

South West Energy & Sustainability



**The Sun Does Not Go Over ANY Horizon
Its energy is critical to our survival and
always there**

**How a local electrical contracting
company is making a difference**

Solar Power & Energy Storage A better Way of Being

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Solar Power & Energy Storage A better Way of Being

- Current SW Energy Situation
- Sustainability Mankind's Greatest Challenge
- Energy Use Reduction Opportunities
- Current & Future Energy Generation & Storage
 - How a SW electrical contractor is making a difference

SW Energy & Sustainability

Current Situation – over 20% solar power in WA

“A Solar Emergency !!”



Batteries not included

Current Situation

SW Interconnected Network – The Grid

1.1 Million Customers

102,000 klm of transmission lines

254sq. Klm SWIN area

228,000 Solar Power System – 1000MW

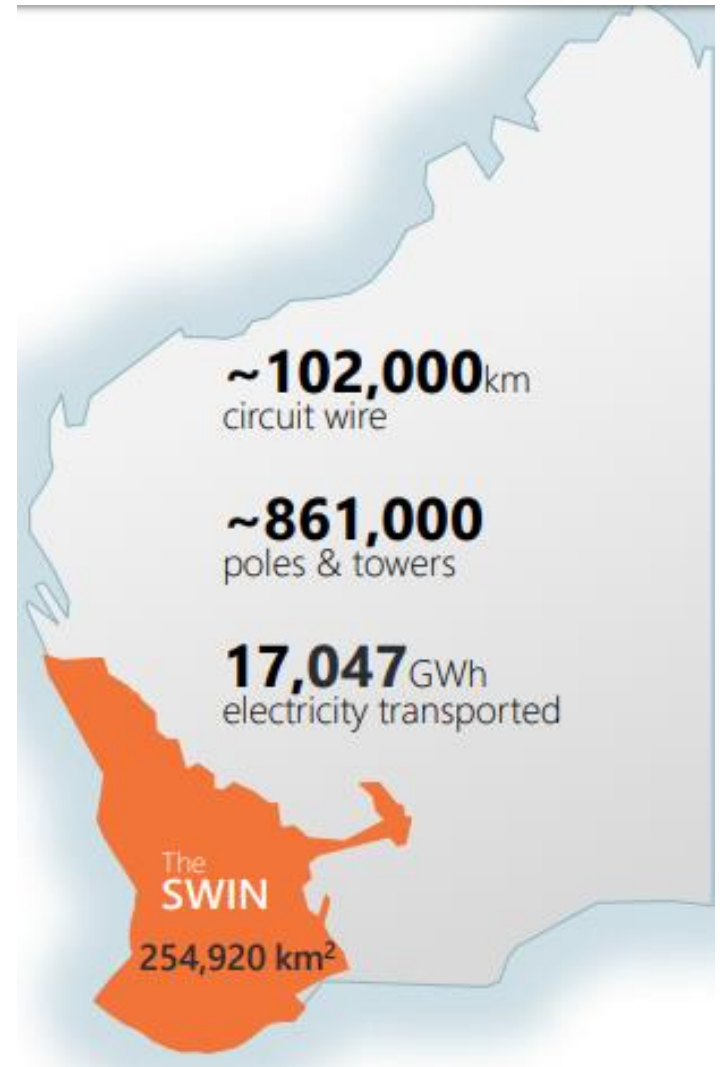
465 Battery Systems

WA over 20% take of grid connected solar power

Rising power prices

Solar & storage equipment costs reducing

Solar subsidy reducing

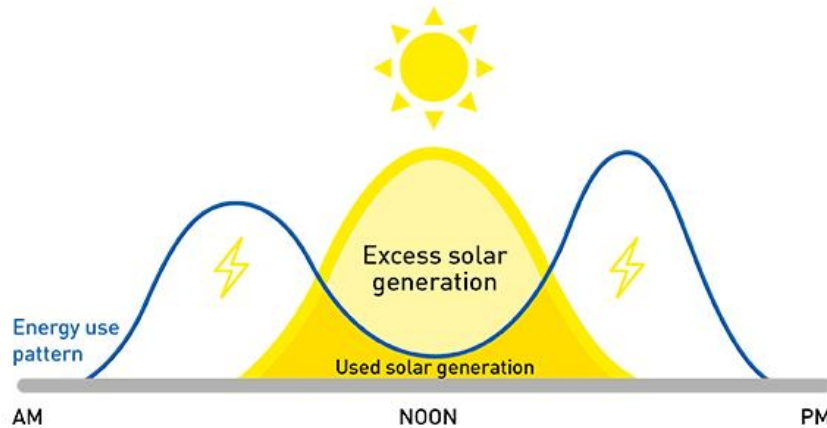


Current Situation – Centralised Grid System

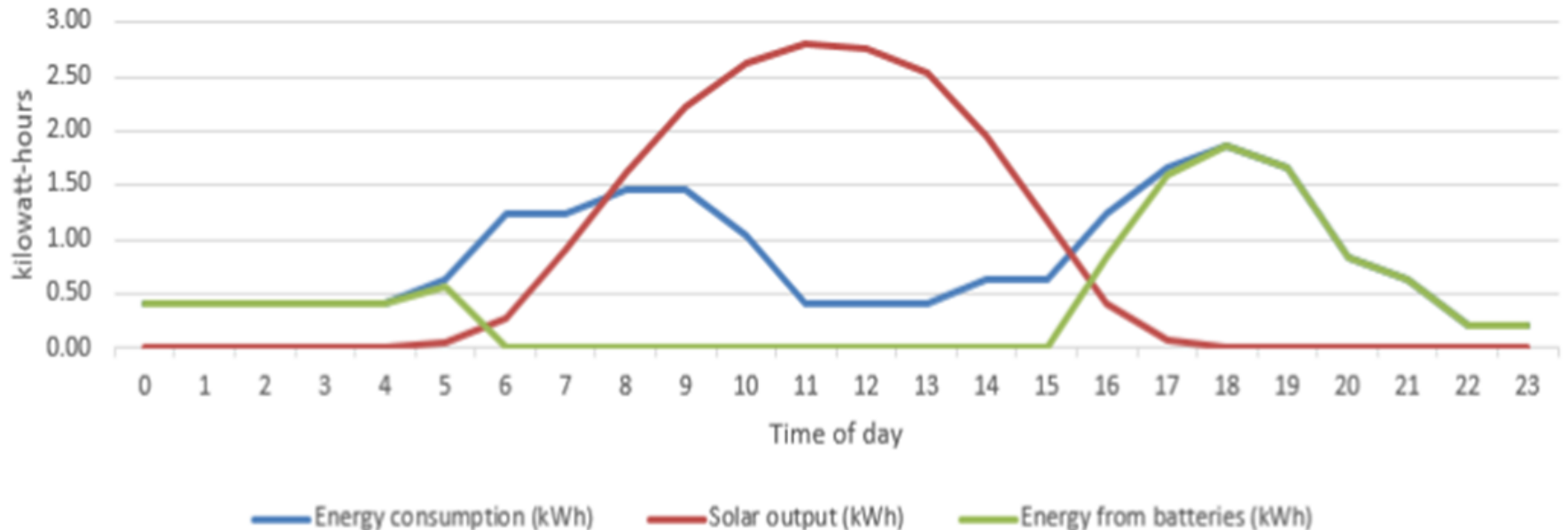
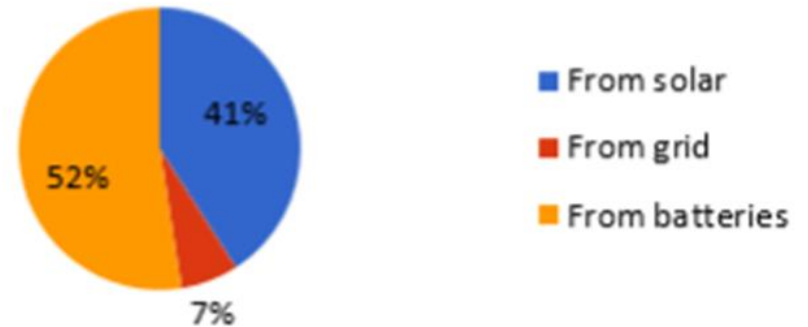
- Typical Coal Fired power has efficiency of less than 35%.
- Typical overhead power transmission line losses can be up to 15%
- Long Transmission lines – 52% of assets serving 3% of customers
- High fire risk from strong winds lines clashing in rural areas
- Rural area unreliable power supply – country people grid connected solar & storage limited by utility regulation – typically to avoid voltage rise and square wave shift
- Grid Connect Storage – Alkimos commercial trial in progress, numerous
residential Tesla Powerwall installations in SW
- Micro and Nano Grids – Horizon Power Esperance & Hopetoun and,
Western Power Bremer Bay
- Stand Alone Power Systems –Ravensthorpe trials ongoing 60 new
Offgrid trials announced

Current Situation – Grid Solar & Stored Energy Use

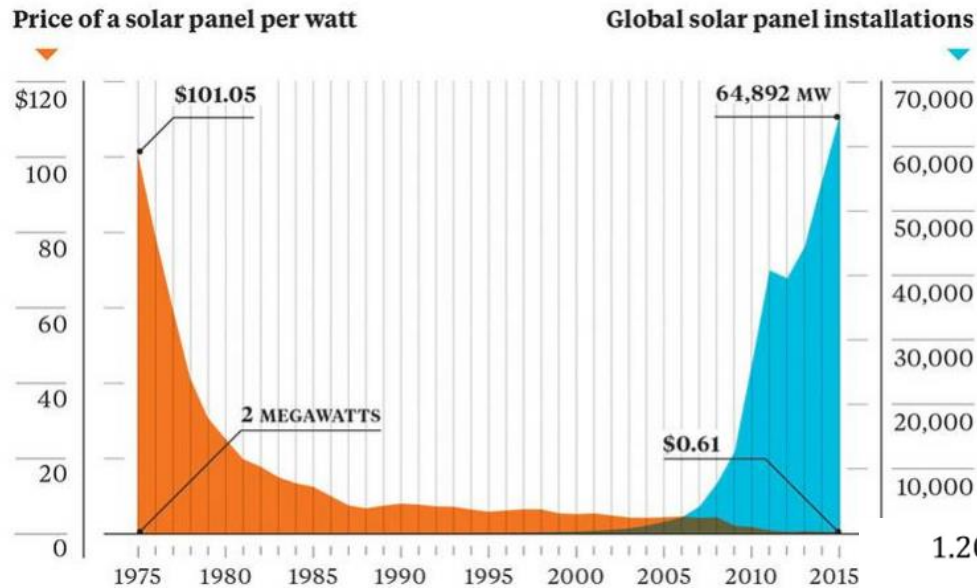
■ Solar generation
■ Energy use pattern



Electricity sources - Average



Current Situation cost of solar & storage

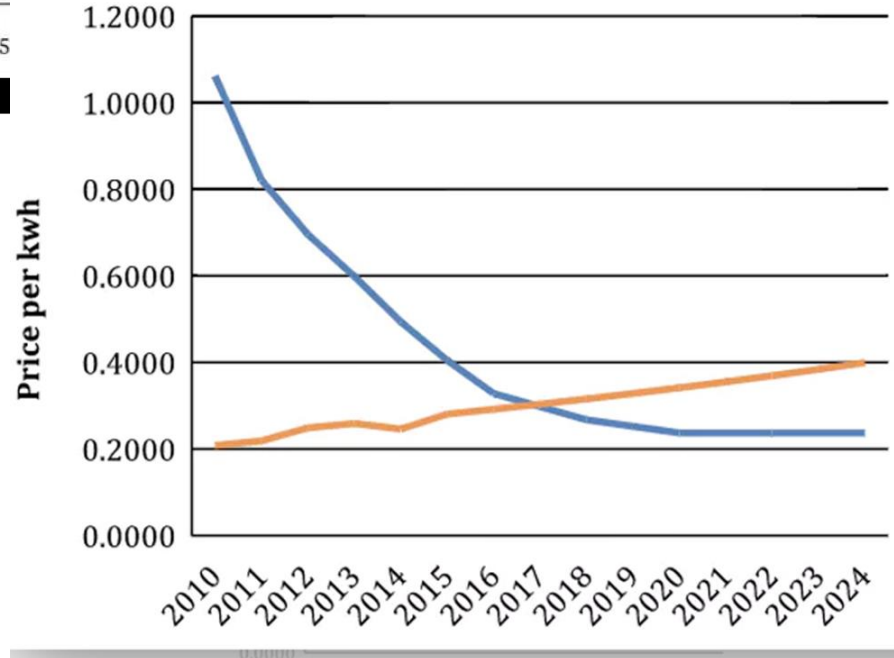


Policy Institute/Bloomberg

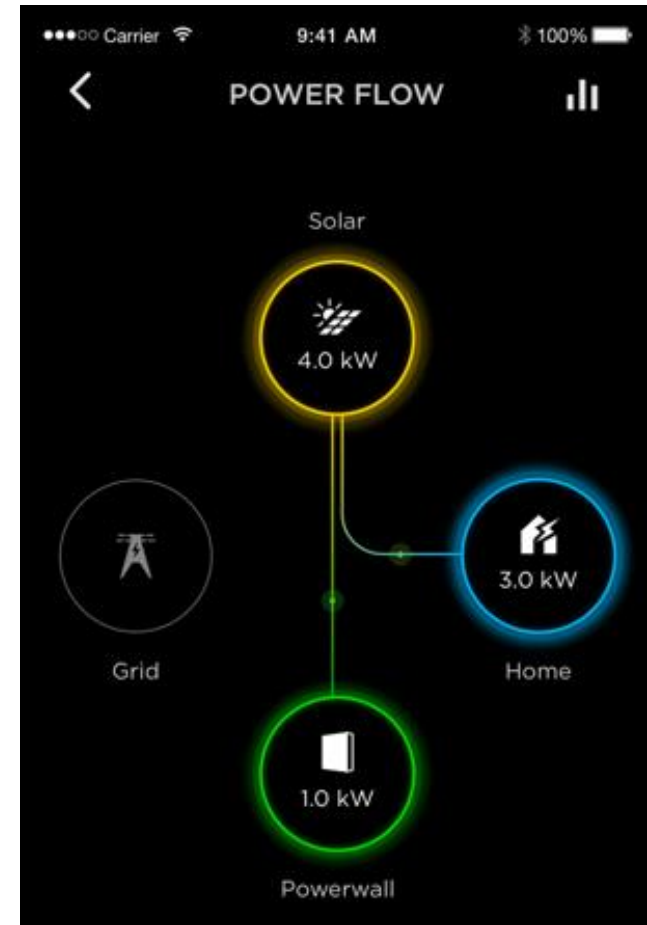
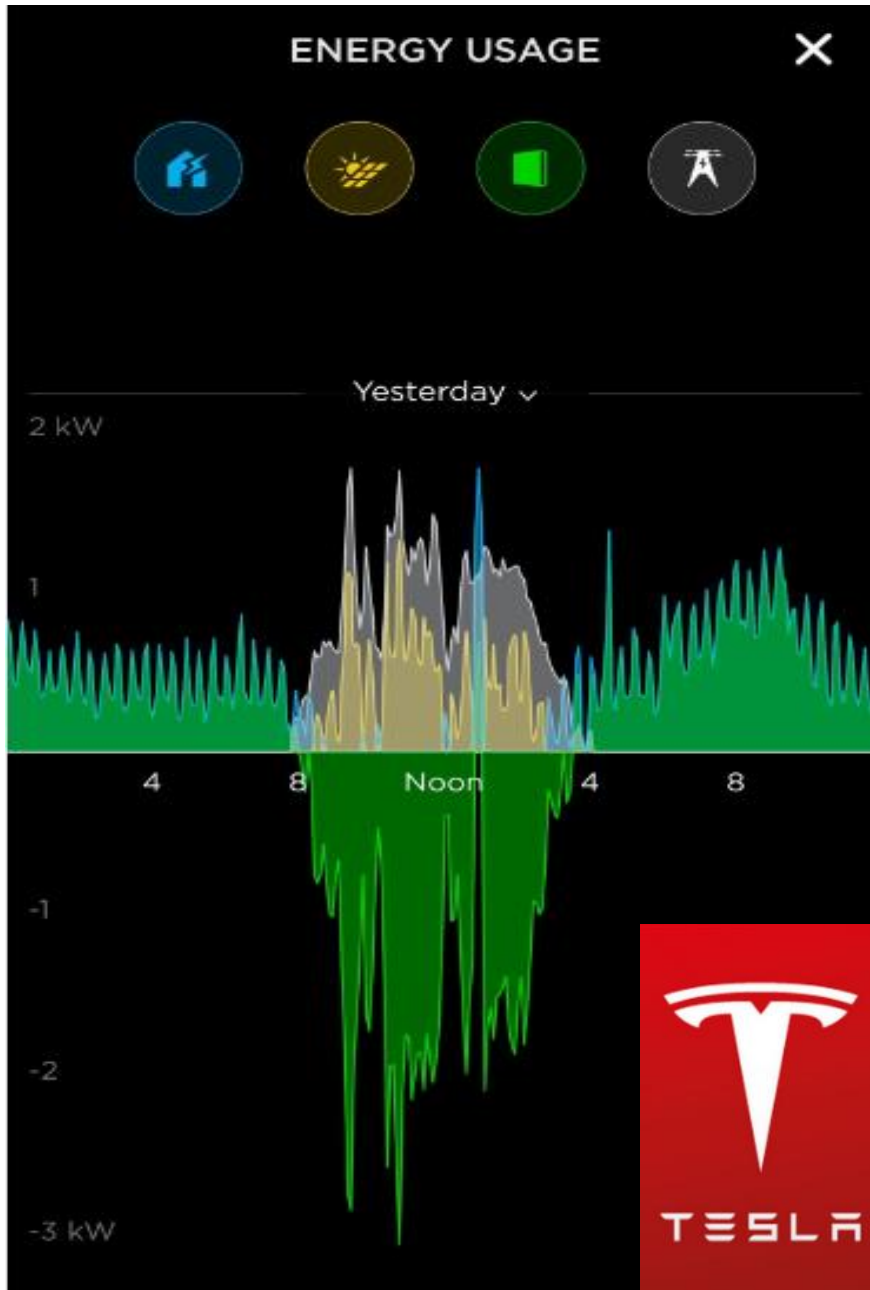
Chart above shows cost of solar panels versus solar installations

Stored solar is now proven in WA SW and is locally do-able, affordable and sustainable

Chart below shows cost of SW grid power versus cost of solar & storage



Grid Connected Solar Power & Energy Storage



Grid connected Tesla Powerwall in operation in Bunbury supplied & installed by SunWise

Humans being more Sustainable

President Obama made it clear that “climate change is a moral issue that affects us all, we don’t have time for debates of the Flat Earth Society.”

Critical Question - **“How do we achieve the political will required?”**



2009 Cartoon from San Francisco Chronicle in lead up to 1st Climate Summit at Copenhagen

Sustainability – Emotion v Science



In Feb 2014 during a speech in Jakarta by Mr Kerry US Secretary of State warned **“that man-made climate change could threaten our entire way of life”** deriding those who doubted the science and existence of climate change that is **“perhaps the world's most fearsome weapon of mass destruction”**

Sustainability – What gets measured gets managed



<http://trillionthtonne.org/>

Emissions of carbon dioxide since 1750 comprise just over half a trillion tonnes of carbon, and are estimated to have caused just under 1 °C of global warming. Photo above taken of bags of coal at the entrance to the British Science Museum in London

Estimated cumulative emissions from fossil fuel use, cement production and land-use change since industrialization began are

573,253,342,753

tonnes of carbon.

Explore what this means

Cumulative emissions matter, because the total amount of carbon dioxide that can be released into the atmosphere is limited if we are to avoid dangerous climate change.

The limit depends on:

How much warming should we expect per tonne of carbon released into the atmosphere?

2°C per trillion tonnes: cautious ▼

At what level do you want global temperatures to peak?

2°C moderate warming ▼

If temperatures rise by **2°C per trillion tonnes** of carbon released into the atmosphere, to avoid more than **2°C of warming** we need to limit total cumulative emissions to below **1,000,000,000,000** tonnes of carbon.

Based on emission trends over the past 20 years, we expect the **1,000,000,000,000th** tonne will be emitted on

Sat, 22 Dec 2040 11:28:02 GMT

We would not release the **1,000,000,000,000th** tonne if emissions were to start falling now at

2.4656523368 % per year

[Find out more...](#)



In 2016 195 countries
Signed the Paris Climate Accord
and all agreed to hold rising
temperatures to no more than
2C, which scientists say is the
climate change limit of safety

Our Planet Our Responsibility

Sustainability Mankind's Greatest Challenge

In the words of the great Mahatma Gandhi;

"It's the action, not the fruit of the action, that's important. You have to do the right thing.

It may not be in your power, may not be in your time, that there'll be any fruit. But that doesn't mean you stop doing the right thing. You may never know what results come from your action.

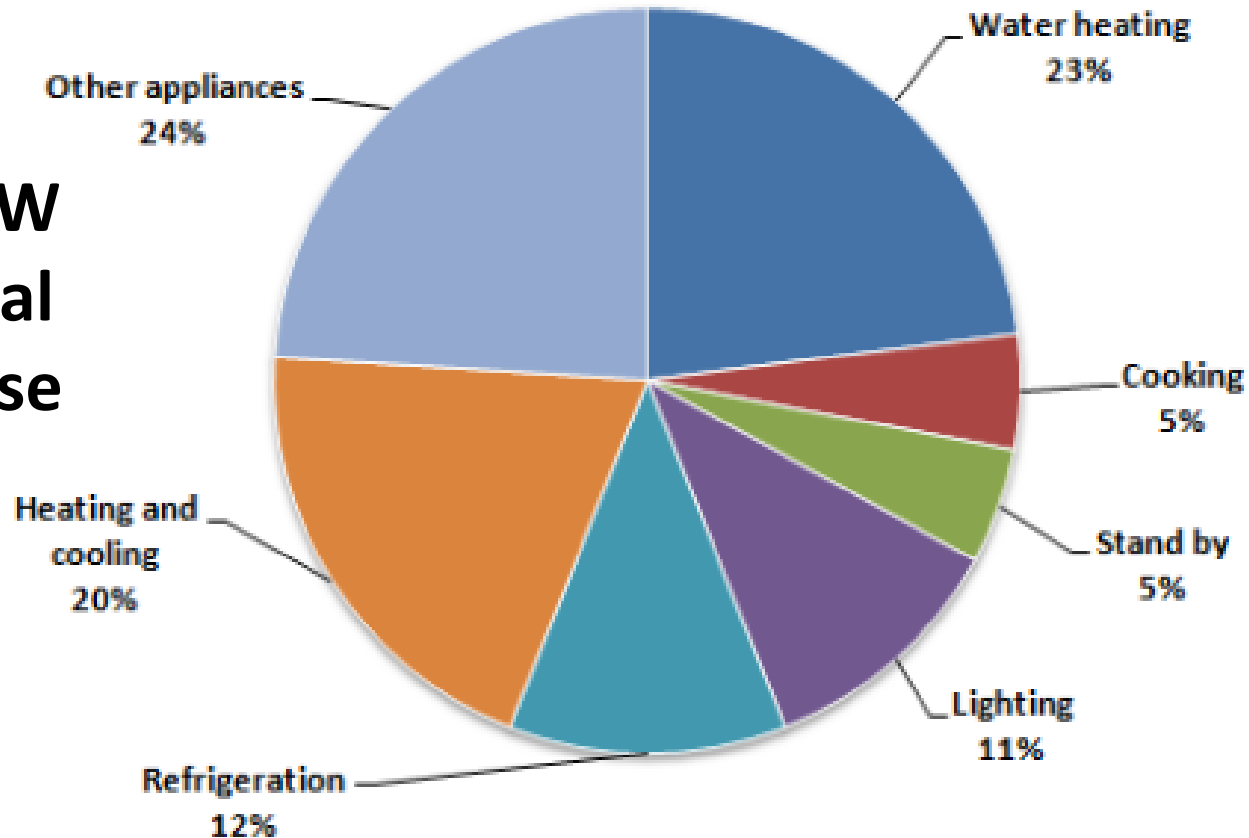
But if you do nothing, there will be no result"



<http://bze.org.au/>

Energy Use Reduction

Typical SW residential energy use



The energy derived from fossil fuel that we do not use now is available to use later. The need to preserve our precious fossil fuels is urgent – we need them to make the transition toward renewable energy and a more sustainable way of being.

Everybody has the ability to reduce power use, reduce emissions and be more sustainable – a better way of being

Reducing Energy Use

- Measure & monitor your power use
- Install solar hot water or heat pump
- Wash clothes using cold water or use heat pump dryer
- Take shorter shower – use less heating for hot water
- Install insulation and/or install ceiling fans
- Manage your heating/cooling thermostat
- Run fridge more efficiently
- Look for natural refrigerants use in refrigeration appliances
- Hang out your laundry
- Replace old inefficient appliance with 4 star energy rating or better
- Shut doors, close windows when heating/cooling & use of window coverings
- Turn off unnecessary appliances and lights
- Use natural light
- Use energy efficient lamps
- Unplug unused electronics
- If You have solar power align your power use to the sunshine period as much as possible
- If you do not have solar power – go to your local electrical contractor solar specialist for professional advice
- Consider solar pumping if you need to pump water in rural areas

Going Solar Energy & Storage in SW

Why going solar locally makes sense and saves \$

- Every day you don't have solar is another day you do have to pay high electricity bills.
- A well designed solar system without batteries will reduce your bills
- Use a proven local electrical contractor specialising in solar power to ensure ongoing support, professional compliant installation, employs local people & keeps hard earned \$\$\$'s in our community
- Many people have no issue spending up to \$5000 on a entertainment system that does not earn any income may have 2 years warranty with no financial payback – a solar system earns \$\$'s in avoided energy use - Its like a passive income guaranteed free from the sun, typically with over 10 years warranty
- Where else can You get up to 25% return on your investment with payback inside 3-4 yrs guaranteed by rising power costs and energy free from the sun with 10 yr equipment warranties
- If you are not home to use solar power a battery makes sense if installed with the solar power system can significantly reduces the cost
- A well design storage system will store exported energy and provide black-out back-up
- If you do not have the up-front funds finance options may help get solar power and still have return on your investment up to 15% with payback inside 5 yrs

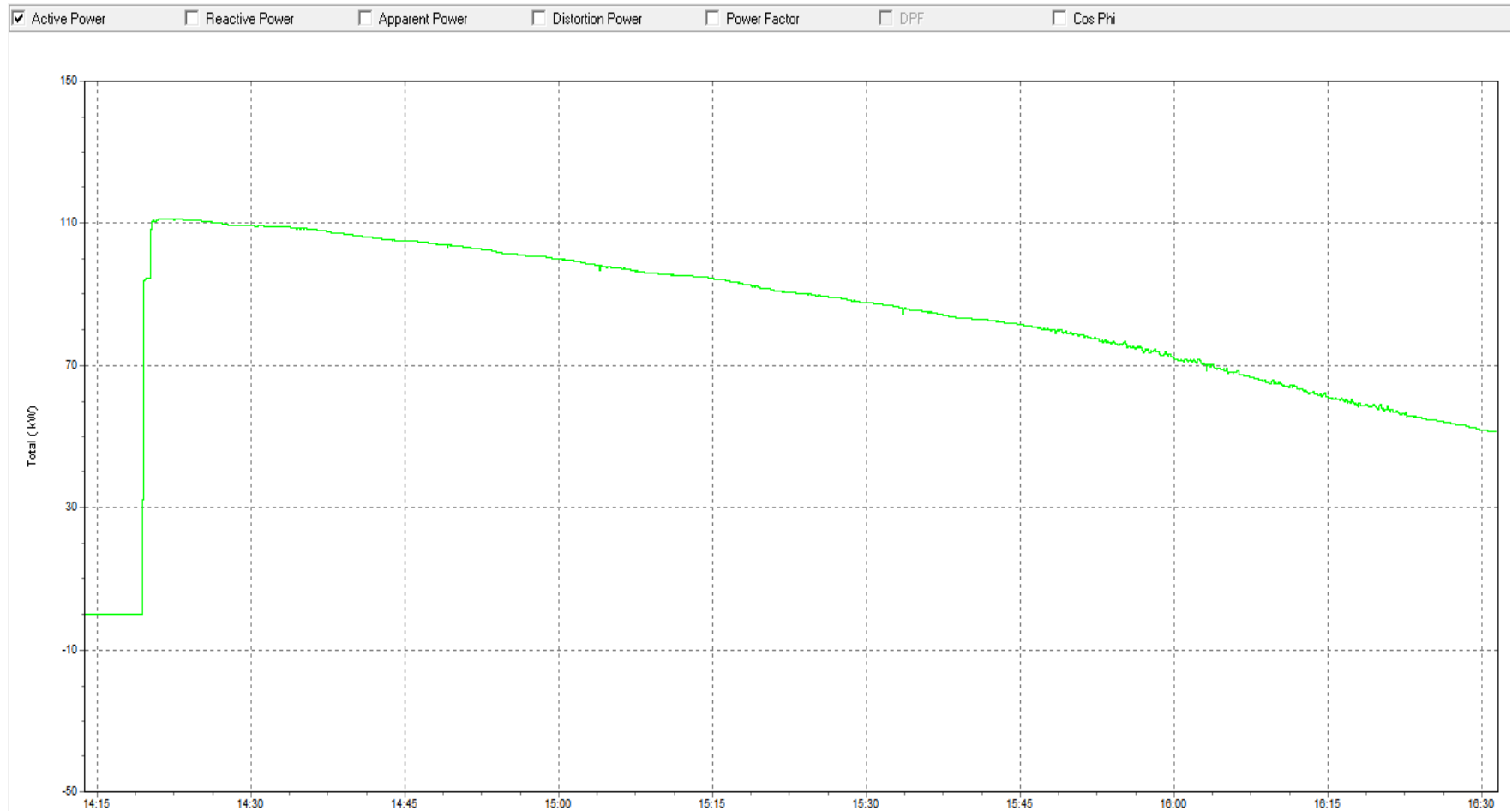
Commercial Solar Leeuwin Estate 150kW



One of the largest solar systems in the SW installed by SunWise

Commercial Solar Power Measurement

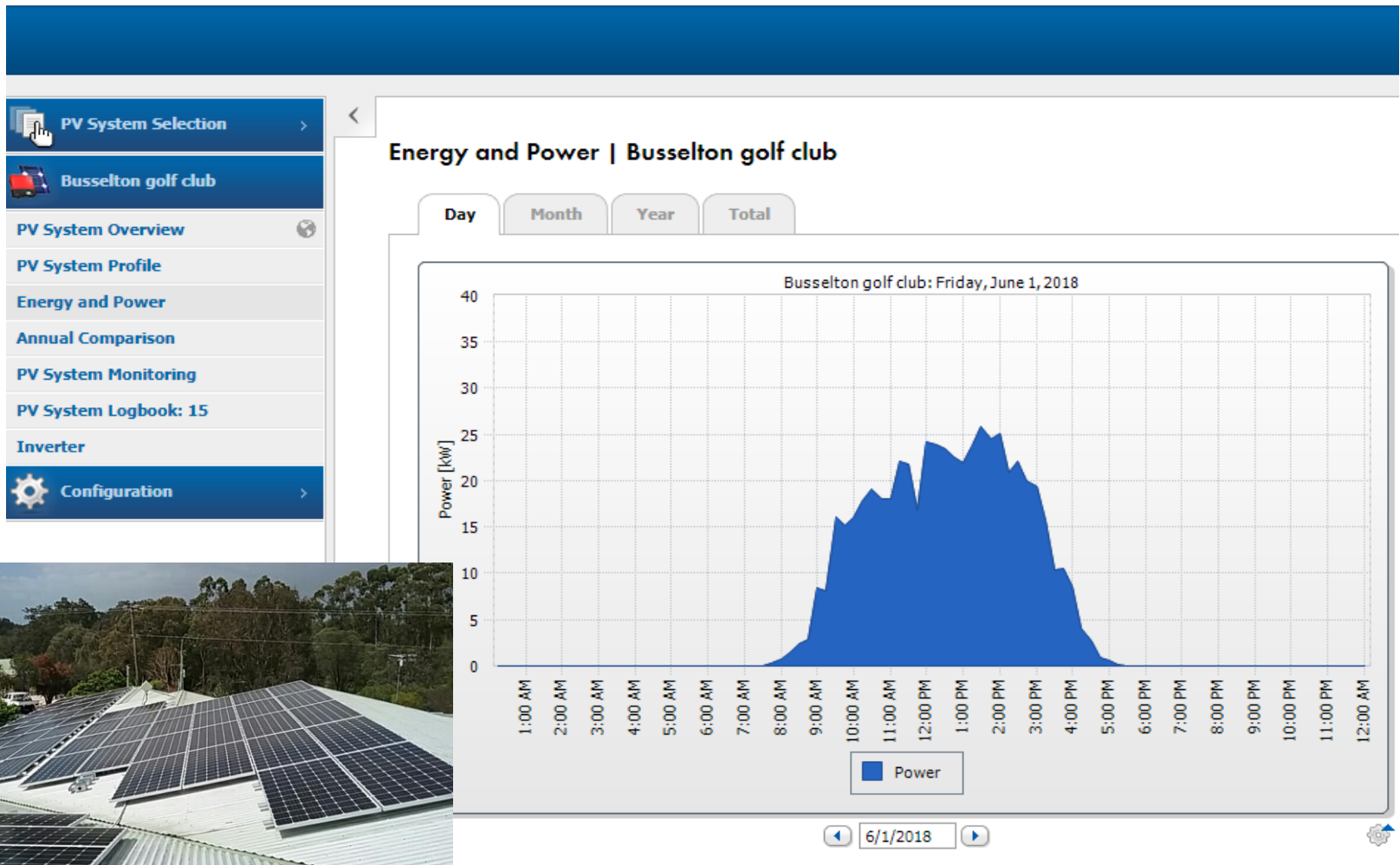
Measurement taken Jan 2014 – over 110kW generation



Solar Energy and Storage

Commercial Grid Connected Solar Power

SUNNY PORTAL US-English ▾



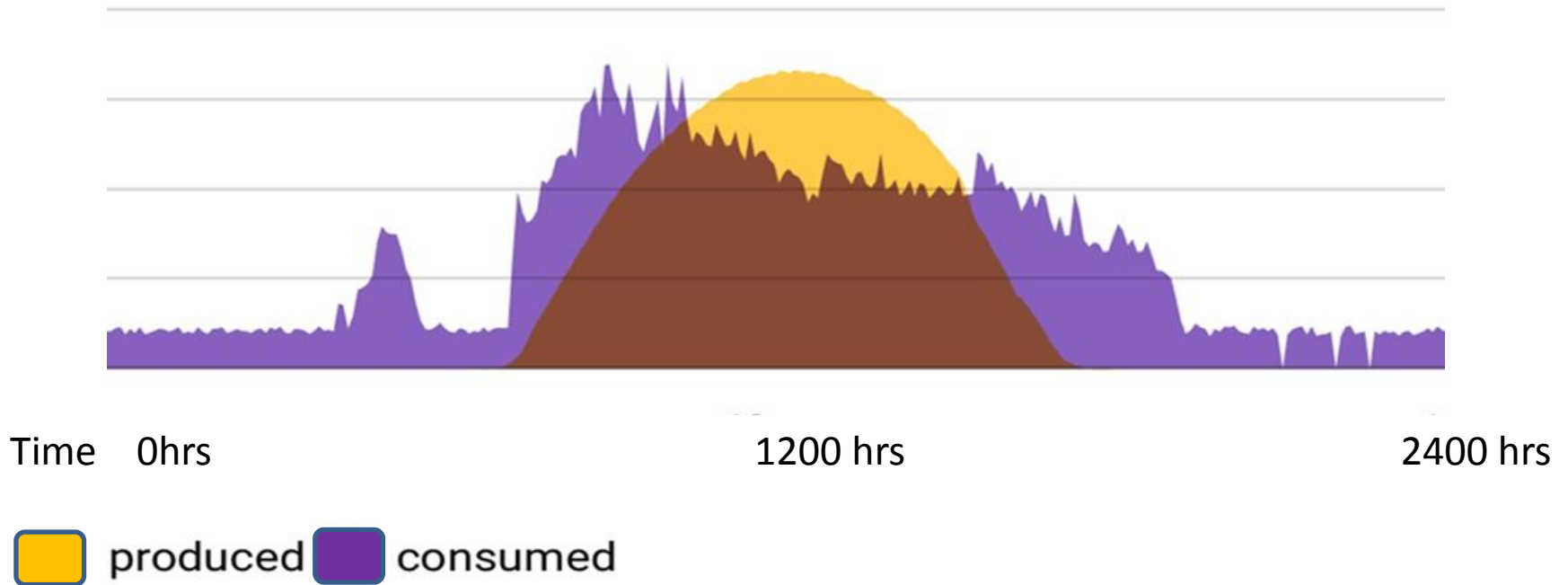
Solar Energy and Storage

Bunbury 30kW Commercial Grid Connected Solar
Power No Storage



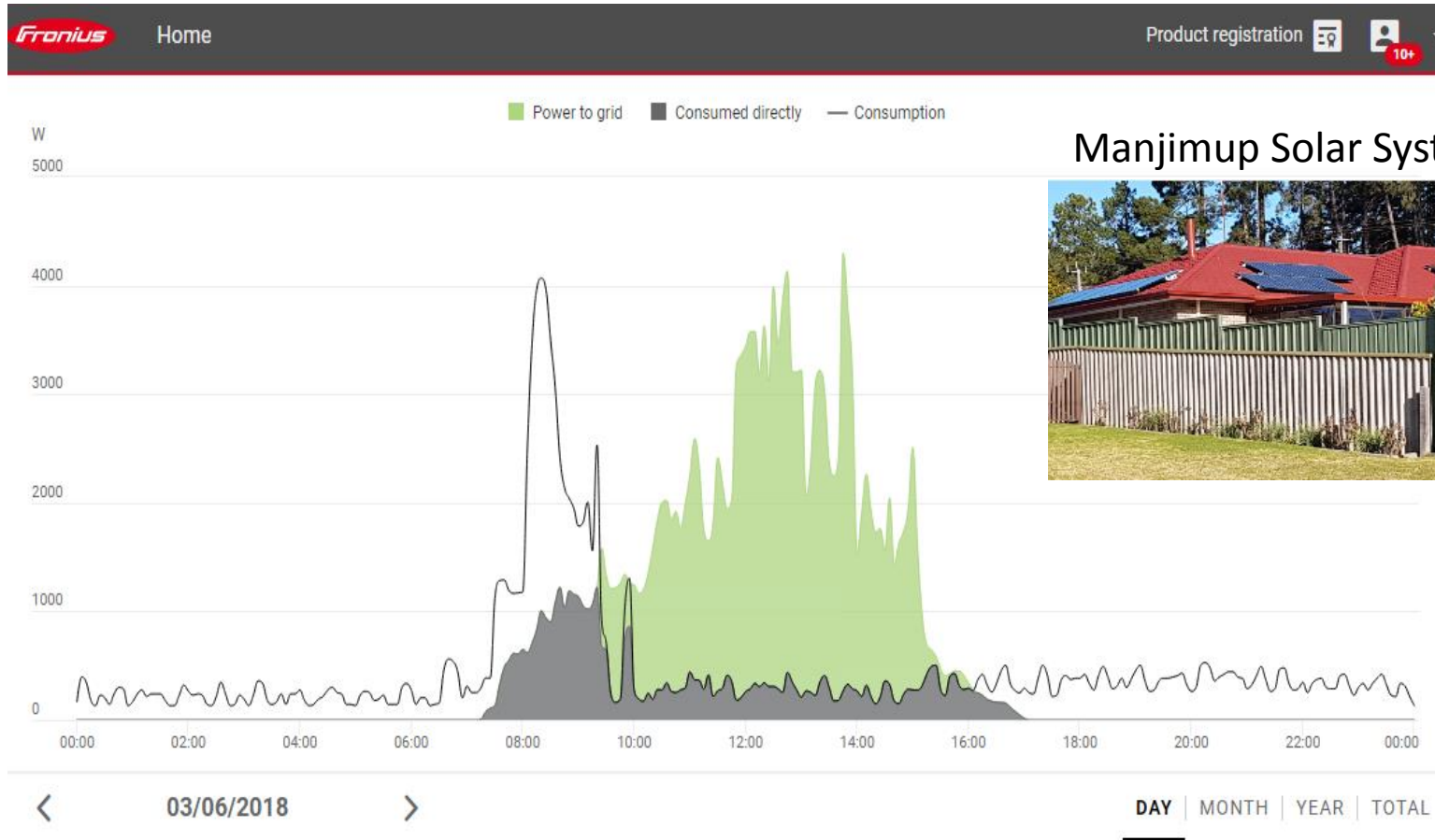
Solar Energy and Storage

30kW Commercial Grid Connected Solar Power
No Storage

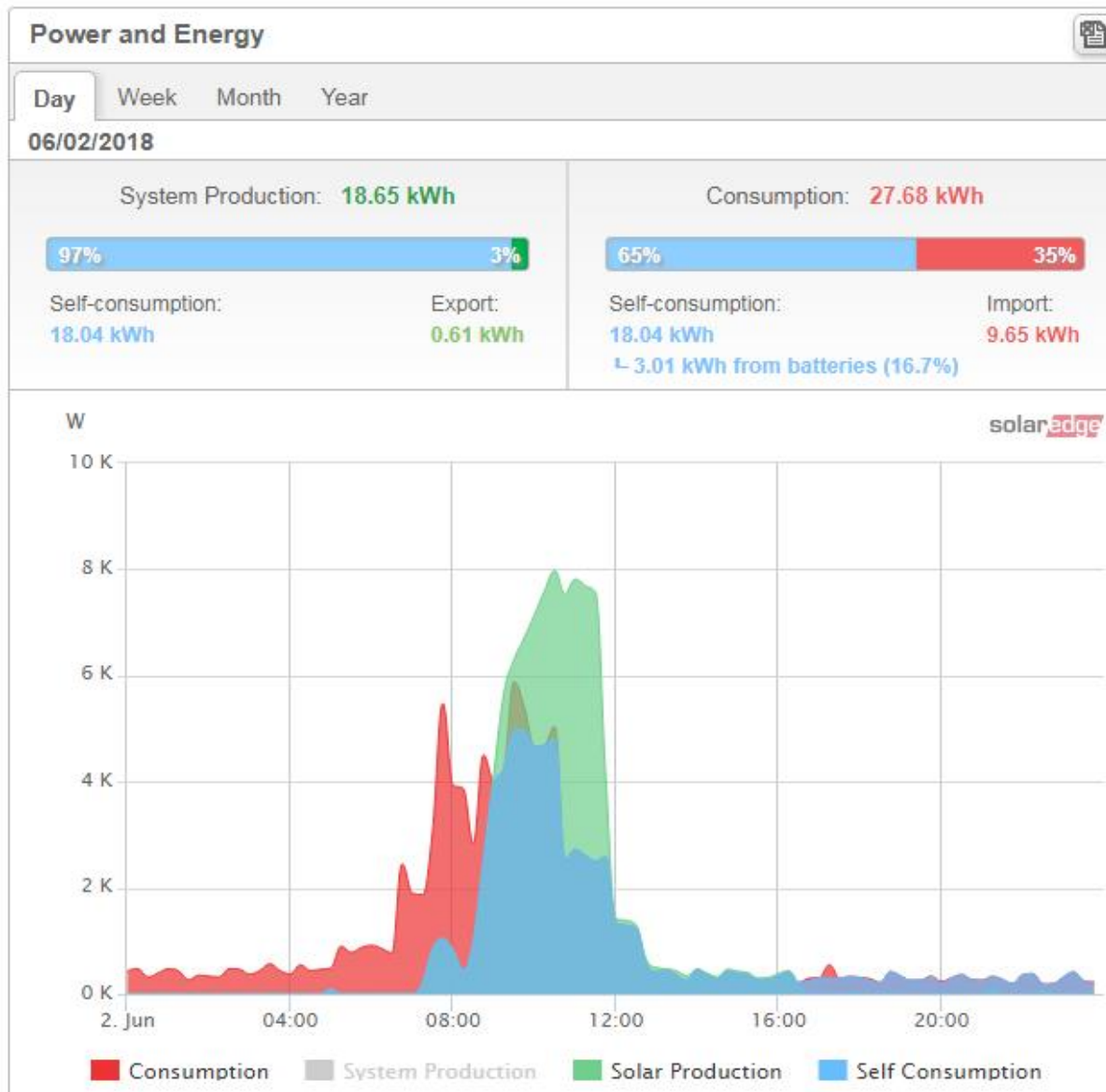


Solar Energy and Storage

Residential Grid Connected Solar Power – no storage



Solar Energy and Storage – Grid Hybrid



Weather

 Mostly Cloudy
15 °C
Feels like 15 °C
Wind NW, 29 km/h
Humidity 75 %
Sunrise at 07:10
Sunset at 17:06

Tuesday



16 - 8 °C
Windy

Wednesday



14 - 8 °C
Partly Cloudy

Thursday



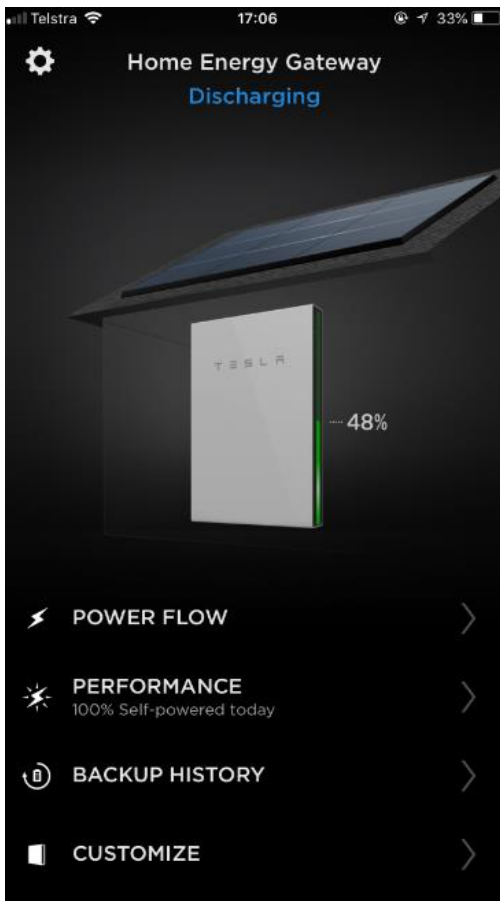
14 - 6 °C
Mostly Sunny

Mt Barker Solar & Storage



Solar Energy and Storage Grid Hybrid

5 PM June 2018 48%
battery charge 100%
powered by solar and
battery



Dallyelup Solar &
Battery fully charged
10:30 – 100%
powered by solar &
battery



Solar Energy and Storage Grid Hybrid

Kingtree Lodge Wellington Mill – 15kW Solar Power 16kW Power Management



Solar Energy and Storage Grid Hybrid

Kingtree Lodge Wellington Mill – Grid, Solar & Storage Management System

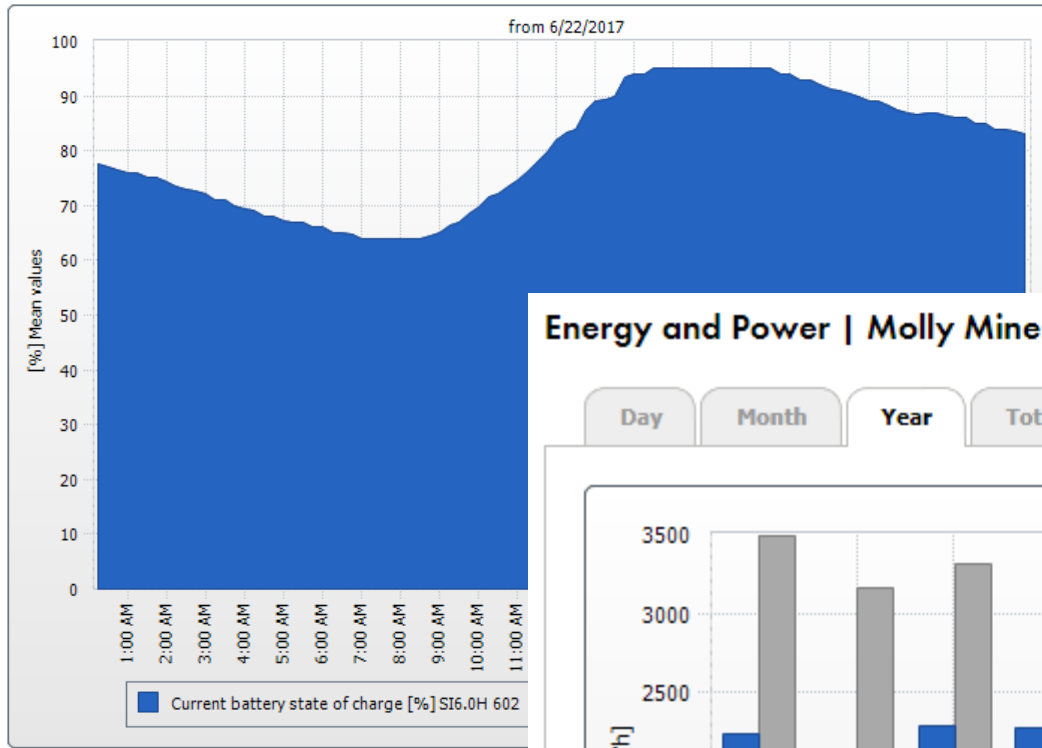


Solar Energy and Storage - Offgrid

Marble Bar area – Telstra Offgrid Power System

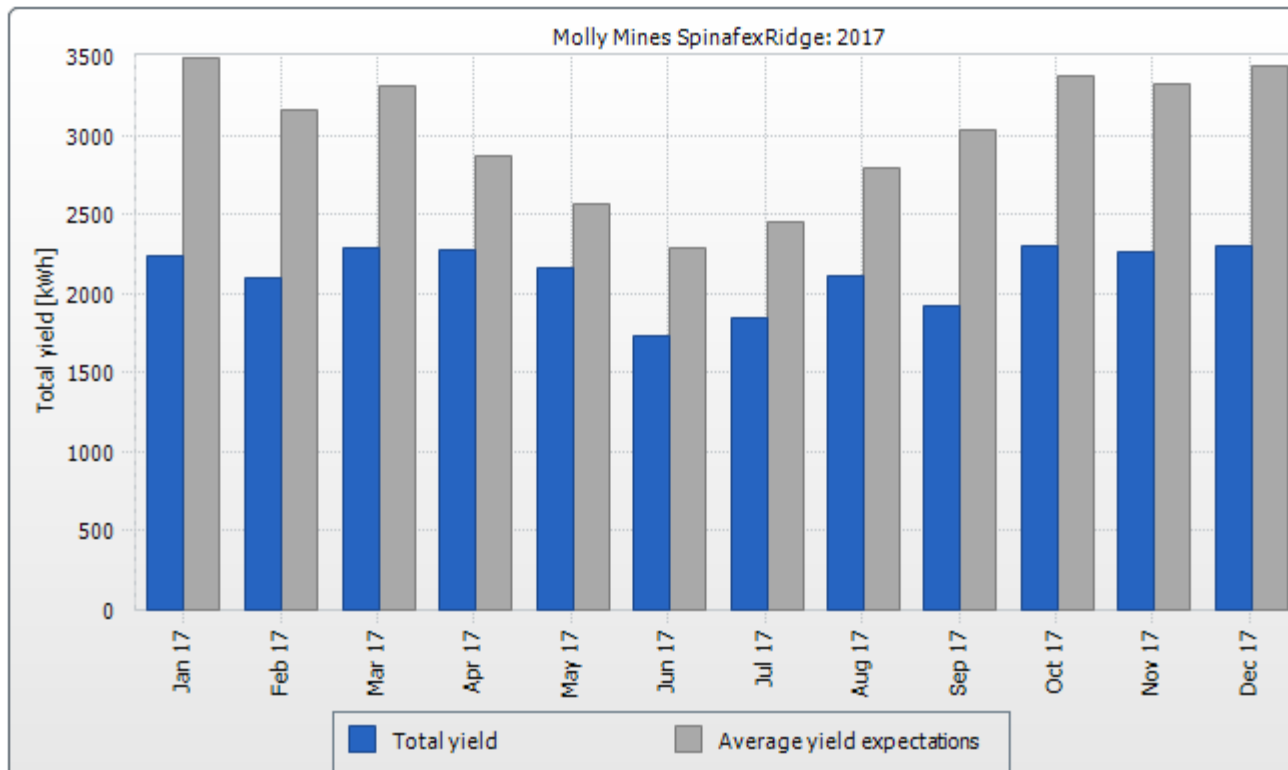


Solar Energy and Storage - Offgrid



Energy and Power | Molly Mines Spinafex Ridge

Day Month Year Total



Solar Power – 2017 Actual Generation v Possible

Solar Energy and Storage - Offgrid



Solar, Storage and Generator Backup @ Malemup Community near Windy Harbour designed, supplied and installed by SunWise in 2018

Solar Energy and Storage - Offgrid



Jinko Solar Panels, BYD Storage and Generator Backup nano-grid system

Solar Energy and Storage Offgrid & Wind Power



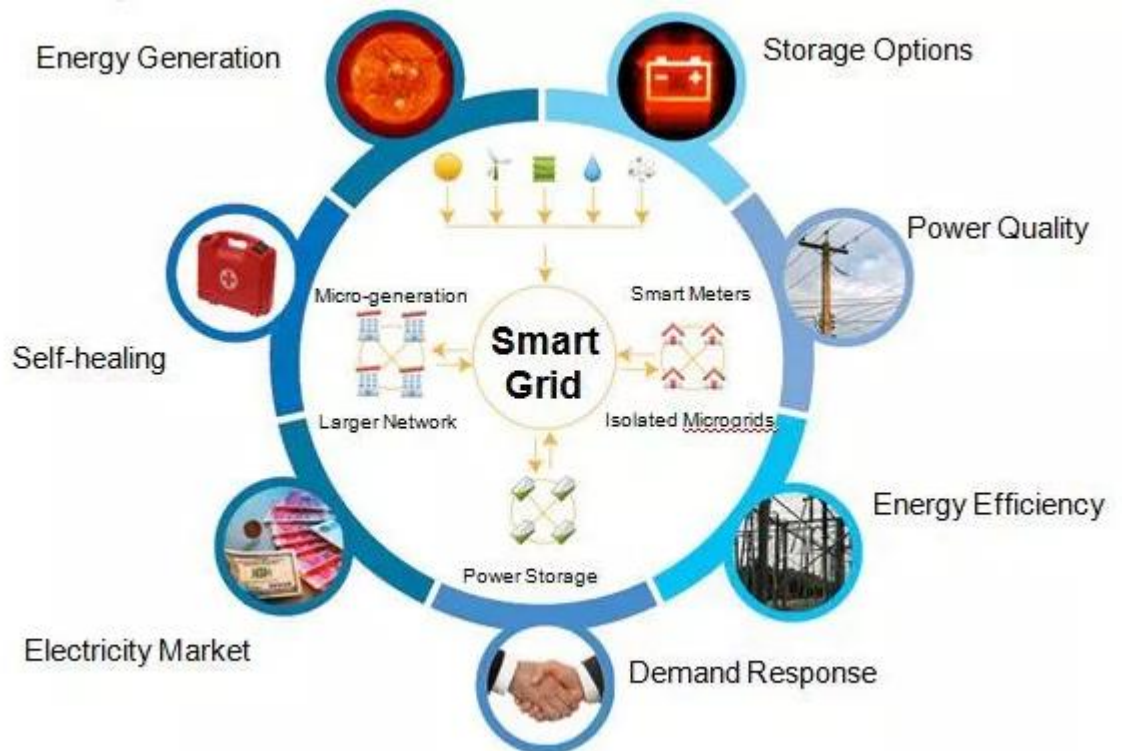
Solar Energy and Storage looking over the horizon

- Decentralisation of the grid
 - Micro-grids energy systems -
 - Nano-grids energy systems
 - Offgrid energy systems
- Local generation use and storage of energy
 - Self consumption energy systems
 - Essential power energy systems
 - Grid back-up energy systems
- Smart Power
 - Optimised use of appliances for best outcome use of solar power and storage
 - Time of use & other specialised tariffs - retailing peak solar or stored energy
 - Load shedding – DREMS
- Electric Vehicles (EV)
 - Smart Transport & Home Energy Use - Electric Vehicles coupled with home solar and storage charging & use of combined EV & house stored energy
 - Optimised self consumption of un-used EV battery power coupled with stored grid connected solar energy & storage

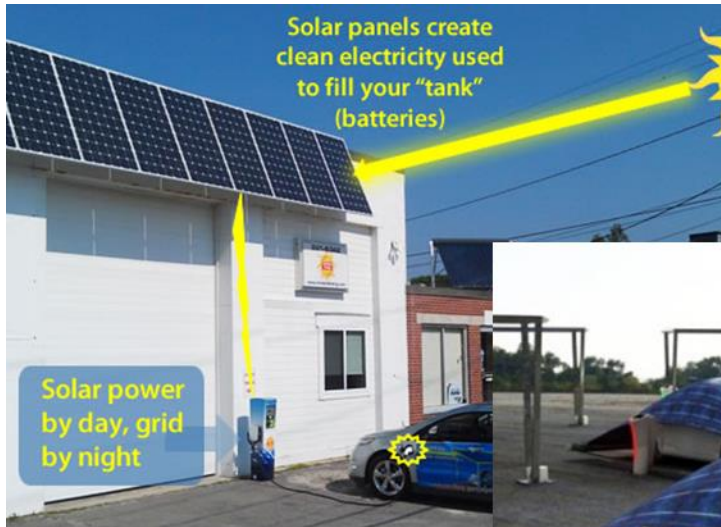
Solar Energy and Storage - Smart Power



turn on/off home appliance by your smart phone APP at anytime& anywhere



Solar Energy and Storage – Islands of Solar and EV Energy Optimised for Transport, Grid & Home Energy Use



We have to do the right thing!

