

## CLEAN TECHNOLOGY FUND

### *Ukraine: Second Power Transmission Project*

#### Responses to Comments from the UK

October 2014

#	Comment	Response
1	Can the project team please articulate more clearly what the CTF additionality is?	<p>Additionality from the CTF stems from pioneering the introduction of smart grid technologies which are innovative in the Ukrainian context. Support from the CTF would be essential to demonstrate the feasibility of implementing and operating these highly-innovative technologies, which would help bridge the knowledge and innovation gap with respect to the technologies currently deployed in the Ukrainian Power Sector and by Transmission Operator (Ukrenergo). There is already interest from privately held Distribution Companies for investments in Smart Grid applications, but the technologies have not yet been tested and their impact not yet assessed in Ukraine. The lack of demonstrational projects is in effect preventing these Distribution Companies from embarking into smart grid investments. The pioneering introduction of Smart Grid elements by Ukrenergo can indeed serve to demonstrate the potential of Smart grid technologies and create the conditions for a larger penetration of smart grid solutions in the country. Moreover, the implementation of the proposed CTF project will create the basis for wider replication of similar smart grid technologies at both transmission and distribution levels, which would lead to further significant benefits for the Ukrainian Power system, including energy savings, higher penetration of RE, and reduction of GHGs.</p>
2	Why would this entire project not happen without CTF funds?	<p>As indicated in response #1, the use of CTF funding will be crucial for introducing smart grid technologies in Ukraine, which would not have happened in the absence of CTF support. Ukraine has suffered from economic stagnation for most of the 1990s and has not fully recovered from the 2008/2009 crisis, which led to inadequate investments and insufficient maintenance of aging energy infrastructure. The financial scenario is not promising in the near future as Ukraine is deepening into new wave of recession/economic stagnation and access to financial resources needed to implement Smart Grid programs is severely restricted due to higher priority investments for upgrading and rehabilitating transmission systems to satisfy increasing demand and control losses. The introduction of smart grid technologies would compete directly with higher priority investments on existing generation/transmission infrastructure and possibly defer investments in cost-intensive new transmission corridors to satisfy increasing</p>

	<p>demand. In this context, the availability of CTF financing provided the World Bank with the opportunity to discuss with the Government of Ukraine (GoU) and Ukrrenergo about the possibility of undertaking smart grid investments aimed at modernizing the transmission network, ensuring an efficient management of the transmission system and better integration of renewable energy. In the absence of CTF, the existence of financial constraints and higher priorities in the energy sector would have made investments in smart grid technologies unlikely. CTF is therefore essential to help pioneer the introduction of smart grid technologies in Ukraine and contribute to the demonstrational impact of new technologies which is essential for the further replication of similar investments in the country.</p> <p>Furthermore, the objectives set forth for this project would only be achieved provided there is an integral approach for rehabilitating and automating the power transmission system in Ukraine, which would require both rehabilitation and automation of the substations being proposed under the project. The rehabilitation of substations is proposed under Component 1. The CTF-funded smart grid investments (Component 2) will contribute directly to the automation of these substations, improving the information exchanges and communications systems of Ukrrenergo and enhancing the reliability and management of the transmission networks. The deployment of smart grid technologies will help automatize the substations being rehabilitated under the project, allowing for more efficient and larger integration of intermittent renewable energy into the power grid. The sub-component 2.3 (Balancing market support) depends heavily on the deployment of the CTF-funded smart grid technologies, as their installation would provide the basis for smarter management of demand, as well as monitoring and control of transmission and generation assets, which are indispensable structures for balancing markets.</p>
3,4	<p>Why would the renewable energy sector necessarily develop through the installation of smart grid technologies? Is this a sufficient incentive?</p> <p>The installation of CTF-funded smart grid technologies will contribute to the development of the renewable energy sector in Ukraine by reducing barriers and facilitating integration of renewable resources into the power grid. The “Green Tariff” introduced in 2009 has already led to some increase in wind and solar power generation over the last couple of years. As such, the total renewable energy-based installed generation capacity reached about 576 MW by the end of 2012. However, existing system constraints and dispatch barriers for integrating renewable resources will limit achieving the GoU’ ambitious targets of 4 GW and 8 GW of installed renewable energy capacity by 2020 and 2030. Therefore not only does the GoU need to mobilize substantial resources to accomplish these low carbon growth goals, but it</p>

	<p>particularly needs CTF resources to lower these system barriers to attract private sector participation in renewables.</p> <p>As indicated above, the proposed investments will contribute directly to the Government of Ukraine's target of installing 8GW of renewable energy capacity by 2030. The integration of large-scale power generation capacity from intermittent renewable energy resources requires investment and modernization of UE's transmission system and Ukraine's distribution and operation systems getting Wholesale Electricity Market functioning with Bilateral mechanisms. As it was indicated in the project document, the deployment of smart grid technologies would significantly increase the maximum allowable renewable energy integration to 4GW compared to the "business as usual" scenario of 2.95GW by 2020. The introduction of the proposed smart grid investments for enhanced grid monitoring and control will contribute to ensuring optimal dispatching operation, stability control and congestion management at transmission level, which is particularly important in view of an increasing penetration of variable renewable energy.</p>
5	<p>The majority of IBRD finance is going to Component 1: Rehabilitation of Transmission Substations (US\$241.5 million IBRD) – which is unrelated to the other smart-grid component being co-financed between CTF and IBRD. Should this subcomponent not be separated from the project as a whole and/or discounted from the IBRD leverage/and associated energy savings from avoided technical losses (c. 16% of overall) from the total emission savings and other benefits?</p> <p>All components of the project are strongly interrelated (refer to response #2). Therefore, the impact of CTF funding on leveraged financing, energy savings, increased renewable capacity, and GHG savings was claimed for the entire project. Estimates for leverage financing include IBRD contribution, as well as private contribution based on assumed private sector investments of US\$1 million per MW installed wind power capacity and US\$2.5 million per MW of installed solar capacity. Energy savings are attributed to interventions in Components 1 and 2.1 (traditional transmission investments – where substations will be rehabilitated and reactive power compensation devices will be installed) plus Component 2.2 (Smart Grid with CTF co-financing). Savings from technical losses are due to optimization of transmission system configuration. Estimates for GHG savings are based on energy savings primarily from increased level of renewable energy integration and reduced technical losses.</p>