

# PV Solar Home Systems in the CDM

## Streamlined Procedures for Solar Home Systems in the Clean Development Mechanism

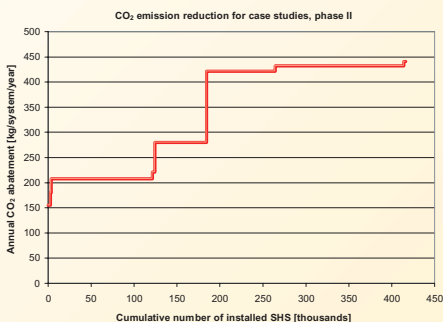
### Summary

Photovoltaic (PV) solar home systems (SHSs) simultaneously displace GHG emissions and contribute to sustainable rural development. Carbon offset funding through the CDM can potentially accelerate SHS dissemination in many countries, but only with streamlined CDM processes whose costs do not overwhelm CER revenues.

### The Clean Development Mechanism

The Clean Development Mechanism is one of the three flexible mechanisms defined under the Kyoto Protocol. The three instruments are: Emissions Trading (ET), Joint Implementation (JI), and the Clean Development Mechanism (CDM). These mechanisms enable trading emission reductions between countries that can help countries achieve their emission reductions at a lower cost. The Clean Development Mechanism has been set up to allow industrialised countries to achieve part of their emission reduction target in developing countries, provided that the emission reducing activities contribute to the sustainable development in the host country. Public or private parties from industrialised countries will be able to invest in projects leading to emission reductions in developing countries. CDM funding must be additional to existing development assistance and is expected to lead to greater investment flows to developing countries for environmentally projects. Thus it could help renewable energy projects, such as projects involving solar photovoltaic (PV) installations, which may not have been feasible without this extra source of fundin.



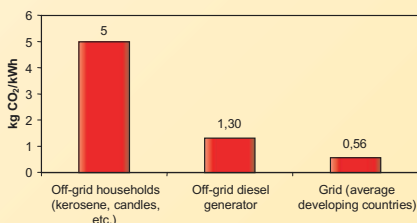


## Introduction

Solar home systems generate electricity for rural homes that are not connected to an electric grid. They displace GHG emissions and contribute to sustainable rural development. While emissions abatement is quite small per household, the rate of CO<sub>2</sub> displacement per kWh is very high. Given projected CER prices, industry participants believe the CDM can boost SHS dissemination, but only if transactions costs are sufficiently low.

## SHS-CDM streamlining project

With support from the Shell Foundation and Dutch government, the Energy research Center of the Netherlands (ECN), IT Power, and Sunrise Technologies Consulting are working to streamline processes for SHS participation in the CDM. The project's goal is to facilitate CDM access by advancing procedures that are simple and environmentally credible. The first phase of the project analysed data relevant to establishing SHS baselines (see Ybema et al, 2000), the second phase has gathered expert and stakeholder input and focused on monitoring and verification (see Martens et al, 2001). The project team has finalized recommendations for SHS baseline setting, monitoring, and verification procedures under a range of possible CDM requirements and participant preferences.



(Source: Ybema et al, 2000; Lazarus et al, 2000; Bosi, 2001)

## The case for off-grid projects under the CDM

The figure above shows the average CO<sub>2</sub> savings per kWh for three different types of applications: PV could respectively replace grid electricity, stand-alone diesel power or household fuels used for lighting. If PV generated electricity is used to replace grid electricity in developing countries, it saves on average 0,56 kgCO<sub>2</sub>/kWh, by replacing conventional sources of electricity generation.

The figure clearly shows that PV used in off-grid applications displaces much more carbon than in grid-connected applications. On average, two times more carbon is abated if off-grid diesel generation is replaced and nine times more if household fuels are replaced.

## Standard CO<sub>2</sub> values

An analysis of activities in eight countries conducted in the first phase of the project shows that 250 kg CO<sub>2</sub> per system per year represents a conservative global average abatement value for SHS installations. Most emissions savings are from reduced kerosene lighting and candle use. From that analysis, the project team proposes a standardised global emission reduction formula varying by SHS size but not location. This standardised baseline will ensure lower transaction costs at the project level.



## Simple project monitoring

To minimize project-monitoring costs, the project team recommends using existing processes and local personnel. Local audited accounting statements can record system deployment and guard against fraud with good reliability at a reasonable cost. The proposed streamlined approach includes the confirmation of system deployment at the project level. In an even more streamlined approach it is not necessary to check operational characteristics at the project level but the standardised emission reduction factor could be corrected for system availability.

## Conclusion

Through the CDM and other GHG offsets markets, SHSs can achieve broader dissemination using participation procedures that are simple and environmentally credible.

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## References

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- Ybema, J.R., J. Cloin, F.D.J. Nieuwenhout, A.C. Hunt, S.L. Kaufman, 2000: Towards a streamlined CDM process for Solar Home Systems - Emission reductions from implemented systems and development of standardised baselines. ECN-C--00-109.
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