CLEAN DEVELOPMENT MECHANISM

CDM-SSCWG51-A06

Draft Information note

Considerations on small- and microscale additionality provisions

Version Draft 01.0

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1. Procedural background

1. The Board at its eighty-seventh meeting (EB 87) considered the analysis and recommendation for the graduation of the positive list of technologies and agreed to retain the current positive list under the “Methodological tool: Demonstration of additionality of small-scale project activities” (small-scale additionality tool).[1] The Board further requested the SSC WG to assess:

   (a) The possible needs for further disaggregation of the positive list based on technologies and/or region;

   (b) The possible expansion of the positive list of technologies to include new technologies taking into account the guidance provided by the Board;

   (c) The appropriate frequency of review of the positive list of technologies (e.g. five years instead of the current three years).

2. Further at EB 85, the Board agreed to request the secretariat, to look further into the issue in consultation with the SSC WG and the MP, with the view to assess whether other criteria than unit size may be used to establish positive lists. It also requested to assess the feasibility of merging the tool for demonstration of additionality of microscale activities (microscale additionality tool) with small-scale additionality tool and make a recommendation for the consideration of the Board at a future meeting.

2. Purpose

3. The purpose is to invite a call for public input on proposals/recommendations on:

   (a) Feasibility to merge small-scale and microscale additionality tools;

   (b) Feasibility of replacing the criteria based on unit size with a different criteria for the positive list;

   (c) The expansion the positive list of technologies to include new technologies;

   (d) Further disaggregation of the positive list based of technologies and/or region;

   (e) Appropriate frequency of review of the positive list of technologies (e.g. five years instead of the current three years).

3. Key issues, analysis and proposed solutions

3.1. Assess feasibility to merge small-scale and microscale additionality tools

4. The small-scale and microscale additionality tools have the following key differences:

   (a) **Thresholds for units to qualify automatic additionality:** It is uniform 5 per cent of the small-scale thresholds under small-scale additionality tool, while microscale additionality tool specifies 33 per cent of the small-scale threshold for

[1] See paragraph 49 of EB 87 meeting report.

projects in LDC/SIDS or underdeveloped regions or off-grid areas of the world. The microscale additionality tool specifies different conditions for rest of the regions (e.g. 10% for type I household projects) and 1% of the small-scale threshold for type-II and type-III projects. Furthermore most of the thresholds specified under microscale additionality tool were in response to specific CMP requests;

(b) **Validity of the positive lists:** The small-scale additionality tool specifies a validity of 3 years from the date of adoption by the Board, no period of validity applies to microscale additionality tool;

(c) **Application of the methodological tools:** The microscale additionality tool is applicable to projects or CPAs applying small-scale or large-scale methodologies, however, the small-scale additionality tool is only applicable to the projects or CPAs applying small-scale methodologies.

5. The secretariat carried out a mapping of the CDM regulatory documents where small-scale and microscale additionality tools are cited with a view to identify the potential impact to the revision of regulatory documents in the event of consolidation of the two tools. See Table 1 of Appendix 1, there are over 60 occurrences.

6. The secretariat and the SSC WG agreed to recommend that the two additionality tools discussed above remain separate, however a flow chart to guide the users to easily navigate provisions on automatic additionality may be considered by the Board for development (see Figure 1 in Appendix 1 for an illustration).

3.2. Assess other criteria than unit size for the positive list

7. As discussed above some of the criteria on the unit size were either specifically included or implied in the CMP decisions while others were agreed by the Board.

8. The work under this mandate aims to identify any negative implications on environmental integrity reported in literature on account of the unit size thresholds including stakeholder inputs (e.g., call for public input). World Bank (2016)[2] stated “only very narrowly defined microscale projects were deemed safe enough to be automatically additional. These projects were seen to have such insurmountable barriers in terms of technological costs, regulatory frameworks, and so on, that deeming them automatically additional was considered low risk. Were the threshold for “microscale” to increase, for example, from 5kW to 20 or 30 kW, the barriers would not have been the same and the risks would have prevented the CDM Executive Board from approving automatic additionality”.

[2] World Bank (2016): Carbon credits and Additionality_ Past, Present and Future <http://documents.worldbank.org/curated/en/2016/05/26396403/carbon-credits-additionality-past-present-future>.

9. The SSC WG, in this regard, discussed if it would be feasible to consider a list of technologies/measures that would not be eligible to apply the unit size threshold criteria rather than changing thresholds based on unit sizes. The SSC WG assessed a list of methodologies where baseline is identified solely based on historical information and where the operation cost could be volatile (e.g. fuel switch projects). The key findings are:

   (a) Out of 71 SSC methodologies there are 42 methodologies (excluding those that are for households application) where baseline is solely based on historical information (Table 2, Appendix 1). Of these only 6 methodologies (i.e. AMS-II.C, AMS-II.F, AMS-III.B and AMS-III.Z AMS-III.H and AMS-III.AW) have been applied in the 7 PoAs and 6 PAs included in the CDM pipeline that have used small scale and micro-scale positive list criteria (See Table 2 of Appendix 1);

   (b) The technologies involved were: efficient fluorescent light bulbs in rural communities, LED public street lighting, efficient heat pumps and solar water heaters, and geothermal technologies, involve efficient base transceiver system, drip method and irrigation system, biogas and fly ash-lime-gypsum bricks and blocks. The sizes of technologies in terms of SSC threshold are well below 1% (See Table 3 and 4 of Appendix 1).

10. The above findings show that a very limited projects/PoAs have so far applied the threshold criteria for automatic additionality and the technologies involved were state-of-the art and the thresholds of those technologies were well below 1% of the SSC thresholds. The SSC WG is of the view that the analysis of the CDM pipeline would not lead to drawing a conclusion on technologies/measures that would not be eligible to apply the unit size threshold criteria. The SSC WG agreed to continue exploring feasibility of other options to replace the criteria based on unit size for the positive list.

11. The SSC WG also noted that this work stream may have potential cross cutting issues with another work stream on additionality (See ‘Concept note on additionality approaches, EB 85, para 37 mandate) and agreed to take into account of the outcome of that work stream, where applicable.

3.3. Assess the expansion the positive list of technologies to include new technologies

12. The SSC WG considered the following criteria for developing positive list:

   (a) Project or unit size or threshold level, e.g. in small-scale and microscale tools;

   (b) Location of the project activity, e.g. projects in LDC/SIDS and SUZ are additional;

   (c) Market penetration of a technology/measure, e.g. as in AM0113;

   (d) Host country regulations, e.g. as in AMS-III.D;

   (e) Financial attractiveness of a technology/measure, e.g. in small-scale and microscale tools;

   (f) A combination of above, e.g. in small-scale and microscale tool;

   (g) Performance of a technology/measure.

3.3.1. Expansion of Renewable Energy Technologies

13. The SSC WG and the secretariat recommend expanding the positive list covering Biomass internal gasification combined cycle (BIGCC) up to 15 MW installed capacity.

14. BIGCC (Biomass internal gasification combined cycle) offers the potential of better generation efficiency. The penetration of the systems in developing countries is so far at the nascent stage (IEA 2015).The same source predicts that BIGCC could become competitive with fossil fuels under a CO_2 price regime. As seen in Table 1, the LCOE of BIGCC is more than 60% higher than that of fossil fuel technologies.

15. It is to be noted that other renewable energy technologies listed in Table 1 below with a capacity of up to 15 MW are already included in the positive list under the small-scale additionality tool.

Table 1. LCOE of electricity generation technologies

Technologies	Global Average LCOE (USD_{2015}/MWh)
SOLAR	
PV- utility-scale	261
PV - commercial rooftop	286
PV - large, ground-mounted	183
PV - residential rooftop	251
CSP no storage	385
CSP storage 6h	207
CSP molten salt storage	243
WIND	
Wind offshore	174
OCEAN	
Wave, Tidal, Ocean thermal energy conversion and salinity gradients.	358
Biomass	
BIGCC (Biomass internal gasification combined cycle)	175
Fossil Fuel Average	83
Coal	85
Combined Cycle Gas Turbine	82

Source[3]: Based on IPCC (2014), IEA (2015), IRENA (2015) and REN 21(2015)

[3] IPCC. 2014. Annex III – "Technology-specific cost and performance parameters", Working Group III IPCC 5th Assessment Report "Climate Change 2014: Mitigation of Climate Change"/.

[3] IEA. 2015. Projected Cost of Generating Electricity, International Energy Agency/.

3.3.2. Expansion of positive list for rural electrification

3.3.2.1. Expansion of rural electrification threshold

16. In the case of rural electrification, renewable energy projects in countries with rural electrification rates less than 20 per cent are considered automatically additional under the small-scale additionality tool. Analysis of data from CDM pipeline indicates that no project or PoA so far has utilized these criteria. This could be because most countries with a rural electrification rate of less than 20 per cent are also LDCs and the projects might have used LDC status for automatic additionality.

17. Following elements were considered for the analysis:

    (a) Data of registered CDM projects and PoAs, and CDM pipeline to identify number of countries that apply this provision;

    (b) Publicly available recent literature on the electrification rates in the developing countries specially least developed countries (LDC) and small island developing states (SIDS), and countries under-represented in CDM[4] to assess relevance of the current threshold for rural electrification;

    (c) An analysis of rural electrification rates in the developing countries specially LDC and SIDS, and countries under-represented in CDM is conducted based on the recent information available from various sources (e.g. SE4ALL, The World Bank) to assess viability of the existing threshold for rural electrification.

18. The above analysis inferred that it is desirable to increase the threshold from current 20 per cent to [40] [50] per cent, to cover more LDCs and countries under-represented in CDM.

19. The countries qualifying the proposed threshold of [40] [50] per cent exhibit barriers comparable to those countries currently qualifying 20 per cent threshold such as access to finance, high cost of capital for renewable energy projects and others as listed below (Refer to Appendix 2 for details):

    (a) Have little to no renewable energy (excluding hydropower) market penetration;

    (b) Low credit ratings, high risk of doing business and barriers to financial access;

    (c) The analysis shows (see Table 2 below) that if the threshold is increased to [40] [50] per cent 17 LDCs and 9 non-LDCs will qualify (Refer to table 1 of Appendix 2 for further details).

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3 IRENA. 2015. Renewable Power Generation Costs in 2014, International Renewable Energy Agency/.

3 REN 21. 2015. Renewables 2015 Global status report.

4 Countries with 10 or fewer registered CDM project activities as on 31 December 2010.

Table 2. Rate of rural electrification and eligibility of countries[5]

Proposed threshold for rate of rural electrification to qualify automatic additionality	Total number of countries qualifying threshold	Total number of LDC/SIDS qualifying threshold	Total number of countries under-represented in CDM other than LDC/SIDS qualifying threshold	Other developing countries qualifying threshold
Up to 20%	40	32	6	2
Up to 25%	43	33	8	2
Up to 30%	47	36	9	2
Up to 35%	53	41	10	2
Up to 40%	53	41	10	2
Up to 45%	57	42	13	2
Up to 50%	64	49	13	2

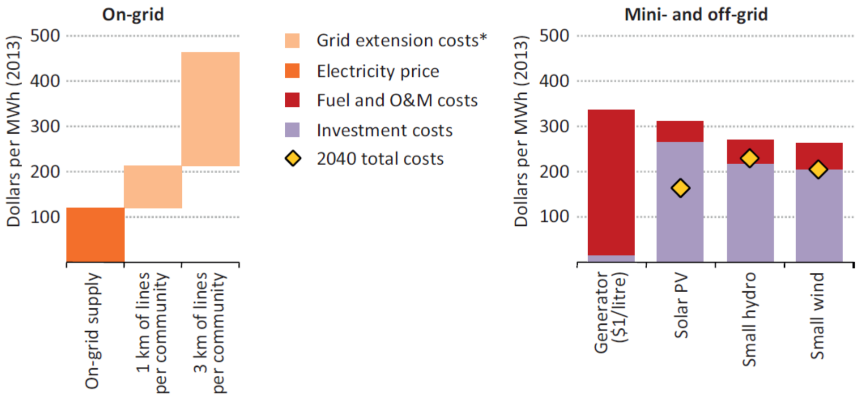
Source: Based on SE4ALL database from The World Bank (2015)

20. Thus SSC WG and secretariat recommend increasing the threshold for rate of rural electrification to [40%][50%] per cent from current value of 20 per cent.

3.3.2.2. Expansion of positive list covering grid extension for rural electrification

21. The cost of grid extension beyond certain distance becomes prohibitive, tipping the balance in favour of off-grid systems. For example, see figure below in the specific case of Africa. The comparison between these two options turns on the density of settlement, with higher density favouring the development of off-grids.

Figure 1. Comparison of cost of electricity supply from grid versus off-grid



Source: World Africa Energy Outlook (IEA, 2014)

22. The comparison of costs in the above figure shows that it is not always evident that cost of grid extension (up to 3 km per community) is always expensive to off-grid (renewable)

[5] Thresholds were not increased beyond 50% for this analysis, as it was believed an increase above 50% was improbable.

option. However according to UNDP (2014),[6] the grid extension to rural community becomes prohibitively expensive when it extends beyond the distance of 10 km.

23. Rural electrification projects involving grid extension are automatically additional when the following criteria representing obvious barriers to grid extension involving rural electrification]are met:

    (a) Rural electrification rate in the country is below [40%][50%];

    (b) Geography: LDCs, SIDS, SUZ;

    (c) Recent trends: rural electrification rate has increased by less than [10%] [20%] over the past [5] [10] years;

    (d) The extension of a grid for rural electrification of a community involves at least a distance of 10 km.

3.4. On possible needs for further disaggregation of the positive list based of technologies and/or region

24. The SSC WG noted that one option is to take into account this request during the update of the positive list.

3.5. On the appropriate frequency of review of the positive list of technologies (e.g. five years instead of the current three years)

25. The SSC WG considered five years as one of the options that also aligns with the reporting cycle of IPCC, IEA (cost data). However, the fast pace of technological evolution might be an issue to consider.

26. The SSC WG 50 preferred the option of three years. However input from the public in this regards are welcome.

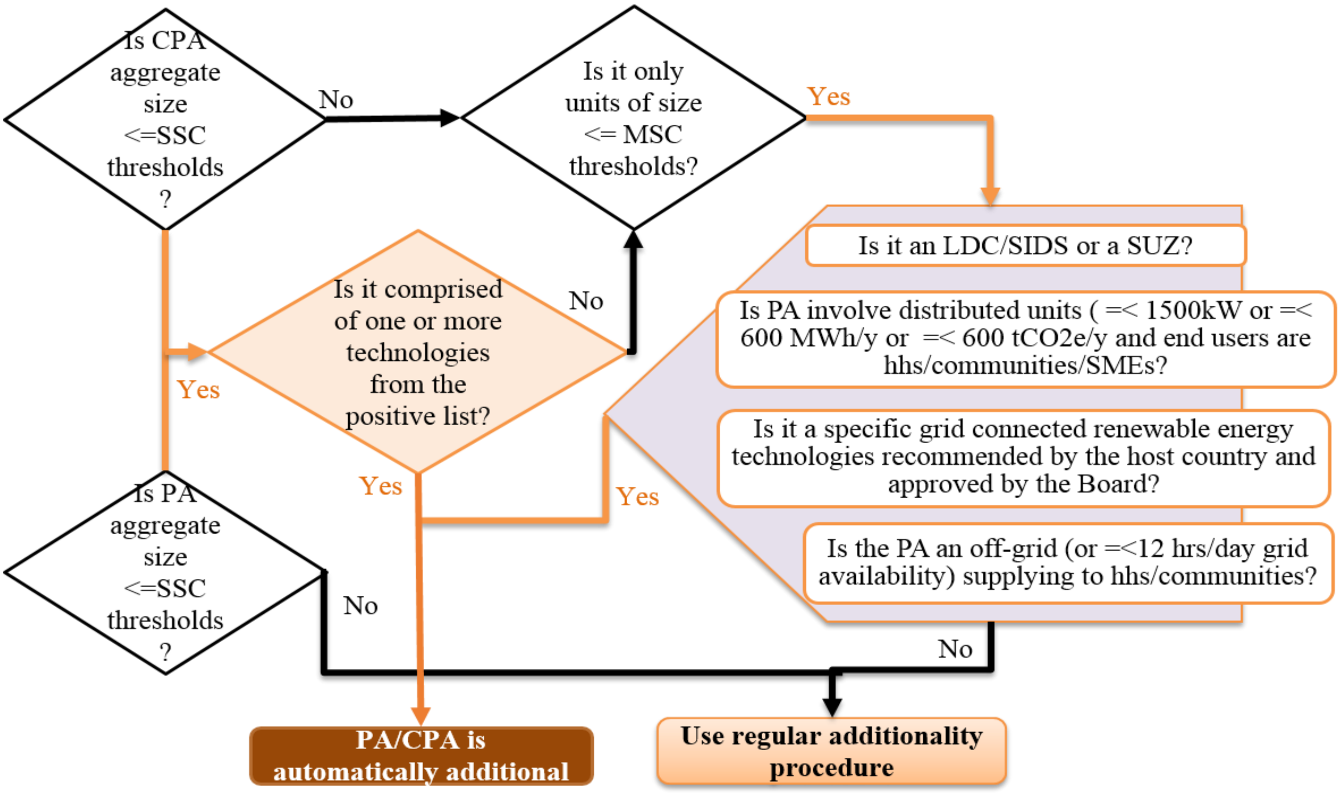
4. Subsequent work and timelines

27. An effort will be made to revise small-scale and microscale additionality tools through electronic consultations (after SSC WG 51) taking into account public input with an aim to make recommendation to EB 92.

[6] UNDP (2014); Integrated Sustainable Rural Development: Renewable Energy Electrification and Rural Productivity Zones (Table 1, pp.6).

Appendix 1. Provisions of small-scale and microscale tools for automatic additionality

Figure 1. Criteria for automatic additionality using micro or small-scale additionally tool



Note:

(a) SSC: Small-scale; MSC: Microscale;

(b) MSC thresholds: = < 5MW capacity or 20 GWh energy savings per year or 20 ktCO2 emission reductions per year;

(c) SSC thresholds i.e. equal to or less than 15MW capacity or 60 GWh energy savings per year or 60 ktCO2 emission reductions per year;

(d) Positive list: It refers to list of technologies under SSC additionality tool that are deemed automatically additional.

Table 1. References to small-/microscale additionality tools

CDM Regulatory Document	Reference to small-/microscale additionality tools
CDM project cycle procedure, Version 09.0	SSC (9 times)
	Page 10; paragraph 21, (j.i) Page 18; paragraph 69, 70, and 71 Page 31; paragraph 150.(b.iii) Page 33; paragraph 156 Page 41; paragraph 210 (2 times) Page 55; paragraph 294
	MSC (2 times)
	Page 10; paragraph 21.(j.i) Page 31; paragraph 150.(b.iii)
CDM project standard, Version 09.0	SSC (49 times)
	Page 3; number 8 Page 4; number 10 Page 5; number 12.7 Page 6; number 13.10 Page 7; paragraph 1.b and d Page 8; paragraph 7 (2 times) Page 10; paragraph 19 (2 times) Page 21; paragraph 84 Page 23; sub title 8 Page 23; paragraph 98 (3 times) and paragraph 99 Page 25; paragraph 100.b, 101, 102, 104, 105, 106, Page26; paragraph 107, 108, 111, 111.a, 112 Page 27; paragraph 115 Page 29; paragraph 125 Page 32; sub title 10 and paragraph 153, 153.a (3 times), 153.b (2 times), 154 and footnote 18 Page 47; paragraph 208 Page 49; sub title 12.7, and paragraph 220 Page 51; paragraph 232 Page 61; paragraph 290.iii Page 67; sub title 13.10 and paragraph 314 (2 times) Page 72; number 4 Page 76 (2 times)
	MSC (4)
	Page 26; paragraph 111 Page 47; paragraph 208 Page 61; paragraph 290.iii Page 72; number 6.7
CDM validation and Verification standard, Version 09.0	SSC (62)
	Page 3; sub title 8.1 Page 4; sub title 8.3 and 8.5.9 Page 5; sub title 12.1 Page 7; paragraph 1.b and 1.d Page 8; paragraph 7 (2 times) Page 15; paragraph 46 Page 18; paragraph 72.b (2 times) and 72.c

CDM Regulatory Document	Reference to small-/microscale additionality tools
	Page 19; paragraph 73 Page 40; paragraph 180 (2 times), and subtitle 8, and paragraph 181, 182, 183.a, and footnote 21 Page 41; paragraph 183.b, 184, 185 (2 times), 186, 188.a, 189 and footnote 24 (4 times) Page 42; paragraph 190 (3 times), 191, 192, 193 (2 times), 194, 195, 197 Page 43; paragraph 199 (2 times), 200 Page 47; subtitle 8.3 and paragraph 229.a, 229.b (2 times) Page 57; paragraph 283 and 286, and subtitle 8.5.9 and footnote 29 Page 68; paragraph 347.a (2 times) Page 71; paragraph 361.d, Page 76; paragraph 387 Page 82; sub title 12.1 and paragraph 415 (3 times), 416 Page 83; paragraph 416.a
	MSC (2)
	Page 42; paragraph 196 Page 71; paragraph 361.e
Demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities, Version 04.0	SSC (18 times)
	Page 2; sub title 4.3.2 and 4.3.4 Page 4; paragraph 10 (2 times) Page 5; paragraph 11 (2 times), 12, 13 (3 times), and 14 Page 7; paragraph 18.k and 18.l, and footnote 11 Page 9; sub title 4.3.2 Page 10; paragraph 33 Page 12; sub title 4.3.4, and paragraph 36
	MSC (14)
	Page 4; paragraph 9 (2 times) Page 5; paragraph 11(3 times), 13 (2 times) Page 7; paragraph 18.k (3 times), l (2 times), and footnote 10 Page 16
Sampling and surveys for CDM project activities, Version 05.0	SSC (6)
	Page 3; paragraph 3 Page 5; paragraph 10, and footnote 7 and 9 Page 6; footnote 16 Page 8; paragraph 17.c
	MSC (3)
	Page 9; paragraph 22 (3 times)

Table 2. SSC methodology which is not household and baseline solely based on historical data

SSC-Methodology	Methodology	Baseline scenario	PoA	PAs
AMS-I.G	Plant oil production and use for energy generation in stationary applications	Services (e.g. electricity, thermal and mechanical energy supply) are provided using fossil-fuel-based technologies		

SSC-Methodology	Methodology	Baseline scenario	PoA	PAs
AMS-I.H	Biodiesel production and use for energy generation in stationary applications	Services (e.g. electricity, thermal and mechanical energy supply) are provided using fossil fuel based technologies		
AMS-II.A	Supply side energy efficiency improvements - transmission and distribution	Electrical/thermal energy is transmitted and distributed using less-efficient energy system	1	
AMS-II.B	Supply side energy efficiency improvements - generation	Use of the existing fossil-fuel-fired energy generation equipment with lower efficiency		
AMS-II.C	Supply side energy efficiency improvements- equipments	Less-efficient equipment (e.g. lamps, refrigerators, motors, fans, air conditioners, pumping systems, chillers) consume more energy, thus resulting in higher GHG emissions	5	1
AMS-II.D	Energy efficiency and fuel switching measures for industrial facilities	Consumption of electricity, heat and/or fossil fuel leads to CO_2 emissions	1	
AMS-II.F	Energy efficiency and fuel switching measures for agricultural facilities and activities	Installation and use less efficient agriculture facilities, processes and equipment	1	1
AMS-II.H	Energy efficiency measures through centralization of utility provisions of an industrial facility	Production of power/heat/cooling in separate element processes, e.g. grid and/or captive fossil-fuel-fired power plant, fossil-fuel-fired boiler for heat and electrical compression chillers for cooling		
AMS-II.I	Efficient utilization of waste energy in industrial facilities	Continuation of the use of a less-efficient waste energy recovery system		
AMS-II.K	Installation of co-generation or tri-generation systems supplying energy to commercial buildings	Separate generation of power/ heat/cooling supplied to commercial, non-industrial buildings		
AMS-III.B	Switching fossil fuels	Use of more-carbon- intensive fossil fuel for energy generation equipment	2	
AMS-III.E	Avoidance of methane production from decay of biomass through controlled combustion, gasification or mechanical/thermal treatment	Organic waste is left to decay and methane is emitted into the atmosphere		
AMS-III.H	Methane recovery in wastewater treatment	Methane from the decay of biogas from biogenic organic matter in wastewater or sludge is being emitted into the atmosphere		1

SSC-Methodology	Methodology	Baseline scenario	PoA	PAs
AMS-III.I	Avoidance of methane production in wastewater treatment through replacement of anaerobic systems by aerobic systems	Biogebic organic matter in wastewaters is being treated in anaerobic systems and produced methane is being released into the atmosphere		
AMS-III.L	Avoidance of methane production from biomass decay through controlled pyrolysis	Organic matter will decay under clearly anaerobic conditions in a solid waste disposal site and the produced methane is being released into the atmosphere		
AMS-III.M	Reduction in consumption of electricity by recovering soda from paper manufacturing process	Black liquor from paper production is wasted. Much electricity is needed to produce caustic soda that is consumed in the paper mill		
AMS-III.O	Hydrogen production using methane extracted from biogas	LPG is used as feedstock and fuel for hydrogen production		
AMS-III.P	Recovery and utilization of waste gas in refinery facilities	Element process (es) will continue to supply process heat, using fossil fuel. The waste gases from the refinery are flared		
AMS-III.Q	Waste energy recovery (gas/heat/pressure) projects	Energy is obtained from GHG-intensive energy sources (e.g. electricity is obtained from a specific existing power plant or from the grid, mechanical energy is obtained by electric motors and heat from a fossil-fuel-based element process) and some energy is wasted in the production process and released		
AMS-III.S	Introduction of low-emission vehicles/technologies to commercial vehicle fleets	Passengers and freight are transported using more-GHG intensive transportation modes.		
AMS-III.T	Plant oil production and use for transport applications	Petrodiesel would be used in the transportation applications		
AMS-III.V	Decrease of coke consumption in blast furnace by installing dust/sludge recycling system in steel works	High amounts of coke are used to produce pig iron, thus leading to high CO_2 emissions. Dust/sludge from steel works is sold to outside user and/or land-filled		
AMS-III.W	Methane capture and destruction in non-hydrocarbon mining activities	Methane is emitted from boreholes into the atmosphere		
AMS-III.Y	Methane avoidance through separation of solids from wastewater or manure treatment systems	Solids in manure or wastewater would be treated in a manure management system or wastewater treatment facility without methane recover, and methane is emitted into the atmosphere		

SSC-Methodology	Methodology	Baseline scenario	PoA	PAs
AMS-III.Z	Fuel Switch, process improvement and energy efficiency in brick manufacture	Brick production using more-carbon-intensive fuel and energy-intensive technology	1	3
AMS-III.AC	Electricity and/or heat generation using fuel cell	Fuel consumption of the technologies that would have been used in absence of the project and/or grid imports are supplying electricity and/or heat to new users or to a grid		
AMS-III.AF	Avoidance of methane emissions through excavating and composting of partially decayed municipal solid waste (MSW)	MSW is left to decay within the SWDS and methane is emitted into the atmosphere		
AMS-III.AG	Switching from high carbon intensive grid electricity to low carbon intensive fossil fuel	Use of carbon-intensive fuel (or mix fuel) to generate electricity		
AMS-III.AH	Shift from high carbon intensive fuel mix ratio to low carbon intensive fuel mix ratio	Production of energy using more-carbon-intensive fossil fuel mix		
AMS-III.AK	Biodiesel production and use for transport applications	Petrodiesel would be used in the transportation applications		
AMS-III.AL	Conversion from single cycle to combined cycle power generation	Electricity is generated by a single-cycle gas turbine(s)/ engine(s) with or without simultaneous generation of thermal energy (steam or hot water)		
AMS-III.AM	Fossil fuel switch in a cogeneration/trigeneration system	Use of carbon-intensive fossil fuel in cogeneration/trigeneration system for production of power/ heat/cooling		
AMS-III.AN	Fossil fuel switch in existing manufacturing industries	Continued use of a carbon-intensive fossil fuel for the heat generation in a manufacturing process		
AMS-III.AS	Switch from fossil fuel to biomass in existing manufacturing facilities for non-energy applications	Use of fossil in manufacturing production process		
AMS-III.AT	Transportation energy efficiency activities installing digital tachograph systems to commercial freight transport fleets	Fossil fuel consumption due to inefficient driving		

SSC-Methodology	Methodology	Baseline scenario	PoA	PAs
AMS-III.AU	Methane emission reduction by adjusted water management practice in rice cultivation	Generation of methane due to anaerobic decomposition of organic matter in rice cropping soils		
AMS-III.AW	Electrification of rural communities by grid extension	In the absence of the project activity, the end users would have used diesel generator to generate electricity		1
AMS-III.AX	Methane oxidation layer (MOL) for solid waste disposal sites	Biomass and other organic matter in waste are left to decay and methane is emitted into the atmosphere		
AMS-III.BC	Emission reductions through improved efficiency of vehicle fleets	Fossil fuel consumption due to inefficient operation of vehicle fleets		
AMS-III.BF	Reduction of N_2O emissions from use of Nitrogen Use Efficient (NUE) seeds that require less fertilizer application	Use of traditional seeds and nitrogen fertilizer rates, in order to achieve the same crop output as in the project scenario		
AMS-III.BI	Flare gas recovery in gas treating facilities	The off-spec gas produced is total or partial flared		
AMS-III.BJ	Destruction of hazardous waste using plasma technology including energy recovery	Hazardous waste is incinerated without net excess useful heat generation		

Table 3. PoAs typical technologies, size range (min-max) in terms of micro-scale threshold

SSC-Methodology	Reference	Type of technology	Which provision from the tool (micro/small)?	Size of the technology in terms of the SSC threshold?	Country
AMS-II.C	PoA 5927	Use of compact fluorescent light bulbs	< 20GWh/y	46.4 kWh/y (0.0000773%)	Senegal (LDC)
	PoA 5019	Use of LED light in public streetlight	< 600 MWh/HH/Community/SMEs	CPA1 = 0.0021 MWh/y (0.0000035%)	Republic Korea
				CPA2 = 0.0022 MWh/y (0.0000036%)	
				CPA3 = 0.0032 MWh/y (0.0000053%)	
				CPA4 = 0.00010 MWh/y (0.0000016%)	

SSC-Methodology	Reference	Type of technology	Which provision from the tool (micro/small)?	Size of the technology in terms of the SSC threshold?	Country
				CPA5 = 0.0010 MWh/y (0.0000016%)	
				CPA6 = 0.0012 MWh/y (0.000002%)	
	PoA 9146	Installation of heat pumps or solar water heaters.	600MWh and household/ or community/SME	18.84 to 35.04MWh/y (0.0314 to 0.0554%)	South Africa
	PoA 8526	Use of geothermal energy	600MWh/household/ community/SME, or Off-grid	not mentioned	China
	PoA 7699	Installation of heat pumps or solar water heaters	5% (3 000 MWh/y) of SSC threshold/ hh/ community/SME	24.6MWh/y (0.041%)	South Africa
AMS-II.F	PoA 9731	Installation of drip and sprinkler irrigation	<600MWh/household/community/SMEs	0.001029 GWh/y (0.00017%)	India
AMS-III.B	PoA 9339	Shift to an alternative brick production technology/process; Shift of fossil fuel to renewable biomass and substitution of high carbon fossil fuels to with low carbon fossil fuels	<600 tCO2/household/ community/SME	155 tCO2/y (First CPA) (0.25%)	Egypt
AMS-III.Z	PoA 9339	Shift to an alternative brick production technology/process; Shift of fossil fuel to renewable biomass and substitution of high carbon fossil fuels to with low carbon fossil fuels	<600 tCO2/household/ community/SME	155 tCO2/y (0.25%) First CPA	Egypt

Table 4. PAs typical technologies, size range (min-max) in terms of the micro-scale threshold

SSC-Methodology	Reference	Type of technology	Which provision from the Tool?	Size of the technology?	Country
AMS-II.C	10170	Efficient BTS (Base Transceiver System) Equipment	600 MWh/hh/Community/SMEs	10.52 MWh/y (0.0175%)	Egypt
AMS-II.F	7186	Drip Method of irrigation system	<= 600 MWh	4.868 MWh/y (0.0081%)	India
AMS-III.H	7333	Biogas	<5MW	2.871 MW (0.019%)	Papua New Guinea (SIDS)
AMS-III.Z	10044	Use of fly ash-lime-gypsum bricks and blocks	< 3 ktCO2e/y	46.1 tCO2e/y (0.0015%)	India
	10062	Use of fly ash-lime-gypsum bricks and blocks	< 3 ktCO2e/y	46.1 tCO2e/y (0.0015%)	India
AMS-III.AW	10057	Grid extension	<20 ktCO2e/y	18.833 ktCO2e/y (0.031%)	Bhutan (LDC)

Appendix 2. Expansion of rural electrification rates in the context of positive list

1. Analysis of rural electrification rates in developing countries

1. Table 1 below provides overview of countries with the increase in the threshold up to [40 per cent [50] percent.

Table 1. Number of additional countries benefiting from increase in rural electrification threshold

	Countries benefiting from raising threshold up to 35%	Rate of rural electrification (in per cent)
1	Guinea-Bissau (LDC/SIDS)	21.45
2	Botswana (URC)[1]	23.87
3	Swaziland (URC)	24.45
4	Gambia (LDC)	25.65
5	Senegal (LDC)	26.60
6	Timor-Leste (LDC/SIDS)	26.75
7	Cote d'Ivoire (URC)	29.00
8	Myanmar (LDC)	31.15
9	St. Vincent and Grenadines (SIDS)	31.75
10	Tuvalu (LDC/SIDS)	31.75
11	Afghanistan (LDC)	32.00
12	Yemen, Rep (LDC)	33.45
13	Nigeria (URC)	34.40
14	Ghana	40.95
15	Nicaragua	42.70
16	Equatorial Guinea	43.00
17	Gabon	44.90
18	Fiji	45.45
19	Kiribati	45.45
20	Marshall Islands	45.45
21	Palau	45.45
22	Cabo verde	46.75
23	Sao Tome and Principe	46.95
24	Bangladesh	49.30

Source: SE4ALL database from The World Bank (2015)[2]

[1] Under represented countries- Countries with fewer than 10 registered CDM projects as on 31 December 2010.

[2] World Bank, Sustainable Energy for All (SE4ALL) database from World Bank, Global Electrification database (upto 2014).

2. The **number of potential beneficiaries in each country is quite substantial**. Looking at the other indicators, it is apparent that these countries face access to finance barriers for example, high "Ease of doing business" Index. The financial sectors of the countries listed are not strong either (according to the CPIA financial sector rating)[3] illustrating as a proxy for access to barriers.

2. The countries benefiting from the threshold being raised from 20 per cent to [40 **per cent**] [50 percent] have **little to no renewable energy (excluding hydropower) market penetration.**

3. Furthermore, the electric power transmission and distribution losses (per cent of output) of these countries are prohibitively high for example in case of Botswana it is reported as more than 50%. This indicator includes losses in transmission between sources of supply and points of distribution and in the distribution to consumers, including pilferage.[4] Expanding the supply of electricity to meet the growing demand of increasingly urbanized and industrialized economies without incurring unacceptable social, economic, and environmental costs is one of the great challenges facing in these countries. For example according to Tenenbaum et al (2014)[5], in developing countries particularly in LDCs, cost reflective tariffs are not allowed even if cost of energy production is higher in one area than the other. This creates a huge problem for utility companies, as, were they to set up a rural electrification project, they may not make back their investment for a long time - if at all - as the costs far outstrip the profit. Incentives are needed to promote such rural electrification projects. On the other hand, literature shows (an also discussed elsewhere in this document) that high capital cost and access to finance to deploy off-grid renewable energy projects for rural electrification is the key barrier.

4. The only non-LDC benefiting from the threshold increase to 35 per cent is Nigeria; however, Nigeria has a large rural population. In addition to the great barriers affecting renewable energy in the country, given the strength of the fossil fuel industry (and subsequent subsidies granted). According to the data used, currently Nigeria uses fossil fuel energy to generate over 80% of its electricity demands. A negligible amount of non-hydro renewable energy (biomass, biofuel etc.) has been used by Nigeria. Despite having a rural electrification rate of 34.4 per cent, in the country as whole, only around 55% of people have access to electricity - over 80 per cent of which reside in urban areas. It seems therefore, that despite the higher percentage of rural electrification, the number of those without any access it quite substantial. Like much of Africa, there is a great push to bring electricity to rural areas, if renewable energy is not supported in this country, it is very likely Nigeria will continue its strong reliance on fossil fuel and will find it much harder to transition to a more carbon-neutral energy source in the future (Tenenbaum et al. 2014).

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[3] World Bank Group, CPIA database <http://www.worldbank.org/ida>.

[4] IEA Statistics. 2012. OECD/IEA 2012 available at <http://www.iea.org/stats/index.asp>.

[5] Tenenbaum et al. 2014. The World Bank Working Paper.

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