

# INCEPTION REPORT

## PROMOTION OF GRID-CONNECTED RENEWABLE ENERGY IN TURKEY

Impact Assessment of the increased use of RE  
in Turkey with Regards to Economy, Climate  
and Energy Efficiency



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On behalf of:



Federal Ministry  
for the Environment, Nature Conservation,  
Building and Nuclear Safety

of the Federal Republic of Germany

**giz** Deutsche Gesellschaft  
für Internationale  
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## Content

1. Executive Summary .....	3
2. Project Synopsis.....	4
3. Analysis of the Project.....	5
3.1. Background and Project Context .....	5
3.2. Promotion of Grid-Connected Renewable Energies in Turkey .....	5
3.3. Impact Assessment of the Increased Use of RE in Turkey with regards to Economy, Climate and Energy Efficiency .....	6
4. Project Progress to Date .....	8
4.1. Kick-off Meeting .....	8
4.2. Familiarizing with Data Resources .....	8
5. Project Planning and Implementation .....	10
5.1. Project Planning and Methodological Approach .....	10
5.2. Indicators and Impact Assessment.....	10
5.2.1. Environmental Indicators .....	11
5.2.2. Social Indicators .....	12
5.2.3. Economic Indicators .....	14
5.3. Development of Scenarios .....	16
5.4. Development of the Excel-Based Policy Tool .....	17
5.5. Organization of Events .....	17
6. Risk Assessment.....	19
7. Workplan.....	20

PROMOTION OF GRID-CONNECTED RENEWABLE ENERGY IN TURKEY

**Project Title:** Promotion of Grid-Connected Renewable Energies in Turkey  
**Project Number:** 11.9039.6-001.00  
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## **1. Executive Summary**

The assignment of “Impact Assessment of the increased use of RE in Turkey with Regards to Economy, Climate and Energy Efficiency” aims to support the Project, Promotion of Grid-Connected Renewable Energies in Turkey. The assignment aims to analyse the impacts of renewable energy resources against environmental, social and economic indicators, which will also lead to presentation of the results of possible RE implementation scenarios based on targets that have been developed by the Republic of Turkey. The assessment of REs and development of scenarios will result in an excel based tool which will then serve the decision makers as a policy tool for future planning of energy mix of Turkey.

This inception report aims to reveal the methodologies and approaches of the project implementation, together with the reasoning behind the choices of indicators and methodologies. Detailed information on the methodologies, approaches and scope are available at the 5th Chapter of this report for each deliverable in the ToR. The final report and other deliverables such as some indicators, scenarios and excel based policy tool may be further shaped and improved as the research continues and as the feedbacks from the RE experts and investors are received at the first workshop. Therefore, the inception report draws a flexible framework and roadmap for the implementation of the assignment which is expected to increase the overall quality of the project. Finally, the report defines the timeline of each activity planned including the share of responsibilities between the partners.

## 2. Project Synopsis

<b>Project Title</b>	Promotion of Grid-Connected Renewable Energies in Turkey
<b>Project Number</b>	11.9039.6-001.00
<b>Assignment</b>	Impact Assessment of the increased use of RE in Turkey with Regards to Economy, Climate and Energy Efficiency
<b>Country</b>	Turkey
<b>Objectives</b>	<ul style="list-style-type: none"> <li>Analyse the impacts of increased use of renewable energy against several parameters such as employment, economic growth, energy import dependency.</li> <li>Present the possible economic, environmental, social, energy-security-related and climate-related impacts of an optimised implementation of various scenarios in expanding power generation from renewable energy sources</li> <li>Advise to measure and monitor the impacts brought about through increased use of renewable energy in Turkey.</li> </ul>
<b>Planned Outcomes</b>	<ul style="list-style-type: none"> <li>A clear picture of renewable energy sector with credible and recent data as well as the renewable energy targets and policies.</li> <li>List of socio-economic, environmental and energy security indicators with description and possible parameters to analyse the impacts of renewable energy</li> <li>An analysis of impacts of increased use of energy renewable energy projects by socio-economic, environmental and energy security indicators, which will be aggregated for the whole sector in Turkey</li> <li>An excel-based methodology and tool to monitor and evaluate the impacts of renewable energy projects concurrently, annually or in long-term, based on the targets of Turkey.</li> </ul>
<b>Technical Team</b>	<p>Technical Team is composed by:</p> <ul style="list-style-type: none"> <li>Project Coordinator, Dr. Farız Taşdan</li> <li>Team Leader/Senior Expert, Gamze Çelikyılmaz</li> <li>Senior Expert, Engin Mert</li> <li>Junior Expert, Barış Alican Kağan</li> <li>Junior Expert, Esra Koç</li> </ul>
<b>Project start date</b>	4 April 2017
<b>Project time period</b>	April 4- June 30 2017

### **3. Analysis of the Project**

#### **3.1. Background and Project Context**

Turkey submitted its Intended National Determined Contribution (INDC) on climate change with the aim of reducing its GHG emissions up to 21% in 2030. According to Turkey's several official strategy and action plan documents, Turkey's national vision includes the aim of integration of climate change policies with its development plans and to increase the use of renewable energy sources. Also, as per the energy targets defined within the scope of Turkey's climate change action plan, Turkey plans to increase the share of renewable energy in the electricity generation and to increase the capacity building studies within the country.

Although renewable energy usage has been increasing in recent years, Turkey has a lot more renewable potential. And also, there are still some challenges regarding legal, economic and technical conditions. The policies need to be strengthened and the government, administration, private sector (including the banking sector) and civil society need more knowledge, awareness and communication on promoting renewable energy.

With the intent of reducing greenhouse gas emissions and improving Turkey's supply of electricity from available renewable energy sources, and helping to protect the climate, increase energy security and strengthen the Turkish economy, several projects are being funded in Turkey by developed countries.

#### **3.2. Promotion of Grid-Connected Renewable Energies in Turkey**

In order to support and promote renewable energy sources, German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) commissioned a project in Turkey called "Promotion of Grid-Connected Renewable Energy in Turkey". The beneficiary of the project is Republic of Turkey, Ministry of Energy and Natural Resources. The project had started its activities in 2013 and planned project end date is 2017. The project aims to assist Turkish institutions to harness German and international experience in the renewable energy sector. By applying this knowledge, it is aimed to enable the improvement of the energy policy framework and push for greater use of renewable energies in line with Turkey's sustainable energy goals. Furthermore, the project aims to communicate know-how that will allow Turkey to sustainably integrate increasing volumes of renewably generated electricity into the grid.

One of the main approaches of the project is to provide capacity increase among the government and related institutions and giving them useful tools to support the enforcement of the current legislation on renewable energy feed-in, as well as other relevant frameworks, and to monitor progress. Furthermore, recognition of the benefits of increased use of

renewable energy sources by the policy-makers and the sectoral stakeholders is promoted within the studies. This way, it is intended to make the related responsible institutions understand the challenges and develop strategies and policies to deal with them.

With those approaches; needs analysis report, organizing renewable energy events, designing useful tools, writing technical reports on the situation in Germany, making comparative analyses on Turkish and German legislations and giving capacity increase trainings are some of the studies conducted within the context of the project so far.

Since there is still considerable need for awareness rising on the beneficial side of renewable energy, to be able to gain wider public support for expanding the use of renewable energy, GIZ now conducts another study under the “Promotion of Grid-Connected Renewable Energies in Turkey” project. The main objective of this task is to analyze the impacts of increased use of RE in Turkey.

### **3.3. Impact Assessment of the Increased Use of RE in Turkey with regards to Economy, Climate and Energy Efficiency**

In the need for awareness rising on the beneficial side of renewable energy to help accelerate the achievement of Turkey’s sustainability targets, Promotion of Grid-Connected Renewable Energies in Turkey project still continues capacity building implementation. Besides the technical analyses and trainings conducted so far, an evaluation on the positive impacts of promoting renewable energy is also necessary to raise awareness among the related sectors and public. Thus, with these in mind, GIZ has decided to perform an impact analysis named “Impact Assessment of the increased use of RE in Turkey with Regards to Economy, Climate and Energy Efficiency”. This project aims to analyze the impact of RE in Turkey from the perspective of several environmental, social and economic indicators based on various scenarios. Analyses will be evaluated per different technology types such as wind, solar, hydro, geothermal, biogas and landfill to electricity power projects. The project also targets to develop advices to measure and monitor these impacts brought by the increased use of renewable energy in Turkey. The preliminary list of indicators is provided explained in Section 5.2 of this report which is open to further development. Main expected deliverables of the project are as follows:

- A clear picture of renewable energy sector with credible and recent data as well as the renewable energy targets and policies
- List of environmental, social and economic indicators with descriptions and possible parameters to analyze the impacts of renewable energy
- An analysis of impacts of increased use of energy renewable energy projects by the selected indicators, which will be aggregated for the whole sector in Turkey
- An excel-based methodology and tool to monitor and evaluate the impacts of renewable energy projects concurrently, annually or in long-term, based on the targets of Turkey.

## Inception Report

- One Workshop which aims to discuss the operationalization of the indicators and a final Workshop which aims to reveal the outcomes of the assignment with relevant stakeholder groups

During the assessment of indicators, feedbacks from the energy sector in Turkey will be considered as an important input for the evaluation. It is also expected that the results of the work will be shared with related institutions through workshops.

At the end of this project, a Technical Impact Assessment Report analyzing the impacts of increased use of renewable energy will be prepared as well as developing a tool to monitor the impacts.

## 4. Project Progress to Date

During the inception phase, the Consultant elaborated a detailed work plan of the activities taking into account the ToR. For each deliverable, the Consultant identified and analyzed activities and steps, identified data sources and defined relevant outputs and experts' input per each deliverable. The work programme is available at Chapter 7.

### 4.1. Kick-off Meeting

The Kick-off Meeting of the project took place on 4th of April 2017 in Ankara, at the premises of the GIZ with participation of GIZ-Turkey Country Office Director and Project Officer, together with Life Enerji Experts. The meeting was the first opportunity for establishing contacts between Life Enerji Experts and GIZ representatives. Following an introduction of the participants, Life Enerji experts made a presentation of how the implementation of the project is envisaged including the selection of indicators and resources to be used for the research. The presentation was followed by a discussion regarding several operational issues such as the two workshops' organization, deliverables and deadlines and requests of the Beneficiary, Ministry of Energy and Natural Resources.

### 4.2. Familiarizing with Data Resources

Life Enerji experts are considering to review documents (legislative acts, reports, strategy papers, etc.) that could be useful for the proper implementation of the project. The following list of materials is going to be considered as a basis for developing a realistic impact assessment which will be based on real figures as well as projections of RE implementation from official documents.

#### National sources:

- Strategy Plan 2015-2019
- National Climate Change Action Plan 2011-2023
- Turkish National Reports submitted to UNFCCC
- Turkish Intended Nationally Determined Contribution to UNFCCC goals (INDC)
- Renewable Energy Law 2010
- National Climate Change Strategy 2010-2020
- Law on Geothermal Resources and Natural Mineral Waters - Law No 5686
- Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy - No. 5346
- Electricity Market Licensing Regulation
- Regulation on Unlicensed Generation of Electricity from Renewables
- Regulation on Registering and Supporting Renewable Energy Sources
- Law on Environment 2872/1983
- Regulation on Monitoring of Greenhouse Gas Emissions

## Inception Report

- Turkish Statistical Institute Publications
- MoENR, Directorate General of Renewable Energy Publications
- Gold Standard Data & Publications
- Central Bank of Republic of Turkey (CBRT) Data & Publications
- Energy Market Regulatory Authority (EMRA) Data & Publications
- TEİAŞ Data & Publications

### **International sources:**

- OECD Data & Publications
- World Bank Data & Publications
- IRENA Data & Publications
- IEA Data & Publications
- EBRD Data & Publications
- CTF Investment Plans for Turkey
- IFC Data and Publications
- WEO Data & Publications
- Voluntary Carbon Standard Data
- Social Carbon Indicators
- Scientific journals

## **5. Project Planning and Implementation**

### **5.1. Project Planning and Methodological Approach**

The ultimate goal of the assignment is to support the “Promotion of Grid-Connected Renewable Energies in Turkey” Project with analytical assessments on RE technologies that will have a positive effect on decision makers to give priority to REs over fossil fuels. Therefore indicators that are investigated under the assignment are chosen among the ones which promote the Renewable sources the most, and which might have the biggest impact on the decision makers towards Renewable energy investments.

For many indicators, the assessment has been made not only for the Renewable technologies, but also for fossil fuel technologies in order to highlight the benefits of the Renewable energy generation. All renewable energy technologies and relevant fossil fueled technologies have been assessed in a way to reveal the external costs which are not reflected to investment, operation and maintenance costs, as much as data is available.

Several resources will be used for data gathering in this assignment. The main resources will be reports, publications, statistics and official documents that are published by Turkish State institutions. Also international and national reports on RE technology impacts including scientific journals will be another important resource for making the assessments against the indicators. Also, Project Design Documents of Voluntary Carbon Asset Development tasks of RE Projects will be an important source of data for some indicators. And finally, Surveys among Renewable Energy investors will be another up to date information source for some indicators. The indicators will be assessed for the operational timeline of the renewable technologies. Therefore, a life cycle approach will not be taken due to data availability concerns.

### **5.2. Indicators and Impact Assessment**

The study will assess the impacts of Renewable Energy technologies against environmental, social and economic indicators as defined in following paragraphs. Indicators for the three pillars of sustainability have been determined in a balanced way in order to address the most critical issues for energy supply planning.

The assessment will also include some comparative analysis for the same set of indicators for selected fossil fuel types, in order to strengthen the points discussed in the report.

## Inception Report

<b>Environmental Indicators</b>	Air and Water Quality
	GHG Emission Savings
	Biodiversity
<b>Social Indicators</b>	Number of Employment
	Gender Balance
	Quality of Employment
<b>Economic Indicators</b>	Import Dependency
	Investment Costs
	Access to Investment and Financing

A draft assessment of REs against the chosen indicators will be provided for the participants at the first Workshop of the assignment, to be held between dates 18-20 May, 2017. The indicators will be further fine-tuned, developed and revised during the First Workshop of the Assignment with the help of the feedbacks from different stakeholders, if necessary. The refined indicators and draft assessment will be finalized by the end of May 2017.

### 5.2.1. Environmental Indicators

#### **Air and Water Quality:**

Fossil-fuel combustion is responsible for the emission of other pollutants, such as nitrogen oxide (NOx) and sulfur dioxide (SO<sub>2</sub>). The production of electricity from fossil fuels puts a strain on water and land resources as well. Therefore, reducing environmental impacts is a major impetus for shifting from fossil fuels to renewable energy for electricity generation.

The assessment for “Air and Water Quality” indicator will involve a deep assessment of Renewable Energy technologies in terms of the air pollutants that has been saved for each MW of electricity produced, compared to coal and natural gas emissions. The comparative analysis is expected to provide a better assessment in terms of evaluating the indicator.

The Air and Water Quality indicator will reveal liquid and gas pollutants saved for production of 1 MW of electricity by each RE technology type considering production of electricity using different types of fossil fuels such as natural gas and coal. National statistics and reports will be considered as well as international publications.

#### **GHG Emission Savings:**

Compared to fossil-fuel-based electricity generation, renewable energy technologies offer a major advantage in lower emissions of CO<sub>2</sub> and other GHGs. GHG emission savings is one of the most important reasons for many States and investors to shift from fossil fuels to renewable energy generation systems. The pressure on Turkey to set enthusiastic GHG emission reduction targets and implement Policies and Measures in order to reach the targets is increasing. Therefore, “GHG Emission Savings” indicator is considered as one the most important indicators throughout the whole study.

The assessment for “GHG Emission Savings” indicator will involve a deep assessment of each Renewable Energy type in terms of the GHG emission that has been saved for each MW of electricity produced, compared to coal and natural gas emissions. The comparative analysis is expected to provide a better assessment in terms of evaluating the indicator.

The GHG Emission savings indicator will reveal GHG emissions saved for production of 1 MW of electricity compared to the net GHG emission savings from each RE technology type considering production of electricity using different types of fossil fuels such as natural gas and coal. National statistics and reports will be considered as well as international publications.

**Biodiversity:**

The impact of renewable energy on biodiversity is generally considered to be negligible or easily mitigated by certain measures. However, wind power plants, if not planned properly; may have negative impacts on bird and bat life. If bird migration routes are not considered during planning, bird strikes could be observed during spring and autumn seasons. Blades of wind turbine cause a sudden change in air pressure; which results bats to die by explosion of their lungs (barotrauma). In order to avoid the impact on birds and bats, the layout of the turbines shall be carefully planned. Bird and bat strikes, if any, shall be monitored during the first few years of operation.

The risk on biodiversity has been highly eliminated through environmental regulations in Turkey. Ministry of Environment and Urbanism requires Ecosystem Assessment reports to evaluate the impacts on bird life. There are cases where number of turbines or project layout are revised before the license is approved. In order to assess the REs against “Biodiversity” impacts of each renewable energy technology on biodiversity will be assessed separately in comparison with the impacts of thermal power plants.

## **5.2.2. Social Indicators**

**Number of Employment:**

Regarding the impacts of renewable energy related projects, number of employment is one of the most realizable outputs from the social impacts point. The renewable energy industry is more labor-intensive when compared with fossil fuel technologies. With the increased use of renewable energy, these projects will definitely support and create new employment opportunities and employment is a key feature regarding the sustainability of the renewable energy projects. Thus, this indicator will be one of the focused points from the perspective of analyzing social impacts of renewable energy projects.

So as to assess the number of employment originating from the increased use of renewable energy, the current employment will be researched and analyzed on a sectoral level through

## Inception Report

surveys, interviews with the sectors and use of statistical employment data. Also, share of number of employment in terms of different renewable sources (e.g. wind, hydro, solar etc.) will be investigated. Where necessary, comparative analysis will be made so as to compare the situation in fossil-fuel based technologies.

Research on “number of employment” indicator will reveal the current employment level and provide an estimation about future employment potential for different renewable energy types. Estimated future number of employment created both in construction and operation stages will be studied as well as the employment rate for each unit of electricity generated from renewable sources.

### **Gender Balance:**

In addition to the number of employment generated by the renewable energy related projects, share of gender in these job opportunities is another point to be searched. Usually the gender balance does not take much notice and there are not much researches on this topic. However, it is an important subject to be pointed out to have an opinion about the possible job opportunities different genders have for their occupational lives. This indicator will provide an insight about the gender roles in different technologies. Thus, “gender balance” will be another indicator for the social impact assessment.

Gender distribution among the created employment will be investigated again through the assessment of surveys, questionnaires with the renewable energy sectors and available statistical data. In addition to the numerical employment rate analysis, the roles of genders in these sectors will be shown. Where necessary, comparative analysis will be made so as to compare the situation in fossil-fuel based technologies.

Studies on gender balance will provide an insight about the distribution of the employment among different genders as well as the characteristics of the roles that different genders have in the sector. Similar to the number of employment indicator, “gender balance” indicator will present the current gender balance among different renewable energy sectors and study the potential distribution of employment. Sectoral analysis and employment rate for each unit of electricity generated from renewable sources will be estimated through useful tools.

### **Quality of Employment:**

Within the study on jobs created with the renewable energy, quality of employment is as important as the previous two aspects. The assessment of the qualification of the employees and their roles in this area will help a better understanding of the sector and required skills for different job opportunities. Therefore, “Quality of Employment” will also be studied under the social impact assessment part of this project.

For the analysis of the quality of employment kinds of offered job positions, requirements for these jobs and the educational backgrounds of the employees will be searched. In addition

to that, types of capacity increase activities provided within their current positions will be of interest during the studies.

With the assessment of quality of employment, educational background and capacity increase opportunities brought to the employees will be shown on historical level. Estimation on future educational requirements and job potential with respect to the qualifications will be studied.

### **5.2.3. Economic Indicators**

#### **Investment Costs:**

Economic analysis of renewable energy related projects involves costs related characteristics of renewable energy investments. Type of costs have to be taken into account for the calculation of the full costs of renewable energy related projects. In this concept, this section will provide investment (capital) costs and operation and maintenance costs (OMC) of renewable energy projects in Turkey.

In order to measure the costs of renewable energy projects, the fundamental steps will be followed:

- Profitability of renewable energy projects in Turkey.
- Defining the average full costs (long-term costs and levelized costs of renewable energy) of providing on \$/kWh basis.
- Defining the marginal cost (short term costs) of providing on \$/kWh basis.

The trends and findings in Turkey and/or global scale will be illustrated and summarized in form of comparative statements. Historical levels, current situation and future expectations of the costs of renewable energy projects will be shown by using global market trends. We envisage that profitability of renewable energy projects in Turkey will be subjected to "Renewable Energy Sources Support Mechanism" which are referred to "Feed-in Tariff" and "Local Equipment Bonus".

International sources, publications and statistical approaches will be considered to define long term costs and levelized costs of renewable energy. Additionally, discount rate, feed-in tariff, short term costs and these kinds of domestic data will be acquired from national statistics and reports.

#### **Access to Investment and Financing:**

In liberal economies, the important parts of investing are the ease of access to investment and the financing these investments. The liberalization process in the energy sector created

## Inception Report

many opportunities in Turkey. On Turkey's energy agenda, renewable energy investments are one of the hot topics.

Providing various monetary and non-monetary incentives for separate technologies and establishing numerous renewable energy financing institutions offer benefits for foreign and domestic investors in Turkey. The regulations and supervisions of energy investments by an independent organization (Energy Market Regulatory – EMRA) ensures that renewable energy investments are made more transparently. Ease of access to investment and financing of investments can have an impact on the increase of renewable energy investments and this impact leads to an increase of Gross Domestic Product in Turkey.

In this project, annual development of access to investments will be illustrated for each renewable technology in comparative statements. We envision that impact of investments on GDP will be summarized by using financing of investments.

EMRA and some financing facilities such as The Turkish Sustainable Energy Financing Facility, The Turkish Mid-size Sustainable Energy Financing Facility will be useful sources to illustrate access to investment and financing.

### **Import Dependency:**

Foreign trade deficit has an important role in the Turkish economy. Although foreign trade deficit originates from public and private sector, the biggest part of foreign trade deficit belongs to private sector (Turkey implements strict fiscal policy and fiscal discipline in terms of public finance (fiscal policy)). A significant part of this deficit belonging to the private sector is the energy raw materials (coal and natural gas) imported for energy production. This situation makes foreign-dependent on Turkey in terms of energy production.

Renewable energy-based energy production can have a significant impact on Turkish economy. The increase in the use and penetration of renewable energy causes decrease in the quantity of imported energy raw materials. The reduction of imported energy raw materials can have positive impact on Turkey's Gross Domestic Product (GDP) and reduce Turkey's foreign dependency on energy production.

In this project, firstly, the sources of foreign trade deficit will be illustrated. Secondly, impacts of the imported raw materials required for energy production on Turkish economy will be stated. Lastly, the impact of reduction of imported energy sources from renewable energy use on the foreign trade deficit will be shown and the relation between Turkey's GDP and the reduced imports will be established.

We will consider Central Bank of Republic of Turkey's (CBRT) data collections and publications to gather economic data such as GDP, import and foreign trade deficit. TEİAŞ

(Turkish Electricity Transmission Company) will be considered to gather electricity production data.

### 5.3. Development of Scenarios

The other issue of the project is impact assessments of renewable energy based on specified scenarios. The scenarios will be grounded on reports and publications which are published and declared by various institutions and Ministries of Republic of Turkey. The possible and intended policies are listed below.

- Republic of Turkey Intended Nationally Determined Contribution (INDC)
- 10th National Development Plan – The Ministry of Development
- 2015-2019 Strategic Plan – The Ministry of Energy and Natural Resources
- Climate Change Strategy 2010-2020 – The Ministry of Environment and Urbanization

According to these scenarios, some policies will be implemented and capacity of production of electricity from renewable energy sources will be increased.

Policies	Targets
<b>INDC</b>	<ul style="list-style-type: none"> <li>• Increasing capacity of production of electricity from solar power to 10 GW until 2030</li> <li>• Increasing capacity of production of electricity from wind power to 16 GW until 2030</li> </ul>
<b>10<sup>th</sup> National Development Plan</b>	<ul style="list-style-type: none"> <li>• Increasing the share of renewable energy in total production to 29% in 2018</li> </ul>
<b>Strategic Plan 2015-2019</b>	<ul style="list-style-type: none"> <li>• Increasing the installed capacity in 2019:                             <ul style="list-style-type: none"> <li>○ Hydro 32,000 MW</li> <li>○ Wind 10,000 MW</li> <li>○ Geothermal 700 MW</li> <li>○ Solar 3,000 MW</li> <li>○ Biomass 700MW</li> </ul> </li> </ul>
<b>Climate Change Strategy 2010-2020</b>	<ul style="list-style-type: none"> <li>• The share of renewable energy in total electricity generation shall be increased up to 30% by 2023.</li> <li>• Wind electricity generation capacity will be raised to 20,000 MW.</li> <li>• Geothermal electricity generation capacity will be raised to 600 MW.</li> </ul>

Relevant scenarios will be selected regarding to discussions with GIZ and the Ministry of Energy and Natural Resources, at a meeting, latest by 10<sup>th</sup> of May in order to have enough time to develop draft versions to be discussed during the first Workshop of the assignment. The draft scenarios will be further developed in parallel with the Excel based policy tool

## Inception Report

development. The feedbacks from the first Workshop will support the consultant to shape the scenarios. Once the policy/policies will be chosen, at least three scenarios will be developed and assessed based on outcomes of the excel-based tool. The scenarios will be finalized together with the excel based tool by mid-June 2017.

### **5.4. Development of the Excel-Based Policy Tool**

Within this project, the excel-based tool will be prepared to monitor the impacts of use of renewable energy on specified indicators. This excel-based tool basically tends to observe and measure 2 main objectives. Monitoring of impacts of use of renewable energy on specified indicators (historical and current situation). According to specified scenarios, impacts of use of renewable energy on specified indicators (future expectations).

The design of excel will enable the user to get results of impact assessment for chosen indicator, once the aggregated electricity production, number of projects or installed capacity or related technology is entered as input data.

According to defined relationships between renewable energy parameters, such as installed capacity and annual total production, and indicators, possible future expectations will be evaluated based on specified scenarios.

The concept of the excel tool will be introduced at the first Workshop of the Assignment including the possible outcomes. The workshop will help the consultant to further shape the excel tool with possible feedbacks from the stakeholders. Also, stakeholder meetings will be held with MoENR in order to further understand the expectations from the decision-makers regarding the excel tool. The draft excel tool will be submitted to GIZ after the first Workshop, and finalized by middle of June 2017.

### **5.5. Organization of Events**

Within the scope of this assignment, two National workshops have been planned to be organized. The first workshop is planned within the first 5 weeks of the assignment and it aims to gather several representatives from Renewable Energy investors as well as state officials who are responsible from improvement of Renewable Energy generation in Turkey. The Workshop is intended to create a platform to discuss the operationalization of the indicators developed within this assignment, and to further improve them based on the feedbacks from the participants. The second workshop will be organized after the submission of the draft Final Report which will aim to present the results of the impact analysis study to several stakeholders including public institutions, potential and existing Renewable Energy investors and Non-Governmental Organizations in the field. The Final Workshop will be followed by a brief Results Report (maximum 3-5 pages) including all the outcomes of all events.

The first Workshop of the Assignment is preliminarily planned to take place at IRENEC 2017, 7<sup>th</sup> International 100% Renewable Energy Conference, which will take place in Istanbul Türkan Saylan Cultural Center between dates 18-20 May 2017. A final decision will be made upon the approval of GIZ and the Beneficiary. The session is planned for half a day Workshop which will be coordinated together with the planned sessions of GIZ at the Conference. The Workshop is planned to bring together various stakeholder groups such as decision makers, renewable energy investors, technology providers, academia, NGOs, business associations and renewable energy associations. The organization of the Workshop at an international Conference is expected to increase the number of participants. The Workshop intends to create a platform between different stakeholder groups in order to discuss pros and cons of renewables as well as the existing bottlenecks for further extension of renewable energy investments, which will finally lead to improve the assessment of indicators that are focused in this assignment. The support of Ministry of Energy and Natural Resources for participation of key stakeholder representatives, especially for State officials, will be crucial for the success of the event.

The final workshop is planned to take place in the third week of June 2017. The venue of the event will be decided together with GIZ, MoENR and the consultant in later stages. The Workshop aims to present the outcomes of the study to different stakeholder groups of renewable energy productions, especially to decision makers from state institutions in order to increase the impact of the study. Finally, a final workshop report will be submitted in the last week of June which will include the outcomes of the Final Workshop.

The Final Report of the Assignment will be submitted on the 3<sup>rd</sup> week of June before the Final Workshop. The Final report will be revised based on the reviews received from GIZ and MoENR together with the outcomes of the Final Workshop.

## 6. Risk Assessment

The research study that will serve for the assignment is considered to face some risks, which is planned to be managed in the following ways:

RISKS	RISK MANAGEMENT
<p><b>Data availability</b></p>	<p>Availability of data is considered to be one of the major risks against the success of the assignment. The excel tool, the scenarios and assessment of REs against the indicators will mainly rely on availability of data.</p> <p>In order to manage the risk of data availability, strong commitment and cooperation from the MoENR is expected in order to make data as much as possible. At the points where no data is available, statistical methods will be applied based on existing data. Also, data from foreign countries with similar economies and scientific research findings will be utilized.</p>
<p><b>Access to Data</b></p>	<p>Another risk expected is accessing the relevant data which might be confidential. Confidentiality problem is planned to be resolved with confidentiality agreements with the beneficiary to the extent possible.</p>
<p><b>Commitment from Stakeholders</b></p>	<p>The success of the project will also be affected by the commitment from stakeholders, mainly from MoENR as the Beneficiary of the assignment. Several issues such as the scenarios, dates of Workshops will need to be decided by the Beneficiary in cooperation with GIZ and the consultant. Therefore, timely reactions to invitations from the consultant will be crucial for the overall success and timely delivery of the Assignment.</p>



