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Task Force on Collaboration with Global and Regional Developments Banks

Exploration of Collaborative Opportunities with Regional Development Banks

Prepared by a task force of experts in response to paragraph 16(a) of the report of the Expert Group on Cleaner Electricity Production from Fossil Fuels Tenth Session[1]

1. Background

The European Bank for Reconstruction and Development (EBRD) and the World Bank Group undertake various projects related to cleaner electricity production from fossil fuels.

In particular, the EBRD adopted a new Energy Strategy in December 2013, where Chapter 5 outlines the EBRD's work in the area of cleaner electricity production from fossil fuels, which involves resource efficiency across the energy value chain, increased use of smart grids, transition from coal-fired power plants to gas-fired power plants and coal screening criteria.

The World Bank Group's key aims are ensuring reliability and environmental and social sustainability of energy and promoting energy efficiency, modern household fuels, improved utility performance and sector governance, financing and advice to countries on oil and natural gas extraction, production, processing, transmission and distribution.

2. Country based projects by EBRD and World Bank

In the past three years the EBRD has undertaken the projects in the following countries: Egypt, Jordan, Kazakhstan, Moldova, Poland, Romania and Russia. The projects included rehabilitation and modernization of electricity distribution networks, installation of modern electricity meters and automatic control systems, strengthening the capacity and efficiency of transformers and distribution lines aimed at reducing distribution network losses and increasing energy efficiency, installation of smart grid infrastructure and replacement of outdated coal-fired capacities with new high-efficiency combined cycle gas turbine (CCGT) power units.

Among the recent projects undertaken by the World Bank Group are the projects in Belarus, China, Mexico, Nigeria, Turkey and Vietnam. The projects' scope encompasses assistance in constructing additional combined heat and power plants, technical assistance in low carbon

[1] Report can be found at:
http://www.unece.org/fileadmin/DAM/energy/se/pdfs/clep/ge10/ECE.ENERGY.GE.5.2014.2_Report.pdf

city development, constructing and reinforcing existing distribution networks, automation and introduction of advanced metering infrastructure, technical assistance and capacity building and improving reliability of gas supply.

The EBRD's and the World Bank's projects in Belarus, Kazakhstan, Moldova, Poland, Romania, Russia and Turkey contribute to energy efficiency improvements in the countries of the UNECE region. Modernization of electricity distribution networks, introduction of automated control systems, technical assistance, capacity building and replacing outdated energy intensive coal-fired power plants with high-efficiency combined cycle gas turbine greatly contribute to cleaner electricity production from fossil fuels.

However, modernization of electricity distribution network and of power generating plants is required extensively in many countries of the UNECE region to improve energy efficiency and ensure cleaner electricity production. The programmes that the EBRD and the World Bank undertake can be scaled up to achieve greater regional coverage. For example, Kyzylorda Electricity Distribution project in Kazakhstan approved by the EBRD will provide a loan to Kazakhstan to finance the rehabilitation and modernization of low and medium voltage distribution networks in Kyzylorda Oblast. The project will include installation of modern electricity meters and automatic control systems, strengthening the capacity and efficiency of transformers, and distribution lines aimed at reducing distribution network losses and increase in energy efficiency. The expected technical and commercial losses reduction will lead to significant reduction of related carbon emissions as the power generation sector of Kazakhstan is of high carbon intensity. Similar projects could be also implemented in some other UNECE region countries.

A project Electrica Equity in Romania undertaken by the EBRD will fund an investment plan targeting the development of the distribution network through the installation of smart grid infrastructure, improving operating efficiencies and refurbishing its existing network infrastructure.

A project Additional Financing Belarus Energy Efficiency Project developed by the World Bank group will finance the costs associated with scaled-up activities to increase the energy saving impact of the project. Expected outcomes of investments on two additional combined heat and power (CHP) plants are an additional 54 megawatts of electric capacity and 46,700 thousand cubic meters (tcm) of gas saved, increasing current outcome indicator targets by 60% and 53% respectively.

3. Conclusion

The EBRD and the World Bank Group's projects contribute to achieving cleaner electricity production from fossil fuels and energy efficiency improvement. The most crucial issues in cleaner electricity production are modernisation of existing electricity distribution networks in line with current energy efficiency standards and improving outdated coal-fired power plants and replacing them with combined cycle gas turbine power units if CCGT prove to be more efficient. Projects similar to those undertaken by the EBRD and the World Bank Group can be implemented in other parts of the UNECE region.

Appendix 1: Summary of EBRD and World Bank Cleaner Electricity Initiatives

The European Bank for Reconstruction and Development

The European Bank for Reconstruction and Development (EBRD) adopted a new Energy Strategy in December 2013 which will guide its investments in the energy and natural resource sector.

The new strategy explains in detail the EBRD's approach to the energy sector. Of particular interest is Chapter 5 which outlines the EBRD's work in regard to cleaner electricity production from fossil fuels. Cleaner electricity production according to EBRD includes:

- *Resource efficiency across the energy value chain*

The Bank will increase efficiency and decrease carbon intensity along the coal value chain, including through improved coal handling, drying and washing facilities at coal mines. It will also support investments in gas and electricity transmission and distribution networks which reduce commercial or technical losses. Where the energy sector produces usable by-products, for example clinker from ash, the Bank will promote reuse rather than disposal.

- *Smart grids*

Smart networks and smart meters will be the backbone of the future power sector; critical to the transition to a more sustainable, efficient model. To support the sector transformation, the Bank will focus on investments in smart grids, smart metering, improved use of information and communication technologies in electricity networks, and measures to improve price transparency and energy savings behaviour. These investments will also facilitate a range of different solutions to energy needs for the benefit of both suppliers and consumers.

- *Transition from coal-fired generation to gas-fired generation*

Natural gas is an important fuel worldwide for electricity generation, providing both reliable baseload and flexible peaking capacity that is required to accommodate the growth in intermittent renewables generation. The Bank will support the installation of highly-efficient gas-fired generation and in particular fuel switching from coal to gas, which is an important route to improve carbon intensity given the much lower GO2 emissions per MWh. The Bank will not finance any greenfield coal-fired power plant except in rare circumstances, where there are no economically feasible alternative energy sources. The Bank is committed to supporting the low-carbon transition in its countries of operations; this entails promoting alternatives to carbon-intensive coal-fired generation. Given that most of the Bank's countries of operations have strong potential for renewables, access to gas or the potential for cross-border interconnections, support for coal projects will not be considered except in exceptional circumstances. In order to focus on reducing CO2 emissions, the Bank will also encourage countries to explore options for offsetting activities for projects that will increase emissions.

The Bank will consider financing efficiency improvements to reduce emissions at existing coal-fired heat and electricity generating plants only in instances where there is significant potential to reduce carbon and other emissions. In most cases the low-carbon transition will

require the replacement of a coal-fired plant by a gas-fired or lower carbon fuelled plant, achieving dramatically lower emissions. However in certain specific situations increasing the efficiency of existing infrastructure may represent the best contribution to achieving worldwide required CO2 emissions reductions. This is especially relevant for the Bank's countries of operations which have an existing legacy of inefficient infrastructure assets.

- *Coal screening criteria*

The Bank will apply a tripartite test to screen all investments in coal-fired generation or associated infrastructure, including thermal coal mining. The infrastructure being considered must be the *least carbon-intensive* of the realistically available options. To determine this the Bank will assess the full range of options, including an assessment of their CO2 emissions, to meet the energy needs of the country where the project is located. This will include energy efficiency, possibilities for energy imports, renewable energy generation and other fossil-fuelled options. The relevant country must accordingly have in place a policy framework that aims to reduce CO2 emissions, for example through support for renewable energy and energy efficiency.

The EBRD projects include:

Country	**Year**	**Project**
Kazakhstan	2014	*Kyzylorda Electricity Distribution* The EBRD is considering to provide a senior loan of KZT 5 billion (EUR 22 million equivalent) to the Joint Stock Company Kyzylorda Regional Electricity Company (KREC), a power utility, responsible for distribution of electricity in the Kyzylorda Oblast, wholly owned by the Oblast Akimat. The proceeds of the loan will be used to finance the rehabilitation and modernization of low and medium voltage distribution networks in Kyzylorda Oblast. The project will include installation of modern electricity meters and automatic control systems, strengthening the capacity and efficiency of transformers, and distribution lines aimed at reducing distribution network losses and increase in energy efficiency. The expected technical and commercial losses reduction will lead to significant reduction of related carbon emissions as the power generation sector of Kazakhstan is of high carbon intensity.
Romania	2014	*Electrica Equity* The EBRD participated in the Initial Public Offering organized by Electrica SA, for the issuance of new shares representing 105 per cent of the company's share capital and floated on the Bucharest Stock Exchange as well as on the London Stock Exchange, via Global Depository Receipts. The proceeds will be used by the company to fund an investment plan targeting the development of the distribution network through the installation of smart grid infrastructure, improving operating efficiencies and refurbishing its existing network infrastructure.
Jordan	2013	*IDECO Modernisation & Expansion Project* The EBRD is considering a senior loan of up to US$ 30 million to support Irbid District Electricity Company's (IDECO).The investment

		will help IDECO implementing its programme to modernise and expand its network in Jordan. The company is one of three electricity distribution companies operating in Jordan, and is responsible for the northern governorates. The Project will enable the Company to modernise and expand its electricity distribution network in northern Jordan. Investments will improve the capacity and reliability of IDECO's network, allow the Company to meet rapid demand growth and demonstrate new grid management and control equipment to prepare the network for the subsequent rollout of smart grid technology. The Company's operational efficiency will be boosted through reductions in losses and other distribution performance standards.
Egypt		*Power sector energy efficiency project* The EBRD is considering the provision of a sovereign loan of up to USD 190 million to the Arab Republic of Egypt, to be on-lent to the state-owned Egyptian Electricity Holding Company (EEHC) and/or its subsidiary East Delta Electricity Production Company (EDEPC). The proceeds of the loan will be used to fund the conversion of two existing open cycle power plants to combined cycle gas turbines: (i) 500 MW Damietta West and (ii) 1,000 MW El Shabab. The project will add significant extra generating capacity to the Egyptian grid and improve the plants' efficiency from c.33% to c.51%. This will help alleviate the on-going energy crisis in Egypt, thus improving the socioeconomic environment for industry, commerce, small businesses and households. It will also result in significant carbon emission reductions.
Russia	2013	*INTER RAO Capacity Replacement Loan* The EBRD is considering providing financing for the replacement of outdated coal-fired capacity with a new high-efficiency 445.6 MW Combined Cycle Gas Turbine (CCGT) power unit at Verkhnetagilskaya GRES in the Urals region. • Demonstration of new replicable behaviour and activities. The project will significantly improve energy efficiency and reduce carbon emissions of Verkhnetagilskaya GRES and will improve environmental situation in the region through a switch from coal to gas. The new CCGT unit will have a gross efficiency of around 57% as compared to the existing old coal-fired units which currently operate with efficiency around 32%. Based on a reference power generation of around 3,000 GWh, the corresponding carbon emissions reduction from the project will be more than 1,200,000 tons of CO2 per year. • Setting standards of business and environmental conduct through replacement of old coal-fired units by new CCGT, the Project will significantly improve efficiency and carbon emissions. The new CCGT will set an important benchmark in terms of efficiency and environmental standards in the region going far beyond existing national practices. Furthermore the Project will facilitate reduction of

		coal-fired generation in Sverdlovsk region and related pollution.
Romania	2013	*Oltenia - Turceni Rehabilitation* The EBRD is considering arranging a syndicated loan of up to EUR 200 million for Complexul Energetic Oltenia ("CET Oltenia") to help finance the rehabilitation and modernisation of unit 6 of CET Oltenia's Turceni lignite fired power plant in order to: 1. significantly improve the efficiency and reduce the carbon intensity by reducing CO2 emissions by more than 160,000 tons annually; 2. increase the availability and reliability of one of the most important power plants in Romania; 3. improve the environmental characteristics of the plant so as to comply with EU environmental directives, reducing harmful local emissions; and 4. implement a modern automation and control system, fulfilling the requirements of ENTSO-E..
Poland	2013	*ENEA Operator* The EBRD is considering providing a loan of up to PLN 800 million to the Polish electricity utility ENEA along with the European Investment Bank and the Nordic Investment Bank. The debt financing will support the PLN 3.2 billion (€772 million) investment programme of Company's distribution business, ENEA Operator, in the period 2012-2015. The investment programme will strengthen the distribution network of ENEA Operator, lead to a decrease in energy losses and improvements in the quality of energy distribution services in north-western Poland.
Poland	2013	*ENERGA smart grid* The EBRD is considering providing a loan of up to PLN 800 million to the Polish electricity utility ENERGA along with the European Investment Bank. The debt financing will support the PLN 5.2 billion investment programme of Company's distribution business, ENERGA Operator, in the period 2012-2015. The investment programme will implement smart grid solutions, strengthen the distribution network of ENERGA Operator ("DSO"), allowing for substantial energy efficiency improvements, and will enable the distribution grid to connect new renewable energy producers.
Kazakhstan	2013	*CAEPCO Energy Efficiency Project* The EBRD is considering providing debt financing to Pavlodarenergo and Sevkazenergo, subsidiaries of CAEPCO, a private energy company in Kazakhstan. The loans will be used to finance the Company's investment program in Pavlovdar and Petropavlovsk aimed at rehabilitation and improving energy efficiency. The projects will include modernization of generating assets as well as upgrade of the existing electricity distribution networks. The investments are expected to yield significant reductions in CO2 emissions, coal savings and reduced losses.
Russia	2012	*Vladivostok Combined Heat and Power Plant* The EBRD is considering financing of a new 140MW gas fired Combined Heat power plant to replace an existing coal fired heating facility in Vladivostok city. The loan will be provided to JSC "RAO ES Vostoka" (the "ESV"). The project will significantly improve

		energy efficiency and cut carbon emissions thanks to the installation of modern co-generation units that will replace old and inefficient systems. The fuel-switch from coal to gas and introduction of state of the art GTUs for co-generation that will lead to significant resource efficiency improvements and a reduction in greenhouse gas emissions.
Moldova	2012	*Moldelectrica Transmission Rehabilitation Loan* The EBRD is considering providing a senior loan of up to US$ 21.5 million to Moldelectrica, to finance the rehabilitation of the company's transmission network. The project includes the design and modernisation of a number of substations and transmission lines. The rehabilitation will improve the energy efficiency of Moldelectrica's network, will strengthen the stability of power supply and improve the Company's overall operation, a necessary prerequisite for Moldova's integration into the European transmission network ENTSO-E.

Links:

1. http://www.ebrd.com/cs/Satellite?c=Content&cid=1395236902827&pagename=EBRD%2FContent%2FContentLayout
2. http://www.ebrd.com/work-with-us/project-finance/project-summary-documents.html?s7=on&s21=on&s25=on&keywordSearch=

The World Bank Group

The World Bank Group financing, combined with advisory and analytical services, knowledge products, as well as policy support helped launch and scale up energy efficiency at national, sub-national and municipal levels. The key aims of the World Bank Group are:

- Ensuring reliability and environmental and social sustainability of energy. The World Bank works on mobilizing financing, as well as policy and institutional frameworks that ensure that electricity access projects are both economically viable and sustainable from a climate perspective.
- Promoting energy efficiency, modern household fuels, improved utility performance and sector governance, financing and advice to countries on oil and natural gas extraction, production, processing, transmission and distribution.

World Bank's projects on cleaner electricity production from fossil fuels include:

Country	Year	Project
Belarus	2013	*Additional Financing Belarus Energy Efficiency Project* This Project Paper seeks the approval of the Executive Directors to provide an additional loan in the amount of US$90 million to the Republic of Belarus for the Energy Efficiency Project. The proposed additional loan would help finance the costs associated with scaled-up activities to increase the energy saving impact of the project. Expected outcomes of investments on two additional combined heat and power (CHP) plants proposed to be financed with the additional financing are an additional 54 megawatts of electric capacity and 46,700 thousand cubic meters (tcm) of gas

		saved, increasing current outcome indicator targets by 60% and 53% respectively.
China	2013	*Green Energy Schemes for Low-carbon City in Shanghai* The higher-level global environment objective of the Green Energy for Low-Carbon City Project in Shanghai Project for China is to support Shanghai's low-carbon city development by promoting green energy schemes, with a focus on Changning district. The project has two components: a) a technical assistance and incremental support for near zero-emission buildings component funded by a Global Environment Facility (GEF) grant; and b) a low carbon investments component funded by an International Bank for Reconstruction and Development (IBRD) loan. The GEF component will primarily provide technical assistance and capacity building activities on policies, financing mechanisms, business models of the key abatement options identified in the abatement cost curve (green energy buildings, clean energy supply, and green transport) to support the Changning district government achieving its carbon intensity reduction target. It will also cover part of the incremental cost for a pilot near zero-emission building. The IBRD loan will focus on low carbon investments in buildings as the bulk of emission reductions in Changning district will come from building retrofit.
Vietnam	2012	*Distribution Efficiency Project* The development objectives of the Distribution Efficiency Project are to improve the performance of Vietnam's power corporations (PCs) in providing quality and reliable electricity services, and to reduce greenhouse gas emissions through demand side response and efficiency gains. There are three components to the project. The first component is system expansion and reinforcement. This component will cover construction and reinforcement of 110 kV, Medium Voltage (MV) and Low Voltage (LV) electricity distribution networks, including substations, of the PCs. These investments will help the PCs to efficiently meet load growth, address load supply constraints due to distribution system congestion, reduce losses, and improve reliability and quality of power supply. The second component is introduction of smart grid technologies in distribution. This component, which includes Clean Technology Fund (CTF) co-financing, will focus on (i) automation, through introduction of supervisory control and data acquisition systems, of electricity distribution network operations of and data collection by the PCs; and (ii) introduction of Advanced metering infrastructure (AMI) systems, including two-way communication systems, as electricity distribution smart grid technologies for key substations and consumers of selected PCs. Supporting the first stage of the roadmap for smart grid technologies for power distribution in Vietnam, the component will assist to increase efficiency, reliability and effectiveness of the PCs' systems and operations, and optimize distribution system configuration by providing real time data from both the supply and the demand side. The third component is technical assistance and capacity building.

		Provision of technical assistance to and capacity building of Electricity Regulatory Authority of Vietnam (ERAV) for improvement of efficiency in electricity tariffs, enhancement of efficiency of and incorporation of smart grid technologies in the grid and distribution codes, integration of renewable energy in the grid and distribution codes, development of demand response and smart grid programs, and project management and monitoring and evaluation.
Nigeria	2012	*Nigeria Electricity and Gas Improvement Project (add. financing)* The development objective of the Additional Financing for the Electricity and Gas Improvement Project for Nigeria is to (i) improve the availability and reliability of gas supply to increase power generation in existing public sector power plants; and (ii) improve the power network's capacity and efficiency to transmit and distribute quality electricity to the consumer.
Turkey	2012	Clean Technology Fund supported 20 energy efficiency projects in Turkey besides the development of renewable energy sources. The investments supported under the project are expected to contribute to greenhouse gas emissions reduction of 3.3 million tons per annum over the life of the project. Going forward, the World Bank Group (WBG) is preparing an energy-efficiency project aimed at promoting commercial bank lending to small and medium enterprises (SMEs) for energy-efficiency investments.
Mexico	2011-2012	Mexico distributed almost 23 million energy-saving light bulbs for free. The national program, partially financed by $185 million from the Global Environment Fund, established over 1,100 exchange points in 2011-12 at which customers replaced their incandescent bulbs with compact fluorescent lamps. More than 5.5 million Mexican families now use energy-saving lamps that consume only 20 percent of the energy and last 10 times longer than a traditional light bulb. The first stage of the program, partially financed by the World Bank, resulted in savings of 1,400 gigawatt hours (Gwh). When the second stage ends in 2014, it is estimated that the saving will be of 2,800 Gwh per year, preventing about 1.4 million tons of CO_2 emissions.

Links:

1. http://www.worldbank.org/en/results/2013/04/10/sustainable-energy-for-all-results-profile
2. http://www.worldbank.org/projects/search?lang=en&searchTerm=&sectorcode_exact=LA