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South Africa's greenest green house

The bar has been raised by ERA Architects and keeping up with the Joneses means more than matching their flashy car or sending your children to an exclusive private school.

By Johan Schronen Photographs: Sinead Brookes



Admittedly the home the Joneses built makes a major statement from the street with its double driveway and imposing triple-volume entrance. But if you're wondering how you could match or better the Joneses' lifestyle, just wait until there's a power blackout leaving your whole neighbourhood in darkness. (Not too difficult to imagine seeing that our national power supplier has been "tripping out" somewhat too often lately.) You'll be surprised to see their home still brightly lit, with Auntie Eskom's dizzy spells not affecting the Joneses in the least. So let's consider how they've raised the bar in their neighbourhood.

PROJECT FOCUS

Ivor Jones has converted an old Hurlingham, Johannesburg, house into an “autonomous” home. It’s completely self-sufficient when it comes to water and electricity and even deals with its own sewerage.

Ken Stucke of ERA Architects in Johannesburg, who designed the home, says even if the City Council failed completely it would still be business as usual at the Joneses. Stucke explains that the structure creates a comprehensive thermal envelope with insulated cavity walls and floor and large double-glazed windows providing pleasant daylight to all internal spaces.

Solar underfloor heating

Sun angles were carefully considered during the design, minimising direct summer sun while getting the best from winter sun. Solar thermal systems generate hot water to be used for domestic purposes and also serve as a heat source for the underfloor heating during winter.



Evaporative cooling towers provide additional cool air to ventilate the house during summer. A photovoltaic (PV) system generates power that is fed into the Eskom grid, effectively lowering the energy consumption of the house. Low-energy LED light fittings and appliances are used throughout the house. Gas stoves and ovens provide all cooking and heating requirements and reduce electrical consumption. Exposed concrete soffits and masonry internal walls provide high internal thermal mass to stabilise diurnal temperature swings. The high thermal mass also retains the energy used to heat or cool the building for longer.

Water wise

House Jones reduces water consumption by harvesting rainwater in two stages:

- Roof-level rainwater is collected for non-potable use in the house.
- Paving run-off and subsoil drainage is collected directly in the storage dam and used for irrigation.

Rainwater is filtered and used for non-potable purposes while council water is filtered separately and delivered to three potable taps in the house. All waste water generated in the house (except kitchen waste) is treated on site in a two-phase anaerobic/aerobic digester system. Clarified water is then fed through a wetland to further purify the water before it's stored in a dam and used for irrigation.

Water storage consists of 40 000 litres of clean rainwater stored in tanks while all recycled water and collected ground-level rainwater is kept in the storage dam. The dam is designed to have its level vary from dry to wet season as the water is stored and used as required. During the dry season the storage dam's total capacity is 60 000 litres.

The borehole on the property is intended to be used as sparingly as possible, and only used to top up the tanks while waiting for rain to fill the storage systems.



Green extreme

The Joneses went to green extremes even during the reconstruction of the old house. Construction waste was carefully soft-stripped and all reuseable materials were reclaimed and donated to charity. This included all electrical and sanitary fittings, windows, doors, cupboards, roof coverings and timbers. All masonry was crushed on site and used in three ways:

- Over-excavated foundation trenches were back-filled and compacted before casting foundations, for geotechnical reasons.
- Surface bed-back filling and levelling was done.
- It was also used for paving subsoil, back-filling and levelling.

PROJECT FOCUS

No crushed masonry was carted away – the balance was used to level the sub-divided portion of the site. Extensive preservation and reuse of top soil and existing planting reclaimed paving blocks from the site were reused in the new paving design.

The following environmental management clauses were included in the contract:

- Soil had to be protected from contamination during construction while mixing cement and other contaminating products.
- No or minimal storm water run-off would leave the site.
- Waste generated during construction had to be minimised and sorted on site for recycling.
- Substances such as paints, solvents, sealants, adhesives, etc had to be of low toxicity and low VOC (volatile organic compounds).
- Water used on site for washing, irrigation, etc had to be minimised through conservation and recycling.



Clearly, keeping up with the Joneses' lifestyle goes far beyond mountain bikes and a jet ski or two. From the first demolition stage and through construction of the new house they have maintained the highest standards of green building. 