



## Karnataka Renewable Energy Project

The Karnataka Renewable Energy Project is helping to prevent climate change whilst turning waste into wealth for local rice farmers in India.<sup>1</sup>

### Improving Livelihoods

The Project generates renewable energy from the collection and clean burning of waste agricultural products, such as rice husks, purchased from local farmers. The farmers are paid for their waste, providing a new source of income for the local community.

Over 65% of Karnataka's 60 million people live in rural areas. Karnataka faces significant electricity stresses as India's Silicon Valley (situated in Bangalore) lies in the south of the state. The renewable electricity generation provided by the Project plant is providing reliable base power for the local grid system.

### Climate Benefits

The Karnataka Project avoids the emission of greenhouse gas via two important processes. Firstly, the collection of waste ensures that the residual crops do not rot and decay in the fields (a process which causes emissions of methane, a greenhouse gas with a global warming potential 21 times higher than that of carbon dioxide).<sup>2</sup> Secondly, the Project displaces electricity generation from fossil fuels, reducing carbon dioxide emissions from the electricity sector.<sup>3</sup> In total, the Project reduces greenhouse gas emissions by **more than 30,000 tonnes of CO<sub>2</sub>-e per year**.<sup>4</sup> The offsets generated by the Project have been third-party audited by DNV, an independent auditor approved by the United Nations Framework Convention on Climate Change,<sup>5</sup> and are accredited to the Voluntary Carbon Standard.<sup>6</sup> The Project has been registered under the United Nations Kyoto Protocol Clean Development Mechanism since 2007.<sup>7</sup>

The Project faced a number of barriers to its successful implementation. The Project's internal rate of return from electricity sales exceeded the weighted average cost of capital needed to finance the Project.<sup>8</sup> A sensitivity



*Rice is the principal crop grown in India and is the dietary staple for many Indians. India ranks only second to China in world rice production. Projects such as this increase the sustainability of the rice industry and assist its preparation and adaptation to climate change.*

<sup>1</sup> Rice Farming in India, from Encarta MSN. Available at: [http://encarta.msn.com/media\\_461568663\\_761569224\\_-1\\_1/rice\\_farming\\_india.html](http://encarta.msn.com/media_461568663_761569224_-1_1/rice_farming_india.html), accessed on the 12<sup>th</sup> of May 2009.

<sup>2</sup> United Nations Framework Convention on Climate Change Global Warming Potentials. Available at: [http://unfccc.int/ghg\\_data/items/3825.php](http://unfccc.int/ghg_data/items/3825.php) accessed on 12th May 2009.

<sup>3</sup> GHG Anthropogenic GHG Emissions by Sector by Pew Centre on Global Climate Change. Available at: <http://www.pewclimate.org/facts-and-figures/international/by-sector> accessed on 12th May 2009.

<sup>4</sup> Ravikiran Power Projects Private Ltd, Monitoring Report: 7.5 MW Grid-Connected Biomass Power Project (UNFCCC Ref. No. 0971), Version: Ravikiran / 001, dated 4 September 2008 ('Monitoring Report'), p. 8, available at: <http://cdm.unfccc.int/UserManagement/FileStorage/13KBH5NLQM60FOWXY9PZ8J47TCISAD>, accessed on 31 March 2009.

<sup>5</sup> Validation Report, below n 13, s 1.2.

<sup>6</sup> Voluntary Carbon Standard, version 2007.1, 18 November 2008, Available at: [http://v-c-s.org/docs/Voluntary%20Carbon%20Standard%202007\\_1.pdf](http://v-c-s.org/docs/Voluntary%20Carbon%20Standard%202007_1.pdf), accessed on 31 March 2009.

<sup>7</sup> United Nations Framework Convention on Climate Change, Clean Development Mechanism Executive Board, 'Clean Development Mechanism Simplified Project Design Document for Small-Scale Project Activities (SSC-CDM-PDD) 7.5 MC renewable energy generation for a grid, Karnataka, India', Version 03, 30 April 2007 ('Project Design Document'), p. 4, available at: <http://cdm.unfccc.int/UserManagement/FileStorage/DA0IZH8WGBHIEFFDTK0D55AZ8FMG>, accessed on 31 March 2009.

<sup>8</sup> Det Norske Veritas, Validation Report: 7.5 Mw Grid-Connected Biomass Power Project by Ravi Kiran Power Projects Private Limited In India, Report No. 2006-9131, Revision No. 02 ('Validation Report') s 3.7, available at: <http://cdm.unfccc.int/UserManagement/FileStorage/4NTUBIYIH8ZH7WZ7ARU7VMII5OQXIH>, accessed on 31 March 2009.



analysis of the financial viability of the Project on normal investment terms (not considering carbon credit revenue) showed that the Project would not be financially viable without the additional revenue delivered from the sale of carbon offsets to climate conscious businesses and individuals.<sup>9</sup>

### Community Benefits

The Karnataka Project provides direct improvements to the livelihoods of local communities. Farmers from the Marlanhalli Village and its surrounding areas gain direct revenue from the sale of agricultural waste products which fuel the Karnataka plant. Farmers are offered an average price of more than 1,200 Rupees (AU \$33.50) per ton of waste,<sup>10</sup> meaning that the Project is already returning around 84 million Rupees (AU \$2.3 million) every year to local communities.<sup>11</sup> The Project has also generated around 500 new local employment opportunities, collecting, transporting and processing the renewable fuel from the farms to the new facility.

Local farmers are also benefitting by using the leftover fly ash as fertiliser,<sup>12</sup> or by making bricks for local construction projects.<sup>13</sup> As a further commitment to the local community, the Project is also funding an ambulance service and renovations to important local temples.<sup>14</sup>

### A Breath of Fresh Air

In addition to tackling global warming, the Project has also contributed to a large improvement in local air quality, with fewer farmers burning their waste crop residues and less coal being burnt at local power stations which has led to improved health within the community.<sup>15</sup> The biomass used in the Karnataka plant is combusted cleanly (at temperatures nearing 500°C) with resulting fly ash being collected by an electrostatic precipitator, rather than being released into the atmosphere.<sup>16</sup>

### How it Works

The 7.5 Megawatt (MW) generator is powered by combusting agricultural fuels which generate high-pressure steam, driving a high-tech impulse turbine generator set. The generator provides base power to villages in remote areas<sup>17</sup> and supplies a reliable and sustainable source of electricity to the local grid, increasing local energy autonomy. The expected operational lifetime of the facility is 30 years,<sup>18</sup> yielding long-term reductions in greenhouse gas emissions that extend beyond the 10 years over which the Project can create and sell carbon credits.<sup>19</sup> The Project is amongst the first in a new generation of biomass generation Projects in India.

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<sup>9</sup> Validation Report, p9

<sup>10</sup> Project Design Document, above n 7, p. 14.

<sup>11</sup> Monitoring Report, above, p. 4.

<sup>12</sup> Gold Standard, '7.5 MC Grid-Connected Biomass Power Project by Ravi Kiran Power Projects Private Limited (Project ID Number 0971) Annex to the PDD including Gold Standard validation requirements', 28 September 2007 ('Annex'), available at: [http://www.dnv.com/focus/climate\\_change/Upload/Ravikiran%20GS%20Annex%20to%20the%20PDD.pdf](http://www.dnv.com/focus/climate_change/Upload/Ravikiran%20GS%20Annex%20to%20the%20PDD.pdf), accessed on 31 March 2009.

<sup>13</sup> Det Norske Veritas, Validation Report: 7.5 Mw Grid-Connected Biomass Power Project by Ravi Kiran Power Projects Private Limited In India, Report No. 2006-9131, Revision No. 02 ('Validation Report') s 3.7, available at: <http://cdm.unfccc.int/UserManagement/FileStorage/4NTUBIYH8ZH7WZ7ARU7VMII5OQXJH>, accessed on 31 March 2009.

<sup>14</sup> Annex, above n 12, p. 14.

<sup>15</sup> Project Design Document, above n 7, p. 5.

<sup>16</sup> Validation Report, above n 13, s 1.2.

<sup>17</sup> Project Design Document, above n 7, p. 4.

<sup>18</sup> Project Design Document, above n 7, p. 17.

<sup>19</sup> Validation Report, p13