
Analysis on
Renewable Energy
In Turkey

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Abbreviations and Acronyms

Biogazder	Biogas Investment Development Association
DSİ	General Directorate of State Water Affairs
EE	Energy Efficiency
EİE	Electric Power Resources Survey and Development Administration
EİGM	General Directorate of Energy Affairs
ENTSO-E	The European Network of Transmission System Operators
ELDER	Elektrik Dağıtım Hizmetleri Derneği - Association of Distribution System Operators
EÜD	Electricity Producers Association
EPDK	Energy Market Regulatory Authority
EE	Energy Efficiency
EECB	Energy Efficiency Coordination Board
EU	European Union
GDRE	General Directorate for Renewable Energy (MENR)
GENSED	Assoc. for Solar Energy Industry
GÜNDER	International Solar Energy Society Turkey
Li-der	Unlicensed Electricity Production Assoc.
MENR	Ministry of Energy and Natural Resources
MTA	General Directorate of Mineral Exploration and Research
NREAP	National Renewable Energy Action Plan
RE	Renewable Energy
RES-E	Renewable Energy Sector-Electricity
TEİAŞ	Turkish Electricity Transmission Company Inc.
TETAŞ	Turkish Electricity Trading and Contracting Company Inc.
TWEA	Turkish Wind Energy Association
YPK	High Planning Council

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Background

The Turkish energy sector as well as the renewable energy sector structure could be described by defining legislation, institutional structure and policy papers together with the progress that these 3 instruments achieved. Turkey has RES-E (Renewable Energy Sector – Electricity) legislations that regulates the market. Institutionally, apart from electricity related institutions, the General Directorate of Renewable Energy is responsible for energy efficiency and renewable energy. Besides that, concrete targets are defined on different levels including the **Electric Energy Market and Supply Security Strategy Paper** (2009) and the **Renewable Energy Action Plan** (2014). The effectiveness of Turkey's existing legislation, institutions and policies can be analyzed by the achieved progress.

Since 2000, Turkey has been making important changes in electricity market as well as renewable energy legislation. After adopting the RE Law in 2005, Turkey amended the new Energy Market Law in 2010. Turkey has been adopting and amending some secondary legislations after steps taken for laws. In 2013 the Energy Market Law and regulation has been amended again. RE Law related regulations were adopted in the same year as well.

Depending on needs and progresses, Turkey has amended or adopted both laws and regulations. On the other hand, the unaccounted number of changes in legislation is showing that there are some works in order to reach a maturation of the legislation or fulfillment of the policy needs.

In 2009, a new strategy document described targets for all energy sources. The strategy document provided quantitative targets, especially for wind and geothermal power. In 2014, Turkey released the National Renewable Energy Action Plan (NREAP). Both documents provided targets for 2023.

In 2011, Turkey closed the existing institution EIE, which had been in charge of renewable energy and energy efficiency. Up to that time, all RE legislation refers to EIE. The government released a statutory decree and assigned EIE's responsibilities¹ to General Directorate of State Water Affairs and newly formed institution; the General Directorate of Renewable Energy (DGRE). Despite its responsibility for renewable energy and energy efficiency, DGRE carries only renewable energy as a name.

Turkey made important changes in RES-E last 10 years. Progress in institutional and legislative structure has been enhancing policies. For the further enhancement, institutional and legislative set-up need further progress and requires better cooperation in national and international scale. The approach of the study is to define role of institutions, legislation and policy documents and put some background information for the gaps & needs.

1 TGNA, Parliamentary Question, for the reply of MENR see: <http://www2.tbmm.gov.tr/d24/7/7-2207c.pdf>

Existing Policy and Institutional Framework

Major Laws and Regulations

In 2005, Turkey adopted the **Renewable Energy Law** No.5346². Article 1 of the Law describes the purpose as *to expand the utilization of renewable energy sources for generating electric energy, to benefit from these resources in a secure, economic and qualified manner, to increase the diversification of energy resources, to reduce greenhouse gas emissions, to assess waste products, to protect the environment and to develop the related manufacturing industries for realizing these objectives.*

Turkey adopted new the **Energy Market Law** in 2013³. This new Energy Market Law replaced the old Energy Market Law which had been adopted in 2001⁴. Old Energy Market Law with Law No 4628 name has changed to the Law on the Organization and Duties of the Energy Market Regulatory Authority (EMRA). Therefore, Law No. 4628 only regulates the duties and rights of EMRA, while the new law regulates market activities.

The Electricity Market Law No. 4628 was adopted as part of the efforts to harmonize with the EU and to liberalize the market.

In Article 3, the law addresses the MENR and its underlying institutions. These institutions are Energy Market Regulatory Authority (EMRA), General Directorate of State Water Affairs (DSİ), General Directorate of Electrical Power Resources Survey and Development Administration (EİE), Turkish Electricity Transmission Company Inc. (TEİAŞ), General Directorate of Mineral Exploration and Research (MTA), Turkish Electricity Trading and Contracting Company Inc. (TETAŞ).

Apart from the main Energy Market Law and Renewable Energy Law, there is only one law that was specifically adopted for a sector which is The Law on Geothermal Resources and Mineral Waters⁵.

In 2013, Turkey adopted and amended important regulations in line with the relevant laws.

- 1- Parallel to the amended Energy Market Law No. 6446 and the adopted Renewable Energy Law No.5346, Turkey amended the Regulation on Documentation and Support of Renewable Energy Sources⁶.

² Full name of the law: The Law On Utilization Of Renewable Energy Sources For The Purpose Of Generating Electrical Energy.

³ Law No 6446, dated March 14, 2013, published in Official Gazette 28603 of 30.03.2013

⁴ Law No 4628, dated February 20, 2001, published in Official Gazette 24335 of 03.03.2001

⁵ Law No 5686, dated June 3, 2007, published in Official Gazette 26551 of 13.06.2007

⁶ Previous version of regulation had adopted in 2011 and amendment had published in Official Gazette 28782 of 01.10.2013.

- 2- Parallel to the amended Energy Market Law No. 6446, the Regulation of Electricity Market Licenses⁷ was adopted.
- 3- In parallel to the Energy Market Law & Renewable Energy Law, Regulation on License Free Electricity Generation was amended⁸ in 2013. Before that, the regulation was adopted in 2010⁹, amended in 2011¹⁰.

The amendments and adoptions of regulations are not limited to the given examples. Wind, solar and geothermal specific legislation has been adopted such as the Tender Regulation for License Applications Regarding Energy Generation from Solar Facilities or the Communiqué on Measurement Standards for Wind & Solar Energy.

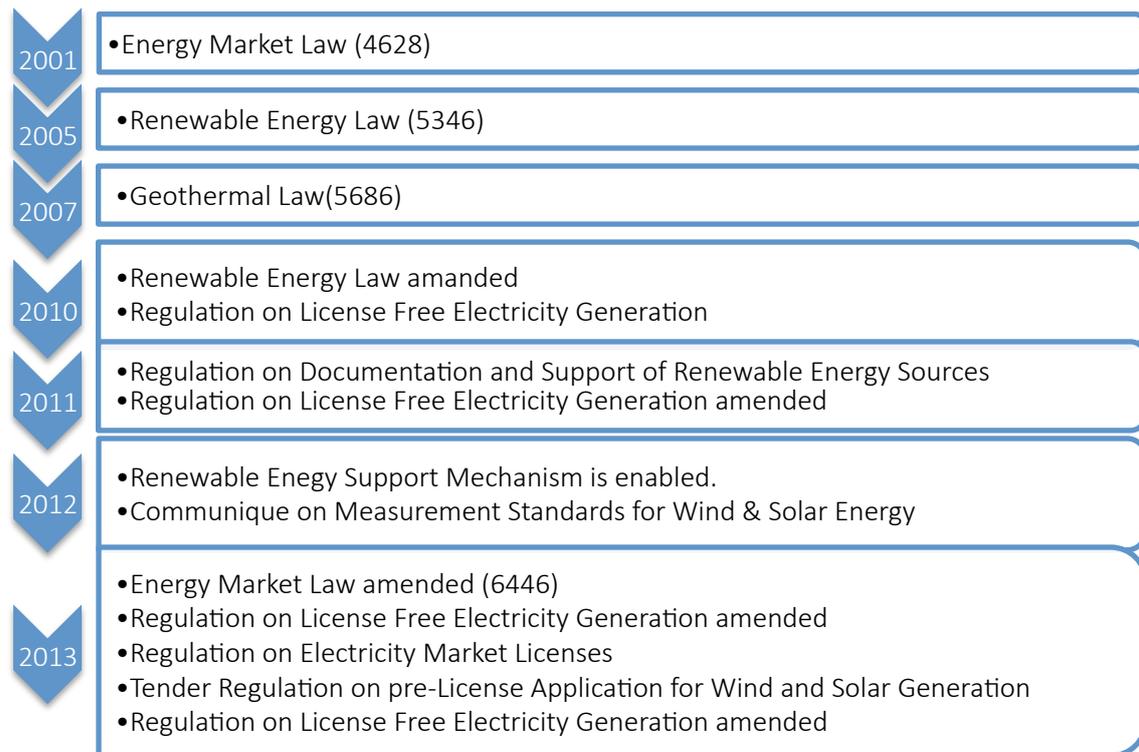


Figure 1: Major RES-E related legislation

7 Published in Official Gazette 28809 of 02.11.2013

8 Published in Official Gazette 28783 of 02.10.2013

9 Published in Official Gazette 27774 of 03.12.2010

10 Published in Official Gazette 28001 of 21.07.2011

Institutional Structure

RES-E is a part of MENR responsibility area and covered by institutions under MENR.

The Ministry of Energy and Natural Resources (MENR)

The Ministry of Energy and Natural Resources was established in 1963. The establishment of MENR was based on a Presidential order and subsequently codified by Law 3154, enacted in 1985. MENR’s legal mandate is “to help define targets and policies related to energy and natural resources in a way that serves and guarantees the defense of the country, security, welfare, and strengthening of our national economy; and to ensure that energy and natural resources are researched, developed, generated and consumed in a way that is compatible with said targets and policies.”¹¹ .

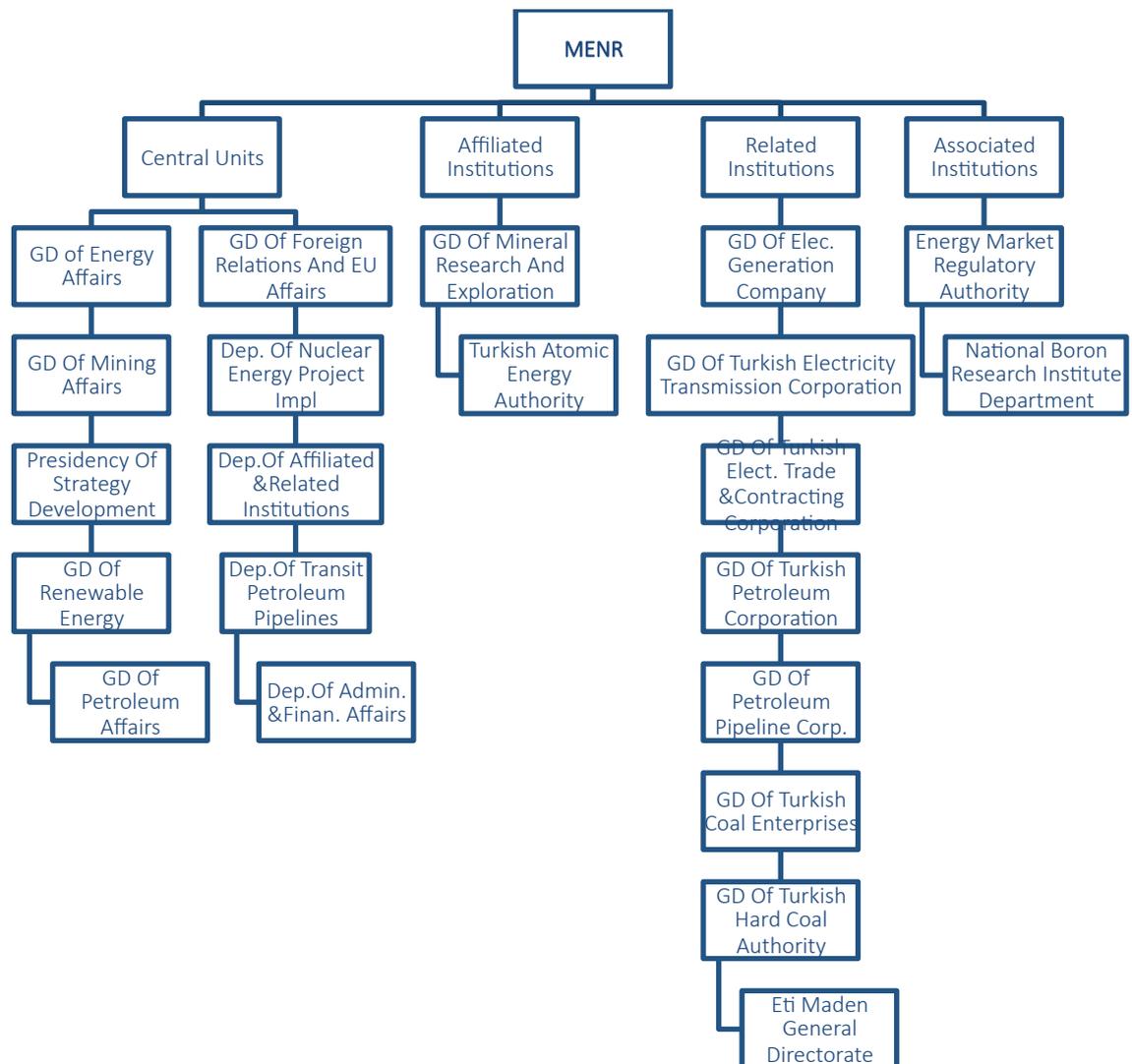


Figure 2 – Institutional Structure of MENR

Source: <http://enerji.gov.tr/tr-TR/Sayfalar/Organizasyon-Semasi>

¹¹ MENR website (www.enerji.gov.tr)

The General Directorate of Energy Affairs

The **General Directorate of Energy Affairs (GDEA)** is the main policy-making body within the MENR. It executes national energy policy. GDEA carries out studies on general energy policies, energy markets, renewable energy, fossil fuels, energy efficiency and environment. It is responsible for the co-ordination of the electricity and natural gas reform programs. It also deals with the consequences of previous efforts to bring private investments into the electricity sector.

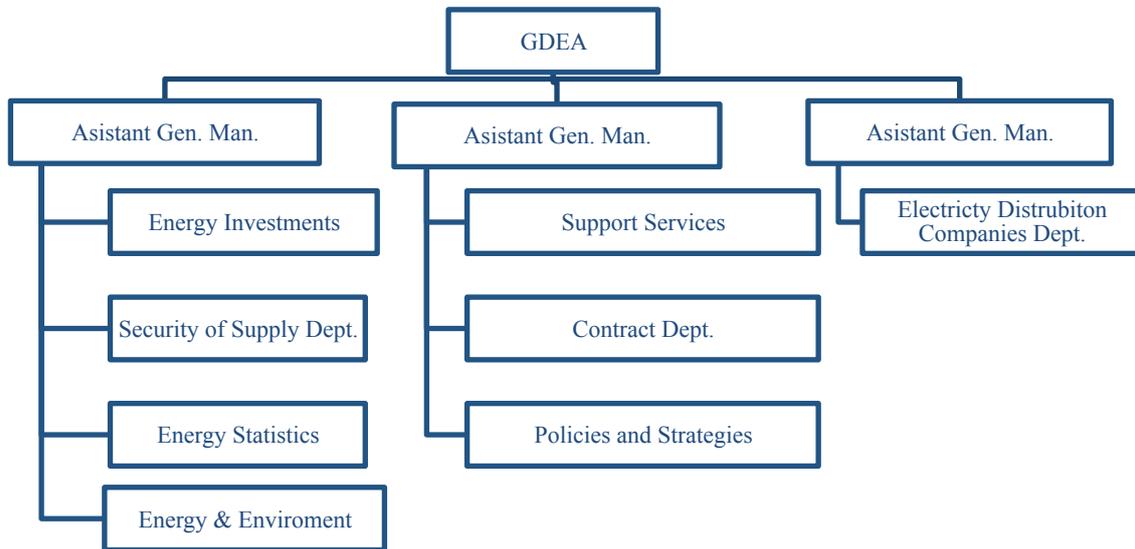


Figure 3 – Organizational structure of GDEA

General Directorate of Renewable Energy (GDRE)

In November 2011, the government released a statutory decree¹² that closed EIE (Article 89), transferred hydro related responsibilities to DSİ (provisional clause 10) and established the General Directorate for Renewable Energy (GDRE). EIE (Electrical Power Resources Survey and Development Administration¹³), an agency under the administration of the MENR, was responsible for researching and promoting renewable energy and energy efficiency since its establishment in 1981. EIE has an extensive experience on hydroelectric projects in the past and this area transferred to DSİ. Except DSİ operations, GDRE became major institution specifically responsible for renewable energy and energy efficiency.

¹² Decision no: KHK/662, published in Official Gazette 28103 of 02.11.2011.

¹³ Full name: General Directorate of Electrical Power Resources Survey and Development Administration

According to Article 82 of the statutory decree described responsibilities of DGRE. These responsibilities are divided in to 5 fields including (i) RES-E activities, (ii) energy efficiencies in industry & buildings, (iii) Energy Efficiency Coordination Board related activities (iv) follow up of developments in RE&EE and (v) providing projections, proposals for the increase of RE usage & EE.

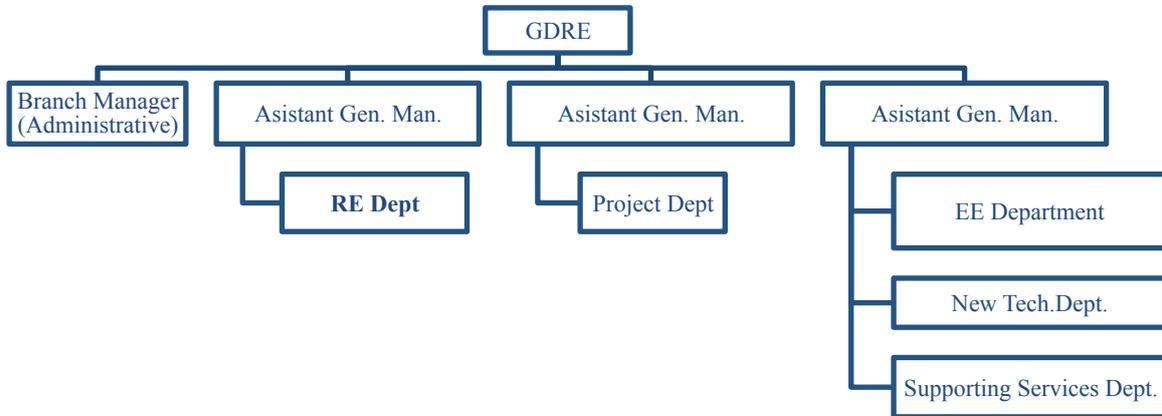


Figure 4 – Organizational structure of GDRE

(Source: GDRE)

General Directorate of Foreign Relations and EU Affairs

The General Directorate of Foreign Relations and EU Affairs (DG EU) on of the central units under MENR. Responsibilities of the DGEU described in the Law on Organization of the Ministry, Law No. 3154 and amended in 2011¹⁴ as given below:

- Following and evaluating EU acquis on energy, comparing it with Turkish legislation;
- Coordinating and supervising contributions to go into National Program and Progress Reports;
- Preparing/creating project proposals, and implementing, monitoring and evaluating projects on behalf of the Ministry of Energy and Natural Resources and its attached and related institutions, through coordination with relevant institutions, within the scope of Financial Cooperation Programs between Turkey and EU;
- Ensuring coordination, direction and following of meetings held with Subcommittees created under the Customs Union, and with similar EU offices, particularly the screening meetings held during the EU negotiation process;

¹⁴ Article 10/C of Law on Organization of the Ministry (Law No. 3154). Current Article updated in November 2011, by a statutory decree (No: 662)

- Following, from the energy sector perspective, all compliance activities performed during the implementation of the EU acquis in functional areas of different Ministries; and contributing to said activities on behalf of the Ministry and its attached and related institutions;
- Following up after correspondence with EU offices.

Other Major Institutions Under MENR

3 related institutions under MENR are in charge of electricity generation (EÜAŞ- Electricity Generation Company) transmission (TEİAŞ-Turkish Electricity Transmission Corporation) and trade (TETAŞ- Turkish Electricity Trade And Contracting Corporation).

TEDAŞ, Turkish Electricity Distribution Company is not listed under MENR. The existing distribution network is divided in to 21 areas and was privatized in 2013. Therefore, TEDAŞ is responsible for monitoring and control of the network.

As an associated institution, EMRA (Energy Market Regulatory Authority) is an important body that regulates and supervises the whole energy market including electricity generation. Monitoring the market performance, designing related regulations, auditing the enforcement process and determining statutory principles of pricing are responsibility areas of EMRA. In addition to these responsibilities, EMRA grants licenses from production to distribution of electricity, natural gas, petroleum, and liquid petroleum gas markets.

Table 1- Responsibility matrix

Institutions	Responsibility
GDEA	Policy / Reporting
GD EU	EU Policy
GDRE	RES-E
TEİAŞ	Transmission
TEDAŞ	Distribution
TETAŞ	Trade
EMRA	Regulation

As seen from the structure, RE related institutions has a rational division of responsibilities. Although there is no overlapping issue between institutions, all the institutions are part of energy market and GDRE is only part of RES-E.

Non-state Actors: Business & Industry Associations

With the development of RES-E sectors in Turkey, the market gained investors and formed new sector associations. Due to liberalization of the electricity production and distribution there are some related associations. market,

TWEA- Turkish Wind Energy Association was founded in 1992 by Ministry of Energy and Natural Resources. TWEA regards itself as a bridge between the Government and the private sector. It is organizing events and activities in order to promote wind energy in Turkey. The Deputy General Manager of TEİAŞ is one of the board members of TWEA, which consists of 11 board members in total.

GÜNDER- International Solar Energy Society Turkey was founded in Turkey in 1992, serving as an umbrella association of solar, thermal and photovoltaic energy companies and research institutions. GÜNDER represents the International Solar Energy Society in Turkey and acts as a multiplier by disseminating information relevant to the solar industry. GÜNDER is dealing with political and regulatory issues and gives advice to governmental institutions, if requested. The board of the association has 13 board members who meet monthly. MoENR is also an active board member.

EÜD - Electricity Producers Association was founded in 2002, serving as an umbrella association of conventional and renewable energy companies. EÜD acts as a multiplier by disseminating information relevant to the power industry. Its members are national as well as international companies active in the Turkish energy market. The association mainly deals with the political and regulatory issues representing the interests of its members.

ELDER-Association of Distribution System Operators is an sector association which represents all 21 electricity distributors in Turkey. Since 2013 there are no government-owned distributors in the country. The major stakeholders represented by the Board of Directors. The Association's mission is to provide a sustainable electricity supply and high grid security in order to satisfy the end customer's needs. For its members, ELDER serves as a "think-tank" and provides up-to-date information on all matters of electricity distribution.

GENSED-Turkish Solar Energy Industry Association, was established in 2009 as the voice of all the stakeholders in Turkey within "electricity generation directly from solar energy, Photovoltaic Power Systems, FVGS" sector value chain. GENSED informs the public with regular meetings, conferences, seminars and training programs and also provides updates for its stakeholder in the sector with respect to the technologic, commercial and legal changes in the road map of the photovoltaic power systems sector.

Apart from these associations, there are also **Biogazder**-Biogas Investment Development Association that was established in 2009 and another organization that was formed after regulation and the name of the association is **Li-der** (Unlicensed Electricity Production Assoc.) that was established in 2013.

Policy Documents:

MENR released the “**Electric Energy Market and Supply Security Strategy Paper**” in 2009. The strategy paper defined targets for all production methods. For the local coal, natural gas, nuclear and renewable energy, the strategy paper proposed quantitative targets for 2023. These targets for the renewables are:

- The basic goal will be to ensure that renewable energy resources have a share of minimum 30 percent in electricity generation by the year 2023. This target may be revised taking into consideration the developments in technology, market and resource potential.
- It will be ensured that whole hydropower potential which can be technically and economically utilized will be used for electricity generation by the year 2023.
- The installed capacity of wind energy is targeted to be increased to 20,000 MW by the year 2023.
- 600 MW geothermal power potential, which has been found to be appropriate for electricity generation for the time being, is targeted to be commissioned entirely by the year 2023.
- The goal is to expand the use of solar power for also generation of electricity and to ensure
- The plan also ads: Generation plans will be prepared by taking into consideration the technologic advancements and the developments in the utilization potential of other renewable resources depending on legal arrangements, and if the use of other renewable resources increases, the share of fossil fuels, primarily including the imported resources, will be reduced.

Apart from renewable targets, the strategy paper also addresses utilizing all economical and possible coal reserves by 2023 and reducing the share of natural gas to less than 30%.. The strategy document has been approved by the High Planning Council (YPK) in May 2009 and became a policy paper.

The High Planning Council

The High Planning Council is composed of the Prime Minister, Ministry of Development and appointed Council of Ministers. The duty of the High Planning Council is to provide assistance to the Council of Ministries in determining economic, social and cultural policy targets and to examine the plans and programs which are prepared within the framework of determined principles, whether they are sufficient or in conformity with the goals determined before submitting them to the Council of Ministers.

In 2014 MENR released **National Renewable Energy Action Plan (NREAP)**¹⁵. Apart from the strategy paper, the plan defined installed capacity target as 5 000 MW for solar, 1000 MW for biomass. The plan also updated 600 MW of geothermal target to 1000 MW and defined hydropower as 34 000 MW by 2023. Apart from the strategy paper, NREAP defined measures for the achieving of target.

Table 2 – Capacity and targets according to NREAP

Technology	2013	2023 target
Hydro	22 289 MW	34 000 MW
Wind	2 759 MW	20 000 MW
Geothermal	310 MW	1 000 MW
Solar	0 MW	5 000 MW
Biomass	224 MW	1 000 MW

However, since NREAP is not a legislative document such as a law or a decree, this target could not be considered as a mandatory target, it is rather an indicative one. So far, it is not common in Turkey to put such targets in legislative documents; these are mostly expressed in strategy documents.

The adoption of legal target would be fully in line with the Turkish government’s stated goals of renewable energy expansion. But, the progress that has been made up to now is not in line with papers approved by highest decision body, the High Planning Council or plans released by MENR.

¹⁵ NREAP is available here : <https://goo.gl/9smYYe>

Policy Developments

The difference between mandatory targets and indicative ones can be described by evaluating progress, comparing the targets with the current situation. The direction of investment in short (one or more years) and medium term (5 to 8 years) will give an idea about the progress of the strategy paper and NREAP..

As a short term example, In 2016, Turkey commissioned 6 449 MW of new power plant as seen from the Table-4:

- Wind added 1246 MW capacity in 2016.
- Hydro power plant capacity increased 789 MW in 2016.
- Solar power added 584 MW mostly license free.
- Other renewable gained 319 MW of new capacity.
- For the conventional fuels, natural gas and coal made important progress. Despite the reduction of the natural gas share, almost a quarter of commissioned capacity belongs to natural gas. On the other hand, coal added 1830 MW of new capacity. Quarter of added coal capacity belongs to local coal despite the defined target to utilize all economical and possible coal reserves..

Table 3- Commissioned capacity in 2016

Source	Capacity
Natural Gas	1691 MW
Imported Coal	1410 MW
Wind	1246 MW
Hydroelectric	789 MW
Solar	584 MW
Lignite Coal	430 MW
Geothermal	196 MW
Biomass	83 MW
Waste Heat	40 MW
TOTAL	6469 MW

(Source: TEİAŞ)

Regarding the *medium term* progress, it is clear that progress is not fully parallel to the strategy paper and the NREAP. From 2009 to 2015, characteristic of investments is showing similar results compared to commissioned capacity in 2016:

- 1- Hydro power capacity has been added by more than 11 000 MW. The capacity reached 25 868 MW in 2015. Compared to 14 553 MW capacity in 2009, the progress for hydro power seems in line with the strategy paper.
- 2- Despite newly added 3 172 MW of wind power capacity and 249 MW of solar power capacity, the progress seems far from the strategy document. On the other hand, geothermal capacity reached 624 MW which is more than the target given in the strategy paper and less in NREAP.

- 3- The strategy paper aimed to reduce electricity generation from natural gas to below 30% of total. In 2009, share of natural gas was 49% of total electricity production. This ratio has fallen to 38% by 2015 according to Energy Balance Tables. Such a reduction in 6 years seems to be a very good progress and makes the target to reduce the share below 30% by 2023 achievable. On the other hand, in this period from 2009 to 2015, natural gas power plants installed capacity half of the existing capacity and reached 24 900 MW by 2015.
- 4- Despite the local coal target, imported coal power plants have experienced a tremendous increase and electricity production from imported coal reached the level of local coal by 2015. The capacity of imported coal power plants has tripled between 2009 and 2015, while local coal power plant capacity remained almost the same.

Table 4 – Installed capacity comparison according to energy balance table.

Installed capacity by tech. in	2009	2015	Changes
	(MW)	(MW)	(MW)
Hydropower	14.553	25.868	11.314
Natural Gas	16.617	24.906	8.289
Imported Coal	2.256	6.690	4.434
Coal	8.245	8.832	587
Wind	792	4.503	3.712
Solar	0	249	249
Geothermal	77	624	547
Other Thermal	2.140	1.105	-1.035
Other Renewables	82	370	289
Total	44.761	73.147	28.385 MW
Share of RES in electricity production	20%	32%	

As seen from the table, the target for hydro power and geothermal has been achieved. For natural gas and imported coal, the development seems beyond strategy. On the other hand, RES-E related targets are partially successful. As of 2015, 58% of expected capacity for hydropower has been reached. For geothermal, the capacity has already reached the target defined in the strategy paper and more than half of the target defined in NREAP. On the other hand, targeted capacity for wind energy seems impossible to reach by 2023. For solar, NREAP defined 5 000 MW capacity for 2023, but until 2015 only 5% of these capacity has installed.

Table 5- RES-E Progress Table

	2009-2015	2009-2023	Progress
Hydropower	11.314 MW	19.447 MW	58%
Wind	3.712 MW	19.208 MW	19%
Solar	249 MW	5.000 MW*	5%
Geothermal	547 MW	923 MW*	59%

(*) Compared to targets defined in NREAP.

(Source Data: DGEA)

In addition to legislative developments, Turkey has defined targets related to RES-E. But these targets are not reflected in the implementation of the policies. Some of the defined targets seem to be impossible to reach by 2023. For hydro power, defined targets are likely to be achieved. For geothermal, the share of renewables in electricity production has already achieved. For solar and wind, targets require extra afford.

It is clear that the absence of mandatory renewable targets based on legislation, lack of monitoring mechanism and year by year has a role for the underperformance in the capacity deployment. The given indicative targets published by the Government are not creating full-compliance in the implementation.

Policy Assessment

Turkey formed legislative structure, defined targets and structured institutions that has different responsibilities. Apart from available infrastructure, the progress is not fully in line with the strategy paper and the NREAP. Compared to the strategy paper and plan, covered targets shows strong side of the current model, whereas, the gap between targets and progress shows weakness. According to analyses provided above and described institutions, legislation and policies specific needs for the cooperation can be classified as below:

- 1- **Implementation of RES-E targets:** Despite existing infrastructure, there has been a need a year-by-year plan for the implementation of RES-E targets. After the strategy paper, such a study did not come to agenda for a long time till 2014. Consequently, the progress is not fully in line with the strategy document, whereas this is not applicable for NREAP. NREAP described measures up to one level and defined year by year installed capacity & electricity production. Despite NREAP is not as strong as the strategy paper, such a road map created clear progress. Comparing to targets for 2016, the progress seems in line with NREAP. Although wind sector is a bit behind the target, solar has completely similar capacity due to 820 MW of small scale license free capacity. It is obviously clear that NREAP type of documents has created difference.

Table 6 – Comparison of targets for 2016 in NREAP and progress.

	2016 target (MW)	Installed Capacity by 2016
Hydropower	27 145	26 681 (*)
Wind	7 604	5 751
Solar	800	832,5 (**)
Geothermal	485	821
Biomass	530	467 (***)

(*): 7122,5 MW of the capacity is river type.

(**): Only 12,5 MW of the capacity is licensed projects.

(***): Includes Biogas and waste heat

- 2- **Monitoring & Reporting:** Up to now, there is no RES-E policies/targets monitoring report prepared yet, although NREAP address DGRE¹⁶. Under normal condition, yearly/biannual-monitoring report would be prepared and reviewed in order to reach targets. In Turkish case, follow up of the progress is not applicable and monitoring report is not available.
- 3- **Policy Enforcement:** Depending on progress and policy, including road map, action plans etc, there is need for an institution that has capacity/ability to

16 NREAP Page 72: “Turkey will endeavour to establish a complete and reliable monitoring system, including indicators for individual measures and instruments. Following up on the developments in the energy sector and associated statistics are the responsibility of the GDRE.”

manage other institutions in line with RES-E target. Depending on gaps between target and progress, such an institution should have a power to revise the plan, define new actions and coordinate other bodies. In Turkish context, it is clear that there is a need of body (in this case MENR or other institutions assigned by the ministry) that can enforce policies according to monitoring reports and other policy documents. .

- 4- **Policy Planning:** Long term action planning includes implementing action in line with targets, legislation and follow up of all off these. EMRA announced license application for wind limited to one day in 1st of November 2007. Record number of application was received and around 78 000 MW of project applied. In 2013, 6 years later, Tender Regulation on pre-License Application for Wind and Solar Generation issued by EMRA. In April 2015, for the 3 000 MW of wind power connection, around 40 000 MW of license application collected according to the Tender Regulation. Despite nearly 120 thousands MW of total project application, Turkey has 5882 MW of installed wind capacity as of March 2017. This shows necessity of planning that includes preparing road map, adopting proper legislation and following related legislation. Otherwise, the country would have more than enough project stock but limited investment with partially applicable law.
- 5- **Supporting RES-E:** Which structure can support interest of RES-E? The Tender Regulation is only applicable for the wind and the solar which is reducing competition, creating barrier due to grid integration problem. On the other hand, hydro power plan and fossil fuel investments received license without any tender or other grid connection problems. Due to grid connection problem, which is recognized technically and politically, can not be solved up to now, since the progress is insufficient. It is clear that RE-E should be institutionally supported against traditionally available source of electricity.

Consequently, Turkey made important progress parallel to target documents especially NREAP. For the gaps, it is clear that monitoring and reporting progress is required. Depending on such studies, it is possible to prepare recovery plan and than it is possible to enforce further policies. Apart from plans, further policy plans would also strengthen current structure. Up to know, Turkey received incredible amount of wind and solar¹⁷ project application but the policy can not proceed such a demand. It is obvious that the gap between the market and legislation is an important issue. It is also obviously that compared to conventional energy sources, some RES-E sectors need supports.

¹⁷ MENR invited companies for 600 MW of available capacity for solar in 2013. For the tender, around 430 companies applied for the total 9000 MW of installed capacity. Up to know, only 13 MW of these projects are in operation.

Cooperation Areas

Turkey has an emerging RES-E market especially in the field of wind, solar, biomass and geothermal. Hydropower has a long story coming from the past compared to other RES-E solutions. With an economical potential and projected capacity, developments would create stronger market and attracts more investments. As a neighboring country of EU, Turkey has a potential to enlarge RES-E market in terms of electricity, supplies and services.

Apart from this perspective, cooperation areas can be classified as below:

1- Policy Level : Under the EU acquis, Member States have to fulfill a number of reporting duties, specified under Art. 4 (National Action Plans), 22 (Biannual Progress Reports) & 23 (Monitoring and Reporting by the European Commission based on member state input) of the Renewable Directive, that includes the statistics on renewable shares & scope of support, policy implementation reviews and actions plans in case progress on target achievement is off-trajectory. On the other hand, The reporting duties are part of a monitoring system by the European Commission that establishes an overview over renewable energy use & policy in the Member States, aimed at ensuring progress on target achievement. Policy level cooperation in the field of legislation, learning/exchanging EU experience would create capacity as well as increase adaptation to EU system.

2- Institutional Level : It is clear that integration of RES-E as well as policies are common questions that whole countries have been experiencing. The answer to these questions are given by countries depending on perspective of governance. These institutions would be independent, partly independent or fully dependent which is directly related to function of these institutions. Under such diversified institutional function and experience of EU, institutional level cooperation and exchange of experience would be an opportunity for both sides. On the other hand, cooperation between Turkish institutions is another area that should be analyzed. In the field of RES-E, there might be Renewable Energy Coordination Board like Turkey has in the field of EE.

3- Participatory Level: For better and efficient renewable energy policy implementation, structuring market and institutional relations among state institutes, business and public is an important area that needs to be strengthened. Participation of whole stakeholders is crucial for the better performance of the market. Turkey has very good example in the field of energy efficiency (EE). Energy Efficiency Coordination Board (EECB) was established under the 2007 EE Law to coordinate various EE policies, programs and other efforts The EECB's main functions are to: (i) prepare national EE strategies, plans and programs, assess their effectiveness and

revise/implement as necessary; (ii) steer EE studies and approve authorization of certificates for EE service; (iii) approve EE projects eligible for government incentive schemes and monitor results; (iv) establish ad hoc commissions as needed; (v) set meeting agenda and participants for advisory committee meetings; and (vi) establish and publish fees for certificates each year. For a strong and sustainable development of RES-E sector, Turkey could be inspired from EECB model and form Renewable Energy Coordination Board.

4- Transmission Level: As seen from the progress of the strategy paper and developments, Turkey needs alternative technics and policies when the issue comes to access of RES-E to the grid. Grid integration is a technical problem which has some economical result and consequently requires better policies. On the other hand, In 2015, TEİAŞ and the European Network of Transmission System Operators (ENTSO-E) signed¹⁸ long-term agreement on synchronization. Next year, Teiaş joined ENTSO-E as an observer organization¹⁹. Through interconnection with Greece and Bulgaria Turkey can import 550 megawatts of electricity and export 400 megawatts according to agreement between TEİAŞ & ENTSO-E. Developing grid connection of renewable energies with strengthened link to ENTSO-E means exchange of more RES-E and support de-carbonization of EU electricity system.

5-Product, Supply & Service Level : In parallel to RES-E targets, Turkey has a priority of local production of renewable energy system products and supplies. On other hand, Turkey and EU are trade partners with high level of import and export of the goods, supply equipment's and transfer of services. It is clear that international companies can not neglect renewable energy potential of Turkish market. It is also clear that adequate level of legislation with proper plans and ambiguous target would definitely increase motivation of investors and reduce cost of risks as well. For the products, supplies and services, there are options such as localization of production, implementation of economic corporations and transfer of renewable energy technologies are important cooperation areas. Companies can form different level of partnership that answers market questions formed by other cooperation and legislation.

18 ENTSO-E, <https://goo.gl/8E4TsC>

19 ENTSO-E, <https://goo.gl/XTibyB>

It is obvious that, exchanging policies and creating institutional partnership are important cooperation areas. From economic point of view, further cooperation's in transmission relate issues and RES-E product-supply-services areas are key issues for the companies. For the further progress in the field of RES_E sector, institutional level cooperation would be analyzed and cooperation opportunities for the Turkish and international companies would be defined.

Cooperation in EU Directives :

The Renewable Directive of EU Article 6, 7, 8 and 11 establish legal options for Member States to cooperate on renewable policy with each other, Article 9 and 10 to cooperate with third countries. As described in the Regulatory Impact Assessment Report²⁰, as a non-member state, Turkey can only participate in cooperation mechanisms under Art. 9 and 10 which means cooperation in electricity sector in the form of joint projects. Therefore, EU and Turkey would develop joint projects and harness outputs according to cooperation model.

20 WB, Deloitte, MENR, August 2016, *Consulting Services for: Acquis Alignment & Institutional Capacity of MENR, Unbundling Support for BOTAS and Visibility & Public Awareness, Regulatory Impact Assessment Report – Second Version*