Brochures

- PowerOptimal Elon 100 - how to maximise your savings
- PowerOptimal Elon® 100 brochure V2.13
- PowerOptimal Elon® 100 kit easy selection guide V2.13

PowerOptimal Elon 100 - how to maximise your savings

How can you Maximise Your Savings with the Elon 100 Solar PV Water Heater?

The Elon 100® solar PV water heater will help you save money on the biggest single electricity user in your household: your geyser.

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Here are some tips for maximising your savings:

- The best way to maximise your savings is to set the Elon® control dial to “**SOLAR ONLY**”. This will ensure that the unit will never use grid (mains) power for heating water. You can still boost with mains power (for example on a cloudy day) by turning the dial to "MAINS ONLY" if needed. (Turn the dial to “MAINS ONLY” until the red light starts flashing, then turn it back to “SOLAR ONLY”. It will complete one heating cycle with grid and then go back to using solar power only.)

However, the "SOLAR ONLY" setting will only be feasible if you have enough solar PV modules for your household’s level of hot water use. Even if you have a smaller system, you might be able to run it on “SOLAR ONLY” for most of the year, depending on your location.

- If “SOLAR ONLY” doesn’t work for your household, setting the dial at "3" will yield the most savings whilst maintaining hot water availability mornings and evenings.
- Install water-saving (low-flow) showerheads. This can reduce your hot water use by 20 to 40%. (You will also save on your water bill!)
- Shower, don’t bath;
- Reduce shower duration;
- Check that your geyser is well insulated;
- It is generally best to shower in the mornings for maximum savings, since then the water can be reheated during the day. (If you have the control dial on “SOLAR ONLY”, you can alternatively shower only in the evenings, as long as you remember that you won’t have hot water early in the morning.)

- A bigger geyser (200L vs 150L or 100L) is better for maximising savings, since more energy from the sun can be stored in the bigger volume of water.

See this video for more on how to use the Elon 100 solar PV water heater.

PowerOptimal Elon® 100 brochure V2.13

V2.13

The PowerOptimal Elon® ***The Most Cost-Effective Solar Water Heating Solution***

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Conventional wisdom has it that solar thermal is the most cost-effective solar water heating solution. Well, it is time to update conventional wisdom! The innovative and patent-pending PowerOptimal Elon® breaks the mould in bringing solar PV (photovoltaic) and water heating together in the most cost-effective package ever. Meeting national building regulations on water heating is now made easy with the PowerOptimal Elon®.

With competitive capital cost, very long lifetimes and almost non-existent maintenance, this is the lowest cost per kWh of water heating your money can buy anywhere.

HOW IT WORKS

The Elon® uses advanced proprietary switching technology to allow for **direct provision of DC (Direct Current) power from solar PV (photovoltaic) modules to electric geyser** and optimised solar power use in a single compact unit. The system can be connected to the grid (AC mains) as well, and intelligently switches between AC and solar power supply. The system requires **no inverter and no battery**, and can be connected to **standard AC geyser heating elements and AC thermostats**, which translates into the most cost-effective solar water heating option today.

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WHAT ARE THE BENEFITS?

Based on a lifetime cost per kWh of water heating (Levelised Cost of Energy or LCOE), the Elon® brings you the lowest cost of any water heating option in South Africa at about **R1.15/kWh**. The average residential price of electricity in South Africa in 2024 (based on a middle-class household in the four largest metropolitan areas) is about R3.12/kWh and increases every year. **Reduce your exposure to ever-increasing electricity prices by installing an Elon® system.**

A graph of water heating costs Description automatically generated

There are many other **benefits** to the PowerOptimal Elon® solar PV water heating system:

- No tank on the roof
- Easy installation - no plumbing changes for retrofit
- You can use your existing electric geyser
- No noise (unlike heat pumps or solar geysers with circulation pumps)
- Lower weight of rooftop components compared to solar geysers means easier installation
- Much longer life and lower maintenance than solar thermal or heat pump systems
- Intelligent grid power backup means you won't have cold water even when there is no sun, whilst grid power use is minimised
- Excellent option for meeting SANS 10400-XA energy efficiency requirements
- Hot water during power failures
- The patent-pending AC-DC switching technology is the smallest and lowest cost solar DC switching solution on the market
- Less vandal-prone than solar geyser systems
- Patent-pending solar power availability detection technology means that no photocell is required compared to solar PV-inverter systems
- Delivers power to loads at lower voltage than what is possible with inverters (from just 20V under load)
- Control dial gives full control over operation – from mains power only to solar power only

WHAT DOES THE SAVINGS TRANSLATE TO IN PRACTICAL TERMS?

Below is a comparison of the energy cost per shower for various energy supply options.

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WHO IS POWEROPTIMAL?

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PowerOptimal is an award-winning company with a mission to bring affordable, reliable and sustainable energy solutions to households and businesses across the African continent. The company is built on proven South African electricity demand management technology, with a strong track record of successful installations over more than 10 years.

FAQ – Frequently Asked Questions

How can solar PV water heating be more cost-effective than solar thermal? Isn't solar thermal efficiency much better than solar PV?

It is true that solar thermal collectors are currently more efficient per square meter (area) than solar PV modules in collecting solar energy. However, overall efficiency must also take into consideration factors such as heat loss in piping (especially in winter) and energy use of solar thermal circulation pumps.

Solar thermal system lifetimes range from about 7 years (for cheap imports) to about 15 years for high quality (and more expensive) systems. (In a comprehensive analysis, Sandia National Laboratories found that about 50% of solar thermal systems fail within a 10-year period.) Solar PV modules are routinely guaranteed at 80% performance after 25 years, and the US National

Renewable Energy Laboratory uses a lifetime of 33 years in its solar PV system calculations.

Solar PV module costs have dropped dramatically – by over 80% in the past 5 years – and the trend is continuing. This has **changed the paradigm**. Whilst solar PV systems will continue to require more roof space than solar thermal in the short term, the key issue is not roof space, but cost. Solar PV systems have become cost-competitive to solar thermal, and the much longer lifetimes and lower maintenance translate into a lower lifetime cost per kWh.

What is SANS 10400-XA?

It is a set of energy efficiency regulations that are compulsory for new buildings and for additions and extensions to existing buildings. One of the key requirements of SANS 10400-XA is that **no more than 50% of the annual volume of domestic hot water must be heated using grid electricity**.

The PowerOptimal Elon® makes meeting this requirement easier than ever before, providing a new cost-effective alternative to heat pump and solar thermal systems.

Do I need to change the heating element on my existing geyser to install a PowerOptimal Elon® system?

Not necessarily. PowerOptimal Elon® works with existing standard AC heater elements, but the best element size (power rating) depends on the size of your solar PV array. If you are building a new house, you can just specify the right heater element from the start. Refer to the table on the next page for a guide or ask the PowerOptimal agent or your installer about the best module & element matching configuration for your needs.

KWIKOT
powered by Haier

Where can I buy an Elon® system?

For installers and resellers: Kwikot (part of Electrolux South Africa) is the sole distributor of the PowerOptimal Elon® in South Africa. Contact the PowerOptimal team for assistance with buying.

For residential customers: Contact PowerOptimal to get a referral to one of our preferred installers depending on your location.

How many solar modules do I need?

The most important factor here is the total size or power of the solar PV array (measured in kilowatt or kWp) rather than the number of modules. The size of solar PV array required depends

on the number of people in the household and your hot water usage levels. A minimum of 1 kW_p is recommended. Below is an **easy selection guide**. Refer to the PowerOptimal Elon® 100 Technical Specifications or the full selection guide (available on the downloads page) for a more detailed guide.

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* 6-minute showers at 40 ºC with 8 litre/min (low-flow) showerheads

What is the payback period for an Elon® system?

This depends on your current electricity tariff, how many solar modules you install, your hot water use, and electricity price increases in the next few years, but typically payback period is in the range of 2½ to 5 years. With a typical solar module life expectancy of more than 30 years, this means that you will enjoy at least 25 years of free hot water!

Where can I learn more about the PowerOptimal Elon®?

Visit our website at www.poweroptimal.com or contact the PowerOptimal team for more information and technical data sheets.

CONTACT US TODAY TO GET A QUOTE OR LEARN MORE ABOUT THE POWEROPTIMAL ELON®

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Patented: GB2583814, ZA2019/02129

PowerOptimal contact page: https://poweroptimal.com/contact-us/

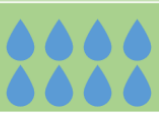
PowerOptimal Elon® 100 kit easy selection guide V2.13

Elon® 100 kit easy selection guide: element matching

Solar PV array size (kW_p)	Best matching geyser element size (kW)	2nd choice geyser element size (kW)	Geyser size – bigger is better (litres)
1 – 1.6	**4**	3	100 - 200
1.6 - 2	**3**	4 or 2	100 - 200
2 – 3	**3**	4	150 – 300
2 – 4 (two parallel PV strings)	**4**	NA	150 – 300

Short-Circuit Current @ STC I_{sc} < 20A **Open-Circuit Voltage @ STC V_{oc} < 250V**

Elon® 100 kit easy selection guide: how much hot water?

Solar PV array size (kW_p)	Showers per day*	50%+ of daily hot water use provided for how many people?	How many people off-grid for hot water?	Typical number of solar PV modules
1 – 1.6				2 -3 modules
1.6 – 2				3 - 4 modules
2 - 3				4 - 5 modules
3 – 4 (two parallel PV strings)				6 - 8 modules

* 6-minute showers at 40 ºC with 8 litre/min (low-flow) showerheads

Typical kit contents

Solar PV modules	Modules detail	Common components
2	1 string of 2 modules	• Elon 100 with controller, controller wire, element adapter and thermostat bridging wire • Mounting kit (corrugated/IBR or tile) • Solar cabling (4 mm^2 or larger) • Earth cabling (6 mm^2 bare copper) • MC4 connectors • 4-way distribution board (DB) • 2-pole DC circuit breaker (16A or 20A for one solar PV string; 32A for two strings) OR DC isolator + fuse • Non-insulated ring lugs x 3 * For high lightning strike density areas (such as parts of Gauteng and Mpumalanga), a **Surge Protection Device (SPD) is recommended**: 220V DC Surge Protection Device (SPD), Type 2. Refer to Appendix F in the Installation Manual for more details.
3	1 string of 3 modules	
4	1 string of 4 modules	
5	1 string of 5 modules	
6	2 strings of 3 modules (6 modules)	
8	2 strings of 4 modules (8 modules)	