



**Component project activity design document form for
small-scale CDM component project activities**

(Version 04.0)

COMPONENT PROJECT DESIGN DOCUMENT (CPA-DD)

Title of the CPA	Doplan Small Scale Hydro Power
Version number of the CPA-DD	02
Completion date of the CPA-DD	23/09/2015
Title of the PoA to which the CPA is included	Small Hydro Power Programme of Activities in Iran
Host Party	Iran
Estimated amount of annual average GHG emission reductions	40,430 tCO₂e

SECTION A. General description of CPA**A.1. Title of the proposed or registered PoA**

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Small Hydro Power Programme of Activities in Iran

A.2. Title of the CPA

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CPA title: Doplan Small Scale Hydro Power

Version: 02

Date: 23/09/2015

A.3. Description of the CPA

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Doplan small scale hydro power consists of a Greenfield small-scale hydropower plant that is run-of-river with a total installed capacity of 12 MW and delivers generated electricity to the Iran national grid. The project will be implemented by Iranian Water and Power Development Company. The purpose of the Project is to generate electricity using renewable energy sources therefore it not only reduces the greenhouse gas emissions by replacing the grid electricity produced from fossil fuels but also helps achieve to sustainable development.

The CPA is located in Ardal city, Chaharmahal and Bakhtiari province within the boundary of Iran and expected to reduce 40,430 tCO₂e every 12 months, leading to 283,010 tCO₂e over the first crediting period (7 years). Based on latest data, the Combined Margin emission factor of the national grid is 0.6923 tCO₂/MWh.

A.4. Entity/individual responsible for the operation of CPA

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Entity/individual responsible for CPA which is called as CPA implementer is: Iranian Water and Power Resources Development Company.

A.5. Technical description of the CPA

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The CPA will introduce the third run-of river power generation plant of Ardel package. The plant will be constructed on Azizabad River located in Lirabi village, Ardal city, Chahar Mahal va Bakhtiyari province, Iran. Total installed power capacity is 12 MW (4×3MW) and there is no plan to change the installed capacity in the future.

Firstly, a derivative stream of Azizabad River will be diverted to a settling basin by the weir and intake channel. Next, water will be channelled to the daily adjustment reservoir, then, to the forebay through two steel pipes (penstocks). Finally, four splits will pass from forebay to four horizontal Francis turbines that are linked to four 3 MW generators. The turbines and other electrical and mechanical equipment are located in the power house.

Generated electricity voltage will be transferred by a 6.3 kV ground cable to the electrical station to raise its voltage to 63 kV; afterwards, it will be transmit to Naghan substation. It is projected to generate 58,400 MWh electricity annually, and to deliver it to the national electricity grid of Iran.

General and technical specifications of the CPA are presented in Table 1 and Table 2, respectively.

Table 1. General specification of Doplan hydropower project

Parameter	Unit	Value
Total installed capacity	MW	12
Project lifetime	year	30

Annual electricity generation	MWh	58400
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Table 2. Technical specification of Doplan hydropower project

Parameter	Unit	Value
weir		
Length of Spillway crest	m	45
height	m	6.5
Settling basin		
Dimension	m ³	24×10×5.3
Water channels		
Reinforced concrete channel to reservoir - Cross section	m ²	2.3×2.7
Reinforced concrete channel to reservoir - length	m	4338
Number of penstocks	-	2
Diameter of penstock	mm	1600
Length of penstock	m	730
Diameter of penstock split	mm	600
Number of penstock splits	-	4
Diameter of penstock	mm	600
Length of penstock splits	m	20
Turbine		
Number of turbines	-	4
Turbine capacity	MW	3
Type of turbine	-	Horizontal Francis
Net design head of turbine	m	175
Nominal speed	rpm	750
Design water flow in turbine	m ³ /s	2
Generators		
Number of generators	-	4
Nominal power	MW	3
Outlet voltage	kV	6.3
Nominal speed	rpm	750
Power factor		0.9

A.6. Party(ies)

Name of Party involved (host) indicates host Party	Private and/or public entity(ies) CPA implementer(s) (as applicable)	Indicate if the Party involved wishes to be considered as CPA implementer (Yes/No)
Islamic Republic of Iran (host)	Mehr Renewable Energy Company (CME)	No
	Iran Water and Power Development Company	
	Mahab Ghodss Consulting Engineering Company	

Contact information of CPA implementer/s is in Appendix 1 of this CPA-DD.

A.7. Geographic reference or other means of identification

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Doplan Small Scale Hydropower will be located on Aziz abad River, in Lirabi village, Ardal city, Chaharmahal and Bakhtiari Province, Iran. This plant is the third small scale hydro power plant on Azizabaad River.

Geographical coordination of the CPA is as follow:

Longitude: 50° 29' E

Latitude: 31° 56' N

Location of the CPA is showed in the following maps in detail:



Figure A-1: The geographical location of Chaharmahal and Bakhtiari Province in Iran



Figure A-2: Location of the Project

A.8. Duration of the CPA

A.8.1. Start date of the CPA

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The expected start date of the Doplan small scale hydro power project is on 01/04/2016.

A.8.2. Expected operational lifetime of the CPA

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Based on FSR, 30 years of operation is anticipated for the CPA.

A.9. Choice of the crediting period and related information

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Renewable crediting period (first 7 years)

A.9.1. Start date of the crediting period

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01/04/2017

A.9.2. Length of the crediting period

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The length of 1st crediting period: 7 years, 0 months.

The number of renewal periods: 2

The duration of crediting period of any CPA shall be limited to the end date of the PoA regardless of when the CPA was added.

A.10. Estimated amount of GHG emission reductions

Emission reductions during the crediting period	
Years	Annual GHG emission reductions (in tonnes of CO ₂ e) for each year
Year 1	40,430
Year 2	40,430
Year 3	40,430
Year 4	40,430
Year 5	40,430
Year 6	40,430
Year 7	40,430
Total number of crediting years	7
Annual average GHG emission reductions over the crediting period	40,430
Total estimated reductions (tonnes of CO ₂ e)	283,011

A.11. Public funding of the CPA

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The CPA will not receive any public funding from Annex I Parties of the UNFCCC.

A.12. Debundling of small-scale component project activities

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According to version 03 of the “Guidelines on assessment of de-bundling for SSC project activities”, for the purposes of registration of a Programme of Activities (PoA), a proposed small-scale CPA of a PoA shall be deemed to be a de-bundled component of a large scale activity if there is already at least one activity, which satisfies both conditions (a) and (b) below:

- (a) Has the same activity implementer as the proposed small scale CPA or has a coordinating or managing entity, which also manages a large scale PoA of the same technology/measure, and;
- (b) The boundary is within 1 km of the boundary of the proposed small-scale CPA, at the closest point.”

The CPA implementer gives the CME a declaration that the proposed CPA is not a de-bundled component of a large scale project and the CME confirms there is no activity with the same technology/measure, whose boundary is within 1km of the boundary of the proposed small-scale CPA by checking of the UNFCCC website.

A.13. Confirmation for CPA

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Mehr Renewable Energy Company, the CME, confirms that the CPA “Doplan small scale hydropower project” is not registered as an individual CDM project activity and is not a part of another registered PoA. Also, CME confirms that the proposed CPA is not a CPA that has been excluded from a registered CDM PoA as a result of erroneous inclusion of CPAs.

A.14. Contact information of responsible persons/ entities for completing the CDM-SSC-CPA-DD-FORM

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Mahab Ghodss Consulting Engineering Company is responsible for completing the CDM-SSC-CPA-DD-FORM. Mehr Renewable Energy Company (MRE) is responsible to check the eligibility criteria of the CPA.

SECTION B. Environmental analysis

B.1. Analysis of the environmental impacts

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According to PoA-DD section E.1:

The proposed CPA is a run-off-river hydro power plant having 12 MW total installed capacity that is lower than 100 MW. Thus the CPA is not required to prepare an EIA.

SECTION C. Local stakeholder consultation

C.1. Solicitation of comments from local stakeholders

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According to the "Small Hydro Power Programme of Activities in Iran" PoA-DD, Section F, the local stakeholder consultation is held at the CPA level.

In order to collect stakeholders' opinions and comments on this CPA, a public meeting was held on June 9th 2014 at Azizabad village. The meeting was announced in local newspaper (Saldartan) on June 7th 2014 (Figure C-1). Also Government, local authorities, experts related to the proposed CPA were invited to attend the consultation.



Figure C-1: Announcement for local stakeholders' consultation meeting in local newspaper

At the local stakeholders' meeting, the climate change, greenhouse gases and their effects and Clean Development Mechanism was explained by the CPA manager. Also a delegate of the CPA Implementer presented general features of the project and highlighted social, economical and environmental benefits of the project implementation. Finally, all the attendees were asked to fill out the Stakeholder's Comment Form questioning the effects of the project on local environment, employment, economy, sustainability and technical improvement.

C.2. Summary of comments received

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Following main concerns were raised during the local stakeholder consultation:

1. Amount of electricity supply for the region
2. Consequent loss of the project operation for inhabitants
3. Construction of road, bridge more than the power plant
4. Tourism progress

C.3. Report on consideration of comments received

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The CPA implementer explained that the project is a run-off-river hydropower plant so it doesn't change the pass of flow of river and doesn't cause loss. Also we consider all environment issues in planning phase to reduce losses. Moreover we compensate all damages that inhabitants suffer from the project operation. The project increases employment opportunities during construction and operation of project. New infrastructure will contribute to economic growth, improve standard of life of the local people and reduce fossil fuel usage to generate electricity so diminishing environmental contaminants and dire consequence of them.

The major purpose of project is renewable electricity generation that has environmental and constructional benefits and minor purpose comes from them. Tourism will be increase as a result of facilities and economic progress.

All in all, all stakeholders present in the meeting support construction of the project.

SECTION D. Eligibility of CPA and estimation of emissions reductions

D.1. Reference of methodology(ies) and standardized baseline(s)

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Doplan small scale hydropower is applying methodology AMS-I.D: Grid connected renewable electricity generation - Version 18.0; reference:

<http://cdm.unfccc.int/methodologies/DB/RSC TZ8SKT4F7N1CFDXCSA7BDQ7FU1X>.

Respective tools and standards are listed below:

"Tool to calculate the emission factor for an electricity system (version 04.0.0)" refer to:

<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v4.0.pdf>

"Tool for the demonstration and assessment of additionality (version 07.0.0)" refer to:

<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf>

"Demonstration of additionality, development of eligibility criteria and application of multiples methodologies for programme of activities (version 03.0)" refer to:

http://cdm.unfccc.int/filestorage/e/x/t/extfile-20130729142721867-meth_stan04.pdf/meth_stan04.pdf?t=b0l8bXJ2ZWZsfDAs4lCcyGw_8jEc44nmFkUB

D.2. Applicability of methodology(ies) and standardized baseline(s)

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The proposed CPA fulfils all of the applicability criteria of methodology AMS-I.D Version 18.0; the following table illustrates how the proposed CPA is compatible with the methodology.

Paragraph	AMS I.D/version 18.0 Applicability Criteria	Methodology AMS I.D (version 18.0) is applicable to an CPA included in the proposed PoA because:
2	This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass: (a) Supplying electricity to a national or a regional grid. (b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.	The Doplan small scale hydro power is a hydro power plant (renewable) that supplies electricity to the national grid of Iran. Thus the condition is met.
4	This methodology is applicable to project activities that: (a) Install a Greenfield plant; (b) Involve a capacity addition in (an) existing plant(s); (c) Involve a retrofit of (an) existing plant(s); (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s).	The Doplan small scale hydropower plant is a hydropower plant (renewable) that supplies electricity to the national grid of Iran. Thus the condition is met.
5	Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: -The project activity is implemented in an existing reservoir with no change in the volume of reservoir; -The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m ² ; -The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m ² .	The CPA is a new run-of the-river hydro power plant. Thus the condition is met.
6	If the new unit has both renewable and non-renewable	The CPAs has renewable

	components (e.g. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15MW.	components only. Thus the condition is met.
7	Combined heat and power (co-generation) systems are not eligible under this category.	The CPA is not a co-generation system. Thus the condition is met.
8	In the case of project activities, that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	The proposed CPA (Doplan small scale hydro power) is a Greenfield project which its capacity is lower than 15 MW limit. Thus the condition is met.
9	In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.	The CPA is a Greenfield small scale hydropower project. Thus the condition is met.

D.3. Sources and GHGs

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The emission sources and gases included in or excluded from the project boundary are listed below based on the methodology AMS-I.D (version 18.0)

Source		Gas	Included?	Justification / Explanation
Baseline	CO ₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity	CO ₂	Yes	Main emission source
		CH ₄	No	Main emission source
		N ₂ O	No	Main emission source
Project activity	Emissions from water reservoirs from hydro power plants	CO ₂	No	Main emission source
		CH ₄	No	The CPA is hydro power plant without reservoir
		N ₂ O	No	Main emission source
	CO ₂ emissions from on-site consumption of fossil fuels due to the project activity	CO ₂	No	Not applicable, no fossil fuel consumption
		CH ₄	No	No
		N ₂ O	No	No

The geographic is located within the boundaries of Iran which is the boundary of the PoA.

D.4. Description of the baseline scenario

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According to paragraph 19 of AMS-I.D, Version 18.0 the baseline scenario for the project activity that delivers electricity to the Grid is the following:

“The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources to the grid.”

The proposed CPA consists of a Greenfield hydro power plant that delivers electricity to the National Grid of Iran. The grid emission factor is calculated in combined margin manner according to procedures in *“Tool to Calculate the Emission Factor for an Electricity System (version 04.0.0)”*.

D.5. Demonstration of eligibility for a CPA

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These eligibility criteria have been developed in accordance with the standard for “Demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities” (version 03.0).

Proposed CPA “Doplan hydropower” demonstrates its eligibility for inclusion under the PoA “Small Hydro Power Programme of Activities in Iran” as follows:

The required eligibility criteria	Justification Procedure	Procedure (evidence)
(A) The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA;	CPA to provide detailed documentation regarding the exact geographical location of the CPA such as feasibility study report or third party assessment report or land documents to be checked and confirmed by the CME that it falls within the boundaries of the POA outlined in section A.5 above.	The Doplan small scale hydropower is located in Ardal city, Chaharmahal and Bakhtiari province, Iran. Its coordinate is 31° 56' N 50° 29' E, while the host country coordinates is 32° N 53° E.
(B) Conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations (e.g. programme logo);	Confirmation that the CPA is not registered or being registered as a stand-alone CDM project outside of this PoA, a bundled CDM Project Activity or a CPA under another registered PoA should be verified by; - Available information on the UNFCCC website, - Confirmation of CPA owner for the same, - Cross verification of unique geographical coordinates of CPA to confirm that the proposed CPA will be located at a site where there was no renewable energy power plant operating prior to the implementation of the proposed CPA (Greenfield plant).	The Doplan small scale hydropower provides: UNFCCC web site check by the CME and confirmation that the CPA is not registered as a part of any other PoA or as an individual CDM project at the time of CPA inclusion under the PoA
(C) The specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications	The technology/measure allowed under PoA is grid connected hydropower (run-of-river type or reservoir type) based generation systems which will displace equivalent quantity of electricity from the national grid in Iran. The total capacity of each CPA will not exceed 15MW. The CPA must be a greenfield power plant generating electricity and must not involve capacity addition, retrofitting or modifying of an existing facility for renewable energy generation. All the equipment of each CPA will be complying with applicable national/international standards. The above details may be validated from one or more of the following documents: <ul style="list-style-type: none"> • Detailed Project Report • Technology Specification provided by the technology supplier • Purchase order copies • EPC contracts • Power purchase agreement • Project commissioning certificates • Or other available documents. 	Doplan small scale hydropower provides following documents: According to the FSR no power plant is constructed prior to implementation of the proposed CPA, and the project capacity 12 MW which is less than 15 MW limit. The proposed CPA meets all relevant national testing and certification requirements, as well.
(D) Conditions to check the start date of the CPA through documentary evidence;	The start date of the CPA should be on or after the start date of validation of the PoA, i.e. the date on which the CDM-PoA-DD is first published for global stakeholder consultation. The start date of the CPA may be confirmed by any documentary evidence	Doplan small scale hydropower complies this criterion with: According to POA-DD, the starting date of the PoA is: 15/04/2015 The starting date of the CPA is expected to be: 01/04/2017 which

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	<p>including:</p> <ul style="list-style-type: none"> • supply order/ purchase order/ with supplier • start of construction of project plant • commitment to implement project • or any other document in line with the start date definition as per the glossary of CDM terms 	<p>is after the start date of validation of the PoA</p>
<p>(E) Conditions that ensure compliance with applicability and other requirements of single or multiple methodologies applied by CPAs;</p>	<p>Each CPA shall meet the applicability criteria of the baseline and monitoring methodology AMS-I.D (version 18.0). There is no possibility of combination of other methodologies in the POA. For a hydropower CPA with reservoir, it must fulfill one of the following conditions:</p> <ul style="list-style-type: none"> • The project activity is implemented in an existing reservoir with no change in the volume of the reservoir; • The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the project emissions section of the applied methodology, is greater than 4 W/m²; • The project activity is implementing new reservoir and the power density of the power plant, as per definitions given in the project emissions section of the applied methodology, is greater than 4 W/m². 	<p>Also applicability of methodology is shown in section D.2 of CPA-DD. According to approved FSR there is no reservoir in the Doplan small scale hydropower, as a result 8th criterion is not applicable. Approved FSR proves that the proposed CPA will be connected to the national grid.</p>
<p>(F) The conditions that ensure that the CPA meets the requirements pertaining to the demonstration of additionality as specified in Section 3.1 of “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities (version 03.0)”;</p>	<p>Any CPA must comply with one of the following additionality tests explained in the PoA-DD:</p> <p>(a) Based on EB approval for automatic additionality of micro-scale renewable energy technologies recommended by Iranian DNA, a CPA with a capacity up to five megawatts is automatically additional and further assessment of additionality at individual CPA level is not necessary.</p> <p>(b) For a hydro CPA with an installed capacity of more than 5MW, up to 15MW, additionality demonstration should be based on the latest guidelines on the demonstration of additionality of small-scale project activities, and investment barrier analysis should be adopted to demonstrate the additionality of the CPA as per the latest guidelines on the assessment of investment analysis and any other relevant guidance from the board pertaining to investment analysis.</p> <p>CPA implementer will have to provide:</p> <ul style="list-style-type: none"> -The approved FSR -Any supporting documents. 	<p>The Doplan hydropower plant applies option (c) to comply this criteria. All procedures and parameters are provided in the FSR. Demonstration of additionality is described in the following of this section.</p>
<p>(G) The PoA-specific</p>	<p>A local stakeholders’ consultation should be</p>	<p>The Doplan hydropower complies</p>

<p>requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact analysis;</p>	<p>conducted at CPA level as per the CDM requirements to gauge the opinions and comments of the stakeholders in the immediate project area. The local stakeholder consultation shall comprise:</p> <ul style="list-style-type: none"> • Identification of local stakeholders • Explain about the CPA project activity • Inviting comments from stakeholders • Recording the comments <p>The CPA implementer must provide CME following documents:</p> <ul style="list-style-type: none"> • Questionnaires of stakeholders survey • Invitation notice • Meeting minute and attendees list • Photo/ video evidence of meeting • Summary of comments received and how they have been taken into account. <p>The renewable power generation will reduce the adverse environmental and social impacts associated with the use of fossil fuels for electricity generation. The Environmental Impact Analysis will be done in conformity with prevailing legislation in the Host Country, Iran.</p> <p>Based on the environmental regulation of Iran, the environmental impact analysis is not required for run-of-river hydropower plants where the installed capacity is less than 100 MW.</p> <p>For reservoir type hydropower plants with a dam height over 15 meter or a reservoir surface area over 400 hectares, the CPA implementer must do EIA and it should be cited in the CPA-DD.</p>	<p>this criterion with holding the local stakeholder consultations meeting and kept its minute, questionnaires and received comments and how they have been taken into account.</p> <p>The Doplan hydropower complies No.13 criterion with: Total installed capacity is 12 MW (<100MW) and there is no plan to change the installed capacity in the future, So based on Iran environmental regulation, there is not mandatory law of environmental analysis.</p>
<p>(H) Conditions to provide an affirmation that funding from Annex I parties, if any, does not result in a diversion of official development assistance;</p>	<p>The CPA should have no public funding from Annex I countries resulting in the diversion of official development assistance.</p> <p>One of the following document shall be provided:</p> <ul style="list-style-type: none"> - The declaration from the CPA implementer affirming that no funding from Annex I parties is used in the CPA; - Loan funding documents (if applicable) 	<p>Iranian Water and Power Development Company confirms that Doplan small scale hydro power receives no funding from Annex I parties.</p>
<p>(I) Where applicable, target group (e.g. domestic/commercial/industrial, rural/urban, grid-connected/ off-grid) and distribution mechanisms (e.g. direct installation);</p>	<p>The CPA should be a new (Greenfield) grid-connected renewable small scale hydro power project.</p> <p>The CME will check the FSR, power purchase agreement or approval from concerned statutory body to ensure that the power generated from the CPA is injected only to the grid system within the host country.</p>	<p>The FSR shows the CPA is a new grid-connected small scale hydropower plant.</p>
<p>(J) Where applicable, the conditions related to sampling requirements for the PoA in accordance with</p>	<p>The POA requires all CPAs to independently monitor all electricity generation sources and no sampling method is applicable.</p>	<p>N/A</p>

the “Standard for sampling and surveys for CDM project activities and programme of activities”;		
(K) Where applicable, the conditions that ensure that every CPA (in aggregate if it comprises of independent sub units) meets the small-scale or micro-scale threshold and remains within those thresholds throughout the crediting period of the CPA;	The CPA implementer should declare that CPA meets the small-scale (installed capacity over 5MW but up to 15 MW) or micro-scale (installed capacity up to 5MW) threshold criteria and remains within those thresholds throughout the crediting period of the CPA.	Doplan small scale hydro power complies this criteria with: - The FSR proves that the capacity of the CPA is 12 MW; -A declaration that the CPA will remain within those thresholds during the crediting period.
(L) Where applicable, the requirements for the debundling check, in case the CPA belongs to small-scale or micro-scale project categories.	CPAs should not be a debundled component of another large-scale CPA or CDM project activity. The assessment of de-bundling would be carried out as per “Guidelines on assessment of debundling for SSC project activities (version 03)”. The assessment of de-bundling criteria can be confirmed from the information available in the UNFCCC website and in the form of declaration obtained from the respective CPA implementer.	Doplan small scale hydro power complies this criterion with: - Declaration on non-debundling - Available information on all registered activities on the CDM website

• **Assessment and demonstration of additionality of the CPA, as per eligibility criteria:**

Since the capacity of the CPA is 5.6 MW (>5 MW), investment analysis is used.

The project uses the *Tool for the Demonstration and Assessment of Additionality* (version 07.0.0), which has been approved by the EB at the 39th conference to demonstrate its additionality. The tool includes the following steps:

- Step 1: Identification of alternatives to the project activity consistent with mandatory laws and regulations
- Step 2: Investment analysis
- Step 3: Barriers analysis
- Step 4: Common practice analysis

Investment barrier:

Step 1: Determine appropriate analysis method

According to “*Tool for the demonstration and assessment of additionality, (version 07.0.0)*”, Step 2, an appropriate analysis method must be chosen for demonstration of additionality.

There are three analysis methods available:

- 1) Simple cost analysis (Option I);
- 2) Investment comparison analysis (Option II);
- 3) Bench mark analysis (Option III).

Since the CPA has a financial benefit other than CDM related income from selling produced electricity, the benchmark analysis (option III) is applied to assess financial attractiveness of the proposed project activity.

Step 2: Option III: Apply benchmark analysis

The project internal rate of return (IRR) is considered as an appropriate financial indicator for the investment analysis of the Project. The likelihood of the development of this Project, rather than the supplying electricity from the national grid (the baseline) will be determined by comparing the IRR of the Project without CDM financing to a suitable benchmark.

the benchmark) has been derived according to the additionality tool (version 07.0.0, paragraph 38, option (b)

(b) *Estimates of the cost of financing and required return on capital (e.g. commercial lending rates and guarantees required for the country and the type of project activity concerned), based on bankers views and private equity investors/funds' required return on comparable projects;*

As a minimum required rate of return, the minimum lending rates of the government to civil projects published by Central Bank of Iran in 2013, 21%, is used. The additionality tool enables the increase of the commercial lending rates by a suitable risk premium. However, no adequate equity premium for hydro power plants is available. The risk premium therefore has not been considered for the benchmark. This is a very conservative approach.

The resulting benchmark applied is therefore 21%. This figure is realistic, however, very conservative.

Step 3: Calculation and comparison of financial indicators and benchmark calculation

The following parameters have been used to calculate the IRR of the project activity;

Table D-1: Financial Parameters for investment analysis

Parameter	Unit	Value	Source
Electricity generation	GWh/y	60.65	FSR
Electricity tariff	Rial/kWh	715 ¹	FSR
O&M Costs	Million Rial/year	15634	
Total investment	Million Rial	446695	FSR
Depreciation method	-	Linear to scrap	FSR
Operation period	year	50	FSR
Operation period	year	4	FSR
Depreciation period	year	30	FSR
Expected CER price	EURO/tCO ₂ e	7	FSR

The IRR of the Project with and without revenue from CDM are shown in the table D-2 bellow.

Table D-2: IRR of the Project with and without CDM

title	IRR
Without revenue from CDM	2.72%
With revenue from CDM	4.48%

In accordance with the benchmark analysis (Option III), if the project IRR of a project is lower than that of the benchmark, the Project is not considered as financially attractive. Based on the above data, without CERs revenues, the project IRR (before interest and tax) of the Project is 2.72%, which is lower than that of the benchmark (21%). Therefore, the Project is not financially attractive.

Step 4: Sensitivity analysis

In order to assess whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions, sensitivity analysis is undertaken for the proposed project activity.

According to the “*Guidelines on the Assessment of Investment Analysis (Version 05)*”, EB62, Annex 5, only variables, including the construction investment, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation. For the project activity, revenue stream (electricity tariff), annual running cost, the total investment are selected for variables subject to the sensitivity analysis based on their quantitative materiality following the guidance.

¹ - Based on historical data, market price of electricity would be around 450 Rial/kWh. According to power ministry regulation, electricity tariff of generated electricity from small scale generators that includes renewable sources with capacity up to 25 MW is 715 Rial/kWh. Since this price is higher than marker price, this law encourages private sector to investment in this sector.

The table and figure below shows variation of IRR when the selected four critical variables are changed in the range of -10% and +10% (the range is equivalent to the least cover range stipulated in “Guidelines on the Assessment of Investment Analysis (Version 05)”.

Table D-3: Results of the sensitivity analysis

Title	-10.0%	-5.0%	0.0	5.0%	10.0%
Total project cost	3.76%	3.22%	2.72%	2.23%	1.77%
O&M expenses	3.05%	2.88%	2.72%	2.55%	2.38%
Supplied electricity	1.75%	2.24%	2.72%	3.17%	3.61%
Tariff	1.75%	2.24%	2.72%	3.17%	3.61%

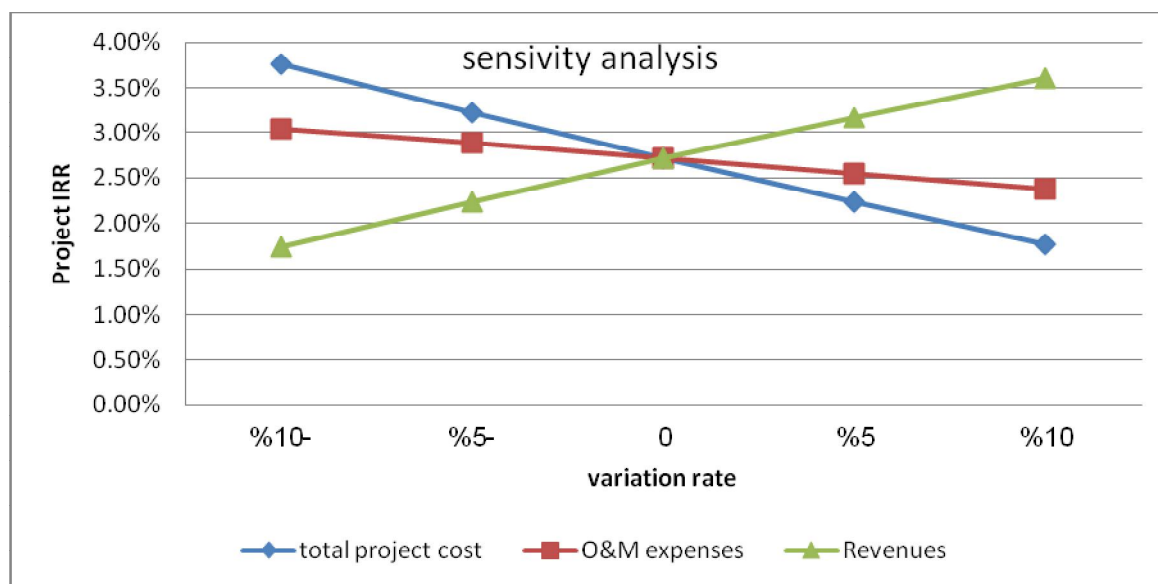


Figure D-1: Results of the sensitivity analysis of the Project

Based on the sensitivity analysis, the project IRR (before interest and tax) of the Project could reach the benchmark if one of the following conditions can be achieved:

- Only when total investment has a drop of 83%
- Only when operation and maintenance cost has decreased 962%
- Only when electricity tariff has increased 347%
- Only when supplied electricity has increased 347%

As materials and equipments costs have involved the main part of investment, and their price has increased during recent years, it is impossible that it has decreased 78%.

725% depression of O& M cost is impossible.

Considering electricity tariff during recent years shows that it has grown 10% each year. So it is impossible it has increased 346% over its life time.

Since the installed capacity of the Project (12 MW) will comply with the selected design in the FSR and the annual operating hours of the Project is considered to be maximum (run-of-river type and 24h operation), it is impossible to increase the supplied electricity by 346% throughout the lifetime of the Project.

Since in all situations the project IRR is lower than the benchmark (21%), the project is additional.

D.6. Estimation of emission reductions

D.6.1. Explanation of methodological choices

>>

According to the selected methodology AMS-I.D, Version 18.0, *Baseline emissions include only CO2 emissions from electricity generation in power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants.* The baseline emissions are to be calculated as follows;

Baseline emissions

Based on the methodology AMS-I.D (version 18.0), paragraph 22: Baseline emissions include only CO2 emissions from electricity generation in power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} \cdot EF_{CO_2,grid,y} \tag{1}$$

Where:

- BE_y = Baseline emissions in year y (tCO₂/yr)
- EG_{PJ,y} = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)
- EF_{CO₂, grid,y} = CO₂ emission factor of the grid in year y (t CO₂/MWh)

According to the methodology AMS-I.D (version 18.0), paragraph 23, a combined margin manner(option(a)) is applied to calculate EF_{CO₂, grid,y}. The detail of EF_{CO₂, grid,y} calculation for the Iran electricity grid is described in section B.6.1 of generic CPA-POA” Small Hydro Power Programme of Activities in Iran”. So based on latest data, the grid emission factor of the Iran national grid in year 2014 is considered:

EF_{CO₂,grid} of Iran=0.6923 tCO₂/MWh.

Project activity emissions

Since the CPA consist of a new hydropower plant without reservoir, project activities is PE_y = 0.

Leakage

As mentioned in the PoA, there is not any equipment transfer in this PoA so leakage emission of the CPA is zero , i.e. LE_y=0.

Emission reductions

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y \tag{2}$$

Where:

- ER_y = Emission reductions in year y (t CO₂e/yr)
- BE_y = Baseline emissions in year y (t CO₂/yr)
- PE_y = Project emissions in year y (t CO₂e/yr)

D.6.2. Data and parameters fixed ex-ante

(Copy this table for each data and parameter.)

Data / Parameter	EF _{grid,CM,y}
------------------	-------------------------

Unit	tCO ₂ /MWh
Description	Combined Margin emission factor
Source of data	Calculated as Combined margin CO ₂ emission factor for grid connected power generation
Value(s) applied	0.6923 tCO ₂ /MWh
Choice of data or Measurement methods and procedures	This value is calculated according to “ <i>Tool to calculate the emission factor for an electricity system (version 04.0)</i> ”.As provided in the PoA-DD
Purpose of data	Calculation of baseline emissions
Additional comment	This data will be calculated at the time of PoA-DD submission and will not be changed during the first crediting period.

D.6.3. Ex-ante calculation of emission reductions

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Calculation of baseline emission:

The annual electricity delivered by the CPA is estimated as 58400 MWh/yr and will be monitored ex-post. Then the baseline emissions is calculated ex-ante using equation 1:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$$

$$= 58400 \text{ MWh/yr} \times 0.6923 \text{ tCO}_2/\text{MWh} = 40430 \text{ tCO}_2/\text{yr}$$

Since project emission of the CPA is zero (PE_y), the emission reduction is:

$$ER_y = BE_y = 40,430 \text{ tCO}_2\text{e/ yr}$$

D.6.4. Summary of the ex-ante estimates of emission reductions

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1	40,430	0	0	40,430
Year 2	40,430	0	0	40,430
Year 3	40,430	0	0	40,430
Year 4	40,430	0	0	40,430
Year 5	40,430	0	0	40,430
Year 6	40,430	0	0	40,430
Year 7	40,430	0	0	40,430
Total	283,010	0	0	283,011
Total number of crediting years	7			
Annual average over the crediting period	40,430			40,430

D.7. Application of the monitoring methodology and description of the monitoring plan

>>

D.7.1. Data and parameters to be monitored

(Copy this table for each data and parameter.)

Data / Parameter	EG _{BL,y}
------------------	--------------------

Unit	MWh/y
Description	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CPA in year y
Source of data	On-site measurements
Value(s) applied	58400
Measurement methods and procedures	Calculated from the on-site measurements by electricity meter(s) owned by the CPA implementer, installed at the point of feeding to the grid. The following parameters will be measured: (i) The quantity of electricity supplied by the project to the grid (ii) The quantity of electricity delivered to the project from the grid
Monitoring frequency	Continuous measurement and at least monthly recording and annual summarization The data will be archived electronically for 2 years after the end of the last crediting period.
QA/QC procedures	The meters will be checked and calibrated annually, according to the relevant national electric industry standards and regulations. Data measured by the main meter will be cross checked by the data from check meters.
Purpose of data	Calculation of baseline emissions
Additional comment	-

D.7.2. Description of the monitoring plan

>>

The monitoring plan is designed to calculate the GHG emission reductions at the CPA level. Co-operation of The CPA implementer and the CME is required to have an accurate monitoring.

1- Monitoring responsibilities

The CME is assumed responsibility for:

- Being the overall supervisor of the PoA
- Preparing the operation and monitoring manual for CPAs
- Calculating emission reductions
- Preparing monitoring reports periodically to the DOE

CPA implementer will be responsible for:

- Monitoring of CPA operations
- Reporting collected data to the CME periodically
- Training employees and set up a CDM team

CDM team will be responsible for data recording, collection, reporting to CME and preservation. This team will be composed by the project manager, technicians, and statisticians.

The detailed structure is shown in figure D-2

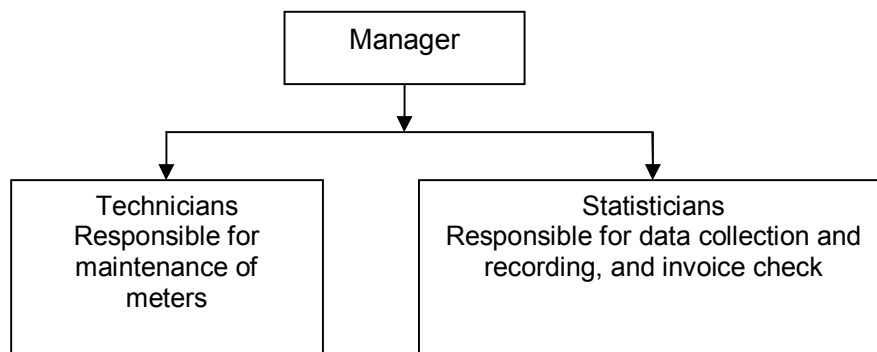


Figure D-2: Management structure of the monitoring activity

Responsibility of Statisticians:

1. Monitors the required parameters:

- Quantity of electricity supplied to the grid by the project activity
- 2. Records and archiving data using computer software; the records will serve as back-up purpose and archived at Project site. All the data will be kept at least for 2 years after the end of the crediting period.
- 3. Compiles and analyzes the monthly monitoring reports and cross-checks the monitoring report data against electricity sales receipts.
- 4. Elaborates an estimate of emission reduction in an Emission Reduction Monitoring Report annually.
- 5. Ensures that operators are appropriately trained and assigned for monitoring/checking the different parameters/meters with classes and an instruction manual.
- 6. Reviews the instruction manual for its effectiveness and improvement. This manual will be made available during verification.

Responsibility of maintenance Technicians:

1. Ensures that all meters installed at the plant are calibrated according to national industrial standards.
2. Ensures that all meters are operating properly, and requests to repair or replace the meters in case of any malfunction.
3. Elaborates the Calibration Report annually. The Calibration Report is composed listing all CDM-related instruments, their details, calibration status and expected error.

Responsibility of manager:

1. Manages and supervises all monitoring activities under the project.
2. Review and approve the Emission Reduction Monitoring Report with all its attachments that will be verified by the CME.
3. Subjects the Calibration Report Status to internal audit and provides as an attachment in the annual Emission Reduction Monitoring Report, for verification.

2- Training

For operation and maintenance of equipments, monitoring and recording process relevant people will be educated and qualified. All training records will be documented by CPA manager.

3- Data to be monitored

The only monitoring parameter will be $EG_{PJ,y}$. Required data will be monitored by the CPA implementer. It will be collected manually or will be saved electronically during the crediting period.

4- A scheme of metering equipments

The CPA implementer will record electricity delivered to and imported from the grid cautiously by energy meters. The net electricity generated will be considered for emission reduction calculation. Also in order to accuracy check, there is a gateway in the nearest substation that receives the generated electricity. If there is a significant difference between energy meters records in the site and substation, an investigation must be done for explanation.

5- Examination and Calibration

The electric meters should be examined and undergo regular field calibration according to the relevant standards and regulations of the power industry. After the examination and calibration, the meters should be sealed. All the meters installed shall be tested and calibrated annually for:

- (a) Detection of a difference larger than the allowable error in the readings of meters
- (b) Repair of meters in case of any failure of one or more parts to operate in accordance with the specifications. In case of irreparable damage of the meters, they shall be changed.

The CPA implementer is responsible for calibration of all metering devices to relevant standards.

6- Data Management System

The data measured hourly will be monthly recorded and archived electronically or manually, in addition monthly data will be printed in paper for a backup.

The project owner will keep electricity sale and purchase invoices. All written documentation such as maps, drawings, the EIA and the feasibility study, should be stored and should be available to the verifier so that the reliability of the information could be checked. The document management system will be developed to ensure adequate document control for CDM purposes; also this system will ease verification process. The CDM Manager of the project is responsible for checking the data (according to a formal procedure) and he will be responsible for managing the collection, storage and archive of all data and records. All the data shall be kept until two years after the end of credit period.

SECTION E. Approval and authorization

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Letter of Approval from DNA of Iran was received on 10/08/2015.

Appendix 1. Contact information of CPA implementer(s) and responsible person(s)/ entity(ies) for completing the CDM-SSC-CPA-DD-FORM

CPA implementer and/or responsible person/ entity	<input checked="" type="checkbox"/> CPA implementer(s) <input type="checkbox"/> Responsible person/ entity for completing the CDM-SSC-CPA-DD-FORM
Organization	Iran Water and Power Development Company
Street/P.O. Box	Bidar St., Afrigha crossing, Modares highway, P.O.Box: 193955897
Building	No. 3
City	Tehran
State/Region	Tehran
Postcode	1964913581
Country	Iran
Telephone	0098 21 27822400
Fax	0098 21 27822430
E-mail	info@iwpc.ir
Website	www.iwpc.ir
Contact person	Eisa Bozorghzadeh
Title	Manager of Understudies Projects
Salutation	Mister
Last name	Bozorghzadeh
Middle name	-
First name	Eisa
Department	-
Mobile	-
Direct fax	-
Direct tel.	-
Personal e-mail	e.bozorgzadeh@iwpc.ir

CPA implementer and/or responsible person/ entity	<input type="checkbox"/> CPA implementer(s) <input checked="" type="checkbox"/> Responsible person/ entity for completing the CDM-SSC-CPA-DD-FORM
Organization	Mahab Ghodss Consulting Engineering Company
Street/P.O. Box	Takharestan St, Dastgerdi Ave., P.O.Box: 193956875
Building	No. 16
City	Tehran
State/Region	Tehran
Postcode	1918781185
Country	Iran
Telephone	0098 21 23961512
Fax	0098 21 22221096
E-mail	info@mahabghodss.com
Website	www.mahabghodss.net
Contact person	Naser Tarkeshdooz
Title	Mister
Salutation	Managing Director
Last name	Tarkeshdooz

Middle name	-
First name	Nasser
Department	-
Mobile	-
Direct fax	-
Direct tel.	-
Personal e-mail	ntarkeshdooz@yahoo.com

Appendix 2. Affirmation regarding public funding

According to section A.11 of this CPA-DD, the CPA “Small Hydro Power Programme of Activities in Iran” does not receive public funding from Parties included in Annex I.

Appendix 3. Applicability of methodology(ies) and standardized baseline(s)

Appendix 4. Further background information on ex ante calculation of emission reductions

Appendix 5. Further background information on monitoring plan

Appendix 6. Summary of post registration changes

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
04.0	9 March 2015	Revisions to: <ul style="list-style-type: none"> • Include provisions related to statement on erroneous inclusion of a CPA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Provisions related to the Host Party; • Editorial improvement.
03.0	25 June 2014	Revisions to: <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the component project activity design document form for small-scale CDM component project activities (these instructions supersede the "Guidelines for completing the component project activity design document form for small-scale component project activities" (Version 01.0)); • Include provisions related to standardized baselines; • Add contact information on a CPA implementer and/or responsible person/ entity for completing the CDM-SSC-CPA-DD-FORM in A.14. and Appendix 1; • Add general instructions on post-registration changes in paragraph 4 and 5 of general instructions and Error! Reference source not found.; • Change the reference number from <i>F-CDM-SSC-CPA-DD</i> to <i>CDM-SSC-CPA-DD-FORM</i>; • Editorial improvement.
02.0	13 March 2012	EB 66, Annex 17 Revision required to ensure consistency with the "Guidelines for completing the component project design document form for small-scale component project activities".
01.0	27 July 2007	EB33, Annex44 Initial adoption.

Decision Class: Regulatory
 Document Type: Form
 Business Function: Registration
 Keywords: component project activity, project design document, SSC project activities