

Hungry for Power: Historical Shifts of Energy Sources in Turkey and Italy

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Abstract

The aim of this paper is to analyze the role of the industrial revolution and the economic policies on the energy transition process of two developing Mediterranean countries: Turkey and Italy. Both countries not only have coast to Mediterranean, they also share a similar story in terms of their energy demands and industrialization in the interwar period. The study will analyze the period between the two world wars, considering the fact that times of war and depression most likely traumatize energy consumptions and economic growth and energy policies are constantly altered by wartime policies and constraints.

Keywords: Energy demand, industrialization, interwar period

Cite this article: Duman, Y. S., & Emre, O. (2018). Hungry for Power: Historical Shifts of Energy Sources in Turkey and Italy. *International Journal of Management, Accounting and Economics*, 5(1), 43-53.

Introduction

Energy is one of the most vital inputs of production and with the improvement of technology and machinery which are basically the transformations realized through industrial revolution; the production process is being more and more energy dependent. The energy demand in turn would contribute to the rise of technological advances and industrial development. Such that, the increased demand for energy created incentives to improve current technology in order to produce more reliable sources of energy, which in return helped enhance the society.

History presents us with several examples in this debate. Deforestation occurred due to excessive use of wood as a primary energy source and due to the widespread use in constructions. Nevertheless, the energy transformations in the world cannot be explained

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by the simple fact that the industrial revolution had required solely more fuel (Stern and Kander, 2011). In fact there has been a unilateral relationship between energy sources and industrial revolution. Industrial revolution could not have been physically possible in organic economies without access to energy on a scale which had never existed until then (Wrigley, 2010). Therefore, considering the fact that coal had become the abundant source of energy by replacing wood, it is safe to state that industrial revolution would not have been possible if it were not for the coal.

Today, the population, level of technology and the level of consumption is unprecedented thus overall the need for energy is far more than ever. Similarly, the challenges faced by the entire world population in terms of reliability of energy resources are more severe than ever. The only tangible fact is that, with today's scarce resources; issues such as renewable energy, energy security, energy diversification and environmental protection in consuming and producing energy has gained utmost significance. There is both increased concern and awareness about the decisions and the choices about energy efficiency that it will affect generations to come.

The transition to energy intensive production could be dated back to the industrial revolution during the 18th century England where it consequently spread over Europe. The main attribute of the industrial revolution was the utilization of steam power into production. In this vein, the revolution had altered the economic production from human or animal operated tools to more mechanical and technological tools.

This paper will dwell on the energy transition that has been experienced by both Turkey and Italy during the interwar period, when the industrialization process is observed more clearly. Essentially for Turkey and Italy, both of which have started their industrialization process during the 19th century, the transformations in the energy demand, energy consumption and energy sources have changed significantly. Both countries have experienced major political shifts that changed their economic policies therefore altered their energy profiles.

This paper will develop as follows; first section will dwell on the economic policies and energy consumption of Turkey and how these might be related in the corresponding periods. The second section will develop an understanding for Italy similar to that of section one. Conclusion will make a comparison between Italy and Turkey based on the arguments indicated in the preceding sections.

Energy and Economy Interaction in Turkey between 1923 and 1939

Contrary to the common perception, the rise of economic indicators of Turkey can be dated back to the late 18th and 19th century. Ottoman Empire demonstrated modest attempts and emperors of the time took personal interest in introducing European industrial techniques into domestic production such as; Sultan Selim III had utilized European style production for cannons, rifles, mines and gunpowder, followed by the Sultan Mahmud II who had established a paper factory, spinning mill, *Feshane* (to replace the hand-manufacture of the new fez head gear), wool spinning and weaving mill (Clark, 1974). Despite these efforts to transition to a more industrial economy the Emperors

faced numerous difficulties, experienced wars, and faced societal challenges. By the beginning of the 20th century, the industrial census of 1913 indicated that within the borders of Turkey there existed 600 factories that employ 10 or more workers represented only 0.2% of the overall population (Pamuk, 2008).

During the early 20th century, after 1923, with the establishment of the Republic and the first initiatives being taken towards creating a modern Turkey, industrialization has begun to diffuse into the new Turkish economic system. Perhaps the World War, de-globalization and the emergence of the concept of national economies following the Great Depression of 1929 have contributed in Turkey's industrialization. Due to wars and global turmoil, exchange rate crises and the closing of the economies jointly promoted domestic industrial production.

Early republican economic period of Turkey was highly influenced by the attributes brought about by the World War I (WWI) such as, closing of economies, inward looking strategies and industrialization. These were the main characteristics that helped define the early republican period. The grounds of the 1920s' economic and energy policies were set in the İzmir Economic Congress where Mustafa Kemal himself emphasized the importance of economic independence after stressing that political independence had already been achieved (Zürcher, 1993). The congress was summarized into nine principles and the main topic of interest at the congress had been of similar nature to the Young Turks era (1914 - 1918), whether to implement policies regarding liberalism or state intervention of the 'National Economy'. The congress agreed to focus on the protection of the local industry and without any privileges, promoting foreign trade as well. In terms of energy, the idea was to improve the existing coal basins, promote the domestic industries on using domestic coal and protect the energy industry against the foreign competition (Demir, 1980).

There were several infrastructural developments that followed the Izmir Economy Congress led to increases in energy demand. Between 1923 and 1929, 800 kilometers of railroad tracks were constructed and another 800 kilometers were under construction as of 1930. Another policy was the abolishment of the tithe (aşar) tax in 1925 which promoted agricultural production and promoted widespread tractor use on agriculture. The 'Law on the Encouragement of the Industry' was issued in 1927 in order to promote domestic production. Another event of the 1920s that might have increased the use of energy was the establishment of the "İş Bank" (Business Bank) and the "Sanayi Bank" (Industrial Bank), and these initiatives further promoted the private sector (Zürcher, 1993).

Before the republic was established, Turkey did not rely much on the conventional energy sources such as coal, oil, natural gas or wood for production purposes. Production relied mostly on artisanship and craftsmanship and the relatively low amount of energy was used mainly to heat up houses and furnaces with the use of wood or and kerosene lamps were used for illumination purposes. Basically, it was the renewable energy or biofuels that were abundantly used during the early republican period. Between 1927 and 1937 around 64 percent of the accrued wood was utilized for heating purposes and overall; wood constituted 60 percent of the primary energy supply (General Directorate

of Forestry, 1973). There were no power lines in rural regions and it was costly to transport conventional fuels to the peripherals of the country. Thus, the most common biofuel was *tezek* (processed turd, animal excrement) and it was mainly used for heating purposes, to the amount of nearly 14 million tons (Demir, 1967).

On the other hand, coal production had started during the mid 19th century at the Black Sea region. However; it was mostly administered by the foreign capital and it remained same in the early years of the Republic. The production of 1.4 million tons of coal in 1923 increased to 2.6 million tons, which should have been higher compared to other industrializing nations. Nevertheless the reason of low production of coal during the early periods also stems from the fact that the proven coal reserves of that time were mainly located in geographical regions which made it rather challenging and costly to extract (Demir, 1967).

Also, Turkey has been blessed with high reserves of lignite such that in 2009 Turkey produced 75.577 thousand tons of lignite (Turkish Statistical Institute, 2010) which constituted nearly 50 percent of its total primary energy supply. Nevertheless the production of lignite did not start until after the Great Depression of 1929 when Turkey's energy need increased due to closing of the world economy and focusing on substituting imports during which in 1923 there was no production of lignite while in 1930 it reached to 9 thousand tons and in 1938 to 14 thousand tons (Demir, 1967; State Planning Organization, 2010).

The most popular energy source of today is oil and natural gas. Although Turkey does not have a long history in utilizing petroleum, the expeditions to find petroleum has started in 1933 with the help of two governmental institutions; *Petrol Arama ve İşletme İdaresi* (Directorate for the Exploration and Process of Petroleum) and *Maden Tetkik Arama* (MTA, General Directorate of Mineral Research and Exploration). With the lead of these institutions, first petroleum reserves were explored in Bitlis in 1940 however, Turkey was going through wartime and petroleum expeditions and extractions were extremely limited.

Electricity production on the other hand was constrained to the large cities and one of the primary polices of the Congress was to distribute electricity to all cities in Turkey by building power plants. In this regard, the first power plants were built in 1923 Adapazarı; in 1925 Izmir, Adana, İnebolu, Artvin, Trabzon, Akşehir, Mersin; in 1926 Sivas, Aksaray, Konya, Ayvalık, Bursa, Malatya, İzmir, Kütahya; in 1928 Nazilli, Kırkağaç, Antalya, Afyon, Akşehir, Kırklareli, Samsun, Çorlu, Giresun, Eskişehir, Yozgat; in 1929 Bandırma, Biga, Milas, Ordu, Bafra; in 1930 Balıkesir, Kastamonu, Tekirdağ, Urfa (Çavdar, 1983; Özdemir, 2011).

Electricity consumption and production numbers for the period are given in Table 1. It can be clearly seen from the table that per capita electricity production and consumption gradually increases from 1923 to 1939 indicating that the industrialization process and the policies towards distributing electricity to the population have a significant effect on the increasing use of electricity. In fact some of the newly established factories between 1927 and 1934 such as, weaving factory in Bursa, Bunyan; cement factory in Ankara,

automobile assembly factory of Ford and another 4 sugar factories have also contributed to the rise of the energy demand and production (Özdemir, 2011). The electricity network development can also be seen from the table, that the total installed capacity have been slow in the first years of the Republic yet it has acquired a slight pace after 1925.

Table 1. Annual development of installed capacity gross generation and net consumption in turkey and per capita

YEARS	TOTAL				PER CAPITA		
	POPULATION	INS.CAP	GROSS.GEN.	NET CON.	INS.CAP.	GROSS.GEN.	CONS.
	(*1000)	(MW)	(GWh)	(GWh)	(Watt)	(kWh)	(kWh)
1923	12360	32.8	44.5	41.3	2.7	3.6	3.3
1924	12620	32.9	44.6	41.3	2.6	3.5	3.3
1925	12885	33.4	45.3	41.9	2.6	3.5	3.3
1926	13155	48.6	65.8	60.6	3.7	5.0	4.6
1927	13562	51.9	70.1	63.4	3.8	5.2	4.7
1928	13851	65.9	89.4	81.4	4.8	6.5	5.9
1929	14146	72.1	97.8	88.9	5.1	6.9	6.3
1930	14448	78.0	106.3	96.7	5.4	7.4	6.7
1931	14756	101.9	117.9	106.0	6.9	8.0	7.2
1932	15071	103.3	131.6	117.5	6.9	8.7	7.8
1933	15392	107.8	151.9	136.2	7.0	9.9	8.8
1934	15721	117.4	175.2	157.7	7.5	11.1	10.0
1935	16046	126.2	222.9	199.6	7.9	13.9	12.4
1936	16350	138.5	231.1	206.8	8.5	14.1	12.6
1937	16631	167.1	289.8	257.7	10.0	17.4	15.5
1938	16916	178.5	312.1	279.9	10.6	18.4	16.5
1939	17369	215.6	353.3	316.8	12.4	20.3	18.2

Source: Turkish Electricity Transmission Company, 2010, Electricity Generation & Transmission Statistics of Turkey, TEIAS.

The period of globalization and the slight liberalization, if not with the WWI, had definitely ended with the Great Depression. One of the most significant attributes of the Turkish economy after 1929 has been the introduction of etatism. It was a transition to state planning period in Turkey and intensification on further industrialization hence the first and second development plans of the period focused on energy. The policy idea was to increase domestic production, reduce the foreign dependency and to the foreign currency as well. In this regard parallel to aforementioned MTA; Electrical Power Resources Survey and Development Administration (EIE, Elektrik İşleri Etüt İdaresi), Sümerbank were responsible for industry, Etibank was responsible for mining and Office for Soil Products (Toprak Mahsulleri Ofisi TMO) was established to be in charge of agriculture. Overall, Turkey pursued an imports substitution policy in every aspect of its economy after 1930 and energy production was one of them.

Turkey did not have the power to establish its own tariffs due to the Lausanne Treaty. However; with the 1929 global economic crisis, the tariffs were drastically increased in order to protect the domestic industries. The crisis had presented an opportunity to balance the current account and stabilize the Turkish Lira. Furthermore in order to strengthen the current state of the currency and promote sustainable growth, the Central Bank of Turkey was established in 1930. However, due to the fact that crisis was more severe than it was expected, it had more impact than did the protection measures had on the economy. During crisis periods, agricultural producers were affected by the downfall hence production has dropped. Despite the conventional expectations, as can be seen from the Table 1 installed capacity, generation and consumption continued to increase without any alteration. During this period consequent laws that targeted the nationalization of foreign administered power stations and uniting them under the authority of the aforementioned institutions were ratified. With the nationalization of the electricity production and strengthening and widening the authority of the institutions, Turkey had finally established its preliminary industrial infrastructure and experienced a transition in terms of energy use from simple heating and cooking to industrial scale production.

Italian Economy and Energy in the Interwar Period

The pillars of industrial revolution are technical progress and creation of a knowledge base, and these have been the driving forces of the modern economic growth. Before the spread of the knowledge based growth over Europe, Italy had an economic structure which mostly relied on agriculture and a major part of the population was living in the rural sections. Lacking domestic coal reserves, Italy was not able to utilize the power of the steam engines in the early periods of the industrial revolution, therefore relied on the foreign sources and that consequently delayed its industrialization. Nevertheless with the diffusion of the industrial revolution over Italy, the economy started experiencing a transformation from an agrarian to an industrial economy and a rapid growth (Malanima and Zamagni, 2010).

Perhaps the most significant attribute of the interwar period for Italy in general is the Benito Mussolini's accession to power in 1922 and declaring his dictatorship in 1925. The regime shift definitely had significant alterations over both the industrialization and the economic growth of Italy. Nevertheless, it does not indicate any major dispersion in terms of energy transition, at least for the interwar period. With the new regime however, the nature of the industry shifted from the needs of the civil economy to a rather heavy industry. As it has been in all of the early contemporary economies, the first and foremost source of energy has been the human power, wood and low amount of coal which slowly transformed into alternative sources This transition is presented in the Figure 1 for the years between 1860 and 2000.

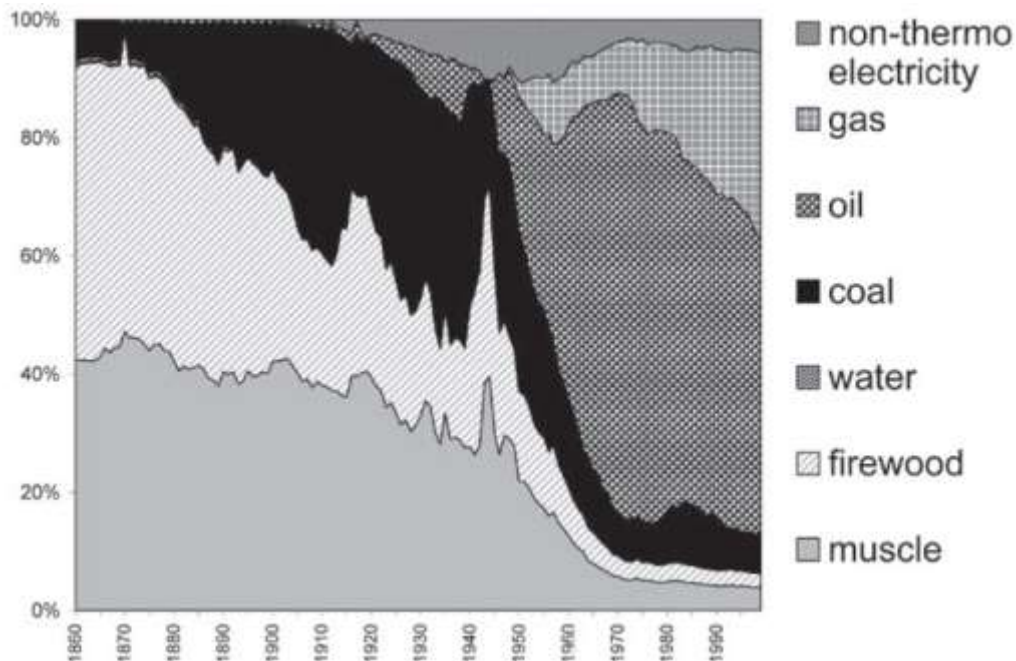


Figure 1. Energy Transition in Italy between 1860 and 2000

Source: original data from S. Bartoletto, “L’energia”, in *Rapportosulleconomiedel Mediterraneo*, P. Malanima (ed.), Il Mulino, Bologna 2005, pp. 231-256; and Malanima, *Energy consumption in Italy*, citation here is from Bartoletto and Rubio (2008).

Italian economy between 1922 and 1925 before the dictatorship had focused on controlling wages, establishing a privatization program, reforming domestic and foreign tax regimes and eliminating the budget deficit. With Alberto De’Stefani as Finance and Treasury Minister, this program overall emphasized on the industrial sector and aimed on encompassing both on liberalism and authoritarian aspects of the economy at the same time. Therefore in De’Stefani administration, the industrial sector experienced highest profits, investments, production and employment relative to the whole dictatorial period (Bini, 1998). The country experienced modest growth during this period however, with the downside of currency weakening followed by a crisis was in fact one of the reasons for De’Stefani’s resignation. In terms of energy consumption, due to industrial focus, the energy demand increased and consequently the economy moved towards more efficient sources. In this regard, the share of fossil fuels in the energy profile of Italy during this period shows a significant 4% and 5% , increase while wood, water and wind energy consequently loses share (Malanima, 2006).

With the fall of the moderate liberal policies and the challenges the Italian currency was facing in the global arena, Mussolini initiated a transformation in the economy from free trade to protectionism and deregulation to state intervention. Italian currency continued to weaken even after the economic regime change, which was an opportunity that could create cheaper and more competitive exports. Mussolini regarded the decrease in the value of the currency as a decrease in his prestige, therefore he declared his renowned “Battle for the Lira” policy in which he introduced polices such as anchoring

the value of Lira to the gold standard, reducing the money supply and increasing the interest rate in order to bring the value back to its old level. (Pollard, 1998).

In Italy, the producers can be divided into two; one being the traditional production that relies mainly on the human power and the other the advanced production that mostly relies on fossil fuels. Although, before the rise of fascism, the traditional production share was higher, with the regime shift, the share of advanced production on chemical, metal and engineering gained significance. Hence, except for the 1929 crisis, heavy production has gradually increased as depicted in the Figure 2 (Felice and Carreras, 2012). Parallel to the rise of heavy industries, energy usage and the need for more efficient energy increased and the share of fossil fuels in the total energy profile also showed a similar behavior (Malanima, 2006).

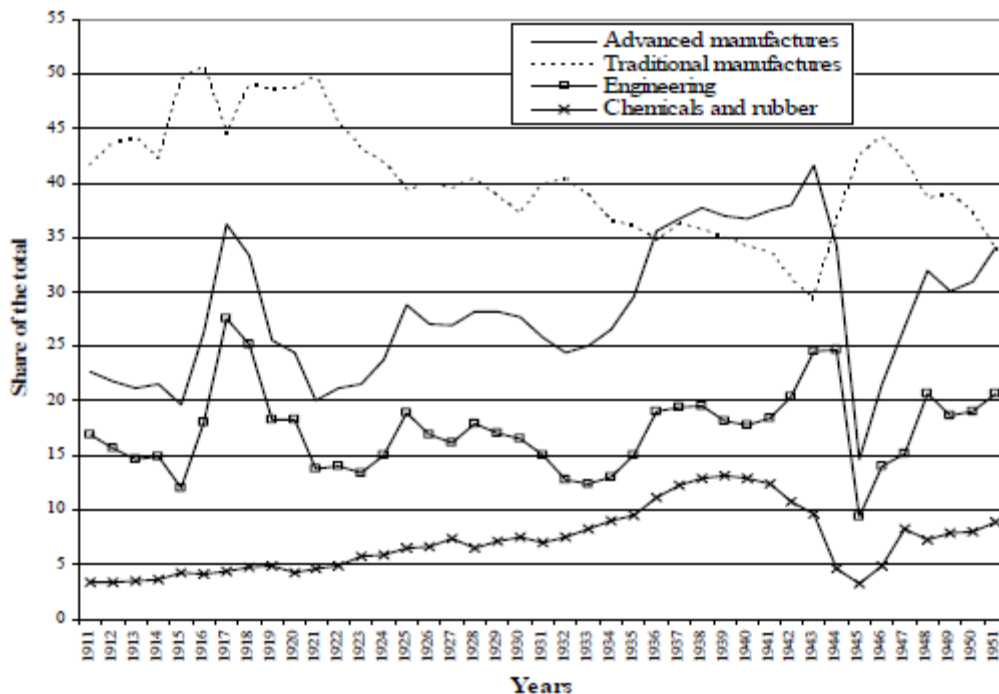


Figure 2. Transformation of production between 1911-1951
 Source: Felice and Albert, 2012

Due to an autocratic regime, the nature of the industrial growth and the economy during the interwar period is not very clear because the economy was not shaped by the market forces itself but rather shaped by Mussolini himself and to the benefit of the corporate state and those who are close to the fascist regime. For instance, following the Great Depression, the economy was severely affected by unemployment. However; the fascist regime sought the way of coping with this problem by ceasing to publish the unemployment statistics after 1932 (Pollard, 1998). The fact that concerns the context of this study is the industrialization process and the use and production of energy, and in that sense, during the interwar period, improvement was achieved in Italy's energy structure and progress was made in heavy industry.

Conclusion

Turkey and Italy are similar in several aspects. Among which is the lack of domestic conventional energy sources, being late to catch up with the industrialization era and they share economic development paths in earlier years. Both countries are situated on the Mediterranean Coast which grants them the similar characteristic of climate hence they have similar access to solar radiation for heating and lighting purposes. The lack of adequate domestic reserves has made both Turkey and Italy import dependent in terms of energy. Neither country has substantial oil and natural gas reserves. Furthermore, although Turkey had significant amount of coal reserves of high quality unlike Italy, during the interwar period it was hard to extract the coal and was costly for Turkey and those of which were accessible were of poor quality. Therefore it can be stated that both countries are similar in terms of coal utilization as well. Overall, both countries have relied on foreign sources in terms of fossil fuels.

In terms of their economic performances, despite the regime in Italy, both countries were late bloomers in terms of industrialization. Both countries started pursuing industrialization during the interwar period and established their industrial infrastructure before the WWII. Both countries have similarly been affected by the moderate globalization after WWI until the crisis in 1929 and experienced state intervention policies following the crisis period.

During the early periods of the industrialization, although both countries had slight amount of electricity production, despite regional distribution disparities, they did not have the adequate coal in order to utilize the steam engine of the industrialization process. They had a similar process in establishing railways, introduction of minerals through newly established institutions and state investments, spread of automobiles and machinery in both the agricultural and industrial sector. Although data on Turkey's energy profile during the 19th and 20th century is not as comprehensive as the pioneering works of Malanima (2006) for Italy and Kander (2006) for Sweden, it can be stated that energy transition in Turkey would look much more similar to that of Italy as in Graph 1. Perhaps the only difference would be that after the global oil crisis of 1973, Turkey shifted more to natural gas than using oil. However, what is common and clear for both of the countries is that, traditional energy sources have accounted for a large share of their total energy consumption until after the WWII. Therefore, it can be stated that until after the WWII, Turkey and Italy shared the same energy transition process, yet after WWII economic policies and industrialization paths started converging.

Overall, this study has provided an energy transition framework within the context of industrialization process of Italy and Turkey. Those countries both show major similarities in terms of their transition from archaic energy sources to more conventional energy sources. Apart from showing that both countries share a similar transition process, this study has also provided an intuition to the relation between the industrialization process and energy consumption. In this context, shifting to fossil fuels then was a matter of contingency with rapid industrialization, the need for higher efficiency in energy and quality of fuel sources are in high demand, therefore countries such as Turkey and Italy, contrary to lack of domestic sources, shift to fossil fuels.

References

- Bartoletto, S., & Rubio, M. M. (2008). Energy transition and CO2 emissions in Southern Europe: Italy and Spain (1861-2000). *Global Environment*, No. 2, 46-81.
- Bini, P. (1998). The Making of Economic Policy in Italy in the Inter-war Years (1922-1940), presented at the Conference on “Economic Thought in Southern Europe in the Interwar Period (1910-1950)”, University of Porto.
- Çavdar, T. (1983). Türkiye’de Enerji, Cumhuriyet Dönemi Türkiye Ansiklopedisi, C.3, İstanbul, İletişimYayımları.
- Clark, E. C. (1974). The Ottoman Industrial Revolution, *International Journal of Middle East Studies*, Vol. 5, No. 1, pp. 65-76, Cambridge University Press.
- Demir, A. (1967). Türkiye’ de Birincil Enerji Üretim ve Tüketimi Üzerinde Bir Araştırma, Ankara Üniversitesi Siyasal Bilgiler Fakültesi Dergisi (22:3)
- Demir, A. (1980). Türkiye’de Cumhuriyet Döneminde Enerji Politikaları, Ankara Üniversitesi Siyasal Bilgiler Fakültesi Dergisi (35:1)
- EMO Enerji Komisyonu (1981). Türkiye’de Elektrik Enerjisi Sektörünün Yapısı ve Tarihsel Gelişimi, *Elektrik Mühendisliği Dergisi*, Vol. 278. 81-91.
- Felice, E. and Carreras, Al. (2012). The roots of success: industrial growth in Italy reconsidered, 1911-1951, UHE Working papers 2012_04, Universitat Autònoma de Barcelona, Departament d'Economia i Història Econòmica, Unitatd' Història Econòmica.
- General Directorate of Forestry (1973). Cumhuriyetimizin 75. Yılında Ormancılığımız, Ankara: Orman Bakanlığı Yayın Dairesi.
- Kander, A. (2006). Economic growth, energy consumption and CO2 emissions in Sweden 1800-2000. *Almqvist & Wicksell International*, Sweden.
- Malanima, P. & Zamagni, V. (2010). 150 years of the Italian Economy, 1861-2010. *Journal of Modern Italian Studies* 15(1).
- Malanima, P. (2006). Energy Consumption in Italy in the 19th and 20th Centuries. A Statistical outline. Roma: CNR.
- Özdemir, N. (2011). Türkiye’de Elektriğin Tarihsel Gelişimi (1900-1938). Yüksek Lisans Tezi, Ankara Üniversitesi, Türk İnkılap Tarihi Enstitüsü, Ankara.
- Pamuk, Ş. (2008). Osmanlı’dan Cumhuriyet’e Küreselleşme, İktisat Politikaları ve Büyüme, Seçme Eserler, İş Bankası Yayınları.

Pollard, J. (1998). *The Fascist Experience in Italy*, Routledge Sources in History, New York.

State Planning Organization (2010). *Economic and Social Indicators (1950-2010)*, DPT <http://www.dpt.gov.tr/PortalDesign/PortalControls/WebIcerikGosterim.aspx?Enc=83D5A6FF03C7B4FC5A73E5CFAD2D9676>, 05/27/2012.

Stern, D. I. & Kander, A., (2011). *The Role of Energy in the Industrial Revolution and Modern Economic Growth*, CAMA Working Papers 2011-01, Australian National University, Centre for Applied Macroeconomic Analysis.

Turkish Electricity Transmission Company (2010), *Electricity Generation & Transmission Statistics of Turkey*, TEIAS.

Turkish Statistical Institute (2010). *Statistical Indicators: 1923–2010*. TSI, Ankara, Turkey.

Wrigley, E. A. (2010). *Energy and the English Industrial Revolution*, Cambridge University Press.

Zürcher, E. J. (1993). *Turkey: A Modern History*, London, I.B. Tauris & Co Ltd.