

The Green House – Occupation Phase

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South East Regional Energy Group

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Executive Summary

The goal of *The Green House (TGH)* was to demonstrate on a very practical level, how the environmental and financial performance of existing residential dwellings can be substantially and cost-effectively improved by simple and relatively inexpensive initiatives.

TGH was open to the public for twelve months as an educational tool and source of information on affordable, sustainable retrofitting, and was the first of its kind in the Perth metropolitan area.

After the *TGH* closed in July 2007, SEREG, in partnership with the Department of Housing & Works and Murdoch University, commenced phase two of the project – home occupancy. The occupancy phase enabled SEREG to gather some hard data on the home's financial and environmental performance.

Data collected from *TGH* in the occupancy phase (daily temperatures, energy and water use and waste generation) have been compared to similar records collected from the house next door, which was recruited as a 'Control House'. Importantly, *TGH* and the Control House were almost identical – in design, orientation, building materials, size and floor plan - and also had similar occupancy rates.

It was found that *TGH* achieved significant energy savings, using 72% less electricity and 98% less natural gas than the Control House – saving over \$1000 on energy bills and an impressive 5.67 tonnes of greenhouse gas emissions. A large proportion of these savings can be attributed to the use of a solar hot water system and a reduced need for artificial heating and cooling in the *TGH*. This can be attributed in large, to the adoption of passive solar design principles and the installation of energy efficient electrical and gas appliances

During phase two of the project, *TGH* also used significantly less scheme water than the Control House (e.g. 45%). The majority of these savings can be attributed to the installation of waterwise fixtures throughout *TGH* (e.g. AAA showerhead and tap aerators), the use of waterwise appliances (e.g. 5A-rated washing machine), plumbing a 2,500L rainwater tank to the toilet and the installation of a waterwise garden.

A number of waste reduction strategies were also successfully employed at *TGH* to reduce the amount of rubbish sent to landfill. These measures concentrated on diverting organic waste from landfill, which in turn will help reduce the production of one of the most potent greenhouse gases, methane. Again, the waste reduction strategies employed at *TGH* were very successful and as a result, *TGH* sent 86 % less waste to landfill.

The occupancy phase of *TGH* project demonstrated that affordable, sustainable retrofits can successfully deliver significant financial and environmental savings, with *TGH* saving over \$1,250 on energy and water bills and 5.67 tonnes of greenhouse gas emissions over a 12-month period, when compared to a non-retrofitted home of similar size and occupancy rate.

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1.0 Introduction

Through the ***switch your thinking! (syt!)*** program and in collaboration with project partners (SEDO, DHW, the Maddington Kenwick Sustainable Communities Partnership and major sponsors Solahart, Cool or Cosy, and the Water Corporation), SEREG retrofitted a Homeswest dwelling in Maddington – a double brick and tile house built in the 1970's with no consideration of environmental performance, and typical of many in the region - to showcase sustainable home renovations.

The Green House (TGH) was retrofitted by local contractors and, wherever possible, with local products to demonstrate that energy and water efficient housing retrofits can be simple, affordable and attractive.

TGH was open to the public for one year to show residents, on a practical level, how the environmental and financial performance of existing residential dwellings could be substantially and cost-effectively improved.

To evaluate how *TGH* performed in 'real life', three students from Murdoch University occupied the home for 12-months. To get an idea about how *TGH* compared to a 'normal' house (e.g. non-retrofitted), the neighbouring property was recruited as a 'Control House'.

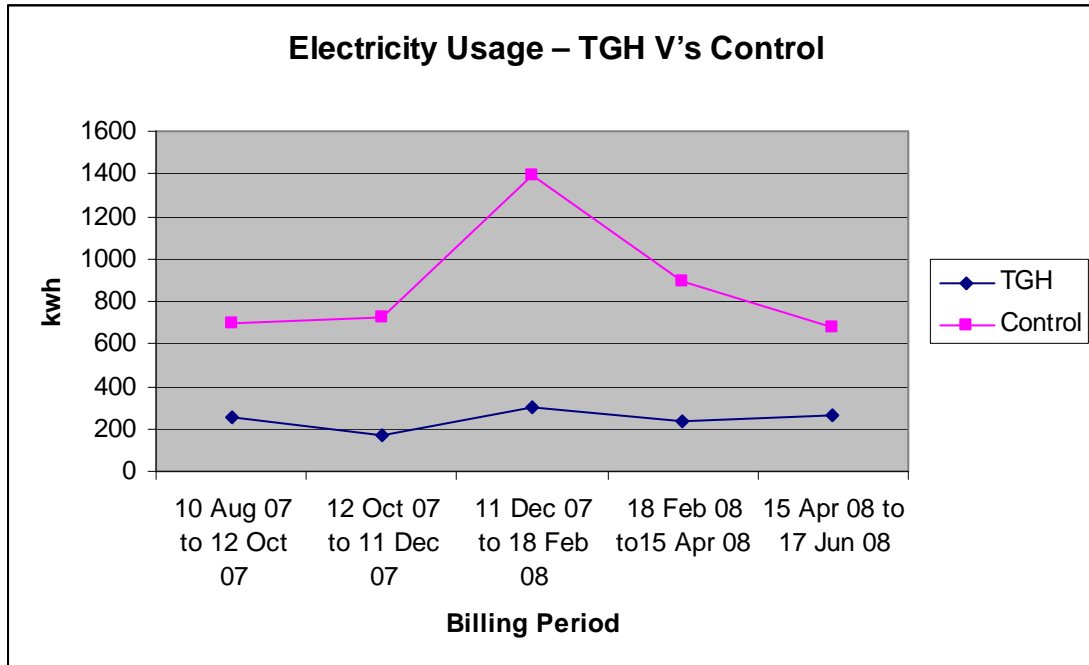
The Control House had a similar occupancy rate (2 adults and 2 children <5 yrs old) and was almost identical to *TGH* in design and floor space / layout. Importantly, the Control House did not alter any of its energy / water / waste usage habits during phase two of the project.

2.0 Energy

Electricity bills from *TGH* and the Control House were collected over the course of the 12-month occupancy phase. Over this time, *TGH* used a total of 1,221 kWh of electricity, which was significantly less than the 4,388 kWh used by the Control House - a saving of approximately 72%. This equates to a financial saving of over \$400.

Figure 1 (overleaf) shows the electricity consumption trends for *TGH* and Control House over the 12-month occupancy phase.

Figure 1 Comparison of electricity consumption (kWh) trends between the Green House and the Control House



Twelve months of gas bills were also collected from both *TGH* and the Control House. Again, *TGH* performed significantly better than the Control House, using a total of 230 kWh of gas during the occupancy phase, compared to 12,322 kWh of gas used at the Control House over the same period.

As a result, the total gas billing for *TGH* was just \$60.60 (excluding GST and application / late fees), compared to a whopping \$767.30 (excluding GST and late fees) for the Control House. This huge difference can help be explained by the fact that the Control House had an instantaneous gas powered hot water system, gas oven and stove, and gas heater in their home, while *TGH* had just one gas connected appliance – a 5.9 star-rated gas convection heater.

2.1 Solar Passive Design

As stated above the design and orientation of the *TGH* and Control House were virtually identical prior to *TGH* being retrofitted in May - June 2006.

Table 1 (below) details the structural changes made to *TGH*:

Table 1 Structural Changes made to The Green House

<i>Retrofit</i>	<i>Benefits</i>	<i>Costs</i>
2 x Brow widows installed on the north facing wall of the lounge room	The windows increase the amount of natural light entering the lounge room and allow the sun to warm the area in winter, while wide eaves and a shade structure carrying deciduous vines (<i>Wysteria</i>) shade the widow in summer.	General Glass - \$300 (glass) Structural changes to the wall - Atwell Building Company - \$500 each window Total – \$1,300
Removal of Archway between the lounge and dining room	Assists with natural lighting and cross ventilation.	Atwell Building Company - \$7,672
Installation of bi-fold doors on the northern side of the family room	The clear glass panels in the bi-fold doors allows winter sun to enter the family room and warm the clay tiles, helping to naturally heat the house. Also assists with natural lighting and cross ventilation.	Atwell Building Company (structural changes to the wall) – Furntech (door) – Total \$3,828
Shade sail installed in the court yard	The shade sail (erected in summer and taken down in winter) prevents the hot summer sun hitting the glass bi-fold doors and heating the house. It also shades the large paved courtyard which can absorb large amounts of heat and re-radiate it at night, slowing the cooling process.	West Coast Shade – \$1,500
Shade structures with deciduous vines erected on the northern and western sides of the house	These structures (made from old Western Power power poles) provide shading from the summer sun while allowing the winter sun to naturally warm the house.	Landscaping (including construction of shade structures) - \$12,000
Clay tiles laid throughout the hallways, lounge, dining room, kitchen and family room	Tiling provides a greater thermal mass than other floor coverings. Increased thermal mass helps stabilise temperatures experienced inside the house - helping keep the house cooler in summer and warmer in winter.	Tiles and Tiling - \$1,500

In addition to structural changes a series of other retrofits were made to *TGH* and surrounding gardens. *TGH* was also fitted out with affordable energy efficient appliances.

2.2 Non-Structural Energy Efficient Retrofits

Table 2 (below) details retrofits and installations undertaken at *TGH* in May - June 2006.

Table 2 Non-structural Retrofits made to The Green House

<i>Retrofit / Appliance</i>	<i>Benefits</i>	<i>Costs</i>
Solar hot water system installed (electric boosted)	Approximately one-third of energy used in the average WA household is used for water heating. Solar hot water systems make use of WA's plentiful sunshine to provide up to 80% of a home's hot water needs for free.	Solahart - \$ 3,000
Installation of roof insulation (R-3.5)	Roof insulation significantly reduces the amount of heat lost through the ceiling in winter and the amount of heat intrusion in summer. Up to 30% of heat transfer occurs through the ceiling.	Cool or Cosy (insulation & window tinting) - \$2,000
Reserve sweep ceiling fans installed in the master bedroom and family room	Reserve sweep ceiling fans are an energy efficient means of cooling in summer and can be reversed in winter to circulate warm air accumulating near the ceiling.	Armadale Lighting - \$60 per fan (total \$120) <i>plus</i> electrician fees
5.9 energy star-rated gas convection heater installed	Gas is a more efficient form of heating than using electricity and produces less greenhouse gas emissions. An inbuilt thermostat enables the occupiers to 'set and forget', with the heater automatically turning off once the room temperature has reached the desired level.	Rinnai Australia - \$1,200
Widow tinting (30% shade) installed on eastern windows	Tinting reduces the amount of heat which enters the house during summer. Vice versa it also restricts the winter sun entering and naturally heating the home in Winter – hence a 30% shade was considered a good balance.	See insulation
Pelmetted curtains installed on all windows	Thick rubber backed pelmetted curtains can reduce heat intrusion in summer and heat loss in winter.	AK Curtain Shop - \$2,000
Internal walls painted with Ecco-therm insulation paint	Insulation paint increases the R-value of walls and ceilings that it is applied to. This helps keep heat in during winter and out	Aalto Colour (paint) - \$215 AB & SA Painting Innovations

	during summer.	(painting services) - \$400
Northern, eastern and western walls rendered	The light olive coloured render and texture applied to external walls absorbs significantly less heat than the original dark brown bricks.	Budget Home Improvements - \$2,300
Whirly Bird installed	Whirly Birds allow hot air to be purged from the roof cavity in summer.	See Skylights
All spaces and cracks addressed using draught tape	Cracks and gaps provide easy access for heat to enter and leave a dwelling.	Bunnings - \$10
Draught excluder installed on the kitchen exhaust fan	This device applies the same principles of draught tape, reducing heat intrusion in summer and heat escaping during winter.	Existing feature
Compact Fluorescent Lighting installed throughout	CFL's use up to 80% less energy and last up to ten times longer than traditional incandescent globes.	Armada Lighting (all lighting) - \$500
Skylights installed in the bathroom and second bedroom	Skylights reduce the need for artificial lighting and are especially useful in dark rooms on the southern side of the house. A louvered skylight was installed in the second bedroom so that the room can be darkened during the day.	RJ Skylights (skylights & whirly birds) - \$1050
High energy and water star-rated appliances were installed throughout	Appliances that were both affordable and energy / water efficient were used in <i>TGH</i> .	Fridge and Washer City (energy efficient whitegoods & electrical appliances) - \$3,000 Electrolux Home Products (4.5 Star refrigerator, oven, rangehood & washing machine) - \$3,500

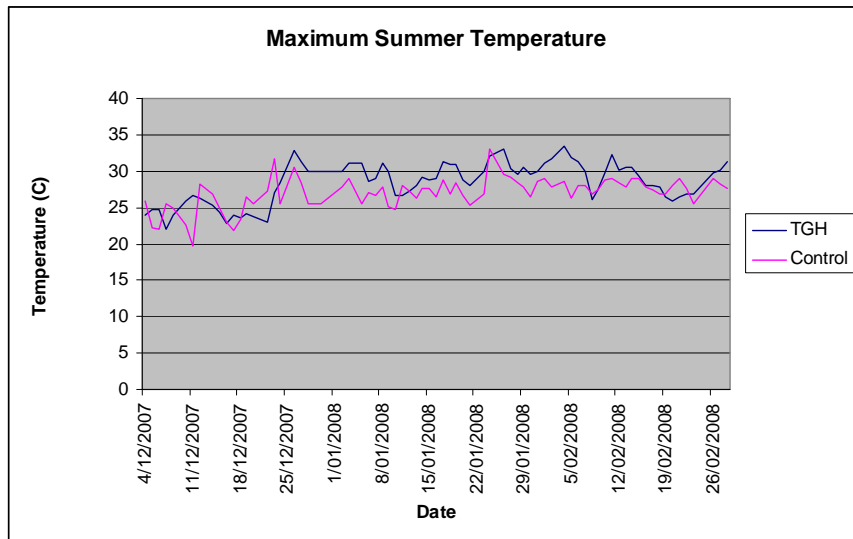
2.2 Ambient Temperature Comparison

26% of the average Australian household's total energy consumption is used to maintain a comfortable ambient temperature (e.g. heating and cooling). *TGH* featured a number of products that reduced the need for costly artificial heating and cooling (see Table 1 and Table 2 above). Data loggers were used in both *TGH* and Control House to record maximum and minimum daily temperatures over the course of the 12-month occupancy phase.

On average, during summer *TGH* experienced an average maximum temperature that was 1.4°C warmer than the Control House.

Figure 2 (below) shows the daily maximum temperatures experienced in *TGH* and Control House over the 2007/08 summer.

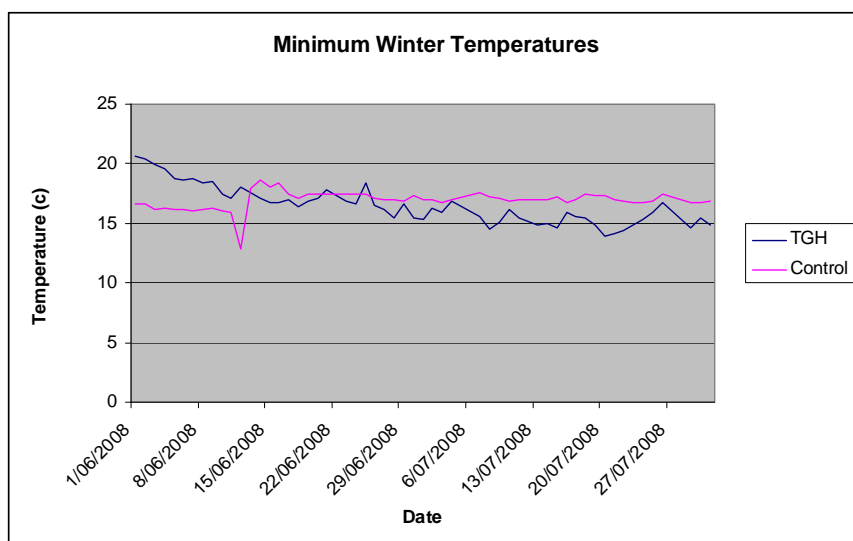
Figure 2 Comparison of daily maximum temperatures trends experienced The Green House and Control House in summer 2007/08



During winter *TGH* experienced an average minimum temperature that was 0.4°C cooler than the Control House.

Figure 3 (below) shows the daily minimum temperatures experienced in *TGH* and Control House over winter 2008.

Figure 3 Comparison of daily minimum temperatures trends experienced in The Green House and Control House in winter 2008



The analysis of internal ambient temperatures throughout the course of the occupancy phase should be done in parallel with the assessment of energy and cost savings.

As such, the bottom line is that *TGH* achieved significant energy savings on artificial heating and cooling (e.g. air-conditioning, using heaters), while maintaining a similar temperature to the Control House throughout the course of the year.

When comparing the electricity consumption of *TGH* to that of the Control House, the most significant discrepancies, and hence savings, were noticed during the summer months.

Between December and February, the *TGH* used 301 kWh of electricity, while the Control House used 1,396 kWh. As the Control House significantly reduced its electricity usage during winter, it is evident that the ducted reverse cycle air-conditioning used in the Control House for cooling accounted for much of the difference.

Analysis of notes on the temperature data logging sheets indicates that the Control House had the air-conditioner running almost every day during summer.

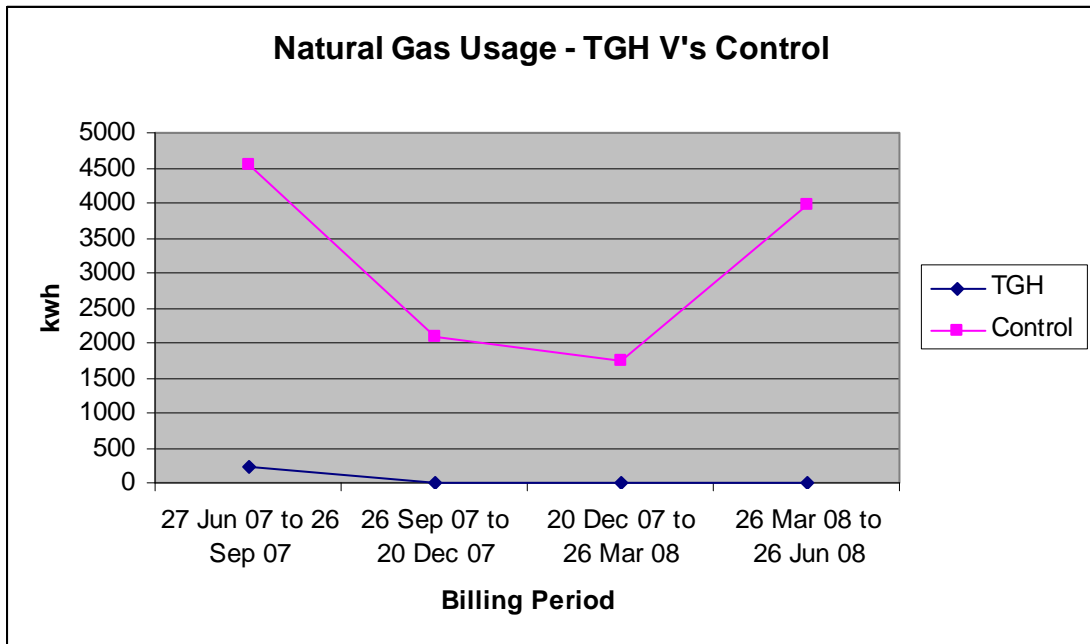
TGH on the other hand, had no air-conditioner, and still managed to maintain a comparable temperature range to the Control House. This further demonstrates the benefits of employing Passive Solar Design principles and sustainable retrofits, and the positive effect they have on reducing the need for artificial heating and cooling.

2.2 Natural Gas Consumption

As the stove and oven were electric, it can be assumed that all gas use in *TGH* was associated with heating in winter. Presumably the largest gas user in the Control House during the trial period was the instantaneous gas hot water system. Other gas appliances used at the Control House during the occupancy phase included a stove, oven and gas heater. Generally, the consumption of natural gas creates fewer greenhouse gas emissions than that of electricity, due to a significantly lower emissions factor. *TGH* achieved similar greenhouse reductions across electricity and gas, as significantly higher larger gas savings (98%) were made.

Figure 4 (overleaf) illustrates the natural gas consumption trends for *TGH* and Control House. Figure 4 shows that natural gas consumption in the Control House trends towards a peak in winter, which is consistent with expected increased hot water and heater usage.

Figure 4 Comparison of natural gas consumption (kwh) trends between the Green House and Control House



Natural gas usage between *TGH* and Control House is difficult to compare due to the fact that the Control House used gas for cooking, heating and water heating, whilst *TGH* used gas solely for heating purposes. However, it should be noted that *TGH* also recorded significantly less electricity consumption when compared to the Control House.

3.0 Water

Water bills from the *TGH* and Control House were collected once the 12-month occupancy phase of the project had concluded.

Table 3 (below) details the waterwise strategies employed at *TGH*.

Table 3 Waterwise Retrofits made to The Green House

<i>Waterwise Strategy</i>	<i>Expected Water Savings</i>	<i>Costs</i>
Rainwater tank plumbed to the toilet	The 2,500 litre rainwater tank installed at <i>TGH</i> was plumbed to the toilet, helping to save thousands of litres of potable water from literally being flushed down the toilet. Plumbing rainwater tanks to the toilet enables the efficient use of rainwater all year round. The rainwater tank was also plumbed to an external garden tap for use in the garden.	West Coast Poly & Davey rainwater pump - \$1900 (not including plumping / installation costs)
G-flow grey water recycling system	This gravity-fed grey water system collects and filters waste water from the washing machine and is used to irrigate the gardens via sub-surface irrigation.	H-R Products - \$660
Tap flow restrictors	Flow restrictors reduce the amount of water delivered by taps throughout the house.	Parkwood Plumbtec – kitchen and bathroom sinks – Total \$280 Restrictors came standard with the new kitchen sink and bathroom sink taps
AAA shower head	Waterwise shower heads work using the same principles as tap flow restrictors and halve the flow rate from approximately 20L / min to 9L / min.	Bunnings - \$20
Waterwise garden and irrigation	The use of native and drought resistant species of plants reduces the need for fertilising and watering. Drip irrigation was used to deliver water to the root zone of plants requiring water to aid establishment. Low angle heavy droplet sprinklers were used to service the small area of lawn. The rest of the garden was heavily mulched and did not require irrigation.	Various Nurseries (seedlings, mature trees, herbs, natives & grass trees) - \$2,010 City Farmers (pea straw, manure, minerals, soil wetting agent, garden products) - \$780 Earth & Water Pty Ltd (waterwise irrigation, garden design) - \$1,000

		<p>Homes for Wildlife (nesting boxes) - \$250</p> <p>Josh Byrne & Associates (garden design and establishment) - \$6,000</p> <p>Lovegrove Turf Services (drought resistance turf) - \$150</p> <p>Mazeggas Mitre 10 (shed & DIY accessories) - \$750</p> <p>MulchNet.com (mulch) - \$500</p> <p>Rainfill Tanks (raised garden beds) - \$500</p> <p>Soil Land (landscaping mix, compost, soil, sand, mulch) - \$250</p>
Sub-surface irrigation system	Purple plastic polypipe with holes spread along each length sit under several inches of mulch and deliver water directly to the plants roots, thereby reducing the amount water lost to evaporation and run off.	Netafim (subsurface irrigation) - \$500
Re-direction of gutter downpipes	Storm water collected from the gutters on the North and West side of the roof was re-directed to a garden bed, reducing the need for watering with potable water.	Accounted for in landscaping costs – estimated to have costed \$100
Waterwise appliances	A 5A-rated washing machine was installed and used in the laundry.	See appliances

Unfortunately, water usage was only measured over a 6 month timeframe due to the Water Corporation’s billing timetables and *TGH* occupation schedule. During this time *TGH* used 45% less water (132kL) than the Control House. This is a significant saving. Not only does it help conserve one of our most precious resources, it also helped *TGH* achieve a financial saving of over \$150.

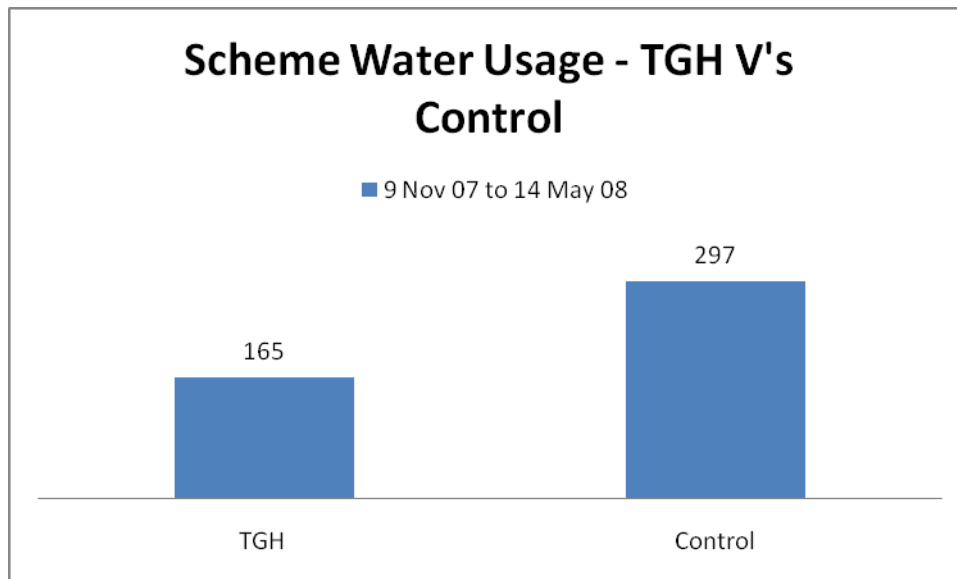
Additionally, anecdotal evidence suggests that gardens at *TGH* remained healthy and productive throughout phase 2 of the project, providing fresh produce for residents (e.g. fruit and vegetables) and habitat for local native species.

Throughout the occupancy phase of *TGH* project, the native gardens continued to mature and became well established (e.g. groundcover species became inter-locking), further reducing the need for hand watering and garden maintenance.

Native ground covers reduced the need for weed control and additional mulching. Organic soil improvement and fertiliser products produced onsite (e.g worm castings and compost), negated the need to use synthetic, phosphorus and nitrogen rich fertilisers, which contribute to the eutrophication of our local waterways and cause toxic algal blooms.

Figure 5 (below) illustrates the difference between scheme water usage at the *TGH* and Control House during the occupancy phase.

Figure 5 Comparison of scheme water consumption (kl) trends between the Green House and the Control House



4.0 Waste

Organic waste decomposing in landfill sites is a major contributor to regional greenhouse emissions, and also an easy area for householders to take action on.

Table 4 (overleaf) shows the waste minimisation strategies employed at *TGH* throughout the occupancy phase of the project.

Table 5 Waste Minimisation Strategies Used at The Green House

<i>Waste Management Strategy</i>	<i>Final Destination</i>	<i>Cost</i>
Traditional Worm Farm (e.g. 3-tray system)	Castings and worm whiz utilised onsite as organic fertiliser	The Worm Shed - wormfarms, worms and castings - \$100
Recycled Refrigerator Worm Farm	Casings and worm whiz utilised onsite as organic fertiliser	No Cost
Rotating Composting System	Compost utilised onsite	220L \$39 400L \$56
Bokashi bucket	Compost utilised onsite	\$79 Bucket \$10 per month for Bokashi mix
Open composting System	Compost utilised onsite	Containing structures made from recycled pallets

During the first 3-months of the occupancy phase, residents of *TGH* and the Control House were asked to measure and record the amount of waste they were sending to landfill and/or the recycling depot. A 3-month data set was considered sufficient for the purposes of this project, due to the impost on residents of both houses in having to weigh both their bins before they were put out on the kerb each week.

On average *TGH* produced 2.4kg of non-recyclable waste each week while the Control House sent an average 17kgs of waste to landfill each week.

Over the course of the occupancy phase of the project, the Control House sent 86% more waste to landfill, than *TGH*.

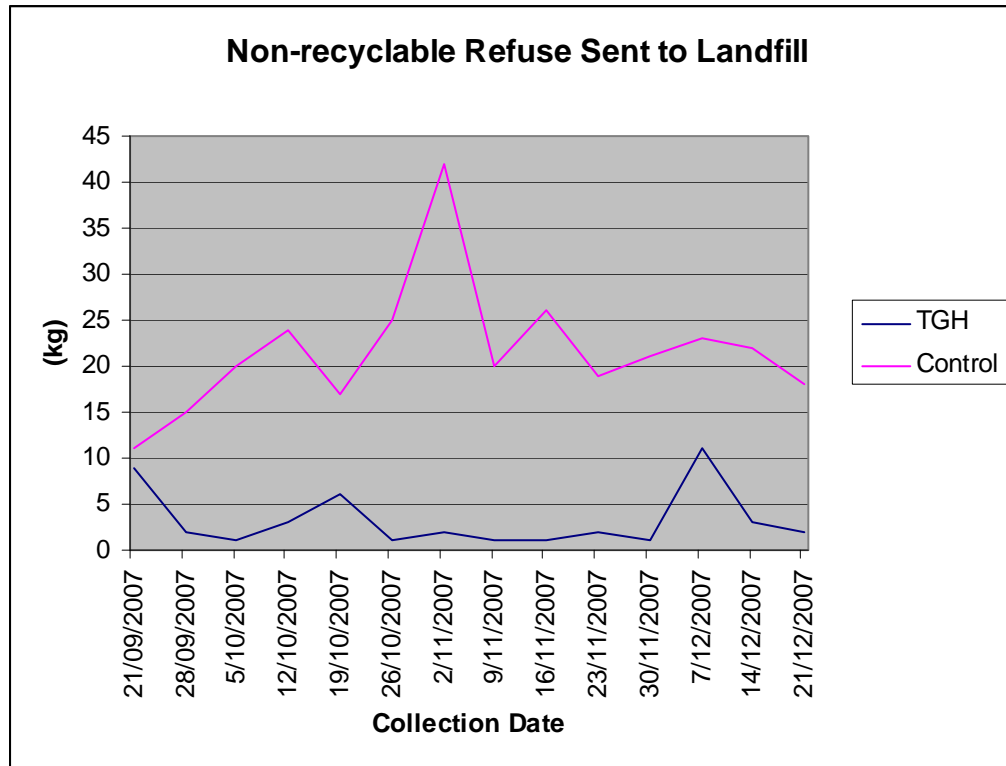
Over the same period, the Control House also produced 162kg of recyclable waste, while *TGH* produced just 63kgs of recyclable waste.

As no waste minimisation strategies for recyclable materials were trialled, this may indicate that the Control House produced more waste in general than *TGH*. This may be due to a number of factors, including different occupancy rates (and ages) and purchasing and lifestyle decisions.

Assuming there is a direct correlation between the amount of recycling and the amount of landfill refuse produced by a household, it would be expected that *TGH* would send 2.57 times less waste to landfill than the Control House. However *TGH* produced 7 times less non-recyclable waste than the Control House. This suggests that the organic waste minimisation strategies employed at *TGH* were effective and significantly reduced the amount of waste sent to landfill.

Figure 6 (below) illustrates the amount of waste sent to landfill by the *TGH* and the Control House each week of the 3-month sample period.

Figure 6 Comparison of waste disposal trends between The Green House and the Control House



5.0 Conclusion

TGH project was a huge success with over 2,500 visitors filing through the doors during the demonstration home phase, including residents, schools, community groups, Council staff, politicians, academics, and TV stations - all seeking practical ideas on how to make residential dwellings more sustainable.

The data collected during the occupancy phase of *TGH* project demonstrates that significant energy, water and waste savings can be made when simple, affordable retrofits are made to existing dwellings.

During the 12-months occupancy phase, when compared to the Control House, *TGH* saved 5.67 tonnes of greenhouse gas emissions and over \$1,250 in financial savings thanks to lower ongoing utility bills (e.g. electricity, gas and water).

With just over \$43,465 spent on ‘sustainability’ retrofits at *TGH* (inside and outside), initial cost analysis suggests a 34 year payback period for the combined house and garden retrofit. However, it should be noted here that labour accounted for some of expenditure (e.g. landscaping). These costs could, in most cases, be substantially reduced if home owners completed landscaping works themselves.

It should also be acknowledged that many of the retrofitted appliances are considered necessities, required in all homes. For example the energy efficient refrigerator, hot water system, stove, floor coverings, white goods and paint in most cases were only slightly more expensive than traditional products or had relatively short payback periods. Additionally, cost / saving projections don't take into account future utility price rises, and also don't take into account various rebates currently available to residents on a wide range of products installed at *TGH* (e.g. solar hot water systems, rainwater tank plumbed to the toilet, insulation, sub-surface irrigation etc).

Whilst not factored in to the payback period for the project in this instance, it should be noted that information on various Federal, State and Local rebates was actively promoted at *TGH* during the first phase of the project.

During phase one of the *TGH* project, visitors were encouraged to implement one or two low cost retrofits at their homes immediately and save for big ticket items requiring a larger amount of capital expenditure. Importantly, visitors were also supplied with information on how to achieve good savings by simply changing their behaviour. Anecdotal evidence provided by *TGH*'s Sustainable Demonstration Home Officers indicated that a number of patrons visited *TGH* on more than one occasion to get specific advice before they made large purchasing decisions, such as replacing hot water systems and commencing renovations.

Local businesses associated with *TGH* (e.g. project partners, providers of sustainable products and services) also reported increases in enquiries and sales of products on display at *TGH*.

Anecdotal evidence from local real estate agents that visited *TGH* suggested that the retrofits undertaken had increased the property's value by up over \$100,000, providing a huge return on investment and demonstrating an additional incentive for home owners to incorporate sustainability into any future renovations.

Taking into account sponsorship, grant funding and partnerships brokered with local businesses, *TGH* project was completed with minimal cost to SEREG (approximately \$15,000 cash and \$25,000 in-kind). *TGH* project was successful in showcasing energy, water and wastewise products and services which were both affordable and attractive. The project also reinforced the 'think global, act local' philosophy.

TGH project not only assisted the local and regional residential community to reduce their environmental footprint, but also inspired other WA metropolitan local governments to investigate implementing similar projects. The 'sustainable housing on a budget' philosophy promoted through *TGH* was spread even further through the Channel 7 TV program *Nuts and Bolts Goes Green*, the distribution of educational DVDs made by the City of Gosnells, and recognition received through State and National awards.

In conclusion, the occupancy phase of *TGH* achieved all that it was hoped it would achieve, by successfully demonstrating that affordable, sustainable retrofits can successfully deliver significant financial and environmental savings, with *TGH* saving over \$1250 on energy and

water bills and over 5.67 tonnes of greenhouse gas emissions over a 12-month period, when compared to a non-retrofitted home of similar size and occupancy rate.

Appendix A – Sponsor List

Company	Product
Aalto Colour	Insulation paint
AB & SA Painting Innovations	Painting
AK Curtain Shop	Curtains, blinds etc
All West Ceramics	Tiles
Armadale Lighting	All types of lighting - security, sensor, fluorescent, compact fluorescent etc
Benara Nurseries	Seedlings and trees
Boral Concrete - Canning Vale	Concrete
Budget Home Improvements	Rendering etc
Callaghan Security Services	Alarms, monitoring, patrols
City Farmers – Kelmscott	Pea straw, manure, minerals, soil wetting agent, garden products etc
Earth & Water Pty Ltd	Waterwise irrigation and plumbing rainwater tank to <i>TGH</i>
Electrolux Home Products Pty Ltd	4.5 Star Westinghouse refrigerator, Westinghouse electric fan forced oven and rangehood, and 5A front-load washing machine
Ellenby Tree Farm	Mature trees
Fridge and Washer City – Cannington	Energy efficient whitegoods and electrical appliances
General Glass Pty Ltd	Glass
Good Sammy Stores - Gosnells	Second hand furniture and clothes
Herbs R Us	Herbs etc
Homes for Wildlife	Nest boxes
H-R Products	Grey water systems, valves etc
Huntingdale Cabinets	Cabinets, benches, vanities etc
Josh Byrne & Associates	Environmental, horticultural and communications advice

Lovegrove Turf Services Pty Ltd	All types of turf
Mazeggas Mitre 10	Shed, paint and other DIY accessories
MulchNet.com	Mulch
Netafim (Australia) Pty Ltd	Waterwise Irrigation products - subsurface irrigation etc
Oakford Native Nursery	Native seedlings and trees
Parkwood Plumbtec	Kitchen and Bathroom sinks and taps
Rainfill Tanks	Raised garden beds
Re.plants	Grass trees
Rinnai Australia Pty Ltd	Gas heaters and hot water systems
RJ Skylights	All sorts of sky lights and whirly birds
Soil Land	Landscaping mix, compost, soil, sand, mulch etc
Solar Dwellings	Solar passive design advice
The Worm Shed	Wormfarms, worms and castings
Vinyl-Tech Doors	Doors, bathroom vanities etc
West Coast Poly Pty Ltd	Rainwater tanks, rainbank pumps etc
West Coast Shade	Shade sails
Solahart	Solar hot water systems
Cool or Cosy	Insulation, window tinting, air-conditioning
Electrician	
Plumber	
TOTAL	
Carpets	
Landscaping costs (e.g. labour)	