

► Edition 3.1 | 2022

SLG: Smart Living Guide

A guide to making smart choices to reduce your environmental impact and save money

Switching geysers off and on? Myth busted.

Should I use hot or cold water?

Here is what to do with electronic waste.

see money differently

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This document was researched and compiled by Natalie Mayer and Blake Robinson of the Sustainability Institute (SI) on behalf of Nedbank Limited. The third edition was undertaken by Nicola Jenkin, also at the SI.

The SI was established in 1999 as an international living and learning centre for theory and practice in values-based, entrepreneurially empowered action towards positive social impact and ecological restoration – in essence to promote learning about and practice in sustainable living in South Africa.

Located in the Lynedoch Eco Village in Stellenbosch, the SI is recognised as one of the leading expert institutions in navigating the transition towards social justice and change in Africa, and forms an institutional base for some of the top academics in the field. In partnership with the School of Public Leadership (SPL) at the University of Stellenbosch the SI has built up renowned master's and PhD programmes in sustainable development, and in 2018 introduced the Diploma in Sustainable Development. For more information visit www.sustainabilityinstitute.net.

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Estimated price range*

	Costs next to nothing (but may require a bit of effort)	2 X	Lowest-cost option costs between R500 and R999	4 X	Lowest-cost option costs between R5 000 and R 10 000
1 X	Lowest-cost option costs less than R500	3 X	Lowest-cost option costs between R1 000 and R4 999	5 X	Costs more than R10 000

* Disclaimer: Prices are per unit or average size, are estimates only and are correct at the time of publishing.



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While some investments might seem expensive upfront (eg converting a cheap electric geyser to a solar water heater), they can result in reduced household running costs that generate great financial returns over a slightly longer period.

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Energy



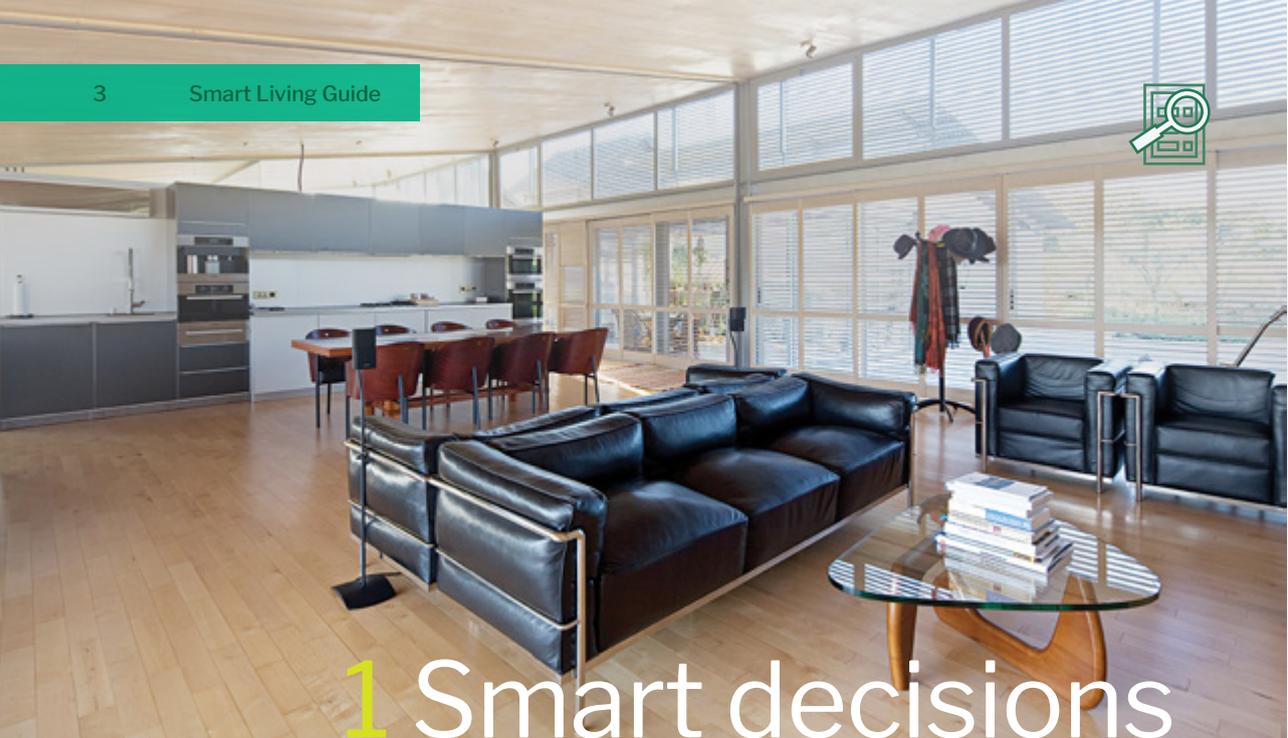
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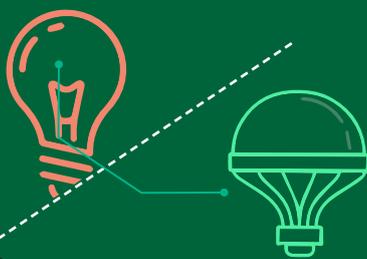
Waste



Ecosystem health



1 Smart decisions for a better future.



We can improve or maintain our quality of life and ensure that we are living sustainably by making **simple changes in our daily lives, eg switching to LED lighting and adopting new technologies.**



Smart living

Our home is our sanctuary, the place in which we spend more than half of our day. When we go about daily routines such as cooking, cleaning, entertaining and relaxing, it is easy to forget that our behaviour has an impact on the outside world.

South Africa is facing numerous environmental, social and economic challenges – from poverty, inequality and unemployment to climate change, water scarcity, pollution and resource depletion. These issues are deeply interconnected, but many people are not aware that the decisions we make at home every day can contribute positively to resolving these issues with minimal effort.

While some issues may seem more pressing than others, we cannot escape the fact that the health of the environment is inseparable from the health of society and the economy. Fresh water, healthy food, clean air and quality of life are dependent on well-functioning ecosystems, yet our high-consumption lifestyles demand more and more from our natural surroundings.

The good news is that a combination of simple changes in our daily lives and adoption of new technologies allows us to maintain or improve our quality of life without adding to the demands we already place on the environment.

Also, choosing local materials, products and artisans over imported alternatives helps to stimulate our economy and support local jobs.

This guide is aimed at all income groups, and provides a range of smart interventions from simple ‘no cost’ changes in behaviour to more costly investments that help reduce utility bills and environmental impact over time.

When one considers small investments, it is best to start with those that improve water and energy efficiency – eg switching to water-efficient shower heads or light-emitting diodes (LED) lighting – as they result in savings in monthly utility bills that can quickly outweigh the costs. While some investments might seem expensive upfront (eg converting a cheap electric geyser to a solar water heater), they can result in reduced household running costs that generate great financial returns over a slightly longer period.

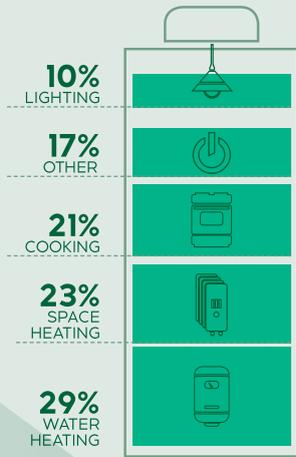
We hope that this guide will help everyday South Africans make simple yet smart changes to their home lives to contribute towards a better future.

In this section we will start by introducing four key challenges that we can address directly through the decisions we make at home: energy, water, waste and ecosystem health.

To find out how you can reduce your use of non-renewable energy and transition to renewable energy sources look out for the  icon throughout this booklet.



1.1 | Energy



Why be concerned about energy?

Most homes in South Africa use electricity to provide a range of useful services, including cooking, refrigerating, heating, drying, cleaning and entertainment. In South Africa, the residential sector consumes over a third of the country's electricity, and **in the average medium-to-high income home 29% of electricity is used for water heating, 23% for space heating, 21% for cooking and 10% for lighting.**¹

However, the way electricity is generated can have significant social and environmental impacts. This is particularly true in a country like South Africa, whose electricity grid is heavily reliant on coal and nuclear energy to generate electricity.

Coal accounts for most of the country's primary energy usage (77%)², but burning coal to generate electricity releases CO₂ as well as other pollutants.

Coal-fired power stations have made South Africa the largest greenhouse gas emitter per person on the continent, and one of the largest in the world. The country's energy sector is responsible for 84% of the country's greenhouse gas emissions.³

These emissions contribute to climate change, which causes an increase in extreme weather events, drought and food shortages; a rise in sea levels; and a decline in the health of ecosystems (plant and animal species).

In addition to its contribution to climate change, the generation of electricity from coal requires the mining of a non-renewable resource, with the accompanying degradation of the environment.

Coal-fired generation also uses vast amounts of water, with approximately 1,41 l of water needed to produce 1 kilowatt-hour (kWh) of electricity⁴ (which excludes the water needed to extract the coal in the first place).

¹ Green Building Council of South Africa. 2011. *Technical Manual Green Star SA – Multi-unit Residential Design & As Built Version 1*. p112.
² South Africa Yearbook 2018. Available at <https://www.gcis.gov.za/sites/default/files/docs/resourcecentre/yearbook/8-Energy2018.pdf>.
³ USAID. 2016. *GHG Emissions in South Africa*. Available at https://www.climatelinks.org/sites/default/files/asset/document/GHG%20Emissions%20Fact%20Sheet%20South%20Africa%20-%202017-5-16%20USAIDSAcomm_rev08-26-16_Clean.pdf.
⁴ Eskom. 2015. *Eskom Fact Sheets*. Available at: http://www.eskom.co.za/IR2015/Documents/Eskom_fact_sheets_2015.pdf.

Nuclear energy contributes 5% of South Africa's electricity supply.⁵ Although it produces lower greenhouse gas emissions than coal, its low-level nuclear waste remains dangerously toxic to humans and ecosystems for thousands of years, while high-level nuclear waste is radioactive for over 100 000 years. South Africa's low-level waste is buried underground in Namaqualand, and high-level waste remains stored within the Koeberg Nuclear Power Station near Cape Town.⁶ There are currently no safe, affordable methods of disposing of nuclear waste.

Radioactive material threatens the long-term sustainability of environments that surround mines, nuclear power plants and waste disposal sites, and the short-term gains of nuclear power come with uncertain future costs, which are typically not properly planned for.

Between 2008 and 2015 the price of South Africa's grid electricity increased at an average rate of over 20% a year. In 2019 Eskom was allowed to increase electricity prices by a further 13,8%.⁷

What should we aim to achieve?

The ultimate goal is to have all energy services delivered through safe, clean, efficient, affordable and accessible pathways. Making South Africa's energy system more sustainable will require a combination of improving efficiencies in the generation, transmission and usage of electricity, and shifting away from coal and nuclear energy towards clean, renewable alternatives.

If electricity costs continue to escalate at a conservative 9% per year, South Africans will be paying double for electricity by 2024. The Council for Scientific and Industrial Research (CSIR) has indicated that, in generating electricity at a utility scale in South Africa, the levelised cost from nuclear (R1,20 to R1,30 per kWh) is significantly higher than new coal plants (R1,10 to R1,20 per kWh), which in turn is higher than solar photovoltaic (PV) and wind energy (R0,61 per kWh).⁸

In other words, new power from solar PV and wind is about **40% cheaper** than from new coal plants today.

Electricity costs are likely to continue to rise for many more years unless there is a significant shift toward renewable energy and away from coal and nuclear energy.



Households have an important role to play in reducing their demand for grid electricity (particularly during peak electricity demand periods), firstly through conservation, then being more efficient, and lastly through substitution with sunlight, biogas or other renewable-energy sources where appropriate. As the price of grid electricity rises, it will become more affordable and popular for households to generate their own electricity through renewable-energy systems. In addition, South Africa may in future follow other parts of the world that allow homeowners to earn additional income from selling clean electricity back to the grid.

⁵ World Nuclear. 2019. *Nuclear Power in South Africa*. Available at <http://www.gcis.gov.za/sites/www.gcis.gov.za/files/docs/resourcecentre/Energy2015.pdf>.

⁶ Eskom. 2013. *Eskom Fact Sheet: Nuclear Waste*. Available at: http://www.eskom.co.za/content/NU_0002NuclearWasteRev5.

⁷ Eskom. 2019. *Eskom annual price increase 2019/20*. Available at http://www.eskom.co.za/CustomerCare/TariffsAndCharges/Pages/Tariffs_And_Charges.aspx.

⁸ Yelland, Chris. 2016. *Comparative Analysis: The cost of new power generation in South Africa*. Available at: <http://www.dailymaverick.co.za/article/2016-10-18-comparative-analysis-the-cost-of-new-power-generation-in-south-africa/#:WAh-oeB96UK>.

TO FIND OUT HOW YOU CAN SAVE OUR PRECIOUS WATER RESOURCES LOOK OUT FOR THE  ICON THROUGHOUT THIS BOOKLET.



1.2 | Water



Why be concerned about water?

If water consumption continues to increase at current rates, **we can expect global water demand to outstrip supply by 40% by 2030.**⁹ South Africa's freshwater supply is particularly vulnerable given its location in a region with low and unreliable rainfall, and recently experienced severe droughts.

Annual rain is often not enough to replenish the dams and other sources of freshwater that supply our taps between rainy seasons.

Climate change is projected to bring a combination of rising temperatures and reduced or more erratic rainfall, placing further pressure on already constrained water supplies – particularly to the west of the country. Most of South Africa's available water sources are already being fully utilised, and there are limited options available for increasing water supply.

While water supply limits are being reached, South Africa's demand for freshwater is increasing, specifically for household consumption in urban areas as

people migrate to cities – resulting in a more concentrated demand for potable water, and therefore the sources for this water. Previously unserved communities are gaining access to piped water for the first time, which enables greater levels of comfort, health and sanitation.

Meanwhile, rising income levels increase demand for swimming pools, access to boreholes, green lawns and other water-reliant luxuries.

⁹ WWAP (United Nations World Water Assessment Programme). 2015. *The United Nations World Water Development Report 2015: Water for a Sustainable World*. Paris, UNESCO.



It is estimated that, by 2025, **11** out of the country's **19** water catchment areas **will not be able to supply** enough water to meet demand.¹⁰

Alternative sources of water such as desalination are highly energy-intensive and expensive, so shifting behaviour to minimise water wastage and achieve more from the country's remaining water resources is crucially important.

Another threat to South Africa's limited freshwater supplies is contamination by human activities and wastes. Most homeowners do not think about what happens to their sewage when it is flushed away. However, in

many parts of the country improper management of wastewater results in these wastes leaking from pipes or overflowing from treatment facilities and polluting freshwater sources.

The *2019 Green Drop Report* on the country's wastewater treatment works found that **65 out of 124** wastewater treatment plants did not comply with

quality standards.¹¹ Water bodies are further polluted by the runoff of oil and other pollutants from roads and driveways, chemical fertilisers and pesticides from gardens, as well as salts and chlorine from pool backwashed water.

For the latest information on South Africa's water crisis visit www.dwa.gov.za.



What should we aim to achieve?

The ultimate goal when it comes to freshwater is to make the best use of every drop and recycle water where it is safe to do so (see the sections on grey-water use). This means that wastage is minimised, pollution is eradicated and ecosystems are allowed to continue to provide water-filtering services.

Every household should save water – but particularly those in higher-income brackets that habitually use more. We can do this by reducing water leaks and wastage, improving water use efficiency, harvesting rain water, planting water-wise indigenous gardens and reusing lower grades of water, such as grey water and pool backwashed water for non-potable uses like toilet flushing.

¹⁰ Department of Water Affairs and Forestry. 2004. *National Water Resources Strategy*. Department of Water Affairs and Forestry, Pretoria.

¹¹ AfriForum. 2019. *AfriForum Branch Project Report: Blue and Green Drop Project*. Available at: <https://www.afriforum.co.za/wp-content/uploads/2019/09/AfriForum-Blue-and-green-drop-project.pdf>.

To find out how you can reduce the impact of our household waste on the environment look out for the  icon throughout this booklet.



1.3 | Waste



Why be concerned about waste?

To make any product requires natural resources. For example, wood and paper products are derived from trees, plastics from crude oil, and fabric from crops like cotton. The problem is that South Africans need **1,9 Earths**¹² to provide the natural resources and services we currently use, and over the past 50 years our ecological footprint – a measure of our consumption of natural resources – has increased by about **190%**.¹³ In other words, we are using far more resources than the planet can replenish.

Extracting these natural resources and processing, packaging and transporting them require energy, which is where the second problem arises. Electricity and transport are still based mainly on the burning of fossil fuels, a process that emits carbon dioxide (CO₂) at a rate faster than the atmosphere, sea, soil and vegetation can absorb it. This excess CO₂ is contributing to the rise in average global temperature.¹⁴

A third problem is that most extraction and manufacturing processes also discharge pollutants into our water, soil and air, threatening human and ecosystem health.



Finally, waste from every stage of the production process is usually sent to landfills, with **only about 10% of South Africa's waste being recycled**.¹⁵

¹² Global Footprint Network. 2019. *Country Trends: South Africa: Ecological footprint (number of Earths)*. Available at: <http://data.footprintnetwork.org/#/countryTrends?cn=202&type=earth>.

¹³ WWF. 2018. *Living Planet Report 2018*. Available at: https://wwf.panda.org/knowledge_hub/all_publications/living_planet_report_2018/.

¹⁴ Intergovernmental Panel on Climate Change. 2007. *Climate Change 2007*. Geneva: United Nations Environment Programme.

¹⁵ GreenCape. 2018. *Waste 2018 Market Intelligence Report*. Available at: <https://www.green-cape.co.za/assets/Uploads/20180622-GreenCape-Waste-MIR-FA-LR.pdf>.



Landfills pollute groundwater and the air, and are hazardous to human and ecosystem health, especially where dumpsites are uncontrolled.¹⁶ As it decomposes, organic waste from landfills emits methane, a greenhouse gas that is 21 times more potent than CO₂ in its contribution to rising global temperatures.

Though a few areas in South Africa have their recycling collected by the municipality, most citizens put their rubbish bin on the kerb each week to be taken to a dumpsite or landfill, where it is buried.

Dumping our waste instead of reusing or recycling it means that we are not using our natural resources effectively. Instead, we are putting extra pressure on ecosystems to deliver new natural resources at a rate beyond their ability to rejuvenate or absorb harmful emissions.

However, we can reduce our waste through eliminating, reusing, recycling or composting it.

Reducing our waste sent to landfills helps us to:

- save dwindling natural resources;
- reduce degradation of ecosystems;
- reduce energy use and resultant CO₂ emissions;
- reduce pollution;
- save landfill space and reduce methane emissions;
- free up organic waste for compost and return valuable nutrients to the soil; and
- save money.



What should we aim to achieve?

The ultimate goal is to have no waste at all, where every output is an input for another production process. Nature cycles outputs like this daily and leaves no waste, as the byproducts of one system feed another. We too can achieve zero waste through good design and innovative systems.

Materials and products can be designed to be 100% recyclable with no loss of quality, or 100% compostable and nourishing for the soil (see the section on biodegradable and compostable packaging for guidance on which to choose).¹⁷

With progress being made under the government's Operation Phakisa initiative¹⁸, the separation of waste at source to improve recycling, and improvements in our waste collection infrastructure, the intention is that we will have better facilities to help us recycle more, more often.

¹⁶ United Nations. 2018. *Africa Waste Management Outlook*. Available at: https://wedocs.unep.org/bitstream/handle/20.500.11822/25514/Africa_WMO.pdf?sequence=1&isAllowed=y.

¹⁷ Braungart, M & McDonough, W. 2008. *Cradle to Cradle: Re-making the way we make things*. London: Vintage Books.

¹⁸ Department of Environmental, Fisheries & Forestry. 2019. *Operation Phakisa: Chemicals and Waste consolidated 3ft plans as amended during Alignment Workshop held 18-19 July 2019*.

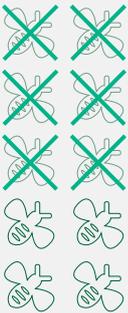
TO FIND OUT HOW YOU CAN CONTRIBUTE TO ECOSYSTEM HEALTH LOOK OUT FOR THE  ICON THROUGHOUT THIS BOOKLET.

1.4 | Ecosystem health

Why be concerned about ecosystem health?

We rely on ecosystems for our survival, particularly now with the threats posed by climate change. Besides providing us with natural resources such as clean air and water, food, timber, plant fibres, metals and minerals, ecosystems perform other vital functions. These include moderating air temperatures, regulating disease and climate, supporting nutrient formation and pollination of crops, purifying water and providing for recreation and spiritual wellbeing.

Scientists and natural-resource economists have tried to calculate the economic value of some of these services if we had to provide them ourselves, and the costs run into billions of rands. Yet we are able to enjoy these ecosystem services for free, as long as the ecosystems providing the services are maintained in a healthy state.



However, due to various factors, global ecosystem health is deteriorating rapidly. For example, in its most recent *Living Planet* report, WWF International suggests that wildlife populations have **decreased by 60%** over the past 40 years.¹⁹

In South Africa overexploitation of resources and species, urban sprawl, climate change, invasive alien species and pollution of land, water and air are the main culprits. For example, nearly a fifth of the country's coastline has some form of development within 100 m of the shoreline.²⁰

This reduces natural protection against storm surges and rising seas, placing people and property at greater risk, and threatens coastal and inshore ecosystems.

¹⁹ https://wwf.panda.org/knowledge_hub/all_publications/living_planet_report_2018/.

²⁰ *South Africa Yearbook 2014/15*. Available at: <http://www.gcis.gov.za/sites/www.gcis.gov.za/files/docs/resourcecentre/Environmental2015.pdf>.



While the outlook for our ecosystems appears bleak, the issues they face are a consequence of human behaviour. This means that, by changing our behaviour, we can change their future (and ours) for the better.

To reduce our negative impact on ecosystems we can:

- find out which natural resources and species are threatened or in decline and try to conserve them;
- avoid using non-renewable resources, such as fossil fuels and their byproducts;
- support high-density urban development (eg multistorey city apartments) rather than urban sprawl (eg golf estates);
- save energy, be more energy-efficient and transition to renewable energy;
- remove alien invasive species and replace them with indigenous varieties;
- stop littering and pouring toxic chemicals down our drains; and
- use our purchasing power as consumers to encourage companies to produce and/or manufacture more responsibly.

What should we aim to achieve?

Our vision should be healthy ecosystems that are easily able to support biodiversity and provide their vital services to humans and all other living things.

We must therefore prioritise the restoration of degraded ecosystems, switch to using renewable resources, and reuse them as many times as possible before returning them to ecosystems in a form that will nourish rather than pollute.





2 Where to start? Understanding your household consumption.



Being aware of your energy and water use can help change behaviour.

You can track your usage through your bill with an electronic monitoring device.



2.1 | Monitoring

2.1.1 Monitoring electricity consumption



Just being aware of your energy use can help you slash your consumption by up to 20%. You can track your home's electricity use through your bills or through an electronic monitoring device. If you have a municipal electricity account (ie no prepaid meter), then you can find your monthly consumption on the bill in kWh. For help on reading your municipal rates bill click [here](#).

Bear in mind that the amount may be an estimate, so rather use your actual readings when calculating a monthly average. Prepaid electricity meters work on 'units' rather than kWh; but one unit is equal to 1 kWh.

By keeping a record of the number of units you purchase each month, you will be able to calculate a monthly average. Alternatively, you could call your electricity supplier to ask how many units you purchased over the past 12 months.

You could also install an electronic monitoring device to provide you with real-time data on electricity usage and tell you specifically what is drawing electricity, eg lights, geyser or irrigation.

The information is presented in easy-to-understand charts on a dashboard that you can view online, allowing you better to understand your consumption over time.

You can purchase an electricity monitor online or at your local electrical supply store or hardware store for between R600 and R2 500, depending on the monitoring system.



To find out which household activities use the most electricity and where you can save, try the Department of Energy's appliance calculation tools.

You will need to create an account and set a password, and then you will be able to input your home's electricity-related information.



2.1.2 Monitoring water consumption



Average water consumption in South Africa is 233 litres per person per day. This is higher than the estimated world average of 185 litres per day per person. During drought conditions, our water consumption needs to decrease dramatically. For example, during the Day Zero crisis in Cape Town only 50 litres were allowed per person per day under severe water restrictions.²¹

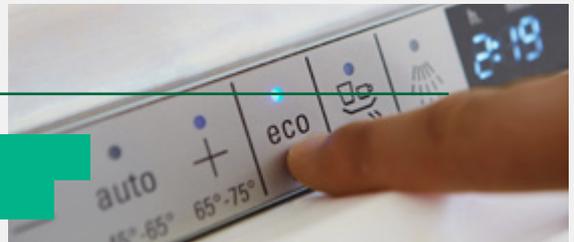
You can find out your monthly water consumption on your utility bill, measured in kilolitres (kl). Note that 1 kilolitre = 1 000 litres (ℓ) = 1 cubic metre (m³). When calculating a monthly average, remember that your water use may vary considerably depending on the season, especially if you have a garden to irrigate.

To find out which household activities use the most water and where you can save, conduct a [simple household water audit](#) on the City of Cape Town's website.

Alternatively, you could install an electronic device that keeps track of water consumption. These devices are installed on the water mains (usually by a plumber) and send consumption data wirelessly to an indoor display.

An added advantage is that they can also detect leaks and shut off the water automatically, preventing water losses, damage to property and all associated costs. Water consumption monitors cost between R250 to R 2 500 and can be purchased online or from a plumbing supply store.

Does knowing your consumption levels change your behaviour?

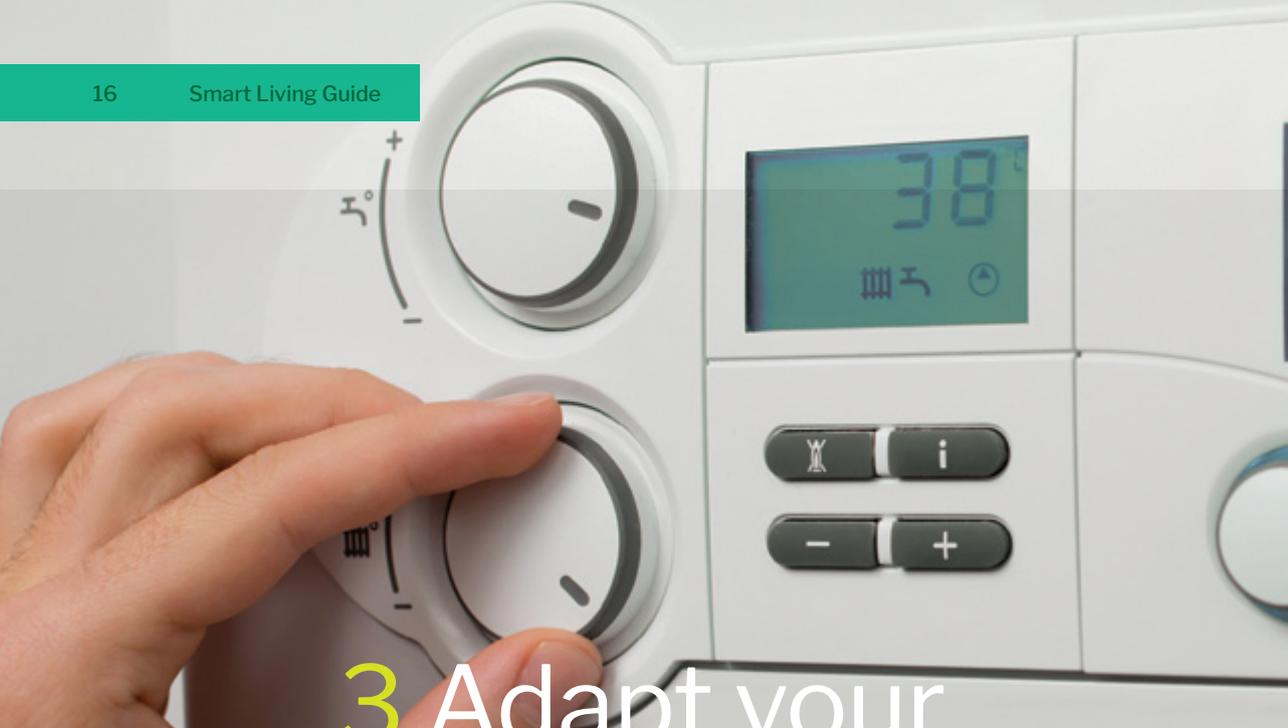


Yes. Various studies (mainly energy-focused) have estimated electricity savings of between 10% and 20% just from the behaviour change that follows learning of consumption levels.

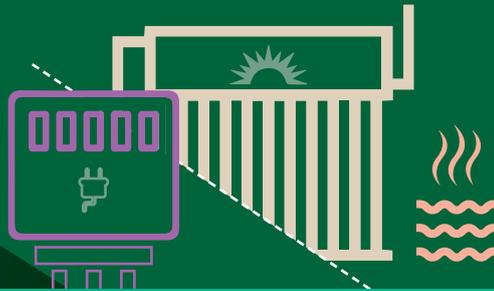
Energy companies internationally have begun to give customers much more detailed information about their electricity usage on their bills and through cellphone apps, helping people to target energy-saving actions even more. Knowing your

neighbours' consumption levels and being able to make a comparison with your usage is another, even more effective (and perhaps surprising), motivator for reducing consumption. Indeed, from a psychological perspective, behavioural and social motivators have shown to be more powerful than data.

²¹ Makou, G. 2018. Do South Africans each guzzle 235 litres of water per day? News24, 12 April. Available at <https://www.news24.com/news24/analysis/do-south-africans-each-guzzle-235-litres-of-water-per-day-20180412>.



3 Adapt your behaviour, improve your home.



Devices that harness the sun's heat, such as solar water heaters, can reduce electricity bills, as they **provide up to 80% of hot-water energy needs.**



3.1 | Water heating

3.1.1 Geyser thermostat settings



Many households have their geysers operating at very high temperatures, and waste a lot of water and electricity trying to reach a suitable temperature when using a tap or the shower. This can easily be avoided by resetting the geyser temperature on the thermostat.

This should not be set higher than 60 °C, but some homes have them set to a scalding 65 °C or more all year round. It is estimated that for every 1 °C that your thermostat temperature is reduced, you could save roughly 10% of your water-heating costs.



The geyser thermostat is located on the geyser itself, inside a protective covering. To turn down the temperature you first have to turn off the electricity supply to the geyser. Then you need to get to the geyser and open the protective covering. Then, with a small flat screwdriver, you can turn the thermostat setting screw to a lower temperature. Be sure not to set it lower than 55 °C or else bacteria may grow that can cause legionnaires' disease.

3.1.2 Geyser insulation



If you have an electric geyser in your home, insulation can help keep the geyser water warm for longer.

This reduces the amount of water and electricity wasted when waiting for water to reach an ideal temperature. A geyser can be insulated by wrapping it tightly in a geyser blanket and installing pipe lagging on the hot-water pipe for at least the first 2 m from where it leaves your geyser. Geyser blankets and lagging should be available at your local hardware store and are relatively simple to install. If you are unsure, a plumber will be able to assist you.



For exposed hot-water pipes the SANS 10400-XA building regulations 2011 specify insulation with a minimum R value of 1,0 for pipes with an internal diameter of less than 80 mm, and insulation with a minimum R value of 1,5 on larger pipes.



3.1.3 Solar water heaters

R R R R



Approximately 29% of the average energy consumed by middle-to-upper income households is used to heat water in an electric geyser. Using an alternative to an electric geyser is therefore one of the most significant ways in which homes can save on electricity.

Solar water heaters (SWHs) have been used in South Africa since the 1970s, but they are gaining increasing popularity as an alternative to electric geysers as electricity prices and new building regulations have encouraged homeowners to invest in energy-saving measures.



South Africa has abundant sunshine. By using devices that harness the sun's heat, solar water heating can provide up to 80% of hot-water energy needs, and significantly reduce electricity bills. There are various types of SWHs, and they each differ in cost, aesthetics and energy efficiency. Studies show they can have a payback time of four to eight years (depending on the system).²²

The main choices that will need to be made are:

Passive or active?

Passive systems take advantage of the tendency of hot water to rise above cold water, allowing natural circulation of water without an electric pump. These systems require that the tank be placed above the collector plate, typically on the roof. Active systems use a bit more electricity to circulate the water by pump, but allow for the tank to be concealed below the roof. Both systems can have an electrical element as a backup for times when the sun's heat is not strong enough to achieve the required water temperature.

Flat-plate or evacuated-tube?

A flat-plate system collects the sun's heat through a weatherproof box with a glass cover, whereas an evacuated-tube system does so through a series of parallel glass tubes. Evacuated-tube systems are designed for colder climates, and typically achieve higher water temperatures than flat-plate systems. Flat-plate systems are suitable for most areas in South Africa.



Not all buildings are suited to solar water heating due to shading, orientation, Roof covering type and other factors, so it is worth consulting an expert to determine your home's suitability before investing in a SWH.

If you cannot afford a SWH upfront, some suppliers offer finance options. Alternatively, you could get a loan through your access bond or another type of flexible bond facility.

To learn about how Nedbank can assist you with purchasing a SWH please see [page 79](#).

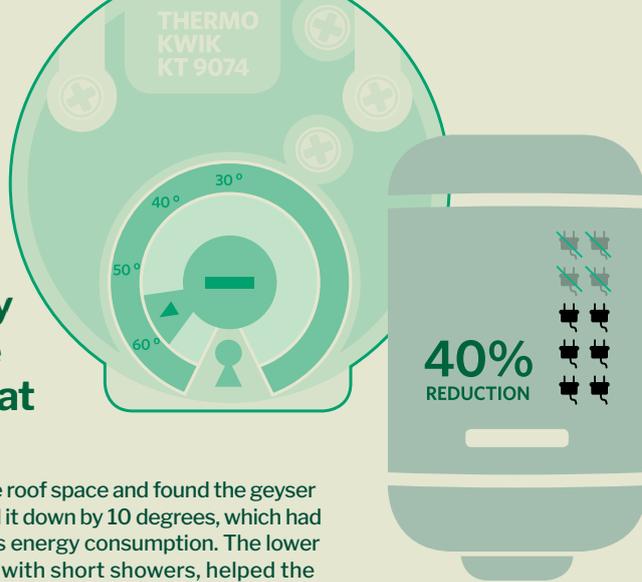
²² Sustainable.co.za. 2019. *Water heating*. Available at: <https://www.sustainable.co.za/water-heating.html>.



Case study:

Saving electricity by adjusting the geyser thermostat

Lutho Ngewana climbed into the roof space and found the geyser had been set to 70 °C. He turned it down by 10 degrees, which had an instant impact on the family's energy consumption. The lower thermostat setting, combined with short showers, helped the Ngewanas reduce the electricity used by the geyser by 40%.



FROM

My
GREEN
HOME

COURTESY OF THE GBCSA.

3.1.4 Heat pumps

RRRRR

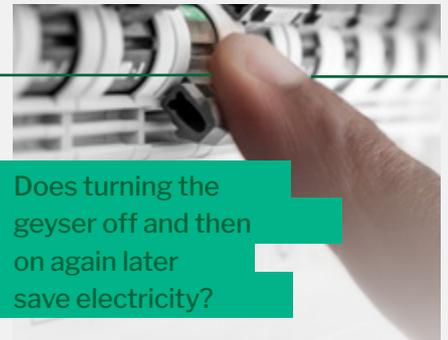


Water can be heated by extracting warmth from the air through a heat pump, which uses 50% to 70% less electricity than a traditional electric geyser. A heat pump resembles a small air-conditioning unit attached to the exterior of a building, and is typically connected to a geyser inside.



As heat pumps do not require roof space or direct sunlight, they are easier to incorporate into the design of buildings than SWHs. Noise needs to be considered and their overall lifecycle costs can make them more expensive than solar water heaters for household applications.

A heat pump's ability to heat water is limited by the temperature of the surrounding air, so it typically uses a small amount of electricity each day to raise water temperatures to the desired levels.



Does turning the geyser off and then on again later save electricity?

This is only true if you plan to be away from your home for a few days or longer.

But on a day-to-day basis switching off your geyser during the day and then on again at night does not save electricity, because of the energy needed to reheat the cold water in the geyser.

In general you will achieve greater savings by turning your thermostat down to between 55 °C and 60 °C, insulating your geyser and pipes with a geyser blanket and lagging, and reducing your hot-water use.²³

²³ Isotherm. 2019. Does switching off the geyser really save energy? Available at: <https://www.isootherm.co.za/switching-off-geyser-really-save-energy/>.



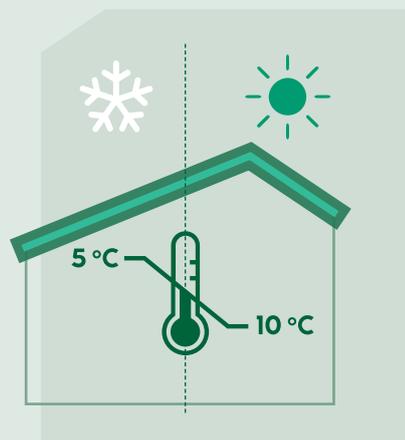
3.2 Space heating and cooling

3.2.1 Ceiling insulation

(R) (R) (R)²⁴



One of the most important ways to improve the management of the internal temperatures in your home is to insulate your ceilings to better protect internal spaces from extreme external temperatures. Ceilings and good roof insulation can keep a home **5 °C warmer in winter and 10 °C cooler in summer** when compared to homes without such insulation.



Since 2011 it has been compulsory for all new buildings in South Africa to install insulation of a certain standard depending on its location, but insulation can be added relatively easily to existing homes too. Insulation comes in many forms, including blanket-style strips that are rolled out between the rafters, silver foil or polystyrene boards that act as ceiling and insulation combined.

While some insulation options are hazardous to human health and the environment, there are a number of affordable and sustainable options available, including a cellulose fibre composed of recycled newspapers that is pumped into the ceiling cavity and forms a thick layer when it settles on top of the ceiling boards.

²⁴ This is based on the cost for the self-installation of the cheapest blanket-style insulation in a 75 m² dwelling.



If you are not sure whether your home has insulation, try to find a way to access the area between the roof and the ceiling, and check if there is any insulation in the form of silver foil, blanket-style strips or a layer of cellulose fibre on top of the ceiling boards.

If there does not appear to be any insulation or the existing insulation does not seem to be working adequately (some types can move or

deteriorate over time), take a few photos of the area and ask your local hardware store for advice on what to install.

Depending on the structure of your roof, installing insulation yourself can be difficult and even dangerous, so it may be worth your while to approach local insulation installers for advice and quotations.

The effectiveness of insulation material is indicated by its R value, and the performance of existing insulation can be improved by adding further layers on top of it to increase the thickness. The new R value would be the sum of the R values of the layers. If you are insulating on a budget, you should ensure that what you install meets the minimum R value requirements for your climate zone as specified in the SANS 10400-XA energy efficiency regulations.



3.2.2 Draught-proofing

R²⁵



Many homes are difficult to heat or cool due to draughts entering from outside through gaps in windows and doors. Adhesive foam sealing tape in various widths is available at most hardware stores, and can be adhered to the edges of doors and windows to close these gaps and make your home more airtight.

Specially designed draught excluder strips are available **to block gaps at the bottom of doors** while still allowing them to open and close easily.

Alternatively, a long thin beanbag called a draught 'snake' or 'sausage' can be positioned to prevent draught from entering underneath your door.

²⁵ Currently, you can buy ceiling tape of up to 35 m for R200.



3.2.3 Space-heating tips



There are several options available for heating indoor spaces, but many of them require a great deal of electricity. Underfloor heating is one of the most energy-wasteful ways of heating a space, and should not be used when trying to save energy.

Electricity is more efficient than gas – for example, on average, heating a room with electricity costs R24, while it costs R51 when using gas.²⁶

You can use the following tips to maintain a constant temperature in your home all year round, reducing the amount of time you need to use extra heating:

- Keep curtains, blinds and shutters open during the day – especially in rooms where direct sunlight enters your home.
- Close all curtains when the sun goes down to retain as much heat as possible.
- Thicker curtains are more effective at retaining heat than thinner curtains.
- When heating or cooling a space, it is advisable to make the space as airtight as comfortably possible by closing windows and both internal and external doors.
- Instead of heating a room, rather wear warmer clothes and use a hot water bottle or blanket to keep warm when sitting or sleeping.

3.2.4 Closed fireplaces and wood burners



One of the most environmentally friendly ways of heating internal spaces is to burn a sustainable fuel in a fuel-efficient closed fireplace – often referred to as wood burners. Open fireplaces lose a great deal of heat up the chimney, and the release of smoke and fumes into the house can be hazardous to one's health. Closed fireplaces have a door, and modern designs maximise the release of heat from the fuel into the room while minimising the loss of heat up the chimney.



Depending on the design, these fireplaces can be set into the wall, hung on the wall or stand alone. They can use a range of sustainable fuels, including sustainably harvested wood, untreated waste wood or pellets made from waste wood, alien vegetation or sawdust. Some of the more advanced units can also be used to heat household water.

²⁶ Property24. 2016. *Most cost-effective way to heat your home this winter.*

Available at: <https://www.property24.com/articles/most-cost-effective-way-to-heat-your-home-this-winter/24023>.



Do South African homes really need insulation?

While temperatures in South Africa may not be as extreme as in North America or Europe, or reach the high temperatures found along the equator, it is still worth insulating your home to reduce the energy needed to power heaters, fans or air conditioners by up to 50%. The thickness of the insulation should be appropriate for your climate, ceiling design and structure of your home (number of storeys and whether it is built on a concrete slab or not). In general, the higher the R value of the insulation, which measures its thermal resistance, the greater the insulation and energy savings.

Insulation is now required by law: The building regulator for South Africa has published an energy efficiency standard (SANS 10400-XA) that requires all new buildings to install insulation, with different R value requirements depending on which of the six climatic zones of South Africa the property is located in. For example, a new house in Cape Town, which falls in the temperate coastal zone, must have insulation with a minimum R value of 3,70 for the entire roof.

3.2.5 Space-cooling tips



Here are some alternative tips to keep your house cool in warm weather:

- Block the entry of direct sunlight into your home by closing curtains, blinds and shutters as required. Light-coloured curtains and blinds are best for preventing heat from entering the home as they reflect light and heat instead of absorbing it.
- During hot weather, open windows or doors at night to flush out the hot air and remember to open windows or doors on more than one side of a space to allow for cross-ventilation. Open the highest windows in the house (eg upstairs windows and roof windows) to allow the rising heat to escape swiftly.
- If you need to cool only a few people and they are not moving around too much (eg when watching television), use a fan to create a breeze rather than an air conditioner.
- If you have an air conditioner and you absolutely need to use it, ensure that the thermostat temperature is set at no more than 10 °C below the outside temperature. Also, remember to minimise the area to be cooled by closing doors and windows.



Air conditioning requires a great deal of electricity and should be considered only as a last resort or cooling an interior space where passive or when less energy-intensive measures have failed.

For example, a window unit air conditioner uses about 500 W to 1 500 W, whereas a floor fan uses only about 100 W on the highest speed, and ceiling fans 15 W to 95 W depending on speed and size.



3.3 | Cooking

3.3.1 Energy-efficient cooking



The following changes can help you save electricity without having to invest in new appliances:

- When using the stove or oven, turn the heat off slightly before the food is ready to allow the heat remaining in the pot, stove plate or oven to finish off the cooking.
- When boiling water, use a kettle instead as this requires only half of the electricity needed to boil water on the stove. Ensure that you do not boil more water than is needed, that the element is always covered, and that the kettle is turned off when it starts to boil.
- When cooking legumes like beans and lentils, let them soak overnight to soften up before cooking to save on cooking time.
- Regularly check that the rubber seal on your oven is intact. Bad seals can allow heat to escape, resulting in increased electricity usage.
- As a general rule, use the smallest-sized appliance that you can for your cooking needs to save on energy, and always check the energy efficiency ratings.
- Defrost frozen food overnight by leaving it in the fridge rather than using a microwave to defrost it.
- Check your portion sizes before cooking. Cooking too much can waste not only food, but also energy. But if you cook too much, you can freeze it for later use.



When cooking on the stove, try to match the pot or pan size to the size of the plate to ensure that the plate is not wasting energy by heating up the air around the pot. Avoid using a pot or pan that is larger than what is NEEDED.



3.3.2 Hot boxes

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Hot boxes are a great way to save energy when cooking foods such as stews, soups or rice, which need constant low heat over a long period. A hot box consists of a box and lid made from cushions filled with polystyrene, within which a cooking pot can be placed.

The contents of the pot needs to be brought to the boil on the stove, and once the pot has been placed inside the hot box and the box has been closed, the heat is retained within the box and the food continues to cook without needing any more energy.



The food cooks in roughly the same time as cooking on the stove, yet can save up to 60% of cooking costs. Note: hot boxes are not suited to all types of cooking, so please read the instructions carefully.

The Wonderbag is a locally produced hot box in the shape of a bag. For every Wonderbag bought a donation is made to The Wonderbag Foundation, which gives Wonderbags to families in need in Africa. There are a number of other variations on the hot-box design, some of which can be made at home from designs available online.

3.3.3 Gas stoves

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The use of electricity for cooking is highly inefficient as energy is lost when heat is converted to electricity and back to heat again. Using a direct fuel such as liquid petroleum gas (LPG) or biogas is thermally much more efficient and helps to reduce peak demand for electricity.

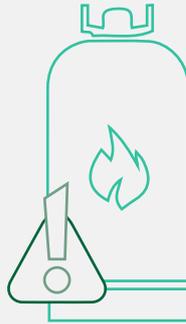


Gas is well known to be the preferred cooking fuel for top chefs due to the precision with which the heat can be controlled, and this further helps to save energy by reducing the wasteful preheating and cooling down associated with conventional electric stoves.

²⁷ This is based on the cost for the cheapest two-plate countertop gas cooker.



In South Africa cooking with LPG is slightly more expensive than cooking with electricity: A study by DFR Engineers showed that the monthly cost of running a gas stove for 1,5 hours a day is R68,51, compared with R54,68 for an electric stove.²⁸



However, be cautious when using gas. Ensure it is properly installed, be in the room when the gas stove is on and ensure the gas is turned off properly when not in use.

See the following guidance for using gas safely: <https://www.arrivealive.co.za/Safety-With-Gas>.

Portable LPG tanks are widely available, and piped natural gas can be accessed in certain parts of the country (eg from Egoli Gas in Johannesburg). Built-in gas stovetops or freestanding ring burners can be retrofitted to kitchens relatively easily where there is a piped gas connection or a suitable and safe location for gas tanks nearby.

Biogas is another fuel source, but due to the amount of biomass required to generate the gas, it is better suited to a multi-unit development or smallholding rather than an individual suburban home. In areas where biogas digesters can be installed to capture gas from wastewater, low-pressure gas ring burners can be connected to allow one to cook with a free and renewable source of energy that is not derived from fossil fuels.

For more information visit the Southern African Alternative Energy Association's (SAAEA) website at www.saaea.org, or Biogas SA's website at biogassa.co.za.

Is cooking with gas better than cooking with electricity?



This depends on your energy source. On the face of it, gas seems better. Burning natural gas emits less than half the CO₂ that burning coal does, so it contributes less to climate change and pollution. Gas stoves are also more energy-efficient as they reach cooking temperatures almost instantly and therefore use less energy than electricity (even if gas is more expensive than electricity). However, even with an exhaust system, gas stove emissions are harmful to your health. A well-maintained, correctly placed extractor hood helps to reduce these emissions, but does not completely eliminate them.²⁹

If the electricity is from renewable sources, eg solar or wind power, cooking with electricity is a clear winner over gas.

For those who do not have access to renewable-energy sources, there is another option: induction cooking. Induction cooking uses less electricity than conventional stoves, and does not affect the quality of indoor air negatively.

²⁸ Slabbert, A. 2014. *Outwitting Eskom: the costs*. Available at: <https://citizen.co.za/uncategorized/293660/outwitting-eskom-the-costs/>.

²⁹ Nicole, W. 2014. *Cooking Up Indoor Air Pollution: Emissions from Natural Gas Stoves*. Available at: <http://ehp.niehs.nih.gov/122-a27/>.



3.3.4 Induction cookers



Conventional electric stoves waste a lot of energy to heat up a cooking plate. Induction cookers, on the other hand, use electricity to power an electromagnet, which transfers energy directly to the vessel in order for it to heat the contents, using less electricity than a conventional electric stove.

As the outside of the vessel does not heat up, induction cookers are safer to use than conventional electric stoves. They also heat up quicker and are more precise as the amount of heat being generated can be instantaneously adjusted – similar to cooking with gas.



One possible drawback is that pots and pans need to be made of ferrous metals, such as iron or steel (and not aluminium or copper), for the electromagnet to work. Therefore, consumers will need to ensure that they have appropriate cookware. An increasing range of portable and built-in induction cookers is now available at major appliance retailers in South Africa.

3.3.5 Microwave ovens



While a microwave oven may defrost or cook a meal more quickly than a stove or oven, it does use energy to do so.

There are some basic principles for choosing an energy-efficient microwave³⁰:

- The wattage is important – the less watts, the less energy used. Most microwaves are about 1 000 watts – this is fine for a family, but if you live on your own consider a smaller microwave rated at 650 to 800 watts.



- Try buying a microwave that has sensors, as this helps the microwave cook your food more efficiently.
- Ensure your microwave has a stand-by mode, as this can cut energy use by up to 75%.

³⁰ Durham Electric. 2018. *How to Buy an Energy Efficient Microwave*. Available at: <https://durhamelectricalservices.com/how-to-buy-an-energy-efficient-microwave/>.



3.4 | Lighting

3.4.1 Natural light



Use natural light in your home as far as possible. Not only does this reduce electricity usage, but health, wellbeing and productivity are promoted when we are able to see the natural passing of time.

During the day ensure curtains and blinds are open before you resort to switching on artificial lights, and position desks and other work areas to take advantage of natural light.

Consider installing a skylight or sun pipe to allow daylight into dark passages or rooms (see 'Natural light' in the 'Home renovations' section). A sun pipe is a type of solar tube installed between your ceiling and the roof to let in daylight. Some versions are made of flexible reflective material to allow for light to be reflected around corners. They are highly effective and relatively inexpensive to install.





3.4.2 Energy-efficient bulbs

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Replace incandescent bulbs with compact fluorescent light (CFL) bulbs or light-emitting diodes (LEDs).

Compared with an incandescent bulb:

- CFLs use 80% less electricity and last up to 10 times longer; and
- LEDs use 90% less electricity and last up to 25 times longer.

As a general guideline, a 60 W incandescent bulb emits roughly the same amount of light as a 13 W to 15 W CFL bulb or a 6 W to 8 W LED bulb.

Both CFLs and LEDs are available in a variety of whites, including a soft warm white, so you do not have to settle for that



clinical look. CFLs come in a wide range of fittings, so make a note of the size and type of your old bulb or take it along with you to the store to ensure that you purchase the correct replacement. LEDs can replace most halogen bulbs used in recessed spotlights; again it may be best to take your old bulb to the store to ensure you buy the right fitting.

When disposing of CFLs, make sure that you do not add them to your kerbside rubbish collection as they contain small quantities of toxic mercury that can be released when the bulbs are shattered. Rather take them to specialised dropoff points, some of which are conveniently located at major supermarkets. LEDs do not contain mercury or toxic chemicals, but should be recycled at e-waste dropoff points. Locate drop-off points in your area at mywaste.co.za.

Case study:

Saving money with LEDs



Say Mr B and Mr G each have R1 000 to save or invest, and each has 10 incandescent lights of 50 W in his home that could be replaced by more energy-efficient LED globes.

Mr B leaves his old bulbs in place, putting his R1 000 in a five-year fixed-deposit bank account that pays 8% annual interest. Mr G chooses to invest his R1 000 in 7 W LEDs to replace those 10 older globes.

Five years later the R1 000 that Mr B deposited has grown to R1 490. But Mr G has saved R5 525 on electricity and another R316 on replacement bulbs, since LEDs last much longer. The new globes were such a good investment, it is as if Mr G had earned nearly 32% annual interest.



3.4.3 Task lighting



Avoid lighting up a whole room if you are using only part of it. Make use of functional or task lighting such as a desk or side lamp. These lamps can be fitted with CFLs or LEDs to help you reduce your electricity use even further.



3.4.4 Occupancy sensors



If you or your family frequently forget to turn off non-essential lights, installing occupancy sensors might be the perfect solution.

Working on the same principle as outdoor security lights, occupancy sensors detect movement in the room and switch on the lights automatically. If no movement has been detected for a preselected amount of time, the lights are switched off.

Does turning lights on and off frequently use more energy than it saves?

No. Although there is a small power surge when you switch on a light, the amount of energy consumed is much smaller than the amount saved by switching lights off. Another related myth is that switching lights on and off again too often can shorten the life of the bulb.

In truth, the wear and tear on the bulb is so small as to be insignificant. Incandescent and halogen lights should be turned off whenever they are not needed, as they are the least efficient bulbs.



LEDs can also be turned off and on without affecting their operating life. CFLs are more affected by the frequency of switching on and off than the other bulb types, so some sources recommend leaving CFL bulbs on if you are not leaving the room for long.



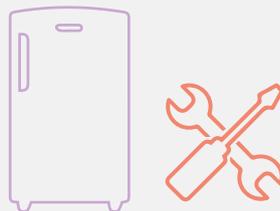
3.5 | Refrigeration

3.5.1 Fridge and freezer maintenance



The following tips will help you to ensure your energy unnecessarily:

- Ensure that there is at least a hand's width between the back of the fridge and the wall so that air can circulate around the condenser.
- Clean behind the fridge regularly to keep the condenser free of dust and other material.
- Check that the rubber seals around your fridge doors are in good condition and that the doors close properly to prevent the loss of cold air. If the seal is worn or does not seal properly, contact the manufacturer or an appliance retailer for a replacement seal.



Also consider purchasing a fridge or freezer that is made of parts that can be replaced or easily maintained. This means you need to replace only the damaged part and not the whole fridge or freezer. And while the fridge or freezer may cost a bit more, the reward lies in its longevity.

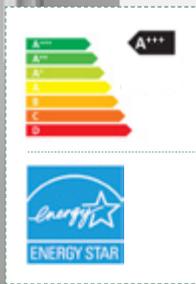
3.5.2 Energy-efficient fridges



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Fridges typically operate 24 hours a day, even when you go on holiday, so it is important that you choose an energy-efficient model when buying a new fridge. New fridges should have highly efficient compressors and fan motors to save energy, and this can be seen in the amount of energy consumed in watts (W) or kilowatts (kW) as indicated in the instruction manual or on the appliance itself.



South Africa does not currently have its own rating scheme for the energy efficiency of appliances, so we rely on foreign labelling systems. The European system ranks energy efficiency from A to G, with an A rating being the most energy-efficient.

The American Energy Star mark is also a suitable indicator of energy efficiency. As a general rule, deep freezers with a lid on the top require less energy than those with a door on the side as they lose less cold air each time they are opened.



Does keeping the fridge or freezer full save energy?

The jury is still out on this one. Some science forums suggest that energy consumption is the same whether the fridge or freezer is full or empty – as long as the door is kept closed.

The logic goes like this: If you open your fridge or freezer often, a full appliance is better as the food and drinks inside act as a thermal mass, keeping the temperature the same for longer.

A full appliance could also mean that the flow of air that cycles around to cool the fridge or freezer is reduced, which could help to prevent the loss of cold air when the door is opened.

Other researchers shelve the ‘full fridge’ idea, stating that the savings are negligible and not worth the effort of filling it with things you do not need.

Either way, there is virtually no data available to support either position. Instead, make sure your fridge or freezer is as energy-efficient as possible and that the rubber seals are working effectively.



3.6 | Laundry

3.6.1 Washing machines



Most of us will be relieved to know that using a washing machine is far more water- and energy-efficient than washing our clothes by hand. When buying a new machine, choose the correct size for your needs and the most efficient one you can afford, bearing in mind the electricity and water costs you will save years into the future.

The average top-loader uses around 180 l of water per load, whereas a front-loader uses half of that or less. The most efficient washing machines are therefore front-loaders³¹, have an energy rating of A+ under the European labelling system or an Energy Star mark of approval, and use a maximum of 90 l of water or less per load. A label of AA means that three different functions of the machine (such as energy consumption, wash quality and spin drying) are each rated A.

Run your washing machine only when it is full (not overloaded), set it to a cold wash and spin-dry on your lowest setting (if at all). Use only the minimum amount of washing powder and softener necessary. To protect human and ecosystem health ensure that these products are non-toxic, are biodegradable and do not contain phosphates (see the 'Cleaning products' section on page 55). Please be careful not to drain dirty washing water into the stormwater system.

The lifespan of your washing machine will depend on the model you have but should last about six years, with good washing machines lasting up to 20 to 30 years.³²



With regular cleaning and maintenance, you can improve the lifespan of your machine as follows:

- Do not overload your machine as this will put strain on the bearings, while underloading can be a waste of a cycle. Follow the manufacturer's guidelines on capacity.
- Get your washing machine checked and repaired by a professional as soon as you notice any problems.
- Clean your machine to prevent blockages in the filters and draining system and putting strain on the machine. Your machine may come with a function that will tell you when it needs a clean.

³¹ City of Cape Town. 2011. *Smart Living Handbook*. Available at: http://resource.capetown.gov.za/documentcentre/Documents/Procedures,%20guidelines%20and%20regulations/Smart_Living_Handbook_Eng_FULL%20VERSION_4thEd_2011-05.pdf.

³² RepairAid. 2019. *How Long do Washing Machines Last?* Available at: <https://www.repairaid.co.uk/washing-machine-lifespan/>.



3.6.2 Clothes-drying



As far as possible, use the free energy of the sun and wind to dry your clothes outside.

This means you will need to plan your washing according to the weather report. You could also benefit from your home's trapped heat by setting up a drying rack inside. If you absolutely have to use a tumble-dryer, choose the most energy-efficient one you can afford. Before using the dryer, remove as much of the water from the clothes as possible by wringing them out by hand or using a short spin cycle on the washing machine.

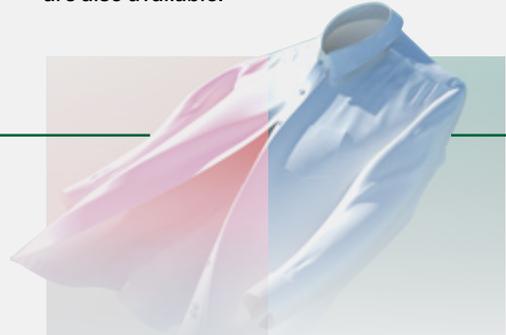


To conserve energy always make sure that the lint filter is clean. Small, portable clothes dryers that use less space and electricity to help you dry essential items are also available.

Does hot water clean clothes better than cold water?

No, hot water does not wash better. In fact, cold water protects the fabric dye, which helps colours last longer, and it uses less electricity as the water is not heated as high.

Cold water prevents clothes shrinking and helps them maintain their shape. It also stops some stains, such as blood, from setting into the fabric. The key to clean clothes is rather to use the right amount of washing powder for your load and to treat stains quickly before they go into the machine. Besides not being more effective, washing clothes in hot water also uses a lot of electricity – 90% of



the energy used in a hot wash goes to just heating the water. This results in significantly higher electricity costs and more carbon emissions than for a simple cold wash.

Another good reason to wash at a lower temperature is that it is less aggressive on your clothing, and therefore less likely to release plastic microfibres, which can then be released into our rivers and oceans. It is estimated that up to 64% of new clothing is made of or contains plastic.³³

³³ Friends of the Earth. 2018. *Microfibres: the plastic in our clothes*. Available at: <https://friendsoftheearth.uk/plastics/microfibres-plastic-in-our-clothes>.



3.7 | Dish washing

3.7.1 Dish washing by hand



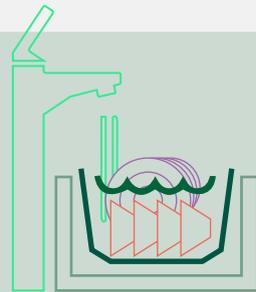
For small loads of dishes, washing by hand can be the most water- and energy-efficient if you keep the basin water to only a few centimetres deep. Fill the second basin or a tub to a shallow level with water for rinsing – do not leave the tap running.

Washing items in order from least dirty (glasses) to most dirty (pots and pans) helps to keep your water cleaner for longer.



Remember to use non-toxic, biodegradable and phosphate-free dishwashing liquid to protect our water resources and the ecosystems that depend on them.

These products can be easily found at Clicks, Dis-Chem, most major retailers and online at, for example, Faithful to Nature (<https://www.faithful-to-nature.co.za/>) and Wellness Warehouse (<https://www.wellnesswarehouse.com/shop/>), or check out your local farmers' or weekend market for stock.



It is also a good idea to wash dishes in a basin that fits into your sink.

In this way you can capture the water and use it in your garden.



3.7.2 Dishwashing machines



If you regularly need to wash large loads, using a dishwasher can be more water- and energy-efficient than washing dishes by hand. Choose a dishwasher with an energy rating of A or A+, and uses 20 l of water or less per cycle (older models use an average of 30 l to 53 l).



Make sure it is properly loaded and completely full before switching it on, and use economy wash settings or short cycles.

Skip the drying cycle and let the dishes dry naturally by leaving the dishwasher door open once the rinse cycle has ended. Once again, remember to use ecologically friendly dishwasher powder, and skip the rinse aid altogether – most dishwasher powder is sufficient on its own.

Does a dishwasher need rinse aid to clean glasses properly?

Rinse aid is a surfactant that stops water droplets from forming on the surface of a plate or glass, helping to reduce water spots that sometimes occur during drying. Rinse aid speeds up the drying process and gives our glassware that desirable shine.

The problem is that the chemicals that most rinse aids are made of are highly toxic to both humans and ecosystems, particularly aquatic ecosystems.



Sodium tripolyphosphate, methylchloroisothiazolinone, oxybenzone and troclosen sodium are just some of the typical ingredients and are linked to cancer, respiratory problems, organ damage, skin irritation and other dangers to health. The good news is that there are a number of brands of rinse aid that use plant-based formulas, helping you and your family avoid contact with these chemicals (including even ingesting them). Alternatively, you can use white vinegar in place of rinse aid, but be careful not to put it in the rinse aid drawer as it can damage the rubber components. Instead, put it in a small cup on one of the trays inside the dishwasher. Even better news is that you might not need rinse aid at all – try a few washes without it, and assess the results for yourself.



3.8 Renewable energy

3.8.1 Solar PV

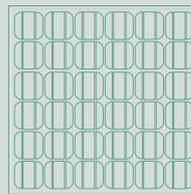
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Solar photovoltaic (PV) technology converts sunlight into electricity. South Africa is considered to be among the richest countries in the world in terms of solar resources, with most areas in the country experiencing more than 2 500 hours of sunshine per year, compared with an average of only 1 000 hours per year in some European countries.³⁴

In recent years solar PV has experienced significant growth in South Africa, with privately owned installed capacity estimated at ~280 MW in 2017.³⁵ For comparison 164 MW of installed capacity could power about 27 000 households, depending on factors like sunshine, energy consumption patterns, temperatures and wind conditions.

SOLAR PANEL



CABLING



INVERTER

The main components that make up a solar PV system include panels, mounting structures, inverters and battery storage. A solar PV panel (or module) for residential applications is typically a flat plate containing a chain of connected silicon cells. Mounting structures are used to support the panels and keep them tilted at the correct angle to collect as much sunlight as possible. In South Africa panels should ideally be positioned to face north. An inverter converts the direct current (DC) from the solar PV module to alternating current (AC), which is required for most home appliances. If electricity consumption is higher at night than during the day, batteries can be used to store excess energy generated during sunlight hours for later use.

³⁴ Kritzinger, K. 2017. *Policy Brief: Solar photovoltaic technologies*. Available at: <https://www.crses.sun.ac.za/files/research/publications/popular-media-and-policy-brief/PV%20Policy%20Brief%20Dec%202017.pdf>.

³⁵ PQRS. 2016. *Solar PV – Aug 2016 PQRS Industry Report*. Available at: <http://pqrs.co.za/s-a-solar-pv-list-2/>.



There are three main solar PV system types: grid-tied, off-grid and hybrid. With a grid-tied system the homeowner consumes some electricity from the solar PV system and the rest from the national electricity grid when the sun is not shining, thereby reducing the need for batteries. An off-grid system is a standalone system and is typically implemented in remote locations without electricity grid access (eg in rural areas). A hybrid system is a combination of a grid-tied and off-grid system.

Unless you can afford an off-grid solar PV system that fully meets your household's electricity needs throughout the year, you will need to consider connecting it to the grid. A number of municipalities have small-scale embedded generation (SSEG) schemes in place to allow you to do so, and others are in the process of piloting or drafting such schemes. One of the challenges for homeowners wishing to tie their systems to the grid is that South African legislation requires such systems to be registered and licensed with the National Energy Regulator of South Africa (NERSA), in line with the Electricity Regulation Act, 4 of 2006.

This process is currently complicated, and NERSA has suggested that an SSEG register be implemented to simplify the process. At the time of printing this is still under consultation.³⁶

An investment in a solar PV system in South Africa can be recouped through reduced electricity bills within five to 15 years, depending on the system's design, its exposure to the sun, and the tariff that Eskom or the municipality charges for electricity. The batteries are the costliest components of a solar PV system, so grid-tied or hybrid systems that require less battery storage are more cost-effective than off-grid systems. Some municipalities in South Africa allow for grid-tied systems, but the regulations are different for each municipality. It is therefore important to check with the energy office at your municipality whether a grid-tied system is legal before installing one. In general, a solar PV panel will last for at least 20 years, an inverter will need to be replaced after 10 years and a battery can be used for two to 10 years, depending on the design of the system and user consumption patterns.

³⁶ NERSA. 2018. *Consultation Paper: Registration application fee to be paid by small-scale embedded generator applicants*. Available at: <http://www.nersa.org.za/Admin/Document/Editor/file/Notices/Invitations/Consultation%20Paper%20-%20Registration%20application%20fee%20to%20be%20paid%20by%20Small-Scale%20Embedded%20Generators.pdf>.



Points to keep in mind if you are considering installing solar PV:

- Ensure you have reduced your home's energy consumption as much as possible through behaviour change and efficiency interventions (see page 77). This will help you make sure the PV system you install meets your household requirements.
- Get a needs assessment and quote from two or three credible suppliers. As yet, there is no third-party accreditation scheme in place locally for renewable-energy suppliers, although several industry bodies and industry best practices can provide valuable guidance in making an informed selection. Contacting industry bodies such as the South African Photovoltaic Industry Association (SAPVIA), the Sustainable Energy Society of Southern Africa (SESSA) and the South African Alternative Energy Association (SAAEA) is a good starting place to get some guidance.
- As a general guide for a standard household, a 3 kW hybrid system will cost between R108 000 and R150 000 to install (at R36 to R50 per watt), including batteries. A 3 kW system could cover 80% of the average consumption of a household in South Africa (4 600 kWh/year). The same system without battery storage will cost between R54 000 and R75 000 to install (at R18 to R25 per watt).³⁷
- Check whether you are legally allowed to connect your system to the grid (and what the requirements of doing so would be) by consulting the energy office at your municipality.

For more information on how Nedbank can assist you with purchasing a solar PV system please see page 79 of this guide.

Is solar PV too expensive for residential use in South Africa?

Solar PV appears expensive due to the initial outlay for the system components and installation, but the cost-saving benefits are enjoyed long after the system has been paid off.

Some governments around the world offer a rebate or tax incentive for residents installing these systems, and certain electricity suppliers offer residents a feed-in tariff for selling electricity from home PV systems back to the grid. Unfortunately, this option is limited in South Africa, as it is not an option provided by Eskom. However, check with your local municipality, as some do provide buy-back schemes.

Nedbank have the following solar finance options available:

Option 1 – Asset Finance

Apply for solar-energy finance over a period of up to 72 months at a competitive interest rate with MFC, a division of Nedbank.

Option 2 – Home Loan Finance

Finance a solar-energy solution through your Nedbank home loan.

To find out more visit <https://personal.nedbank.co.za/borrow/solar-finance.html>

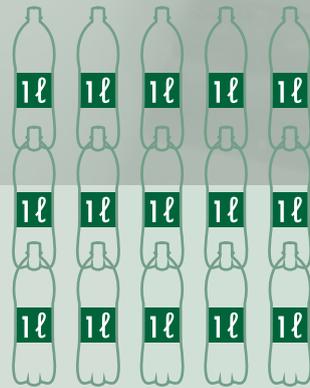


³⁷ CRSES. 2015. Do you want to install a PV system? Available at: http://www.crses.sun.ac.za/files/news/PV%20one%20pager%20info%20brochure_final.pdf.



3.9 | Toilets

One flush =



3.9.1 Reducing toilet flush capacity



Toilet flushing is one of the biggest wastes of fresh water, yet flushing a toilet has become a norm to which most of the world aspires and which is unlikely to be replaced any time soon. Standard South African toilets use 9 ℓ to 15 ℓ of water to remove human waste, yet in many cases the same result could be achieved with much less water.³⁸

A simple way to reduce the amount of water required for each flush is to adjust the height of the 'float' in the cistern so that the water in the cistern refills to a lower level after each flush.



Alternatively, some of the volume of the water in the cistern can be displaced by installing a brick or closed 2 ℓ litre bottle filled with water in a corner that does not affect the toilet mechanisms.

Some new toilets have cisterns as small as 6 ℓ, and it is worth considering a smaller cistern size when you are purchasing a new toilet as a means of conserving water.

³⁸ Biggs, B. 2017. Domestic Water Saving Fixtures Report. Available at: <https://www.greencape.co.za/assets/Uploads/Domestic-Water-Saving-Fixtures-Report-.pdf>.



3.9.2 Dual-flush and multiflush mechanisms



Many modern toilets have a two-button or dual-flush mechanism that allows one to choose between a full flush for solids and a half-flush for liquids. Multiflush systems have a handle flushing mechanism, but only release water for as long as you hold down the handle, ensuring that you do not use all the water in the cistern for each flush. Some hardware stores sell a small weight that can easily be added to a conventional toilet mechanism to serve the same purpose as a multiflush. These days you can also choose a hold flush, which allows you to control the flush volume – as soon as you let go of the toilet handle it will stop flushing. This can save more than 50% of the flushing volume.³⁹

When installing a new toilet, it is advisable to consider one with a dual-flush or multiflush mechanism. If your toilet already has one of these installed, it is important to educate its users as to how to use it to save water when flushing.

Alternatively, if you already have a conventional handle-flushing mechanism installed, remember to lift the handle after enough water has been released into the bowl. This means that the whole cistern does not need to be refilled after every flush.

3.9.3 Grey-water toilets



For a more substantial investment in water saving there are systems available in South Africa that allow for the reuse of grey water. This means that water from the shower, washing machine, basins and bath can be collected, partially treated, and supplied to the toilet cistern for flushing.

Although the plumbing requirements can be challenging and it is not always possible to convert an existing toilet to a grey-water system, flushing with grey water allows for money to be saved throughout the year by reducing water and sewage bills.

Considering that 30% to 40% of household water use is for toilet flushing⁴⁰, reusing grey water to flush toilets is one of the best ways to reduce household freshwater demand.

Plumbing Africa provide some useful guidelines for grey-water use and management in South Africa, which can be found [here](#).

³⁹ Biggs, B. 2017. *Domestic Water Saving Fixtures Report*. Available at: <https://www.greencape.co.za/assets/Uploads/Domestic-Water-Saving-Fixtures-Report-.pdf>.

⁴⁰ News24. 2018. *New Toilet Can Save 30% of Water and 30% of Consumers' Water Bills*. Engineering News. 20 November. Available at: http://www.engineeringnews.co.za/article/new-toilet-can-save-30-of-water-and-30-of-consumers-water-bills-2018-11-20/rep_id:4136.



3.9.4 Waterless toilets



Given South Africa's water insecurity and droughts, waterless toilets are an option, and can be just as hygienic as a water-flushing toilet. The most common type of waterless toilet is a composting toilet.

If designed, used and maintained properly, they can conserve water, keep effluent away from waterways, do not smell and, if allowed enough time with the correct treatment, can produce fertiliser for your garden.



Temperature, soil pH, and digestion by invertebrates over time all contribute towards the decomposition of the material in the toilet.⁴¹ You can purchase composting toilets off the shelf or build them yourself with readily available materials. Before you buy or build, check what system is best for you, and if in doubt, get professional advice.



Is flushing things down the toilet a good way to dispose of them?

There is a widespread belief that items disposed of in a toilet simply dissolve away. In reality when a toilet is flushed, the water (and whatever else is in it) is piped to sewerage treatment plants, where the water is 'cleaned' – a process that is energy- and carbon-intensive, as well as costly. Unfortunately, many of South Africa's wastewater treatment plants cannot cope with the volumes of sewage they must treat, and the pipes and infrastructure are old and not maintained properly. The excess sewerage often leaks out into groundwater or is piped out into rivers or the sea, polluting aquatic ecosystems. Supposedly biodegradable items such as paper towels, tampons, flushable wipes and cotton balls do not break down like toilet paper does, and need to be composted or at least taken to the landfill.

Condoms and plastic items are a definite no-no, as they can block pipes or end up polluting waterways and the sea. A good rule of thumb is: If you do not want to see it floating down a river, do not throw it in the toilet!

The exception to this is dirty water containing harmful substances such as cleaning chemicals or paint. This should be flushed down the toilet rather than thrown onto your lawn or down the stormwater drain as it is more likely to be treated properly by the sewerage treatment plant.

⁴¹ Australian Government. 2013. *Waterless Toilets*. Available at: <http://www.yourhome.gov.au/water/waterless-toilets>.



3.10 | Showering and bathing

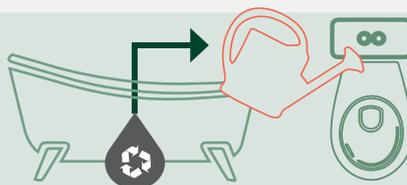
3.10.1 Water- and energy-saving bathing



Water is essential for keeping clean, but small changes can help to reduce your use of hot water, saving both water and electricity:

- A four-minute shower uses between 30 ℓ and 48 ℓ of water (depending on the efficiency of the shower head), while a conventional bath can use between 80 ℓ and 200 ℓ of water. To save water a short shower (four minutes or less) is recommended instead of a bath.
- A shower timer can help you keep to a short shower. It usually comes with a suction cup that sticks to the wall of your shower and alerts you when your time or water usage limit is reached.
- If you are wasting water waiting for the shower or bath water to heat up, collect it in a bucket or container for use in the garden or for toilet flushing rather than letting it run down the drain.
- Turn taps off properly to ensure that they do not drip, and replace the washer on any taps that continue dripping. A leaking tap can waste around 1 ℓ of water per hour.
- Ensure that everyone in your home knows where your master water shutoff valve is located. This could save litres of water and damage to your home should a pipe burst.
- If you have a solar water heater, ensure that you shower at the end of the day when the water is still hot from the sun rather than in the morning when additional electricity may be required to increase the water temperature.

During water restrictions you can use your bath to collect grey water from showers to water your garden or to fill up toilets.





3.10.2 Water-saving fittings



A well-designed shower head can allow for a comfortable shower without needlessly wasting water. Wasteful shower heads release 15 l of water per minute more than low-flow shower heads, which release 7,5 l to 10 l per minute at full power. A simple test of your current shower head would be to see how long it takes to fill a 2 l jug – if it takes 12 seconds or less at full power it is wasting water unnecessarily. With a low-flow shower head, a seven-minute shower at full power can save as much as 37 l of water.⁴²

When less hot water is used per shower, less cold water is released into the geyser to replace it, so water-saving shower heads can help to conserve electricity as well as water. Similarly, tap aerators help to reduce the amount of water used in hand basins by adding air to the flow of water. Many modern taps come with aerators, but they can also be retrofitted to some existing taps.

Other opportunities to save water include installing low-flow or aerated taps in your kitchen or bathrooms, which can **save as much as 60% of a tap's water use and cost**, with a payback period of about six months.⁴³

Case study:

Saving water with efficient shower heads

If the Sullivans use an average of 15 l per minute for four three-minute showers each day, over the course of the year they will use about 66 k l of water, at a cost of R1 719. They will also have to pay a sanitation charge to the municipality for part of that water, adding another R881.



On top of that, to heat the water with electricity would require more than 2 000 kWh, at a cost of R3 852, bringing the grand total to R6 452.

Cutting that in half with shower heads that use just 7,5 l per minute would save R3 226 in a single year, all as a result of shower heads costing just a few hundred rand each!



⁴² Sustainable.co.za. 2019. Water Saving Showerheads Buyer's Guide. Available at: <https://www.sustainable.co.za/watersavingshowerheads>.

⁴³ Biggs, B. 2017. Domestic Water Saving Fixtures Report. Available at: <https://www.greencape.co.za/assets/Uploads/Domestic-Water-Saving-Fixtures-Report-.pdf>.

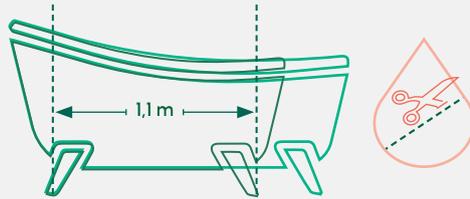


3.10.3 Sit tubs

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As a general rule one should shower instead of bath whenever possible due to the large amount of water and energy required to fill a bath tub. The amount of water and energy demanded by a bath is largely due to its size, and although South Africans tend to install full-length baths of between 1,6 m and 1,9 m long, there are shorter options available that allow for a relaxing bath while using less water.



If you are installing or replacing a bath, consider installing a 'sit tub' as an alternative. These baths are around 1,1 m to 1,2 m long. While you probably will not be able to stretch your legs out straight, **they require less than half the volume of water for bathing** than a full-length bath tub would.

Does showering save more water than bathing?



Not always. **It depends on the time you spend in the shower** and the shower head you have. A bath uses around 80 ℓ to 200 ℓ of water on average. If you are taking long showers (eight to 12 minutes) with a regular shower head, you could fill your bath in that time, and would therefore not be saving water at all.

However, if you have a four-minute shower with a low-flow shower head, you will only use around 30,4 ℓ⁴⁴ of water – you can therefore save a significant amount of water by showering in this way. If you are unsure of how long you spend in the shower, you can set a timer on your cellphone to alert you when your four minutes are up. (Keep your phone

out of the shower.) There are also locally made shower timers that measure the average water output from your shower and programme it into a timer, letting you know when you have exceeded your personal usage target.

FROM

My
GREEN
HOME

COURTESY OF THE GBCSA.

⁴⁴ Cape Water Solutions. 2018. *Showerheads*. Available at: <http://www.capewatersolutions.co.za/showerheads/>.



3.11 | Car washing



It is estimated a typical car wash can use up to 250 ℓ of water. Once used, this water often contains harmful abrasive chemicals from industrial cleaning products and ends up in stormwater drains.⁴⁵

Waterless car washing is becoming an option; look for Eco Wash, Durawash or Green Machine franchises or other car washes that use their or similar products and waterless technology. Many retailers also stock waterless products to clean your car should you wish to wash it yourself, but try to use products that are earthfriendly and will not pollute the water system.

OTHER SUGGESTIONS FOR USING LESS WATER WHEN WASHING YOUR CAR INCLUDE THE FOLLOWING:

- Use microfibre cloths, which collect the dirt and are also less likely to scratch your car.
- Divide your car into sections and start with the least dirty areas first. This will also make your cloths last longer.
- Consider using grey water from your shower or leave your car outside when it rains.

⁴⁵ Carzar. 2017. CT Drought: Car wash without water. Available at: <https://www.carzar.co.za/blog/ct-drought-car-wash-without-water>.



3.12 Waste minimisation and disposal

3.12.1 Reduce, reuse and repair



There are many practices you can adopt to reduce the amount of waste you generate at home. The principle of 'reduce, reuse and repair' is a useful guide for making a decision about whether you need something in the first place (reduce) or before throwing it out (reuse or repair). To illustrate this principle, two examples are given below.



Fast fashion

It has been suggested that the average person bought 60% more clothing in 2014 than they did in 2000 yet kept each item of clothing for half as long. It is also estimated that we recycle only about 1% of clothing.⁴⁶ Our consumption is projected to increase and with this the amount of wasted and unwanted clothes. To reduce our clothing impact consider mending or repairing clothes – there are always good seamstresses willing to do the job for you, or cobblers to resole a shoe. If you no longer want an item, consider donating it to a local charity.



Food waste

In South Africa we throw away about a third of the food we grow.⁴⁶ This is a waste of precious resources used to grow the food, such as water and nutrients. We also have many people in the country who are undernourished, and this food could be redistributed to feed those in need. To reduce wasted food write a shopping list before you head out the door, check what is in your fridge, consider using leftovers from the day before and read the storage instructions to extend the life of your fruit and vegetables.

⁴⁶ WWF South Africa. 2017. *Food Loss and Waste: Facts and futures: Taking steps towards a more sustainable food future.* Available at: http://awsassets.wwf.org.za/downloads/WWF_Food_Loss_and_Waste_WEB.pdf.

⁴⁷ Remy, N. et al. 2016. *Style That's Sustainable: A new fast-fashion formula.* McKinsey & Company. Available at: <https://www.mckinsey.com/~media/McKinsey/Business%20Functions/Sustainability/Our%20Insights/Style%20that%20sustainable%20A%20new%20fast%20fashion%20formula/Style-thats-sustainable-A-new-fast-fashion-formula-vF.fashx>.

What's all the fuss about single-use plastic?



While single-use plastic, such as a shopping bag or drinks bottle that we use only once, is very convenient, over half is used as packaging and thrown away a few minutes after use.

It is estimated that about 77% of the plastic that lands up on our beaches is packaging. Aside from being an eyesore, many of these plastics can not be recycled, especially if they become damaged by the sun or life grows on them. They can also be digested by birds and fish, with devastating consequences. We may even end up eating some of that plastic when eating fish.

The most problematic single-use plastics to avoid are takeaway trays and crockery and cutlery, straws, coffee cups, soft drinks and water bottles, sweat wrappers, carrier bags and earbuds.



If you live near the coast and would like to take part in beach cleanups, you could contact The Beach Co-op (<https://www.thebeachcoop.org/>) in the Western Cape or look out for local events during International Coastal Cleanup Day in September every year, when you will easily find a beach cleanup near you.

You can shop better to reduce your use of single-use plastics:

- Do not accept a straw, or if you need a straw, consider buying a metal, glass or bamboo alternative.
- Keep a reusable carrier bag in your bag or car so it is easy to find and use.
- Use a reusable coffee flask or water bottle. There are many designs and choices to fit your budget.
- If you do use plastic drinks bottles, please remember to recycle them. We have a good plastic bottle recycling scheme in South Africa.



Consider using zero-waste hair care products instead of shampoo that comes in plastic bottles. Packaged in a recyclable cardboard box, the Zero Bar shampoo bar is cruelty-free and is made using no water. Zero bars are locally made using locally sourced ingredients. They are kinder to your hair and the planet and, because they are highly concentrated, a little goes a long way. Find out more at zero.bar.co.za.



3.12.2 Composting food and garden waste



Composting your food and garden waste saves landfill space and reduces greenhouse gas emissions, while adding the compost to your pot plants or garden helps to create nutritious soil for healthy plants. In places like the Western Cape composting will become the norm when the province introduces a planned ban of all organic waste by 2027, with a 50% target set for 2022.⁴⁸ Here are three ways to compost your food and garden waste:

Worm farm

Food waste can also be broken down by special composting earthworms, the most common type used being red wrigglers.

A worm farm can be made from a variety of waste items, such as old tyres or bath tubs, or bought from garden centres or other retailers. The most common shop-bought version consists of at least three stackable containers. Organic waste is put into the top container. Once the worms have composted it, the container is moved to the middle position, and fresh organic waste is put into the top container. The top and middle container have holes that allow worms to access a fresh batch of organic waste once they have eaten and processed the old batch. The bottom container captures the liquid runoff or 'worm tea', and has a tap system similar to the Bokashi bin.

Worm tea can also be sprayed directly onto plants as a liquid feed, but must be diluted with water in a ratio of 1:10.



The compost made by worms (called vermicompost) is the most nutritionally rich of the three methods described, and can radically improve soil fertility. This is because earthworms actually multiply the amount of nutrients found in the food waste as it passes through their digestive tract, and present them in a form readily absorbable by plants.⁴⁹ For more information see <https://www.yuppiechef.com/spatula/how-to-farm-worms/>.

⁴⁸ GreenCape. 2017. *Food and Organic Waste Management: Why separation at source is beneficial for businesses*. Available at: <https://www.greencape.co.za/assets/Uploads/NF-1-Industry-Brief-GreenCape.pdf>.

⁴⁹ Murphy, M. 2010. *Beginner's Guide to Earthworm Farming*. Penguin Books: Johannesburg.



Bokashi bin

A Bokashi bin is a useful option for smaller homes or apartments where a compost heap is impossible.

Layers of food waste are alternated with a thin layer of Bokashi bran containing micro-organisms, which ferment the waste and speed up the composting process to between one and two weeks.

The bin itself has three main components: an outer bucket, a smaller inner bucket with holes at the bottom, and a tap for draining off the liquid waste.

This 'compost tea' can be sprayed directly onto plants as a liquid fertiliser, but must be diluted 1:100 with water. Once full, the waste can be dug into soil and covered with a layer of topsoil, or added to a compost heap.



When used correctly, a Bokashi bin will not smell and can be kept indoors. For more information see www.bokashishop.co.za.

Garden composter

There are various premade composters to suit your space, including enclosed ones that can be turned easily by hand.



Buying a large, ready-made bin from a garden centre can be expensive, but you can make your own at very low cost by reusing waste materials. A 1 m x 1 m x 1 m container is usually sufficient, but for a larger family or garden with more food or green waste two containers might be best. Kitchen scraps consisting of fruit and vegetables, tea bags, coffee grounds and eggshells can be composted, but avoid animal products and cooked food.⁵⁰ Garden waste from pruning plants, raking up fallen

leaves or mowing the lawn can be added to the compost heap. Large prunings or those from woody plants or branches will need to be cut up into smaller pieces before being added to the compost.

When the first container is full, leave the waste to break down while you fill up the second. One side of the container should be removable for easy access to the compost. Cover the top of the container to keep the compost from becoming too wet or dry, and to prevent rodents or other scavengers from finding their way in. Adding layers of dry material such as grass cuttings or torn-up newspapers in between the food waste will stop the heap from becoming too wet. Remember to turn the compost every month or so using a spade or pitchfork.

The compost is ready when it is dark and soil-like, a process that takes approximately three to six months depending on the season. For more information see <https://www.gardenandhome.co.za/gardening/how-tos/how-to-make-compost/>.

⁵⁰ The Gardener. 2018. *Composting*. Available at: <https://www.thegardener.co.za/composting-2/>.



If not added to the compost heap, grass cuttings can also be used as mulch around certain plants to keep the soil moist and to add nitrogen. Some branches could be used as tree stakes or to construct garden fences or screens. Garden waste can take between six months and two years to break down fully before it can be used as compost or fertiliser replacement.



What is the difference between biodegradables and compostables?

With heightened awareness on how packaging and plastic is polluting our environment, many alternatives are being proposed as a solution to this problem. However, the solution is not that simple, and the terms have been misused. Therefore, it is useful to understand the different terms and to ask questions of the person or company who is providing you with the alternative.

As a start, the terms 'biodegradable' and 'compostable' are similar, and mean that the product can be broken down by organisms naturally, such as bacteria, fungi and algae. However, there is a difference in the way they break down.

- **Compostables** – these break down into organic matter, carbon dioxide and water at a rate similar to other organic matter composting in the system. It is suggested that compostable products can take up to 180 days to break down in a commercial composting facility and may take longer in your home compost. In most instances, no toxins are released during the process.
- **Biodegradables** – these also break down into organic matter and carbon dioxide, but through the action of micro-organisms, bacteria and fungi. These products can still

take a long time to break down – it depends on the composting facility and the design of the product. Sometimes wax coatings or glues can be used to bind the material, which could result in toxins being released.

- **Bioplastics** – these are plastics made from plant or other biological material instead of fossil fuels. Examples include PLA made from cornstarch (which will not biodegrade if it lands up in the ocean) and PET, which is the same plastic used in soft drinks and water bottles and will also not biodegrade, but can be recycled.

For more information on this topic see <https://www.nationalgeographic.com/environment/2018/11/are-bioplastics-made-from-plants-better-for-environment-ocean-plastic/>.



3.12.3 Recycling household waste



Separating your household waste into recyclables and non-recyclables is an easy and impactful change to make. Buy or allocate a second bin, box or bag for your recyclables, and place it near your usual dustbin for convenience. Various dropoff points will have a slightly different list of what you can and cannot recycle. However, most places accept paper, cardboard, glass, aluminium cans and plastics. Where plastics are concerned, the ones that can be recycled usually have a polylogo – a number

in a triangle – stamped underneath the container. Numbers 1, 2 and 5 are the most commonly recycled.



Remember to wash out old food containers before putting them in the recycle bin to avoid bad odours and pests.



Also, try to get into the habit of buying products in containers that you know can be recycled. This will further reduce your waste going to landfill.

For a list of dropoff points in your area visit http://awsassets.wwf.org.za/downloads/recyclearea_2.pdf. If you move, check your new municipality's waste page for when and how your recycling will be collected, and what items it collects. Each municipality is different.

Case study:

Reducing waste through separation at home

At the start of the project the Ngewana family was sending all their waste to landfill. The family was challenged to take a critical look at their waste, which was initially a big mess and all in one bin. They realised that there was much that they could do and started with implementing a three-bin system, separating waste to landfill, dry recycling and organic waste. When the three-bin system was in place, it was easy to implement because the municipality

collected their recycling on the same day as their normal waste. They were simply required to place their recycling in a see-through bag, while waste was in the normal black bag. The main types of recyclable materials produced by the family were typical of a high-income home, with large amounts of packaging, including glass, plastic, tin, cardboard and paper.



They also implemented a counter-top bucket for the food scraps that would go to either the worm farm or compost heap. At the start of the process around 15 kg of waste was sent to landfill each week, but this was reduced, with around 68% being recycled, 13% used for composting or the worm farm, and only 19% sent to landfill.



3.12.4 Disposing of large household items



Before you throw out large items such as old appliances or furniture, consider whether the item can be fixed or refurbished for a new look. Repainting an old desk, fixing a broken washing machine or re-covering an old couch could prevent waste and save you money – and give you a certain feeling of creative satisfaction at the same time.

Advertise in the classifieds section of a newspaper or online on free websites. Or sell the item yourself at a local market or car-boot sale and enjoy the camaraderie of these public spaces. Alternatively, ask a junk collection company to remove and sell the item for you.



If you are still committed to getting rid of the item, remember that one person's trash is another person's treasure. Rather than dump it, try to sell it second-hand or give it away to a needy person or cause.

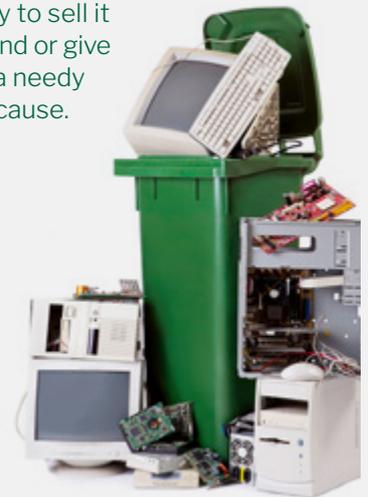
3.12.5 Disposing of electronic waste



Electronic waste such as old laptops, cellphones, TVs and fridges contain valuable components and metals that can be extracted and reused. It is estimated that South Africans generate about 300 000 tonnes of e-waste that is almost 6 kg per person.⁵¹ If you cannot repair the item or sell it, take it to an e-waste dropoff point rather than sending it to landfill. Besides your losing valuable resources, dumping the item could contaminate land and groundwater due to the toxic chemicals often present in electronic waste.

Many e-waste centres fix old computers and donate them to schools and other organisations that can benefit from more affordable technology.

Find your nearest dropoff point through the e-Waste Association of South Africa (eWASA) website, at www.ewasa.org.



We all have cellphones in the back of drawers or collecting dust in cupboards. Why not recycle your phone on Mobile Phone Recycling Day – 26 February each year?

By doing so, the precious metals in your phone can be reused, and raw mineral extraction and the impact of mining reduced.

⁵¹ ITWeb. 2018. SA Joins Mobile Phone Recycling Day Observation. ITWeb. 24 January. Available at: <https://www.itweb.co.za/content/KA3WwqdYNrwvrydZ>.



3.12.6 Minimising and disposing of hazardous waste



Besides e-waste, there are some items that should not go to landfill and need to be handled separately. Some of these include batteries, CFLs, motor oil, paint, chemical cleaning products and insecticides.

These items are considered hazardous as they are flammable, corrosive, toxic, explosive or harmful to the skin or respiratory system.

Several major supermarkets in South Africa offer a dropoff point for CFLs and batteries. Another option is to purchase rechargeable batteries, but only where it makes sense for example in cameras, children's toys or wireless game controllers.

The ROSE Foundation (www.rosefoundation.org.za) collects and recycles used motor oil.

Where chemical cleaning products and insecticides are concerned, there is no safe disposal method. Rather use versions that are non-toxic, organic and biodegradable.

Paint is another household toxic item than can pile up in cupboards or garages. Before you buy, consider trying test patches, or buying the smallest tin available to ensure you are happy with the colour. When you have chosen your colour, ask an expert at the hardware store how much you need, and the best way to apply the paint to ensure it lasts as long as possible. If you have leftover paint, consider donating it to your local school or charity.



Can liquid cartons be recycled in South Africa?

As of 2016 liquid cartons (commonly referred to as Tetra Pak) can now be recycled in South Africa through Mpac Recycling, and should be included in your paper and cardboard recycling.

The liquid carton is a composite packaging made of 73% paper board, 22% polyethylene plastic and 5% aluminium, and it is used to extend the shelf life of products without the need for preservatives or refrigeration. In the liquid carton recycling process the paper board is dissolved and used to make new paper board packaging, while the plastic and aluminium by-product can be used in products such as roofing and flooring.

Currently, only 16% of all liquid cartons are recycled in South Africa. To increase the recycling rate, consumers are therefore urged to rinse their cartons, flatten them to remove air, and reattach the lid so that they do not reflate. This allows for more recycling to be transported per vehicle, reducing the fossil fuel used and greenhouse gas emissions, and making it economically viable to recycle liquid cartons. Find out where to drop off your liquid cartons [here](#).



3.13 Household cleaning products

3.13.1 Avoiding hazardous products



Most household cleaning products contain ingredients that are toxic or hazardous to human and ecosystem health.

Avoid products containing ingredients with names that start or end in 'ammonia', 'ethanol', 'glycol', 'ethylene', 'phenol', 'chlorine', 'dioxane', 'hydroxide' or 'naphthalene'.

Unfortunately, these ingredients are not always on the label; if you are not sure, rather do not purchase the product. Also, avoid products containing phosphates. High levels of phosphates from conventional soaps, shampoos, laundry and dishwasher powder (as well as chemical fertiliser) are contributing to a rapid increase in algae blooming in South Africa's rivers and dams, reducing the amount of dissolved oxygen in the water and destroying species and their habitats.



3.13.2 Eight hazardous chemicals to avoid

Just because a product is sold in stores and has a recognisable brand name does not mean that it is safe. Unfortunately, there is very little legislation in place in South Africa to prevent companies from using dangerous chemicals in their products. The damage caused by these chemicals can also be hard to quantify as conventional studies are usually of a short-term nature and look at the effect of one chemical in isolation, rather than taking into account the effect of exposure to multiple chemicals day in and day out over time, which is the reality for most people.

Nonetheless, here is a list of the most well-known and common chemicals that have been proven to be hazardous to your health and to the environment:



1

Dioxins

Polychlorinated dibenzodioxins (PCDDs), or simply dioxins, are environmental pollutants linked to cancer, hormone disruption, liver toxicity, immune system damage and developmental problems in people and animals. Dioxins are produced during the manufacture of organochlorine, bleaching of paper, smelting of metal and burning of materials containing chlorine, such as polyvinyl chloride (PVC). Dioxins are found in the air and water, as well as in the fatty tissue of animals.

Rather choose unbleached paper and toilet paper, recycle or dump but do not burn your rubbish, and reduce your consumption of meat and dairy.

2

Phthalates

Phthalates are used in numerous products, including flooring, shower curtains, paints, furniture finishes and food containers, to name a few. These chemicals interfere with testosterone and estradiol, and are linked to male genital abnormalities and breast cancer.

Avoid anything with a synthetic fragrance, avoid vinyl products and rather store your food in non-plastic containers, eg glass or metal.

3

Perfluorinated chemicals (PFCs)

PFCs are found in the non-stick coating of pots and pans, in the additive that makes carpets and upholstery water- and stain-repellent, and also in food packaging with a plastic coating (eg fast-food boxes and pet food bags). The chemicals are linked to infertility in both men and women, as well as to thyroid issues.

4

Avoid non-stick items, rather go for stainless-steel cooking equipment, and choose PFC-free carpets and fabrics.

Triclosan

Triclosan is an antibacterial and antifungal agent found in many personal-care products, such as soaps, toothpastes and shaving creams. It is also found in mattresses, insulation and flooring that have been pretreated to prevent bacteria. The chemical is a hormone disruptor and affects thyroid functioning. Triclosan is also toxic to aquatic bacteria, inhibits photosynthesis and – even in low doses – has been found to disrupt hormones, growth and development in animal species.

Rather just use simple soap and warm water to clean yourself, and avoid pretreated products.



5

Formaldehyde

A known human carcinogen, formaldehyde is highly toxic to all animals. Originally used as a disinfectant and for preserving biological specimens, formaldehyde is most frequently produced by humans for resin-based construction materials (eg carpet glue) and through the combustion of organic compounds (eg vehicle exhaust emissions).

Instead, choose formaldehyde-free products.

6

Synthetic fragrances

Fragrance or perfume is used in a wide variety of products, from washing powders to air fresheners, soaps and sunscreens. It covers a range of harmful chemicals that are linked to cancer, hormone disruption and damage to reproductive health – even in small doses.

Rather open a window for better ventilation, or choose unscented products or those with natural scents (eg candles with essential oils).

7

2-Butoxyethanol

This chemical is found in window and multipurpose cleaners. It can cause a sore throat when inhaled, and at high levels can also contribute to narcosis, pulmonary edema, and severe liver and kidney damage.

Rather clean mirrors and windows with newspaper and diluted vinegar, or make your own multipurpose cleaner with baking soda, vinegar and essential oils. See the 'Recipes for home cleaning products' section.

8

Chlorine

Chlorine is found in scouring powders, toilet bowl cleaners, mildew removers, laundry whiteners, and household tap water. Chlorine is an acute respiratory irritant, and may be a serious thyroid disrupter. You can choose environmentally friendly versions of these products, or make your own using the recipes in the following section.

To reduce your exposure to chlorine through tap water, install filters on your kitchen sink and in the shower.

The good news is that there are several brands of locally made, non-toxic and biodegradable cleaning products.

These can be found in your local supermarket, health store, neighbourhood market and on websites such as Faithful to Nature, Green Stuff and Wellness Warehouse. Alternatively, you can make your own cleaning products using natural and effective ingredients such as lemon juice, vinegar and baking soda. See page 55 for home cleaning product recipes.





Recipes for home cleaning products



Here are a number of recipes for popular household cleaning products that you can make yourself and that will keep your home sparkling and fresh without damaging your health or the environment. You may already have most of the ingredients in your kitchen cupboard.

Many (but not all) home cleaning products contain vinegar. It is a remarkable ingredient that is able to break down grease, lift stains and remove odours. The strong smell evaporates when it dries. It can even be used to unstick scissors, remove candlewax, remove ink stains from clothes and water stains from wooden furniture, and unclog drains. There are many more cleaning uses of vinegar, just have a look online.



Note: Vinegar is powerful enough to remove the sealer on some countertops, eg marble, so double-check your counter type before you apply it. Always remember to dilute the vinegar.

Another popular ingredient is baking soda (also known as sodium bicarbonate or bicarb),

which is a powerful deodoriser, can remove stains and is also antibacterial.



Washing soda (also known as sodium carbonate or soda ash) is a stronger cleaning agent, and gloves should be worn when using it to avoid contact with your skin.

Essential oils can provide you with a lovely scent of your choice and some, such as tea tree oil, have antimicrobial properties that can protect against disease. There is also much to be said for the simple cleaning power of hot water and the right type of cloth or sponge!



All-purpose household cleaner

Mix one part vinegar to nine parts water in a spray bottle, shake and use. (Yes, it is that simple!)



Scrubbing paste (for tiles, ovens, pots, etc)

Rub baking soda on the surface with a damp sponge and rinse with water.



Window cleaner

Mix warm water with two tablespoons of lemon juice in a spray bottle. Spray on windows or other glass surfaces, then wipe with a cloth or chamois.





Drain cleaner

Pour half a cup of baking soda down your drain, then half a cup of white vinegar. Cover the drain and leave it for two hours, then rinse it by pouring boiling water down the drain.



Bleach replacement

Soak stained or yellowed clothes overnight in a bucket with 12 parts hot water mixed with one part vinegar. Wash as normal the next day.



Dishwasher powder

Many dishwashers are able to take a mixture of borax and washing soda (15 ml of each) in the dispenser drawer. Use the machine as normal.



Toilet cleaner

Pour $\frac{1}{4}$ cup of borax into the toilet bowl just before you go to sleep and leave overnight. Flush the toilet in the morning. For an even fresher smell add lemon juice to the bowl. You can also use a mixture of baking soda and vinegar instead of borax.



Laundry powder

Mix half a cup each of finely crushed washing soda, salt, borax and baking soda with one cup of finely grated pure soap, then store in an airtight container. One tablespoon is sufficient for a small load, two tablespoons for a full load. If you have a top-loader you will need to dissolve the powder in a jug of hot water before adding it. For a front-loader use just a little hot water to dissolve the powder, then add to the dispenser drawer as usual.

Are 'green' cleaning products as effective as mainstream chemical ones?



It depends on what you are cleaning, how long you are cleaning for, and the level of hygiene you want to achieve. The first few green cleaning products that came out might not have been as effective in cleaning as mainstream versions, but a decade or two later this is no longer true.

With innovation and product development there are now a number of local and imported green cleaning products that clean beautifully and are far better for your health and the environment than mainstream chemical ones.

If you want to remove dirt, mould, stains, food spills, drain blockages, etc, then green cleaning products will work perfectly well, especially if you attend to the problem immediately rather than leaving it to become worse. If you want to disinfect or sanitise something, studies have shown that, although undiluted natural ingredients such as vinegar do have some antimicrobial effect on Ecoli and salmonella, when diluted in a solution they are not effective at killing these bugs. You need to decide on the level of 'clean' that is appropriate and necessary for your home. Perhaps it is not necessary to be as sterile as a hospital. Too often we 'go for the big guns' on dirt when hot water and a sponge will do just as well.



3.14 Personal-care products



As with cleaning products, many personal-care products, such as soap, shampoo, deodorant, cosmetics and perfumes, contain hazardous ingredients, or microbeads in the case of toothpaste or face cleansers.

A list of the more common toxic ingredients include unnatural fragrances (such as phthalates), formaldehyde-releasing preservatives, sodium lauryl (ether) sulphate, mineral oil (a by-product of petroleum), mercury, fluoride, parabens, siloxanes, polyethylene glycol, dyes, triclosan and talc.⁵² Check the ingredients list before buying the product.



What are microbeads?

The South African government is seriously considering banning microbeads in cosmetics and toothpaste. So, how do you identify them, and not purchase them?

Microbeads are tiny plastic particles that are hardly visible to the eye. They are used for scrubbing or exfoliation.

When used they are flushed down our drains into the water system and can land up being digested by ocean life and into the sea food chain, which means we could also probably be eating microbeads when eating fish.

Over 500 microplastic ingredients have been recorded as widely used in cosmetics and personal-care products globally.

A detailed list of these can be found [here](#).

As the list can be quite daunting, as a start try to avoid products containing the most problematic ingredients, listed below:

- Acrylates copolymer
- Acrylates crosspolymer
- Butylene
- Carbomer
- Dimethicone
- Ethylene
- Methacrylate copolymer
- Methacrylate crosspolymer
- Methyl methacrylate copolymer
- Methyl methacrylate crosspolymer
- Nylon
- Polyacrylamide
- Polyacrylate
- Polypropylene
- Polyurethane
- Polyvinyl
- Propylene copolymer or polypropylene
- Polyvinylpyrrolidone (PVP)
- Styrene copolymer
- Tetrafluoroethylene
- Vinyl acetate (VA) copolymer
- Vinylpyrrolidone (VP) copolymer

⁵² More information on these ingredients is available at: <https://aromawealth.com/12-toxic-ingredients-in-your-cosmetics-and-personal-care-products/>.



3.15 | Pest control

3.15.1 Controlling household pests



Using toxic chemicals and poisons in your home to control pests can be harmful to human and pet health if ingested, and creates hazardous waste that is impossible to dispose of safely.

Pests can be controlled in an eco-friendly manner as follows:

- Avoid infestation by cleaning dishes and countertops after every meal, sealing up potential entry points, emptying your dustbin regularly and ensuring that fresh produce is not left out on the countertop too long.
- Spray cockroach hideouts with a mixture of equal parts tea tree oil, rosemary oil and citronella oil, or place catnip strategically.
- Get rid of flies by placing about three tablespoons of dried cloves in a bowl and sprinkling them with

citronella or a combination of peppermint oil, clove oil and lavender oil.

- Mosquitoes are repelled by burning citronella, lemongrass, tea tree oil, peppermint oil or lavender oil. To prevent fishmoths, soak cotton wool balls with citronella, lavender, cedarwood or peppermint oil and place these in cupboards and drawers, replacing them every few weeks.
- Drops of peppermint oil on counter tops, walls and skirting boards will keep ants away.

For treating pets that have fleas, it is useful to understand the flea's breeding cycle, as this helps with control. With patience, it is possible to break the flea cycle in two to three months.

Some useful natural tips for managing fleas include the following:

- Keep carpets, rugs and soft furnishings clean and hoovered regularly.
- Comb your pet with a flea comb.
- Clean your pets bedding and laundry.
- Use spray or powder repellents containing garlic or khakibos.

Additional natural pet care advice and tips can be found [here](#).

More information on natural pest control can be found [here](#).

If you have mice or bird lice infestations, call a professional to assess your situation. Many pest control companies these days use eco-friendly products – check if they have these available.



3.15.2 Controlling garden pests



Chemical-based pesticides, herbicides and insecticides are poisons that kill indiscriminately. This means that beneficial creatures are also removed from your garden's ecosystem, such as bees, which are essential for pollination, and birds, which eat pesky insects.

The poisons eventually find their way into water sources, destroying aquatic life and making the treatment of drinking water even more resource-intensive.

The first eco-friendly step in pest control in your garden is to ensure healthy soil. Healthy soil makes for strong and healthy plants, which are more resistant to pests and disease. Composting your food and garden waste and adding it to your garden helps to increase soil fertility. The second step is to use companion planting techniques, where plants such as marigolds are planted close to herbs and vegetables to repel pests. Companion planting can also be used to attract beneficial predators to your garden. These two steps can go a long way in reducing damage from pests by supporting a self-regulating ecosystem. If, however, pests still manage to gain a foothold, try natural pest control techniques. If all else fails, ask your local garden centre for advice on biological and organic controls.

Encouraging wildlife into your garden can also help to control pests from eating your plants. For example, growing a patch of nettles will attract aphids, which ladybirds and lacewings will feed on. If you have the space, create a small pond – even a very small one – to encourage frogs (who will eat slugs) and bats (who eat mosquitos). Birds also eat slugs, snails and other grubs – you could create a wild patch with grass seeds to attract birds or grow flowers that contain nectar.⁵³



Are store-bought insecticides safe?

Just because something is bought in a store does not mean it is safe. Unfortunately, there is very little in the way of standards, legislation or enforcement surrounding the use of toxic chemicals, particularly in non-food applications.

Most store-bought chemical insecticides are indiscriminate killers, destroying beneficial insects as well as pests; they also pollute soil and water, and handling them can be dangerous to our health.

A new class of insecticides used on soy and corn seeds called neonicotinoids have been shown to be partly responsible, alongside food and habitat loss, for the worldwide decline in bees – necessary for pollination of food crops and other plants.

There are many natural insecticides that can be made at home and are safer for human and ecosystem health. Neem oil is an effective natural insecticide and fungicide that can biodegrade and is non-toxic for most other wildlife. It is available at most garden centres, and spraying it as directed on the stems and leaves of plants discourages insects from eating them. Keep in mind, however, that any substance designed to kill something should be used with caution, even if it is eco-friendly.

⁵³ Bradbury, K. *Natural Pest Control for Your Garden*. Available at: <https://www.growveg.co.za/guides/natural-pest-control-for-your-garden/>.



3.16 Water-wise gardening and landscaping

3.16.1 Indigenous and water-wise plants



Growing indigenous plants is a great way to attract local biodiversity to your garden. Indigenous plants also tend to use an amount of water that can be easily sustained by the local environment. For example, fynbos indigenous to the Western Cape is by its nature water-wise, so is suitable for the drier climate.

Exotic plants (such as pine and gum trees) tend to require copious amounts of water and can also be invasive, destroying native species by encroaching on their habitat or changing the soil type. This is why it is crucial to know which plant species are invasive aliens in your region and remove them before replacing them with indigenous varieties.



The *Guide to biodiversity in your garden*, available at www.pamgolding.co.za, is a useful resource for home gardeners and is supported by Nedbank, Pam Golding Properties and the Endangered Wildlife Trust.

The guide explains biodiversity gardening and provides reason why protection and encouraging of biodiversity is of importance. It also gives helpful advice on how to attract biodiversity to your garden, as well as valuable tips on organic vegetable gardening.

Find out which plants are invasive alien species [here](#).

Are alien plants really that bad for my garden?

Once again, it depends. An alien plant is one that is not indigenous to the area but originates from another region or country. Some alien plants, such as oak trees or fruit trees, are very useful to humans and are not harmful.

Alien plants are mainly a problem when they are invasive, ie do not have any natural enemies and spread uncontrolled, as in the case of black or silver wattle, pines, Port Jackson and eucalyptus trees. They tend to use significantly more water than indigenous varieties, drying up water sources and reducing runoff by up to 30%.



They furthermore push out indigenous vegetation such as fynbos, as well as the insects and animals that depend on it. When there is a fire, flames of alien plants burn much hotter and higher than indigenous plants and there is greater devastation. Find out the names of trees and plants in your garden, and check whether they are indigenous or alien, and whether or not they are invasive. Remove invasive aliens and replace them with water-wise, indigenous varieties. This will help to conserve water resources and encourage biodiversity to return to your garden.

3.16.2 Lawns

®



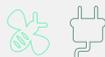
Lawns are water-hungry spaces that need regular maintenance and are costly in terms of energy, money and time. Consider replacing your kikuyu lawn with indigenous and water-wise buffalo grass or fynkweek (couch grass).

If local water restrictions allow you to water your lawn, it is best to water in the early morning hours or in the evening when temperatures are lower to minimise water

loss through evaporation. To feed your lawn use organic compost rather than chemical fertilisers that pollute water sources and are energy-intensive to produce. Even better, replace your lawn altogether with low-lying indigenous vegetation or meadow-style grasses, which are just as aesthetically pleasing and support biodiversity while requiring far less maintenance. Meadows help to keep the feeling of openness and provide an inviting play space for children and pets.



3.16.3 Vegetable gardening



Growing your own herbs, fruit and vegetables can be a very satisfying hobby. It also provides other significant benefits, such as saving money; reducing carbon emissions related to artificial fertilisers, pesticides and food transport; and of course improving access to healthy food.



Food gardens can be tailored to suit virtually any living situation: you do not need to have your own piece of ground or even much space. Fresh produce can be grown in containers on a balcony or rooftop. Vertical gardens, which make use of trellises, brackets or shelves with rows of pots, are another space-saving option. If none of these suit you, consider renting a space in an allotment garden nearby, and enjoy the community aspect of growing food alongside others.



Pests can be a problem when growing vegetables. See the handy tips in the section 'Controlling garden pests' on page 62.



If you grow more than you need, consider sharing your surplus with neighbours and friends, or donate it to a charity. You could also use a cellphone app to connect with others to share your produce, such as Food for Us or Mapha Food Share.



3.16.4 Irrigation and watering



Watering your garden with a hose or irrigation system connected to the water mains uses far more potable water than necessary, and is restricted in certain parts of the country. Reusing potable water or capturing rain water saves the energy required to treat water to drinking quality and pump it to your home. Also, it avoids water being wasted through leaks in the water supply system.

Using grey water or harvesting rainwater is therefore one way in which you can reduce your usage of potable water, while still giving your garden the hydration it needs. Other ways of reducing usage of potable water include the following:

Drip irrigation system



The only part of a plant that needs water is the roots, and any water left on stems, leaves and flowers simply evaporates. Unlike a traditional irrigation system, which wastes water by spraying everything within a certain radius, a drip irrigation system waters plants at the soil level just above the roots, or the roots directly. A medium to large garden would benefit from a piped system, which could be installed by professionals or purchased from a garden centre. Those with a small garden could skip pipes and instead reuse plastic water bottles with holes punched in the sides and bottom, buried next to the plant's roots with the bottle's neck left exposed. The plant can then be watered by hand or the water hosed directly into the bottle, with no waste of water due to evaporation.

Rainwater harvesting



Capturing rainwater off your roof (or through permeable paving – see section on 'Outdoor hard surfaces' on page 67) is another way to save potable water. The rainwater is directed into a tank, which can be placed above ground, out of sight or buried. The optimum tank size depends on the area of the roof catchment area, and can be as small as 260 ℓ and as large as 27 000 ℓ for large properties.⁵⁴ Harvested rainwater can be used to flush toilets or water vegetable gardens, plant beds and lawns. Again, there are several reputable local companies who can install rainwater harvesting systems, or you could try to install one yourself.

⁵⁴ Water Rhapsody. 2013. Website. Available at: <http://www.savingwater.co.za/2011/06/01/09/harvest-rainwater-and-use-it-in-the-home/>.



Grey-water system

(R)(R)(R)(R)(R)

Grey water is water that has been used in one or two applications but is still of sufficient quality to be used again, usually for toilet flushing or watering plants. For example, water from your hand basins, washing machine, bath or shower can be redirected to your toilet or to your lawn or fruit trees instead of being wasted down the drain.

Grey-water systems can be installed by professionals or you could install one yourself, and prices vary according to the size, positioning and complexity of the system and can cost between R12 000 to R20 000.⁵⁵



Local suppliers have reported a payoff period of three years as a result of reduced water and sewage bills.⁵⁶ If you are using grey water for your garden, remember to use non-toxic, biodegradable soap products (see 'Cleaning products' section on page 55) or you could damage your plants and contaminate local water sources. It is important to use the grey water almost immediately or to filter and treat it correctly, as it is illegal to store grey water.⁵⁷ In warm temperatures bacteria breed and produce methane and hydrogen sulphide, which can smell.

3.16.5 Outdoor hard surfaces

(R)



Overuse of hard surfaces such as concrete and asphalt (tar) in urban and suburban areas means that stormwater is prevented from filtering through the soil and recharging underground water sources, called aquifers. This results in large volumes of water (often polluted) being channelled into stormwater systems, and eventually into rivers and oceans.

Instead of laying concrete or solid brick pavers for your outdoor entertainment area, use permeable options, such as gravel, bark chips or raised wooden decking that allows water to pass between the slats.



Permeable brick pavers are also an option, and are particularly useful for high-traffic areas such as driveways and parking areas. They can even be used in conjunction with a built-in rainwater harvesting system that collects the runoff from underneath the pavers.

To prevent flooding clean your drains and gutters before the rainy season by freeing them of obstructions, such as litter and leaves.

⁵⁵ Property24. 2018. *20 Need-to-knows Before Spending Money on a Grey Water System*. Available at: <https://www.property24.com/articles/20-need-to-knows-before-spending-money-on-a-grey-water-system/27100>.

⁵⁶ Grey Water Systems. 2013. Website. Available at: <http://www.greywater.co.za/costs.htm>.

⁵⁷ Cape Water Solutions. 2019. *Grey Water Systems: Rules and regulations*. Available at: <https://capewatersolutions.wordpress.com/grey-water-systems/rules-and-regulations-of-grey-water/>



3.17 | Swimming pool

3.17.1 Water-neutral and natural pools

RRRRR



Given our country's water scarcity, pools are a luxury and can be water wasters. A small pool of about 4 m x 3 m can lose between 518 to 2 600 litres per week, and a large pool between 2 166 to 10 833 litres per week.⁵⁸

Therefore, before building one, decide if you really need one – are there local pools nearby, or do you live near the sea? If you do desire or have a pool, consider building a natural pool.

South Africa has approximately 650 000 swimming pools containing 32,5 billion litres of our country's scarce freshwater. In addition to pools losing much of their water to evaporation, a great deal of energy is required to clean swimming pools. Also, the chemicals or salts used to keep the water clear are energy-intensive to produce and can pollute aquatic ecosystems.



2166 ℓ - 10 833 ℓ water lost through evaporation



518 ℓ - 2 600 ℓ WATER LOST THROUGH EVAPORATION



⁵⁸ Rand Water. *Sustainable Swimming*. Available at: http://www.waterwise.co.za/export/sites/water-wise/gardening/Swimming_pools_ponds_and_water_features/Downloads/Sustainable_Swimming_Rev_5_xFINALx_SG_article.pdf.



Natural pools use ecosystems to purify and clean pool water, eliminating the need for chemicals and making the water more pleasant to swim in. Water is pumped from the swimming area to a manmade wetland, where waterside plants act as filters to remove and dissolve nutrients in the water before it is returned to the deeper swimming area. The filtration zone can form part of the pool or be situated elsewhere in the garden, and a wide range of attractive designs can be accommodated. The water in the pool is environmentally friendly, and is safe to use for your garden if required, as it does not contain salt or chemicals.



Some existing swimming pools can be retrofitted to operate as natural pools. However, it can be difficult to get the right ecosystem balance to keep the water clear. Consulting a natural-pool specialist would be better than trying to do this yourself. Further information on how much rainwater needs to be stored for differently sized natural pools is available [here](#).



Is a natural pool
hygienic enough
to swim in?

When one hears that a natural pool does not make use of any chemicals to clean the water, the question that often follows is: Can it be safe to swim in? The answer is yes.

Natural swimming pools mimic natural processes to remove compounds that could fuel the growth of harmful pathogens and algae.

This is how freshwater is cleaned in nature, and natural swimming pools simply mimic this process.

We have become used to chemical water treatment since urbanisation brought about water-borne diseases – a result of human waste contaminating water supplies. The chlorine used to clean conventional pool (and drinking) water can not be thought of as safe either. It is a skin and respiratory irritant and may also be a thyroid disrupter, and degrades soil and aquatic ecosystems. The human race has survived for centuries on freshwater resources provided in nature, so there is nothing to fear about a well-maintained natural swimming pool – even if the water is not the bright blue colour you may have become accustomed to.



3.17.2 Swimming pool pumps

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Pool pumps and filtering systems can contribute up to 11% of a household's electricity consumption. However, you can reduce this electricity use and the costs by a significant 70% to 90% just by choosing a variable-speed (or multispeed) pool pump over a fixed-speed pool pump.⁵⁹

A variable-speed pump can be adjusted to run at different speeds depending on the function it is performing, for example at low speed when filtering water, or at medium speed when used with the pool cleaner.

The following tips can help you save electricity when maintaining your pool:

- If your pool pump and filtering system is currently running continuously for more than six hours a day, rather adjust it to operate on two cycles a day totalling six hours. If this is insufficient, try increasing the filtering time by increments of 30 minutes until the water remains clear and chemically balanced.
- During winter, reduce your pool pump time to around three hours a day, or consider turning it off for a few days at a time.
- Set your pool pump to run outside the period of 17:00 to 21:00 to reduce your household's contribution to peak energy demand.
- Clean your pool filters regularly, but make sure you do not dispose of your backwashed water into the stormwater system.

Case study:

Saving electricity by adjusting the pool pump timer



Whoever told you to run the pump eight or 12 hours a day does not pay your electricity bill. With such long runtimes, your pool could be one of your biggest power users, as the Ngewana family found out. Research shows that four to six hours is enough in summer for most pools, and just two to three hours in winter. Zweli Ngewana usually had his timer set to 10,5 hours. He brought that all the way down to three hours for winter and will increase it to four or five in warmer weather. Even if he had not switched to a more efficient pump, reducing hours by making two seasonal timer adjustments would save him R2 500 in electricity over the following year.

A pool cover further reduces the number of hours needed, especially if it blocks sunlight. Every pool is different, so monitor it and adjust the hours as needed if the water does not stay clear.

FROM



COURTESY OF THE GBCSA.

⁵⁹ 2015. Variable speed swimming pool pump reviews. Available at: <http://www.swimmingpoolsteve.com/pages/pump-reviews.html>.



3.17.3 Swimming pool covers

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One of the greatest causes of water loss from a swimming pool is evaporation, when the sun warms the surface of the water.

Covering your pool or part of it when it is not in use can reduce the amount of water lost to evaporation by up to 80%, and cut the amount of electricity required for cleaning and heating. Those with heated pools can reduce the cost of energy required to heat the pool by up to 80% by covering it when it is not in use.⁶⁰ Impervious pool covers prevent heated surface water from escaping into the atmosphere as



water vapour, and help to keep pools clean by acting as a barrier against dirt and leaves. This means that the pool does not have to be topped up as often, fewer chemicals can be used, and the filter does not need to run as often or as long. All you really need is a sheet of floating plastic to cover a pool, but for safety and aesthetic reasons it is worth having a cover professionally fitted. There are a number of different designs and materials on the market, but the most important requirement is that it does not allow water vapour to escape. A pool net will therefore not suffice for this purpose.

3.17.4 Reusing swimming pool backwashed water

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Swimming pools with granular or sand filters need to be backwashed regularly to flush the dirt, bacteria, chemicals and other pollutants from the filter.

These substances are harmful to aquatic ecosystems and human health. It is now a legal requirement that discarded backwashed water is disposed of into the sewage system for further treatment, instead of into stormwater systems that lead directly to rivers and the sea.



Many pools are not set up to cater for the disposal of backwashed water into the sewer, and arrangements need to be made to allow for this in compliance with the law. As an alternative, systems are available in South Africa that allow for backwashed water to be stored and treated on the premises so that it can be reused for non-potable uses. This saves fresh water and reduces pressure on overburdened sewage systems.

⁶⁰ Pool Covers SA. 2019. *The Advantages of Swimming Pool Covers*. Available at: <https://sa-poolcovers.co.za>.

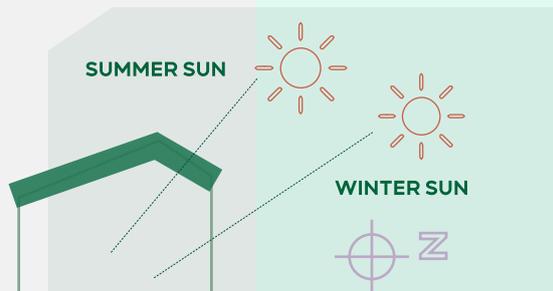


3.18 | Home renovations

3.18.1 Orientation



When planning a new home or the addition of a new room, try to ensure that it is orientated to face north or has some north-facing windows. In the southern hemisphere north-facing buildings enjoy more hours of natural light and are warmer than buildings orientated otherwise.



This is called 'passive solar design', and can reduce the need for artificial lighting and heating at no additional cost. Such a simple shift can save you a considerable amount of energy and money in the long term.

FIND MORE INFORMATION ON PASSIVE SOLAR DESIGN [HERE](#).

3.18.2 Ventilation



A well-ventilated home is essential for health and comfort, especially if gas is used for heating and cooking. Air conditioners and fans are often used to improve ventilation, but they are energy-intensive and should only be a last resort. When building or renovating there are several things you can do to ensure good ventilation, depending on the design.

Demolishing a passage wall to create an open-plan home allows for better air movement as well as increases natural light.



Installing windows on two sides of a room (even if one set of windows is small and set high up in the wall for privacy) allows for cross-ventilation. There is also the whirlybird, which pipes fresh air into your home using the power of the wind. It is installed on your roof and is connected to the room below through a simple duct. The vents of the whirlybird can be opened, closed or set anywhere in between by hand.



3.18.3 Natural light

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Designing your home to take advantage of natural light not only saves you a considerable amount of energy, but helps to create a space that people enjoy being in. As mentioned under the 'Lighting' section on page 28, natural light actually improves people's health, wellbeing and productivity.

The optimum design for natural light would include a portfolio of interventions, including a north-facing orientation, large windows or glassed areas, and skylights and/or comparatively cheaper sun pipes or daylight tubes for darker rooms or passageways (see 'Natural light' in the 'Lighting' section on page 28).



Open-plan homes also enjoy far more natural light and are more conducive to socialising with friends and family than those where the living areas are separated.

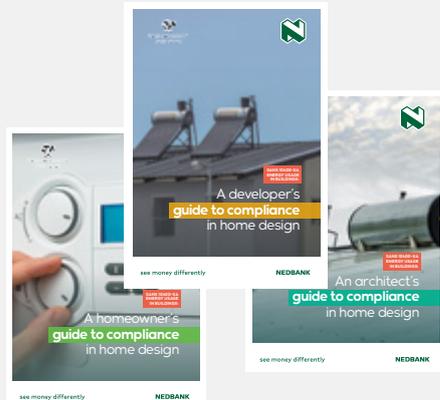
Knocking out unnecessary interior walls – if structurally possible – is relatively inexpensive compared with other building alterations, and could vastly improve the look of your home as well as your lifestyle.

Other tips for making a room look lighter include painting walls a lighter colour or putting up mirrors to reflect light into a room.

3.19.4 Energy-efficient design



To promote more sustainable buildings in South Africa the amended National Building Regulations require that new buildings, additions and extensions comply with the SANS 10400-XA energy efficiency regulations.⁶¹ These regulations have implications for water heating, pipe insulation, roofs and ceilings, exterior walls, floor insulation (where there is underfloor heating), and shading over windows and glass doors. Homeowners are responsible for ensuring compliance with the new regulations, and can appoint a suitably trained professional to ensure that their building project is compliant and minimises energy wastage.



Find more information on the SANS 10400-XA regulations and how they affect homeowners [here](#).

⁶¹ If the existing building is unaffected by an addition, only the addition will need to comply with the regulations. Renovations will need to comply with the regulations if they require planning approval from a local authority. Garages and storage areas that are not within the building envelope and do not form part of the habitable area do not need to comply with the SANS 10400-XA regulations.



3.18.5 Sustainable building materials

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There are numerous options when it comes to sustainable building materials: adobe brick, bamboo, hemp, cork, clay, straw bale, sand bag, stone and wood are just some of the options that are usually more energy- and water-efficient and pollute less than cement blocks and other more conventional materials, particularly if sourced locally.



Innovation around how conventional materials are used has also resulted in increased sustainability. For example, not only does it take half the time to construct buildings using steel frames rather than brick and mortar, but steel frames are much stronger and provide vastly better insulation, at the same time producing less waste and lower carbon emissions, and reducing foundation requirements.⁶²

If you are interested in using alternative, sustainable building products, look out for suppliers certified by Agrément SA, an independent organisation that focuses on the certification of non-standard or innovative building products, using assessments to verify whether the product is fit for purpose. Their certificates comply with the National Building Regulations and are accepted by the National Home Builders Registration Council (NHBC). For more information visit www.agrement.co.za.

If you can not find a sustainable option, try to reuse existing materials such as second-hand bricks, wood, windows and fittings rather than buying new. This is a form of recycling that helps to avoid extra pressure on already overexploited natural resources. Second-hand materials are

also much cheaper, and can be sourced through classified adverts online or from building and demolition companies. If virgin materials must be used, choose locally made ones with low embodied energy – those that do not require much energy to extract, manufacture, package and transport.

Some materials with high embodied energy, such as cement and concrete, can be used more efficiently when industrial waste or recycled aggregate is added to the mix.

Besides choosing local products and those with low embodied energy, bear in mind the material's durability and ability for reuse. Although steel, for example, has high embodied energy, it is a durable material and will not need to be replaced nearly as often as timber – so the total embodied energy might be higher for wood products over time. However, mining the minerals required for steel is far more ecologically destructive than felling timber.

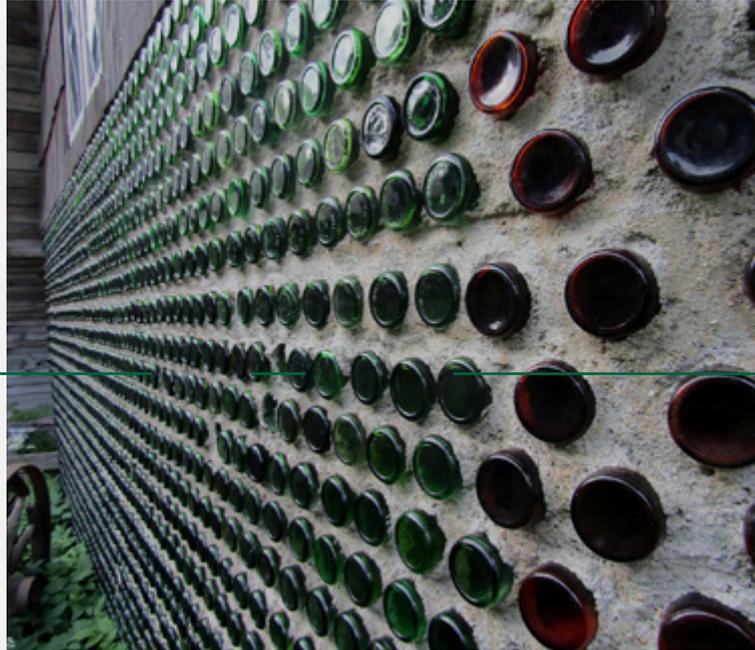
⁶² Green Cape. No date. *A Catalogue of Green Building Materials*. Available at: <http://greencape.co.za/assets/Green-Building-Material-Catalogue-Final.pdf>.



Nevertheless, first look for sustainable materials. If there are not any, look for second-hand materials. If there are none, choose materials that are local, durable, reusable and have low embodied energy. Finally, remember to sell or donate your own used building materials that you do not need or send them to an appropriate recycler.

Clearly, choosing the most sustainable material is not an exact science.

There will be compromises, and much depends on the intended use of the material.



Are sustainable building materials as strong as conventional materials?

Yes and no. The definition of 'sustainable building material' is quite broad, and includes characteristics such as being recyclable, locally sourced and made, thermally efficient, and healthy for building occupants; requiring less energy and water to manufacture; and producing minimal waste, harmful emissions and pollution during manufacture.

Sustainable building materials therefore include recycled bricks, steel and aluminium; wood; and new materials such as cross-laminated timbers, mycelium (which is made of the root structure of fungi and can be made into bricks and other shapes), and ferrock (a stronger alternative to concrete made of steel dust, which actually absorbs carbon dioxide

during its curing phase). Hempcrete is another concrete alternative made from hemp fibres bound with lime, and creates structures that are both strong and light, saving on energy from transport and making use of a quick-growing, renewable resource.

It is not helpful to label sustainable materials as 'weak' or 'strong', as there are many options available with different properties, and not all of them need to bear heavy loads. Rather compare materials that are appropriate for a specific use, and check for those certified by Agrément SA.



3.18.6 Paints

®



Most paints are made from the by-products of oil, a finite resource. Global oil production is said to have peaked and is now in decline due to decreasing reserves.⁶³

Both oil-based and water-based paints also emit volatile organic compounds (VOCs) throughout the paint's lifetime, which affect human health negatively. Some paints also contain lead, which is highly toxic. Cleaning paintbrushes, rollers and paint trays of oil-based paint requires chemical solvents that pollute water sources – especially when they are poured into stormwater drains.

Water-based paints contain fewer petroleum products and toxic ingredients, but still cause pollution. While water-based paints with low VOCs are available from most hardware stores and are preferable to solvent-based options, they still partly rely on declining oil resources.



A better option is offered by paints and varnishes made from plant oils, and natural gum-based turpentine can be used to clean the brushes. They emit zero VOCs, do not pollute, and are available in many shades from independent local producers.⁶⁴

Before painting, ensure the surface is well-prepared; the tin should contain the instructions. With the correct preparation of the surface, the paint will last a long time.



For more information on green building certification application to both commercial and residential projects in South Africa visit the Green Building Council South Africa's (GBCSA's) website at www.gbcsa.org.za.

How do you dispose of VOCs?

IF YOU DO HAVE LEFTOVER PAINT, REMEMBER THAT **THIS CAN NOT BE DISPOSED OF DOWN THE SINK OR DRAIN. NEITHER CAN PAINT BE MIXED WITH GENERAL LANDFILL WASTE**, AS IT WILL FIND ITS WAY INTO WATERWAYS. DONATE LEFTOVER PAINT TO SCHOOLS OR CHARITIES. CONTACT YOUR LOCAL MUNICIPALITY TO FIND OUT IF ANY PROGRAMMES ARE IN PLACE TO HANDLE PAINT WASTE. RESEARCH INDEPENDENT COMPANIES THAT OFFER HAZARDOUS WASTE DISPOSAL.



⁶³ International Energy Agency, 2008. *2008 World Energy Outlook*. Available at: <http://www.worldenergyoutlook.org/media/weowebsite/2008-1994/weo2008.pdf>.

⁶⁴ Pro Nature Paints. 2013. Available: <http://pronature.co.za/>.



3.19 | The importance of buying local



When choosing building materials, fittings and appliances for your home, try to buy items made in South Africa or, even better, in your own province.

Buying local has a number of important benefits: carbon emissions are often lower because the item (and its components) does not have to be transported as far; local businesses are supported, which helps to generate employment; and wealth is kept in local communities

rather than sent away to a distant country, where a multinational company's head office may be located. Buying local also encourages entrepreneurship in South Africa and the manufacture of goods that are uniquely designed to suit local conditions. From a social-

sustainability perspective, it is also easier to monitor working conditions for local employees than those in a foreign country.

Unfortunately buying local does not always mean that the item is cheaper, but the benefits for the greater good may be well worth the extra rands.



Do sustainable options always cost more than conventional ones?

No, this is not always true, as it depends on the intervention and the time frame you are considering. Some sustainable options cost more upfront, but help you save money in the long term. A solar water heater is a good example. It costs more upfront than an electric geyser, but after a few years it will have paid itself off in electricity savings, and after that the sun heats your water for free. So, in the short term conventional options may appear more cost-effective, but over the long term sustainable options are often cheaper.

Society also needs to broaden its definition of 'cost' to include externalities such as damage to social welfare and the environment. Just because something may be cheaper in the short term, it does not mean there are not costs elsewhere.

For example, you may pay less at the till for solvent-based paints, but you could face medical bills later due to respiratory issues, and pay higher water bills due to the municipal cost of cleaning and purifying paint-polluted water. In the long run the conventional choice can in fact be much more expensive than the sustainable one.

Green rating for South African residential developments

If you are building a residential development, single home or have an existing home, you can now ensure that it is efficient by getting it certified using the Excellence in Design for Greater Efficiencies (EDGE) tool.

Launched in 2017 by the GBCSA in partnership with the International Finance Corporation (IFC), EDGE is an affordable, fast and user-friendly online platform for rating green residential building supported by a network of EDGE Experts and EDGE Auditors around the country.

EDGE-certified homes cost less to run by saving resources, and certification adds value to your home by showing potential buyers that it is efficiently designed. It aims to reduce the embodied energy of construction materials and shrink energy and water consumption.

To achieve the EDGE standard a home must achieve at least a 20% saving in:

- energy embodied in construction materials;
- predicted energy consumption in operation; and
- predicted water consumption in operation.

To get an EDGE certification for your new home simply:

- create a user profile and design your project using the free EDGE online software;
- register your project for certification and pay the fee to GBCSA;
- appoint an EDGE Expert to ensure compliance with EDGE requirements;
- contract an independent EDGE Auditor to perform the Audit and submit the application to the GBCSA;
- pass the EDGE Review conducted by the GBCSA;
- receive an EDGE certificate for your project from GBCSA.

EDGE provides a common benchmark and understanding among all parties involved in your new build, ensuring that your home is built to green standards. For more information visit www.gbcsa.org.za as well as the GBCSA My Smart Home platform www.smarthome.org.za



Invest in your home's future value with Nedbank



Why not improve the sustainability of your home for you and your family, and increase its value at the same time? Homeowners often want to change or improve something in their home. Perhaps after reading this guide you would want to install a solar geyser or heat pump, improve your home's insulation or convert your garden to a more water-wise investment.

If money is the only thing holding you back, you could secure the necessary funds in the following ways:



- Existing Nedbank Home Loan clients may be able to
 - access available funds through NedRevolve; or
 - apply for a readvance or a further loan based on your home's value.
- The Nedbank Money app enables you to transfer any available funds in your home loan to your Nedbank savings or current account. You can even apply for a readvance or further loan using the app.
- For enquiries relating to NedRevolve, readvance or further loans simply call us on 0860 555 111.
- If you invest wisely in improving your home today, it will reward you in terms of future value. Therefore, you may want to consider applying for a personal loan.

FOR MORE INFORMATION ON A NEDBANK PERSONAL LOAN JUST DIAL *120*5363# AND A CONSULTANT WILL CALL YOU BACK, OR VISIT YOUR NEAREST NEDBANK BRANCH.



Glossary

Alien invasive species

Species of plants that are not native to the area and that have the potential to out-compete native species and alter indigenous ecosystems.

Allotment garden

A parcel of a larger plot of land that is rented to individuals or families for growing fruit and vegetables.

Aquifers

Permeable rock that can contain or transmit groundwater.

Biodegradable

Capable of being decomposed by bacteria or other living organisms.

CFLs

Compact fluorescent light bulbs that use 80% less electricity and last 10 times longer than incandescent bulbs.

Cistern

A tank situated above a toilet bowl and that is used to store the water used for flushing the toilet.

Closed fireplace

A fireplace with a door (or doors) attached to the front to prevent excess heat loss.

Collector plate

Rectangular plate with a glass surface that transfers heat from the sun to water in a solar water-heating system.

Condenser

A series of thin tubes on the back of a refrigerator that release heat extracted from the refrigerator into the room.

Drip irrigation

A system of irrigation that waters plants at the soil level just above the roots or delivers water to the roots directly.

Electric geyser

A water-heating system that uses heat derived from electricity.

Embodied energy

The total energy required to extract, manufacture, package and transport an item.

Energy carrier

A form of energy input required to perform a function, for example using electricity to power a fridge or petrol to power a lawnmower.

Geyser blanket

A layer of insulation customised to fit around a geyser to prevent the loss of heat.

Greenhouse gas emissions

Atmospheric gases that contribute to global warming or climate change, including carbon dioxide (CO₂), methane (CH₄), nitrous oxide (NO₂) and water vapour.

Grey water

Water that has been used in an application but is still of sufficient quality to be reused for another purpose, for example water from hand basins, washing machines or showers that can be used for toilet flushing.

Hazardous waste

Waste that is flammable, corrosive, toxic, explosive or harmful to human or ecosystem health.

Lagging

Insulation used to prevent the loss of heat, in the context of this document from hot-water pipes.

LPG

Liquefied petroleum gas, which is a flammable mixture of hydrocarbon gases derived from petroleum and used as a cooking or heating fuel.

Passive solar design

An approach to building design that makes best use of the sun, shade and prevailing winds to heat and cool living spaces instead of using electricity.

Peak electricity demand

The time of day and year when total demand for electricity is at its highest, typically during winter evenings when more heating and lighting are required. A country's power systems need to be designed to meet peak demand to avoid blackouts, so shifting electricity usage to non-peak times helps to slow the rise in peak demand and can reduce the need for additional power plants to be built.

Permeable paving

Paving options, such as specially designed brick pavers, gravel, bark chips or raised wooden decking, that allow water to pass through into the soil.

Phosphates

Inorganic compounds containing phosphorous present in personal and household cleaning products and fertilisers, contributing to algal blooms in rivers and dams and degrading water quality and habitats.

Potable water

Water that is treated or purified to drinking-water quality.

Thermostat

A device that automatically regulates temperature, or that activates or deactivates a device (eg electrical heating element) when a certain temperature is reached.

Vertical gardens

Gardens designed to make use of vertical space rather than horizontal space through the use of trellises, shelves or other options.

VOCs

Volatile organic compounds, some of which are dangerous to human health due to compounding long-term effects.

Wattage

The operating power of an electrical appliance as expressed in watts (W) or kilowatts (kW).

**For more information
about Nedbank's approach
to sustainability visit
nedbank.co.za.**

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