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**Project Name:**

Umdoni Gel Fuel low Income Housing Project.

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**Project Location:**

Umdoni Local Municipality, South Coast, KwaZulu-Natal South Africa.



Figure 1: Umdoni Local Municipality, in the Ugu District municipality, KZN, east coast of South Africa

Umdoni municipality is a poor rural municipality with a population of 75,000 people (20,000 households).

### **Project commencement date:**

1 July 2008.

### **Project Period:**

10 years

### **GHG Savings schedule:**

- Year 2008: 512 tonnes CO2
- Year 2009: 1,814 tonnes CO2
- Year 2010: 3,208 tonnes CO2
- Year 2011: 796 tonnes CO2 (revised methodology)
- Year 2012: circa 698 tonnes CO2
- Year 2013: circa 698 tonnes CO2
- Year 2014: circa 698 tonnes CO2

### **Project Partners:**

The PACE Centre is a South African not-for-profit (NPO registration number 055-238-NPO), voluntary organisation whose registered office is at The PACE Centre NPO, Office Annex, 2 Bokkemannskloof, Hout Bay, 7806, this is also the registered postal address ([www.carbon.org.za](http://www.carbon.org.za)). PACE plays the role of Project Proponent in the Project.

The Umdoni Municipality is a local government authority registered in terms of the Local Government: Municipal Structures Amendment Act [No. 20 of 2002]. The registered address of the municipality is Cnr Airth and Williamson Street, Scottburgh and the postal address is P O Box 19, Scottburgh, 4180, South Africa ([www.umdonline.co.za](http://www.umdonline.co.za)). Umdoni has an oversight role in the project and the procurement and distribution of gel to the beneficiary households.

The Project Preparation Trust (PPT) is a south African not for profit (NPO registration number 930026332) and was registered in 1993. PPT's registered office is at Suite 501, 5th Floor 88 Field Street Building, 88 Joe Slovo Street, South Africa, P.O box 5609, Durban 4000 ([www.pptrust.co.za](http://www.pptrust.co.za)). PPT plays the role of project developer in the project.

The project development is subject to a binding Financing and Co-operation Agreement between these entities and dated 26<sup>th</sup> June 2009 and a subsequent acquisition and project funding agreement between the parties dated 31 January 2012.

## Methodologies involved:

- **Fuel switch to gel fuel stoves – AMS II. E. Version 5** Energy Efficiency and Fuel Switching Measures for Buildings.
- As of 2013 it is proposed to introduce energy efficient woodstoves - **AMS II.G., version 1, “Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass.”** However as this is still being negotiated between the Umdoni community, PPT and the Umdoni Municipality, the additional CO2 savings from the proposed efficient woodstoves has not been included in the future CO2 estimates.

## Brief Description of the project (business as usual, the intervention and the saving):

The project involves support for the sustained roll-out of bioethanol gel-fuel for bio-fuel stoves to over 4,000 rural households in the Umdoni Municipality. On a voluntary basis, participating households are given an energy-efficient cooking stove and bio-ethanol gel for use in the stoves. It is assumed that 90% of the gel that is distributed is actually used for cooking and heating in the stoves.

The project sees households displacing coal, wood, paraffin and dung fuel sources with bioethanol gel (a by-product of the local sugarcane industry) a shift that is associated with:

- An elimination the fire threat (unlike liquid paraffin, the vapours of the bioethanol gel are not flammable).
- Reduced indoor air pollution during periods of cooking and heating.
- Less time spent collecting firewood.
- Reduced household expenditure on energy.
- Retention of cattle waste on croplands, and associated soil fertility.
- Sustainable village businesses in the retail of bioethanol gel.
- Reduce greenhouse gas emissions.

- Setting a replicable precedent for the provision of clean, safe domestic energy in rural South Africa.

Gel has been distributed since 2008 and uptake of the gel has gradually increased. 2010 saw the first sale of Credible Carbon credits by PACE from this project. The proceeds from these sales will be used to purchase household-level renewable energy and energy efficient technologies that can supplement the burning of bioethanol gel.

### **Capacity Building**

Awareness raising and some training is provided as part of this project in collaboration with the local municipality's development officer and PPT. The aim of this outreach is to ensure effective use of the bioethanol gel, to ensure that the gel is being used to support the most vulnerable households and to explore suitable alternative technologies that may improve livelihoods in Umdoni. In selecting beneficiary households, preference is given to households that are not connected to the ESKOM grid, are female-headed and child-headed households, with the understanding that it is these households (many of which have been created by the HIV/ Aids pandemic) that are typically most needy and most exposed to climate change impacts and increasing energy costs. Furthermore, households that are off-grid and are not part of the Eskom rural electrification do not qualify for the ESKOM subsidies available to poor grid-connected households.

PPT monitors the uptake of the stoves and gel, the need for replacement stoves and the opportunities to introduce more suitable renewable energy and energy efficient technologies to the households.

### **Funding**

The project is financially supported by Umdoni Local Municipality, where the municipality provides the funding for an initial fuel quantity of 7L per household per month and the replacement of defective and aging stoves. The municipality is not, however, in a position to provide alternative renewable energy and energy efficient technologies to the households. It has been noted that the 7l gel fuel only lasts 7-10 days of the month, after which households revert back to wood, paraffin and dung fuel sources for the remainder of the month.

Revenue from the sale of Credible Carbon credits will be used to introduce further renewable energy products into Umdoni households based on demand for these products. PPT is responsible for engaging the households on how best to allocate the funds on their behalf so as to improve their livelihoods, increase their energy efficiency and encourage the use of renewable energy. PACE, as project proponent, is responsible for registering the project with

the Credible Carbon Registry, ensuring legal compliance of all transactions, marketing the project's carbon credits and ensuring accountable financial flows between buyers of credits, the project developer and the beneficiary community. At least seventy percent of the value of the generated carbon credits is re-invested in the project and the role that the project developer plays in the project. The balance may be used to support the process of credit certification and sale.



**Figure 2: Nana Ndlovu of PPT distributes bioethanol gel in Umdoni (Copyright, PACE)**



**Figure 3: An Umdoni resident carries his household's monthly bioethanol gel allowance home**

## Projected GHG saving calculations:

The average number of households in the project in the first three months of 2012 was 3623. The 2012 audit found that there was a collection rate of approximately 90% (households who actually collected their monthly gel fuel). Therefore the number of units for the future was assumed to be 90% of 3623 = 3260. The Umdoni Municipality does intend increasing the number of households each year so this 3260 might prove to be conservative.

Technology	Gel stoves per unit	Units	Baseline (tCO <sub>2</sub> /yr/unit)	Emissions after intervention (tCO <sub>2</sub> /yr/unit)	Leakages* (tCO <sub>2</sub> )	tCO <sub>2</sub> saving per unit	Annual savings all units (tCO <sub>2</sub> /yr)
Additional Gel fuel	1	3260	0.928	0.714	0.00	0.214	698

**Table 1: Anticipated greenhouse gas (CO<sub>2</sub>e) savings from project**

\* Leakages. We have no information on the potential leakages of CO<sub>2</sub> savings for this project. For instance, the fuel wood freed up by the project households might simply be absorbed by the non-project households, thus reducing the net CO<sub>2</sub> savings. Lacking any evidence to the contrary, we have assumed zero leakage.

## Actual (verified) Umdoni credit generation to date:

In May 2012 an independent audit of the impacts of the Umdoni Project was commissioned by the Credible Carbon Registry and conducted by Urban Earth, a Durban-based NGO with considerable experience in the monitoring of the carbon projects.

The audit found the following Credible Carbon Credits had been saved by the project during the period January 2011 to April 2012:

Year 2011	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Households (hh)	4313	4194	4029	4029	4002	4002	4172	4172	4172	4172	4172	4172
Households x 90%	3882	3775	3626	3626	3602	3602	3755	3755	3755	3755	3755	3755
Kg CO <sub>2</sub> savings/hh	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8
<b>Total tCO<sub>2</sub> saving</b>	<b>69.2</b>	<b>67.3</b>	<b>64.7</b>	<b>64.7</b>	<b>64.2</b>	<b>64.2</b>	<b>67.0</b>	<b>67.0</b>	<b>67.0</b>	<b>67.0</b>	<b>67.0</b>	<b>67.0</b>

  

Year 2012	Jan	Feb	Mar	Apr
Households (hh)	4172	3369	3439	3510
Households x 90%	3755	3032	3095	3159
Kg CO <sub>2</sub> savings/hh	17.8	17.8	17.8	17.8
<b>Total tCO<sub>2</sub> saving</b>	<b>67.0</b>	<b>54.1</b>	<b>55.2</b>	<b>56.3</b>

**Table 2: Audited figures of CO<sub>2</sub>e savings from the Umdoni Project conducted on behalf of the Credible Carbon Registry (McKenzie and Botes, 2012)**

## Monitoring and evaluation

The project generates revenue from its credits through the Credible Carbon Registry. The registry requires an independent audit of all projects in order to answer four definitive questions (the audit answers are shown in italics):

**i. Is the project real?**

*Yes, the Umdoni Gel Fuel Low Income Housing Project is real.*

*A site visit was conducted on the 18th May 2012 to confirm the existence of the project.*

**ii. Is the described technology in place and functioning in accordance with its design specification?**

*Yes, the described technology is in place and functioning. Beneficiaries receive 7 litres of gel fuel per month which lasts for approximately 7 days. During the site visit on 18th May 2012 the authors observed bioethanol gel-fuel being distributed by Umdoni Municipality to households in the Malangeni community. Based on interviews with ten beneficiaries during the site visit and other sources, it is concluded that the gel fuel lasts approximately seven days.*

**iii. Are the estimates of greenhouse gas emissions reduction reasonable in terms of accepted international standards and unbiased towards buyer or seller?**

*No, the estimates do not appear to be reasonable. The revised estimates are shown in Table 2 above.*

**iv. Is there a discernible impact on poverty?**

*Yes the project does have a discernible impact on poverty. The project provides free bioethanol gel-fuel to poor households which displaces their energy needs for approximately 7 days. The key benefits of the project to these poor households are reduced exposure to fire risk and respiratory hazard associated with paraffin use, reduced time spent on collecting fire wood and small income savings as a result of receiving free energy.*

The first two questions are established by drawing a project sample on a site visit conducted by the auditor. Estimates of CO<sub>2</sub>e savings are established by checking on the volume of gel purchased and distributed by the Municipality and through a cross-check with a sample of beneficiaries so as to ensure that gel was received and burned. The fourth question is not subjected to a quantitative test, but it should be obvious to an independent auditor that the project beneficiaries are poor by South African households and that the project makes some contribution to the alleviation of their poverty or livelihood risk.