CTCN
CLIMATE TECHNOLOGY CENTRE & NETWORK

CTCN Technical Assistance
Response Plan

Country:	Iran
Request Identification Number:	2014-018/IRN-02

Title:	Combined Heat & Power (CHP) and Micro Combined Heat & Power (MCHP) Technology

Project summary

The activities proposed in this Quick Response Plan are aimed to produce the prototype of the transferred foreign CHP & MCHP technology including the related after-sales services. Parts of this Response Plan concern the CTCN assistance with the aim to transfer CHP & MCHP technology from foreign suppliers to Iran. The Response Plan comprises four activities that will span over 2 years. However, CTCN assistance is provided for the first 7-9 months of this broader programme.

The four main outputs of the Response Plan encompass:
(1) Report on the identification of the companies with technical knowledge on CHP & MCHP;
(2) Business communication with the selected CHP & MCHP companies;
(3) Signed contract with the selected CHP & MCHP technology owner to realize technology transfer;
(4) The prototype of the transferred foreign technology including the related after sales services.

Partners will be from the government (notably the CITC, Ministry of Petroleum and Ministry of Energy) and Tamkar Gas Equipment Company, a representative from the private sector, as the request proponent.

The activities outlined in this Response plan will be refined in consultation with the above key stakeholders during initial inception missions.

1. Overview of the assistance

1.1 Objectives (outcomes)

The CTCN assistance will contribute to the following medium and long-term outcomes in Iran, if it would end in the development of CHP & MCHP technology and related market introduction:

- Considerable annual natural gas savings, compared to conventional generation of heat and power for the household and commercial sectors;
- Reduction of transmission losses, CO_2 emissions, NO_x emissions, and energy demand during peak usage;
- Expected huge annual opportunity cost for the government;
- Potential market share of the technology in the region;
- Creation of jobs in the industry.

1.2 Results (outputs)

CTCN contributes to the achievement of the above-mentioned objective by delivering the first two outputs, namely:

- A report on the identification of CHP & MCHP companies with technical knowledge, and
- Business Communication with the selected interested CHP & MCHP companies.

The second two stages of technology purchase and localization are considered beyond the scope of a quick response, as they involve substantial financial resources.

1.3 Technology aspects

While the overall objective of the CHP & MCHP project is to produce the prototype of the transferred foreign technology including the related after sales services, the objective of the CTCN assistance is to facilitate the transfer of the technology from foreign CHP & MCHP suppliers to Iran.

2. Description of the Assistance

2.1 Activities

Annex 1 summarizes the outputs partly provided by the CTCN, the activities that will be carried out as part of each output, and the deliverables, explaining the formats in which the results will be conveyed.

Activity 1 – Identification of the companies with CHP & MCHP technical knowledge

Activity 1.1 – List of requirements CHP & MCHP for Iran
Activity 1.2 – Survey CHP & MCHP companies (long list)
Activity 1.3 – Matching long list with list of requirements (short list)
Activity 1.4 – Communication long list/short list with Iran
Activity 1.5 – Selection CHP & MCHP companies with technical knowledge, based upon Tamkar's option and discretion

Activity 2 – Business communication with selected CHP companies

Activity 2.1 – Contact selected CHP & MCHP companies to map their willingness for potential cooperation with Iran
Activity 2.2 – Communication of the list of interested CHP & MCHP companies with Iran
Activity 2.3 – Selection CHP & MCHP technology owners for business communication
Activity 2.4 – Organizing business communications

Deliverables	Delivery date
Report on identification of CHP & MCHP companies with technical knowledge	6 months after the start of project
Organizing business communication with selected interested CHP & MCHP companies	9 months after the start of project

2.2 Expertise required

The assistance provider should offer expertise in the field of CHP & MCHP technology, including the related applications, and high-quality consultancy services.

2.3 Main partners

The table below shows the stakeholders the CTCN Response Expert Team expects to engage and collaborate with during the implementation of the response. It is likely that this list will be further amended / expanded during the course of the response.

Stakeholder	Role
Ministry of Energy	Implementation of Iran government policies and regulations related to the energy sector.
Ministry of Petroleum	Implementation of Iran government policies and regulations related to the fuel sector.
Centre of Innovation Technology Cooperation (CITC)	NDE and government research centre
Tamkar Gas Equipment Company	Request proponent
UNIDO Country Office	Coordinate and facilitate communication with stakeholders

While the overall objective of the CHP & MCHP project is to produce the prototype of the transferred foreign technology including the related after sales services, the objective of the CTCN assistance is to facilitate the transfer of the technology from foreign suppliers to Iran. In order to do so, successful collaboration with the key stakeholders in Iran, i.e. NDE/CITC and TGEC, and CHP technology owners is essential. For this a coordination mechanism will be established to facilitate communication among them.

The central role of the NDE/CITC will be to act as facilitator and coordinator of the planned activities. These activities will also receive support from the local UNIDO office in Tehran. Knowledge regarding national circumstances would be required in order to work more efficiently. TGEC shall be supported by some consulting services, for selecting the best & cost effective capacity of CHP or MCHP technology, regarding local circumstances. A preliminary inventory of the required specifications for CHP & MCHP has already been made (see Annex 2). This list, as part of the activities of output 1, will be further completed/updated. It is particularly important to build up on the work that has already been done and to make sure that existing assessments and reports on CHP & MCHP technology in Iran are identified and used.

2.4 Synergies

Energy use intensity is very high in Iran. Since the household and commercial consumers are one of the main sectors of energy demand in the country, and considering the lossy process of electricity production in conventional power generation methods, all the energy-related ministries in Iran are interested in decentralized, high-efficiency technologies for supplying energy to the household and commercial sectors. The CTCN intervention will make technical assistance available to realize these intensions.

In the past a number of studies have been carried out in Iran to identify the best technology for energy cogeneration, market needs, and implementation of different CHP projects. Also some efforts are ongoing concerning technology transfer through purchasing and installation of equipment, as well as localization of production of equipment and after sales service support. This CTCN intervention will build up upon this available knowledge.

2.5 Timeline

The table below illustrates the expected time frame of the project, starting with the CTCN intervention. This timeline is a first estimate and it will be discussed internally and streamlined.

	Year 1				Year 2	
Output **Month:**	**1-3**	**4-6**	**7-9**	**10-12**	**13-15**	**16-24**
1: Identifying the companies with technical knowledge						
Activity 1.1						
Activity 1.2						
Activity 1.3						
Activity 1.4						
Activity 1.5						
2: Business Communication						
Activity 2.1						
Activity 2.2						
Activity 2.3						
Activity 2.4						
3: Technology transfer through purchasing and installation of equipment						
Activity 3.1						
Activity 3.2						
Activity 3.3						
4: Localization of production of equipment and after sales service support						
Activity 4.1						
Activity 4.2						
Activity 4.3						
Activity 4.4						

2.6 Indicative budget

The total budget dedicated by CTCN for the Quick Response, covering outputs 1 and 2, is USD 50,000. Further details on the indicative budget for the Quick Response are outlined below.

Output	**Labour CTCN ($)**	**Travel ($)**	**Other Direct Costs ($)**	**Total ($)**
1: Identifying the companies with technical knowledge				
Activity 1.1	25100	1500	350	26950
Activity 1.2				
Activity 1.3				
Activity 1.4				
Activity 1.5				
2: Business Communication				
Activity 2.1	21200	1500	350	23050
Activity 2.2				
Activity 2.3				
Activity 2.4				
3: Technology transfer through purchasing and installation of equipment				
Activity 3.1	-	-	-	-
Activity 3.2				
Activity 3.3				
4: Localization of production of equipment and after sales service support				
Activity 4.1	-	-	-	-
Activity 4.2				
Activity 4.3				
Activity 4.4				
TOTAL	46300	3000	700	**50,000**

2.7 Gender considerations

Given the current participation of high-quality educated women at the request applicant side as well as at the assistance provider side, it is expected that gender issues within this request will be taken into account in a balanced way.

2.8 Risk identification and risk mitigation

Risks	Consequence	Probability	Mitigation
Lack of willingness of technology owners to transfer the CHP & MCHP technology to Iran	No technology transfer would take place, no prototype would be built in Iran	Moderate	In close cooperation with CITC and TGEC informing the technology owners of their potential benefits as licence holders due to the promising market potential of the technology in Iran and surrounding region
Lack of funding for the following steps of the proposed Response Plan	No follow-up of the Response Plan due to lack of funding	Low	Seeking early contact with key funding bodies to ascertain interest and scope

2.9 Monitoring and Reporting

Milestones for each of the activities and deliverables will be detailed at the outset of the intervention. Regular and efficient communication will be established to allow for adaptive management and refine the approach as more information is gathered and produced. The NDE will contribute to those efforts and support the timely implementation of the activities and the reports.

3. Long-term impacts of the assistance

3.1 Expected climate benefits

It is expected that a CHP & MCHP system would result in a considerable annual natural gas saving, compared to conventional generation of heat and power for the household and commercial sectors. On the other hand, there are about 550,000 buildings that use central heating in Iran. If 20% of these buildings would be covered by CHP & MCHP, this would result in a huge annual opportunity cost for the government. Moreover, the localization of the CHP & MCHP production offers Iran a potential market share for this technology in the region.

3.2 Co-benefits

The CTCN assistance will contribute to the following medium and long-term benefits in Iran, if it would end in the development of CHP & MCHP technology and related market introduction:

- Considerable annual natural gas savings, compared to conventional generation of heat and power for the household and commercial sectors;
- Reduction of transmission losses, CO_2 emissions, NO_x emissions, and energy demand during peak usage;

- Expected huge annual opportunity cost for the government;
- Potential market share of the technology in the region;
- Creation of jobs in the industry.

3.3. Post-assistance plans and actions

This assistance aims to help transferring CHP & MCHP technology from foreign suppliers to Iran. It is part of a broader programme with the aim to produce the prototype of the transferred CHP & MCHP technology including the related after-sales services.

4. Formal agreement and signatures

Signatures of the requesting country

For the NDE	**For the Request Applicant**
Name: Mr. Seyed Ali Akramifar	Name: Mr. AmirHooshang Khaki
Title: Head	Title: Managing Director
Iranian Presidential Center for Innovation and Technology Cooperation (CITC)	Tamkar Gas Equipment Company
Date: 11.15.2015	Date: 10.31.2015
Signature:	Signature:

Signatures of the CTCN

For the CTCN Director	**For the Climate Technology Manager**
Name: Jukka Uosukainen	Name: RAJIV GARG.
Title: CTCN Director	Title: Climate Technology Manager
Date:	Date: 11. 17. 2015
Signature:	Signature:

Annex 1: Planned Activities

The table below shows the outputs partly provided by the CTCN, the activities that will be carried out as part of each output, and the deliverables, explaining the formats in which the results will be conveyed.

Output	Activity	Deliverables	Responsibility
1. Identification of the companies with CHP & MCHP technical knowledge	1.1. List of requirements MCHP for Iran	Report on identification of CHP & MCHP companies with technical knowledge	CTCN
	1.2. Survey CHP & MCHP companies (long list)		
	1.3. Matching long list with list of requirements (short list)		
	1.4. Communication long list/short list with Iran		
	1.5. Selection CHP & MCHP companies with technical knowledge, based upon Tamkar's option and discretion		
2. Business Communication with the selected interested CHP & MCHP companies	2.1. Contact selected CHP & MCHP companies to map their willingness for potential cooperation with Iran	Organizing business communication with selected interested CHP & MCHP companies	CTCN
	2.2. Communication of the list of interested CHP & MCHP companies with Iran		
	2.3. Selection CHP & MCHP technology owners for business communication		
	2.4. Organizing business communications		
3. Technology transfer through purchasing and installation of equipment	3.1. Negotiation with technology owners	Signed contract with selected CHP & MCHP technology owner to realize technology transfer	TGEC / CITC
	3.2. Receive and review proposals		
	3.3. Sign contract		
4. Localization of production of equipment and after sales service support	4.1. Technology adaptation to local conditions (market demand, skilled manpower, facilities, infrastructure, etc.)	Skilled manpower, public education, the prototype, after sales service support	CHP & MCHP owner / TGEC / CITC
	4.2. Production (design, construction, installation of equipment, etc.)		
	4.3. Technology uptake (encompassing technology is introduced into the society, study skills as public education)		
	4.4. Technology development (integrating technology into the domestic skills and experience to achieve a new technology) → the prototype		

Annex 2: Preliminary inventory of the required specifications for MCHP

Parameter	Required specification	Comment
Type MCHP	Reciprocating gas engine	
Unit size MCHP	15-20 kWe	Based on base load of heat deamands, suitable for multi-family buildings or small offices with net internal area of 250 – 300 m^2
Heat-to-power ratio	1.7 – 2.0	
Fuel type	Natural gas	
Price range	800 – 1000 $/kWe	$12,000 – 20,000
Current competing options	- Boiler rooms to supply heat through conventional steam boiler or condensing boiler - Power plants to supply electricity	
Existing infrastructure	- Gas grid - Electricity grid	Both existing
Allowable emissions		Although the Department of Environment in Iran is preparing environmental standards, there is no standard for using MCHP in Iran yet.
Allowable noise level	55 dB	
Climatic zones in Iran		- Caspian zone (Caucasian and mid-European affinities, slightly Mediterranean on the coast) - Beluchi zone (Saharo-Sindian and subtropical affinities) - Irano-Turanian zone (slight Mediterranean affinities) a) Subdesertic zone b) Steppic zone c) Substeppic zone d) Xerophilous forest zone - High-mountain zone

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