

**Economic and Social Council**Distr.: General  
9 February 2012

Original: English

---

**Economic Commission for Europe**

Committee on Sustainable Energy

**Steering Committee of the Energy Efficiency 21 Programme**

Twenty-third session

Geneva, 25 April 2012

Item 5 of the Provisional Agenda

**Projects proposed for continuation or inclusion in the eighth three-year phase of the EE21 Programme (2012–2015)****Projects proposed for continuation or inclusion in the eighth three-year phase of the EE21 Programme (2012-2015)****Mitigating Climate Change through Attracting Foreign Direct Investment in Advanced Fossil Fuel Technologies****Note by the secretariat****I. Introduction**

1. Fossil fuels supply over 80% of the world's primary energy. In the United Nations Economic Commission for Europe (UNECE) region, over 60% of electricity comes from fossil fuels. According to the International Energy Agency (IEA), fossil fuels will continue to be the principal source of primary energy and electricity for the foreseeable future.
2. There is a high level of consensus in the scientific and political communities that anthropogenic emissions of carbon dioxide and other greenhouse gases (GHG) contribute to climate change and global warming. Point sources of emission, such as fossil fuel-fired power plants, are responsible for the lion's share of these emissions.
3. An effective way to decrease GHG emissions is to replace obsolete fossil fuel-fired electricity generation technologies with more efficient ones. Improving the efficiency of electricity generation is one of the low-hanging fruits of the climate change mitigation.
4. Efficiency of coal- and natural gas-fired power plants can be looked at also in the context of overall energy efficiency. In this case it is not the end-use efficiency that promotes a more efficient electricity consumption; it is the efficiency of electricity generation. Improving the "conversion" or "upstream" efficiency, however, has not received the attention it deserves. In the climate change discourse, fossil fuels—and coal in

particular—have seldom been mentioned in a positive context. This is unfortunate because any investment in improving the efficiency of fossil fuel-fired electrical power plants has a positive domino effect that enables to reap huge climate change benefits along the value chain of electricity generation, transmission, distribution and consumption.

## **II. Background**

5. The Mitigating Climate Change through Attracting Foreign Direct Investment in Advanced Fossil Fuel Technologies project is funded from the seventh tranche of the United Nations Development Account (UNDA). In its execution UNECE, as the principal agency, cooperates closely with the United Nations Conference on Trade and Development (UNCTAD) and the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). The project covers nine countries: Afghanistan, China, India, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Ukraine, and Uzbekistan.

6. In 2006, the Committee on Sustainable Energy recognized the importance of encouraging investment in the electricity sector. To carry out this work, the Committee created the Ad Hoc Group of Experts on Cleaner Electricity Production from Coal and Other Fossil Fuels. The programme of work of the Ad Hoc Group of Experts provides the framework to implement this UNDA project.

7. To insure its efficient functioning, the project has established an Advisory Board, led by the Chair of the UNECE Ad Hoc Group of Experts. The Board includes a number of reputed industry and government experts and representatives.

8. The Ad Hoc Group of Experts has on several occasions discussed the three principal challenges the world faces in the 21st century:

- (i) Secure an adequate energy supply at a reasonable cost;
- (ii) Reduce the greenhouse gas emissions; and
- (iii) Manage intelligently energy demand to lower consumer bills.

9. This project deals with some parts of the first and second challenges by enhancing the ability of selected countries to attract foreign direct investment in advanced fossil fuels technologies for electricity production. According to UNCTAD, foreign direct investment (FDI) is defined as "an investment involving a long-term relationship and reflecting a lasting interest and control by a resident entity in one economy in an enterprise resident in an economy other than that of the investor."

## **III. Foreign direct investments**

10. FDI is distinguished from other forms of international investment by two characteristics:

- (i) All international investments are made outside the home country (country of residence) of the investing company, but FDI is made inside the investing firm (distinctive from other forms). Control over the use of the resources transferred remains with the investor, allowing him/her to make investment and operational decisions.;
- (ii) While all investments involve the transfer of capital across borders, FDI involves, in addition to capital, other assets and resources, such as technology, management and other skills, access to markets, entrepreneurship, etc.

11. In other words, FDI involves more than just the flow of capital to the host country – it is a package of assets and resources, which are, in many cases, the resources needed by host countries for their economic growth and development. FDI also involves control of the production activity by the foreign investor in host countries. FDI has many other potential benefits, such as, for example, obtaining the needed capital without incurring debt, transfer of knowledge, technology and business transfer, and acting as a catalyst for further capital inflows.

12. In general, the nine countries covered by the project need to increase the capacity to attract foreign investments. Becoming an attractive destination for capital is particularly difficult in the case of energy infrastructure projects, because of comparably high risks and the long time needed for return on investment.

13. Despite considerable efforts to attract FDI in the last several years, actual levels of FDI into the electricity and coal sectors in many these countries have been moderate at best. Even China does not attract any significant FDI inflows. Most of newly constructed generation capacity in China is financed from domestic sources of capital. In other eight countries, the sheer magnitude of required investment in the cleaner electricity production necessitates capital flows from foreign sources.

14. The mobilization of the necessary capital resources, however, will require an attractive investment climate: a business friendly environment, favourable macro-economic performance, and a predictable, fair, transparent and efficient regulatory environment.

#### **IV. Advanced fossil fuel technologies**

15. For the purposes of this project, the expression "advanced fossil fuel technologies" refers to a spectrum of technologies used to prepare fossil fuels for combustion in thermal power plants ("pre-combustion"), the combustion technologies themselves, and the post-combustion treatment of products, including removal and treatment of harmful gases. The project primarily deals with technologies that enable a more efficient use of coal and natural gas in thermal power plants. In this sense, the project is not concentrated on extractive technologies of obtaining fossil fuels, such as advanced drilling.

16. The project deals with fuels that go into high efficiency, low carbon emitting power plants, such as: (i) natural gas; (ii) pulverized or liquefied coal gas; and (iii) syngas from underground coal gasification.

17. Project addresses to a certain extent pre-combustion technologies such as underground coal gasification (UCG), surface coal gasification and Fischer-Tropsch processes, coal and natural gas preparation (such as drying, removal of impurities, and increase of calorific value).

18. Combustion technologies are at the core of this project. In natural gas-fired plants, the project concentrates on combined cycle gas turbines (CCGT) and combined heat and power (CHP) plants using gas. As far as coal-fired power plants are concerned, the project primarily deals with integrated gasification combined cycle (IGCC), supercritical pulverized coal (SCPC) and ultra-supercritical pulverized coal (U-SCPC).

#### **V. Project objectives and activities**

19. The principal goal of the project is to enhance the nine governments' abilities to attract FDI into advanced fossil fuels technologies, which would support their energy security and low-carbon sustainable development.

20. The project is expected to:
- (i) Increase the skills to develop and maintain an attractive investment climate to encourage FDI into the electricity sector based on coal-fired electricity sector, to meet the growing demand for electricity and achieve related climate change mitigation goals;
  - (ii) Improve cooperative relationships between energy policy makers in the countries with economies in transition and the investors;
  - (iii) Increase the skills to develop electricity-related pre-feasibility studies; and
  - (iv) Exchange experiences and lessons learnt in fostering investment in cleaner electricity generation among the countries covered by the project and possibly beyond.
21. To achieve these objectives, the project consist of the following activities:
- (i) Develop baseline and a comparative analyses on electric power generation status and infrastructure. A particular emphasis should be given to the possibility to apply advanced fossil fuel technologies and the ways to finance them from foreign sources of capital. This activity seeks to establish a benchmark against which the electricity generation investments and regulatory frameworks might be measured;
  - (ii) Develop and arrange regional workshops that would provide an opportunity to exchange ideas with the officials and share with them the results of the baseline studies and comparative analysis. The workshops would educate the officials from countries on foreign direct investment into advanced fossil fuel technologies, and review with them desirable changes to existing policy, legal and regulatory frameworks that would lead to a more favourable investment climate for the power generation projects based on cleaner fossil fuel technologies;
  - (iii) Provide technical assistance to the national officials through two or more broad-based technical training workshops, to educate them on technical and policy options for cleaner electricity production;
  - (iv) Provide technical assistance to national experts to develop pre-feasibility study on advanced and cleaner electricity generation and related fossil fuel-based energy project in each country.

## **VI. Implementation and first results**

22. The executing agencies (UNECE, UNCTAD and ESCAP) established communication with institutions and officials from most of the countries covered by the project.
23. Six out of nine baseline studies were initiated or finalized in 2011. Baseline studies have been drafted for Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, and Uzbekistan
24. The first three regional workshops (in Tajikistan, China, and Kazakhstan) were attended by over 120 participants from over 60 Governmental agencies, institutions, academia, and public and private companies operating in the energy sector, as well as representatives of the investment community and technology providers. The primary purpose of these workshops was to enable participants to design and implement effective and enabling legal and regulatory frameworks supporting FDI into cleaner electricity production. The workshops held in 2011 resulted in creation of a number of networks among the officials from the countries, the investment community and technology

providers. This will be instrumental in possible future foreign direct investments into advanced electricity generation based on fossil fuels.

## **VII. Upcoming activities**

25. All activities planned for 2012 (technical workshops, end-of-the-project conference, the synthesis study) will be instrumental in creating new networks and deepen the existing ones. Preparations for technical workshops in Mongolia (March or May 2012), in New Delhi, India (April 2012), in Kyrgyzstan (September 2012) and in Kiev, Ukraine have started.

26. In cooperation with officials from the region, the implementing agencies also plan to organize a major end-of-the-project conference. This conference will be an opportunity for the officials from all nine countries to network with one another, as well as with investors, technology providers, and representatives of other Governments and international organizations with expertise in the foreign direct investments and advanced fossil fuel technologies.

---