

# Instrument calculates prevented CO<sub>2</sub> emissions

**What form of sustainable local energy production can best be used in developing countries for specific situations, and which produces the most CO<sub>2</sub> reduction? TNO has created a decision-making tool that can objectively and reliably answer this question, taking account of the local context in which the energy technology is used.**

Since 2007 there has been an agreement between the development organisation ICCO and TNO for the latter to use its expertise to help solve problems in developing countries. The business of calculating the prevention of CO<sub>2</sub> emission for particular technologies is linked to the Kyoto protocol. But how can you do that for small-scale installations that produce biogas from cow dung in a small village in the south of India, for instance? That's the kind of question that ICCO brought to TNO.

'The actual question was,' according to Wilfred Appelman, project leader at TNO, 'what form of local energy application is most suitable for a specific situation and how much CO<sub>2</sub> emissions can it cut? It was a question that needed a concrete answer in the Karnataka region in India, an area almost as large as France. Following research and discussion with ICCO, we decided to focus on five sustainable energy technologies: (parabolic) solar cookers, improved wood-burning stoves, biogas installations for the digestion of cow dung, wind energy and solar-photovoltaic lighting.'

## RAPID INSIGHT

Appelman not only reviewed the literature but also went to Karnataka with colleague Elsbeth Roelofs to be able to provide the most thorough answer possible to the question. They talked with the people from the development organisation and looked at the availability of energy sources – like solar energy, the size of the cattle herd and the biomass that is present. In addition, they considered the social, economic and cultural aspects that determine the success of using an energy technology that depends on the quantity of prevented CO<sub>2</sub> emissions. All such data are incorporated into the estimation tool to calculate the CO<sub>2</sub> reduction.

Appelman: 'The tool is the result of answering the question from both a technological and social science perspective. Initial practical experience reveals that the tool quickly generates insight into what the five energy technologies cost and yield. In terms of yields, it is clear not only how much CO<sub>2</sub> emission can be prevented but also what the positive side effects are of the respective technology. For instance, by not using wood for cooking in the home, the health and position of women are improved and they use up less time and energy collecting wood. It is a tool that can be used to help development organisations and investors to make a suitable choice of sustainable energy technology for a particular area.'

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Biogas project in India.

Carbon Credits are an alternative source of revenue for the partner organisations of ICCO in developing countries and for the poor there. 'The scan that TNO input has helped develop is a nice example of the use of *hightech* knowledge in a *lowtech* environment,' says ICCO programme specialist Nelleke van der Vleuten. 'It generates relevant innovations that bring us closer to our target of combating climate and poverty.'



Photos: Mathilde Miedema / TNO

## PROGRAMME

For several years TNO has been running a development cooperation programme to fund demand-driven projects for which TNO has twenty professionals available. One of these projects, described in this article, concerns the development of a reliable, objective tool that enables the calculation of prevented CO<sub>2</sub> emissions for local, small-scale energy provision in developing countries.

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