SE Europe Energy Outlook

2015/2016

Study Prospectus

March 2016

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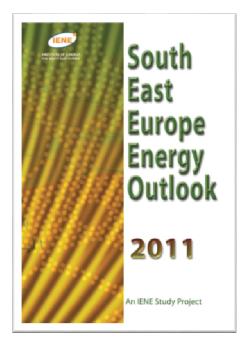
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Institute of Energy for SE Europe (IENE) 3, Alex. Soutsou str, 106 71-Athens, tel.:0030 210-3628457, fax: 0030 210-3646144 e-mail: info@iene.gr, website: www.iene.eu

1. An IENE Study Project

The SEEEO is a comprehensive study, which deals with the current energy situation in the SE European region but is also concerned with its 'Outlook" from now until 2025. The study covers all 13 countries of the region. These countries include: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Slovenia, Cyprus, Former Yugoslavian Republic of Macedonia, Greece, Kosovo, Montenegro, Romania, Serbia and Turkey.

This is the second time that such a major study is being undertaken by IENE. The first study was published by IENE in 2011 (see cover). The study contains substantial comparative data, detailed sectorial analysis, estimates and projections. After a compendious introduction, in which the economic and political background of South East Europe is thoroughly presented, the study examines the impact of the regional integration process on SE Europe's energy prospects. The advent of EU's Energy Union is also discussed and analysed in relation to its anticipated catalytic role in accelerating energy market integration in SE Europe. The study comprises four main parts: country energy surveys, regional economic and energy analysis, sectorial analysis and energy investment outlook. It also includes energy demand and supply projections for 2020/2025 and beyond.



The regional energy sector analysis focuses on the region's economies, on oil (upstream, midstream, downstream), natural gas, power generation, renewable, energy efficiency, cogeneration and environmental issues. A major part of the study concerns the individual countries of the region and contains an energy overview of each one of them. A set of original energy maps for the region has been created, together with comparative data tables and economic analysis.

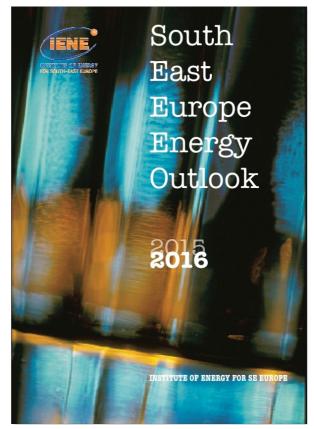
Another important part of the study covers the energy interconnections in South East Europe and in the Black Sea region for oil, gas and electricity. The major energy projects in the region (oil and gas pipelines, gas storage, nuclear plants, hydrocarbon exploration projects, refineries, RES installations) are described and fully analysed. The study also covers latest developments in the energy market liberalization process but also the environmental and energy security considerations in South East Europe. The study concludes with an in depth analysis and projections of the current and future investment potential and business opportunities of the region's energy sector. The structure of the study is presented in the Table of Contents which follows.

The current "SE Europe Energy Outlook 2015/2016" (see cover) study was carried out over the last two years (2014-2015) largely based on IENE's ongoing study research and analysis of the region's key energy issues. The need for this study emerged from IENE's quest to understand the geopolitical and geographical sphere within which it operates, but also to

define and evaluate in an objective manner the major policy challenges which lie ahead in the energy sector of the region. Parallel to that, was the equally important need to identify the important investment and business opportunity areas across the region.

Judging from the present body of work and the extensive database which IENE has built over the years on SE Europe's energy sector, we can safely say that IENE is fulfilling one of its primary goals, which is to acquire an in-depth understanding of energy markets operation and an assessment of their potential development in SE Europe. The depth of analysis, the substantial statistical data and the detailed regional and country profile information included make the study a useful tool, sort of an energy atlas of SE Europe.

Given the current state of affairs in SE Europe and the constant flux, which characterizes most energy markets and the fact that certain key transnational projects, such as main oil and gas pipelines, have suffered serious drawbacks, with final investment decisions being



constantly postponed, and which is bound to affect investment in the energy sector as a whole, the study provides some useful insight on background developments, at both government and company level, which are likely to affect the outcome of key projects over the coming years.

One of the key observations of the study is the need for a much better organized and continuous market surveillance and analysis. This is necessary if we are to understand better and interpret the development and trends of the energy sector in the region. The poor statistics and lack of reliable information on projects and energy flows in general, from several countries in the area, make such a task cumbersome and tedious. IENE is already addressing this challenge in close co-operation with knowledgeable and reliable contacts and partners in each country with considerable part of its work now devoted towards this direction. In this respect, IENE is in the process of building up a detailed energy database for the region, while its goal remains the updating of this Outlook study once every three years.

2. Energy Issues in SE Europe

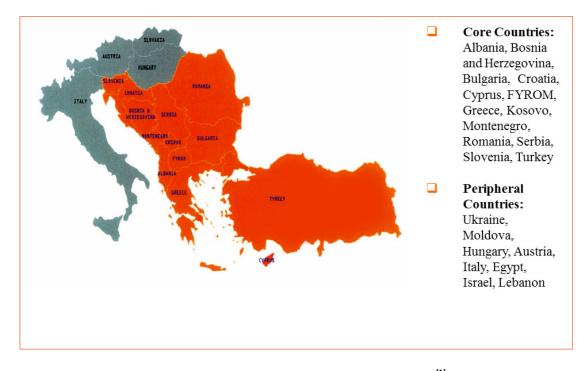
One of the main purposes of this study is to bring together the latest available knowledge on energy developments in the region and also provide comprehensive data on energy demand, energy consumption, the assessment of major energy projects and pursued energy policies as well as trends, estimates and projections. In short, the scope of the study is to present a critical assessment of the current status of the energy market at large in SE Europe and at the same time provide an insight on future developments. In addition, the study covers the economic and political background of South East Europe and includes analyses on the dynamics of the regional integration process and the impact of EU's expansion on economic development and the energy markets.

The energy sector constitutes a major economic activity for most countries in SE Europe with a significant contribution to infrastructure investment. Even more important is the geopolitical role often associated with energy issues as they normally involve bilateral or even trilateral co-operation. A number of key energy projects are currently under development across the region including major oil and gas pipelines, power plants(comprising nuclear ones), renewable energy applications (e.g. wind farms, photovoltaic plants, geothermal plants, solar water heating installations etc.) and large-scale energy efficiency interventions in the building sector.

SE Europe's geopolitical position is unique as an energy bridge between eastern producers and western consumers. In this respect, the importance of the region's diplomatic, strategic and economic advantages, which may result from extended electricity and gas interconnectors for the whole SE Europe is considered in the study. The study also covers latest developments in RES markets while it analyses the high potential of renewable sources in SE Europe such as solar, wind, hydro, biomass and geothermal.

The region of SE Europe is characterized by distinctly different (in terms of structure and operation) and frequently segregated, energy "markets" in various stages of development. In this sense, the present Outlook reviews the energy sectors and policies of individual countries by focusing on key policy challenges that need to be addressed over the next five to ten years. This study further attempts to discuss these policy challenges at a regional level and propose necessary initiatives both as part of the transition process envisaged within the Energy Community (*i.e. electricity and natural gas markets*) but also within EU's energy policy targets for EU member countries (Greece, Cyprus, Bulgaria, Romania, Croatia, Slovenia) and associated ones (i.e. Turkey). In this context regional oil and gas pipeline projects, electricity interconnections, energy market liberalization issues as well as environmental considerations are discussed.

Inevitably, a large part of the aforementioned discussion focuses on the need to upgrade and expand energy infrastructure, as it is anticipated that the region will benefit from a robust economic recovery, with likely growth rates considerably higher than other parts of Europe. It has to be noted that a considerable part of the region, comprising more than half of its land mass, was until 25 years ago governed by Soviet type economies, while many of them were part of the COMECON group. In this sense, the still incomplete process of moving from a centralized type economy to an open economy, with all the implications that such a move entails for the energy sector, still dominates economic activity and government policies of several countries. In addition, to the pressures for market liberalization, the region has to cope with some major reconstruction issues which pose an additional financial burden to already fragile economies.



Map 1. The South East European Area Defined

In the case of Western Balkans as pointed out by an IEA survey⁽¹⁾much of the energy infrastructure was damaged during the conflicts related to the break-up of the Socialist Federal Republic (SFR) of Yugoslavia in the 1990s. The rebuilding process has been long and difficult and is still going on. Consequently, these countries have initiated energy reforms at a later stage than other European economies in transition. Electricity systems in some parts of the region still remain fragile and as a result low system reliability and low efficiency impede economic recovery. However, reliable and affordable energy supply is crucial for economic development and social welfare, not only across Western Balkans but for the whole S.E. Europe region.

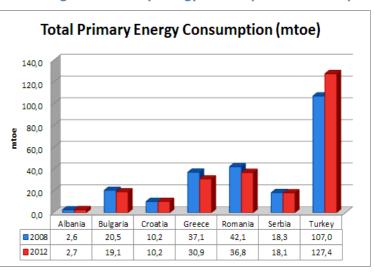
Treating the S.E. European area as a whole, in the sense of a homogeneous regional entity, although necessary, for the purpose of the current study, has not been easy since the constituent parts are far from uniform in terms of defining characteristics. A multitude of tiny, small and larger new nation states, but with very old origins, now comprises the Western Balkans area, and stand opposite the older (in terms of national boundaries) countries of the Eastern Balkans, with Greece's mountainous island like structure on the south and Turkey's huge continental expanse on the east.

A brief look at the map of SE Europe (Map 1), as previously defined, and a cursory examination of its basic economic and energy statistics will reveal the great disparities that exist between the countries of the region. There are marked differences over a wide spectrum of economic and social parameters to an extent that makes one wonder if there is any merit in pursuing a common stand in the hope of establishing integrated strategies for the area. On the other hand, it is evident that the relatively small and fragmented states of S.E. Europe can no longer move alone and pursue truly independent economic, let alone energy policies. Even the largest states of the region such as Turkey, which enjoys a strong geopolitical position, needs to develop close ties and partake into the energy policies of

⁽¹⁾ IEA, "Energy in the Western Balkans – The path to Reform and Reconstruction", 2008.

neighboring countries, like Bulgaria and Greece, in order to advance its own energy interests. Thus, a sense of interdependence becomes inevitable. As a result, all countries have their eyes set towards the broader region of South East Europe where the development of meaningful economic relations and cooperation, based on mutually beneficial policies, have energy as their common denominator.

However, one should adopt a approach realistic when investigating the energy situation of the region by identifying at an early stage the serious imbalances that exist between the East and West Balkans in terms of energy demand, supply and infrastructure. As part of our integrated examination of the peculiarities of S.E. Europe we must single out Turkey, whose position, because of its size (much bigger than any of the other state of the region) and



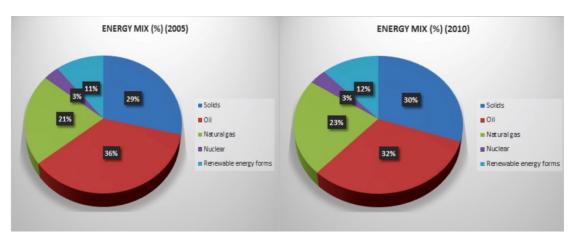
geographical position has to be viewed in context. Turkey's role, in relation to the rest of S.E. European countries, in the forging of common energy strategies and energy market integration (in both electricity and gas) is as important as that of Greece in influencing the developments in the rest of the region. The abbreviated energy data for the region, as shown on *Figure 1*, which includes the Primary Energy Consumption for each country, can help us understand the region's diverse energy scene. This is characterized not only by market disparities in terms of population, economic development and energy infrastructure (e.g. installed electricity capacity, gas use, oil consumption), but also by the region's great dependence on energy imports (see Fig. 2).

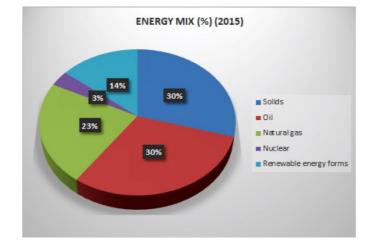


Figure 2. Energy Dependence in SE Europe

Figure 1. Primary Energy Consumption in SE Europe







Indeed the region's overdependence on energy imports (see Fig. 3) is a defining characteristic of its economy and in that respect considerable emphasis is given in the study of the negative economic impact from substantial oil and gas imports but also on the efforts currently in place to develop further indigenous hydrocarbon production and RES utilization.

Although the per capita primary energy consumption of SEE countries is about half of that of more developed European countries, consumption per unit output is two to three times the OECD-average, while the Purchasing Power Parity (PPP) indicator is increasing continuously making most countries more dependent on energy imports with more investments required for grids and electricity generation. With the diversification of energy routes and energy gas suppliers emerging as the most important strategic issue of the entire region with direct consequences for energy security.

S.E. Europe is strategically located between the hydrocarbon-rich regions of the Middle East and the Caspian basin, including Russia, and the big energy-consuming states of Western and Central Europe. Thus, the region is well positioned to play an important role in the transiting of hydrocarbon resources and in the diversification of oil and gas supplies, both within the region itself and for Europe as a whole. At present, gas markets in the East Balkans although in existence for many years are still at an early stage of truly commercial development while those in Western Balkans are small, and in some areas non-existent, but have an excellent potential for growth.





It should also be noted as a general observation that many countries in the region depend heavily on coal and lignite for power generation. Cost-effective expansion of generating capacity would produce a more diversified mixture, including new technology more efficient lignite power plants (with less CO2 emissions), gas-fired combined cycle and CHP, and renewables including hydropower, with the balance being determined by the prevailing prices for fuel and CO₂emissions. This would support a more sustainable energy mix for the region and would lower its carbon and overall energy intensity.

The composition of SE Europe's energy mix for three different but recent time periods is shown in *Figure 4*. The energy mix presented in the charts take into account Turkey's energy sector composition. In our various calculations a distinction is made as to Turkey's participation (with and without Turkey) as the country's size and energy magnitudes are significant in comparison with the other countries of the region and therefore if seen together with the East and West Balkan region, they tend to distort the overall picture. However, in both cases, solid fuels, which include coal and lignite, maintain their strong position which albeit has increased to a 30% share in 2015 compared to 29% in 2005. Likewise, oil's share remains strong in 2015, somehow reduced in the pie, which includes Turkey, at 30%, and unchanged without Turkey at 39%. Solid fuels and oil's dominance and the inherent difficulties in decarbonizing the region are discussed in detail in the relevant chapters of the Study.

The role of natural gas is also important, the share of which in the case that Turkey is included in our calculations,

increases from 21% in 2005 to 23% in 2015, but decreases if we leave Turkey out, from 19% in 2000 to 17% in 2015. This is understandable if we consider latest developments in the region where natural gas has not made significant inroads in the West Balkans as they remain largely without gas infrastructure, while gas use in Bulgaria and Romania has not increased substantially. On the other

Figure 4.Gas Interconnections in SE Europe

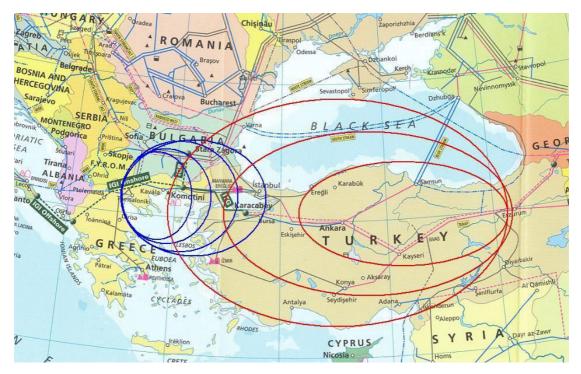


hand, natural gas over the last decade has expanded impressively in Turkey but less so in Greece and Bulgaria.

In both cases, with Turkey and without, nuclear's share for power generation remains small, 3% and 5% respectively, as no new nuclear capacity has come on stream. In sharp contrast shares of Hydro and Renewable Energy Sources (RES) have increased considerably making significant impact for power generation.

A common feature of the S.E. European region (with the exception of Greece and Turkey) is that key elements of the region's energy infrastructures (e.g. gas pipelines, major thermal power plants) were built in the 1960s and 1970s, based on standard Soviet era technology. This concentration in age and type of technology, combined with inadequate maintenance, is now creating serious challenges in terms of infrastructure upgrades. Therefore, there is an urgent need for widespread rehabilitation and replacement of ageing infrastructure. While some markets are particularly affected by low day-to-day efficiency and the constant risk of technical failure.

Another important observation is that almost all countries (with the exception of Romania and Croatia) depend heavily on hydrocarbon imports, from outside the region. Shared infrastructure also creates a high level of interdependence within the region itself. For instance, all countries participate in extensive daily and seasonal exchanges of electricity, Serbian oil refineries rely on deliveries through the Croatian pipeline network and FYROM imports all its crude via pipeline from Greece.



Map 2. The Thessaloniki and Istanbul Proposed Gas Trading Hubs will between them cover a wide geographical range and adjacent trading zones

Source: The Outlook for a Natural Gas Trading Hub in SE Europe, an IENE Study Project (M19), September 2014

An analysis of the data reveals the region's huge dependence on oil and gas imports. With total oil consumption nearing 1.9 million barrels of oil per day and local production at only 0.25 million barrels, the region is 87% dependent on outside oil supplies, a situation which is slightly better in the case of natural gas where import dependence is nearly 78%. With oil and gas consumption set to increase over the coming years the energy security situation is bound to worsen at a time when the international situation in terms of security of supply tends to become more uncertain.

The electricity sector and its further expansion constitute the backbone for the region's economic and energy development. The electricity mix which is shown in *Figure 6* has significant diversity as the prime fuel for power generation varies considerably from country to country. In the West Balkans hydroelectricity as well as coal (i.e. lignite) form the basis for power generation with Albania relying almost 100% on hydro, while Kosovo depends 100% on lignite and the other countries enjoy a mix based on oil and gas. On the other hand, in the East Balkans the energy mix for power generation is more diversified with the addition of nuclear energy and the wider use of natural gas, which is the case in Bulgaria and Romania, whereas Greece and Turkey rely heavily on lignite and steam coal but with growing inputs from Renewable Energy Sources including wind, photovoltaic and hydro electricity.

Since the early 2000, electricity transmission operators (TSO) in the region have focused on two priority areas, (*a*) the rehabilitation of grids and interconnections in the area of Western Balkans, and (*b*) the building of interconnections in order to handle even more demanding electricity flows between the various countries as witnessed by latest developments in the case of the East Balkans.

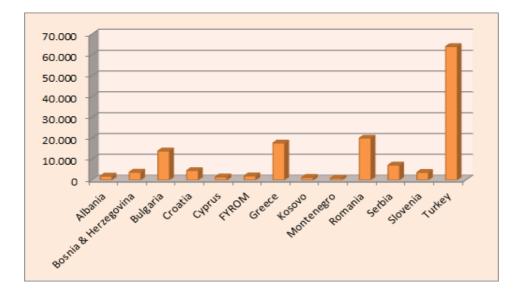


Figure 5.Total Electricity Installed Capacity in SE Europe (2013)

The latest such addition being the interconnection between Greece and Turkey and the upgrading of the connection between Turkey and Bulgaria. The linking of the various national electricity networks through trans - border high - voltage connections and their synchronization with the UCTE has improved security of supply, diversified supply and export options and enabled further trade within the region and beyond its borders. However, in certain cases interconnection capacity still remains low given the existing potential for cross - border trade.

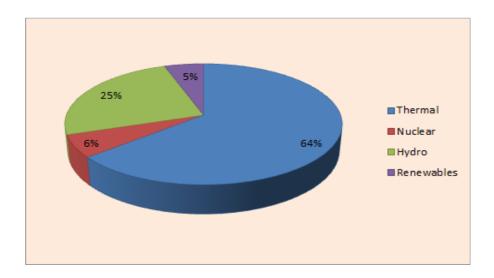


Figure 6.The Power Generation Mix in SE Europe, including Turkey (2013)

3. Who Will Benefit from the Study?

This major publication, expected to run well into 600 pages, will be of benefit to a wide range of energy market participants but also to various government departments and energy related state entities and international organizations. The study will also be very useful to banks and financial institutions involved with the financing of energy projects. The SEEEO 2015-2016 will be of great interest too to local and international law firms with active advisory involvement on energy issues for major clients.

The following is a list of the type of companies and organizations to whom this IENE outlook study will be useful:

Electricity utilities	Regulatory authorities
Independent power producers	Regional development organizations
Electricity trading companies	Law firms
Integrated oil companies	Banks and financial institutions
Oil marketing companies	Consulting and engineering companies
Hydrocarbon exploration and production companies	International accounting firms
Gas distribution and trading companies	 Investment funds Market & equity analysts
• Electricity and gas transmission operators	GovernmentsInternational organizations

4. Publication Timetable

According to the current schedule the study's first Draft Report will be ready by late April 2016 while the final report is anticipated to be completed by the end of May following review by the International Energy Agency (IEA). Publication of the Outlook is planned for June 2016.

5. Study Contents

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Acknowledgements Study Organization and Contributors

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(political, geopolitical and economic background of the region)

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- The Russian Ukrainian conflict and its impact in securing energy supplies in SE Europe (including Russia's bid to bypass Ukraine)
- The role of Turkey in regional energy security
- The Greek bridge
- West Balkan's energy security challenges
- The rising importance of indigenous energy supplies
- Building a secure energy environment in SE Europe

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- The Eurozone and SE Europe's Economy (to include a discussion on latest post crisis developments in Greece and Cyprus)
- Macroeconomic Outlook
- Bulgaria, Romania, Croatia and Slovenia: Structural economic challenges following EU entry
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- (b) Bosnia and Herzegovina
- (c) Bulgaria
- (d) Croatia
- (e) Cyprus

²Each Country Profile to include information on energy demand/consumption characteristics, existing and planned energy infrastructure, major projects under development and the legal framework

- (f) FYROM
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- IV. Sponsors' Profiles
- V. The Institute of Energy of SE Europe

6. Contributors

> The IENE Team

Group A (inhouse)

- Mr. Costis Stambolis, Executive Director, IENE, Study Editor
- Mr. Nicholas Sofianos, Research Projects Co-ordinator of IENE, Associate Editor
- Mr. Anastasios Mastrapas, Research Associate, IENE
- Mr. Dimitrios Mezartasoglou, Research Associate, IENE
- Mr. John Chadjivassiliadis, Chairman, IENE
- Mr. Constantinos Theofylaktos, Chair, Energy Efficiency Committee, IENE
- Ms. Afroditi Fillipaki, Editorial Assistant, IENE
- Ms. Eleni Evangelatou, Administrative Assistant, IENE

Group B (external associates)

- Professor Pantelis Capros, Head EC3 Lab, NTUA and Chair of IENE's Scientific Committee
- Mr. Gus Papamichalopoulos, Partner, KG LAW FIRM- Secretary General of IENE
- Dr. Sotiris Douklias, Senior Associate, KG LAW FIRM
- Mr. Stratos Gonithellis, Associate, KG LAW FIRM
- **Dr. Michael Thomadakis**, Natural Gas Expert, ex Deputy Chairman, Regulatory Energy Authority, **Greece**
- Dr. Michael Loufir, Head of Emerging Markets Research, National Bank of Greece, Greece
- Dr. Nenad Stefanovic, Electricity Expert, AERS, Serbia

Group C (Study contributors from the region)

- Ms. Eugenia Gusilov, Director, ROEC, Romania
- Dr. Stavri Dima, Head of Primary Policies Sector, Ministry of Economy, Trade and Energy General Policies Directorate, Albania
- Mr. Solon Kassinis, Director, Kassinis International Consulting, Cyprus
- Professor Vesza Borozan, University "Sts. Cyril and Methodius"-Faculty of Electrical Engineering and Information Technologies, FYROM
- Mr. Mihailo Mihailovic, Independent Energy Consultant, EPS Advisor, Serbia
- Mr. Slavtcho Neykov, President of the Management Board, Energy Management Institute, Bulgaria
- Mr. Aleksandar Mijuskovic, Executive Director, Coordinated Auction Office in South East Europe, Crnogorski Elektroprenosni, Montenegro
- Dr. Franc Cimerman, Technical Director, Plinovodi, Slovenia
- Mr. Gokhan Yardim, General Manager, Turkerler Energy and Investment Holding Turkey
- Prof. Dr. Osman Sevaioglu, Dpt. of Electrical and Electronics Engineering, Middle East Tech. University, Turkey

7. Sponsorship Opportunities

(i) Study Funding

The budget for this major IENE study project runs approximately to 250,000 euros. This sum covers IENE's related overheads over the course of 18 months, travel and associated expenses, specialized sub-studies, workshop organisational expenses, editing and proofread costs, page layout and printing costs, promotion costs including study presentation and road show expenses. Raised funds are also used to cover professional fees and expenses for the 20 strong IENE team engaged in the major project. As is the case with most IENE projects funding for the "SE Europe Energy Outlook" is obtained entirely in the form of sponsorship from companies and organizations active in the broad energy field in SE Europe.

It should be noted that this new edition of the study has already attracted interest by a number of major energy companies with extensive business interests in the area.

Lead Sponsor

- There is going to be only one lead sponsor.
- Company representative(s) will be able to participate in all meetings of the Study Coordination Group and any Workshop(s) to be organized.
- The Lead Sponsor will have the right to comment on both the First and Final Drafts of the study and will generally cooperate with IENE in the development of the study.
- Company executives will be able to contact freely and exchange views with the study group.
- The Lead Sponsor will receive free of charge (12) copies of the printed version of the study and several copies in electronic form.
- The Lead Sponsor's company extensive profile to appear in both the published and the electronic version of "The SE Europe Energy Outlook 2015/2016".
- Appearance of the company's logo in a prominent position of the Study's published version as well as on the back cover, where all sponsors' logos will appear.
- The Lead Sponsor's name to be mentioned in all Press Releases to be circulated by IENE relevant to the Study.
- IENE will provide extensive publicity for the Lead Sponsor on both IENE websites (www.iene.eu and www.iene.gr) as well as through sites and publications of the Study's media partners (energia.gr and www.seenews.com).
- The Lead Sponsor's logo will be printed on the invitations to the official study launching in Vienna and Athens and in all road shows which will follow to be organized in other major cities in SE Europe and beyond.
- The Lead Sponsor's logo to appear on all banners to be placed in the various venues where the Study will be presented.
- A representative of the Lead Sponsor will have the opportunity to address all road shows where the study will be presented. During a 5 month period in 2016 road shows will take

place in the following cities: Vienna, Athens, Bucharest, Belgrade, Ankara, Sofia, Istanbul (tbc) and Paris (IEA Headquarters).

- The Lead Sponsor will have the right to invite a number of its executives and associates to attend all road shows.
- The Lead Sponsor will have the right to distribute promotional material about the activities of his company in all road shows for the study presentation.

Lead Sponsor's contribution: 45.000 Euros

Sponsors

- There is provision for the participation of several sponsors
- One company representative from each sponsor will be able to participate in the Regional Workshop to be organized in Athens in February-March 2016 to review and discuss the study's First Draft.
- Sponsors will have the right to comment on the Study's First Draft.
- Each Sponsor will receive five copies free of charge of the printed version of the study and several copies in electronic form.
- The Sponsor's concise company profile to appear in both the printed and electronic versions of the study.
- Appearance of the Sponsor's logo on the second or third page of the Study's final version as well as on the back cover, where all sponsors' logos will be published.
- Each Sponsor's name to be mentioned in the various Press Releases to be circulated by IENE relevant to the Study.
- Printing of the Sponsor's logo on all signs and banners to be placed in the various venues where the Study will be presented.
- Each sponsor will have the right to participate in the road shows by nominating one of its executives to address up to two (2) of the events. Selection of the events where the sponsor will have 15' to make an intervention or presentation will be made in consultation with IENE.
- Each sponsor will be invited to nominate a number of its executives and associates to attend the study's official launching and participate in all road shows.

Sponsor contribution: 25.000 Euros each

Supporters

- There is provision for the participation of several supporters
- One company representative will be able to participate in the regional Workshop to be organized in Athens in February-March, 2016 to review and discuss the study's First Draft.

- Each Supporter will receive two copies free of charge of the printed version of the study and copies in electronic form.
- The Supporter's company profile to appear only in the electronic version of the study.
- Appearance of the Supporter's logo on the second or third page of the Study's final version as well as on the back cover, where all sponsors' logos will be published.
- Printing of the Supporter's logo on banners to be placed in the various venues where the Study will be presented.
- Each supporter will be invited to nominate up to five (5) of its executives and associates who will be invited by IENE to attend the study's official launching in Vienna and Athens.

Supporter contribution: 15.000 Euros Each

<u>Note</u>

All sponsorship amounts are liable to VAT if the company of the sponsor is resident in Greece. No VAT is applicable if the sponsor's company or its nominated representative is resident in any of the 28 EU member countries.

8. About IENE

The Institute of Energy for South East Europe (IENE) was founded in 2003 by a small group of independent professionals and business executives active in the energy sector of the region. The Institute, which has its headquarters in Athens, Greece, is a nongovernmental and nonprofit organization (see <u>www.iene.eu</u> for further information and also Appendix I).

Goals and Objectives

The Institute's prime purpose is to constitute a permanent forum where energy issues can be discussed, analyzed, reformulated and presented to a broader audience, in unbiased, objective and credible terms. This is achieved thanks to the Institute's scientific standing, its managerial rectitude and the transparency of all its operations.

One of IENE's key objectives is to participate in the formulation of energy policies, both at national and international level, within the broader region of South-East Europe. These policies focus on rationalizing the production and utilization of both conventional and renewable sources of energy. IENE is thus contributing towards the implementation of the European Union's sustainable strategy which combines social and economic development with environmental protection. The Institute aspires to play a significant role in providing public opinion with factual and unbiased information on subjects concerning energy, the environment and sustainable development.

Mission and Vision

IENE's **Mission** is to promote a broader understanding of the key energy issues in the region and provide a suitable platform for the exchange of views and information, open to professionals, companies, stakeholders and others who are actively involved in the energy sector.

The **vision** of IENE's founders and those of its members is to establish the Institute as the leading energy think tank in the region and at the same time develop a highly credible and worthwhile range of services covering research, assessment studies, sectorial surveys, educational activities, event organisation and networking. These services to be offered primarily to its members, but also to government and industry and other important stakeholders. As part of its vision IENE is committed to developing high level research and analysis capabilities, with the involvement and in cooperation with leading energy experts from all different countries of the region.

The timely dissemination of information and analysis is an integral aspect of IENE's work with the aim of facilitating the understanding of central policy and complex technical issues thus helping to promote an informed public debate. The establishment of serious and dispassionate dialogue on SE Europe's key energy and environmental issues is seen as part of a democratic policy making process to which IENE is fully committed.

Operation

The Institute's headquarters are in Athens while it has a well established network of associates in all countries of the region and beyond. A small number of permanent administrative and secretarial staff (8 people in all including the Executive Director) is

responsible for manning the Institute's daily operations. This staff, backed by few external associates, is responsible for research and studies, newsletter preparation and editing, event organisation and maintaining links with local, regional and international organisations (see <u>www.iene.eu</u> under Organisation and Management for a detailed insight into IENE's structure and operation).