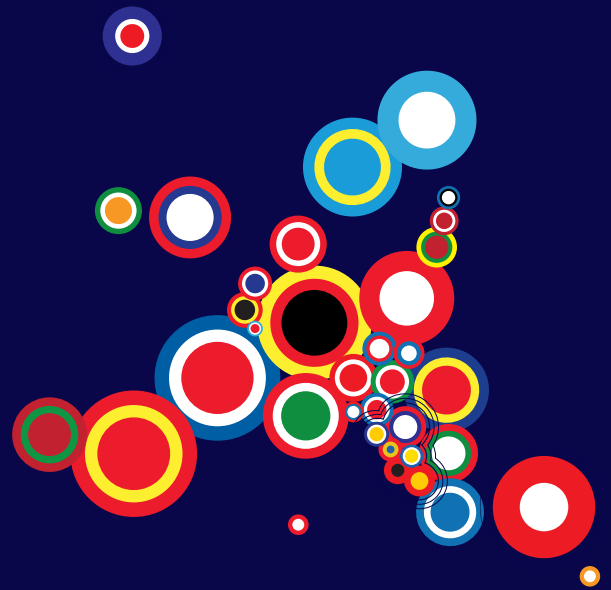




INSTRUMENT FOR PRE-ACCESSION ASSISTANCE (IPA II) 2014-2020

TURKEY

SUPPORT TO THE ENERGY SECTOR



Action Summary

The Action in Energy sector will improve the reliability, efficiency and operational performance of Turkish Power System by extending and strengthening the National Load Dispatch System Supervisory Control and Data Acquisition System/Energy Management System (SCADA/EMS) and Information Systems/Information Security Structure of Turkish Electricity Transmission System. As a direct effect, the Action will increase the capability of the integration of large amount of renewable energy resources to the Turkish Power System and also enhance the integration and operation capability of the Turkish Power System with the European Network of Transmission System Operators for Electricity (ENTSO-E) Continental Europe Synchronous Area (CESA).

Action Identification	
Programme Title	Annual Action Programme for Turkey 2014
Action Title	Support to the Energy Sector
Action Reference	IPA 2014/037-708.1/TR/Energy
Sector Information	
ELARG Sectors	Energy
DAC Sector	23040 - Electrical transmission/distribution
Budget	
Total cost	15 400 000 EURO
EU contribution	13 090 000 EURO
Management and Implementation	
Method of implementation	Indirect Management
Indirect management: Responsible Unit or National Authority/Implementing Agency	The Central Finance and Contracts Unit (CFCU) will be the implementing agency and will be responsible for all procedural aspects of the tendering process, contracting matters and financial management, including the payment of project activities. The Director of the CFCU will act as the Programme Authorising Officer (PAO) of the project. Contact details of the PAO: Ms. Emine DÖĞER (Deputy CFCU Director) Central Finance and Contracts Unit Tel: +90 312 295 49 00 Fax: +90 312 286 70 72 E-mail: emine.doger@cfcu.gov.tr Address: Eskişehir Yolu 4 Km, 2 Cad. (Halkbank Kampüsü) No:63 C Blok 06580 Söğütözü/Ankara-TÜRKİYE
Implementation responsibilities	The lead institution for programming and monitoring this action is the Ministry of Energy and natural resources.
Location	
Zone benefiting from the action	Turkey
Specific implementation area(s)	Turkey
Timeline	
Deadline for conclusion of the Financing Agreement	At the latest by 31 December 2015
Contracting deadline	3 years following the date of signature of the Financing Agreement
End of operational implementation period	6 years following the date of signature of the Financing Agreement

1. RATIONALE

PROBLEM AND STAKEHOLDER ANALYSIS

Turkish Electricity Transmission Company (TEİAŞ), as the transmission system operator (TSO) of Turkey, is the sole owner and operator of the electricity transmission network which consists of more than 650 substations, more than 51,000 km of high voltage transmission lines and around 1400 power transformers with a total capacity of 117,000 MVA. Total electricity generation installed capacity has reached to 64,000 MW by the end of 2013 and annual electricity generation is expected to exceed 245 TWh in 2014. With around 8 percent annual increase in demand, Turkish Electricity System is becoming an important market in Europe.

Turkish National Load Dispatch Supervisory Control and Data Acquisition System (SCADA)/ Energy Management System (EMS), which had been renewed and taken into service in 2004, has one National Control Centre (NCC), one Emergency National Control Centre (ENCC) and 9 Regional Control Centres (RCCs) for the time being. Although around 950 substations and power plants are connected to Turkish Electricity Transmission Network, only 370 substations and power plants are included in the National Load Dispatch SCADA/EMS system (the 90 connected to the 400 kV transmission network and only few connected to the 154 kV transmission network). Real-time data required by TEİAŞ's Load Dispatch Control Centres are collected only from these substations and power plants.

Sufficient amount of real-time data collection is needed for real-time monitoring and reliable operation of the Turkish Power System and for proper functioning of the Energy Management System programmes available at the National Control Centre (NCC) and the Emergency National Control Centre (ENCC). Therefore, extension of TEİAŞ's existing SCADA/EMS System to the remaining TEİAŞ substations which do not have Remote Terminal Units (RTU) has a vital importance for reliable operation of Turkish Power System and better usage of the existing EMS programmes which are used at NCC for analysis of the network and stable and reliable operation of overall power system.

Reliable operation and performance are essential elements not only for the power system itself, but also for successful operation of the electricity market. Due to restructuring and establishment of competitive electricity market, instead of centralized dispatching of power plants, self-dispatching is used. In addition, integration of large amount of renewable energy resources such as wind power plants and run-of-river hydro power plants increase the importance of close monitoring of the power system by means of real-time data collection from the substations and power plants connected to the transmission network and extension of existing SCADA/EMS system.

Studies for the synchronous parallel operation of the Turkish power system with the ENTSO-E CESA are ongoing. Trial synchronous parallel operation of Turkish Power System with ENTSO-E CESA has been started in 2010. Following successful completion of this trial operation, Turkish Power System expects to be permanently interconnected with ENTSO-E CESA by the autumn 2014. With the integration of Turkish Power System to the ENTSO-E CESA, TEİAŞ will be obliged to fulfil requirements and rules of the "Operational Handbook (or Network Codes)", a collection of principles and rules for transmission system operators in continental Europe.

Real-time monitoring and reliable operation of the overall Turkish Power System can only be managed by extension of TEİAŞ' existing SCADA/EMS System to the substations which have not been included in this system yet. Extension of the SCADA/EMS System to the overall transmission network is also crucial for obtaining proper and accurate results from network analysis EMS programme needed for efficient, reliable and stable operation of the power system. This extension is also relevant for the fulfilment of ENTSO-E requirements. Furthermore, extension of SCADA/EMS System to the overall transmission network is needed for successful interconnected operation with ENTSO CESA system as well as to accelerate the integration of Turkish Electricity Market to the European Internal Electricity market. Implementation of this activity shall also improve capability of Turkish Electricity Transmission System regarding integration of large amount of renewable energy resources in line with the related policies of European Union.

To evaluate the technical justification of this activity, the Communication and Information System Department of TEIAS assessed all the relevant aspects of the Turkish Electricity Transmission System, mainly the SCADA/EMS System and Information System/Information Security Structure of TEIAS. The reports for the Needs Assessment study, the Feasibility Study and the Market Research, prepared within the context of a SEI project after the consultation made with TEIAS, have been attached respectively in Annex 2, Annex 3 and Annex 4.

It has been identified that some deficiencies exist in the operational monitoring and control network for the electricity transmission network of TEIAS. Almost 580 of the total 950 substations are not monitored since there is no local measurement data acquisition and no central monitoring. In addition, there is no standardized IT infrastructure at about 450 substations, and there is no cyber security related protection in these substations. And this causes important support functions unable to transfer data to central support applications.

According to the final report of the SEI project, these deficiencies should be corrected on short term to meet international obligations, partly to raise efficiency of operations of TEIAS. Missing RTUs prevent TEIAS' control centre to exactly know what the current status of around 60% of the substations is. This is obviously limiting the dispatchers in their functioning but also stops any transmission support IT system. In fact the missing RTUs and the missing data from substations cause many relevant part of the SCADA/EMS to malfunction or to stop functioning entirely.

Installing the missing RTUs would lead to the transmission network being fully observable and would allow control centre support systems, specifically SCADA/EMS that are very important in a safe and secure operating of the network to function.

The total number of about 580 RTUs is planned to be tendered in three lots for procurement;

- 200 RTUs are to be financed by a World Bank Loan (in parallel to this activity),
- 300 RTUs are to be financed by an EU - IPA funding
- About 80 RTUs are to be financed from other sources, possibly TEIAS own funding.

All of these activities shall be coordinated by Communication and Information Systems Department of TEIAS.

Second issue is the lack of IT systems, communication systems and cyber security related protection mechanisms in substations. The IT and communication systems would enable substation based non-real-time support systems to exchange data with central management and maintenance application systems. The cyber security is important in the protection of critical assets in the substations against cyber based attacks. This activity will also enhance the protection mechanisms of the critical assets in the substations. This issue is relevant in about 450 substations; these 450 substations in the TEIAS transmission network are equipped with one or more local operations support systems which are not integrated with the standardized IT infrastructure. As a part of IT System to be implemented at 450 substation within this activity, Firewalls shall be installed and commissioned at each substation.

RELEVANCE WITH THE IPA II STRATEGY PAPER AND OTHER KEY REFERENCES

According to the indicative strategy paper 2014-2020 for Turkey, in order to obtain an enhanced security of supply and further integration with the EU internal electricity and gas market, the EU assistance to the country will finance actions such as “*market integration and development of infrastructures*”.

Moreover, in the “Enlargement Strategy and Main Challenges 2013-2014 (COM2013/700)” document it is stated that “*strengthening of the EU-Turkey energy cooperation as well as relevant progress in the accession negotiations would facilitate further progress towards the interconnection and integration of the energy markets of the EU and Turkey*”.

Also the document “EUROPE 2020: A strategy for smart, sustainable and inclusive growth” foresees that the Commission will work to present an initiative to upgrade Europe's networks, including Trans European Energy Networks, towards a European supergrid, and interconnections in particular of

renewable energy sources to the grid. This includes promoting infrastructure projects of major strategic importance to the EU in the Baltic, Balkan, Mediterranean and Eurasian regions.

In the Accession Partnership document prepared for Turkey, it is stated under section “3.2 Medium Term Priorities” that Turkey should upgrade the country’s infrastructure, in particular in energy and transport, in order to strengthen the competitiveness of the economy at large.

Additionally, in the Sector Alignment Strategy (SAS) prepared in 2011 by the Ministry for EU Affairs and the Ministry of Energy and Natural Resources, it is highlighted that “integration of the market and establishment of an internal market are the main goals of the legislation regarding electricity and natural gas sectors. The legislation for overcoming barriers to energy trade aims at promoting necessary infrastructure, financial and administrative tools for establishing such a trade”. Within this context, the improvement of the electricity network is envisaged within the sector approach for the IPA II period.

SECTOR APPROACH ASSESSMENT

In Turkey, both primary energy and electricity demand are increasing rapidly in parallel with growing economy. The country has a young and urbanising population and energy use is still comparatively low. Ensuring sufficient energy supply to a growing economy remains the government’s main energy policy concern.

As of 2012, around only 26.6 % of the total energy demand was met by domestic resources while 73.4% was supplied from a diversified portfolio of imports. The natural gas was the dominant source with a share of 35% in 2012. On the other hand, the share of oil was realized as 26.4 % and coal as 26.25 % in 2012. The renewable kept its upwards trend with a share of 12.33 % in 2012 from 11.09 % in 2011. The gross inland consumption has increased by 1.2 % in 2013 compared to 2012 figures.

Reforms in the electricity sector and the level of alignment with the Electricity Directive are advanced and further improved with the new electricity market law. Progress in the renewable energy sector is encouraging but has been slower. Overall, Turkey is at a rather advanced level of alignment in the field of energy.

Within its EU accession process, Turkey has already taken major steps to bring its legal framework in line with the EU energy acquis. Regarding internal market, Turkey started a reform process to liberalize its energy markets in 2001. In this regard, two main framework laws for electricity and natural gas were adopted. Following the EU 3rd energy package, Ministry of Energy and Natural Resources (MENR) initiated studies to amend the electricity and natural gas laws in order to fully comply with the new EU Directives and to meet the needs arising from market dynamics. Within this framework, MENR adopted a new electricity market law on 30 March 2013.

The energy sector has been directing its progress through the strategies in the national, sectoral and sub-sectoral levels. Tenth Development Plan (2014-2018), Electricity Market & Security of Supply Strategy Paper, Energy Efficiency Strategy (2012-2023) and National Climate Change Strategy (2010-2020) are among those strategies which constitute a general sector strategic framework.

Turkey’s Public Financial Management and Control Law no: 5018, requires the annual preparation of the Medium Term Programme (MTP) for a three year perspective. MTP for the years of 2014-2016 has been prepared. In compliance with MTP, MENR 2010-2014 Strategic Plan has a ‘Costing’ section which sets out budget forecasts intended for aims and targets included in the plan. For the next period comprising 2015-2019, the relevant studies on the MENR’s new Strategic Plan are ongoing. In the last quarter of 2014, the costing measures will be announced in the framework of the new MENR Strategic Plan which is going to determine main principles on which Turkey’s energy sector will be regulated.

The energy sector is governed by a very large number of institutions. The main actor and the leading institution is the Ministry of Energy and Natural Resources (MENR) which is responsible for development of policy, legislating and enforcement of legislation in all areas of the sector. There are also other institutions responsible for the energy sub-sectors. However, MENR is in charge for the overall sector coordination which means that energy sector has a leading institution which is a prerequisite for sector approach.

In 2011, EU-Turkey Financial Cooperation – Energy Sector Alignment Strategy has been developed and endorsed by the Working Group composed of related public institutions, universities and NGOs. The Working Group established the state of play as regards legislative alignment and implementation, assessed the outcomes of the projects implemented and identified the gaps in terms of alignment with EU acquis and implementation mechanisms. This shows the willingness of the beneficiaries to improve their capacity in the energy sector. Moreover, IPA 2012 and 2013 projects in cooperation with the World Bank and EBRD will contribute to further capacity building in the sector, including targeted training of MENR and relevant agencies' staff.

The sector coordination, including the international financial institutions has always been an active tool of implementation in terms of grant applications as well as donor coordination arrangements for the state actors in Turkey. The relations with the non-state actors have been coordinated under the leadership of the relevant sector public institutions in the country. This active relationship and coordination of IFI's will be strengthened through IPA. In IPA II programming, the Steering Committee to be established within the framework of the IPA 2012 and 2013 projects, could evolve towards a Sector Committee under the leadership of MENR. The Committee will consist of the representatives of attached and related institutions of MENR, Civil Society Organizations (CSOs), Non-Governmental Organizations (NGOs), Universities and Municipalities. Sector Committee will provide for a well-functioning sector coordination which is needed for the sector approach.

In conclusion, currently ongoing studies and the planned ones regarding the development of MENR capacity for sector coordination, monitoring and strategic expenditure forms the relevant preparatory work towards sector approach. Thereby, energy sector in Turkey has been taking firm steps forward in the way towards Sector Approach.

LESSONS LEARNED AND LINK TO PREVIOUS FINANCIAL ASSISTANCE

Taking into account the liberalization in the Turkish electricity market in the last decade together with the synchronous parallel operation of Turkish power system with ENTSO-E CESA, it is obvious that the real-time monitoring capability of TEIAS for the Turkish Power System is a crucial factor for reliable and efficient operation of this system. Real-time data collected from the transmission substations by means of SCADA System is also necessary of proper network analysis programmes. In the past, we assumed that manually entered data which are collected from the untelemetered substations several times a day can be used together with the real-time data collected via SCADA System for network application programmes. However, it has been noted that in practice it is not possible to have result from the network application programme for most of the time and the quality of the solution obtained in this way is not good enough both for operation of the transmission network and for creation of the network snapshots and Day-Ahead Congestion Forecast (DAFC) files required by ENTSO-E. Therefore, the only possible solution to obtain the expected result is the installation of the necessary Remote Terminal Units at the substations and the inclusion in the SCADA system.

TEIAS has already implemented 3 projects¹ under the framework of IPA funds to date, and under the same framework is currently implementing 2 projects².

¹ TR0303.03 - Complementary Technical Studies for the Synchronization of the Turkish Power System with the UCTE Power System;

TR06 IB EY 01 - Improvement of the Conditions for Cross Border Electricity Trade in Turkey in Compliance with the Best Practice in EU;

TR0702.05 - Rehabilitation of the frequency control performance of Turkish Power System for Synchronous Operation with ENTSO-E.

² TR2009.0315.01 - Structure and Capacity Improvement of TEİAŞ;

TR2010.0315.01 - Harmonization of Transmission Code with ENTSO-E.

The implemented projects provided a strong contribution towards the synchronous parallel operation of Turkish power system with ENTSO-E CESA, and improved the conditions for the functioning of cross-border electricity trade in Turkey by removing technical, administrative and legislative obstacles.

The ongoing projects aim respectively to:

- improve the institutional structure and capacity of TEIAS, by expanding its technical capacity to perform live working and to develop work safety and training activities and restructuring its organization by improving human resources policies and its IT structure;
- to harmonize Turkish Power System Transmission Code in line with ENTSO-E RG CE technical/market requirements to be implemented in planning/operational activities of TEIAS, especially by improving the overall interconnected power system operational security and quality of supply for the end users, which will enhance the electricity transmission system performance in Turkey and in the ENTSO-E system.

So, not only there is no overlapping between other EU funded projects currently being implemented by TEIAS and the activity described in this document, but also the current proposal would be in line with the previous activities implemented through IPA and will give a continuity to the process.

Similarly, there is no overlapping between this activity and the project being implemented under the World Bank Loan (WBL) (169 MEURO) for upgrading of the TEIAS transmission network. The WBL Project aims to further support the improvement of the capacity and reliability of the power transmission system in Turkey, and its ability to integrate renewable energy capacity into the system. The current WBL Project will contribute further to the outcomes of the previous WBL projects. In addition, the WBL project will continue the advisory and investment support for internal market implementation and its integration into the European market.

It would worth to mention that the project implemented under World Bank Loan will be a complimentary project to this Action, taking into consideration the direct benefit to the Turkish transmission system and indirect benefit to the connection of Turkish power system with ENTSO-E CESA.

2. INTERVENTION LOGIC

LOGICAL FRAMEWORK MATRIX

OVERALL OBJECTIVE	OBJECTIVELY VERIFIABLE INDICATORS (OVI)	SOURCES OF VERIFICATION	
Contribute to increase the integration of the Turkish Electricity Market with the European Internal Electricity Market.	<ul style="list-style-type: none"> Capacity for electricity exchange between Turkish and European Electricity Markets. 	1- Annual Reports of TEIAS. 2- Annual Reports of ENTSO-E. 3- Progress reports of EC.	
SPECIFIC OBJECTIVE	OBJECTIVELY VERIFIABLE INDICATORS (OVI)	SOURCES OF VERIFICATION	ASSUMPTIONS
To improve reliability, efficiency and operational performance of the Turkish Electricity Transmission System.	<ul style="list-style-type: none"> Status of the interoperability of Turkish Power Systems and ENTSO-E Continental Europe Synchronous Area (CESA) Network. 	<ul style="list-style-type: none"> Annual Reports of TEIAS. Annual Reports of ENTSO-E. Progress reports of EC. 	<ul style="list-style-type: none"> Necessary technical requirements such as proper integration of the RTUs to TEIAS SCADA System by means of communication protocols used in this system should be fulfilled for successful operation of these RTUs.
RESULTS	OBJECTIVELY VERIFIABLE INDICATORS (OVI)	SOURCES OF VERIFICATION	ASSUMPTIONS
Result 1: SCADA/EMS system of the Turkish Electricity Transmission System has been extended and strengthened	<ul style="list-style-type: none"> Number of real-time data collected from the substations and power plants by means of SCADA System. Installed capacity of the renewable energy resources connected to Turkish Power System. Number of substations connected to 	<ul style="list-style-type: none"> Annual Reports of TEIAS. Annual Reports of ENTSO-E. Annual reports of Ministry of Energy and Natural Resources. Provisional Acceptance Reports of the Action. 	<ul style="list-style-type: none"> The works to be done at the substations as a part of this activity shall performed in a way that operation of the substation shall not be disturbed and operation of the overall power system shall be effected negatively due to these activities. Trainees should attend the training programmes and obtain all necessary

<p>Result 2: Information Systems and Information Security Structure of the Turkish Electricity Transmission System have been expanded.</p>	<p>the SCADA/EMS system.</p> <ul style="list-style-type: none"> • Increase of reliable and secure operation of the TEIAS Information System Security Structure. • Increase of the substations connected to TEIAS Information Systems and Information Security Structure. 	<ul style="list-style-type: none"> • Annual Reports of TEIAS. • Annual Reports of ENTSO-E. • Provisional Acceptance Reports of the Action. 	<p>information and skill to fulfil their responsibilities for proper operation of the equipment.</p>
<p>ACTIVITIES</p>	<p>MEANS</p>	<p>OVERALL COST</p>	
<p>Activities to achieve Result 1: Extension and Strengthening of TEIAS's existing SCADA/EMS System (see details in the following section);</p> <p>Activities to achieve Result 2: Expansion of the TEIAS's Information System and Information Security Structure (see details in the following section);</p>	<ul style="list-style-type: none"> • Supply Contracts 	<p>Total Cost 15 400 000 € EU Contribution 13 090 000 €</p>	

ADDITIONAL DESCRIPTION

Within the first activity of the action, 300 RTUs and where necessary sensors, local data cabling, Data Acquisition Panels (DAP, or marshalling cabinets), modems or other communication equipment will be installed in substations all through the country both at the RTU site and at the related Control Centre Site. This would allow TEIAS to have necessary real-time data from overall transmission network for reliable operation of the network, connect these new RTUs to the SCADA/EMS.

Detailed steps for Activity 1: "Extension and Strengthening of TEIAS's existing SCADA/EMS System:

- 1.1 Supply of the Data Acquisition Panels (DAP) and other related equipment to be needed at the substations for collection of the required data from the substations.
- 1.2 Supply of the Remote Terminal Units (RTU) and other related equipment such as necessary communication equipment to be needed at the substations.
- 1.3 Supply of the necessary communication equipment required at TEIAS' related Control Centres for connection of the RTUs to be installed at the substations within the scope of this contract.
- 1.4 Performance of the necessary adaptation works for collection of the required data to the Data Acquisition Panels (DAP) at TEIAS' substations.
- 1.5 Installation, parameterization and commissioning of the Remote Terminal Units (RTU) and related communication equipment at TEIAS' substations.
- 1.6 Installation and commissioning of the necessary communication equipment required at TEIAS' related Control Centres for connection of RTUs to be installed at the substations within the scope of this contract.
- 1.7 Training related to the equipment such as Remote Terminal Units (RTU) and communication equipment to be delivered within the scope of the contract.
- 1.8 Supply of the spare parts for the equipment to be delivered within the scope of this contract.
- 1.9 Point-to-point testing of the data to be collected and sent to TEIAS' control centre by means of RTUs for each substations and overall acceptance of the work within the scope of the contract.

About 450 substations in the TEIAS transmission network are equipped with one or more local operations support systems which are not integrated with the standardized IT infrastructure. Obviously this limits the use of these systems, and therefore limits the efficiency of operations and maintenance.

To allow for efficient data exchange between the local support systems in the substations and central processing systems, a basic infrastructure needs to be installed in these 450 substations.

Within the second activity, TEIAS will extend information system to the substations and improve information security structure. The installation and commissioning of the following items will be performed at the 450 substations: firewalls, local data acquisition/storage system, communication equipment, LAN switch or router, UPS, Cabinet (19"rack) to house all equipment.

Detailed steps for Activity 2 "Expansion of the TEIAS's Information System and Information Security Structure":

- 2.1 Supply of the equipment needed for extension of TEIAS' information system to the substations and improvement information security structure.
- 2.2 Installation and commissioning of the equipment needed for extension of TEIAS' information system to the substations and improvement of information security structure.

- 2.3 Training related to the equipment used for extension of TEIAS' information system and improvement of information security structure.
- 2.4 Supply of the spare parts for the equipment to be delivered within the scope of this contract.
- 2.5 Testing and overall acceptance of the work within the scope of the contract.

The data communication protocol used for connection of new RTUs to TEIAS's SCADA/EMS System is compatible to international open protocol standards. However, the RTU data communication protocol used in TEIAS SCADA/EMS System has some characteristics and details specific to TEIAS, in other words, some parameters and options in the communication protocol are needed to be adjusted in accordance with the parameters and options used in TEIAS SCADA System. Therefore, the RTUs to be connected to TEIAS's control centres should be adapted to characteristics and details of the data communication protocol used in TEIAS system in order to fulfil required compatibility. This compatibility has been fulfilled by several manufacturers and it is not difficult for any company manufacturing RTUs for electricity transmission substations.

3. IMPLEMENTATION ARRANGEMENTS

ROLES AND RESPONSIBILITIES

The contracting authority will be the Central Finance and Contracting unit (CFCU) and CFCU will also be the implementing agency for this action and it will be responsible for all procedural aspects of the tendering process, contracting matters and financial management of the activities.

The final beneficiary of the action will be the Turkish Electricity Transmission Corporation (TEIAS), who will be responsible, inter alia, for the coordination, supervision, assessment, execution and management of the activities implemented. TEIAS will act as the implementing authority and will have the complete responsibility for administration related to the preparation, technical control and implementation of the different components for efficient administration.

The Technical Coordination (TC) of this activity within the TEIAS will be conducted by Communication and Information Systems (CIS) Department.

Technical coordination of this activity will be carried out by CIS Department of TEIAS and the Research Planning and Coordination (RPC) Department of TEIAS will support CIS Department for the administrative issues.

IMPLEMENTATION METHOD(S) AND TYPE(S) OF FINANCING

The action, which has a budget of 15.400.000 EURO, will be implemented throughout two Supply Contracts, which are not linked to each other and can be realized independently. TEIAS has already made its plans for this action both financially and physically.

TEIAS, which is a State Economic Enterprise, will give all information required by the Ministry of Energy and Natural Resources (MENR) on the technical implementation of the action.

4. PERFORMANCE MEASUREMENT

METHODOLOGY FOR MONITORING (AND EVALUATION)

Steering Committee Meetings will be held in order to monitor the progress of the Action with the participation of the authorities responsible for the EU IPA programming in Turkey, such as Delegation of the EU to Turkey, Ministry for EU Affairs, Ministry of Energy and Natural Resources, TEIAS and Supplier.

The Supplier shall prepare a Work Plan in order to present a detailed schedule for the implementation

of the activities and define the Supplier's intervention logic to the implementation of the Action. Moreover, the Supplier shall perform all the activities of the action within the context of this Work Plan in order to control the progress of the action and to anticipate risks and constraints. This Work Plan should be part of the proposal submitted by the Supplier, and shall set out in a systematic and logical way the contract objectives and the relationships between them, the procedures for checking whether these objectives have been achieved, and the assumptions and factors outside the scope of the contract which may influence its results.

INDICATOR MEASUREMENT

Indicator	Description	Baseline (2010)	Last available (2013)	Milestone 2017	Target 2020	Source of information
Capacity for electricity exchange between Turkish and European Electricity Markets.	This indicator measures the increase in the capacity for electricity exchange between Turkish and European Electricity Markets.	<i>for 2010 Zero for 2011 300 MW in export direction and 450 MW in import direction.</i>	<i>400 MW in export direction and 550 MW in import direction.</i>	<i>1200 MW in export direction and 1200 MW in import direction.</i>	<i>1200 MW in export direction and 1200 MW in import direction.</i>	<ul style="list-style-type: none"> • Annual Reports of TEIAS. • Annual Reports of ENTSO-E. • Progress reports of EC
Number of real-time data collected from the substations and power plants by means of SCADA System.	This indicator measures the increase of the real-time data collected from the substations and power plants by means of SCADA System to be used by the Network Applications programs in Energy Management System at National Control Centre	<i>30,000 real-time data is collected.</i>	<i>50,000 data is collected.</i>	<i>70.000 real-time data shall be collected.</i>	<i>Real-time data shall be collected from all substations and power plants connected to 380 and 154 kV network by means of SCADA System.</i>	<ul style="list-style-type: none"> • Annual Reports of TEIAS. • Annual Reports of ENTSO-E.
Installed capacity of the renewable energy resources	This indicator measures the increase of the installed	<i>1400 MW of installed</i>	<i>2800 MW of installed</i>	<i>5000 MW of installed</i>	<i>11.000 MW of installed</i>	<ul style="list-style-type: none"> • Annual Reports of TEIAS.

Indicator	Description	Baseline (2010)	Last available (2013)	Milestone 2017	Target 2020	Source of information
connected to Turkish Power System	capacity of the renewable energy resources connected to Turkish Power System	<i>capacity of RES</i>	<i>capacity of RES</i>	<i>capacity of RES</i>	<i>capacity of RES</i>	<ul style="list-style-type: none"> • Annual Reports of ENTSO-E. • Annual reports of Ministry of Energy and Natural Resources
Increase of reliable and secure operation of the TEIAS Information System Security Structure.	This indicator measures the increase of the percentage of reliability and security of the substations in TEIAS Information Systems.	<i>Around 10% of TEIAS substations have reliable IT systems</i>	<i>Around 25% of TEIAS substations have reliable IT systems</i>	<i>Around 70% of TEIAS substations have reliable IT systems</i>	<i>100 % of the TEIAS substations shall have reliable IT systems</i>	<ul style="list-style-type: none"> • Annual Reports of TEIAS. • Annual Reports of ENTSO-E.
Number of substations connected to the SCADA/EMS system.	This indicator measures the increase of the substations connected to the SCADA/EMS system.	<i>130 substations are connected to TEIAS's SCADA/EMS System</i>	<i>230 substations are connected to TEIAS's SCADA/EMS System</i>	<i>670 substations are connected to TEIAS's SCADA/EMS System</i>	<i>100 % of the substations are connected to TEIAS's SCADA/EMS System</i>	<ul style="list-style-type: none"> • Annual Reports of TEIAS. • Provisional Acceptance Reports of the Action. • Annual Reports of ENTSO-E.
Increase of the substations connected to TEIAS Information Systems and Information Security Structure.	This indicator measures the percentage of the substations connected to TEIAS Information Systems and Information Security Structure.	<i>70 major substations are equipped with one or more local</i>	<i>170 major substations are equipped with one or more local</i>	<i>450 major substations are included to TEIAS's Information System and</i>	<i>100 % of the substations are included to TEIAS's Information</i>	<ul style="list-style-type: none"> • Annual Reports of TEIAS. • Provisional Acceptance Reports of the Action. • Annual Reports of

Indicator	Description	Baseline (2010)	Last available (2013)	Milestone 2017	Target 2020	Source of information
		<i>operations support systems which are not integrated with the standardized IT infrastructure.</i>	<i>operations support systems which are not integrated with the standardized IT infrastructure.</i>	<i>IT Security Structure.</i>	<i>System and IT Security Structure.</i>	ENTSO-E.
Status of the interoperability of Turkish Power Systems and ENTSO-E Continental Europe Synchronous Area (CESA) Network.	This indicator measures the modality of the interoperability between Turkish Power Systems and ENTSO-E CESA Network.	<i>Trial synchronous parallel operation of Turkish Power Systems and ENTSO-E CESA Network.</i>	<i>Limited commercial electricity exchange between Turkish Power Systems and ENTSO-E CESA Network.</i>	<i>Permanent synchronous parallel operation of Turkish Power Systems and ENTSO-E CESA Network.</i>	<i>Permanent synchronous parallel operation of Turkish Power Systems and ENTSO-E CESA Network.</i>	<ul style="list-style-type: none"> • Annual Reports of TEIAS. • Annual Reports of ENTSO-E. • Progress reports of EC

5. CROSS-CUTTING ISSUES

ENVIRONMENT AND CLIMATE CHANGE (AND IF RELEVANT DISASTER RESILIENCE)

Extension of National Load Dispatch (SCADA/EMS) System to the rest of the transmission network as well as expansion of Information Systems and improvement of Information Security Structure shall improve reliability, efficiency and performance of the operation of the Turkish Power System and shall increase capability of Turkish Power System regarding connection of large amount of the renewable energy resources such as wind farms. This will in turn decrease the need for installation of more thermal power plants which use fossil fuels to meet rapidly increasing electricity demand in Turkey and thus make positive effect to the environment.

ENGAGEMENT WITH CIVIL SOCIETY (AND IF RELEVANT OTHER NON-STATE STAKEHOLDERS)

The Action is for the public benefit, in which the stability and operation quality of the electricity transmission system is enhanced. The civil society will be regularly informed about the achievement of progress in the Action through announcements in the TEİAŞ web page.

TEİAŞ as a transmission system operator in Turkey, is regularly consulting with the actors in the energy sector, trade unions, trade associations and other relevant organizations for better transmission services and other facilities.

EQUAL OPPORTUNITIES AND GENDER MAINSTREAMING

This is an Action for the Supply of technical equipment required for a better functioning of a transmission system. In this regard, it can be highlighted that all the public will take the advantage of of this action.

Equal opportunity principles and practices in ensuring equitable gender participation in the project will be guaranteed. Male and female participation in the project will be based on the relevant standards of the EU. The main criteria for staff recruitment will be appropriate qualifications and experience in similar projects, not sex or age. Both men and women will have equal opportunities and salaries.

MINORITIES AND VULNERABLE GROUPS

According to the Turkish Constitutional System, the word “minorities” encompasses only groups of persons defined and recognized as such on the basis of multilateral or bilateral instruments to which Turkey is a party. This project has no negative impact on minority and vulnerable groups. The reliability of the electricity system will be enhanced with this Action and entire population will benefit from this, including the vulnerable groups.

6. SUSTAINABILITY

TEİAŞ has assigned the highest priority to further expand and strengthen the SCADA/EMS system as well as the IT system needed to achieve a reliable and efficient operation of Turkish Power System. To finance the investments needed, TEİAŞ plans to merge its own funds with external contributions (loans and grants).

The sustainability of the action should be considered according to a twofold aspect: the maintenance plans for the equipment provided and the sustainability of the electricity supply.

On the first point, TEİAŞ, as the owner and operator of the electricity transmission system in Turkey, has the responsibility to perform the maintenance of the installed equipment. In this regard, trainings will be performed by the supplier to the relevant TEİAŞ staff to sustain the operation and maintenance of the equipment by TEİAŞ. TEİAŞ has 22 regional directorates responsible for operation and

maintenance of the transmission system in their responsibility areas. Within the organisation of these 22 Regional Directorate, Electronic and Information System Units are maintaining the communication systems and equipment such as RTUs and IT equipment installed at the substations. Concerning the equipment installed through the action, spare parts for its maintenance have been included in the scope of the action. In case additional spare parts will be needed in the future, such operational expenditures shall be met from TEIAS's budget.

Training for SCADA/EMS System and for Information Systems/Information Security Structure are foreseen. The Supplier shall prepare and deliver a comprehensive training programme on the operation, configuration and maintenance of the RTUs as well as the Information Systems/Information Security Structure. Firmware training shall teach the TEIAS staff the skills required for the RTU and Information Systems/Information Security Structure maintenance and expansion and for the preparation and integration of new functions. Hardware trainings will be useful to acquire the skills required to perform routine preventive maintenance and perform diagnostic tests on the processors and their peripheral equipment, LANs, and display and communications equipment.

Also the sustainability of the electricity supply will benefit of the action, thanks to:

A diversification of the energy resources, through the integration of large amount of renewable energy to the electricity network. This will also increase the share of the domestic energy resources in overall electricity generation in Turkey and increase the security of supply.

The facilitation of the integration of Turkish Power System to ENTSO-E Continental Europe Electricity Network and the coupling of the markets. This will increase the amount of electricity trading and sharing of the reserves with European internal electricity market, and will contribute to the sustainability of the synchronous parallel operation of Turkish Power System with ENTSO-E CESA network.

7. COMMUNICATION AND VISIBILITY

The Supplier shall take all necessary measures to publicise the fact that the European Union has financed the Action and will take all the necessary measures to ensure the visibility of the European Union financing or co financing.

All communication and visibility activities will be carried out in close co-operation with the CFCU. The CFCU is the main authority in charge of reviewing and approving visibility-related materials and activities. Before initiating any information, communication or visibility material and activity, consultants and implementing partners should seek the approval of the CFCU in writing.

The EU-Turkey cooperation logo will be accompanied by the following text:

“This project is co-funded by the European Union and the Republic of Turkey.”