

## Green Luxury

When talking about 100% power efficiency or as some like to call it “Off grid “, Schulphoek can be seen as one of the leading examples of this phenomenon in South Africa.

A combination of optimum system design and modern technology allows this beautiful 15-bedroom boutique hotel, to avail 3000 liters of instant sanitary hot water daily, hydronic heated towel rails as well as heated Spa bath to go with the 5-star experience of Schulphoek. Although this sounds like something you would expect from a normal 5-star hotel, what you would not expect is that all this is done completely by the power of the Sun. The technology works on the principle of storing “heat”, rather than storing hot water. Heat is then taken out of the storage via an integrated plate heat exchanger to produce instantaneous fresh hot water. This means that sanitary hot water is only produced as it is needed.

The energy consumption for heating up hot water in any normal residential building can be anything more than 50% of the monthly electricity bill. Therefore, removing this load from the required consumption just makes perfect sense. Now the question is, is 50% enough to be “Off Grid “or is there more to be done.

Of course, there is more. The second biggest consumer of power is the luxury of space heating and cooling. Schulphoek is fitted with the latest in technology of hydronic air conditioning where inverter heat pump technology is used to heat up or cool down water. This perfectly temperature controlled water is then distributed to each hydronic air conditioning via a well-insulated ring main.

Heat pump technology works on the principle of harvesting energy from the atmosphere or dumping energy into the atmosphere. Also known as the Cooling cycle, the two 15 kW machines at Schulphoek are used to do both heating and cooling for the hydronic air conditioning system and at the same time, used to back up the 3000L hot water system. This back up is need in days when the beautiful cape is experiencing bad weather. When talking about 15 kW, it seems like a massive power consumer, but this is where heat pump technology comes in. The power input required to deliver this combined 30 kW of energy output is an astonishing 8.5kW at peak load. This means that the entire system can run on a power input equivalent to three normal domestic geysers. Once the system has

### SEG Solar Energy (Pty) Ltd

168 Bram Fischer Drive  
 Randburg 2194, Johannesburg  
 Tel no: +27 (11) 326-3956 1  
 Fax no: +27 (11) 326-2344

47 Montreal Drive Ext. Airport City Business Park  
 Airport Industria 7490, Cape Town  
 Tel no: +27 (21) 385-0123  
 Fax no: +27 (21) 385-0123

Reg no: 2009/009782/07  
 VAT no: 4250255884  
 Import no: 20964146  
[www.solarenergy.co.za](http://www.solarenergy.co.za)

reached its desired temperature, the inverter driven heat pumps, wind them self's down to even lower power input. This is defining efficiency.

An efficient system requires an efficient building. When it comes to heating and cooling, the most important aspect is to protect your desired temperature inside of the building. In this case, the expanded polystyrene walls, insulated ceilings and double-glazed windows ensure that no energy is lost to the outside atmosphere.

Although this sound like perfect conditions, proper insulation means that fresh oxygen also find it hard to enter the building. The key is to ventilate each room without losing your controlled temperature. Each room at Schulphoek has been fitted with a state of the art decentralized ventilation unit with built in heat recovery. A system that is designed to replace old air inside of the room at rate of 38m<sup>3</sup> with fresh air every hour. The temperature of the used air is stored within the unit and replaced back into the room with the fresh air. The result is that no temperature change took place. This entire process is driven by a 4-Watt reversible motor, the equivalent of one single ceiling down light.

Now that all the major power consumers are looked after as efficient as possible, a 10 kW photovoltaic system is installed to satisfy all the power needs of Schulphoek. these are things such as lighting, televisions, wall plugs for appliances and plant room power requirements. For battery backup, 16 200Ah batteries where added to the system to guarantee no inconvenience during power outages.

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