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CDM: Recommendation Form for Small Scale Methodologies (version 01)

(To be used for presenting questions/proposals/amendments to the simplified methodologies for small-scale CDM project activity categories)

Date of SSC WG meeting:	20–23 March 2012, SSC WG 36
Title/Subject (give a small title or specify the subject of your submission, maximum 200 characters):	Revision of AMS-I.A/AMS-I.D/AMS-I.F to cover Road Power Generation systems
Indicative methodology to which your submission relates (refer the items of Appendix B of the Simplified Modalities and Procedures), if applicable.	AMS-I.A "Electricity generation by the user" AMS-I.D "Grid connected renewable electricity generation" AMS-I.F "Renewable electricity generation for captive use and mini-grid"
Name of the authors of the query:	Craig Near Institution: Genziko Road Power Generation Limited Nathan Gachugi Institution: Viability Africa craig.near@genziko.com nathan.gachugi@viabilityafrica.com dan.kuipers@viabilityafrica.com

Summary of the query:

Please use the space below to summarize the query related to SSC methodologies/categories SSC Modalities and Procedures provide recommendation/analysis of the SSC WG.

Original text from PP:

Pursuant to the decision of the CDM EB in the meeting report of EB 27 Annex 102 the project proponent, Genziko Road Power Generation Systems Ltd, through its contracted CDM consultant, Viability Africa, wishes to request a revision to the three approved SSC CDM methodologies namely, AMS-I.A., AMS-I.D., and AMS-I.F.

The revision requested is an inclusion of Road Power Generation systems to the specifically mentioned renewable energy sources in the methodologies for electricity generation for the purpose of developing a CDM Programme of Activities based on Road Power Generation technology. The specifically stated methodologies currently include: photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass. Road Power Generation (hereinafter described as RPG) as envisioned in the proposed revision is premised on the Project Proponents "Genziko Road Power Generators". The RPG technology uses piezzo electronic principles to convert mechanical energy from vibrations and compressions on roads and walk ways to electric energy. The Genziko RPG systems in particular are based on revolutionary vibrational energy harvesters that were built and tested under a US National Science Foundation development program. These harvesters are the first piezoelectric ceramic-based devices to be highly efficient at the required low frequencies guaranteeing higher performance especially in temperate regions.

The technology is intended to be used for mini grids or direct export to national/regional grids.

Applicability to the selected methodologies:

1. The output capacity of the installed RPG units shall not exceed 15 MW

2. The electricity generated shall be for export to national grids, for direct consumption by the user or for captive use or mini grids.

3. The projects shall all be green field project activities

Additional questions to the author and the response received

Pursuant to the response provided by the CDM Secretariat on 02/22/2012 at 11.13 AM requesting the following:

In order to better understand and facilitate the consideration of your submission, you are requested to provide the following additional information:

- It is not clear from the submission whether the described technology is well proven and complies with EB 25, paragraph 71 that states "The Board agreed to indicate to the project participants that project activities under the CDM shall make use of technologies which are proven under field conditions and show general acceptance of the technology." Please confirm.

The project proponent wishes to affirm the following:

1. The concept of road power generation using piezoelectric components has been studied extensively for the past 15 years. This concept is an extension of the embedded piezoelectric traffic sensors used commercially worldwide since 1975 for traffic counts, vehicle classification, weigh-in-motion, speed studies, speed cameras, red light cameras, and parking lot controls.
2. The first full scale in-road demonstration was done by Innowattech in 2009[1].
3. The first commercial usage was for powering road signs on the Venice-Trieste Autostrada in Italy in 2010[2].

- It is also not clear whether the implementation of such technology would need modified design of the road compared to the baseline situation which might impact on the operation of the vehicles plying on the modified road. For example, more energy might be required to drive on such roads and hence additional emissions. In other words, please substantiate that implementation of such technology would not lead to any leakage/project emissions.

The project proponent wishes to affirm the following

1. Generators harvest the waste energy created by the movement of vehicles on roads and converts it to electrical energy. The electrical energy is transferred and stored in the roadside power conditioning and storage unit from there it is distributed. As the RPGs are embedded and have no moving parts, the only operational needs for generation are road inspection and maintenance.
2. Genziko RPG systems harvest energy that ordinarily goes to waste. They do not change a vehicle's fuel economy. They do not have an impact on road characteristics.
3. RPG systems can be implemented in urban environments in any road, runway, or walkway near points of demand, thereby minimizing transmission costs. Assessment of roads for which the project activity shall be applied to and the power generated therefrom is conducted prior to installation. The roads upon completion of installation remain in the same or improved conditions (because of the re-carpeting of the road required after installation of the systems) therefore no additional energy would be required to drive on the roads.

[1] http://www.innowattech.co.il/techInfo.aspx

[2] http://www.globes.co.il/serveen/globes/docview.asp?did=1000559251&fid=1725

4. RPG system is made from a series of individual generators that are embedded into roadways in two strips of 650 generators for both the left and right wheel for a total of 1300 generators. Each generator is a sealed device that is ~12" long x ~18" wide x ~0.1" thick and has a pair of wires coming from it. Generators are embedded into asphalt, concrete, or composite concrete and asphalt roads at a depth of about 5cm, where the compressional stress from traffic is greatest. The RPGs are laid down in two linear series and placed in quick drying concrete and left for 30 minutes. Installation can be accomplished in the time it takes to resurface roadways. Once connected, power is immediately available. Therefore there is only minimal modification to roadways which would not require any additional energy requirements on the part of the road user.

- Please clarify how the technology/measure falls under "Renewable Energy" as it is harvested through the vibration of roads for example by vehicles (anthropogenic) and may not be produced through natural process/environment. According to IPCC SRREN, Chapter 1, "Renewable energy is any form of energy from solar, geophysical or bio-logical sources that is replenished by natural processes at a rate that equals or exceeds its rate of use. RE is obtained from the continuing or repetitive flows of energy occurring in the natural environment and includes resources such as biomass, solar energy, geothermal heat, hydropower, tide and waves and ocean thermal energy, and wind energy."

1. The definition provided by the IPCC SRREN is indeed accurate. However, to limit the scope of the term "renewable energy sources" to the identified sources (i.e. solar, geographical or bio-logical) excludes potential technologies that qualify under the scope of the latter part of the definition "that are replenished by (natural) processes at a rate that equals or exceeds its rate of use. The project proponent is therefore more content with the same definition in so far as its definition of RE states: "RE is obtained from the continuing or repetitive flows of energy".
2. It would not have been possible to envision said "continuing or repetitive flows of energy" which are "replenished … at a rate that equals or exceeds its rate of use" emanating from an energy source outside the natural environment before the RPG technology had been created or considered as an RE technology.
3. The other fundamental characteristics of RE energy are listed as follows and include:

   Providing energy services in a sustainable manner and, in particular, in mitigating climate change,

   They are inexhaustible or replenished at a rate that exceeds their consumption
4. Renewable energy conversion systems at this stage have only been applied to kinetic and thermal conversion of the primary energy source (e.g. solar) into their final application for either mechanical, heat or electric energy. This largely owing to the fact that there hasn't been any option that allows for mechanical energy (i.e. vibration and compression) to be converted to electricity.
5. The project proponent is therefore content with the inclusion of RPG solutions to the scope of RE technologies in so far as the technology contributes to reduced GHG emissions, it is dependent on a non-exhaustible energy source because electricity production occurs at a rate higher than the capacity such RPG systems would be able to supply electricity to the consumer or the electric grid and finally because the RPG systems produce electricity from continuing or repetitive flows of energy.

Recommendation by the SSC WG:

Please use the space below to provide amendments/change (in your expert view, if necessary).

Please refer to paragraph 16 of the meeting report of the SSC WG 36 <http://cdm.unfccc.int/Panels/ssc_wg>.

Answer to authors of query by the SSC WG:

Please use the space below to provide answer to the authors of the above query.

The small-scale working group of the CDM Executive Board would like to thank the author for the submission.

The SSC WG agreed to clarify that the energy harvested through the vibration of roads by vehicles (human induced/anthropogenic) though can be considered a promising source of alternative energy but can not be considered as a renewable energy source. The group is of the opinion that this technology/measure falls under waste energy recovery project and a new methodology under Type III would be required.

Since the baseline emissions is the amount of actual electricity produced times the emission factor of the baseline technology/energy source that is displaced (in terms of tCO_2 emissions per MWh), a simple Type-III methodology can be proposed taking into account provisions to calculate baseline emissions from approved methodologies such as AMS-I.A/I.D/I.F. The new methodology shall address following issues in form of applicability condition or justification such as the below:

- It is possible to measure the amount of electricity produced by generators;
- It shall be substantiated that there are no significant GHG emissions related with the manufacturing of these technology/devices. The group is aware that for other technologies those eligible under CDM, there are information available showing that emissions from manufacturing those technologies are very low compared with emissions associated with the avoided technology;
- Also it shall be substantiated that there are no significant emissions from repaving (or ¨recarpeting¨ relative to the electricity generated;
- The implementation of the project would not change any driving conditions (slowdown of traffic etc.) that might lead to leakage emissions.

Signed by the Chair, Mr. Peer Stiansen

Date: 23/03/2012

Signed by the Vice-Chair, Ms. Fatou Gaye

Date: 23/03/2012

Information to be completed by the secretariat	
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