

# NS-134 - Supporting Mechanisms for Promoting Distributed Generation (Net Metering, Wheeling, Banking etc.) in Pakistan to put 3 GW Alternative and Renewable Energy (ARE) Projects in next 7 years.

## Pakistan

### NAMA Seeking Support for Preparation

#### A Overview

A.1 Party

Pakistan

A.2 Title of Mitigation Action

Supporting Mechanisms for Promoting Distributed Generation (Net Metering, Wheeling, Banking etc.) in Pakistan to put 3 GW Alternative and Renewable Energy (ARE) Projects in next 7 years.

A.3 Description of mitigation action

The Government of Pakistan envisages mainstreaming of alternative and renewable energy (ARE) in the development plans of the country. The RE policy of the government of Pakistan invites investment from private sector for: i) Independent Power Projects (IPPs) for sale of power to the grid only; ii) Grid Spill-over Power Projects for self-use and sale to utility; iii) Captive Power Projects for self or dedicated use; and iv) Isolated Grid Power Projects (small, stand-alone). The Government of Pakistan (GoP) has targeted to include a large share of AREs in the energy mix to meet the increasing energy demand through Renewable Energy technologies in the country. The GoP had previously planned to produce at least 5% of the total power generation of the country (i.e. 9700 MW) through renewable energy and more significantly through wind energy sources by 2030. However, Keeping in view the potential of AREs in Pakistan and their prospects for development this target is being revised. The GoP is now planning to generate 3,000 MW through ARE Distributed Generation (DG) by 2020. Main issues that are preventing development of distributed generation options include lack of policy instruments, implementing mechanisms, financing facilities, capacity building of distribution companies & customers and proper marketing.

This NAMA is designed to address afore-stated issues. This NAMA Support project will enable in establishing a conducive environment for development of ARE Distributed Generation options in the country. The overall objective of this NAMA Support document is to establish a regulatory regime that would help in developing the ARE DG options in the country.

The GoP is emphasizing to encourage electricity customers to put up generation facilities within their territories and get it connected to the distribution grid as distributed generation. This is an entirely a new venue in Pakistan. However, this can be promoted within the country to put up 3 GW installed capacity in next 10 years. Exploiting AREs for distributed generation is expected to be very beneficial for Pakistan considering the facts that:

- AREs are clean source of energy that have definite prospects of reducing Green House Gases (GHGs). It is estimated that the planned 3 GW ARE power projects will have a potential of reducing emissions of

GHGs to the tune of 2.6 million tCO<sub>2</sub> on annual basis<sup>[1]</sup> as per current grid emission baseline.

- The ARE power projects would be developed all over the country. This would (i) relieve the burden over the north-to-south supply side (ii) reduce technical line losses at distribution level (iii) enable the grid operators to serve their clients through nearby installed power plants.
- Availability of power would result in meeting electricity demand. This would add to the economic benefit of the country.
- Availability of power would also enable social uplift of the people residing in remote parts of the country
- The development of 3 GW through DG applications can help in reducing fossil fuel import bill approximately US \$ 1 billion per year. The project will result in establishing a Guarantee Support fund of US\$ 5 million that would be used to help the financing sector to finance the end customers through soft financing schemes for installing ARE Distributed Generation generators to cover initial higher capital cost for installing these systems

Establish a regulatory regime within Pakistan for developing 3 GW AREs Distributed Generation Facilities by 2020 through private sector customers in collaboration with all the power sector stakeholders. Following related objectives would also be achieved through this proposed NAMA:

- Development of Legislative document, SoPs, Policy Guidelines for Distributed Generation options.
- Taking step towards establishing financing mechanism for Distributed Generation options.
- Relevant quarters will be attracted through workshops, seminars and Business to Business (B2B) meetings in this regard.
- Reducing GHG emission of approximately 2.6 million tCO<sub>2</sub> annually in the longer run.
- Contribution towards improved and sustainable economy by providing relatively cheaper electricity
- Establishing a Guarantee Fund for attracting commercial banks to finance the ARE DG options at consumer end level.

#### Potential of Transformational Change

The country is facing huge energy deficit. The maximum dependable power generation capacity of the country is around 19,500 MW in summer and 13,500 MW in winter<sup>[1]</sup> whereas the current demand in summer and winter is 24,500 MW and 17,500 MW respectively<sup>[2]</sup> indicting a short fall of around 4000-5000 MW. The available power generation capacity is being supplied to the 71% population of the country only. The data available with the National Power Control Centre (NPCC), Ministry of Water & Power indicates that the maximum dependable capacity is hardly reached during most part of the year due to various

constraints. At present, the power business is being done in a manner that government supplies the electricity to the consumers at all the sectors of economy. Moreover, the power generating projects are concentrated at specified places that are usually away from the load centres.

This NAMA Support project intends to transform the current market scenarios in following manners:

- The end customers will be encouraged to set up their own power generating units, meet certain portion of their electricity demand by their own as well as supply the generated electricity to the national grid at times when they do not require it. This will not only relieve the grid from the load, but would also make available extra electricity that would become available to serve dedicated loads e.g. large industries;
- This NAMA Support Project can trigger an investment of US \$ 6 billion in the private sector without involving any government money;
- The electricity would be generated near the load centres and would be connected to the distribution grid. This would strengthen the grid, reduce overall line losses and improve supply demand situation
- Addition of targeted 3 GW clean electricity would abate GHG emissions that would be developed as a result of this NAMA Support project. Once the sector is triggered and market mechanisms are set in place, this can lead towards establishing much higher capacities through DG options as compared to the target envisaged in this NAMA Support project. This would help in mitigating more GHG emissions. Further, this would support in implementing the envisaged NAMA Implementation Programme in the country.
- This NAMA Support project would overcome the barriers that are currently being faced in developing DG options.

As the installed as well as generation capacity of the country would be increased, the electricity would become available to serve demand of current as well as future connected customers. 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. Capacity development, awareness raising and training of stakeholders are major components of this NAMA Support project. This will help in building capacity, human resource development, clarifying the risk perceptions and addressing technical and financial constraints. 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 of AREs exist and DG options are yet to be promoted.

## Financial Ambition

The estimated cost of this NAMA Support project is around €14.56 Million. With this meagre amount, this NAMA Support project envisages following:

- A transformational change in the supply of electricity and evolving power selling business at the consumer end.
- Deploying cleaner sources of energy to generate electricity.
- Strengthening of the national grid by integrated distributed generation facilities at near the load centres.
- Open up the market and creating business opportunities for the local businesses, encouraging local manufacturers and the developers to come the business.
- Building capacity of the key personals in the public sector to understand the mechanics involved in managing and operating such applications.
- Establishing policy and regulatory regime, creating financial and technical instruments and procedures for developing ARE DG options in Pakistan, in a way paving ways towards easy transformation to this new regime in the country.
- Attracting the private sector investment and encouraging them to invest in options other than business as usually; creating options for investors to invest in power sector other than the Independent Power Producer (IPP) option.
- Triggering an investment of US \$ 6 billion from the private sector in the initial phase and relatively a large quantum when the NAMA Implementation project will be executed.

The host country will not only facilitate the implementation of NAMA activities but will contribute financially by various policy and strategic initiatives in the form of duty exemptions on renewable/energy efficiency equipment. This NAMA Support project will open up options for the investors to access concessional loans from local banks, accessing Clean Technologies Fund and Green Climate Fund as and when this will be established will be sougheed out at later stage. The successful implementation of proposed actions in the NAMA would spur private sector investment. The electricity would be generated near the load centres and would be connected to the distribution grid. This would strengthen the grid, reduce overall line losses and improve supply demand situation

- Addition of targeted 3 GW clean electricity would abate GHG emissions that would be developed as a result of this NAMA Support project. Once the sector is triggered and market mechanisms are set in place, this can lead towards establishing much higher capacities through DG options as compared to

the target envisaged in this NAMA Support project. This would help in mitigating more GHG emissions. Further, this would support in implementing the envisaged NAMA Implementation Programme in the country.

- This NAMA Support project would overcome the barriers that are currently being faced in developing DG options.

Capacity development, awareness raising and training of stakeholders are major components of this NAMA Support project. This will help in building capacity, human resource development, clarifying the risk perceptions and addressing technical and financial constraints.

[1] NTDC

[2] State of Industry Report, 2013

[1] Baseline emission Factor (0.6 tCO<sub>2</sub>/kWh) X targeted Installed Capacity (3000 MW) X Average Capacity Factor (15.2%) No. of operating hours in one year (8760 hours) .

A.4 Sector

<input checked="" 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	
<input type="checkbox"/> Other <input type="text"/>	

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 checked="" type="checkbox"/> Solar Energy
<input type="checkbox"/> Wind Energy	<input type="checkbox"/> Ocean Energy
<input type="checkbox"/> Carbon Capture and Storage	<input type="checkbox"/> Low till / No till
<input type="checkbox"/> Land fill gas collection	
<input type="checkbox"/> Other <input type="text"/>	

A.6 Type of action

<input checked="" type="checkbox"/> National/ Sectoral goal	<input type="checkbox"/> Project: Investment in machinery
<input type="checkbox"/> Strategy	<input type="checkbox"/> Project: Investment in infrastructure
<input type="checkbox"/> National/Sectoral policy or program	<input type="checkbox"/> Project : other
<input type="checkbox"/> Other <input type="text"/>	

A.7 Greenhouse gases covered by the action

<input checked="" type="checkbox"/> CO <sub>2</sub>	<input type="checkbox"/> CH <sub>4</sub>
<input type="checkbox"/> N <sub>2</sub> O	<input type="checkbox"/> HFCs
<input type="checkbox"/> PFCs	<input type="checkbox"/> SF <sub>6</sub>
<input type="checkbox"/> Other <input type="text"/>	

B National Implementing Entity

B.1.0 Name

Alternative Energy Development Board

B.1.1 Contact Person 1	Mr. Irfan Yousuf
B.1.2 Address	Alternative Energy Development Board 2nd Floor, OPF Building G-5/2, Islamabad
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B.1.5 Contact Person 2	
B.1.6 Address	
B.1.7 Phone	
B.1.8 Email	
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	AED Conversion to USD: 1
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**E Cost**

E.1.1 Estimated full cost of preparation	14560000
E.1.2 Comments on full cost of preparation	<p>Pakistan's performance in international financial markets, its lower credit rating and difficulty in handling financing related issues like circular debt has made it very difficult for the lenders to easily finance the power projects in Pakistan. The lenders who choose to finance the projects charge very high financing rates that make the power generated through ARE power plants expensive. If the situation is not handled adequately then materializing GoP plans for developing AREs would be difficult. Further, the GoP has included coal as one of the sources for generation of electricity in its energy generation planning. Future perspective of cheap coal power will make it difficult for ARE projects to materialize. By undertaking this NAMA, the GoP would be able to set a clear direction towards developing ARE market in Pakistan. This will enable easy financing available for the projects in the country and will smoothen the ways for setting up 3 GW clean ARE power into its national energy mix. This will also help in reducing GHGs to the tune of 2.6 million tCO<sub>2</sub> annually.</p> <p>Further, the NAMA is designed to attract private sector to invest in the DG options and install such options at their premises to meet their energy needs. It is estimated that through an investment of slightly more than US\$ 14.5 million, this NAMA will trigger an investment of US \$ 6 billion from the private sector till 2020 and quantum can increase more as the time passes and such options are being adopted by the end consumers in different sectors of economy.</p> <p>Development of ARE DGs 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.</p>

## F Support required to prepare the mitigation action

F.1.1 Amount of Financial support

5943000

F.1.2 Type of required Financial support

<input checked="" type="checkbox"/> Grant	<input type="checkbox"/> Guarantee
<input type="checkbox"/> Loan (sovereign)	<input type="checkbox"/> Equity
<input type="checkbox"/> Loan (Private)	<input type="checkbox"/> Carbon finance
<input type="checkbox"/> Concessional loan	
<input type="checkbox"/> Other <input style="width: 150px;" type="text"/>	

F.1.3 Comments on Financial support

It is noted that the sustainability, reliability and long term impacts are one of the corner stone's for successful implementation of any development project/ programme around the world. This NAMA proposal includes an important section in form of RLF which ensures sustainability of the whole program and is explained in detail below:

Since 2011, the GoP has established an Alternative Energy Development Fund (AEDF), the vires of its operations are yet to be finalized. However, as per memorandum and articles of association of AEDF, any project/programme within the scope of AREs in Pakistan can be undertaken through this and a separate funding window can also be created. The AEDF is expected to have the capacity to effectively handle the RLF.

The proposed RLF will be a separate funding window under the existing AEDF specifically for the financing of Distributed Generation activities through soft loan schemes. The loan structure under NAMA and its fund will be similar to the existing programmes of the GoP i.e. Providing below market rates for lease finance facilities. The rates have been proposed at Karachi Inter Bank Offer Rates (KIBOR) plus 5-6% per annum but would be finalized after stakeholder/Financial Institutions consultations. Financial Institution will evaluate the financial strengths of a person or entity desiring a loan and the technical evaluation of every financing case will be carried out by AEDF. Obtaining additional collateral may cover the proposed exposure/credit risk against the prospective client. Moreover, the Financial Institution will determine the quantum of equity participation by the customer/client as appropriate. The customer/client shall bear all pertinent costs including inter alia installation and insurance of equipment. Financing limit (restrictions on the size of the entity) would be determined by the experts according to the size and capacity of the project under review.

This financial instrument will facilitate in attaining the objectives stated an Section 5.3: financial ambitions.

F.2.1 Amount of Technical support

8617000

F.2.2 Comments on Technical support

The NAMA Support Project would result mitigating the risks involved in diversion from Business As Usual (BAU) growth trajectories. This will be done through removing policy,

legislative, technical, technological and financial barriers and improving the systems in vogue. This NAMA Support project is expected play an important role in overall Greening of Economy and Green Growth as is envisaged in Pakistan National Climate Change Policy of Government of Pakistan.

Development of ARE DGs as envisaged under the NAMA Support project with a vision to encourage private sector investment coming to the development. This NAMA Support project is expected to leverage the private sector investment and create an enabling environment for trigger development of ARE DGs in the country. This NAMA Support project targets developing this entirely a new venue in Pakistan to level that 3 GW may be installed through DGs by 2020.

Main issues that are foreseeing can be major hurdles in propagating this aspect are policy instruments, implementing mechanisms, financing facilities, capacity building of distribution companies & customers and proper marketing. *This NAMA is designed to address afore-stated issues. This NAMA would enable the country to proficiently develop ARE sector in Pakistan and contribute in mitigating GHG emissions.*

This NAMA Support project will result in developing a detailed documentation (including legislative document, operating procedures, guidelines, implementation mechanisms etc.) that could be used as a development framework for promotion and development of ARE DGs in the country. The mechanism created under this NAMA will act as a catalyst for addressing the risk perceptions of customers and the public sector stakeholders,.

Human resource development, its capacity building and orientation towards latest models, techniques and trends is one of the components of this NAMA. The country would benefit from the experience of developed human resource in implementing similar projects in other parts of the country. The NAMA would result in improved energy mix of the country.

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 type="text"/>

F.3.3 Comments on Capacity Building support

Capacity development, awareness raising and training of stakeholders are major components of this NAMA Support project. This will help in building capacity, human resource development, clarifying the risk perceptions and addressing technical and financial constraints. Capacity building will be

carried out through training workshops, awareness campaigns, roadshows and other instruments.

F.4 Financial support required

F.5 Technological support required

F.6 Capacity support required

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

##### G.1 Relevant National Policies

National Climate Change Policy approved in 2012 outlines goals and strategies to achieve targets in the Adaptation and Mitigation sectors. It guides the implementing agencies to exploit clean energy sources (i.e. alternative and renewable energy resources) to generate electricity, improve efficiency of currently installed thermal power plants, improve efficiency of the national grid system and deploy AREs for domestic uses.

Moreover, Policy of Development of Renewable Energy for Power Generation, 2006 has been announced by the Government of Pakistan to attract private sector investment for developing clean ARE power projects with objectives of sustainable development, energy security, environmental protection and socio-economic uplift. The Power Policy 2013 of the Government of Pakistan (GoP) emphasises development of AREs for providing inexpensive and clean electricity to every household in Pakistan with deep interest of reducing GHG emissions. Please describe the national and international climate policy context: Describe the current framework for addressing climate change in the target country. Please include a description of the country's mitigation strategy and plans to address climate change. Specify whether/how national targets relate to international agreements, especially to emission reduction pledges.

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<sup>[1]</sup>. 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.<sup>[2]</sup> By 2050, energy related emissions are expected to increase to 2,730 MtCO<sub>2e</sub>, i.e., equal to 64% of total emissions that year<sup>[3]</sup> – evidence that the energy sector in Pakistan will become increasingly carbon-intensive without intervention.

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 set up ARE power projects. The GoP, in its long term plans i.e. upto 2030, is targeting to set up around 15 GW ARE power through different applications in different parts of the country. This will

result in increasing share of AREs in the energy mix from zero to around 12%.

Development of supporting regulatory and financial instruments and conducive environment will support the initiatives of the government towards harnessing ARE potential in the country. This will help in promoting DGs under this NAMA that would lead towards developing AREs through private sector investment and without involvement of public money. The documentation, instruments, promotional activities and financing structure established as a result of this NAMA would become a basis for contributing towards attaining the long term target.

Further, this NAMA would become basis for a broader NAMA Implementation Program which targets development of ARE DGs in every sector of economy through technical and financial instruments.

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

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

[3] Ministry of Climate Change, Government of Pakistan

G.2 Link to other NAMAs

#### H Attachments

H	Attachments	Title	Description
H.1	Attachment description		
H.2	File	<input type="text"/>	<input type="button" value="Browse..."/>

#### I Support received

I.1	Outside the Registry	Nil					
I.2	Within the Registry	<table border="1"> <thead> <tr> <th>Support provided</th> <th>SupportType</th> <th>Amount</th> <th>Comment</th> <th>Date</th> </tr> </thead> </table>	Support provided	SupportType	Amount	Comment	Date
Support provided	SupportType	Amount	Comment	Date			