CTF UKRAINE
PRIVATE SECTOR PROPOSAL

Name of Project or Program	Ukraine Renewable Energy Program (the Program)
CTF amount requested	Total: US$ 65 million or Euro equivalent comprising: 1. Investment – €50 million (€38.5 million for IFC's account, €11.5 million for EBRD's account) 2. Grant (advisory services and knowledge management) – US$200,000 for IFC's account (see Annex A) and US$100,000 for EBRD's account. 3. Implementation and supervision budget – US$500,000 for IFC's account and $170,000 for EBRD's account (see Annex B).
Country targeted	Ukraine
Indicate if proposal is a Project or Program	Program

1. DETAILED DESCRIPTION OF PROGRAM

1.1 Fit with Ukraine Country Investment Plan

This Program proposal is consistent with Ukraine's Country Investment Plan (CIP), which was endorsed by the CTF Trust Fund Committee (TFC) on March 16, 2010, as well as with the proposed updated CIP which will be considered by the TFC in May 2013.

Ukraine's updated CIP confirms what has been stated in the original 2010 Plan; direct financing for private sector renewable energy development is a high priority for the country. The CIP initially earmarked US$62.5 million to IFC, namely US$25 million to develop a renewable energy (RE) financing facility and US$37.5 million to engage in energy efficiency (EE) work. This US$37.5 million allocation was later adjusted to US$25 million whereby US$12.5 million was reallocated to EBRD. Following appraisal and discussions with the private sector and in agreement with the Government of Ukraine (GoU), the distribution of IFC's CTF allocation between RE and EE programs has been further adjusted to better reflect the relative needs of each sector to meet the objectives of the CIP. Specifically, the updated CIP stipulates that if IFC is not able to develop suitable EE projects by March 2013, IFC would propose to reallocate the remaining funds of US$25 million to the RE program. IFC's assessment is that currently the banking sector in Ukraine is facing significant challenges and few financial institutions (FIs) are able to engage in EE lending at this time. Given this unfavorable business environment and a strong pipeline for RE projects where CTF funds could be deployed relatively quickly (and meet the TFC's request to commit CTF funds in the near future), IFC seeks to use its full allocation of US$50M for its RE program. These resources will be deployed to encourage transformation of the private RE sector by establishing direct RE project level interventions, particularly in wind generation, which is nascent but offers significant potential in Ukraine.

EBRD's initial allocation was US$50 million, of which US$48.3 million has been approved for two separate projects, the Ukraine Sustainable Energy Lending Facility (€20 million) and the Novozaovsk wind farm (US$20.7 million). Both of these projects are expected to fully disburse in 2013. Under the IP update process, following discussions with the private sector, and in agreement with the GoU, EBRD's allocation increases from US$50 million to US$100 million by reallocating US$50 million of CTF funding from the Zero Emissions Power from the Gas Network program. The increase responds to market needs and strong pipeline for RE projects.

The proposed programmatic proposal, *Ukraine Renewable Energy Program*, alongside the previously

mentioned CTF/EBRD-supported projects, addresses the use of CTF funds to support the development of renewable energy projects. It aims to demonstrate that clean energy projects can be successful in Ukraine (thereby helping to reduce risk for future investors) while also addressing some of the early entrant barriers related to establishing precedents and reducing costs.

1.2 Ukraine's GHG emissions profile

In 2005, Ukraine's GHG emissions ranked 18th in the world, after Australia and France. Estimated total emissions in 2005 were nearly 495 million metric tons of carbon dioxide equivalent ($MtCO_2e$) and per capita emissions were over 10 tons per person. Due to the inefficient use of gas and dependency on coal, Ukraine is the most energy intensive economy in Eastern Europe, consuming more than twice the amount of energy per US$ of GDP as Poland and almost 40% more than Russia. The only countries with more energy intensive economies are the oil producers of the Middle East. While the carbon intensity of the economy has been decreasing due to a drop in economic growth, the energy sector alone was responsible for 69% of GHG emissions in 2006. According to the Ukrainian "Energy Strategy through 2030," fossil fuel-fired generation is expected to increase over the next 20 years, primarily driven by a 30% increase in the use of coal for energy use

1.3 Renewable Energy in Ukraine

While Ukraine's steep economic decline in the 1990s ensures that total emissions in 2012 and 2020 will remain well below 1990 levels, the Government of Ukraine has stated its commitment to keep GHG emissions 20% and 50% below 1990 levels in 2020 and 2050, respectively. As part of the preparation process, the government is reviewing its GHG emissions profile and assessing its mitigation and adaptation activities.

Ukraine is actively promoting the development of alternative energy sources to reduce dependency on imported gas. In 2006 the Ukrainian Cabinet of Ministers approved the "Energy Strategy to 2030," which provides an all-encompassing overview and strategy of the energy sector. Additionally, the government has a target to install non-hydro renewable energy capacity by 2020 estimated to generate about 3.6 TWh, of which 1.9 TWh is targeted to be generated from wind. The government's steps are complemented through the work of several IFIs and development agencies operating in Ukraine. As of 2012, there are 8 wind projects operating in Ukraine, totalling 120 MW and representing less than 0.23% of installed capacity in Ukraine. European Bank for Reconstruction and Development (EBRD) and CTF have financed the Novoazovsk II Wind Farm (32.5 MW), the first Ukrainian wind project to be financed on a non-recourse basis. To further demonstrate the viability of private sector wind projects and at a larger scale, this Program seeks to support an additional 60-120 MW of project-finance based wind projects in Ukraine. IFC is working with EBRD to help transform the wind sector, especially to bring installed capacity of large-scale wind projects to a critical mass of 500 MW.

Part of the GoU support to develop the renewable energy sector includes the establishment of a feed-in tariff (aka "Green Energy Tariff") in 2009 via the Ukrainian Law on Electricity. The Green Energy Tariff for wind projects is more than 1.5x the wholesale power price in Ukraine. As such, Ukrainian wind investments are perceived as high risk by project developers and long-term lenders.

In addition, there are significant opportunities for the development of clean energy in the agribusiness sector in Ukraine. IFC recently finalized an agricultural waste study for Ukraine, which identified that 80% of agriwaste annually generated in Ukraine can be utilized either for energy generation or in the production of other value added products. Economically viable projects in this sector that would pay back within five years require investment in the order of US$40-50 billion. These include small and mid-capacity heat recovery systems, combined heat and power units and production of non-energy value-added materials, such as cellulose, heat insulation, nutrition components and small-scale innovative projects used to produce biodegradable plastic, dyes and pigments, and fire retardants.

The programmatic intervention by CTF, IFC and EBRD will help catalyze a robust and sustainable

renewable energy market. CTF resources are needed to launch a coordinated effort which will require significant financial resources and RE project finance expertise that are not currently mobilized in the market. These resources will be used to enable private developers and financial institutions to gain practical experience and enhance private sector development of wind projects.

1.4 Barriers to market transformation

The proposed Ukraine Renewable Energy Program represents IFC-EBRD's initiative to accelerate private sector participation in RE, specifically in the wind sector. Private sector wind investment in the Ukrainian economy faces a number of interrelated barriers including: (i) lack of long-term financing; (ii) limited experience in wind development by sponsors in Ukraine; and (iii) perception of payment risk related to the Green Energy Tariff. These barriers are exacerbated by the fact that RE projects in Ukraine suffer some diseconomies of scale and higher development costs. Recent unfavourable changes in market conditions for wind projects in neighbouring countries like Bulgaria have impacted project developers' risk-reward expectations and compounded perceived risks in wind investment in Ukraine.

The advisory services component of this Program will target two additional market barriers: (i) limited awareness of the benefits of and market opportunities in clean energy in Ukraine and (ii) perception of high technical and financial risks of clean energy projects.

1.5 Summary of the Program and use of CTF funds

The proposed Program is designed to support Ukraine's initiatives to scale up renewable energy investments. The investment component will catalyze financing from CTF, IFC, EBRD and other commercial investors and lenders in the wind sector. The aim is to increase energy generation by wind farms, thereby reducing GHG emissions. Wind has the highest potential for large-scale development in Ukraine. Transformation of the wind sector will have a positive impact on other RE sources, including biomass and waste-to-heat, and therefore has the potential to have a material impact on the GHG emission intensity of the Ukraine power sector.

The advisory component will focus on opening up the market for investments in biomass and agribusiness related sectors, by providing capacity building to major industrial and agribusiness energy users as well as renewable energy project developers. In addition, this proposal includes a knowledge management component to carry out one or more studies on the linkages between climate finance from the Clean Technology Fund and the development of large scale renewable energy programs in Ukraine.

2. FIT WITH INVESTMENT CRITERIA

2.1 Potential GHG Emissions Savings

Assuming a carbon intensity factor for Ukraine of 0.42 tCO_2e/MWh, a 60MW wind project operating at 25% capacity factor would generate 55,000 tCO_2e per year[1]. With an asset life of 20 years this type of project would generate GHG reductions of 1.1 $MtCO_2e$. Depending on the final allocation of funds, the Program is expected to directly support emissions reductions of 1.1 to 2.2 $MtCO_2e$ (assuming support to approximately 60-120 MW of wind power capacity) over 20 years.

Wind technology is fully proven; both technically and commercially, and there are widespread examples of successful application at scale around the world. Ukraine has an excellent wind resource that promises the greatest future potential opportunity for renewable energy in the country. Once these initial projects are

[1] The CTF is implemented according to the procedures of the participating MDBs. MDBs have not yet adopted a joint approach to the calculation of CO2 emissions reductions, and at this stage MDBs use different calculation methodologies in their assessment of CO2 emission reductions. The figure given above is based on the IFC methodology (using International Energy Agency (IEA) emission factors), as the lead MDB on this project. For comparison purposes with earlier EBRD CTF project applications for renewable energy investments in Ukraine, the volume of estimated CO2 savings for a 60MW project according to EBRD's methodology (using EBRD emission factors based on an independent third-party study) would be 140,000 tCO2 reduced per year. As illustrated by these estimates, the use of different methodologies may have implications, for e.g., on the calculation of cost effectiveness of the CTF investment and the periodic CO2 emission reductions reporting from individual MDBs for a project. The MDBs have an active working group discussing a harmonization approach.

implemented and provide a successful demonstration/track record, it is very feasible that the market will achieve the scale anticipated by this Program.

2.2 Cost-Effectiveness

Based on the above calculations and an expected CTF investment of €50 million, the implied direct GHG reductions per CTF Euro invested will be up to 0.04 tCO_2e/€.

2.3 Demonstration Potential at Scale

The Program seeks to support and enable early megawatt-scale, private-sector wind projects in Ukraine. Wind projects are higher cost energy solutions and relatively larger amounts of CTF support will be necessary to enable such projects. This technology has the potential to provide power at utility scale in Ukraine so the initial projects supported by CTF will provide a demonstration effect and could provide the impetus for a ten-fold increase in projects over the next ten to fifteen years. This increase could provide GHG emission reductions of 11 $MtCO_2e$ against a current energy sector annual production of 350 $MtCO_2e$.

The Program, together with CTF-financed Novozaovsk project, is expected to demonstrate the commercial viability of project finance in the wind generation sect. In the case of Novozaovsk, long-term financing from CTF has enabled the project sponsor to move forward and develop wind power in Ukraine on a project finance basis. Over the long term, CTF will not be needed as the sector becomes sustainable because: (i) the reduced perception of risk will lower the cost of capital enabling future projects to achieve reasonable returns; and (ii) as global markets reach scale, equipment costs will continue to fall, allowing domestic regulatory support to be sufficient to support future growth of the sector. In the long-term, with further technological advances and sector scale, it is expected that wind technology can offer power at costs that are competitive with fossil-fired thermal technologies.

2.4 Development Impact

Expected co-benefits achieved by the Program include:

- By enabling and accelerating private sector participation in wind renewable power generation in Ukraine, the Program will directly support diversification of the country's power generation mix, which is currently dependent on large thermal and nuclear sources.
- By accelerating the development of wind farms in Ukraine, related sectors can also be developed and supported.
- By accelerating the development of wind renewable energy and supporting its achievement of critical scale in Ukraine, the Program will open up opportunities for potential future wind energy equipment manufacture in Ukraine.
- The construction and operation of wind farms will create employment, much of it rural, given the location of the most propitious project sites.

2.5 Implementation Potential

See foregoing description regarding Ukraine wind power markets for details on the market context and regulatory environment. The economics of renewable energy projects are highly variable and site and project specific. The following illustrates the level of mobilization expected by under this Program: A 120 MW wind project costing approximately €250 million, the total €50 million from CTF is expected to leverage up to €210 million in other financing, including from multilateral, bilateral and private sector funds. In all cases, projects supported under this Program will seek to minimize the use of CTF funds and maximise the leverage achieved from other sources.

2.6 Additional Costs & Risk Premium

CTF financing will complement the regulated FIT in Ukraine to support RE projects and Clean Development Mechanism revenues via the Kyoto Protocol created under the United Nations Framework Convention on Climate Change.

Given the limited experience in grid-tied, wind power in Ukraine and perceived high risks of this technology, the FIT may only provide marginal or insufficient returns given current capital costs of wind power equipment. Concessional funding is necessary to support pioneer projects and to accelerate sector growth to a critical, sustainable scale.

2.7 Financial Sustainability

Wind technologies have been largely undeveloped in Ukraine. The FIT and other incentives for wind power under the newly established RE Act are meant to catalyze development of these technologies. Such incentives would make the wind sector attractive for investors and financiers depending on the FIT levels for wind technologies. FIT levels will significantly affect the profitability of wind projects and will also influence a project's ability to attract equity investors and lenders. Wind technology is expected to require some additional support to jump-start the first few project financed wind projects due to high equipment costs and high perceived risk.

Projects within this Program are expected to promote sustainability by helping to establish a demonstrated track record of the technical and financial viability of private sector wind projects, and thereby accelerate development of the sector. Future project developers are expected to benefit from these development efforts, persistence and high costs encountered by the early movers in the sector, including projects in this Program, which should ease the development and implementation process and lower the entry costs for future project developers. Lowering risks, which results from the establishment of such a track record, along with improvements in financial markets and the continual reduction of equipment costs, would make Ukrainian wind projects attractive without concessionary funding. The Program will enable an accelerated scale-up of the wind sector, which will become economically sustainable over the coming years as the commercial viability of private sector wind farms is demonstrated and the perception of risk by financiers and project developers decreases, which will, in turn, improve the availability and cost of long-term capital available to project developers.

2.8 Effective Utilization of Concessional Finance

Wind power is commercially proven worldwide but apart from locations with particularly good wind resources, it cannot compete with lower cost thermal power generation. Pioneering multi megawatt-scale projects in wind will face higher costs and higher risks associated with first movers; CTF financing will be used to address these issues. In the long-term however, it is believed that the lower cost of capital from lower perceived risk once the initial projects have been completed and decreasing equipment costs will be sufficient to enable sustainable growth of the wind sector.

Given the varying economics of the technology considered under this proposal and the site specific economics of renewable power in general, the structuring of CTF funds will need to be tailored on a project by project basis but will always seek to maximize the use of other sources of funding (MDB, private sector, carbon finance and other concessionary sources) while minimizing the use and concessionary nature of CTF funds.

2.9 Mitigation of Market Distortions

The Program is designed specifically to have a supporting rather than distorting impact on the nascent private sector development of the Ukrainian wind power sector. The proposed Program will provide CTF funds to individual projects and will enhance domestic regulation that encourages renewable energy, until

the wind sector has reached sufficient scale to grow sustainably on a fully commercial basis. It is unlikely that these pioneer projects would move forward without concessional financing. If they did, the poor returns received would provide little incentive for replication and growth of the market to scale.

2.10 Risks

Macroeconomic Risk: Continued macroeconomic and political instability hampers the availability of long-term financing needed for RE projects.

Mitigation: Ukrainian bank lending slowed dramatically with the onset of the global financial crisis in 2008. While banks have now increased their lending, they remain cautious as their customer base has changed significantly. The Program will monitor the situation closely and will re-assess the readiness of financial institutions to engage in lending in 15 months after the start of the Program. However, a number of banks have already expressed their interest in lending to wind projects in Ukraine.

Project Readiness: Potential sponsors/clients fail to disburse loans as planned, delaying project implementation and utilization of CTF funds.

Mitigation: IFC and EBRD investment staff have met with potential clients over the last few months and believe that potential projects will be able to secure board approval for disbursement of CTF funds.