

## 1.4 Super critical thermal power plants (TPP) capacity 600 MW

### 1.4.1 Introduction/Background

One of the challenges facing Mongolia, similar to other countries, is to reduce GHG emissions and manage the cost of energy generation by reducing fuel consumption.

Mongolia has been planning to construct Thermal Power Plants of a total capacity of 2800MW near Aduunchuluu, Tavantolgoi, ShiveeOvoo and Baganuur coal mines, with annual electricity generation of 14-16 billion kWh in the near future. These power plants are expected to combust about 12.0 million tonnes of coal every year. Coal-fired supercritical TPP technology is crucial and highly recommended for reducing the GHG emissions from these planned thermal power plants.

Supercritical and ultra-supercritical plants are more expensive because of the higher requirements for the steel which needs to stand higher pressure and temperature, but the higher efficiency can result in cost savings during the technical lifetime of the plants.

The emissions of CO<sub>2</sub> per MWh delivered to the grid could be reduced from 830 kg to 730 kg.

In Mongolia, coal fired Combined Heat and Power plants contribute 98 % of the total electricity supply. Among the total installed electricity capacity of turbines of CHPs currently under operation, 60% is 13 MPa, 22% is 3.5 MPa, and 18% is 9.0MPa.

### 1.4.2 Objectives

To build a super critical Thermal Power Plant with capacity 600 MW at the BaganuurCoalMine, which is 130 km from Ulaanbaatar.

### 1.4.3 Measureable output

Electricity generation is 3.3 billion kWh/year.

### 1.4.4 Relationship to the country's sustainable development priorities

- Improving the efficiency of electricity production in Mongolia;
- Increase reliability of the country's energy supply;
- Increase favorable conditions for the construction of large electricity projects
- Introduce advanced technologies in the energy sector;
- Reduce the negative impact of energy on the environment;
- Reduce greenhouse gas emissions from the energy sector;
- Gain access to advanced technologies.

### 1.4.5 Project Deliverables

Construction of coal fired supercritical power plants with installed capacity 600 MW for delivering electricity in amount of 3.3 billion kWh/year to national grid.

### 1.4.6 Project scope and possible implementation

The proposed supercritical coal fired TPP will be constructed in Baganuur coal mine.

The Baganuur coal mine is one of the biggest open coal mines in Mongolia, which is supplied 50% of the Mongolia's total coal demand and 70% of the coal demand of the Central region. The Baganuur mine is located 139 km from Ulaanbaatar, contains 600 million tons of coal and has the capacity to extract 3 million tons of coal annually.

### 1.4.7 Project activities

#### I. Preparation Phase

- Organize study on the technology of Super Critical TPP for the senior decision makers and specialists;
- Organize discussion about the technology of Super Critical TPP for the specialists and senior decision makers;
- Take the decision on the implementation of technology super critical TPP in thermal power

- plants of high capacity;
- Conduct pre-feasibility study on the coal-fired super critical TPP at Baganuur Coal mine;
- Develop engineering design for the super critical TPP with a capacity of 600 MW.

## II. Implementation Phase

- Decide to invest in the super critical TPP;
- Change legislation, if necessary, for foreign investment in the construction of thermal power plants;
- Call for tenders for construct or for the super critical TPP;
- Contract a company that will build the TPP;
- Build the super critical TPP;
- Train specialists for Super critical TPP

## III. Development of technology

- Establish an organization for the operation of super critical thermal power plants;
- Invite foreign experts for training workers;
- Develop guidelines for operation super critical thermal power plants;
- Set up and configure the super critical TPP;
- Commission for operation;
- Monitor and assess the economic and environmental efficiency of super critical TPP.

### 1.4.8 Project Timeline

The following timeline for implementing the project is to be expected. It is assumed that the work for concrete placing is carried only for the summer season (from April to October).

- Conduct feasibility study on the coal-fired super critical TPP at Baganuur Coal mine – 2003-2004
- Develop engineering design for the super critical TPP with a capacity of 600 MW 2004 - 2015
- Call for tenders for constructor for the super critical TPP - 2015;
- Contract a company that will build the TPP -2015;
- Build the super critical TPP –April

2016 - October 2016; April 2017-  
October 2016; April 2017 – October  
2017

### 1.4.9 Budget/Resource requirements

The total requested budget for implementing this project is 900 million USD.

The project can be implemented by soft loan or through encouraging private investment in public-private partnerships according to Concession Law of Mongolia.

### 1.4.10 Measurement/Evaluation

The output as electricity distribution (3.3 billion kWh/year) to the central grid will be measured by electricity meter on in the power house of the super critical TPP.

### 1.4.11 Possible Complications/ Challenges

The main barriers to the deployment and dissemination of this technology are: 1. Lack of adequate access to financial resources; 2. Lack of public and specialist information about efficient super critical TPP and energy use, as well as lack of information for policy makers to develop adequate strategy in this direction. An important missing component of enabling environment for coal combustion technology is the long term strategy for energy sector – which is the most important indigenous energy source in Mongolia. This is largely because of the lack of sufficient information for policy making.

### 1.4.12 Responsibilities and Coordination

Government/Ministry of Energy will be responsible in coordination with private companies and international financing organizations.