



TÜRKİYE RÜZGAR ENERJİSİ BİRLİĞİ  
TURKISH WIND ENERGY ASSOCIATION

# Wind Business in Turkey

## An outlook for investors





# Preface

Dear wind energy investors,

As Turkish Wind Energy Association (TWEA), we are pleased to share an outlook of investment climate in Turkey for wind energy investments. Turkey at the moment is the most prominent wind market in Europe with a 11 GW of project stock and with a national target of 20 GW wind power capacity by 2023. With this brief report, we aim to provide an idea of this large size market which provides excellent investment opportunities for wind investors.

Turkey is one of the fastest growing markets, with 9.2% and 8.5% growth rate in 2010 and 2011 respectively. Electricity sector is growing steadily with economic growth and population: Despite the global financial crisis that affected Turkey as well in 2008 and 2009, the CAGR for the eleven year period 2000-2011 is 5.43%, and 6.07% for the last six years, 2005-2011. Comparing the per capita consumption with the European countries, there is even more room for consumption growth beyond the growth rate of the economy.



Turkish Wind Energy Association (TWEA)  
**Mustafa Serdar Ataseven**  
Chairman

Turkish electricity market has been encountering a transformation period, evolving from a fully state owned structure to a fully liberalized market. Regulatory framework is evolving to ensure this transition. Share of private sector in generation portfolio increased up to half of the portfolio and about to increase even more regarding the privatizations and more and more private investors investing in greenfield generation facilities. Renewables are at the center of private investors' interest, especially wind power plants.



Turkey supports renewables with feed-in tariff mechanism and numerous other material and non-material support schemes.

In this report, we aim to provide the readers with a summary of these incentives. Electricity generated in renewable power plants are tradable in the market, through bilateral agreements and through feed-in tariff.

Upcoming new market structures such as over the counter markets and intra day market will complement the existing trading opportunities, which will further increase the attractiveness of Turkish market.

The existing wind power plant project stock requires over 10-12 billion investment in Turkish market for the next 4-5 years. This calls for the investments from international investors as well as locals. Therefore, we invite investors to take part in this lively market.

We would be glad if we attract the readers' attention to Turkish wind business and raise more questions regarding the wind investments in Turkey.

Turkish Wind Energy Association (TWEA)

**Mustafa Serdar Ataseven**

Chairman

# List of abbreviations

<b>BPM</b>	Balancing Power Market
<b>CAGR</b>	Compounded Annual Growth Rate
<b>CDM</b>	Clean Development Mechanism
<b>CER</b>	Certified Emission Reductions
<b>CPI</b>	Consumer Price Index
<b>EBRD</b>	European Bank for Reconstruction and Development
<b>EIA</b>	Environmental Impact Assessment
<b>EIU</b>	Economic Intelligence Unit
<b>EML</b>	Electricity Market Law
<b>EMRA</b>	Energy Market Regulatory Authority
<b>ENTSO-E</b>	European Network of Transmission System Operators for Electricity
<b>EMRA</b>	Energy Market Regulatory Authority
<b>EU</b>	European Union
<b>GDP</b>	Gross Domestic Product
<b>OECD</b>	Organization of Economic Co-Operation and Development
<b>ORKOY</b>	Forest Village Relations General Directorate
<b>R&amp;D</b>	Research and Development
<b>REL</b>	Renewable Energy Law
<b>RER</b>	Renewable Energy Resource
<b>RERC</b>	Renewable Energy Resource Certificate
<b>RER EIA</b>	RER Energy Imbalance
<b>SMP</b>	System Marginal Price
<b>S&amp;P</b>	Standard & Poors
<b>TEDAS</b>	Turkish Electricity Distribution Inc.
<b>TEIAS</b>	Turkish Electricity Transmission Corp.
<b>TETAS</b>	Turkish Electricity Trade and Contracting Corp.
<b>TSKB</b>	Industrial Development Bank of Turkey
<b>TTGV</b>	Turkey Technology Development Foundation
<b>VER</b>	Voluntary or Verified Emission Reduction
<b>WPP</b>	Wind Power Plant

# 0. Introduction

Considering Turkey's heavy dependence on imported hydrocarbons, its high wind potential, and the environmental benefits of renewable energy, a significant shift towards the development and use of local renewable energy generation and wind energy in particular, is increasingly likely. Factors affecting this evolution and determining the development of wind power potential include, in addition to a country's energy policy, its legislative framework, support mechanisms, supply/demand balance, carbon policy, grid connection capability and funding availability. This report aims to provide a brief overview of these factors in the Turkish context in order to understand the trends and potential for wind power development in the country.

The Report has four main sections:

- The first section outlines Turkey's current financial outlook, demand growth and supply development, in addition to the demand growth drivers and current market structure properties, which create trade opportunities for renewable investments.
- The second section provides an overview of Turkey's wind potential and capacity development.
- The third section is a detailed synopsis of the policy and regulatory environment of the renewable energy market, emissions and carbon policy, renewable energy targets, and wind capacity license applications. It also includes a comprehensive review of renewable energy support mechanisms, export opportunities, grid constraints for new renewable capacity expansion, and an overview of wind power plant equipment suppliers.
- The fourth section details current wind projects and other investment areas in the wind market.

# 1. Turkish electricity market development

The Turkish electricity market, is one of the most rapidly growing in the world, with an average of 6-9% annual growth (excluding 2008 and 2009 due to the effects of the global financial turmoil). Although the financial crisis that is harshly experienced all over the world has affected the Turkish economy significantly, the electricity sector in Turkey has not contracted as much as the rest of the economy during this period, and has showed signs of recovery since 2010.

Alongside this rapid growth, the Turkish electricity market has been undergoing a liberalization process since the early 2000s, which aims to transform the state owned electricity sector into a well-functioning liberal market.

## 1.1 Economic development in Turkey

Turkey's high rates of development and macroeconomic stability create an appropriate environment for new foreign investments. The Turkish economy - the 7th largest economy in Europe in 2010 with 738 bn USD<sup>1</sup> GDP - has been displaying a stable growth trend for the past decade, with a real GDP CAGR of ca. 6% between 2002 and 2010. Even during the troubled years of 2010 and 2011, the Turkish GDP achieved growth rates of 9.2% and 8.5%<sup>2</sup>, driven by structural reform, a young, growing and urbanizing population, and increased industrialization.

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1. Nominal GDP

2. Growth rate of 2010 as compared to 2009 and 2011 as compared to 2010 respectively



As a result of this stability and positive economic development, credit ratings for Turkey by credit-rating agencies such as Standard & Poors (S&P), Fitch and Moody's have been mostly stable or positive, unlike other countries of the Eurozone. S&P raised Turkey's local currency sovereign credit rating to investment grade (BBB-) in September 2011, while Fitch confirmed the foreign currency outlook at BB+. Moody's confirmed the sovereign debt rating at Ba2 both in November 2011 and March 2012, noting that the rating "reflects the resilience of the country's economy during the global financial crisis" and that "economic strength is moderate to high in the sovereign rating spectrum, the large scale of the economy and its diversification, plus its underlying dynamism, has pushed per capita incomes into levels well above peers and increased integration into the global economy is likely to maintain such growth in coming years".

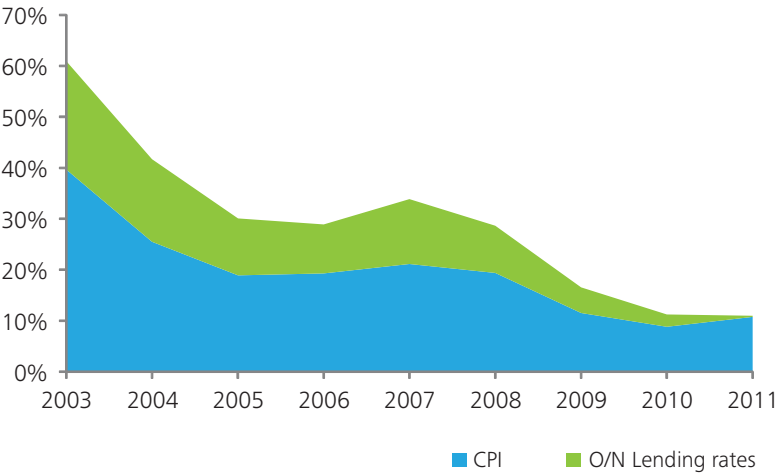
This is mostly the result of a reduced debt burden, the solidity of the financial sector and a healthy potential growth rate in Turkey. Operating on a tight leash and schooled through two major crises in 1999 and 2001, the well regulated and strong banking sector with high capitalization and no toxic asset issues has been helping the country stay out of the global collapse.

However, due to the continuing negative economic outlook in the Euro area, an inevitable slow-down is expected in 2012. The effect of a slow-down in growth rates is anticipated as minimal and Turkey is nonetheless expected to maintain its position as the fastest growing economy among European countries during this downturn.



As a result of this increasing stability and robust growth performance, inflation rates and the Central Bank overnight lending rates have fallen to single digits (as seen in Graph 1), thus closing the gap that represents theoretical sovereign political risk premium.

Graph 1. Overnight lending rate vs CPI



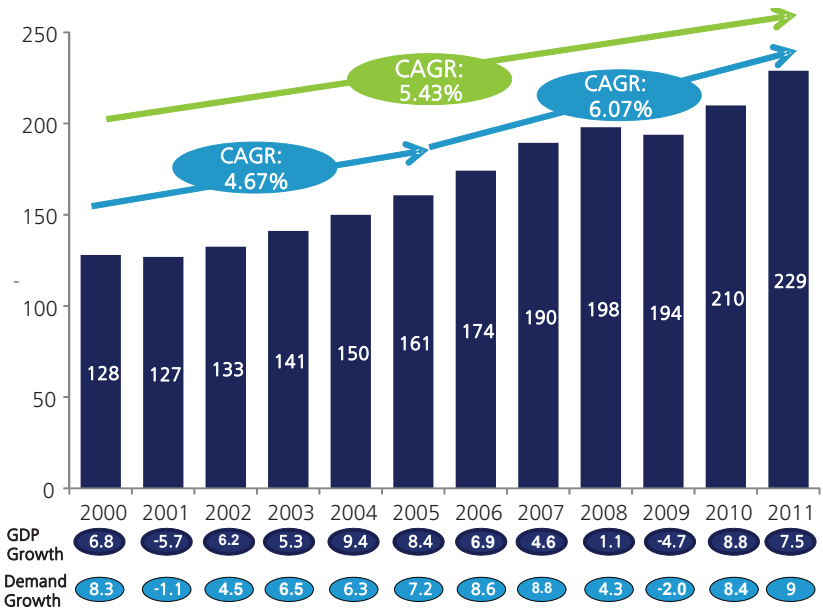
Source: Central Bank of Turkey

### 1.2 Electricity demand growth in Turkey and supply

In 2009, 194 TWh of electricity was supplied to the domestic market, corresponding to a 2.0% annual decrease from the 2008 figure of 198 TWh. The sector recovered after 2009 and according to the National Transmission Grid Operator (TEIAS) figures, electricity demand increased by ca.

9% and reached ca. 229 TWh in 2011. The CAGR for the eleven year period 2000-2011 is 5.43%, while for the last six years, 2005-2011, it is 6.07%, meaning electricity consumption growth rate is also increasing. This growth depends on economic developments and even exceeds GDP growth rates.

Graph 2. Gross electricity demand in Turkey, 2000 - 2011



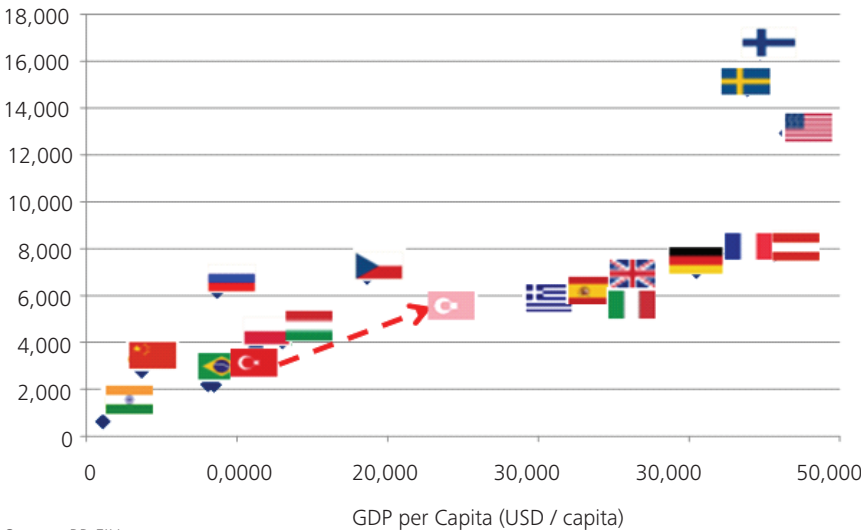
Source: TEIAS, TurkStat

\* 2011 GDP Growth is EIU forecasts

There is a clear relation between consumption per capita and GDP per capita, which reveals the development level of a nation. Analysis displaying consumption per capita versus GDP per capita reveals that Turkey has a high potential for development. GDP growth, together with population growth will change Turkey's relative position. Turkey's move to higher consumption / higher GDP positions is expected to be triggered by a growing population, rapid urbanization and strong economic growth. Gross consumption per capita of ca. 3,100 kWh was ca. 40% of OECD EU average in 2011, which signals great potential for further demand growth.

As for supply, installed capacity in Turkey has increased more than fivefold since 1984. Development of renewables has been rather slow in comparison to thermal and hydro capacity. Although the renewable energy share has been increasing steadily since 2006, it is still at 4% of total installed capacity, which is very low compared to the EU average of 14%.

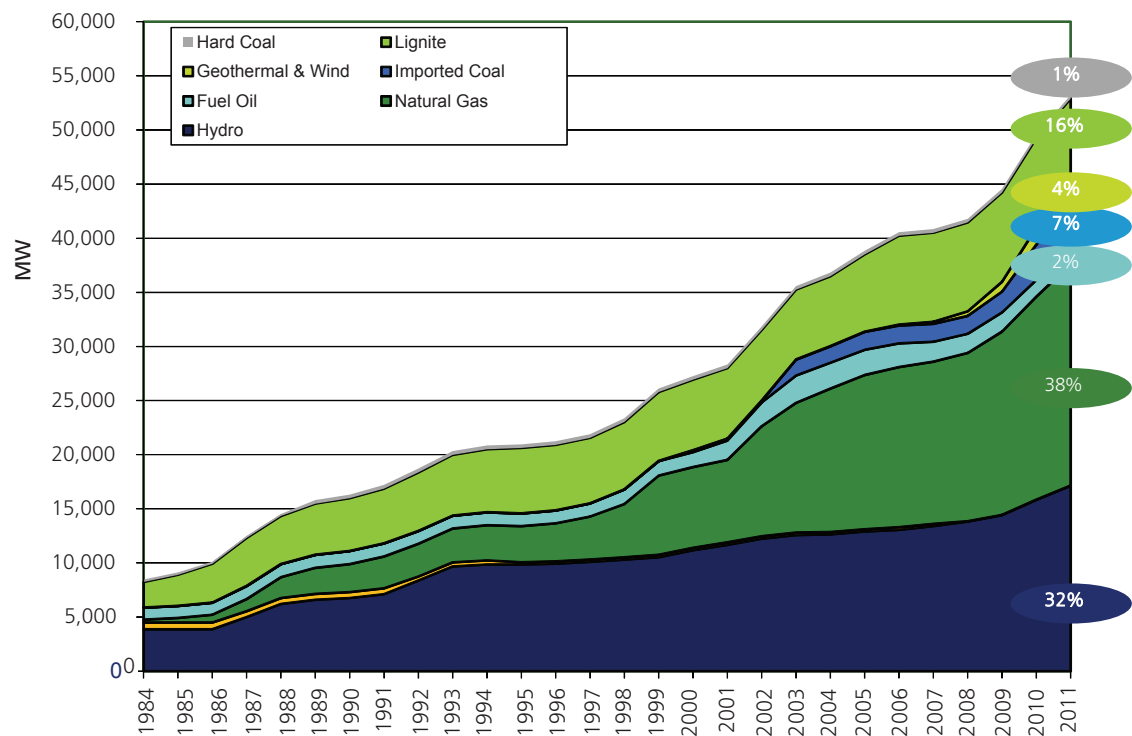
Graph 3. Electricity demand, GWh



Source: BP, EIU

The highest share of currently installed capacity in Turkey is thermal plants. As of December 2011, 38% of total installed capacity was natural gas, 16% lignite, 2% fuel oil, 8% imported and hard coal. The share of hydro capacity is 32%. Wind and geothermal represent 4% of total installed capacity.

Today, due to substantial renewable energy potential, recent developments in renewable energy legislation and electricity market liberalization, there is a suitable environment for renewable investments.



With extensive project stock, increasing interest of merchant players and ongoing liberalization process, supply figures in Turkish Electricity Market show unprecedented development rates but increased uncertainty on supply development expectations. Over the last two years, ca. 9 GW of new capacity was commissioned and ca. 12 GW of new licenses were issued in 2011.

### 1.3 Market structure

Turkish electricity market structure is composed of a bilateral contracts' market complemented by a balancing mechanism. The BSR (Balancing and Settlement Regulation) establishes the balancing and settlement regime which acts as a market where un-contracted generation can be bought and sold. The regulation enhances security of supply by facilitating participation of independent and small generators.

The balancing and settlement mechanism aims to enable the operation of a spot market that provides price signals to attract new investments. Along with the spot market, there is a newly established financial market for electricity derivatives.

In the short-medium term, the spot market and financial market will be complemented with the intra-day market where electricity will be traded until one hour prior to the physical delivery of the electrical energy. This is especially good news for WPPs, as the confidence level of daily generation forecasts will be higher than the day-ahead forecasts. Furthermore, with the introduction of the over-the-counter market in the short-medium term, bilateral agreements will be easier to make, which in turn enhances the trading alternatives for WPPs. Both intra-day and over-the-counter markets are formally on the government's agenda.

## 2. Current WPP capacity and wind potential

Turkey is increasingly putting emphasis on renewable energy sources as a means to improve its energy security and decrease its dependence on imports. The growth rate for wind power projects has been impressive in recent years. The country's high wind potential makes it a very attractive location for new wind investments.

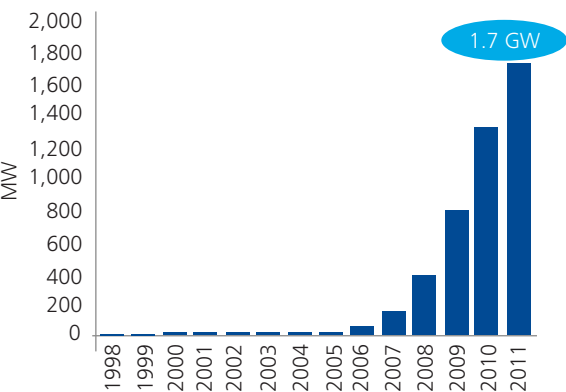


2.1 Current WPPs in Turkey

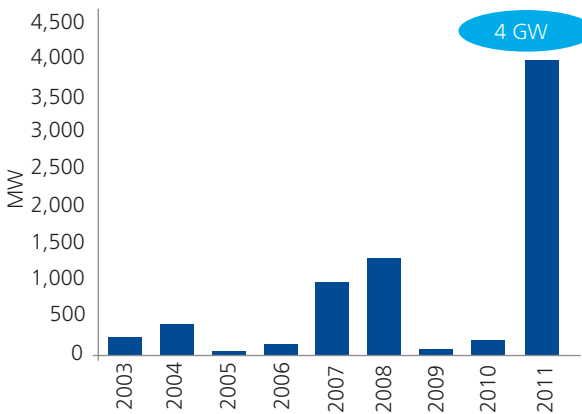
Today, total installed capacity in Turkey is above 53 GW. Total wind power installed capacity represents only 3% of the total capacity, at just above 1.7 GW. Driven by the government goals defined for wind energy and by the desire of investors to convert potential wind energy resources in Turkey into business opportunities, it is generally assumed that the installed wind power capacity will continue to increase rapidly. In 2011, generation licenses representing around 4 GW of wind capacity were granted by EMRA. Considering the pending license applications currently under evaluation, this capacity is expected to increase significantly.

Graph 5. Wind capacity development

Existing wind capacity development (1998-2011)



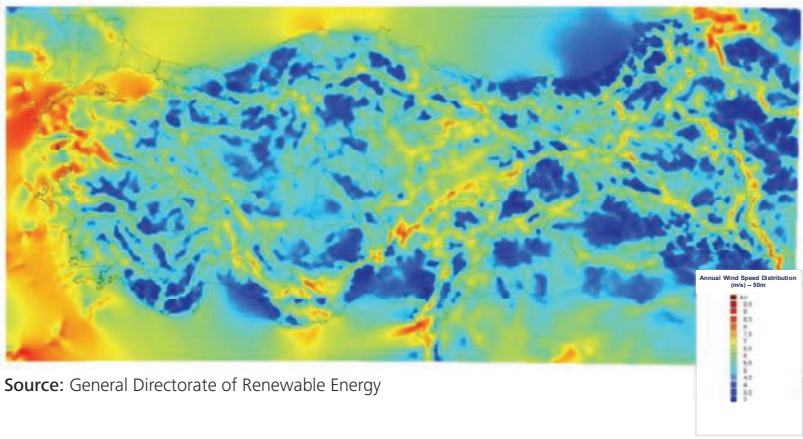
Licensed wind capacity expansion (2003-2011)



Source: TEIAS

The techno-economic wind potential of Turkey is 48 GW, according to General Directorate of Renewable Energy. The locations with highest potential, according to analyses of air streams related to pressure variations, are in the Aegean, Marmara, and Eastern Mediterranean.

Graph 6. Turkish wind atlas



Source: General Directorate of Renewable Energy

Graph 7. Turkey potential wind resources (50 m)

Wind Speed (m/s)	Wind Power Density (W/m2)	Usable Area (km²)	Techno-economical Potential (MW)
7.0 – 7.5	400 – 500	5,852	29,259
7.5 – 8.0	500 – 600	2,599	12,994
8.0 – 9.0	600 – 800	1,080	5,400
> 9.0	> 800	39	196
Total	9,570	47,849	

Source: General Directorate of Renewable Energy



### 3. A new era for WPPs in Turkey

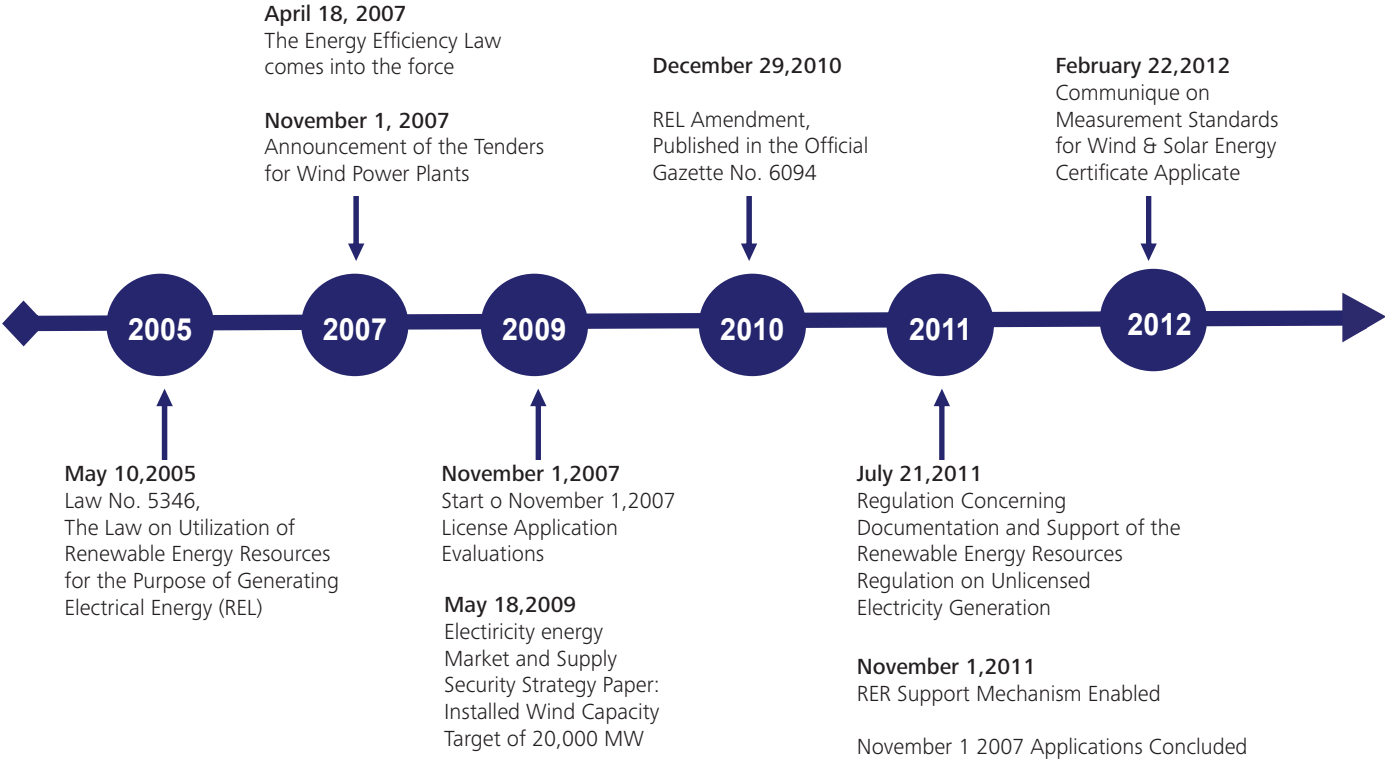
Turkey is a new player in the renewable energy sector but it has been on a fast track in the last decade. Goals for 2015, as specified in the 2010-2014 Strategic Plan from the Ministry of Energy and Natural Resources, indicate 10 GW of installed WPP capacity. The Electricity Energy Supply and Security Strategy Paper (aka Supply Security Strategy Paper or Strategy Paper) includes more comprehensive goals and provides ambitious targets as well, with a share of renewables in the electricity generation portfolio aiming for 30%. Furthermore, this strategy paper sets the WPP capacity target as high as 20 GW by 2023. These targets represent a new era for WPPs in Turkey.

#### 3.1 Renewable energy regulatory environment

The most significant milestone for renewable energy policy in Turkey is the Law No 5346 regarding Renewable Energy Resources for the Generation of Electric Energy (Renewable Energy Law -REL), dated 10 May 2005. This law aimed to increase the usage of renewable energy resources for electricity generation, utilize these resources in a safe, economically efficient and high quality way, decrease emissions, preserve nature and improve related industries. Accordingly, WPPs qualify for Renewable Energy Resources Certificates (RERC) which enables them to benefit from a feed-in tariff support mechanism (the Renewable Energy Support Mechanism).



Graph 8. Renewable energy market milestones



Source: Deloitte Analysis

Other legislation, including but not limited to Law No 5627 on Energy Efficiency and Law No 5788 for some amendments on the Electricity Market Law, also mention renewable energy resources. An updated version of the Renewable Energy Law was published on 29 December 2010, defining new feed-in tariff levels for different resources and a new concept: the local equipment bonus, further detailed in the upcoming sections. Accordingly, WPPs are entitled to a feed-in tariff level of 7.3 USD cent/kWh, which is roughly the same as the tariff defined in the original version of the Renewable Energy Law.

### 3.2 Trading alternatives

Trading opportunities for WPP's are not limited to sales to the Market Operator as part of the Renewable Energy Support Mechanism. Other sales options include:

- Sales to supplier companies, State Owned Wholesale Company (TETAS) or to eligible consumers through bilateral agreements;
- Sales to the Market Operator as part of their day-ahead planning/market operations; Given that enrollment in the Renewable Energy Support Mechanism is optional and has a duration of one year, WPP investors need to decide whether to enrol in the support mechanism or not. Deciding on which trading alternative to choose depends on several factors including price levels, revenue expectation and evaluation of risks.

Graph 9. Trading opportunities for renewable investor

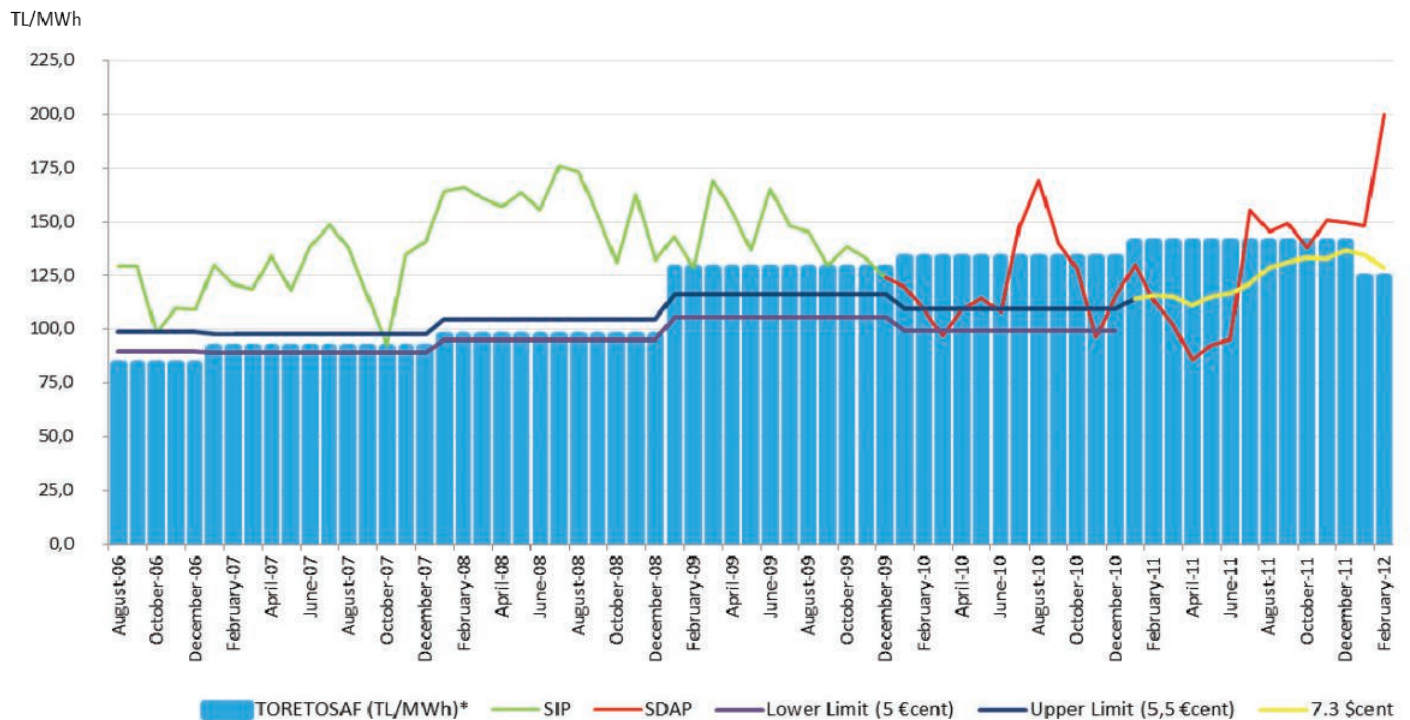
	Organized markets Day ahead market	Bilateral contracts - Wholesale companies - Distribution companies - Eligible customers	Feed-in tariff Within the context of RER Support Mechanism to suppliers via MFSC
Price Risk	<b>High:</b> Exposed to hourly and seasonal price fluctuations.	<b>Medium:</b> Price is subject to negotiations. Possibility of hedging middle/long term price is the market price.	<b>None:</b> Constant price linked to USD.
Sales (amount) Risk	<b>None:</b> Can sell the whole proposed amount since proposal is price independent.	<b>Low:</b> Amount is also subject to negotiations. There is always the possibility of selling the unsold amount of bilateral contracts in day-ahead market.	<b>None:</b> Can sell all generation amount.
Revenue Expectation (*)	<b>High variability:</b> Variable due to price fluctuations and imbalance cost.	<b>Low/middle variability:</b> Possibility of guaranteeing a certain amount of revenue with middle/long term contracts.	<b>Constant:</b> No surprises in revenue expectations due to constant price. Imbalance cost is not on RES investor.

Source: EMRA, TEIAS, Central Bank of Turkey  
\* In case of a comparison for the same generation amount

With the exception of a few months when impacts of financial crisis and hydrology were felt in the market, market price levels have been higher than the feed-in tariff level of 5.5 Eurocent/kWh -the level valid from May 2005 until the moment the amended Renewable Energy Law came into force

in December 2010, when the law was revised to include different feed in tariff levels for different renewable technologies. The new feed-in tariff at 7.3 USD cent/kWh defined in the revised law is still lower than the market price on average.

Graph 10. Price development



Source: EMRA

\*Upper limit of Feed-in tariff, with the lower limit being 5.0 Eurocent/kWh

### 3.3 Emissions and carbon policy

Turkey approved the Kyoto Protocol on Global Warming on July 02, 2008 and the Turkish President ratified the Law concerning Turkey's accession to the Kyoto Protocol on February 16, 2009. Pursuant to Decision 26/CP.7 of COP7 (Conference of the Parties – 7) in 2001, Turkey is listed in Annex-I of the protocol in a unique position with special circumstances. Although an Annex I country, Turkey bears no emission reduction obligation for the moment based on the fact that it is still defined as a developing country. Whether Turkey should have a formal and binding emission reduction target in the medium-long term is a controversial issue. Nonetheless, Turkey has been engaging in voluntary emission reduction activities, and a carbon market is expected to be established in the medium term.

#### Voluntary or verified emission reductions (VERs) in Turkey

Since Turkey does not have formal reductions obligations within the framework of the Kyoto Protocol, certified emission reductions (CERs) under the Clean Development Mechanism (CDM) of the Kyoto Protocol are not applicable for the time being. However, an opportunity for additional revenue generation for renewable power projects exists in Turkey through voluntary or verified emission reduction credits (VERs).

Renewable energy generation companies have the opportunity to receive and sell VER certificates on the voluntary emission market from which they can obtain additional income.

### 3.4 WPP License applications

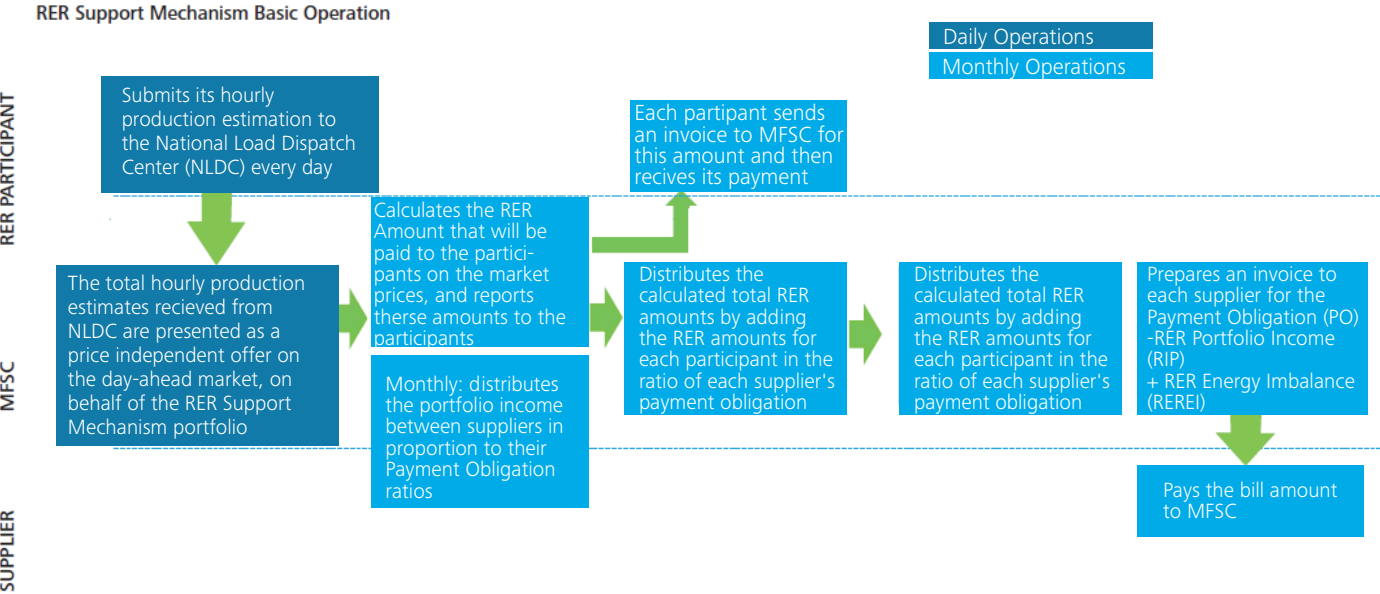
For the wind energy, the Energy Market Regulatory Authority (EMRA) who is in charge of, issuing licenses; accepts license applications only on specified dates and in a discrete manner. In other words, license applications are not continuous and EMRA takes applications according to Government strategy. The last time license applications were accepted was on 1 November 2007 and a mass of 751 license applications which initially were as high as 78 GW. Although this figure is then reduced down to around 35 GW as many applicants revised their application in accordance with the updated grid connection capacities announced by TEIAS, it still depicts a considerable interest in WPP investments. More than half of these applications competed for grid connection for substations in overlapping or intersecting areas on the basis of contribution fees payable to TEIAS. These contribution fees range from 0.01 krs/kWh to 6.52 krs/kWh for 20 years. This is a depiction of how WPP investors see opportunity in this business.

### 3.5 Renewable support mechanism and incentives available for WPPs

According to the Renewable Energy Law, legal entities that hold generation licenses for facilities that generate energy using renewable resources are entitled to “Renewable Energy Resource Certificates” (RER Certificates). These certificates enable them to enroll for the renewable energy support mechanism as defined in the Law. Enrollment in the support mechanism is voluntary and valid for one year.

WPPs operators who wish to benefit from the mechanism must first apply to the EMRA in order to receive a RER Certificate. This RER Certificate indicates a WPP commissioning date and its annual electricity generation capacity. Participation in the mechanism is on an annual basis. To take part, applications for RER Certificates must be submitted to the EMRA by October 31 of the previous year. Each year, the plants that will be included in the mechanism for the following year are announced by EMRA on November 30.

Graph 11. RER Support mechanism



Source: Deloitte Analysis



Some of the additional incentives regulated in the Renewable Energy Law and other legislation can be summarized as below:

- If mechanical or electronic equipment used in generation facilities, commissioned before 31 December 2015 and subject to the RER Support Mechanism, are manufactured in Turkey, then a local equipment bonus will be added to the feed-in tariff relevant to this renewable energy source. The bonus amounts, based on the type of the plant and the equipment used, will be added to the feed-in tariff figures.
- For plants subject to the RER Support Mechanism that became active or that will become active between 18 April 2005 and 31 December 2015, the projected feed-in tariff for the use of wind power based generation facilities for the next 10 years are in the graph 12.
- The Ministry of the Environment and Urban Planning, The Ministry of Forestry and Hydraulics Works or the Ministry of Finance can, upon payment of a fee, allow, rent or give the right to use any kinds of immovable properties accepted as forest lands, owned by the Treasury or controlled by the government for facilities, transportation roads and network connection points in order to enable the generation of electricity from renewable resources.
- For RER Certified WPPs that will become active before 31 December 2015 or that are currently active, an 85% discount will be applied to any permit, rent, servitude or right of use fees for energy transmission lines, including the ones that will be transferred to TEIAS and distribution companies, between transportation roads and system connection points as defined in their licenses for the first ten years of their investment and operating period. Moreover, Forest Village Relations General Directorate (ORKOY) and forestation payments will not be required from these facilities for forest areas.

- Upon receiving a permit from the related Ministry for any national park, natural parks, natural monuments, nature protection sites, protected forests, wild life development fields and special environment protection zones, or upon receiving a permit from the related regional protection council for any natural protected areas, the establishment of facilities for the WPPs are permitted.

Graph 12. Feed-in-tariffs for wind power based generation facilities

Maximum price including the local equipment bonus (USD cent / kWh)	
Feed-in-tariff	7.3
Equipment bonus	3.7
1- Blade	0.8
2- Generator and power electronics	1.0
3- Turbine tower	0.6
4- All of the mechanical equipment in rotor and nacelle groups (excluding payments made for the wing group and the generator and power electronics)	1.3
<b>Total</b>	<b>11.0</b>

Source: EMRA

- For RER certified WPPs, the 1% Treasury share that is usually taken as specified by Additional Article 2 of the 29 June 2001 Law No. 4706 on Making Amendments to the Law on the Valuation of Immovable Properties Belonging to the Treasury and Value Added Tax will not be collected.
- WPPs having an installed power of less than 500 kW have the opportunity to benefit from the above mentioned feed-in tariff for ten years for all electrical energy generated that exceeds their needs and thus is given to the distribution system. For all facilities that are not obliged to establish a company or to take a license as specified under the Electricity Market Law, it is obligatory that all electrical energy that these

facilities give to the distribution system be purchased by a Distribution Company which holds a retail distribution license. The Regulation on the Unlicensed Electricity Generation on the Electricity Market has entered into force through publication in the Official Gazette dated July 21, 2011 and No 28001.

The Regulation states that real and legal persons fulfilling certain minimum legal requirements are exempt from the requirement of obtaining a license and establishing a company in order to generate electricity. According to this regulation, real and legal persons who will generate electricity from WPPs with a maximum installed power of 500 kW can benefit from this mechanism.



Under the Law No 26510 on Energy Efficiency dated 02 May 2007:

- It is intended that R&D and investment incentives will be provided.

Under the Regulation No. 24836 on Electricity Market Licenses dated 04 August 2002, which is still valid with the amendment issued in the Official Gazette No. 27418 dated 26 November 2009:

- Over a calendar year, plant owners may purchase electrical energy from private sector wholesale companies up to any amount that will not exceed their estimated average annual generation.
  - During the first 8 years following the commissioning of a facility, the plant owners are exempted from their annual license fee.
  - They have the right to be exempted from 99% of the license application fee.
  - TEIAS and/or distribution license holders give priority to local renewable energy resource based power generation facilities in terms of system connections.
- For all electrical energy purchases by legal entities holding a retail sales license for sales on to final consumers, these entities are obliged to make their purchases primarily from renewable energy resource based power generation facilities whenever any such facility has a sales prices lower than or equal to the sales price of TETAS and when there is no cheaper alternative.
  - WPPs lower than 10 MW capacity are exempt from EIA report liability



3.6 Export opportunities

Currently Turkey has interconnections with Greece, Bulgaria, Georgia, Armenia, Iran, Iraq, and Syria; however, so far import and export figures are almost negligible in comparison to Turkey’s overall electricity demand. Eventually, ENTSO-E synchronization will increase the amount traded. In 2010, Turkey imported 1,883 GWh and exported 2,674 GWh of electricity. The map below illustrates the existing interconnection capacities and the table indicates seasonal capacities.



Graph 13. Existing interconnection capacities

Country	Connection	Type	Summer capacity (MVA)	Spring / Autumn capacity (MVA)	Thermal capacity (MW)	Synchronous parallel interconnection
Bulgaria	Babaeski - Maritssa East	2B, Rail	832	1360	995	500
Bulgaria	Hamitabat - Maritssa East	3B, Cardinal	1,268	2,070	1,510	
Georgia	Hopa - Batum	Rail	240	393	287	
Armenia	Kars - Gumri	2B, Cardinal	480	786	574	
Azerbaijan	Iğdır - Babek	Hawk	110	180	132	
Iran	Doğubayazıt - Bazargan	Cardinal	171	280	204	
Azerbaijan	Başkale - Khoy	3B, Cardinal	488	796	581	
Iraq	PS3 - Zakho	2B, Cardinal	342	560	408	
Syria	Birecik - Aleppo	2B, Cardinal	845	1,360	1,005	
Greece	Babaeski - Filippi	3B, Cardinal	1,268	2,070	1,510	500
Georgia	Borçka - Alket	Under construction			1,000	

Source: TEIAS

Transmission operators in Turkey, Bulgaria and Greece have recently begun an auctioning process for capacity trading. It is expected that opportunities for exporting electricity produced in WPPs in Turkey will be important for the EU countries, as it is possible for imported electricity produced from renewable energy sources outside the Community to count towards Member States' targets. This means that according to the Renewable Energy Directive of European Commission, either electricity produced in qualified WPPs in Turkey or investing in qualified WPP projects in Turkey will be a means of fulfilling the country targets. With the availability and possibility of further expansion of cross border transmission capacity, this opportunity is expected to be utilized further in the coming years.

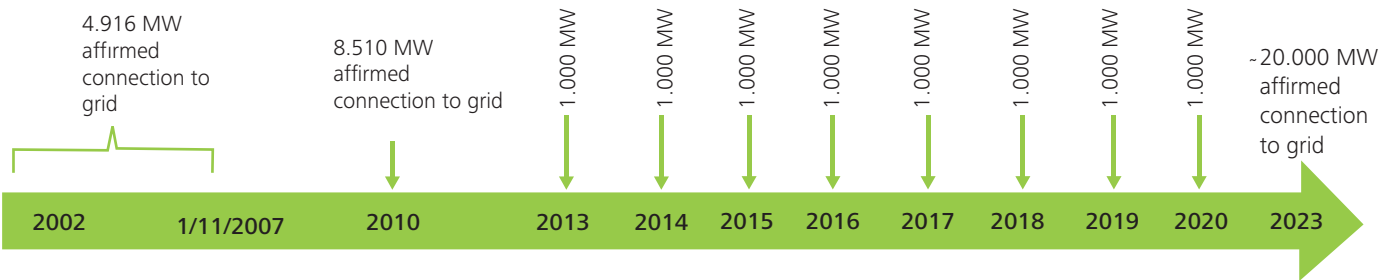
### 3.7 Grid constraints

Grid connection has been the primary bottleneck for WPPs since the potential investments in WPPs started to increase in 2007. Grid connection, by definition, is under the responsibility of TEIAS. There is a possibility for an investor to plan and invest in the grid connection and the relevant infrastructure of a plant directly, and get the costs reimbursed by deducting them from the transmission system use charges to be paid to TEIAS over 10 years. However, investors generally do not employ this approach given the high cost of grid connection.



Until now, TEIAS has confirmed connection of around 12.5 GW WPPs. TEIAS announced investments in transmission infrastructure and thus will be able to deliver 1 GW each year starting from 2013 until 2020. All in all, TEIAS has declared that the grid connection will be able to support the “20 GW WPP by 2023” target of Supply Security Strategy Paper.

Graph 14. Affirmation of WPP grid connection, as planned by TEIAS



Around 1.000 - 1.200 MW affirmed connection then dropped by EMRA Board Decision

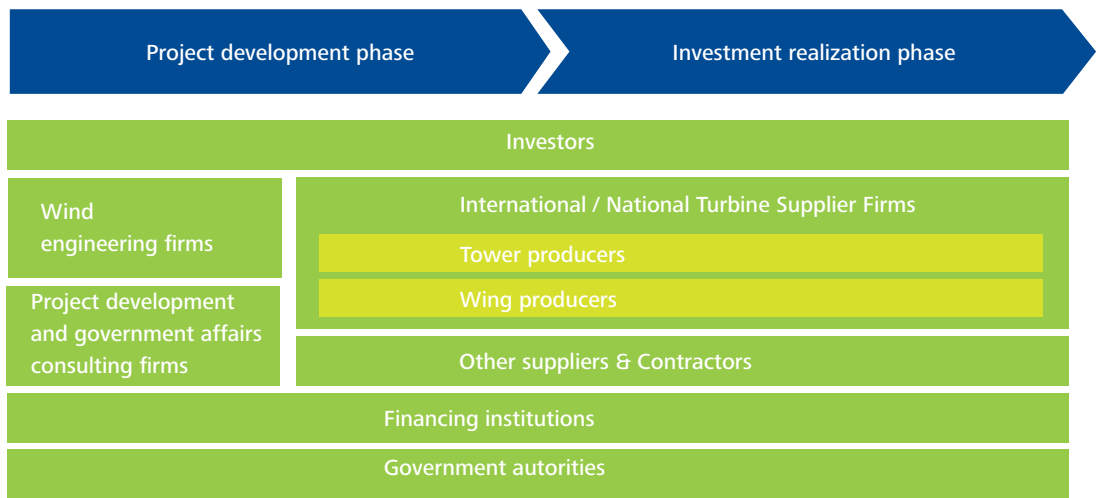
Source: TEIAS



3.8 Investment process

The overall investment process is composed of two phases: the project development phase and investment realization phase. In the project development phase; investors, technical consulting firms, financial institutions and Government Authorities are the key stakeholders. Potential investors begin to make contact with wind turbine firms, tower and wing producers and other suppliers and contractors during that same phase.

Graph 15. Wind turbine sector value chain



Source: Deloitte Analysis

A quick look into the investment process and the relevant components of the value chain active in the process, gives a good insight on the big picture:

#### **Investors**

Obviously, investors are the main drivers in the value chain. Currently, there are both national and international investors in WPP investments, in various phases of investment.

#### **Wind engineering firms**

Wind measurements are important both in pre-license phase and in M&A's of existing projects in early phase. There are many wind engineering firms active in Turkey and currently, there is a remarkable competition between the local and international engineering firms.

#### **Project development and government affairs consulting firms**

The complexity of wind investments forces potential investors to work with Project Development and Government Affairs Consulting Firms. Careful development of these projects is crucial and detailed feasibility studies of the projects are therefore important today, especially considering the competition for access to funds.

#### **Government authorities**

The licensing application process requires a lot of paperwork. Licensing is possible only if TEIAS confirms grid connection and agrees to the duration of construction. After this first step, some requirements must be fulfilled by the potential investor firms. Once the license is issued, a potential investor must construct the WPP on time. EMRA is the responsible Government Authority to control the construction duration.

# 4. Investing opportunities

## 4.1 Current project stock

Turkey is one of the fastest growing countries in terms of WPP capacity and is the biggest wind market in Europe with licensed WPP projects of over 11 GW. Currently there are several wind projects in various stages of project development. This stock presents a considerable opportunity for investors seeking investments in brownfield or greenfield WPP projects.

Investors who prefer to develop their own WPP project will need to wait until EMRA starts taking new applications. There will certainly be at least one more mass application collection by EMRA, after completion of the process of licensing existing WPP stock for which grid connection is confirmed.

Availability of the local equipment bonus presents another investment opportunity: production of WPP components in Turkey. Investing in equipment manufacturing in Turkey means both benefiting from a growing market in the country and, thanks to its unique geography, gaining access to considerable untouched markets in the neighboring countries. Turkey can be a production hub for the region covering the Balkans, the East Mediterranean, the Middle East and Russia. WPP targets of neighboring countries indicated below provide insight on the potential market:

Country	Target capacity
Greece	9 GW by 2020
Bulgaria	3 GW by 2020
Poland	13 GW by 2020
Croatia	0.4 GW by 2030
Azerbaijan	0.25 GW
Iran	2 GW by 2015
Syria	2.5 GW by 2030
Egypt	7.2 GW by 2020
Lebanon	0.5 GW by 2020

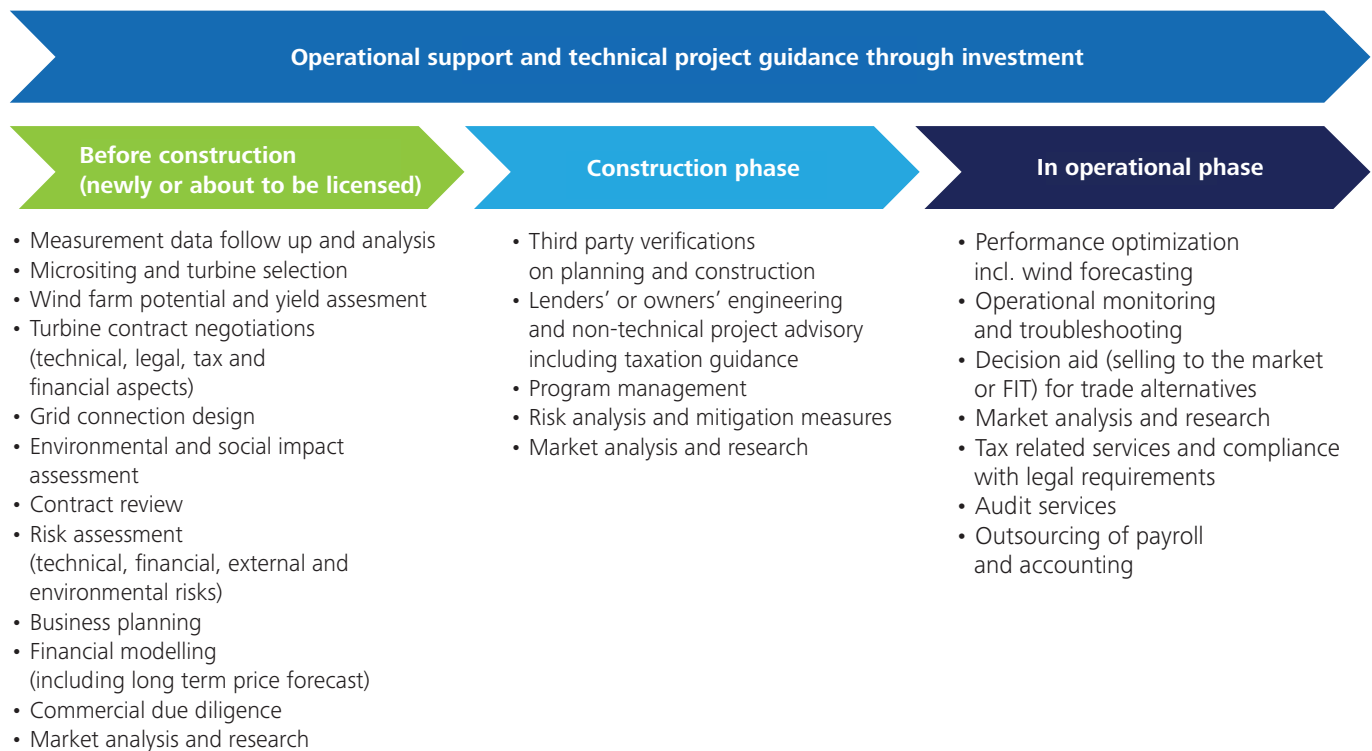
## 4.2 Availability of funding

Potential of WPP development has attracted attention of financing institutions such as the EBRD, TSKB, local and international banks which are offering individual or club funds for WPP investments. Furthermore, there are various international financing opportunities, especially supporting sustainable development or clean development, including carbon funds.

A significant amount of investment is still required to enable the existing project stock of about 11 GW to go online. This means, there will be harsh competition for access to financing for these projects, and feasibility will become a key issue. For feasible projects, it is expected that a lot of M&A activities will occur in Turkey.



# Integrated solutions for all phases of a Wind Power Plant (WPP) investments



## Early Stage Investment

### Investment Decision Support

- Market analysis and research
- Commercial due diligence
- Financial due diligence
- Technical due diligence
- Refinancing of operational wind farms
- Risk analysis and mitigation measures

*in case of transaction*



#### **Yield assessment**

- Measurement data follow-up and analysis
- Turbine selection
- Micrositing
- Wind farm potential and yield assessment

#### **Technical advisory**

- Turbine contract negotiations (technical, legal, tax and financial aspects)
- Risk assessment (technical, financial, external and environmental risks)
- Contract review

#### **Project feasibility and planning**

- Grid connection design
- Business planning
- Financial modelling (including long term price forecast)
- Environmental and social impact assessment

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