



INSTITUTE OF ENERGY
FOR SOUTH EAST EUROPE

South East Europe Energy Outlook

An IENE Study Project

Outline Presentations

Athens, April 11, 2011



The South East Region Defined





SOUTH EAST EUROPE ENERGY OUTLOOK

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S.E. Europe Basic Economic and Energy Data (2008)

Country	Population (Million)	GDP (PPP) (USD Billion)	FDI (% of GDP)	Installed Electricity Capacity (MW)
Albania	3.2	19.9	4.2	1.590
Bosnia & Herzegovina	4.6	28.2	5.48	4.341
Bulgaria	7.2	90.1	7.15	11.360
Croatia	4.4	76.5	6.94	4.460
Cyprus	0.75	17.2	9.0	1.240
FYROM	2.1	9.2	2.03	1.581
Greece	11.2	357.5	0.42	14.300
Montenegro	0.67	6.6	11.0	0.883
Romania	22.2	161.5	6.0	21.360
Serbia	7.4	84.2	10.0	8.359
Turkey	71.5	729.4	0.65	40.840
UNMIK	1.8	5.3	-	1.495
Total	137.02	1.585,6	5.6	110.926

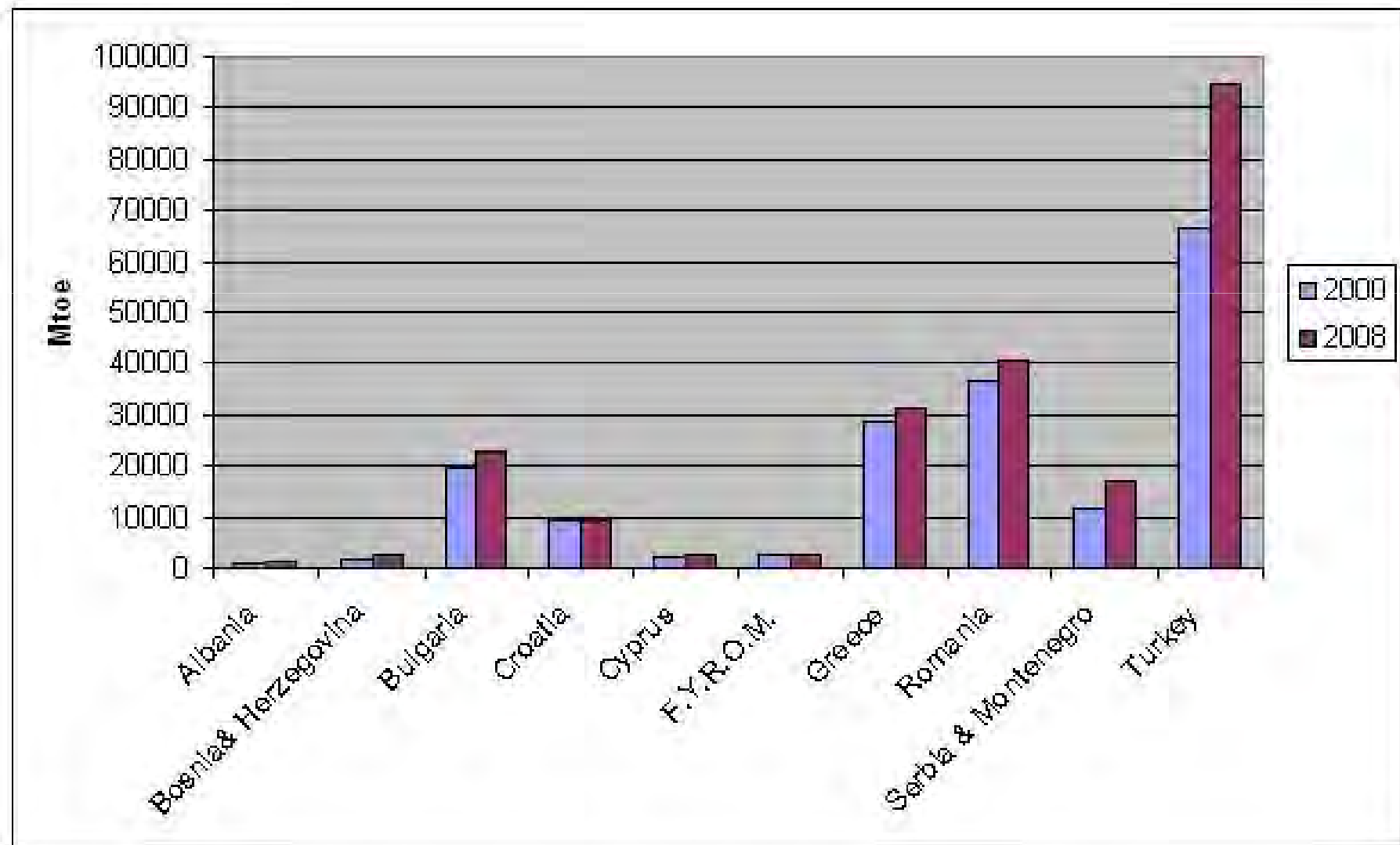


S.E. Europe Oil and Gas Production and Consumption (2008)

Country	Oil Production (Bl/day)	Oil Consumption (bl/day)	Oil Refining Capacity (bl/day)	Gas Production (bcm/year)	Gas Consumption (bcm/year)
Albania	6.000	33.000	26.000	0.02	0.02
Bosnia & Herzegovina	0	27.500	0	0.0	0.31
Bulgaria	1.000	120.000	208.000	0.31	3.5
Croatia	13.670	106.000	163.000	2.03	3.1
Cyprus	0	61.000	0	0.0	0
FYROM	0	21.000	50.000	0.0	0.05
Greece	1.000	428.860	413.000	0.0	4.25
Montenegro	0	5.000	0	0	0
Romania	95.400	225.000	468.000	11.2	16.9
Serbia & Kosovo	10.000	90.000	162.500	0.25	1.92
Turkey	41.580	677.690	710.000	1.03	36.9
Total	168.650	1.759.050	2.200.500	14.84	66.95

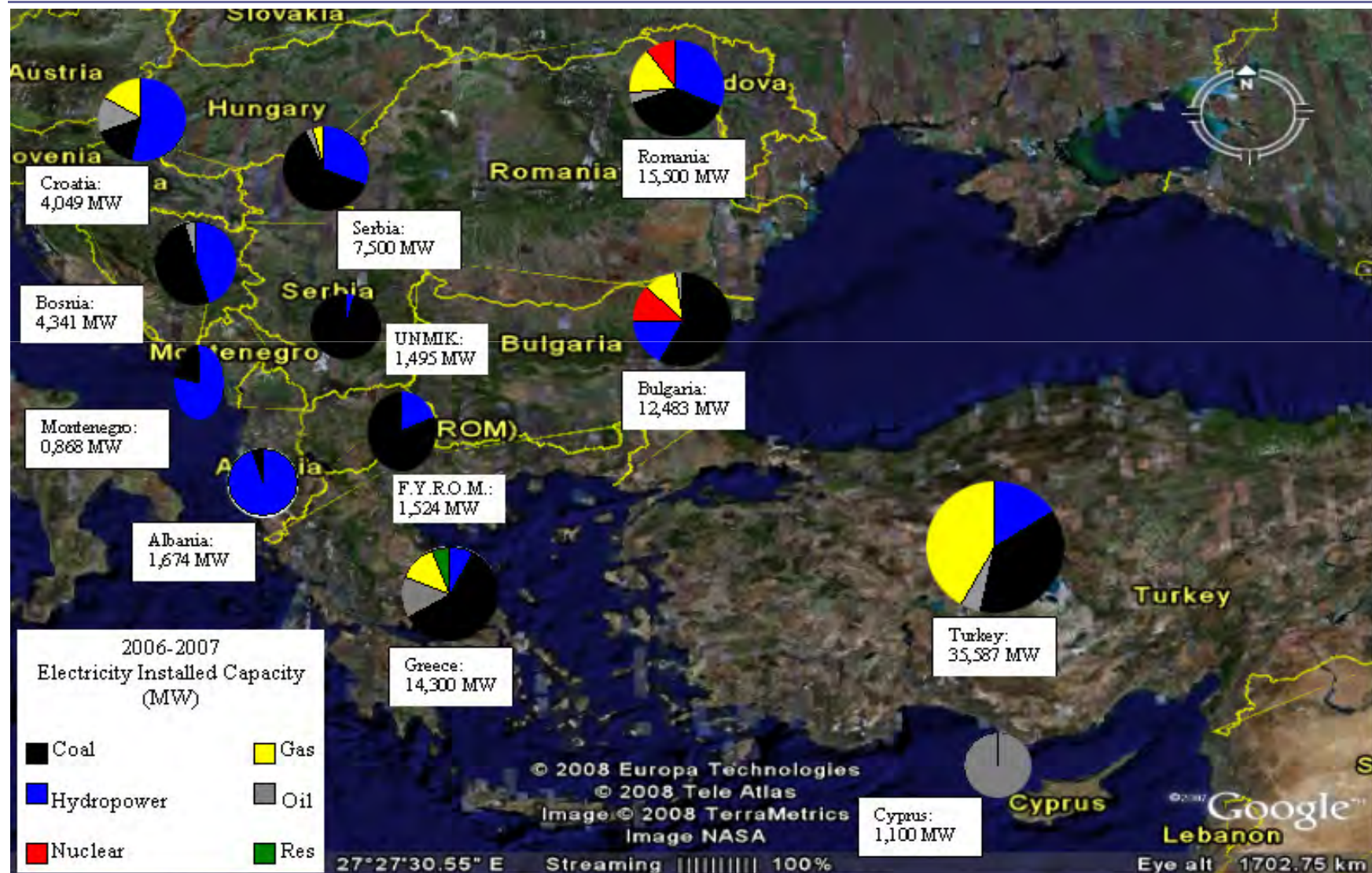


Primary Energy Consumption in SE Europe (2000 & 2008)



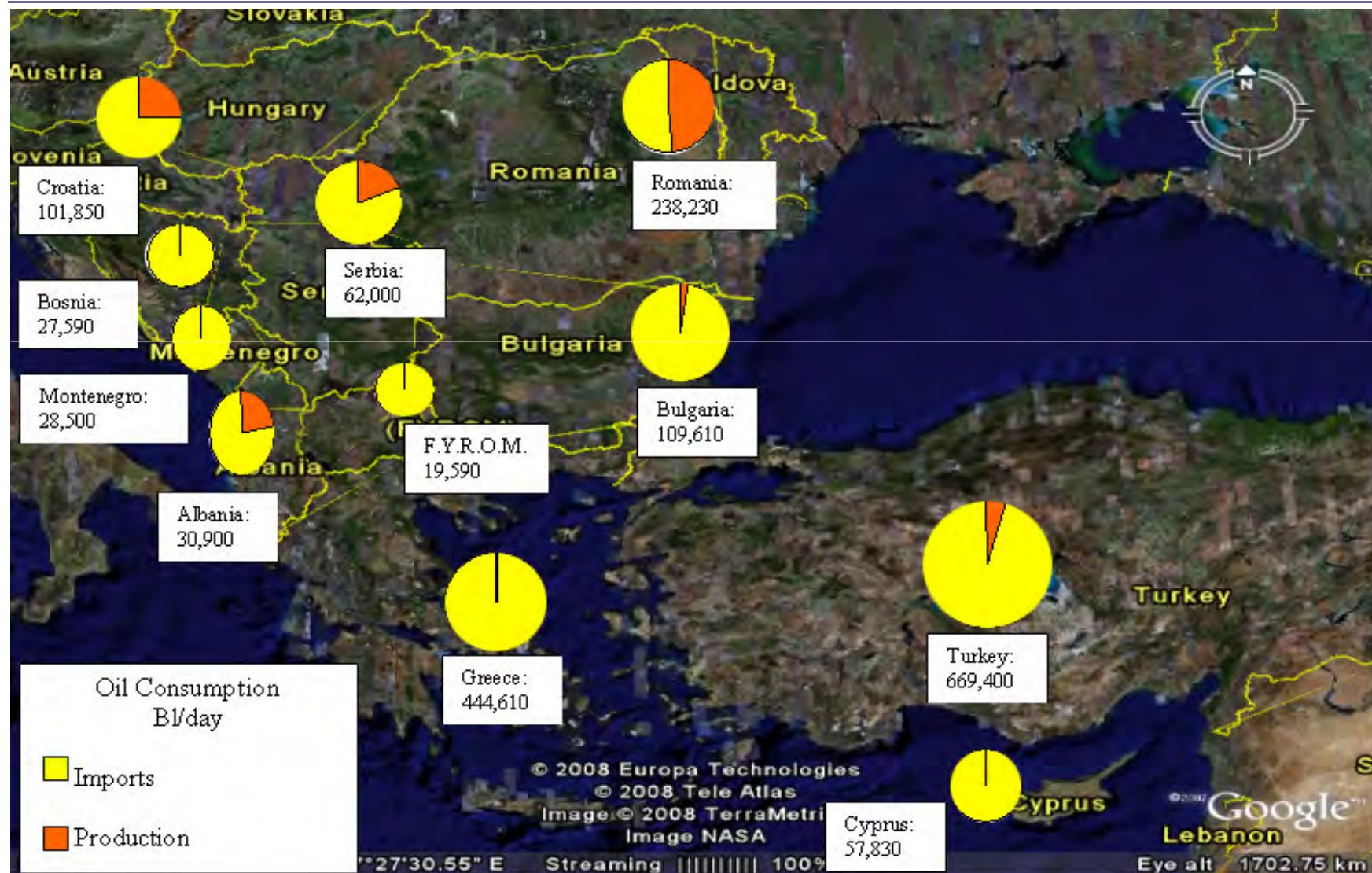


South East Europe Electricity Installed Capacity and Generation Mix (2008)



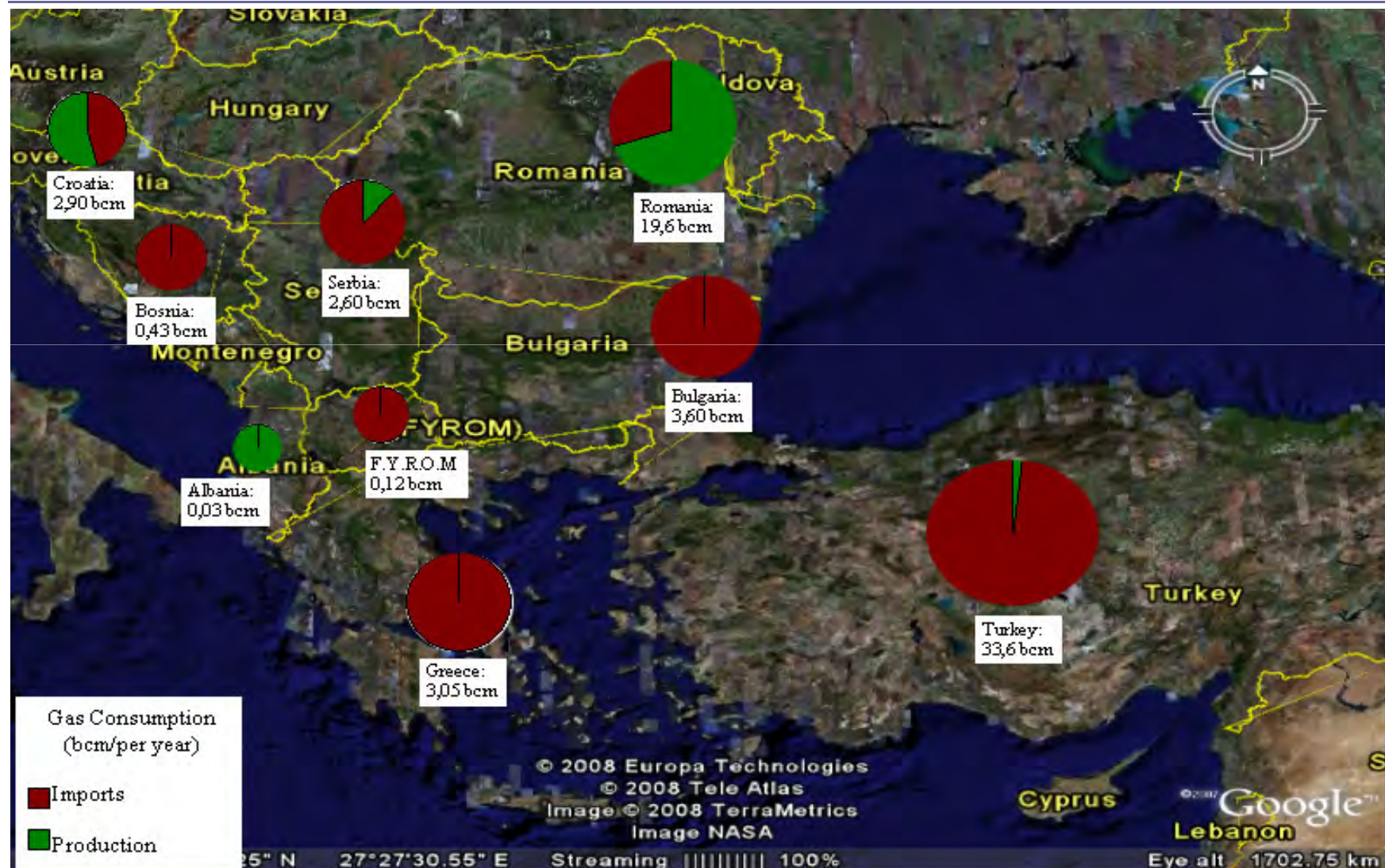


South East Europe Net Oil Import Dependency (2008)





South East Europe Natural Gas Import Dependency (2008)



Refining Capacity in South East Europe



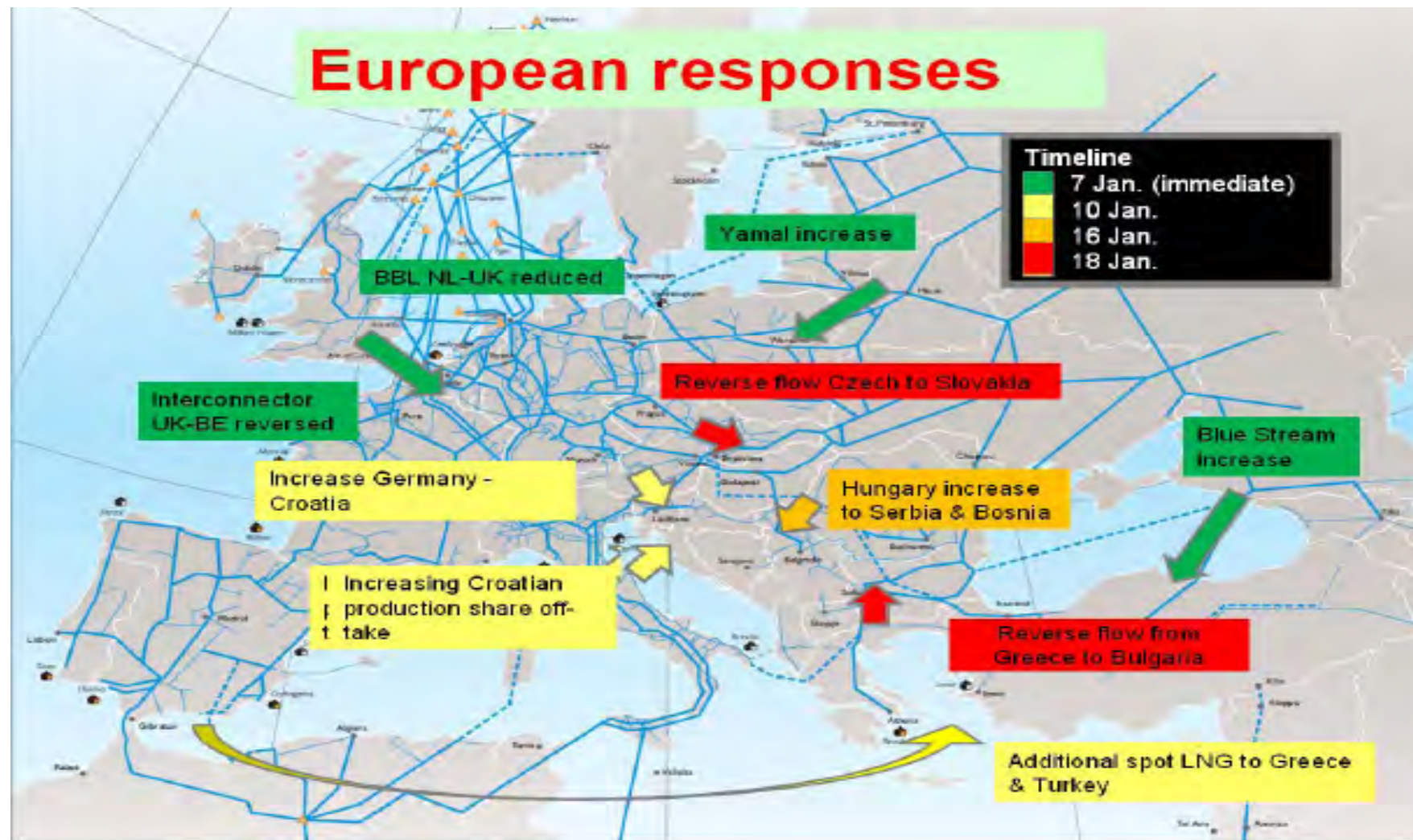


A Positive Outlook for Gas

- EU gas market is an attractive regional market that opens up to international gas trade
- 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
- 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

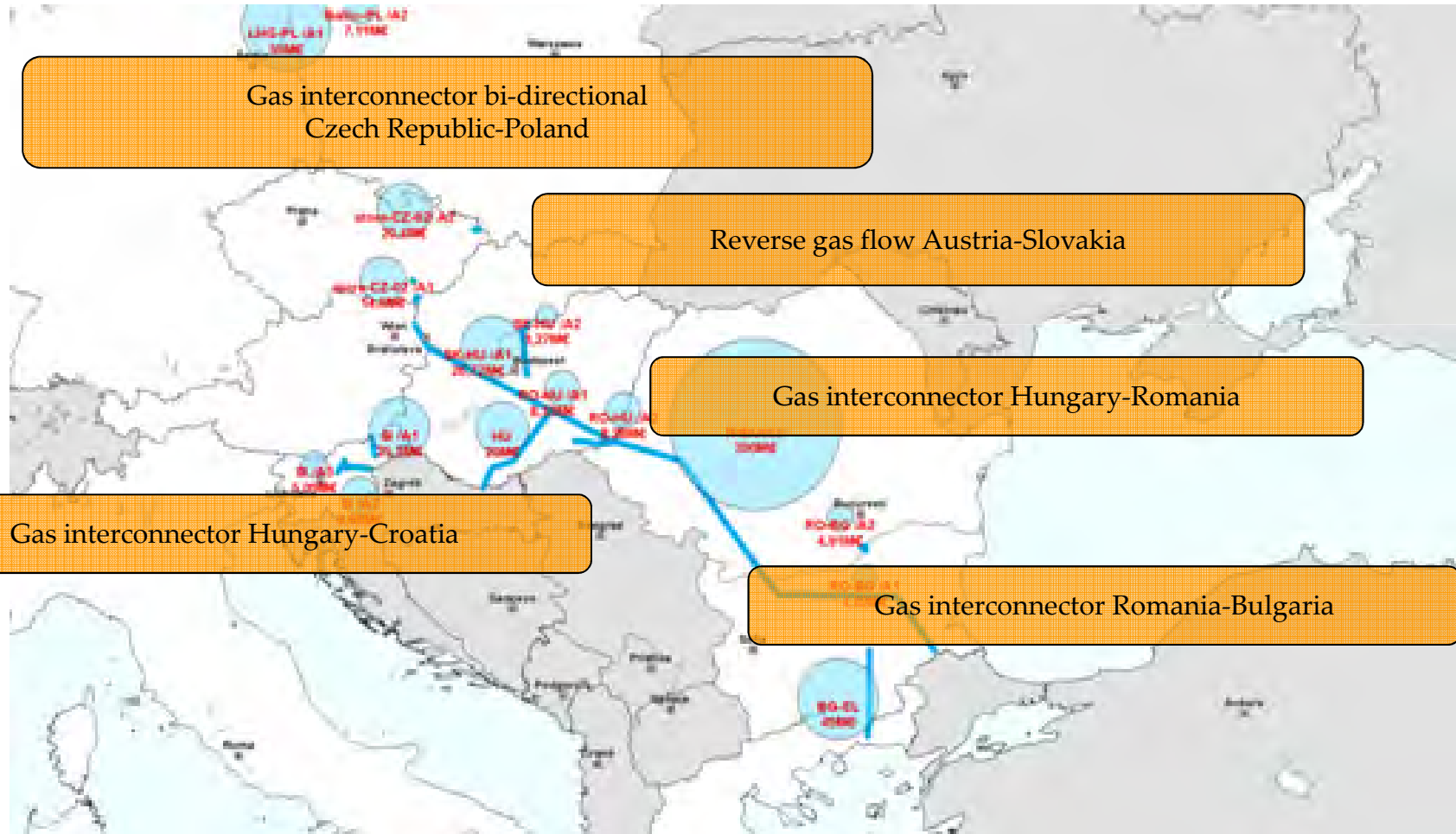


European Responses to the Russian – Ukrainian Gas Supply Crisis (January 2009)





EEPR – Examples of success stories gas





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**



- EU decisions and Directives will have an impact on SE Europe Energy development by : 2014,2015, 2020
and will affect:
 - energy strategy, energy mix
 - energy infrastructure
 - energy demand



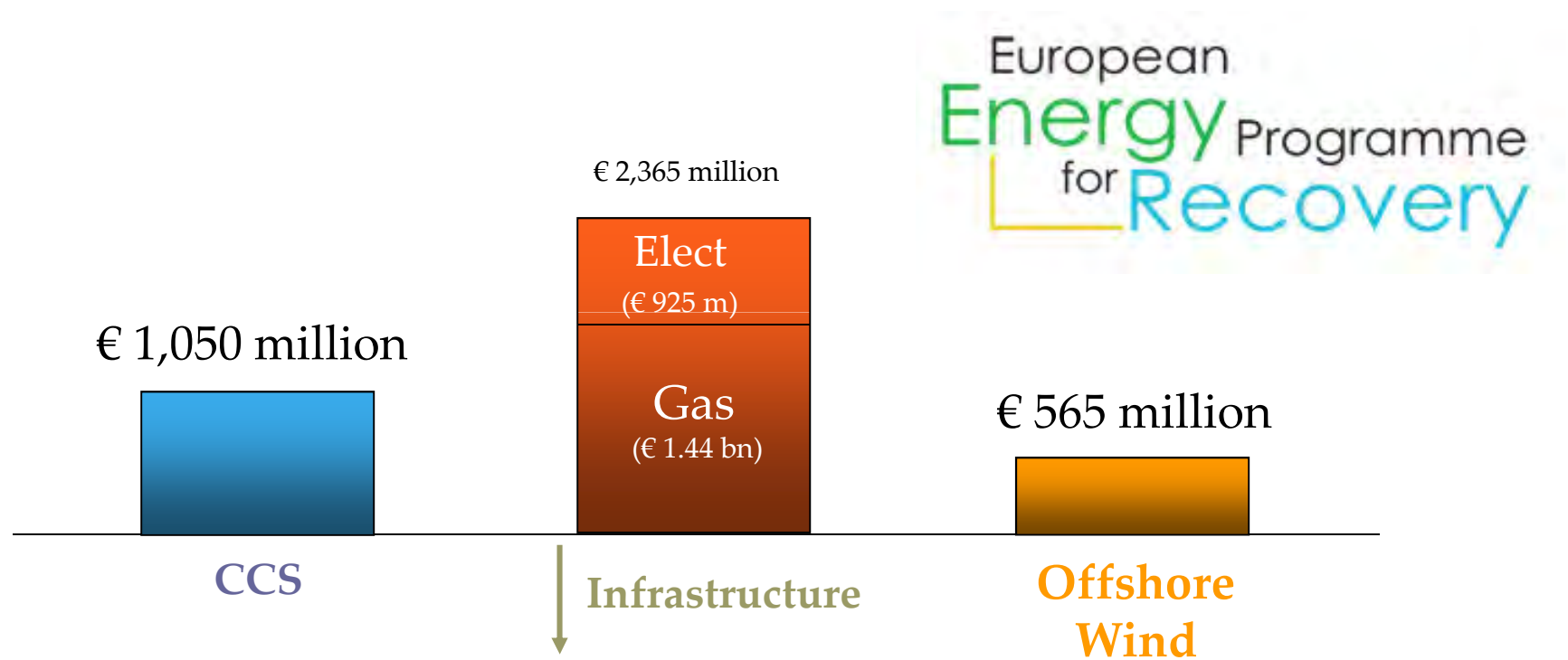
Energy Infrastructure Strategy for 2020

European Council 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



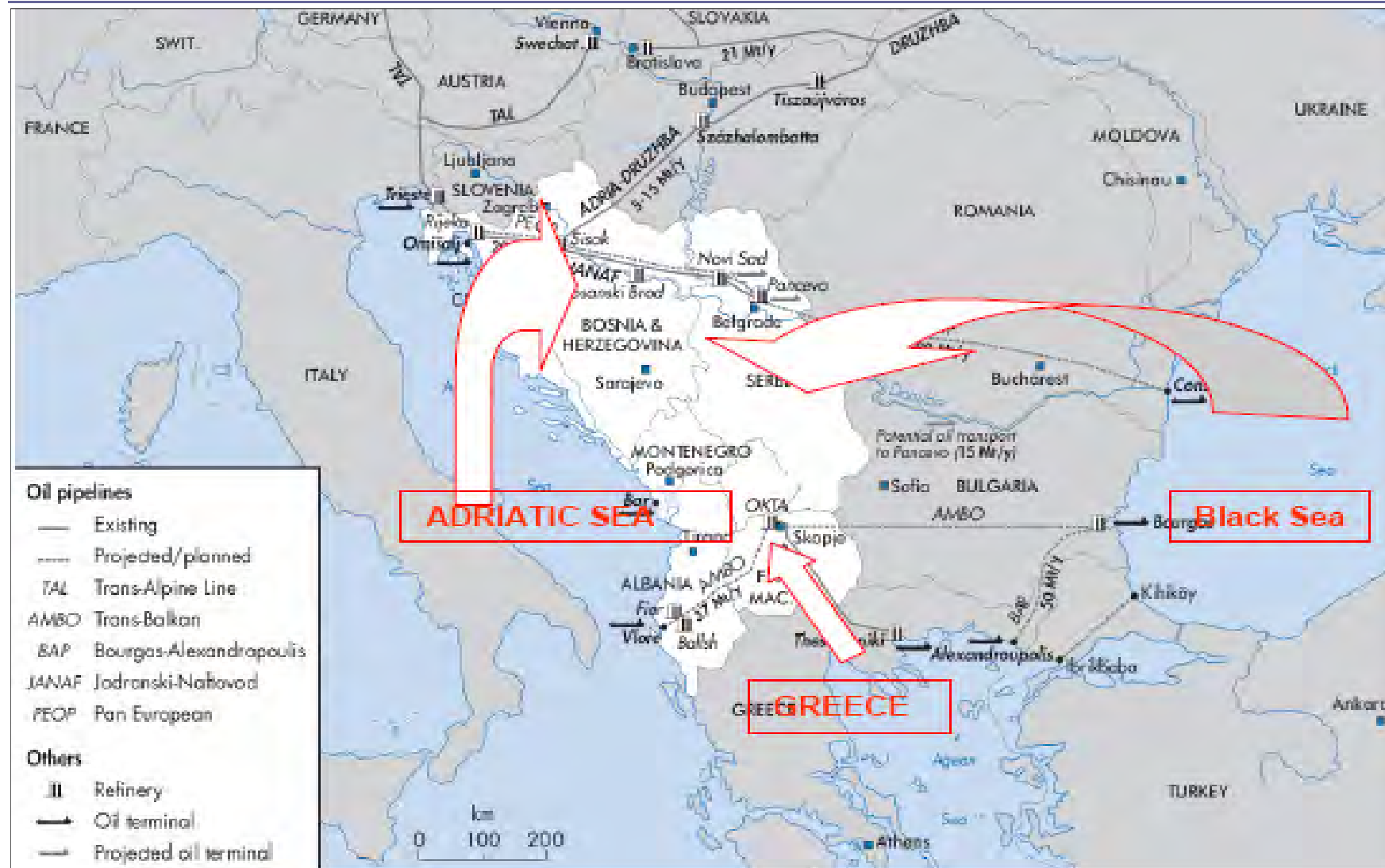
Leveraging private investment - European Energy Programme for Recovery



- 44 projects with commitments of total of 2,268 M€
- Gas interconnectors: 1,285 M€
 - Reverse flow: 78 M€
 - Electricity interconnectors: 905 M€



Western Balkans and S.E.E. Oil Pipeline Projects





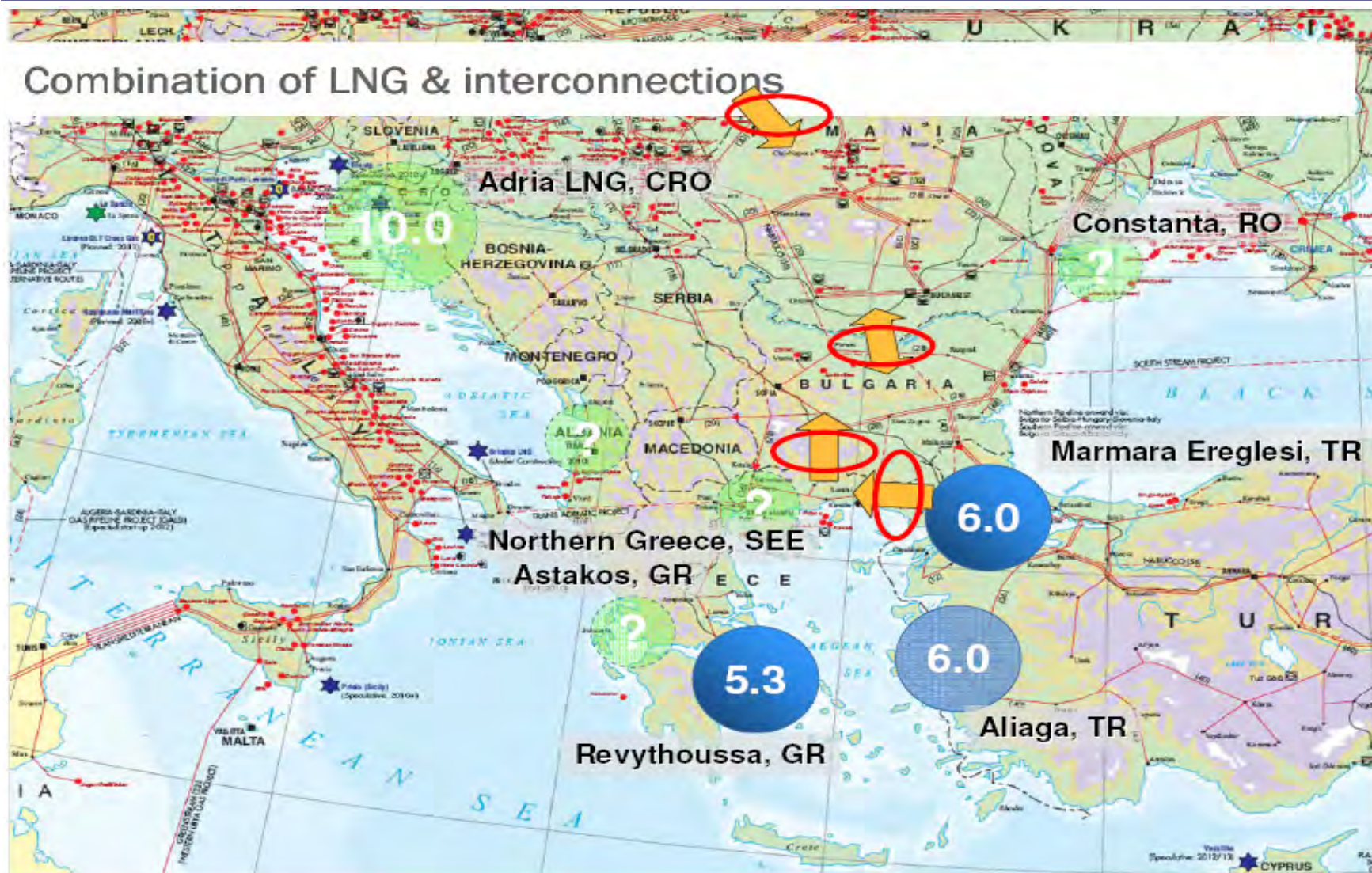
Caspian, Black Sea and S.E.E. Oil Pipeline Projects





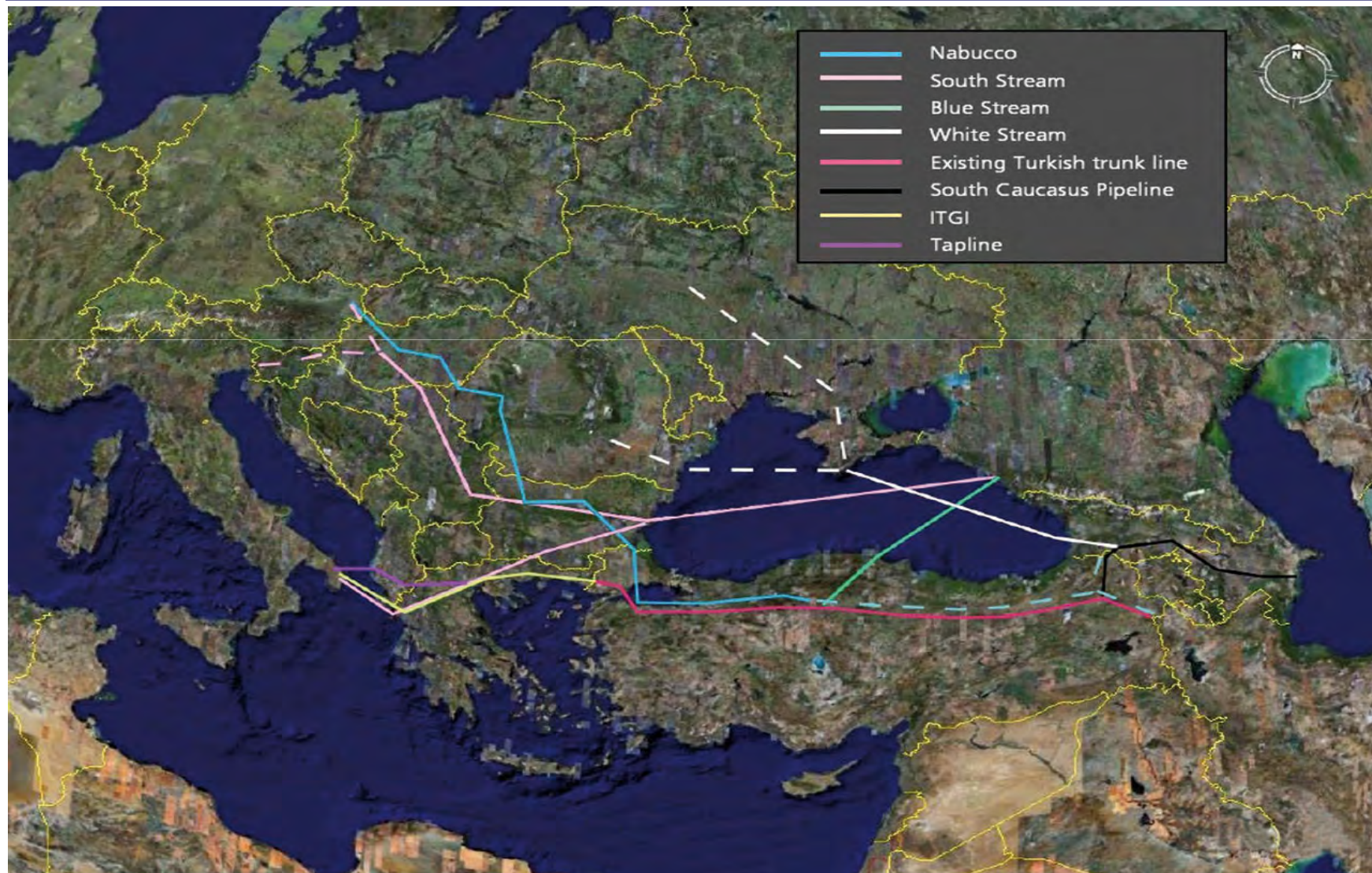
South East Europe Gas Interconnectors and LNG Projects

Combination of LNG & interconnections





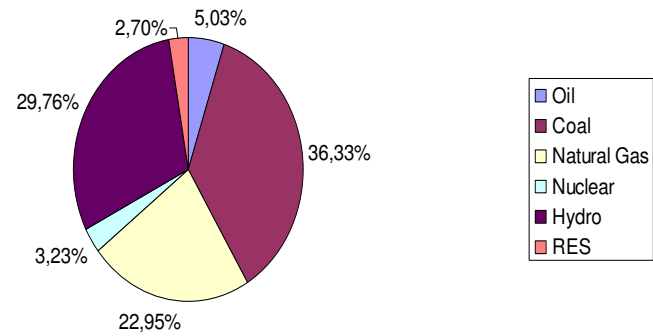
South Corridor Gas Projects



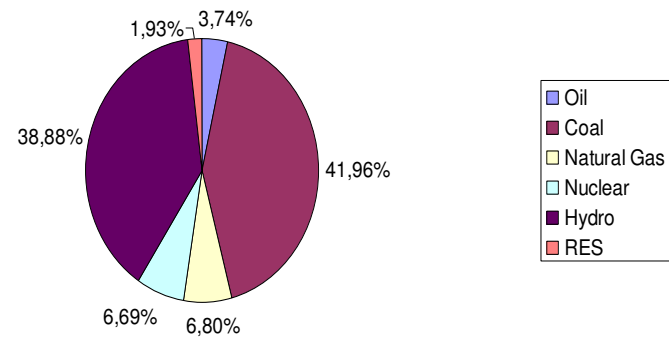


S.E. Europe Capacity Mix 2010

Capacity Mix 2010 (Installed Capacity MW) - Greece and Turkey included

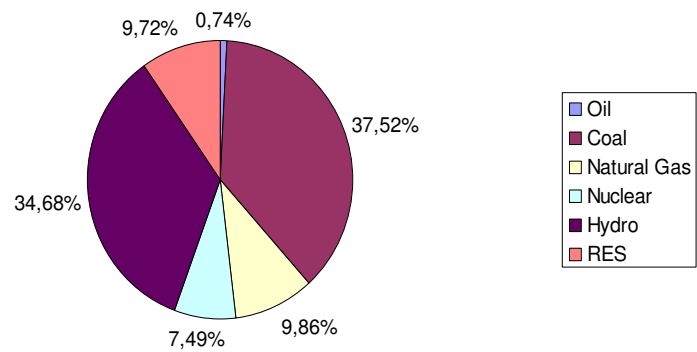


Capacity Mix 2010 (Installed Capacity MW) - Greece and Turkey excluded

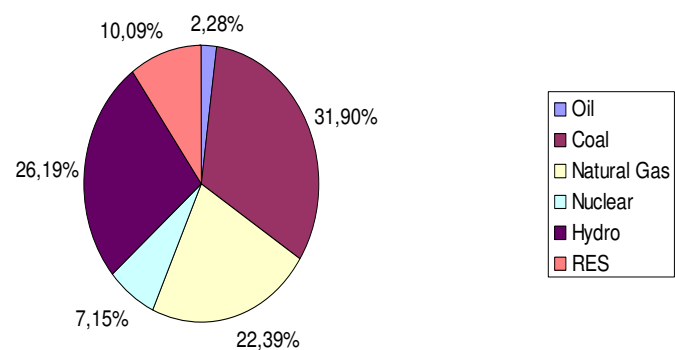


S.E. Europe Capacity Mix 2020

Capacity Mix 2020 (Installed Capacity MW) - Greece and Turkey excluded



Capacity Mix 2020 (Installed Capacity MW) - Greece and Turkey included



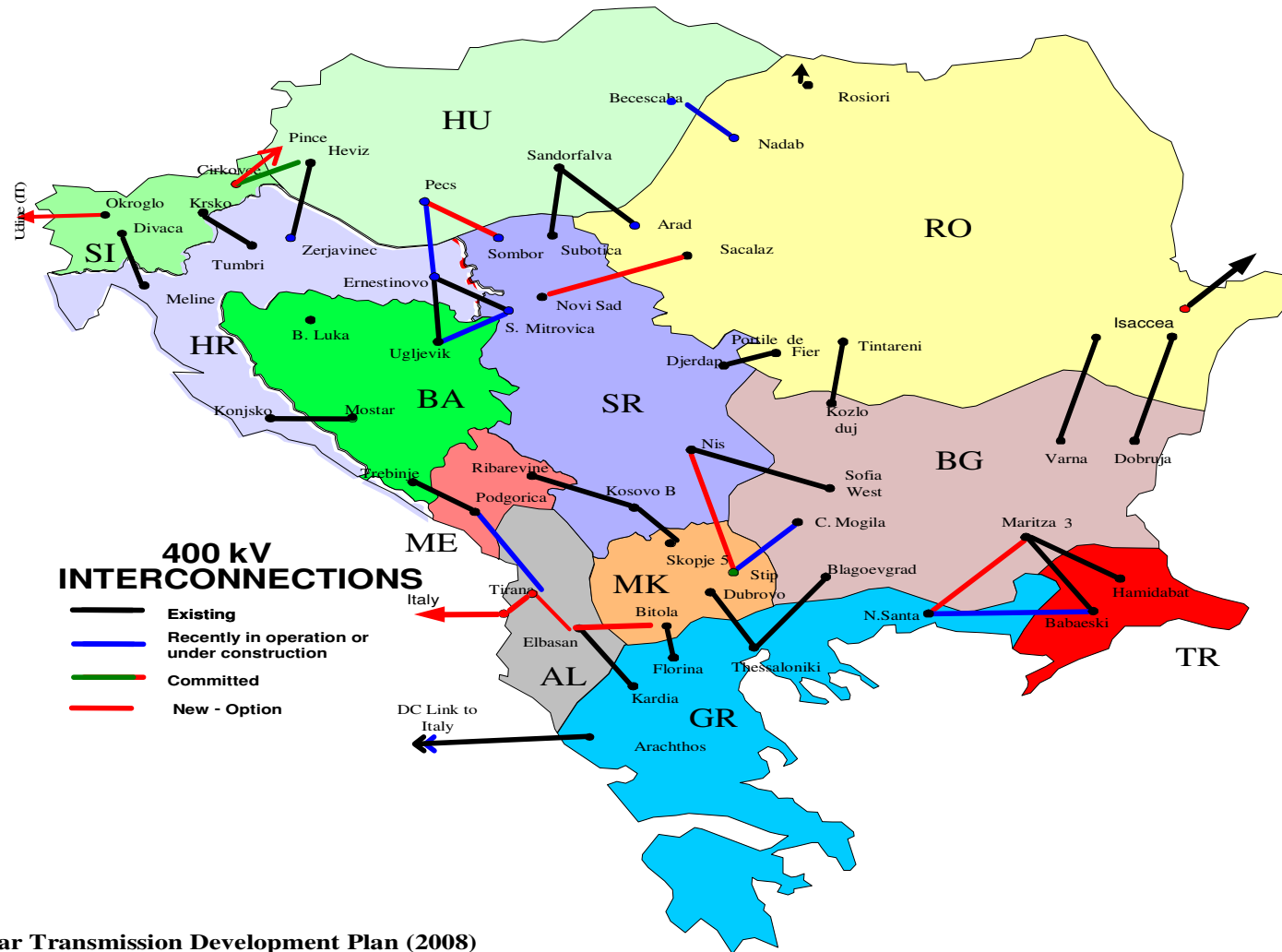


Nuclear Power Plants in South East Europe





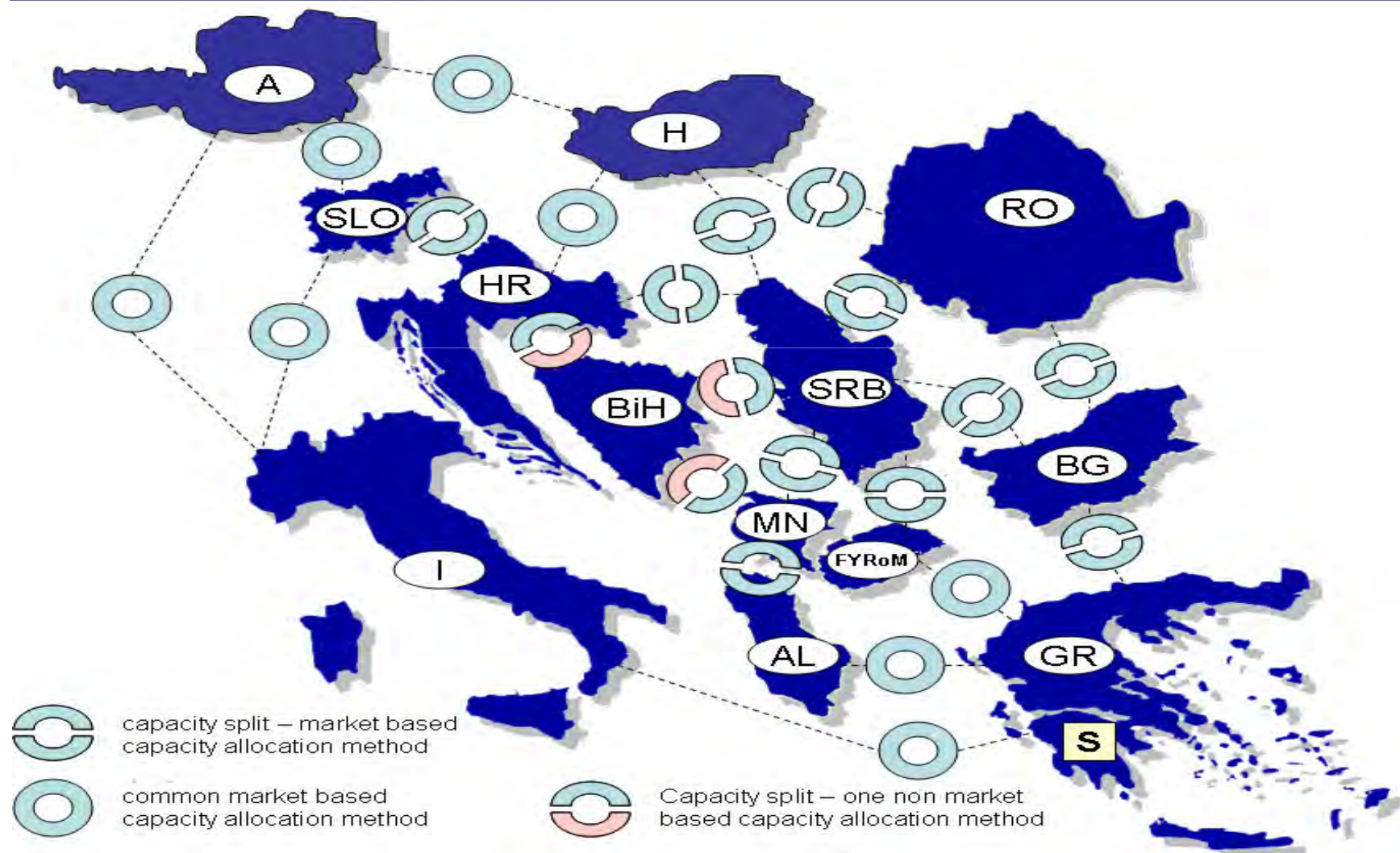
The 400 KV Interconnections in South East Europe



Source:
UCTE 10 Year Transmission Development Plan (2008)



Electricity Capacity Allocation System in S.E. Europe





S.E. Europe Renewables – Solar Thermal Market

Table 1: Installed capacity of solar collections in 2008 and the cumulative capacity

No	Countries	Installed capacity in 2008		Cumulative capacity, end 2008	
		in m ²	in MWth	in m ²	in MWth
1	Bulgaria	6,000	4.2	62,000	43
2	Cyprus	40,550	28	665,300	465
3	Greece	300,000	210	3,550,000	2,485
4	Romania	10,000	7	79,600	56
5	Turkey	NA	NA	12,000,000	8,400



Solar Photovoltaic Installed Capacity in SE Europe (end 2010)

Country	Installed Capacity (Mw)
Bulgaria	10.0 (e)
Cyprus	6.0 (e)
Greece	205.0
Romania	2.0 (e)
Turkey	5.0
Total	228.0

(e) – IENE estimate



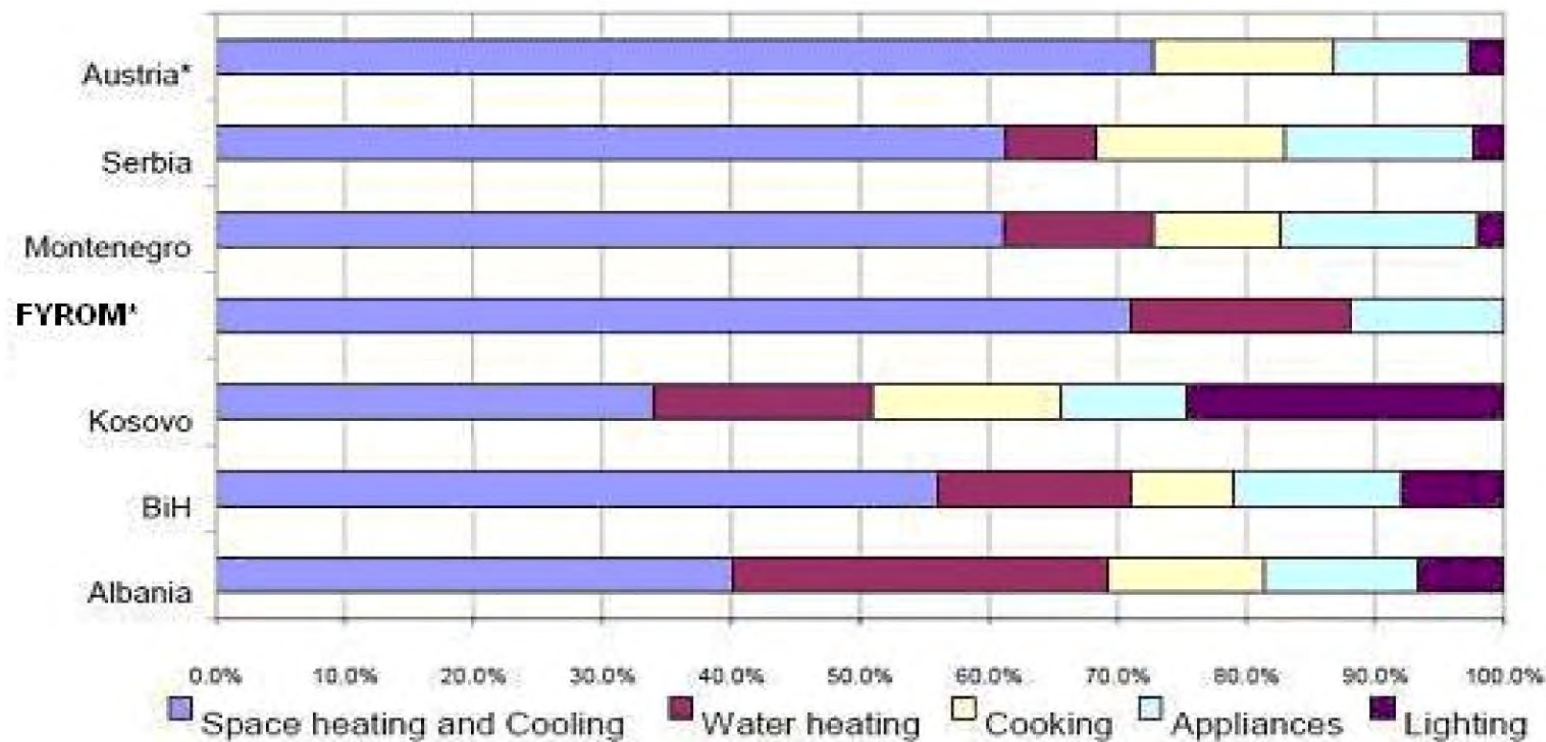
RES in S.E. Europe

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%



Energy Efficiency in S.E. Europe

Energy Consumption distribution in private households in Western Balkans: Austria as benchmark



Comment: In Austria, "water heating" is included in "space heating and cooling." FYR Macedonia only distinguishes between "space heating," "water heating" and "appliances." Source: Austrian Energy Agency, Local Consultants.



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 Turkey*
- **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*



Energy Demand Forecast in S.E. Europe

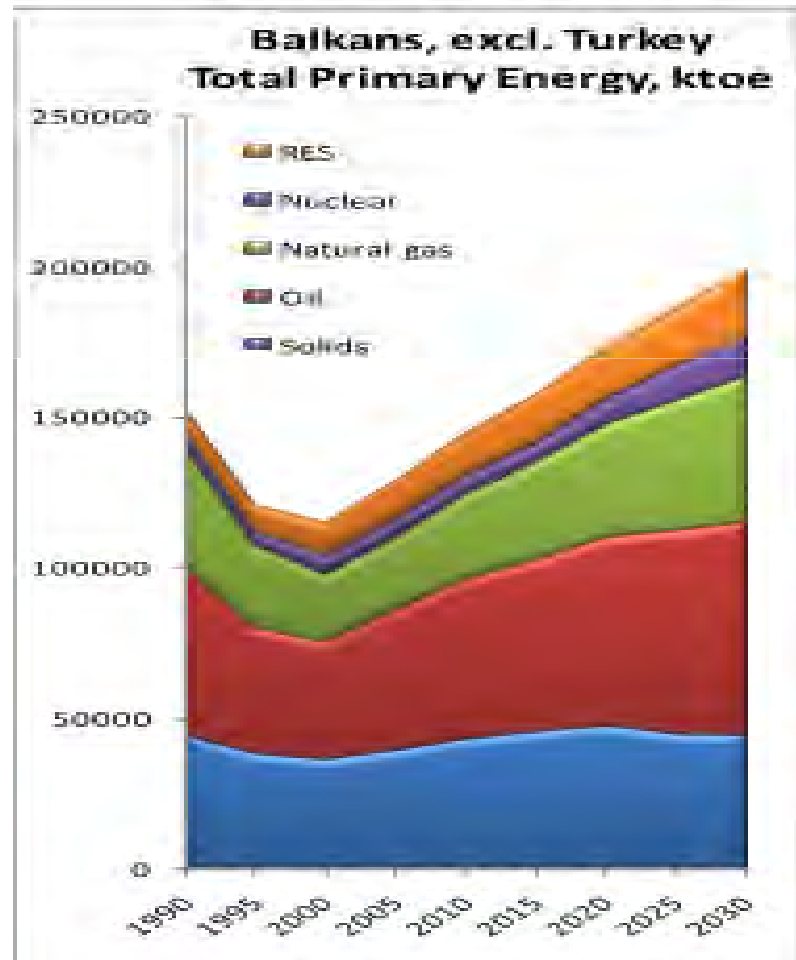
The Conclusions for the energy demand forecast for S.E. Europe can be summarized as follows:

- Economic growth scenarios for the Balkans after the financial crisis imply rather low growth of energy demand. The projections for Turkey differ than the rest of the SEE.
- Gasification trends and renewable deployment is a dominant trend; however future gas needs are found lower than expected in the recent past.
- The current trends in the SEE show a less climate-friendly evolution than in the EU₂₇ both regarding emissions and the RES. Security of supply is among the issues for concern.
- Applying the EU Climate Action and RES policy package in the entire SEE region induces significant changes: high energy savings, impressively more RES (wind and biomass) and some more nuclear close to 2030. Gas substitute's fossil fuels but total gas needs reduce slightly from baseline.
- However, such a policy implies higher electricity prices but a modest increase in overall energy system costs.

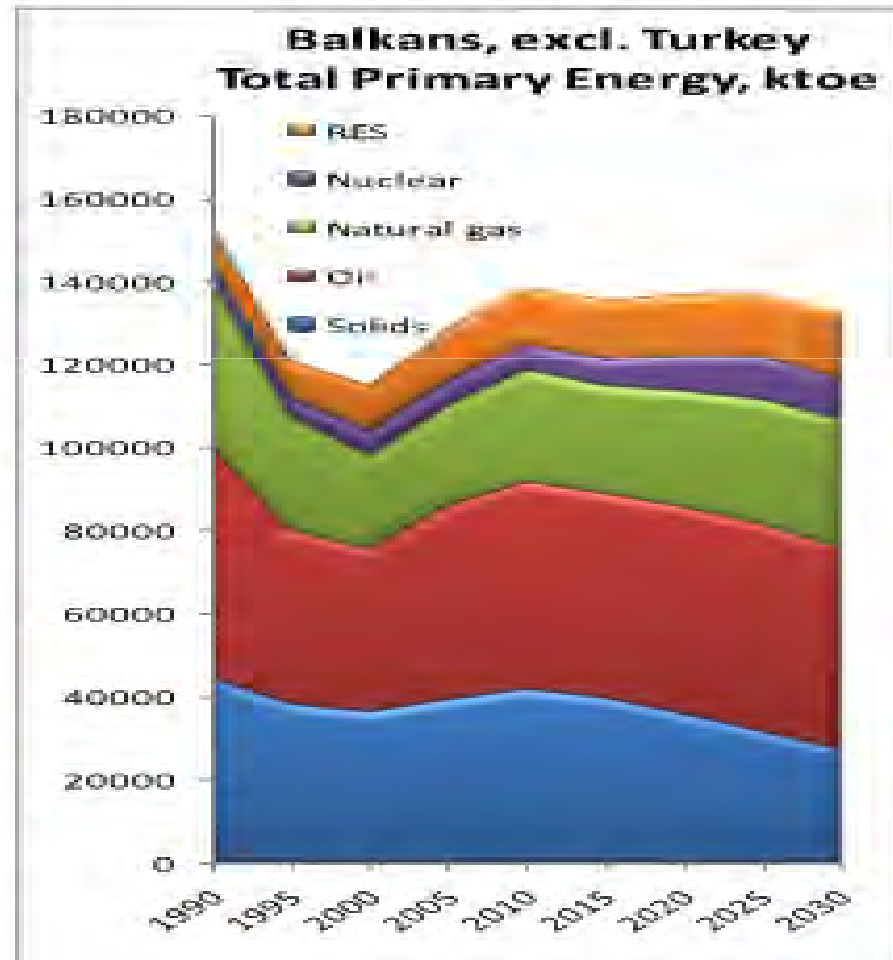


Structure of Primary Energy Consumption

View 2 years ago



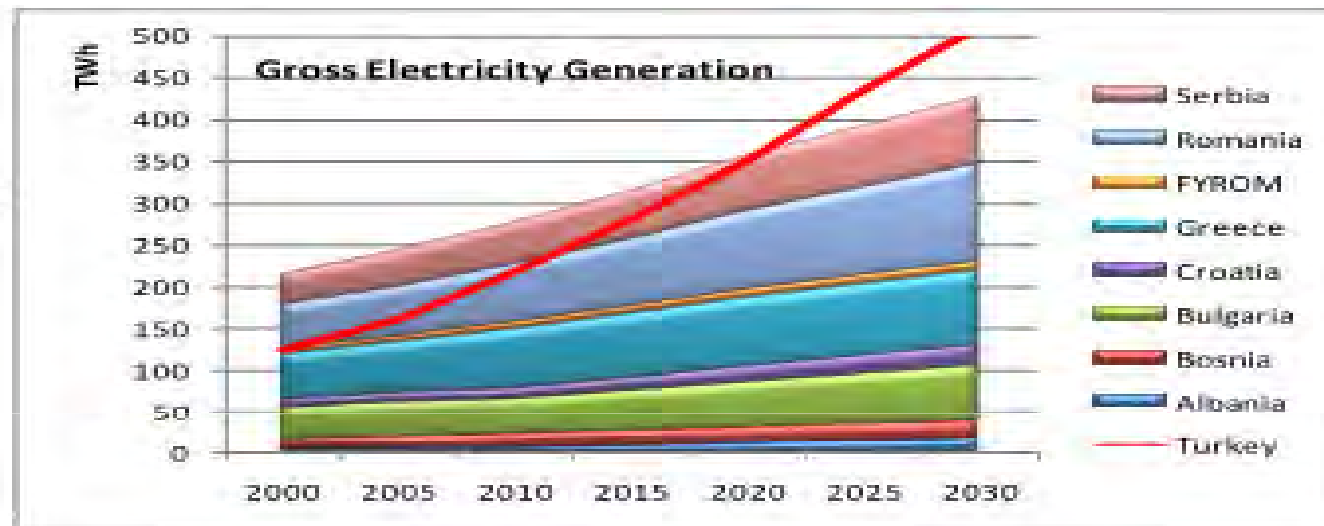
Current View



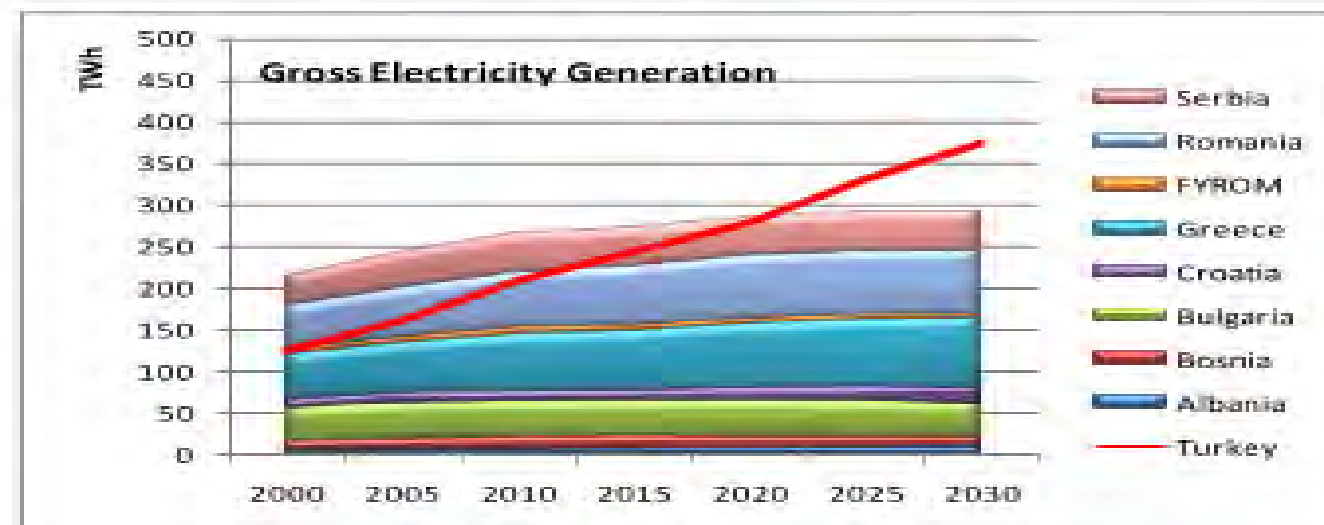


Electricity Sector

View
2 years ago



Current
View



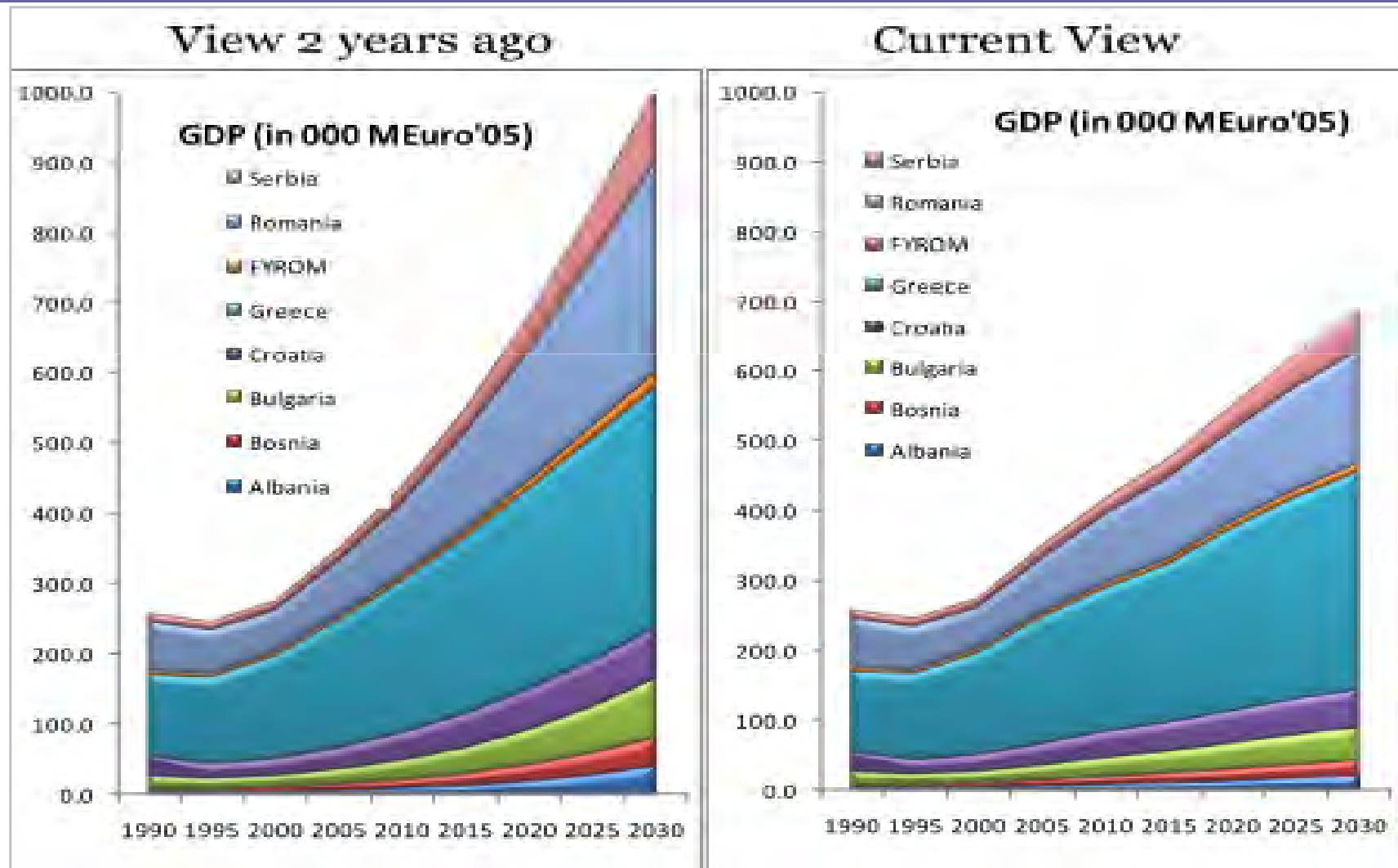


SE Europe Energy Outlook Key Messages

- Continuing Strategic Relevance of Coal
- Inadequate Progress on Electricity and Gas Market Liberalization
 - ✓ *Electricity*
 - ✓ *Gas*
- Very High Net Import Dependence and Unsatisfactory Import Diversification
- Underdevelopment of R.E.S.
- Low Infrastructure Inter-Connectivity in Oil & Natural Gas
- Positive Investment Outlook
- Significant Business Opportunities in:
 - ✓ *Upstream Sector*
 - ✓ *Gas Transmission and Distribution*
 - ✓ *Power Generation Plants (Steam Plants, CCP, Nuclear)*
 - ✓ *RES (thermal and electricity)*



Macroeconomic Projections for S.E. Europe





Major Oil and Gas Pipeline Projects in South East Europe

Project	Involved States	Capacity	Projected Cost	Date
BAP*	GR-BUL	700.000-1.000.000 b/d	€1 bn	2013
TAPCO*	TRK (ENI-Calik)	1.200.000-1.500.000 b/d	€3,5-4 bn	2013
PEOP*	RM-SERB-CRT-ITL	800.000-1.800.000 b/d	€1,8-2,6 bn	2015+
AMBO*	BUL-FYRM-ALB	750.000 b/d	€0,95 bn	2015+
ITGI*	TR-GR-ITL	11,6 bcm/y	€1,3-1,5 bn	2015
Nabucco*	TR-BL-ROM-HUN-AUST (RWE)	31 bcm/y	€7,9 bn	2015
TAP*	TR-GR-ALB-ITL	10 - (20) bcm/y	€1,5 bn	2015
South Stream*	(TR)-BL-GR-SERB-CRO-HUN-AUS-SLNV-ITL (EDF)	31 - (62) bcm/y	€10-12,5 bn (€20-25 bn)	2015
IGB*	GR-BUL (170km)	1,5-4,5 bcm	€160 mn (€45/EEPR)	2013
IBR*	BUL-ROM (30km)	1,5-4,5 bcm	€30 mn (€8,9 mn/EEPR)	2011
		1,5-4,5 bcm	€100-120 mn (€60? Mn / by Bulgarian ERDF)	
IBS*	BUL-SERB (180km)			2013
IRH***	ROMN-HUNG (109km)	4,5 bcm	€136 mn (€68/EEPR)	2010
			€~307 mn (€150 EIB loan to MOL for 205km)	
ICH**	CROT-HUNG (264km)	6,5+ bcm/y 5,5 bcm/y N-S 7,5 bcm/y S-N		2011

*Construction not started

** Under Construction

*** Commissioned on 14/10/2010



S.E Europe Investment Outlook for 2020

Sector	Investments (€ Billion)
Oil Upstream	40
Oil Downstream/Midstream (<i>incl. liquid biofuels</i>)	10
Electricity	
▪ Thermal Plants (<i>incl. nuclear</i>)	
▪ Lignite Mine Development	
▪ Grids - Upgrade and Expansion (<i>incl. metering systems</i>)	95
▪ HV Transmission Lines	
▪ RES (<i>Wind, PV, Biomass, Mini Hydro, Geothermal</i>)	
Gas	
▪ Main and branch gas pipelines	25
▪ LNG Terminals	
▪ Town grids	
Energy Efficiency (<i>inc. RES thermal</i>)	15.0
Mega Projects	
▪ Oil Pipelines	15.0
▪ Gas Interconnectors	
▪ Main gas pipelines	
Total	200



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