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➤ RECAPITULATION OF ENERKEY ACTIVITIES

Chris Cooper and Harold Annegam (U)



A year has passed since the inaugural workshop for EnerKey and it is appropriate to reflect on what has been achieved, and to consider the future development of the project. Three significant events were held during the year under review.

○ ENERKEY KICK-OFF

The first has to be the inaugural EnerKey workshop held in Johannesburg in November 2005, hosted jointly by the City of Johannesburg and the University of Johannesburg. This event gave all the participating institutions an opportunity to

meet and to define priorities. The main themes for the project were identified and five areas were selected as being most appropriate and urgent for providing substance to the overarching project.



Kick-Off Meeting in Johannesburg

○ EXPERIENCE EXCHANGE WORKSHOP

The second event was a mid-year experience exchange and review workshop held in Stuttgart in July 2006, attended by a delegation of thirteen from South Africa, including delegates from two cities, two

EnerKey
project meeting
planned for
Joburg in
March 2007

➤ CITIES PERSPECTIVE ON ENERKEY INITIATIVES - CITY OF STUTTGART

Dr. Jürgen Görres – Dept. of Environmental Protection, City of Stuttgart

At a central place, the city of Stuttgart is planning to retrofit a school as a "Plus-Energy-School". This means that averaged over the year, the energy production of the school will be higher than the energy consumption. Therefore the energy-efficiency of the school must be increased up to a maximum by retrofitting the building envelope and the systems, furthermore renewable energies have to be installed, whose overproduction may be supported to the public power supply.

The intended school for this project is the "Uhlandschule" in Stuttgart-Zuffenhausen, which was built in 1954 and consists of several buildings: the main building, a building next door called "Pavilion", a sports hall and a new building from 2004. Contrary to the first planning's the entire complex of buildings will be involved in the Plus-Energy-Concept. The total floor area is about 6 440 m².

In order to reach this high target, different energy concepts may be applied, however currently the relevant technologies aren't profitable yet. Therefore the department of energy management is presently trying to get a government aid. But beside this, a big part of the financing has to be provided by the city itself. Thus the financial aspects of the project must be clarified with the office for school administration and the city council.

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Universities and two NGOs. This event built on the outputs of the first workshop and helped the participants better define the areas of cooperation. It was particularly significant that the City of Johannesburg sent a very high level delegation. This reinforced the importance of energy and the environment to the City management. The meetings helped strengthen the newly formed ties between the University of Johannesburg and the City, and demonstrated that the University/City partnership is of benefit to both parties. The EnerKey sub-projects were refined during the workshop.



Münster Waste incineration Plant Visit

o INSITE EXHIBITION

The third event was the visit to the Department of Science and Technology INSITE (International Science and Technology) Exhibition in September 2006 by a high ranking German Ministerial delegation, and a meeting with the local EnerKey participants. This meeting helped focus the research partners on the rationale behind the BMBF funding model and anticipated outcomes.

o OTHER ACTIVITIES

In addition to the three specific events one South African student (Philip Goyns) spent three months in Germany investigating transport models and one German partner (Simon Wössner from Fraunhofer Institute for Building Technology) visited South Africa to investigate buildings and the

implementation of the REDUCE energy efficiency toolkit. Simon's visit was sponsored through the South African German Alumni Association and the Goethe Institute in Johannesburg. Both of these visits have helped cement the relationship and have better defined the research programme.

o ENERKEY'S FUTURE

While it is clear that there is much work to be done the project participants have now developed much better and stronger relationships. In terms of the sub-projects the foundation has now been laid for the schools and buildings efficiency project to deliver initial results. Ekurhuleni has begun identifying schools and their electricity consumption patterns. Links have been created to one primary school in Johannesburg and one primary school in Tshwane regarding energy audits for possible energy efficiency retrofits. Full audits will be carried out during 2007. A request for funding has been submitted to the National Energy Efficiency Agency to complete these audits.

On the transport sub-project data on vehicle engine operating parameters are being collected and preliminary analyses have been conducted. These initial investigations show that very useful data should be available for other traffic and environmental models used by the City of Johannesburg. The end result will be much more accurate calibration of, and outputs from, this suite of models. The City management will as a result be in a far better position to evaluate the environmental effects of traffic in the city.

Further submissions are being prepared for funding from SANERI. This will enable the South African partners to have a funding stream that will help other projects under the EnerKey umbrella deliver useful and useable results.

PROJECT PARTNERS



➤ **INSITE 2006 EXHIBITION,
24-27 SEPTEMBER 2006**

The EnerKey project was presented in INSITE 2006 Exhibition as a part of the German Pavilion run by the German Academic Exchange Service (DAAD). This four day event in Sandton Convention Centre, Johannesburg was a good opportunity to demonstrate the objectives of the EnerKey project, establish new local contacts and discuss the future of the project with the South African partners.



The EnerKey Project Stand on the German INSITE Pavilion

The interest on the EnerKey project at the exhibition was relatively high. The visitor profile was very broad ranging from students to industrialists. The visitors are informed about the activities of EnerKey, the renewable and alternative energy possibilities in South Africa and the possible future projects.



The South African Minister of Science and Technology Mosibudi Mangena and Olaf Kündgen (DAAD) visited the EnerKey stand

➤ **IEA-ENERGY CONCEPT ADVISER
FOR EDUCATIONAL BUILDINGS IN
SOUTH AFRICA**

Simon Wössner (IBP)

Simon Wössner, a senior software developer from the German project partner Fraunhofer-Institute for Building Physics (IBP) visited South Africa middle of October for two weeks. Within this time, there were several opportunities to present one of the German contributions to the EnerKey project, the Energy Concept Adviser (ECA). The ECA, developed in a common IEA project, deals with energy efficient retrofits of educational buildings. It aims at decision makers on retrofits and shall show them, that there is a benefit in energy efficient retrofits.



The visit to the Laerskool Garsfontein

Besides the talks to several partners within the framework of EnerKey, the Department of Architecture of the University of Johannesburg offered a possibility to give a lecture on the ECA and the energy demand calculation to students. As the ECA deals with educational buildings, the two schools could be visited. One was the Emmerantia Primary School in Johannesburg and the other was the Laerskool Garsfontein in Tshwane. At both schools there is a potential for an energy efficient retrofit. With these possible retrofits, the learning environment could also be improved. At the Emmerantia Primary School, which is a solid brick building, an energy audit with some

pupils was performed. The Laerskool Garsfontein has brick buildings as well as pre-fab buildings. The pre-fab buildings represent quite a huge stock of buildings for schools.

Finally the needed steps to implement the Energy Concept Adviser to South African conditions and the further ongoing with possible school retrofits were discussed. The needed steps within the implementation of the Energy Concept Adviser will be the input of typical constructions and climatic data for the concept development part, the identification of typical consumptions for the performance rating, the description of some case studies and for the problem Relates Recommendations the identification of existing problems and solutions for those problems.



The Energy Concept Adviser can be visited at:

⇒ www.annex36.com

➤ OUTCOMES OF THE RESEARCH VISIT OF PHILIP GOYNS TO GERMANY

Philip Goyns (UJ)

The purpose of the research visit was to learn about various transport energy and emissions models with the aim of guiding the selection of an appropriate model for use in mobility module of the Enerkey

project. The IKARUS transport model (ITM) was originally recommended for the project.

The ITM hides many of the details needed to transform the data from the German situation to the South African situation. The ITM uses the Handbook of Emissions Factors (HBEFA), which is a lower level model, as the source of emissions and fuel consumption data based on a set of road types and driving conditions such as freeway, main road, and streets and stop and go, partially congested, and free flowing. Total fuel consumption and emissions are calculated in the ITM by allocating different proportions of each road type and driving condition and then integrating all the values based on total vehicle activity.

The ITM provides no quantifiable way of matching the South African driving conditions to those used within the model. The research visit provided access to the underlying data within the ITM and the HBEFA to allow for a way to match the driving conditions used in the HBEFA to those occurring in South Africa.

With the driving cycles measured in Johannesburg, as part of the current research, and the details of the disaggregated emissions factors used to develop the HBEFA the European data can be transformed for South African conditions. This will make it possible to adapt the ITM to study the situation in Johannesburg."



IKARUS Transport Model

www.emerging-megacities.org

Emmerantia School Pictures



➤ THE ENERKEY SCHOOL PROJECT IN SOUTH AFRICA – EMMARENTIA PRIMARY SCHOOL

Jan Strotmann (GTZ)

In order to promote a wide spread awareness on energy and its efficient use it is necessary to involve the young generation into the issue. By introducing renewable energy and energy efficiency at schools awareness will be raised with the school kids and hopefully also with their parents. The idea is to integrate the children in the process of retrofitting schools and let them participate in the step by step changes that will be made.



The Emmarentia Primary School

Emmarentia Primary School showed a great eagerness to be involved in the energy efficiency project. After making contact, Jan Strotmann (from GTZ) gave a presentation on global warming, energy efficiency and renewable energy to all of the grade 5, grade 6 and grade 7 pupils. This was met with great enthusiasm. In October Simon Wössner from the Fraunhofer Institute of Building Physics (IBP) came to visit South Africa. Together with the ten top science pupils an energy efficiency tour of the school was undertaken. Topics addressed were: lack of natural light in the classrooms which resulted in the lights being turned on all the time, heating issues in summer and winter, orientation of buildings, but also broad issues like how electricity is generated in South Africa.

The children then got some homework on energy issues and had to report back to their classes. The pupils articulated a keen interest in communicating with pupils from German Uhland School which is undergoing an energy retrofit.

The South African Energy Efficiency Agency (SANEAA) was approached for funding. They have agreed to fund a complete energy retrofit of the Emmarentia School. The idea is to partner the Emmarentia primary school with a township school and use both as an example for a state of the art retrofit. The architectural department of the University Johannesburg (UJ) was asked to drive the process and Vusi Shongwe has agreed to take on the role of project coordinator. Together with Sara Blecher, a very engaged parent, they will guide the project.

The next step is to do three different energy audits of the school each with different scenarios, namely:

- “Business as usual” - shows the expenditures if no changes are done.
- Economic model – small changes that make economic sense (replacing light bulbs, etc.)
- Lighthouse model – the complete renewable energy retrofit with locally available state of the art technology.

Once the money from the Energy Efficiency Agency has been signed over, the refurbishing of the school will begin. This will be coupled with an ongoing project by the pupils to participate in and learn from all the changes that are taking place in the school.



Girls playing at schoolyard

➤ **UPCOMING EVENTS RELATED TO URBAN SUSTAINABILITY**

○ **BIOFUELS MARKETS AFRICA**

Cape Town, South Africa
30 November - 1 December 2006

⇒ www.greenpowerconferences.com

This two day conference brings together an unparalleled line up of CEO's to investigate all the key issues relevant to Biofuels in Africa.

○ **INTERNATIONAL CONFERENCE ON ECOCITIES 6**

Banglore, India
3-6 December 2006

⇒ www.tciconferences.com/ecocity2006/ecocity2006.htm

The Theme of the Conference is: "From Theory and Planning to Development Transforming a City into an Ecocity".

○ **SUSTAINABILITY CONFERENCE**

Chennai, India
4 - 7 January 2007

⇒ sustainabilityconference.com

The conference is cross-disciplinary in its scope, a meeting point for natural and social scientists, researchers and practitioners, professionals and community representatives.

○ **TERRAPINN CONFERENCES**

Johannesburg, South Africa
16 - 20 April 2007

⇒ www.terrapinn.com

There are seven congresses in the same venue: Africa Power & Electricity Congress and Exhibition, Power Quality & Reliability Africa, Power Generation World Africa, Energy Efficiency World Africa, Renewable Energy World Africa, Transmission and

Distribution World Africa and On-site Power World Africa

○ **45TH IMCL CONFERENCE**

Portland, USA
10- 14 June 2007

⇒ www.livablecities.org/45ConfPortland.htm

Themes include among others: Principles of true urbanism, sustainable development models, designing for physical health and Green buildings, healthy buildings.

○ **AFRICA ENERGY FORUM 2007**

Hamburg, Germany
27-29 June 2007

⇒ www.energynet.co.uk

This is the meeting place for the African and international power sectors. AEF2007 will also include seminars on energy access and the changing face of Africa's gas sector.

○ **INTERNATIONAL CONFERENCE ON WHOLE LIFE URBAN SUSTAINABILITY AND ITS ASSESSMENT**

Glasgow, Scotland
27-29 June 2007

⇒ www.sue-mot.org.uk

The SUE-MoT conference theme is Sustainable Urban Development: Meeting the Challenges of Whole Life Assessments.

○ **SECOND BIENNIAL KMAFRICA CONFERENCE 2007**

Nairobi, Kenya

⇒ www.kmafrica.info

The biennial conferences of KMAfrica serve as a platform for knowledge dissemination and exchange among policy makers, donors, academics, and sector professionals.

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