„Communal Water House“
A German-South African technology co-operation project

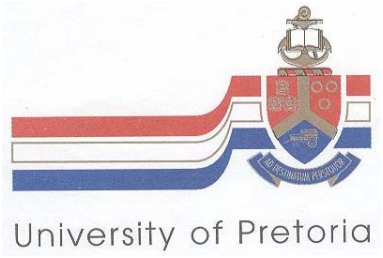
Communal Water House (CWH)

A German-South African technology co-operation project
to be realised in

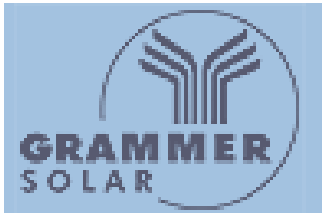
a rural Municipality as a demonstration plant

Funded by
German Ministry of Science and Education (BMBF)
and South African National Research Foundation

Presented at Eastern Province Government Meeting
Ass. Prof. Dr. Konrad Soyez, Potsdam University, Potsdam, Germany
Francois Friend, University of Pretoria, South Africa



Eastern Cape Municipality ?



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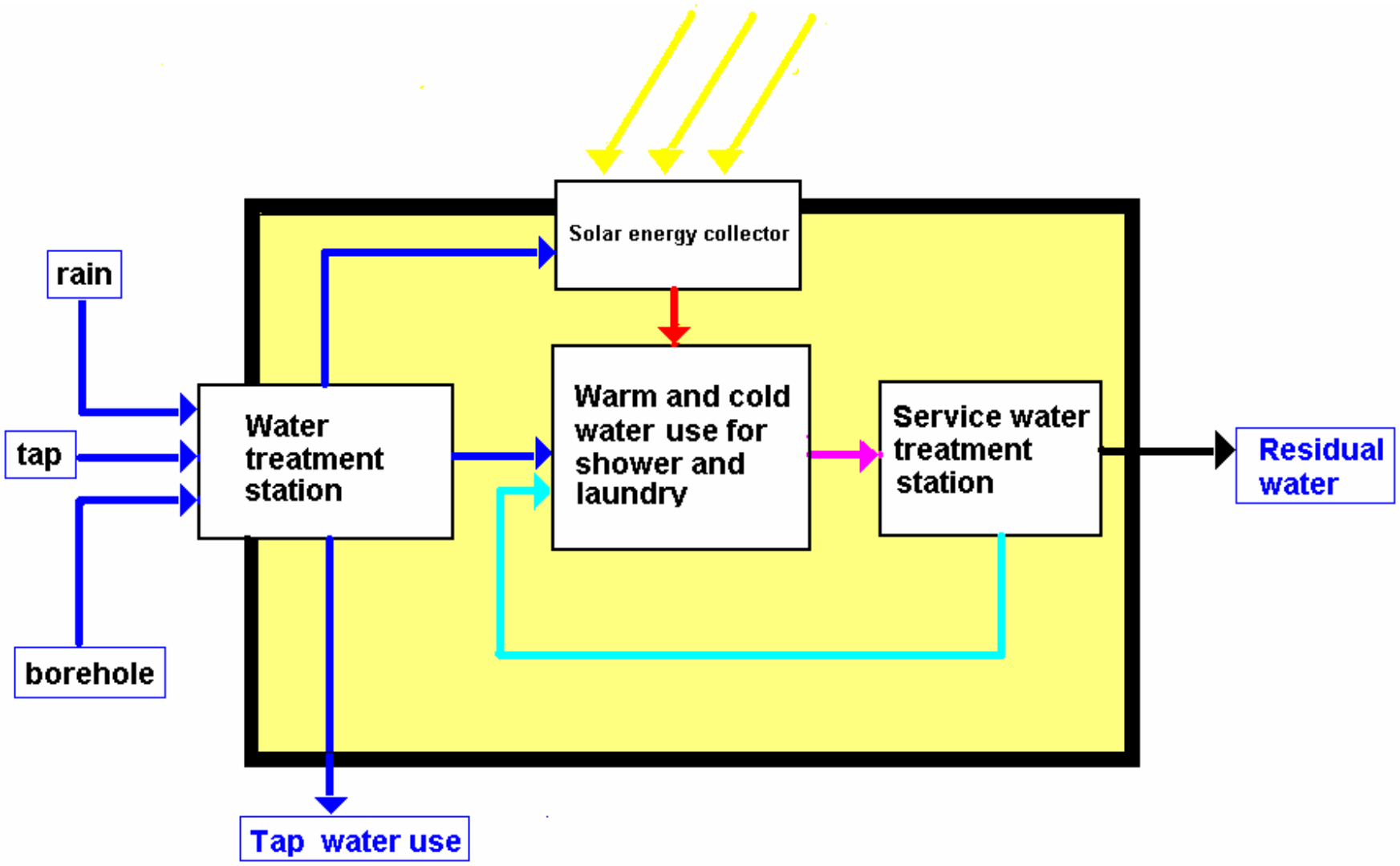
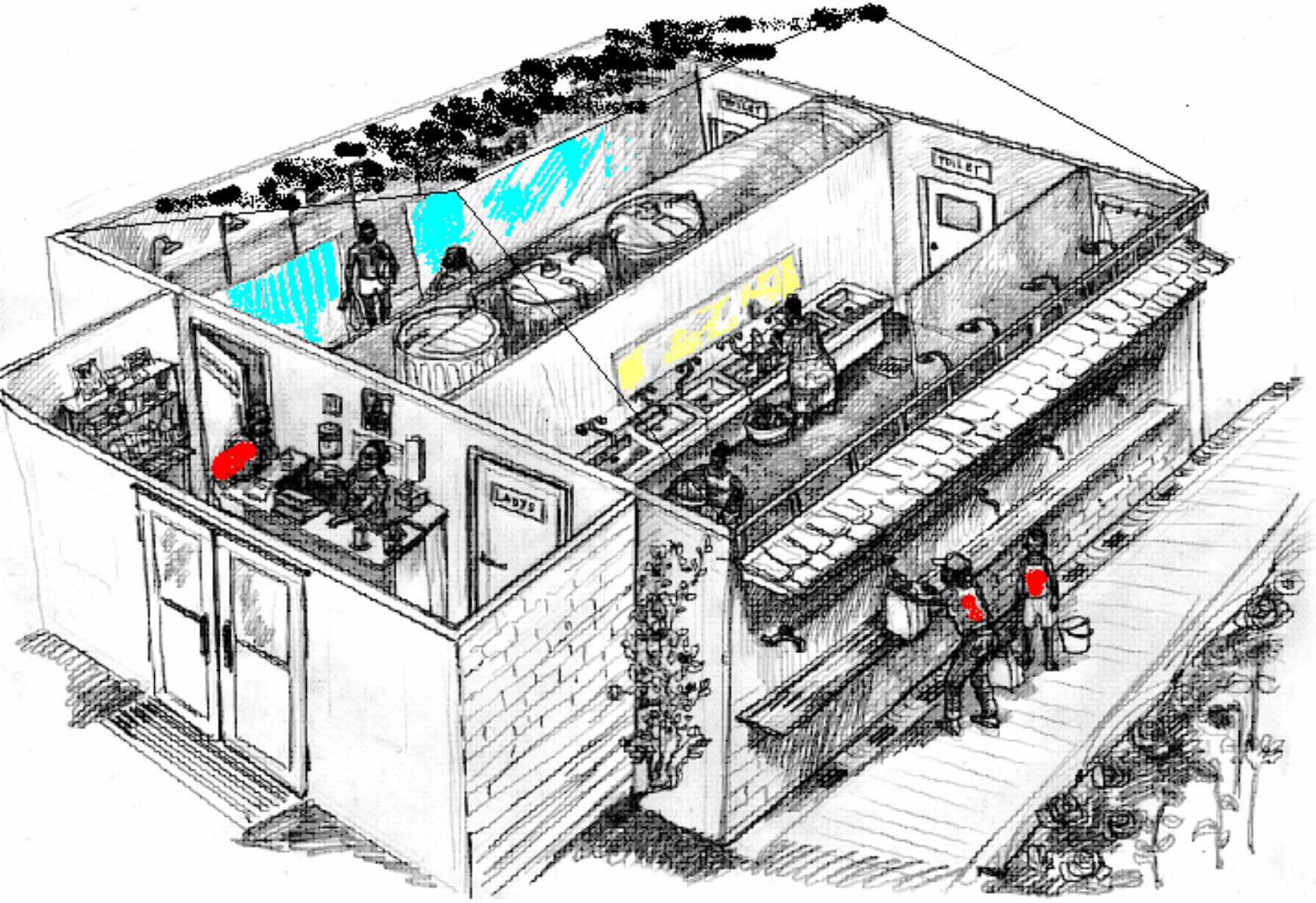
CWH principal scheme

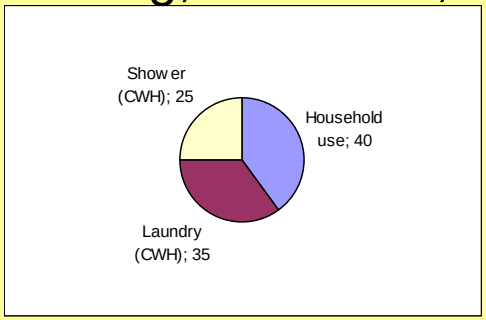


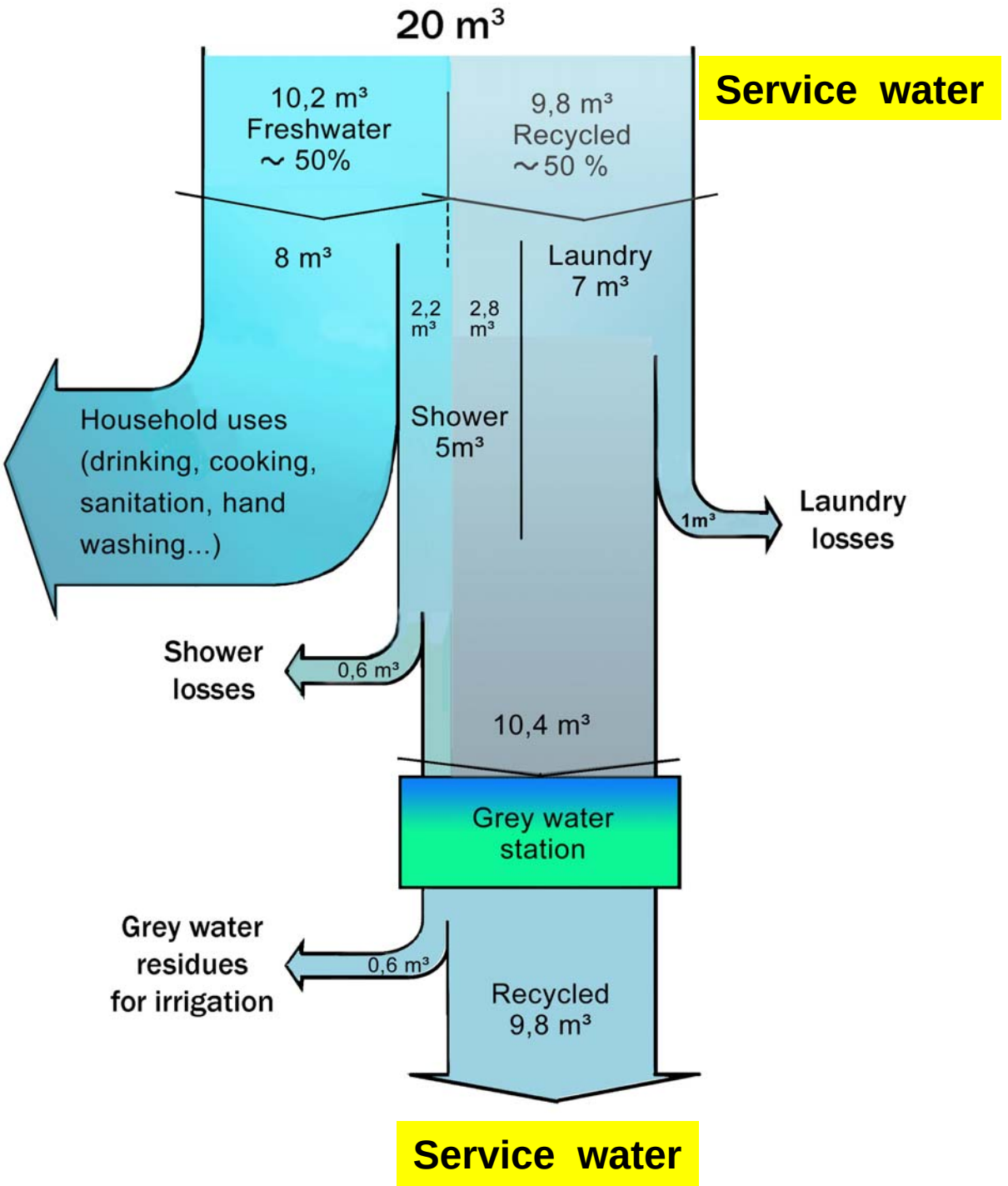


Patent DE 102006000464.7

Fundamental outlay of CWH

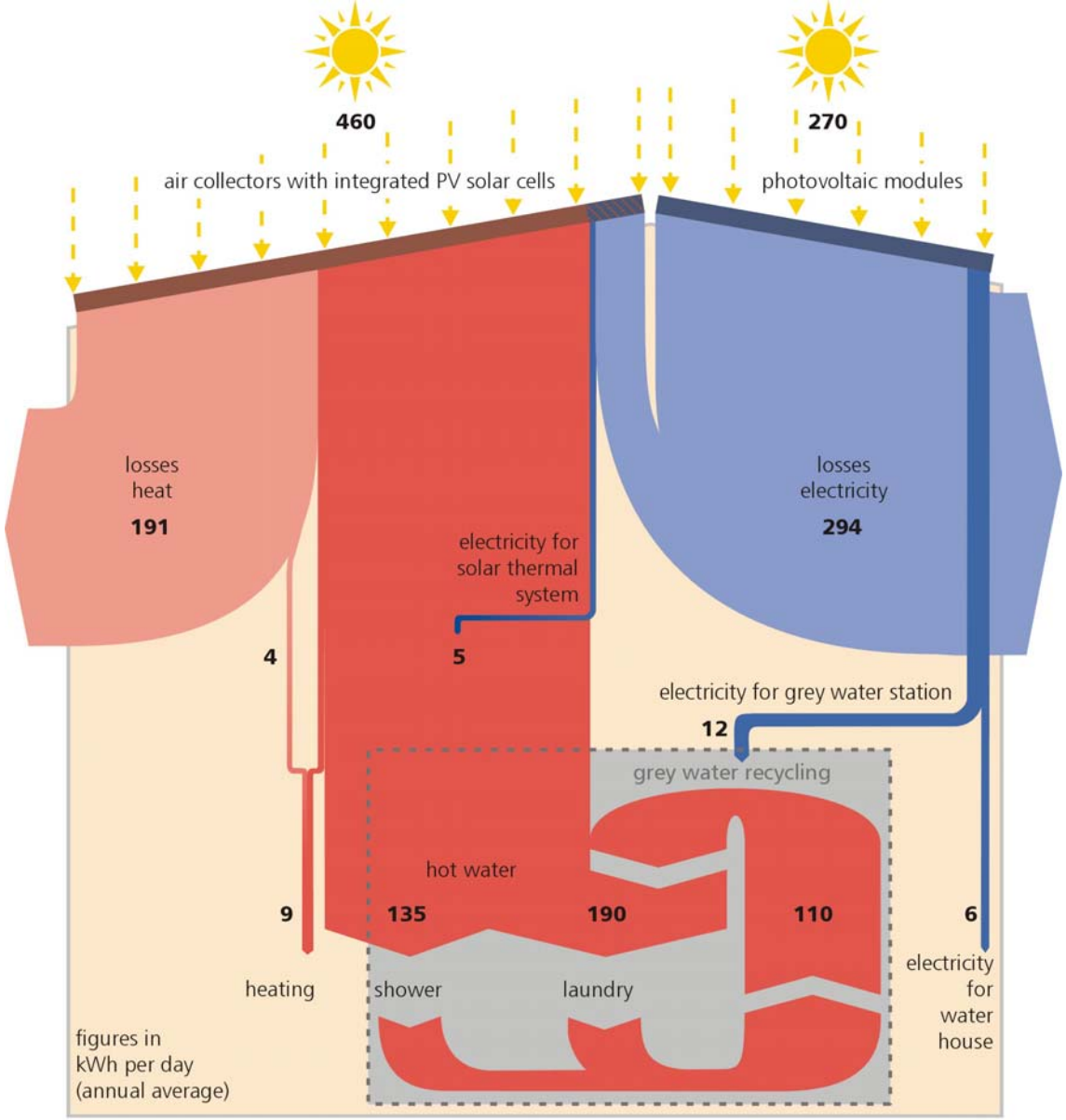
- **Communal water supply reference numbers**:
  - Minimum quantity of potable water of 25 l/d/cap.
  - Within 200 m walking distance
- **Estimation of number of people served**
  - 200 m distance = a circle area of 120.000 m^2
  - 1 house and infrastructure 800 m^2 = 150 houses
  - 5,3 people per family (=per house) = 800 people
- **Estimation of water demand**
  - 800 people times 25 litres = 20 m^3/d
  - 40% household uses (drinking, cooking, sanitation, hand washing, etc.),
  - 35% landry,
  - 25% shower and bathing
- **Recyling rate: 50-70%**

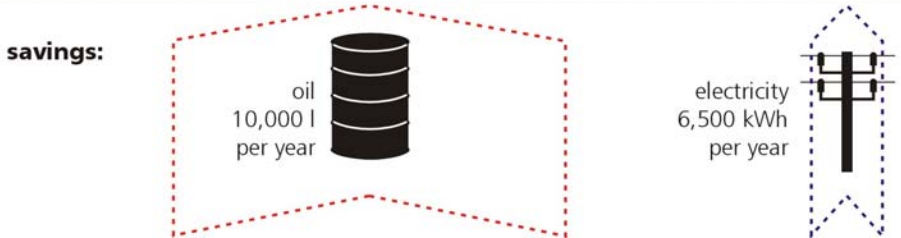




Total water balance version A (50%)

Gross Energy balance





www.DGS.de

Hemmerle, 2006

Estimated effects of CWH

1. Water saving

10 m³ per day = 3.500 m³ per year, Equivalent to free public services for **~150.000 people**

Warm water improves washing effciency and improves sanitary standards

2. Energy savings and CO_2 prevention benefits

Item	**Annual savings**	**Economic effect**
Heating and ventilation	3.200 kWh	
Warm water preparation	89.800 kWh	
Total	***93.000 kWh***	***R 32.500***
Equivalent amount of oil	9.290 l/a	R 37.160
Climate effects	26.950 kg CO_2-eq.	R 7.000

Description of technical and economical details

Main Modules of CWH

Module	**Task**
Borehole	Supply of water if no other sources
Tap water purification station	Improves quality level of tap water
Service water station	produces clean water applicable for service purposes
Solar collectors	heating of air for room heating and water for showering and laundry
Compost toilet	basic sanitation as a safe, reliable, environmentally sound easy to clean device with minimum smell and flees and disease carrying pests
Building	Ca. 12*15 m area, using environmentally sound building material and/or using recycling material, applying the principles of rational energy use and high standards of safety and cleanliness

Principle scheme of water recycling by service water treatment (European conditions)

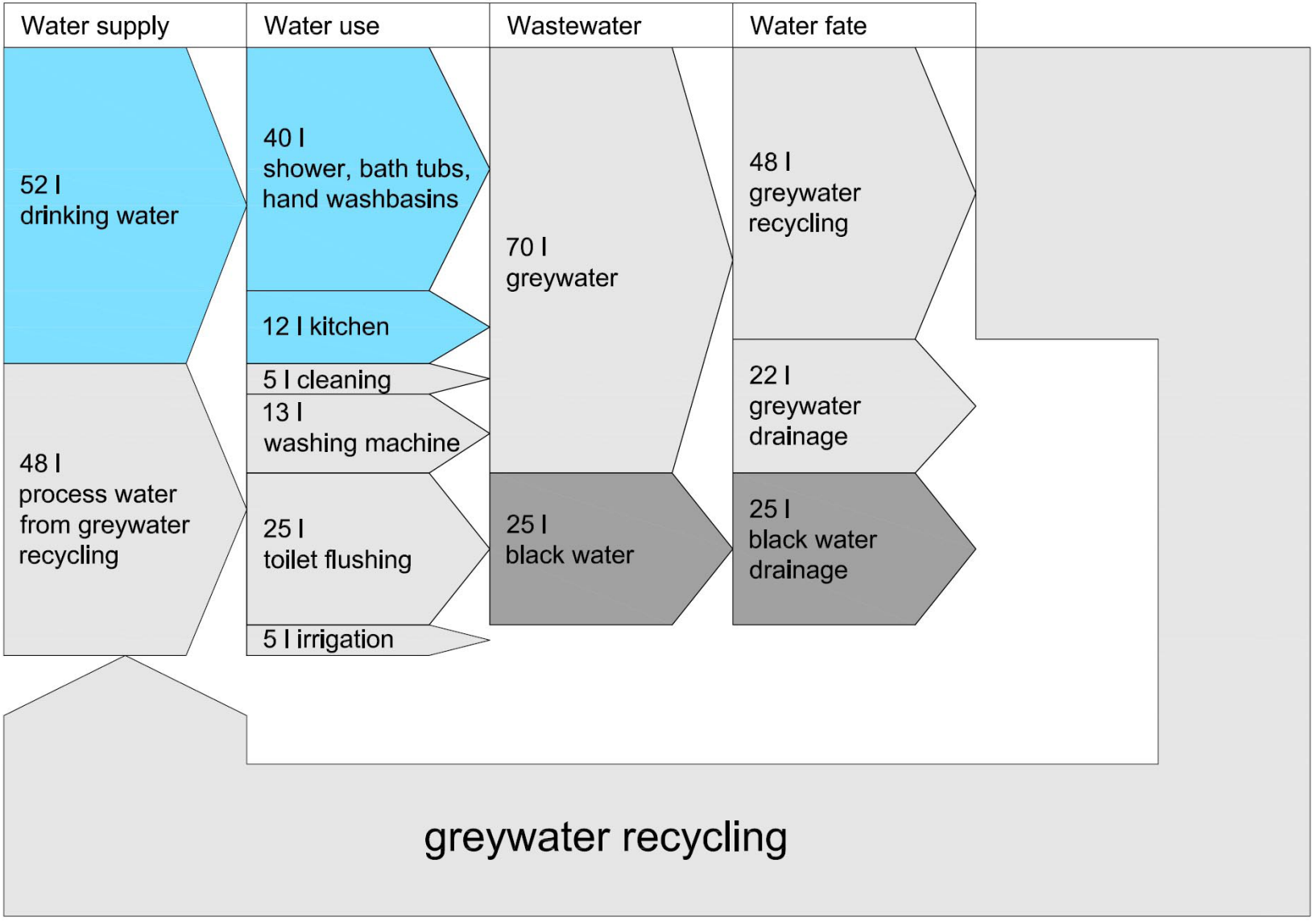
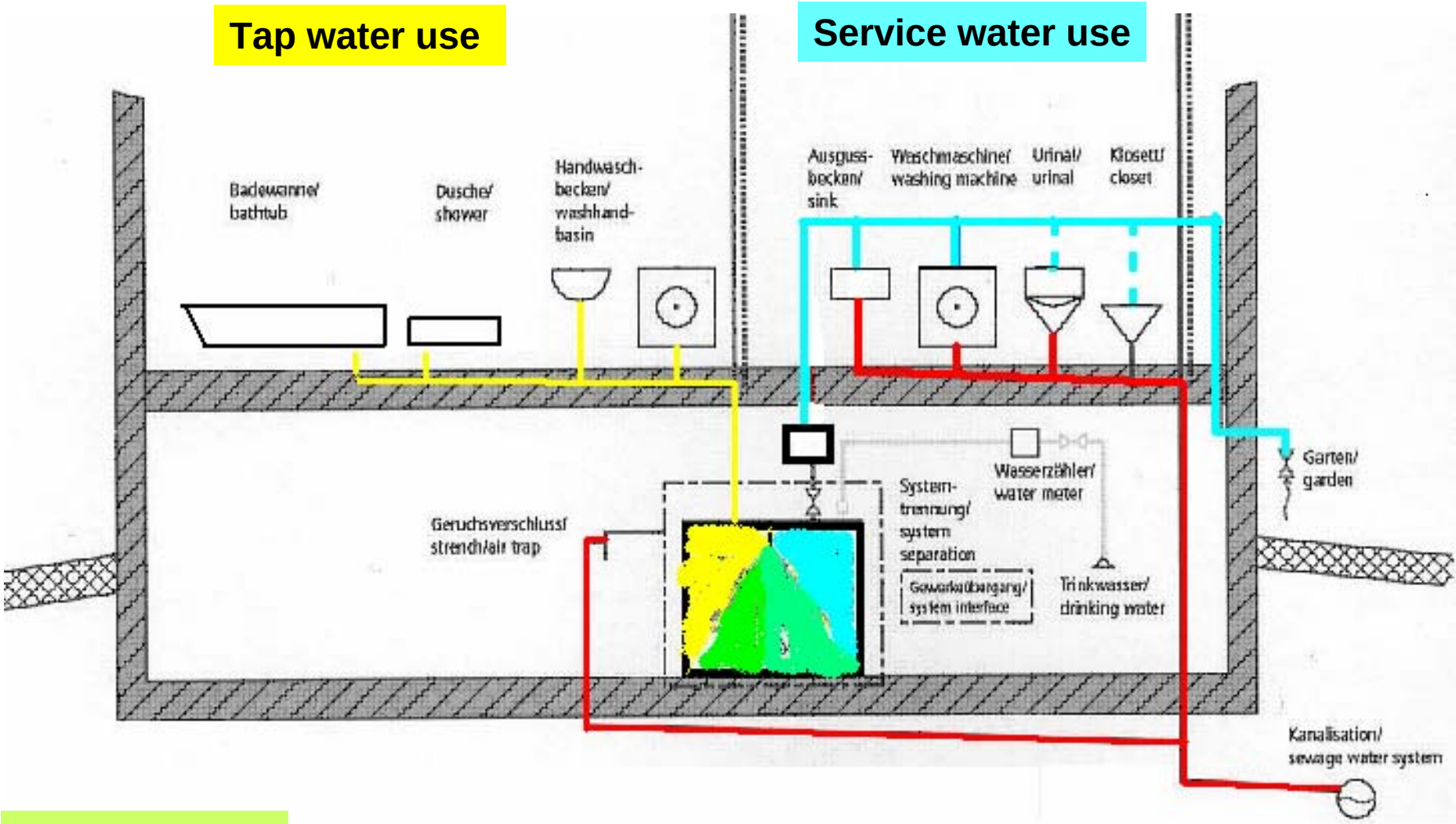


Diagram of AquaCycle system



www.pontos.de

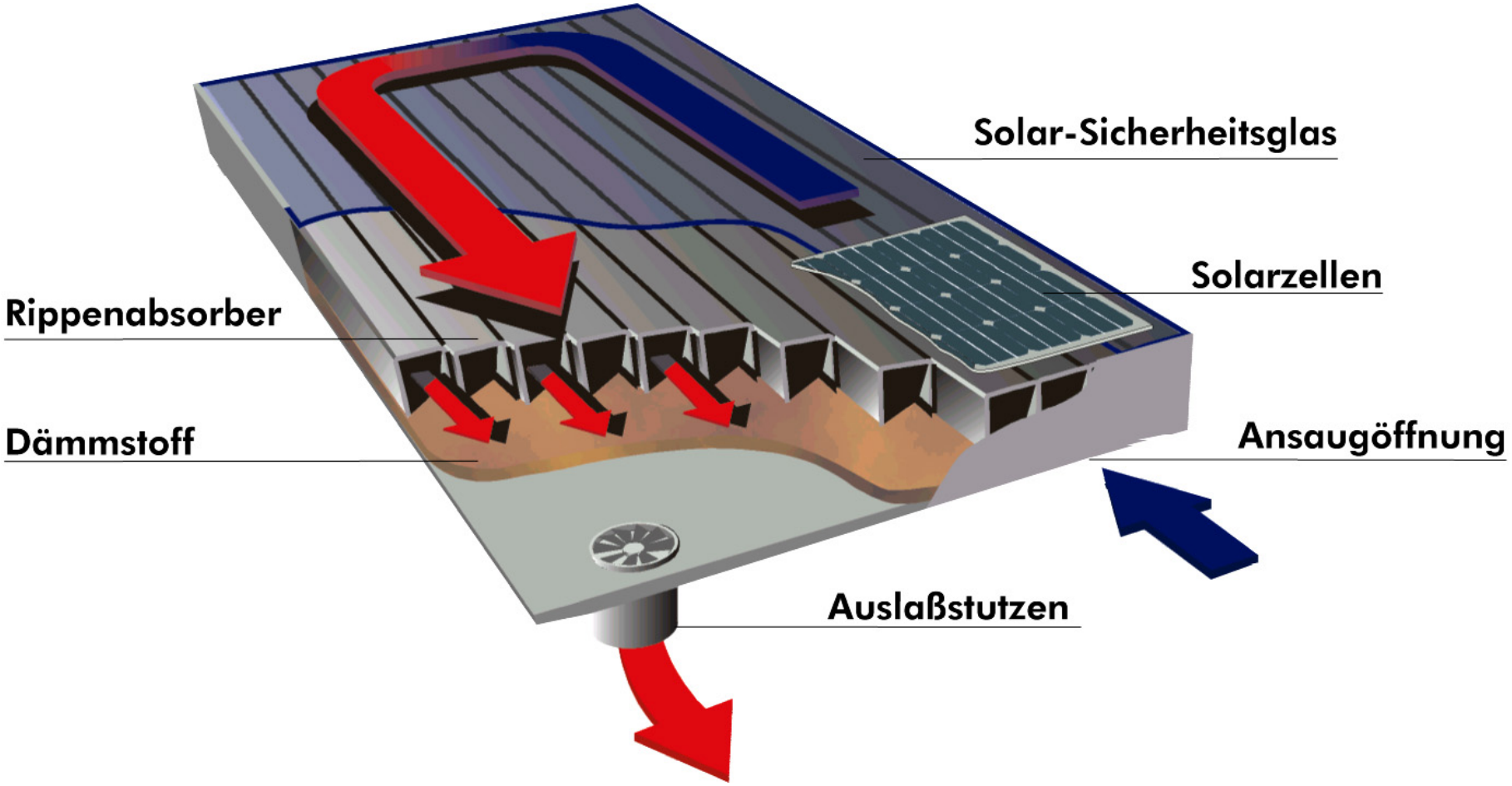
Service water treatment station

1 filter
2 biological cleaning system
3 hygienisation by UV light
4 pumps and valves

www.pontos-aquacycle.de

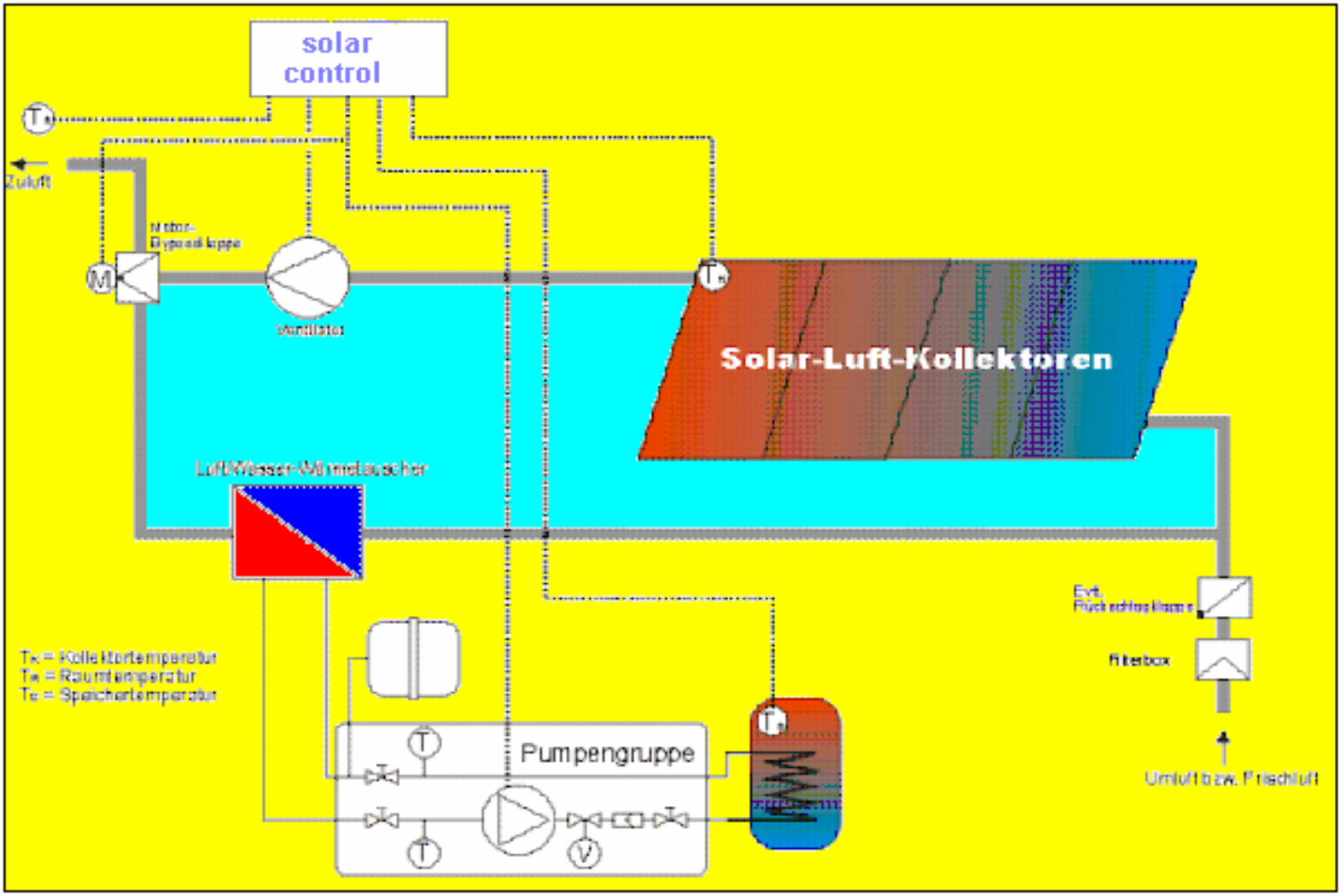
Pontos experimental station

Solar energy collector for warm air and warm water preparation



www.grammer-solar.de

Solar air and water heating in CWH



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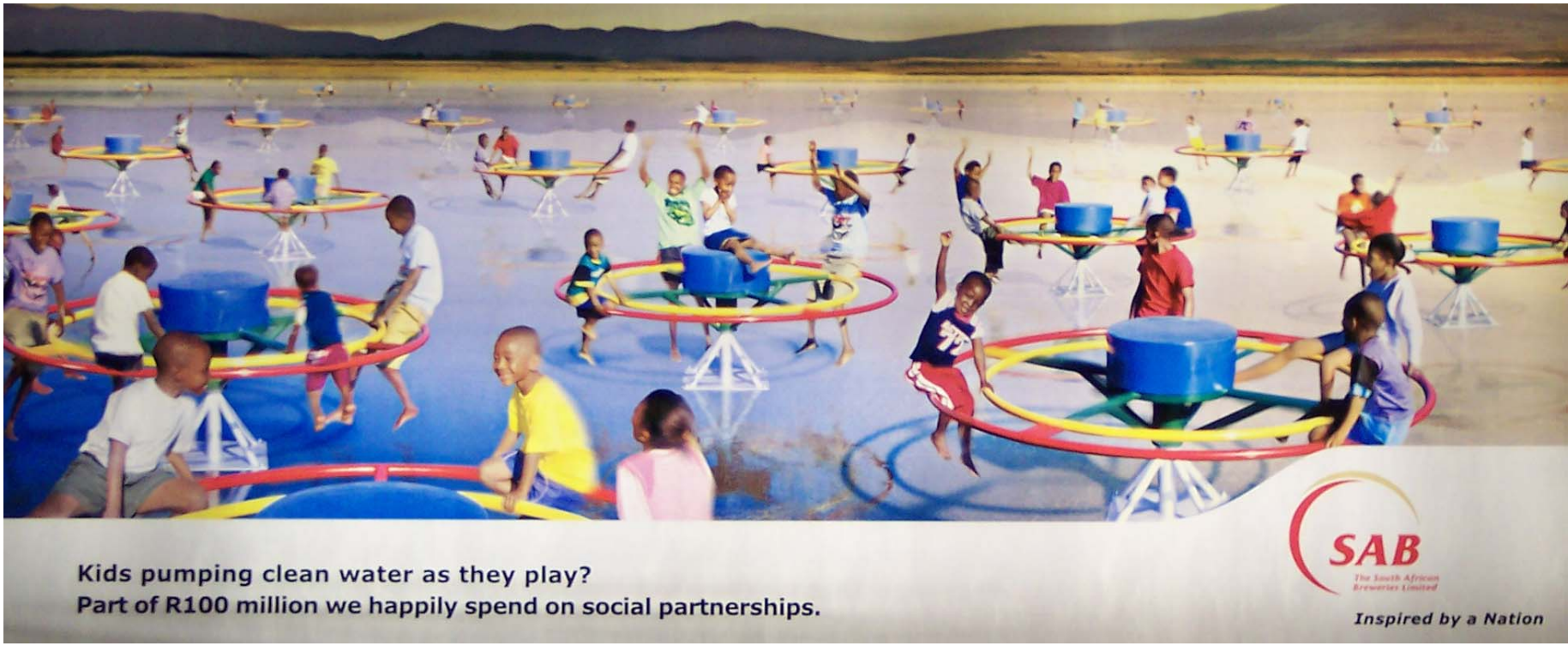
„Manual“ pumping



Poster presented by SAB at Johannesburg International Airport

Solar Pumping station

Solar powered deep well hand pump.
This unique system closes the gap between conventional hand pumps and solardriven submersible motor pumps.

In many developing countries deep well hand pumps are the main source for the daily water supply for the village people.
pb aquasolar is a solar powered drive system for new and already installed hand pumps.
Well established pump technology has been blended with maintenance-free photovoltaic components to form this novel pump concept.

Summary of the technical data is listed on the following page

www.gwe-gruppe.de

Con

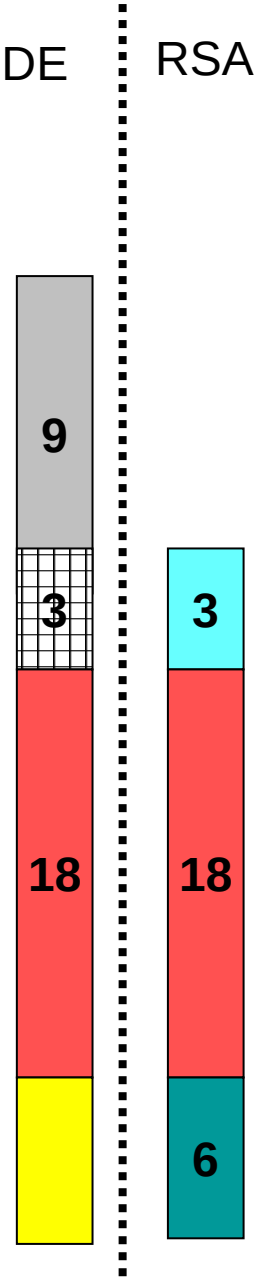
UD toilet system

Draft cost calculation Investment

No.	Item	Costs (Rand)
1	Service water treatment station	250.000
2	Solar warm water collectors	70.000
3	Solar warm air system	10.000
4	Compost toilets	3.000
5	House construction incl. Fencing	150.000
6	Borehole and equipment	30.000
	Total	**480.000**

Project time schedule

Project total duration	**36 months, 01.07.06-30.06.09**
Phase 1: Technology development and adaptation	9 months (in Germany)
Phase 2: Construction of the CWH-building	3 months Municipality
Phase 3: Establishment of the technology and processing	18 months (D and RSA)
Phase 4: optimisation of the performance	6 months (RSA)



Participation of Eastern Cape Municipality

- Basic understanding
  - Participation in the efforts for the project realization is a necessary pre-condition for the success
  - Establishment of a project team consisting of stakeholders, municipal representatives, firms bringing technologies and representatives from communities
  - After project period the Municipality will become the owner of the whole system
  - **Main items**
    - Selection of a suitable site and establishment of an agreement with the beneficiary community
    - Taking over the costs for renting the area and running the demonstration plant
    - Establishment of a building as a shelter for the technical equipment provided by German project partners (about 180m^2)
  - **Other supporting activities**
    - Support the realization by availing human resources,
    - planning support
    - Support educational activities, social activities (as education in water resource management), business planning

Sustainability effects of CWH: Factor 2-3

- **Improved water services**
  - Reduction of the water amount needed by 2-3 times at the same level of services
  - Short time solution at good cost/benefit ratio
  - 2-3 times people served by the same amount of water
  - 2-3 times prolonged life time of boreholes
  - Reduced capacities of pipes and devices
- **Higher social standard**
  - Reduced transport of large water amounts to the households
  - Washing efficiency by reduced washing agent costs
  - Improved hygienic standard by warm shower use and warm rooms
  - Improved education for water house users via communication centre
  - Job creation for water house construction and maintenance
  - Higher washing efficiency by warm water use
  - Use of organic fertilizer in private gardens
- **Environmental effects**
  - Generally reduced environmental impacts
  - Lower input of washing agents into environment
  - Use of solar energy instead of fossil fuels
  - Environmental awareness improved
  - Production of organic fertilizer in compost toilets

General benefits for Municipality

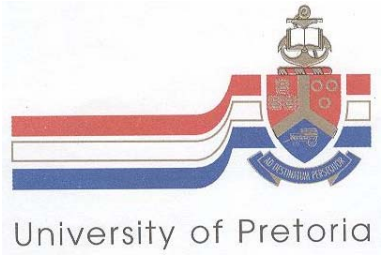
- Scientific project with a demonstration character. The scientific aim of the project is
  - to fit **proven technologies** to the situation on site,
  - to **optimise** combined action of technologies,
  - to prove the **acceptance of the local people** after their special needs.
- Massive support by the German Ministry of Science and Education.3 year period. Further activities envisaged.
- CWH implies **only modern technologies**, which are proven in Western Countries in a **innovative combination** to fit it to the situation of rural region in R.S.A.
- The result of the project will be marketed by a **joint venture** including the Municipality or other forms of engagement of rural people.
- The CWH itself will be transferred into the **property of the Municipality** by special agreements.
- A production of equipment in the region is envisaged. Thus a massive input of **investment and creation of jobs** at several educational levels is possible.
- During the project period **educational programs** are foreseen for the rural people, especially young people.
- **Local firms** will be engaged for technical activities, thus jobs are created, and profits are possible.

Project network partners

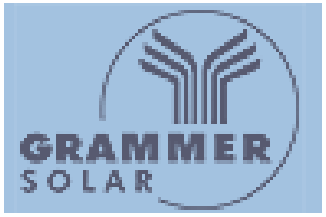
1. Potsdam University
2. Pontos GmbH
3. Grammer Solar GmbH
4. German Water and Energy GmbH
5. German Society for solar energy
6. Society for ecological technology

1. NRF
2. Municipality
3. University of Pretoria
4. Waterops pta ltd
5. Local firms

Bundesministerium
für Bildung
und Forschung



Eastern Cape Municipality !



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