

NS-138 - Development and Installation of Carbon Dioxide Sequestration Technologies in Pakistan

Pakistan

NAMA Seeking Support for Preparation

A Overview

A.1 Party

Pakistan

A.2 Title of Mitigation Action

Development and Installation of Carbon Dioxide Sequestration Technologies in Pakistan

A.3 Description of mitigation action

The policy makers, planners and Think Tanks of Pakistan are extensively working on way forwards or solutions to come out from ongoing severe energy crisis which has hampered the economic growth in the country. Therefore, the Government of Pakistan (GoP) is very serious, and key emphasis is being placed on the need to cope with prevailing situation of energy crisis, alternative or renewable energy sources, reducing GHGs concentration. As GoP envisages mainstreaming of alternative and renewable energy (ARE) in the development plans of the country. The political intention is to reduce dependence on donor aid through increased domestic economic base. In view of current prevailing energy crisis, the coal deposits may be used as energy sources. However, the safely handling of un-capture carbon dioxide and carbon contents is a barrier in utilization of coal (total estimated reserves more than 187 billion tonnes) as energy source.

Project Description

This very ambitious NAMA is designed to address the above discussed issues. The problem of un-capture carbon dioxide will be addressed under this NAMA. The specific focus of the NAMA is to develop CO₂ emission scavenging technology following the installation of technology, in order to reduce total GHGs concentration in project areas. Environmental Impact Assessment survey will also be carried out in the Thar Coal, Kandra gas field and other power generation stations. The NAMA will act as a tool to contribute to transformation towards a prosperous nation.

Scope of the NAMA Support Project

To Develop and install carbon dioxide sequestration or scavenging technologies near the Thar coal, Kandra gas fields and

other power generation stations with reduced risk of un-capture carbon and carbon dioxide, to make safe use of coal deposits for production of energy, in order to cope the prevailing situation of energy crisis in the country.

It is expected that with the implementation of the NAMA, the following objectives could be achieved:

- Development of technology for carbon dioxide scavenging.
- Assessment of environmental impact of the Thar Coal project.
- Designing and installation pilot plant of CO₂ sequestration near Thar coal, Kandra gas fields and other power generation stations.
- Establishment CO₂ Sequestration Laboratory in Pakistan
- Reduction/ mitigation the GHGs concentration from atmosphere by ensuring implementation of NAMAs with the assistance of Ministry of Climate Change.

The NAMA will spur energy generation projects/programs implemented across Pakistan in energy sector, it is envisaged that the project boundary would be Thar Coal, Kandra gas field and other power generation stations.

Concept and Methodological Approach

Despite of abundant coal reserves total estimated more than 187 billion tonnes of coal (only Thar estimated 175 billion tonnes), categories amongst the world largest coal reserves countries. Only Thar can generate 100,000 MW per annum by burning 536 million tonnes which will be the cheapest (Rs. 600/tonnes) that furnace oil. It's safe use as energy is still challenge owing to problems in handling of un-capture carbon dioxide and carbon contents. From the last decade focus has been given to safe use of coal as energy. The design of this project targets to address technical, policy and financial barriers in use of coal as energy. Pakistan will be first developing country who will use this technology for reduction of CO₂ in the atmosphere.

In order to undertake this project a Project Management Unit (PMU) will be established and empowered within PCST. The PMU will coordinate all the activities. The PMU will be responsible for successful accomplishment of the NAMA. The PMU will coordinate with National University of Sciences and Technology (Islamabad), Karachi University (Karachi) and other technical organizations on the subject technology. In this regard, PMU will also coordinate and work with Climate Change Division for execution of project. After successful trials plant would be constructed with the help of national engineering firms. Technical Monitoring and Evaluation (M&E) of proposed NAMA will be carried by the Ministry of Science and Technology Pakistan. The scope of the NAMA is to accelerate the energy production utilizing coal deposits with minimum GHGs emission risk.

Impact of the NAMA support Project

By undertaking this NAMA, the GoP will be able to overcome the energy crisis. This will smoothen the ways to utilize coal as energy and cut GHGs emissions by significant amount. It will also add energy in the system and economic competitiveness by lowering energy intensity and improving energy productivity. Upon replication of CO₂ sequestration technologies at other sites will also help in reducing GHGs emissions. The NAMA will act as a tool to contribute to transformation towards a prosperous nation.

The outcomes from this program activity are long term because of the phase out carbon dioxide from all sectors of the country. Successful implementation of proposed NAMA will lead towards attaining goal of sustainable development, self-reliance and self-sufficiency in meeting energy needs of the end consumers and promoting clean sources of energy.

This will result in improving the social status of the general masses, improve production capacity of the industries, enhance commercial and economic activities and contributing towards improving overall economy of the country.

This NAMA Support Project has the replicable potential with respect to its applicability in other regions, countries and internationally where there is a huge potential exist.

Project Output

The main objective of the project is to reduce the un-capture carbon & CO₂ concentration from the atmosphere while allowing the fossil fuel to use as energy for power generation.

The anticipated outputs or results include greenhouse gases effect on the global warming, which ultimately affect the climate and weathering conditions making it more intense and severe, the reduction of such gases from the atmosphere will reduce the global warming and climate severity. Following are the output indicators:

Output 1: *Development of CO₂ Sequestration technology*

Output 2: *Establishment of CO₂ Sequestration Laboratory*

Output 3: *Installation of developed technology*

Output 4: *(Development of) Strategies for CO₂ mitigation*

Financial Ambition

The estimated cost of this NAMA Support project is around €12.38 million (inclusive of appraisal costs) will be required for carrying out various activities under this proposed NAMA. The host country will not only facilitate the implementation of NAMA activities but will contribute financially by various policy and strategic initiatives.

Mitigation Ambition

According to 2008 statistics, Pakistan's national GHG inventory was 310 million tons of CO₂ equivalents with the energy sector as the single largest source of GHG emissions (51% of the total emissions). Pakistan contributes 0.8% of total global GHG emissions and is ranked 135th globally on a per-capita basis (GHG emissions for 2007-09). In terms of sectoral distribution, the energy sector is the most significant contributor to GHG emissions in Pakistan totalling 157 million tons of CO₂ equivalents in year 2007-08 which accounts for over 51% of the country's total emissions (0.45% of the world's total).

By successful implementation of NAMA will improve overall environmental conditions in the country. Significant amount of CO₂ will be reduced in result of this NAMA implementation. The following Environmental, Economic and Sustainable

development benefits are expected to result from the proposed NAMA implementation:

Environmental Benefits:

The Environmental benefits include clean and safe utilization of coal for generation of power to meet the demands of the country. It would ultimately help Pakistan in meeting its international climate change responsibilities.

Economic Benefits:

The long term economy wide benefit of this proposed NAMA include increased share in export, corresponding to increase of the GDP. The realization of the safe energy production potential in the economy will result in decrease in the energy gap. This will improve the country’s economy ultimately which will lead to social and economic benefits and improved economic conditions.

Sustainable Benefits:

Sustainable benefits include creation of new jobs and new economic opportunity (Green Growth). Further benefits will include health benefits through improved air with reduced concentration of carbon dioxide concentration in the atmosphere, lifestyle benefits through the use of environmental services. The Technical and human resource capacity will be strengthened due to this proposed project.

A.4 Sector

<input type="checkbox"/> Energy supply	<input type="checkbox"/> Transport and its Infrastructure
<input type="checkbox"/> Residential and Commercial buildings	<input type="checkbox"/> Industry
<input type="checkbox"/> Agriculture	<input type="checkbox"/> Forestry
<input type="checkbox"/> Waste management	

Other

A.5 Technology

<input type="checkbox"/> Bioenergy	<input type="checkbox"/> Cleaner fuels
<input type="checkbox"/> Energy Efficiency	<input type="checkbox"/> Geothermal Energy
<input type="checkbox"/> Hydropower	<input type="checkbox"/> Solar Energy
<input type="checkbox"/> Wind Energy	<input type="checkbox"/> Ocean Energy
<input checked="" type="checkbox"/> Carbon Capture and Storage	<input type="checkbox"/> Low till / No till
<input type="checkbox"/> Land fill gas collection	

Other

A.6 Type of action

<input type="checkbox"/> National/ Sectoral goal	<input type="checkbox"/> Project: Investment in machinery
<input type="checkbox"/> Strategy	

A.7 Greenhouse gases covered by the action	<input checked="" type="checkbox"/> National/Sectoral policy or program	<input type="checkbox"/> Project: Investment in infrastructure
	<input type="checkbox"/> Other <input type="text"/>	<input type="checkbox"/> Project : other
	<input checked="" type="checkbox"/> CO2	<input type="checkbox"/> CH4
	<input type="checkbox"/> N2O	<input type="checkbox"/> HFCs
	<input type="checkbox"/> PFCs	<input type="checkbox"/> SF6
	<input type="checkbox"/> Other <input type="text"/>	

B National Implementing Entity

B.1.0	Name	
B.1.1	Contact Person 1	Prof. Dr.MudassirAsrar, Chairperson PCST
B.1.2	Address	Shahrah-e-Jamhuriat, Sector G-5/2, Islamabad
B.1.3	Phone	+92-51-9101275
B.1.4	Email	mudassir.asrar@gmail.com
B.1.5	Contact Person 2	Mr. Khalid Pervez Bhatti
B.1.6	Address	Shahrah-e-Jamhuriat, Sector G-5/2, Islamabad
B.1.7	Phone	+92-51-9201259
B.1.8	Email	hafiz_khalidbhatti@yahoo.com
B.1.9	Contact Person 3	
B.1.10	Address	
B.1.11	Phone	
B.1.12	Email	
B.1.13	Comments	

C Expected timeframe for the preparation of the mitigation action

C.1	Number of months for completion	36
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D Currency

D.1	Used Currency	<input type="text" value="AED"/>
	Conversion to USD:	1

E Cost

E.1.1	Estimated full cost of preparation	12380000
E.1.2	Comments on full cost of preparation	Full cost of the project includes the capacity building, establishment of R&D Lab, technology development and fabrication costs, appraisal, technical and financial assistance/ evaluation costs for execution of the NAMA.

F Support required to prepare the mitigation action

F.1.1	Amount of Financial support	12380000
F.1.2	Type of required Financial support	<input checked="" type="checkbox"/> Grant <input type="checkbox"/> Loan (sovereign) <input type="checkbox"/> Loan (Private) <input type="checkbox"/> Concessional loan <input type="checkbox"/> Other <input type="text"/>
		<input type="checkbox"/> Guarantee <input type="checkbox"/> Equity <input type="checkbox"/> Carbon finance
F.1.3	Comments on Financial support	
F.2.1	Amount of Technical support	
F.2.2	Comments on Technical support	
F.3.1	Amount of capacity building support	

F.3.2	Type of required capacity building support	<input type="checkbox"/> Individual level <input checked="" type="checkbox"/> Institutional level <input type="checkbox"/> Systemic level <input type="checkbox"/> Other <input style="width: 100px; height: 15px;" type="text"/>
F.3.3	Comments on Capacity Building support	
F.4	Financial support required	<input type="checkbox"/>
F.5	Technological support required	<input type="checkbox"/>
F.6	Capacity support required	<input type="checkbox"/>

G Relevant National Policies strategies, plans and programmes and/or other mitigation action

G.1 Relevant National Policies	<p>The projected electricity demand of Pakistan’s growing economy is expected to within the range of 306,797 GWh by 2020, and 889,583 GWh by 2035[1]. The planned projects in power sector indicate that most of the power is likely to be sourced from the country’s vast coal reserves. The GoP is planning to harness local as well as imported coal for generation of 6,600 MW power in next five years. The installed capacity of coal power plants is planned to be enhance to 13,200 MW by 2025.[2] By 2050, energy related emissions are expected to increase to 2,730 MtCO_{2e}, i.e., equal to 64% of total emissions that year[3] – evidence that the energy sector in Pakistan will become increasingly carbon-intensive without intervention. Despite of total estimated more than 187 billion tonnes of coal (only Thar estimated 175 billion tonnes), categories amongst the world largest coal reserves countries. Only Thar can generate 100,000 MW per annum by burning 536 million tonnes which will be the cheapest (Rs. 600/tonnes) that furnace oil. But the barrier in use of coal as energy is the increased risk of un-capture CO₂ and C contents in the atmosphere[4].</p> <p>Pakistan is currently categorized as non-Annex-I country that does not have any binding to reduce GHG emissions. However, as a commitment to play a role in the global GHG emission reduction initiatives, GoP in its plans has keen interest to use coal as energy source with minimized CO₂risk.Pakistan is being a signatory of UNFCCC, CDM and Kyoto Protocol Pakistan government is committed to reduce the GHGs through adaptation of climate change policy (2012), development of environment friendly technologies and others measures required to reduce the GHGs emissions.</p> <p>Development and application of carbon mineralization technologies in Pakistan will support the initiatives of the government towards mitigation of CO₂ in the atmosphere as well as utilization coal as</p>
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energy. Under this NAMA the economic growth of the country will be improved.

[1]State of Industry Report, 2012, NEPRA. (www.nepa.org.pk)

[2]Power Policy 2013 (www.ppib.gov.pk)

[3]Ministry of Climate Change, Government of Pakistan

[4]Pakistan Coal Power Generation Potential, 2004 Private Power & Infrastructure Board, Pakistan

G.2 Link to other NAMAs

H Attachments

H Attachments
H.1 Attachment description
H.2 File

Title Description

Browse...

I Support received

I.1 Outside the Registry
I.2 Within the Registry

Support provided SupportType Amount Comment Date