Climate Investment Funds

CTF/TFC.11/8
April 5, 2013

Meeting of the CTF Trust Fund Committee
Washington D.C.
May 2-3, 2013

Agenda Item 9

REVISED CTF INVESTMENT PLAN FOR UKRAINE

PROPOSED DECISION

Recalling its endorsement in March 2010 of the CTF Investment Plan for Ukraine, the Trust Fund Committee reviewed the document, CTF/TFC.11/8, *Revised CTF Investment Plan for Ukraine*, submitted by the Government of Ukraine in collaboration with EBRD and the World Bank Group. The Committee takes note of the proposed revisions to the *CTF Investment Plan for Ukraine*, including the cancellation of the project concept entitled, *Zero Emissions Power from the Gas Network,* and the reallocation of USD 100 million in requested CTF funding proposed for that project to the other three projects originally foreseen in the plan addressing renewable energy, energy efficiency, and smart grids (see table below). The Committee endorses the revised plan as a basis for the further development of the proposed project and program concepts, confirms the calendar for project development, including Trust Fund Committee and MDB approvals, and requests that the proposed projects and programs be submitted to the Trust Fund Committee for funding approval by the end of March 2014.

The Committee takes note of the continued request for an indicative allocation of USD 350 million in CTF funding to support the Ukraine investment plan, recalling that the approval of CTF funding by the Committee is dependent on the submission of high quality project or program proposals. The Trust Fund Committee requests the MDBs to work closely with the stakeholders in Ukraine to expedite the development of the proposals for timely submission to the Committee for approval of CTF funding.

CTF Program	**CTF Funding** (CTF Plan Endorsed March 2010)	**CTF Funding Reallocation**			**CTF Funding** (CTF Plan Proposed for Endorsement May 2013)
		EBRD	**IFC**	**IBRD**	
Ukraine Renewable Energy Financing Facility	75	(+) 50	(+) 10 to 25		135 to 150
Improving Energy Efficiency	125		(-) 10 to 25	(+) 20 to 50	120 to 165
Smart Grids	50			(+) 0 to 30	50 to 80
Zero Emissions Power from the Gas Network	100	(-) 50		(-) 50	0
Total	350	0		0	350

Державне агентство екологічних інвестицій України

State Environmental Investment Agency of Ukraine

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Від 28.03.2013 № 1069/13/9

Gevorg Sargsyan
CIF Program Coordinator
The World Bank

Re: Endorsement of updated version of CTF Investment Plan for Ukraine

Dear Mr. Sargsyan,

The State Environmental Investment Agency of Ukraine presents its compliments to the **World Bank** and You personally, and has the honour to express appreciation of the MDB's team efforts in addressing issues raised by CTF Trust Find Committee in the new version of the CTF Investment Plan for Ukraine.

The CTF Investment Plan focuses on Energy Efficiency and Renewable Energy issues and clearly coincides with the Government of Ukraine approach to reduce GHG emissions on the large scale in the long term. Besides, please be advised that CTF concessional financing as well as loans provided by MDBs are critical to address climate change mitigation in Ukraine especially in the times of global financial crisis.

As a designated counterparty I confirm that the updated components of CTF Investment Plan for Ukraine are fully supported by the Government of Ukraine. The updated version of CTF Investment Plan for Ukraine will be posted on the official State Environmental Investment Agency's website during next week, and I would encourage the MDB team submitting the new version of CTF Investment Plan for Ukraine at soonest for virtual review by the Trust Fund Committee.

The State Environmental Investment Agency of Ukraine avails itself of this opportunity to renew the assurance of its highest consideration and to express hope in regards to the fast approval of the CTF Investment Plan for Ukraine by Trust Fund Committee.

Annex: Revision Note of CTF Investment Plan for Ukraine on 41 pages

Best Regards,
Head **Vladislav Iakubovskyi**

CLEAN TECHNOLOGY FUND

INVESTMENT PLAN FOR

UKRAINE

Revision Note

February 2013

UKRAINE

UKRAINE

CLEAN TECHNOLOGY FUND INVESTMENT PLAN

Revision Note

February 2013

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List of Abbreviations

CTF	Clean Technology Fund
DH	District Heating
EBRD	European Bank for Reconstruction and Development
EE	Energy Efficiency
ESCO	Energy Services Company
FI	Financial Intermediary
GoU	Government of Ukraine
GTS	Gas Transmission System
HRSG	Heat Recovery Steam Generators
IBRD	International Bank for Reconstruction and Development
IFC	International Finance Corporation
IP	Investment Plan
MDB	Multilateral Development Bank
MW	Mega Watt
PPG	Project Preparation Grant
PTP	Power Transmission Project
RE	Renewable Energy
SME	Small and Medium Enterprise
TA	Technical Assistance
TFC	Trust Fund Committee
UIP	Urban Infrastructure II Project

EXECUTIVE SUMMARY

This note updates on the implementation status and presents revisions to the Clean Technology Fund (CTF) Investment Plan for Ukraine. The CTF Plan for Ukraine was endorsed by the CTF Trust Fund Committee (TFC) in March 2010. Under this plan, the Government of Ukraine (GoU) would use US$350 million from the CTF to finance and catalyze greater investments in renewable energy, energy efficiency, smart-grids, and waste heat recovery projects. As of February 2013, US$50 million of CTF funding has been committed by the Trust Fund Committee.

The areas of intervention of the original CTF Plan for Ukraine remain unchanged. However, the GoU proposes to reallocate CTF resources among existing programs (see Table 1)**.** The GoU's intention is to commit all US$350 million of CTF funding by Q2-2014. The impact of the revised programs on CTF objectives is expected to be comparable to the one envisioned in the original CTF Plan.

- *Program 1 - Ukraine Renewable Energy Financing Facility (EBRD, IFC)*: two EBRD projects (Ukraine Sustainable Energy Lending Facility US$27.6 million, Novoazovsk Wind Project US$20.7 million) have been approved by the TFC. The IFC project will be presented for TFC approval by Q2-2013. Upon TFC approval of this IFC project, all CTF funding originally planned under this program will be fully committed. The GoU proposes between US$60 and 75 million of CTF funding be reallocated to this program.
- *Program 2 - Improving Energy Efficiency (EBRD, IBRD, IFC)*: the TFC has approved US$1 million grant for the preparation of the District Heating Energy Efficiency project (IBRD). The GoU proposes to increase IBRD's allocation by US$20-50 million by reallocating funds from the Gas Network program to Urban Infrastructure II Project and to reallocate US$10 million of IFC's funding to the RE program from Energy Efficiency. Additionally, the GoU may propose US$15 million of the remaining IFC funds be also reallocated to the RE program provided the market situation prevents it from developing suitable projects by Q2-2013.
- *Program 3 - Smart-Grids (IBRD)*: the TFC has approved US$0.5 million grant for the preparation of the Smart Grids project. Hinging upon the results of the feasibility study, the GoU proposes up to US$30 million of CTF funding be reallocated to this program from the Gas Network program.
- *Program 4 - Zero Emissions Power from the Gas Network (IBRD, EBRD)*: due to progress being slower than anticipated and greater results being expected in other programs, the GoU proposes US$100 million of CTF funding be reallocated to other programs while reserving the opportunity to seek additional financing after 2014.

Table 1: Ukraine CTF Plan Revision February 2013 – Summary of Results and Impact Indicators

Results Indicator	Unit	CTF Target Value	Ukraine Value	CTF Impact (% Ukraine Value)
CO_2 Savings	$mtCO_2e$/year	6.4-6.8	356 [3]	1.8-1.9%
Energy Savings	GWh/year	1,400-1,630 [1]	134,023 [4]	1.0-1.2%
RE Installed Capacity	MW	4,138-4,158 [2]	576 [5]	718-722%
- Wind	MW	185-205	182 [5]	102-113%
- Biomass	MW	40	4 [5]	1,000%
- Small Hydro	MW	25	73 [5]	34%

[1] Excludes energy savings from Smart Grid program to be quantified in feasibility study and from Urban Infrastructure II project
[2] Includes 250-270 MW from RE program and 3888 MW from Smart Grid Program
[3] Ukraine CO_2 emissions in 2010 (MDB estimate); [4] Electricity Consumption in 2010 (IEA) Ukraine; [5] RE installed capacity in 2012 (MDB estimate)

Table 2: Proposed Reallocation of CTF Resources (US$ million)

CTF Program	CTF Funding (CTF Plan Endorsed March 2010)	CTF Funding Reallocation			CTF Funding (CTF Plan Revision February 2013)
		EBRD	IFC	IBRD	
Ukraine Renewable Energy Financing Facility	75	(+) 50	(+) 10 to 25		135-150
Improving Energy Efficiency	125		(-) 10 to 25	(+) 20 to 50	120-165
Smart Grids	50			(+) 0 to 30	50-80
Zero Emissions Power from the Gas Network	100	(-) 50		(-) 50	TBD
Total	350	0	0	0	350

Table 3: Ukraine CTF Plan Revision February 2013 - Indicative Financing Plan (US$ million)

Program	CTF	Co-financing				Total	PPG
		MDB	Ukraine Counterpart	Other Donors	Private Sector		
Ukraine Renewable Energy Financing Facility	135-150[1]	259		8	366	**768-783**	6
Improving Energy Efficiency	120-165[1]	760-910	105	100	25	**1,110-1,305**	7
Smart Grids	50-80	250-350	50		200 [2]	**550-680**	0.5
Zero Emissions Power from the Gas Network [3]	TBD	TBD	TBD			**TBD**	TBD
Total	**350** [4]	**1,269-1,519**	**155**	**108**	**591**	**2,473-2,723**	**13.5**

[1] Depending on market demand and speed of project development IFC may reallocate the remaining US$15 million of CTF funds to the Renewable Energy Financing Facility

[2] Around US$200 million is expected to be invested by the private sector into RE by 2018 and at least US$1000 million by 2030

[3] Project amounts, including CTF funding and co-financing, will be determined at a later stage

[4] Smart Grids and Energy Efficiency funds are mutually exclusive; hence total CTF allocation remains US$350 million (instead of US$320-380 million). This also constitutes the reason why the horizontal and vertical totals do not add up by the amount in question.

Table 4: Ukraine CTF Plan Revision February 2013 – Calendar of TFC and MDB Board Approvals

Program / Project Title	MDB	CTF Funding (US$ million)	2010 to Q1-2013	2013			2014	
				Q2	Q3	Q4	Q1	Q2
Program 1: Ukraine Renewable Energy Financing Facility								
- Ukraine Sustainable Energy Lending Facility I	EBRD	27.6	TFC, Board					
- Ukraine Sustainable Energy Lending Facility II	EBRD	30			TFC		Board	
- Renewable Energy II – Novoazovsk Wind Project	EBRD	20.7	TFC, Board					
- Large Wind Farm	EBRD	21.7			TFC	Board		
- Ukraine Renewable Energy Acceleration Project	IFC	35-50		TFC		Board		
Program 2: Improving Energy Efficiency								
- District Heating Energy Efficiency	EBRD	50			TFC	Board		
- District Heating Energy Efficiency	IBRD	50			TFC	Board		
- Urban Infrastructure II Project	IBRD	20-50 [1]					TFC	Board
- Energy Efficiency	IFC	0-15					TFC	Board
Program 3: Smart Grids								
- Ukraine Transmission	IBRD	50-80 [1]				TFC		Board
Program 4: Zero Emissions Power from the Gas Network								
- Ukraine Heat Recovery Steam Generators [2]	IBRD	TBD	TBD (after 2014)					
Total TFC Approval (US$ million)			48.3	35-50	151.7	50-80	20-65	0
Total TFC Approval (%, cumulative)			14%	24-28%	67-71%	81-94%	100%	100%

[1] Subject to outcome of feasibility studies for Smart Grids and Urban Infrastructure II program

[2] Project amounts, including CTF funding and co-financing, will be determined at a later stage

INTRODUCTION

This note updates on the implementation status and presents revisions to the original CTF Investment Plan of Ukraine, which was endorsed by the CTF Trust Fund Committee in March 2010. Specifically, this note provides an update of the status of project implementation under the original investment plan, proposes reallocation of funds within priority sectors, and assesses the impact of the proposed changes on achieving objectives and targets of the initial investment plan.

The original CTF Plan for Ukraine was developed to support the priority areas outlined in the Energy Strategy of Ukraine through a combination of renewable energy and energy efficiency programs. The CTF Plan for Ukraine proposed CTF co-financing for reducing risks and overall costs of investing in renewable energy, energy efficiency in residential and government buildings, district heating and industry, introduction of smart grid components in the transmission system, and zero emissions power generation from the gas network.

The selected activities for CTF co-financing included the following:

- *Program 1 - Ukraine Renewable Energy Financing Facility (EBRD, IFC)*: to address policy, finance, business, and information barriers to renewable energy market developments as well as direct financing to private sector of 100 MW of large-scale wind power capacity and 80 MW of medium-sized renewable sources;

- *Program 2 - Improving Energy Efficiency (EBRD, IBRD, IFC)*: an energy efficiency program targeting reconstruction and refurbishment of municipal and mixed ownership housing stock, upgrade of Government-owned buildings, decrease losses in district heating supply, and industrial energy efficiency;

- *Program 3 - Smart-grids (IBRD)*: strengthening of the management and control systems that would allow loss reduction through demand management and large-scale integration of intermittent renewable sources; and

- *Program 4 - Zero Emissions Power from the Gas Network (EBRD, IBRD)*: commercial-scale demonstration of zero-emissions power generation from waste heat recovered from compressors in Ukraine's gas network.

STATUS OF ORIGINAL INVESTMENT PLAN IMPLEMENTATION

The commitment of CTF funding under the CTF Plan for Ukraine has been slower than anticipated. As of February 2013, the Trust Fund Committee has committed US$50 million out of US$350 million originally endorsed for Ukraine.

Table 5: Financing Allocation and Status of Project Approvals (CTF Plan - Endorsed March 2010)

CTF Program / Project Title	TFC Approval Date	MDB Board Approval Date	CTF Funding (US$ million)	Leveraged Funding (US$ million)
Program 1: Ukraine Renewable Energy Financing Facility			**75** [1]	**330**
Renewable Energy Financing Facility (EBRD)				
- Ukraine Sustainable Energy Lending Facility	Sep-2010	Nov-2010	27.6	
- Renewable Energy II – Novoazovsk Wind Project	Jun-2012	Mar-2013	20.7	
Renewable Energy Financing Facility (IFC)				
- Ukraine Renewable Energy Acceleration Project	Q2-2013 (planned)	Q4-2013 (planned)	25	
Program 2: Improving Energy Efficiency			**125**	**925**
District Heating Energy Efficiency (EBRD)	Q3-2013 (planned)	Q4-2013 (planned)	50	
District Heating Energy Efficiency (IBRD)	Q3-2013 (planned)	Q4-2013 (planned)	50	
Energy Efficiency (IFC)	Q1-2014 (planned)	Q2-2014 (planned)	25	
Program 3: Smart Grids			**50**	**400**
Ukraine Power Transmission (IBRD)	Q4-2013 (planned)	Q2-2014 (planned)	50	
Program 4: Zero Emissions Power from the Gas Network			**100**	**600**
Zero Emissions Power from the Gas Network (EBRD)	TBD (after 2014)	TBD (after 2014)	50	
Ukraine Heat Recovery Steam Generators (IBRD)	TBD (after 2014)	TBD (after 2014)	50	

[1] US$50 million was allocated for EBRD. Of these, US$48.3 million was approved for two projects. The remaining balance of US$1.7 million CTF funds will be used for new projects proposed by EBRD under the Ukraine Renewable Energy Financing Facility program (CTF Plan Revision February 2013).

Program 1: Ukraine Renewable Energy Financing Facility (EBRD, IFC)

Description: The objective of the Renewable Energy Program is to help demonstrate that clean energy projects can be successful in Ukraine while helping to reduce risks for future investors and also addressing some of the early entrant barriers related to establishing precedents and reducing costs. This program has been allocated US$75 million of CTF resources and consists of three projects, two of them led by the EBRD and one by the IFC. The EBRD Ukraine Sustainable Energy Lending Facility (USELF) is aimed at providing finance to project developers that lack equity and cannot raise capital on a commercial basis for all renewable technologies and project volumes ranging from US$1 million to US$150 million. Another EBRD project is aimed at supporting the expansion of an existing Novoazovsky Wind Farm by 34 MW to 59 MW. The focus of the IFC program is to support a 50-70 MW wind project thought its Ukraine Renewable Acceleration Energy Project (U-REAP). This project is expected to require €24-25 million (approx. US$35 million)[1] of CTF funds, leveraged by up to €30 million (approx. US$42 million) IFC funds and up to €66 million (approx. US$92 million) private sector funds. Another US$1 million is expected to be used for advisory work related to developing the renewable energy sector

Rationale: While there are some components in the program that intend to support all types of renewable energy technologies, a major part of it is designed to specifically support the development of the wind industry in the country. Ukraine's wind sector is nascent but offers significant potential. 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. However, the private sector wind investment in the Ukrainian economy continues to face 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 unfavorable changes in market conditions for wind projects in neighboring countries have impacted project developers' risk-reward expectations and compounded perceived risks in wind investment in Ukraine.

The program aims to address these existing capital and market barriers by supporting the rapid development and construction of wind projects. The Novoazovsk wind farm and U-REAP projects will help establish a track record of wind projects in Ukraine and build confidence in the market for other projects to follow. The involvement of MBDs and other bilateral and multilateral institutions as leveraging partners for CTF funds is expected to provide confidence and information to other investors and commercial lenders to finance future wind projects thus substantial demonstrational and transformative impact on the sector.

Progress:

- Ukraine Sustainable Energy Lending Facility (USELF) - EBRD

The project was approved by the TFC in September 2010 and by the Board in November 2010. In April 2012 it signed the first subproject. Since then, another two subprojects were signed, and a total of US$8.4 million of the US$27.6 million volume was committed. The pipeline of the program was sufficient to ensure absorption of the remaining funds. Expected total investment by the end of the program has risen to US$164 million, from US$147 million expected when the program was approved. The expected

[1] The original CTF IFC allocation for this projected amounted to US$25 million. As discussed further in this document, following the GoU request, the IFC will seek to reallocate an additional US$10 million from its EE program to RE.

impact in terms of capacity installed has reduced however, from 115 MW financed to 60 MW financed. CO_2 emissions reductions expectation has also reduced, from 352.5ktCO_2/yr and 7mtCO_2 lifetime to 294ktCO_2/yr and about 6mtCO_2 lifetime. The reason for these reductions is primarily an overly optimistic initial assessment about the speed of market transformation in the renewables sector in Ukraine.

- Novoazovsk Wind Farm - EBRD

The project was approved by TFC in June 2012. At the time it was expected that it would close quickly. In September the supplier of the wind turbines, which had already been delivered, went bankrupt, eliminating all supplier warranties. This prevented the EBRD from moving ahead with signing the project. At the time of the CTP Plan Revision, a mitigation plan is awaiting approval by the EBRD. The project is EBRD Board approved, and signing is currently foreseen for Q3-2013.

- Ukraine Renewable Acceleration Energy Project (U-REAP) - IFC

IFC has been actively engaging with private sector project developers in the wind sector to get a sense of the most advanced and suitable projects to merit CTF support. The IFC team is under discussion with a couple of developers and expects to submit a program proposal for TFC approval by Q2-2013. In discussions with project developers, if IFC faces greater and more urgent need for RE project financing (relative to EE financing), then IFC will seek to reallocate more CTF funds to RE financing.

Program 2: Improving Energy Efficiency (EBRD, IBRD, IFC)

- **Improving Energy Efficiency (EBRD, IBRD)**

Description: The original objective of the Energy Efficiency program in Ukraine was to support EE measures in municipal and residential buildings as well as industrial and district heating sectors. In the Revision, the GoU has requested the IFIs to provide greater support to the DH and residential sectors because: (i) improving energy efficiency of these sectors are among the highest priorities of the GoU; (ii) the existing market and financial barriers for these sectors are greater than for the industrial sector; and (iii) they are of higher priority for social reasons.

The current objective of the Energy Efficiency program led by the IBRD and EBRD is to improve energy efficiency of selected Ukrainian District Heating (DH) utilities and increase their quality of service. Due to intervention in DH sector, the proposed Program is expected to facilitate the saving of 0.55-0.70 million tons of CO_2 emissions annually after the Program is fully implemented (by 2020) which will translate into 5.5-7 million tons by 2030. The Program includes the following components: (i) installing ITPs in buildings; and (ii) decreasing losses in DH networks. The EE program led by the IFC focuses on residential housing aiming at encouraging financial intermediaries (FIs) to develop appropriate energy efficiency lending programs (discussed below in more detail). The DH program led by the IBRD and EBRD has been allocated US$100 million of CTF resources, which is expected to be leveraged by US$655-755 million of IBRD, EBRD, state utilities, private sector, and other donors.

Rationale: Heat supply systems in Ukraine are predominantly based on district heating supplying mostly residential customers. It provides heating needs for roughly 60 percent of population and more than 65 percent of buildings in the country, while accounting for 20 percent of the CO2 emissions and 81 percent of the methane emissions from fossil fuel combustion in Ukraine. DH companies are typically organized as municipal enterprises, with some management independence, but heavily dependent on

the local administration, and there is only limited private sector involvement. Historically, DH in Ukraine has been heavily subsidized, which resulted in low energy efficiency of the sector as well as poor financial state of the utilities.

Due to poor financial viability, DH utilities have been unable to properly maintain their assets; because of poor creditworthiness and legislative constraints, utilities have not been able to raise capital for necessary investments as well. Because of lack of investments and improper maintenance over the last 25 years, DH systems are in poor state and in urgent need to modernization. Despite the need and understanding of their urgency, energy efficiency investments are not of the highest priority for DH utilities that have to deal with emergency repairs to guarantee minimal operation of the system and prevent its collapse. DH utilities and local authorities lack financial capacity to finance rehabilitation of the system entirely from their own resources; local banks perceive DH utilities as high risk clients because of poor performance with respect to profitability and cash flow and refuse to work with them.

It is expected that the CTF resources will be used for investments that otherwise would not have taken place because of lack of capacity of DH utilities and/or longer payback period. The CTF financing will be used to facilitate installation of individual heat substations, which are still novelty in Ukraine, and replacement of networks, which has long (20-25 years) payback period. The expected outcome of the program is to achieve critical mass by engaging with a sufficiently large number of utilities to enhance the demonstration effect of utility level reforms, particularly cost control and governance between city-utility.

Progress: Poor financial viability of utilities because below cost recovery tariffs, DH regulatory environment along with existing market conditions in the banking sector prevented the program from following the timeline presented in the original CTF plan. Recently, however, the process gained momentum with the establishment of the Utilities Regulator (the National Commission on the Regulation of the Communal Services) and greater attention to this sector from the Government. Most participating utilities have been already identified and preparation of feasibility study for the IBRD-led part of the program is expected to be launched in March 2013. This preparatory work has been combined with ongoing policy dialogue on tariff reforms with the main objective of improving the regulatory practices focused on achieving financial sustainability (opex and capex cost recovery from tariffs). As a part of this process, the Utilities Regulator has established a priority list of the 75 largest DH companies and aims to have their tariff calculated and approved by the end of the 2012-2013 heating season. To date, the Utilities Regulator has calculated tariffs for the 40 largest DH utilities that cover about 70% of heat market in Ukraine. The GoU expects to present both the IBRD- and EBRD-led projects for TFC approval in Q3-2013.

- **Improving Energy Efficiency (IFC)**

Description: The objective of this program is to encourage local financial intermediaries (FIs) to develop appropriate energy efficiency lending programs with a focus on residential housing. The program will address FI-related barriers (described below), provide technical assistance to local FIs to help mitigate their risk perceptions about EE/RE financing, and seek to deploy a risk sharing-type instrument using CTF funds as first-loss coverage to help underwrite the FI's early efforts in developing an EE/RE financing portfolio. IFC will seek to allocate US$15 million[2] towards the Ukraine Sustainable Energy Finance (U-

[2] The original IFC CTF allocation in for this project amounted to US$25 million. As discussed further in this document, the GoU proposes to reallocate US$10 million from the EE program towards RE program led by the IFC.

SEF) Program which is expected to be leveraged by up to US$60 million in IFC funds and up to US$25 million private sector funds.

Rationale: In 2007 the industrial sector accounted for 41 percent of total final energy consumption while the residential sector accounted for 28 percent, transportation 15 percent and commercial/public services 3 percent. Ukrainian businesses spend more on average on energy than other countries in the regional according to a 2010 energy efficiency survey conducted by IFC in six countries in the region (Source: Energy Efficiency: A New Resource for Sustainable Growth, IFC). About 19 percent of firms' production costs are spent on energy, and 30 percent of Ukrainian companies operate obsolete energy-intensive equipment that is over 15 years old. Similarly, the residential sector is the second largest consumer of energy and a key driver of GHG emissions. Ukraine's housing stock is generally old and sub-standard. While over two thirds of the country's 70,000 multifamily buildings require refurbishment, at least 80 percent of the refurbishment needs are related to either energy saving or energy supply and distribution.

Although Ukraine possesses significant potential for energy savings throughout its economy, it remains a largely unrealized potential due to a number of interrelated barriers including: (i) the absence of activities specifically targeted towards supporting EE efforts, and in particular the lack of a services market to support companies interested in using energy more efficiently such as ESCOs; (ii) lack of information on technologies; (iii) lack of awareness among private enterprises as to the economic benefits of EE; (iv) the absence of local financial institutions that act as promoters of investments in EE and which can carry out a thorough risk analysis of these financial products; (v) the existing residential regulatory environment does not allow for the transfer of heat savings into monetary cash flows to serve as collateral; (vi) the regulatory environment does not do enough to protect FIs when lending to residential housing associations; and (vii) current National Bank of Ukraine (NBU) regulations require higher reserves for banks wishing to lend to Condominium Associations.

Thus, CTF resources are needed to launch a coordinated effort which will require significant financial resources and know-how that are not currently mobilized in the market. These resources will be used to enable private FIs to gain practical experience and jump-start the development and deployment of appropriate financial instruments. CTF resources will also be used to raise awareness among energy end-users, develop technical capacity among energy service providers, and identify mechanisms for different market players to partner with FIs to expand sustainable energy finance in the country. And finally, CTF funds would be combined with IFC long term foreign currency financing can be used to smooth out and absorb shocks enabling commercial banks to eliminate this risk while pricing the financing at an acceptable level.

Progress: Discussions with local FIs Banks have shown a high degree of interest in participating in EE lending as long as certain risks and costs can be addressed. The IFC team is in the process of identifying potential partner FIs and anticipates being able to submit a program proposal for TFC approval by the end of Q1-2014. IFC is proceeding with caution because the banking sector in Ukraine is facing some challenges with few viable FI partners that could do EE financing. If IFC is not able to develop suitable EE projects by Q1-2013, IFC would propose to re-allocate the remaining funds towards the Ukraine Renewable Energy Financing Facility program.

Program 3: Smart Grids (IBRD)

Description: The program is designed to support the stated-owned power transmission operator UkrEnergo in its plan to expand and modernize transmission networks in general, and to facilitate the integration of growing electricity generation from renewable sources, in particular. The IBRD allocated US$50 million of CTF resources to the smart grid component of UkrEnergo's as part of much broader Power Transmission Project II (PTP II). The impact of the smart grid project on GHG reduction will be through increasing the integration of renewables (wind and solar) and reducing T&D losses thus meeting demand with lesser amount of fossil fuel generated electricity. Additional reductions in power losses are expected to come from the installation of a reactive power compensation device in the Crimea Power System 110-330 kV grid. It is expected that the project will facilitate the integration of around 3888 MW of renewable energy, which will result in 4.2mt of CO_2 emission reductions per year. The project is expected to reduce T&D losses from current levels of 16 percent to below 10 percent.[3]

Rationale: Ukraine is moving fast in terms of renewable energy deployment and its energy plan envisions further scale-up of renewable energy. To ensure that the current and future progress of clean technology development is not impeded by the transmission system constraints, the smart grid will be necessary to manage intermittency of wind and solar supply and allow for its greater integration. Apart from ensuring that carbon free energy is utilized to its fullest potential, the other impact would be the reduction of electricity demand through reduction of T&D losses, thus increasing GHG reductions. Overall, the smart grid program is a necessary component to complement the other CTF-sponsored programs in Renewable energy and Energy Efficiency.

Progress: The original timeline of the project preparation was delayed because of a slow start of the IBRD financed Power Transmission Project I (PTP I) approved in 2007. In 2011, the project gained momentum and is currently advanced enough to restart preparation of the PTP II, which includes Smart Grid component as part of the CTF financing blended with the main IBRD loan. In October 2012, the Ministry of Energy and Coal Industry and UkrEnergo made necessary steps to proceed with implementation of PTP II and requested support from the CTF to prepare the Feasibility Study for the Smart grid project. The US$0.5 million grant was approved by the TFC in October 2012 and a tender for selection of consultants to prepare the study was launched. Upon the completion of the Feasibility Study, Ukraine will proceed with official initiation of the Project. The tentative plan is to finalize and submit the request for financing of Smart Grid for TFC approval by the end of Q4-2013.

Program 4: Zero Emissions Power from the Gas Network (EBRD, IBRD)

Description: The program is designed to provide US$100 million of CTF funds shared in equal proportion between the EBRD and IBRD to introduce a zero emissions power generation technology from waste heat recovered from compressors in Ukraine's gas network.

Rationale: Ukraine's gas transit system (GTS), managed by Ukrtransgaz - a subsidiary of a state energy company- Naftogaz, has been in urgent need of upgrading and rehabilitation. It was expected that the GoU would launch an extensive gas network modernization program to reduce natural gas losses. This program per se would have been a substantial source of GHG reductions. However, if coupled with an installation of additional zero carbon technology that would capture exhaust gas/heat from compressors

[3] Energy and emissions savings from T&D losses reductions will be estimated in the Feasibility Study.

and convert it to electricity, it would provide an extra source of GHG reductions and energy saving for the country.

The application of such technologies is currently limited to few pilot projects. The associated costs and risks involved make this technology financially not viable without concessional financing. Over the long-term, this technology is expected to become economically more attractive in Ukraine and can be replicated to other countries that have substantial gas transmission network.

Progress: To date, the progress of this program has been stalled as Naftogaz has not been able to move forward with its GTS modernization plan. The replacement of the out-of-date gas compressors continues to be the national priority and the GoU would like to reserve an opportunity to seek additional financing for the GTS modernization component after 2014.[4]

As a result, the GoU proposes to reallocate US$50 million of EBRD CTF funds from this program to the Ukraine Renewable Energy Financing Facility program, where the funds can be utilized more effectively in the near term. Moreover, the GoU proposes to reallocate up to US$30 million of IBRD CTF funds available for this program to the Smart Grids program, depending on the results of the feasibility study. The remaining IBRD CTF funds (US$20-US$50 million) will be proposed by GoU for Urban Infrastructure II Project depending on results of feasibility study. GoU is reserving the opportunity to seek additional financing after 2014, when the GoU is ready to move forward with the GTS modernization project.

[4] The EBRD is proceeding with a loan which originally developed as a GTS emergency rehabilitation project; however, its technical characteristics do not qualify for CTF financing.

CIRCUMSTANCES AND RATIONALE FOR INVESTMENT PLAN REVISION

Ukraine is one of the top ten most energy intensive economies in the world[5]. It is also in the group of the twenty largest primary energy consuming nations. While the current level of GHG emissions is well below the 1990 levels, attributed largely to the steep economic downturn seen in the 1990s, the country has an immense potential to further reduce its carbon footprint through a combination of renewable energy and energy efficiency measures. Moreover, if the economic recovery experienced in the 2000s persists and deliberate actions to reduce energy intensity are not taken, Ukraine can return and surpass its 1990 level of GHG emissions.

To tap to this potential and to mitigate the challenges of energy security, the GoU has made strategic commitment to reduce energy intensity by 20 percent by 2015 and by 50 percent by 2030. The GoU has also set an ambitious target of achieving 6 GW of installed renewable energy capacity by 2030, or 10 percent of total installed capacity. The "Green Tariff" introduced in 2009 has already led to significant increase in wind and solar power generation over the last couple of years. As such, the total renewable-based installed generation capacity reached about 576 MW by end of 2012.

The renewable energy agenda outlined in the original CTF Plan for Ukraine has been largely successful. However, further support from the CTF is yet necessary to achieve market transformation in this area. Since most of the CTF funding allocated to the *Ukraine Renewable Energy Financing Facility program* has been committed, the GoU proposes the expansion of this program by reallocating CTF resources from other programs. Specifically, the GoU intends to reallocate CTF funding from the Energy Efficiency (US$10 million out of US$25 million of IFC's original allocation) and Zero Emissions Power from the Gas Network programs (US$50 million from EBRD original allocation).

Pursuing an aggressive renewable energy agenda underscores the urgency for investments in the transmission system modernization. The *Smart Grids program* proposed in the original CTF Plan for Ukraine is, therefore, vital to ensure integration of renewables to its fullest potential while maintaining reliability of supply. Based on the new evaluation prepared by the Ministry of Energy and Coal Industry, together with UkrEnergo, the GoU would like to seek additional resources for this program. Specifically, the GoU intends to expand the Smart Grids program by reallocating CTF resources from the Zero Emissions Power from the Gas Network program (up to US$30 million out of US$50 million IBRD's original allocation).

Increasing energy security through energy efficiency has been a strategic priority for the GoU. Unfortunately, the *Improving Energy Efficiency program* proposed in the original CTF Plan for Ukraine has evidenced limited progress, as existing conditions in the banking sector, coupled with low (subsidized) energy prices has dampened the availability of financing for energy efficiency projects in the municipal and residential sectors. In this context, the GoU requested the IFIs to provide greater support for the district heating (DH), municipal and residential sectors, as the challenges faced by these sectors are substantially higher than in the other sectors, including industry. If energy efficiency program in the residential sector led by IFC still faces significant challenges in early 2013, the GoU would propose to reallocate the remaining IFC funds under the EE platform in favor of greater support for renewable energy.

[5] Measured as amount of primary energy used to produce one unit of GDP (PPP). Source: IEA World Energy Statistics and Balances; World Development Indicators.

The EBRD and IBRD agree to tap into these resources to finance projects in the District Heating sector. The experience from the successful implementation of the CTF co-financed EBRD District Heating (DH) project in Kazakhstan may be considered for the effective financing of DH projects in Ukraine. Also, a series of changes over the last few years has improved the market conditions for pursuing the energy efficiency agenda in DH in Ukraine:

(a) Establishment of an independent DH regulator responsible for calculating cost recovery tariffs for DH residential customers;
(b) Adoption of a comprehensive energy efficiency master plan for municipal sector, with improvements of energy efficiency for DH;
(c) Invitation of the IMF to negotiate a new program, including DH and gas tariffs.

Even though the *Zero Emissions Power from the Gas Network program* has shown little progress, the modernization of the Gas Transmission Network (GTS) remains highly ranked on the GoU's agenda. The upgrade of the Ukrainian GTS is urgent as the majority of assets, which were built between 1950 and 1980, have either exceeded their operational lifetime or are close to reaching that point. The existing gas compressors operate at about 24 percent efficiency, while new equipment can be twice as efficient. Thus, investment in replacement of the gas compressors alone would provide an important reduction of GHG emissions; if coupled with installation of equipment to recover exhaust heat to produce zero emissions electricity, the CO_2 emissions reduction could reach 1.8 million tons/year or even higher. Despite this high technical potential, due to the current economic and structural barriers, the GoU proposes to reallocate the CTF funds envisioned for the Zero Emissions Power from the Gas Network program to other programs, while reserving an opportunity to seek CTF funding when the project is ready to move forward.

PROPOSED CHANGES TO THE INVESTMENT PLAN

The proposed changes below would allow the GoU to commit US$350 million of CTF funding by Q2-2014. As already indicated in this revision note, the areas of intervention of the original IP remain unchanged. However, the implementation of the Zero Emissions Power from the Gas Network is pushed back until after 2014 and a new project is proposed within the Improving Energy Efficiency program. To achieve objectives of the IP, the GoU proposes to reallocate CTF resources among existing programs as follows:

- **Program 1 - Ukraine Renewable Energy Financing Facility:** overall CTF allocation for this program increases from US$75 million to US$135-150 million.
    - 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. These funds will be used for scaling-up the Ukraine Sustainable Energy Lending Facility (USELF) and financing an additional 40MW of wind power production.
    - IFC's allocation increases from US$25 million to US$35-50 million, by reallocating US$10-25 million of CTF funding (out of US$25 million originally allocated) from the Improving Energy Efficiency program.

- **Program 2 – Improving Energy Efficiency:** overall CTF allocation for this program increases from US$125 million to US$120-165 million.
    - IBRD's allocation increases by US$20-50 million to be used for a new project to improve energy efficiency in water and wastewater infrastructure (UIP II) in addition to existing US$50 million earmarked for District Heating energy efficiency. (See Annex I for updated concept notes for these projects).
    - IFC's allocation decreases from US$25 million to US$15 million by reallocating CTF resources to the Ukraine Renewable Energy Financing Facility program. Moreover, if the challenges in the financial sector prevent a viable energy efficiency project by Q2-2013, the GoU would seek the reallocation of the remaining US$15 million of IFC's CTF resources to the Ukraine Renewable Energy Financing Facility program.

- **Program 3 - Smart Grids:** depending on the results of the feasibility study, the overall CTF allocation for this program may increase from US$50 million to up to US$80 million.
    - IBRD's allocation may increase from US$50 million to up to US$80 million by reallocating CTF resources from the Zero Emissions Power from the Gas Network program and will be leveraged by additional private financing coming into RE.

- **Program 4 - Zero Emissions Power from the Gas Network:** all US$100 million of CTF funds are reallocated to other programs. However, GoU would like to reserve the opportunity to discuss the inclusion of the GTS modernization project in the next phase of the CTF Plan for Ukraine.
    - EBRD's allocation of US$50 million is reallocated entirely to the Ukraine Renewable Energy Financing Facility.
    - IBRD's allocation of US$50 million is split between Energy Efficiency and Smart Grid programs. Up to US$30 million (exact amount is subject to the outcome of the feasibility study) of these funds is earmarked for the Smart Grid program, with the remaining funds proposed for the Energy Efficiency program.

Table 6: Proposed Reallocation of CTF Resources (US$ million)

CTF Program	CTF Funding (CTF Plan Endorsed March 2010)	CTF Funding Reallocation			CTF Funding (CTF Plan Revision February 2013)
		EBRD	IFC	IBRD	
Ukraine Renewable Energy Financing Facility	75	(+) 50	(+) 10 to 25		135-150
Improving Energy Efficiency	125		(-) 10 to 25	(+) 20 to 50	120-165
Smart Grids	50			(+) 0 to 30	50-80
Zero Emissions Power from the Gas Network	100	(-) 50		(-) 50	TBD
Total	350	0	0	0	350

Table 7: Financing Allocation and Status of Project Approvals (CTF Plan Revision February 2013)

CTF Program / Project Title	TFC Approval Date	MDB Board Approval Date	CTF Funding (US$ million) [1]	Leveraged Funding (US$ million) [2]
Program 1: Ukraine Renewable Energy Financing Facility			**135-150**	**633.5**
Renewable Energy Financing Facility (EBRD)				
- Ukraine Sustainable Energy Lending Facility I	Sep-2010	Nov-2010	27.6	67 (EBRD) 68 (Private) 8.5 (GEF)
- Ukraine Sustainable Energy Lending Facility II	Q3-2013 (planned)	Q1-2014 (planned)	30	70 (EBRD) 70 (Private)
- Renewable Energy II – Novoazovsk Wind Project	Jun-2012	Mar-2013	20.7	40 (EBRD) 68 (Private)
- Large Wind Farm	Q3-2013 (planned)	Q4-2013 (planned)	21.7	42 (EBRD) 80 (Private)
Ukraine Renewable Energy Acceleration Project (IFC)	Q2-2013 (planned)	Q4-2013 (planned)	35-50	40 (IFC) 80 (Private)
Program 2: Improving Energy Efficiency			**120-165**	**990-1140**
District Heating Energy Efficiency (EBRD)	Q3-2013 (planned)	Q4-2013 (planned)	50	200 (EBRD) 55 (Utilities) 60 (Other)

District Heating Energy Efficiency (IBRD)	Q3-2013 (planned)	Q4-2013 (planned)	50	250-350 (IBRD) 50 (Utilities) 40 (Other)
Urban Infrastructure II (IBRD)	Q1-2014 (planned)	Q2-2014 (planned)	20-50 [3]	250-300 (IBRD) TBD (Utilities)
Energy Efficiency (IFC)	Q1-2014 (planned)	Q2-2014 (planned)	0-15	60 (IFC) 25 (Private)
Program 3: Smart Grids			**50-80**	**600**
Ukraine Transmission (IBRD)	Q4-2013 (planned)	Q2-2014 (planned)	50-80 [3]	250-350 (IBRD) 50 (GoU) 200 [4] (Private)
Program 4: Zero Emissions Power from the Gas Network			**TBD**	**TBD**
Ukraine Heat Recovery Steam Generators (IBRD) [5]	TBD (after 2014)	TBD (after 2014)	TBD	TBD

[1] Based on CTF Plan for Ukraine endorsed in March 2010
[2] Based on latest estimates from MDBs
[3] Subject to outcome of feasibility studies for Smart Grids program
[4] Around US$200 million is expected to be invested by the private sector into RE by 2018 and at least US$1000 million by 2030
[5] Project amounts, including CTF funding and co-financing, will be determined at a later stage

Table 8: Ukraine CTF Plan Endorsed March 2010 – Indicative Financing Plan (US$ million)

Program	CTF			MDB			Ukraine Counterpart	Other donors	Private Sector	Total	PPG
	EBRD	IBRD	IFC	EBRD	IBRD	IFC					
Ukraine Renewable Energy Financing Facility	50		25	250		50			30	**405**	1
Energy Efficiency	50 [1]	50	25 [1]	200	250	25	250		200	**1,050**	1
Smart Grids		50			300		100			**450**	0.5
Zero Emissions Power from the Gas Network	50	50		250	250		100			**700**	0
Total	**150**	**150**	**50**	**700**	**800**	**75**					
	350			**1,575**			**450**	**0**	**230**	**2,605**	**2.5**

[1] Funds allocated for EBRD/IFC was US$37.5 million each in CTF Plan endorsed in March 2010. Reallocation of funds between EBRD and IFC was approved afterwards

Table 9: Ukraine CTF Plan Revision February 2013 – Indicative Financing Plan (US$ million)

Program	CTF			MDB			Ukraine Counterpart	Other donors	Private Sector	Total	PPG
	EBRD	IBRD	IFC	EBRD	IBRD	IFC					
Ukraine Renewable Energy Financing Facility	100		35-50 [1]	219		40		8	366	**768-783**	6
Energy Efficiency	50	70-100	0-15 [1]	200	500-650	60	105	100	25	**1,110-1,305**	7
Smart Grids		50-80			250-350		50		200 [2]	**550-680**	0.5
Zero Emissions Power from the Gas Network [3]	TBD	TBD		TBD	TBD		TBD			**TBD**	TBD
Total	**150**	**150**	**50**	**419**	**750-1000**	**100**					
	350 [4]			**1,269-1,519**			**155**	**108**	**591**	**2,473-2,723**	**13.5**

[1] Depending on market demand and speed of project development IFC may reallocate the remaining US$15 million of CTF funds to the Renewable Energy Financing Facility

[2] Around US$200 million is expected to be invested by the private sector into RE by 2018 and at least US$1000 million by 2030

[3] Project amounts, including CTF funding and co-financing, will be determined at a later stage

[4] Smart Grids and Energy Efficiency funds are mutually exclusive; hence total CTF allocation remains US$350 million (instead of US$320-380 million). This also constitutes the reason why the horizontal and vertical totals do not add up by the amount in question

POTENTIAL IMPACTS OF PROPOSED CHANGES ON INVESTMENT PLAN OBJECTIVES

The overall impact expected from the proposed CTF Plan Revision is comparable to the impact expected in the original CTF Plan. However, demonstrational and transformational effects in RE and DH sectors are considered larger than originally envisioned. Table 10 compares impacts of both CTF Plans.

Table 10: Assessment of Proposed Changes

CTF Investment Criteria	CTF Plan (Endorsed March 2010)	CTF Plan (Revision February 2013)
Transformational Impact	Programs in RE & EE intend to create enabling environment for future clean energy projects, reducing risks, removing barriers, and encouraging greater private sector participation in the nascent industry of clean energy investments in the country.	In the light of proposed increased financing of US$60 million to RE program, resulting in 260 MW of installed capacity as opposed to 180 MW as originally planned, and the Smart Grid project expected to facilitate integration of 3888 MW, the transformational impact in the RE industry is expected to be greater under the revised plan. On the EE side, the more targeted concentration of funds on the DH sector is expected to bring significant demonstration and transformation effect to the municipal sector.
Potential for GHG Emissions Savings	Proposed interventions target sectors with highest margin of CO_2 emissions, with the emissions savings potential of the original IP estimated at **5.7mtCO_2e/yr** (RE--0.7mtCO_2e/yr, EE--3.2mtCO_2e/yr, Gas Network --1.8mtCO_2e/yr, savings from the smart grid component were not quantified).	The overall direct CO_2 reduction potential of the revised IP is estimated at **6.4-6.8mtCO_2e/yr** (RE--1.0mtCO_2e/yr, EE--1.1-1.6mtCO_2e/yr, Smart Grid--4.3mtCO_2e/yr), equivalent to about 2% of Ukraine's annual emissions in 2010.
Cost-effectiveness	Cost-effectiveness was not estimated at the plan level. Cost-effectiveness for individual programs assumed lifetime of 20 years: RE -- 4.7$/t$CO_2$, EE -- 2.0$/tCO_2 and gas network at 2.8$/t$CO_2$. Cost-effectiveness not provided for Smart Grids program,	Cost-effectiveness of the revised plan is estimated at **2.6-2.8$/t$CO_2$** (RE –6.9$/tCO_2, EE – 5.2-7.3$/t$CO_2$, Smart Grid -- 0.6-0.9$/tCO_2). More conservative assumptions in the RE and EE components result in reduced cost-effectiveness for these programs as compared with

	as CO_2 savings were not quantified.	original plan.
Demonstration Potential at Scale	The CTF Plan envisions systemic approach to the energy sector, targeting the most promising and currently most vulnerable areas. All proposed programs have potential to be applied at scale to similar sectors in other parts of the country.	Higher impact expected from stronger focus on areas with larger demonstration and transformation potential such as RE and DH sectors.
Development Impact	The CTF Plan is expected to have substantial impact on development via reduction of energy demand through EE demand and supply-side measures, increase in energy security, savings of foreign currency by decreasing reliance on energy imports, displacement of some coal power generation, creation of jobs, as well as other environmental and health co-benefits as a result of expected lower GHG emissions.	The development impact of the revised plan is expected to have similar results as the original plan.
Implementation Potential	Even though at the moment of CTF Plan preparation Ukraine lacked any experience in implementation of much of the proposed programs, it was considered that the implementation potential was sufficient as the GoU had clear energy strategy and established policies framework supporting clean technologies development.	Implementation potential is higher than in the original plan due to greater focus of investments in EE, more advanced dialogue and improvements in the regulatory environment (particularly relevant to DH and RE sectors), and TA work carried out under RE program.
CTF Additionality	The CTF financing is an enabling factor for projects to materialize. Investor confidence and private sector participation in clean technology development in Ukraine is low since none of the clean energy projects was tested on the ground.	CTF financing remains essential factor for the projects to happen. It also remains crucial to facilitate private sector engagement in RE and Smart Grid investments.

All projects are not expected to offer gender-specific benefits; consumers of different genders are equally expected to benefit from improved quality of DH services, better efficiency of energy consumption, improved comfort levels in their homes and reduced CO_2 emissions. If specific gender

impacts are detected during subprojects preparation, additional analysis would be done to evaluate those.

The **Overall Risk After Mitigation** for the proposed CTF Plan is considered **moderate** and remains unchanged from the original plan. The main risks are identified and mitigation measures discussed in Table 11 below.

Table 11: Risks and Mitigation Measures

Risk	Mitigation Measure	Residual Risk
Macroeconomic framework	Despite steady improvements in macroeconomic situation, Ukraine economic recovery remains fragile. Downside risks to the economy remain considerable, in particular on the fiscal side. While Ukraine does not face immediate fiscal and external financing difficulties, there is a risk to medium-term macro sustainability and growth if deep fiscal, structural and governance reforms needed to sustain recovery are not implemented. As before, the donor community (the IBRD, IMF, EC and EBRD) will agree to jointly proceed on several priority policy measures that would help the Government address critical policy gaps while sustaining their commitment to reform.	High
Country engagement with the IFIs	All IFIs are closely engaged with the GoU on energy policies and program issues. The IBRD's Country Partnership Strategy is with agreement with the Government's development plan. EBRD and IFC have strong relationship with the GoU and the private sector, and their strategies are fully aligned with government priorities. The IFIs will maintain strong dialogue on issues pertaining to the achievement of the CTF objectives.	Low
Country governance	In the light of continuous political tensions and a certain level of turbulence seen over the last decade, the country governance risk to substantially undermine the CTF-funded activities is considered moderate. However, engaging in continuous dialogue and consensus between donors and the Government is expected to mitigate this risk if it occurs.	Moderate
Systemic corruption	Despite various measures to address systemic corruption, it remains a pervasive problem across all sectors. Close supervision and adherence to the IFIs procurement procedures represent the best measures to address it for the CTF-funded projects.	High
Sector policies and institutions	The growing energy bill and energy security concerns put EE and RE measures on top of the Government's agenda. Gas and DH tariffs remain below cost recovery levels. The GoU has an elaborate energy strategy to 2030 already in place, which is currently undergoing a planned Revision, with the priority areas closely aligned with the CTF intervention areas. The GoU has implemented RE policies framework and feed-in-tariff (FiTs), but there are certain concerns with the sustainability of the established FiTs levels. Utilities market regulator has been established and estimation of utilities-level cost recovery	Moderate

	tariffs is underway. Gas and DH tariffs remain a focal point of the IMF program that is being negotiated. It is unlikely that the priorities change. Continuous dialogue and technical assistance from donor community (the IBRD, USAID, E5P) will continue addressing sector issues.	
Implementing agencies	Local capacity to build and operate small-hydro and wind power facilities, and implement EE projects including building retrofits and construction has been demonstrated. DH utilities have high technical skills. The skills of the domestic financial sector to assess and supervise RE projects through financial assessment of activities are emerging. The decentralized nature and smaller size of RE and EE interventions mitigate impacts on energy sector performance due to possible delays or failures of individual projects. Technical assistance and external expertise will be sourced to support assessment of EE and RE opportunities, as well as Smart Grid development.	Moderate
Technology	CTF will utilize commercially available wind, biomass, and EE technologies that have already been proven in the country. CTF will also utilize technologies with a proven track record outside Ukraine such as Smart Grid and building-level individual heat substations for DH projects.	Moderate
Safeguards	IBRD/IFC/EBRD safeguard policies will apply to all interventions. Many implementing agencies have experience applying these policies through previous and ongoing engagements with IFIs. Moreover, the GoU has its own fairly robust and established safeguard policies and mechanisms.	Moderate
Overall risk after mitigation	**Moderate**	

MONITORING AND EVALUATION

Table 12 below presents the summary of the expected Results Indicators and their target values, comparing the expected results of the original and revised plans. For each project, the monitoring and evaluation will be carried out by the implementing agency (described below) as part of the monitoring process for the entire project, including co-financing and other contributions.

The GoU has assigned the State Environmental Investment Agency (SEIA) to coordinate the implementation of the CTF Plan and facilitate the exchange of information among the ministries responsible for projects preparation and implementation. The nominated Agency will consolidate results indicators into the CTF results framework, measuring the output, outcome and impact of the projects using the indicators specified in the table below.

Table 12: Results Framework

Results Indicator	**Target Value** (CTF Plan Endorsed March 2010)	**Target Value** (CTF Plan Revision February 2013)
Co-financing of CTF funding (US$ million)	2,255	2,123-2,373
- Public	2,025	1,532-1,782
- Private	230	591
GHG Emissions Savings ($mtCO_2e$/year)	5.7	6.4-6.8 [4]
Energy Savings (GWh/year)	n/a [1]	1,400-1,630 [5]
RE Installed Capacity (MW)	530 [2]	4,138 – 4,148 [6]
CTF Cost Effectiveness (CTF US$/$tCO_2e$ reduction over 20 years)	n/a [3]	2.6-2.8

[1] Energy savings were not quantified
[2] Includes 180 MW from the RE program and 350 from the Zero Emissions Power from Gas Network
[3] Cost-effectiveness was not quantified at the plan-level
[4] Includes emissions savings from of the Smart Grids program estimated at 4.3$mtCO_2e$/year resulting from expected integration of 3888 MW of renewable energy. This amount, however, excludes the savings from T&D losses reduction which will be assessed in the feasibility study
[5] Excludes energy savings from T&D losses reductions in the Smart Grid program, which will be quantified during the feasibility study, and the savings from UIP project which will be quantified at a later stage
[6] Includes 250-270 MW from the RE program and 3888 MW from the Smart Grid program

ANNEX I: REVISIOND PROGRAMS CONCEPT NOTES

Program 1: Ukraine Renewable Energy Financing Facility

- Ukraine Renewable Energy Acceleration Project (IFC)

Problem Statement: Private sector investments in the Renewable Energy (RE) sector in Ukraine faces a number of interrelated barriers including: (i) limited awareness in the banking sector about the real potential of RE projects, which leads to (ii) lack of experience in evaluating RE projects, resulting in (iii) lack of access to long-term financing; and (iv) limited experience in RE development by sponsors in Ukraine. These barriers are exacerbated by the fact that RE projects typically suffer some diseconomies of scale, higher development and initial capital cost, and higher initial cost of power production.

Proposed Transformation: IFC's Ukraine Renewable Energy Program will focus on the wind sector to complement the Novoazovsk II Wind Farm 34 MW, financed by EBRD and CTF, thus creating a larger track record of wind power investments in the country. The program will finance roughly 50-70 MW of wind power which will create a 'critical mass' of wind power project financing in Ukraine and provide confidence in the market for other projects to follow thus having a substantial demonstrational and transformative impact on the sector.

Implementation Readiness: IFC aims to target and apply CTF funds to support 1-2 private sector RE projects, primarily in wind power. IFC's RE program will seek to retain flexibility (in terms of approach, project selection, and application of CTF funds) in structuring the best way to accelerate the implementation of these renewable energy investments with minimum concessionality on a project-by-project basis. The key risks of limited experience in wind development by sponsors in Ukraine and the perception of payment risk related to the Green Energy Tariff continue to be a problem. IFC intends to design its RE program to address these risks and expected to present proposals to the Trust Fund Committee approval by Q2-2013.

Rationale for CTF Financing: Although, wind power is commercially proven in most places, it cannot compete with the lowest-cost forms of thermal power generation. Pioneer grid-scale projects in wind face higher costs and higher risks associated with first movers and concessional finance can help address these issues. For example, CTF funds blended with other commercial financing can provide a material concession to the overall financing package that will improve the risk-reward profile on a project so that it becomes attractive to first movers in the market.

Results Framework:

Results Indicator	**Target Value** (CTF Plan Endorsed March 2010)	**Target Value** (CTF Plan Revision February 2013)
Co-financing of CTF funding (US$ million)	80	120
GHG Emissions Savings (tCO_2e/year)	233,500	173,000
RE Installed Capacity (MW)	32	50-70
CTF Cost Effectiveness (CTF US$/$tCO_2e$ reduction over 20 years)	5.4	10.1

Financing Plan:

Financing Source	Amount (US$ million)
CTF	35
IFC	40
Private Sector [1]	80
Total	155

[1] Sponsor, commercial bank and other co-financing

Project Preparation Timetable:

Milestone	Date
TFC Approval	Q2-2013
Board Approval	Q4-2013

- Renewable Energy Financing Facility (EBRD)

Problem Statement: Ukraine has significant renewable energy potential, ranging from wind and small hydro to geothermal and biomass. Realizing the importance of these resources to address energy security as well as other environmental issues, the GoU established a political framework and a favourable Green tariff to encourage investments into clean energy. Despite these efforts, however, the renewable energy resources remain largely untapped. The EBRD RE program in Ukraine is aimed at private sector renewable energy developers with projects across all renewable technologies and project volumes ranging from US$1 million to US$150 million.

Proposed Transformation: The program is designed as a financing instrument in support of successful policy dialogue by the MDBs, led by the EBRD, with the Government of Ukraine on renewable energy support policies. Its aim is to provide finance to project developers who lack equity, and cannot raise finance on a commercial basis. Through this offer, it is expected to create a cohort of first-mover renewable energy projects in Ukraine, which in turn will make the sector more attractive to commercial co-financing, due to the reduction of perceived risk. It is also expected that the developers who are being supported by the program will continue to develop new renewable energy projects, either together with the MDBs, or independently of them.

Implementation Readiness: The implementation readiness of renewable energy projects has improved compared to the original plan, due to the substantial work that was undertaken under the EBRD USELF.

Rationale for CTF Financing: The market remains nascent, and financing support remains difficult to access. CTF support is required to bridge capital gaps, but in line with the principle of least concessionality under which CTF funds are provided, the funds are expected to be deployed at near-commercial rates, with future projects further tightening the remaining spread between CTF and EBRD finance.

Results Framework:

Results Indicator	**Target Value** (CTF Plan Endorsed March 2010)	**Target Value** (CTF Plan Revision February 2013)
Co-financing of CTF funding (US$ million)	250	495
GHG Emissions Savings (tCO_2e/year)	466,500	800,000
RE Installed Capacity (MW)	148	200
CTF Cost Effectiveness (CTF US$/$CO_2e$ reduction over 20 years)	5.4	6.3

Financing Plan:

Financing Source	**Amount** (US$ million)
CTF	100
EBRD	219
Sponsors	286
Other Donors	8.5
Total	613.5

Project Preparation Timetable:

Milestone	**Date**
TFC Approval	
- Ukraine Sustainable Energy Lending Facility I	Sep-2010 (approved)
- Ukraine Sustainable Energy Lending Facility II	Q3-2013
- Renewable Energy II – Novoazovsk Wind Project	Jun-2012 (approved)
- Large Wind Farm	Q3-2013
Sub-project Approval under Ukraine Sustainable Energy Lending Facility II	
- First Sub-Project Signed	Q1-2014
- Final Sub-Project Signed	Q4-2015

Program 2: Improving Energy Efficiency

- District Heating Energy Efficiency (IBRD, EBRD)

Problem Statement: Ukraine is among the most energy intensive economies in the world. Ukraine's energy intensity[6] exceeds that of Germany by a factor of 3.7 (0.44 kg of oil equivalent in Ukraine vs. 0.12 kg in Germany) and more than double that of the EU-12 countries. The only countries in the Europe and Central Asia (ECA) region with more energy intensive economies are Turkmenistan and Uzbekistan. Such high energy intensity is attributable, in part, to historically low energy prices, especially for natural gas, which biased the incentives in favor of inefficient and energy intensive technologies. As a result, the Ukrainian industrial sector is labor and energy intensive. Similarly, district heating is also labor and energy-intensive and was designed based on low-cost gas.

GoU calls for more than a 50% reduction in energy intensity by 2030, corresponding to energy savings of 223 million ton of oil equivalent (MTOE). About 38% of the savings (85 MTOE) would come from structural changes, as the economy shifts away from heavy industry to more service-oriented sectors, and the rest would primarily come from technical improvements in industries and buildings. To achieve this target it is estimated that about US$20 billion needs to be invested in energy efficiency.

District heating (DH) is the key element of energy consumption in Ukraine: DH companies are the third biggest consumers of natural gas in the country (after population and industry); practically all buildings in cities and towns are connected to DH networks. DH Accounts for 20% of the CO_2 emissions and 81% of the methane emissions from fossil fuel combustion in Ukraine. 77,400 high rise buildings consume 44% of the country's heat energy resources. DH Companies are typically organized as municipal enterprises, with some management independence, but heavily dependent on the local administration, and there is only limited private sector involvement.

Historically, DH in Ukraine has been heavily subsidized, which resulted in poor energy efficiency of the sector. For example, the average import gas price Ukraine paid in 2012 was US$425 per thousand cubic meters (tcm). DH companies paid about 20% of import price (US$93/tcm, excluding VAT + delivery charges) for gas used to produce residential heat. As a result, actual average financial cost of heat production in Ukraine in 2012 was about US$40 per Gcal, which is about 50% below that of Western Europe and many countries in Eastern Europe.

Moreover, existing district heating tariffs are subsidized and cover on average about 60% of total current financial heat production cost and are much lower than district heating prices in other countries. Low district heating prices is a pervasive problem that negatively impacts much of the energy sector. As a result of low DH tariffs, DH companies are financially constrained and pay about 60% of their gas bill. They do not have funds to implement necessary investments and maintain the system in decent condition to provide good service quality. About 60% of heat is lost: 22% in production, 25% in networks, 5 % at heat exchangers and 30% during end-use[7]. Due to a protracted lack on investment over the past 25 years, the system is in urgent need of rehabilitation. Because of poor financial state, DH

[6] Energy intensity is measured herein as kilogram of oil equivalent of energy use per constant PPP GDP. Energy use refers to use of primary energy before transformation to other end-use fuels. PPP GDP is gross domestic product converted to 2005 constant international dollars using purchasing power parity rates.

[7] Ukraine Energy Policy Review, IEA, 2006

companies cannot borrow from local banks for investment projects to improve their efficiency and quality of service.

Deferred maintenance and lack of funds for investment in turn lead to higher-than-necessary operating costs. Maintenance and investments are carried out on an *ad hoc* basis to deal with emergency situations rather than in a planned manner designed to reduce operating costs. The common use of two-pipe technology, with direct supply from the boiler-house to consumers or four-pipe connection through group substations (CTP's) leads to higher losses, lower quality and of service and higher CO_2 emissions than more modern systems based on building level substations (ITP's).

The vast experience from Central and Eastern Europe demonstrates high economic impacts of modernizing the DH systems. In particular, those investments made on the supply and demand side have provided the highest economic returns of all investment components. The main investment component on the supply side is modernization of the networks (replacement of old pipes with pre-insulated pipes) and installation of the individual building-level heat substations, ITP, with automatic temperature control and heat metering facilities.

Proposed Transformation: The objective of the Program is to improve energy efficiency of selected Ukrainian DH utilities, increase their quality of service and decrease CO_2 emissions from DH sector. The Program would include the following components: (i) installing ITPs in buildings; and (2) decreasing losses in DH networks. Due to intervention in DH sector, the proposed Program is expected to facilitate the saving of 0.55-0.7 million tons of CO_2 emissions annually after the Program is fully implemented (by 2020) which will translate into 5.5-7 million tons by 2030.

The Program aims to achieve critical mass by engaging with a sufficiently large number of utilities to enhance the demonstration effect of utility level reforms, particularly cost control and governance between city-utility. This is combined with policy dialogue on tariff reforms with the main objective of improving the regulatory practices focused on achieving financial sustainability (opex and capex cost recovery from tariffs). Based on current operating conditions and performance of the DH utilities that will participate in the Program, the modernization of the DH systems within the context of the Program would generate an emission reduction of around 10-15% relative to the situation at the start of the Program. Expanding credit support of international financial institutions to DH energy efficiency investments could help Ukraine reap substantially larger energy-savings benefits in much shorter time that what could be achieved with currently available capital.

The proposed Program would be transformative because (i) it would transform existing DH systems in participating utilities from obsolete and inefficient four-pipe systems (with group substations consumer connections) into modern two-pipe systems (with building level heat substations consumer connections); (ii) would create huge demonstration effect of utility-level reforms; and (iii) it would approach the market for municipal services at a point where the market can develop a lower "carbon trajectory" that it would otherwise, avoiding substantial emissions for a long period in the future.

Implementation Readiness: Heat production, transmission and distribution in Ukraine used to be locally regulated. In July 2010, the Parliament of Ukraine passed a law on the State Regulation in the Area of Communal Services in Ukraine. In July 2011, the President of Ukraine signed a decree creating NCRCS – the National Commission on the Regulation of the Communal Services (district heating and water supply sectors); the Law on Heat Supply was amended accordingly. The newly created utilities market regulator issues licenses, controls the licensees and approves tariffs for DH companies that operate

boiler houses with a total capacity of over 20 Gcal/h, or about 270 DH companies that produce about 70 per cent of the total heat in Ukraine. The regulator has established a priority list of the 75 largest DH companies and aims to have their tariff calculated and approved by the end of the 2012-2013 heating season. So far the regulator has calculated tariffs for the 40 largest DH utilities that cover about 70% of heat market in Ukraine.

The Law on State Regulation of Communal Services provides that tariffs for communal services need to cover economically justifiable costs and planned profit. Recent amendments to the Law on Heat Supply allow DH companies to develop investment programs to be agreed with the regulator and the Ministry of Regional Development. Expenses for investment programs need to be included in the tariff. DH companies and the regulator are in the process of exchanging and analysing data to calculate DH tariffs and agree on investment programs. So far investment programs have been approved for several largest utilities.

In May 2012, the Government approved a master plan to improve energy efficiency measures in the district heating sector based on a combination of cost-recovery tariffs, a large scale investment program in energy efficiency measures starting but not limited to building-level heat substations, and reforms of the social safety net to protect vulnerable consumers. The donor community, including the IBRD, EBRD and USAID, is assisting with implementation of this master plan through an ongoing policy dialogue on DH tariff regulation and social safety nets. Moreover, IMF is currently in the process of discussion of a new program in Ukraine. Increased gas prices and DH tariffs are the main part of the proposed program.

Energy pricing reforms alone will create a considerable incentive for changes in attitude to energy efficiency, some of which are already visible. Public consultations held by the IBRD in 2011 showed growing awareness on behalf of consumers of necessity of energy tariff increases, importance of energy conservation and need for urgent implementation of demand-side and supply-side energy efficiency measures. There is also huge demand from DH utilities to invest in modernization of the DH systems and improving their energy efficiency and quality of service. The CTF program would assist with implementing vital investments in the sector and help DH utilities and consumers address some of the pressing energy efficiency concerns.

Rationale for CTF Financing: Investments in energy efficiency can be financed entirely on the basis of the saved energy, and capital costs can be typically recovered in 5-10 years. Lessons learned from energy efficiency lending elsewhere has shown that, despite attractive returns, market penetration has been limited due to barriers. Experience has shown that subsidies are required to overcome these barriers.

Because of poor financial state and legislative constraints, DH utilities have been unable to raise capital for energy efficiency improvements at the local market. Moreover, despite the need and understanding of their urgency, energy efficiency investments are not of the highest priority for DH utilities that have to deal with emergency repairs to guarantee minimal operation of the system and prevent its collapse. Despite the need for substantial level of rehabilitation of the DH systems, very little progress has been achieved so far, in part because municipal and central governments lack funds to support a significant renovation program, and there is only limited private sector involvement. DH utilities and local authorities lack financial capacity to finance rehabilitation of the system entirely from their own resources; local banks perceive DH utilities as high risk clients because of poor performance with respect to profitability and cash flow and refuse to work with them.

It is expected that the primary modality for DH energy efficiency support would be through utilities, drawing on lessons learned from successes in other countries. Working directly with utilities helps ensure their capacity building and guarantee that projects are developed in a sustainable way; it also would allow improving their financial discipline and build up their credit rating which would allow them to consequently transition out of the concessional financing to working with local banks. The IBRD and EBRD have experience of working with utilities in other Eastern European countries that can be built upon. The CTF funds will be used to enhance the scope of the Program, and will be deployed quickly. The CTF funds will enhance investments that otherwise would not have been undertaken because of lack of capital, low capacity and/ or longer payback period. The CTF financing will be used to facilitate installation of individual heat substations, which are still novelty in Ukraine, and replacement of networks, which has long (20-25 years) payback period.

Results Framework:

District Heating Energy Efficiency Program	**CTF Plan Endorsed March 2010**			**CTF Plan Revision February 2013** (including actuals for projects under Implementation by EBRD)			
	GHG Emissions Savings ($tCO2e/yr$)[1]	Energy Savings[2]	Co-financing of CTF funding (US$ million) [3]	GHG Emissions Savings ($tCO2e$/year)	Energy Savings/year	Co-financing of CTF funding (US$ million)	CTF Cost Effectiveness (US$/$tCO_2e$)
EBRD	n/a	n/a	370	250,000	40 mln cm gas eq 23 GWh electricity 0.5 mln m3 H20	315	10.0
IBRD	n.a	n.a	370	300,000 - 450,000	50-70 mln cm gas eq 29-40 GWh electricity 0.6-0.9 mln m^3 H20	340-440	5.6-8.3

[1] GHG savings were quantified at the program level, including district heating, industrial, and residential sectors

[2] Energy savings were not calculated

[3] Breakdown not provided, but assumed based on MDB share of total allocation under Improving Energy Efficiency program.

Financing Plan: The major share of financing is expected to become available from EBRD, the IBRD, and CTF concessional financing. Additional support will be sought from E5P grant fund facility, managed by EBRD. The significant volume of energy efficiency within the financing plan is grounded in (i) the potential of energy efficiency in the Ukrainian DH sector; and (ii) the importance of utilizing significant volumes in order to achieve a sustainable market transformation in the DH sector.

Additional to the investment and Program preparation elements, technical assistance from other donors is being separately identified. GoU reserves an opportunity to discuss the additional funds for DH energy efficiency program in the next phase of the CTF Plan for Ukraine.

Financing Source	Amount (US$ million)		Total (US$ million)
	IBRD	EBRD	
CTF	50	50	100
MBDs	250-350 [1]	200	450-550
Utilities	50	55	105
Others	40	60	100
Total	**390-490**	**365**	**755-855**

[1] Subject to the results of the feasibility studies and borrowing capacity of the utilities

Program Preparation Timetable:

EBRD

Milestone	Date
TFC Approval	Q3-2013
First Sub-project Signed	Q1-2014
All Sub-projects Signed	Q4-2015

IBRD

Milestone	Date
TFC Approval	Q3-2013
Board Approval	Q4-2013
Implementation	Q1-2014 to Q1-2019

- Urban Infrastructure II Project (IBRD)

Problem Statement: Ukraine has the most developed water and wastewater infrastructure among the countries of the former Soviet Union. Nonetheless, the municipal services sector in Ukraine suffers from decades of underinvestment and poor maintenance, which requires significant investment. Investment needs for upgrading the network are higher than what can be mobilized by utilities, consumers and local government. An estimated US$ 5.5-8 billion are needed to bring the water and sanitation system to operational safety and total of US$ 30-35 billion will be required to achieve international services standards. This translates into a minimum need to replace 35% of water mains and repair 31% of the sewer network. These direct investment needs are exacerbated by the overall high-energy consumption in water production and wastewater treatment.

The Government of Ukraine (GoU) recently highlighted the considerable potential to improve energy efficiency through the municipal services sector, including water, wastewater and solid waste.

In order to address both pressing issues, UIP2 and CTF projects would focus on targeted investments to increase energy efficiency in the municipal services sector. The closely aligned project will enable better investment planning by utilities that will replace the current ad hoc nature of investments that respond only to emergency needs rather than long term operations.

Proposed Transformation: The proposed project's development objective is to simultaneously improve the quality and efficiency of municipal services and reduce pollution in the project target areas.

The objective will be achieved by (i) development of national water, sanitation and solid waste strategies; (ii) rehabilitation/ construction of wastewater and sludge treatment facilities; (iii) rehabilitation/ construction of water supply systems and (iv) implementation of a solid waste management activity.

The initial CTF investment coupled with the IBRD project will enable several utilities to achieve improved fiscal capacity and operations. Expected transformations include (i) improved operating standards; (ii) implementation of national regulatory reform; (ii) demonstrated fiscal benefit of improving the energy efficiency to local utilities; and (iii) avoiding future emissions.

Implementation Readiness: The establishment of the National Regulatory Commission for Communal Services in 2011 made substantial changes to the governance structure of municipal services and is expected to improve financial operations. Cost recovery is expected to increase through centralized tariff setting, thus limiting the influence of local political actors. The National Regulatory Commission will also establish national service standards, utility governance and reporting requirements. This coordination is expected to include energy audits and long term financial planning.

The GoU also demonstrated interest in the sector through both UIP and request for financing UIP2. The municipal services sector was recognized as an important area for scaling up investment. The successful implementation of UIP and request for a follow up project is clear indication of GoU priorities and readiness.

Furthermore, several municipalities have already submitted plans for implementing utility investments and energy efficiency improvements. Six sub-projects in Kyiv, Kharkiv, Zhytomyr, Ternopil, Kirovograd and Kramatorsk have noticeable potential for Green House Gas (GHG) emissions reduction with potential in improving energy efficiency by at least 15% with relatively short pay-back. Several municipalities have already submitted investment plans for specific interventions, which would fall under the CTF project components. There is clear demand for additional funds to complete investment plans and a growing interest in reducing energy costs by increasing energy efficiency.

Rationale for CTF Financing: The CTF project compliments UIP2 to maximize energy efficiency gains and demonstrate potential savings. Both projects will address the efficiency of water, wastewater and solid waste infrastructure in several Ukrainian municipalities. Yet, the CTF project is crucial to meeting demands for increased energy efficiency by providing funding to components which will not be available under UIP2. In addition, CTF funding is necessary because water utilities do not consider these investments a priority, due to urgent repair and maintenance needs. Unless immediate intervention is taken to mitigate the situation in preselected utilities, the amount of required investments will swell progressively in the coming years with environmental and energy-related risks increasing dramatically. Hence, CTF funds would finance investment that otherwise would not have been immediately undertaken thus enhancing the project. UIP2 will address some of the urgent needs thus alleviating some of the pressure on municipalities to respond to growing maintenance and investment issues. In combination both investments will improve the efficiency of the sector as well as the long term financial viability. The future implication is that municipalities will have fiscal capacity and social capital to make additional investments in energy efficiency, without funding from IFIs.

Results Framework: Although, the specific investment program is being developed there are likely to be large energy and CO2 savings. At this time we are not able to estimate a specific range for energy savings. On the other hand for CO2 savings we can make a better estimate based on proposal from two cities, Kharkiv and Kyiv. In Kharkiv, they have proposed both landfill gas capture and sludge

thickening/dewatering investments. Feasibility studies show that the landfill gas subproject will amount to 60-80,000 tons per year of CO2 savings and that the water subproject will save 99,000 tons per. Kyiv also completed feasibility studies for its priority investment subprojects resulting CO2 savings of 200,000 – 220,000 tons per year. These studies indicate that the overall program savings could range from 400,000 to 700,000 tons per year.

Results Indicator	**Target Value** (CTF Plan Endorsed March 2010)	**Target Value** (CTF Plan Revision February 2013)
Co-financing of CTF funding (US$ million)	n.a.	250-300
GHG Emissions Savings (tCO_2e/year)	n.a.	400,000-700,000
Energy Savings (GWh/year)	n.a	TBD
CTF Cost Effectiveness (CTF US$/$CO_2e$ reduction over 20 years)	n.a.	1.4-6.3

Financing Plan:

Financing Source	**Amount (US$ million)**
CTF	20-50
IBRD	250-300
GoU	TBD
Total	**270-350**

Project Preparation Timetable:

Milestone	**Date**
Government concept approval/Bank Concept Review	Q4-2013
TFC Approval	Q1-2014
Board Approval	Q2-2014
Project Implementation	Q3-2014 to Q3-2020

- Energy Efficiency (IFC)

Problem Statement: Although significant opportunities for the implementation of EE exist across all sectors of the economy, only a small proportion of this potential has been realized. The development of EE financing by private sector actors has been held back due to a combination of factors, including weak legal environments regulating housing and condominium associations, low technical capacity within FIs to estimate EE savings by end users, the underestimation of potential energy savings by SMEs, and the lack of available long term financing. There is currently a lack of information and guidance for FIs on development of lending products for EE, on assessing energy efficiency projects, and in collaborating with local energy audit experts – all compounded by the difficult general situation of the financial sector in the country.

Proposed Transformation: IFC's proposed program is designed to result in a transformed financial sector that views energy efficiency financing as a standard business practice, as well as transformed SME, commercial and residential sectors, which view energy efficient technologies as standard ways of operating an efficient business and competing in the market. The Program is a long-term effort to increase awareness, support behaviour change, build the EE financing market, support some early entrants by Fis into the SE financing business, and build the momentum for it to continue to grow.

Implementation Readiness: IFC is in discussions with a few commercial banks/financial institutions in Ukraine and these discussions have confirmed that FIs are interested in developing a new business line in sustainable energy financing, but continue to have some reservations. IFC will choose FI partners based on the following criteria: (i) strong commitment to sustainable energy financing, (ii) commitment to improving risk management capacity, (iii) innovative mindset to pilot new products; and (iv) strong capital base and low level of non-performing loans. At this time, IFC intends to present proposals to the Trust Fund Committee approval by first quarter of 2014. If, however, existing conditions in the banking sector, coupled with low (subsidized) energy prices have an effect of lowering FI appetite for EE financing market, IFC will propose to reallocate these funds to RE financing.

Rationale for CTF Financing: In working with FIs to promote energy efficiency financing, IFC is unable to engage in Grivnya-denominated (local currency) lending and, therefore, unable to offer domestic financial institutions attractive enough terms in order to induce them to enter the market for energy efficiency lending. The proposed CTF investment (e.g. through a risk sharing facility) would allow IFC to provide much more attractive terms to local FIs – and as a consequence to end-users/investors, meeting the necessary preconditions to establish market acceptable conditions for the Program and ensuring its successful rollout.

Results Framework:

Results Indicator	**Target Value** (CTF Plan Endorsed March 2010)	**Target Value** (CTF Plan Revision February 2013)
Co-financing of CTF funding (US$ million)	185	85
GHG Emissions Savings (tCO_2e/year)	n/a	180,000
Energy Savings (GWh/year)	n.a	445
CTF Cost Effectiveness (CTF US$/$CO_2e$ reduction over 20 years)	n/a	4.2

Financing Plan:

Financing Source	**Amount**(US$ million)
CTF	15
IFC	60
Private Sector [1]	25
Total	100

[1] Sponsor, commercial bank and other co-financing

Project Preparation Timetable:

Milestone	Date
TFC Approval	Q1-2014
Board Approval	Q2-2014

Program 3: Smart Grids

- Smart Grids (IBRD)

Problem Statement: Electricity demand in Ukraine is growing at about 5 percent per year after sharp decline in 2009/2010 as consequences of financial crisis. Ukraine transmission system is witnessing increased strain on its network because of this higher than anticipated growth in electricity demand, particularly in the eastern part (Zaporizhia Region) and south of Ukraine (In Crimea), but also in some parts of western region. Ukraine Transmission lines are increasingly loaded, in some cases beyond levels that would be considered efficient from a reliability and system security perspective. Interruptions and voltage drops, though still few, are frequent. Transmission of electricity into Crimean Peninsula and rural areas on Black Sea coast also pose a problem as line capacity is limited and Ukraine is facing high demand to increase capacity of electricity produced from Renewable Energy Sources in the peninsular which can meet existing and growing demand.

At the same time, the Government's Energy Strategy is calling for the total balance of the installed capacities is projected to grow to the level of 10 percent by 2030; and under the reference scenario will amount close to 6 GW. The mix of wind, solar, biomass and minor hydropower units will be defined with the account of the trends of reducing specific capital costs for construction of the above mentioned facilities. This scale of wind development will create major challenges to the power system, in terms of required grid connections, transmission system reinforcement and grid management of large-scale intermittent generation (due to the inevitable variations in wind power generation) as well as would offset the need for dispatching nuclear and coal fired power plants. Similar issues are challenging utilities in Europe and the USA, and significant research is currently ongoing on suitable power grid system controls to ensure efficient integration of intermittent wind generation. In this situation, incremental transmission investments are necessary for the provision of system efficiency, reliability, and security. IBRD is involved in supporting transmission system expansion and rehabilitation, improvement in the system and market operation, and in load dispatch technical support, by an ongoing loan to Ukraine Transmission Operator UkrEnergo.

Proposed Transformation: CTF resources are proposed to be blended with the IBRD-financed second Power Transmission loan, which will support transmission expansion and strengthening for, among other reasons, support for wind energy integration into the grid. CTF resources specifically are proposed to be utilized for assisting UkrEnergo, Ukraine Power transmission operator, in design and implementation of the next generation of modern grid management and control systems which can enable large-scale integration of wind and solar energy resources. IBRD resources would focus on expansion and rehabilitation of "conventional" transmission grid and system control reinforcements and interconnections.

In Europe and the USA, the challenges posed by wind generation are sought to be addressed through similar "intelligent" grids, which can respond to the challenges placed by growing intermittent capacity measures, such as wind generation, increasing demand, etc. These systems are currently under development by the European Technology Platform (Smart Grid) and Electric Power Research Institute (EPRI) in the USA[8] (the IntelliGrid Program).

Forecasts by UkrEnergo and the Ministry of Energy and Coal Industry show that if wind and solar energy development materializes as planned – 6GW of installed capacity or 13 – 14 TWh by 2030 – then the incremental reduction in CO_2e emissions would by about 5-7 million tons per year in 2015 and about 10-14 million tons per year starting 2025.

Implementation Readiness: UkrEnergo has preliminarily identified an investment plan of about US$380 million to be financed in this project. Approval of US$300 million of the US$380 million investment plan will be provided by the Ministry of Economic Development and Trade for inclusion into the 2014 investment plan (US$50 mln will be as local financing from UkrEnergo). UkrEnergo is seeking approval from CTF for the additional US$80 million, and it is expected that the project will be prepared and approved in 2013 – 2014 period.

Preparation of the second Power Transmission Project which includes Smart Grid Project as part of CTF Financing blended with main IBRD loan is progressing. In October 2012 Ministry of Energy and Coal Industry made a decision to proceed with steps in the preparation of PTP II Project and in parallel requested support from CTF to prepare Feasibility Study for Smart Grid Project. Subsequently in November CTF Trust Fund committee has approved Grant of US$0.5 million and Ministry of Energy proceeded with hiring consultant for preparation of Feasibility Study. As soon as Feasibility Study is completed Ukraine will proceed with official initiation of the Project and is tentatively planning to finalize and submit request for financing of Smart Grid to CTF Trust Fund Committee by December 2013, and the project will be prepared and implemented in the 2014 – 2019 period.

UkrEnrgo has an adequate capacity in implementing complex transmission projects, including projects in areas of load dispatch, energy system operation and control, and market management. UkrEnergo also has significant experience with IBRD procedures, having under implementation the ongoing Power Transmission Project with IBRD financing and a number of projects with other IFIs including three loans financed by EBRD, one loan financed by EIB and one loan financed by KfW.

Rationale for CTF Financing: In order for this level of wind and solar energy to be implemented and utilized, significant effort needs to be placed in parallel in developing and implementing a smart-grid solution in Ukraine. Since this is a very innovative and complex concept, which is only now being tried in Europe and the USA, it would be beneficial to utilize CTF financing for this effort, given the concessional nature of CTF-financing. Use of CTF resources in this endeavor would remarkably reduce GHG emissions by increasing the capacity of the electricity grid to absorb renewable energy resources while maintaining the stability and reliability of the transmission system.

In addition to GHG reduction benefits, the implementation of the smart-grid and the development of wind and solar energy have significant national-level benefits. It would help offset increased imports of

[8] The European Technology Platform SmartGrids brings together European utilities, technology providers/manufacturers, regulators and government agencies. EPRI's IntelliGrid Program brings together a large number of US and two European electric utilities, technology providers, and agencies including the US Department of Energy.

natural gas, which would save the government important foreign currency, thus freeing up resources for social welfare and economic activities. Wind and solar energy development also entails significant employment benefits, as indigenization levels increase and domestic industry develops to provide supplies and construction support.

The investments are expected to support the integration of intermittent power capacity, such as solar and wind, and to support the Government target in development of these renewable sources. If wind energy development materializes as planned – 6 GW of installed capacity by 2030 (10 percent of total installed capacity) – then the incremental reduction in CO_2e emissions would by about 5-7 million tons per year in 2015 and about 9-14 million tons per year starting 2025.

Results Framework:

Results Indicator	**Target Value** (CTF Plan Endorsed March 2010)	**Target Value** (CTF Plan Revision February 2013)
Co-financing of CTF funding (US$ million)	400	500
GHG Emissions Savings (tCO_2e/year)	n/a	4,250,000 [1]
Energy Savings (GWh/year)	n/a	n/a [1]
RE Installed Capacity (MW)	n/a	3888 [2]
CTF Cost Effectiveness (CTF US$/$CO_2e$ reduction over 20 years)	n/a	0.6-0.9

[1] Energy and emissions savings from T&D losses reductions will be estimated in the Feasibility Study
[2] The Smart Grids program is expected to allow the integration of approximately 3,888MW of installed RE capacity

Financing Plan:

Financing Source	**Amount**(US$ million)
CTF	50-80 [1]
IBRD	250-350
UkrEnergo	50
Private	200 [2]
Total	550-680

[1] Subject to the results of the feasibility study
[2] Around US$200 million is expected to be invested by the private sector into RE by 2018 and at least US$1000 million by 2030 in Crimea. Country-wide, this amount is expected to reach US$3000-4000 million by 2030.

Project Preparation Timetable:

Milestone	**Date**
Government concept approval / Bank concept review	Q3-2013
Project preparation	Q3/Q4-2013
TFC Approval	Q4-2013

Appraisal/Negotiation	Q3-2013/Q1-2014
Board Approval	Q2-2014
Project Completion	Q2-2019