

Steigerung der Energieeffizienz im Ballungsraum Gauteng, SA -EnerKey-Projekt – -南非豪登省大型城区能源高效利用EnerKey项目

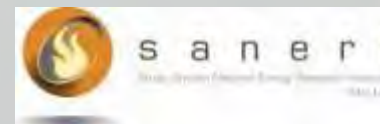
RECAST Urumqi Konferenz

13. Juli 2010

RECAST 乌鲁木齐会议

2010年7月13日

Ludger Eltrop



Vortragsgliederung - Aktivitäten im EnerKey Projekt

报告内容-EnerKey项目活动

1. Projektvorstellung – Das Enerkey Projekt

EnerKey项目介绍

2. Tools zur Energieeffizienz – Der EnerKey Advisor und das EnerKey Performance Zertifikat

能源高效利用工具 - EnerKey顾问及EnerKey性能证书

3. Das EnerKey Schulprojekt

EnerKey 学校项目

4. Energieeffizienz im Armutssektor

贫瘠地区的能源高效利用

Gauteng und die JET Cities – Hintergrund

豪登及茨瓦纳地区-背景资料



- Bevölkerung von 9,6 Mio. mit höchster Dichte in SA (578/km²)
南非人口最为密集的地区,约有960万人口 (578/平方公里)
- Kleinste Provinz SA mit 17.000 km²
豪登省是南非最小的省,面积约为1.7万平方公里
- Hohes Bevölkerungswachstum bis 4,5 % pro Jahr, ca 17 % der Gesamtbevölkerung SA
南非人口增长率最高的地区,每年增长率为4,5%,约占南非总人口的17%
- 14 % der nationalen CO₂-Emissionen, aber auch 30 % des GDP
其生产总值约占南非经济总量的30%,二氧化碳排量占总量的14%
- Mangel an Energieversorgungsicherheit (Stromausfälle!)
能源供给不足 (电力中断)
- Drei Städte Johannesburg, Ekurhuleni und Tshwane (JET-cities) wachsen zu einer Megacity zusammen
由约翰内斯堡 (Johannesburg), Ekurhuleni (东方田埂) 及Tshwane (茨瓦纳城区) 3座城市组成的超大城区

Source: <http://www.southafrica.info>

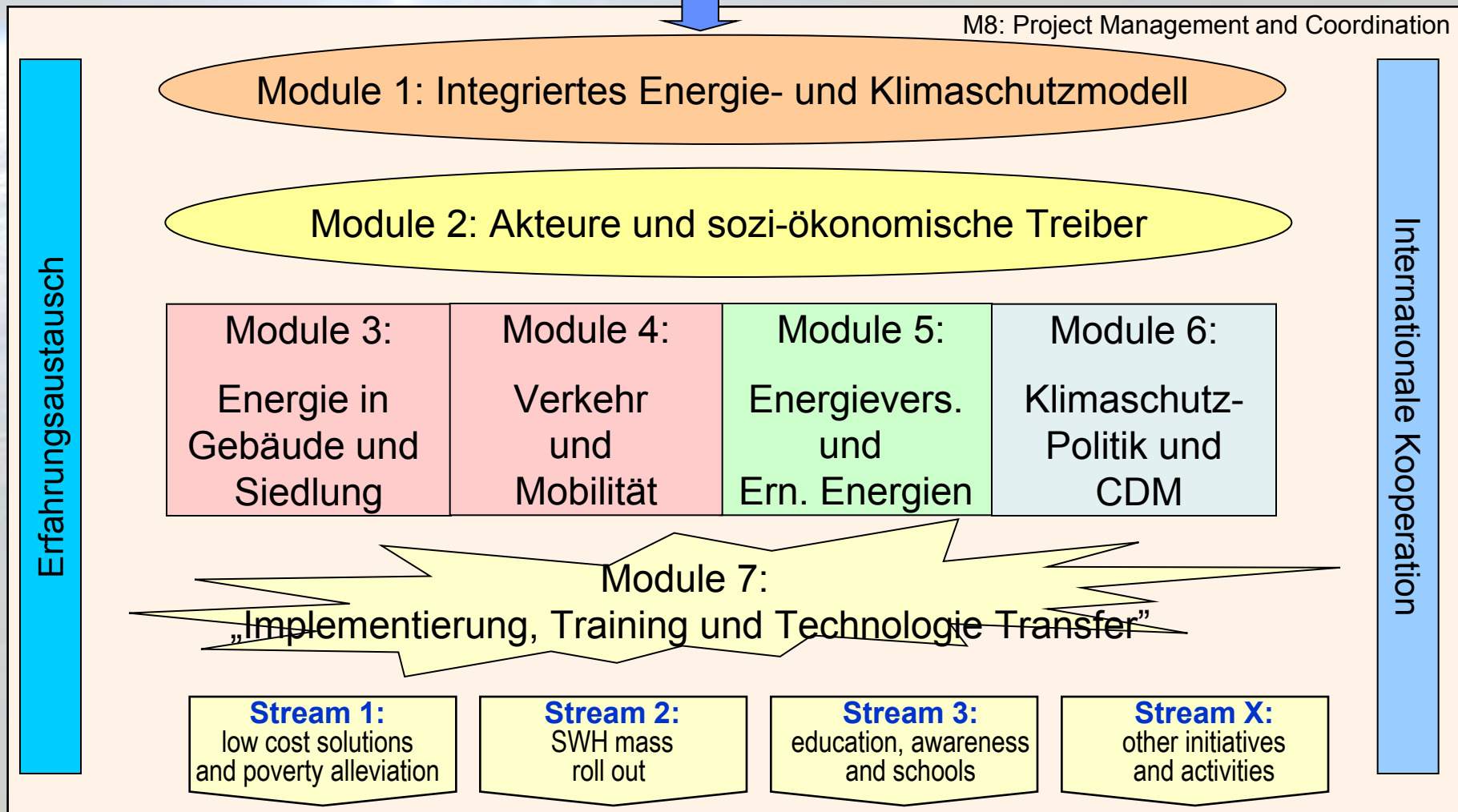
Visionen für die Nachhaltige Entwicklung der Städte in Gauteng 豪登省各城市可持续发展前景

1. A world-class African city for all
世界一流水平的非洲城市
Joburg约翰内斯堡, GDS 2006
- The Smart, Creative and Developmental City
聪明而有创造力, 极具发展的城市
Ekurhuleni东方田埂, IDP 2008
- To be an energy smart city of excellence
成为卓越的智能能源城市
Tshwane茨瓦纳, SECS 2006

Projektaufbau



Partner in Südafrika



项目构成

EnerKey 南非管理委员会

南非计划管理委员会

南非合作伙伴

M8: Project Management and Coordination

模块 1: 能源-气候保护一体化模型

模块 2: 参与者及 社会经济驱动器

<p>模块 3: 建筑及居民区 能源</p>	<p>模块 4: 城市交通</p>	<p>模块5: 能源供给</p>	<p>模块 6: 气候保护政策及 清洁发展机制 CDM</p>
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模块 7:
„实施，培训及技术转化”

趋势 1:
低成本方案与扶贫

趋势 2:
SWH mass
roll out

趋势 3:
意识教育及学校

趋势 X:
其他创意及活动

经验交流

国际合作

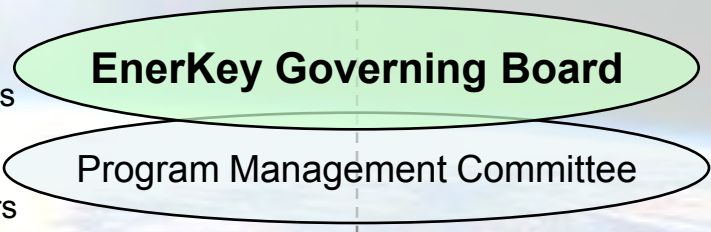
Projektorganisation und Arbeitsteilung

Deutsche Partner

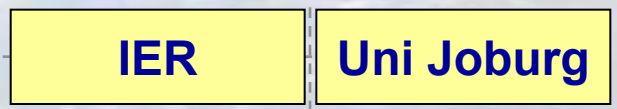
- IER** M1: Integrated Modelling
M5: Energy Supply Systems
- IZT** M2: Stakeholders
and Socio-econ. Drivers
- IBP** M3: Building and
District Systems
- TIE** M4: Traffic and Mobility
M6: Climate Policy + CDM

Partner in Südafrika

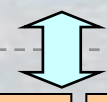
- UJ** M1: Integrated Modelling
- UPret** M5: Energy Supply Syst.
- ERC** M1: Integrated Modelling
- CSIR** M3: Buildings
M4: Traffic and Mobility



Strategic support and quality assurance



Forschung
Umsetzung



- Africa Society of German Enterprises**
- Implementation and Business Networks
- German Chamber of Commerce**
- ASH / INEP** Buildings + socio-econ.
- GTZ**



- ESKOM** **City Power**
- ies and Implementing agents
- energy manag. **SEA**
- M5 and M2 **PEER Africa**
- M5 **SESSA**

expert exchange, energy management
capacity building, information, transfer, training, education

项目组织及工作分配

德方合作伙伴

- IER** M1: 一体模型
M5: 能源供应系统
- IZT** M2: 参与方及社会经济
驱动者
- IBP** M3: 建筑区域系统
- TIE** M4: 交通及流动性
M6: 气候保护政策 + CDM
清洁发展机制

研究
转化

Africa Society of German Enterprises

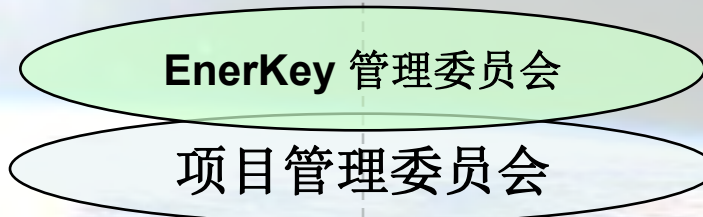
实施及商业网络

German Chamber of Commerce

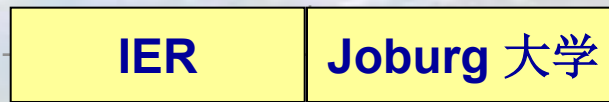
ASH / INEP

Buildings + socio-econ.
建筑+经济学

GTZ



战略支持及质量保证



项目管理

豪登地区政府

斯图加特

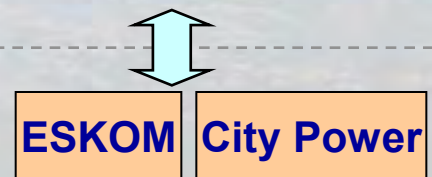
**JET多元城市区:
约翰内斯堡:
Ekurhuleni东方田埂
(M6),
Tshwane茨瓦纳**

expert exchange, energy management 专家交流,
能源管理

capacity building, information, transfer, training, education

南非合作伙伴

- M1: 一体模型 **UJ**
- M5: 能源供应系统. **UPret**
- M1: 一体模型 **ERC**
- M3: 建筑
M4: 交通及流动性 **CSIR**



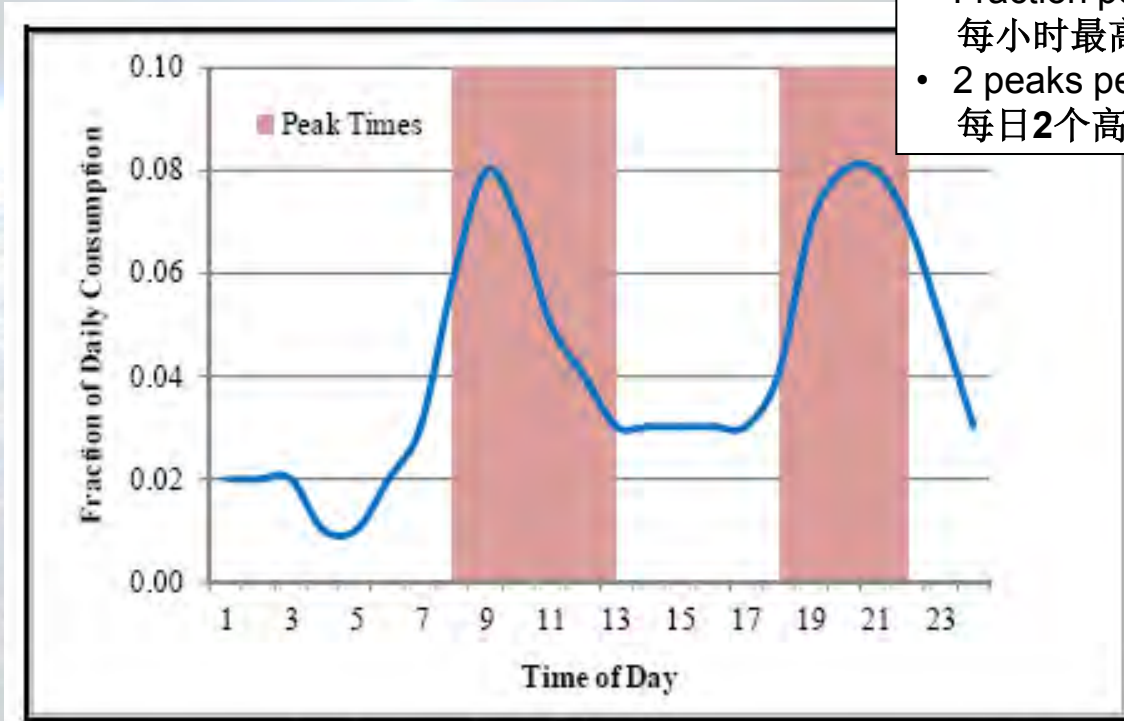
公司及代表

能源管理. **SEA**

M5 and M2 **PEER Africa**

M5 **SESSA**

Reduktionspotenzial der Strom-Spitzenlast durch Solaranlagen 通过太阳能集热设备减少高峰期电力负荷



- Fraction per 1 hr peak: 0.08
每小时最高值 : 0.08
- 2 peaks per day
每日2个高峰期

Typische
Warmwasserbedarfskurve
典型热水需求曲线
(Meyer and Tshimankinda)

Reduktion des Leistungsbedarfs für die Warmwasserbereitstellung (MW/day during peak hours)
减少热水供应所需功率 (MW/日高峰期间)

	2005	2010	2015	2020	2025	2030	2035	2040	
1hr peak time	0	0	168,87	581,59	1094,61	1230,86	1381,42	1597,50	MW/peak

Typische Haushalte und Gebäude in Gauteng

豪登省典型家庭及建筑

Dwelling typology of Community Survey 2007		
1. House or brick structure on a separate stand or yard	1.734.531	54,6%
2. Traditional dwelling/Hut/Structure made of traditional material	11.603	0,4%
3. Flat in block of flats	221.312	7,0%
4. Town/Cluster/Semi-detached house (simplex, duplex, triplex)	149.996	4,7%
5. House/Flat/Room in backyard	189.669	6,0%
6. Informal dwelling/Shack in backyard	267.292	8,4%
7. Informal dwelling/Shack NOT in backyard, e.g. in an informal/squatter settlement	452.581	14,3%
8. Room/Flatlet NOT in backyard but on a shared property	38.369	1,2%
9. Caravan or tent	3.757	0,1%
10. Private ship/boat	1.463	0,0%
11. Workers' hostel (bed/room)	96.905	3,1%
Other	8.101	0,3%
Total	3.175.579	100,0%

Source: Community Survey 2007, Statistics South Africa.

Gebäudetypen im unteren Einkommensbereich (poor)

低收入贫瘠地区的典型建筑

Alleinstehendes Haus
独立建筑
(incl. öff. gef. Sozialwohnungsbau)

Informelles Haus in einer
informellen Siedlung ("shack")
非正式居民区的非正式建筑 (棚屋)



45.9 %



22.1 %

- House in backyard

- Informal dwelling in backyard



后院房屋

5.9 %



后院非正式住房

12.6 %

- Traditional dwelling

- Others (Flat, semi-detached house, hostel etc) 其他

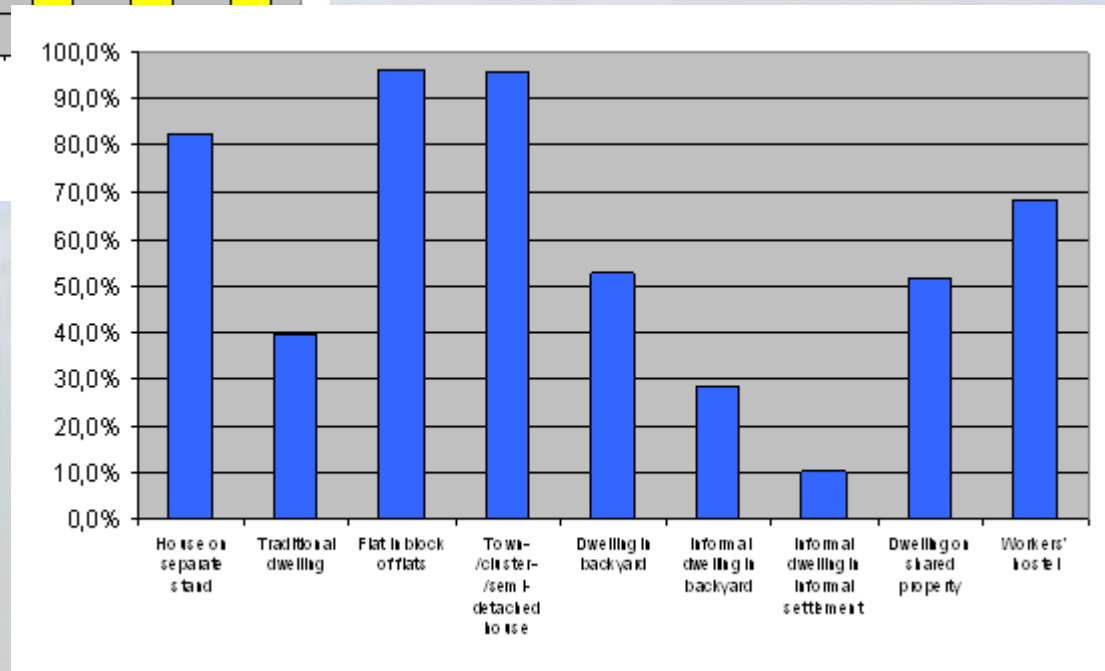
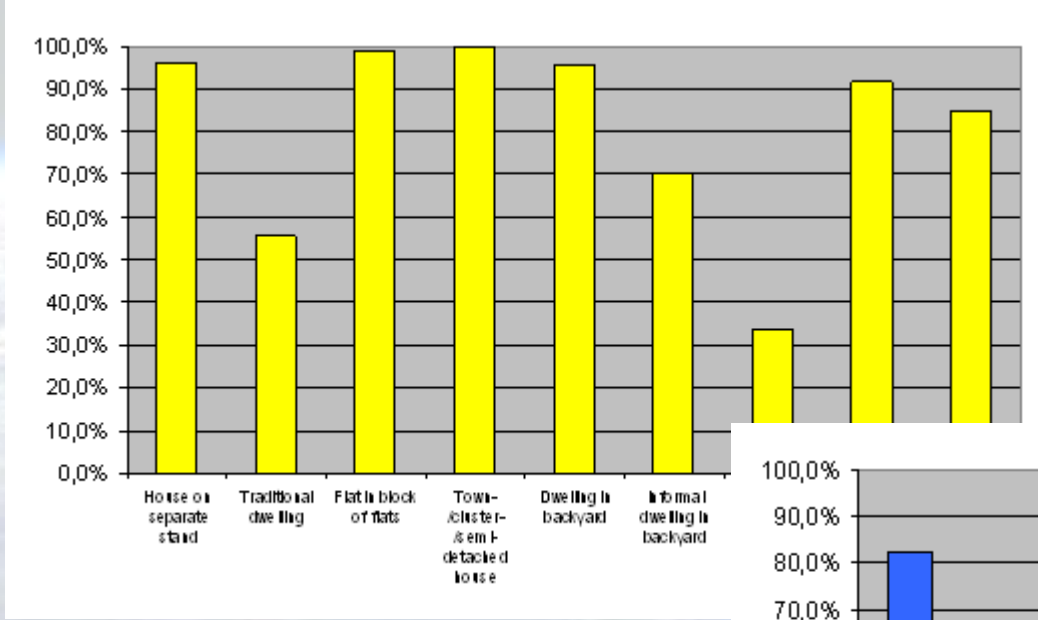


0.5 %

13.0 %

Gebäudetypen in Gauteng – Anteile Strom- und Wasseranschluss

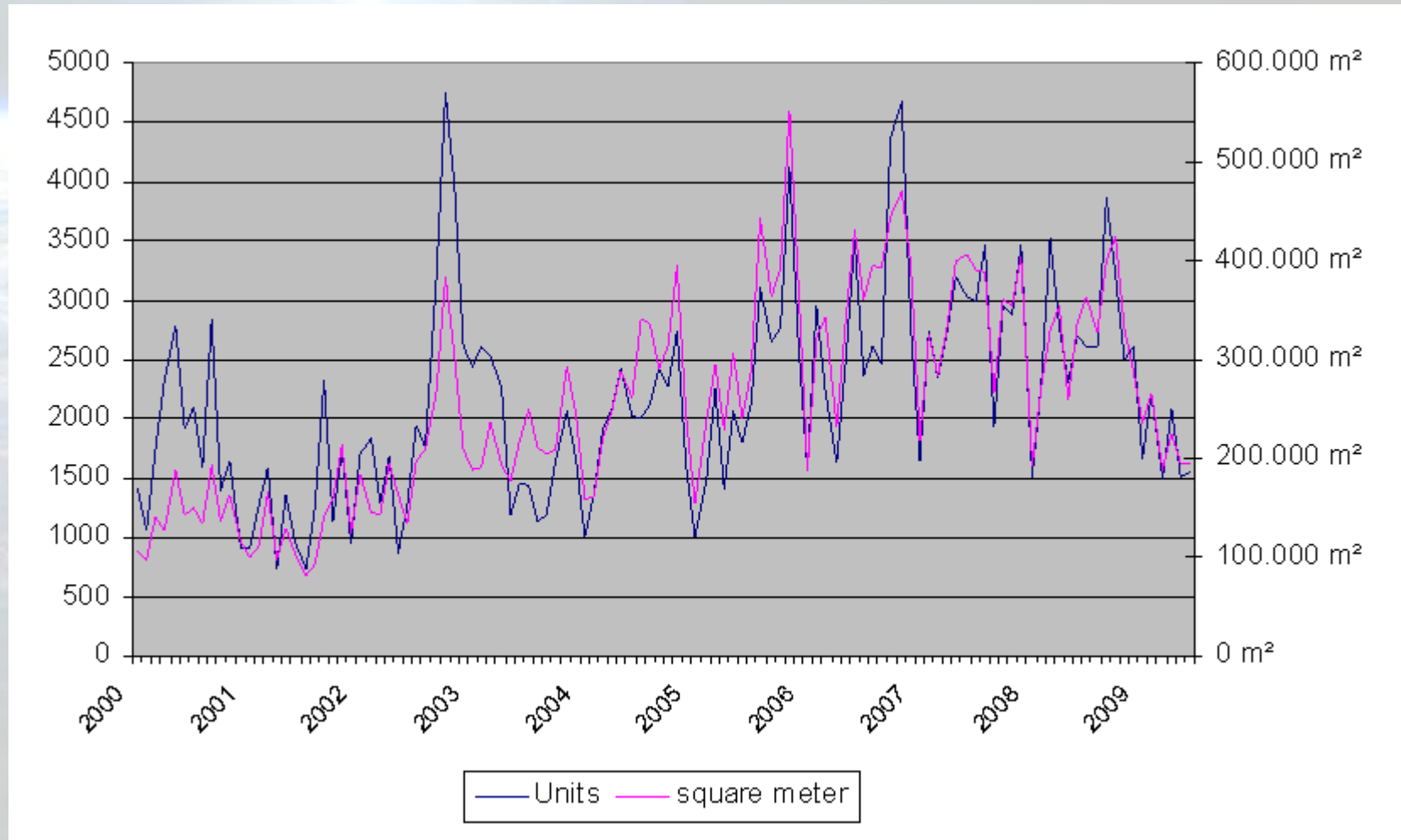
豪登省建筑类型-水电路路分布



Source: Own calculation based on Community Survey 2007, Statistics South Africa.

Monatlich fertig gestellte Neubau-Wohnungen in Gauteng

豪登省每月新建住宅



— Units — square meter

单位 平方米

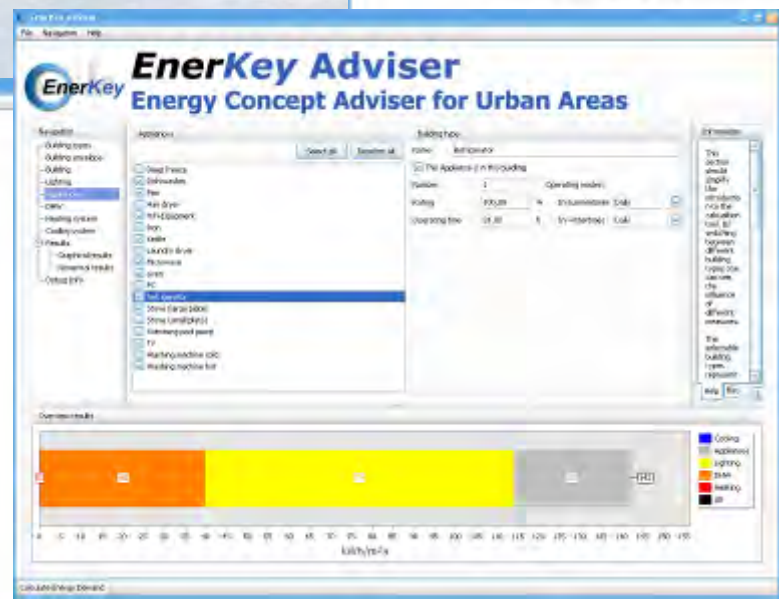
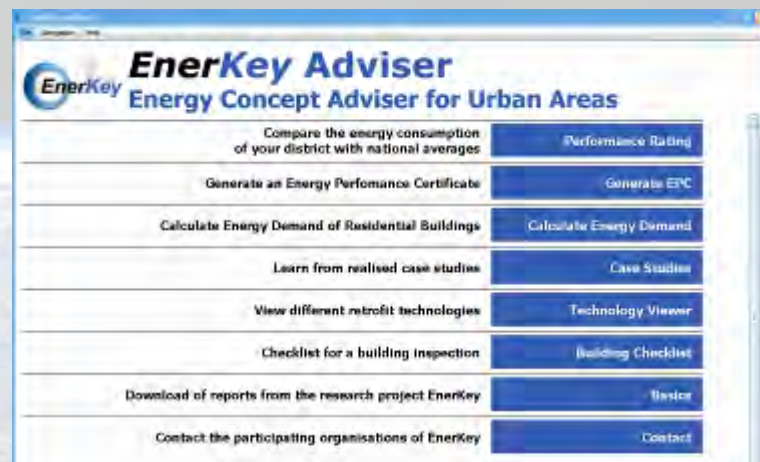
Source: Building statistics, Statistics South Africa.

ohne öff. gef. Wohnungsbau

Der EnerKey Adviser – Tool zur Energiebedarfs- u. Leistungsanalyse

EnerKey 顾问- 能源需求与功率分析工具

- Leistungs Rating für Energiebedarf
按照能源需求进行功率评定
- Generator EnerKey Performance Certificate
拥有**EnerKey** 性能证书的发电机
- Berechnung des Energiebedarfs 能源需求计算
- Fallstudien Betrachter 个案分析
- Technologie Betrachter 技术观测
- Inspections Protokoll 检查记录



Das EnerKey Performance Zertifikat

EnerKey 性能证书

Joburg
EnerKey Performance Certificate

Project:
Civic Centre
Johannesburg

Valid until:
Mar 2011

Building

Address:	
Civic Centre 158 Loveday Str Braamfontein Johannesburg	
Occupant/Owner:	
City Council Johannesburg	

Energy consumption (final energy) in kWh/(m²a)

↓ This building
102 kWh/(m²a)

↑ Reference value:
200 kWh/(m²a)

Primary energy: 349 kWh/(m²a)

The consumption includes the energy share for:
 Heating Cooling Water Heating Lighting Appliances Other

Building type:	Offices
Year of construction:	1978
Useable floor area:	45.620 m ²
Reference value according to:	SANS 204-1
Climatic zone:	Cold interior (Johannesburg, Braamfontein)
Issuer's accreditation number / designation:	EnerKey
Created with:	EnerKey Advisor Version 0.9.0.2

Issuer:
 Simon Woessner
 Fraunhofer IBP
 Nobelstrasse 12
 D-70569 Stuttgart
 GERMANY

04.03.2010
Date

Simon Woessner
Issuer's Signature

- Beschreibt den Energiebedarf (End Energie) des Gebäudes
描述建筑能源需求
- Erstellt einen Vergleich mit Anforderungen gleichartiger Gebäude bzw. gültiger Standards
建立与同类建筑的对比
- Ermöglicht die Einordnung der energetischen Leistung und Eigenschaften der Gebäude
依据其能源功率及建筑特点进行分类编排
- Ist einfach, selbsterklärend mit einer Farbskala
用简洁的颜色刻度表展示说明
- Ist angelehnt an internationale EU-Standards und Normen
以国际化欧盟标准为依据

Trainingskurs für Energie-Auditoren

能源审核员培训课程

- Ausbildung von ausgebildeten, aber arbeitslosen Mitarbeiter
培训对象为失业技术人员
- In Kooperation mit dem Ministerium und der GTZ und Indalo Yetu
与政府部门，德国技术培训公司及Indalo yetu公司进行合作

- Entsprechend den SAQA
Standards

依据南非国家标准**SAQA**

- Bis Ende 2010 100, nach der
Evaluation 1.000 ausgebildete
Energieauditoren

预计到**2010**年培训**1000**名能源审核员

- Erweiterung auf ganz Südafrika
in einer zweiten Phase

在第二阶段进一步扩展到整个南非地区

Module 1: Building Energy Audits



DEPARTMENT OF MINERALS AND ENERGY
DME-Danida Capacity Building in Energy Efficiency & Renewable Energy

Energy Assessment of South African Buildings: Context and General Approach

Erste Anwendungen für städtische Gebäude in Johannesburg

EnerKey性能证书-首次用于约翰内斯堡城市建筑

OFFICIAL WEBSITE OF THE CITY OF JOHANNESBURG

RESIDENTS TOURISTS INVESTORS QUICKHELP E-SERVICES NOTICES SEARCH

World Class Stadiums

A World Class African Host City

2010 CLOCK 91 0 53 59
DAYS HOURS MINS SECS

home > news update other city news

City gets energy efficient nod

Written by Mekoena Pabale
Wednesday, 10 March 2010



For the first time, an EnerKey Performance Certificate has been awarded in South Africa, and the recipient is Johannesburg, for its Metro Centre.

Colourful opening of council
SMART suits and traditional outfits filled the council chambers for the opening of council, which took place after a solemn wreath-laying ceremony.

Masondo has bold vision
THE executive mayor sees Johannesburg as a leading international city, and it seeks 'to actively use the instrument of local government - the municipality - to improve the quality of life of all residents and citizens'.

Sowetans discuss City plans
THE Regional Spatial Development Framework was up for discussion at a Region D open day, with scores of Sowetans commenting on their needs. Similar days are being held in other regions.

Telkom Tower is soccer ready

SITE MAP

Offizielle Übergabe des EnerKey Performance Zertificates an die Stadt Johannesburg und Councillor Matshidiso Mfikoe 正式向约翰内斯堡及Councillor Matshidiso Mfikoe地区递交EnerKey性能证书

JOHANNESBURG has been rewarded for saving energy through implementing energy efficiency measures in the Metro Centre.

On Monday, 8 March, the City received the EnerKey Performance Certificate from the EnerKey Project during a brief ceremony at the centre, a council-owned building in Loveday Street, Braamfontein.

This is the first time such a certificate has been awarded in South Africa. The EnerKey Project is a South African-German collaboration that aims to develop and implement innovative projects in urban energy supply and use in order to improve energy sustainability.

After receiving the certificate, the member of the mayoral committee for environment and corporate and shared services, Matshidiso Mfikoe, said: "Thank you very much for doing the inspection of our building; we are hoping that there will be more certificates to follow ... We are hoping to get certificates for Joburg as a whole, not just for the Civic Centre. We will continue to get buildings in Joburg to be energy efficient."



MMC for environment and corporate and shared services Matshidiso Mfikoe

The council building is a prime example of energy efficiency in public buildings, with a total primary energy use for heating, hot water, ventilation, cooling and lighting of 102 kilowatts per hour.

According to Simon Wössner from Fraunhofer Institute of Building Physics, it is 49 percent below the national mean value for office buildings in South Africa. The institute is a German research company.

The handover of the energy certificate was preceded by a training workshop that focused on energy efficiency in commercial and office buildings. It gave participants a deeper understanding of energy efficiency in office buildings and will enable them to analyse energy efficiency in buildings more effectively.

Football on top of the Telkom Tower in Hillbrow is an unmistakable reminder that the World Cup is drawing closer by the day.

A peep into State of the City

THE mayor has a vision for the city - and he is expected to outline how he plans to get there in his State of the City address.

What to expect from Masisoni

[Visit our news archive](#)

[Search Joburg.org.za](#)

Search news stories from 2001 - November 2007 using our [archive search facility](#).

pulse of the city

The Easter Holidays are coming up. Which of the recreation spots would you most likely visit?

- Zoo Lake
- Wemmer Pan
- Emmarentia Dam
- Gillooly's Farm
- Florissa Lake
- Morija Dam

most popular stories

Guidelines

In May 2009, the City and the Council for Scientific and Industrial Research released Guidelines for Energy Efficient Buildings. The guide gives practical ways to construct buildings that have minimal energy requirements.

It states that buildings consume energy throughout their lifecycle - from construction to operation and then demolition.

The guide focuses on passive environmental control, day lighting and the use of renewable energy like solar power. With passive environmental control, there is no need for mechanical heating or cooling; buildings take advantage of natural energy flows such as the sun.

The guidelines centre on the early design stages of a new building and what measures can be taken to ensure it is energy efficient. For example, it can be designed using west- or north-facing strategies to maximise natural sources of energy such as the sun.

Greening buildings can cut operating costs through retrofitting their structures. The effectiveness of thermal insulation, windows and air ventilations can be checked. Passive solar design is another solution as it makes use of natural light through windows and light wells.

Energy efficient lighting systems and controls and solar heating systems can also be fitted into existing buildings.

Speaking when the guidelines were released, Linda Phalatshe, the deputy director for climate change and cleaner production in the City's environmental management unit, said: "Retrofitting is an investment that businesses should start looking into."

"They should start weighing their economies of scale by doing a cost-to-benefit analysis of their buildings and see how much they are currently spending on a normal building versus a retrofitted building."

She explained that office parks could retrofit their buildings to be more energy efficient by changing lighting, ventilation and air conditioning systems and by using effective thermal insulation.

Homes could also be more energy efficient, she added. "The geyser is the number one culprit ... solar water heaters can replace current geysers. [Residents] can also replace old incandescent lights with compact fluorescent light bulbs and unplug all electrical appliances not being used from the main switch."

Related stories:

- [Towards a greener Joburg](#)
- [City plans an hour of darkness](#)
- [Green building practices urged](#)
- [New buildings to become energy wise](#)
- [Johannesburg introduces new measures to ensure energy efficient development](#)



The Metro Centre is energy efficient

- [Soccer City: an architect's dream](#)
- [It's dance time again!](#)
- [To Hala, with love](#)
- [Soccer City ready for testing](#)
- [Halala nominations open](#)

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Das EnerKey Schulprojekt – Energetische Sanierung und Isolierung in der Garsfontein Primary School, Pretoria

EnerKey学校项目-对比勒陀利亚Garsfontein小学的能量及绝热改造



Reflective white roof paints
白色反射性屋顶材料

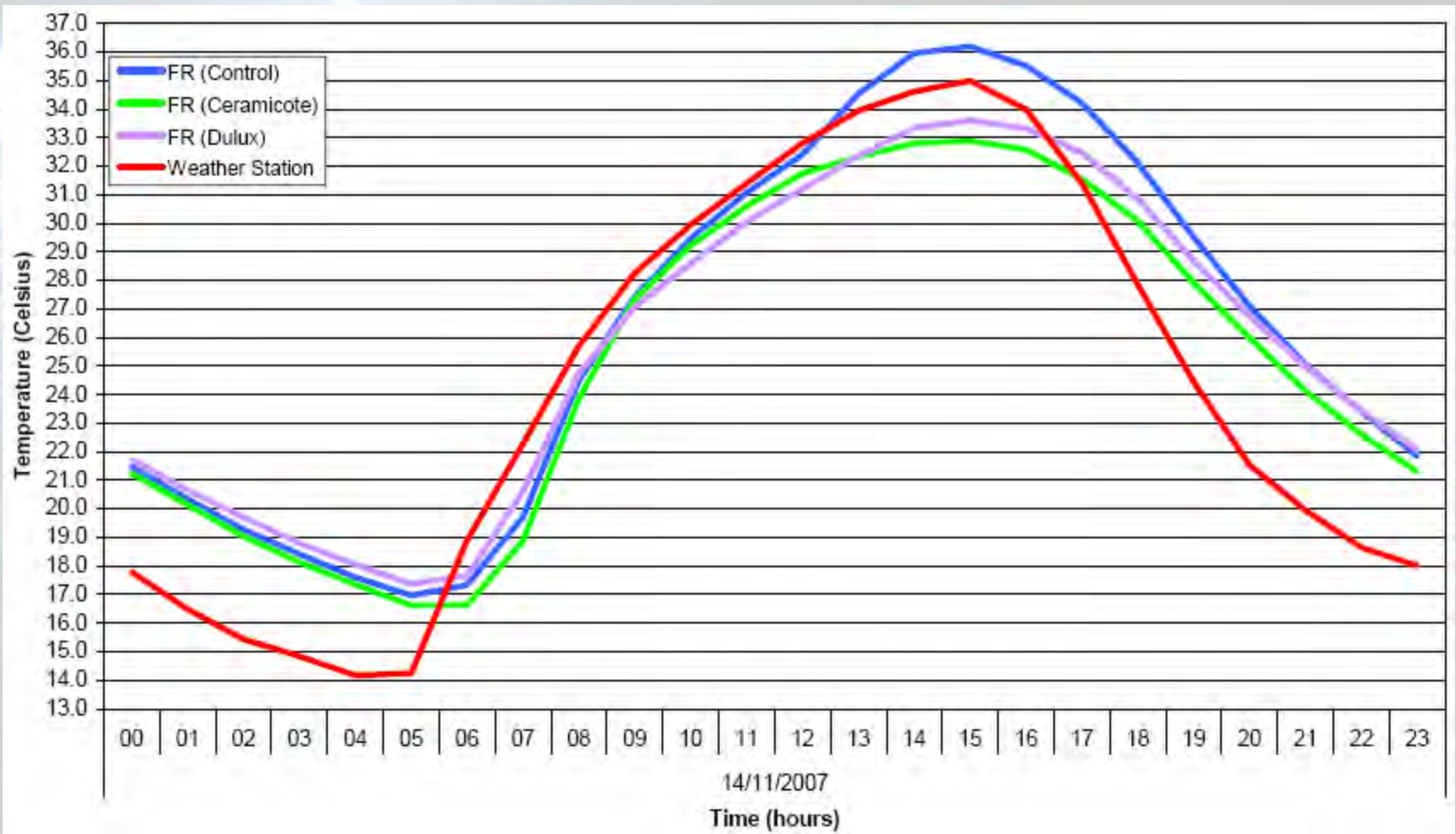


Thermal roof insulation
屋顶隔热材料



Reduktion der Raumtemperatur durch passive Maßnahmen (Garsfontein Primary School, Pretoria)

被动式措施降低室内温度（比勒陀利亚**Garsfontein**小学）



Schulpartnerschaft mit Stuttgart - Das Plus-Energie-Schulprojekt

斯图加特友好学校- 学校能源项目

Die “Uhlandschule” in Stuttgart-Zuffenhausen, gebaut 1954.

斯图加特Uhland学校，建于1954年



Hauptgebäude 主教学楼

Turnhalle 体育馆




Das EnerKey Schul-Zertifikat

EnerKey 学校认证书







EnerKey Schools Certificate

Die

Uhlandschule Stuttgart

ist Partner des internationalen Schulprojektes

„Energetische Renovierung einer Schule“

Durch das Begleiten der energetischen Sanierung, das Bearbeiten von Fragen rund um Energie, Klimaschutz und Umwelt und die Beteiligung am Austausch mit der Emmarentius Primary School in Johannesburg und der Laerschool Genstertstein School in Taiwan beteiligt sich die Uhlandschule am Schutz unserer Umwelt, dem gegenseitigen Verständnis der Menschen untereinander und am Erfolg des EnerKey-Projektes.

Für die Partner im EnerKey-Projekt

Dr. Lügger Eitrop
University of Stuttgart

Prof. Harold Anegani
University of Johannesburg







Die Ansprechpartner der Uhlandschule im Projekt sind

Schüler : Schüler der Umwelt-AG

Elternbeirat Herr Burkart

Lehrer/in Herr Maute, Frau Mayle

Rektor/in Frau Heidi Lermann

Schulpartnerschaft und –austausch

校际交流



- Grund- und Mittelschule
小学及中学
- Alter: 6 bis 16 Jahre
年龄: 6至16岁
- 350 Schüler 350名学生



Niedrigenergie- und low cost Siedlungsprojekte für die Ärmsten der Armen

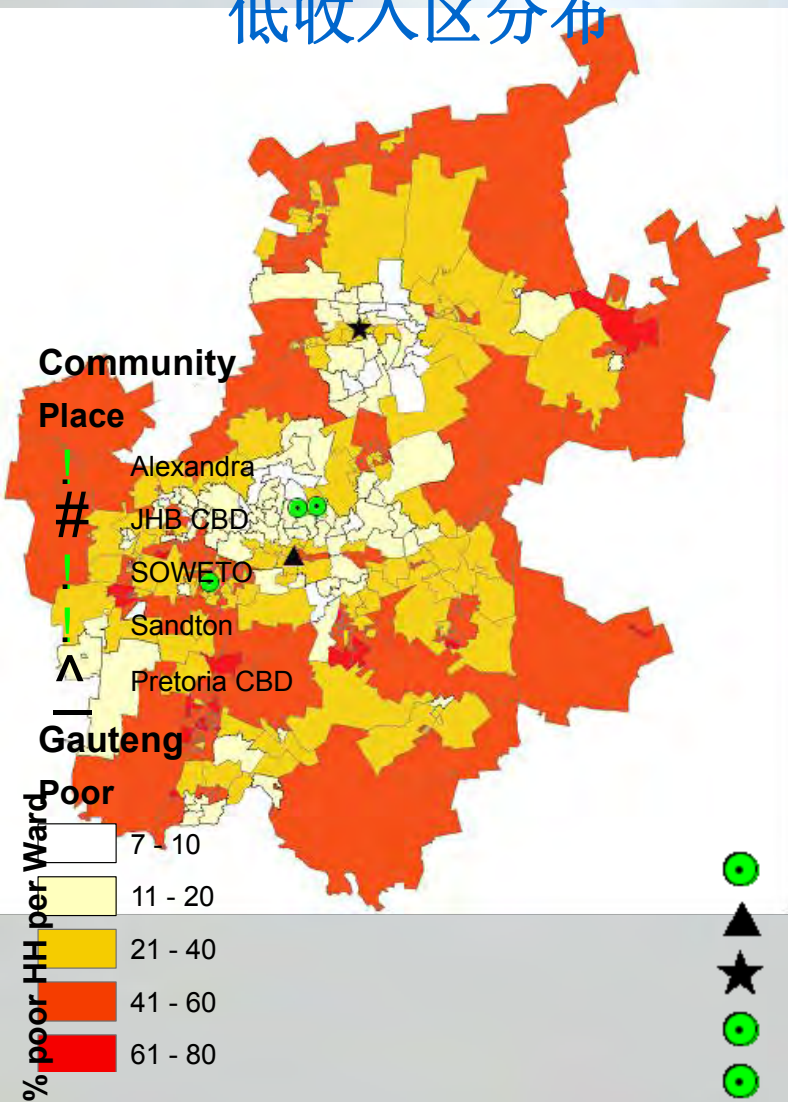
针对最贫瘠地区进行低能耗-低成本的居民区改造



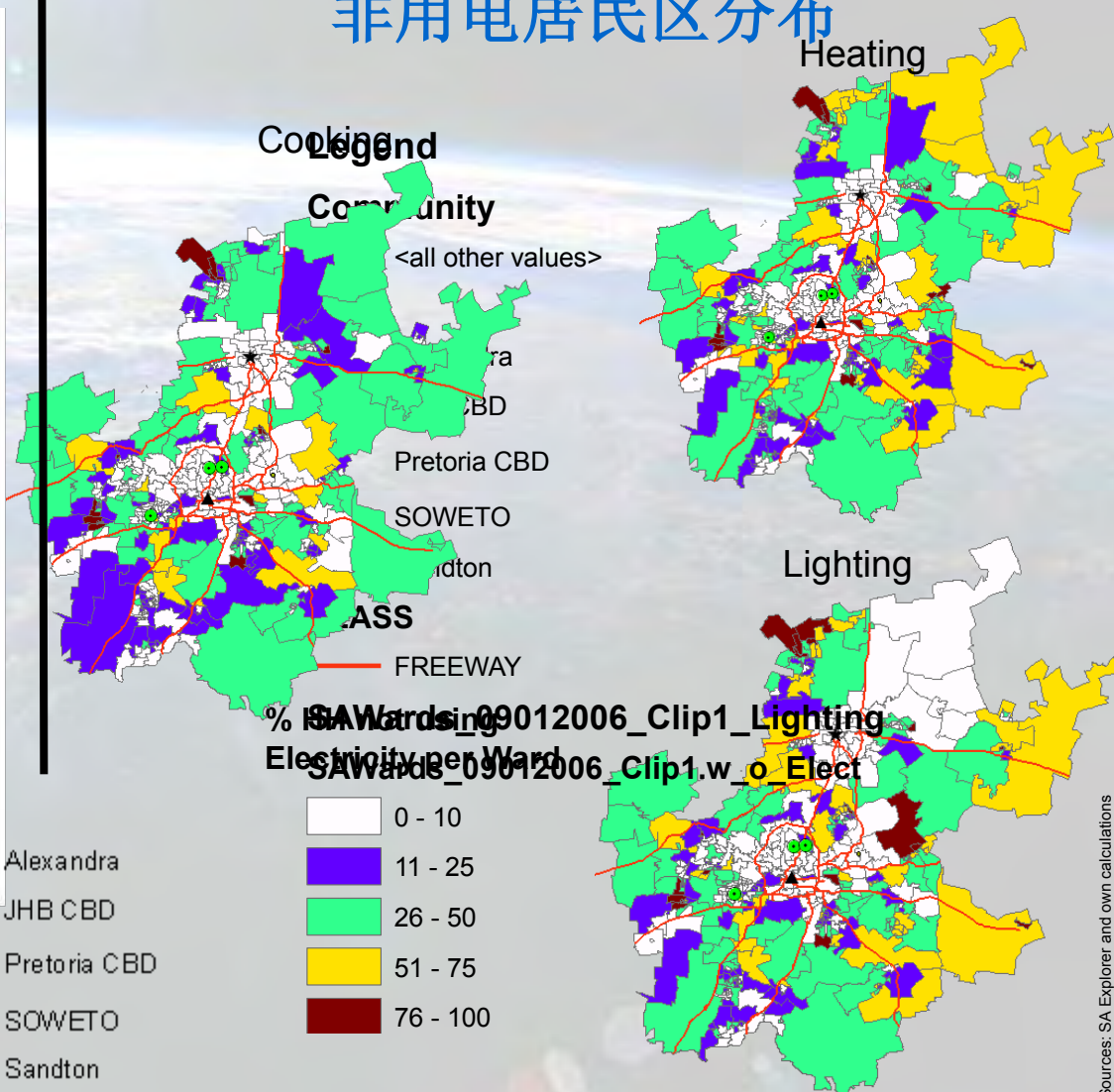
- Passive Energienutzung (Hausorientierung, Fenster, Dachüberhänge, etc.)
被动式能源利用（房屋定位，窗户，屋顶隔热）
- Partizipative Mitwirkung der Bewohner
居民参与协作
- Freie Grundenergieversorgung
基本能源供给



Verteilung der unteren Einkommensklassen 低收入区分布

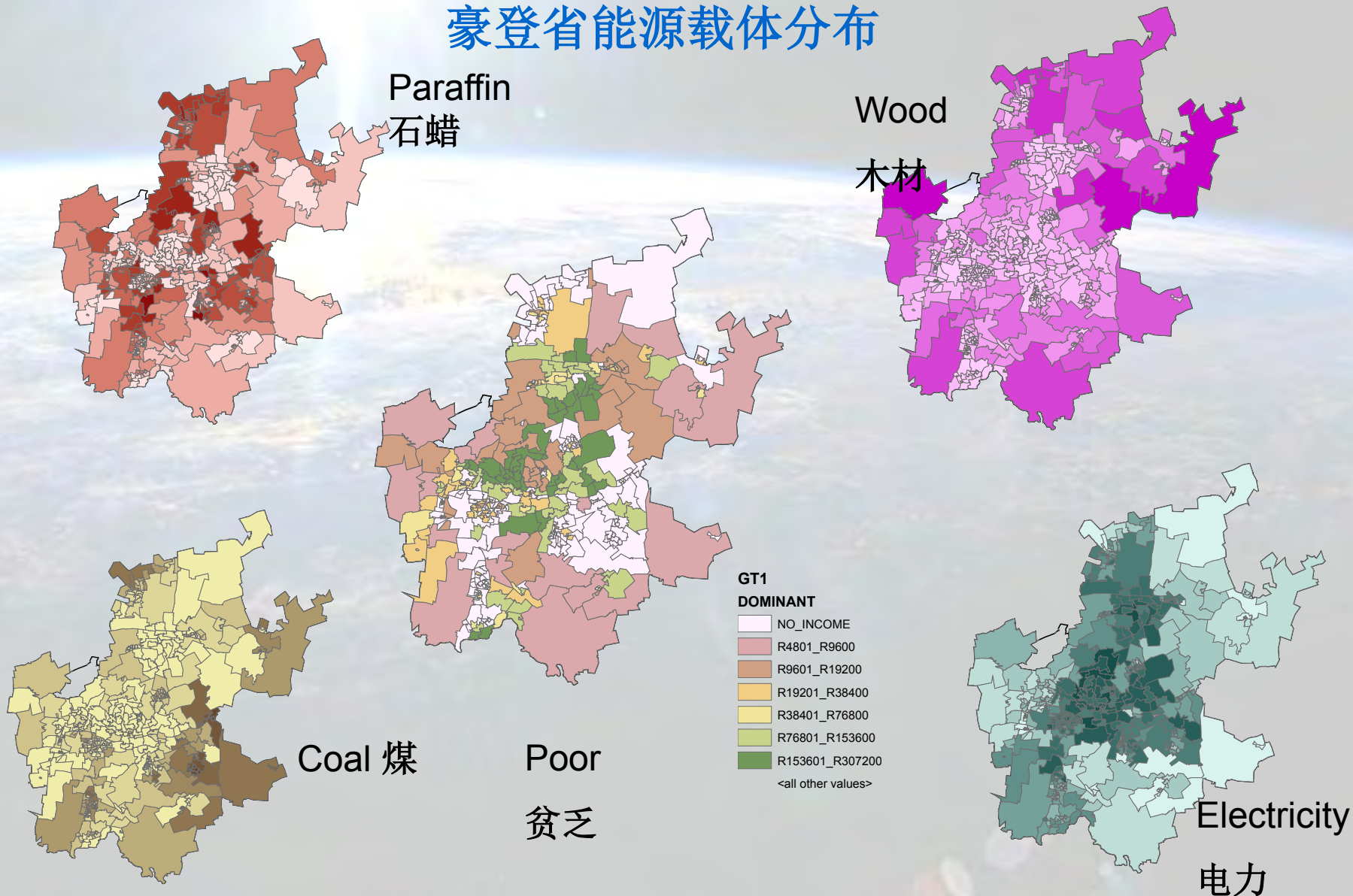


Verteilung nicht-stromgebundener Haushaltsanwendungen 非用电居民区分布



Sources: SA Explorer and own calculations

Verteilung von Energieträgern in Gauteng 豪登省能源载体分布



Visionen formulieren und Ziele setzen
Unabdingbare Voraussetzungen für den Erfolg!

成功的必要前提制定远景目标

Vision for Energy Efficiency in South Africa
南非地区能源高效利用前景

*To encourage sustainable energy sector development and energy use
through efficient practices*

thereby

*Minimising the undesirable impacts of energy usage upon health and the
environment,*

and

Contributing towards secure and affordable energy for all.

Energy Efficiency Strategy of South Africa, 2005



For more information and contact ...
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www.enerkey.de

www.enerkey.co.za

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