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Energy, Logistics, Tourism: Sectoral Prospects, Incipient Investment Projects and Contribution to GDP

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1. Introduction [1]

The Greek economy, after a lengthy and painful adjustment process in which macroeconomic disequilibria were corrected, is in search of dynamic and sustainable growth rates for the years to come. A necessary requirement in this pursuit is the transformation of its growth model, from a model based on credit-fuelled consumption, to growth driven by investments and exports. While the relative discussion has taken centre stage for some time now, propositions as to its exact content remain generic and rather vague. The current study contributes to this direction; it reviews some of the most important investment projects that are either already being implemented or are under consideration in Greece in three strategic sectors of the Greek economy: energy, logistics and tourism. These sectors constitute areas of -actual and potential- comparative advantage for the Greek economy, they contribute to the growth model transformation as they are exporting sectors or sectors substituting imports and create economies of scale and scope with other exporting activities. This is by no means an exhaustive list as other sectors possess similar characteristics. For example, manufacturing is an area of priority and it is encouraging that it shows signs of dynamic recovery recently. Yet, the said three sectors have already attracted investor interest, either exploratory or materialized. Under the conditions of economic policy trust, credibility and reduction of uncertainty, this interest can translate into measurable greenfield investment of considerable size and completely change the economic landscape, thereby complementing the specialization paradigm of the Greek economy.

The Greek economy needs a ca €86bn net increase in the capital stock in 2010 prices just to reach the level of the 2010 peak. In addition, the composition of investment has to change. Residential real estate, which collapsed during the crisis, should increase again but it cannot be expected to be the locomotive of growth. A more extrovert and knowledge-based growth model requires to focus on investment in machinery & equipment, non-residential construction, civil engineering and R&D. Overall, Greece needs a sustainable increase in all GFCF components which, would bring them at least in line with EZ averages as percentages of GDP and, preferably, higher, if the country is to converge to EZ living standards. The projects reviewed in this study, if completed, can contribute a great lot in achieving the quantitative, as well as the qualitative target.

[1] The authors wish to thank Nikos Karamouzis, Kostas Vassiliou, Foivos Karzis and Andreas Zervas for valuable comments; any remaining mistakes are our own.

Firstly, the projects are of large scale, totalling an investment of ca €22.4bn in current prices. This amount is by itself enough to cover ca ¼ of the gap with 2010 capital stock, leaving aside depreciation for a moment. Secondly, given that most projects are of a strategic nature, in sectors crucial for the Greek economy and with a large productive potential, they have a large cumulative multiplicative effect on the GDP in the long-term.

In the initial part of the study, the characteristics and main sizes of the three sectors in the Greek economy are analysed, including areas of strength, remaining challenges and future prospects.

The energy sector is an important pillar for the transition towards sustainable and extrovert growth. Greece's energy sector direct contribution to economic activity is currently relatively small, i.e. 2.7% in terms of Gross Value Added (GVA) and 0.7% in terms of employment (2016 data), excluding wholesale and retail trade activities. However, its total contribution and, most importantly, its potential are significantly higher. The ongoing liberalization of electricity and gas wholesale and retail markets, the existence of comparative advantages in terms of geographical position and availability of renewable and fossil resources, accompanied by important discoveries of gas fields in the Mediterranean basin, create significant investment opportunities. Energy is related to major infrastructure investment projects such as pipelines, ports, energy generation plants, storage facilities etc. Given that energy is a vital input in almost all production processes, investment in energy can reduce the costs for industry. Furthermore, the capital stock accumulated through these investment projects creates significant economies of scale and scope for other sectors and improves the long-term prospects of the economy.

Logistics is also a sector with strategic importance and large potential for Greece, mainly as a result of the country's geographical position. Greece has the potential to act as a regional or even European transhipment and connection hub between the Far East and Europe via its ports, road and rail networks, its storage and air transport facilities and the related logistics services. Yet, the geographical advantage of the country remains mostly underexploited, as a result of the lag in infrastructure development and competitiveness constraints. The GVA of the Transportation and Storage sector in Greece was at 6.5% of total GVA in 2016, vs a Eurozone average of 5%. However, if the shipping sector is excluded, 2016 GVA falls to 3.8% vs a Eurozone average of 4.8%.

Greece also lags behind the Eurozone average in terms of efficiency of the logistics sector services as measured by the World Bank's Logistics Performance Index. The progress achieved in recent years through the adjustment programmes' structural reforms and the privatization of some key assets related to the logistics sector was significant but still not enough. In order to enhance the strategic relevance of the sector, further progress is required in infrastructure upgrading, cost competitiveness, quality of the logistics services provided, reduction of border procedures or other red tape, etc. Such actions, besides the positive effect on Greek exports, will further improve the country's performance as a transhipment and gateway hub and can align the contribution of the domestic logistics sector with the respective Eurozone one (i.e. an annual increase in gross value added terms of ca 1% of GDP).

Travel and tourism is a sector with already substantial direct and indirect contribution to the Greek GDP and employment. Tourism proved resilient during the crisis, increasing its GVA share, from 5.5% in 2008 to 6.4% in 2016. Additionally, it creates significant secondary spill-overs and it is by definition extrovert and thus integral for the shift of the country's growth paradigm towards tradable goods and services. Due to Greece's particular natural and cultural characteristics, "Sun and Beach" is the prevailing tourism model followed by "Culture and Religion", "City Break", "Nautical Tourism" and "Meetings, Incentives, Conferences and Exhibitions (MICE)". The strong performance of tourism in recent years was underpinned by the reduction of domestic

uncertainty, increased foreign demand and improved price competitiveness. At the same time, tourism infrastructure is gradually being upgraded with the share of 5- and 4-star hotels having risen significantly since 2000. The sector's structural competitiveness has also improved with Greece ranking 24th among 136 countries in the 2017 World Economic Forum Travel & Tourism Competitiveness Index.

Nevertheless, serious challenges remain. *First*, VAT, levies and non-wage labour cost account for a much higher share of the total room price in Greece compared to competitors. *Second*, NPLs in the hotel sector have to be managed quickly and efficiently. *Third*, Greece has still a long way to go in a number of areas that are important for tourism development such as spatial planning, the legal framework, the rules that govern FDI, ICT readiness and ground and port infrastructure. *Fourth*, high seasonality and the low geographic dispersion have to be dealt with in order to fully exploit the country's potential and improve the distribution of tourism income. *Fifth*, expenditure per trip in Greece is quite low compared to that of competing destinations, pointing to the need for diversifying the existing tourism offering and attracting higher spending visitors. International tourism demand is set to increase in the years ahead on the back of a growing world economy and rising per capita incomes in emerging markets. For Greece to secure and develop its position on the global tourism map, policies are needed to diversify the existing product mix through the upgrade of public and private infrastructure but also through the targeting of niche markets, such as senior citizens and business visitors. Cruise is also a market segment with strong growth potential and significant positive spill-overs to other sectors, especially if home porting is strengthened.

In section 5, the projects reviewed in this study are described, with features of each project, value of primary investment (acquisition cost of related assets and investment already executed are excluded) and horizons of initiation and completion. The projects are naturally chosen due to their size, importance and degree of maturity, whereas investment ideas for which details are yet unavailable are left out and comprise upside potential. The reviewed projects are the following:

In the energy sector: the Trans Adriatic Pipeline (TAP), the Interconnector Greece - Bulgaria (IGB) pipeline, the Floating Storage and Re-gasification Unit (FSRU) of Alexandroupolis, the Interconnector Greece - Italy (IGI) pipeline, the Eastern Mediterranean Pipeline (East Med), islands' electrical interconnection with Mainland Greece, the EuroAsia electrical Interconnector, Renewable Energy Sources (RES, new licenses), the LNG terminal station in Revithousa, and the combined cycle gas-fuelled power plant at Agios Nicolaos Viotia.

In Logistics & Infrastructure: the freight centre in Thriasio Field, the Sea2Sea project connecting Northern Greece ports with Black Sea ports and the Danube, and the upgrade of Piraeus port.

In Tourism & Urban Development: Athens metro Line 4 (Section A, "Veikou Alley – Goudi"), expansion of the Attika Motorway to Lavrio and upgrade of the Lavrio port, extension of the Western Imittos ring road and connection to Vouliagmenis Avenue, the Northern Motorway of Crete, the Kasteli airport in Crete, the Hellinikon Urban Development Project and several Hotel Developments, including, among others, tourist developments in Attica's Riviera, development of Kassiopi, Afantou Rhodes, Ikos Resorts and Costa Navarino, renovation of Athens Ledra, Astir Palace and Athens Hilton, relocation of the Mont Parnes Casino.

Subsequently, the study attempts a quantification of the projects' potential contribution to the Greek GDP at medium and longer-term horizons. Our methodology concerns the calibration of the Incremental Capital–Output Ratio (ICOR) and the depreciation rate of capital, 'δ'. Next, we apply the calibrated values to estimate the net creation of capital by projects under consideration, we calculate the NPV of these capital flows and their projected

impact on GDP. We run scenaria both with calibrated and historic ICORs, as well as with data from either the total economy or the industry sector.

These scenaria provide a range of estimates; in a 10-year horizon, the projects worth €22.4bn in current prices lead to the creation of GDP (again in current prices) worth, from €25.2bn (i.e. 1.1 times higher than the projects' initial worth) in the most conservative scenario, up to €31.4bn (i.e. 1.4 times higher) in the most optimistic scenario. In a 20-year horizon, the projects lead to the creation of GDP worth, from ca €45bn (i.e. 2 times higher than the projects' initial worth) in the most conservative scenario, up to €65.5bn (i.e. 2.9 times higher) in the most optimistic scenario. In any case, contribution is very substantial and increasing over time.

As a basis comparator, we also apply an approach based on multipliers pertinent to public investment. Results obtained with the multipliers methodology are similar in magnitude, thereby increasing confidence in our findings.

Finally, an approximation of the number of jobs that may be created by these projects is attempted by the use of the empirical relationship between real GDP and number of jobs. As a harsh indication, in a 10-year horizon, reviewed projects and associated real GDP creation can lead to the creation of 485,000-605,000 jobs, depending on the scenario.

Section 7 concludes.

2. The Energy Sector: Review, Challenges and Prospects

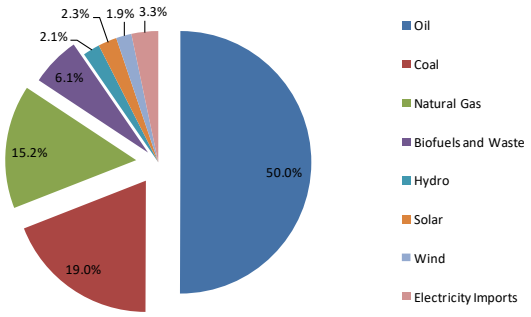
2.1. Greece's Energy Sector Value Chain

Based on the IEA (2017) review report on Greece, the energy's sector value chain consists of 2 basic stages:

Stage 1 – Total Primary Energy Supply (TPES): this is equal to production of energy plus imports minus exports and international marine and aviation bunkers +/- stock changes. As Figure 1 presents, TPES in Greece is dominated by oil (50% of TPES in 2016, the 2nd highest share in IEA member countries after Luxembourg), almost exclusively through imports, followed by coal (19%) mainly through domestic production, natural gas (15%), biofuels and waste (6.1%), hydro (2.1%), solar (2.3%), wind (1.9%) and electricity imports (3.3%). TPES in Greece reached 22.9 Mtoe (million tons of oil equivalent) in 2016 from 30.1 Mtoe in 2006 (cumulative % change of -26.0%, slightly more than a -24.0% loss of real GDP in the same period).

Energy production contributed 6.8 Mtoe or 29.7% of TPES in 2016. As Figure 2 exhibits, coal has the lion's share in energy production in Greece (58.0% in 2016). Biofuels and waste have the 2nd highest share (18.3%), followed by solar (7.9%), hydro (7.0%), wind (6.5%), oil (2.2%), natural gas (0.1%) and geothermal (0.1%). During the 10-year period 2006-2016, energy production in Greece decreased by -32.0%. Moreover, energy's production mix has changed, with renewables almost doubling their relative contribution, from 5.9% in 2006 to 12.5% in 2016.

Figure 1: Shares in Total Primary Energy Supply in Greece, 2016 Provisional Data (%)

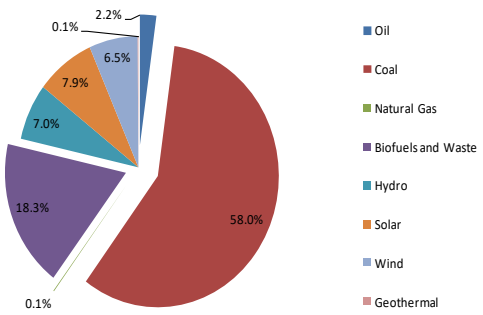


Source: (a) IEA (2017) Review Report on Greece, (b) Eurobank Research.

Stage 2 – Total Final Consumption (TFC): TPES is consumed for transformation procedures (for example in power generation and refining) and final

use (transport, residential, industry, commercial). The transport sector has the highest share in energy consumption (35% of TFC), with the residential, industry and commercial uses following with shares of 27%, 23% and 15% respectively.

Figure 2: Shares in Energy Production in Greece, 2016 Provisional Data (%)



Source: (a) IEA (2017) Review Report on Greece, (b) Eurobank Research.

Table 1: Energy Consumption Shares by Sector in Greece, 2015 Data (%)

In each row, columns sum to 100%

	Oil	Coal	Natural Gas	Biofuels and Waste	Other Renewables***	Electricity	Heat
Industry*	39%	6%	20%	7%	-	28%	-
Transport	97%	-	-	3%	-	-	-
Residential	33%	-	8%	19%	4%	34%	-
Commercial**	17%	-	7%	3%	-	73%	-
Total	54%	-	8%	8%	1%	27%	-

Note: (a) as is noted in IEA (2017) Review Report on Greece (page 23, Figure 1.8), * industry includes non-energy use, **commercial includes commercial and public services, agriculture, fishing and forestry and ***other renewables include solar and geothermal.

Source: (a) IEA (2017) Review Report on Greece, (b) Eurobank Research.

In Table 1 we present the contribution that each fuel has in the energy consumption of 4 major sectors in Greece based on 2015 data. Some key findings are as follows: First, the industrial sector mainly consumes oil (39% of total), electricity (28%) and natural gas (20%). Second, transportation activity is by 97% oil consuming. Third, the residential sector exhibits the highest contribution of renewable resources among all sectors. Fourth, energy consumption in the commercial sector is dominated by electricity (73% of total). All in all, oil is the main fuel consumed in Greece (54% of total), followed by electricity (27%), natural gas (8%), biofuels and waste (8%) and other renewables (1%). Given that oil is almost exclusively imported, this has a detrimental effect on the current account and on cost efficiency.

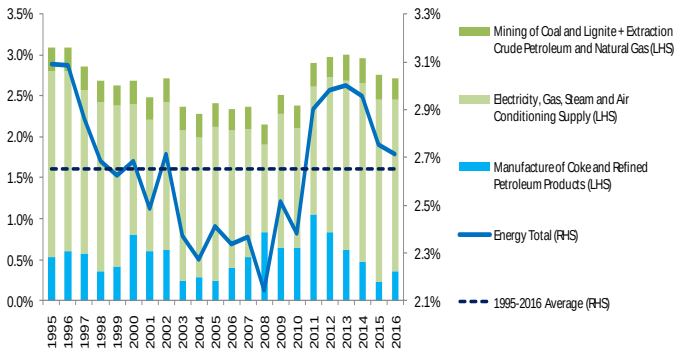
2.2. The Importance of the Energy Sector

Greece, after experiencing its worst economic performance in the post-war period, is trying to enter a path of sustainable growth with exports and investment as its main drivers, while maintaining solid public finances, increasing competitiveness and productivity. At the micro level, one of the sectors of the economy that could support this transition is the energy sector. The strategic importance of the energy sector to the functioning of the Greek economy stems from (i) the significant - actual and potential – direct, indirect and induced contribution of the sector in terms of gross value added (GVA) and employment, (ii) the potential investment opportunities in that sector in Greece, given availability of renewable and fossil resources, as well as the strategic position of the country in the international transmission of energy network (iii) the fact that energy is an essential input in almost all production processes; hence, the energy sector has high economies of scale and scope with many other sectors, (iv) energy is related to major infrastructure investment projects such as pipelines, ports, energy generation plants, storage facilities etc. The capital stock which is accumulated through these investment projects creates significant positive externalities and improves the long-term prospects of the economy.

2.3. Actual Direct Contribution of the Energy Sector to Greece's Economy

In order to calculate the direct contribution of the energy sector to Greece's economy in terms of GVA and employment we take into account that the energy's value chain consists of many interrelated economic activities, such as production of primary inputs, manufacturing, distribution and sale. Using the NACE Rev 2. methodology (Statistical Classification of Economic Activities in the European Community) we compute a proxy for energy's direct contribution by summing up the GVA produced and labour employed in the following subsectors: (1) mining of coal and lignite plus extraction of crude petroleum and natural gas, (2) manufacture of coke and refined petroleum products and (3) electricity, gas, steam and air conditioning supply. We must note, however, that this is an underestimation of the true values since data for wholesale and retail trade activities in subsectors (1) and (2) are not available.

Figure 3: A Proxy for the Direct Contribution of Greece's Energy Sector to Total Gross Value Added (%), 2016

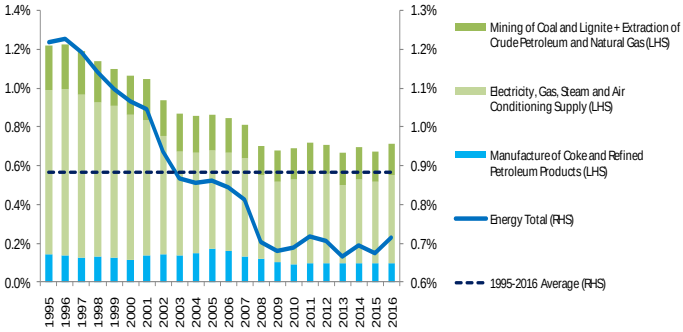


Source: (a) Eurostat, (b) Eurobank Research

Based on the latest available data, the direct contribution of the energy sector in terms of GVA in 2016 was €4.1 bn or 2.7% of the total gross value added in the Greek economy (€151.8 bn in current prices in 2016). As Figure 3 shows, the aforementioned share was marginally higher compared to the respective 1995-2016 average. Mining of coal and lignite plus extraction of crude petroleum and natural gas contributed 0.3 ppts or €0.4 bn, coke and refined petroleum products 0.4 ppts or €0.5 bn and electricity, gas, steam and air conditioning supply 2.1 ppts or €3.2 bn. Hence, the bulk of the gross value added produced in the energy sector in Greece came from the subsector of electricity, gas, steam and air conditioning supply.

As regards the direct contribution of the energy sector to employment, in 2016 it was 29.2k people or 0.7% of total employment (4.1 mn persons employed in Greece in 2016). The subsector of electricity, gas, steam and air conditioning absorbed the lion's share with a contribution of 0.5 ppts or 18.5 k people. Mining of coal and lignite plus extraction of crude petroleum and natural gas followed with 0.2 ppts or 6.8k people. Finally, the contribution of the subsector of coke and refined petroleum products was 0.1 ppts or 4.0k people.

Figure 4: A Proxy for the Direct Contribution of Greece's Energy Sector to Total Employment (%)



Source: (a) Eurostat, (b) Eurobank Research

Data confirm that contribution to employment is proportionally smaller than contribution to GVA due to the capital intensity of the sector. Furthermore, as Figure 3 and 4 present, the fact that during the crisis years the share of the energy sector in Greece has increased in GVA terms while it remained almost stable in employment terms, implies that the percentage change of labour productivity in the

energy sector was higher relative to that of the aggregate economy.

All in all, the direct contribution of Greece's energy sector to total gross value added and employment is not that large compared to other sectors of the economy, as is the case for EU-28 and EA as well. However, the total contribution, i.e. direct + indirect + induced, is significantly higher, especially for employment (Vettas, 2016).

2.4. Strengths of the Greek Energy Sector – Investment Opportunities

Regulation – Institutional Developments: During the last 7 years, Greece has made considerable progress towards increasing competition and efficiency in the electricity and gas wholesale and retail markets. Many laws have been voted by the parliament in order to bring Greece's legal framework in line with EU standards (EU Electricity and Natural Gas Market Directives). For the electricity suppliers that, unlike the Public Power Corporation (PPC, the incumbent company in the electricity market), do not have access to lignite fired generation, natural gas is an essential input in the production process. As a result, increasing competition in the natural gas market will create additional benefits to the electricity market as well.

As is pointed out in the EC's (2017) report on the developments of Greece's ESM programme, the reform of the electricity market is mainly focused on the reduction of PPC's market dominance on the wholesale and retail markets, namely the reduction of its market share below 50% by 2020. The instrument initially chosen was the NOME auctions mechanism (sale by auction of electricity forward products with physical delivery by PPC to other suppliers, which thereby indirectly acquire access to lignite-fired capacity), which has nevertheless not proved particularly successful. Indicatively, in October 2017 PPC's market share stood at 83.16%[2] significantly above the 77.24% target.[3] Another instrument to this effect is the divestment of 40% of PPC's lignite-fired capacity units, through a procedure overseen by DGComp, initially targeted to be completed by H1 2018.

In terms of privatizations, in June 2017, the government sold through the HRADF (Hellenic Republic Asset Development Fund) a 24% share of ADMIE, the Independent Power Transmission Operator. The sale of a 66% share of DESFA, the Hellenic Gas Transmission Operator, is still in progress.

Moreover, the increasing power and independence of the sector's regulator, i.e. the Regulatory Agency for Energy (RAE), creates favorable conditions in boosting competition. The crowding-out effect from dominant state-owned enterprises with powerful labor unions is on a downward trajectory and this creates strong incentives for private firms to invest and exploit profit opportunities in the energy sector.

Natural Resources: A key comparative advantage of the Greek energy sector, especially in the segment of renewable sources, stems from Greece's capacity in renewable sources such as sunlight and wind; Greece averages 300 days of sunshine per year and has high wind potential, especially in the islands. However, the system of renewable energy is only viable if sufficient units are in place, flexible enough in their output capacity (i.e. CCGT), so that output is secured when the sun is not shining and the wind is not blowing. Furthermore, the exploitation of the wind potential in the islands requires the electrical connection of the islands with the mainland and the achievement of economies of scale to make such projects competitive. Upon completion of the main interconnection of the islands, significant potential in exploiting renewable energy will be created with only minor secondary connections.

[2] See LAGIE (2018).
[3] In ESM (2017).

According to the IEA (2017) review on Greece, from 2010 to 2015 the cumulative change in wind and solar PV power generation was +300%, albeit from a low starting basis. Furthermore, in terms of power generation, renewable sources had a share close to 30% in 2015. Based on the same report, Greece has potential in other sectors of renewable energy such as geothermal, biomass and concentrated solar power. Therefore, it is important that RES usage is increased in other domains except electricity generation, for example decarbonizing the oil-intensive sector of transport.

Geographical Position: Due to its geographical position at the far-right end of South Eastern Europe (a cross road of three continents) and due to the new energy map in the eastern part of the Mediterranean basin (important discoveries in Egypt, Israel and Cyprus), Greece can transform into an important energy hub in the future. Projects reviewed in this study will contribute greatly to this end. Most important among them, Greece's involvement in the major project of the Southern Gas Corridor through the Trans Adriatic Pipeline (TAP, see below), a step towards reducing Europe's gas dependence from Russia; also, the development of vertical energy interconnectors with Greece's northern neighbors (Interconnector Greece-Bulgaria, IGB) and the construction of the Floating Storage and Re-Gasification Unit (FSRU) in Alexandroupolis.

2.5. Challenges

Recovery and Energy Efficiency: According to the IEA (2017) review on Greece, the country will probably meet the EU targets for emissions reduction and energy efficiency in 2020. However, the main contributing factor to this result is the "Greek depression". During the 9 years period 2007-2016, Greece experienced 8 years of negative real GDP growth and just one with positive, albeit anemic, growth in real GDP (+0.7% in 2014). The meagre economic performance led to a reduction of final energy consumption, from 21.8 Mtoe in 2007, to a trough of 15.3 Mtoe in 2013 and 16.4 Mtoe in 2015, -24.8% lower relative to 2007. Hence, after the economic recovery in 2017, a big challenge for the Greek energy sector is how it will respond – in terms of achieving the EU targets - when growth starts gathering pace again. The implementation of policies and reforms for continuous improvement in energy efficiency and increase of the shares in natural gas and renewable energy are key aspects of this challenge.

Reducing Oil and Coal Dependence: as already mentioned, the energy mix in Greece is highly oil intensive, especially in the sectors of transport and heating. In addition, lignite plays a major role in electricity generation. Switching to a more balanced energy mix by increasing the relative shares of natural gas and renewables constitutes a major challenge for Greece's long term energy policy. Despite the recent decrease in greenhouse gas (GHG) emissions, its carbon intensity in producing power is above the IEA average (see IEA, 2017).

3. The Logistics Sector

3.1. The Current Situation of the Logistics Sector In Greece

According to the Council of Supply Chain Management Professionals, logistics is the process of planning, implementing and controlling procedures for the efficient and effective transportation and storage of goods, including services and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements; it includes inbound, outbound, internal and external movements.[4]

[4] For more information on the definition of logistics and related definitions please refer to: https://cscmp.org/CSCMP/Educate/SCM_Definitions_and_Glossary_of_Terms/CSCMP/Educate/SCM_Definitions_and_Glossary_of_Terms.aspx?hkey=60879588-f65f-4ab5-8c4b-6878815ef921

Logistics is a sector with strategic importance and large potential for Greece. This accrues naturally from the country's geographical position. Greece is located at the south-east end of mainland Europe and close to the one of the three intercontinental maritime routes worldwide (McKinsey, 2012). As a result, Greece has the potential to act as a regional or even European transshipment and connection hub via its ports (mainly Piraeus and Thessaloniki ports), its road and rail networks, its storage and air transport facilities and the related logistics services. According to the European Commission's policy on Trans-European Transport Networks (TENT-T), the main ports of Greece are the entry points to the European Union and the start of the Orient/East-Med Corridor that connects large parts of Central Europe with ports of the North, Baltic, Black and Mediterranean Seas.[5] However, the geographical advantage of the country remains mostly underexploited, mainly as a result of the lag in infrastructure development and competitiveness constraints.

Currently, the logistics sector in Greece is mostly situated in the greater Athens and Thessaloniki areas due to the proximity of both areas to ports and airports (Piraeus port and Athens International Airport for Athens and Thessaloniki port and Makedonia International Airport for Thessaloniki) and the gateway to the Balkans, offered directly by Thessaloniki and indirectly (via the railway) by Athens. Volos at the center of the country, Iraklion in Crete and Patra on the west (main connection with Italy via Ro-Ro ships) constitute secondary logistics hubs. The sector comprises the port and airport facilities and related services for the management of third party goods including, among others, receiving, dispatching and storage, custom clearance, shipping and aircraft agency services. NAIHellas, estimates that the storage and distribution services produce approximately 90% of the sector's turnover (NAIHellas, 2017).

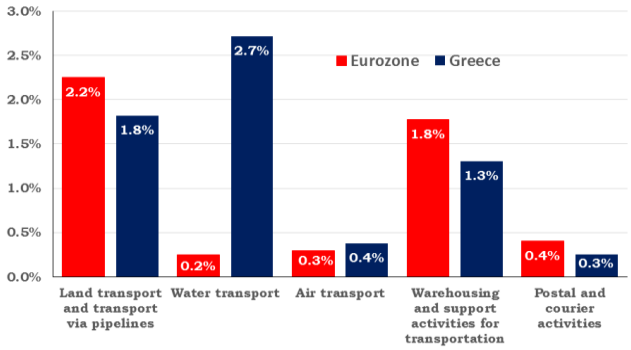
Despite the apparent comparative advantage of geography, the Greek logistics sector had a rather limited contribution in gross value-added terms in recent years. According to Eurostat, the GVA of the Transportation and Storage sector – the proxy for the logistics sector – in Greece was at 6.5% of total GVA in 2016, from 8.0% of total GVA in 2007, exceeding the respective figures for Eurozone of 5% of total GVA in 2016 vs 4.9% of total GVA in 2007. Yet, Eurostat's definition of transportation and storage includes the shipping sector.[6] If from the above figures on Transportation and Storage we subtract the shipping sector (water transportation in Eurostat terminology), the Greek gross value added from the logistics sector comes at 3.5% of total GVA in 2007 and 3.8% of total GVA in 2016 vs a EZ average of 4.7% in 2016 and 4.6% in 2007. In other words, the share of the shipping sector in the Greek logistics sector is far more important than the respective share in the Eurozone. By contrast, as Figure 5 below shows, the shares of a) the land transports and transports via pipelines in 2016 (1.8% of total GVA in Greece compared to 2.2 in Eurozone), b) the warehousing

[5]According to the European Commission's policy on Trans-European Transport Networks, the Orient/East-Med Corridor connects large parts of Central Europe with ports of the North, Baltic, Black and Mediterranean Seas. The main focus of the EC's policy is to foster the development of these ports as major multimodal logistics platforms and provide economic centers in Central Europe with modernized, multimodal connections to international sea routes. The Orient/East-Med corridor incorporates the Elbe River as a key inland waterway and will improve multimodal connections between Northern Germany, the Czech Republic; the Pannonian region and Southeastern Europe. The corridor will also provide an improved link to Cyprus. For more information please refer to: https://ec.europa.eu/transport/themes/infrastructure/orient-east-med_en and https://ec.europa.eu/transport/themes/infrastructure_en

[6] For more information on the Greek shipping sector by beneficial ownership refer to: http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx It has to be noted, however, that although the Greek shipping sector was first in terms of beneficial ownership in the Eurozone and the world in 2017, its significance for the domestic logistic sector is limited by the fact that the main bulk of the shipping industry operates in the Far East.

and support activities for transportation (1.2% of total GVA in Greece compared to 1.8 in Eurozone) and c) the postal and courier activities (0.3% of total GVA in Greece compared to 0.4% in Eurozone) significantly lag behind the Eurozone average. Air-transport is on equal terms with the Eurozone (5.9% of sector's GVA in Greece compared to 5.9% in Eurozone), due to the Athens International Airport being a major air-hub for the area.

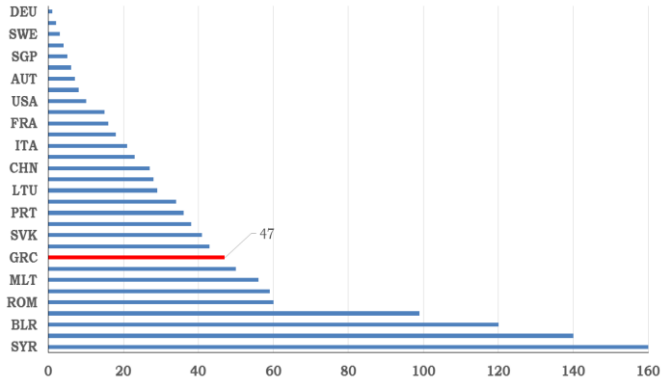
Figure 5: Logistics sector sub-divisions (Eurozone, Greece, sector GVA, %, 2016)



Source: Eurostat

Greece also lags significantly behind its main Eurozone partners and local competitors - Turkey in particular - in terms of the efficiency of its logistics sector. Greece ranked at the 47th position among 160 countries in the 2016 World Bank's Logistic Performance Index (LPI, see Figure 6), mainly as a result of the low efficiency of the customs and related border agencies' clearing process, the low quality of the trade & transport infrastructure and the logistic services (World Bank, 2016).[7] The average 2016 LPI ranking of the Eurozone members (including Greece) is at 27, while Greece's main regional competitors, namely Turkey, Romania, Bulgaria, FYROM, Cyprus and Malta rank at 34, 60, 72, 106, 56 and 59 respectively. In addition, Greece lagged behind the OECD average LPI index in the aforementioned categories (OECD, 2016).

Figure 6: The 2016 World Bank's Logistics Performance Index



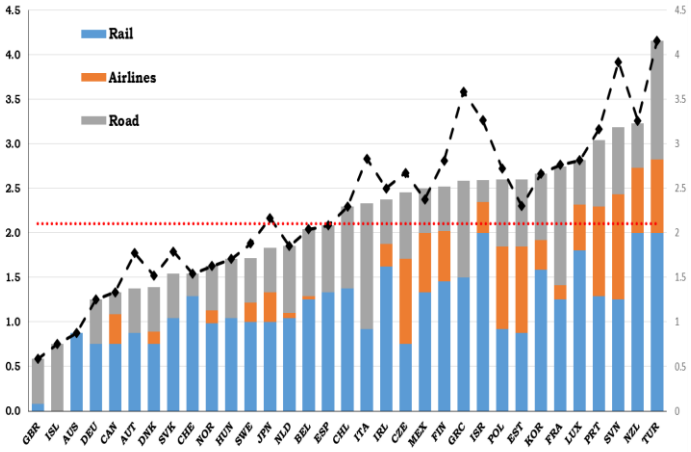
Source: World Bank

To wit, the logistic sector in Greece lags behind the Eurozone average, both in terms of gross value added, as well as in terms of World Bank's LPI measured quality. The progress achieved in recent years – mainly as a result of the implementation of the structural reforms included in the three consecutive adjustment programmes and the privatization of some key items related to the logistics sector – was significant but not enough. For example, the Law 4302/2014 significantly improved the environment of the Greek logistics sector, in accordance with the World Bank's guidelines (World Bank, 2016). The new law, a) defined for the first time the logistics sector in Greece, b) established the framework for the sector's business activities, via firms offering logistics services to third parties (3PL firms), c) provided incentives to the potential investors in the sector, d) harmonized the various licensing procedures in accordance with the simplified licensing framework established by Law 3982/2011 and related laws, d) created a framework and institutions responsible for a national policy in logistics, e) established the procedures for the development of business parks on land plots of 500 acres or more, etc. More recently, in mid-2016, Law

[7] The index aims to help countries identify the challenges and opportunities they face in their performance on trade logistics and what they can do to improve their performance. For more information on World Bank's LPI please refer to: https://lpi.worldbank.org/about and https://wb-lpi-media.s3.amazonaws.com/LPI%20Methodology.pdf .

4408/2016 harmonized the domestic railways legislation with the respective EU directive and introduced the distinction between the railway infrastructure manager and the railway operators,[8] their relations and their framework of operations, etc. The liberalization already introduced by the aforementioned laws will significantly improve Greece's ranking in the OECD's transport regulation index. The latter was significantly above the OECD average (i.e. more restrictive than the OECD average) back in 2013 (Figure 7).

Figure 7: Regulation in the transport sector (Index scale 0 to 6, (least to most restrictive), 2013



Source: OECD

Moreover, the Word Bank's Trading Across Borders Doing Business sub-index ranked Greece 29th among 190 countries in October 2017 (Doing Business 2018), from 80th among 183 countries in October 2009 (Doing Business 2009).[9]

[8] Railway operators (railway undertakings in the EU directive) are public or private undertakings licensed according to this Directive, the principal business of which is to provide services for the transport of goods and/or passengers by rail with a requirement that the undertaking ensures traction; this also includes undertakings which provide traction only (EE L343/32).

[9] For additional information please refer to:. http://www.doingbusiness.org/data/exploreeconomies/greece

3.2. Logistics sector in Greece: Key areas of improvement and the prospects of the sector

The key logistics sector related areas that require attention in the following period include:

1. The enhancement of the country's strategic relevance via the creation of supporting infrastructure. Projects reviewed in this study, including the upgrade of Piraeus and Thessaloniki Ports after their privatization, the railway connection of the North Aegean with Black Sea ports, the privatization of regional Greek ports and airports, together with the privatization of the railway operator TrainOSE, can create the conditions of integration and efficiency, which is necessary for the sector to enter the global supply chain networks sustainably. Privatizations completed so far and those that follow will carry along investments for the upgrade of acquired assets, thereby improving the infrastructure of the logistics sector.
2. The opening up of the domestic land and rail transport sector; it creates opportunities for the participation of international players and thereby potential for improving the competitiveness of the sector (World Bank, 2013).
3. The improvement of cost competitiveness via, inter alia, cutting related red tape procedures, is important in order to reach the level of Greece's main competitors. This is especially so as regional ports are concerned. Note here that, according to World Bank (2013), trading with EU markets was more costly via Greece than via Turkey, although Turkey is farther away from the EU than Greece and economically less integrated into the EU. This is also verified by the score of both countries on the LPI index above.
4. Emphasis on the improvement of the quality of logistics services via the import of "know-how" from abroad in areas that are underdeveloped or developed locally currently (for example road- and rail-

transports) and improvement of the related education provided by the Greek universities that currently mainly focus on the shipping sector only.

5. Attraction of Greek shipping operators to Greece following Brexit. Such an endeavor requires significant investment, not only in real estate, but also in infrastructure for the shipping industry and related services at a level comparable to that of the UK.

These actions can create the necessary environment in order for Greece to improve the strategic relevance of the logistics sector for the greater geographical area and further improve its performance as a transshipment and gateway hub for the greater geographical area (McKinsey, 2012). This can allow the alignment of the domestic logistics sector's contribution to GDP with the respective of the Eurozone, i.e. an annual increase in gross value added terms of ca 1% of GDP.

Moreover, advancements in the logistics sector can support the increase of Greek exports mainly via two channels. The first channel is the improvement in cost competitiveness, as reduction in the logistics-related cost (either direct cost or red-tape cost) will make Greek exports more competitive. The second channel is the improvement of the supply chains of Greek exporting firms and the participation of Greek firms in Global Value Chains. Currently, Greece's ranking in participation to Global Value Chains is among the lowest in the OECD countries, while the respective results in terms of supply chain efficiency are equally poor (de La Maisonneuve, 2016 and World Bank, 2013). According to the World Bank (2013), the improvement in the efficiency of the Greek export sector's supply chain from its current levels to the ones of the best EU performer (Denmark) could cause an increase of 46% and 21% in Greek exports and GDP respectively. Even though these figures are notional, they showcase the medium-term potential of the Greek economy.[10]

4. Tourism

4.1. Present status – Fundamentals – Contribution

Travel and tourism is an important sector of the Greek economy, with substantial contribution to GDP and employment. According to the most recent data from the World Travel & Tourism Council (WTTC), the sector's direct contribution to Greece's GDP in 2016 was EUR 13.2 billion or 7.5% of GDP; taking into account the secondary spillovers of demand to other sectors, total contribution is estimated at €32.8 bn or 18.6% of GDP. 2017 has been another record year, with tourism international receipts rising in the area of €14.5 bn and arrivals of around €27mn persons. With the current projections on arrivals and revenue growth, direct and total revenues are expected to climb by 2027 to €22.1 bn (9.6% of GDP) and €54.7 bn (23.8% of GDP) respectively (Figure 8).

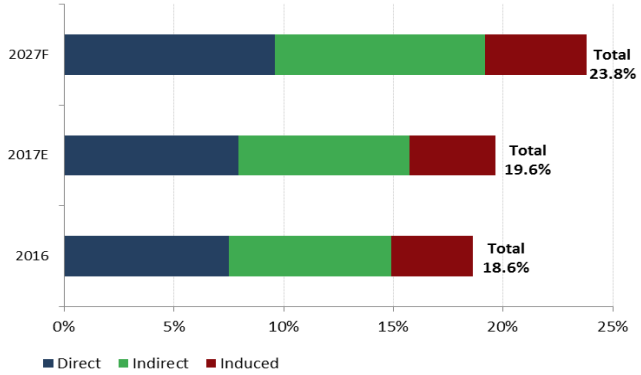
Sheer size is not the only reason why tourism is a strategic sector for the Greek economy. The sector is also extrovert, therefore integral to the country's growth paradigm transformation away from consumption-based growth. Tourism revenues constitute one of the most important sources for the financing of the balance of payments, accounting in 2017 for 80% of the trade deficit and 26% of total goods and services exports. The sector has high domestic value added and wide dispersion of secondary effects. Equally importantly, it is a labor-intensive sector, so that its contribution to employment exceeds the respective to GDP; direct and total contribution was estimated at 11.5% and 23.4% of total employment respectively in 2016; it is expected that by 2027 ca 1.27 mn people will be directly and indirectly employed in tourism and travel.

Given its extroversion, the sector proved resilient during the crisis, when sectors dependent on the domestic market collapsed, and it managed to increase its Gross Value Added (GVA) share, from

[10] The World Bank's exercise was mainly based on the improvement of only two aspects of the supply chain, namely the border administration and the transport infrastructure efficiency (World Bank, 2013).

5.5% in 2008, to 6.4% in 2016 (Table 2).[11] Yet, despite record arrivals (24.8 mn in 2016, +5.1%YoY), GVA in absolute terms remained in 2016 ca €2.1bn below 2008 levels. According to tourism sources, this is related to reduced prices due to the internal devaluation process, reduction in domestic tourism and other conjectural factors (offers in response to the severe refugee problem, Brexit-related turmoil etc).

Figure 8. The contribution of Travel & Tourism to Greece's GDP



Source: WTTC, Travel and Tourism, Economic Impact 2017, Greece

Greece's reliance on the tourism sector becomes apparent if one considers that 'Accommodation and food service activities' has a larger share on total GVA from 14 out of 20 industries in total. Table 3 shows that, from a sample of competing countries, which already base their specialization model on tourism, only Spain has more (16) industries than Greece with a GVA share smaller than that of tourism.

Table 2: Accommodation and food service activities GVA

	2008	2009	2010	2011	2012	2013	2014	2015	2016
GVA, current prices, mil €	11,797	10,066	9,812	8,502	8,220	9,421	10,009	10,119	9,648
% of Total GVA	5.5%	4.7%	4.9%	4.7%	4.9%	5.9%	6.3%	6.5%	6.4%

Source: Eurostat

[11] Eurostat, Gross Value Added, 'Accommodation and food service activities'

Tourism development in Greece began in the mid-1950s and evolved around some of the country's unique features, namely its mild, Mediterranean climate with 300 days of sunshine on average per year, its 16.000km long coastline (the second longest in Europe, 12th longest in the world), over 2,500 islands (of which 165 are inhabited and developed), and its vast historic and cultural heritage. Consequently, leisure is the predominant purpose of travel to Greece, accounting in 2016 for around 85% of total receipts, followed by business (6%) and other personal purposes (9%), such as visits to family and studies. In turn, the "Sun and Beach" model prevails in the tourism portfolio with a share of 70%,[12] while other offerings include "City Break" (7%), "MICE"[13] (3%), "Culture and Religion" (11%), and "Nautical tourism" (4%).[14]

Table 3- Number out of 19 industries with GVA share smaller than that of 'Accommodation and food service activities'

Country	No of industries
France	7
Euro area	8
Turkey	8
Italy	9
Cyprus	13
Portugal	13
Greece	**14**
Spain	16

Source: Eurostat

EU-28 countries are the primary source market for Greek tourism, accounting on average for almost 64% of total international receipts in the five-year period 2012-2016, with Euro area countries accounting for ca 42%. As regards the individual countries of origin, Germany leads with a share in the order of 16% of total receipts, followed by the UK (c. 13%), France (c. 8%), Italy (c. 5.5%) and USA (c. 5%). In terms of expenditure per overnight stay, however, on average

[12] IPK International.

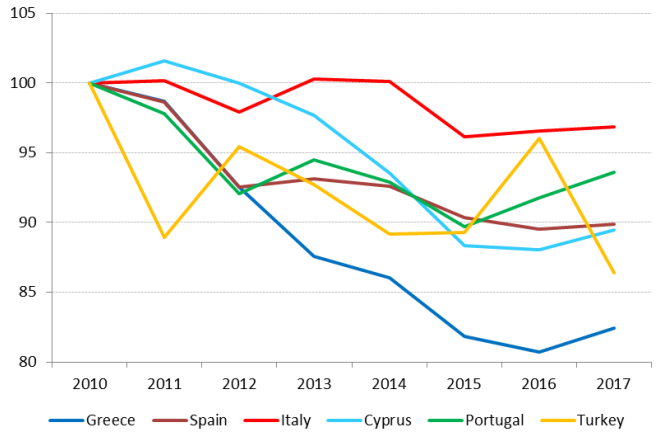
[13] Meetings, Incentives, Conferences, Exhibitions.

[14] Yachting and cruise.

in the period 2012-2016, the highest amount was spent by visitors from Australia (€107.5), while those from USA (€97.3) and Switzerland (€ 93.1) ranked second and third.

Tourism's increase of recent years was partly spurred by the reduction of domestic uncertainty and foreign demand factors. In addition, it was also greatly assisted by improvement in price competitiveness. Greece's Real Effective Exchange Rate based on nominal unit labour cost against 37 trading partners depreciated by 17.6pps between 2010 and 2017, reclaiming almost all 2001-2008 losses. Significant reforms in the labour market since 2012 have kept wages at check and allowed more flexible forms of labour into the market. Competing destinations' improvement was relatively smaller: Spain -10.1%, Italy -3.1%, Cyprus -10.5%, Portugal -6.4% and Turkey -13.6% (Figure 9).

Figure 9. Real Effective Exchange Rate based on ULC, Index 2010=100, 37 trading partners

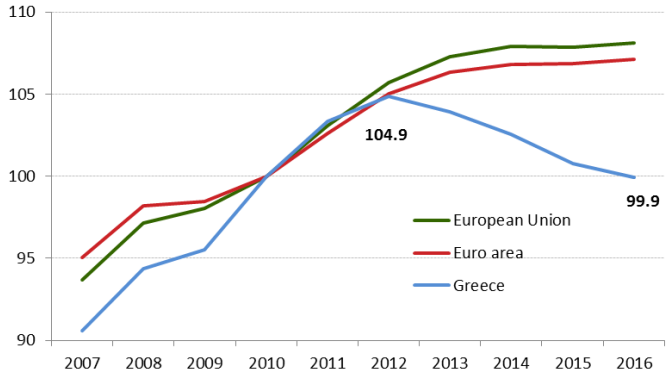


Source: Eurostat

Prices corrected by less due to consecutive hikes in tax rates and lag in product market reforms. Still, the Greek CPI contracted by 4.71% from 2012 to 2016, when for the European Union and the Euro Area it increased by 2.26% and 1.99% respectively (Figure 10). Price competitiveness is expected to further improve as the impact of the recent reforms in the product markets gradually kicks into the Greek economy, helping to build negative price differentials vis-à-vis competitors.

In addition, the tourist infrastructure is gradually improving, thereby creating the potential for attracting higher spending visitors, which has long been an objective of Greek tourism. According to the Hellenic Chamber of Hotels and the Institute for Tourism Research and Forecasting, the share of 5-star hotels in total hotels has risen, from 5.8% in 2000, to 18.1% in 2017, while that of 4-star ones has also slightly increased. Accordingly, the share of 3- 2- and 1-star hotels has shrunk, from an aggregate share of 69%, to 55.9%. In addition, recent years saw improvements in general infrastructure that is relative to tourism and more projects are underway (see below).

Figure 10. National Consumer Price Index, 2010=100



Source: Ameco

All these developments helped to increase structural competitiveness of Greek tourism. According to the latest Travel & Tourism (T&T) Competitiveness Index[15] (featured in the Travel & Tourism

[15] The World Economic Forum Travel & Tourism Competitiveness Index (TTCI) ranks 136 countries in 14 pillars that enable the sustainable development of the Travel & Tourism sector. These are: 1) Business Environment, 2) Safety and Security, 3) Health and Hygiene, 4) Human Resources and Labour Market, 5) ICT Readiness, 6) Prioritization of Travel & Tourism, 7) International Openness, 8) Price Competitiveness, 9) Environmental sustainability, 10) Air Transport Infrastructure, 11) Ground and Port Infrastructure, 12) Tourist Service Infrastructure, 13) Natural Resources, and 14) Cultural Resources and Business Travel.

Competitiveness Report 2017), which benchmarks the T&T competitiveness of 136 countries, Greece ranks 24th, having risen by 7 positions against the previous (2015) ranking and having outperformed some of its main competitors, namely Croatia (32nd), Malta (36th), Turkey (44th), and Cyprus (55th).

4.2. Challenges

In spite of these favorable developments, a number of serious challenges remain. After consecutive increases in the VAT rate for a number of tourism-related services and products, the VAT rate charged to visitors in Greece is estimated to be on average five or six times higher than that of competitors. According to the Greek Tourism Confederation, VAT and levies (tax per room and star) account currently for 16.6% of the room price in Greece, significantly higher than in competitor countries such as Cyprus (8.3%), Turkey (9.5%), Spain (10%), Italy (12.7%) and Croatia (13.3%). At the same time, non-wage labour cost is also higher for Greece, standing at 16.8% of the room price, against 7.8% in Cyprus, 14.0% in Turkey, 14.3% in Spain, 16.1% in Italy and 14.9% in Croatia. These costs, either increase prices, or – potentially – compress profit margins.

In addition, legacy NPL problems for some hotels – NPEs account for 42.7% of total loans in the accommodation sector– constrain investment plans, should these hotels remain under their current management. NPEs present in fact opportunities for investors, yet the challenge lies in the implementation processes, so that the NPE problem can be quickly and efficiently resolved. Else, no motives are provided to existing owners to proceed with consensual solutions.

At the same time, Greece lags behind in a number of areas that are important to tourism. The aforementioned Travel & Tourism Competitiveness Report 2017 ranks Greece 103rd in 'Business Environment', 90th in 'Price Competitiveness', and 51st in 'ICT Readiness'. With respect to the business environment, it is especially worrying that Greece performs very poorly in the "Effect of taxation on incentives to invest" (134th), the "Effect of taxation on incentives to work" (133rd), the "Efficiency of the legal framework in settling disputes" (128th) and the "Business impact of rules on FDI" (112th). Additionally, heavy bureaucracy combined with the lack of spatial planning have their toll on a number of other important investment parameters, such as the time and cost to deal with construction permits and start a business. Special mention should be made with regard to Greece's disappointing position (27th, below Spain, Italy, Turkey, Portugal and Egypt) in the 'Cultural Resources and Business travel' sub-index, considering that the country is home to a significant number (18) of UNESCO world heritage sites, a lot more than those in most of its competing tourism destinations. This may be an indication that cultural sites in Greece are not adequately promoted or as easily accessible as they should be. As regards transport infrastructure, Greece fares rather well in air transport infrastructure (26th), especially due to airport density and number of operating airlines, but lags behind in ground and port infrastructure (48th), with the quality of ground transport scoring particularly low.

Furthermore, tourism in Greece is characterized by high seasonality, with around 75% of total annual receipts and 70% of total annual international arrivals concentrating in the 4-month period from June to September. At the same time, it lacks geographic dispersion with more than 50% of beds and 52% of overnight stays concentrated in the prefectures of the Southern Aegean Sea and Crete, leading as a result to the uneven distribution of tourism income.

Expenditure per trip is also a source of concern as it has been decreasing on average by ca 4.4% in the 5-year period 2013 to 2017, starting from an already low base; it currently stands well below that of our main competitors,[16] although it did pick up slightly in 2017, according to Jan-Dec 2017 Bank of Greece data

[16] According to the World Economic Forum "Travel & Tourism Competitiveness Report 2017", average receipts per arrival in Greece amount to USD664.1 against USD1,252.9 in Portugal, USD935.3 in Cyprus, USD824.1 in Spain, USD777.6 in Italy and USD674.2 in Turkey.

(+1.4%YoY at €521). This decrease comes primarily from the decline of the number of days per trip, and secondarily from fluctuations in the daily expenditure of tourists. One possible explanation for the low expenditure per trip is the predominance of the "Sun & Beach" product, which may have mass appeal but attracts declining numbers of high wealth customers compared to those of competing destinations. This in turn, is attributed to inadequate infrastructure (e.g. marinas and ports), a problematic business environment (e.g. lack of spatial planning, bureaucracy and a volatile taxation framework) and a shortage in specialized tourism professionals. Other explanations include statistical issues, such as the recording of day trips from neighboring countries.

Finally, it is important to note that Greece's strong performance in the past few years may be partly attributed to the poor performance of some of its competitors, such as Turkey and Egypt, whose tourism was affected by political and geostrategic turmoil and security incidents. These, however, are conjunctural factors that will sooner or later pass, fueling competition. Already in 2017, Turkish tourism recorded a strong rebound with international arrivals growing by 30% in the first 10 months of the year.

4.3. Prospects - opportunities

Tourism is a rapidly growing sector internationally, with consistent growth of 4%YoY or higher since 2010 on the back of sustained demand stemming from an improving global economy. From 2018 to 2022, the world economy is expected to grow on average by 3.7% annually, whereas the European Union – which accounted for 69% of Greece's total international travel receipts in 2016 – has an expected average annual growth of 1.8% for the same period. At the same time, the increase of per capita incomes in emerging countries means that a vast global middle and upper class demanding tourism services will emerge in the coming years. Indicatively, for the BRIC countries, projected average annual GDP rates for the period 2018-2022, are as follows: China +6.15%, India +7.87%, Russia +1.52% and Brazil +1.92%. According to UNWTO, in 2017, preliminary data show that overnight visitors worldwide increased by 7%YoY, while in Southern and Mediterranean Europe growth recorded an impressive +13%YoY. International tourist arrivals are expected to grow at a 3.5%-4% rate in 2018.

In this favorable environment, Greece has the potential to further solidify its position as a top-tier tourism destination. As the Greek economy is gradually recovering and the country returns to normality, the tourism sector is ideally positioned to reap the benefits of the past years' adjustments and head confidently into an era of sustained growth and profitability.

Yet, in order to attract investments in tourism, Greece needs to address chronic deficiencies of the business environment, such as the lack of spatial planning; the complicated, uncertain and time-consuming procedure to complete a permitting process for a new hotel unit; the lengthy judicial procedures and the unstable tax and regulatory framework. Adherence to the path of fiscal prudency and commitment to critical reforms, such as the revamp of public administration and the completion of the cadaster, will greatly boost investor sentiment.

The improvement in general infrastructure will also contribute to quality competitiveness. A number of projects have recently been completed or are underway in the context of the HRADF Asset Development Plan, some of these are reviewed in this study. Projects with relevance to tourism include the concession of 14 regional airports (the upgrade of these airports is underway and expected to improve connectivity with emerging, long-haul markets), the privatization of the Piraeus Port Authority and the Thessaloniki Port Authority, the privatization /concession of several ports and marinas,[17] the development of the Afantou region in Rhodes

[17] The HRADF Asset Development Plan mentions the ports of: Alexandroupolis, Elefsina, Lavrio, Rafina, Igoumenitsa, Corfu, Kavala, Volos, Patra and Herakleion and the marinas of: Pylos, Alimos, Chios, Thessaloniki (Aretsou), Mykonos, Argostoli, Zakinthos and Itea.

(encountering delays) and the development of a number of mineral springs and sites belonging to the State or State-related entities (no specific timetable). Transport infrastructure projects, such as the northern motorway of Crete, are also expected to upgrade Greece as a tourism destination.

At the same time, action must be taken to extend the tourism season and increase revenues per trip. This would be achieved through targeting specific market groups, such as senior citizens who can travel all year round, and special interest tourists, such as business tourists and those who are interested in yachting, gastronomy, wellness and culture, who generally belong to higher income brackets. Alternative tourism models such as City Break, MICE, and Nautical Tourism need to be cultivated through substantial investments that will cater to the requirements of these special niche markets. Tourism professionals cite, among others, the need for more 5-star hotels, closer collaboration with tour operators, better educated personnel, improved conference infrastructure, better organized sites of tourist interest (e.g. archaeological sites, hiking trails, mineral springs, etc.), better urban environment and more flagship events to boost cities' visibility and attractiveness. An additional challenge is the existence of an appropriate number of airport connections during the off-peak months. For this, the entire industry needs to work together to find solutions.

Developments to enhance and upgrade Attica's hotel & leisure capacity can be a catalyst for the prolongation of the Greek tourist season. Due to Attica's unique features as a multifaceted cultural and urban destination, Athens has substantial potential to further develop its recreational, "City Break" and "MICE" offerings. As an indication, according to BoG data, total visits to the Attica Region from main countries of origin totalled 5.2 mn persons in 2017, increased from 4.5 mn in 2016. By way of comparison, London had in 2017 19.8 mn visitors, Paris 14.2mn, Rome 9.6mn, Istanbul 8.6mn, Prague 8.6mn, Barcelona 7.6mn, Milan 6.9mn, Amsterdam 6.6mn, Antalya 6.5mn and Vienna 6mn (Euromonitor International). Therefore, the diversification of Attica's hotel & leisure package could be instrumental in both extending the tourist period, as well as spatially diversifying tourist income, which is currently skewed towards certain islands. Projects which contribute to this direction include the renovations of Athens Ledra, Athens Hilton, Asteria Glyfadas, Astir Palace Vouliagmeni –with the participation of major global operators with limited or no presence in Greece; the Hellinikon concession; other tourist developments in Attica's Riviera; the extension of the Athens metro; the extension of the Attica Motorway and Western Imittos ring road; the relocation of Mont Parnes casino; the expansion of the Attika Motorway to Lavrio and upgrade of the Lavrio port; upgrading of Piraeus port as a major Mediterranean cruise centre.

Another form of tourism that can be further developed is cruise. Cruise is gaining pace internationally, with global cruise passengers reaching 24.7 million in 2016 (up from 5.6 million in 1995) and increasing on average by 5.2% annually from 2005 to 2016, faster than the total international tourist arrivals to destinations worldwide (+3.9%). Cruise is also quite popular among Greece's source markets. In 2016, Germany and the UK accounted for more than half of the total 6.7 million European passengers, while Italy, France and Spain followed suit with 0.5 million passengers each. Demand from Austral-Asia is also on the rise. Due to a number of natural and geographical factors, such as the mild climate, the long coastline and the large number of islands, Greece is uniquely positioned to exploit the opportunities of this sector. In 2016, among European cruise destinations, only Greece and Spain exceeded 3 million passengers,[18] attesting to the fact that Greece already has a strong foothold in this market. Nevertheless, cruise revenues are a source of concern as revenues from day trips are low and non-residents' expenditure per overnight stay of cruise passengers has decreased on average by 12% from

[18] Note, though, that data is not available on Italy, France and the UK.

2012 to 2016.[19] In order to reap substantial benefits for the domestic economy and create positive spillovers to other sectors (accommodation, transportation, food services, retail trade, etc.), home porting has to grow. Else, cruise risks bringing only marginal benefits and noise to already crowded destinations. In turn, strengthening home-porting requires upgrading port infrastructure in order to increase the number of ports where large cruise-ships can embark.

5. Review of the Projects

5.1 Energy

Project	Trans Adriatic Pipeline (TAP)
Cost	€4.5 bn (total project cost for Italy, Albania and Greece) - amount to Greece: €2bn; ca €700mn still to be invested
Funding	EBRD €500mn - request is under approval (12/2017) EIB €2,000mn. - request in the process of being approved (08/2015)
Timeline	Start of work in Greece: mid 2016 Completion: end 2019 / beginning 2020 Duration: 3,5 years
Progress	65% (at end 2017)

The 878-kilometres long Trans Adriatic Pipeline (TAP) will transport Caspian natural gas to Europe. Connecting with the Trans Anatolian Pipeline (TANAP) at the Greek-Turkish border, TAP will cross Northern Greece, Albania and the Adriatic Sea to connect with the Italian natural gas network. TAP is part of the Southern Gas Corridor, a 3,500-kilometre long gas value chain. TAP's shareholders are major energy companies SOCAR, Snam, BP, Fluxys, Enagás and Axpo. Greek companies also work on the project as contractors, sub-contractors and pipe providers. The length of the pipeline in Greece is approximately 550 km, starting from Kipi at Evros, and finishing at its border with Albania, south-west of Ieropigi. The Greek section will include one compressor station near Kipi for 10 billion cubic metres (bcm) and an additional one near Serres - should TAP's capacity be expanded to 20 bcm. There will be 22 block valve stations along the Greek route.

TAP's initial capacity of 10 bcm gas per year is equivalent to the energy consumption of approximately seven million households in Europe. Future addition of two extra compressor stations, doubling throughput to more than 20 bcm, can be activated as additional energy supplies come on stream in the wider Caspian region. The pipeline will have the 'physical reverse flow' feature and can facilitate connections to a number of existing and proposed pipelines.

The pipeline will be funded without financial support from public subsidies but it has applied for EIB and EBRD funding. The project has been included in the European Commission's list of 33 priority energy security projects of common interest. Greece, Albania and Italy signed an Inter-Governmental Agreement (IGA) in support of TAP in February 2013 and the project is currently in its construction phase, which started in 2016. The first gas delivery is expected in 2020.

Project	Interconnector Greece - Bulgaria (IGB)
Cost	€160mn estimate for total cost; €80mn relating to the Greek part
Funding	PPP; grant of €45mn from the European Energy Program for Recovery (EEPR), supplementary financing from EU Structural Funds assessed
Timeline	Start of construction: third quarter of 2018 Start of operation: second half of 2020
Progress	In its final phase before the start of construction

A pipeline of 182km length, 31km of which in Greek soil. Construction is expected to begin in H1 2018.

[19] Bank of Greece, Non-Residents' Expenditure per Overnight Stay in Greece by Country of Origin.

Entrance point will be in Komotini and exit in Stara Zagora, Bulgaria. It will connect the Greek and Bulgarian gas networks with the ability for reverse flow. It will be able to transfer 3bn cbm of gas annually, with an option to increase capacity to 5bn cbm once the compression station is built.

The design, construction and operation of the Project has been undertaken by ICGB AD, a Bulgaria-based company with a 50% stake of the Bulgarian state company Bulgarian Energy Holding (BEH) and a 50% stake of the Greek IGI Poseidon Company, in which DEPA and Italian EDISON participate equally. The IGB Pipeline has obtained intergovernmental support by Greece and Bulgaria via a Memorandum of Understanding signed in 2009. The importance of the project is highlighted by the fact that, at a European level, the IGB is labelled as a Project of Common Interest (PCI), and is included in the list of priority infrastructure projects of Central and South Eastern Europe Gas Connectivity (CESEC); at a national level, the project is included in Greece's list of fast track projects. The project has already obtained a grant of €45mn from the European Energy Program for Recovery (EEPR), with supplementary forms of financing through the Structural Funds mechanism being currently assessed, in order to secure the Project's competitiveness.

Project	**Floating Storage and Re-gasification Unit (FSRU) of Alexandroupolis**
Cost	€300mn
Funding	Private, Connecting Europe Facility, possible NSRF funding
Timeline	Construction scheduled to start in 2018. Commercial operation expected in 2023
Progress	FEED and environmental permits complete, Final Investment Decision in the end of 2018, construction phase to begin immediately thereafter

The Floating Storage and Re-gasification Unit (FSRU) of Alexandroupolis consists of an offshore floating unit for receiving, storage and gasification of Liquefied Natural Gas and an underwater and terrestrial pipeline system through which natural gas will be promoted to the National Natural Gas Transmission System of Greece. The Alexandroupolis oil and gas installation aims at creating a fourth gas import gate in Greece and SE Europe with a capacity of up to 700,000 cbm per hour or 6.1 bcm of natural gas a year and a storage capacity of up to 170,000 cubic meters of liquefied natural gas. It will operate complementarily with the IGB pipeline.

The project will be undertaken by Gastrade, a company consisting of the Copelouzos Group (80%) and Gaslog (20%). Recently, Bulgarian Energy Holding and DEPA have decided to participate in the project, with their share expected to arise from a reduction of Copelouzos Group 80% stake. The project's FEED and environmental permits are completed and the Final Investment Decision is expected by the end of 2018. The project's delivery in operation is expected in 2023.

The FSRU has been identified as a Project of Public Interest for the EU (PCI) as it strengthens security of energy supply and, as such, is financially covered by the Connecting Europe Facility. The project also has the possibility of joining the NSRF, with the company currently commencing related procedures.

Project	**Upgrade of DESFA's LNG terminal station in Revithousa**
Cost	Total cost €147mn, €40 mn remaining
Funding	35% NSRF grants, €80 mn loans from the EIB, DESFA own funds
Timeline	Construction underway
Progress	Completion in 2018

The upgrade of DESFA's LNG terminal station in Revithousa is already completed to a large extent and projected to finish soon. Revithousa upgrade features the expansion of the port, so that it will be able to

harbour ships of up to 260,000 cbm capacity and the addition of a third tank of 95,000 cbm capacity, so that Revithousa's storing capacity will be increased to 225,000 cbm; annual gasification capacity will be increased to 7 bcm from 5.2 bcm currently. Given that the Greek market's consumption is ca 2 bcm, ca 5 bcm can be exported, a volume equal to 1/3 of Balkan countries' consumption.

Project	East Med
Cost	Total cost €6bn; €3bn relating to the Greek part
Funding	N/A for construction, EU grant of €34.5mn to cover 50% of the eligible costs next FEED phase
Timeline	Completion expected in 2025
Progress	International joint declaration signed, feasibility study concluded, engineer consultant confirmed that acquired data are sufficient to start the FEED Phase.

The Eastern Mediterranean Pipeline (East Med) will connect the recently discovered gas fields in the Levantine Basin, in the south-eastern Mediterranean, with mainland Greece and is projected to carry 8-14 bcm per year of natural gas to Greece and Europe. The approximately 1900km long pipeline (700km on-shore, 1200km off-shore) consists of three pipelines (from the fields to Cyprus, Cyprus to Crete, from Crete crossing mainland Greece up to the Ionian coast), as well as compressor stations located in Cyprus and Crete. The EastMed can link up from the Ionian coast with the offshore Poseidon pipeline enabling the delivery of additional diversified sources from the Levantine to Italy and beyond. Since the end of July 2014, the Project is being developed by DEPA's subsidiary company IGI Poseidon S.A in which the Italian Company Edison holds a 50% share.

EastMed is declared by Greece as a project of national importance; it is a priority project for Italy as well. Since 2013, it has been promoted by the EU as a Project of Common Interest (PCI), benefiting from the fast-track procedures provided by Regulation 347/2013, while co-financing by the EU's Connecting Europe Facility for the pre-FEED studies was approved in 2015. The Pre-FEED studies underline the EastMed's added value and its complementarity with other projects and demonstrate conclusively that the project is technically feasible, economically viable and commercially competitive. Moreover, as a result of continuous technological progress, the pipeline's capacity could be increased to further enhance its economic potential. Note that Israel has discovered an offshore gas deposit of 900 bcm, while studies signify further deposits of 2,200 bcm.

The successful results of the pre-FEED studies have provided further impetus to the project's development through initiatives at both the national and European level. In this context, in December 2017, the Energy Ministers of Greece, Cyprus, Italy and Israel signed, in the presence of the EU Commissioner for Climate Action & Energy Miguel Arias Cañete, a quadrilateral joint declaration to follow closely the EastMed's development and further support its promotion. In January 2018, East Med was selected for a second CEF grant of €34.5mn, covering approx. 50% of the eligible costs of the next FEED phase, which will bring the project at final investment decision status. Completion of the project is aimed for 2025 with an estimated total cost of ca €6bn. The IGI Poseidon consortium will apply for funding from the European Regulation "Connecting Europe".

Project	Interconnector Greece - Italy (IGI) pipeline
Cost	Total cost €500mn
Funding	PPP; studies co-financed by the EERP and TEN-E programs (grants of €9 mn)
Timeline	To be commissioned at the end of 2022
Progress	In the final phase of the licensing procedure in Greece

The Interconnector Greece - Italy (IGI) pipeline project consists of two sections: The 590 km onshore

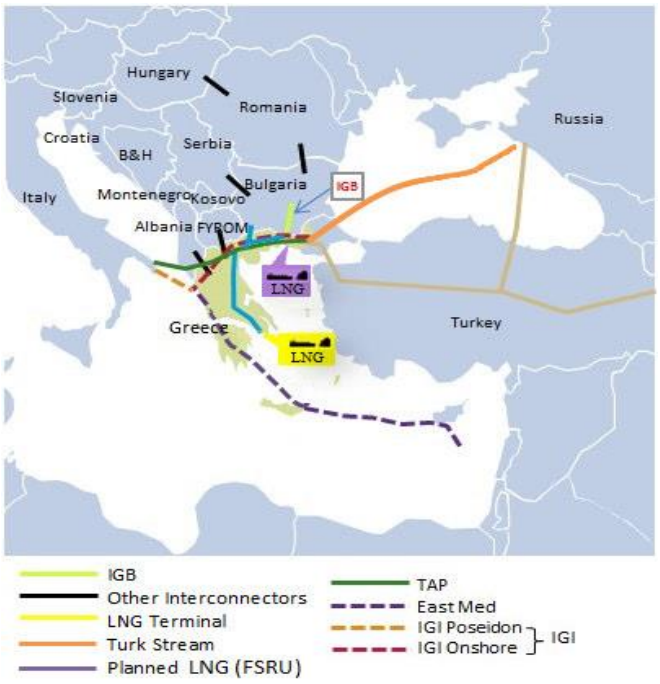
IGI pipeline crossing Greece from Komotini to the Thesprotia region, which is developed by DESFA, and the 207 km offshore Poseidon pipeline connecting the Greek and Italian transmission systems, from the shores of the Thesprotia region to Otranto in Italy, which is developed by the Greek company IGI Poseidon S.A. (50% DEPA - 50% Edison). The Poseidon pipeline consists of a 207 km long, 32 inches diameter pipeline, a 120 MW compressor station and a metering station. It is designed to have an initial 12 bcm annual capacity and could potentially be expanded up to 20 bcm per year. Poseidon can carry gas from diversified sources that become available at Greece's borders, including from the Caspian, Middle East and East-Mediterranean.

The development of the Poseidon project is covered by an Intergovernmental Agreement between Greece and Italy, ratified by the relevant Parliaments. In 2015, as a result of the project contribution to European targets, the Poseidon pipeline has been confirmed as a Project of Common Interest (PCI), being included by the EU Commission in the second PCI list among the Southern Gas Corridor projects, and benefits from the fast track procedures provided by the EU Regulation 347 of December 2013. The Poseidon pipeline has also been included in the last Ten Years Development Plan (TYNDP), in line with the objective of the European Network Transportation System Operators of Gas (ENTSOG) to create a single European market for gas and a reliable and safe transmission network capable of meeting Europe's current and future needs. The Poseidon pipeline has benefited from European grants of approx. €9 mn euro through the European Economic Recovery Plan (EERP) and the Trans-European Networks Energy (TEN-E) programs for the conduct of studies.

The promoters have already obtained all mandatory authorizations to build and operate the project in Italy while in Greece permits are being finalized. The Final Investment Decision can be taken as soon as the prerequisite activities are completed. Based on the current timetable, the project could be commissioned at the end of 2022.

The entire picture of Greece's gas network (transfer pipelines, storage and gasification facilities) after the completion of the aforementioned projects is depicted in Figure 11.

Figure 11: Greece's gas transfer network after the completion of proposed projects



Source: DEPA

Project	Islands' Electrical Interconnection with Mainland Greece
Cost	Cyclades Phase B: €86,8mn, "Small" Crete connection €330mn
Funding	Public, EU funds
Timeline	Phase B is expected to be completed by end 2019; Phase C by end 2020; Crete interconnection by end 2023
Progress	Tenders submitted for Phase B

In its wider conception, the project concerns the interconnection of islands' power networks with mainland Greece in order to: (i) reduce cost from the use of oil-fueled power stations in operation in the islands currently, (ii) being able to exploit the high

potential of the islands in Renewable Energy Sources (RES), wind power in particular.

The works of Phase A (worth €245mn) on the interconnections Lavrio-Syros, Syros-Paros, Syros-Tinos and Syros-Mykonos were completed in March 2018. Phase B includes:

(a) Study, supply and installation of a 150kV XLPE submarine and underground cable system for the interconnections Paros-Naxos and Naxos-Mykonos: approximately 47.6 km, budget of € 52.1mn.

(b) Construction of a 150 kV / MT Substation in Naxos, at a cost of € 11.16mn

(c) Upgrading and replacing the existing cable connections between Andros-Evia (14.5 km) and Andros-Tinos (4 km), with a total cost of € 23.56mn.

Phase B is expected to be completed by end 2019; tenders have been submitted and the procedure is in the process of legalizing documents. Phase C concerns a second cable to connect Lavrio with Syros and is expected to be completed by 2020. Phase D concerns the interconnection of Lavrio-Serifos, Serifos-Milos, Milos-Thira and Thira with Paros or Naxos. Phase D is still under consideration and it is to be included in ADMIE's 10-year plan.

In addition, there are two interconnections of Crete with Mainland Greece. Firstly, a "small" one connecting Crete with Peloponnese; this has a budgeted cost of €330mn, it is expected to be commissioned in 2018 and completed by mid-2020. Secondly, a "large" interconnection with Attica. The Regulatory Authority of Energy (RAE) has asked for the Crete interconnection project to work in synergy with the EuroAsia Interconnector project (interconnection Israel-Cyprus-Greece, see below), i.e. merge the two projects. Hence, ADMIE has signed a Memorandum of Understanding (MoU) with the EuroAsia Interconnector to set up a joint venture to build the Greek part of the project and is now negotiating the shareholders agreement. ADMIE is expected to control 51% and will also take over the management of the cable.

Project	**EuroAsia Interconnector**
Cost	Total Cost: €3.5bn, Greek part of the project: €800mn- €1bn
Funding	Intergovernmental; possible EU co-financing
Timeline	Total project: expected to be delivered by 2023; Crete-Attica section possibly by end 2020
Progress	The project is in the phase of final studies

The project concerns the connection of the national electricity grids of Israel, Cyprus and Crete-Attica, Greece through a 1,518km subsea HVDC cable electricity interconnector with a capacity of 2000MW. More than 3.000 km of HVDC submarine cable, laid at water depths of up to 3.000 m, will be required. The project has been included in the EU list of Projects of Common Interest (PCIs) and labelled as an EU "electricity highway". It includes in its full development the following sub-projects:

- Interconnection between Hadera (Israel) and Kofinou (Cyprus) - Link 1; onshore-13 km, offshore-310 km
- Interconnection between Kofinou (Cyprus) and Korakia, Crete (Greece) - Link 2; onshore-18 km, offshore-896 km
- Internal line between Korakia, Crete (Greece) and Attica region (Greece) - Link 3; onshore-37 km, offshore-335 km

The latter coincides with the "large" Crete-Attica interconnection mentioned above. The financial cost of the entire project is estimated at €3.5 billion, while the Crete-Attica part is estimated at € 800mn-€ 1bn, depending on the conditions at the sea bottom and other parameters during construction.

Preliminary and final pre-works studies of the project have already been co-financed by the European Union with grants, in two separate occasions, through the Connecting Europe Facility. An application to the EU for the co-financing of the construction of the project will be submitted during the "2018 CEF Energy Call for Proposals". EuroAsia Interconnector Limited, the Project Promoter of the

interconnection, is currently in the planning phase of the procurement process for the construction.[20]

Project	Renewable Energy Sources
Cost	€1.2 - €3.5bn
Funding	Private
Timeline	300 MW of wind farms: equally spread in 2018-2020 300 MWh of photovoltaics: equally spread in 2018-2020 400 MW of joint tenders for both technologies: equally spread in 2019-2020; 300 MW of site-specific competitions: 100 MW in 2019, 200 MW in 2020
Progress	Auctions authorised

EC approved the Ministry of Energy's Plan for an auction mechanism for the production of electricity from renewable energy sources. The project concerns licensing of 1,300 MW of Wind and Photovoltaic Parks between 2018-2020, which translates into total investment of €1.2bn - €1.5 bn.

According to reports, this plan includes four categories of competitions: exclusively for wind parks (300 MW total projects equally spread in the three years), exclusively for photovoltaics (projects with a total output of 300 MW equally spread in the three years), joint tenders for both technologies (projects totaling 400 MW equally spread in 2019 and 2020), site-specific competitions for areas with recently installed new electrical interconnections in which free electricity transmission capacity is available (projects totaling 300 MW, 100 MW to be allocated in 2019 and the remaining 200 MW in 2020). Such cases are the areas in the new interconnection Polypotamos-Nea Makri, as well as the Cyclades islands' new interconnections.

In general, there are plans for wind parks on the islands worth €3.5bn, which await the interconnection of islands with Mainland Greece in order to be implemented. These include 1,000MW in Crete, 706MW in Eastern Aegean islands, 333MW in Skyros, 528MW in 23 rock islands in central Aegean and 220MW in Cyclades. Under a conservative approach, these additional projects have not been accounted for and constitute upside potential.

RES attracts foreign investor interest. For example, American company General Electric created an autonomous business unit for investing in wind power projects in Greece. This makes sense considering that Greece has a high potential for solar and wind power but little capacity installed. Indicatively, the total value of electricity produced in Greece in 2017 by wind parks is estimated at €400 mn, projected to increase to ca €500 mn in 2018 with the extra connections to new wind parks.

Project	Combined cycle gas- fueled power plant at Agios Nicolaos,Viotia
Cost	€300mn
Funding	N/A
Timeline	To be completed/operating in 2023
Progress	In the process of licensing

Mytilineos Group recently announced its decision to construct a new combined cycle unit of 650MW fueled by natural gas and located at the company's Energy Centre at Ag. Nicolaos, increasing the centre's capacity to 1428MW. This move reshuffles the electricity market as it signifies the turn of domestic power market's major private players away from lignite. The cost of the investment is estimated at €300mn and the station will have a technologically advanced gas turbine with a performance rate of 63 percent, rendering it the most efficient combined-cycle plant in Europe. The constructor will be METKA-

[20] A proposal has been made from Italy's Terna for a further electrical interconnection, namely a second cable connecting the Greek and Italian systems, yet the discussion is in early stages. Note there is already one cable in operation connecting the Greek and Italian systems with a total length of 313 km, of which 160 km underwater, and maximum power transfer capacity of 500 MW, voltage of 400 kV.

EPC, which has undertaken dozens of similar projects around the world and the unit is expected to operate in 2023.[21]

5.2 Logistics and Infrastructure

Project	Freight Centre in Thriasio Field
Cost	€158.4mn, of which €10mn for the land rental price, net €148.4 mn
Funding	Phase A: €36.1mn private capital (ETVA-Goldair at a rate 80-20%), €38.4mn long term loans, €16 mn short term loans
Timeline	Construction period of 10 years, expected to begin in 2018
Progress	Concession contract in the Court of Auditors' proceedings

The project concerns the development of an integrated facility for storing, warehouse management and logistics services. A total of 235,000 m^2 of storage space will be built, 120,000 m^2 in years 1-2 (when also the equipment of the freight centre and its railway interconnection will be constructed) and 115,000 in years 3-10. The total investment budget is €158.4mn, allocated to €90.5mn and €67.9mn in the first and second phases respectively. Of the €90.5mn of the initial investment, €10mn concern the one-off price that GAIAOSE will receive to rent the space. The Concessionaire has been nominated following a competitive procedure, for 588 of the approximately 2,000 acres of GAIAOSE owned land. It is a consortium formed by the subsidiary of Piraeus Bank, ETVA, participating by 80%, and the Greek logistics company Goldair, which participates with 20%. The duration of the concession is 60 years.

Funding for the first phase comes from equity (€36.1 mn from ETVA and Goldair at 80-20%), long-term bank lending to be provided by Piraeus Bank (€38.4 mn) and short-term bank lending (to cover VAT) €16mn.

The duration of construction works is estimated at 10 years and was expected to begin in Q1 2018 but delays have occurred. According to reports, the concession contract for the Freight Centre in Thriasio Field is in the Court of Auditors' proceedings.

Investments are also needed on the remaining OSE-owned land of 1,450 acres, which hosts the sorting and transhipment station (combined transport transhipment buildings, containers loading, wagon load transhipment, liquid fuel station etc.), as well as mechanical equipment (cranes, forklifts, straddle carriers, etc.). These additional projects have not been accounted for adopting a conservative approach and constitute upside potential. The wider project comprises the first integrated freight transport centre in Greece gathering railway activities that were previously scattered across the wider Athens area (sorting station, container terminal, customs office, commerce station, warehouse, etc.). Reports mention OSE's intention to launch a study for a PPP on this second project. Both projects constitute MoU prior actions. The final investment can be even larger since private transport and logistics companies are expected to invest in the wider area in order to exploit increased freight traffic.

Project	**"Sea2Sea" project:** railway connection of northeastern Aegean ports with Black Sea ports and the Danube
Cost	ca € 5bn excluding the Romanian section; €2bn relating to the Greek part
Funding	N/A
Timeline	N/A; the company to undertake construction and management of the lines is expected to be established in the first half of 2018
Progress	MoU between Greek & Bulgarian PMs

The "Sea2Sea" project in its wider conception concerns the development of a multimodal freight

[21] Modernization of the lignite powered units in the context of PPC privatization are also important and are expected to bring substantial investment. Given that details on these projects are yet unavailable, they are left out and comprise upside potential. In addition, expansion of DEPA's gas networks is also key for the reduction of dependency on oil.

corridor connecting the north eastern Aegean ports with the Black Sea ports and the Danube. Europe-Far East trade is currently being expedited by the route through the Bosporus Straits, which is bound by traffic congestion, high cost in terms of charges and time of shipment, and high risk in terms of safety and environmental impact. A reliable railway connection of Northern Greece with Black Sea ports and the Danube could provide a safe alternative route.

In its first phase, the project intends to create a railway line that will connect three ports in Greece (Thessaloniki, Kavala, Alexandroupolis) with three Bulgarian ports (Burgas and Varna on the Black Sea and Ruse on the Danube), starting from the Kavala-Ruse line. Key is the infrastructure for connecting the ports to the railway; these projects are ongoing. Albeit doubts have been expressed as to the economic viability of the project, political will to proceed has been manifested. An MoU was signed in September 2017 between the Greek and Bulgarian Prime Ministers for the formation of a joint implementation platform. A tripartite Summit (Greece-Bulgaria-Serbia) has already been held to examine an expansion to include Serbia; in its final phase the project could also expand towards Romania, which has officially stated its intention to participate in it. A four-partite Summit (Greece-Bulgaria-Serbia-Romania) will be held in Varna in October 2018 to discuss the project. The total budget of the project is unknown but preliminarily estimated at ca €5bn excluding the Romanian section.

A company is expected to be established in the first half of 2018, comprising participations from Greece, Bulgaria and Romania, to undertake the construction and management of the lines, with the use of EU and private funds. Greek and Bulgarian Prime Ministers hope to secure funding from the Juncker plan (European Fund for Strategic Investments, or EFSI), as President Juncker has stated he agrees to discuss the project. Reports suggest that joint consultations have already been made at the level of the Directorates-General of the European Commission and the project has been greenlighted by Transport Commissioner Violeta Bulc.[22]

Project	**Upgrade of Piraeus Port**
Cost	Obligatory investments of €300m; proposed additional investments of €172mn
Funding	PPA SA
Timeline	Total investment duration until 2021, further works until 2026
Progress	Construction has started

Under the Concession Agreement between PPA SA and the Greek State, ratified by Law 4440/2016, Cosco has to undertake compulsory investments of €300mn by 2021 and another €50mn by 2026 for the upgrade of Piraeus Port. These include the expansion of the passenger port in the southern zone, the conversion of the pentagonal warehouse into a cruise passenger station, the underground connection of the car-transport station with the former Directorate for Public Material Management (DPMM), dredging of the main port, construction of a new oil tanker pier, expansion of the car transport station, the improvement of the Perama Shipbuilding Zone infrastructure, the procurement of new equipment and the improvement and maintenance of the port infrastructure.

PPA has proposed additional investments of €172 mn, which it considers necessary for the development of Piraeus into a Port with integrated services and modern infrastructure. These include the development of a storage and distribution center

[22] A further project has been proposed regarding the construction of a motorway and railway axis of Elefsina-Thiva, with a possible budget of €700mn. It is intended to bypass Attica and offer an alternative route for commercial transports, which are expected to increase dramatically in volume due to the transformation of Piraeus into a major logistics hub. The project includes a new double railway line Thriassio-Thiva, which will bypass almost all Attica and reduce the distance by 30 km, as well as an Elefsina-Thiva-Yliki closed motorway, which reduces the distance by 50 km. However, this is a rather immature project, given its high cost and possible implications for the revenues of other concessions; if implemented, it is not going to be operational before the next 10years. Therefore, it is left out and comprises upside potential.

in the former DPMM, the construction of 4- and 5-star hotels, construction of two multi-storey car parks, the purchase of eco-buses and the construction of a cruise passenger terminal. The Master Plan and Port Development Plan are currently being finalized by the PPA. The above figures do not take into account investments that other companies may undertake in related activities in the wider region of Piraeus as an indirect result of the upgrade of the port.

Cosco's goal is to make Piraeus one of the 30 largest ports globally (38th in 2017 from 44th in 2016), as it plans to convert it into China's main southern entry point into Europe. The port will be the only one globally able to harbor 5 giga-carriers (capacity >18,000 teu) simultaneously. In 2017, Piraeus handled 4,17mn teu containers vs 1,19 in 2011; after completion of investments total capacity is expected to increase to 7.2mn teu.

5.3 Tourism and Urban Development

Project	Athens metro Line 4, Section A "Veikou Alley - Goudi "
Cost	€ 1,45 bn
Funding	Public, NSRF 2014-2020
Timeline	Construction estimated to start in 2020 and to be completed in 96 months
Progress	Submission of application files completed, appeals pending

The project concerns the extension of the Athens metro with the construction of Line 4. In August 2017, the submission of application files was completed for the tender for Section A "Veikou Alley - Goudi ", a 13 km long line with 14 new underground stations. However, appeals have been filed by competitors, which the Attiko Metro Committee will be asked to assess. In the event of a negative decision, the tender will proceed to the next phase, but there is a possibility for the candidates to ask for interim measures and the whole case to be transferred to the Court of Auditors. If not, the second phase of the tender will take place in H1 2018 with the submission of technical and financial offers. Construction is not expected to start before 2020, even if there are no legal impediments, since it will take several months for the agreement to be approved by the Court of Auditors and the Parliament.

The estimated cost of the project is € 1.45 bn. Funding for the project is earmarked under the new NSRF 2014-2020 and the Operational Program YMEPERAA (Infrastructure, Transport, Environment and Sustainable Development). The estimated construction duration is 96 months.

Project	Extension of Western Imittos Ring road and connection to Vouliagmenis Av.
Cost	€450mn
Funding	N/A
Timeline	N/A
Progress	N/A

The project includes the extension of Western Imittos Ring road and connection to Vouliagmenis Avenue, as well as the upgrading of Vouliagmenis Avenue up to Alimos junction (underground crossings, incorporation of slopes, etc.) at a total cost of €450mn. This project too is included in the New Metropolitan Plan of Athens. However, implementation appears to delay as a comprehensive plan for the auctioning of the Attika Motorway extensions and related studies are pending.[23]

[23] There are a number of projects which can be combined with this one, such as the extension of train and motorway to Rafina; these are yet immature and comprise upside potential.

Project	Expansion of the Attika Motorway to Lavrio and upgrade of the Lavrio port
Cost	Total cost estimated at €285 mn
Funding	N/A
Timeline	N/A
Progress	N/A

The project concerns the expansion of the Attika Motorway to Lavrio, with a parallel construction of the suburban railway extension at Koropi - Lavrio and the upgrading of the Lavrio port. This project is included in the New Metropolitan Plan of Athens. However, implementation delays are expected as studies are pending and funding is not secured. Total cost is estimated at € 285 mn.

Project	Northern Motorway of Crete
Cost	€700mn to €1.5bn
Funding	N/A, proposed for NSRF funding
Timeline	Construction not expected to start before 2020
Progress	Preparation of a road safety study

The Northern Motorway of Crete (NMC) is intended to link a 310 km distance stretching between Kastelli Kissamou and Sitia Airport, following broadly the existing A90 National Road route. The planned motorway will reportedly have 4 traffic lanes and emergency lanes along its entire 310km, from just 41km today. Given that the project is still in the early stages of planning, lacking a strategic feasibility study or method of implementation, cost estimations vary from €700mn to €1.5bn (we estimated it at €700mn to be conservative). A contract has been signed for the preparation of the road safety study, with completion time of the study estimated in twelve months and its first part, road safety measures, in six months. The project will be proposed for implementation with funding through the NSRF road safety program 2014-2020. Construction is not expected to start before 2020.

Project	Kasteli Airport
Cost	€1bn
Funding	PPP
Timeline	Completion by 2023
Progress	Construction expected to start in mid-2018, submission of agreement for approval by the Greek Parliament is still pending

The project concerns the construction of a new airport at Kasteli, Crete that will replace the old and saturated "Nikos Kazantzakis" airport. The consortium Ariadne Airport Group, which includes TERNA and Indian GMR Airports Limited (10%) has undertaken the construction and operation of the airport for 37 years. The concession agreement is expected to be signed in Q2 2018; an independent engineer is scheduled to be hired by March 2018 and the project will subsequently be approved by the Greek Parliament. The total cost is estimated at ca €1bln; net construction cost is estimated at € 480mn, while ca € 520mn concern other construction costs (including insurance costs, independent engineers' fees, old airport transfer costs, pre-operational tests etc.). The project will be run as a Public Private Partnership (PPP), using the concession method, with the State participating in the concession company by 46%. The Ministry of Infrastructure is negotiating with the European Investment Bank for a €180mn loan to cover the State's contribution to the construction. Construction works are expected to start in mid-2018 and the airport is scheduled to operate in 2023.

The new airport will have a 3.2 km long landing-take-off runway, expandable to 3.8 km if necessary; parking space for 25 aircrafts; 5 fissures; 400 acre developments for commercial activities; parking for at least 800 vehicles, 50 tourist buses, 150 taxis, 20 professional passenger service vehicles and public transport.

Project	The Hellinikon Urban Development Project, Athens
Cost	€ 7 bn of net new investment
Funding	Private
Timeline	Court of Auditors decision expected by Spring 2018, completion in 12 years.
Progress	Developing consortium in place

The Project consists of an integrated urban development featuring a Metropolitan Park covering an area of 2,000,000 m^2, residential communities, hotels, shopping centres, entertainment venues, museums and cultural venues, health and wellness centres, sports and recreation facilities, a business park with an educational and R&D hub, as well as the upgrade of the existing marina and the Coastal Front. The Project constitutes the largest urban regeneration project in Europe.

The investment amounts to €8bn including acquisition cost, and is expected to create 10,000 permanent jobs during the construction period and 75,000 jobs (IOBE study, July 2016) during its maturity. It is also expected to attract at least 1 mn new tourists. The project has been undertaken by the Global Investment Group consortium of investors - the Chinese conglomerate Fosun Group, Eagle Hills from Abu Dhabi and Latsis Group. The progress of the Hellinikon project constitutes a prior action in Greece's Economic Adjustment Programme due to its importance for the investment climate and Greek GDP and the need to overcome bureaucratic obstacles. The Council of State endorsed in February the Presidential Decree that approves the Integrated Development Plan of Hellinikon bringing the project a step closer to its financial closing and the beginning of construction works although a number of actions are still pending.

Project	Hotel Developments
Cost	Ca €1.25bn
Funding	Private
Timeline	Varrying according to project
Progress	Varrying according to project

The upturn of tourism in recent years has motivated the construction of many new hotel complexes and other tourist developments, as well as the upgrade of existing ones. This trend has been reinforced by the availability of related assets due to the privatization programme, compressed asset prices and wage costs, and the need to restructure some overleveraged and non-performing units. The process is multifaceted and ongoing and, therefore, only indicative cumulative numbers can be given. Some of the most prominent examples of projects already launched are mentioned below, with the list being by no means exhaustive.

Kassiopi Tourist Development: a luxury resort developed in Corfu by NCH Capital with a five star hotel, tourist residences and a marina with a capacity of 60 boats. The project worth €100mn, of which €75mn FDI and €25mn for rental price and capital gain royalties; expected total investment duration is 5 years. The HRDAF tender was completed in 2013, yet investment licencing has not been completed due to environmental organizations' appeals. In August 2017, geotechnical studies began, yet work was prevented by the Mayor of Corfu, who subsequently filed an application for interim measures, with the decision pending. All appeals so far have been dismissed either by the Court of Auditors or by the competent courts, yet environmentalists claim that an appeal to the Committee on Petitions of the EU resulted in a call for a preliminary investigation by the European Commission and the European Parliament's Committee on the Environment.

Afantou Rhodes Development: The Afantou property consists of two neighbouring beachfront land plots located in the Afantou area of the Island of Rhodes and is situated in close proximity to very important

tourist destinations of the island. The combined surface of the land plots is ca 1,858,000m², while part of the property (ca 450,000 m²) currently encompasses an 18-hole Golf course, operating since 1973. The property has the potential to be developed, via a large scale integrated tourism, leisure, residential project, enclosing the existing golf course. The total cost of the aforementioned investment is estimated at €300mn. In July 2014, M.A. Angeliades Inc and Aegean Sun Investment Ltd were selected as preferred investors for the property through a tender process, with a total bidding offer of €45.1mn. However, the Ministry of Culture declared the area an archaeological site, a decision that froze the investment. In December 2017, an MoU was signed between HRADF and the Ministry of Culture, which establishes the framework for carrying out archaeological exploratory investigations on the area in order to ascertain the existence of any antiquities, as well as the management and protection of potential findings. The cost of archaeological research will be covered by HRADF.

Costa Navarino Development: TEMES SA is a premier destination developer & operator in the high-end tourism and real estate sector. Its further investment in Costa Navarino, southwest Peloponnese is estimated at €250mn and is expected to start within 2018. It includes the development of luxury private properties for sale, two new luxury five-star hotels and two further signature golf courses, among others.

Reconstruction of Hotel Ikos Dassia (Corfu) and Ikos Kefalos (Kos): the former hotels of the Chandris Group in Dassia, Corfu Chandris and Dassia Chandris, are in the process of reconstruction by the Ikos Resorts hotel group in order to operate as a single 5-star hotel complex from May 2018 under the name Ikos Dassia. The new unified hotel will feature 403 rooms, suites and villas, seven restaurants, SPA and two Kids Clubs. The hotel will work almost all year round with the aim to extend the tourist season for the broader tourist sector of Corfu. The Ikos Resorts hotel has also acquired Club Med in Kefalos, which will be transformed into the 5* Ikos Kefalos, offering approximately 410 rooms and suites; it is due to open in 2019. Combined, the two developments worth €200mn, of which €110mn for Ikos Dassia and €90mln for Ikos Kefalos.

Renovation of Athens Ledra: this is a historical Athens hotel in Sygrou Avenue. It was bought, through an auction process, by the American investment fund Hines for a total amount of €33.5mn. The hotel has 314 rooms and a number of restaurants. Renovation works worth €15mn are about to begin in order for the hotel to operate in the summer of 2018; they include the renovation of all rooms and common areas, the refurbishment and configuration of restaurants and the construction of a new SPA.

Renovation of Astir Palace Vouliagmeni: sold to Jermyn Street Real Estate Fund IV LP in October 2016, with a total valuation of the company's share capital at €444mn. Jermyn Street, led by London-based AGC Equity Partners, is an investment fund with two state-owned Abu Dhabi and Kuwait funds, Arab investors and the Turkish Dogus Group. The hotel is currently being renovated to operate under the Four Seasons brand name; the renovation investment is estimated at €100mn. The redevelopment plan includes the complete renovation of the hotel, an upgrade of the Vouliagmeni marina, the renovation of Astir Beach, the development of up to 13 luxury residences and the creation of a leisure park, aiming at the emergence of Asteras Vouliagmenis as a world-class destination. The hotel will have approximately 300 rooms, suites and luxury bungalows, spa and leisure facilities, conference and event venues, infinity pools, beaches etc. Following the recent signing of the Joint Ministerial Decision regarding the approval of the investment plan for the exploitation of the property, the renovation works began; the hotel is expected to operate in 2018.

Renovation of Athens Hilton: Konstantakopoulos Group and the Turkish Dogus Group acquired the Athens Hilton from Alpha Bank in October 2016. The new owners are planning significant investments

regarding the upgrade of the hotel, such as converting part of the existing structure into private houses (condominia) and converting some of the areas of supplementary use (public and conference venues) into retail shops, restaurants and leisure facilities. Plans for the renovation are expected to begin in autumn 2018.

Relocation of Mont Parnes casino: the Government has passed legislation that allows for the relocation of the greater Athens area's sole casino, from atop Parnitha mountain, to an urban area closer to the city's centre. The casino is managed by a Hyatt Regency-led consortium. The relocation will, by all accounts, be in north-northwest Athens, "relatively far" from another planned casino in the coastal Helliniko area, which will be part of the relative urban development project. The investment is estimated to worth €100mn. The legislation provides for the retention of the State's 49% minority stake in the current Mont Parnes casino, without any contractual obligation for the State to participate in any new investment. The concession holder that will manage the casino in its new location will be obliged to pay €1mn a year, for five years, from its gaming profits to an authority managing the Mt. Parnitha national park.

Tourist Developments in Attica's Riviera: the Athens Riviera is the 60km long coastal area from the port of Piraeus to Cape Sounio. Due to the area's natural beauty and proximity with Athens cultural attractions, it has been the subject of various tourist development plans, some of the most ambitious ones aiming to unify the front. As mentioned above, Astir Vouliagmeni is already progressing. In addition, one should consider the case of the hotel Grand Resort Lagonissi, which faces distressed debt issues and litigation between the leaseholder and the Greek State. Although the hotel has published a call for strategic partners to participate in its management, possible failure to deal with debt issues would raise various eventualities, including liquidation of its assets. Further, Asteria Glyfada has been acquired by Grivalia REIC via an auction process. The new owner has announced a €60mn investment plan for transformation of the complex into an "integrated resort" with a residential component.

Real estate experts indicate three more publicly owned land areas where integrated resorts could be developed: one adjacent to the Asteria Glyfada complex currently hosting a public foundation, one in the area of Anavissos, currently hosting a public school for hotel administration, and one in the area of Kavouri, currently hosting the site of an Air-Force facility. Each of these faces obstacles, including the general problems plaguing the Greek tourist industry, such as lack of spatial planning, and land uses, delays in administering justice, instability and lack of transparency of the regulatory framework and excessive taxation. Given unavailability of details, these - and other - projects are not included in the analysis and constitute upside potential.

Further Infrastructure Projects

There is a number of further infrastructure projects, which are of interest to tourism; given unavailability of details, these projects are not included in the analysis and constitute upside potential. Firstly, the upgrade of peripheral ports is necessary given that most of them do not have the capacity to harbour large cruise ships. Cruises are an alternative vacation choice gaining popularity in recent years. Given fiscal limitations, privatization is the most efficient way to attract FDI in upgrading port facilities. Secondly, the improvement of the secondary road network is necessary to make certain tourist developments more easily accessible, e.g. the Kalamata-Pylos road (Costa Navarino) and the west coast of Peloponnese motorway (Patra-Pyrgos). Finally, the privatisation of a number of airports, such as Kalamata, Araxos and Paros, is likely to significantly upgrade the existing infrastructure.

6. Estimation of Projects' Contribution to the Greek GDP

Investment, being the most volatile component of GDP in changes of the economic climate and sovereign risk, collapsed during the crisis. Nominal GCF in Greece in 2017 was at €20.8bn or 11.7% of GDP vs €60.5bn or 24.6% of GDP in 2007. As of today, capital decumulation continues as investment remains at very low levels and is exceeded in size by depreciation. This fact has grave repercussions on future productive capabilities and the ability of the country to maintain its human resources.

The Greek economy needs ca €86bn net increase in the capital stock in 2010 prices just to reach the level of the 2010 peak. Assuming a constant capital-to-GDP ratio, this amount is what is required to return to 2010 real GDP as well (also assuming that TFP and labour hours return to their pre-crisis level).[24] The amount of gross investment that is required in order to reach this level is of course larger as the capital that is depreciated in the meanwhile also needs to be replaced.

In addition, the composition of investment has to change. In the years before the crisis, investment was overly reliable on real estate; in the years 2001-2008, dwellings comprised on average a 37.2% share of total investment in Greece vs a 29.2% EZ average (in peak year 2006 the gap was even bigger, i.e. 41.4% in Greece vs 29.7% in EZ). Residential investment, while having a wide dispersion in the economy and a large domestic value added, is a less productive part of investment, i.e. it does little to expand the productive capabilities of the economy and therefore has smaller multiplicative impact on the GDP. Investment in equipment also fared well in the pre-crisis years; by contrast, non-residential construction, civil engineering and R&D lagged behind in comparison to EZ averages. In the crisis years, real estate collapsed; in 2017, residential real estate investment amounted to ca 0.6% of GDP in Greece vs an EZ average of 5%. This level should increase, but real estate cannot be expected to be the locomotive of growth again, given the still large numbers of unsold properties, as well as the need for a more extrovert and knowledge-based growth model. Equipment and infrastructure investment, which are the most productive parts (embodied technological change), held better in the crisis although they also fell. Infrastructure even managed to recover in 2016 to 4.5% of GDP, from lower levels in previous years, vs an EZ average of 4.7%. Investment in equipment still lags behind at 4.6% of GDP vs EZ average of 6.5% of GDP. Overall, there is a need for a sustainable increase which, at least, would bring all GFCF components in line with EZ averages as percentages of GDP and, preferably, higher, if the country is to converge to EZ living standards.

The projects reviewed in this study can contribute a great lot in achieving the quantitative, as well as the qualitative targets. Firstly, the projects are of large scale, totaling an investment of ca €22.4bn in current prices. This amount is by itself enough to cover ca ¼ of the gap with 2010 capital stock, leaving aside depreciation for a moment. Secondly, most projects are of a strategic nature and in sectors crucial for the Greek economy. In addition, they involve activities with a large productive potential, i.e. they generate economies of scale and scope with other sectors and activities, hence they can have a large cumulative multiplicative effect in the GDP in the long-term. The remainder of this section attempts a quantification of this long-term contribution to GDP and associated creation of jobs.

As a first step, we attempt an approach based on the concept of multipliers. This approach is subject to certain limitations. There is a large literature on the estimation of fiscal multipliers, i.e. the impact of a - temporary or permanent - fiscal shock (change in the fiscal stance) on the level and dynamics of GDP in the short and longer term. Estimation is based on either DSGE or empirical models. Some of the approaches estimate multipliers for changes in particular components of public revenue and expenditure, including public investment. By contrast, estimation

[24] Continuous convergence with EA averages would require the rate of capital creation to exceed EA averages in the years thereafter.

of a multiplier for private investment is a more difficult task as private investment is a highly endogenous variable, while public investment can be considered, under certain assumptions, as exogenous. For the purposes of this study, multipliers pertinent to public investment could be utilized, as many of the projects reviewed concern the construction of public infrastructure and other capital items of long duration. Yet, this is bound to be an imperfect approximation, as other projects are purely private in nature, with different kinds of economies of scale and scope to other activities, and with different horizons of usage. Furthermore, timing of start and completion varies among projects so that cumulating the impact in a single moment in time is inappropriate. Hence, a "steady-state" estimate of cumulative impact based on multipliers can only be used as a harsh indication against which findings from our methodology explained below can be compared.

The literature has showed that there is vast variation in the size of the short-term multipliers across studies. In general, fiscal multipliers tend to be larger in deep recessions or financial crises, when public finances are more sound, when fiscal consolidation is backloaded, when a significant part of households and firms face liquidity constraints (so that they cannot engage in intertemporal consumption smoothing), when there are nominal price and wage rigidities, when policy interest rates do not react or react only mildly to decreases in aggregate demand (so that crowding-in effects of private investment are smaller), when the degree of the economy's openness is low, and when expenditure increases concern more productive parts of expenditure.[25]

An estimation tailor-made to the Greek economy is provided by Bank of Greece (2014). Following this approach, a 1ppt increase of public investment causes a cumulative increase of real GDP by ca 1ppt in 1 year, 1.6 ppts in 2 years, 2ppts in 3 years and 2.4ppts in the long run (more than 4 years). Therefore, reviewed projects worth €22.4 bn, are expected to increase real GDP by €22.4bn, €35.8bn, €44.8bn, €53.8bn in 1, 2, 3, and more than 4 years respectively.

With these results in mind, we proceed to the methodology of choice, which concerns the calibration of the capital-output ratio and of the net capital that the projects under consideration will create.

In the framework of the standard neoclassical growth model, output (Y) is a function of labor (L), capital (K) and total factor productivity (A) i.e.:

$$Y = AK^{\alpha}L^{1-\alpha} \quad (1)$$

where α (constant parameter with $0 < \alpha < 1$) is the share of capital and 1-α is the share of labour.

This production function (Cobb-Douglas) exhibits constant returns of scale.[26] For the purposes of this study, we need the Incremental Capital-Output Ratio (ICOR), i.e. the increase in output which is associated with the increase in the capital stock created by the reviewed investment projects. This implies we also need to calculate the rate of depreciation of the created capital in order to get from gross to net capital creation. This is done as follows:

In order to construct real capital stock series we adopt the perpetual inventory method. The law of motion of capital stock is as follows:

$$K_{t+1} = (1-\delta)*K_t + I_t \quad (2)$$

where K_t is the real capital stock in period t, δ is the constant depreciation rate parameter and I_t is the real fixed investment in period t. Next, we choose a value for δ, so as the average ratio of consumption of fixed capital over output, $\delta^* K_t / Y_t$, to be equal to

[25] For a review see ECB, (2015b).

[26] A well-known property of the neoclassical growth model is that, in the absence of shocks, the artificial economy converges to a balanced growth path where output and capital grow at the rate of population growth and total factor productivity adjusted by the share of labor ($A^{1/1-\alpha}$). This shows the importance of dealing with the acute problem of ageing Greece is facing, as well as implementing deep structural reforms to boost productivity.

that observed in the data.[27] For the Greek economy, available data exist between 1960-2016. We use the entire dataset available as a longer time span alleviates the fluctuations observed in later years due to the crisis, so:

Average (1960-2016) $\delta^* K_t / Y_t = 12.9\%$ (3)

Moreover, we choose a value for the initial capital – output ratio (in our case 1960) so as to be equal to the respective average over some reference period (in our case 1961-1970), that is:

K_{1960} / Y_{1960} = Average 1961-1970 K_t / Y_t (4)

Equations (2), (3) and (4) constitute a system of 58 equations in 58 unknowns (K_{1960}, K_{1961},..., K_{2016} and δ). Given data for real output (real GDP), real fixed investment and consumption of fixed capital stock,[28] we solve this system and we obtain a value for δ equal to 4.1% and an average value for capital – output ratio equal to 3.2. The calibrated value is close to the historical average of the capital – output ratio in Greece, which according to IMF (2017) is about 3.5. The latter provides an alternative ICOR value to run the exercise.

Next, we apply the calibrated values to calculate the net creation of capital by reviewed projects and their projected impact on GDP. Table 4 summarizes the value of investments.

Three important notes are due:

1. We count only the net capital creation value of projects and not the value that relates to the cost of acquiring a pre-existing asset.
2. We count only the amount of investment that is yet to materialize untill the completion of the project and not the entire size of the investment, in case this has started in the past and has partially materialized already. Furthermore, in case of international projects, we count only the part related to Greece.
3. The implicit assumption of the calculation is that the mixture of reviewed projects has similar characteristics and lifespan to the total capital stock in the Greek economy and therefore the same δ applies.

Hence, from information assembled we deduce when the investment will actually be undertaken -and the respective capital will be created- and we start to depreciate the new capital stock in the following years according to the calibrated δ (4.1%). Then, we calculate the total net capital stock of all projects combined.

Next, we have to discount the future capital flows into present values. For this, we use a discount rate of 2%, equal to the ECB's long-term target for the inflation rate.

Finally, the respective increase in output is calculated according to the two alternative ICORs (3.2 and 3.5). As capital depreciation is long-term (related assets have a long lifetime), we need to choose the time horizon at which we estimate the effect; we choose a 10-year horizon and a 20-year horizon. Results are given in Table 5.

[27] See Gogos et al. (2014) for an explanation.

[28] Real values remove the effect of inflation from calculation of depreciation.

Table 4: Value and Timeline of Projects

Project	Value* (in € mns)	Year of operation
ENERGY		
1. Trans Adriatic Pipeline (TAP)	700	2020
2. Interconnector Greece - Bulgaria (IGB)	80	2020
3. Floating Storage and Re-gasification Unit (FSRU) of Alexandroupolis	300	2023
4. Interconnector Greece - Italy (IGI) pipeline	500	2022
5. The Eastern Mediterranean Pipeline (East Med)	3.000	2025
6. Islands Interconnection with Mainland Greece		
Cyclades Phase B	86,8	2019
Cyclades Phases C (Syros- Lavrio)	102	2020
"Small" Crete connection	330	2020
7. EuroAsia Interconnector	1.000	2023
8. Renewable energy sources (ΑΠΕ), new licenses	1.200	2020
9. LNG terminal station in Revithousa	40	2018
10. Combined cycle unit of 650MW, fuelled by natural gas, in Agios Nicolaos	300	2023
LOGISTICS & INFRASTRUCTURE		
1. Freight Centre in Thriasio Field		
Phase A	80,5	2020
Phases B	68	2028
2. Sea2Sea Project	2.000	2024
3. Upgrade of Piraeus Port		
Compulsory Investments	300	2021
Additional Investments	172	2021
TOURISM & URBAN DEVELOPMENT		
1. Athens metro Line 4, Section A "Veikou Alley – Goudi"	1.450	2028
2. Expansion of the Attika Motorway to Lavrio and upgrade of the Lavrio port	285	2023
3. Extension of Western Imittos Ring road and connection to Vouliagmenis Av.	450	2023
4. Northern Motorway of Crete	700	2024
5. Kasteli Airport	1.000	2023
6. The Hellinikon Urban Development Project	7.000	2028
7. Hotel Developments**	1.250	2018-2021

**Refers to the remaining amount to be invested (until the completion of the project) and to the part of the investment related to Greece.*
*** Including, among others, the following projects: tourist developments in Attica's Riviera, Development of Kassiopi, Afantou Rhodes, Ikos Resorts & Costa Navarino, Renovation of Athens Ledra, Astir Palace and Hilton, Relocation of Mont Parnes Casino.*

Table 5: Contribution of Projects to GDP

	δ = 4.1% (calibrated, total economy) ICOR = 3.2 (calibrated)	δ = 4.1% (calibrated, total economy) ICOR = 3.5 (historic)	δ = 8.8% (calibrated, industry) ICOR = 3.5 (historic)
Cumulative contribution to GDP (2019-2028)	€31.4bn	€28.7bn	€25.2bn
Cumulative contribution to GDP (2019-2038)	€65.5bn	€59.9bn	€45bn

It can be seen that, with the use of calibrated δ and ICOR values, the projects worth €22.4bn in current prices lead to the creation of GDP (again in current prices) worth ca €31.4bn (i.e. 1.4 times higher than their initial worth) in a 10-year horizon and ca €65.5bn (i.e. 2.9 times higher) in a 20-year horizon.

When the historic ICOR is used instead of the calibrated one, along with the calibrated δ, GDP creation is estimated to be slightly less but still very impressive: ca €28.7bn (i.e. 1.3 times higher than the projects' initial worth) in a 10-year horizon and ca €59.9bn (i.e. 2.7 times higher) in a 20-year horizon.

We also run the calibration with data from the industry sector, instead of the total economy. The reason is that the capital stock of the Greek economy comprises more of buildings and less by equipment and R&D. The latter are more productive forms of capital but also depreciate more quickly. As a result, Greece has one of the lowest depreciation rates among EZ countries, given that buildings have a longer usage period. Given that the mixture of investment projects reviewed in this study includes equipment and infrastructure, industry-specific data are a suitable approximation.

Indeed, the calibration with industry data (data are only available for the period 1995-2016 in this case), rendered a depreciation rate of 8.8%. Due to the shorter data period, the calibrated ICOR is biased due to the crisis, hence the historic ICOR is used instead. With these values, GDP creation is estimated to be ca €25.2bn (i.e. 1.1 times higher than the projects' initial worth) in a 10-year horizon and ca €45bn (i.e. 2 times higher) in a 20-year horizon.

These scenaria provide a range of estimates which are quantitatively similar to the results accruing from the multipliers method, albeit achieved in a somehow longer horizon, thereby increasing confidence in findings.

Finally, an approximation of the number of jobs that may be created is attempted. Historic data point to a relationship between increases in the economy's real GDP and creation of jobs. The average for the EMU period, 2001-2016, is 5.2%, i.e. increase of real GDP by €1bn is associated with the creation of 52,000 jobs on average. Obviously, the relationship cannot be considered to be stable over time as it depends on a host of factors, including whether the economy operates above or below potential, TFP, demographics etc. Yet, as a harsh indication, the above figure means that in a 10-year horizon, reviewed projects and associated real GDP creation can lead to the creation of 485,000-605,000 jobs, depending on the scenario.

7. Conclusion

This study analyzed the prospects of three strategic sectors of the Greek economy, namely energy, logistics and tourism. The incipient recovery of the Greek economy, combined with its undisputed comparative advantages, can attract substantial foreign investor interest in these sectors, as is the case for other extrovert sectors as well. This is demonstrated in the study by the review of major projects in these three sectors that are, either already initiated or contemplated. If and once completed, these projects are warranted to completely change the landscape of the Greek economy. Not only they are large in size and strategic in nature, but they also create externalities for other economic activities, thereby boosting productive capabilities. We have showed that these projects by themselves cover a significant part of the Greek economy's investment gap; along with their secondary spillovers, they can cause large scale contributions to GDP and employment. The Greek banking system, while progressing with the process of dealing with NPLs and returning to operational normality, will be increasingly able to support the investment effort with financing and advisory support. Yet, given scarcity of domestic savings, a large-scale attraction of FDI is a necessary complement of the effort for a sustained recovery.

The projects reviewed are only an illustration of the true potential for FDI attraction and the scope of GDP expansion. The Greek economy features many other opportunities in various activities. Yet, there are still some impediments in the investment environment that inhibit this potential from being materialized. These include high tax and social contribution rates, an inefficient public administration, little clarity in the post-programme regime for the Greek economy and public debt sustainability, remaining obstacles to entry and other impediments in product & services markets competition, long delays in administering justice, complexity and instability in the legal framework, vagueness in land uses and the cadaster. A frontloaded plan of nationally-owned policy interventions to address these issues could go a long way in improving markets' trust and reducing country risk and uncertainty. This is essential for the attraction of investment, greenfield FDI in particular, which involves long-term commitment of capital and therefore necessitates visibility over a long horizon for financial planning. Given fierce international competition among countries for the attraction of FDI, the country cannot stay still while other countries progress with bold structural reforms as it risks being trapped in low growth rates for a long time. Greece needs to move fast in order to exploit ample availability of inexpensive capital internationally due to vibrant global growth and accommodative monetary policy. Time is of essence.

References

Bank of Greece (2014), D. Papageorgiou, BoGGEM: A dynamic stochastic general equilibrium model for policy simulations, Working Paper 182, May

Bank of Greece (2017), Governor's Report

De La Maisonneuve, C. (2016), How to boost export performance in Greece. OECD Economic Department Working Papers, (1299), 0_1

ECB, (2015b), T. Warmedinger, C. Checherita-Westphal and P. Hernández de Cos, Fiscal multipliers and beyond, Occasional Paper Series Occasional Paper No 162, June 2015

European Commission (2017), "The ESM Stability Support Programme – Greece, First & Second Reviews, July 2017 Background Report", European Commission, Institutional Paper 064 / November 2017

European Union Law 343/32/2012

European Stability Mechanism (2017), The ESM Stability Support Programme, Greece First & Second Reviews, July 2017 Background Report

Foundation for Economic & Industrial Research, (2016), The Economic Impact of the Privatization of the Piraeus Port Authority, Athens, March

Gogos S.G., Mylonidis N., Papageorgiou D. and Vassilatos V. (2014), "1979-2001: A Greek Great Depression Through the Lens of Neoclassical Growth Theory", Economic Modelling, No 36, pp 316-331

Hellenic Chamber of Hotels and Institute for Tourism Research and Forecasting, "Development in the Key Figures of Greek Hotels and in Greek and World Tourism in 2017", February 2018

INSETE, Greek Tourism: Developments and Prospects, Volume 2, January 2017

International Energy Agency (2017), "Energy Policies of IEA Countries – Greece 2017 Review", OECD/IEA, 2017

International Monetary Fund, World Economic Outlook Database, October 2017

LAGIE (2018), Forward Electricity Products Auctions System, Monthly Wholesale and Retail Penetration and Market Share Report, February

Law 3982/2011

Law 4302/2014

Law 4408/2016

McKinsey&Company, 'Greece 10 Years Ahead', September 2011

McKinsey & Company. Greece 10 Years Ahead: Defining Greece's New Growth Model and Strategy, Athens Office, November (2012)

NAIHellas (2015), 2015 Logistics Market Report, Athens

NAIHellas (2017), 2017 Logistics Market Report, Athens

OECD (2016), Economic Surveys, Greece

McKinsey & Co. (2012), Greece 10 Years Ahead: Defining Greece's New Growth Model and Strategy, Athens Office, November

Retsos, Y. President of the Greek Tourism Confederation (SETE), ECFIN Seminar for Journalists from Euro Area Countries, 8 February 2018, http://sete.gr/media/9128/yiannis-retsos-ecfin-seminar.pdf

The World Bank (2016), Connecting to Compete 2016: Trade Logistics in the Global Economy – The Logistics Performance Index and Its Indicators. Washington, DC

The World Bank (2016), Greek Logistics - Unlocking Growth Potential through Regulatory Reform and Complementary Measures, Washington, DC. November

The World Economic Forum, Travel & Tourism Competitiveness Report, 2017

UNWTO, European Union Short-term Tourism Trends, Volume 1 2017-6

UNWTO, World Tourism Barometer, Volume 16, Advance Release January 2018

Vettas N. (2016), "Energy and Strategic Planning in Greece", Energy Committee – Academy of Athens Proceedings, Editor L. G. Christoforou, pages 29-41 (in greek)

WTTC, Travel and Tourism, Economic Impact 2017, Greece

Web sources

http://www.admie.gr
https://www.alexpolisonline.com
http://www.ametro.gr
http://www.capital.gr
http://www.depa.gr
http://www.desfa.gr
http://www.dimokratiki.gr
http://www.ebrd.com
http://www.eib.org
https://www.euractiv.com
http://www.euroasia-interconnector.com/
http://www.euro2day.gr
http://www.gastrade.gr
http://www.hradf.com/
http://www.hurriyetdailynews.com
http://www.hydrocarbons-technology.com
http://www.icgb.eu
http://www.igi-poseidon.com
http://ikosresorts.com
http://www.kassiopiproject.com
http://www.kathimerini.gr
http://www.lamdadev.com
http://www.naftemporiki.gr
http://www.newmoney.gr
https://www.tap-ag.gr/
https://thehellinikon.com/en/
http://www.tovima.gr
http://worldenergynews.gr
http://www.ypodomes.com

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