The State, Geopolitics and Coal in Greece: A Historical Perspective

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Abstract

Since its foundation in the 1830s, modern Greece used to import fuel from abroad in peace times and lean mainly on its own lignite resources in times of conflict. What was coal and/or lignite used for? What was the impact of shortages that occurred in certain periods of time? This article presents on one hand economic data based on the official statistics about Greek coal imports and lignite production. On the other hand it presents the position the state took regarding the energy issue following the debate among engineers, public servants and mining entrepreneurs who considered the lignite issue as a "national issue". Using institutional economics, the article sheds light on the difficult question of the energy problem in Greece, culminating in the creation in the 1950s of a state monopoly (Public Power Corporation DEI) centered on lignite.

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INTRODUCTION

> "Our civilisation, pace Chesterton, is founded on coal, more completely than one realizes until one stops to think about it. The machines that keep us alive, and the machines that make the machines, are all directly or indirectly dependent upon coal."
>
> George Orwell

1 In this way George Orwell opened the second chapter of his 1937 novel *The Road to Wigan Pier*. Definitely he made this statement on the grounds of his own experience living in one of the principal coal-producing countries at that time. There is a vast literature when it comes to the coal-producing countries. Less known are the paths taken by the coal-importing ones. Greece is one of these. This article addresses the questions of how the coal supply in Greece evolved and what kind of solutions the country adopted in times of shortage.

2 Modern Greece, since its independence in the 1830s, initially resolved her energy problems by importing coal as she did not possess any hard coal deposits. Only lignite deposits were available[1] and it was not clear if these deposits could provide energy sufficient for the country's needs. No quantitative surveys were carried out until the late 1930s. Greece's lignite "golden age" began in the 1950s-60s, that is, during a time when in many countries this particular fuel was already considered obsolete.

3 Coal has often been associated with the Industrial Revolution and it was even believed that British preeminence in this field was a result of the proximity of coalmines to towns along with a demographical boom.[2] A lot of research has been conducted regarding the role of coal in northwestern Europe. Recent research has also begun to investigate the situation in southern European countries, most of which were "late-comers" in industrialization. However, Greece has so far not attracted much attention regarding her energy situation and we know more about the case of two other Mediterranean countries, Italy and Spain.[3]

4 It is imperative to make three preliminary remarks on the specific case of Greece:

5 First: the modern nation-state of Greece, since its foundation in 1830, depended heavily on British capital, which was initially made available in the form of loans. Greece remained for a long time a loyal customer of British coal. Great Britain was the main supplier of coal to Greece – with the exception of the year 1920 when it was temporarily replaced by the USA – until 1932. Several other countries, including Germany, Turkey, Russia/USSR and Belgium also provided Greece with coal in diverse quantities.[4]

1 The first scientific survey in modern Greece was conducted by the "Expédition Scientifique de Morée" and was published in Paris. The surveyors followed in the footsteps of the ancient philosopher Theocritus (371-287 BC), who had mentioned in his work «Περί λίθων» the existence of *άνθρακες* (possibly referring to lignite) in the Peloponnese. The team conducted surveys in various parts of the Peloponnese and made remarks about the existence of lignites both in Kymi (Euboea) and on the island of Alonissos. Cf. *Expédition Scientifique de Morée,* 44, 227, 233, 234. In the years that followed, other foreign scientists conducted similar studies. The first Greek person to mention lignite in his work was Panayotis Vouyoukas, an engineer officer. Cf. Vouyoukas, *Σύντομος περιγραφή των ορυκτών της Ελλάδος* [A brief description of the minerals of Greece], 1-7. For more information about the scientific surveys conducted in modern Greece, see Iordanidou, 'Τα μεταλλεία στην Βόρεια Ελλάδα, 1912-1940', [Mines in Northern Greece, 1912-1940], 171-176.

2 Fernihough & O'Rourke, 'Coal and the European Industrial Revolution'. In the latest version of their research these authors, who rely heavily on quantitative analysis, it is stated that "access to coal became an important driver of regional economic development in the nineteenth century", though they do not underestimate the use of technology and innovation. Their research discusses the cases of the United Kingdom, Ireland, Belgium, France and Germany.

3 See Gales *et al.* 'North versus South: Energy transition and energy intensity in Europe over 200 years'.

4 The first entry in the statistical data refers to the year 1857. Coal is here described under different headings, initially "Γαιάνθρακες" [Coal]. In 1920 the main fuel category is "Οπτάνθρακες" [Coke] and in 1926 the broader notion of "Λιγνίτες, ανθρακίτες και πλίνθοι εκ τούτων" [Lignite, anthracite and derived briquettes] is used. The difference in the use of coal terms does not lead to any significant alteration of the calculations. The principal commodity imported remains coal.

6 Second: the frontiers of Greece did not remain unaltered for long. The state's present-day borders date back only to 1947 with the incorporation of the Dodecanese Islands, which for several decades belonged to Italy. Importantly, the biggest lignite deposits in Greece are to be found in today's Western Macedonia (Ptolemaida), a region that was incorporated into the Greek state after the Balkan wars in 1913. I want to stress this as we have data on the production of lignite only for the years after 1919. As for the statistical data regarding the year 1919, the lignites of the "New Provinces" (Greek Macedonia, Epirus and Crete) were not taken into account. Moreover, for the pre-1913 era we have to consider two different political entities: the Kingdom of Greece and the Ottoman Empire. This article uses exclusively Greek statistical data.

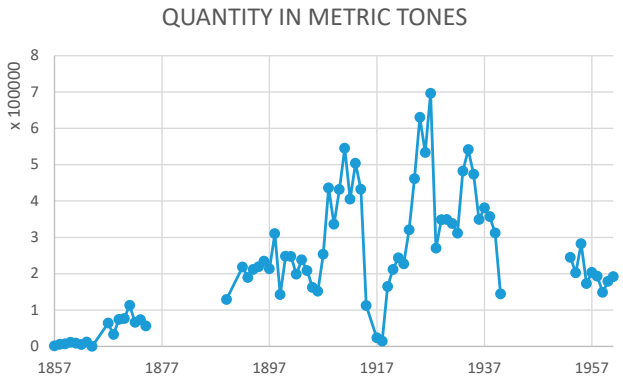

Table 1: External commerce, Coal imports, 1857-1961.
Sources: Υπουργείον Οικονομικών, Τμήμα Δ' ή Τμήμα Γ', *Γενικός Πίναξ του εξωτερικού εμπορίου της Ελλάδος δια το έτος* **...** [Ministry of Finance, Dep. III or IV, General List of the Foreign Trade during the year...] - Υπουργείον Οικονομικών, [Γραφείον Στατιστικής ή Στατιστικόν Γραφείον], *Εμπόριον της Ελλάδος μετά των ξένων επικρατειών κατά το έτος* ....[Ministry of Finance, Statistical Office, Commerce of Greece with foreign countries during the year...] - Υπουργείον Εθνικής Οικονομίας, Γενική Στατιστική Υπηρεσία της Ελλάδος, *Στατιστική του εμπορίου της Ελλάδος μετά των ξένων επικρατειών κατά το έτος* ... [Ministry of National Economy, General Statistical Service of Greece, Statistics of the commerce of Greece with foreign countries during the year...] - Εθνική Στατιστική Υπηρεσία της Ελλάδος, *Εξωτερικόν Εμπόριον της Ελλάδος κατά το έτος*....[National Statistical Service of Greece, Foreign Commerce of Greece during the year...].

7 The article, which takes inspiration from the field of institutional economics, spans more than a century and the focus is on the state's stance and policies. I begin exposing my findings based on the statistics of the foreign trade of Greece, which I subsequently discuss and analyse.

8 A first methodological problem is that during this period in the statistical series we find three different types of measuring coal (kantar, okka, kilograms/tones). I present the quantities transformed in metric tones. The equivalence is presented in the interior of the series. (1 kantar = 56.45 kg, 1 okka = 1.28 kg and 1,000 kg = 1 metric tonne).

9 Several ups and downs can be observed in this table. We find a maximum of Greek coal imports in the year 1927, which was probably due to the aftermath of the 1926 British miners' strike.[5] World War I on the other hand is an ambivalent period since Greece at that time faced a "national schism" and had two governments (one headed by the King in Athens and the other in Thessaloniki by Eleftherios Venizelos) until 1917, when Greece entered the war on the Allies' side. In 1914 and 1916 – years that we have data about – the situation in "Old Greece" is only taken into consideration. It is only in 1917 that we find as import points Customs houses in Thessaloniki and Florina in the so-called "New Provinces".

10 As coal import is interconnected with domestic lignite production, it is also necessary to present the data regarding the latter (Table 2).

11 In 1918 Greek lignite production amounted to 213,488 metric tons, a quantity that was surpassed only in 1940. There was a certain fluctuation during the war and after, but in 1953 the country produced 444,482 tons. Production then increased massively, reaching 2,700,240 tons in 1962.

12 Third: another question that requires an answer is who used coal and lignite and what it was used for. Preliminary I am going to assert that mainly industrial actors and, later on, electric

5 On the specific case of a shipping and coal-importing company as well as a general overview of the coal commerce in the Mediterranean basin, see Theodorou, 'Γαιανθρακαποθήκες στο Αιγαίο' [Coal warehouses in the Aegean Sea].

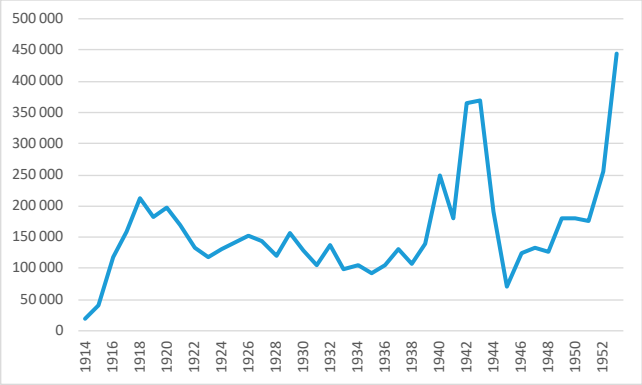

Table 2: Annual lignite production (1914-1953).
Sources: Υπουργείον Εμπορίου, Ειδικόν Πειραματικόν Εργαστήριον, 36, Μελέτη επί του ελληνικού λιγνίτου [Ministry of Commerce, Special Experimental Laboratory, 36, Study on the Greek lignite], (Athens, November 1963).

power companies, railroads and military and civilian steamships made copious use of coal.[6] I do not consider in this article household consumption. The Greek lignite fields were scattered mostly in rural areas and the extent to which their operation was economically feasible hinged on the transport costs and related factors. I do not claim that coal was not used in the cities at all, but what transpires from the available documents is that the state did not care much about the household use of coal or lignite and was mainly inclined to facilitate the operation of factories.

THE LONG 19TH CENTURY

13 Since the mid-19th century, a number of Greek engineers who had studied either in Greek Universities/Polytechnic Schools or/and Universities abroad (Germany, Switzerland, Belgium, France)[7] engaged in the public debate concerning lignite. The first Greek Law on Mines was passed in 1861.[8] The preparatory commission of this code, which was strongly inspired by the French Mining Law of 1810, included Andreas Kordellas, a Greek mineralogist who had completed his studies at the Freiberg Bergakademie in Germany.[9] Kordellas became one of the first promoters of lignite usage in Greece. On the occasion of the Paris International Fair of 1878, Kordellas composed an essay dedicating a whole chapter on the lignites found in Greece.[10] He stated that Greece, lacking domestic hard coal resources, would be eternally dependent on Britain, her main coal supplier, unless the country could not cover its energy needs in metallurgy,[11] manufacture and shipping through alternative supplies. He strongly believed that local lignite could replace British coal imports. Kordellas wrote that "During the Franco-Prussian war (1870-1871) the Greek lignite mines offered great services to the Greek industry as the (imported) coal prices went extremely high and so the preference was transferred to the lignites. Nevertheless after the end of the war the Greek lignite mines faced once again problems as the – British – coal prices went down and the consumers demonstrated their preference for the imported commodity."[12] In the meantime Kordellas had acted as an entrepreneur and got a share in lignite mines in Kymi and near Athens. When Kordellas wrote his essay, however, exploitation had already ceased in some of the above mentioned lignite mines.

14 As mentioned above, Britain was not Greece's only coal supplier. For example, Greece also imported coal from the Ottoman Empire. Interestingly, the first Ottoman Law on Mines dates back to 1861 and was based on the French legislation of 1810. But the Greek-Turkish coal connections went even further: the first joint-stock mining company *in absoluto* in the Empire was created by a group of Greek Bankers of

6 On the Mercantile Marine and the use of coal and later oil, see Chlomoudis, 'Η Ελληνική Εμπορική Ναυτιλία, 1910-1939' [Greek Mercantile Marine, 1910-1939], 43.

7 Papastefanaki, 'Mining Engineers'; Papastefanaki, 'Οι Μηχανικοί στην Ελλάδα του Μεσοπολέμου' [Engineers in Interwar Greece].

8 L. 690/1861 (Φύλλο Εφημερίδας της Κυβερνήσεως, ΦΕΚ [Government Gazette Issue, from now on FEK] 44/A/24 August 1861).

9 On Andreas Cordellas cf. Papastefanaki, *Η φλέβα της γης* [The earth's vein], 153-154.

10 Kordellas Andreas, *Η Ελλάς εξεταζομένη γεωλογικώς και ορυκτολογικώς* [Greece examined under a geological and mineralogical point of view], 150-155.

11 Here I am certain that he refers to the Mines of Laurium, which two rival companies hoped to exploit, eventually causing an international scandal. Cf. **https://en.ltcp.ntua.gr/history/**

12 My translation.

Galata (Constantinople) in 1870. Its aim was to exploit a lignite mine in the area of Siroz (today Serres in Greek Eastern Macedonia). [13]

15 The country's gasworks were among the first enterprises that used coal in large quantities. Data are available on the gasworks in Athens, Piraeus, Thessaloniki, Patras, Volo, Corfu and Midilli (Lesbos).[14] The one in Athens was possibly the first to appear. The founding law of the Athens Gasworks goes back to 1857 and so it coincides with the beginning of the available statistical data. Today the historical gasworks' facilities are used as a cultural hub.[15]

16 Since the last decades of the 19th century coal was increasingly used for the electrification of Britain, the United States, Germany and other countries,[16] the main reason being that electricity constituted a much cleaner and easier way to transport energy. The first effort to provide the capital city of Athens with electricity occurred in 1889. The fuel used was coal imported from Britain. 10 years later a multinational enterprise appeared in the Greek energy market and obtained the rights over the pre-existing Greek company. It was the Thomson–Houston of the Mediterranean, a subsidiary of the Compagnie française Thomson-Houston. [17]

17 In 1899 the very first issue of *Αρχιμήδης* (Archimedes), a technical magazine, was published under the auspices of the Greek Polytechnic Association.[18] It was dedicated to the fuels. In its opening article – which was edited by the Association's president, the above-mentioned Andreas Kordellas – lignite was portrayed as the perfect alternative not to imported coal, but to excessive logging.[19] The elite group that created the Association consisted of Athenian engineers, members of the Service of the Ministry of Public Works, professors of the Polytechnic of Athens (also known as the National Technical University of Athens, NTUA), CEOs of mining enterprises along with natural scientists,[20] who subsequently would present their opinion frequently in public discussions regarding the lignite issue.

18 In 1902 another scientist and entrepreneur, Procopios D. Zacharias, in a public lecture argued that the whole matter of lignite in Greece was subject to a huge misunderstanding. According to him, the neglect of lignite was all due to prejudice and lack of scientific information. In an essay he stated that it was a complete absurdity to believe that industry in Greece could not be developed due to lack of fuel; on the contrary, the country was blessed with an abundance of local lignite.[21] Zacharias conducted experiments with Greek lignite in Greece, Britain and the USA and the results he obtained were quite encouraging. He ultimately obtained the electrification rights for the city of Tripolis in the Peloponnese.

19 At this point the legislation regarding mines appeared rather obsolete. A new bill drafted by a special Commission was presented in the Parliament in 1899, but it did not pass. In 1902, though, the same bill was made law of the independent Cretan State (Κρητική Πολιτεία), which was incorporated into the Greek State only in 1913. In 1909 a major political change occurred: the military Goudi coup led to the appearance of the Cretan lawyer Eleftherios Venizelos in the political arena in Athens. In 1910 he was appointed Prime Minister. This had a major impact on the

13 Tok, 'The Ottoman mining in the age of capitalism', 44; Iordanidou, 57-60 and 231-236.

14 Information on these seven gasworks, though not exhaustive, can be found on the website **www.vidarchives.gr.**

15 Cf. Industrial Gas Museum, *The Athens Gasworks.*

16 On this energy transition, see Kander et al., *Power to the People.*

17 Pantelakis, *Ο εξηλεκτρισμός της Ελλάδας* [Greece's electrification], 40-70.

18 The Greek Polytechnic Association was founded in 1898 and was the first institution whose aim was to represent in the public discourse the voice of Greek engineers, holders of diplomas from Greek or foreign universities. Their efforts would eventually lead to the creation of the Technical Chamber of Greece in 1923. Cf. Spyros Tzokas, 'Περιοδικά και κοινότητες μηχανικών στην Ελλάδα' [Journals and Engineers' Communities in Greece].

19 Kordellas, 'Περί καυσίμων υλών' [Regarding fuels].

20 Antoniou, *Οι Έλληνες Μηχανικοί* [The Greek engineers], 181-193.

21 Zacharias, 'Ο εκ της χρησιμοποιήσεως των ελληνικών ανθράκων πλούτος' [The wealth originating from the use of Greek coal].

institutional modernization of the state. A great deal of laws were passed after the coup, including a mining code[22] based on the 1899 bill. With various additions or amendments, it remained in force until 1973.

20 1912 marks the beginning of a long period of conflicts. In the following decade, Greece on one hand doubled its surface but found herself obliged on the other hand to abandon forever the "Great Idea" – occupying Constantinople and liberating the "unredeemed Greeks". Greece accomplished a glorious victory during the Balkan Wars of 1912-13 and annexed Southern Macedonia – the rest of it went to its Balkan neighbors, Serbia and Bulgaria. Around the same time, Greece increased its imports of coal from other countries than Britain (which still supplied over 70%). Around a quarter of the imports came from Westphalia in Germany, while the rest came from Belgium, the Netherlands and Turkey. [23]

WORLD WAR I AND THE ASIA MINOR CAMPAIGN

21 After the First World War began in 1914, a profound scission appeared in the Greek political arena. Prime Minister Venizelos favored the Entente while King Constantine advocated strict neutrality. As long as Greece maintained neutrality until 1917, the Allies, British and French, subjected Southern Greece to a naval blockade.[24] Coal prices increased and profiteering made its appearance. The United States appeared as the main Greek coal supplier in 1915, but it could not offer full energy security to Greece.

22 Just like in times of war in the 19th century, the exploitation of the country's lignite mines turned out to be a worthy investment.[25] The Greeks, as the British observed, usually mixed local lignite with imported coal.[26] Interestingly, the official statistics of the Ministry of National Finance in 1918 and 1919 kept silent over the quantities of lignite mined during the war in Northern Greece.[27] The latter were exploited by the Allies at the Macedonian front. The French *Armée d'Orient* exploited three mines in the area of Florina in Western Macedonia[28] and planned to perform scientific surveys in order to know the exact amount of available lignite in that zone. The plan was abandoned as soon as the war was over, however. The British Expeditionary Forces, for their part, exploited one lignite mine in Dranitsa near Katerini in Central Macedonia.[29] Photographs in the Imperial War Museum, London, depict Turkish prisoners of war gathered for the construction of a Decauville Railway to transfer lignite from the Dranitsa mine to the coast.[30]

23 Starting in 1917, the Greek government took the issue of coal supply seriously. That year it created an independent Directorate General of Transport (Ανωτάτη Διεύθυνση Μεταφορών), whose responsibility comprised all land and sea transports. Its jurisdiction also comprised the exploitation of all lignite mines and the distribution of local lignite and imported coal.[31] Another law exempted the lignite miners from the obligation of mobilization.[32] Further legislation authorized the

22 L. 3524/1910 (FEK11/A/13 January 1910).

23 'Grecian Coal Importation'.

24 There are reminiscences of this fact in the UK National Archives and Eleftherios Venizelos' archive. See, e.g., UK National Archives, CAB 42/5/20 (War Committee, 23 November 1915). Sir E. Grey mentioned the complications created by the proclamation of the blockade, see UK National Archives, CO 730/54/39 (War Cabinet) 53/3 February 1917 "The War Cabinet authorized the Secretary of State for Foreign Affairs to propose to the French Government that the blockade of Greece should be raised. The Cabinet takes note that, even if this is done, no supplies can reach Greece for three weeks"; Memorandum of the Greek government regarding the Commercial Embargo inflicted by the Allies, 6 January 1917, **https://venizelosarchives.gr/show/38582**.

25 Papastefanaki, *Η φλέβα της γης* [The earth's vein], 91. Greece had turned already earlier to the US in cases of coal supply breaks from Wales. Cf. 'Trade conditions and tonnage at Baltimore, Md., during 1914 by W.R. Hough'.

26 *Greece with the Cyclades and Northern Sporades*, 99.

27 Υπουργείον Εμπορίου, Ειδικόν Πειραματικόν Εργαστήριον, 36, *Μελέτη επί του ελληνικού λιγνίτου* [Ministry of Commerce, Special Experimental Laboratory, 36, Study on the Greek lignite], 3.

28 E. Thomas, *L'oeuvre civilisatrice*, 16.

29 Iordanidou, 172 and 219-229.

30 On the Railways and Locomotives of the Macedonian front cf. Down, *Industrial Railways,* 202-258.

31 L.D. FEK225/A/15 October 1917. Later on, according to two further legislative decrees, the Directorate General of Transport was even allowed to requisite lignite mines in case of *force majeure*.

32 L.D. 1426/11 May 1918.

Directorate of Transport to requisite lignite mines in case of need. As a result of these measures, 50 lignite mines were operating during the war. 1918 marked the peak of lignite production in Greece up to that point (though not including the mines in Northern Greece until World War II).[33]

24 Nevertheless, even such advocates of lignite as the abovementioned P. Zacharias did not expect the massive reliance on lignite to end well. Already in 1917, Zacharias believed that after the war the lignite mines would cease operation. In his opinion, the Greek entrepreneurs involved in these ventures did not wish to get into much trouble and spend considerable amounts of capital on machinery and equipment in local mines. On the other hand he blamed the consumers, who did not wish to adapt their combustion engines to Greek lignite as they hoped to return to burning cheaper British coal after the war.[34]

25 But how come the British coal was that cheap? One American noticed that British coal arrived cheaply in the Athenian port of Piraeus because it was carried by steamships heading to the Black Sea in order to buy wheat for Britain.[35] It is the very same Zacharias that in 1919 in a further discussion declared that war had to be conceived as a unique opportunity![36] The same concept was expressed by the Americans in the journal *Coal Age* just before the beginning of World War I, looking forward to peace after the end of the Balkan Wars.[37] In this period possibly rose the Americans' concern about the Greek market.

26 In 1919 the war was not over for Greece as it engaged in a further military campaign in Asia Minor (Μικρασιατική Εκστρατεία) against Turkey. The Greek army occupied the Zonguldak coal mines 300 km eastwards from Istanbul for a brief period.[38] That same year, 1919, the Ministry of National Economy, which oversaw the country's mines since its creation in 1911, established a special committee with mineral and industrial sub-sections.[39] The committee, which aimed to define the existing amount of lignite in Greece, faced several challenges. The mining entrepreneurs were reluctant to share any relevant details with the committee, but this information was finally provided by the Directorate of Mines. Other problems were related to the exploitation of the coal mines in Zonguldak and specifically the mines exploited in the previous period by entrepreneurs of Greek descent. While some engineers considered the lignite a "national issue", the committee's performance was far from satisfactory.[40] Critique also came from Zacharias, who was perplexed by the suggestion of one of the sub-committees that Greece should rely more on oil. This, Zacharias exclaimed, would once again increase Greek dependence on foreign fuels.

33 Cf. Figure 1. However, as mentioned before, at this particular year the production of the lignite mines in Northern Greece that were under allied Occupation were not taken into consideration.

34 Zacharias, 'Διάλεξις περί της χρησιμοποιήσεως των ελληνικών λιγνιτών' [Lecture on the usability of the Greek coals].

35 Cf. 'Development of lignite mines in Greece brought about by the war'. According to the same article, the war forced Greece to produce lignite out of their own lignite mines in the region of Attica and the government was promoting a plan of using lignite briquettes to be used for cities' electrification. Cooking and heating, however, should be provided by wood, which was much more expensive; 'Foreign markets and export news: Coal imports of Greece'. If the US wished to conduct a fruitful bargain they should import tobacco, leather, magnesite, emery and marbles from Greece and licorice, carpets, dried fruit, emery and tobacco from Turkey; Edwin B. George, 'Openings offered in coal trade by Greece'. The author expresses fear that the Japanese would prevail in the Greek coal market if the Americans did not hurry to cover Greece's needs!

36 'Εργασίαι του Συλλόγου. Οι ελληνικοί γαιάνθρακες' [Association's Proceedings. Greek coal].

37 'Grecian Coal Importation': "The general storage of coal throughout the Levant will necessitate the placement of important orders as soon as peace is concluded, and the requirements of these markets will offer opportunity for American coal shippers".

38 Edwin B. George expressed the opinion that "for immediate purposes", the mines in Heraclea were "rather useless."

39 L. 3798 (FEK150/A/21 June 1911).

40 That same year the results of the two committees were made public. Cf. Kl. Filaretos (ed.), *Επιτροπή επί των Καυσίμων. Εκθέσεις και Υπομνήματα του βιομηχανικού τμήματος* [Commission on the Fuels. Reports and memoranda of the Industry department]; G. K. Georgalas, *Επιτροπή επί των Καυσίμων. Πορίσματα, εκθέσεις και υπομνήματα του μεταλλευτικού τμήματος αυτής* [Commission on the Fuels. Findings, reports and memoranda of its Mining department].

THE INTER-WAR PERIOD

27 During the Inter-war period, Greek articles, economic studies, special committees and technical reports referred extensively to the lignite question but there were no practical outcomes. In reality in the early 1920s, lignite production decreased markedly. There was not yet any scientific survey providing quantitative findings. But the Commission on the promotion of lignite opined in 1923 that the State Railways, the electrical companies, some industries, the steamships and the Hellenic Navy would be interested in lignite supply.[41] So far the coal issue and the lignite issue involved the industrial and transport sectors, while it was not much of a concern for the households.[42] Residential heating was provided mostly by wood although it was not a cheap solution. As lignite had some technical problems and disadvantages, the construction materials company S.A. Atlas offered the State Railways lignite briquettes. But the experiment proved to be a total failure as the briquettes turned out to be extremely friable. [43]

28 And where did the State stand in all this? For the first time, shortly after the incorporation of the particularly rich lignite fields of Macedonia into the Greek state (which occurred in 1913 after the Balkan wars), a plan for the nationalization of the totality of the area's mines seemed rather appealing. Indeed, the government took legislative actions that ensured the nationalization of particular mines and especially lignite mines. First of all, the State acquired the lignite mines that used to be under exploitation by the French and British Allies during World War I. But this idea was not unanimously accepted. For example, Demetrios Kalitsounakis, a lawyer, economist and politician who had observed the coal mines' nationalization procedure in Germany during World War I, expressed his opinion that the Greek nationalization should be limited to agriculture and commercial marine.[44] On the other hand, Solon Papadimitriou, a public servant, in his study – the first of its kind in Greece regarding mining legislation – seemed rather skeptical. Yet he still believed that nationalization could encourage foreign investments in Greece – if the vast majority of mines were left in the hands of private investors.[45] It seems that in the majority of the cases, engineers or economists were against nationalization as they were not confident that the state could provide the adequate supervision to these mines.[46]

29 In 1929, Prime Minister Eleftherios Venizelos visited Aliveri, a town in Euboea, to inspect the facilities of the S.A. Coal Mines of Aliveri (A.E. Ανθρακωρυχείων Αλιβερίου). During his visit, the shareholders of the company emphasized the broader significance of their enterprise. They asserted that the matter was of national importance, tied to the industrial and economic advancement of Greece.[47]

30 The first law on lignite passed in 1930,[48] but it received severe critique. It was believed that it did not provide "protection" to lignite but it only aimed at resolving some fiscal technicalities. According to this law the lignite mine owners or contractors were granted exemption from

41 'Πρακτικά Επιτροπής 1923' [Proceedings of the 1923 Commission].

42 This was, at least, the state's opinion. However, in the Interwar years advertisements circulated in the press about coal-consuming stoves and about middle-men who traded coal for household consumption in Greek cities. In an illuminating book that touches upon this theme, we are told that the writer's grandfather, who had discovered lignite mines in Western Macedonia at the age of 28, used to advertise this commodity in the cafés, squares and farmers' markets and outside the church on Sundays. He was considered "a magician, a fakir, a phenomenon", according to his son. He used to give for free samples of lignite and advise people on how to use it. In this way he created an urban market for lignite and in 1930 he obtained the final concession for the lignite mine he had discovered five years earlier. Cf. Pavlidou, *Η ιστορία των λιγνιτών της Δυτικής Μακεδονίας* [The history of Western Macedonia's lignites], 148-151.

43 Iordanidou, 184-185.

44 Kalitsounakis, 'Αι σημεριναί τάσεις προς εθνικοποίησιν' [The current trends towards nationalization].

45 Solon Papadimitriou, *Στοιχεία του Ελληνικού Μεταλλευτικού Δικαίου* [Elements of the Greek Mining Legislation].

46 For a detailed description of the case of the national mines in Greece, see Iordanidou, 123-133.

47 Ψηφιακό Αρχείο Ελευθερίου Βενιζέλου [Digital Archive of Eleftherios Venizelos], Museum Benaki, File 165.27 (Athens, 15 November 1929), **https://venizelosarchives.gr/show/52495**.

48 L. 4834 (FEK246/A/29 July 1930).

payment of certain taxes. Ioannis Solomos, a former Inspector of Mines who was the first to dedicate an entire scientific study to the lignites,[49] felt frustrated. Solomos underlined the complete lack of a far-sighted plan regarding the exploitation of the mines. At the same time, he observed the very poor condition of the national lignite mines in Macedonia and also the complete lack of scientific surveys.[50] Solomos also brought to light the scandalous affair of the British company Power and Traction Finance Company Limited that during the years 1924-1927 was commissioned to provide the city of Athens with electricity. One of the contract's controversial points was the use of imported British coal in the company's facilities.[51] In the following years some laws were promulgated but with no major impact on the country's lignite production. The only difference was that the mines situated in Northern Greece were considered at that point far more important than the ones situated in Southern Greece, an opinion that certainly did not please the lignite mine owners in Athens.[52] But even in Northern Greece at that point the lignite enterprises were of an extremely small size where rather obsolete techniques and machinery were used.

31 Nevertheless, over the years foreign capitalists started paying more attention to Greece's lignite mines. The International Labour Organisation, in a study of lignite production in Europe, made special reference to the lignite mines in Western Macedonia.[53] In 1928 in London the Anglo-Greek Syndicate of Lignite was founded to exploit the lignite mines in Greek Western Macedonia.[54] In 1930 a new company emerged out of the Syndicate: the Grecian Mining & Development Co. After testing Amyntaio-Florina lignites in Britain, the company declared its intention to undertake Salonica's electrification. The company concluded a contract with the Greek State[55] and in 1931 it published in London a leaflet about the fuel needs of Greece,[56] declaring that Greece was mostly depending on imported coal and she was spending enormous amounts of capital while the use of domestic lignite in 1928 contributed only 2% of total energy needs. Despite this propaganda, the abovementioned company did not survive for long. After just two years, it was evicted from the property on financial grounds. On top of it, the lignite miners went on strike as the company refused to pay their wages.[57]

32 The repercussions of the international economic crisis were not sensed in Greece until 1931-32, when the Greek state declared bankruptcy. Elias Gounaris, a former Mine Inspector, declared: "The currency difference surpassed any governmental effort and the lignite mines now find market for their actual production."[58] Interestingly, the new commission on the lignite issue did not consider necessary a survey that would give evidence beyond any doubt about the available quantity of lignites![59]

33 After a military coup d'état on 4 August 1936, the dictatorship of General Ioannis Metaxas was established and a new chapter in the political history of Greece began. The export of minerals and Greece's energy dependence on foreign countries were not favorably seen by the authorities. Political alliances had changed and Germany became the main commercial partner of Greece. Looking for self-sufficiency in the energy sector – something not uncommon at that time among the European states that

49 Υπουργείο Εθνικής Οικονομίας. Διεύθυνσις της Υπηρεσίας των Μεταλλείων, *Ελληνικοί λιγνίται*. Έκθεσις Ιω. Σολωμού, Επιθεωρητού των Μεταλλείων [Ministry of National Economy, Directorate of the Mining Service, Greek lignites. Mining Inspector John Solomos' Report].

50 Solomos, 'Ο ελληνικός λιγνίτης. Τι πρέπει να γίνη' [The Greek lignite. What has to be done].

51 Cf. Pantelakis.

52 Christos Chatziiosif, *Η γηραιά σελήνη*, [The old moon], 191-194.

53 'The present state of the Lignite industry in the various European countries'.

54 Ibid.

55 Ψηφιακό Αρχείο Ελευθερίου Βενιζέλου [Digital Archive of Eleftherios Venizelos], Museum Benaki, File 193.93.25 (23 September 1931), **https://venizelosarchives.gr/show/56253**.

56 Grecian Mining & Development Co. Ltd., *Προβλήματα καυσίμων εν Ελλάδι* [Problems regarding fuels in Greece].

57 Iordanidou, 332-333.

58 Gounaris, 'Αι περί λιγνίτου προτάσεις του 1932' [Year 1932 proposals regarding lignite].

59 Kilimis, 'Οι λιγνίται' [Lignites].

foresaw their possible implication in a war – in 1938 the Greek government invited Prof. Karl Kegel of the Freiberg Bergakademie to give his scientific advice on the lignite question. In his report, Kegel stated that the richest lignite mines were situated in the zone of Ptolemaida in North-Western Macedonia.[60] In 1939 the deposits in this zone were given in concession to George Filis, a Greek-American lawyer from Buffalo, USA, but he lost his privileges just before World War II.[61] The Greek government returned the concession several times to him and in 1946 a new contract between the Greek state and Filis was signed. He created a corporation but he did not manage to realize a viable institution.

THE 1940S AND BEYOND

34 Before 1940, there were about 400 local enterprises that produced and distributed electricity in Greece in towns with a population over 2,000. They mainly used imported fuel but some of them also tried to use lignite or hydroelectric power.[62] The foreign investors developed thermoelectric plants that burnt imported fuel. During World War II most of them were destroyed or forced out of business. The lignite mines were exploited by the Germans in a very productive way during the occupation of Greece in 1941-44 and the output increased (Table 2).[63]

35 During the German Occupation 85% of the electric power produced in Greece was consumed in Athens and Piraeus. The plans consisted in the construction of thermal electrical plants that would use imported oil and minor hydroelectric plants. The German occupation was followed by a Civil War that ended in 1949. In its aftermath, the United States strengthened its presence in the country in connection with the Marshall Plan (1949-1952).[64] The American aid to Greek industry focused only on the energy sector and a few other traditional economic branches.

36 In 1948 an American company, leader in its sector, Ebasco Services, undertook a significant survey. The main goal this time was the production of cheap energy. The company proposed a 20-year plan and the creation of a thermal electrical plant in Ptolemaida. With Emergency Law 1566/1950, then, the Public Power Corporation (PPC, or DEI in Greek) was created. Another American company, Pierce Management Inc., was recruited in order to activate thermal electrical plants in Aliveri (Euboea) and in 1951 a plant of the same type went operational in Ptolemaida.

37 As US priorities changed during the Korean War (1950-1953), the Americans decided that the major Western European Allies should share the burden of the Reconstruction and the smaller allies, such as Greece, should be looking elsewhere for foreign investment and financial aid.[65] In 1953 a bilateral agreement was signed between Greece and West Germany thanks to the good services of two businessmen who had never deserted their German partners since the Interwar era. One of them was Prodromos Bodossakis-Athanassiadis, a refugee from Anatolia who during the Interwar period was in connection with Germany due to his involvement in the arms industry. [66] In 1955, Bodossakis' enterprise S.A. Greek Enterprise of Fertilizers and Chemical Products (L.3304/1955) bought the lignite mines of Ptolemaida, which it ran as a

60 'Η έρευνα του λιγνιτικού προβλήματος' [Research on the lignite issue in Greece], and 'Υπόμνημα περί ερευνών επί ελληνικών λιγνιτών' [Memorandum on the researches on Greek lignites].

61 On this concession cf. Chatziiosif, 193-194; Iordanidou, 195-196.

62 Samiou, *Η εξαγορά των ηλεκτρικών επιχειρήσεων από τη ΔΕΗ* [Electrical Enterprises' Acquisition by DEI (Public Power Corporation)].

63 Manousakis, 'Starving for fuel in times of war: the coal shortage in Occupied Greece, 1941-1944'. On the statistics Manousakis, 'Οικονομία και Πολιτική στην Ελλάδα του Β' Παγκοσμίου Πολέμου (1940-1944)' [Economics and Politics in World War II Greece (1940-1944)] believes that the numbers on lignite production as provided by the official sources are probably underestimated.

64 Stathakis, *Το Δόγμα Τρούμαν και το Σχέδιο Μάρσαλ* [The Truman Doctrine and the Marshall Plan]; Zacharias, 'Struggle for survival: American Aid and the Greek Reconstruction'.

65 Regarding the case of Greece but in a broader European context cf. Lagendijk, 'Electrifying Europe', 159-198.

66 Pelt, *Tobacco, Arms & Politics*; Tsakas, 'Growth Models and Core-Periphery Interactions in European Integration', Idem, *Με το βλέμμα στην Ευρώπη* [With the gaze directed to Europe] (original title of the study: Tsakas, *Post-war Greco-German Relations*).

joint stock company called LIPTOL.[67] The technical assistance was provided by the German enterprise Krupp in cooperation with Ebasco. The official inauguration of the thermal-electric plant was performed under the auspices of King Paul of Greece on 26 July 1957.

38 Until World War II, electric power in Greece was produced and distributed by small local enterprises. Now that a national system was created these enterprises were gradually acquired by PPC. In 1961 even the company that provided power to Athens and Piraeus joined PPC. Between the years 1950 and 1973 the energy sector in Greece developed quickly based on cheap energy supplies. This period might be considered as the "golden age" of Greek lignite. Industries constituted PPC's privileged customers due to special agreements, such as with the French Pechiney-Aluminium Hellas. The electrification of the country was intensified and was completed in the 1980s. Greek energy policy favoured the use of local resources (lignite and hydropower), leading to an improvement of the ratio between domestic and imported fuels. The years 1973 and 1979 were not easy for PPC as the oil crises affected the company. It meant that once more Greece had to lean on the local resources. In 1975 LIPTOL merged with PPC. The region of North-Western Macedonia with Ptolemaida provided 70% of the extracted lignite in the 1980s. The question of the lignite mines remained the main concern for both PPC and the governments during the period after the oil crises.

39 Following Greece's accession to the European Economic Community (EU since 1993) in 1981, Brussels repeatedly made clear its environmental concerns, urging Greece to comply with its directives and move away from lignite as its main source of electricity. In 2018 the British daily *The Guardian* published a provocative article titled "Lignite mining: Greece's dirty secret", [68] pointing to the country's continued reliance on lignite. In fact, Greece was by that time quickly moving away from lignite and by the early 2020s this local fossil fuel covered less than 10% of the Greek electricity mix, being replaced by natural gas, wind and solar energy.[69] Even so, the history of lignite in Greece may not be over once and for all. After the Balkan wars in the 1990s most people did not believe that another war would occur in Europe. Yet it seemed that peace was a very fragile concept and after Russia's full-scale invasion of Ukraine in 2022 Greece is reconsidering its policy to shut down its lignite installations, fearing the consequences of Russia's disruption of natural gas supplies.

CONCLUSIONS

40 From 1860 to the 1960s, Greece faced a fragile and often unstable energy landscape due to its dependence on imported coal and, later on, oil. International conflicts and coal miners' strikes in exporting countries frequently disrupted supplies, leaving Greece scrambling for alternative energy sources such as local lignite. Lignite, though less efficient than coal, provided a potential emergency substitute. In this respect, interwar experts usually compared Greece's energy situation to that of Bulgaria, which managed its coal and lignite resources more effectively. But we can also look at Denmark, which mitigated its coal crises by "social adaptation" or to Communist East Germany, which, similarly to Greece, embraced local lignite after World War II.[70]

41 For the most of the European Short Coal Age, Greece exploited its lignite mines reactively and abandoned them as soon as coal imports resumed. Despite repeated proposals from engineers and geologists to survey the country's lignite reserves, the government delayed

67 Bousios, *Το έργο της Πτολεμαΐδας* [The Ptolemaida affair].
68 "Lignite mining: Greece's dirty secret – in pictures", *The Guardian*, 23 March 2018, **https://www.theguardian.com/environment/2018/mar/23/lignite-mining-greeces-dirty-secret-in-pictures** (accessed 2 July 2025).
69 See e.g. "Share of Electricity Production by Source, Greece", Our World in Data, available at **https://ourworldindata.org/energy/country/greece** (accessed 2 July 2025).
70 See the following contributions Fossat and Rüdiger. 'Coal or Chaos? Coal Shortages and the Short Coal Age in Denmark, 1860-1960' and by Scognamiglio, 'The "Brown Gold" of East Berlin: East German Energy Policies in the 1950s', respectively, in this special issue.

action until the late 1930s. During crises, various individuals sought mining concessions or pushed for favourable legislation. Yet, once coal imports resumed, industries quickly returned to imported coal, leaving domestic lignite production underdeveloped.

42 Low interest in Greek lignite before the mid-20th century might be linked to a relatively limited impact of coal (shortages) on daily life, as Greece remained a largely agrarian society. The bulky nature and low energy content of the country's lignite was always a problem. This meant that if a city was near a lignite field it often found it convenient to use it, but if the price of the transportation was too high or the quality too poor, the city usually opted to cover its energy needs in other ways. Yet the question of how Greece's cities envisaged the problem of coal shortages is in need of further study. Coal, whether imported or domestic, primarily fuelled industry and transportation. Only a few regions near lignite mines opted to take advantage of their proximity to the resource.

43 The situation changed in important ways after World War II. The establishment of thermoelectric plants marked a turning point by enabling Greece to use its local lignite more effectively. Initially driven by the Marshall Plan, this effort gained further momentum through a bilateral agreement between Greece and Germany, facilitated by influential business networks. This development helped Greece reduce its dependence on foreign coal, although the transition stemmed more from necessity than strategic foresight.

44 When Greece joined the EEC in 1981, it faced new challenges, particularly in aligning with EEC (later EU) environmental directives. The new regulations prompted Greece and other European countries to shift away from lignite. However, recent geopolitical events, such as the war in Ukraine, have forced many nations, including Greece, to reconsider lignite as a viable energy option.

45 All in all, it can be concluded that Greece's energy policies have historically been reactive, focusing on short-term fixes rather than sustainable solutions. Eventually the creation of the Public Power Corporation (PPC), intended to secure long-term energy needs, came too late to shield Greece from new energy challenges. Although the country once believed its lignite reserves could sustain it for over a century, today Greek energy security faces a new threat.

Bibliography

Primary Sources

Υπουργείον Εθνικής Οικονομίας, Διεύθυνσις της Υπηρεσίας των Μεταλλείων, *Ελληνικοί λιγνίται.* Έκθεσις Ιω. Σολωμού, Επιθεωρητού των Μεταλλείων [Ministry of National Economy, Directorate of the Mining Service, Greek lignites. Mining Inspector John Solomos' Report], (Athens, 1918).

Υπουργείον Εθνικής Οικονομίας, Υπηρεσία Επιθεωρήσεως Μεταλλείων, *Στατιστικοί πίνακες μεταλλευτικής κινήσεως της Ελλάδος κατά το έτος* ... [Ministry of National Economy, Directorate of Mines, Statistical tables concerning mining movement in Greece during the year...].

Υπουργείον Εμπορίου, Ειδικόν Πειραματικόν Εργαστήριον, 36, *Μελέτη επί του ελληνικού λιγνίτου* [Ministry of Commerce, Special Experimental Laboratory, 36, Study on the Greek lignite], November 1963.

Υπουργείον Οικονομικών, Τμήμα Δ' ή Τμήμα Γ', *Γενικός Πίναξ του εξωτερικού εμπορίου της Ελλάδος δια το έτος* **....** [Ministry of Finance, Dep. III or IV, General List of the Foreign Trade during the year...].

Υπουργείον Οικονομικών, [Γραφείον Στατιστικής ή Στατιστικόν Γραφείον], *Εμπόριον της Ελλάδος μετά των ξένων επικρατειών κατά το έτος* ....[Ministry of Finance, Statistical Office, Commerce of Greece with foreign countries during the year...].

Υπουργείον Εθνικής Οικονομίας, Γενική Στατιστική Υπηρεσία της Ελλάδος, *Στατιστική του εμπορίου της Ελλάδος μετά των ξένων επικρατειών κατά το έτος* ... [Ministry of National Economy, General Statistical Service of Greece, Statistics of the commerce of Greece with foreign countries during the year...].

Εθνική Στατιστική Υπηρεσία της Ελλάδος, *Εξωτερικόν Εμπόριον της Ελλάδος κατά το έτος*....[National Statistical Service of Greece, Foreign Commerce during the year...].

Φύλλο Εφημερίδας της Κυβερνήσεως = ΦΕΚ [Government Gazette Issue = FEK]

Ψηφιακό Αρχείο Ελευθερίου Βενιζέλου [Digital Archive of Eleftherios Venizelos], https://www.venizelos-foundation.gr/en/foundations-digital-archive/.

UK National Archives, CAB42/5/20 (War Committee).

UK National Archives, CO730/54/39 (War Cabinet).

Secondary sources

'Εργασίαι του Συλλόγου. Οι ελληνικοί γαιάνθρακες' [Association's Proceedings. Greek coal]. *Αρχιμήδης – Μηνιαίον Περιοδικόν σύγγραμμα του Ελληνικού Πολυτεχνικού Συλλόγου* 20/3 (1919) : 17-24 and 20/4 (1919): 25-28.

"Η έρευνα του λιγνιτικού προβλήματος. Η έκθεσις του καθηγητού κ. Kegel" [The research on lignite issue in Greece. Prof. Kegel's report], *Τεχνικά Χρονικά. Επίσημον Όργανον του Τεχνικού Επιμελητηρίου της Ελλάδος,* vol. 15, 1939, 301-327 and "Υπόμνημα περί ερευνών επί ελληνικών λιγνιτών" [Memorandum regarding the researches on Greek lignites]. *Τεχνικά Χρονικά. Επίσημον Όργανον του Τεχνικού Επιμελητηρίου της Ελλάδος* 16 (1939): 249-265.

'Πρακτικά Επιτροπής 1923 προς υποστήριξιν και προαγωγήν των ελληνικών λιγνιτών' [Proceedings of the 1923 Commission on supporting and promoting the Greek lignites]. *Αρχείον Οικονομικών και Κοινωνικών Επιστημών* 4/2 (1924): 158-210.

'The present state of the Lignite Industry in the various European Countries'. *International Labour Review* XXIII/3 (1931).

Antoniou, Ioannis
Οι Έλληνες Μηχανικοί. Θεσμοί και ιδέες 1900-1940 [The Greek engineers. Institutions and ideas 1900-1940]. Athens: Vivliorama, 2006.

Batsis, Demetrios
Η βαρειά βιομηχανία στην Ελλάδα [Heavy industry in Greece]. Athens: Kedros, 1947.

Bousios, Emile D.
Το έργο της Πτολεμαΐδας ή η ιστορία της ΛΙΠΤΟΛ, [Ptolemaida affair or the history of LIPTOL]. Athens: Center of Technology and Solid Fuels' Applications, 1997.

Chatziiosif, Christos
Η γηραιά σελήνη. Η βιομηχανία στην ελληνική οικονομία (1830-1940) [The old moon. The industry in the Greek economy (1830-1940)]. Athens: Themelio, 1993.

Chatziotes, Kostas
Πρόδρομος Μποδοσάκης-Αθανασιάδης (1891-1979) [Prodromos Bodosakis-Athanasiades (1891-1979)]. Athens: private edition, 2005.

Cheirhanteri, Georgia
'Τα κτίρια των πρώτων ηλεκτρικών εταιρειών κατά την περίοδο 1889-1940/50. Ιδρυτικοί παράγοντες και σχεδιασμός' [The first Electrical Companies' buildings during the period 1889-1940/50. Factors of foundation and design]. PhD diss., National Technical University of Athens, 2014.

Chlomoudis, Konstantinos
'Η Ελληνική Εμπορική Ναυτιλία, 1910-1939. Συνύπαρξη διαφορετικών τρόπων παραγωγής' [Greek Mercantile Marine, 1910-1939. Co-existence of various kinds of production]. PhD diss., University of Macedonia, Thessaloniki 1991.

Down, Chris
Industrial Railways and Locomotives of Greece. Melton Mowbray, Industrial Railway Society, 2019.

Fernihough, Alan & O'Rourke, Kevin Hjortshøj
'Coal and the European Industrial Revolution'. NBER Working Papers 19802, National Bureau of Economic Research Inc., 2014.

Fernihough, Alan & O'Rourke, Kevin Hjortshøj
'Coal and the European Industrial Revolution'. *The Economic Journal* 131 (635) (2021): 1135-1149.

Filaretos, Kl. (ed.)
Επιτροπή επί των Καυσίμων. Εκθέσεις και Υπομνήματα του βιομηχανικού τμήματος [Commission on the Fuels. Reports and memoranda of the Industry department]. Athens, 1920.

Fossat, Sissel Bjerrum and Mogens Rüdiger
'Coal or Chaos? Coal Shortages and the Short Coal Age in Denmark, 1860-1960'. *Journal of Energy History / Revue d'histoire de l'énergie* 14 (2025).

Gales, Ben et al.
'North versus South: Energy transition and energy intensity in Europe over 200 years'. *European Review of Economic History* 11 (2007): 215-249.

Georgalas, G.K. (ed.)
Επιτροπή επί των Καυσίμων. Πορίσματα, εκθέσεις και υπομνήματα του μεταλλευτικού τμήματος αυτής [Commission on the Fuels. Findings, reports and memoranda of its Mining department]. Athens, 1920.

Gounaris, Elias
'Η μεταλλευτική κίνησις της Ελλάδος κατά το 1913' [Mining movement in Greece a. 1913], *Αρχιμήδης – Μηνιαίον Περιοδικόν σύγγραμμα του Ελληνικού Πολυτεχνικού Συλλόγου* 16 (1915): 7-12 and 23.

—, 'Αι περί λιγνίτου προτάσεις του 1932' [Year 1932 proposals regarding lignite]. In Τεχνικόν Επιμελητήριον Ελλάδος, *Η οικονομική έρευνα των μεγάλων τεχνικών ζητημάτων* [Technical Chamber of Greece, The economic research of the great technical issues]. Athens: Technical Chamber of Greece, 1933, LXXXIX-LXXXXII.

Grecian Mining & Development Co. Ltd., *Προβλήματα καυσίμων εν Ελλάδι* [Problems regarding fuels in Greece]. London: Grecian Mining & Development Co., 1931.

Greece with the Cyclades & Northern Sporades (Handbooks prepared under the direction of the Historical Section of the Foreign Office - No. 18). London, 1920.

Iordanidou, Domna
'Τα μεταλλεία στην Βόρεια Ελλάδα, 1912-1940' [Mines in Northern Greece, 1912-1940]. PhD diss., University of Ioannina, 2021.

Kalitsounakis, Dimitri
'Αι σημεριναί τάσεις προς εθνικοποίησιν' [The nowadays trends towards nationalization]. *Αρχείον Οικονομικών και Κοινωνικών Επιστημών* 1/1 (1921): 49-72.

Kander, Astrid, Paolo Malanima, Paul Warde
Power to the People. Energy in Europe over the Last Five Centuries. Princeton: Princeton University Press, 2013.

Kilimis, P.
'Οι λιγνίται' [Lignites]. *Αρχείον Οικονομικών και Κοινωνικών Επιστημών* 15/4 (1935): 292-307.

Kordellas, Andreas
'Περί καυσίμων υλών' [Regarding fuels]. *Αρχιμήδης – Μηνιαίον Περιοδικόν σύγγραμμα του Ελληνικού Πολυτεχνικού Συλλόγου* 1/1 (1899): 2-9.

—, *Η Ελλάς εξεταζομένη γεωλογικώς και ορυκτολογικώς κατ' αίτησιν της Κεντρικής Επιτροπής της Ελλάδος δια την Παγκόσμιον Έκθεσιν του 1878* [Greece examined under a geological and mineralogical point of view at the request of the Central Committee of Greece for the 1878 World Exhibition]. Athens, 1878.

Lagendijk, Vincent
'Electrifying Europe: the power of Europe in the construction of electricity networks'. PhD diss., Eindhoven University of Technology, Industrial Engineering and Innovative Sciences, 2008.

Le Puillon de Boblaye, Emile and Theodore Virlet
Expédition Scientifique de Morée. Section des sciences physiques. Tome II. 2e partie. Géologie et minéralogie. Paris: Levrault, 1833.

Manousakis, Vasilis G.
'Starving for fuel in times of war: the coal shortage in Occupied Greece, 1941-1944'. *Journal of Energy History / Revue d'histoire de l'énergie* 14 (2025).

—, 'Οικονομία και Πολιτική στην Ελλάδα του Β' Παγκοσμίου Πολέμου (1940-1944)' [Economics and Politics in World War II Greece (1940-1944)]. PhD diss., Aristotle University of Thessaloniki, Faculty of Political Sciences, 2014.

Pantelakis, Nikos S.
Ο εξηλεκτρισμός της Ελλάδας. Από την ιδιωτική πρωτοβουλία στο κρατικό μονοπώλιο (1889-1956) [Greece's electrification. From the private initiative to the state monopoly (1889-1956)]. Athens: Cultural Foundation of National Bank of Greece, 1991.

Papadimitriou, Solon
Στοιχεία του Ελληνικού Μεταλλευτικού Δικαίου [Elements of the Greek Mining Legislation]. Athens: ed. Peter L. Vergianitis, 1921.

Papastefanaki, Leda
'Mining Engineers, Industrial Modernisation and Politics in Greece, 1870-1940'. *The Historical Review / La Revue Historique* XIII (2016): 71-115.

—, 'Οι Μηχανικοί στην Ελλάδα του Μεσοπολέμου. Σπουδές, επαγγελματικές σταδιοδρομίες, διασυνδέσεις' [Engineers in Inter-war Greece. Curricula, professional careers, interconnections]. *Μνήμων* 35 (2016): 233-263.

—, *Η φλέβα της γης. Τα μεταλλεία της Ελλάδας, 19ος-20ός αιώνας* [The earth's vein. Greek Mines, 19th-20th cc.]. Athens: Vivliorama, 2017.

Pavlidou, Miranda
Η ιστορία των λιγνιτών της Δυτικής Μακεδονίας (1925-1957) και ο Μικρασιάτης Γεώργιος Ν. Παυλίδης [The history of Western Macedonia lignites (1925-1957) and the Asia Minor refugee George N. Pavlidis]. Athens: private edition, 2023.

Pelt, Mogens
Tobacco, Arms & Politics. Greece and Germany from War Crisis to World War (1929-41). Museum Tuscolanum Press – University of Copenhagen, 1998.

Samiou, Demetra
Η εξαγορά των ηλεκτρικών επιχειρήσεων από τη ΔΕΗ. Αρχειακή Τεκμηρίωση [Electrical Enterprises' Acquisition by DEI (Public Power Corporation). Archival documentation]. Athens: CNR-GR, 1998.

Scognamiglio, Anna Maria
'The "Brown Gold" of East Berlin: East German Energy Policies in the 1950s'. *Journal of Energy History / Revue d'histoire de l'énergie* 14 (2025)

Solomos, Ioannis
'Ο ελληνικός λιγνίτης. Τι πρέπει να γίνη' [The Greek lignite. What has to be done], *Έργα* 158 (1931): 377-382.

Stathakis, George
Το Δόγμα Τρούμαν και το Σχέδιο Μάρσαλ. Η ιστορία της Αμερικανικής Βοήθειας στην Ελλάδα [The Truman Doctrine and the Marshall Plan. The story of the American Aid in Greece]. Athens: Vivliorama, 2004.

Stoyannidis, Yannis and Chatzigogas, Sakis, eds.
The Athens Gasworks. The history, the technology, the people, the museum. Athens: Industrial Gas Museum, 2013.

Theodorou Vasiliki
"Γαιανθρακαποθήκες στο Αιγαίο. Το αρχείο του σταθμού ανθράκευσης της εταιρείας Μιχαλινός στην Κέα"[Coal warehouses in the Aegean. The archive of the Michalinos company's bunkering station in Kea]. *Μνήμων* 37 (2019): 259-276.

Thomas E.
L'oeuvre civilisatrice de l'Armée française en Macédoine (Étude Publiée par "L' Indépendant": Salonique 1918).

Tok, Alaaddin
"The Ottoman mining in the age of capitalism: an analysis of state-capital relations (1850-1908)". Master Thesis, University of Bosphorus, Istanbul, 2010.

Tsakas, Christos
"Growth Models and Core-Periphery Interactions in European Integration: The German-Greek Special Relationship in Historical Perspective". *Journal of Common Market Studies* 59,4 (2021): 1-18.

—, *Με το βλέμμα στην Ευρώπη. Οι ελληνο-γερμανικές σχέσεις μετά τον πόλεμο (1953-1981)* [With the gaze directed to Europe. The Greek-German relations after the war (1953-1981)], (Heraclion: Crete University Press, 2023) (original title of the study: Christos Tsakas, *Post-war Greco-German Relations, 1953-1981. Economic Development, Business Interests and European Integration* (Basingstoke: Palgrave Macmillan, 2022).

Tsotsoros, Stathis N.
Ενέργεια και ανάπτυξη στη μεταπολεμική περίοδο. Η Δημόσια Επιχείρηση Ηλεκτρισμού 1950-1992 [Energy and progress after the [Second World] War. The Public Power Corporation 1950-1992] (Athens: CNR=GR 1995).

Tzokas, Spyros
"Περιοδικά και κοινότητες μηχανικών στην Ελλάδα: Η περίοδος πριν την ίδρυση του Τεχνικού Επιμελητηρίου της Ελλάδας" [Journals and Engineers' communities in Greece: the period prior to the Technical Chamber of Greece's foundation]. *Νεύσις* 18 (2019): 49-68.

ΟΥΝΡΡΑ - Οργανισμός Περιθάλψεως και Αποκαταστάσεως των Ηνωμένων Εθνών – Αποστολή Ελλάδος, *Ο ορυκτός πλούτος της Ελλάδος* [UNRRA – United Nations Relief and Rehabilitation Administration – Mission of Greece, The mineral wealth of Greece]. Athens: UNRRA,1947.

Vouyoukas, Panayotis
Σύντομος περιγραφή των ορυκτών της Ελλάδος [A brief description of the minerals of Greece]. Athens : publisher unknown, 1856.

Zacharias, Procopios D.
"Διάλεξις περί της χρησιμοποιήσεως των ελληνικών λιγνιτών και του μέλλοντος αυτών" [Lecture on the usability of the Greek coals and their future]. *Αρχιμήδης – Μηνιαίον Περιοδικόν σύγγραμμα του Ελληνικού Πολυτεχνικού Συλλόγου* 18 (1917): n° 9, 65-79 and n° 10, 73-79.

—, "Ο εκ της χρησιμοποιήσεως των ελληνικών ανθράκων πλούτος" [The wealth providing from the use of the Greek coal]. *Αρχιμήδης – Μηνιαίον Περιοδικόν σύγγραμμα του Ελληνικού Πολυτεχνικού Συλλόγου*, 4 (1903): n° 6, 43-44 and n° 7, 52-54.

Zacharias, Stelios
"Struggle for survival: American Aid and the Greek Reconstruction". In *The Marshall Plan: Fifty years after*, edited by Martin A. Schain, 153-163. (New York: Palgrave, 2001.