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The World Bank

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Report No: PAD636

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A PROPOSED IBRD LOAN

IN THE AMOUNT OF EURO 217.6 MILLION

AND A CTF LOAN

IN THE AMOUNT OF US$ 50 MILLION

WITH THE GUARANTEE OF THE REPUBLIC OF TURKEY

TO THE

TEIAS- TURKIYE ELEKTRIK ILETIM A.S.

FOR A

RENEWABLE ENERGY INTEGRATION PROJECT (P144534)

APRIL 16, 2014

Sustainable Development Department
Turkey Country Unit
Europe and Central Asia Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective February 28, 2014)

Currency Unit for IBRD Loan	=	Euro
Currency Unit for CTF Loan	=	USD
US$1	=	Euro 0.725

TURKEY - GOVERNMENT FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

CPS	Country Partnership Strategy	NCCS	National Climate Change Strategy
DAM	Day-ahead Market	OECD	Organization for Economic Co-operation and Development
DC	Direct Current	OHLs	Overhead lines
CO2	Carbon dioxide	ORAF	Operational Risk Assessment Framework
CTF	Clean Technology Fund	PCU	Project Coordination Unit
ECSEE	Energy Community of South East Europe	PDO	Project Development Objective
EMP	Environmental Management Plan	PMUM	Electricity Market Financial Reconciliation Center (Turkish)
EMRA	Electricity Market Regulatory Agency	LAAP	Land Acquisition Action Plan
ENTSO-E	European Network of Transmission System Operators for Electricity	RER	Renewable Energy Resource
EPIAS	Electricity Market Operators	RERC	Renewable Energy Resources Certificates
EUAS	Electricity Generating Corporation	RTU	Remote Terminal Unit
GDP	Gross Domestic Product	SCADA	Supervisory Control and Data Acquisition
GEO	Global Environment Objective	SDR	Special Drawing Rights
GHG	Greenhouse Gas	TEAS	Turkish Electricity Generating and Transmission Corporation
IBRD	International Bank for Reconstruction and Development	TEDAS	Turkish Electricity Distribution Corporation
IPCC	Intergovernmental Panel on Climate Change	TEIAŞ	Turkish Electricity Transmission Corporation
kWh	Kilo Watt-Hour	TEK	Turkish Electricity Authority
MENR	Ministry of Energy and Natural Resources	TETAS	Turkish Electricity Trading and Contracting Corporation
MMS	Market Management System	UNFCCC	United Nations Framework Convention on Climate Change
MW	Mega Watt	WPP	Wind Power Plants
NTGP	National Transmission Grid Project		

Regional Vice President:	Laura Tuck
Country Director:	Martin Raiser
Sector Director:	Laszlo Lovei
Sector Manager:	RanjitLamech
Task Team Leader:	Mikul Bhatia
Co-Task Team Leader:	YesimAkcollu

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EUROPE AND CENTRAL ASIA

ECSEG

Report No.: PAD636

Basic Information		
Project ID P144534	EA Category B - Partial Assessment	Team Leader Mikul Bhatia
Lending Instrument Specific Investment Loan	Fragile and/or Capacity Constraints [ ] Financial Intermediaries [ ] Series of Projects [ ]	
Project Implementation Start Date 10-May-2014	Project Implementation End Date 30-June-2019	
Expected Effectiveness Date 01-Jul-2014	Expected Closing Date 30-June-2019	
Joint IFC No		

Sector Manager	Sector Director	Country Director	Regional Vice President
Ranjit J. Lamech	Laszlo Lovei	Martin Raiser	Laura Tuck

Borrower: TEIAS- TurkiyeElektrikIletim A.S.

Responsible Agency: TEIAS- Turkiye Elektrik Iletim A.S.

Contact:	Mr. Kemal Yildir	Title:	General Manager
Telephone No.:	90-312-203-8063	Email:	kemal.yildir@teias.gov.tr

Project Financing Data(in USD Million)					
[X]	Loan	[ ]	Grant	[ ]	Guarantee
[ ]	Credit	[ ]	IDA Grant	[ ]	Other

Total Project Cost:	475.00	Total Bank Financing:	350.00
Financing Gap:	0.00		

Financing Source	**Amount**
Borrower	125.00
International Bank for Reconstruction and Development	300.00

Clean Technology Fund	50.00
Total	475.00

Expected Disbursements (in USD Million)

Fiscal Year	2014	2015	2016	2017	2018	2019	0000	0000	0000
Annual	25.00	57.00	80.00	80.00	80.00	28.00	0.00	0.00	0.00
Cumulative	25.00	82.00	162.00	242.00	322.00	350.00	0.00	0.00	0.00

Proposed Development Objective(s)

To assist Turkey in meeting its increased power demand by strengthening the transmission system and facilitating large-scale renewable energy generation.

Components

Component Name	Cost (USD Millions)
Component-1: Upfront development of transmission infrastructure to facilitate faster development of WPPs	59.00
Component-2: Smart-grid investments to strengthen grid operation and management in face of higher wind energy generation	68.00
Component-3: Lapseki-Sutluce 380 kV Submarine Power Cable to better inter-connect wind energy locations with other parts of Turkey	79.20
Component-4: Strengthening of Transmission Networks to cater to growing demand and supply of electricity in Turkey	206.80

Institutional Data

Sector Board

Energy and Mining

Sectors / Climate Change

Sector (Maximum 5 and total % must equal 100)

Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Energy and mining	Other Renewable Energy	50		100
Energy and mining	Transmission and Distribution of Electricity	50		
Total		100		

☐ I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.

Themes

Theme (Maximum 5 and total % must equal 100)

Major theme	Theme	%
Financial and private sector development	Infrastructure services for private sector development	80
Trade and integration	Regional integration	20
Total		100

Compliance

Policy

Does the project depart from the CAS in content or in other significant respects?	Yes [ ] No [X]
Does the project require any waivers of Bank policies?	Yes [ ] No [X]
Have these been approved by Bank management?	Yes [ ] No [X]
Is approval for any policy waiver sought from the Board?	Yes [ ] No [X]
Does the project meet the Regional criteria for readiness for implementation?	Yes [X] No [ ]

Safeguard Policies Triggered by the Project	**Yes**	**No**
Environmental Assessment OP/BP 4.01	**X**	
Natural Habitats OP/BP 4.04	**X**	
Forests OP/BP 4.36		**X**
Pest Management OP 4.09		**X**
Physical Cultural Resources OP/BP 4.11	**X**	
Indigenous Peoples OP/BP 4.10		**X**
Involuntary Resettlement OP/BP 4.12	**X**	
Safety of Dams OP/BP 4.37		**X**
Projects on International Waterways OP/BP 7.50		**X**
Projects in Disputed Areas OP/BP 7.60		**X**

Legal Covenants

Name	**Recurrent**	**Due Date**	**Frequency**
Self-Financing Ratio	**X**		Yearly

Description of Covenant

Except as the Bank shall otherwise agree, the Borrower shall maintain funds from internal sources equivalent to not less than 35% of the Borrower's capital expenditures during the Fiscal Year concerned.

Name	**Recurrent**	**Due Date**	**Frequency**
Current Ratio	**X**		Yearly

Description of Covenant

Except as the Bank shall otherwise agree, the Borrower shall maintain a ratio of current assets to current

liabilities of not less than 1.0.

Name	Recurrent	Due Date	Frequency
Debt Service Coverage Ratio	X		Yearly

Description of Covenant

Except as the Bank shall otherwise agree, the Borrower shall ensure that the net revenues of the Project Implementing Entity shall be at least 1.5 times the estimated maximum debt service requirements of the Borrower for any Fiscal Year on all debt of the Borrower.

Conditions

Name	Type

Description of Condition

Team Composition

Bank Staff

Name	Title	Specialization	Unit
Kari J. Nyman	Lead Specialist	Lead Specialist	ECSEG
Margaret Png	Lead Counsel	Project Lawyer	LEGLE
YesimAkcollu	Senior Energy Specialist	Co-Team Lead	ECSEG
Selma Karaman	Program Assistant	Program Assistant	ECCU6
Mikul Bhatia	Senior Energy Specialist	Team Lead	SEGEN
Ayse Yasemin Orucu	Energy Specialist	Energy Specialist	ECSEG
Salih Kemal Kalyoncu	Senior Procurement Specialist	Senior Procurement Specialist	ECSO2
ZeynepLalik	Sr Financial Management Specialist	Sr Financial Management Specialist	ECSO3
Fan Zhang	Energy Economist	Energy Economist	ECSEG
Regina Oritshetemeyin Nesiama	Senior Program Assistant	Senior Program Assistant	ECSSD
Zeynep Durnev Darendeliler	Social Development Specialist	Social Development Specialist	ECSSO
EsraArikan	Environmental Specialist	Environmental Specialist	ECSEN
Katsuyuki Fukui	Sr Power Engineer	Sr Power Engineer	ECSEG
SelcukRuscuklu	Team Assistant	Team Assistant	ECCU6

Non Bank Staff

Name	Title	Office Phone	City
Kishore Nadkarni	Consultant - Financial Analysis		

Locations					
Country	**First Administrative Division**	**Location**	**Planned**	**Actual**	**Comments**
Turkey	Nevsehir	Urgup	**X**		Substation
Turkey	Izmir	Selcuk	**X**		GIS Substation
Turkey	Antalya	Manavgat	**X**		Substation
Turkey	Izmir	Izmir	**X**		Wind Power Substation
Turkey	Antalya	Goksu	**X**		GIS Substation
Turkey	Istanbul	Yakuplu	**X**		Underground cable between Ambarli and Yakuplu
Turkey	Istanbul	Yakuplu	**X**		GIS Substation
Turkey	Kirklareli	Vize	**X**		Wind Power Substation
Turkey	Istanbul	Umraniye	**X**		Underground cable between Umraniye and Dudullu
Turkey	Istanbul	Kadikoy	**X**		Underground cable between Kucukbakkalkoy and Kadikoy
Turkey	Istanbul	Istanbul	**X**		Unground cable between Yeni-Ambarli and Yenibosna.
Turkey	Istanbul	Istanbul	**X**		GIS Substation planned in Hadimkoy
Turkey	Canakkale	Canakkale	**X**		A submiarine cable is planned between Lapseki and Sutluce.
Turkey	Canakkale	Can	**X**		Wind Power Substation
Turkey	Istanbul	Atasehir	**X**		GIS Substation
Turkey	Istanbul	Sultanbeyli	**X**		GIS Substation
Turkey	Izmir	Karabaglar	**X**		Underground cable planned between Karabaglar and Buca

I. STRATEGIC CONTEXT

A. Country Context

1. **Turkey is an upper middle-income country with the world's 18th largest economy[1].** The Gross Domestic Product (GDP) of the country reached US$786.3 billion in 2012. Private consumption accounts for more than 70 percent of GDP, and it is the main driver of economic growth, while exports make up only 26.4 percent of GDP. Domestic savings are very low (around 14 percent of GDP), and thus economic growth is largely financed by external inflows, most of which are of a short-term nature and thus increase the risk of volatility.

2. **Turkey's development over the past decade is a story of notable turnaround thanks to successfully implemented structural reforms and sound macroeconomic management.** Reforms include strong fiscal management, social security reforms, strengthening of banking supervision, and shifting to a flexible exchange rate regime with an independent central bank responsible for inflation targeting. These reforms yielded results. The financial sector remained profitable and highly capitalized. Despite the global crisis of 2008-09, the Turkish economy expanded by an average of 5.2 percent during the 2002-12 period. During this period, per capita income more than tripled reaching US$10,504; inflation declined to single-digit levels; and public debt-to-GDP ratio eased from 74 percent in 2002 to 36.2 percent in 2012.

3. **After a strong rebound from the global crisis in 2010 and 2011, 2012 stood out as the first episode of a controlled economic slowdown in Turkey's recent economic history.** Turkey rebounded strongly from the global crisis with GDP growth reaching 9.2 percent and 8.8 percent in 2010 and 2011 respectively. However, this rebound was domestic demand driven and caused both external and internal balances to deteriorate sharply. At the end of 2011, the current account deficit increased to 9.7 percent of GDP while inflation jumped to double digits. Exchange rate depreciation followed by decisive monetary policy tightening in 2011 helped Turkey achieve a soft landing in 2012. GDP growth eased to 2.2 percent, exports became the major contributor to headline growth and the current account deficit improved to 6.0 percent of GDP. As domestic demand decelerated, inflation also eased to 6.2, lowest in last 40 years.

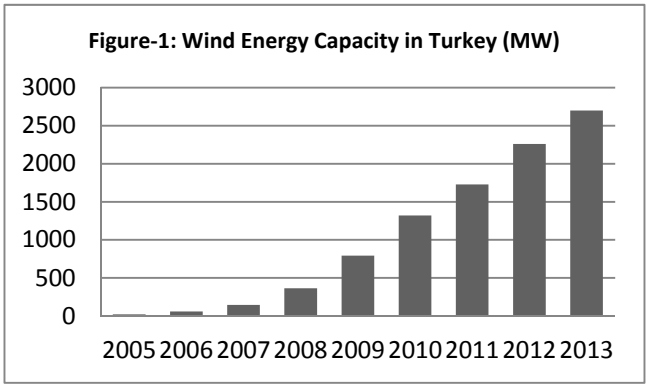
4. Turkey's economic growth is forecast to stage a moderate recovery over the next few years. Any event that could result in a decline in risk appetite towards emerging markets such as advanced country central banks early exit from expansionary policies or a deepened crisis in Euro could hinder Turkey's growth performance significantly.

B. Situations of Urgent Need of Assistance or Capacity Constraints

5. None.

[1]According to 2011 GDP ranking of IMF's World Economic Outlook Database (latest available).

C. Sectoral and Institutional Context



6. **Securing sufficient and reliable energy to a growing economy in an environmentally sustainable manner has been and remains the Turkish government's main energy policy concern.** Future demand growth is projected to be around 4.5 to 5.0 percent per annum, which could lead to supply shortages if generation investments fall behind load growth. In particular, Turkey imports all the oil and gas it uses and these imports may more than double over the next decade. To diversify sources of energy supply, Turkey is increasing domestic energy production, including through indigenous renewable energy generation from wind and hydro resources.

7. **Turkey has ambitious plans for developing wind energy.** A major milestone for the development of the wind energy was Renewable Energy Law (Law No.5346) passed in 2005. Under this law, wind power plants qualify for Renewable Energy Resources Certificates (RERC) which enables them to benefit from a feed-in tariff of a minimum of 7.3 USD cent per kWh. An amendment in 2010 provided feed-in-tariffs up to 11USD cent per kWh to reward the use of locally produced equipment. A Strategy Paper prepared by the Government of Turkey in 2009 ambitiously aims for 20,000 MW of installed wind capacity by 2023. By these projections, this would amount to about 25-30% of the projected peak demand in 2023. Total wind capacity that has been licensed reached 11,000 MW by third quarter of 2013 of which about one-fourth (2,700 MW) is currently operational.

8. **Turkey has made important progress in reforming the power sector, with advisory and investment lending support from the Bank.** The originally vertically-integrated state-owned electricity monopoly (TEK) was split into two state-owned companies: a generation and transmission company (TEAS) and a distribution company (TEDAS). Electricity market liberalization was launched and progressively implemented under the Electricity Market Law of 2001 (Law No. 4628). As per the 2001 Law, TEAS was split into three companies: the Turkish Electricity Transmission Corporation (TEIAS), the Turkish Electricity Trading and Contracting Corporation (TETAS) and the Electricity Generating Corporation (EUAS). It also established the Electricity Market Regulatory Agency (EMRA) as an independent regulatory authority which provides generating licenses and sets tariffs. The Law also laid the basis for the establishment of a wholesale electricity market and gradual opening of the retail electricity market.

9. **Turkey's reform and liberalization agenda in the electricity sector has deepened starting from late 2000s.** Turkey's electricity security has improved much in the recent years. A large volume of private investment has been attracted, including the development of about 15,000 MW of new generation capacity in the 2008-2012 period and about US$12.7 billion in investment in the electricity distribution privatization program that has been completed in 2013.

10. **A balancing and settlement system called PMUM – the abbreviation of electricity market financial reconciliation center in Turkish - is being operated by TEİAŞ.** Although originally designed for system balancing, PMUM evolved into an electricity trading platform. Nearly 30 percent of monthly electricity consumption in Turkey is transacted through the PMUM market by more than 700 market participants. Accordingly, a Day-ahead Market (DAM) has been developed by TEİAŞ and was launched in December 2011.

11. **A new Electricity Market Law (Law No. 6446) passed in March 2013 paved the way for further liberalization by restructuring TEIAŞ into a separate transmission company and an electricity market operator called EPIAS.** EPIAS is currently awaiting its market operator license and will be operational within six months following the registration with the regulator. After operationalization, EPIAS will be in charge of the electricity market operations except for the balancing market which will remain under TEIAS.

12. **Turkey's synchronous 400 kV interconnection with the European electricity grid is in the final testing phase, with limited commercial operation with Bulgaria and Greece already allowed.** After the full commercial operation starts, Turkey will also become a member of the European Network of Transmission System Operators for Electricity (ENTSO-E). An asynchronous direct current (DC) interconnection between Turkey and Georgia is now under testing. TEIAŞ is also studying DC interconnections with Iran and Syria.

Key Sectoral and Institutional Issues:

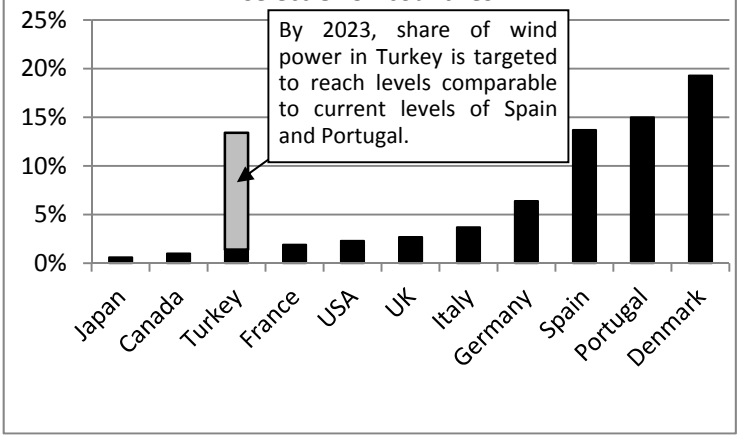
13. Although Government of Turkey has set an ambitious target of developing 20,000 MW of wind energy capacity by 2023, at the present rate only about 400-500 MW of wind energy is likely to be added each year, as against about 1600-1700 MW needed to achieve the goal of 20,000 MW by 2023. To enhance the rate of addition of wind energy, the key barriers that inhibit faster development of wind energy in Turkey need to be addressed. These are as follows:

a) Need for upfront transmission investments hinders the development of WPPs

14. In Turkey, existing and most potential WPP sites are located in relatively rural areas where local electricity demand is generally low. Any available network assets in these areas were originally built to meet the low consumer demand. Therefore, existing overhead lines (OHLs) are thin and substations do not have large transformer capacity. Also, power flows on conventional transmission networks are analogous, so to speak, to flows from a large trunk to small twigs.

15. On the contrary, remotely located WPPs pour produced power from a twig to the trunk. Therefore, when considering rapid WPP penetration, it is necessary to address not only high power flows but also their reverse direction– often necessitating new transmission infrastructure. With multiple WPPs planned in most locations, transmission investments have to be optimized for evacuation of power from all planned WPPs. However, new transmission infrastructure must be made available with the commissioning of the very first WPP. The high upfront transmission investments needed to cater to evacuation of power from all planned WPPs impede wind power development by imposing a disproportionately heavy investment burden on transmission facilities related to the initial few WPPs.

Figure-2: Share of wind energy in Turkey vis-à-vis select OECD countries



Data Source: World Energy Balance (IEA), Data for 2010

b) Limitations of existing load dispatch and control systems

16. At present, Turkey has 2700 MW of installed wind energy capacity which is about 4% of installed power generation capacity and 2.5% of electricity generated in the country. Targeted wind capacity of 20,000 MW by 2023 would account for 20% of installed generation capacity and about 10-12% of energy generation in Turkey. This would amount to about 25-30% of the projected peak demand in 2023. Figure-2 shows how the projected shared of wind energy in Turkey in 2023 compares with the share of wind energy in some of the leading countries today.

17. Since wind energy is less predictable and is usually treated as a negative load for the purposes of load dispatch, countries with large wind energy capacity rely on robust load dispatch and control systems for managing fluctuations in wind energy generation through rapid response from other generation capacities. Compared to high wind energy countries, the load dispatch and control system facilities in Turkey face the following limitations at present:

(i) ***SCADA system needs upgrade:*** TEIAS operates the National Control Center (with Emergency Control Center as a back-up) and other regional centers since mid-1980s. The SCADA system was renewed and extended in 2004 and extended again in 2011. However, the existing SCADA/EMS System is not aligned with the advanced systems needed for high share of wind in generation mix.

(ii) ***Gaps in installation of RTUs:*** TEIAS has been installing Remote Terminal Units (RTUs) to all 380kV substations and power plants since 1980s. However, RTUs have not been installed in many rural 154kV substations which are hubs of sub-transmission network and are often the main interface with WPPs.

(iii) ***Old RTUs are slow and obsolete:*** Many old RTUs which were installed in mid-1980s are still being used. However, such old RTUs are slow and do not have many common and high speed functions required in current Smart Grid Technology protocol.

(iv) ***Wind Prediction Capabilities are not integrated:*** Grid operation and wind energy utilization can be improved through better prediction of wind and sharing of information with generators as well as load dispatch centers. Efforts are underway to collate and analyze data from wind masts at various WPP locations. There is a need to strengthen these efforts and integrate them with smart-grid systems.

(v) ***Need to strengthen other components of grid management system:*** Apart from the limitations, the grid management system needs strengthening of numerical protection relays for better protection, as well as shunt reactors for control of reactive power.

18. As a result, it is expected that rapid addition of wind energy to the Turkey's national grid would impose difficulties for grid operator in managing smooth operation of the grid.

c) Limited transmission links vis-à-vis geographic location of wind energy resources

19. Turkey's wind energy potential that is technologically and economically viable is estimated to be around 48,000 MW, according to MENR's General Directorate of Renewable Energy. The locations with the highest wind energy potential are in the Aegean, Marmara, and the eastern part of the Mediterranean region.[2] The key load center for electricity in this part of Turkey is around the city of Istanbul in the Thrace area[3], which also links Turkey to other European countries. This area has significant wind energy potential. However, most of the other energy resources including thermal, hydropower and a large part of wind energy resources are located in the Anatolian part of Turkey. Therefore, connections between Thrace and Anatolia are critically important for the development and effective functioning of power systems in Turkey.

20. The Thrace and Anatolian regions have several transmission links on the eastern side through the Bosphorus strait.[4] However, going forward, transmission links would be needed across the Dardanelles strait as well. This is particularly important as the planned WPP sites are located on the eastern side of Marmara and Aegean regions closer to the Dardanelles strait. The first transmission connection on the Dardanelles strait would be the 1000 MW Lapseki-Sutluce Submarine Power Cable-1 which is being implemented under the APL-6 project. The contract has been awarded in September 2013 and it is expected to be completed by end-2014. However, this first link is already planned for loading to capacity and additional links would be needed to cater to the planned wind energy development in the Marmara and Aegean regions.

[2] Marmara region is located all around the Sea of Marmara – across the European and Asian sides of Turkey. The Aegean region is located along the western coast of Turkey, with the Marmara region to its north. The Eastern Mediterranean region is located along the southern coast of Turkey.

[3] Turkey comprises of Thrace and Anatolia. Thrace area is the European part of Turkey, which is separated from Anatolia area or the Asian part of Turkey by the Sea of Marmara.

[4] Sea of Marmara separates Anatolia on the Asian side from Thrace on the European side of Turkey. It connects the Black and Aegean Seas through the Bosphorus strait on the East and the Dardanelles strait on the West.

d) Inadequacy of existing transmission network to meet the growing demand of electricity

21. According to the "Ten Year Capacity Projection Report" prepared by TEIAS, electricity sector in Turkey is expected to grow at nearly 4.5 to 5% per annum. This means that the peak supply will increase from 38 GW in 2012 to about 65-72GW levels by 2023.Transmission systems, including lines, substations and their transformers, need to be continuously strengthened to respond to the increasing requirements of higher electricity consumption and increased supply from newly constructed power plants including wind and conventional thermal power plants. Further, with increasing flow of power, it is important to continuously strengthen the grid network to ensure reliability and security, as well as to reduce losses from excessive loading.

e) Market and Regulatory Aspects

22. The licensing regime for wind power plants is based on the new Electricity Market License Regulation of November 2013 as per new Electricity Market Law of March 2013. Transmission capacity for grid connection for regions and provinces is announced by TEIAS for the next five and ten years based on the wind potential map of regions prepared by MENR. Licenses are awarded through competitive bidding for grid-connection, subject to techno-economic approval from TEIAS and General Directorate of Renewable Energy of MENR.

23. Acquiring the license also requires approval of the pre-feasibility study, decision regarding the environmental impact assessment and agreement with TEIAS regarding the renewable energy contribution fee. Wind energy developers need to get permits from nearly fifteen institutions such as Ministry of Defense, Ministry of Forestry and Water Affairs, and Ministry of Environment and Urbanization. Simplification of the licensing processes can boost wind energy installation by reducing the time lag between licensing and implementation of projects.

24. In addition, planning needs to be undertaken on a cumulative basis rather than for individual projects – especially for integrated transmission development as well as integrated environmental impact assessment for multiple wind energy sites located in the same area.

D. Higher Level Objectives to which the Project Contributes

25. The project contributes to the realization of the objectives of the Turkey Country Partnership Strategy (CPS) for FY12-15. The CPS has three main strategic pillars: (i) Strategic Objective 1 - enhanced competitiveness and employment; (ii) Strategic Objective 2 - improved equity and public services; and (iii) Strategic Objective 3 - deepened sustainable development. In harmony with pillars (i) and (iii), this project will facilitate the integration of renewable energy, including private sector financed renewable energy, which will contribute to promoting Turkey's competitiveness while deepening its sustainable growth. In addition, the project is also expected to improve energy security through development of domestic renewable energy resources and strengthen cross-border energy linkages through transmission networks that extend across Thrace into neighboring European countries.

II. PROJECT DEVELOPMENT OBJECTIVE(S)

A. Project Development Objective (PDO)

26. The PDO is "*To assist Turkey in meeting its increased power demand by strengthening the transmission system and facilitating large-scale renewable energy generation.*"

B. Global Environment Objective (GEO)

27. The GEO is "*To avoid Green House Gas (GHG) emissions from fossil fuel based power through greater integration of renewable energy sources based generation in Turkey.*"

C. Project Beneficiaries

28. The Project beneficiaries will be all users of electricity transmission system such as electricity generation, distribution, and retail companies; as well as all consumers of electricity in Turkey who will benefit from (i) greater availability of power, (ii) a more reliable electricity supply, and (iii) associated economic and employment opportunities. Besides, the Global community will benefit from reduced greenhouse gas emissions.

D. PDO Level Results Indicators

29. The achievement of the Project Development Objective and the Global Environment Objective shall be measured using the key indicator described below:

Objectives	Outcome Indicators
Strengthening transmission system to meet increased power demand	• Peak load handled by the transmission system (MW) • Transmission lines constructed under the project (Km) • Transformation capacity added under the project (MVA)
Facilitating large-scale renewable (wind) energy generation	• Increase in installed wind energy capacity (MW) • Increase in wind energy generation (GWh) • Wind energy capacity connected to sub-stations funded under the project (MW) • Wind energy generated from plants connected to sub-stations funded under the project (GWh)
Avoiding Greenhouse Gas (GHG) emissions from fossil fuel based power	• GHG emissions avoided through wind energy plants connected to sub-stations funded under the project ($MTCO_2$)

30. Additional indicators pertaining to improvement in reliability and reduction in loss levels of transmission system would be monitored (see Annex-1). Further, increase in power transmission to/from the East Thrace area and onwards to/from the European ENTSO-E networks would also be monitored. In addition, progress on deployment of Smart-grid solutions and their effectiveness in improving the capacity of the grid to absorb renewable energy would also be monitored through other indicators.

III. PROJECT DESCRIPTION

A. Project Components

31. The project components are expected to help alleviate the key barriers that inhibit faster development of wind energy in Turkey as identified in Section-1C.

Component-1: Development of transmission infrastructure to facilitate faster development of WPPs

32. Within the Aegean and Marmara regions that hold the highest wind energy potential in Turkey, the provinces of Izmir, Canakkale and Kirklareli rank among the highest with installed wind capacity of 877 MW, 407 MW and 382 MW respectively. The wind power investments in these three provinces together constituted nearly 70 percent of the installed wind capacity in Turkey in 2012. Due to their high wind potential, these provinces will continue to attract more investments in WPPs. Availability of upfront transmission infrastructure to cater to growing needs of new WPPs in these provinces could enable faster implementation of wind energy projects.

33. The first component of this project would therefore develop three 380kV 500 MVA highly digitalized sub-stations with associated grid connection structures for evacuation of wind power in the areas of Can, Izmir and Vize. The proposed structures would include high voltage (HV) substations, HV grid interfacing equipment, smart-metering systems, feeders (underground cables), tele-metered dispatch systems, digital protection systems, supervisory systems, and automatic voltage control systems.

Component-2: Smart-grid investments to strengthen grid operation and management in face of higher wind energy generation

34. These investments will enable TEIAS to monitor network status in real-time and operate entire network reliably and securely. It would enable TEIAS to handle the increasing amounts of wind energy. It consists of:

(i) Upgrade of hardware and software of the National Control Center (NCC), Emergency National Control Center (ENCC) and 9 Regional Control Centers (RCCs) in TEIAS' existing SCADA/EMS system and the addition of Renewable Energy Resource (RER) Operator Desk on SCADA system to manage rapidly increasing WPP.
(ii) Remote Terminal Unit (RTU) installation to substations and power plants to monitor and control them from dispatching centers.
(iii) Digital Protection Relay deployment which will make faster fault clearing in order to minimize network disturbance and outage area.
(iv) Shunt Reactor installation to bulk-transmission network to secure appropriate system voltage among network.

Component-3: Lapseki 2-Sutluce 2 380 kV Submarine Power Cable to better inter-connect wind energy locations with other parts of Turkey

35. As the second double-circuit submarine cable route having 4.35km length across the Dardanelles strait, this cable will connect Anatolian side and Thrace side of Turkey with a capacity of 2GW. Along with the first submarine cable being implemented under APL-6, the aggregate submarine cable capacity across the Dardanelles strait will be 4GW, connecting wind power sub-stations in provinces of Can, Izmir and Istanbul. As a result of this sub-component, the 380kV bulk-transmission network to Istanbul across the Bosphorus and Dardanelles straits will form a secure strong loop network around Marmara Sea.

Component-4: Strengthening of Transmission Networks to cater to growing demand and supply of electricity in Turkey

36. This component will cater the investment needs for 380kV bulk-transmission and 154 kV sub-transmission network expansions to meet rapidly increasing demand and supply. This component consists of the 380kV Yeni Ambarli– Yenibosna single-circuit underground cable (route length 16.7km), four 380kV substations (total transformer's capacity is 2100MVA), four 154kV substations (total transformer's capacity is 800MVA), and four 154kV single-circuit underground cable (total route length is 31.2km).For the sake of urgent requirement, procurement of the 380kV Yeni Ambarli – Yenibosna underground cable has been initiated under APL-6 though most of the investment will be financed by this REIP.

Technical Assistance for implementation of smart-grid technologies and strengthening environmental aspects of wind energy development *(To be funded under EU-IPA program)*

37. In addition to the above four components, technical assistance would be covered through the ongoing EU-IPA 2012 program, which is supported by the EU through funds channeled through the World Bank for the benefit of Turkish energy sectors agencies. This support would be needed for: (i) design, implementation and capacity building for smart-grid technologies, (ii) simplification of market and regulatory processes for allocation of licenses for wind power (and other renewable energy) development, (iii) strengthening the wind energy markets, and (iv) strengthening environmental and social safeguards in wind power projects (especially from the perspective of cumulative impact assessment).

38. The renewable energy component of the EU-IPA program is planned for helping MENR accelerate renewable energy development including through the review of regulatory framework, legislation, tariff mechanism, and principles and procedures regarding the site selection of the renewable energy plants; streamlining of licensing processes and permits; and preparation of a renewable energy road map and action plan. This program also includes efforts to strengthen the upfront ecological assessment of wind energy locations, as described in Annex-9.

39. Based on discussions with the Ministry of Energy and Natural Resources (MENR), it is proposed that a technical assistance activity be designed that builds on the efforts already initiated by the ministry. The ministry has recently published a regulation for guiding site selection phase for renewable energy developments. To complement this regulation, the

proposed technical assistance activity would pilot up-front comprehensive studies of wind energy locations for regional/strategic/cumulative environmental assessment, as well as establish guidelines/toolkits which will define the methodology for ecological assessments to be conducted during the site selection process. A detailed scope of the proposed activity as well as specific Terms of Reference would be prepared in discussion with various stakeholders including the Ministry of Energy and Natural Resources, Ministry of Environment, and EMRA.

40. Details of project costs and financing are shown in the Table below.

Table-1: REIP Project Costs (Euro Millions)

Component Activities	Local Costs	Foreign Costs	Total
Upfront development of transmission infrastructure	6.62	36.79	43.41
Smart-grid investments	7.60	42.24	49.84
Lapseki 2 – Sutluce 2 380 KV submarine power cable	8.91	49.50	58.41
Strengthening of transmission networks	23.22	129.00	152.22
Contingency (@15% of Base Costs)	6.95	38.63	45.58
Total	**53.31**	**296.15**	**349.46**

B. Project Financing

41. The project will be financed by IBRD (Euro 217.6 million) and TEIAS (US$125 million) with a contribution from Clean Technology Fund (US$50 million).

42. The CTF funding would comprise of USD 50 million loan for investment activities, extended under harder concessional terms. The CTF loan is offered with a service charge of 0.75% per annum on the disbursed and outstanding loan balance and 20-year maturity, including a 10-year grace period, with Principal repayments at 10% for Years 11-20. Principal and service charge payments accrue semi-annually. A management fee equivalent to 0.45% of the total loan amount (US$225,000) will be charged, to be paid by TEIAS from its own resources, following the effectiveness of the loan.

Table-2: REIP Project Component-wise Financing Plan (USD Millions)

Project Components	Project cost	IBRD	CTF	TEIAS
1. Wind power grid connection	59.00	25.00	25.00	9.00
2. Smart-grid applications	68.00	32.50	25.00	10.50
3. Submarine power cable	79.20	67.20		12.00
4. Expansion of Urban Networks	206.80	175.30		31.50
Contingency	62.00			62.00
Total Costs				
Total Project Costs	475.00	300.00	50.00	125.00
Front-End Fees	0	0	0	0
Total Financing Required	475.00	300.00	50.00	125.00

TEIAS would finance the Value Added Tax (VAT) as well as contingency amounts from its own sources (all other taxes are eligible for payment under the IBRD and CTF loans).

C. Series of Project Objective and Phases

43. Not Applicable.

D. Lessons Learned and Reflected in the Project Design

44. TEIAS is currently implementing the ECSEE APL6 project which is rated as satisfactory as of January 2014. In the last decade, it has implemented four other projects – ECSEE APL2, ECSEE APL3, the TEK restructuring and the National Transmission Grid Project (NTGP) – all of which were rated as satisfactory or highly satisfactory upon completion. NTGP financed a time-slice of TEIAS' transmission grid investment program including the supply and installation of 380 KV and 154 KV transmission lines and substations, and information and control systems for the power dispatch. Among the components of APL2, were creation of Market Management System (MMS) and strengthening of the SCADA/EMS, and grid strengthening with new substations, in addition to the technical assistance regarding enhancement of capacity of market participants, and balancing and settlement system consultancy. APL3 constituted GIS substations and 380 KV underground cables to strengthen the network, and 154 KV overhead transmission lines. Under APL6, TEIAS has been financing several substations, cables (including Lapseki-Sutluce I submarine cable), SCADA/EMS upgrade and market management system (automatic meter reading, and extension of balancing and settlement system).

Lessons learnt from these projects and during project preparation are as follows:

45. ***Time Slice Approach:*** World Bank assistance to TEIAS has followed a time slice approach across many projects in the past and has successfully supported the expansion of transmission network in Turkey. Building on the past success, the proposed project would support a time-slice of investments over the 2014-18 period, which form a part of TEIAS's planned investment needs on the one hand, and on the other hand are aligned with the objective of mitigating transmission related barriers to renewable energy development.

46. ***Leveraging TEIAS's Expertise in Technical and Fiduciary Areas:*** Past experience with TEIAS has shown that TEIAS has developed much competency over the years in some areas such as substations and underground/overhead cables. It is increasing its capabilities in some new areas such as submarine cables, and balancing and settlement systems. Regarding the fiduciary (procurement and financial management) and safeguards policies of the Bank, TEIAS is knowledgeable and experienced, and cooperative when an issue arises. The design of the REIP project is commensurate with the capabilities available at TEIAS, as well as those that TEIAS is trying to strengthen going forward.

47. ***Exclusion of Ecologically Sensitive Sites:*** During project preparation, an Environmental and Social Due Diligence (ESDD) study was conducted to examine the potential safeguard impacts of construction and operation of project funded sub-stations and related wind power plants. The four originally proposed substations were examined by independent consultants: Can, Izmir, Vize, and Catalca, along with the associated access roads and electric transmission lines, and the wind power plants planned to be connected to these substations. According to the study, the Catalca substation and the related WPPs are likely to have significant adverse impact on

critical natural habitat. It should also be added that Ministry of Environment and Urbanization has also suspended the national EIA process of the WPP which is planned to be connected to the Catalca substation.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

48. The project will be implemented by TEIAS in its roles as the electricity transmission system owner and operator, and as the electricity market operator. TEIAŞ is the backbone of the Turkish power system and is under increasing stress to respond to the demand for transmission services from private generators. Increased levels of investment are projected in both generation and distribution sub-sectors due to the privatization process undertaken over the last few years. With increasing investments in both upstream and downstream subsectors, TEIAŞ would also have to enhance its transmission network commensurately. TEIAS also faces increasingly complex demands on system operations due to introduction of different supply technologies. However, TEIAS has demonstrated in the past a robust ability to meet these challenges through appropriate investments and institutional capacity development.

49. TEIAS is currently implementing the ECSEE APL-6 project which is rated as satisfactory as of January 2014. TEIAS is familiar with the Bank policies and guidelines, in terms of procurement, financial management and safeguards. Project implementation will be carried out by the following units within TEIAS:

a The Project Coordination Unit (PCU) within the Research, Planning and Coordination Department of TEIAS oversees and coordinates the World Bank projects.

b Four operating departments will be responsible for procurement and implementation for this project. These are the:

   i. Substation Department (for substations, underground and submarine cables),

   ii. Communication and Information Systems Department (for SCADA and Smartgrid), and

   iii. Operations Department (for shunt reactor and numerical relay).

   iv. Trade Department (bidding procedures).

c The finance department is responsible for financial and disbursement reporting to the PCU, the timely completion of audits and implementing the plans to address issues related to achieving a comprehensive audit opinion of TEIAS.

B. Results Monitoring and Evaluation

50. The approach for results monitoring and evaluation is based on the framework presented in Annex-1. This includes indicators to monitor wind energy development as well as expansion of transmission system network, directly through the project interventions as well as beyond the project for Turkey as a whole. TEIAS maintains a data collection and reporting system which was also deployed to monitor progress under previous World Bank projects. This project will

leverage the same system for monitoring the expansion of transmission network and the energy carrying capacity. In addition, expansion of wind energy capacity and generation will be monitored through data collection from the system operation and load dispatch center.

51. The Project Coordination Unit (PCU) will collate the inputs from implementation units of TEIAS as well as data from load dispatch, on a quarterly basis to prepare and submit a report on implementation progress. The report will include inter-alia procurement, implementation progress and financial management aspects (including disbursements) on a quarterly basis, as well as environmental and land acquisition aspects on a semi-annual basis. Progress would also be monitored by the Bank team through periodic visits to project sites.

C. Sustainability

52. The sustainability of the development outcomes and the global environmental outcomes of this project is high because:

a. Expansion of wind energy in Turkey would be better supported through a stronger smart-grid system and enhanced capability to handle wind energy through better prediction of wind generation. It is expected that transmission network in Turkey would be able to absorb and manage larger volumes of wind energy while avoiding system instabilities.

b. Private sector investments into wind energy capacity that would connect to the grid through transmission infrastructure created under this project are expected to be sustainable.

c. TEIAS is subject to a tariff setting that ensures that they have adequate funding for the operation, maintenance and expansion of the transmission system in Turkey.

d. EMRA is committed to cost-recovery tariffs for TEIAS.

V. KEY RISKS AND MITIGATION MEASURES

A. Risk Ratings Summary Table

Risk Category	Rating
Stakeholder Risk	Low
Implementing Agency Risk	
- Capacity	Low
- Governance	Low
Project Risk	
- Design	Low
- Social and Environmental	Substantial
- Program and Donor	Low
- Delivery Monitoring and Sustainability	Low
- Other – Procurement	Moderate
Overall Implementation Risk	Moderate

B. Overall Risk Rating Explanation

53. The overall Implementation risk rating is proposed as moderate. TEIAS has worked on World Bank projects – NTGP and three ECSEE APLs of which two are completed and one is ongoing satisfactorily. As a result, TEIAS is familiar with the Bank requirements and procedures. The project is also an important element of the overall energy strategy of the Government of Turkey. The overall reform program in the energy sector of Turkey is robust and is under satisfactory implementation, as indicated in section-1C. The Government's and TEIAS' commitment to the project and investments supporting the renewable energy is evident, as demonstrated by the legislative achievements and policy statements.

54. Several potential safeguards issues were identified at the preparation stage. Accordingly, a rapid ecological assessment was conducted to screen the wind plants development areas for possible impacts of the projects on wildlife (migrating birds), natural habitats, and other safeguard issues. As a result of this assessment, one sub-station was dropped from World Bank funding (and national EIA process of the wind power plant which was planned to connect to Catalca substation has also been suspended by the Ministry of Environment and Urbanization), while one wind power plant will not be connected to the World Bank funded sub-station. Further, a framework approach for preparation of feasibility studies, Environmental Management Plans (EMPs), and Land Acquisition Action Plans (LAAPs) has been adopted for adequate mitigation of safeguard concerns. Accordingly, safeguards risk is rated as substantial before the above mitigation measures.

55. The overall implementation risk rating is proposed to be '*Moderate*' as:

(i) Although TEIAS is well-experienced in implementing similar investments and is also familiar with the Bank guidelines and procedures, its implementation capacity may be under pressure from demands for large investments to match generation and distribution expansion.

(ii) Although safeguards risks have been partially mitigated through measures suggested in the rapid ecological assessment, TEIAS will need to pursue timely and effective preparation and implementation of EMPs and LAAPs.

(iii) Adequate technical studies and contractual arrangements are essential for effective implementation of the sub-projects.

VI. APPRAISAL SUMMARY

A. Economic and Financial (if applicable) Analysis

56. ***Economic Analysis:*** Economic appraisal is conducted for all subprojects proposed under components 1, 3 and 4. Results of the economic analysis show that these subprojects are economically attractive with high economic rate of returns. The analysis takes into account four major benefits which will result from the transmission investments. These benefits are: Reduction in carbon emissions, reduction in unserved energy, reduction in energy loss, and additional transmission capacity. Details of the benefits are explained in detail in Annex 7.

57. The economic rate of return (ERR) for various subprojects under the three components of the project are estimated and summarized in Table-3. The project remains economically viable under stress tests assuming 20% decrease in carbon and electricity prices combined with 20%

increase in investment costs. The application of smart grid technology would increase the reliability, stability and efficiency of the operation of Turkish Power System as well as facilitate greater integration of intermittent renewable power into the grid. Due to limited data availability, these benefits are not quantified. But experience in other countries has shown that this type of investment can generate attractive economic rate of return. [5]

Table-3: Project Economic Rate of Return by Component

Component	Baseline	Stress Test
Upfront development of transmission infrastructure	36% - 40%	29%-34%
Submarine Power Cable	57%	42%
Strengthening of transmission networks	28%- 68%	21%-51%

Note: *Stress test assumes a scenario of 20% decrease in emissions reduction, 20% decrease in carbon and electricity prices, 20% increase in investment costs and one-year delay in construction.*

58. ***Financial Analysis:*** The financial analysis of the project has been carried out at the project-level and at the entity-level. The main results are summarized below and the detailed analysis is available in Annex 7.

a) Project-Level Analysis: In conjunction with the economic analysis of the project, financial analysis has been carried out for each subproject and the results aggregated for the project as a whole. The Financial Net Present Value (FNPV) is estimated at about TL 582 million and the Financial Internal Rate of Return (FIRR) at 22% which is substantially over the estimated Weighted Average Cost of capital (WACC) of about 6.5% for TEIAS. The project's FIRR is robust to changes in the key underlying variables (capital costs and incremental revenues) and remains above 10% for increases of up to 20% in capital costs or decreases of up to 20% in incremental revenues.

b) Current and Projected Financial Performance of TEIAS: TEIAS's financial performance has been strong over the last three years (2010 to 2012) and is projected to continue to be satisfactory over the period 2013 to 2020.

c) Financial Covenants: The existing financial covenants under the ongoing Bank loans to TEIAS will be continued under the proposed project. TEIAS would maintain these covenants on an annual basis.

Table-4: TEIAS - Key Financial Indicators (TL million in real terms)

Indicator	2010	2011	2012	2013	2015	2017	2020
	Actual			Forecast			
Net profit/total revenues (%)	4%	2.5%	6%	5%	28%	34%	33%
Current ratio (number)	2.3	1.9	1.9	1.7	1.5	1.5	1.5
Debt service coverage (number)	8.8	6.9	11.5	10.6	8.7	10.5	8.5
Self-financing ratio (%)	>40%	>40%	>40%	>40%	>40%	>40%	>40%

[5] A conservative assessment of the deployment of similar smart grid technology in Vietnam is shown to generate an economic rate of return of 14%.

B. Technical

59. The proposed project will support one of key challenges that TEIAS is facing within the framework of "Electrical Energy Market Supply Security Strategy Paper". By 2023, Turkey envisions that country's installed wind power capacity will reach the 20GW level. To reach this goal, TEIAS has to strengthen and expand its transmission network to integrate more wind power into the system, as well as other new power plants, in order to meet Turkey's active electric demand. Given the rapid demand increase and the dramatic energy mix change between conventional power plants and unevenly distributed and intermittent wind power plants, TEIAS investment priorities must focus on bulk transmission system strengthening and expansion, as well as distribution system expansion to rapid demand growth area. The project is therefore designed to support investments that will cope with these challenges. Annex II describes the main renewable energy integration subprojects to be financed under this loan. Annex II also shows a list of bulk-transmission system and sub-transmission system subprojects at this stage that will satisfy Turkey's coordination needs between demand and supply, reliability and security needs.

60. Although TEIAS is familiar with ordinary projects such as substation construction and underground / submarine cable installation, TEIAS will possibly face technical difficulties in implementing smart-grid applications, given limited time frame and complexities. The upgrading of SCADA system in control centers must be performed in parallel with existing old SCADA system and end-to-end test shall be conducted comprehensively. The addition of RER Operator desk will be also challenging because WPPs are owned by private companies and comprehensive new data link and software between control centers and WPPs shall be established. As RTU and Protection Relay shall be installed to existing and operating many equipment and facilities (switchgears, control board, local SCADA system) in many substation and power plants, following works will be cumbersome and require complex procedure and longtime, such as outage schedule, physical installation and wiring, end-to-end test including on-site equipment to a local SCADA, and a local SCADA to control centers' SCADA.

C. Financial Management

61. TEIAS has extensive experience in implementing World Bank financed projects. The financial management arrangements for the ongoing ECSEE APL-6 Project have been assessed as satisfactory during the last financial management supervision. TEIAS will establish similar arrangements for the Renewable Energy Integration Project. The following are the minimum requirements for such arrangements:

- TEIAS will maintain a financial management system acceptable to the Bank.
- The project financial statements will be audited annually by the Treasury Controllers in accordance with the International Standards on Auditing (ISA).
- TEIAS's entity financial statements prepared in accordance with the International Financial Reporting Standards (IFRS) will be audited by private auditors acceptable to the Bank in accordance with ISA.
- The project audit reports will be provided to the Bank within six months, and entity audit reports within eight months of the end of each fiscal year together with the auditors' management letters.

- TEIAS will prepare the interim unaudited financial reports (IFRs) for the project on a quarterly basis in agreed content and format. The IFRs will be submitted to the Bank within 45 days after the end of each calendar quarter throughout the life of the project and the grace period.

D. Procurement

62. Procurement for the Renewable Energy Integration Project will be carried out in accordance with the World Bank's "*Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by the World Bank Borrowers*" dated January 2011 (Procurement Guidelines); and the provisions stipulated in the Loan Agreements (LAs). World Bank's "*Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants*", dated October 15, 2006 and revised in January 2011 (Anti-Corruption Guidelines) will apply to this Project. It is envisaged that no consultant services will be procured from the proposed Loan. However, any consultant services needed for highly specialized subjects under the Project will be financed from TEIAS' own resources.

63. A procurement assessment has been carried out between February-September 2013 and has concluded that TEIAS has adequate experience and capacity to carry out the procurement activities related to the proposed project. The existing Project Coordination Unit (PCU) within the Research, Planning and Coordination Department of TEIAS oversees and coordinates the World Bank projects. The Procurement Plan covering the first 18 months of the project implementation has been received by the Bank and found to be acceptable. Taking into account the TEIAS' long experience in Bank-financed projects and successful implementation of the ongoing ECSEE APL6 project, the overall procurement risk for the project is assessed as moderate. A summary of the procurement arrangements is provided in Annex 3 including procurement implementation risks and mitigation measures.

E. Social (including Safeguards)

64. OP 4.12 is triggered for this project as land acquisition is expected during implementation. Social impacts of the proposed list of investments (substations and transmission lines) are not expected to be significant: Small sizes of land will be expropriated for the substations. For transmission line, long term easements will not limit use of land significantly. Physical relocation of households is not expected, nor is impacts on structures. Alternative lands for purchase exist in the surrounding areas, if farmers whose lands are expropriated want to continue farming. There are also alternate lands for grazing in these areas. Lastly, the Environmental and Social Due Diligence (ESDD) study conducted in the area found that the area experiences out-migration to urban areas and a sizable portion of affected people may choose to use the compensation provided for expropriation to purchase houses in urban areas. Overall, different impacts on men and women are not expected during land acquisition due to the small size of parcels, but this will be monitored during implementation by the Bank. The Environmental and Social Due Diligence study conducted has consulted men and women separately, and did not observe any differential impacts due to land acquisition at WPP sites.

65. Apart from land acquisition, there may be some damages on the lands during construction. In such cases, damages have to be compensated and/or reinstated (if possible) immediately by the relevant contractor. The exact routes and locations of the proposed list of

transmission investments are not known at this time. As a result, TEIAS has prepared a Land Acquisition Policy Framework satisfactory to the World Bank for the project. For this, the Land Acquisition Policy Framework (LAPF) prepared by TEIAS for the APL6 Project and disclosed by TEIAS in June 2010 has been revised. The final draft of the LAPF was disclosed on the TEIAS website and World Bank's Infoshop on March 19, 2014. For each sub-project, before starting implementation of the sub-project, TEIAS will prepare a LAAP or an ALAAP, present the LAAP or ALAAP to the World Bank, and after agreement with the World Bank, disclose the LAAP and ALAAP on its website. During the implementation of the project, TEIAS will monitor and report on the progress as described in the LAPF.

F. Environment (including Safeguards)

66. In accordance with World Bank environmental policies and procedures (OP/BP/GP 4.01) the project has been assigned "Category B", as the types of potential impacts are limited and should be relatively easy to assess and mitigate through careful selection of sites and good construction practices. Since the exact footprints of the sub-projects are not determined yet, an environmental review framework document (ERFD) has been prepared by TEIAS to provide guidance for screening, assessing, conducting consultations, reporting and monitoring practices. The EMF has been consulted with key stakeholders on November 1, 2013 and November 7, 2013 in Ankara and Izmir, respectively. The draft final framework document has been disclosed on TEIAS's website on December 9, 2013 and on Bank's Infoshop on December 11, 2013. The revised final framework document, which is describing the responsibilities of TEIAS for the future WPPs which may be connected to WB financed substations, has been disclosed in country on March 4, 2014 and on Bank's Infoshop on March 5, 2014.

67. During the preparation of the project, it was agreed that the area of influence for the substations to be financed under this project will not be limited to the substation footprints. To form a basis for screening high risk areas (regarding OP 4.04) a Rapid Ecological Assessment (as a part of environmental and social due-diligence study) has been conducted. Results of the assessment were shared with TEIAS to guide them for financing substations which are receiving energy from wind power plants that are not creating any significant adverse impacts on natural habitats and that are not placed in critical natural habitats.

68. In addition to the already assessed WPP sites, it is important to have an assessment for the future WPPs which will be connected to WB financed substations during the loan implementation period. For that purpose, the Bank will undertake another preliminary environmental and social risk assessment (by appointing consultants if required) including desk based review and conduct field studies if necessary. When completed, each of these studies would inform the World Bank about the safeguard risks/concerns with the prospective WPPs, and could also be shared by the World Bank with the Ministry of Energy, Ministry of Environment and Urbanization, and EMRA.

69. In addition to the above mentioned mitigation measures, options are being explored especially to strengthen the safeguard assessment of wind power plant site selection at a systemic level. Possibility of using EU IPA funds to serve for this purpose is being discussed with the Ministry of Energy and more detailed information is provided in Annex-9 of the PAD.

Annex 1: Results Framework and Monitoring

Turkey: Renewable Energy Integration (P144534)

Project Development Objectives

PDO Statement

To assist Turkey in meeting its increased power demand by strengthening the transmission system and facilitating large-scale renewable energy generation.

These results are at	Program Level

Project Development Objective Indicators

Indicator Name	Core	Unit of Measure	Baseline	Cumulative Target Values					Frequency	Data Source/ Methodology	Responsibility for Data Collection
				YR1	YR2	YR3	YR4	End Target			
Installed wind energy capacity in Turkey	☐	Megawatt (MW)	2700	3205	3785	4453	5221	6104	Annual	Reports by TEIAS, EMRA	TEIAS
Wind energy generation in Turkey	☐	Gigawatt hour (GWh)	7.81	9.27	10.94	12.87	15.09	17.65	Annual	Reports from EMRA and TEIAS	TEIAS
Peak load handled by the transmission system in Turkey	☐	Gigawatt (GW)	38.00	39.50	41.50	43.60	45.70	48.00	Annual	Reports by TEIAS	TEIAS
GHG emissions avoided annually through wind power plants connected to substations funded under the project	☐	Million Tonnes of CO2 (MTCO2)	0.00	0.00	0.00	0.42	0.60	0.69	Annual	Calculations by TEIAS based on reports from EMRA and TEIAS	TEIAS

Intermediate Results Indicators

Indicator Name	Core	Unit of Measure	Baseline	Cumulative Target Values					Frequency	Data Source/ Methodology	Responsibility for Data Collection
				YR1	YR2	YR3	YR4	End Target			
Wind energy capacity connected to sub-stations funded under the project	☐	Megawatt (MW)	0	0	0	365	520	600	Annual	Reports by TEIAS	TEIAS
Wind energy generated from plants connected to sub-stations funded under the project	☐	Gigawatt hour (GWh)	0	0	0	1055	1503	1734	Annual	Reports by TEAIS and EMRA	TEIAS
Energy transferred over Lapseki 2-Sutluce 2 submarine power cable	☐	Gigawatt hour (GWh)	0	0	0	0	4600	4900	Annual	Reports by TEIAS	TEIAS
Transmission lines constructed or rehabilitated under the project	☒	Kilometers (Kms)	0	0	0	10	30	52	Annual	Reports by TEIAS	TEIAS
Transmission lines constructed under the project	☒	Kilometers Sub-Type Breakdown	0	0	0	10	30	52	Annual	Reports by TEIAS	TEIAS
Transformation capacity added under the project	☐	Kilovolt Ampere (KVA)	0	0	0	1700000	2800000	4500000	Annual	Reports by TEIAS	TEIAS
Proportion of TEIAS sub-stations that are equipped with RTUs	☐	Percentage (%)	33	35	40	60	70	80	Annual	Reports by TEIAS	TEIAS
Renewable Energy Resource (RER) operator desk is functional	☐	Yes/No	No	No	No	Yes	Yes	Yes	Annual	Reports by TEIAS	TEIAS
CTF co-financing delivered	☐	Amount (USD million)	0	9	123	586	847	1026	Annual	Calculation by TEIAS	TEIAS

Project Development Objective Indicators	
Indicator Name	Description (indicator definition etc.)
Installed wind energy capacity in Turkey	This indicator measures the installed wind energy capacity in Turkey.
Wind energy generation in Turkey	This indicator measures the annual wind energy generation in Turkey.
Peak load handled by the transmission system in Turkey	This indicator measures the peak load handled by the transmission system in Turkey to reflect the transmission system's overall capacity to handle power.
GHG emissions avoided annually through wind power plants connected to substations funded under the project	This indicator measures the GHG emissions avoided annually through wind power plants connected to substations funded under the project.

Intermediate Results Indicators	
Indicator Name	Description (indicator definition etc.)
Wind energy capacity connected to sub-stations funded under the project	This indicator measures the wind energy capacity connected to sub-stations funded under the project.
Wind energy generated from plants connected to sub-stations funded under the project	This indicator would measure wind energy generated from plants connected to sub-stations funded under the project.
Energy transferred over the 2nd Lepsuki-Sutluce submarine power cable	This indicator measures energy transferred over the 2nd Lepsuki-Sutluce submarine power cable.
Transmission lines constructed or rehabilitated under the project	This indicator measures the length of the transmission lines constructed or rehabilitated/upgraded under the project.
Transmission lines constructed under the project	No description provided.
Transformation capacity added under the project	This indicator measures the transformation capacity added across all substations constructed or augmented under the project.
Proportion of TEIAS sub-stations that are equipped with RTUs	This indicator measures proportion of TEIAS sub-stations that are equipped with RTUs.
Renewable Energy Resource (RER) operator desk is functional	This indicator would check whether Renewable Energy Resource (RER) operator desk is functional.
CTF co-financing delivered (including IBRD, TEIAS and Private WPP investment)	This indicator measures CTF co-financing delivered across IBRD, TEIAS and Private WPP investment. Measurement of Private WPP Investment is based on an estimate.

Annex 2: Detailed Project Description

TURKEY: Renewable Energy Integration Project

A. Project Description

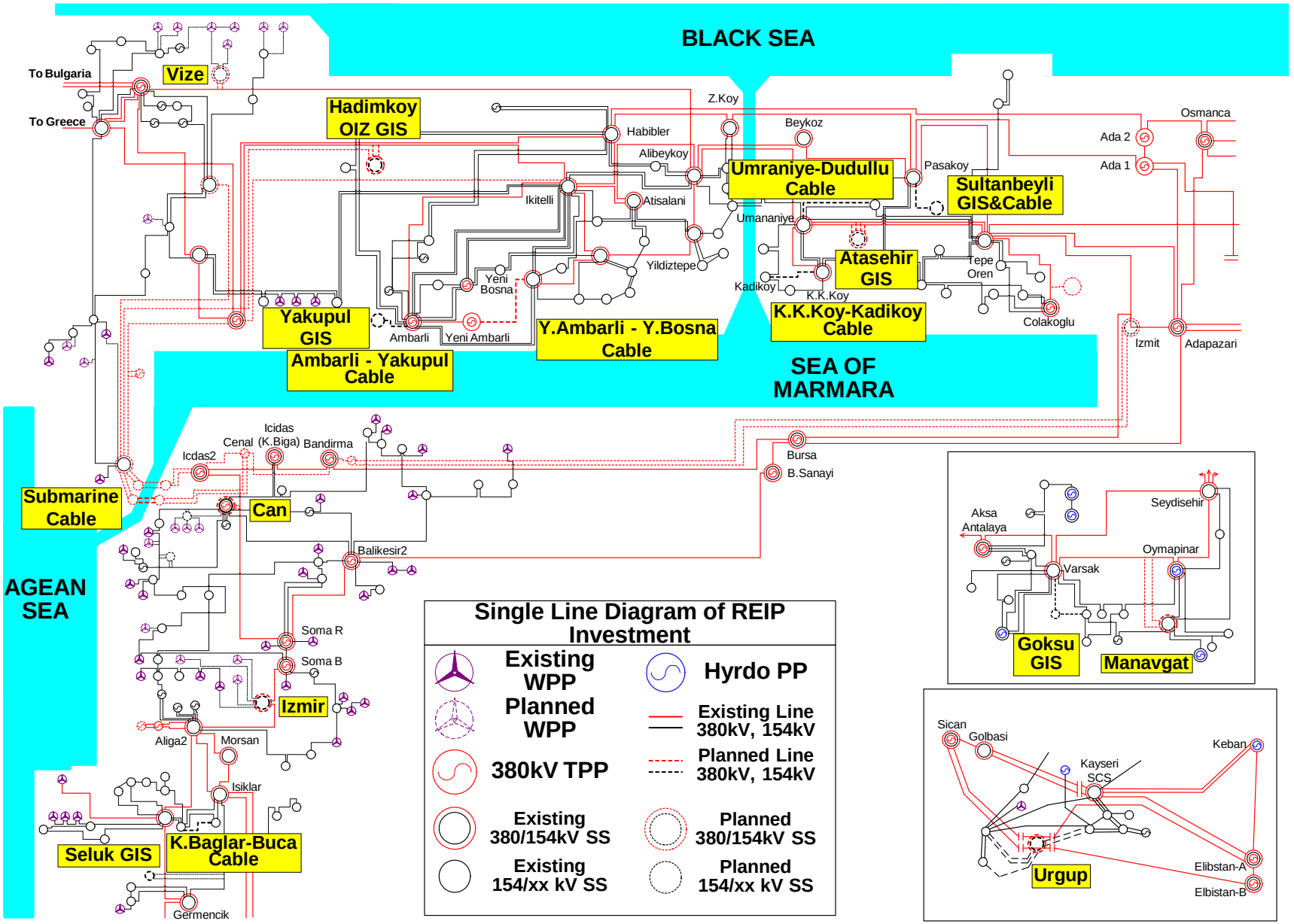
1. The Renewable Energy Integration Project (REIP) comprises of four components: (1) Construction of Wind Power Grid Connection Structures, (2)Smart-grid Applications to Improve Grid Operation and Management, (3) Lapseki-Sutluce 380 kV Submarine Power Cable (Phase-II), and (4) Expansion of Urban Transmission Networks.

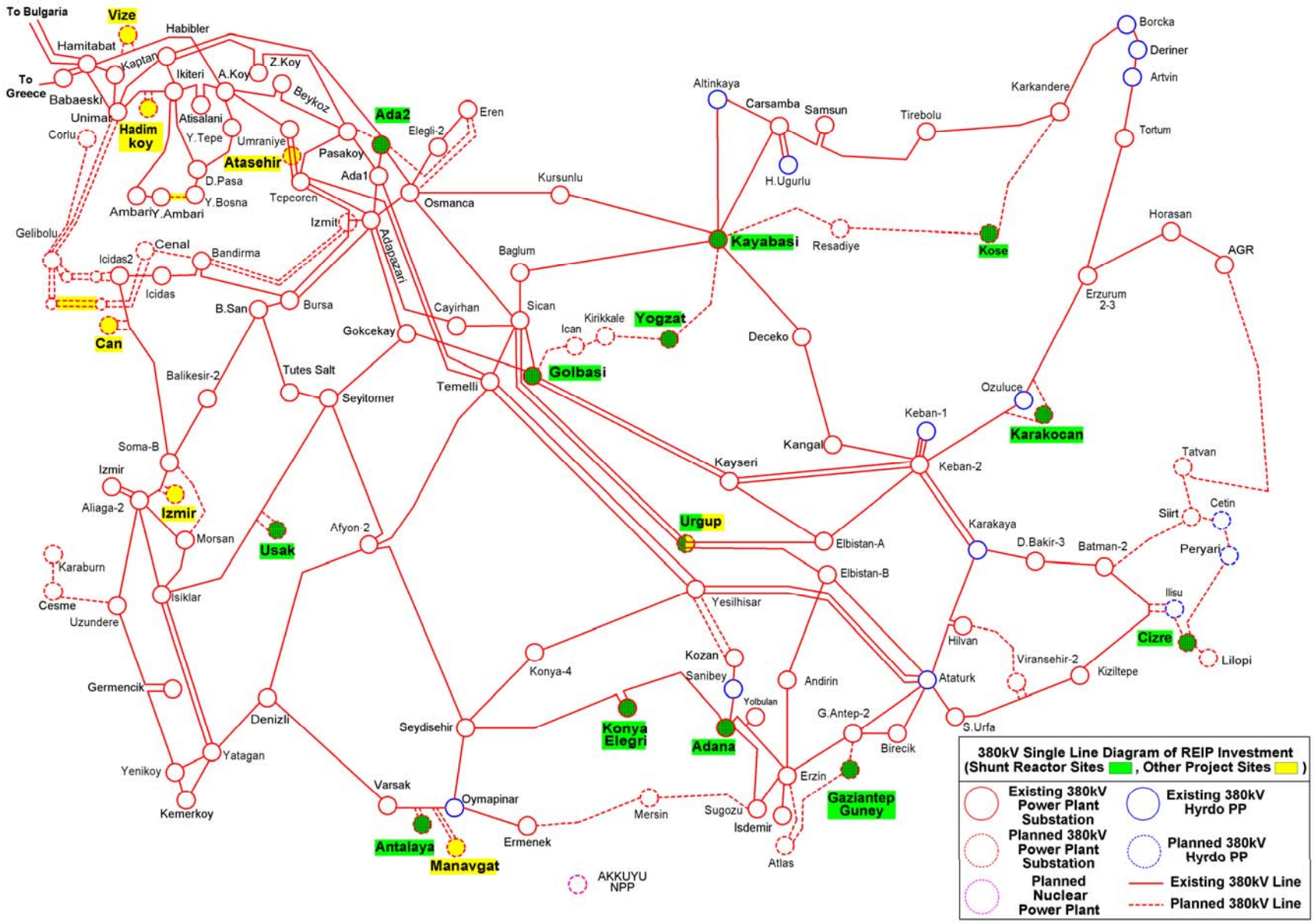
Component-1: Upfront development of transmission infrastructure to facilitate faster development of WPPs

2. The first component covers the investment needs for transmission system strengthening and expansion to absorb and transmit renewable energy to bulk-transmission network. It includes 380kV substations near WPPs (Wind Power Plants) which have inadequate access to bulk-transmission network in view of the projected large wind energy capacity being installed.

(a) ***380/154kV Can Basin wind power substation:*** This substation having 2 x 250 MVA transformers will be constructed adjacent to existing 154kV Can substation which is located at Can City in Canakkale province where wind potential is high in south-west side of Marmara Sea. This area has operating WPPs (119MW), and allocated WPPs (316MW), totaling considerable capacity of 435MW. As this area is relatively rural area, there exist only a couple of 154kV thin and single-circuit transmission lines and local 154kV substations. The existing 154kV transmission system handles existing WPPs, however, it will not able to transmit additional wind power to the transmission network stably and securely. Therefore, this substation will solve stability and security issues, help to reduce transmission losses, and transmit renewable energy easily to Istanbul area which is the biggest load center, via planned 380kV bulk-transmission south route network. In addition, this substation will play an important role to increase connectable capacity for future WPP integration without major constraints.

(b) ***380/154kV Izmir Basin wind power substation:*** This is a new 380/154kV substation that will be constructed at Bergama district in Izmir province where wind potential is high in west side of Turkey's Asian side facing Aegean Sea. Currently this area has operating WPPs (178MW) and allocated WPPs (187MW), totaling considerable capacity of 365MW. This area is also relatively rural area, so there exist a couple of 154kV thin and single-circuit transmission lines and local 154kV substations only, and WPPs locations are far from existing 380kV substations. Current 154kV local transmission system can handle existing WPPs, however, it will not be able to transmit additional wind power to the bulk-transmission system stably and securely. Therefore, this substation will solve stability and security issues, help to reduce transmission losses, and transmit renewable energy easily to Istanbul. In addition, this substation will play an important role to increase connectable capacity for future WPP integration without major constraints.


BLACK SEA
To Bulgaria
To Greece
Vize
Hadimkoy OIZ GIS
Z.Koy
Habibler
Beykoz
Alibeykoy
Umraniye-Dudullu Cable
Pasakoy
Sultanbeyli GIS&Cable
Osmanca
Ada 2
Ada 1
Ikitelli
Atisalani
Umananiye
Atasehir GIS
Tepe Oren
Kadikoy
K.K.Koy
K.K.Koy-Kadikoy Cable
Colakoglu
Yildiztepe
Yeni Bosna
Yakupul GIS
Ambarli
Yeni Ambarli
Y.Ambarli - Y.Bosna Cable
Ambarli - Yakupul Cable
SEA OF MARMARA
Izmit
Adapazari
Bursa
B.Sanayi
Icdas2
Cenal
Icidas (K.Biga)
Bandirma
Submarine Cable
Can
Balikesir2
AGEAN SEA
Soma R
Soma B
Izmir
Aliga2
Morsan
Isiklar
Seluk GIS
K.Baglar-Buca Cable
Germencik
Aksa
Antalaya
Seydisehir
Oymapinar
Varsak
Goksu GIS
Manavgat
Sican
Golbasi
Keban
Kayseri SCS
Urgup
Elibstan-A
Elbistan-B
Single Line Diagram of REIP Investment
Existing WPP
Planned WPP
380kV TPP
Existing 380/154kV SS
Existing 154/xx kV SS
Hyrdo PP
Existing Line 380kV, 154kV
Planned Line 380kV, 154kV
Planned 380/154kV SS
Planned 154/xx kV SS


To Bulgaria
Vize
Habibler
Hamitabat
Kaptan
Ikiteri
A.Koy
Z.Koy
To Greece
Babaeski
Beykoz
Unimat
Hadim koy
Atisalani
Y.Tepe
Umraniye
Ada2
Eren
Elegli-2
Corlu
Atasehir
Pasakoy
Ada1
D.Pasa
Tepecoren
Osmanca
Kursunlu
Ambari
Y.Ambari
Y.Bosna
Izmit
Adapazari
Gelibolu
Cenal
Bandirma
Icidas2
Icidas
Baglum
Kayabasi
Resadiye
Kose
Can
B.San
Bursa
Cayirhan
Sican
Kirikkale
Ican
Yogzat
Gokcekay
Deceko
Golbasi
Balikesir-2
Tutes Salt
Temelli
Seyitomer
Soma-B
Izmir
Aliaga-2
Izmir
Morsan
Usak
Afyon-2
Karaburn
Cesme
Uzundere
Isiklar
Germencik
Denizli
Yatagan
Yenikoy
Kemerkoy
Seydisehir
Konya-4
Konya Elegri
Varsak
Oymapinar
Antalaya
Manavgat
Ermenek
Mersin
AKKUYU NPP
Urgup
Kayseri
Kangal
Keban-1
Keban-2
Elbistan-A
Elbistan-B
Yesilhisar
Kozan
Sanibey
Yolbulan
Andirin
Adana
Ataturk
G.Antep-2
Birecik
S.Urfa
Hilvan
Viransehir-2
Kiziltepe
Erzin
Gaziantep Guney
Sugozu
Isdemir
Atlas
Altinkaya
Carsamba
Samsun
H.Ugurlu
Tirebolu
Karkandere
Borcka
Deriner
Artvin
Tortum
Horasan
AGR
Erzurum 2-3
Ozuluce
Karakocan
Tatvan
Siirt
Cetin
Peryari
Karakaya
D.Bakir-3
Batman-2
Ilisu
Cizre
Lilopi
380kV Single Line Diagram of REIP Investment
(Shunt Reactor Sites , Other Project Sites)
Existing 380kV Power Plant Substation
Existing 380kV Hyrdo PP
Planned 380kV Power Plant Substation
Planned 380kV Hyrdo PP
Planned Nuclear Power Plant
Existing 380kV Line
Planned 380kV Line

(c) ***380/154kV Vize Basin wind power substation:***This is also a new 380/154kV substation that will be constructed at Vize district in Kirklareli province where wind potential is high in European side near Black Sea. Currently the region has allocated WPPs of about 250MW. This area is also relatively rural area, so there exist a couple of 154kV thin and single-circuit transmission lines and local 154kV substations only, and WPPs locations are far from existing 380kV substations. This new substation will solve stability and security issues because existing local 154kV sub-transmission system cannot transmit even allocated wind power to the bulk-transmission network stably and securely. In addition, this substation will help to reduce transmission losses, and transmit renewable energy easily to Istanbul via 380kV bulk-transmission west route in European side. In addition, this substation will play an important role to materialize future WPP integration without major constraints.

Table 2.1 Summary of 380/154kV Wind Power Substations

Wind Power Substation	Existing WPPs (MW)	Allocated WPPs (MW)	Loss Reduction (MW)
	Generated Power (GWh/y)	Generated Power (GWh/y)	Loss Reduction (GWh/y)
Can	134	226	9
	387	653	26
Izmir	178	200	16
	515	578	46
Vize	-	250	5
	-	723	14

33% capacity factor is assumed by TEIAS.

Component-2: Smart-grid investments to strengthen grid operation and management in face of higher wind energy generation

3. The second component covers the investments for Smart-grid system including the "(Supervisory Control and Data Acquisition)" system upgrade in addition to Renewable Energy Operator Desk at main dispatching centers, RTU (Remote Terminal Unit) for supervision and control at substations, smart grid application systems to manage intermittent and unpredictable RE, new protection relay to secure system stability, and shunt reactors to control load flow in the bulk-transmission network. These investments are needed for Turkish stable system operation to prepare massive RE penetration whose target is 20GW by 2023.

(a) ***Upgrading TEIAS' SCADA system and Addition of RER Operator Desk***

(i) TEIAS established its NCC (National Control Center) and ENCC (Emergency NCC as backup) in mid 1980s, and renewed them in 2004. Since then, the Turkish transmission network has grown dramatically, and these dispatching centers continue to supervise, control and collect data from most substations in the power system. Now it is time to upgrade hardware and software existing

dispatching control centers' SCADA/EMS (Supervisory Control and Data Acquisition / Energy Management System) to new version SCADA/EMS that will be able to handle Turkish evolving transmission network in the future.

(ii) In line with SCADA/EMS upgrade, TEIAS needs RER (Renewable Energy Resource) Operator Desk to accommodate variable renewable energy, especially WPPs which evacuate RE to 380kV bulk-transmission system via 154kV sub-transmission system in rural area. The installed capacity of WPP will be considered to increase dramatically from current 3GW level to 20GW level by 2023. To achieve reliable operation of the power system to which large amount of variable WPPs will be integrated in the near future, NCC and ENCC will have to add the specialized Operator Desk for RER which will have SCADA/Monitoring function to WPP, dispatch WPP generation, forecast WPP generation, and perform static and dynamic analysis for stable network operation.

(b) ***RTU installation:*** One of smart gird applications for modern power network to secure reliable and stable operation, real time monitoring and control through SCADA/EMS system is key application. However, although more than 900 substations are connected to Turkish power network, about 400 substations and power plants are connected to the control centers' SCADA/EMS system via RTU (Remote Terminal Unit). Although all of the substations and power plants connected to the 380kV network, power plants and some 154kV substations connected to the 154 kV network, have link to the control centers' SCADA/EMS system, many154kV substations do not have any link to SCADA/EMS system yet. Further, as previously mentioned, the Turkish control center was established in mid 1980s and renewed in 2014, there still exist around 60 RTUs that were installed in mid 1980s and do not have any smart grid functions to meet modern SCADA/EMS system requirement. To overcome the absence of links to the control centers' SCADA/EMS system in some cases and the prevalence of obsolete equipment in some other cases, TEIAS needs to install 200 RTUs to 154kV substations and replace some of the existing old 60 RTUs in order to improve real-time observability of the transmission network.

(c) ***Protection Relay Deployment:*** To operate power grid stably and securely, protection relay plays a very important role for clearing any fault in the high voltage network precisely and immediately in order to prevent system instability and wide-area blackout. Thanks to the development of digitalized central processing unit and IT technology, the modern protection relay system can achieve this object smoothly. TEIAS recognizes, however, that about 40% of its 380kV line protection relays are old type (transistor, mechanical, and analog type) and 60% relays are numeric (digital) type, and about half of its 154kV line protection relays are old type and remaining half relays are numeric type. These numeric type relays, however, do not support IEC (International Electro technical Commission) 61850standard which defines protocols, specifications and interfaces required for evolving smart grid application in the protection and automation architecture in the transmission and substation system. Therefore, TEIAS will deploy IEC oriented digital protection

relay to replace existing relays and to place new relays along with new transmission lines and substations projects.

(d) ***Shunt Reactors in transmission system:*** Shunt reactors are necessary to compensate capacitive reactive power derived from overhead lines and power cables. They are also used to adjust regional voltage profile in bulk-transmission network. Currently, Shunt reactors are installed at 47 stations and their total capacity is about 6270 MVar. TEIAS will continue large transmission investment. Therefore, new substations, overhead lines and power cables will be constructed in the coming years. In this context, existing shunt reactors are not enough to compensate additional capacitive reactive power. According to TEIAS's system analysis, it is necessary to install 15 shunt reactors at 13 stations whose total capacity is 2231MVar, and to secure 2 back-up shunt reactors in case of emergency (2x183MVar).

(e) **Component-3: Lapseki 2-Sutluce 2 380 kV Submarine Power Cable to better inter-connect wind energy locations with other parts of Turkey**

4. As the second double-circuit submarine cable under Dardanelles Strait, this submarine cable will be laid between Lapseki interface point (Asian side) and Sutluce interface point (European side) in Canakkale province. The route length is about 4.35km, and this cable is XLPE with 1600mm2 that can carry 2 x 1000MW under the sea. Lapseki interface point will have 380kV double-circuit OHL connection from the proposed 380kV Can Basin wind power substation via existing 380kV Bekirli substation in the future. Under ongoing APL-6, the first Lapseki-Sutluce submarine cable is being progressed. To meet rapidly growing power demand in Istanbul area, however, many and various power plants in Canakkale province and Izmir province, including WPPs in Can Basin and Izmir Basin, are planned and will be connected to this region's 380kV bulk-transmission network. According to the load projection, the first Lapseki-Sutluce submarine cable will be overloaded by about 360MW (18%) even in the normal condition if this proposed second submarine cable does not exist. Once this second submarine cable is completed, no overload will be observed in case of a contingency. In addition, this submarine cable will also contribute to establish robust and shorter 380kV southern route (Southern Marmara Sea Side) to Istanbul. Network loss will be reduced by 50 MW at its peak.

5. This investment is needed urgently for system stability to meet aggressive demand and supply increase, and hence their procurement was commenced under the ongoing APL-6, though most of the financing would be provided under the REIP.

Component-4: Strengthening of Transmission Networks to cater to growing demand and supply of electricity in Turkey

6. The last component covers the investment needs for 380kV (other than the submarine cable) and 154 kV transmission network strengthening and expansion to meet rapidly increasing demand and supply. It includes the YeniAmbarli–Yenibosna underground cable as well as several other underground/over ground cables and GIS/other substations. In view of the urgent requirement, procurement of the YeniAmbarli–Yenibosna underground cable has been initiated under APL-6 though most of the investment will be financed by this REIP.

(a) ***380kV YeniAmbarli–Yenibosna underground power cable:*** This underground cable will connect a substation at Yeni Ambarli NGCCP (Natural Gas Combined Cycle Plant) to Yenibosna 380/154/33kV GIS substation near Ataturk Airport in Istanbul. The route length is about 16.7km, and this cable is XLPE (CROSS-LinkedPoly-Ethylene insulated cable) with 2000mm2 that can carry 990MVA power. Although Yenibosna GIS substation has two 380/154kV 250MVA, two 380/33kV 125MVA, and two 154/33kV 100MVA transformers, totaling 950MVA capacity, this substation has only one 380kV underground cable connection from Davutpasa GIS substation as its power supply route. On the other hand, as its power evacuation route, Yeni Ambalri NGCPP has only one 380kV underground cable connection to Ambarli NGCCP that has double-circuit overhead line to Ikitelli Substation where Davutpasa GIS substation is also connected. Therefore, these two single-route connections in each station surely threaten the security of supply in the network. According to the load projection, about 470MW load shedding will happen in one case when Yenibosna–Davutpasa route is open. Given this critical situation, once this proposed Yeni Ambarli–Yenibosna underground power cable is installed, the 380kV loop connection among Ambarli NGCCP, Yeni Ambarli NGCCP, Yenibosna, Davutpasa, and Ikitelli will be formed. As a result, there will be no security issue in case of a contingency.

(b) ***380/33kV Atasehir GIS substation:*** This is a new 380/33 kV GIS (Gas Insulated Switch Gear) substation with two 125MVA transformers that will be constructed at Atasehir district in Istanbul province where will see growing population and developing business center in the East side of Bosporus Strait. Currently three 380kV substations (Umraniye, K.B.Koy, and Tepeoren) are main power sources. Based on the new zoning application in Atasehir district, it is planned that large scale business center including International Finance Center, commercial area, and public housing in this region. According to this development plan, the new additional demand will reach to about 200MVA that existing 380kV and 154kV system cannot handle reliably and stably. By constructing this substation, the increasing load will be shared among substations in a balanced manner and the reliability and stability will be secured. As the available area is limited, GIS substation is required for space-saving.

(c) ***380/154/33kV Hadimkoy OIZ GIS substation:*** This is a new 380/154/33 kV GIS substation with two 380/154kV 250MVA, two 380/33kV 125MVA, and two 154/33kV transformers that will be constructed at Arnavutkoy district's Deliklikaya site in Istanbul province' European side where OIZ (Organized Industrial Zone) is planned for future development. Currently two 380/154kV substations (Habibler and Ikitelli) and one 154/33kV Hadimkoy that is connected to Habibler are main power sources. Based on the 1st stage of OIZ development plan, the new additional demand will reach to about 80MVA. By taking account of this new demand and ordinary demand increase in the future, existing 380kV and 154kV network will not be able to handle this situation reliably and stably. In the peak time, if this substation does not exist, it is estimated that about 330MW load shedding will occur when one fault leads to cascading overload in this region's network. The new network configuration will

decrease loss by 9MW at its peak. As the allocated land for this substation in this OIZ is limited, GIS substation is required for space-saving.

(d) ***380/154kV Manavgat Substation:*** This substation having two 250MVA transformers will be constructed adjacent to the existing 154kV Manavgat substation which is located at Manavgat district in Antalya province, near Mediterranean Sea coast. Current main power source in this area is one 380/154kV Oymapinar substation that has 250MVA and 180MVA transformers, totaling 430MVA capacity. This substation also supplies power to the existing 154kV Manavgat and the 154kV Alanya-1 substations. According to the load projection based on that this sea coast area will develop tourism industry, if this proposed 380/154kV Manavgat substation does not exist, Oymapinar load will be 550MVA exceeding nominal transformers' capacity, and two 154kV lines from Oymapinar to Manavgat and Alanya-1 will be overloaded by 20MVA. The new network configuration will decrease loss by 9.8MW at peak time.

(e) ***380/154/33kV Urgup Substation:*** This substation having two 380/154kV 250MVA and two 154/33kV 100MVA transformers will be converted to a substation with switching station function from existing 380kV Urgup SCC (Series Capacitor Center) that is necessary for stable power transmission and loss reduction for long, about 470km, Sican-Elbistan A line and Sican-Elbistan B line, and this SCC is located at the middle of these lines. Currently, Kayseri and Nevsehir provinces are supplied by the 380/154kV Kayseri Capacitor substation having 700MVA (1x250MVA, 3x150MVA) capacity through 154kV thin lines via Kayseri-2, Cinkur, Avanos, and Nevsehir substations. Some routes are single-circuit line and the length from Kayseri to Nevsehir is about 100km. According to the load projection followed by regional development and population increase estimation, if this proposed 380/154kV Urgup substation does not exist, the transformer load in Kayseri Capacitor substation will reach to 540MVA causing supply security issue, and thin 154kV transmission lines will be also overloaded in case of one line failure. In addition, as this substation will divide 470km double circuit lines, network reliability and system stability will increase.

(f) ***154/33kV Selcuk GIS substation:*** This substation having a 100MVA transformer will be constructed at narrow area adjacent to the existing 33/15kV Selcuk distribution substation which is located at Selcuk district in south-west of Izmir province and close to Aydin province. Currently this area is supplied by two 33kV distribution substations, Belevi and Selcuk, thorough 33kV-26km double-circuit line from 154/33kV Aslanlar substation that has two 100MVA transformers. According to the load projection based on that Selcuk area will develop tourism industry and increase population, the total load of 33kV Belevi and Selcuk substations will reach to 50MVA from current 26MVA. As a result, voltage drop will be over 11% (regulation: 7%) and loss will be 6.9% (target: 5%), and both voltage drop and loss threaten quality and security of supply. Once this proposed 154kV Selcuk GIS substation is established, these issues will be resolved and the transformer load of

154kV Aslanlar will be alleviated, too. In order to avoid impairing scenery in this area, GIS substation is selected.

(g) ***154/33kV Yakuplu GIS substation:*** This is a new 154/33kV GIS substation with two 100MVA transforms that will be constructed at Beylikduzu district in Istanbul province near Ambarli NGCCP. Currently, this area is mainly supplied by two substations, Beylikduzu and Ambarli NGCPP substations. According to area's development plan including Eston Sea Marina and Ambarli Port development, shopping center and residence development, around 110MVA new demand is expected. By taking account of this new demand and ordinary demand increase of Beylikduzu and Ambarli substations, existing 154kV network will not be able to handle this demand reliably and stably. In one contingency case when 154kV line from Ambarli NGCCP to Beylikduzu is open, for example, other 154kV line from Beylikduzu substation will be loaded by about 130%. If the proposed 154/33kV Yakuplu GIS substation is established, there will be no security and overload in 154kV network in this area. The new network configuration will decrease loss by 3MW at its peak. As this area is so developing and populated, GIS is required for space-saving.

(h) ***154/33kV Goksu GIS substation:*** This is a new 154/33kV GIS substation with two 100MVA transformers that will be constructed at Antalya city. Currently, this area is mainly supplied by three substations, Varsak , Lara-1, and Lara-2 substations. According the load projection, for example, transmission line from Varsak to Lara-1 will be overloaded by 151% even under normal condition. In one contingency case, this line will be overloaded by 170%. If the proposed 154/33kV Goksu GIS substation is established, there will be no overload line in this network. As this area is close to bay area and is expected large development, GIS substation is required for space-saving.

(i) ***154/33kV Sultanbeyli GIS substation:*** This is a new 154/33kV GIS substation with two 100MVA transforms that will be constructed at Sultanbeyli district in Asian side of Istanbul province. Currently, this density populated area where a GIS substation is suitable for space-saving, is mainly supplied by three substations, Pasakoy, Buyukbakkalkoy, and Kurtkoy substations. According to the load projection, two 100MVA transformers at Paskoy will loaded by 90% on average, and four 100MVA transformer at Kurtkoy will be loaded by 68% on average. In a contingency case in each substation, transformers will be overloaded. Therefore, Sultanbeyli substation will play an important role to resolve this security and reliability issue in this area.

(j) ***154kV Karabaglar–Buca underground power cable:*** The purpose of this project is to replace existing 154kV Karabaglar–Buca OTL (Overhead Transmission Line) to a single 154kV underground cable line. These substations and OHL are located at densely populated Izmir city's southern area in Izmir province. As this exiting OTL was constructed in the past but this region has being developed recently, security violation around OTL may emerge, and maintenance is getting very difficult above density populated area. The route length is about 8.7km, and this is a single-circuit

XLPE cable line with 1600mm2 that can carry 370MW. The loss will be decreased by 0.24MW at its peak.

(k) ***154kV Kucukbakkalkoy–Kadikoy underground power cable:*** This development project is planned at Kadikoy and Atasehir districts in Istanbul province's Asian side. In order to meet the huge demand increase in the future, the new 154kV Kadikoy GIS substation was considered under ongoing APL – 6 in addition to existing 154kV Selimiye GIS and Goztepe GIS substations. The purpose of this project is to establish a power supply line from 380/154kV Kucukbakkalkoy substation to this new substation at densely populated Kadikoy district. The route length is about 8.5km, and this is a single-circuit XLPE cable line with 1600mm2 that can carry 370MW. The loss will be decreased by 0.2MW at its peak.

(l) ***154kV Ambarli NGCCP –Yakuplu GIS underground cable:*** The purpose of this project is to establish a power supply line from existing Ambarli NGCCP substation to a new 154/33kV Yakuplu GIS substation at densely populated Beylikduzu district in Istanbul province, and this substation is one of above proposed subproject components. The route length is about 5km, and this is a single-circuit XLPE cable line with 1600mm2 that can carry 370MW. The loss will be decreased by 2.7MW at its peak.

(m) ***154kV Umraniye –Dudullu underground cable:*** The purpose of this project is to establish the second power supply line from 380/154kV Umraniye substation to 154/33kV Dudullu substation at Dudullu district in Istanbul province's Asian side. Currently, 154/33kV Dudullu substation is supplied by three 380/154kV substations, Umraniye, Pasakoy, and Tepeoren, and each OHL is a single-circuit. According to the load projection, if the Pasakoy–Dudullu OHL is open, for example, overload cascading will trip all OHLs to Dudullu substation and this will lead to about 260MW load shedding. Although Umraniye–Dudullu line was commissioned about 30 years ago as OHL, it is so difficult to secure right-of-way for the second OHL route in this densely populated area that underground cable line is selected to alleviate line overload in a contingency. The route length is about 9km, and this is a single-circuit XLPE cable line with 1600mm2 that can carry 370MW. The loss will be decreased by 0.13MW at its peak.

Annex 3: Implementation Arrangements

TURKEY: Renewable Energy Integration Project

Project Institutional and Implementation Arrangements

1. The project will be implemented by TEIAS in its roles as the electricity transmission system owner and operator and electricity market operator. TEIAŞ is the backbone of the Turkish power system and is in the need to respond to the increasing demands of private generators and load changes. Increasingly private investment is projected in both generation and distribution due to on-going privatization processes for both distribution and generation, and new investments on the generation side, leaving TEIAŞ in an increasingly challenging position in the middle. TEIAS is very familiar with the Bank policies and guidelines, in terms of procurement, financial management and safeguards. Project implementation will be carried out by the following units within TEIAS:

a) The Project Coordination Unit (PCU) within the Research, Planning and Coordination Department of TEIAS oversees and coordinates the World Bank projects.
b) Three operating departments will be responsible for procurement and implementation for this project. These are the:

    (i) Substation Department(substations, underground and submarine cables),
    (ii) Communication and Information Systems Department, (SCADA and Smartgrid) and
    (iii) Operations Department (for shunt reactor and numerical relay).
    (iv) Trade Department (bidding procedures)

c) The finance department is responsible for financial and disbursement reporting to the PCU, the timely completion of audits and implementing the plans to address issues related to achieving a comprehensive audit opinion of TEIAS.

2. TEIAS is currently implementing the ECSEE APL-6 project which is rated satisfactory as of January 2014. In the last decade it has implemented four other projects, including ECSEE APL2, ECSEE APL3, the TEK restructuring and the National Transmission Grid projects, all of which were rated as satisfactory or highly satisfactory upon completion. Being a state-owned enterprise, TEIAS faces some constraints e.g. in recruiting and retaining staff, and timely decision making. Options for increasing TEIAS' operational capacity are under discussion and on the Government's agenda.

Financial Management and Disbursements

Implementing Entity

3. TEIAS is a state-owned enterprise established in 2001 and taken over the electricity transmission functions of TEAS the former electricity company. TEIAS is currently implementing the ECSEE APL-6 project which is rated satisfactory as of January 2014. In the

last decade it has implemented four other projects, including ECSEE APL2, ECSEE APL3, the TEK restructuring and the National Transmission Grid projects, all of which were rated as satisfactory or highly satisfactory upon completion.

4. TEIAS has a World Bank Projects Coordination Department and this department is responsible for overall coordination of the project. The financial management functions under the projects are carried out by the Financial Affairs Department (FAD) in coordination with other technical departments of TEIAS. The same arrangements will be maintained for this Project.

Accounting

Staffing

5. The financial management and disbursement arrangements of the project will be the responsibility of the FAD of TEIAS. The staffs working at the department are adequately qualified and experienced. The current staffing level at the FAD is assessed as sufficient for the implementation of this project. The project transactions will be integrated into TEIAS's systems and the project transactions will be handled as part of the FAD's routine work.

Accounting Procedures and Information Systems

6. The project accounting will be maintained by the FAD. The Company has financial management manuals and guidelines. The main transactions, which are the movements of the designated accounts and project expenditures, will be in the Company's main accounting system. However under the current accounting system of the institution, It is not possible to generate project financial statements directly from the system. For that reason, the FAD will continue to maintain separate Excel spreadsheets for project monitoring and reporting, until a new accounting system is available.

7. TEIAS contracted an IT service company to design and develop an Enterprise Resource Planning software (ERP) for the company. The ERP was planned as an integrated Management Information system also including modules relating to financial management. However, the IT service provider went bankrupt and failed to complete the ERP. TEIAS was relying on the ERP to renew and update their IT infrastructure and systems. The issue is currently unresolved. Deficiencies in the IT system are also highlighted in the independent auditors' management letter for 2012.

8. As an alternate, the FAD is working with system developers on a modular FM system integrated with the regional offices. The accountants have been trained and the new system is in use in parallel to the old system. The FAD expects to switch to the new system once the testing stage is completed – which is expected by the end of April 2014. The FAD will then work on the possibility of generating the foreign currency project reports automatically from that system.

9. The risk associated with information systems is assessed as moderate. TEIAS will use excel worksheets to account and report for the Project. Issues around accounting and reporting at the entity level are summarized below.

10. SOEs, including TEIAS, are required to maintain their accounts and prepare financial statements in accordance with the Tax Procedures Code and the Uniform Chart of Accounts rather than a set of more general purpose financial reporting standards such as IFRS.[6]As per the new Commercial Code, for accounting periods starting on or after January 1, 2015, all large and medium-sized SOEs, including TEIAS, will prepare annual financial statements in accordance with Turkish Accounting Standards (TAS) which are equivalent to International Financial Reporting Standards (IFRS).[7]However, SOEs will continue to use UCA for accounting purposes. TEIAS will need to build capacity to modify its accounting and reporting systems in order to be able to prepare financial statements in accordance with TAS.[8]

Internal controls and Internal Audit

11. TEIAS is a State Owned Enterprise. Accordingly, there exist strict control procedures for processing the transactions. The general procedure for payments is as follows. The project contracts are followed by the technical departments. After the tendering and the signing of the contract, technical teams of TEIAS closely monitor the work plan of the subcontractor, as well as the purchases of materials by the subcontractor (amount and quality). All these controls are documented by TEIAS as at each stage the relevant staff prepare test reports, goods receipt reports and situation reports. Situation reports are partial completion reports which details all the work done relating to the relevant transmission line and they are used as the base document to request payment from the FAD. The situation reports are prepared by the responsible technical staff of TEIAS (engineer and technical chief), signed by the subcontractor, inspected and signed by an assistant manager and approved by the director and head of Transmission Lines investment, Project and Construction Department. The situation report, the relevant control documents relating to the verification of goods received, the subcontractor's invoices are sent to the FAD together with the payment request indicating both foreign currency and equivalent TL

[6]The Revenue Administration designs legally mandated accounting requirements to meet the needs of the state as a tax collector. These requirements may not necessarily meet the IFRS and information needs of other groups. There are significant differences in the reported financial position and performance of an enterprise between financial statements prepared in accordance with the Tax Procedures Code and the Uniform Chart of Accounts (UCA) and those prepared in accordance with International Financial Reporting Standards (IFRS) because IFRS require accounting estimates whereas the Tax Code and UCA do not. Furthermore, disclosures required by the UCA are relatively limited compared to IFRS thereby reducing the transparency of financial statements in general.

[7] The Council of Ministers Decision effective from January 1, 2013 requires the SOEs operating under the Decree Law 233 and their subsidiaries to be subject to external audit and thus prepare their financial statements in accordance with the TAS starting from 2015. The SOEs that meet two of three criteria will be subject to that regulation. These criteria are: (i) assets exceeding TL 40 million, (II) net sales exceeding TL 50 million; and, (iii) number of employees exceeding 125.

[8] The OECD Guidelines and good practice in many countries requires DOEs, even those wholly owned by the government, to produce annual reports with financial statements comparable to those produced by listed companies. In the EU, this would mean producing complete OFRS statements.

amounts to be paid from both the loan (by indicating loan number) and TEIAS's own funds for counterpart contributions as per the legal agreements. The Finance Department upon receiving the payment order from the related technical department makes the payment and then enters it into the main accounting system of TEIAS. The bank payment order is signed jointly by two of the authorized signatories. The balances of the technical department and the finance department are reconciled quarterly by the World Bank projects department which is responsible for the compilation of the information and sending the IFRs to the Bank.

12. TEIAS does not fall within the scope of the Public Financial Management and Control Law which requires internal control departments to be established at public administrations. However, TEIAS is committed to modernize its financial management systems and in line with the General Investment Finance (Council of Ministers) decree approved in 2013 on General Investment and Finance for SOEs, the company is going to establish an internal audit and control department within two year time.

Reporting and Monitoring

13. TEIAS will maintain records and will ensure appropriate accounting for the funds provided on a cash basis. The interim un-audited financial reports (IFRs) will be prepared quarterly and will be submitted to the Bank no later than 45 days after the end of the quarter. The format and the contents of the IFRs will be agreed upon with the Bank and attached to the Minutes of Negotiation.

14. The IFRs will include the following reports at a minimum:
- Sources and Uses of Funds by Components
- Sources and Uses of Funds by Categories
- Designated Account Statement (IBRD)
- Designated Account Statement (CTF)
- Detailed Expenditure Tables for Contracts Co-Financed by CTF

External Audit

15. Annual project financial statements will be audited by the Treasury Controllers. TEIAS's entity financial statements prepared in accordance with IFRS will be audited by independent auditors acceptable to the Bank. The acceptable auditors' qualifications will be stated in the Minutes of Negotiation.

16. As a requirement of the ongoing ECSEE APL-6 Project, TEIAS is subject to annual audits in accordance with the International Standards on Auditing.

- The Treasury Controllers issued an unmodified (clean) audit opinion on 2012 ECSEE APL-6 project financial statements with no management letter.
- The private auditors of the entity IFRS financial statements issued a disclaimer opinion on TEIAS financial statements since 2002 mainly due to: i) incomplete registration of the title deeds and transfer of ownership of the immovable assets to TEIAS during the past

restructurings, and ii) lack of information on the fair value of fixed assets which represent more than 50% of total assets as per the audited financial statements.

17. Although the entity audit report has a disclaimer of opinion, the project financial statements have clean audit opinions for previously implemented projects. This cannot be considered as risk to the project but rather as a corporate governance issue. The World Bank teams will be ready to provide support upon TEIAS's request. TEIAS has resolved many of the issues indicated in previous years' audit opinions and expresses commitment to improve the quality of audits and align its accounting and reporting systems with IFRS. TEIAS FAD has decided to procure financial consulting services for the valuation of its fixed assets, alignment of its accounting system and training of its staff.

18. The following table summarizes the audit requirements for the Project:

Audit Report	***Due Date***
Entity financial statements	Within eight months of the end of each fiscal year and also at the closing of the project
Project financial statements	Within six months of the end of each fiscal year and also at the closing of the project

Funds Flow and Disbursement Arrangements

19. Project funds will flow from the Bank - either as an advance, via the Designated Accounts, which will be replenished under transaction based disbursement method, or by direct payment on the basis of direct payment withdrawal applications.

20. There will be two designated accounts for the project for disbursements from the World Bank loan and from the Clean Technology Fund (CTF). The accounts will be in Euro and will be at a public commercial bank acceptable to World Bank. Payments to the contractors, suppliers and consultants for the Bank/CTF funded portions will be made from these accounts (except direct payments). The Financial Affairs Department of TEIAS will be responsible for administering the accounts and executing all payments including the counterpart fund payments in compliance with the loan agreements and the project documents. TEIAS is a revenue earning entity and access to the counterpart funds has not been a problem to date in other World Bank financed projects implemented by TEIAS.

21. Only certain packages defined under Component 1 (sub-stations) and 2 (smart-grid) will be co-funded from CTF. These will be clearly identified and the expenses paid from the IBRD and CTF funds will be accounted for separately to enable segmented reporting upon request. The disbursement split between IBRD and CTF for these components/packages will take place at a rate of 50-50, subject to a maximum of the allocated CTF funds for the component, after which the entire disbursements will take place from the IBRD loan. The 50-50 split will be applicable on a transactional basis, i.e. each advance and progress payment made for the qualifying packages will be co-funded from IBRD and CTF sources at a 50-50 rate.

22. TEIAS will specify authorized signatories for withdrawals from the Bank and CTF funds and payments from the designated accounts will be made with the approval of the authorized staff. The Ceiling for this Designated Account will be defined in the Disbursement Letter (DL) for the project. Documentation requirements for replenishment would follow standard Bank procedures as described in the DL.

Overall Conclusion

23. It is concluded that the financial management environment of TEIAS is acceptable.

24. The following action plan is proposed to monitor the progress in TEIAS's financial management environment - these actions will be followed up during implementation and do not represent conditions for the Project but will be areas of follow up during regular implementation support missions.

Action subject to follow up	**Tentative Deadline**
1. Follow up progress on TEIAS's new accounting system that will be in use by end 2014 including the revision of the project financial management manual in line with the new accounting system of TEIAS.	December 31, 2014
2. Follow up TEIAS's progress for the implementation of the new Commercial Code, including the procurement of consultancy services for compliance with the accounting and auditing provisions set forth in the New Commercial Code.	September 30, 2014

PROCUREMENT

25. Procurement for the Renewable Energy Integration Project will be carried out in accordance with the World Bank's "*Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by the World Bank Borrowers" dated January 2011 (Procurement Guidelines)*; and the provisions stipulated in the Loan Agreements (LAs). World Bank's *"Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants", dated October 15, 2006 and revised in January 2011 (Anti-Corruption Guidelines)* will apply to this Project.A General Procurement Notice will be published on the Bank's external web-site and UN Development Business. Following procurement implementation arrangements were agreed with TEIAS.

26. **Procurement Implementation Arrangements:** The Project Coordination Unit (PCU) within the Research, Planning and Coordination Department of TEIAS oversees and coordinates the World Bank projects. Four operating departments will be responsible for procurement and implementation for the Project. These are the; 1) Substations Department (substations, underground and submarine cables), 2) Communications and Information System Department (SCADA & smart grid), 3) Operations Department (Relays and Shunt Reactor), and 4) Trading Department (bid documents).

27. **Procurement of Works:** No works contracts are foreseen in the project.

28. **Procurement of Goods/Supply and Installation:** Goods procured under this project would include: Supply and Installation of Substations, underground and submarine power cables, smart grid applications, SCADA, RTU and supply of numerical protection relay and shunt reactors.

29. It is envisaged that all above procurements will done in accordance with International Competitive Bidding (ICB) procedures. The procurement will be done using the Bank's latest Bank's Standard Bidding Documents for all ICBs.

30. Three contracts initiated under the ECSEE APL6 Project namely; 1) Design Supply and Installation of YeniAmbarli - Yenibosna 380 kV Underground Power Cable, 2) Design, Supply and Installation of Lapseki 2 – Sutluce 2 380 kV Submarine Cable, and 3) Upgrade of TEIAS' SCADA system will continue to be financed under the proposed Project. The Bank agreed with TEIAS for the Direct Procurement of SCADA upgrade from the original supplier. The procedures described in the World Bank's January 2011 Procurement Guidelines were followed in the procurement of these contracts.

31. **Procurement of Non consulting services:** No non-consulting services are foreseen in the project.

32. **Selection of Consultants:** No consulting services foreseen from the Loan. However, any consultant services needed for highly specialized subjects under the project will be financed from TEIAS' own resources.

33. **Procurement plan and methods and review thresholds:** TEIAS developed a Procurement Plan for the entire duration of the project which also provide basis for the procurement methods and thresholds. This plan has been agreed between TEIAS and the Bank and will be published on the Bank's external web-site after loan negotiations. The agreed procurement plan is available in the project files. The Procurement Plan will be updated at least annually or as required to reflect the actual project implementation needs. A summary of the agreed procurement packages and their schedule are given in Table 1.

34. The procurement plan includes the procurement methods and review thresholds as well as the project specific arrangements. The Bank will review the procurement arrangements performed by TEIAS as including contract packaging, applicable procedures, methods and the scheduling of the procurement processes for its conformity with Bank's Procurement Guidelines, the proposed implementation program and disbursement schedule. The Bank's prior review thresholds are provided in the agreed procurement plan. The procurements not prior reviewed by the Bank will be subject to the Bank's ex-post review in accordance with the procedures set forth in Appendix 1 to the Procurement Guidelines respectively on a random basis. One in ten contracts of the Project will be post reviewed. Post review of the procurement documents will normally be undertaken during the Bank's implementation support missions or as the Bank may request to review any particular contract at any time.

Table 1. Procurement Packages and Time Schedule							
Contract Package	**Contract Description**	**Type**	**Financing from**	**Procurement Method**	**Review Method**	**Expected Bid Announcement Date**	**Expected Contract Completion Date**
RENEWABLE ENERGY PROJECTS (Components 1 and 2)							
1	Supply and Installation of 380 kV **Can** wind power substation including control, protection and automation system (380/154 kV, 2x250 MVA)	G/SI	WB/ CTF	ICB	Prior	Mar-15	Mar-17
2	Supply and Installation of 380 kV **Izmir** wind power substation including control, protection and automation system (380/154 kV, 2x250 MVA+154/33kV)	G/SI	WB/ CTF	ICB	Prior	May-14	Jun-16
3	Supply and Installation of 380 kV **Vize** wind power substation including control, protection and automation system (380/154 kV, 2x250 MVA+154/33kV)	G/SI	WB/ CTF	ICB	Prior	Jun-14	Jun-16
4	Supply of Numerical Protection Relay needed for improvement of the protection system	G	WB/ CTF	ICB	Prior	Aug-14	Feb-18
5	Smart Grid Applications for improvement of operation of the transmission system	G/SI	WB/ CTF	ICB	Prior	Jun-15	Dec-18
6	Supply of Shunt Reactor for the control of reactor power	G	WB/ CTF	ICB	Prior	Oct-14	Apr-17
7	Supply and Installation of upgrade of TEIAS' SCADA/EMS system and Addition of Operator Desk for RER	G/SI	WB/ CTF	DC	Prior	NA	Dec-15
8	RTU Supply and Installation (200 units)	G/SI	WB/ CTF	ICB	Prior	Jun-14	Dec-17
380 kV PROJECTS							
9	Ataşehir 380 kV GIS Substation (380/33 kV 2x125 MVA)	G/SI	WB	ICB	Post	Jul-14	Jun-16
10	Hadimkoy OSB 380 kV GIS Substation (380/154 kV 2x250 MVA; 380/33 kV 2x125 MVA; 154/33 kV 2x100 MVA)	G/SI	WB	ICB	Prior	Jun-14	May-16
11	Manavgat 380 kV Substation (380/154 kV 2x250 MVA; 154/33 kV 100 MVA)	G/SI	WB	ICB	Prior	Aug-15	Jul-17
12	Urgup 380 kV Substation (380/154 kV 2x250 MVA)	G/SI	WB	ICB	Prior	Aug-14	Aug-16
13	YeniAmbarli-Yenibosna 380 kV Underground Power Cable (2000 mm^2, 16.7 km)	G/SI	WB	ICB	Prior	Nov-13	Feb-16
14	Lapseki 2-Sütlüce 2 380 kV Submarine Power Cable (2x1600 mm^2, 4.35 km)	G/SI	WB	ICB	Prior	Nov-13	Sep-16
154 kV PROJECTS							
15	Selcuk 154 kV GIS Substation (154/33 kV 2x100 MVA)	G/SI	WB	ICB	Post	Jul-14	Jun-16

16	Yakuplu 154 kV GIS Substation (154/33 kV 2x100 MVA)	G/SI	WB	ICB	Post	Jun-14	May-16
17	Goksu 154 kV GIS Substation (154/33 kV 2x100 MVA)	G/SI	WB	ICB	Post	May-15	May-17
18	Sultanbeyli 154 kV GIS Substation (154/33 kV 2x100 MVA)	G/SI	WB	ICB	Post	Apr-15	Mar-17
19	Karabaglar-Buca 154 kV Underground Power Cable (1600 mm^2, 8.7 km)	G/SI	WB	ICB	Post	Jan-15	Oct-16
20	Kucukbakkalkoy-Kadikoy 154 kV Underground Power Cable (1600 mm^2, 8.5 km)	G/SI	WB	ICB	Post	May-14	Feb-16
21	(Ambarli DGKCS-. –Yakuplu GIS 154 kV Power Cable (1600 mm^2, 5 km)	G/SI	WB	ICB	Post	Jul-15	Apr-17
22	Umraniye-Dudullu 154 kV Power Cable (1600 mm^2, 9 km)	G/SI	WB	ICB	Post	Sep-14	Jun-16
G: Goods; G/SI: Plant Design, Supply and Installation; WB: World Bank; CTF: Carbon Trust Fund; ICB: International Competitive Bidding; DC: Direct Contracting							

35. **Procurement Capacity and Risk Assessment:** An assessment of TEIAS to implement procurement actions for the proposed project has been carried out between February-October 2013 and concluded that TEIAS has adequate capacity to implement the procurement activities. The assessment reviewed the organizational structure implementing the project. TEIAS as an institution has a good knowledge about the Bank's operations. The existing Project Coordination Unit (PCU) within the Research, Planning and Coordination Department of TEIAS oversees and coordinates the World Bank projects. Four technical departments within TEIAS will implement the proposed project under the coordination of PCU. These departments are 1) Substations Department;2) Communications and Information System Department; and 3) Operations Department. In addition to these departments, Trade Department will give support to the technical departments for the issuance of the bidding documents and contract execution, and Finance Department will give support for the payments and handling of the securities and insurance policies related to the contracts signed under the project.

36. The project will include large and complex procurements that may need collaboration of different departments within TEIAS in the preparation of the bidding documents and also in the evaluation of the bids. Due to complexity of the contracts there is a potential risking delaying of the procurement activities (i.e. Risk of inadequate or delayed preparation and implementation of environmental management plans and land acquisition plans etc.). Considering the complexity of the envisaged contracts and track record of TEIAS with procurement activities under the NTGP, ECSEE APL2, ECSEE APL3 and ECSEE APL6 projects, the procurement risk for the project is assessed as "moderate" with following risks being identified in the procurement activities:

- The project will include large and complex procurements that may need collaboration of different departments within TEIAS in the preparation of the bidding documents and also in the evaluation of the bids. The potential risk in delaying of the procurement activities can be addressed through adequate coordination between different departments (i.e. risk of inadequate or delayed preparation and implementation of environmental management plans and land acquisition plans etc.).

37. The measures and time frame given in Table 2 were agreed to mitigate the remaining risks.

Table 2. Procurement Risk Mitigation Action Plan			
Action No.	**Mitigation Measure**	**Responsible Party**	**Time Frame**
1	The Bank's procurement specialist will work closely with TEIAS and the Bank will organize procurement refresher trainings to TEIAS staff whenever needed.	WB	Throughout the project
2	TEIAS' Research Planning and Coordination Department will organize the coordination between different departments.	TEIAS	Throughout the project
3	TEIAS will hire consultants for highly specialized subjects (if required).	TEIAS	Throughout the project
4	TEIAS will initiate high priority contracts under the ongoing ECSEE APL-6 Project.	TEIAS	Completed

ENVIRONMENTAL AND SOCIAL (INCLUDING SAFEGUARDS)

38. TEIAS has significant experience in meeting World Bank safeguard requirements, and in particular safeguard requirements for the ECSEE APL projects, which are very similar in nature with the REI Project. The company maintains an environmental department for the preparation of the sub-project environmental assessment documents. Some of the sub-projects of the REI project will require more elaborated sections on the Natural Habitats issues and TEIAS will use the results of the ESDD Report to fulfil these requirements. TEIAS will also monitor the implementation of the partial EAs/EMPs closely, and works with the contractors to ensure that impacts are mitigated in time and effectively. During the meeting it has been also agreed with TEIAS that, in case any new WPP, which has not been assessed within the scope of the ESDD study, is planned to be connected to REI financed sub-stations TEIAS will share the list of WPPs eligible for connection and WB will conduct a preliminary environmental and social risk assessment. TEIAS will facilitate these studies as necessary.

39. TEIAS will continue submitting the environmental monitoring status reports to the Bank periodically, as they are already doing for the APL projects. These will confirm that TEIAS has been fully effective in supervising and monitoring individual sub-projects in accordance with the specifications of their partial EAs/EMPs which were prepared in accordance with the procedures outlined in the previous framework documents.

MONITORING AND EVALUATION

40. The approach for results monitoring and evaluation is based on the framework presented in Annex-1. This includes indicators to monitor wind energy development as well as expansion of transmission system network, directly through the project interventions as well as beyond the project for Turkey as a whole. TEIAS maintains a data collection and reporting system which was also deployed to monitor progress under previous World Bank projects. This project will leverage the same system for monitoring the expansion of transmission network and the energy

carrying capacity. In addition, expansion of wind energy capacity and generation will be monitored through data collection from the system operation and load dispatch center.

41. The Project Coordination Unit (PCU) will collate the inputs from implementation units of TEIAS, on a quarterly basis to prepare and submit a report on implementation progress. The report will include inter-alia procurement, implementation progress and financial management aspects (including disbursements) on a quarterly basis, as well as environmental and land acquisition aspects on a semi-annual basis. Progress would also be monitored by the Bank team through periodic visits to project sites.

Annex 4: Operational Risk Assessment Framework (ORAF)

Turkey: Renewable Energy Integration (P144534)

<table>
<tr><th colspan="7">Project Stakeholder Risks</th></tr>
<tr><td>Stakeholder Risk</td><td colspan="6">Rating Low</td></tr>
<tr><td rowspan="3">Risk Description:

Risk of change of priorities of the key stakeholders (Government of Turkey, Energy Regulator-EMRA and TEIAS) to shift focus away from the project, capacity building efforts, or the implementation of the legislations in the electricity sector.</td><td colspan="6">Risk Management:

Continued dialogue by World Bank team and TEIAS with the stakeholders to ensure continued ownership of the project, as well as on strengthening TEIAS’ institutional capacity and the implementation of the legislations, including in the area of renewable energy.</td></tr>
<tr><td>Resp:</td><td>Status:</td><td>Stage:</td><td>Recurrent:</td><td>Due Date:</td><td>Frequency:</td></tr>
<tr><td>Both</td><td>In Progress</td><td>Both</td><td>☑</td><td></td><td>CONTINUOUS</td></tr>
<tr><th colspan="7">Implementing Agency (IA) Risks (including Fiduciary Risks)</th></tr>
<tr><td>Capacity</td><td colspan="6">Rating Low</td></tr>
<tr><td rowspan="4">Risk Description:

Risk that capacity constraints (such as recruiting and retaining qualified staff) of TEIAS could impact project implementation.</td><td colspan="6">Risk Management:

The PIU would bring any capacity constraints, as and when these are observed, to the attention of the TEIAS management who would suitably remedy them, keeping the Bank team informed of the planned course of action.</td></tr>
<tr><td>Resp:</td><td>Status:</td><td>Stage:</td><td>Recurrent:</td><td>Due Date:</td><td>Frequency:</td></tr>
<tr><td>Both</td><td>In Progress</td><td>Both</td><td>☑</td><td></td><td>CONTINUOUS</td></tr>
<tr><td colspan="6">Risk Management:

Upfront assessment of technical, fiduciary, safeguards and implementation capacity at TEIAS and training to TEIAS staff on Bank’s safeguard and procurement policies / guidelines, as necessary.t</td></tr>
</table>

	Resp:	**Status:**	**Stage:**	**Recurrent:**	**Due Date:**	**Frequency:**
	Both	Completed	Preparation	☐	31-Dec-2013	
Governance	**Rating**	**Low**				
Risk Description: Risk of delays in major decisions and key appointments.	**Risk Management:** TEIAS to provide inputs to any governance related consultations (if any) sought by the Government.					
	Resp:	**Status:**	**Stage:**	**Recurrent:**	**Due Date:**	**Frequency:**
	Client	In Progress	Both	☑		CONTINUOUS
	Risk Management: Close monitoring of the project by TEIAS with well trained staff in procurement by using existing good system of checks and balances, project and company audits, and close supervision by the Bank.					
	Resp:	**Status:**	**Stage:**	**Recurrent:**	**Due Date:**	**Frequency:**
	Both	In Progress	Implementation	☑		CONTINUOUS
Project Risks						
Design	**Rating**	**Low**				
Risk Description: Risk of incorrect design	**Risk Management:** Design by technically qualified staff within TEIAS, use of well-established designs and proven technology, close interaction with relevant line agencies, and support by experienced technical experts as part of the Bank team.					
	Resp:	**Status:**	**Stage:**	**Recurrent:**	**Due Date:**	**Frequency:**
	Both	In Progress	Both	☑		CONTINUOUS
Social and Environmental	**Rating**	**Substantial**				
Risk Description:	**Risk Management:**					

<table>
<tr><td rowspan="2">Social and Environmental: Risk of inadequate or delayed preparation and implementation of environmental management plans and land acquisition plans.

Social: Due to the use of urgent expropriation procedures for land acquisition, consultations before acquisition of land are not mandatory under the national law.

Environmental: The potential environmental risks are related to the wind power plants to be connected to the substations to be financed by the project. The potential risks of these linked facilities are related to footprints of the power plants and their associated structures (access roads, transmission lines, etc.).</td><td colspan="6">Social: Upfront training for TEIAS staff on OP 4.12 has been conducted to increase TEIAS's capacity for implementing the requirements of the policy and providing necessary documentation to WB. The holding of adequate consultations and documentation prior to any land acquisition has been agreed on with TEIAS. Close supervision by the Bank to ensure that the safeguards issues and documentation will be handled timely and adequately.
Environmental: An environmental and social due-diligence study has been conducted for assessing the impacts on natural and critical natural habitats. TEIAS revised the potential list of investments as a response of the conclusions of the report. Other environmental issues will be assessed in the sub-project EA documents. The Environmental Review Framework document has been put to public consultations at two different locations before finalization.</td></tr>
<tr><td><table>
<tr><th>Resp:</th><th>Status:</th><th>Stage:</th><th>Recurrent:</th><th>Due Date:</th><th>Frequency:</th></tr>
<tr><td>Both</td><td>Completed</td><td>Preparation</td><td>☐</td><td>31-Dec-2013</td><td></td></tr>
</table>
Risk Management:

Social and Environmental: TEIAS will ensure adequate and timely preparation, submission and disclosure of safeguards documents. The environmental review framework document and land acquisition policy framework document have been prepared, put to consultations and disclosed. For each sub-project, before starting the implementation of the sub-project, TEIAS will prepare a LAAP or an ALAAP, and after approval of the World Bank, disclose on its website. During the implementation of the project, TEIAS will monitor and report on the progress as described in the LAPF. Sub-project EAs/EMPs will be submitted to WB for prior review and after getting no-objections these will be disclosed in client's websites. The Bank safeguards team would closely support TEIAS in this process.

<table>
<tr><th>Resp:</th><th>Status:</th><th>Stage:</th><th>Recurrent:</th><th>Due Date:</th><th>Frequency:</th></tr>
<tr><td>Both</td><td>In Progress</td><td>Both</td><td>☑</td><td></td><td>CONTINUOUS</td></tr>
</table></td></tr>
<tr><td>Program and Donor</td><td colspan="6">Rating Low</td></tr>
<tr><td>Risk Description:

Risk of mismatch between the sub-projects foreseen</td><td colspan="6">Risk Management:

Adequate load projections, investment planning and feasibility studies) for the planned transmission investments by TEIAS.</td></tr>
</table>

within this project and the achieved private sector investments in electricity generation, mainly wind power investments. (No other donors or development partners are involved in the electricity transmission projects with TEIAS.)	**Resp:** Client	**Status:** Completed	**Stage:** Preparation	**Recurrent:** ☐	**Due Date:** 01-May-2013	**Frequency:**
	Risk Management: Intense, in-depth and continued policy dialogue with the relevant line agencies, so that private sector generation investments are achieved as planned.					
	Resp: Bank	**Status:** In Progress	**Stage:** Both	**Recurrent:** ☑	**Due Date:**	**Frequency:** CONTINUOUS
Delivery Monitoring and Sustainability	**Rating**	**Low**				
Risk Description: Risk of inadequate monitoring and reporting, and the risk that the project development objective (PDO) and outcome indicators might not be attained.	**Risk Management:** Close monitoring and quarterly progress reports by experienced staff of TEIAS, continuous attention to implementation capacity and close supervision by the Bank team, continued dialogue with TEIAS and the Government regarding the electricity sector reforms and the role of TEIAS.					
	Resp: Both	**Status:** In Progress	**Stage:** Implementation	**Recurrent:** ☑	**Due Date:**	**Frequency:** CONTINUOUS
Other (Optional)	**Rating**	**Moderate**				
Risk Description: Procurement Risk: The project will include large and complex procurements that may need collaboration of different departments within TEIAS in the preparation of the bidding documents and also in the evaluation of the bids. Due to complexity of the contracts there is a potential risk in delaying of the procurement activities (i.e. Bank's social and environmental safeguard requirements etc.)	**Risk Management:** All contracts will be subject to the Bank's prior review. The feasibility studies for most investments have already been prepared by TEIAS. The procurement documents for some key packages have been accorded No Objection by the Bank and procurement initiated. Continued close review by the Bank team would be maintained.					
	Resp: Both	**Status:** In Progress	**Stage:** Both	**Recurrent:** ☑	**Due Date:**	**Frequency:** CONTINUOUS
	Risk Management: The Bank will organize a procurement refresher trainings to TEIAS staff whenever					

	needed.					
	Resp:	**Status:**	**Stage:**	**Recurrent:**	**Due Date:**	**Frequency:**
	Both	In Progress	Both	☑		Yearly
	Risk Management: TEIAS' Research Planning and Coordination Department will organize the coordination between different departments.					
	Resp:	**Status:**	**Stage:**	**Recurrent:**	**Due Date:**	**Frequency:**
	Client	In Progress	Both	☑		CONTINUOUS
	Risk Management: TEIAS will hire consultants for highly specialized subjects, if required.					
	Resp:	**Status:**	**Stage:**	**Recurrent:**	**Due Date:**	**Frequency:**
	Client	In Progress	Both	☑		CONTINUOUS
	Risk Management: TEIAS will initiate high priority contracts under the ongoing ECSEE APL-6 Project and will immediately initiate the study on Bank's safeguard requirements for the proposed contracts.					
	Resp:	**Status:**	**Stage:**	**Recurrent:**	**Due Date:**	**Frequency:**
	Client	Completed	Preparation	☐	31-Dec-2013	
Other (Optional)	**Rating**					
Risk Description:	**Risk Management:**					
	Resp:	**Status:**	**Stage:**	**Recurrent:**	**Due Date:**	**Frequency:**
				☐		

Overall Risk		
Overall Implementation Risk:	**Rating**	**Moderate**

Risk Description:

The overall implementation risk is moderate. Although TEİAŞ is well-experienced in implementing the investments involved in the project and in the Bank guidelines and procedures, some of the safeguards, procurement and implementation arrangements may be time-constrained because of urgency of some investments, and the sub-projects might be delayed due to the time required for preparation of the safeguards documents. Specifically, the social and environmental safeguards risk under the project risk is rated as substantial for this reason. However, on the whole, TEIAS has a good track record of timely and effective implementation of World Bank projects and therefore the overall implementation risk is seen as manageable.

Annex 5: Implementation Support Plan

TURKEY: Renewable Energy Integration Project

Strategy and Approach for Implementation Support

1. The Renewable Energy Integration Project is preceded by a series of projects. The largely successful implementation of past and ongoing projects indicates that similar implementation support arrangements can be used for the REIP as well. The procurement, financial management and social & environmental safeguard functions shall be handled from the Ankara office.

2. Risks identified in the ORAF can be mitigated inter-alia through careful supervision, especially in terms of technical review, environmental and social safeguards review, procurement support and continued policy dialogue. The project involves a framework approach to safeguards, which shall be applied to each sub-project going forward under careful supervision of the Bank implementation support team. The first year would require efforts at review of technical and safeguard documents, as well as procurement of contracts. In the subsequent years, the focus would shift to implementation and review of compliance as per agreed documents.

Implementation Support Plan

3. The proposed implementation support requirements are as follows:

Table-1: Implementation Support Focus and Resource Requirements

Time	***Focus***	***Skills Needed***	***Resource Estimate***	***Partner Role***
First twelve months	*Project start-up: Procurement, Safeguards, Financial, Economic and Technical Review, as well as policy dialogue.*	*Social & Environmental Safeguards, Procurement, Technical, Financial, Economic, Financial Management and Team Leadership*	*30 Staff Weeks*	
12-48 months	*Implementation progress review across safeguards, procurement, financial, economic and technical aspects. Continued policy dialogue.*	*Social & Environmental Safeguards, Procurement, Technical, Financial, Economic, Financial Management and Team Leadership*	*30 Staff Weeks*	
Other				

Table-2: Skills Mix Required

Skills Needed	*Number of Staff Weeks*	*Number of Trips*	*Comments*
Team Leader	5	3	
Co-Team Leader	3		Country Based
Power Engineer	3	3	
Financial Analyst	2	2	
Economist	2	2	
Environmental Specialist	3		Country Based
Social Specialist	3		Country Based
Procurement Specialist	5		Country Based
Financial Management Specialist	2		Country Based
Operations Officer	2		Country Based
TOTAL	**30**	**10**	

Table-3: Team Composition

Name	Title	Unit
Mikul Bhatia	Task Team Leader	SEGEN
YeshimAkcollu	Co-Task Team Leader	ECSEG
Kari J. Nyman	Lead Energy Specialist	ECSEG
Katsuyuki Fukui	Senior Power Engineer	ECSEG
EsraArikan	Environment Specialist	ECSEN
ZeynepDurnevDarendeliler	Social Development Specialist	ECSSO
Salih Kemal Kalyonco	Senior Procurement Specialist	ECSO2
ZeynepLalik	Senior Financial Management Specialist	ECSO3
Fan Zhang	Energy Economist	ECSEG
Kishore Nadkarni	Consultant (Financial Analysis)	
SelcukRuscuklu	Team Assistant	ECCU6
Regina OritshetemeyinNesiama	Senior Program Assistant	ECSSD

Annex 6: Clean Technology Fund

TURKEY: Renewable Energy Integration Project

RESULTS FRAMEWORK

Indicator	Units	Short-Term Direct Impact of CTF Project[9] (By 2018)	Medium to Long Term Indirect Impact of CTF (By 2030)	CTF Additionality (difference of 'with' and 'without' CTF) (By 2030)
Installed wind capacity for power generation	MW	600	17,300	6,250 [10]
Renewable Energy Generated Annually	GWh /Yr	1,734	50,011	18,068
Tons of GHG emissions reduced or avoided				
- Annual	MTCO2/Yr	0.69	20.00	7.27
- Lifetime (Minimum 15 years life)	MTCO2	10.42	300.00	108.40
Financing leverage through CTF funding	Million USD			
- CTF		50	50	50
- World Bank		300	300	300
- Turkey (TEIAS)		125	125	125
- Private Sector		600[11]	17300	6250
CTF leverage ratio (CTF : Other Funding)	Ratio	1:20	1:355	1:133
CTF investment cost effectiveness	USD/TCO2	4.80	0.17	0.46
Other Co-benefits				
- Increased Transformation Capacity	MVA	4500		
- Increased Transmission Capacity between Thrace and Anatolia regions	MW	2000		
- Increased employment from expansion of wind industry				
- Local environmental benefits from lower pollution from thermal power generation				

1. INTRODUCTION

a) Country and Sector Background

1. ***Country Background:*** Turkey is the World's 18th largest economy with a GDP of USD786.3 billion in 2012. Its economic growth over the past decade is a story of notable turnaround, thanks to successfully implemented structural reforms and sound macroeconomic management. Despite the global crisis in 2008-09, the country experienced an average growth of 5.2% during the 2002-12 period. The country rebounded strongly from the global crisis with GDP growth reaching 9.2% and 8.8% in 2010 and 2011 respectively. However, with high current account deficit (9.7% of GDP), double digit inflation and significant currency depreciation in 2011, a decisive monetary policy tightening was introduced which rebalanced the economy, but also slowed down the GDP growth to 2.2%. With this rebalancing of the economy, Turkey is expected to resume and sustain the economic growth levels experienced during the previous decade.

[9] The CTF/IBRD funded transmission investments would directly evacuate power from wind power plants of 1200 MW capacity planned in the Can, Izmir and Istanbul provinces, of which about 600MW have already been licensed. In addition, the project would also address some critical barriers to accelerated wind power development in Turkey over the medium to long term to achieve wind energy capacity of 20,000 MW wind energy capacity by 2030.
[10] Difference between installed wind capacity projected in 2030 in the "with CTF" and "without CTF" cases.
[11] Based on an assumed private sector investment of USD 1 million per MW of installed wind power capacity.

2. ***Power Sector in Turkey:*** Securing sufficient and reliable energy for a growing economy in an environmentally sustainable manner has been and remains the Turkish government's main energy policy concern. Demand growth for energy is projected to be around 4.5-5.0% per annum. Turkey remains dependent on import of natural gas and electricity from its neighbors to meet its growing energy needs – affecting energy security and raising global environmental concerns. Meeting growing energy requirements would require commensurate investments in power generation and transmission infrastructure. At the same time, high dependence on imported oil and gas would need to be eased through increased domestic energy production, including indigenous renewable energy generation – especially from high quality wind resources available in Turkey.

3. ***Progress in Power Sector Reforms.*** Turkey has made important progress in reforming the power sector, with unbundling of generation, transmission, distribution and trading companies, as well as the establishment of Electricity Market Regulatory Agency (EMRA). This reform was backed by the Electricity Market Law (Law 4628), which also laid the basis for the establishment of a wholesale electricity market and gradual opening of the retail electricity market. A new Electricity Market Law passed in March 2013 paved the way for further liberalization by restructuring TEIAŞ into separate transmission system and electricity market operators called EPIAS.

4. ***Wind Energy Resources in Turkey.*** According to the Ministry of Energy and Natural Resources' (MENR) Directorate General of Renewable Energy, Turkey has significant wind energy potential of around 48,000MW as against an installed capacity of only about 3,000 MW in 2013. Good quality of winds available in Turkey can allow development of this resource without any significant subsidy support from the government. Upfront development of transmission infrastructure can accelerate the development of wind energy by facilitating evacuation of wind power, increasing the ability of the grid to absorb wind energy, and transferring wind energy across regions.

5. The CTF Investment Plan submitted by the Government of Turkey indicates ambitious plans to develop 20,000 MW of wind power by 2023. The locations with the highest wind energy potential are the Aegean, Marmara and Easter Mediterranean. This project will help TEIAS integrate wind generation in the Aegean and Marmara regions to accelerate progress towards the 20,000 MW target.

6. ***Challenges in Greater Integration of Wind Energy:*** The challenges in greater integration of wind energy in Turkey are described in detail in the main section of the PAD, and can be summarized as follows:

a. Need for upfront transmission investments: In Turkey, existing and most potential WPP sites are located in relatively rural areas where local electricity demand is generally low. Existing overhead lines (OHLs) are thin and substations (SSs) do not have large transformer capacity in these areas. With multiple WPPs planned in most locations, transmission investments have to be optimized for evacuation of power from all planned WPPs. However, new transmission infrastructure must be available with the commissioning of the very first WPP. The high upfront transmission investments needed

to cater to evacuation of power from all planned WPPs impede wind power development by imposing a disproportionately heavy investment burden on the initial few WPPs.
The presently installed 2,700 MW of WPPs are being served largely through existing and incremental transmission infrastructure, rather than through infrastructure built specifically to support wind energy. While renewables are given a priority for grid connection, due to technical limitations, available transmission capacity is allocated to wind and solar projects on a sub-station basis, and is updated annually consistent with enhancements in available sub-station capacity. In case of multiple applications (as is likely at many good wind locations), grid connection rights are awarded based on competitive bidding. So far WPPs have leveraged surplus capacity in existing transmission infrastructure (or with incremental augmentation) to meet the immediate needs of upcoming WPPs. Going forward, accelerated expansion of wind energy would require upfront investments in transmission infrastructure dedicated to wind energy.

b. *Limitations of load dispatch and control systems:* At present, Turkey has 2700 MW of installed wind energy capacity which is about 4% of installed power generation capacity and 2.5% of electricity generated in the country. Although a small percentage at the national level, wind accounts for a much larger share in the Aegean and Marmara regions. Further, the targeted wind capacity of 20,000 MW by 2023 would account for 20% of installed generation capacity and about 10-12% of energy generation. This would amount to about 25-30% of the projected peak demand in 2023. Since wind energy is less predictable and is usually treated as a negative load for the purposes of load dispatch, countries that have developed large volumes of wind energy capacity rely on robust load dispatch and control systems for managing fluctuations in wind energy generation through rapid response from other generation capacities. The Turkish load dispatch and control system would need to be strengthened in light of projected high share of wind energy.

c. *Limited transmission corridors vis-à-vis geographic location of wind energy:* Turkey's wind energy potential that is technologically and economically viable is estimated to be around 48,000 MW, and is located primarily in the Aegean, Marmara, and the eastern part of the Mediterranean region.[12]While the Thrace area of Turkey has high wind energy potential, most of the other energy resources including thermal, hydropower and a large part of wind energy resources are located in the Anatolian area of Turkey. Therefore, connections between Thrace and Anatolia are critically important for the development and effective functioning of power systems. The Thrace and Anatolian regions have several transmission links on the eastern side through the Bosphorus strait.[13] Going forward, additional transmission links would be needed across the

[12] Marmara region is located all around the Sea of Marmara – across the European and Asian sides of Turkey. The Aegean region is located along the western coast of Turkey, with the Marmara region to its north. The Eastern Mediterranean region is located along the southern coast of Turkey.

[13]The Sea of Marmara separates Anatolia on the Asian side from Thrace on the European side of Turkey. It forms a connection between the Black and Aegean Seas through the Bosphorus strait on the East and the Dardanelles strait on the West.

Dardanelles strait, as the planned WPP sites are located on the eastern side of Marmara and Aegean regions closer to the Dardanelles strait than to the Bosphorus strait.

d. *Inadequacy of existing transmission network:* The electricity sector in Turkey is expected to grow at nearly 4.5 to 5% per annum, implying that peak supply will increase from 38 GW in 2012 to about 65-72GWlevels by 2023. Transmission systems, including transmission lines, substations and their transformers, need to be continuously strengthened to respond to the increasing requirements of higher electricity consumption and increased supply from newly constructed power plants including wind and conventional thermal power plants.

e. *Market and Regulatory Aspects:* The prevailing licensing regime for the wind power plants is based on the new Electricity Market License Regulation of November 2013 as per new Electricity Market Law of March 2013. Transmission capacity for grid connection for regions and provinces is announced by TEIAS for the following five and ten years based on the wind potential map of regions prepared by Ministry of Energy and Natural Resources (MENR). Licenses are awarded on a competitive bidding process for the grid-connection, subject to techno-economic approval from TEIAS and General Directorate of Renewable Energy of MENR

Acquiring the license also requires application to TEIAS for the grid connection, approval of the pre-feasibility study, decision regarding the environmental impact assessment and the agreement with TEIAS regarding the renewable energy contribution fee. Accordingly, the wind developers need to get permits from around fifteen institutions such as Ministry of Defense, Ministry of Forestry and Water Affairs and Ministry of Environment and Urbanization – a lengthy and tiring process. Simplification of the licensing processes can give a boost to wind energy installation by reducing the time lag between licensing and implementation of projects.

In addition, planning for wind energy development needs to be undertaken on a cumulative basis rather than for individual projects. This is important from the perspective of integrated transmission system development as well as integrated environmental impact assessment for multiple wind energy sites located in the same area.

b) Turkey's CTF Investment Plan

7. The CTF Investment Plan for Turkey was originally prepared in January 2009, and subsequently updated in November 2012. The plan was divided into two phases, with investments by the World Bank, IFC and EBRD across both the phases. In Phase-1, the following investments were proposed:

(i) Private Sector Renewable Energy and Energy Efficiency Project (World Bank)
(ii) Turkey Sustainable Energy Financing Facility – TurSEFF (EBRD)
(iii) TEIAS Smart Grid Project (World Bank)
(iv) Commercializing Sustainable Energy Finance (IFC)

(v) Private Renewable Energy and Energy Efficiency (IFC)

In Phase-2, the following investments were proposed in the revised Investment Plan of November 2012:

(i) SME Energy Efficiency Project (World Bank)
(ii) Renewable Energy and Energy Efficiency Facilities Projects (EBRD)
(iii) Commercial Sustainable Energy Finance (CSEF) Program (IFC)

8. As per the revised Investment Plan of November 2012, implementation of the three CTF investments from Phase-1 that were approved by the CTF Trust Fund Committee has been on track to meet or exceed their goals. The proposed project – TEIAS Transmission and Smart Grid Project – is the fourth investment from Phase-1. The financing structure of this investment remains the same as originally proposed in the Investment Plan.

9. The financing structure for all investments across the two phases as per the November 2012 Investment Plan is given in Table-1 below.

Table-1: Financing Structure (US$ million)

	Phase-1					**Phase-2**			
Financing Source	WB Private Sector RE/EE *Actual*	IFC CSEF-I & IFC Private RE/EE *Actual & Planned*	EBRD TurSEFF *Actual*	**WB TEIAS Transmission and Smart Grid *Planned***	**TOTAL**	IFC CSEF-II *Planned*	EBRD RE/EE (TurSEFF-II, ResiSEFFMunSEFF) *Planned*	World Bank SME Energy Efficiency *Planned*	**TOTAL**
CTF	100	50	50	**50**	**250**	20	70	50	**140**
WB	1,000			**300**	**1,300**			200	**200**
IFC		213			**213**	80-100			**80-100**
EBRD			218		**218**		250		**250**
Turkey	66		217	**125**	**408**		175	45	**220**
Others	365		20		**385**	80	5	11	**96**
TOTAL	1,531	263	505	**475**	**2,774**	180-200	500	307	**987-1007**

c) Brief Project Description

10. Although all components of the project contribute towards accelerated expansion of wind energy in Turkey, CTF funding would be directly utilized towards components-1 and 2. A brief description of all the project components is available in the main section of this PAD, while technical details are provided in Annex-2. The components funded through CTF are summarized here as follows:

11. ***Component-1: Upfront development of transmission infrastructure to facilitate faster development of WPPs:*** Within the Aegean and Marmara regions that hold the highest wind energy potential in Turkey, the provinces of Izmir, Canakkale and Istanbul rank the highest with installed wind capacity of 877 MW, 407 MW and 382 MW respectively. The wind power investments in these three provinces together constituted nearly 70 percent of the installed wind capacity in Turkey in 2012. Due to their high wind potential, these provinces will continue to

attract more investments in WPPs. Availability of upfront transmission infrastructure to cater to growing needs of new WPPs in these provinces could enable faster implementation of wind energy projects.

12. The first component of this project would therefore develop three 380kV 500 MVA highly digitalized sub-stations with associated grid connection structures for evacuation of wind power in the provinces of Can, Izmir and Vize. The proposed structures would include high voltage (HV) substations, HV grid interfacing equipment, smart-metering systems, feeders (underground cables), tele-metered dispatch systems, digital protection systems, supervisory systems, and automatic voltage control systems.

13. ***Component-2: Smart-grid investments to strengthen grid operation and management in face of higher wind energy generation*** These investments will enable TEIAS to monitor network status in real-time and operate entire network reliably and securely. It would enable TEIAS to handle the increasing amounts of wind energy. It consists of:

(i) Upgrade of hardware and software of the National Control Center (NCC), Emergency National Control Center (ENCC) and 9 Regional Control Centers (RCCs) in TEIAS' existing SCADA/EMS system and the addition of Renewable Energy Resource (RER) Operator Desk on SCADA system to manage rapidly increasing WPP.
(ii) Remote Terminal Unit (RTU) installation to substations and power plants to monitor and control them from dispatching centers.
(iii) Digital Protection Relay deployment which will make faster fault clearing in order to minimize network disturbance and outage area.
(iv) Shunt Reactor installation to bulk-transmission network to secure appropriate system voltage among network.

Support for implementation of smart-grid technologies and for strengthening wind energy markets and regulation

14. In addition to the above four components, support would be needed for: (i) design, implementation and capacity building for smart-grid technologies, (ii) simplification of market and regulatory processes for allocation of licenses for wind power (and other renewable energy) development, (iii) strengthening the wind energy markets, and (iv) strengthening environmental and social safeguards in wind power projects (especially from the perspective of cumulative impact assessment). These aspects are being largely covered through the EU-IPA 2012 program – except for some aspects of safeguards. The EU-IPA 2012 program is supported by the EU funds and will be administered by the World Bank in Turkish energy sectors agencies. The renewable energy component of this program is planned for helping MENR accelerate renewable energy development including through the review of regulatory framework, legislation, tariff mechanism, and principles and procedures regarding the site selection of the renewable energy plants; streamlining of licensing processes and permits; and preparation of a renewable energy road map and action plan. Any additional need for Technical Assistance (TA) funds – especially to strengthen the safeguard assessment of wind power plants at a systemic level – would be explored and addressed separately.

15. Details of project costs and financing are shown in the Table below.

Table-2: REIP Project Component-wise Financing Plan (USD Millions)

Project Components	Project cost	IBRD	CTF	TEIAS
1. Wind power grid connection	59.00	25.00	25.00	9.00
2. Smart-grid applications	68.00	32.50	25.00	10.50
3. Submarine power cable	79.20	67.20		12.00
4. Expansion of Urban Networks	206.80	175.30		31.50
Contingency	62.00			62.00
Total Costs				
Total Project Costs	475.00	300.00	50.00	125.00
Front-End Fees	0	0	0	0
Total Financing Required	475.00	300.00	50.00	125.00

TEIAS would finance local taxes as well as contingency amounts from its own sources.

2. ASSESSMENT WITH CTF INVESTMENT CRITERIA

a) Potential for GHG Emissions Savings

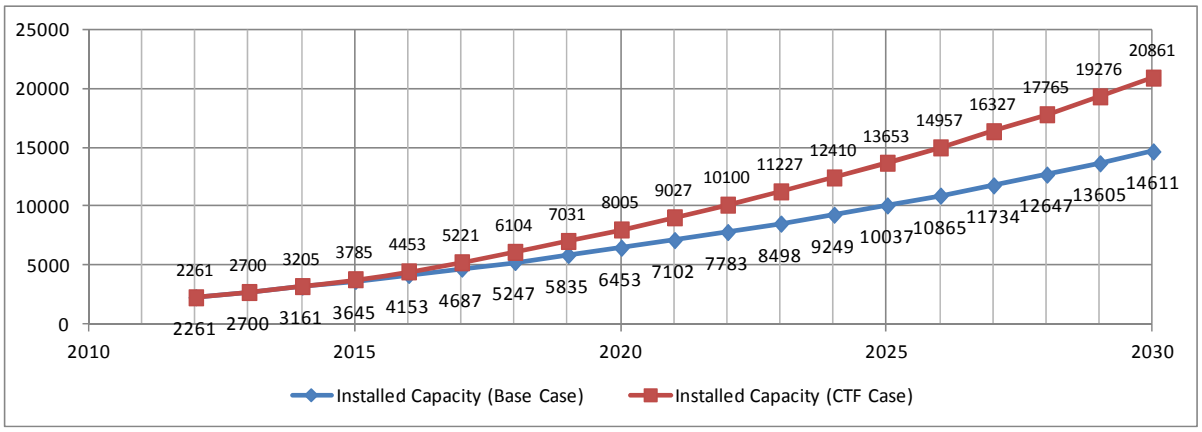
(i) Emission Reduction Potential

16. The installed wind power generation capacity in Turkey is about 2,700 MW, while the total potential is currently estimated at about 38,000 MW. Government of Turkey is targeting the installation of 20,000 MW of wind energy capacity by 2023, though it is estimated that at the present rate of expansion of wind energy, and in the absence of proposed barrier mitigation measures, only about 8,500 MW would be achieved by 2023. The barrier-mitigation efforts under this project could facilitate the achievement of over 11,000 MW by 2023 and the 20,000 MW target by 2030.

17. Interventions under this project would facilitate the integration of renewable energy over short as well as medium term. In the short term, the project would directly facilitate the installation of wind power plants through the upfront development of transmission infrastructure to facilitate faster development of wind power projects in the provinces of Izmir, Canakkle and Istanbul. On the other hand, project investments in strengthening smart-grid systems at TEIAS would enable higher wind energy capacity to connect to the grid system by reducing difficulties in system operations in face of higher volumes of unschedulable wind energy over the medium to long term.

18. Together with continued upfront investments by TEIAS in upfront development of transmission infrastructure, the proposed project would enable faster implementation of wind power projects over the short, medium and long term to achieve the 20,000MW target by 2030. Figure-4 depicts the projected acceleration in wind energy development that may be expected consequent upon efforts under the proposed project.

Figure-4: Accelerated development of wind power projects



Source: World Bank Team Analysis

Short Term Benefits: Upfront development of transmission infrastructure

19. Over the short term, the main quantifiable contribution of the project to reduction/avoidance in GHG emissions will come from the component to provide grid connection structures to new wind power plants (WPPs)in the provinces of Can, Vize and Izmir. This would include the development of three 380kV 500MVA highly digitized wind power grid connection structures (including sub-stations). While the sub-stations can together cater to wind power generation capacity of nearly 1200 MW, eight WPPs with a cumulative generation capacity of about 545 MW have been licensed so far. Additional wind energy capacity would be licensed, implemented and connected to these substations going forward.

20. In the absence of additional wind power capacity, the likely alternative would be to meet the local demand for electricity by increased generation from fossil fuel based generating plants which would add to GHG emissions. Given the Government's commitment to promoting increase in renewable generating capacity as described earlier above, it is likely that the additional wind power capacity will materialize relatively soon.

Table-2: Licensed WPP Projects to be connected to CTF Financed Substations

Name of the WPP	Substation	Capacity (MW)	Company	Status
Ucpinar	Can	99	Derbent	Licensed
Kocalar	Can	26	Isider	Licensed
Koru	Can	50	Eskoda	Licensed
Total for Can Substation		*175*		
Evrencik	Vize	120	Evrencik	Licensed
Airres	Vize	55	Airres	Licensed
Vize 2	Vize	75	Karayel	Licensed
Total for Vize Substation		*250*		
Bergres	Izmir	70	Bergres	Licensed
Kinik	Izmir	50	Esinti	Licensed
Total for Izmir Substation		*120*		

Medium Term Benefits: Increased Wind Energy Integration through Smart Grids Systems

21. Over the medium term, the increasing share of renewable energy in the generation mix of Turkey would necessitate the introduction of smart-grid applications to improve grid operation and management. Government of Turkey is targeting that by 2023 wind energy should reach 20,000MW. If this target is achieved then the installed wind power capacity in 2023 would be about 20% of the total installed capacity in Turkey, generating about 10-12% of the total electricity, and amounting to about 25-30% of the peak demand.

22. Smart-grid applications would provide detailed information to enable operators to manage demand-supply balance in real time to reduce outages as well as the need for peak power and spinning reserves in the system. At the same time these applications would facilitate the integration of larger amounts of renewable energy (including both wind and hydropower) into the grid network, without subjecting the system to imbalance risks due to greater variations in supply from renewable technologies.

23. Investments in smart-grid systems under the project are expected to enable greater absorption of wind energy by allowing improved system operation in face of increase in unschedulable wind energy. Quantification of direct impact of the smart-grid intervention would require an analysis of grid stability with and without such a smart-grid system in face of increasing wind energy input. While such an analysis is difficult to undertake due to absence of suitable data to develop hypothetical scenarios, the underlying benefit of smart-grid systems to expansion of wind energy is well recognized.

Estimation of Emission Reduction

24. In regard to the contribution of the project, the potential reduction/avoidance in GHG emissions has been estimated for three scenarios:

(i) A short-term impact covering only the three substations in Izmir, Can and Istanbul provinces with a total capacity of 600 MW of licensed wind power plants, which are likely to be connected to the sub-stations during the period of the project itself. This short-term impact can be directly attributed primarily to the CTF funded transmission infrastructure, and would be realized over the short term. This is a conservative estimate since more wind power plants are likely to be licensed and implemented – up to a total sub-station capacity of 1200 MW.

(ii) A medium-long term impact covering realization of the targeted 20,000 MW of wind energy capacity by 2030. This impact cannot be attributed solely to the CTF project, though the CTF project would address several key barriers to wind energy development in Turkey, including the ability of the grid to absorb high proportion of unschedulable wind energy, as well as mitigation of important market and regulatory barriers, especially the difficult licensing process. Apart from the proposed CTF funded interventions, the realization of this target would also depend on continued strengthening of transmission networks to address higher demand for electricity, including through transmission links crucial for transfer to wind energy across the Dardanelles strait. The upfront transmission

investments in Izmir, Can and Istanbul provinces would need to be replicated in these and other provinces to facilitate faster implementation of WPPs.

(iii) The medium-long term impact also needs to be assessed in terms of additionality of the CTF intervention. It is estimated that at the present rate of expansion of wind energy, and in the absence of proposed barrier mitigation measures, only about 14,600 MW would be achieved by 2030. The barrier-mitigation efforts under this project could facilitate the achievement of the 20,000 MW target by 2030. The difference between the "with CTF" and "without CTF" cases represents the additionality of the CTF intervention. It is assumed that while in the "without CTF" case, incremental wind energy capacity addition each year would increase by 5% per annum between now and 2030, whereas in the "with CTF" case it would increase by 15% per annum between 2013 and 2018, and then again at 5% per annum thereafter.

25. The main assumptions and the results for the short-term and medium-long term impacts are summarized in Table-3 below.

Table-3: GHG Reduction/Avoidance for Short-term and Medium-Long term impacts

	Short-Term Impact	**Medium-Long Term Impact (by 2030)**	**CTF Additionality (by 2030)**
Installed capacity (MW)	600	17,300	6,250
Estimated annual wind power generation (GWh)	17,34	50,011	18,068
Estimated annual carbon emissions reduction/avoidance (MTCO2)	0.69	20.00	7.27
Estimated lifetime (conservatively assumed to be 15 years) carbon emissions reduction/avoidance (MTCO2)	10.42	300.00	108.40

Note: *Above calculations assume a wind capacity factor of 33%, minimum life of WPPs of 15 years, and carbon intensity of grid of 400 g/kWh.*

26. In addition, carbon savings from IBRD funded project investments in sub-marine cable and transmission strengthening would accrue through increased transmission of electricity over a period, as well as reduced losses and improved grid stability. However, taking a conservative perspective, these potential additional contributions are not included in estimating the carbon emissions reductions resulting directly from this project.

(ii) Technology Development Status

27. Wind energy technology is well proven and commercialized. Wind power plants have been widely deployed around the world and there are a number of internationally reputable firms that specialize in the technology. In Turkey, wind power generation is already competitive even without government subsidies. There has been a marked acceleration in the deployment of smart grid pilot and demonstration projects globally in recent years. Investments around the world have enabled hundreds of projects entirely or partly focused on smart grid technologies. Among the wide span of smart grid technologies, some of them are considered mature in both their development and demonstration, such as protective relays

with digital microprocessors to analyze power system voltages, currents, and other process quantities for the purpose of detecting system faults and Remote Telemetry Units (RTUs). These are the technologies to be supported by the loan.

b) Cost Effectiveness

(i) CTF investment per ton CO2eq reduced/avoided

28. The cost effectiveness of the CTF intervention of USD 50 million is estimated as follows:

	Short-Term Impact	**Medium-Long Term Impact (by 2030)**	**CTF Additionality (by 2030)**
Total GHG reduction/avoidance (MTCO2)	10.42	300.00	108.40
Cost Effectiveness (USD/TCO2)	4.80	0.17	0.46

29. As discussed below in the section on CTF additionality, without the CTF concessional financing under the project, the commissioning of an estimated 6,250 MW of WPPs would be delayed beyond 2030. This absence of renewable wind power would most likely be met through increased generation from fossil fuel based generating plants. A conservative estimate of the direct impact of the CTF financing is that it would enable an avoidance of an additional about 51 MTCO2 emissions by 2030.

(ii) Expected cost reduction of technologies

30. Average capital costs for wind energy projects declined markedly over the past 30 years. Historical capital cost reductions were coupled with dramatic increase in turbine performance resulting from more advanced turbine components and larger turbines. The levelized cost of energy for onshore wind energy has declined by a factor of more than three – from upwards of $150/MWh in the 1980s to about $50/Mwh in the 2000s. In many countries, wind power has already achieved cost parity with conventional sources of generation. The majority of studies indicate continued cost reductions on the order of 20-30 percent through 2030. With the continued scaling-up of the smart grid technology around the world, as well as accompanies technology innovation, similar cost reduction is expected for smart grids technologies.

31. However, it may be pointed out that this project is not aimed at achieving/facilitating cost reduction in wind energy, transmission or smart-grid technologies.

c) Demonstration Potential at Scale

(i) Scope for avoided annual GHG emissions through replication:

32. Turkey is well-endowed with wind resources, with estimated prospects of about 0.25 TWh of wind electricity per year. Government of Turkey is looking to develop 20,000 MW of wind by 2023 (though this analysis conservatively assumes that only about 11,200 MW of wind would be developed by 2023). The proposed project will directly contribute towards

this target and jump-start its larger-scale deployment of smart grid technologies to better integrate wind power to the grid. This scale-up would result in avoided emissions through the displacement of fossil fuel technologies estimated at a cumulative 212 MTCO2 by 2030.

(ii) Transformation Potential

33. The proposed project will have important transformation potential because it is assisting TEIAS in achieving its targeted wind energy development. The move to a smarter grid promises to ensure that the integration of increasing amounts of wind energy would not be constrained by stability considerations of the grid. The momentum in wind energy promotion built through this project would need to be sustained through continued efforts by TEIAS to achieve the projected benefits by 2030.

d) Development Impact

34. The proposed project is expected to strengthen the transmission system by increasing its capacity and expanding the automation of control, management, and protection systems to maintain grid stability, especially in the case of large-scale integration to intermittent renewable resources. As a result, the project is expected to contribute to more efficient and reliable power supply and reduced emissions associated with power generation.

(i) *Increased availability of power:* The project will support investment in three substations which will facilitate the integration of 545 MW wind power plants into the grid. These wind power plants are expected to produce 1,575GWhof power annually.

(ii) *Efficiency Gains*: Investment in transmission capacity would address overload and voltage problems, and reduce energy losses resulting from voltage drops. The avoided energy losses from investments under the project are expected to be 711 GWh per year.

(iii) *Improved Reliability:* The smart-grid applications financed by the project will allow real-term monitoring of the balance between electricity demand and supply and to enable better management of grid operation so as to reduce outages. The project also supports expansion of transmission capacity so as to reduce faults and avoid transmission overload.

(iv) *Environmental Co-benefits:* The project will provide grid connection to new wind power plants in Can, Vize and Izmir Basin areas. These wind farms will not be developed without the necessary investment in transmission infrastructure under the project, in which case gas fired generating plants would likely to be built to meet the increasing local demand for electricity. The project therefore contributes to the reduction in carbon emissions from gas-based electricity generation. Overall, this would amount to a cumulative 20.85 million tons of CO2 emissions reduction over 15 year period.

d) Implementation Potential

(i) Public policies and institutions that support deployment, diffusion and transfer of low carbon technologies

35. Following the enactment of Electricity Market Law in March 2001, the process for the installation of renewable energy plants was started to be tailored according to Electricity Market Law and the process gained pace by the enactment of Renewable Energy Law in 2005 and its amendment in 2007. The Amendment of the Law in 2007 provides a 10-year purchase agreement coupled with a guaranteed feed-in price of €5-5.5 cents/kWh for renewable electricity for all renewable energy certified producers that commerce their operation before December 31, 2011. By setting up a floor price and guaranteed purchase agreement, the Government provided financial incentives and reduced uncertainties of investment in renewable power. The Law also grants a 50 percent reduction on the fees for land use permission, and exemptions from regular license fees for renewable generators.

36. In 2010, the Law was further amended to allow a bonus for the use of locally produced equipment, thus giving the wind developers an opportunity to increase their feed-in-tariff up to 11 USD cent/kWh. The latest amendment of the law in 2011 introduced a "renewable pool". Renewable generation facilities are supported by distributing the total cost of the electricity supplied to the pool, among all the suppliers selling energy to final consumers rather than on the direct purchaser of energy generated by each facility.

37. The promotion of renewable energy sources in the electricity market has been given to EMRA based on the Electricity Market Law. Specifically, the Electricity Market Licensing Regulation ("LR") stated that EMRA has been assigned to taking of necessary measures for encouraging the utilization of renewable and domestic energy resources and to initiate actions with relevant agencies for provision and implementation of incentives in this field. In LR, generation facilities based on renewable energy resources are defined as those power plants which utilize wind, solar, geothermal resources, waves, tidal movements, biomass, biogas and hydrogen; river or canal type hydroelectric generation facilities and hydroelectric generation facilities with a reservoir area below 15 square kilometers or pumped-storage hydropower plants.

38. In the Electricity Market and Supply Security Strategy Paper issued by the High Planning Council in 2009, the wind electricity generation capacity is envisaged to be increased to 20,000 MW in 2023, the known geothermal capacity of 600 MW suitable for electricity generation and all technically possible hydroelectric capacity will be fully utilized by 2023 and the share of electricity generated using renewable sources is targeted to be increased to at least 30% of the total electricity generation.

(ii) Leveraging of Co-financing

39. The CTF financing is a key enabling factor of wind investments. Private investors will not commit to wind power investment without the substations to be financed under the project. The financing will enhance the impact of the US$300 IBRD loan, which would have

otherwise focused on traditional investments in transmission lines and cables rather smart grid technologies. More importantly, investor confidence and private sector participation in clean technology development in Turkey would be further boosted given the international support.

40. Specifically, the project investments would be funded through a mix of CTF (USD 50 million), IBRD (USD 300 million) and TEIAS financing (USD 125 million). Further, the wind sector investments are driven by the private sector and an estimated USD 545 million of financing would be put towards implementation of licensed WPPs connecting to the project substations, and an additional USD 655 million towards WPPs that likely to be licensed going forward and connecting to the same substations. Further, the smart-grid investments under this project would facilitate continued expansion of wind energy capacity that would invite private sector investments of an estimated USD 7 billion towards WPPs, as well as corresponding investments on transmission by TEIAS.

3. CTF ADDITIONALITY

41. Without the CTF concessional financing under the project, construction of the necessary grid connection facilities (including substations) and smartgrid systems would be delayed by several years. This would push back the development of about 6,250 MW of wind power projects beyond 2030. The detailed calculations in this regard are presented in Section-2 above. Between 2013 and 2030, the CTF additionality is projected to be about 51 MTCO2.

42. Over the shorter time horizon, the three CTF funded sub-stations for WPPs would likely be delayed by at least three years, in turn delaying the commissioning of the related WPPs. The CTF financing therefore would enable an acceleration of the commissioning of the three WPPs by at least three years, enabling thereby a reduction/avoidance of GHG emissions of about 2 MTCO2 over this three year period.

4. IMPLEMENTATION READINESS

43. The proposed CTF investments in WPP substations and smart-grid systems are ready for implementation. The feasibility reports for all the investments have been prepared by TEIAS and reviewed by the World Bank team. Some of the bid documents have been prepared and submitted for World Bank No Objection, while others are under preparation. A detailed Environment and Social Due Diligence (ESDD) has been undertaken to review the safeguards impact of the proposed substation investments, and key recommendations have been reflected in the Environment Management Framework (EMF). The necessary investment approvals from Government of Turkey have been obtained and the proposed sub-projects are ready for implementation. Barring unforeseen circumstances, the CTF investments can be made alongside IBRD investments when the Project becomes effective.

Annex 7: Economic and Financial Analysis

Turkey Renewable Energy Integration Project

Economic Analysis

1. Economic appraisal is conducted for all subprojects proposed under components 1, 3 and 4. Results of the economic analysis show that the project is economically attractive with high economic rate of returns.

Rationale for Public Sector Investment

2. Unlike investments in any other utility infrastructure where the projects tend to be smaller in size, located in one area, and are shorter in duration, transmission investments are more capital-intensive, covering larger geographic areas and require longer lead times for the planning process. Given the risks and challenges associated with transmission investment, TEIAS remains under state ownership and is considered a natural monopoly responsible for providing reliable and robust transmission services in Turkey. The local and global benefits associated with the use of renewable energy also justify public sector support.

Rationale for Bank Involvement

3. The Bank has assisted in the design and implementation of the energy reform program in Turkey over the last decade, both through investment financing as well as through policy advisory support and technical assistance. The proposed project is part of the Bank's efforts to scale up its clean energy efforts by exploring opportunities to boost a cleaner energy mix. The Bank is well-positioned to support TEIAS in the improvement of its operations given its ongoing involvement in the structural reforms of the sector and its long participation in improving transmission capacity. Turkey has faced financial constraints for large infrastructure projects in recent years. The investments proposed under the project are large and would tend to stretch the financial capacity of TEIAS unless substantial amounts of funds are made available on a concessional basis to make the investments affordable. The involvement of the Bank enables the inclusion of a significant amount of CTF funds to be employed for justifiable investments under the project. Overall, Bank financing continues to be among the most favorable sources of funds for these activities.

Economic Benefits

4. The analysis takes into account four major benefits which will result from the proposed transmission investments. These benefits are explained below.

a) Reduction in carbon emissions. The project will provide grid connection to new wind power plants in Can, Vize and Izmir Basin areas. These wind farms will not be developed without the necessary investment in transmission infrastructure under the project, in which case gas fired generating plants would likely to be built to meet the increasing local demand for electricity. The project therefore contributes to the reduction in carbon emissions from gas-based electricity generation. The average emission factor of carbon dioxide (CO_2) from gas electricity generation in OECD countries is 400 gCO_2/ per kWh

between 2008 and 2010.[14] This number is used to calculate avoided carbon emissions due to replacing electricity generated from gas with electricity from wind.[15]

The estimated monetary benefits from reduced CO_2 emissions range widely, reflecting differences in estimation methodologies and uncertainties related to the impact of climate change. The mean value of the estimated social cost of one ton of CO_2 emissions identified by the review of Intergovernmental Panel on Climate Change (IPCC) is $12 per ton of CO_2 in 2005 prices[16]. Applying an annual growth rate of 2.4 percent to the social cost of carbon[17] and 10 percent discount rate, the potential benefits from reduced CO_2 emissions is $22 or € 17 per ton of CO_2 which is used in this analysis.
In summary, inputs used for calculating the economic value of carbon emissions reduction include: (1) the social cost of CO2 emissions at € 17 per ton (2) CO2 intensity of natural gas-based power generation 400g/kWh (3) annual wind generation from wind power plants connected to Can, Vize and Izmir Basin substations. Wind generation is calculated based on wind capacity (MW) and wind capacity factor which are identified in the feasibility studies.

b) Reduction in unserved energy (electricity outage). Electricity interruptions occur when a transmission line or substation experiences faults and is unable to supply the required electricity. Good examples of this are Habibler substation which in the N-1 scenario will be overloaded and cut off, and the Kadikoy substation with the weak capacity of the local transmission system to which it is connected. When forced outages occur in the substation's local transmission systems, the customers drawing power from the substation have an electricity shortage or unserved energy. This unserved energy is valued at € 77cents/kWh ($1/kWh) which is the value used by TEİAŞ in their grid planning and is provided by Ministry of Development.

   To estimate the avoided electricity outage due to the construction of new substations, the following information are needed: (1) load shed due to possible outage (MW), (2) the probability of outage, and (3) the length of outage (hours) in the "without project" scenario. All these information are identified in the feasibility studies. In addition, we assume the avoided outage phases out as the new substation moves to maximum throughput. Specifically, we assume only 80% of the expected outage will be avoided during the first year the project is put on line, 60% the second year, and 0% the fifth year.

c) Reduction in energy loss. Investment in transmission capacity would address overload and voltage problems, and reduce energy losses resulting from voltage drops. The avoided energy loss is conservatively valued at the current average electricity market price in Turkey which is € 6.3 cents/kWh.

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14 International Energy Agency. 2012. CO_2 emissions from fuel combustion highlights. Paris, France.
15 Emission rate of gas power plants depend on generation efficiency and gas quality. The actual emission rate of gas power plants in Turkey could deviate largely from the mean value of the OECD countries. Stress tests on emission rate are conducted.
16 IPCC Fourth Assessment Report Working Group II report. 2007
17 This growth rate is suggested by the IPCC working group II (2007, p.822).

Data on annual loss reduction (MWh) due to the development of new substations and cables are provided in the feasibility studies.

d) Additional transmission capacity. Investments under the project would allow the expansion of transmission capacity. As a result, more electricity will be transmitted through the grid than it would otherwise. The additional transmission service is valued at the incremental cost of building alternative single cycle gas fired generating plants to serve local demand. Transmission lines are needed for transferring energy from inexpensive sources to expensive sinks. The estimated cost of a single cycle gas-based power is €6.9 cents/kWh at a 10% rate of return. The cost of supplying power from a new generating plant located some distance from the load source was about €6.0 cents/kWh assuming that it is a new coal fired plant with FGD (with a 10% rate of return). This difference of € 0.9 cents/kWh is used as the value provided by the substation and transmission lines. Based on the respective book values of substations, cables and lines, the transmission service is valued at € 0.4 cents/kWh for substations, and € 0.5 cents/kWh for cables and lines.

Economic Costs

5. Economic costs capital investments costs of cables and substations and the operating costs of substations. The investment costs and their allocation across years are given by TEIAS in the feasibility studies. The operating cost of substation is assumed to be 0.13 euro cents/kWh. It is assumed that there is no operating cost of undersea cables.

Economic Rate of Return (ERR) and Net Present Value (NPV)

6. Based on the above benefits and costs, the economic rate of return (ERR) and net present value (NPV) for various subprojects are estimated and summarized in Table 1.

Table 1: Economic Rate of Return (ERR) and Net Present Value (NPV) by subproject

Component		Name	ERR	NPV (000 Euro)
Wind Substations		Can Basin	40%	65,097
		Vize Basin	37%	57,419
		Izmir Basin	36%	57,419
	Sub-stations	Manavgat	68%	53,889
		Atasehir	28%	18,614
		Hadimkoy	38%	60,504
		Selcuk	39%	19,006
		Sultanbeyli	65%	26,152
	Cables	Kadikoy- Kucukbakkalkoy	57%	57,746
		Umraniye-Dudullu	53%	56,426
		Yakuplu-Ambarli	44%	63,391
		YeniAmbarli-Yenibosna	50%	155,649
		Karabaglar-Buca TL replaclement	64%	57,488
Submarine		Lapseki 2- Sutluce 2	57%	452,669

7. The project remains economically viable under stress tests assuming 20% decrease in emissions reduction, 20% decrease in carbon and electricity prices, 20% increase in investment costs and one-year delay in construction. Table 2 summarize the results of stress tests by subcomponents.

Table 2: Economic Rate of Return (ERR) and Net Present Value (NPV) under Stress Test

Component		Name	ERR	NPV (000 Euro)
Wind Substations		Can Basin	31%	50,372
		Vize Basin	34%	53,411
		Izmir Basin	29%	45,658
	Sub-stations	Manavgat	49%	46,649
		Atasehir	21%	12,149
		Hadimkoy	30%	51,537
		Selcuk	42%	19,040
		Sultanbeyli	46%	22,404
	Cables	Kadikoy-Kucukbakkalkoy	45%	50,916
		Umraniye-Dudullu	42%	49,668
		Yakuplu-Ambarli	34%	52,936
		YeniAmbarli-Yenibosna	39%	134,539
		Karabaglar-Buca TL replaclement	51%	51,085
Submarine		Lapseki 2- Sutluce 2	42%	367,478

Financial Analysis

8. The financial analysis of the project has been carried out at the project-level and at the entity-level. The main results are summarized below and the detailed analysis is available in the Project Files.

9. Project-Level Analysis: In conjunction with the economic analysis of the project, financial analysis has been carried out for each subproject and the results aggregated for the project as a whole. While the economic analysis estimates the economy-wide benefits and costs of the subprojects and the project, the financial analysis focuses on the direct net financial benefits and costs impacting the implementing entity (TEIAS). For the project as a whole, the Financial Net Present Value (FNPV) is estimated at about TL 582 million and the Financial Internal Rate of Return (FIRR) at 22% which is substantially over the estimated Weighted Average Cost of capital (WACC) of about 6.5% for TEIAS. The project's FIRR is robust to changes in the key underlying variables (capital costs and incremental revenues) and remains above 10% for increases of up to 20% in capital costs or decreases of up to 20% in incremental revenues.

10. Current and Projected Financial Performance of TEIAS: As seen from Table-4 below, TEIAS's financial performance has been strong over the last three years (2010 to 2012) and is projected to continue to be satisfactory over the period 2013 to 2020. TEIAS's annual plans are

subject to review by EMRA which establishes each year a revenue cap within which TEIAS is required to operate. TEIAS establishes its annual tariffs based on the revenue cap that is sanctioned. Electricity transmission volumes have increased at an annual rate of about 6.0% and the average tariff has increased from TL 0.0067/kWh in 2010 to TL 0.0089/kWh in 2012. In addition to its normal operations related to transmission of electricity, since 2006 TEIAS has also been undertaking functions related to the Balancing Market (BM). Revenues and expenses resulting from the BM operations are normally expected to offset each other over the course of each year.

d) Up to 2009, problems in the efficient operation of the BM led to lags in TEIAS's collection of revenues from distribution companies and other consumers. This led to resulting delays in TEIAS's payments to the electricity suppliers and TEIAS incurred significant penalties. Starting 2010, these issues were progressively resolved and the BM related activities are now reported to be proceeding well. TEIAS is in compliance with all the financial covenants (self-financing ratio, current ratio and debt service coverage) under its ongoing loans with the Bank.

e) In regard to TEIAS's projected financial performance for the period 2013-2020, the projections (in real terms) have been made on a conservative basis and indicate that TEIAS's financial situation will remain satisfactory in regard to the key financial indicators indicated in Table-4 below. The main assumptions are:

- Transmission volumes will grow at a rate of 5.0% annually.
- Tariffs will gradually increase from the level of TL 0.0089/kWh in 2012 to TL 0.0092 by 2015 and TL 0.0097 by 2020.
- Annual capital expenditures under TEIAS's investment program will be at a level of TL 1,100 million per year (based on the investment program for 2014).

f) Other assumptions are detailed in the project's financial analysis and financial projections file maintained in the Project Files.

g) Financial Covenants: The existing financial covenants under the ongoing Bank loans to TEIAS will be continued under the proposed project. TEIAS would maintain these covenants on an annual basis:

- A self-financing ratio (ratio of net cash from operations to the average of the capital expenditures in the preceding, current and succeeding years) of at least 35%.
- A current ratio (current assets/current liabilities) of at least 1.0.
- A debt service coverage ratio (the ratio of net income after tax plus depreciation plus interest to debt service i.e. the sum of interest and principal repayment) of at least 1.5.

Table-3: TEIAS -Key Financial Indicators (TL million in real terms)

Indicator	2010	2011	2012	2013	2015	2017	2020
	Actual			Forecast			
Transmission volume (GWh)	184335	206246	216794	222867	245711	270896	313595
Average tariff (TL/kWh)	0.0067	0.0069	0.0092	0.0086	0.0081	0.0078	0.0078
Transmission and system operating revenues	1249	1427	2004	1906	1920	2116	2450
Balancing market and other revenues	7243	8625	12721	13491	848	409	409
Total revenues	8485	10052	14724	15397	2768	2525	2859
Net profit after tax	332	247	871	797	783	858	945
Total assets	8504	9209	10323	11836	12475	13696	15256
Current liabilities	957	1339	1656	2197	1910	2105	2435
Long term liabilities	1200	1410	1336	1510	1643	1811	2096
Equity	6347	6460	7331	8129	8922	9780	10725
Financial ratios							
Net profit/total revenues (%)	4%	2.5%	6%	5%	28%	34%	33%
Current ratio (number)	2.3	1.9	1.9	1.7	1.5	1.5	1.5
Debt service coverage (number)	8.8	6.9	11.5	10.6	8.7	10.5	8.5
Self-financing ratio (%)	>40%	>40%	>40%	>40%	>40%	>40%	>40%

Annex 8: Social and Environmental Safeguards
Turkey Renewable Energy Integration Project

Social Safeguards

1. OP 4.12 is triggered for this project as land acquisition is expected during implementation. Social impacts of the proposed list of investments (substations and transmission lines) are not expected to be significant: Small sizes of land will be expropriated for the substations. For transmission line, long term easements will not limit use of land significantly. Physical relocation of households is not expected, nor is impacts on structures. Alternative lands for purchase exist in the surrounding areas, if farmers whose lands are expropriated want to continue farming. There are also alternate lands for grazing in these areas. Lastly, the Environmental and Social Due Diligence (ESDD) study conducted in the area found that the area experiences out-migration to urban areas and a sizable portion of affected people may choose to use the compensation provided for expropriation to purchase houses in urban areas. Overall, different impacts on men and women are not expected during land acquisition due to the small size of parcels, but this will be monitored during implementation by the Bank. The Environmental and Social Due Diligence study conducted has consulted men and women separately, and did not observe any differential impacts due to land acquisition at WPP sites.

2. Apart from land acquisition, there may be some damages on the lands during construction. In such cases, damages have to be compensated and/or reinstated (if possible) immediately by the relevant contractor. The exact routes and locations of the proposed list of transmission investments are not known at this time. As a result, TEIAS has prepared a Land Acquisition Policy Framework satisfactory to the World Bank for the project. For this, the Land Acquisition Policy Framework (LAPF) prepared by TEIAS for the APL6 Project and disclosed by TEIAS in June 2010 has been revised. The final draft of the LAPF was disclosed on the TEIAS website and World Bank's Infoshop on March 19, 2014. For each sub-project, before starting implementation of the sub-project, TEIAS will prepare a LAAP or an ALAAP, present the LAAP or ALAAP to the World Bank, and after agreement with the World Bank, disclose the LAAP and ALAAP on its website. During the implementation of the project, TEIAS will monitor and report on the progress as described in the LAPF.

3. Component A of the Renewable Energy Integration Project includes three sub-stations (Can, Izmir and Vize) that would cater primarily to energy from wind power plants. Eight WPPs that would connect to these sub-stations have already been identified (Ucpinar, Kocalar and Koru to Can sub-station; Bergres and Kinik to Izmir Substation; and Evrencik, Airres and Vize-2 to Vize sub-station). The electricity transmission lines out of a WPP are expected to be constructed by the same private company that constructs the WPP.

4. For the electricity transmission lines connecting the WPPs to the three sub-stations, where the transmission lines are constructed by the private-company, the private company usually comes to a mutual agreement with the land owner for the use of the land. Any land expropriation carried out by TEIAS when the private company and the land owner are not able to

come to a mutual agreement for transmission lines connecting WPPs to the World Bank financed sub-stations will be subject to the LAPF.

5. Accordingly, for the purpose of Component-1 investments, the LAPF will cover land acquisition for:

a. Can, Izmir and Vize substations to be financed under the proposed loan, and the access roads, if necessary between these sub-stations and the existing roads.
b. The first transmission lines constructed by TEIAS connecting the World Bank financed sub-stations to the National Grid.
c. Land parcels acquired by TEIAS where the private company and the land owners are not able to come to a mutual agreement.

6. In case of private-sector constructed transmission lines, the affected land owners would be informed through the village head (Muhtar) that they have the option to negotiate at terms acceptable to them or to decline - in which case, the land in question could be subject to expropriation under the terms and provisions of the LAPF. The LAPF would be made available to them along with contact information in case they have any questions regarding what they would be entitled to receive under its terms. TEIAS has the responsibility either to provide this information to landowners likely to be affected by the TL's or to ensure that the investor does so. TEIAS will conduct spot-checks to ensure that land acquisition carried out is in accordance with these principles. The World Bank and TEIAS will carry out periodic review of land acquisition carried out for this purpose during the implementation process of the project.

7. Under Component B of the project, a submarine power cable will be financed between Lapseki and Sutluce. The connection points of the submarine power cable on land will also be covered by this LAPF.

8. TEIAS has a fully functional land acquisition department that has worked with the World Bank in previous projects. In addition, upfront training for TEIAS staff on OP 4.12 has been conducted in May to increase TEIAS's capacity for implementing the requirements of the policy and providing necessary documentation to the World Bank. The ESDD and discussions with TEIAS have identified that some gaps remain between TEIAS' implementation practices and the World Bank Policy, namely: 1) Due to urgent expropriations procedures under Turkish National Law, consultations are not mandatory prior to land acquisition. 2) There is no grievance redress mechanism in place, other than recourse to the formal court system. 3) While interviewed land owners noted that compensation for land acquisition was sufficient, Turkish law states that the compensation should be at "market value" rather than "replacement cost."

9. These three issues were specifically discussed with the TEIAS team and the following was agreed upon, and are reflected in the revised Land Acquisition Policy Framework of the project: 1) During initial site visits, in the preparation and socio-economic information collection, and during the meetings TEIAS already has with landowners on agreement of prices, TEIAS will inform and consult with affected people on their rights, entitlements and the land acquisition process. 2) A grievance redress mechanism will be set up at the village (Muhtar) and regional TEIAS office level. Affected persons will be notified that they can reach TEIAS for questions and grievances related to the project. Grievances and responses will be documented. 3)

TEIAS will provide sufficient compensation to allow land owners to buy land of equivalent value to those that have been expropriated. Close supervision by the Bank will ensure that these gaps are bridged as discussed and that documentation will be handled timely and adequately.

10. The LAPF prepared for the project, has been disclosed to stakeholders on the TEIAS website and the Bank's Infoshop. In addition, the LAAP or ALAAPs that will be prepared for the sub-projects during loan implementation will be disclosed on at the local project sites (TEIAS's local office) to obtain views/comments from local people.

Environment Safeguards

11. In accordance with World Bank environmental policies and procedures (OP/BP/GP 4.01) the project has been assigned "Category B", as the types of potential impacts are limited and should be relatively easy to assess and mitigate through careful selection of sites and good construction practices. Since the exact footprints of the sub-projects are not determined yet, an environmental review framework document (ERFD) has been prepared by TEIAS to provide guidance for screening, assessing, conducting consultations, reporting and monitoring practices. The EMF has been consulted with key stakeholders on November 1, 2013 and November 7, 2013 in Ankara and Izmir, respectively. The draft final framework document has been disclosed on TEIAS's website on December 9, 2013 and on Bank's Infoshop on December 11, 2013. The revised final framework document, which is describing the responsibilities of TEIAS for the future WPPs which may be connected to WB financed substations, has been disclosed in country on March 4, 2014 and on Bank's Infoshop on March 5, 2014.

12. During the preparation of the project, it was agreed that the area of influence for the substations to be financed under this project will not be limited to the substation footprints. To form a basis for screening high risk areas (regarding OP 4.04) a Rapid Ecological Assessment (as a part of environmental and social due-diligence study) has been conducted. Results of the assessment were shared with TEIAS to guide them for financing substations which are receiving energy from wind power plants that are not creating any significant adverse impacts on natural habitats and that are not placed in critical natural habitats.

13. The assessment found that one of the four substations, Catalca substation and the WPP to be connected to this substation will likely to have significant impacts on a critical natural habitat. It was agreed with TEIAS that this sub-project be dropped from the REIP investment list. It should also be noted that, WB team was informed by Ministry of Environment and Urbanization (MoEU) that the ministry also has some issues regarding the site selected for the WPP, so the WPP still could not receive the EIA clearance from MoEU. Other issues related to natural habitats will be detailed in the EAs and EMPs that will be prepared for the substations and the results of the Rapid Ecological Assessment will be useful documents as a baseline for the sub-project EAs.

14. In addition to the already assessed WPP sites, it is important to have an assessment for the future WPPs which will be connected to WB financed substations during the loan implementation period. For that purpose, TEIAS will share with the WB the list of WPPs eligible for possible connection permit, at the same time when they are sharing the list with EMRA

which is a prerequisite for WPPs to receive a preliminary license from EMRA. This information would include the likely location (with available maps) and the plant sizes of the WPPs in MW. The Bank will undertake a preliminary environmental and social risk assessment (by appointing consultants if required) including desk based review and conduct field studies if necessary. When completed, each of these studies would inform the World Bank about the safeguard risks/concerns with the prospective WPPs, and could also be shared by the World Bank with the Ministry of Energy, Ministry of Environment and Urbanization, and EMRA. This information would be at an early enough stage of the WPP project cycle for the ministries/regulator to take any corrective action if agreed. Ministry of Energy, EMRA, TEIAS will also facilitate WB during this preliminary environmental and social risk assessment process especially for easing the field visits which will be necessary for Bank to complete its assessment.

15. In addition to the above mentioned mitigation measures, options are being explored especially to strengthen the safeguard assessment of wind power plant site selection at a systemic level. Possibility of using EU IPA funds to serve for this purpose is being discussed with the Ministry of Energy and more detailed information is provided in Annex-9 of the PAD.

16. TEIAS has been effective in supervising and monitoring individual sub-projects in accordance with the specifications of their EMPs which were prepared along with the procedures outlined in the framework documents. TEIAS is successfully implementing the APL-6 project and previously had implemented APL 2 and 3. TEIAS team participated in a comprehensive training on WB safeguard policies together with some of their selected regional staff to increase TEIAS' capacity (both in central and regional level) for implementing the requirements of the policy and providing necessary documentation to WB.

Annex 9: Strengthening the Site-Selection Process for WPPs

Turkey Renewable Energy Integration Project

1. Under the pressure of rapid economic growth, high dependency on energy imports and climate change considerations, Turkey is exploring all options towards renewable energy sources for meeting its growing energy demand. Wind power development is one of the most attractive choices since Turkey has good wind energy potential and it is perceived as one of the most environmentally sustainable renewable energy resources. Accordingly, Turkey is revising the legal framework for supporting wind power development. However, the absence of a robust framework for ecological assessment and site-selection, the development of wind energy resources may create ecology vulnerability.

2. WPPs are licensed only after fulfilling the Environmental Impact Assessment (EIA) requirements of the Ministry of Environment. However, the prevailing EIA regulation in Turkey categorizes the ecological risk and the environmental assessment study requirements according to the number of turbines for a WPP development. This approach sometimes creates problems since the site specific characteristics are more important than the number of turbines to be installed. Moreover, the EIA system treats the WPP separately and the associated facilities such as access roads and the electricity transmission lines, which sometimes have more environmental impacts than the turbines, are not integrated into the EIA process. Further, there may be a need for strengthening the public consultation process and using the EIA process for avoiding sensitive locations during the site selection process.

3. In addition to this, wind project investments are concentrated at locations with higher wind potential, and most of the time, these locations are also critical for birds especially as migration routes. The need for identifying sensitive areas for birds, exploring overlaps with wind farm investments and making strategic assessments for current and future wind farm investments is obvious. This is also emphasizing a broader assessment during the site selection phase of the WPP development for conserving the environment and WB will seek opportunities for supporting the government by finding tools which will make the site selection process more environmentally sustainable. This will be very important for the private sector investors since they are currently facing problems during the EIA and licensing processes.

4. For the WPPs connected to the sub-stations funded under the Renewable Energy Integration Project (REIP), an environmental and social due-diligence (ESDD) study has been carried out by the World Bank. This experience provides insights for exploring enhanced EIA studies for the sector as a whole.

5. Based on discussions with the Ministry of Energy and Natural Resources (MENR), it is proposed that a technical assistance activity be designed going forward that builds on the efforts initiated by the ministry. The ministry has recently published a regulation for guiding site selection phase for renewable energy developments. The regulation provides guidance to the private sector on the procedural steps for simplifying the site selection permits which should be gathered from various ministries such as the Ministry of Environment and Urbanization (MoEU),

Ministry of Forestry and Water Affairs (MoFWA), Ministry of Defense (for military zones), Ministry of Transport (for airport), etc.

6. The proposed technical assistance activity, when designed, would consist of piloting up-front comprehensive studies of wind energy locations for regional/strategic/cumulative environmental assessment, as well as establishing guidelines/toolkits which will define the methodology for ecological assessments to be conducted during the site selection process. A detailed scope of the proposed activity as well as specific Terms of Reference would be prepared in discussion with various stakeholders including the Ministry of Energy and Natural Resources, Ministry of Environment, and EMRA.


TURKEY
PROVINCE CAPITALS*
NATIONAL CAPITAL
RIVERS
MAIN ROADS
RAILROADS
PROVINCE BOUNDARIES*
INTERNATIONAL BOUNDARIES
*Province names are the same as their capitals.
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TURKEY
Black Sea
Mediterranean Sea
Sea of Marmara
Gulf of Antalya
ANKARA
BULGARIA
GREECE
GEORGIA
ARMENIA
AZER-BAIJAN
IRAQ
SYRIAN ARAB REPUBLIC
ISLAMIC REP. OF IRAN
RUSSIAN FEDERATION
Kuzey Anadolu Daglari
Toros Daglari
Istanbul
Izmir
Bursa
Edirne
Kirklareli
Canakkale
Balikesir
Eskisehir
Kütahya
Afyon
Manisa
Usak
Aydin
Denizli
Mugla
Burdur
Isparta
Antalya
Konya
Karaman
Aksaray
Nigde
Nevsehir
Kirsehir
Kayseri
Yozgat
Sivas
Tokat
Amasya
Corum
Cankiri
Kirikkale
Bilecik
Bolu
Düzce
Sakarya (Adapazari)
Kocaeli (Izmit)
Yalova
Tekirdag
Zonguldak
Bartin
Karabük
Kastamonu
Sinop
Samsun
Ordu
Giresun
Trabzon
Rize
Artvin
Gümüshane
Bayburt
Erzincan
Erzurum
Kars
Agri
Igdir
Agri Dagi (5166 m)
Tunceli
Bingöl
Mus
Elazig
Malatya
Bitlis
Van
Lake Van
Diyarbakir
Batman
Siirt
Sirnak
Hakkari
Mardin
Adiyaman
Kahraman Maras
Gaziantep
Sanliurfa
Kilis
Osmaniye
Adana
Icel (Mersin)
Hatay (Antakya)
Golu
Hoyran Golu
Beysehir Golu
Aksehir Golu
Tuz Golu
Sakarya
Gediz
Kizil
Devrez
Gökirmak
Ceyhan
Seyhan
Euphrates
Tigris
Firat
Murat
Kura
Coruh
Aras
Kelkit
To Kurdzhali
To Burgas
To Komotini
Istanbul Strait (Bosphorus)
Canakkale Strait (Dardanelles)
To Batumi
To Kirovakan
To Maku
To Salmas
To Oroumieh
To Dahuk
To Al Hasakah
To Damir Kabu
To Aleppo
To Ladhiqiyah
0 50 100 150 200 Kilometers
0 50 100 150 Miles
26°E
28°E
30°E
32°E
34°E
36°E
38°E
42°E
44°E
42°N
40°N
38°N
36°N
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