

# INCENTIVE POLICIES FOR COAL PLANTS IN TURKEY

by

**Hasan YILDIZHAN**<sup>1,\*</sup>

<sup>1</sup>Iskenderun Tehcnical University, Hatay/Dörtyol, Turkey;  
E-mail address: [hasanydhn@hotmail.com](mailto:hasanydhn@hotmail.com)

*Turkey's need for electricity increases constantly because of its developing economy. So it applies to incentives to find solution to the problem of scarcity of electricity. Building plants using coal gets the greatest support from the state in Turkey. Electricity production with coal in Turkey increases faster than the other sources due to the incentive policies at place. On the other hand, coal compared with other fossil fuel is also the most abundant and most widely used fossil fuel in the world. According to The International Energy Agency (IEA) data, building plants using coal is in the lead. In addition, it is foreseen that building plants using coal will be the major way of producing electricity although many other materials started to be used in the production of electricity. The aim of this study is to evaluate the incentive policies Turkey has in regards to coal plants and to offer policies.*

**Key Words:** *Turkey, Coal, Incentive Policy, Electricity Generation*

## 1. Introduction

Countries apply different incentive policies to ensure sustainability in energy supply security. Incentive policies of countries are the most important factor determining which kind of material is used most widely in electricity production. The size of electricity production and choice of source of energy which gives more electricity is shaped by incentive policies implemented by policy makers. In addition many researchers stated that incentive policies implemented by policy makers affect power generation [1, 2, 3, 4, 5, 6, 7].

Countries shape their incentive policies according to energy resource potentials. Turkey applies incentive policy to increase power generation of domestic energy resources. The most abundant source in Turkey is coal compared to other fossil resources. Turkey has mostly lignite and then hard coal. Turkey applies important incentive policy to achieve maximum level of power generation from coal plants especially because of lignite reserves. Subsidies provided to the coal-based electricity plants in question are many more than subsidies provided to other energy sources. Subsidies given to the coal-based power generation are much more than also subsidies to renewable energy sources.

Coal is the most widely used fossil source in the world. Coal plants are the most important part of the world's electricity supply because a large part of electricity of the world is generated through burning coal. According to The International Energy Agency (IEA) data, while power and heat generation with coal was 22.3 % Exajoules in 1971, it increased to 97.8 Exajoules in 2013 after 40 years [8]. In addition, more than 40 % of the world's power generation is provided with coal [9]. As it

is understood, despite the renewable energy sources and the threat of global warming, the world's most of electricity is and will be generated in coal-based power plants.

On the other hand, Turkey participated in the United Nations Framework Convention on Climate Change on 24 May 2004. Turkey also became a party to the Kyoto Protocol on the United Nations Framework Convention on Climate Change No. 5386 on 26 August 2009 [10]. In addition, Turkey has signed the Paris Climate Treaty, which aims to combat climate change. Turkey has submitted the national contribution declaration to the United Nations Secretariat under the Paris Climate Treaty. Turkey has pledged to reduce its greenhouse gas emissions by 21 percent between 2020 and 2030 in its national contribution statements [11, 12]. However, in order to reduce the release of carbon dioxide and protect the environment in Turkey by many researchers; Turkey's should abandon fossil energy sources, such as coal, which emit high greenhouse gas emissions, and turn to renewable energy sources that do not cause greenhouse gas emissions [13, 14, 15, 16].

In this manuscript, in the scope of Turkey's energy security, the strategic plan for the coal based electricity generation and promotion policies have been investigated and discussed. Moreover, the actual case and challenges of the coal based electricity generation in Turkey have been analyzed. Finally, some recommendations have been given to policy makers for sustainable coal based electricity generation in Turkey's demand of electricity production.

## 2. World Electricity Generation and Coal

Electricity generated in the world will increase to 39.0 billion kWh hours in 2040 according to a report released by U.S Information Administration (EIA) [17]. The amount of electricity generated in the world between the years 2010-2040 is given in Table 1. According to this table, it is seen that most of electricity of the world between the years 2010-2040 will be generated with coal. In addition, power generation based on coal will increase year by year. The same table depicts that natural gas follows power generation based on coal.

**Table 1. World net electricity generation by energy source, 2010-2040 (trillion kilowatthours) [17].**

World	2010	2015	2020	2025	2030	2035	2040	Average annual percent change, 2010-2040
Liquids	0.9	0.9	0.8	0.8	0.7	0.7	0.7	-1.0
Natural gas	4.5	5.0	5.5	6.2	7.2	8.3	9.4	2.5
Coal	8.1	9.2	10.1	11.3	12.3	13.2	13.9	1.8
Nuclear	2.6	2.9	3.6	4.3	4.8	5.1	5.5	2.5
Renewables	4.2	5.3	6.5	7.2	7.9	8.8	9.6	2.8

According to data provided by The International Energy Agency (IEA), about 40 % of electricity of the world is generated by China and the United States. Besides the country having the biggest capacity of power generation is China. The United States follows China [18]. Coal has the

biggest share in power generation in China [19, 20]. Coal has the biggest share in power generation also in the USA [21, 22]. The other countries generating electricity mostly through coal source are India [23], South Africa [9], Brazil [9] and Germany [24]. In Turkey, coal-based electricity generation does not have the largest share. But the share of coal-based electricity production in Turkey is constantly increasing.

### 3. View of Power Generation of Turkey

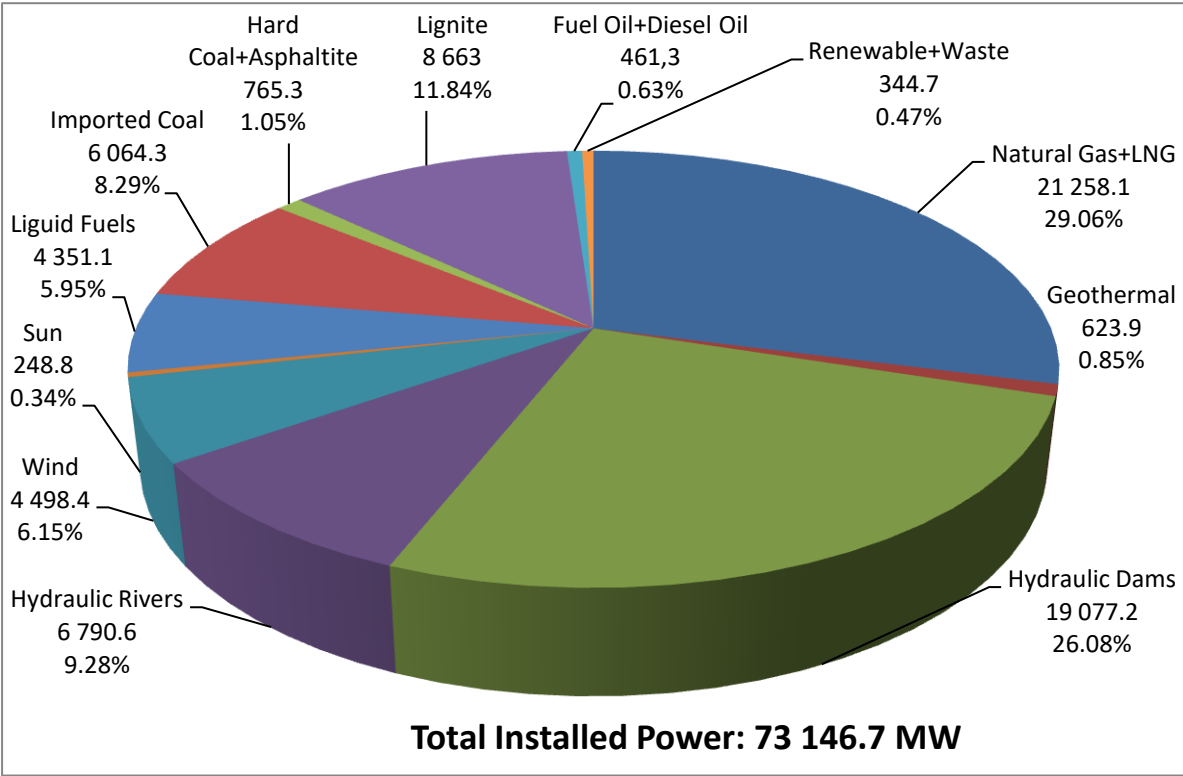
Electricity generation and installed power according to sources are given in Table 2 and Figure 1 respectively. As shown in Table 2, by the end of 2015 the rate of electricity generation Turkey produces through thermic power plants is 68.52 % of total electricity generation. While power plants based on natural gas + LNG takes place on the top with its 37.9 % rate, power plants based on coal follows them with 29.09 % rate. Hydraulic follows thermic power plants with 25.6 % rate [25].

**Table 2. Distribution of Turkey Electricity Generation by Primary Energy Source (GWh) [25].**

PRIMARY ENERGY SOURCES		2014		2015	
		ELECTRICITY GENERATION (GWh)	TOTAL PRODUCTION RATE	ELECTRICITY GENERATION (GWh)	TOTAL PRODUCTION RATE
COAL	HARD COAL + IMPORT COAL+ ASPHALTITE	39.647	15,7%	44.830	17,12%
	LIGNITE	36.615	14,50%	31.336	11,97%
	SUM	76.262	30,2%	76.166	29,09%
LIQUID FUELS	FUEL-OIL	1.663	0,66%	980	0,37%
	DIESEL FUEL	482	0,19%	1.244	0,48%
	SUM	2.145	0,85%	2.224	0,85%
NATURAL GAS + LNG		120.576	47,9%	99.219	37,9%
RENEWABLE + WASTE		1.453	0,57%	1.758	0,67%
THERMIC SUM		200.417	79,5%	179.366	68,52%
HYDRAULIC SUM		40.645	16,1%	67.146	25,6%
WIND SUM		8.520	3,4%	11.652	4,45%
GEOTHERMAL SUM		2.364	0,9%	3.424	1,31%
SUN SUM		17,4	0,01%	194	0,07%
GRAND TOTAL		251.963	100%	261.783	100%

Looking at Figure 1, in 2015, the installed power in Turkey's electricity generation is 73146.7 MW. Most of the installed power is hydraulic (25867.8 MW) and natural gas (21258.1 MW). Then coal-fired thermal power plants coming. Electricity generation from natural gas, hydraulic and coal accounts for about 90% of the total production of Turkey. The share of other energy sources in

Turkey's electricity generation is small. This situation is a negative situation in terms of Turkey's energy supply security. As a result, Turkey should increase the share of other energy sources for electricity generation, excluding natural gas, hydropower and coal-based energy sources. In addition, electricity generation rate of Turkey is about 70% with carbon-based energy sources such as natural gas and coal. This rate is very high in terms of Turkey's carbon emissions. Because Turkey has to reduce its electricity production with carbon-based energy sources such as natural gas and coal in order to fulfill its commitments under climate agreements.



**Figure 1. Distribution of Turkey electrical installed power according to sources, in 2015 [26].**

Natural gas has an important share in power generation of Turkey. However, natural gas used in power generation is imported from abroad. This is an unfavourable situation in terms of sustainability of Turkey's power generation. On the other hand, contribution of renewable sources except for hydraulic power to power production is very low in Turkey. Turkey needs to develop policies to increase electricity generation from renewable energy sources other than hydropower in renewable energy sources. Because this situation is necessary both in terms of energy supply security and environment.

The development of Turkey's coal-backed electricity generation over the years is given in table 4. Table 4 shows that import-supported coal production is constantly increasing. By the end of November 2016, the share of imported coal-based electricity production increased, while the share of domestic coal-based electricity generation decreased. Turkey needs to reduce imported coal-based electricity production. Because increasing Turkey's electricity production with imported coal will increase energy external dependency and increase the foreign trade deficit in terms of economy.

**Table 3. The installed capacity of coal power plants in turkey electricity energy by years [26].**

Coal Type	Year 2014		Year 2015		Until November 30, 2016	
	Installed Power MW	Total Generation Contribution Rate %	Installed Power MW	Total Generation Contribution Rate %	Installed Power MW	Total Generation Contribution Rate %
Hard Coal + Lignite	8.573,4	12.3	9.011,7	12.32	9.429,4	12.0
Imported Coal	6.062,6	8.7	6.064,2	8.3	7.473,9	9.5

#### 4. Coal Reserves of Turkey

Visible coal reserves are about fourteen billion four hundred and thirty million tonnes according to the data of Turkey General Directorate of Mineral Research and Exploration. Lignite constitutes most of these reserves (13 300 000 000 tonnes) [27]. The remaining visible reserves consist of hard coal. In addition, coal exploration projects in recent years have revealed that this number will increase. Besides it is foreseen that the current coal reserves will be sufficient for Turkey for 174 years [27].

Coal plants for power generation are based on both hard coal and lignite. While the plants based on lignite fulfils its fuel demand from domestic sources, the ones based on hard coal fulfils some of its fuel demand from import coal. On the other hand, calorific value of lignite is lower than hard coal [28]. Therefore, the potential of generating electricity of power plants based on hard coal is higher than the power plants based on lignite.

Quality of lignite reserve specified in Turkey in terms of calorific value;

3.18 % is lower than	4186.8	kJ/kg,
66.32 % is between the values of	4186.8 – 8373.6	kJ/kg,
24.5 % is between the values of	8373.6 – 12560.4	kJ/kg,
5.16 % is between the values of	12560.4 – 16747.2	kJ/kg and
0.84 % is higher than	16747.2	kJ/kg

So calorific value of 94 % of our total lignite reserves is lower than 12560.4 kJ/kg [29]. As a result, most of the lignite production is used in power generation plants since lignite has low calorific value.

#### 5. Strategic Plan of Turkey for Power Generation Based On Coal

Turkey has issued “Document of Strategy Electric Power and Market and Supply Security” dated 18.05.2009 and numbered 2009-11 by the Prime Ministry State Planning Organization Supreme Planning Council [30]. To increase the share of domestic sources has been identified as a priority target in the document in question. Therefore, it is stated in Turkey that all of the known sources of lignite and hard coal will be used for power generation.

Moreover, Turkey's Energy and Natural Resources Ministry has prepared a five-year strategy plan for energy [31]. The Strategic plan covers the strategies of Turkey in energy politics as well as its initiatives and it is a reference supporting to national economical aims. In this strategic plan, to evaluate domestic coal reserves of Turkey in the most effective way is identified as one of the main targets. In addition, increasing lignite and hard coal production is aimed. Power generation with domestic coal plan of Turkey, which is stated in the strategic plan, between the years of 2015-2019 is given in the Table 4. The table represents that reaching annual production level of 60 billion kWh in power generation with domestic resources is a target set to be achieved by the end of 2019. As a result, Turkey intends to increase domestic coal-based electricity production with the national strategy plan.

**Table 4. Power generation based on domestic coal plan of turkey between the years of 2015-2019 [31].**

Amount of power generation based on domestic coal (billion kWh)	Base Year 2013	2015	2017	2019
	32,9	40	50	60

From the other side, Turkey has been aiming to reduce the electricity production from imported natural gas with the strategy plan and to increase the electricity production from renewable energy sources. This will increase both domestic coal-based electricity generation and renewable energy-based electricity generation. Nevertheless, the strategy plan did not include targets for reducing imported coal-based electricity generation. For this reason, imported coal-supported electricity production in Turkey will increase more. In this case, it will adversely affect Turkey's energy supply security.

## **6. Power Generation Based on Coal Incentives**

Turkey has begun to give greater importance to the domestic resources used in power generation. Important incentives are given to especially coal plants. Coal plants are given more incentives than other electricity generation sources in Table 6. Turkey is divided into six regions with regional investment incentives applications implemented by Ministry of Economy. The regions are divided according to their economic development. The sixth region is the one which is supported most.

**Table 6. Support and incentives according to the sources of electricity in Turkey.**

Power supply	Purchase Guarantee (US dollars cents / kWh)	Warranty Period (years)
Sinop Nuclear Power Plant [32]	11.83	20
Akkuyu Nuclear Power Plant [33]	12.35	15
Hydroelectric [34]	7.3	10
Wind [34]	7.3	10
Sun [34]	13.3	10
Biomass (garbage gas) [34]	13.3	10
Geothermal [34]	10.5	10
Domestic Coal [35]	Fifth region incentive: <ul style="list-style-type: none"> <li>- VAT exemption</li> <li>- Customs duty exemption</li> <li>- Tax reduction %40-60</li> <li>- Support for employer share of insurance premiums: 7-10 years</li> <li>- Investment allocation</li> <li>- Interest support: 2-5 points</li> </ul>	

Furthermore, power generation based on coal investments are included among the priority investment issues with the decision numbered 2013/4288 of Council of Ministers which is announced in Official Newspaper dated 15.02.2013 and numbered 28560. Thus, the fifth region incentive will be provided for all power generation based on coal investment without taking into account the regions. The incentives provided in the fifth region: Customs duty exemption, vat exemption, tax reduction, support for employer share of insurance premiums, investment allocation, the interest subsidy. In the case of making power generation based on coal investment in the sixth region, the support of income tax withholding and insurance premiums will be provided, too [35]. Thus, the investors investing in power generation through coal burning are getting significant financial support from the state.

On the other hand, the incentives given to renewable energy sources in Turkey are very low compared to European countries [36]. Turkey promotes electricity generation with renewable energy sources within the framework of the mechanism for supporting renewable energy resources. Within scope of incentive the purchase guarantee price per kilowatt-hour (kWh) applied, 7.3 cents for wind and hydroelectric power plants, 10.5 cents for geothermal, 13.3 cents for biomass and sun. In addition to these figures, additions varying between 0.4-3.5 cents are made depending on the use of domestic equipment [34]. As can be seen in Table 6, the incentives given to renewable energy sources in Turkey are very low compared to the domestic coal mine. This situation will adversely affect the development of renewable energy sources in Turkey. In addition, the low level of incentives given to renewable energy sources will adversely affect Turkey's efforts towards climate politics.

Work has been started to establish two nuclear power plants in Turkey. The first of the nuclear power plants will be built in Mersin / Akkuyu with the intergovernmental agreement with Russia. The second one is the nuclear power plant to be established in Sinop under the treaty between Turkey and Japan. Turkey's incentive model for both nuclear power plants is based on long-term (20 and 15 years) and price purchase guarantees as shown in Table 6. Nuclear power plants to be established in Turkey

will enable diversification of energy sources in electricity generation. In addition, the nuclear power plants to be installed will contribute positively to the rapidly increasing energy demand of Turkey.

## **7. Conclusion and Policy Implications**

In recent years, Turkey has started to focus on domestic resources for the sustainable electricity production due to its dependence on natural gas in electricity production. Especially for coal power plants are given big incentives. The incentives in question given to coal power plants are much bigger than the ones for other resources of electricity production. In addition to this, Turkey has the biggest potential in coal resources among fossil fuels, so it should be evaluated as the “primary source”. Turkey should plan especially new power plants based on lignite for sustainable energy and continue the exploration of lignite. Therefore, Turkey should develop new policies in order to increase the share of coal in electricity production, to reduce the foreign dependency and to provide the security of energy. Moreover, by doing so, Turkey will create a good amount of jobs, and increase the coal production and new ways of power production will be introduced.

On the other hand, Turkey's incentive for generating electricity with domestic coal is much higher than renewable energy sources. This situation will limit the development of electricity production with renewable energy sources in Turkey. Turkey's great incentives for electricity generation with domestic coal are contradictory to climate change agreements. Because Turkey declares that it will reduce carbon emissions through climate change treaties, while the other side provides great incentives for carbon-based domestic coal-based electricity generation. However, Turkey has a slightly higher carbon intensity than developed countries [37]. As a result, Turkey should raise the incentives for renewable energy sources to the level of incentives for coal-based electricity generation. In addition, Turkey must provide clean coal technology for coal-fired thermal power plants. Clean coal technology applications reduce carbon emissions from coal-fired thermal power plants and make coal-fired thermal power plants work more efficiently.

Among coal reserves, Turkey has a lot of lignite reserves in good condition but it has limited hard coal reserves. However, the hard coal-fired power plants are much more effective than lignite-fired ones. The electricity produced in hard coal-fired power plants is much more than the lignite-fired power plants with same amount of coal because the calorific value of hard coal is much better than lignite. Turkey may increase the calorific value of lignite by focusing upon research and development activities intended for improvement (coal combustion technologies) of lignite coal. In addition, Turkey needs to make it compulsory that new power plants should be based on lignite. Because of the fact that Turkey has insufficient reserves of hard coal, it will be imported for hard-coal fired power plants. This condition will be problem for the sustainable electricity production.

Almost all of the natural gas used in Turkey's gas-powered electricity production is imported. Nevertheless, there is a continuous increase in the production of imported coal-supported electricity in Turkey. This situation has led Turkey to become a country dependent on imports of electricity. Turkey supplies about 50% of total electricity production with imports. Feeding Turkey's electricity production with imported energy sources such as natural gas and coal will cause problems in Turkey's energy supply and at the same time increase the current deficit in foreign trade. Therefore, in order to reduce the amount of imported resources such as coal and natural gas used in electricity generation in Turkey, it is necessary to set a limit with additional taxation methods. This will ensure that electricity



generation with domestic coal will develop further. Moreover, reducing import dependency in Turkey's electricity generation will reduce the weight of fossil fuels in electricity generation. Thus, the share of renewable energy resources in electricity generation will be increased.

## References

- [1] Bhanot, J., Jha, V., Moving towards tangible decision-making tools for policy makers: Measuring and monitoring energy access provision, *Energy Policy*, 47 (2012), pp. 64–70.
- [2] Sharabaroff, A., Boyd, R., Chimeli, A., The environmental and efficiency effects of restructuring on the electric power sector in the United States: An empirical analysis, *Energy Policy*, 37 (2009), pp. 4884–4893.
- [3] Javadi, S. F., Rismanchi, B., Sarraf, M., Afshar, O., Saidur, R., Ping, W. H., Rahim, A. N., Global policy of rural electrification, *Renewable and Sustainable Energy Reviews*, 19 (2013), pp. 402–416.
- [4] Chen, F. F., Chou, C. S., Lu, K. T., Scenario analysis of the new energy policy for Taiwan's electricity sector until 2025, *Energy Policy*, 61 (2013), pp. 162–171.
- [5] Allan, G., Eromenko, I., Gilmartin, M., Kockar, I., McGregor, P., The economics of distributed energy generation: A literature review, *Renewable and Sustainable Energy Reviews*, 42 (2015), pp. 543–556.
- [6] Ahn, J., Woo, J., Lee, J., Optimal allocation of energy sources for sustainable development in South Korea: Focus on the electric power generation industry, *Energy Policy*, 78 (2015), pp. 78–90.
- [7] Osmani, A., Zhang, J., Gonela, V., Awudu, I., Electricity generation from renewables in the United States: Resource potential, current usage, technical status, challenges, strategies, policies, and future directions, *Renewable and Sustainable Energy Reviews*, 24 (2013), pp. 454–472.
- [8] IEA Statistics, Key Coal Trends Excerpt from: Coal Information, 2015.
- [9] Coal-Energy for Sustainable Development, World Coal Association, [www.worldcoal.org](http://www.worldcoal.org), 2012 April, United Kingdom.
- [10] Republic of Turkey Ministry of Environment and Urbanization [In Turkish], [www.csb.gov.tr](http://www.csb.gov.tr) (Access date: 10.01.2017).
- [11] Karakaya, E., Paris Climate Treaty: An Evaluation on Content and Turkey, *Adnan Menderes University Journal of Social Sciences Institute*, 3 (2016), 1, pp 1-12, [In Turkish].
- [12] Republic of Turkey Ministry of Energy and Natural Resources [In Turkish], <http://www.enerji.gov.tr/tr-TR/Sayfalar/Uluslararasi-Muzakereler>, (Access date: 10.01.2017).
- [13] Demirbaş, A., Energy and environmental issues relating to greenhouse gas emissions in Turkey, *Energy Conversion and Management*, 44 (2003), 1, pp. 203–213.
- [14] Yüksel, I., Energy production and sustainable energy policies in Turkey, *Renewable Energy*, 35 (2010), 7, pp. 1469–1476.
- [15] Kaygusuz, K., Energy policy and climate change in Turkey, *Energy Conversion and Management*, 44 (2003), 10, pp. 1671–1688.
- [16] Şahin, Ü., Aşıcı, A., Acar, S., Bal, G., Karababa, O., Kurnaz, L., Coal Report Turkey's Coal Policies Related To Climate Change, Economy And Health, Istanbul Policy Center, April 2016.

- [17] International Energy Outlook, U.S. Energy Information Administration, 2013.
- [18] Key World Energy Statistics, International Energy Agency, 2014.
- [19] Valentine, V., S., The socio-political economy of electricity generation in China, *Renewable and Sustainable Energy Reviews*, 32 (2014), pp. 416–429.
- [20] Zhang, M., Liu, X., Wang, W., Zhou, M., Decomposition Analysis of CO<sub>2</sub> Emissions from Electricity Generation in China, *Energy Policy*, 52 (2013), pp. 159–165.
- [21] Osmani, A., Zhang, J., Gonela, V., Awudu, I., Electricity Generation from Renewables in the United States: Resource Potential, Current Usage, Technical Status, Challenges, Strategies, Policies, and Future Directions, *Renewable and Sustainable Energy Reviews*, 24 (2013), pp. 454–472.
- [22] Lee, Y., C., Zhou, P., Directional Shadow Price Estimation of CO<sub>2</sub>, SO<sub>2</sub> and NO<sub>x</sub> in the United States Coal Power Industry 1990–2010, *Energy Economics*, 51 (2015), pp. 493–502.
- [23] Bildirici, E., M., Bakirtas, T., The Relationship Among Oil, Natural Gas and Coal Consumption and Economic Growth in BRICTS (Brazil, Russian, India, China, Turkey and South Africa) countries, *Energy*, 65 (2014), pp. 134–144.
- [24] Pahle, M., Germany’s Dash for Coal: Exploring Drivers and Factors, *Energy Policy*, 38 (2010), pp. 3431–3442.
- [25] Republic of Turkey Ministry of Energy and Natural Resources Strategy Development Presidency, World and Country Energy and Natural Resources View, Issue: 14, 1 October 2016, [In Turkish].
- [26] Turkish Electricity Transmission Company [In Turkish], <http://www.teias.gov.tr/>, (Access date: 05.01.2017).
- [27] General Directorate of Mineral Research and Exploration in Turkey, Turkey's Mine Reserves, [In Turkish], [http://www.mta.gov.tr/v2.0/default.php?id=maden\\_rezervleri&m=5](http://www.mta.gov.tr/v2.0/default.php?id=maden_rezervleri&m=5), (Access date: 31.08.2015).
- [28] Acar, S., Lucy Kitson L., Bridle, R., Coal and Renewable Energy Incentives in Turkey, Published by the International Institute for Sustainable Development, March 2015.
- [29] Aktaş, M., Coal Mining In Turkey And Role In Energy [In Turkish], [www.tki.gov.tr/Dosyalar/Dosya/YAZILI%20BİLDİRİ%20METNİ.pdf](http://www.tki.gov.tr/Dosyalar/Dosya/YAZILI%20BİLDİRİ%20METNİ.pdf), (Access date: 31.08.2015).
- [30] Republic of Turkey Prime Ministry State Planning Organization, Electricity Market and Supply Security Strategy Document [In Turkish], [www.enerji.gov.tr](http://www.enerji.gov.tr), (Access date: 18.05.2015).
- [31] Republic of Turkey Ministry of Energy and Natural Resources 2015-2019 Strategic Plan [In Turkish], [www.enerji.gov.tr](http://www.enerji.gov.tr) (Access date: 11.09.2015).
- [32] International agreement text between Turkey and Japan, Official Gazette, <http://www.resmigazete.gov.tr/eskiler/2015/05/20150523-1-1.pdf> (Access date: 02.01.2017).
- [33] International agreement text between Turkey and Russia, Official Gazette, <http://www.resmigazete.gov.tr/eskiler/2010/10/20101006-6.htm>, (Access date: 03.01.2017).
- [34] Republic of Turkey Ministry of Energy and Natural Resources, Renewable Energy Resources Support Mechanism [In Turkish], <http://www.eie.gov.tr/yenilenebilir/YEKDEM.aspx>, (Access date: 03.01.2017).
- [35] Turkish Republic Prime Ministry Turkey Investment Support and Introduction Agency, Incentives [In Turkish], <http://www.invest.gov.tr/tr-TR/investmentguide/investorguide/Pages/Incentives.aspx> (Access date: 07.01.2017).

- [36] Özsoy, E., C., Low Carbon Economy And Carbon Foot List Of Turkey, *International Journal of Labor and Society*, 4 (2015), 9, pp. 15-31.
- [37] ATIS, S., ONAT, N., GUNAY, K. R. I., Assessment of The Turkey's Electric Power Policies In Terms of Sustainability, *Thermal Science*, 18 (2014), 3, pp. 695-707.