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GENERAL MANAGEMENT ASSISTANCE CONTRACT (GMAC)

**Contract No: 674-C-00-01-00051-00**

**Housing Development and Climate Change Mitigation Demonstration  
Project**

Grant number: 0057-0402-G-GA26

**Buffalo Flats**

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## **Activity Summary and achievements:**

The goals of the demonstration project are to assist the Buffalo Flats Community Development Trust to evaluate its role through affordable housing development, in mitigating climate change in the context of Local Agenda 21. This evaluation has helped the participating communities to better define the stream of economic and potential GHG mitigation benefits from project-level activities in the housing sector, and available options for implementing and financing such activities.

In consultation with the Department of Environmental Affairs and Tourism, we held talks with senior government and municipal officials and technical staff, have participated at various JCL sessions in Johannesburg, attended various workshops and conferences on renewable energy and energy efficiency both in Australia and Cape Town and have conducted various community workshops locally.

These discussions served to build a rational dialog on 'energy efficient' housing development issues between various stakeholders and the Buffalo Flats Community Development Trust, by our repeatedly reaching out to exchange views, share technical results to date, and simply talk about the issues informally.

These continual technical exchanges have helped to open particularly municipal officials, NGO's (i.e. Afesis Corplan) and BFcdt representatives to the possibility of adopting building energy ratings, alternative development planning and building methodologies and mitigation options.

Trained management and staff of the Trust in the use of FIRSTRATE energy-efficiency (EE) rating analysis tool. The Development Trust now has and uses the tool.

Produced technical papers summarising the state of energy efficient housing within the study area, considered options for energy efficient building and prepared and delivered training course content for builder training. Organised set of technical and policy discussion workshops within the Trust and affected communities, ranging from purely technical work with systems expert, and informal policy discussions with government and municipal officials to organise FIRSTRATE, to formal stakeholder workshops of 30-50 people. Held consultations on sustainable housing and climate mitigation demonstration project with DEAT and MEGA TECH (USAID in-country representatives). Involved NGOs and the private sector (building technologies) in the demonstration project.

## **Contents of this report:**

- 1. Buffalo Flats Community Development Trust Final Report (June 2003),**
- 2. Grant Activity Completion Report (Aug 2004),**
- 3. Climate Change and Mitigation Project Photo Presentation (Milestones 17, 18, 19 & 20).**

**SUSTAINABLE HOUSING DEVELOPMENT AND  
CLIMATE CHANGE MITIGATION DEMONSTRATION  
PROJECT**

**BUFFALO FLATS COMMUNITY DEVELOPMENT  
TRUST**

FINAL REPORT

June 2003

Prepared  lan & Buffalo Flats Community Development Trust

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## **1. Background of Project**

### Problem Definition:

Lack of formal residential accommodation and the growth of informal settlements contribute significantly to total greenhouse gas emissions globally, largely through deforestation resultant in the need for building materials and sources of solid fuel. Forests serve as sinks for carbon, pulling carbon out of the atmosphere into growing biomass in trees and carbon in soils.

In South Africa various policy options and practices for affordable housing provision have been identified and implemented over the last 10 years. However, implementing an approach that seeks more sustainable and energy efficient forms of housing development is difficult, given the limited funds available for housing, lack of bulk infrastructure, and practical barriers that limit environmental monitoring. The potential value that community based environmental advocacy's offer, is an opportunity for the improved management of more sustainable housing development in some specific circumstances.

Various practical technological and environmental management issues surround the role of such development agencies as they seek more sustainable forms of housing, seen as a critical and least-cost approach to reducing significant GHG emissions.

## **2. Summary of Project Activities to Date**

Arguably, we have influenced perspectives regarding energy efficient affordable housing development within Buffalo City and the Eastern Cape Province regarding its involvement in the Local Agenda 21 process. In consultation with the Department of Environmental Affairs and Tourism, we held talks with senior government and municipal officials and technical staff, have participated at various JCL sessions in Johannesburg, attended various workshops and conferences on renewable energy and energy efficiency both in Australia and Cape Town and have conducted various community workshops locally.

These discussions served to build a rational dialog on 'energy efficient' housing development issues between various stakeholders and the Buffalo Flats Community Development Trust, by our repeatedly reaching out to exchange views, share technical results to date, and simply talk about the issues informally.

These continual technical exchanges have helped to open particularly municipal officials, NGO's (i.e. Afesis Corplan) and BFcdt representatives to the possibility of adopting building energy ratings, alternative development planning and building methodologies and mitigation options.

Trained management and staff of the Trust in the use of FIRSTRATE energy-efficiency (EE) rating analysis tool. The Development Trust now has and uses the tool.

Produced technical papers summarising the state of energy efficient housing within The study area, considered options for energy efficient building and prepared and delivered training course content for builder training. Organised set of technical and policy discussion workshops within the Trust and affected communities, ranging from purely technical work

with systems expert, and informal policy discussions with government and municipal officials to organise FIRSTRATE, to formal stakeholder workshops of 30-50 people. Held consultations on sustainable housing and climate mitigation demonstration project with DEAT and MEGA TECH (USAID in-country representatives). Involved NGOs and the private sector (building technologies) in the demonstration project.

### **3. Summary of Planned Final Activities**

- . Official opening of Bamford Demonstration (6 units) in July 2003.
- . Official opening of Cambridge Demonstration (5 units) in August 2003.
- . Hold discussions with government and municipal stakeholders during July 2003.
- . Hold presentation Conference in July 2003
- . Final activities completed by September 2003.

### **4. Summary of the Project**

The goals of the demonstration project are to assist the Buffalo Flats Community Development Trust to evaluate its role through affordable housing development, in mitigating climate change in the context of Local Agenda 21. This evaluation has helped the participating communities to better define the stream of economic and potential GHG mitigation benefits from project-level activities in the housing sector, and available options for implementing and financing such activities. The East London communities of Cambridge, Bamford Street and Parkridge were selected as the three focus areas of the project. They were selected based on data availability.

Level of planning and preparation as well as potential interest by various in discussions on its climate change mitigation potential. The project partners include:

- Mayor and Councilors Buffalo City Municipality, Ward Committees of Ward 23 and Ward 32;
- Directorate of Development and Economic Planning, Buffalo City Municipality];
- Sam, Christo Crafford, Raymond Foster, Devan Govender, Brian Barratt;
- Department of Housing Local Government and Traditional Affairs, Will Elsebe Johnson, Andre Daniels, Johanne Gerber.

One or more research institutes or NGOs, including: Afesis Corplan, Fred Kuzambiza, IIEC, Jason Schatler, Johannesburg office. CSIR; and Eskom Enterprises

### **5. Summary of Project Process**

#### **5.1 Status of achieving goals**

##### **Goals of Project:**

The project was designed to assist the Buffalo Flats Community Development to evaluate how their housing programme could provide local climate benefits, in addition to the existing stream of economic and social development benefits from sustainable housing development. Properly evaluated housing) and construction methodologies could help mitigate greenhouse



gas en potentially through participation in energy rating and building technologies t1 emerged from this project in the years ahead. The project has already helped participants to better understand the climate benefits from the manager energy efficient building in the climate convention context. The Cambridge, Bamford and Parkridge areas of East London were selected focus communities. For these three, the project was designed to:

1. Training - help to develop in-house technical capacity of management and staff of the BFCDT to assess the energy efficiency rating of housing design and potential climate change mitigation benefits through environmental management and building practice, by providing training in analytic tools and 'r' value evaluation methods;
2. Assessment - the potential of local-level housing policies and projects to accommodate GHG mitigation benefits through the application of energy efficiency building;
3. Demonstration - introduce the concepts of housing project evaluation and investment in the climate change context through energy efficient housing design and construction, to help the BFCTD begin to identify project activities capable of producing credible and verifiable energy efficiency methods, socio-economic and other benefits.

## **5.2 Objectives and benchmarks specified in the work plan**

1. The investigation and collection of data regarding key environmental indicators that describe the state of the project area and its people.
  2. The training of staff and implementation of a sustainable environmental management capacity within the BFcdt
  3. Investigation and preparation of detailed assessment of BFcdt projects with Recommendations, regarding the use of appropriate EE development and building technologies on current development projects
  4. Train in-house management and staff in the use of FIRSTRATE computer models for assessing energy efficient building options
  5. Work with management and staff to develop project -specific estimates of energy-Efficiency ratings, for each housing unit
  6. Training of the local building sector in environmentally sustainable construction techniques
  7. Construction/upgrade of 13 environmentally sustainable energy efficient units
  8. Evaluate performance of construction / operation of environmentally sustainable Development technologies
  9. Hold in-house workshops to train management and staff and hold public- private dialogs on technical and policy issues surrounding evaluation activities
- Identify and assess potential on-the-ground projects that could be invested in by private or other entities, and share these evaluations with interested stakeholders.

## **5.3 Progress on completion of activities against planned targets**

1. *The investigation and collection of data regarding key environmental indicators that describe the state of the project area and its people.*

STATUS: Local area building environment survey to determine indicators of energy efficiency within affordable housing areas. The survey undertaken in July 2002, focused on two local affordable housing areas of *Egoli* (a subsidised low- cost housing scheme of

detached dwellings under individual ownership) and *Belgravia* (inner city social housing rental scheme under HAEL management). A representative sample survey was carried out on both schemes through direct interview questionnaire undertaken by fieldworkers selected from the local community.

*2. The training of staff and implementation of a sustainable environmental management capacity within the BFcdt*

STATUS: Ongoing training to management and staff through various aspects of the project, including: establishment of energy costs within existing housing areas, analysis of energy efficiency ratings of new housing designs and plans through user friendly computer model, assessment of energy efficient options for the planning and design of housing, training of builders in energy efficient housing methods, construction and evaluation of demonstration units.

*3. Investigation and preparation of detailed assessment of BFcdt projects with recommendations, regarding the use of appropriate EE development and building technologies on current development projects*

STATUS: Investigation and preparation of report on energy efficiency and EE options for housing developments completed in September 2002.

*4. Train in -house management and staff in the use of FIRSTRATE computer models for assessing energy efficient building options:*

STATUS: Installation of computer hardware and acquisition of appropriate software completed in August 2002. Training sessions were held at the offices of the BFCDT through September - October 2002 (identification of training needs and description of FIRSTRATE model);

*5. Work with management and staff to develop project-specific estimates of energy-efficiency ratings, for each housing unit:*

STATUS: Training team produced a version of the FIRSTRATE model for various housing unit energy-efficiency scenarios that report energy efficiency of housing design by means of a "star grading" system.

*6. Training of the local building sector in environmentally sustainable constellation techniques*

STATUS: Preparation of training programme and course material completed in October 2002. Builder identification, community consultation and training of 20 builders in energy efficient building methods completed in November 2002. Builder certification to be issued on completion of construction stages. On site training continuing in construction of Cambridge and Bamford units.

*7. Construction/upgrade of 13 environmentally sustainable energy efficient housing units*

STATUS: 6 demonstration units nearing completion at Bamford Street Social Housing Scheme including community hall and convenience shops ('Spaza shops'). Foundations laid upon 5 serviced plots at Cambridge, "Amanzi" water heaters purchased for installation into Cambridge demonstration units.

*8. Evaluate performance of construction / operation of environmentally sustainable Development technologies*

STATUS: Ongoing evaluation of performance currently underway.

*9. Hold in-house workshops to train management and staff and hold public -private dialogs on technical and policy issues surrounding evaluation activities:*

STATUS: Organised set of workshops, ranging from purely technical work with systems expert, and informal policy discussions with municipal, DEAT and MEGA TECH officials, to formal stakeholder workshops of 30-50 people.

The purpose of the workshops was to provide information to all stakeholders about the findings of energy efficiency reports, of the project activities to date, and to engage in a dialogue about the importance of energy efficient housing design activities for future housing projects for the purpose of climate change mitigation. The workshops were well attended and may have contributed to the gradual re- evaluation of prevailing positions on affordable housing planning and building design.

*Identify and assess potential on -the-ground projects that could be invested in by private or other entities, and share these evaluations with interested stakeholders:*

STATUS: We are considering producing a set of technical papers on the demonstration project for peer-reviewed publication, but will not decide this until after the September strategic planning workshop.

#### **5.4 Description of overall Program status**

Summarised in the section 2. Summary description, above.

#### **5.5 Other accomplishments of Program implementation**

1. Cross-fertilisation with NGO's (i.e. Afesis Corplan), agencies and other individuals, perspectives on energy-efficient building practices and climate change.
2. Significant improvement of internal dialog within Municipal, NGO and private sectors on renewable energy, energy- efficient building technologies and climate change: Discussions and workshops have been major stimulus for improving communication across these groups, which had not all consulted with each other prior to our meetings. Our key role may have been in getting the community and private sector views before government and municipal officials.
3. Technical assistance, training and capacity building: As a result of the demonstration project, the BFCDT now has serious analytic capability (the FIRSTRATE model tailored for East London), staff to run the model, improved understanding of the technical and policy issues surrounding energy efficiency and climate change (e.g. "r" values, energy leakage, planning & design for housing).
4. Improved understanding by BFCDT staff in energy-efficient housing technical and policy issues: Repeated meetings with staff, who also attended most of the workshop events to date, have helped them view aspects and technology concerning energy efficient housing construction.

#### **5.6 Identification and explanation of significant problems or delays related to achievement of objectives or activities**

The start-up of the demonstration project activities took longer than anticipated, due to the usual problems in working with community-based development project: These include:

- Uncertain provincial government positions regarding approval of housing subsidies for the 3 projects,
- Time required to train in-house staff in the use of the FIRSTRATE compub model,
- Technical issues associated with the analysis (i.e. data availability),
- using the model correctly and producing results that (e intuitive sense, - time required to organise technical meetings and workshops,
- Failure of one modular construction demonstration "show house" (Amalinda Owing to material damage arising through transportation from Johannesburg~ Rectified at applicant cost.

## **5.7 Brief summary of significant corrective actions and major**

### **Activities planned**

Corrective actions include:

- Planning the September presentation workshops now and beginning contact wit! DEAT, MEGA TECH and other participants.

Major activities to complete by late November:

- Hold discussions with governments and stakeholders during July - September.
- Final activities completed by November.
- We plan to advance the public/private sustainable housing and climate change stakeholder dialogs in each August - September, to:
  - help facilitate any future activities regarding decisions by governments or other Stakeholders on which energy efficient housing activities make sense to pursue,
  - How to evaluate them, including assessing their potential contributions b sustainable development,
- encourage the continued identification and evaluation of specific pilot projects 0 the ground to test sustainable housing approaches,
- Share technical insights and results from other technical work underway - share perspectives on housing policy issues among participants.

Potential future work that cannot be performed by the project now winding up, but that would be highly useful, could include:

The review of individual project proposals, including the evaluation of their physical and financial risks, feasibility of implementation, and barriers,

Evaluation of opportunities for private investment seeking carbon credits in a~ domestic or international policy context.

## **6. Recommendations**

Recommendations for South Africa and specifically for the Buffalo Flats Community

Development Trust DEAT/USAID project are:

### **6.1 Establishment of Local Environmental Management Capacity**

That local housing development agencies be encouraged to establish internal environmental I Monitoring and advocacy capacity.

### **6.2 Energy Efficiency Assessment**

The state of current affordable housing schemes to be surveyed and evaluated in terms of energy efficiency criteria as an integral component of the planning and design process. This process to be assisted by proprietary computer systems to determine energy efficiency rating of existing and new housing designs.

### **6.3 Environmental and social sustainability**

Compliance with all government renewable energy and energy efficiency requirements, electricity legislation, social development upliftment legislation, environmental legislation and licensing requirements.

### **6.4 Base date for 'new' process**

1st January 2004 may be an appropriate base date for the implementation of this requirement in SA.

### **6.5 Certification**

All building and appliance technology for housing should comply with SA certification

1. Name of Organisation	Buffalo Flats Community Development Trust
2. Grant Activity	Housing Development and Climate Change Mitigation Demonstrating Project
3. Briefly describe the grant objectives achievements and impact as a result of the grant activities implemented during the grant period.	See the attached narrative report (Final Report)
4. Briefly discuss the implementation process, including lessons learned and recommendations	<p>This has been dealt with extensively in our attached final report. We wish to express our thanks to the Department of Environmental affairs and Tourism and USAID for the opportunity of exploring Energy-efficiency in housing. Whilst this project has reached completion, the practice of EE building techniques remain core to Bfcdt planning and design. We have indicated this to the delegation that had seen the projects during their recent visit.</p> <p>As per the Grant Agreement, 13 units that were retrofitted. In addition to these units I wish to report on the “new technology” show-house constructed at Amalinda. It is also important to note that special care has been given to the construction of these units, utilizing the trainees from the EE Building construction course. Training was provided by the consultants employed through the grant.</p> <p><u>Bamford Street Social Housing Complex: (Total 46 units)</u>  -6 individual units were retrofitted with stable doors, floor coverings, ceiling insulation, energy-efficient light fittings and weather stripping. The six units are complete and have been inspected by the Buffalo City building engineer and our own site agent. In addition, 6 units, converted to shops and treated as 1 unit, also have insulated ceilings, but the major feature here is the installation of solar panels for water heating. The community hall (multi-purpose center) also has a home made solar panel.</p> <p><u>Cambridge Peoples Housing process (Total – 198 units)</u>  -5 individual houses were retrofitted with weather stripping; Amazing Amanzi Systems; Ceilings; wooden windows and plaster, inside and outside.</p> <p><u>Parkridge (Total 99 units)</u>  The one “test” house at Parkridge has been restored by replacing windows, plaster and paint on outside, repairs to doors, and roof. All building processes have been done through our Mentorship programme, with the EE training programme as the base. Trainees have not only been used on the 13 demo units, but on the construction of other houses as well. This was done in addition to simply “upgrading to acceptable handover”, which was all that was possible with the subsidy, which is still to be accessed. We hope that this will allow us to access full subsidies plus a top-up to show benefit of EE building to community and Housing Department.</p> <p><u>Amalinda (109 units)</u>  The 1 show house has proven to be one of the less successful projects. Although we have managed to salvage this product by designing steel brackets to secure the walls and also by applying a sealing plaster layer, we will not be using this technology in the new future. Although the agreement certificate shows that this method of “panel” walling (Tuffwall) is extremely energy –efficient, the transporting of such heavy material (panels) from Johannesburg is not viable. It has been a costly exercise and to crown it all, the panels had fallen off the trailer en route to East London. The show house will be used for a site office during the project development of the 109 units.</p>
5. Public Dissemination: This was done through workshops and by word of mouth when people came for housing information at our offices.	

Signature of Grantee \_\_\_\_\_ R. Rooy \_\_\_\_\_ Date 6 August 2004 \_\_\_\_\_



# CLIMATE CHANGE & MITIGATION PROJECT

(Supported by DEAT and USAID)

Below are photographs that show the types of activities and additions, as detailed in our project plan, that have been carried out to increase the energy efficiency for consumers and mitigate climate change factors within our environment in our building projects.

In our social housing project – Cecil Ditta Place – we installed stable doors, tiled the floors of the 18 bedsits, weather stripped the external joinery, installed solar panels in the shop complex and community hall and lined the roofs in the shops with insulating foil.



Bedsits with stable doors, weather stripping and tiled floors.



Solar panel for shops and insulation foil on inside roof



In our People's Housing Process at Cambridge we have put in ceilings, plastered homes, weather stripped the external joinery and installed the Amazing Amanzi Water heating system.



Ceilings



Plaster home



Amazing Amanzi water heating system

In our urban regeneration project in Parkridge we have installed a ceiling, plastered the outside of the home, weather-stripped the external joinery, installed internal doors and re-established foundations.



External plaster and weather stripping of joinery and installation of a ceiling

In addition to these extra features for our standard building projects we trialed the construction of a “show” home made from alternative materials. The product was sourced from Johannesburg and as detailed in our project reports we have encountered many challenges in erecting and making the home habitable.



Almost completed “show” home – touch up external plaster, glazing and front door to be installed. This will be done when beneficiary is found or when used as site office for Amalinda infrastructure installation.