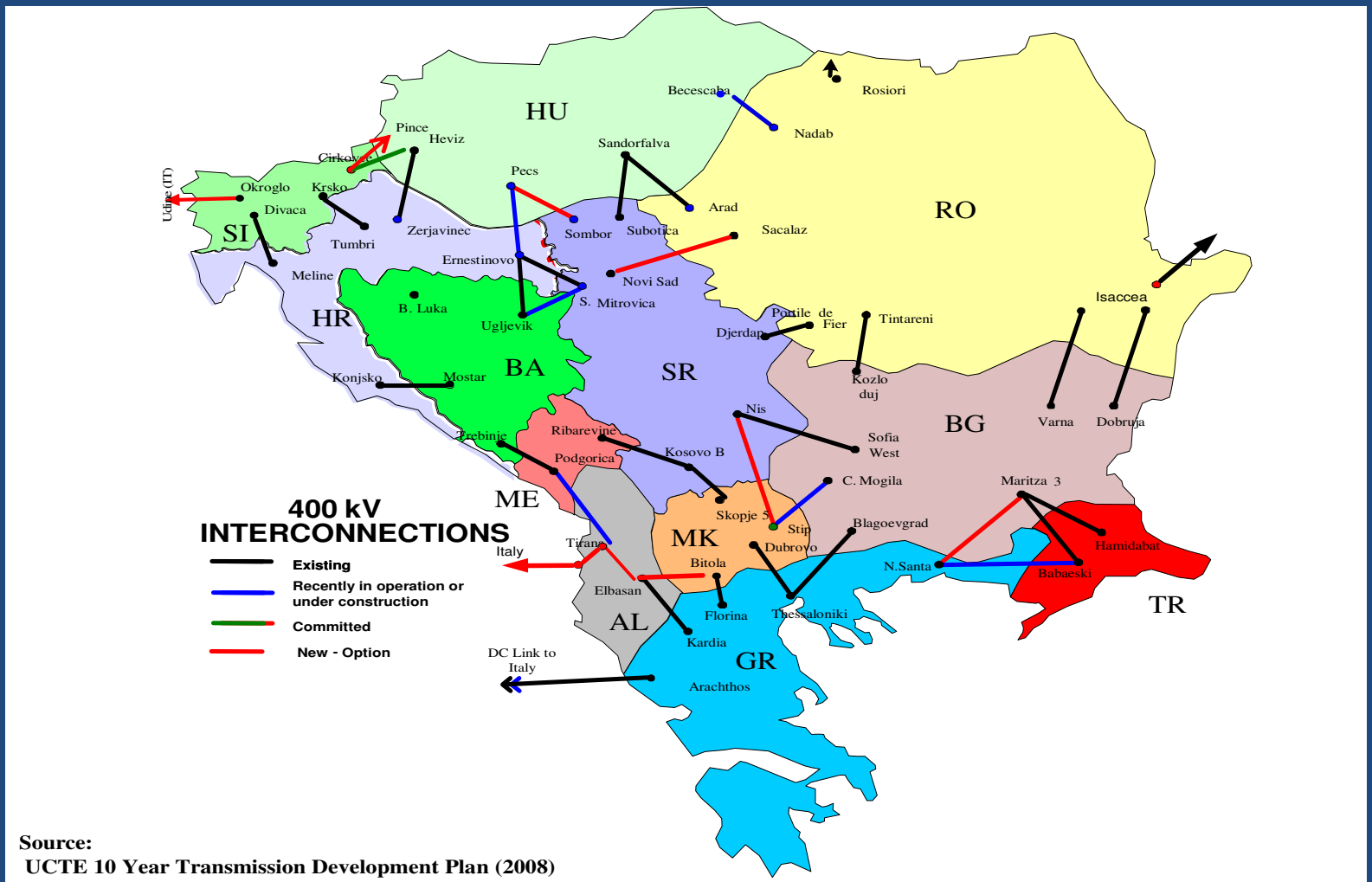
South East Europe Gas Interconnectors and L.N.G. Projects



Oil Pipeline Projects

Energy Community Map

Electricity Interconnections



Source:
UCTE 10 Year Transmission Development Plan (2008)

Net Electricity Flows

Renewable Energy Sources in SE Europe

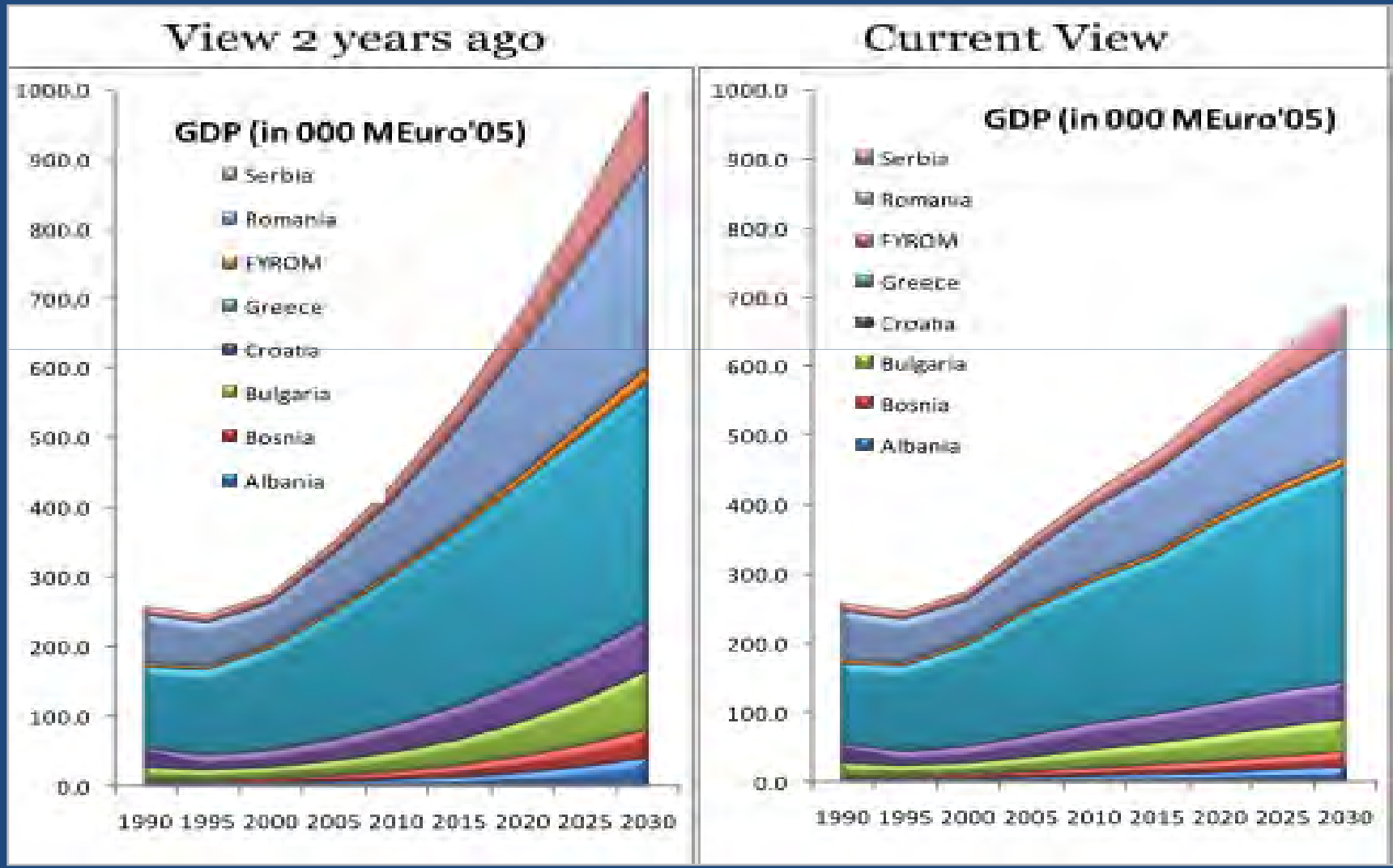
RES in S.E. Europe

RES in Gross Final Energy Consumption						Target
%	2005	2020	% diff	2030	% diff	2020
Albania	32.6	25.7	2.8	26.0	5.3	?
Bosnia	18.8	20.9	4.7	24.4	7.9	?
Bulgaria	11.1	23.5	12.2	34.3	18.1	16%
Croatia	13.6	16.3	2.9	18.7	5.2	?
Greece	7.6	17.8	7.1	22.5	10.1	20%
FYROM	15.7	22.8	5.8	25.6	10.6	?
Romania	18.9	25.8	6.8	29.0	8.2	24%
Serbia & Montenegro	18.9	19.5	4.3	18.7	5.1	?
Balkans excl. Turkey	14.9	21.4	6.5	24.8	8.9	
Turkey	15.5	13.3	3.7	14.6	5.4	?
All SEE	15.2	17.0	5.6	19.0	7.5	
EU27	8.6	20.0	5.2	22.2	3.8	20%

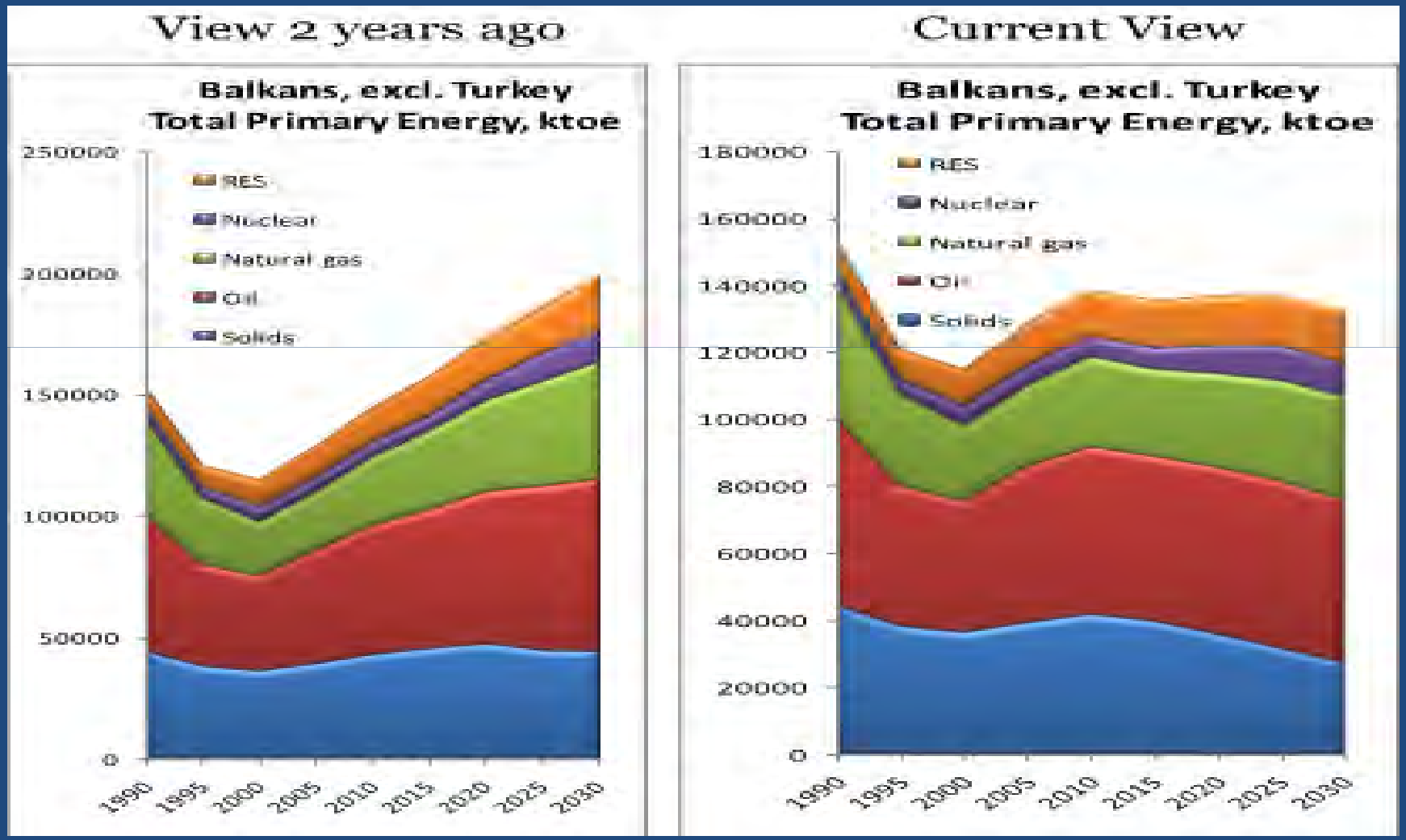
Status of Renewable Energy Sources in S.E. Europe

- Solar Thermal — *Well developed markets in Greece, Cyprus and Turkey*
- Solar PV — *Approximately < 250 MW total PV installed, with Greece being the most developed market, followed by Bulgaria*
- Wind — *Key players: Greece, Turkey, Bulgaria, Romania*
  Installed Capacity < 3.600 MW
- Mini Hydro — *Well developed in Western Balkans.*
  Considerable Potential in Greece and Turkey
- Biomass — *Embryonic market for power generation but extensively used for house heating*
- Geothermal — *Large untapped potential in Greece, Turkey, Bulgaria, Romania, Serbia and Croatia*

Macroeconomic Projections for S.E. Europe

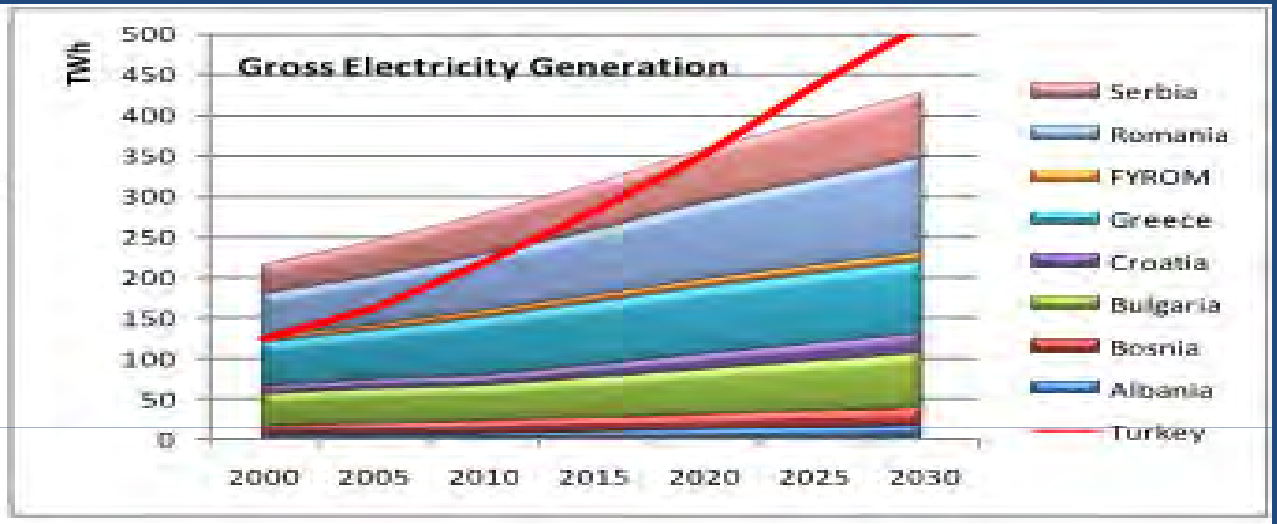


Primary Energy Consumption 1990-2030

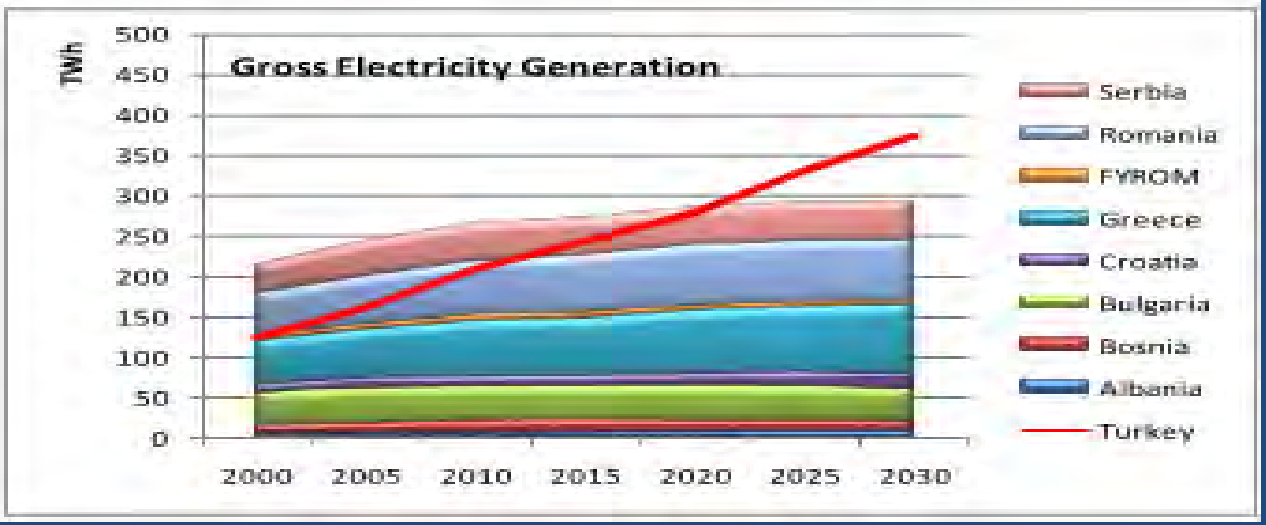


Electricity Generation in SE Europe (2000-2030)

View 2 years ago



Current View



Operational and planned nuclear power plants in SE Europe

Significant Investment and Business Opportunities in SE Europe:

- ✓ Oil and Gas (upstream)
- ✓ Oil (midstream, downstream)
- ✓ Natural Gas (transmission, distribution , storage)
- ✓ Power Generation (Thermal Plants, CCP, Nuclear, Large Hydro)
- ✓ Electricity Transmission and Distribution
- ✓ RES (SWH, Photovoltaic, Wind,Mini-Hydro, Biomass, Geothermal)

Total estimated investment regional potential ~ Euro 240.0 billion (±10%)

TOTAL ENERGY INFRASTRUCTURE INVESTMENTS PER COUNTRY

	(in million Euros)
✓ *Albania*	8,800
✓ *Bosnia & Herzegovina (Republic of Srpksa only)*	3,855
✓ *Bulgaria*	17,150
✓ *Croatia*	7,000
✓ *Cyprus*	19,000
✓ *FYROM*	1,850
✓ *Greece*	35,300
✓ *Kosovo*	4,620
✓ *Montenegro*	3,960
✓ *Romania*	36,500
✓ *Serbia*	10,665
✓ *Turkey*	70,500
TOTAL	**219.200**

Total Energy Infrastructure Investment Per Sector

Sector	Investments (€ Million)
Oil Upstream *(Research, Exploration and Production)*	*33,820*
Oil Downstream/Midstream *(incl. liquid biofuels)*	*23,100*
Electricity ▪ Thermal Plants ▪ Nuclear Plants ▪ Lignite Mine Development ▪ Grids - Upgrade and Expansion *(incl. metering systems)* ▪ HV Transmission Lines	*89,692*
Gas ▪ Main and branch gas pipelines ▪ Gas Storage ▪ LNG Terminals and Liquefaction plants ▪ Town grids	*24,955*
RES *(Wind, PV, Biomass, Mini Hydro, Geothermal)*	*47,633*
Intraregional Mega Projects ▪ Oil Pipelines ▪ Gas Interconnectors ▪ Main gas pipelines	*20,800*
Total	*240,000*

SE Europe Energy Outlook Key Messages

- Rising energy demand but at a much slower pace than previously forecasted
- Continuing strategic relevance of coal
- Urgent need to replace antiquated and low efficiency thermal electricity plants
- Inadequate progress in electricity and gas market liberalization
- Very high net hydrocarbon import dependence and unsatisfactory import diversification
- Need to replace and upgrade old and outdated refinery complexes
- Underdevelopment of R.E.S
- Low infrastructure inter- connectivity in oil & natural gas
- Positive investment climate with East Balkans and Turkey far ahead of Western Balkans in terms of actual investments and potential.

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Thank you for

your attention

and your for patience!