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Renewable Energy Sources in the Mediterranean Region

Mehmet ZİLE[1]

[1]Mersin University, Erdemli UTIYO, Department of Information Technologies and Information Systems, 33730, Mersin, Turkey

Abstract

The need for energy in our country, which has been developing rapidly in recent years, is evident how effective and efficient use of available energy resources should be. For this reason, the current energy sources and the situation in the Mediterranean region have been investigated. Hydroelectric, solar energy, wind energy, natural gas, biogas energy, naphtha energy and thermal energy resources of each province in the Mediterranean Region have been determined. It has been determined that the largest share among the renewable energy sources of the Mediterranean Province consists of hydroelectric power plants and is not oriented towards other energy sources sufficiently. However, although the Mediterranean region has a great potential in wind and solar energy, it is concluded that wind and solar power installed power plants are inadequate. As the Mediterranean region has intense solar radiation and wind speed, it is concluded that more solar and wind power plants should be established. It was concluded that more support should be given to the private sector for the establishment of solar and wind power plants in the Mediterranean Region. With this study, it is to raise awareness of renewable energy sources. The main goal in our energy policies should be to turn to local and renewable resources. Turkey's most important centers of national and international energy potential to be one of the qualified investment process renewable energy sources should be included. It should turn the Mediterranean region into an energy production center. Effective use of energy should be expanded.

Keywords: Mediterranean, Energy Resources, Renewable Energy.

Akdeniz Bölgesindeki Yenilenebilir Enerji Kaynakları

Mehmet ZİLE [1]

Özet

Son yıllarda hızla gelişen ülkemizin enerjiye olan ihtiyacı, mevcut olan enerji kaynaklarının ne kadar etkin ve verimli kullanmamız gerektiği aşikârdır. Bu sebeple Akdeniz bölgesinin mevcut enerji kaynakları ve gelinen durum araştırılmıştır. Akdeniz Bölgesinde yer alan her bir ilin hali hazırda bulunan hidroelektrik, güneş enerjisi, rüzgar enerjisi, doğal gaz, biyogaz enerjisi, neft enerjisi ve termal enerji kaynakları belirlenmiştir. Akdeniz İlinin yenilenebilir enerji kaynakları içinde halen en büyük payın hidroelektrik santrallerinin oluşturduğu ve diğer enerji kaynaklarına yeterince yönelinmediği tespit edilmiştir. Ancak, Akdeniz bölgesinin rüzgâr ve güneş enerjisinde büyük bir potansiyele sahip olmasına rağmen, rüzgâr ve güneş enerjisi kurulu güç santrallerinin yetersiz olduğu kanaati elde edilmiştir. Akdeniz bölgesinin yoğun bir güneş ışıması ve rüzgâr hızı olması sebebiyle daha fazla güneş ve rüzgâr enerji santrallerinin kurulması gerektiği sonucuna ulaşılmıştır. Akdeniz bölgesinde güneş ve rüzgâr enerji santralleri kurulması için özel sektöre daha fazla destek verilmesi

[*]*Corresponding Author*, e- mail: mehmetzile@mersin.edu.tr

gerektiği kanaatına ulaşılmıştır. Bu çalışma ile yenilenebilir enerji kaynaklarına yönelik bir farkındalık oluşturmaktır. Enerji politikalarımızda temel amaç, yerli ve yenilenebilir kaynakları yönelmek olmalıdır. Türkiye'nin en önemli potansiyel enerji merkezlerinden birisi olması için ulusal ve uluslararası nitelikli yatırım süreçlerine yenilenebilir enerji kaynakları dahil edilmelidir. Akdeniz Bölgesini enerji üretim merkezi haline getirmelidir. Enerjinin etkin kullanımını yaygınlaştırılmalıdır.

Anahtar Kelimeler: Akdeniz, Enerji Kaynakları, Yenilenebilir Enerji.

1. Introduction

Energy sources are sources that generate energy in any way. Energy sources are divided into renewable and non-renewable energy sources. Non-renewable energy sources are coal, oil, natural gas and nuclear [1-6]. It is important for the clean and sustainable nature of renewable energy sources. The Mediterranean region has different energy sources due to its climatic conditions, geographical structure and geological features. The Mediterranean region is more fortunate in terms of hydraulic, solar and wind energy potential than many other provinces. For this reason, in order to meet the energy demand in our country in the most efficient way, it is revealed that renewable energy sources should be utilized as much as possible [7-9].

2. Renewable Energy Resources in the Mediterranean Region

The Mediterranean Region takes its name from the neighboring sea. The region extends into a strip ranging between 120180 km^2 and starts from the vicinity of Köycegiz to the west and near the end of Hatay province, near the Cape of simple. With a surface area of approximately 120000 km^2 it constitutes about 15% of the total area of Turkey. There are Adana, Antalya, Burdur, Hatay, Isparta, Mersin and Osmaniye provinces in the Mediterranean Region. The annual average solar intake in the Mediterranean region is 1.390 kWh/m^2 year and 2956 hours. The Mediterranean region is in a unique position in terms of the sun, which is the main source of renewable energy. Solar water heating systems are widely used in renewable energy in the Mediterranean region during year. The Mediterranean region is the leading region of our country in terms of renewable energy use. However, it is a known fact that the use of this natural richness is not used sufficiently despite the high level of country. It will be a useful resource for increasing and encouraging the use of renewable energy resources.

2.1. Renewable Energy Resources in Adana

Hydroelectric power plants and installed forces in Adana Province are shown in Table 1.

Table 1. Hydroelectric power plants and installed forces in Adana Province

Power Plants	Installed Power Amount
Yedigöze Hydroelectric	311 MW
Göktaş Hydroelectric	276 MW
Kavşak Hydroelectric	191 MW
Çatalan Hydroelectric	169 MW
Köprü Hydroelectric	156 MW
Menge Hydroelectric	89 MW
Yamanlı 2 Hydroelectric	82 MW
Karakuz Hydroelectric	76 MW
Feke 2 Hydroelectric	69 MW

Doğançay Hydroelectric	62 MW
Seyhan Hydroelectric	60 MW
Toros Hydroelectric	50 MW
Mentaş Hydroelectric	50 MW
Eğlence Hydroelectric	43 MW
Feke 1 Hydroelectric	29 MW
Gökkaya Hydroelectric	29 MW
Himmetli Hydroelectric	27 MW
Kıy Hydroelectric	24 MW
Çakıt Hydroelectric	20 MW
Kuşaklı Hydroelectric	20 MW
Ahmetli Hydroelectric	12 MW
Seyhan 2 Hydroelectric	7,5 MW
Yüreğir Hydroelectric	6 MW
Sarıtepe Hydroelectric	4,9 MW
Kozan Hydroelectric	4 MW
Çoraklı Hydroelectric	2,6 MW

The installed capacity of Adana's power plant is 3716 MW. With 46 electric power plants in total, power plants in Adana produce about 15388 GWh of electricity per year. The rate of electricity generated in the province of Adana with electricity consumption of Turkey is % 6,02. Solar power plants and installed forces are shown in Table 2.

Table 2. Solar power plants and installed forces in Adana Province

Power Plants	Installed Power Amount
T Dinamik Solar Power	5,47 MW
Sarıl Solar Power	4,50 MW
Reysaş Solar Power	1 MW
Zahit Solar Power	1 MW
Abdioğulları Solar Power	1 MW
Pakmil Solar Power	0,81 MW
Weber Solar Power	0,092 MW
Veli Taş Solar Power	0,045 MW

Natural gas power plants and installed forces are shown in Table 3.

Table 3. Natural gas power plants and installed forces in Adana Province

Power Plants	Installed Power Amount
Amylum	14 MW
Bossa	6,70 MW
Kıvanç	6,06 MW

Biogas power plants and installed forces are shown in Table 4.

Table 4. Biogas power plants and installed forces in Adana Province

Power Plants	Installed Power Amount
Sofulu Dumpster Biogas	16 MW
Pakmil Biogas	1,76 MW
Adana Western Wastewater Biogas	0,80 MW
Adana East Wastewater Biogas	0,80 MW
Adana Western Wastewater Biogas	0,80 MW

Naphtha energy plants and installed forces are shown in Table 5.

Table 5. Naphtha energy plants and installed forces in Adana Province

Power Plants	Installed Power Amount
Mensa Mensucat Naphtha Power	10 MW
Toros Agriculture Ceyhan Naphtha	4,74 MW

Thermal power plants and installed forces are shown in Table 6.

Table 6. Thermal power plants and installed forces in Adana Province

Power Plants	Installed Power Amount
İSKEN Sugözü Thermal Power Plant	1320 MW
Tufanbeyli Thermal Power Plant	450 MW

In Adana Province, there are 26 hydroelectric power plants, 8 solar power plants, 3 natural gas power plants, 5 biogas power plants, 2 naphtha power plants and 2 thermal power plants. Figure 1 shows the share of the total installed power plants in the province of Adana which produce different electrical energy.

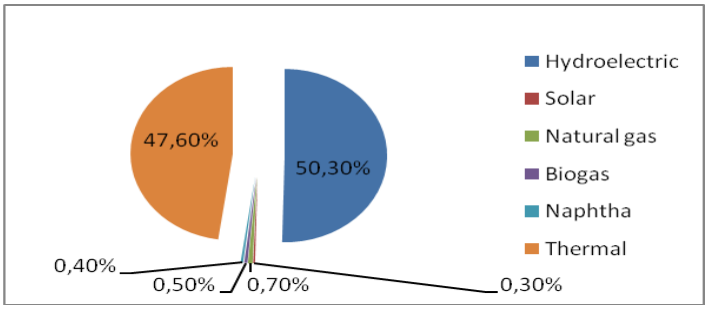

Figure 1. The share of the total installed power plants in Adana

In Adana province, 50.3% of the total installed capacity is composed of hydroelectric, 47.6% thermal, 0.30% sun, 0.7% natural gas, 0.5% biogas, 0.4% naphtha and 47.6% thermal power plants.

2.2. Renewable Energy Resources in Antalya

The installed capacity of Antalya's power plant is 2051 MW. With 72 electric power plants in total, power plants in Antalya produce about 5603 GWh of electricity per year. The rate of electricity generated in the province of Antalya with electricity consumption of Turkey is 2,19%. Hydroelectric power plants and installed forces in Antalya Province are shown in Table 7.

Table 7. Hydroelectric power plants and installed forces in Antalya Province

Power Plants	Installed Power Amount
Oymapınar Hydroelectric	540 MW
Manavgat Hydroelectric	48 MW
Yalnızardıç Hydroelectric	41 MW
Dim Hydroelectric	38 MW
Kepez Hydroelectric	26 MW
Kızıldüz Hydroelectric	16 MW
Şahmallar Hydroelectric	14 MW
Kürce Hydroelectric	12 MW
Kozdere Hydroelectric	9,27 MW
Yaprak Hydroelectric	8,97 MW
Bucakköy Hydroelectric	8,70 MW
Tınaztepe Hydroelectric	7,50 MW
Değirmen Hydroelectric	6,82 MW

Kepez 2 Hydroelectric	6 MW
Çenger Hydroelectric	5,69 MW
Dereköy Hydroelectric	5,64 MW
Kargı Hydroelectric	5,63 MW
Tocak 1 Hydroelectric	4,76 MW
Anak Hydroelectric	3,76 MW
Eskiköy Hydroelectric	2,63 MW
Alakır Hydroelectric	2,06 MW
Çandır Hydroelectric	1,71 MW
Turunçova-Finike Hydroelectric	0,53 MW

Solar power plants and installed forces are shown in Table 8. Natural gas power plants and installed forces are shown in Table 9. Biogas power plants and installed forces are shown in Table 10. Lng energy plants and installed forces are shown in Table 11.

Table 8. Solar power plants and installed forces in Antalya Province

Power Plants	Installed Power Amount
Portsan Solar Power	4,36 MW
Barla, Dönence MS Talaşoğlu Solar	2,47 MW
Ambassador Solar Power	2 MW
Korkuteli and Ulucak Solar Power	2 MW
Gençler and TS Solar Power	2 MW
DY Energy Solar Power	1,92 MW
Salur and HK Solar Power	1,92 MW
Işıkyuvar Energy Solar Power	1,84 MW
Özden Solar Power	1,84 MW
Aytar Solar Power	1,62 MW
Antalya Arena Solar Power	1,24 MW
CTN Energy Solar Power	1 MW
Koztek Solar Power	1 MW
Antsa Solar Power	1 MW
Antalya Döşemealtı Solar Power	1 MW
Sume Solar Power	1 MW
Terram Energy Solar Power	1 MW
Osman Toprak Solar Power	1 MW
Paf Energy Solar Power	0,97 MW
Mustafa Erdoğan Solar Power	0,90 MW
Durdaşlar Çatı Solar Power	0,55 MW
Detay Solar Power	0,51 MW
Süral Manavgat Solar Power	0,50 MW
Doğan SHD Solar Power	0,50 MW
Mustafa Albayrak Solar Power	0,49 MW
CW Energy	0,46 MW
Doğan Solar Power	0,42 MW
07 Pan-El-San Pano Solar Power	0,40 MW
Alyans Solar	0,39 MW
Sapmaz Solar Power	0,31 MW
Arüv Solar Power	0,30 MW
Meysak Solar Power	0,30 MW
Ömer Ünal Solar Power	0,30 MW
Antalya Airport	0,25 MW
Aktaş Solar Power	0,20 MW
Mehmet Yanık Solar Power	0,20 MW
Yeşilyurt Solar Power	0,20 MW
Shell Bepet Solar Power	0,18 MW

Çıtırım Solar Power	0,16 MW
Environment and Urbanization Solar	0,15 MW

Table 9. Natural gas power plants and installed forces in Antalya Province

Power Plants	Installed Power Amount
Aksa	1150 MW
Falez	12 MW
Ataç	5,40 MW
Kaya Belek Hotel	1,29 MW

Table 10. Biogas power plants and installed forces in Antalya Province

Power Plants	Installed Power Amount
ITC Antalya Biogas	14 MW
Manavgat Waste Biogas	3,60 MW
Sezer Biogas	0,50 MW

Table 11. LNG energy plants and installed forces in Antalya Province

Power Plants	Installed Power Amount
Antalya Airport Lng Power	8 MW
Antalya Aldaş Lng Power	1,95 MW

In Antalya, there are 23 hydroelectric power plants, 40 solar power plants, 4 natural gas power plants, 3 biogas power plants and 2 LNG power plants. Figure 2 shows the share of the total installed power plants in the province of Antalya which produce different electrical energy. Figure 2 shows the share of the total installed power plants in the province of Antalya which produce different electrical energy.

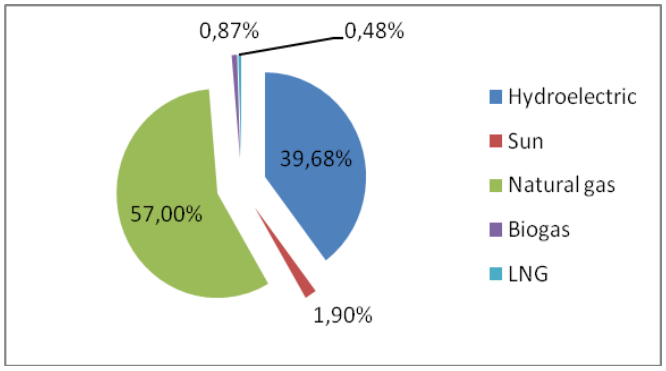

Figure 2. The share of the total installed power plants in Antalya.

In Antalya Province, 39,68% of the total installed capacity is composed of hydroelectric, 1,90% sun, 57% natural gas, 0.87% bioga and 0,48% Lng power plants.

2.3 Renewable Energy Resources in Burdur

Hydroelectric power plants and installed forces in Burdur Province are shown in Table 12.

Table 12. Hydroelectric power plants and installed forces in Burdur Province

Power Plants	Installed Power Amount
Karacaören 2 Hydroelectric	46 MW
Karacaören Hydroelectric	32 MW

Solar power plants and installed forces are shown in Table 13.

Table 13. Solar power plants and installed forces in Burdur Province

Power Plants	Installed Power Amount
Yarışlı Solar Power	8 MW
Diana Hotel Solar	5,60 MW
Masa Mining Solar Power	4,93 MW
Burdur Kozluca Solar Power	4 MW
Burdur Tefenni Solar Power	3,96 MW
Antek Solar Power	2,75 MW
Günsu ve Tay Solar Power	2 MW
Rofa Solar Power	2 MW
Antek Solar Power	2 MW
Denaş Solar Power	0,90 MW
Değirmen Construction Solar Power	0,90 MW
Gündoğdu Çatı Solar Power	0,50 MW
Mercan Solar Power	0,50 MW
Solarpark Solar Power	0,35 MW
Burdur Anadolu Food Factory Solar	0,26 MW

Natural gas power plants and installed forces are shown in Table 14.

Table 14. Natural gas power plants and installed forces in Burdur Province

Power Plants	Installed Power Amount
Burdur Sugar Factory	11 MW

The installed capacity of Burdur's power plant is 128 MW. With 18 electric power plants in total, power plants in Burdur produce about 326 GWh of electricity per year. The rate of electricity generated in the province of Burdur with electricity consumption of Turkey is 0,13%.

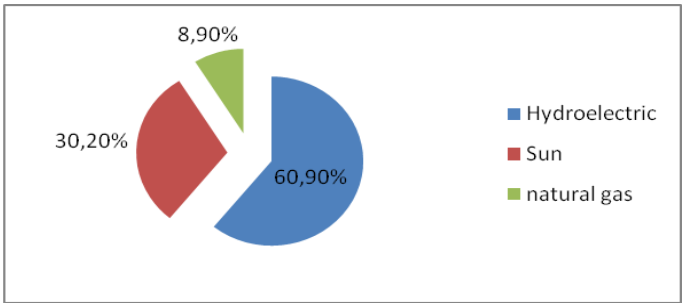

Figure 3. The share of the total installed power plants in the Burdur Province

In Burdur, there are 2 hydroelectric power plants, 15 solar power plants and 1 natural gas power plants. Figure 2 shows the share of the total installed power plants in the province of Burdur which produce different electrical energy. Figure 3 shows the share of the total installed power plants in the province of Burdur which produce different electrical energy. In Burdur Province, 60,9% of the total installed capacity is composed of hydroelectric, 30,2% sun and 8,9% natural gas power plants.

2.4 Renewable Energy Resources in Hatay

Hydroelectric power plants and installed forces in Hatay Province are shown in Table 15.

Table 15. Hydroelectric power plants and installed forces in Hatay Province

Power Plants	Installed Power Amount
Yeşilvadi Hydroelectric	9,98 MW
Kuzuculu Hydroelectric	0,27 MW

Wind energy plants and installed forces are shown in Table 16.

Table 16. Wind energy plants and installed forces in Hatay Province

Power Plants	Installed Power Amount
Ziyaret (Türbe)	76 MW
Sebenoba	60 MW
Çerçikaya	57 MW
Belen	48 MW
Şenbük	38 MW
Şenköy	35 MW
Zaf Grup Şenbük	27 MW
Atik	18MW
Yetişen	0,75 MW
Bereket farm	0,25 MW

Province Solar power plants and installed forces are shown in Table 17.

Table 17. Solar power plants and installed forces in Hatay Province

Power Plants	Installed Power Amount
Hatay Önesa AVM Solar Power	0,26 MW
Antakya Ottoman Otel Solar Power	0,25 MW
Kemal Altunay Solar Power	0,010 MW

Natural gas power plants and installed forces are shown in Table 18.

Table 18. Natural gas power plants and installed forces in Hatay Province

Power Plants	Installed Power Amount
Erzin Natural gas power plants	904 MW
MMK Natural gas power plants	15 MW

Biogas power plants and installed forces are shown in Table 19.

Table 19. Biogas power plants and installed forces in Hatay Province

Power Plants	Installed Power Amount
Gökçegöz Garbage Plant	4,24 MW
Iskenderun Garbage Gas	4,24 MW

Naphtha energy plants and installed forces are shown in Table 20.

Table 20. Thermal power plants and installed forces in Hatay Province

Power Plants	Installed Power Amount
İskenderun Atlas Thermal Power Plant	1200 MW
Iskenderun Iron and Steel Works	220 MW

The installed capacity of Hatay's power plant is 2718 MW. With 21 electric power plants in total, power plants in Hatay produce about 14518 GWh of electricity per year. The rate of electricity generated in the province of Hatay with electricity consumption of Turkey is 5,68%. In Hatay province, there are 2 hydroelectric power plants, 10 wind energy plants, 3 solar power plants, 2 natural gas power plants, 2 biogas power plants and 2 thermal power plants. Figure 4 shows the

share of the total installed power plants in the province of Hatay which produce different electrical energy.

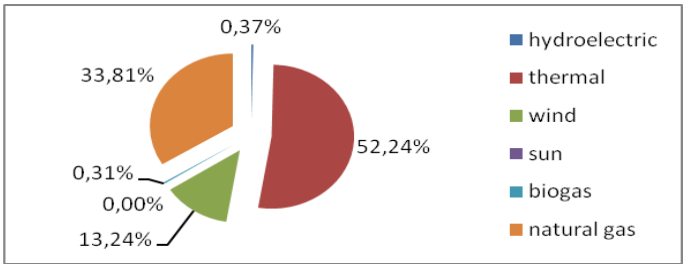

Figure 4. The share of the total installed power plants in the province of Hatay

In Hatay Province, 0,37% of the total installed capacity is composed of hydroelectric, 52,24% thermal, 13,24% wind, 0,002% sun, 31,81% natural gas and 0,31% biogas power plants.

2.5 Renewable Energy Resources in Isparta

The installed capacity of Isparta's power plant is 300 MW. With 32 electric power plants in total, power plants in Isparta produce about 721 GWh of electricity per year. The rate of electricity generated in the province of Isparta with electricity consumption of Turkey is 0,28%. Hydroelectric power plants and installed forces in Isparta Province are shown in Table 21.

Table 21. Hydroelectric power plants and installed forces in Isparta Province

Power Plants	Installed Power Amount
Kasımlar Hydroelectric	99 MW
Kovada 2 Hydroelectric	51 MW
Gökbel Hydroelectric	19 MW
Aksu Çayköy Hydroelectric	13 MW
Kovada 1 Hydroelectric	8,25 MW
Yaylabel Hydroelectric	5,09 MW
Maraton Hydroelectric	3,65 MW
Çukurçayı Hydroelectric	3,60 MW
Gökböğet Hydroelectric	3,18 MW
Sütçüler Hydroelectric	2,22 MW

Wind energy plants and installed forces are shown in Table 22.

Table 22. Wind energy plants and installed forces in Isparta Province

Power Plants	Installed Power Amount
Uluborlu	60 MW

Province Solar power plants and installed forces are shown in Table 23.

Table 23. Solar power plants and installed forces in Isparta Province

Power Plants	Installed Power Amount
Gönen Sargas, Matar and Apollo	4 MW
Metbil Solar Power	3,88 MW
Senirce Solar Power	3 MW
Emin Solar Power	2 MW
Aksu Energy Solar Power	1,88 MW
Ozan Solar and Asya Solar Power	1,88 MW
Erham Energy Solar Power	1,54 MW
Aksu Solar Power	1 MW

Öz Cunstruction Solar Power	1 MW
Masfen Solar Power	0,96MW
M325 Energy Solar Power	0,75 MW
Beyhan Energy Solar Power	0,66 MW
Solarpur Solar Power	0,52 MW
Meyso Solar Power	0,45 MW
Onurlu Solar Power	0,35 MW
Büyükkabaca Municipality Power	0,25 MW
DSI 18th Regional Directorate Solar	0,18 MW
Isparta Security Directorate Solar	0,50 MW

Natural gas power plants and installed forces are shown in Table 24.

Table 24. Natural gas power plants and installed forces in Isparta Province

Power Plants	**Installed Power Amount**
Isparta Textile Natural gas plants	**4,30 MW**

Biogas power plants and installed forces are shown in Table 25.

Table 25. Biogas power plants and installed forces in Isparta Province

Power Plants	Installed Power Amount
Arel Isparta Garbage Gas Plant	2,83 MW

In Isparta province, there are 10 hydroelectric power plants, 1 wind energy plants, 18 solar power plants, 1 natural gas power plants and 1 biogas power plants. Figure 5 shows the share of the total installed power plants in the province of Isparta which produce different electrical energy.

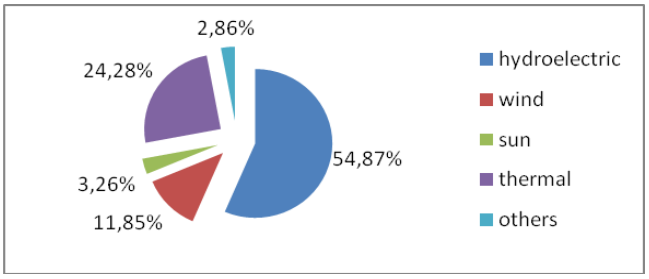

Figure 5. The share of the total installed power plants in the province of Isparta

In Isparta Province, 69,33% of the total installed capacity is composed of hydroelectric, 20% wind, 8,26% sun, 1,43% natural gas and 0,94% biogas power plants.

2.6 Renewable Energy Resources in Mersin

The installed capacity of Mersin's power plant is 1051 MW. With 48 electric power plants in total, power plants in Mersin produce about 3728 GWh of electricity per year. The rate of electricity generated in the province of Mersin with electricity consumption of Turkey is 1,46%. Hydroelectric power plants and installed forces in Mersin Province are shown in Table 26.

Table 26. Hydroelectric power plants and installed forces in Mersin Province

Power Plants	Installed PowerAmount
Gezende Hydroelectric	159 MW
Kadıncık 1 Hydroelectric	70 MW

Kadıncık 2 Hydroelectric	56 MW
Birkapılı Hydroelectric	49 MW
Otluca 1 and 2 Hydroelectric	48 MW
Lamas 3 and 4 Hydroelectric	36 MW
Alaköprü Hydroelectric	29 MW
Azmak 1, 2 and Kirpilik	24 MW
Pamuk Hydroelectric	24 MW
Sebil Regulator Hydroelectric	23 MW
Dağbaşı Hydroelectric	10 MW
Berdan Hydroelectric	10 MW
Gök Hydroelectric	10 MW
Sarıkavak Hydroelectric	8,06 MW
Yazılı 1, 2, 3 Hydroelectric	6,62 MW
Dinç Regulator Hydroelectric	1,97 MW
Remsu Hydroelectric	1,96 MW
Mut Derinçay Hydroelectric	0,88 MW
Anamur Hydroelectric	0,84 MW
Bozyazı Hydroelectric	0,42 MW
Silifke Hydroelectric	0,40 MW
Zeyne Hydroelectric	0,33 MW

Wind energy plants and installed forces are shown in Table 27.

Table 27. Wind farms and installed forces in Mersin Province

Power Plants	Installed Power Amount
Mut Borusan	50 MW
Dağpazarı	39 MW
Mersin Doğan Energy	34 MW

Solar power plants and installed forces are shown in Table 28.

Table 28. Solar power plants and installed forces in Mersin Province

Power Plants	Installed Power Amount
Dayıcık	6 MW
Gülnar	5,75 MW
Gülnar T Dinamik	5,53 MW
Nar Solar Energy	5 MW
Tiryaki Agro	4 MW
Göl, Hörç and Akova Tuluk	3 MW
Yayla Agro	1 MW
Özipek	1 MW
Cemile Bingül	1 MW
Ah-Fer	0,97 MW
Eren	0,48 MW
Opat	0,15 MW
Büyükeceli Mosque	0,003 MW

Other power plants and installed forces in Mersin Province are shown in Table 29.

Table 29. Other power plants and installed forces in Mersin Province

Power Plants	Installed Power Amount
Toros Agriculture Mersin Energy	12 MW
Çimsa Waste Heat Plant	9,56 MW
Durum Food Natural Gas Plant	5,62 MW
Karaduvar Wastewater Biogas Plant	1,90 MW
Frito Lay Food Biogas Plant	0,66 MW

In Mersin province, there are 22 hydroelectric power plants, 3 wind energy plants, 13 solar power plants, 1 natural gas power plants, 2 biogas power plants and 2 Waste Heat Plant. Figure 6 shows the share of the total installed power plants in the province of Mersin which produce different electrical energy.

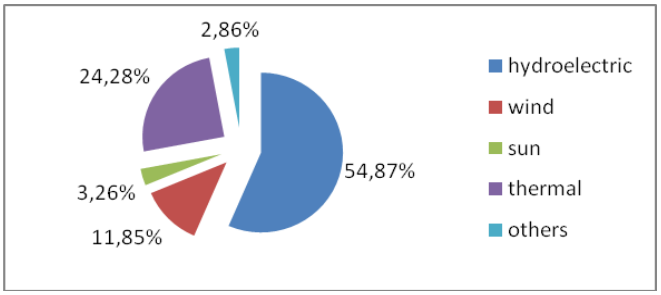

Figure 6. The share of the total installed power plants in the province of Mersin

In Mersin province, 54,87% of the total installed capacity is composed of hydroelectric, 24,28% thermal, 11,85% wind, 3,26% sun, 2,86% natural gas and biogas power plants.

2.7 Renewable Energy Resources in Osmaniye

The installed capacity of Osmaniye's power plant is 1057 MW. With 22 electric power plants in total, power plants in Osmaniye produce about 3336 GWh of electricity per year. The rate of electricity generated in the province of Osmaniye with electricity consumption of Turkey is 1,31%. Hydroelectric power plants and installed forces in Osmaniye Province are shown in Table 30.

Table 30. Hydroelectric power plants and installed forces in Osmaniye Province

Power Plants	Installed PowerAmount
Berke Hydroelectric	510 MW
Aslantaş Hydroelectric	138 MW
Ceyhan Hydroelectric	62 MW
Kalealtı Hydroelectric	29 MW
Sayan Hydroelectric	15 MW
Tahta Hydroelectric	12 MW
Köroğlu Hydroelectric	9,06 MW
Horu	8,48 MW
Sabunsuyu Hydroelectric	7,35 MW
Akcakoyun Hydroelectric	6,79 MW
Yamaç Hydroelectric	5,46 MW
Gökkoyun Hydroelectric	5 MW
Üçgen Hydroelectric	3,39 MW
Erem Hydroelectric	3,05 MW
Değirmendere Hydroelectric	0,48 MW
Karacay Hydroelectric	0,38 MW

Wind energy plants and installed forces are shown in Table 31.

Table 31. Wind farms and installed forces in Osmaniye Province

Power Plants	Installed Power Amount
Osmaniye Gökçedağ	135 MW
Hasanbeyli	50 MW
Sarıtepe	50 MW

Solar power plants and installed forces are shown in Table 32.

Table 32. Solar power plants and installed forces in Osmaniye Province

Power Plants	Installed Power Amount
T Dinamik Osmaniye Garden	3,20 MW
Emta Cable Solar Power Plant	0,90 MW

Other power plants and installed forces in Osmaniye Province are shown in Table 33.

Table 33. Biogas power plants and installed forces in Osmaniye Province

Power Plants	Installed Power Amount
Atlas Construction Garbage Gas Plant	2,83 MW

In Osmaniye province, there are 16 hydroelectric power plants, 3 wind energy plants, 2 solar power plants and 1 biogas power plants. Figure 7 shows the share of the total installed power plants in the province of Osmaniye which produce different electrical energy.

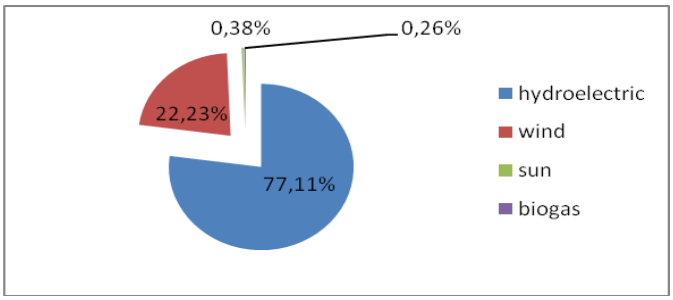

Figure 7. The share of the total installed power plants in the province of Mersin

In Osmaniye Province, 77,11% of the total installed capacity is composed of hydroelectric, 22,23% wind, 0,38% sun and 0,26% biogas power plants.

3. Conclusion

The installed capacity of Adana's power plant is 3716 MW. With 46 electric power plants in total, power plants in Adana produce about 15388 GWh of electricity per year. The rate of electricity generated in the province of Adana with electricity consumption of Turkey is % 6,02. In Adana Province, there are 26 hydroelectric power plants, 8 solar power plants, 3 natural gas power plants, 5 biogas power plants, 2 naphtha power plants and 2 thermal power plants. In Adana province, 50,3% of the total installed capacity is composed of hydroelectric, 47,6% thermal, 0.30% sun, 0,7% natural gas, 0,5% biogas, 0,4% naphtha and 47,6% thermal power plants. The installed capacity of Antalya's power plant is 2051 MW. With 72 electric power plants in total, power plants in Antalya produce about 5603 GWh of electricity per year. The rate of electricity generated in the province of Antalya with electricity consumption of Turkey is 2,19%. In Antalya, there are 23 hydroelectric power plants, 40 solar power plants, 4 natural gas power plants, 3 biogas power plants and 2 LNG power plants. In Antalya Province, 39,68% of the total installed capacity is composed of hydroelectric, 1,90% sun, 57% natural gas, 0.87% bioga and 0,48% Lng power plants. The installed capacity of Burdur's power plant is 128 MW. With 18 electric power plants in total, power plants in Burdur produce about 326 GWh of electricity per year. The rate of electricity generated in the province of Burdur with electricity consumption of Turkey is 0,13%. In Burdur, there are 2

hydroelectric power plants, 15 solar power plants and 1 natural gas power plants. In Burdur Province, 60,9% of the total installed capacity is composed of hydroelectric, 30,2% sun and 8,9% natural gas power plants. The installed capacity of Hatay's power plant is 2718 MW. With 21 electric power plants in total, power plants in Hatay produce about 14518 GWh of electricity per year. The rate of electricity generated in the province of Hatay with electricity consumption of Turkey is 5,68%. In Hatay province, there are 2 hydroelectric power plants, 10 wind energy plants, 3 solar power plants, 2 natural gas power plants, 2 biogas power plants and 2 thermal power plants. In Hatay Province, 0,37% of the total installed capacity is composed of hydroelectric, 52,24% thermal, 13,24% wind, 0,002% sun, 31,81% natural gas and 0,31% biogas power plants. The installed capacity of Isparta's power plant is 300 MW. With 32 electric power plants in total, power plants in Isparta produce about 721 GWh of electricity per year. The rate of electricity generated in the province of Isparta with electricity consumption of Turkey is 0,28%. In Isparta province, there are 10 hydroelectric power plants, 1 wind energy plants, 18 solar power plants, 1 natural gas power plants and 1 biogas power plants. In Isparta Province, 69,33% of the total installed capacity is composed of hydroelectric, 20% wind, 8,26% sun, 1,43% natural gas and 0,94% biogas power plants. The installed capacity of Mersin's power plant is 1051 MW. With 48 electric power plants in total, power plants in Mersin produce about 3728 GWh of electricity per year. The rate of electricity generated in the province of Mersin with electricity consumption of Turkey is 1,46%. In Mersin province, there are 22 hydroelectric power plants, 3 wind energy plants, 13 solar power plants, 1 natural gas power plants, 2 biogas power plants and 2 Waste Heat Plant. In Mersin province, 54,87% of the total installed capacity is composed of hydroelectric, 24,28% thermal, 11,85% wind, 3,26% sun, 2,86% natural gas and biogas power plants. The installed capacity of Osmaniye's power plant is 1057 MW. With 22 electric power plants in total, power plants in Osmaniye produce about 3336 GWh of electricity per year. The rate of electricity generated in the province of Osmaniye with electricity consumption of Turkey is 1,31%. In Osmaniye province, there are 16 hydroelectric power plants, 3 wind energy plants, 2 solar power plants and 1 biogas power plants. In Osmaniye Province, 77,11% of the total installed capacity is composed of hydroelectric, 22,23% wind, 0,38% sun and 0,26% biogas power plants. Today, due to the finite fossil fuels and the environmental problems they have created and the high costs, the energy resources and production techniques have been revised. Environmental problems such as air pollution, global warming, soil and water pollution that are generated during the production of energy from fossil fuels are increasing day by day. In order to eliminate these problems and to reduce the increase in production and transmission costs, renewable energy sources should be utilized. Especially in the Mediterranean Region, where sunshine and windy days are high, it is very important to benefit from solar and wind energy. In addition, one of the most important inputs of enterprises, industrialists, public institutions and municipalities is the energy costs. Therefore, in order to solve the problems and to ensure a healthy and healthy environment in clean and healthy environment, solar and wind energy should be used in the Mediterranean region in the most efficient way. The purpose of this study is to provide an overview of the role and role of alternative energy sources in the electricity market. For this purpose, in this study, promotion of alternative energy sources has been made. It was emphasized that these resources are very important for our country. In recent years, it has been tried to present a small perspective covering the rise of this energy in the world and in our country, the reasons underlying this rise and the results of its rise.

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