

# **Business Development Proposal**

**WIND POWER PLANT SET UP IN  
ÇEŞME/İZMİR**

**ACA ENERGY LIMITED COMPANY**

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## **EXECUTIVE SUMMARY**

The following pages define the business development proposal about wind power plant set up in Turkey in Izmir/Çeşme area. Before setting up the wind power plant, having certification and license agreements is one of the most compulsory activity to implement the project. These documentation needs 3 main agreements. These are; wind power plant set up permission license, International Organization for Standardization (ISO) 14001 and ISO 9001. The most common of these 3 documents is for the protection of the environment, but having these documents is not hard as having these documents like coal, oil, natural gas power plants. So, it will not create big difficulties. After this point, machinery leasing and technical details is going to be implemented. Then, staff recruitment and marketing will be made.

Because of wind energy turbines use the wind as a source, there will not be any cost for the product (electricity). This is one of the biggest advantage of this business, that is why, location choice is really important thing to get efficient wind velocity. There are many other wind power plant projects in that area, and I also visited many of them. So I know their efficiency level, yearly electricity production according to capacity of the power plants. So, financial calculations is made in financial part is prepared taking into account with these wind data, and approximate sales will be 105.000, 120.750, 138.863, 159.692 and 183.646 euros respectively for the first 5 year period. Share capital is specified as 60.000 euros. This work will be made within a partnership between me and my two friends who are called Can Nalbantoğlu and Ali Çelebioğlu. It is going to be set a limited company between 3 of us. In addition, everyone will have equal shares on the company with 33 %. The calculations is prepared taking into account adverse situations. Although, it is calculated like this, the payback period will occur between third and fourth years and breakeven will be until at the end of

the second year. This progress might be shorter, if everything goes well. When the payback period comes, for now the plans is increasing the capacity of the wind power plant and this situation is going to continue like that in every payback period in first 20 years after start-up. So, in long term, revenues, shares and also company will grow with this idea.





## **1. INTRODUCTION**

### **1.1 Specification of Business and Causes of This Business Selection:**

Energy is one of the most important factor in daily world as everybody knows. Within the increasing of human population in all over the world every year, energy use also increasing directly proportional. Because of increasing of energy consuming, non-renewable energy fossil fuels (such as coal, oil, natural gas) sources are running out rapidly.

Therefore, to meet the energy needs, it should be focused on increasing the amount of renewable energy sources such as wind, solar, tidal, wave, hydropower etc.

Turkey is one of the most country which is dependent to another countries in terms of energy. It meets its energy demand through Russia, Iraq and Azerbaijan. Because of this demand, Turkey has to pay heavily loaded amounts every year to provide its electricity. So, the Turkish government also wants to see that kind of investment ideas from business planners and investors. On the other hand, my bachelor degree was energy systems engineering. Thus, I have many and also important knowledge and experiences and because of these situations this business development proposal is decided as setting up of a wind power plant.

In every year the need of energy demand is increasing. Just 26% of electricity demand can be met with its own energy sources and the rest 74% is met by from other countries. (Appendix 1 (A-1)). That is why, Turkish Government suggest these steps;

- Diversify its energy supply routes and source countries.
- Increasing of renewable energy sources and also supporting of nuclear energy idea.
- Increasing of energy efficiency level for power plants.

Turkey has a wonderful advantage to make investment to renewable energy sources because of its position. For example, it is in the 7<sup>th</sup> position in all over the world and it is in the first stage with its geothermal energy potential. It has also have many hydroelectric power supplies and because of its weather condition, wind and solar energy is also a reliable term for Turkey. Republic of Turkey, Ministry of Foreign Affairs. (2014).

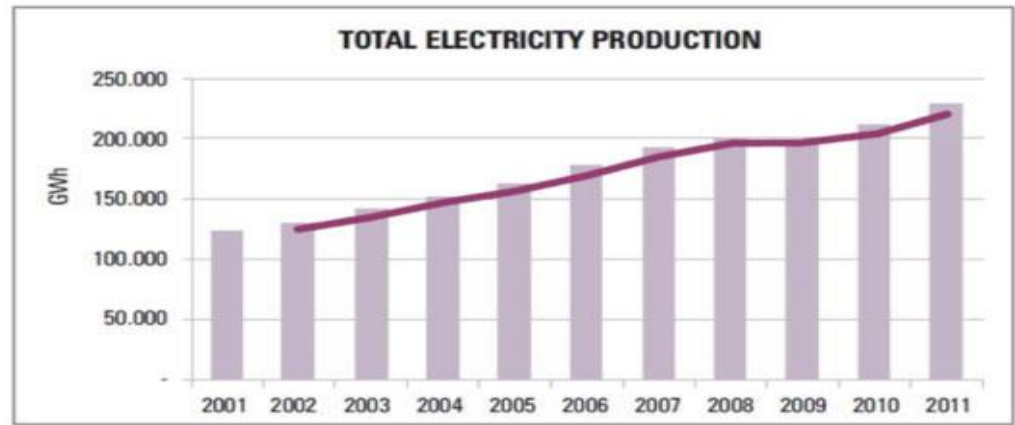


Fig. 1: Total Electricity Production in Turkey between 2001 and 2011

### **1.2 Selection of Scenario:**

Scenario of this business development proposal can be counted as a new company startup as an entrepreneur, because this wind power plant is not exist now, it will be set up. On the other hand, this business idea also can be created as being a partner with a company or institution as using a sponsorship. Whatever the way is chosen from these two, I will be the person who thought and prepared this proposal and it helps to use my knowledge and also it helps to understand something better such as law issues, manufacturers or etc.

### **1.3 Aim and Purposes:**

Main reason of choosing business development proposal idea rather than dissertation is, I prepared a dissertation on my bachelor degree and got experience about it. Secondly, knowing that making investment to setting up wind power plants generally causes wonderful consequences and this proposal can be shared in the future with investors because of providing extreme examples in the previous. On the other hand, while this report has been prepared, specifying what is the real meaning of business development is put as a target. Because, contrary to what everyone thinks, having an idea about a business idea is inadequate to reach the goals. It is not that simple. A successful business development needs many details, knowledge and observation. Moreover, it is aimed that getting experience about this steps and processes and also improving of knowledge about wind energy is from renewable energy types, observing the casualty parts about it and completion of these casualty parts. When this business development is decided, another aim is specified as to make payback period as much as minimum, because, abating payback time to minimum to attract attention of investors in these type outlays for major investments are very important. The biggest situation is to find a way to solve unexpected expenses. These expenses occurs mechanical defections and these problem also causes to stop of wind turbines and also creates maintenance costs. Thus, it needs a great market research making to resist these problems. These research should be about to find more reliable technology sources to provide efficient continuity for choosing of them.

#### **1.4 Sources:**

For the preparation of this proposal, the main sources are;

- Turkish government websites such as permissions, laws for setting up wind power plant or following of electricity prices and etc.
- Engineering websites about electricity, energy or for more theory.
- Company websites such as to specify competitors or checking their investments to get better idea.
- Articles about wind energy to get more ideas.
- Journals about wind energy to get more ideas.
- E-library, books or etc.

#### **1.5 Structure of the Proposal:**

The structure of this business development proposal is organized as follows;

On the previous page, executive summary exists and in this executive summary part the outlines of this proposal are shown. Moreover, these outlines are;

- Business opportunities
- Market needs
- Business potential
- Market context
- Some financial information.

On the below;

- Chapter 2 includes information about business and business concept

-Chapter 3 explains mainly the research methodology for this business development, 5 key areas of a research and also data analysis which is made.

-Chapter 4 explains the business model of the study like value chain model, SWOT analyze, resource based theory.

-Chapter 5 is the short explanation of business plan with overall assessment of the business plan and also shows proposed plan of action.

### **1.6 Timescale:**

Time process of this business development as specified as follows.

- To make plan for content and for the draft of business development between 8<sup>th</sup> of November and 11<sup>th</sup> of November.
- Beginning of proposal on 12<sup>th</sup> of November.
- To show enough progress until 19<sup>th</sup> of December to show my work and also for discuss with my advisor.
- Finishing of business development until 5<sup>th</sup> of January 2015.
- Correction of grammar mistakes until 6<sup>th</sup> of January 2015.

## CHAPTER-2 BUSINESS CONCEPT

### **2.1 Business Concept:**

Wind energy is one of renewable energy sources. Renewable energy is the energy which is obtained by movement of earth like water discharge from dam, wind, absorbing the sun or etc. It converts the energy which is obtained to electricity. In this business, the source will be wind and wind energy can be described as energy which is obtained by the movement of air. This energy can be used for both generating electricity and heating of waters. However, main aim is to converting this energy to electricity. Tony Burton, Nick Jenkins, David Sharpe, Ervin Bossanyi (2013).

Wind power plant are set up in large scale geographical areas. For an efficient working of plants, high hills and places which gets strong wind velocity are preferred. Alex Kalmikou and Katherine Dykes. (2012).

This projects aims that setting up of a wind power plant. Within this investment, the energy which is obtained by wind will be converted to electricity and this electricity will be sold to provide income. Moreover, the project specifies its payback period in maximum 4 years. To reach this aim, one of the most important thing is to abstain from unexpected mechanical problems. Because, these problems will cause to stop of wind turbines or will create unexpected maintenance expenses.

If we mention about the capacity of wind power plant, the capacity is specified as 500 Kw. It is going to use 10 wind turbines which their capacities are 50 kW for each. So, 500 kW capacity will be obtained with these 10 wind turbines. Without facing with unexpected problems like low wind velocity, breakdown on turbines or etc, the yearly electricity production of the wind power plant will be 1.533.600 kWh approximately. 30 % of the electricity which is produced will be sold to

government and the rest 70% will be sold to eligible consumers. On the other hand, for now this business thinks that to make lease for 10 years. Because this lease will provide many advantages for the company. This idea firstly will help to reduce initial capital requirement, so this will help to the economy of our company. Moreover, because of it causes less initial capital requirement, risk also will be less because leasing action. Machinery systems such as wind turbines, turbine blades, generators and other all will come from another company. Secondly, if Turkish Government decides to stop the wind power plant for a reason, because of the buying of machinery is not made by our own company, it will not cause a big loss in terms of machinery buying.

## **2.2 Mission:**

- Creating high quality, friendly and safe environment.
- To produce clean and sustainable energy and distribution of that energy with electricity.

## **2.3 Vision:**

- Having a regional power in the area where wind power plant is.
- Increasing the capacity of wind power plant on next decade and setting up of new wind power plants.

## **2.4 Agreement Styles and Target Market:**

There are 2 agreement styles for selling of electricity and the target market changes according to these 2 agreements.

### **2.4.1 Agreement A:**

In this agreement, agreement is made between energy companies and Turkish Government (TEAŞ) and in this agreement, it includes that how much electricity is going to be bought by government from the company in one year. Furthermore, this electricity is in terms of kWh and the electricity price is always constant. An under limit is specified

on this agreement and energy companies gives guarantee about this limit going to be produced. If companies reaches this limit, they can sell their rest of electricity with a price of which is specified by Turkish Government market in hourly basis for that moments. Moreover, this generally will be more than the price which is on agreement paper. On the other hand, if companies cannot produce electricity below the limit. They have to spend money for that moment's price. As it is explained on the above, this price generally will be more than the price on agreement paper. So, it causes big and unexpected expenses for companies. If this scenario is chosen, the target market will be the Turkish Government and this scenario has lower risk and better idea for small energy companies. Turkish Law. (2013).

#### **2.4.2 Agreement B:**

In this agreement, company does not make an agreement with the government directly. The first and main agreement is made between energy companies and eligible consumers. What does it mean eligible consumers? Eligible consumers can be companies, houses, workplaces or whatever which spend more than 4500 kWh electricity per year. (A-2 and A-3). On this agreement, energy companies offer more convenient price rather than government price to eligible consumers. Also, companies have a chance to sell the rest of its electricity with a price which is specified by own to the common market in hourly basis. Demand and supply balance changes the price of electricity in hourly basis. If electricity demand is really much, the government needs to buy electricity from energy companies. So, it helps to provide better incomes for companies. This agreement mainly used by biggest energy companies in Turkey. As a consequence, this agreement's target markets are eligible consumers and the market. Moreover, lastly, for this business development, agreement B will be chosen. 30% of electricity capacity will be sold to government and 70% of electricity



capacity will be sold to eligible consumers. Turkish Law. (2013), Esko Enerji. (2013).

### **2.5 Specific Features:**

Specifying of specific features is one of the most necessarily thing for a business plan. When business plan is considered as setting up a wind power plant in Turkey, specific features can be shown as eligible consumers may prefer to make agreement with energy companies with lower electricity prices when it is comparing with Turkish Government's price. Thus, energy companies can increase their incomes and it is a great advantage for energy companies.

### **2.6 Window of Opportunity:**

Opportunity window can be appear according to not facing with technical problems. Because as explained before, mechanical problems will cause to stop wind turbines and how long this turbines stop, income of company will be affected. Also because of this unexpected mechanical problems will cause unexpected maintenance cost. So, the economic situation will suffer. Furthermore, these kind of problems will delay the payback period. One of the biggest target according to plan is, when payback period will come, another wind turbines will be added to this power plant. So this will increase the capacity and also electricity amount for the company and that means more electricity sale and also more income. If the problems will be in low level which is planned, this development will be opportunity for this business. Secondly, efficient results will help to be reliable on government's mind. Thus, the next agreement can be made with higher electricity price and this will accelerate the growth of the company.

## **CHAPTER-3 FEASIBILITY RESEARCH**

### **3.1 Data Types:**

There are two data types. These are called as primary and secondary data.

#### **3.1.1 Primary Data:**

Primary data is the data which is collected by an investigator, planner, discoverer or etc. It is the meaning of creating a new thing, to find an answer from person's own actions. For example to primary data, answer of a questionnaire or a result of an experiment can be shown.

#### **3.1.2 Secondary Data:**

Secondary data is the data is the source of someone else, so that means these data are already prepared. It does not need to make an experiment or any work like that. Secondary data, mainly used in dissertations, presentations or that kind of academic works. Websites, articles, journals, books or etc. can be shown as example of secondary data. Journal of Business Ethics. (2009).

Before a business development is made, one of the main action is making a research about that business. But, what kind of research should must be made? Primary research or secondary research? According to my opinion, especially when a different and new business idea is considered to be set up, a very detailed primary research should be done or if this business will be mostly about people's pleasures, hobbies or desires. Because, without making a primary research in these kind of business ideas, it is impossible to answer how people can be satisfied, happy and it is almost impossible to reach the targets without it. On the other hand, if a business contains more technical knowledge, secondary data must be in that business. For example, for this business there is no point to collect a primary data as a result of

questionnaire or an experiment, because it does not help to anything. Setting up a wind power plant just necessitates to get secondary data. Because, to provide an efficient work for a wind power plant, technical details must be known. For this business development proposal, journals, articles, websites, books are used. These things can be shown as example to show why secondary data used for;

- Making wind velocity analyze for the place which this power plant will be built up.
- To decide which wind turbine brands are reliable and has quality.
- Checking daily electricity prices in Turkey to specify the electricity sale price for this company.
- To know the laws to set up this power plant.
- Making research about agreements for sale of electricity.
- Getting wind data for 2014 year to make a calculation to find approximately electricity amount which is going to be produced for this power plant.
- Getting data from other wind power plants which is close to this wind power plant.
- Knowing the efficient environment effects for a wind power plant.
- Specifying the customer groups (like to know the minimum limit to become eligible consumers)
- - To make financial calculation, many cost or price analyzes are made. (ex= wind turbine costs, maintenance costs, approximate ground are price for wind power plant or etc.)
- and much more secondary data are collected for this wind power plant business.

### **3.2 Research Methodology:**

#### **3.2.1 Previous Wind Turbine Power Plant Examples in Turkey:**

Before setting up this business development, to identify what other energy companies are doing which they have wind power plant in that area and also all around the Turkey, will be best examples for this project. (in Çeşme/İzmir/TURKEY). So, first main focus about research question for this business must be in this way.

Wind power plants provide the best income levels in Turkey when making a comparison with other renewable energy sources such as solar, wave, biomass, hydroelectricity or etc. power plants. Turkey has a really big potential in terms of wind energy and it is also one of the best country in all Europe as well. Furthermore, the most suitable areas are in Turkey in terms of wind energy are shown on the below.

- Alaçatı/Çeşme
- Bodrum/Marmaris
- Didim
- Kuşadası/Aydın
- Antalya
- Çanakkale
- Gelibolu
- Balıkesir
- Bandırma
- Silivri/İstanbul.

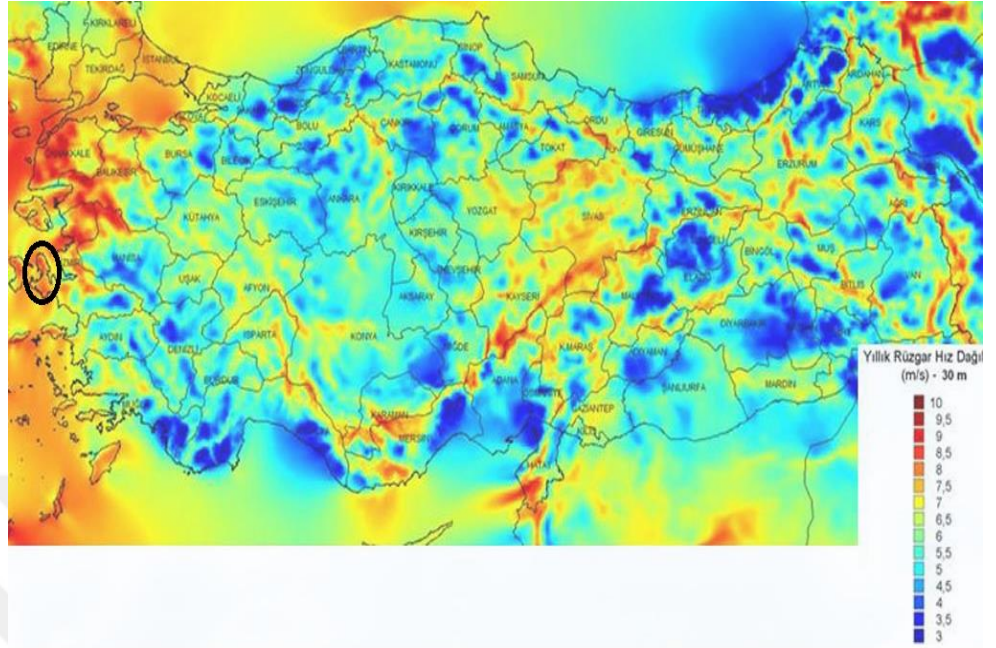


Figure 2: Wind Map in Turkey

The picture on the above shows that the wind velocity in terms of m/s. In addition, the dark blue colors shows the velocity between 3m/s and 4 m/s, light blue colors shows between 4,5 m/s and 6 m/s, yellow colors shows between 6,5 m/s and 7 m/s, orange shows 7,5 m/s red shows between 8 m/s and 9 m/s and the brown colors shows between 9,5 m/s and 10 m/s. Moreover, the black ring shows where Alaçatı/Çeşme is. As seen in the picture, while most of the map is in blue color, the area where Alaçatı/Çeşme is in brown color and also the data for brown color is most efficient wind velocity for a wind turbine power plant. So, this picture proves that, Alaçatı/Çeşme area is really efficient place for setting up a wind power plant according to wind velocity data.

As it is mentioned before, this business is planned for Alaçatı/Çeşme/İzmir. So according to this source, it can be said that, the most efficient place for wind power plants in Turkey is chosen as Alaçatı. For now, the installed capacity of wind power plants are 2 thousand MW in Turkey and the target is to increase this amount to 20

thousand MW until 2023. In the long term the desired amount is specified as 98 thousand MW. Naturel Yenilenebilir Enerji. (2013).

ARES is the first BOT (Build- Operate-Transfer) wind power plant model in Turkey. This power plant set up period started in 1997 and it is finished in 1998. This power plant has been producing 19 million kWh in every year since 1998 within the usage of wind energy.

Alaçatı/Çeşme is a really touristic place especially for summer seasons and although having too many tourists, 20% electricity demand of all Çeşme is met through Ares Wind Energy Power Plant. On next years, guess about the potential energy capacity of wind turbines in Alaçatı will be between 250 to 300 MW. Before setting up this wind power plant, the key issues were;

- Wind measurement
- Micro siting
- Wind turbine selection
- Receipt of permits
- Signing of Concession Agreement

-Installation and operation. Atamer Group Feasibility Report for Wind Energy. (2013).

### **3.2.2 Costs of Wind Turbine Power Plants:**

First and main research question's answer is explained on the above and the second research question is, what kind of costs will be occur within setting up this power plant. This answer is shown on the below.

Costs which is caused by a wind power plant is more than people predicted and these costs are really big amounts when it is comparing with many of business. This is the biggest disadvantage for wind power plants. The main costs are can be analyzed in 3 categories which are called capital/installation cost, operating and maintenance cost (O&M), levelised cost of electricity. Green Rhino Energy. (2013). (A-4).

### **3.2.2.1 Capital/Installation Cost:**

Capital/installation cost can be explained as the installed cost of a wind power project is dominated by the upfront capital cost (it is also known as CAPEX) for the wind turbines (installation cost, tower cost or etc.) and this cost is around 84% of the total installation cost. Like other renewable energy sources, wind power's high upfront cost might be a barricade for uptake. However, the biggest plus for wind power plants, also for other renewable energy sources is, not paying fuel price to provide working of wind power plant. This also really helps to escape from costs unlike non-renewable energy sources. Capital/installation cost separates to 4 major topic in it. These are shown on the below;

#### **Turbine Cost:**

This cost is the cost which includes tower, blades and transformer price in it.

#### **Civil Work:**

This cost includes construction costs for site preparation and foundations for the tower part of wind turbine.

#### **Grid Connections Costs:**

Grid connection is made for providing connection between transformations, subs-stations and transmission network, local distribution. This cost is occurred because of the transferring of electricity basically.

#### **Other Capital Costs:**

In this type of cost, it exists construction of control systems, buildings, and consultancy or etc. costs in it. The capital cost's topics are shown on the picture on the below within their percentages. Irena, International Renewable Energy Agency. (2012).

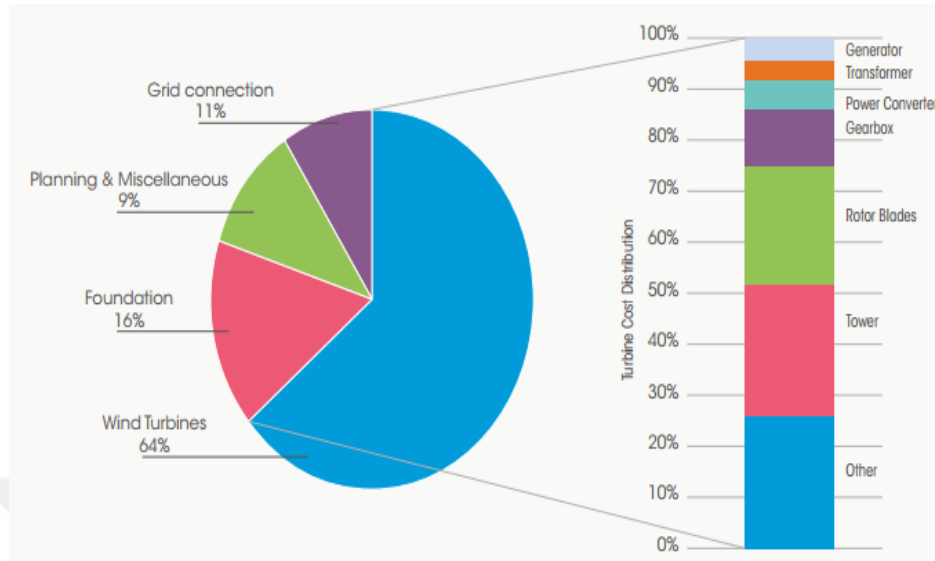


Figure 3: Distribution of Capital/Installation cost with their percentages

#### **3.2.2.2 Levelised Cost of Electricity Generation:**

The LCOE is the price of electricity required for a project where revenues would equal costs, including making a return on the capital invested equal to the discount rate. If the electricity price is higher than this levelised cost of electricity level, greater return on capital will be occur, on the other hand, if price is lower than this level, this will cause lower return on capital. There are some factors which affects the LCOE level. These factors might be, project and technology level of wind power plant, country, efficiency and performance levels of wind turbines, operating costs and etc. LCOE calculation can be measured as Irena, International Renewable Energy Agency. (2012).



$$\text{LCOE} = \frac{\sum_{t=1}^n \frac{I_t + M_t + F_t}{(1+r)^t}}{\sum_{t=1}^n \frac{E_t}{(1+r)^t}}$$

Where:

**LCOE** = the average lifetime levelised cost of electricity generation;

**I<sub>t</sub>** = investment expenditures in the year t;

**M<sub>t</sub>** = operations and maintenance expenditures in the year t;

**F<sub>t</sub>** = fuel expenditures in the year t;

**E<sub>t</sub>** = electricity generation in the year t;

**r** = discount rate; and

**n** = economic life of the system.

Figure 4: LCOE calculation

### **3.2.2.3 Operating & Maintenance Cost:**

Operation and maintenance costs form a fairly large share of the whole annual cost of wind turbine. For a new turbine, O&M costs may make up 20-25 per cent without difficulty of the total levelled cost per kWh produced over the lifetime of the turbine. The share may only be 10-15 percent if the turbine is fairly new, but this may increase to 20-35 percent by the end of the turbines lifetime. O&M costs are offering greater attention as an outcome, while the manufacturers outstandingly attempt to lower these cost by developing new turbine designs that is in need of less turbine downtime and fewer regular service. The main components which affects the level of O&M cost are;

- Insurance
- Regular maintenance
- Administration
- Repair
- Spare parts.

Some of these components can be calculated easily. Insurance and regular maintenance are can be shown as example to this easy calculation. Because, these components are constant. But, it is impossible to say the same thing for spare parts or repair cost. Because, it is impossible to know when a breakdown, failure or any similar problem occur, these costs can be counted as unexpected costs. While all components of operating and maintenance cost are affected according to age of power plant, spare parts and repair cost are particularly affected in terms of age of wind power plant. But, even if lifetime affects the O&M cost directly because of wind power plants' lifetime is averagely 20 years, for short term it won't create big expenses when this business development becomes real. In addition, percentage of O&M cost are shown on the below according the type of cost between 1997 and 2001. Wind Energy The Facts. (2008).

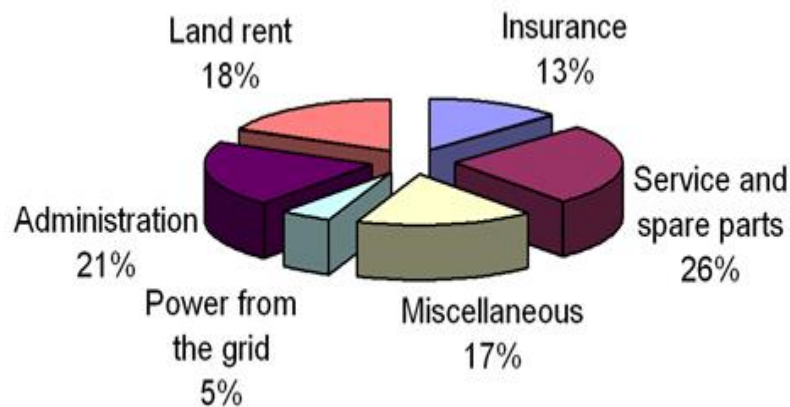


Figure 5: Percentages of O&M costs between 1997 and 2001

Commissioned projects are not extensively available for actual O&M costs. Care must be taken in extrapolating historical O&M cost even where data are available with the dramatic changes in wind turbine technology that raised over the last two decades. However, it is clear that since 1980 annual average O&M costs of wind power systems have declined to a significant extend. Irena, International Renewable Energy Agency. (2012).

### **3.3 Five Key Areas of Research:**

#### **3.3.1 Product and Services:**

In this business development the main and only product will be electricity and this electricity product exist with the conversion of wind energy to electricity. After this progress, electricity will be sold like selling of an ordinary product. This electricity production and selling of this electricity can be thought like an item which is produced in a fabric. As everybody knows, in a fabric, there are 2 main parts for an item which are production and selling part. Production part is responsible for creating of this item and for this business, converting energy to electricity is shown a similar example to this. In addition, selling part is responsible for financial terms, after converting progress, selling part is responsible to make money for this business.

On the other hand, this business will be only responsible to produce enough electricity which is planned as on agreement paper. Normally, there is a service system for products to provide trust on customer's mind. For example, electronic devices have a quality level or have a risk to be broken. But, there is no quality level of electricity or because of there is no risk to be broken of electricity. Only risk is not supply enough electricity according to agreement because of broken of wind turbines, blades or etc. So, agreements should be prepared really carefully. Because, if enough energy can't be supplied, this business will have to pay money in big amounts as a consequence of not obeying the agreement. Thus, this business will have to follow and obey the agreement. So, the service strategy can be explained with these things.

### **3.3.2 Industry and Market Analyze:**

Industry and Market analyze for this business development proposal will be observed in 2 areas. First area will be all around the world and the second one will be about Turkey.

2011 Yılı Sıra No	Ülke	2011 Yılı Toplam Kapasite (MW)	2011 Yılı Büyüme Oranı (%)	2010 Yılı Sıra No	2010 Yılı Toplam Kapasite (MW)
1	Çin	62364	39.4	1	44733
2	ABD	46919	16.8	2	40180
3	Almanya	29075	6.8	3	27215
4	İspanya	21673	4.8	4	20676
5	Hindistan	15880	21.54	5	13065.8
6	İtalya	6787	17.1	6	5797
7	Fransa	6640	17.3	7	5660
8	İngiltere	6018	15.7	8	5203.8
9	Kanada	5265	31.4	9	4008
10	Portekiz	4379	18.3	11	3702
17	<b>Türkiye</b>	<b>1729</b>	<b>35.7</b>	<b>17</b>	<b>1274</b>
	<b>Toplam</b>	<b>237227</b>	<b>18.8</b>	<b>-</b>	<b>199739</b>

Figure 6: Top Countries In Terms Of Wind Energy Capacity

According to World Wind Energy Association 2011 data, total energy amount is specified as 237277 MW in all around the world which is obtained by just wind energy. When analyze of table is made, China is seen in first stage with 62364 MW in 2011 and their wind energy capacity was 44733 in 2010. China showed 39.4% growth rate between two years which is really serious growing. Moreover, China is still in leader position in terms of wind energy capacity in all around the world. Secondly, US came with 46919 MW and Germany, Spain, India, Italy, England comes with 29075 MW, 21673 MW, 15880 MW, 6787 MW, 6640 MW, 6018 MW respectively in 2011. Furthermore, Turkey takes its position in 17<sup>th</sup> stage with 1729 MW according to 2011 data. Erdem Koç, Mahmut Can Şenel. (2012).

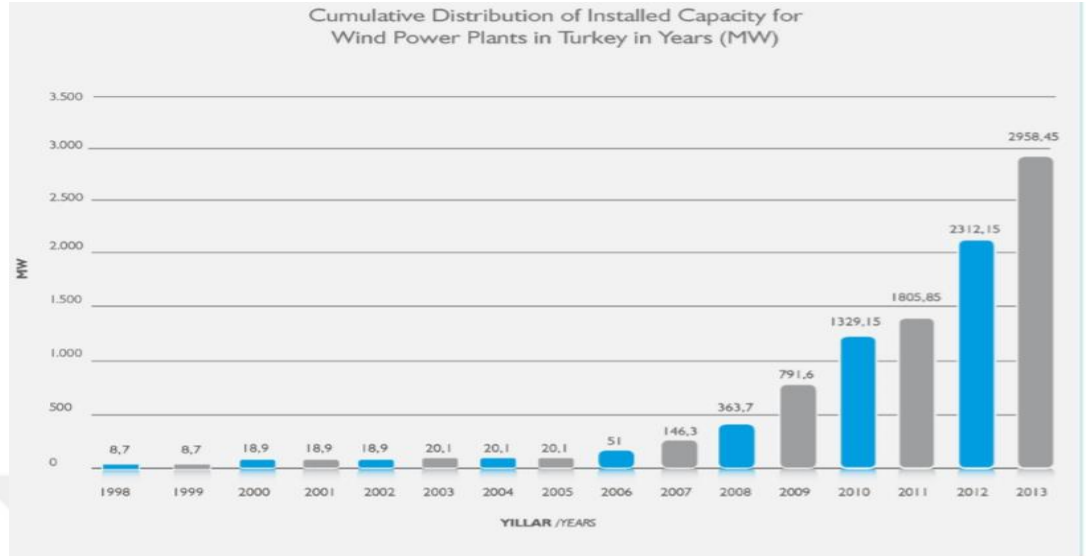


Figure 7: Wind Power Plant Capacity in Years

This table is obtained from Turkish Wind Energy Congress' (TWEK) 2014 presentation report. In addition, in this table, installed wind energy capacities in Turkey in terms of megawatt (MW) are shown between 1998 and 2013 in yearly basis. On the above, World Wind Energy Association 2011 data is explained and in that data Turkey's wind energy capacity is shown with 1729 MW and here it is shown with 1805 MW. Although, the difference is not that much, I wanted to use all of these 2 sources. According to Figure 6, Turkey showed 122 % wind energy capacity increase between 2010 and 2013. So, according to table, Turkey increases its capacity in wind power plant industry rapidly. So, it can also to be said that, supply is inadequate for supply. Otherwise, this industry could not be show that kind of serious growth.

So, clearly, it can be said that Turkey must increase this amount if it really wants to be in race. Although Turkey is still in first 20 in all around the world in terms of wind energy production according to Turkish Government explanation, it is an exact thing that it is inadequate. That is why, Turkish Government really wants to see that increasing of wind energy investments

### **3.3.2.1 Wind Turbine Manufacturers:**

Wind turbine manufacturers is making really big profits within increasing energy and electricity demand in all around the world year by year. When an industry analyze is made, the majority of manufacture of wind turbines are done in China, US, Germany, Denmark, Spain and India. On the other hand, according to Erdem Koç and Mahmut Can Şenel 2012 research, the highest market share of wind turbine manufacturers are shown on the below respectively.

- 1) Vestas- Denmark with 12.9 %
- 2) Goldwind - China with 9,4 %
- 3) General Electric – US with 8,8%
- 4) Gamesa - Spain with 8,2 %
- 5) Enercon – Germany with 7,9 %
- 6) Suzlon – India with 7,7 %. Erdem Koç, Mahmut Can Şenel. (2012).

On the other hand, Turkey has not any domestic manufacturer for wind turbines. If a domestic manufacturer will be exist in this industry with a reliable technology, this manufacturer might make perfect money and also this situation will help to decrease the price of setting up this wind power plants in Turkey. In my opinion, being active in wind power plant manufacturing will cause really effective incomes for Turkish economy.

### **3.3.2.2 Biggest Wind Power Plants in Turkey**

According to feasibility research of Radikal Newspaper, biggest wind energy power plants in Turkey are shown on the below. As seen on the list, one of biggest energy company which is called Zorlu Enerji set up the biggest wind power plant in Turkey until now.

- 1) Enerjisa and Eon Energy Corporation Wind Power Plant (WPP) - 143 MW
- 2) Zorlu Enerji (Rotor) Gökçedağ WPP - 135 MW
- 3) Aksa Enerji Balıkesir Şamlı WPP - 114 MW
- 4) Sanko Enerji Çatalca WPP – 60 MW
- 5) Bandırma WPP – 50 MW
- 6) Bozcada WPP – 50 MW
- 7) Aksa Enerji Hatay Sebenoba WPP – 30 MW
- 8) Ares Alaçatı Çeşme WPP – 14.2 MW
- 9) Aksa Enerji Manisa Karakurt WPP – 10.8 MW Radikal Gazetesi, (2013).

On the 8<sup>th</sup> stage Ares's wind power plant is seen with 14.2 MW. As mentioned in chapter 2, this area is the same area which this business development for. This list is an another proof that, this area is an available for this project.

### **3.3.2.3 Biggest Rivals in Energy Sector:**

Before setting up a business plan, to specify biggest rivals for that industry is a really big key step for determining that business' place in the industry. Yeşil Ekonomi Magazine when in 2013 December defined biggest private energy companies in Turkey for 2013. On first stage, Enka Power shows itself. Enka Power has 3 natural gas which their total installed capacity is 3984 MW and also it has one coal power plant as well with 800 MW. Thus, Enka Power takes first stage with 4784 MW installed capacity in Turkey. After Enka Power, Aksa Enerji takes the second stage with 2210 MW and the third stage is taken by Enerjisa with 1606 MW. Yeşil Ekonomi Magazine. (2013).

### **3.3.2.4 Wind Energy Capacities in Cities in Turkey:**

How that a potential of a business is changing according to location of it, how that a business plan is considered according to this potential, we can say the same thing for setting up of a wind power plant. Before setting up process of a wind power plant, to specify one of the best location in terms of efficiency is a mainly key step. That is why, the work on the below is made to have better knowledge about the location of this wind power plant project.

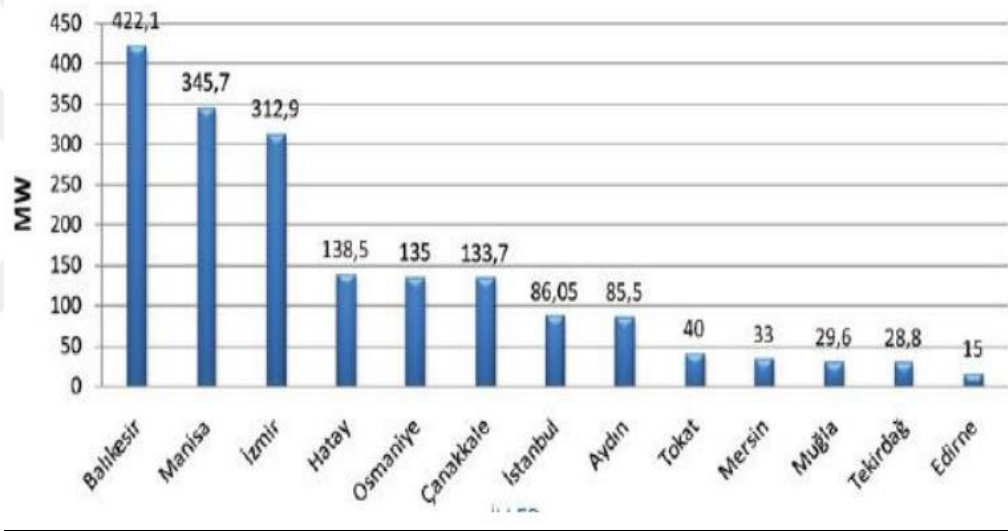


Figure 8: Wind Energy in Cities in Turkey

The graph on the above is taken by Turkish Government's Electricity Production Report. While this graph is analyzed Balıkesir city of Turkey is far the leading when it is compared with other cities of Turkey. Its installed wind energy capacity is 422.1 MW, then Manisa follows Balıkesir with 345.7 MW and after that İzmir comes as third. As we mentioned before, this business plan is thought for Alaçatı/İzmir area. In addition the city on first stage which is called Balıkesir is really close to İzmir and in the second stage which is called Manisa is one of the neighbor city of İzmir. As a consequence, to set up this business in



Çeşme will be really sensible idea to work this wind power plant really efficient.

#### **3.3.2.5 Pestel Analysis:**

Pestel Analysis is most widely approach for external business environment. The underlying thinking of the PEST analysis is that the enterprise has to react to changes in its external environment. This reflects the idea that strategy requires a fit between capabilities and the external environment and so it is necessary for an enterprise to react to changes. Expansion of Pestel is; political, economical, social, technological, environmental and legal. This analysis is used for to determine that if u a business strategy can bring success or not with analyzing these 6 factors. On the below definitions of these 6 factors are given.

-Political factors mainly gives information about the effects of the government on business environment. Relationship between countries, the effects of European integration can be counted as a parameter on business.

-Economical factors refers to macro-economic factors. Exchange rates, growth rates, cyclical movements, currency conversion rate changes, commodity prices are can be shown as example for economical factors.

-Social factors talks about cultural influences, sustainable development, demographics or etc. Aging of the population in western countries can be shown as an example for social factors.

-Technological factors cover the effects of technological change on products, distribution channels, and processes. Development of car, communication, computer technology or etc. are some of the examples of this factor.

-Environmental factors usually focus on green issues such as environmental pollution, waste or etc.

Lastly on legal factors, legal restrictions or changes, issues such as health and safety laws are examined. International Journal of Modern Social Sciences. (2013).

PESTEL analysis for this business development is prepared as,

Political: As it mentioned before in introduction part, Turkey supplies 74% electricity demand from another countries' contributions like Iran, Russia or etc. So, relationship with these countries always have to be in good shape. So, because of making number of renewable energy sources will decrease the need of other countries, this business plan should be supported.

Economical: Renewable energy sources utilizes to economy of Turkey. Although these projects are really expensive for setting up or their payback period is at least 3 and half year, in long term these sources provide big benefits for Turkey. Because, increasing of energy capacity with free energy (means that renewable energy sources, no need to pay for fossil fuels) will help to decrease the expenses which are made for other countries for fossil fuels like coal, oil, natural gas. So, this wind energy project will provide contribution for the economy of Turkey.

Social: Human population is growing rapidly in Turkey every year. More population means more electricity consuming, more electricity consuming means more energy source need. So, according to social factors, we can say that renewable energy sources should be supported.

Technological: As it mentioned before, there is no domestic manufacturing for wind turbines. Because of this, setting up and the tool buying such as wind turbines, tower part of wind turbine or others are really expensive and this causes really big expenses. For, technological way, there are some negative sides of this business.

Environmental: There are both positive and negative effects of wind power plants. The positive and the best benefit of wind power plants is, because they do not need fossil fuels, there is no CO2 emission or other greenhouse gasses, this will also cause not to create expense for working of power plants, however, on the other hand, for near areas, while turbine blades turn, it creates noise pollution and this might interrupt some home or farm owners, also another problem is, wind power plants might cause dying of birds because of crashing to wind blades.

Legal: Legal permissions takes long time for wind power plants. But, if everything will be well prepared according to rules and laws, legal issues won't be a problem for setting up this business.

#### **3.3.2.6 Porter's 5 Forces Model:**

Porter Model's creator is Michael E. Porter. The model is created to identify and analyze 5 competitive forces. These are;

##### **Competition in Industry:**

This force is used for to evaluate of companies' current situations, incomes and expenses, industrial development. Basically, this force tries to give answer to this questions:

-Is this business is at level that which can compete with other companies in same sector or industry?

-What will be the share of this business from the pie?

One thing that should be examined in the competitive analysis is to determine of market intensity. If the market share is between 1 percent and 10 percent, it means there is a high degree of intensity in the market.

#### Potential of New Entrants into Industry:

As everybody knows, more rivals for a company means less income, less sales. So, it is so important to make guess and analyze for new rivals is a critical point for a company in an industry. Because, new entrants will get some part of customers, especially if they have high quality level with affordable prices. Thus, this force of Porter Model should be done before starting up a business.

#### Power of Suppliers:

It is used for to define pressure on suppliers with raising prices, decreasing quality of products with using advantages according to their secured place in the market. If there are less suppliers and many buyer s in the market, this will increase the bargaining power for suppliers. Moreover, suppliers might use this situation as increasing prices or decreasing quality level for products to provide better incomes for themselves. Because, there is no threat to reduce their sales.

#### Power of Buyers:

It is mainly used for to find an answer to the question which comes next sentence. How much product could be sold from manufactured products? For example; for a television manufacturer, power of buyers are much more than a company which makes retail trade. So, television manufacturer gets more attraction from buyers, so it brings more power for retail company. Finally, we can say that, power of buyers' potential changes between on suppliers.

#### Threat to Substitute Products:

Substitute goods includes products that can be used instead of the products we produce. It defines the threats of a substitute products for my business. For instance, I am a manufacturer of desktop computer and I choose my opponent as a company which is a laptop

manufacturer. If this situation is examined, to give this answer for my business is so important. Do the buyers mainly buy my product or my rival's product? If, the buyers makes their choice in laptop sector, it can be said that, laptop computers are big alternative threat for my business. Michael E. Cafferky. (2005).

While these factors taking into account, biggest 2 risks for this business plan are; competition in industry and potential new entrants into industry. Because, there are many energy companies and every year more companies join to energy sector in Turkey. So, this affects the electricity prices as well. But on the other hand, because of increasing of electricity demand and because of there is no substitute product for this sector, this business won't meet with a big bad surprise in terms of selling electricity.



Figure 9: Five Forces of Porter

### **3.3.3 Organizational:**

#### **3.3.3.1 Risk of Operations:**

It is almost impossible to bring success without taking risks. If a target is specified, people, companies have to take risk to reach the targets and like in every business or investment, this business development have some risks too.

One of serious risk for wind power plants is, not getting enough wind velocity. Moreover, low wind velocity means, extending of payback period and less income. That is why, finding right location needs perfect research and knowledge.

The second risk is, technical breakdowns. If a technical breakdown will occur in a wind turbine, the wind turbine which break downs should be stopped. Furthermore, stopping of a wind turbine means lower electricity production and it also means lower incomes. In addition, breakdowns will be need unexpected maintenance cost. As a consequence, because of breakdowns affect economical situation for this business, to make this break down as soon as minimum is really important and to block this problem, reliable technologies and brands should be used and following of technical data of wind power plant should be done regularly such as gearbox, turbine, generator or etc.

Electrical leakage is too risky for places which have intense transmission of electricity. So, in that kind of businesses which has intense transmission of electricity, big bucks are paid. Because, when an electrical leakage exists, whole power plant has to be stopped not just a wind turbine. Moreover, this stop will cause to make money for the business. Furthermore, if an electrical leakage is noticed lately, it may cause a big fire. That is why, security system's following must be done regularly for protection of power plant.

### **3.3.3.2 Licensing Agreements and Government Issues:**

Licensing agreements for wind power plants separates to 3 main topic. These are wind power plant set up permission license, ISO 14001, ISO 9001 certificates.

#### **Wind Power Plant Set Up Permission License:**

Getting of WPP set up permission license is related to factors of wind power plant to environment. This license is made for protection of the environment and to reduce destructive effects of energy sources as minimum level. Moreover, this license aims to be sure that the location is available for wind power plant projects. Thus, this license is prepared. The main legal issues of this license are;

- Wind power plant area must not to be set up on rough ground
- If there are some construction like houses, farms, hut or etc. these constructions should not be closer than 20 meters.
- Its position should not be in a position to cause noise pollution for people.
- The turbines must be set up taking into account the migration routes of birds. Environmental circulation should not be affected from rotor blades.
- Grid field connection of wind power plant should be made really securely.
- It must not be any airport, land military or civilian radar around the power plant in 5 kilometers.
- Desired level wind velocity should be for that environment
- Area must not be so sloped. Turkish Government Energy Market Regulatory Agency. (2014).

#### International Organization for Standardization (ISO) 14001 Certificate:

The current environment people are living has been affected, developing industries and technology can't be ignored. The growing population of the world, habitat contraction, natural environment, lack of education and environmental pollution are some of the many problems that threatening human quality of life in the last years. Aim of getting this certificate by companies is, to reduce or to make disappear these kind of negative effects for future world.

#### International Organization for Standardization (ISO) 9001 Certificate:

ISO 9001 certificate was created to meet customer needs and expectations, to increase customer satisfaction, to improve the quality management system and to provide better and quality product or service for customers. International Organization for Standardization "ISO Quality Management Principles. (2008).

#### **3.3.3.3 Social and Cultural Values:**

As most of people knows, non-renewable energy sources causes serious air pollution, releasing of CO<sub>2</sub> and CO emission and greenhouse gasses. These gases are really dangerous for future of the world. On the other hand, Renewable energy sources provides sustainability and clean energy. If renewable energy sources set up within taking laws into account, there is no any negative effect for the environment. Increasing of investments on renewable energy sources will get people attraction and people will have more idea about renewable energy sources and they may understand what clean and green energies are.



### **3.3.4 Financial Analyze:**

Financial analyze is one of the first attention point of entrepreneurs. Because every business is set up to provide financial benefits. So, this part's analyze is really critical. As shown in the business plan before, energy sources in Turkey are inadequate to supply the electricity demand in Turkey. This situation plays a very important role to be made of electricity sales really easily. It is explained chapter 2, the capacity of this wind power plant will be 500 kW. The approximate electricity amount which is going to be produced is calculated by this calculation;

$500 \text{ kW (capacity of the wind power plant)} * 365 \text{ days/1 year} * 24 \text{ hour/1 day} * 35 \% \text{ (the efficiency of wind turbines)}$

While the calculation is made, total production in a year becomes approximately 1.533.600 kWh, 30 % of this production will be sold to Turkish Government and the rest of 70% will be sold to eligible consumers which are going to be found. In addition, as a result of these sales, the expected revenue will be around 105,000 euro for the first year and the growth rate is 15 %. Installation cost will be around 250.000 euros because of leasing advantage. Leasing decreases this business expense seriously. As in the tables which are on the below, everything is shown more detailed.

#### **3.3.4.1 Sales Forecast:**

<b>(a) SALES FORECAST</b>						
<b>Year</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>(a) Sales Value</b>		105,000	120,750	138,863	159,692	183,646
<b>(b) Cost of goods</b>		0	0	0	0	0

Figure 10: Sales Forecast

Sales will be provided by electricity sales. The growth rate is projected as 15%. Payments will to be get at the end of every months. Because, electricity bills is paid in monthly basis. So, company provides income in monthly basis as well.

#### **3.3.4.2 Project Funding:**

This company will create as a consequence of 3 business partners. One of them is me and the other people will be my friends Ali Çelebioğlu and Can Nalbantoğlu. That is why, our company name will be chosen first letters from our names. ACA Energy Company will be a limited company and its share capital is specified as 60.000 euros and shareholder percentages will separated equally between us as 33% each.

#### **3.3.4.3 Cash Flow Projections:**

<i>Cash flow summary</i>						
<b>NET CASHFLOW FOR PERIOD</b>	<b>16,000</b>	<b>3,000</b>	<b>16,650</b>	<b>30,687</b>	<b>43,051</b>	<b>92,060</b>
<b>OPENING CASH BALANCE</b>	<b>0</b>	<b>16,000</b>	<b>19,000</b>	<b>35,650</b>	<b>66,337</b>	<b>109,388</b>
<b>CLOSING CASH BALANCE</b>	<b>16,000</b>	<b>19,000</b>	<b>35,650</b>	<b>66,337</b>	<b>109,388</b>	<b>201,448</b>

Figure 11: Cash Flows

In year 0, closing cash balance defines the working capital in the first year. After the first year, cash surpluses are expected.

(4) PROFIT AND LOSS FORECAST						
	Preop					
Year	0	1	2	3	4	5
Revenue	0	105,000	120,750	138,863	159,692	183,646
Cost of sales	0	0	0	0	0	0
Gross profit	0	105,000	120,750	138,863	159,692	183,646
Expenses/overheads						
Premises (rent, rates)		7,000	7,000	7,000	7,000	7,000
Wages and salaries		40,000	41,200	42,436	43,709	45,020
General expenses		30,000	30,900	31,827	32,782	33,765
Interest and bank charges payable		0	0	0	0	0
Lease payments		25,000	25,000	25,000	25,000	25,000
Depreciation		0	0	0	0	0
Other expenses		12,000				
Total expenses/overheads	0	114,000	104,100	106,263	108,491	110,786
Profit before tax	0	-9,000	16,650	32,600	51,201	72,860
Tax @25%			1,913	8,150	12,800	18,215
Profit after tax		-9,000	14,738	24,450	38,401	54,645
Dividends			0	0	0	0
Transfer to reserves		-9,000	14,738	24,450	38,401	54,645
ROEI		-15%	25%	41%	64%	91%

Figure 12: Profit and Loss Forecast Table

Sales on growth is specified as 15 % per year. Breakeven is expected in the second year after start up and lastly, expected payback period is projected between third and fourth years.

#### 3.3.4.4 Breakeven Analyze:

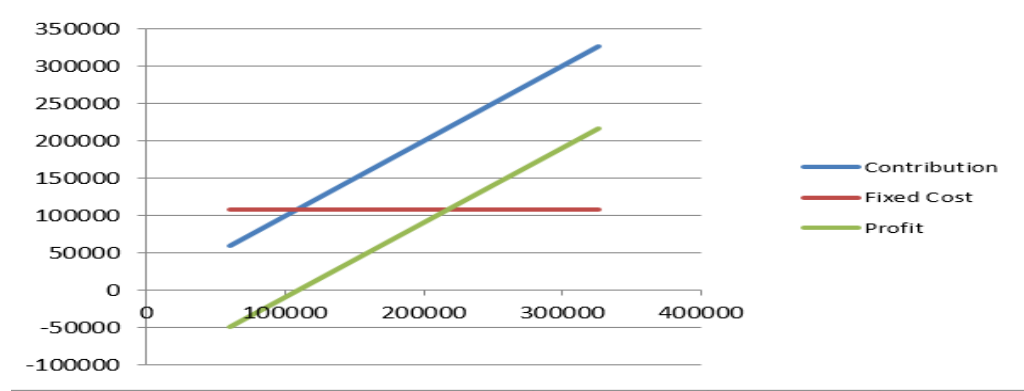


Figure 13: Breakeven

As shown on the above, the company's breakeven period will occur in the second year with revenues. The first year's revenue will be around 105.000 euro and the second year this revenue will be around 120.750 euro.

#### **3.3.4.6 Risk Evaluation:**

Risk is really reduced within the usage of leasing. So, this helps to decrease the expenses on start up period and also helps to reduce the risk for the company. Because, buying of machineries, turbines and other equipment would create much more expenses.

## **CHAPTER-4 BUSINESS MODEL**

### **4.1 Porter's Value Chain Model:**

Value chain is a well-known strategic concept and founded by Porter in 1985. Value chain is used for to increase the value offered to buyer. It contains all the range of activities between the provision of the raw materials before production and reaching the products to buyers. The range of activities are analyzed in two topics which are called primary and support activities. Primary activities can be explained with improvement such as marketing, distribution and sale methods, service, inbound and outbound logistics and, on the other hand, support activities can described with infrastructure, human resource management, technology development and procurement. In every progress, companies' aim is to find a way to improve the benefits for buyers. Because, improving the benefits for companies will help to create competitive advantage. However, while companies make this, they will also have to create more cost for themselves and this will also affect the gross profit. According to this logic, how much gross profit will be more, it also creates margin for a business directly proportional. İ. Hakkı Eraslan, Aslı Deniz Kuyucu, İsmail Bakan. (2009).

For an energy company, this model can be used for improving of marketing, distribution and methods. For instance; preferable electricity prices might be offered to eligible consumers to create competitive advantage or to get more customer attraction or technology development might be used to increase capacity of power plant. However, this will also create expenses for our company. On the other hand, some activities can't use for wind electricity production. For example; electricity has no quality level. Every electricity is same with others. Only amount can be changed. That is why, we can't say that technology development will get more attractions from buyers. It just will pave the way more sales opportunity. We can also say the same

things for inbound and outbound logistic. Because, this business will sell its electricity to specific customers.

#### **4.1.1 Gross Profit:**

Gross Profit is one of the important financial concept for financial calculations. To calculate gross profit for a business, it is really important to know the distinction between fixed and variable costs. Basically, gross profit is calculated by sales minus cost of goods sold. Entrepreneur (2013).

If we talk about, the gross profit of this business, there is no cost to generate the electricity, because, the wind is the main source to generate electricity, this is the best advantage for renewable energy sources. So, whatever is obtained from the sales, is going to be the gross profit for the company. Moreover, the expected gross profits and also sales will be around 105.000 for the first year, 120.750 for the second year, 138.863 for the third year, 159.962 for the fourth year and 183.646 euros for the fifth year.

#### **4.2 SWOT Analyze:**

SWOT analyze is responsible to examination of strengths, weaknesses, opportunities and threats of a business.

##### **4.2.1 Strengths:**

-Production of wind energy is reliable, because there is no consuming risk life fossil fuels.

-There is no cost for fuel usage.

-Increasing of wind power plants will create new job opportunities and this will also help to economy.

-Because of it is renewable energy source, it is clean and has no emission effect.

#### **4.2.2 Weaknesses:**

-It is difficult to know when wind will blow.

-Like every renewable energy sources, it has less efficiency when it is compared with non-renewable energy sources.

-Wind energy technology need huge constructions and it causes land consuming.

-Renewable energy sources have higher cost to give start-up (setting up) to business.

-Energy industry is managed by strict policy, policy changes might cause sudden changes on the business.

#### **4.2.3 Opportunities:**

-Using larger wind turbines will increase generated electricity amount but will also cause increasing of investment cost.

-If direct drive wind turbine models is used, it reduces operating and maintenance costs.

-Offshore wind will help to increasing of electricity production.

#### **4.2.4 Threats:**

-Breakdown or failure risks on machines, turbines or etc. (ex= braking down on electricity transferring)

-Fire risk because of intensive electrical flow or electrical leakage.

### **4.3 Resource Based Theory:**

As a consequence of the globalization of the economy, many of enterprises had been started to find new management and business strategies in order to compete in markets. According to Martin M. Caldeira and John M. Ward (2001), resource based theory has been developed in order to realize how organizations could take advantages which are sustainable and competitive. Development of the accessibilities of resources, makes the resource based theory more important and usable in businesses. Irina V. Kozlenkova, Stephen A. Samaha and Robert W. Palmatier (2013) declared that, the use of resource based theory has increased by more than %500 in the past decade, that shows the resource based theory has become an importance as a framework examining and foreseeing the benefits of outcomes. Barney, J.B. and Clark, D. N. (2007) also demanded that the resource based view and theory has emerged over the last fifteen years as one of the leading perspectives that used in strategic management processes of businesses.

Inside of the book which named "Mastering Strategy Management", the resource based theory described as an importance of having important competitive advantages over organizations by Dave Ketchen and Jeremy Short. Same authors categorise the characteristics of resources within four subtitles which are 'valuable', 'rare', 'difficult to imitate' and 'nonsubstitutable' because they believe that these four qualities could create sustained competitive benefits. The resource based theory takes an attention that, strategic resources and other resources are in different categorises which means even many of resources have being used in organizations only the strategic ones are important for the resource based theory (Dave Ketchen and Jeremy Short, 2014). According to Michael H. Zack (2008), it is important to have resource based theory at the business strategy level, in order to explore the relations between



resources, competition, profitability and the differences between competing firms in markets. F. J. Acedo, C. Barroso and J. L. Galan (2006), declared that in their study, the resource based theory has two dimensions in its nature which are related to organizational learning and knowledge and related to different areas of management such as human resources, marketing, environment, quality management and so forth.

As explained in previous paragraphs, resource based theory is one of the most important framework for having an efficient strategy management in businesses. Previous research studies show that, use of resource based theory rate has being increased day by day in order to reach the goals in businesses.

#### **4.4 VRIO/VRIN Framework:**

VRIO Framework is founded by J. Barney in 1991. The framework is a term which is used to define a firm's internal resources and capabilities to know if they can be a source of sustained competitive advantage or not like Value Chain. The VRIO term existed within the usage of initials Valuable, Rare, Imperfectly Imitable and Non-Sustainable words. Then, this framework is developed and its name became VRIN because of initials of Valuable, Rare, Costly to Imitate and Organized the capture the value of resources words. If a resource or capability that needs all these 4 properties will provide sustained competitive advantage for a company according to this framework.

##### **Valuable:**

If sources provide value to the firm, these sources can be shown as a source of competitive advantage.

### Rare:

Resources which can only be get one or few companies are considered rare. Valuable and rare sources provides temporary competitive advantage. When same resource is used by more than few companies causes to competitive parity.

### Costly to Imitate:

Costly to imitate observes for resources that how much cost will occur if another manufacturer company makes an imitation product of a company. How expensive this production will be, it provides secure for a business directly proportional. For electricity generation, imitation product is out of the question.

### Organized to Capture Value:

The resources itself do not confer any advantage for a company if it's not organized to capture the value from them. A firm must be responsible to organize its management system, organizational structure, policies and processes if wants to know its potential on valuable, rare and costly to imitate subjects. After this point, a firm can provide sustained competitive advantage for itself. Ovidijus Jurevicius. (2013).

On the table on the below, VRIO analyze of this business is shown.

<u>Resources</u>	<u>Value</u>	<u>Rare</u>	<u>Inimitability</u>	<u>Organizing</u>	<u>Net Score</u>	<u>Competition Advantage</u>
Site & Location	5	3	5	5	18	Sustainable Advantage
Managerial Vision	5	4	5	5	19	Sustainable Advantage
Efficiency	5	5	5	5	20	Sustainable Advantage
Recruitment of Staff	5	4	5	4	18	Sustainable Advantage

So, we can say that, the business have serious sustainable advantages according to site & location, managerial vision, efficiency and recruitment of staff resources.

#### **4.5 Building Blocks of the Business Model:**

##### Customer Relationships:

-To arrange meetings with eligible consumers to explain what discounted electricity selling to themselves. These meetings will be made by a staff which is responsible from marketing.

##### Customer Segments:

-Government

-Work places, offices, houses, fabrics or etc. (but which are can be counted as eligible consumers)

##### Key Partners:

-Other energy companies. (Zorlu Energy, Aksa Enerji or etc.)

##### Key Resources:

-Staff (Engineers, manager, board engineers or etc.)

-Facility

##### Key Activities:

-Generating electricity from wind energy conversion in power plant.

-To provide revenue with selling of electricity which will be produced.

##### Value Propositions:

-Selling electricity with more affordable price to eligible consumers rather than the amount which government sells.

##### Cost Structure:

-Meeting of electricity need of the power plant

-Operation and maintenance cost

-Installation cost

-Levelized cost of electricity

-Grid connection cost

-Other capital cost

-Salaries of the staff

-Civil work

-Machinery

-Insurance

Revenue Streams:

-Revenue will be provided by selling of electricity to the government and to eligible consumers.

## **CHAPTER-5 BUSINESS PLAN**

### **5.1 Overall Assessment of Business Plan:**

#### **5.1.1 Product and Service:**

Electricity is the only production in this business. The business aims to produce as much as electricity. Electricity will be obtained by energy conversion. The wind which comes to turbine blades will provide turning of rotor blades and this kinetic energy will be converted to electricity. So, the product will be obtained with this system basically. Moreover, the service part is responsible from transferring the electricity to the main grid.

#### **5.1.2 Legal issues:**

Legal issues is the hardest part for setting up of an energy power plant in Turkey. Especially, for non-renewable energy sources the issues are really strict. Because, energy sources should affect the environment and the future as minimum as possible. So, in all around the world, governments puts really serious rules about energy power plant investments. Renewable, energy sources have not so strict issues like non-renewable energy sources. However, of course there are some legal issues for renewable energy sources as well. These issues mainly based on not to affect the environment. The examples can be; wind power plants should not be set up rough grounds or migration of bird routes should not be affected or etc. The other main examples are shown on chapter 3. Consequently, for setting up for wind power plants in Turkey needs 3 certificates which are government policy and issues, ISO 14001 and ISO 9001. After, getting of permission of these 3 certificates, wind power plant construction can be begin.

### **5.1.3 Financial Evaluation:**

Making investment on renewable energy sources is one of the best idea in Turkey. Within increasing of electricity demand, electricity prices also shows slight increase every year. So, it is almost not to make good profits with electricity selling. Furthermore, I can say that, sales which is given in Chapter 3's finance part, can be obtained easily and within 15 % growing rate, payback period will occur between third and fourth years and breakeven will occur until at the end of the second year. Low risk is sometimes really important key for a new company which makes big investment. That is why, leasing method is thought for this project. This leasing will not only make risks lower for the business, also it will help to decrease expenses on start-up progress. When the payback period come, the power plant can be improved, energy capacity can be increased with addition of new wind turbines. Thus, for long term big incomes can be obtained.

### **5.1.4 Risk issues:**

Like in every business or every investment, this business has some risks as usual. However, including risk for a business, it can not be the meaning that, business should not be done. On the other hand, these risk should be reduced as minimum as possible or be made disappear for some businesses like this business. But, without getting risk, it is almost impossible to reach the goals for a business. For a wind power plant it can be said that, there are 3 main risks. The first and the most dangerous one is, electrical leakage. As everybody knows, the locations where includes electrical transmitting or transferring, there is a huge density in terms of electricity. Furthermore, this electricity transmitting or transferring has really serious risks for human life. If an electrical leakage exists in a part of wind power plant, this leakage might cause a huge fire and cause burning of whole power plant. That is why, security

systems have to be reliable and people who are responsible from security systems always have to be alerted to block this risk.

The second risk is technical breakdowns. Because, technical breakdowns will cause to stop of a wind turbine or if this breakdown will be from a main part of the wind power plant, this breakdown will cause to stop whole power plant and to stop of a wind turbine or power plant means no electricity generation. No electricity generation means no product for this business and no product means no sale. Thus, to reduce breakdowns as possible will help to continuity to working the power plant and also making money. On the other hand, breakdowns create unexpected maintenance costs. So, we can say that, breakdowns won't only block the sale of electricity, will also create unexpected expenses for the company. That is why, reliable technology usage plays a really important role to provide better financial status for our company.

Weather condition can be counted as third risk for this business. Less wind velocity or so sever wind velocity cause to stop of wind turbines. Less wind velocity (less than 4 m/s) does not have enough power to turn rotor blades, high wind velocity (more than 11 m/s) might cause to breakdowns on the machines. That is why, getting efficient wind velocity is really important for sustainability and working of this this work. Çeşme/İzmir area is one of the best area for a wind power plant in Turkey in terms of wind velocity. Besides, I have been in some wind power plants near this area. So, I can say that, I have a really good knowledge about the area and I can say that the area is reliable in terms of wind velocity. Moreover, analyze of wind data is made for last year. As a consequence, according to me, this business won't face with a serious problem according to wind velocity.

#### **5.1.5 Organizational Feasibility:**

Organizational structure can be analyzed with 2 main topics. First one is risk of operations. Blocking or reducing of electrical leakage and breakdown risk and not to get enough wind velocity for working of power plant are the risks of this business. That is why, an organization report should be prepared by professional people about this subject to reduce the risk and this can be counted as part of organization plan.

This topic is explained more detailed in risk issues part. The second is about to obtain the licenses and certificates which has to be taken for setting up the wind power plant. These are called as; wind power plant set up permission license, International Organization for standardization (ISO) 14001 and 9001 certificates. Without getting of these documents, it is impossible to give start up to the construction of wind turbines.

#### **5.1.6 Marketing Matters:**

Energy and electricity demand shows a really rapid increasing in every year within growing of human population in all around the world. We can also say the same thing for Turkey as well. As it is explained before in Chapter 3 in market and industry analyze part, Turkey is a dependent country to another countries to supply its energy and electricity demand. Moreover, its fossil energy sources consume rapidly because of growing of human population. Because of this, in Turkey, there are many investments on renewable energy projects. As it is shown before, Turkey showed 122 % increase in wind energy capacity between 2010 and 2013. This is the proof of both making investment on wind energy is a great idea to make money for a company and supply is really inadequate for demand of electricity and electricity without getting help from another countries. Renewable energy is not only for future, it is also really sustainable because of not affecting environment seriously. In addition, if a local wind turbine manufacturer will be in the market



in near future, expenses will decrease so much and this will help to make payback period shorter for companies which will make investment on energy sector. All in all, it is an exact thing that to make investment on wind energy sector will provide perfect incomes for energy companies and when the payback period comes, this business idea can be enlarged within increasing the capacity of the wind power plant with addition wind turbines. Thus, we can clearly say that, not providing benefit, income and sustainability on this project almost impossible. It is one of the best idea to make investment on a business.

#### **5.1.7 Overall Resource Sufficiency:**

Before setting up a business, to discuss and compare advantages and disadvantages is the progress which decision is going to be taken. This helps to give an answer to this question. Is this business is going to be made or not? When we analyze this business, we can say that like every job, this business also both advantages and disadvantages. If we start to count advantages, firstly it might be mentioned about payback period. Payback period is short for this business. Generally maximum payback period is seen in 6 years. There is almost no company which gets their payback period longer than 6 years. But, wrong management and bad trading behaviors cause to make payback period for energy companies. So, I can clearly say that, management and trading should be done in really logical way, especially trading. This business, will not make trade for first 5 years not to take risk, the electricity price will be decided before selling to eligible consumers. So, because of having fixed price, financial calculations will not show too much difference with reality. The second advantage is, there is no need to pay big amount for marketing. Because, the capacity of the wind power plant is not too much, thus, selling of whole electricity which is going to be obtained will be easy. The third one is, wind energy will be used as a source, as mentioned before, there will not be any cost for producing

the electricity. Gross profit will be equal to sales and this is a great advantage for a business. On the other hand, the biggest disadvantage of this business is needing huge amount money to make investment, but this problem is fixed with leasing tactic, so, because of reducing the price for this business, we can afford the amount, so we will not pay huge amounts for this business. The second disadvantage can be shown as license and certificate needs, this step needs a time to getting necessarily permissions. The third disadvantage is, unexpected breakdowns and electrical leakages. All in all, when we take everything into account, disadvantages are not big issues to give start up to this business, on the other hand, the advantages of this business is really effective. Consequently, this business has a great potential to make good profits.

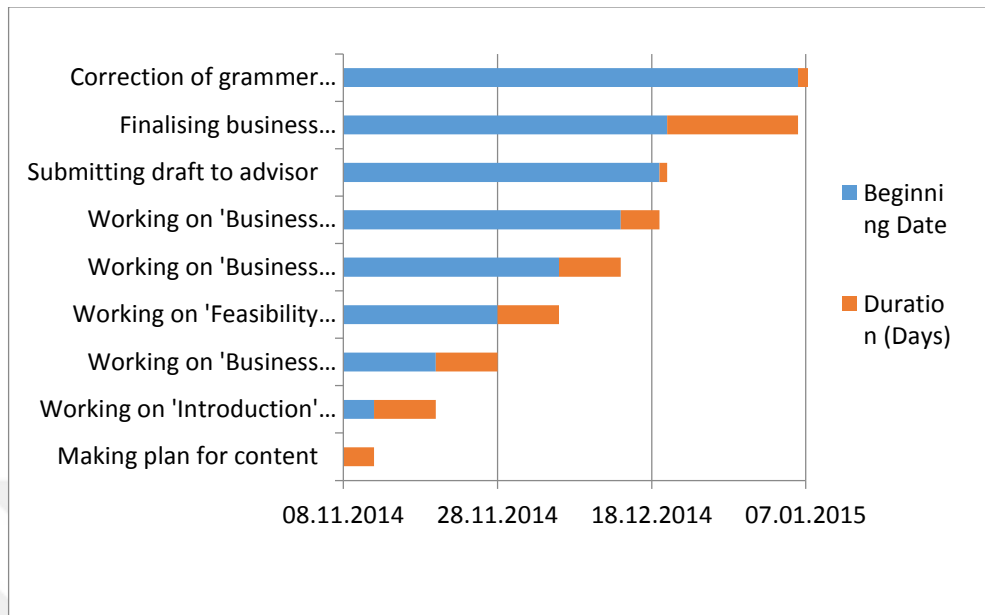
## **5.2 Proposed Plan of Action:**

Task Number	Description	Week
1	Setting up of ACA Company	4 weeks
2	License and Certificate Agreements	5 weeks
3	Funds Arrangement	1 week
4	Construction of the Wind Power Plant	10 weeks
5	Recruitment of Staff	3 weeks
6	Making Negotiation and Deal with Turkish Government and Eligible Consumers	4 weeks
7	To Give Start Up To Business	1 week

The actions is shown on the above on the table. Firstly, as it is mentioned before in this business plan, this company will be a new company. So, the first main task is setting up the company. This

company will set up between me and 2 friends of mine. The company will be limited company. Secondly, without providing compulsorily permission, it is not a legal action to give start up to a business. Otherwise, the business will be stopped by government as everybody knows. So getting of wind power plant set up permission license, ISO 14001 and ISO 9001 certificates is the second task of the company. Can Nalbantoğlu is responsible from these agreements. Thirdly, a detailed fund arrangements is going to be made about everything to obtain more reliable results. Also, in this arrangement it is going to be discussed that how expenses can be reduced, how wages can be arranged to optimum level or etc. This arrangement is going to be between me and Ali Çelebioğlu and Can Nalbantoğlu. The fourth case is to give start up to the construction, this will be the longest period between these 7 actions with 10 weeks period. The fifth one is recruitment of staff, this task is a really critical period to find quality and professional staffs for the business. Because, this business really needs perfect knowledge about electrical, mechanical and chemical engineering, so if it is going to be believed that, adequate staffs have not been found, this 3 weeks period might be longer to find better staffs. All 3 of us is responsible from fifth case. The sixth action is responsible to make agreement with Turkish Government and also to make marketing meetings with eligible consumers. This is going to be made by Ali Çelebioğlu. The seven and last one is to give start up to our business after completed first 6 tasks in the chart on the above.

In the Gantt Chart on the next page, it is showed that the progress while this business development proposal was preparing.



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## **APPENDICES**

1)

### **I. Turkey's Energy Profile and Strategy**

With a rapidly growing economy, Turkey has become one of the fastest growing energy markets in the world. Turkey has been experiencing rapid demand growth in all segments of the energy sector for decades. Over the last decade, Turkey has been the second country, after China, in terms of natural **GAS AND ELECTRICITY** demand increase. Turkey is expected to become one of the most dynamic energy economies of the world in terms of increase in energy demand.

The limits of Turkey's domestic energy sources in light of its growing energy demand have resulted in dependency on energy imports, primarily of oil and gas. At present, around 26 % of the total energy demand is being met by domestic resources, while the rest is being provided from a diversified portfolio of imports.

The primary aim of Turkey is to realize its own energy **SECURITY**. To this end, Turkey has for objective to

- diversify its energy supply routes and source countries,
- increase the share of renewables and include the nuclear in its energy mix,
- take significant steps to increase **ENERGY EFFICIENCY**,
- contribute to Europe's energy security.

It is estimated by the International Energy Agency (IEA) that Turkey will likely see the fastest medium to long-term growth in energy demand among the IEA member countries. On the other hand, it is estimated that total final energy demand and the total primary energy demand will more than double and reach at 170.3 and 222.4 Mtoe respectively by 2020. It is also estimated that **ELECTRICITY**, natural gas and oil demand will reach at 398-434 billion kWh, 59 BCM and 59 million tons respectively. In order to meet such an immense growth in energy demand, huge levels of investment is required as well in all three sectors alike. The Turkish Government is giving priority to the private sector for **FINANCING** these investments and has taken in that respect the necessary steps to facilitate the investment environment.

2)

Enerji Piyasası Düzenleme Kurulu (EPDK), elektrik piyasasına yönelik 2014 yılı için serbest tüketici limitini belirledi. EPDK kararına göre, 2013'te 5 bin kilovatsaat olan serbest tüketici limiti, 2014 yılı için 4 bin 500 kilovatsaate düşürüldü.

Konuya ilişkin EPDK kararı Resmi Gazete'nin bugünkü sayısında yayımlandı.

Mesken abonesi için her türlü vergi, fon ve paylar dahil olmak üzere kilovatsaate 35,44 kuruş baz alınarak yapılan hesaba göre, aylık yaklaşık 133 lira harcaması olan konut abonesi serbest tüketici olabilecek ve **ucuz elektrik** kullanabilecek.

Serbest tüketicilere, tedarik lisansı sahibi tüzel kişiler, elektrik enerjisi satışı yapabiliyor ve dağıtım şirketlerinden alınan fiyata göre yüzde 5-10 oranında indirimli tedarik sağlayabiliyor..

Toptan ve perakende satış şirketleri aracılığıyla ellerindeki elektriği daha uygun koşullarda müşterilerine satabiliyor. Burada talep birleştirme imkanının da olması sadece küçük ölçekli sanayi tesisleri için değil vatandaşlar için toplu konutlar, AVM, şubeler, kamu kurumları gibi çok geniş bir alanda tüketicilerin serbest tüketici olanaklarından yararlanmasını sağlıyor.

3)

## Serbest Tüketici Nedir?



Enerji Piyasası Düzenleme Kurumu (EPDK) tarafından belirlenen elektrik enerjisi miktarından (2013 yılı için Serbest Tüketici Limiti: 5.000 kWh/yıl) daha fazla tüketimi olan veya iletim sistemine doğrudan bağlı olması nedeniyle tedarikçisini seçme serbestisine sahip gerçek veya tüzel kişiler Serbest Tüketici olup kendi tedarikçilerini seçme hakkına sahiptir.

### Serbest Tüketici Olma Şartları:

- Bağılı Olunan Dağıtım Şirketi/Mevcut Tedarikçi'ye karşı bir yükümlülüklerini yerine getirmiş olmak
- Enerji Piyasası Düzenleme Kurumu (EPDK) tarafından yayımlanan Sayaç Tebliğine uygun çok zaman dilimli ölçüm yapabilen elektronik sayaca sahip olmak
- EPDK'nın yayınlamış olduğu "Serbest Tüketici Limiti"nden daha fazla elektrik enerjisi tüketiyor olmak. (Bu limit her yıl EPDK tarafından Kurul Kararı ile güncellenmekte olup, 2013 yılı için 5.000 kWh/yıl'dır. Tüketici tek bir tüketim noktasındaki tüketimi ile bu şartı sağlayacağı gibi aynı tüzel kişilik adına kayıtlı aynı veya farklı dağıtım bölgelerindeki birden fazla aboneliğinin toplam tüketimi ile de serbest tüketici limitini geçtiğini ispatlayabilir.)

4)

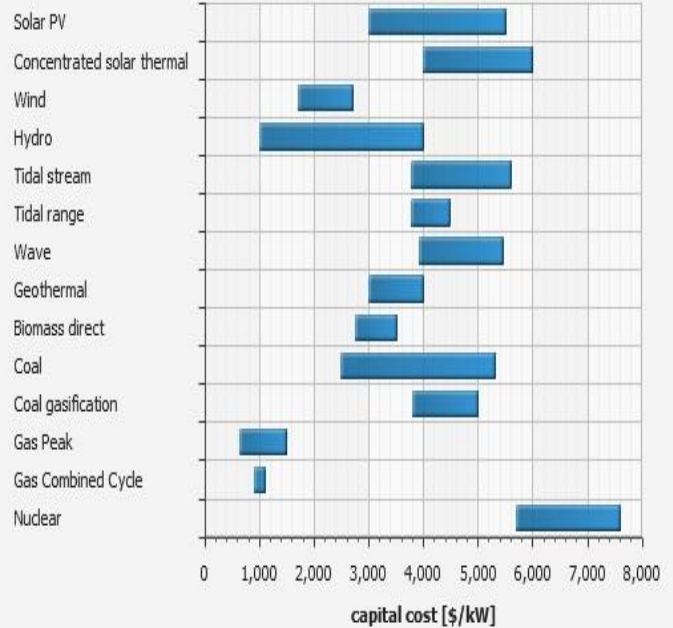
### Capital Costs

**Capital costs** are the upfront costs to construct the plant and major maintenance work that needs to be carried out during the lifetime of the plant beyond typical operating expenses.

To compare different technologies, capital costs are divided by the peak power (or "name plate power") of the plant to get the **specific capital cost**, where the peak power is the maximum electric power that the plant can deliver.

As the cost for most plant components, especially electric, rises with the required power, the specific capital cost is useful to compare the upfront costs of different technologies.

Among renewable energy sources, **SOLAR ENERGY** is the most capital-intensive. However, this is easily exceeded by nuclear power stations.



### Operating Costs

**Operating costs** cover operations, maintenance and, where appropriate, costs for fuels. **RENEWABLE ENERGY** plants tend to be very low on operating costs in comparison with fossil fuel generators.



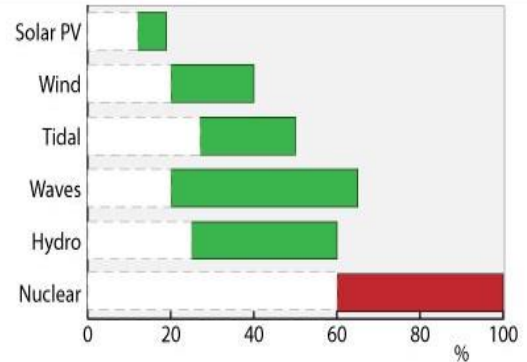
### Capacity Factor

The capacity factor of a power station is the ratio of average output power to peak power that the station could deliver. Due to fluctuations in the availability of the primary energy source and outages due to maintenance of the equipment, the capacity factor is never 100%. In fact, for renewable energy sources, it is mostly below 50%.

The capacity factors of **SOLAR** plants are particularly low. After all, the sun is only half of the time above the horizon.

Why is this important?

- All electrical components have to be sized such that they can deliver peak power, which is more cost-efficient when the plant runs at high capacity.
- Higher capacity factors imply less fluctuation.

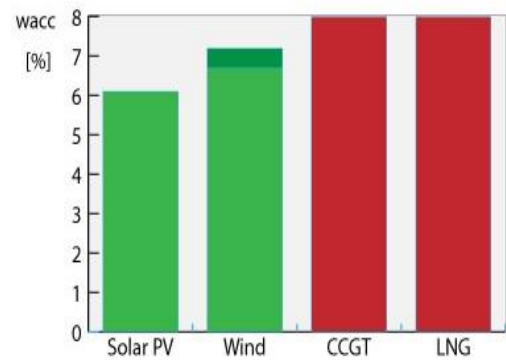


### Cost of Capital

The weighted average cost of capital is a measure of how much money the plant has to pay banks and investors in order to provide them with their expected return on the assets. The returns are shared by **DEBT** providers (banks) and investors.

This expected return also reflects the risk associated with the business, or in this case, technology. According to figures published by *Zelya Energy*, **SOLAR** photovoltaics are considered a lower risk than wind or liquid gas turbines (LNG).

The wacc is impacted by level of maturity of technology, predictability of the energy yield, fuel supply risk and also policy risk. The expectation of rising carbon prices could increase the cost of capital for coal-fired power plants in future. The risk of **SOLAR PV** is particularly low because the forecast of energy yields of solar modules is more accurate than for other sources.



### Levelised Cost of Energy

The levelised cost of energy (Lcoe) is the price (per kWh) for generated electricity that makes the net present value of the **INSTALLATION** zero. In other words: If the sales price is lower than the Lcoe, the plant does not provide the required return. It is a measure of the **cost of ownership** of the plant.

$$LCOE = \frac{\sum_{i=0}^N \left[ \frac{I_i + O_i + F_i - ITC_i - PTC_i}{(1+r)^i} \right]}{\sum_{i=0}^N \left[ \frac{E_i}{(1+r)^i} \right]}$$

$I_i$	Investment costs in year i
$O_i$	O&M costs in year i
$F_i$	Fuel costs in year i
$ITC_i$	Investment tax credits in year i
$PTC_i$	Production tax credits in year i
$E_i$	Energy generated in year i
$r$	wacc
$N$	Lifetime of project (years)

We are deducting tax credits from costs in this formula, as they are benefits independent from the sales price level. It is particularly important to take into account any capital allowances (investment tax credits), as their availability may be limited to certain technologies.

In the absence of availability of tax credits, and assuming that the investment is all made in the first year with constant operating costs and annual energy yield, the formula becomes:

$$LCOE = \frac{1}{E_0} \left[ \frac{rI_0}{1 - \frac{1}{(1+r)^N}} + O_0 \right]$$

### Sensitivity of the levelised cost of energy

The levelised cost of energy is a very sophisticated measure, as it takes into account the capital costs, operating costs, cost of capital, capacity factor, generated electricity as well as the timing of all flows.

On this basis, **RENEWABLE ENERGY** sources are clearly very competitive. Nevertheless, the high capital outlay for renewables is often an obstacle.

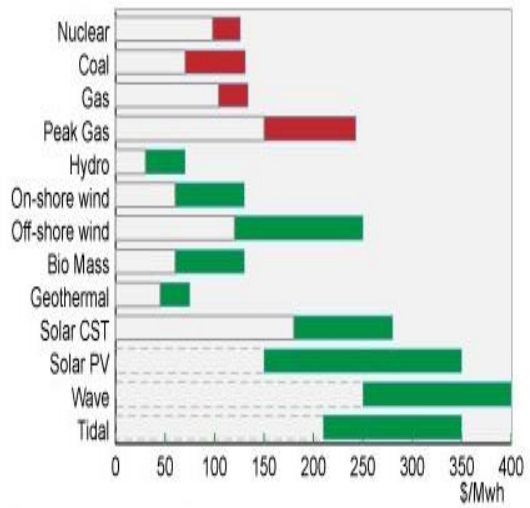
We have calculated the sensitivity of the levelised cost of energy to variations in a number of parameters of a 1MW **SOLAR** park. While varying parameters within a +/-5% range (as shown in diagram), the LCOE varies within expectation.

The big unknown, however, is the cost of capital. Changing the wacc from 7% to 6% in the same calculation, results in a (-9%) - swing in the level of the cost of energy.

Whilst the levelised cost of energy is the most comprehensive measure, it should be read with utter caution, especially when it is used to compare different technologies.

Nevertheless, this is the one figure to use when deciding on one project over another one on pure economic basis.

### Levelised Cost of Energy by Technology



### Sensitivity of Levelised Cost of Energy

