

NS-302 - Energy Efficiency Improvement in Iran's Agricultural Irrigation Systems through the Replacement of Inefficient Water Pumping Systems (EEIIA)

Iran (Islamic Republic of)

NAMA Seeking Support for Implementation

A Overview	
A.1 Party	Iran (Islamic Republic of) ▼
A.2 Title of Mitigation Action	Energy Efficiency Improvement in Iran's Agricultural Irrigation Systems through the Replacement of Inefficient Water Pumping Systems (EEIIA)
A.3 Description of mitigation action	The Agriculture sector in Iran dominated for more than 16.2% of electricity consumption, while its share on national GDP is about 11.2%. Also the electricity demand in agriculture sector is 2.5 times more than average demand growth in recent years. On the other hand, the electricity price in agriculture is lowest among all sectors, therefore the government pays huge amount of subsidy to electricity consumption in agriculture. Also with respect climate modeling and change study, the results show that in the future, country will be suffered from drought and annual rainfall will be decreased by 9% in period 2010-2039 in comparison to 1971-2005 period 1. It is evident that in the future, the demand for electricity in agricultural irrigation will be rapidly increased in future, which caused that government suffer from extra investment in providing secure electricity in national level, so energy efficiency improvement in agriculture is crucial. The EEIIA programme is a sector wide programme to improve energy efficiency of Agricultural irrigation infrastructure with objective to reduce the consumption per unit of exploited water targeting pumping facilities in well fields and booster stations within the country. The EEIIA programmes is directly saving and GHGs emission reduction in different provinces. Also other local pollutants will be reduced as result of saved electricity. The project activity including replacement of existing (retrofit) and future (Greenfield) inefficient pumps with submersible efficient ones and also re-sizing pumps. For this purpose the population of different pump types, its power consumption and other specifications in baseline scenario with respect to historical evaluated and therefore electricity demand for agricultural irrigation systems for 2014-2030 has projected. Then the project scenario was developed with following activities: Activity 1: Retrofitting the 60% of existing inefficient pumps population in 2015 by efficient ones during 2018-2030 and selecting optimal size for them. Activity 2: Promoting the utilization of efficient pumps by farmers (60% of population of yearly installed pumps) in new constructions (green fields) and existing ones. Activity 3: Transfer of Technology for improvement the technology of the domestic pump manufactures to produce efficient pumps. The incremental cost for retrofitting the existing pumps and new constructions is estimated about 106.2 Million USD. Also cost of technological improvement of the pumps manufacturing facilities and capacity building activities are 10 and 0.2 Million USD, respectively. It is to be noted that the project incremental cost of pumps replacement and the farmers are responsible for base cost.
A.4 Sector	☐ Energy supply ☐ Residential and Commercial buildings ☒ Agriculture ☐ Waste management ☐ Other ☐ Transport and its Infrastructure ☐ Industry ☐ Forestry
A.5 Technology	☐ Bioenergy ☒ Energy Efficiency ☐ Hydropower ☐ Wind energy ☐ Carbon Capture and Storage ☐ Land fill gas collection ☐ Other ☐ Cleaner Fuels ☐ Geothermal energy ☐ Solar energy ☐ Ocean energy ☐ Low till / No till
A.6 Type of action	☐ National/ Sectoral goal ☐ Strategy ☒ National/Sectoral policy or program ☐ Other ☐ Project: Investment in machinery ☒ Project: Investment in infrastructure ☐ Project: Other
A.7 Greenhouse gases covered by the action	☒ CO2 ☐ N2O ☐ PFCs ☒ Other ☐ CH4 ☐ HFCs ☐ SF6
In addition to CO2 emission reduction, project implementation eliminates CH4 and N2O emissions, while will reduce the emissions of other greenhouse gases.	
B National Implementing Entity	
B.1.0 Name	Power Generation Management, Transmission and Distribution Company of Iran (Tavanir), Ministry of Energy, Islamic Republic of Iran

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B.1.10	Address	
B.1.11	Phone	
B.1.12	Email	
B.1.13	Comments	

[Add Additional Entity](#)

C Expected timeframe for the implementation of the mitigation action

C.1	Number of years for completion	13
C.2	Expected start year of implementation	2019

D Currency

D.1	Used Currency	USD
Conversion to USD: 1		

E Cost

E.1.1	Estimated full cost of implementation	2,960,300,000
Conversion to USD: 2,960,300,000		
E.1.2	Comments on full cost of implementation	
E.2.1	Estimated incremental cost of implementation	116,400,000
Conversion to USD: 116,400,000		
E.2.2	Comments on estimated incremental cost of implementation	

F Support required for the implementation the mitigation action

F.1.1	Amount of Financial support	80,000,000
Conversion to USD: 80,000,000		
F.1.2	Type of required Financial support	☒ Grant ☐ Loan (sovereign) ☐ Loan (Private) ☐ Concessional loan ☐ Other ☐ Guarantee ☐ Equity ☒ Carbon finance
F.1.3	Comments on Financial support	
F.2.1	Amount of Technological support	10000000
F.2.2	Comments on Technological support	
F.3.1	Amount of capacity building support	200,000
Conversion to USD: 200,000		
F.3.2	Type of required capacity building support	☒ Individual level ☒ Institutional level ☒ Systemic level ☐ Other
F.3.3	Comments on Capacity Building support	

G Estimated emission reductions

G.1	Amount	53.80
G.2	Unit	MtCO2e
G.3	Additional information (e.g. if available, information on the methodological approach followed)	A methodological approach for monitoring the project and estimating GHGs emission reduction is prepared based on CDM approved methodologies AM0020 and AMS II.P. Grid emission factor is calculated and published by Ministry of Energy in yearly bases. Current national grid emission factor for CO ₂ is about 0.715 Kg/KWh ^[1]

[1] The Combined Margin (CM) grid CO₂ emission factor is 0.715 Kg/KWh, while the average grid CO₂ emission factor in 2013 is about 0.767 Kg/KWh (2013 Balance Yearbook, MOE, 2015).

H Other indicators

H.1 Other indicators of implementation

Cumulative project emission reduction up to 2030 is estimated between 53.8 to 192 Million ton CO₂. It is depending to the progress of power sector efficiency and grid loss reduction which are under implementation by power authority, which will be affecting the grid emission factor. With respect to the gradual improvement of emission factor, the cost of conserved carbon for the project is varied between 0.61 to 2.16 USD/ton CO₂. The lowest value will be occurred when the project improvement and grid loss reduction projects objectives is fulfilled completely.

Currently the national grid emission factor for CO₂ is about 0.715 Kg/KWh [1].

1. Increasing the power supply security: The electricity demand is growing with 8-10% every year in Iran and government have to install 8000 MW new capacity with cost of about 8 Billion USD. So with respect to the lack of financial resource, Power Authority suffers from secured supply of electricity, especially in hot seasons.

2. Increasing the gas supply security: 65% of the power plant in Iran runs by natural gas, any efficiency improvement in irrigation system may cause less demand and therefore, less natural gas consumption by power sector. This is increasing the supply of natural gas to other consumers. It is to be noted that in winter time suffer from secure supply of natural gas to consumers in industry.

3. Eliminating the adverse impact of climate change on power supply: The hydro-power contributes about 7% of total power generation in Iran. Recent drought impact on hydro power generations. Also the result of Climate modeling and Change Study (Iran's Second National Communication to UNFCCC, 2010) reveals that the country will be suffer from drought and decreasing in rainfall by 9%. So the power sector will be suffered from secure supply of electricity as result of contribution of hydro power. Efficiency improvement in irrigation systems minimizes the adverse impact of climate change on secure power supply.

4. Improvement the welfare in local and national level: at local level, any improvement in irrigation systems efficiency may reduce the electricity bill of the local farmers and have a positive impact on their income level and welfare. At national level, based on recent study by Iranian Fuel Conservation Organization (IFCO, 2014), the energy efficiency is 3 times cheaper than investment in installation of new facilities in Iran, so the government may utilize the saved amount in other development projects. Also the energy carriers are highly subsidized in Iran and agricultural electricity have the lowest price among other energy carriers, therefore government pays for providing electricity to farmers. Any improvement in efficiency of irrigation systems may increase the financial resource of the government, and then they can invest in infrastructure development.

5. Improvement local and global environment: As are mentioned before, the CO₂ emission factor of grid and grid loss are about 0.715 Kg/KWh and 18%, respectively. electricity saving in end-use may reduce about 872 Kg Carbon dioxide. Also the grid emission factor for NO_x, SO_x and CO is 2.894, 3.915 and 0.694 g/kWh. improvement in energy efficiency of end-use may improve local and global environment. From local environment point of view, some of power plants are located in mega-cities which suffered from air pollution, any improvement in end-use electricity consumption, will improve the air quality and health conditions in the mega-cities.

[1] The Combined Margin (CM) grid CO₂ emission factor is 0.715 Kg/KWh, while the average grid CO₂ emission factor in 2013 is about 0.767 Kg/KWh (2013 Balance Yearbook, MOE, 2015).

I Other relevant information

I.1

Other relevant information
including co-benefits for local
sustainable development

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

J.1 Relevant National Energy Efficiency Improvement Act No. 1770

National Policies

1. Iran's Intended Nationally Determined Contribution (INDCs), Submitted to UNFCCC on November 2015.
2. Low Carbon Development Strategies and Action Plan under 6th Five Years Development Plan
3. Strategic Action Plan on Climate Change, under Approval by National Climate Change Committee.

J.2 Link to other NAMAs

(none)

K Attachments

K	Attachments	Title	Description
		No records to display.	
K.1	Attachment description		
K.2	File	Choose File	No file chosen

L Support received

L.1 Outside the Registry

L.2	Within the Registry	Support provided	SupportType	Amount	Comment	Date
		No records to display.				