



COMMUNITY POWER HUB METROPOLITAN MELBOURNE

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YARRA ENERGY FOUNDATION

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Home Energy Basics

How to save money, cut emissions
and increase comfort at home



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Welcome!

YARRA ENERGY FOUNDATION

- Lachlan Hensey, Community Energy Project Officer at **Yarra Energy Foundation**
- Support community-led energy projects and provide advice on energy at home.
- Care about climate; love the outdoors; a bit of a nerd.
- **YEF**: a not-for-profit working towards a zero-carbon future by helping residents, businesses, councils and everyone in our community across metropolitan Melbourne to transition to clean energy.

Metro Community Power Hub

- 1 of 7 Hubs set up across Victoria
- Funded by Sustainability Victoria on behalf of the Victorian Government
- Accelerate the transition to renewables
- Deliver community energy projects
- Support household energy efficiency and generation (solar)
- Build 'energy literacy' in the community
- Share knowledge and experiences



Supported by



Projects

- Solar and All-Electric Home program
 - Connecting households with providers for quotes on solar, heat pump hot water systems and heating/cooling split systems.
- Free personal energy consultations with Renew and YEF
- Energy Efficiency/Literacy workshops
- Community Battery feasibility studies
- Energy audits for schools and businesses
- Guide to Solar for Apartments

What we will cover:

- Where we get our energy (10min)
- Understanding your bill (15min)
- What you can do at home (25min)
- Q&A after each section
- Break about halfway

Polls

- How many people currently have a solar system installed?
- How many people have modified their home to be more energy efficient?
 - E.g. upgraded draughtsealing, insulation, window coverings/treatments, lighting, etc.)?
- How many people are currently renting?



Our place in the energy system

Understanding how we get our energy is
important to knowing how to use it best

Where does it come from?

Traditional flow of energy:



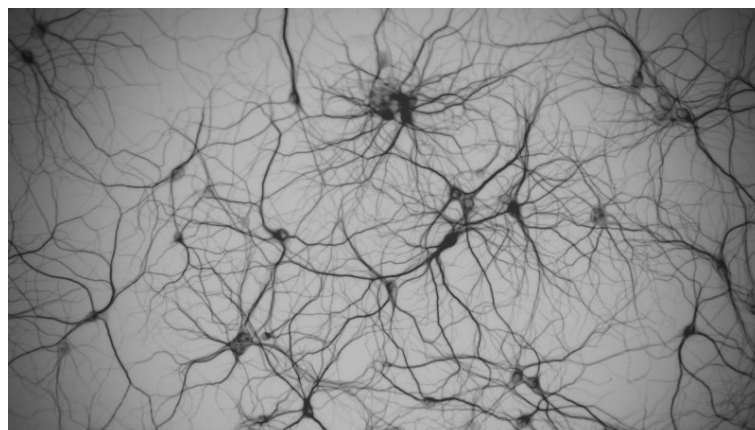
New flows of energy (rooftop solar):



From this . . .

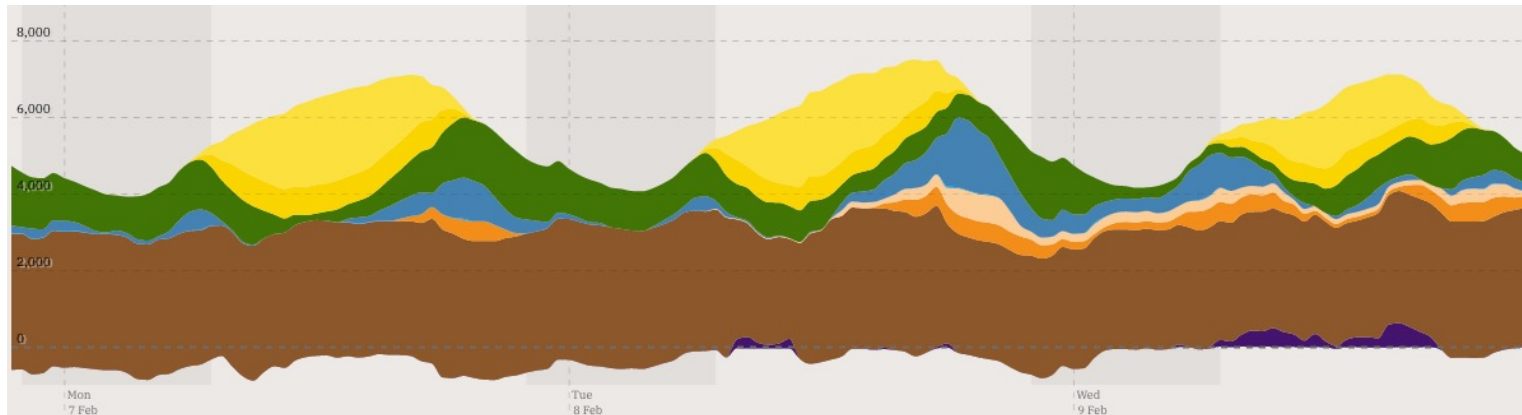


. . .to this?



Electricity generation - Victoria

- Rooftop solar makes a huge difference (light yellow)
- **Higher percentage of renewables during the day**
- **Shift your use to daytime to reduce emissions (and bills)**
- We need lots of wind, solar and battery storage of all sizes



Breakdown of generation sources in Victoria from 7/2/22 to 9/2/22 (3 days)

Source: OpenNEM.org.au



Any questions so far?



Understanding your bill and home energy use

Being aware of how your energy consumption is charged helps you make better decisions

Energy, electricity and power – not the same!

Energy

- The ability to do work (produce heat, light, move, etc.)
- *Quantity*

Electricity

- The *form* of the energy we use

Power

- The *rate* at which energy is flowing (measured in watts)
- 1000 watts (W) = 1 kilowatt (kW)

Example:

You are billed according to your **energy** consumption, measured in kilowatt-hours (*quantity*).

- 1kW of power flowing for one hour = 1kWh of energy

When you turn on a typical kettle, you are:

- Drawing ~2100W or ~2.1kW of *power*

If you left the kettle on for one hour (don't!)

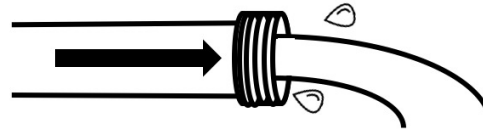
- Consume 2.1 *kilowatt-hours (kWh)* of *energy* (50 cents)
- Usually only on for about a minute or two



Electric Power vs Energy

Power

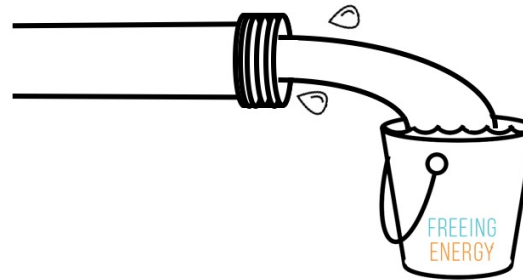
Watts or
kilowatts



...is like the flow
rate of the water

Energy

Watt-hours or
kilowatt hours



...is like the the
amount of water
that ends up in
the bucket

Source: FreeingEnergy.com

Energy = power x time

Power draw	7W	2100W
Time	300 hours	1 hour
Energy used	2.1kWh	2.1kWh
—	—	—
Time	5 hours	1 minute
Energy used	0.035kWh	0.035kWh



Typical household energy consumption

- Can be as low as 2.6kWh per day (2 people)
- Can be over 30kWh per day
- Depends on efficiency of home, efficiency of appliances, use patterns, and number of people.





Any more questions?

Next: Decoding your bill

How you are charged for electricity

Daily supply charge

- Fixed rate charged per day by retailers for your property to be connected to the grid.
- Also known as 'service to property' or similar.
- Ranges from 80c to \$1.40 per day.

Usage charges (tariffs)

Flat rate

- Suits those using lots of energy at peak times (e.g. 3pm – 9pm)

Time-of-use tariffs - peak, off-peak and shoulder

- Suits those who use more power off-peak (e.g. shift workers).

Block tariffs – one rate for first Y kWh, then another rate beyond.

- Sometimes first block is cheaper, sometimes it's more expensive.

How your bill is calculated

Daily supply charge X number of days in billing period **(\$1.00 X 30 days)**

+

Usage charge: Rate X kilowatt-hours (kWh)

+

(25c X 300kWh)

+ or – any discounts,
concessions, premiums,
outstanding amounts.

= \$105

= TOTAL

Switching retailer?

- Many people are on expensive offers
- Some retailers offer cheap prices before raising them
- Review your bill!
- Visit **energy.compare.vic.gov.au**
- Check out the MCPH's *Guide to using Victorian Energy Compare* at **mcph.org.au/resources/**



Actions:

- Know your tariffs
- Know your usage
- Consider switching retailer



Any questions?

Next: What you can do at home

- Energy consciousness
- Energy efficiency and the 'thermal envelope'
- Home energy technology



Energy consciousness

Simply understanding will make a difference

Energy consciousness

- Understand how much power your appliances draw, and how much energy they use
- Track your energy consumption
 - Powerpal
 - Retailer app
 - NMI data (from your DNSP [Jemena])
- Know when to use your appliances
 - Tariffs (cost)
 - Renewable content (emissions)
 - Do your laundry before 3pm

Energy consciousness

- Review your standby power consumption
 - Turn things off at the powerpoint – it's good for them!
- Consider what is essential, desirable or indulgent.
- Where can you creatively enhance your efficiency?
 - e.g. Use a timer to turn your fridge off at night in winter (e.g. 12am-6am)
 - Set heating/cooling according to your tariff, or during daylight hours if you have solar



Energy efficiency and the 'thermal envelope'

Energy efficiency measures to enhance comfort in
your home

Appliances

- Replace all older globes (incandescent, halogen or compact fluorescent) with LED globes
- Fix inefficient appliances (e.g. replace fridge seals)
- Replace with efficient appliances at end of life
- Efficient appliances can be more expensive up front, but are much cheaper to run



	Model 1 3 star, 400 litres	Model 2 6 star, 400 litres
Star Rating	3 star	6 star
Energy used each year	263 kWh	120 kWh
Annual running cost	\$74.38	\$33.96
10 years running cost	\$743.78	\$339.56
+ Purchase price	\$899.00	\$899.00
= Total cost of ownership	\$1,642.78	\$1,238.56



By selecting Model 2 you save* **\$404.22** over 10 years

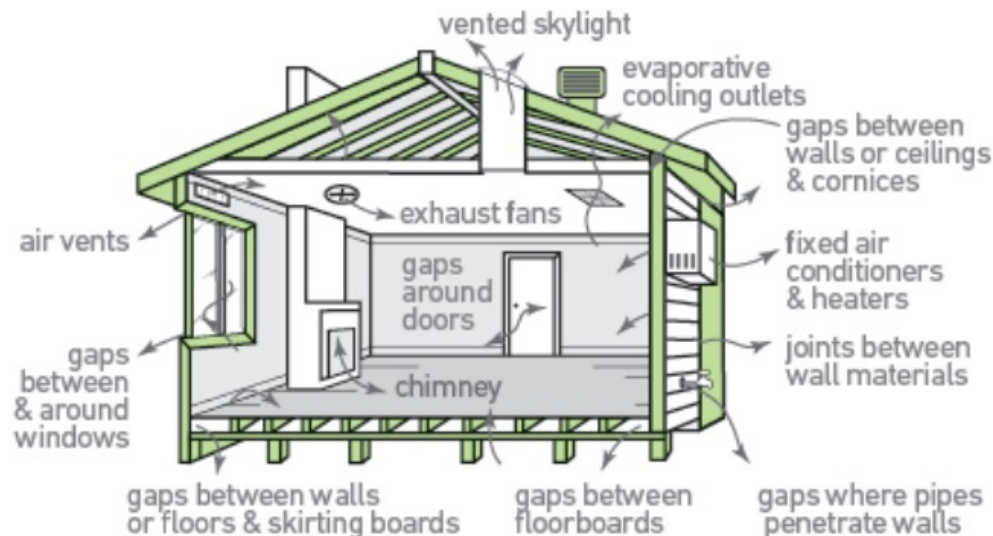


Source: EnergyRating.gov.au

Draught proofing

- Stop air flow and heat loss or gain
- Tools: Caulking gun (silicone), brush strips, foam tape, rubber blades, chimney balloons
- **Poll: Air leakage**

FIND & FIX GAPS





Insulation

- One of the most important aspects of energy efficiency
- Foil (reflective), bulk (most common) or spray (foam)
- The more trapped air, the less heat transfer
- Ceiling insulation is the most important, and easiest to install
- Check to ensure it has been installed properly – any gaps can spoil good insulation
- Look for an R-value of 6 or 7



Windows

- **Poll: Window heat loss**
- **Poll: Window heat gain**
- Double glazing (trapped air)
- Energy efficient window frames – aluminium, timber or uPVC
- Added films – toned glass or reflective coatings
- Use windows for controlled ventilation – open at night to cool the house naturally.

Windows

- Heavy curtains or **honeycomb blinds** (trap air and block light)
- Light curtains can diffuse and reflect some light
- **Pelmets** stop air currents increasing heat loss





Actions:

- Monitor your consumption (app)
- Fix/replace inefficient appliances
- Draught proof your home
- Open windows for ventilation;
close doors to 'zone' house
- Invest in good curtains



Any questions?

Next: Home energy technology

Rooftop solar,
efficient hot water,
efficient heating and cooling,
and induction cooking.

MCPH Solar and All-Electric Home Program

- Support the community to access affordable solar from vetted, trusted providers
- Up to 20% of standard pricing
- Provide advice and guidance throughout the process
- Help households transition to all-electric
- Visit **mcph.org.au** for more information



Rooftop solar

- Generous rebates still on offer
 - \$1400 rebate and \$1400 no-interest loan from Solar Victoria
 - Small-scale Technology Certificates (STCs) will subsidise further (several thousand \$s)
- Prices may not continue going down
- Often pays for itself within 5 years, and is a better economic investment than almost anything else
- Don't get too hung up on brands – MCPH solar providers only use high-quality, Tier 1 products

What size system?

- Bigger is almost always better
- Aim for at least 5kW
- Many connections are limited to 5kW inverters
- Panels are more efficient than ever (400W)
- Price before rebates and no-interest loan:
 - 6.6kW: \$9,000
 - - \$1,400 rebate
 - - \$1,400 no interest loan
 - - \$2,755 in STCs
 - = **\$3,445 up front (estimate!)**

Optimise your system

- Shift as much of your energy use to daylight hours
 - E.g. dishwasher, laundry, heating/cooling, water heating
- Use solar to power other energy saving appliances in an **all-electric home**
 - Heat pump hot water system
 - Reverse cycle split systems (heating/cooling)
 - Induction cooktop
 - Stop paying for your gas connection

Heat pump hot water systems

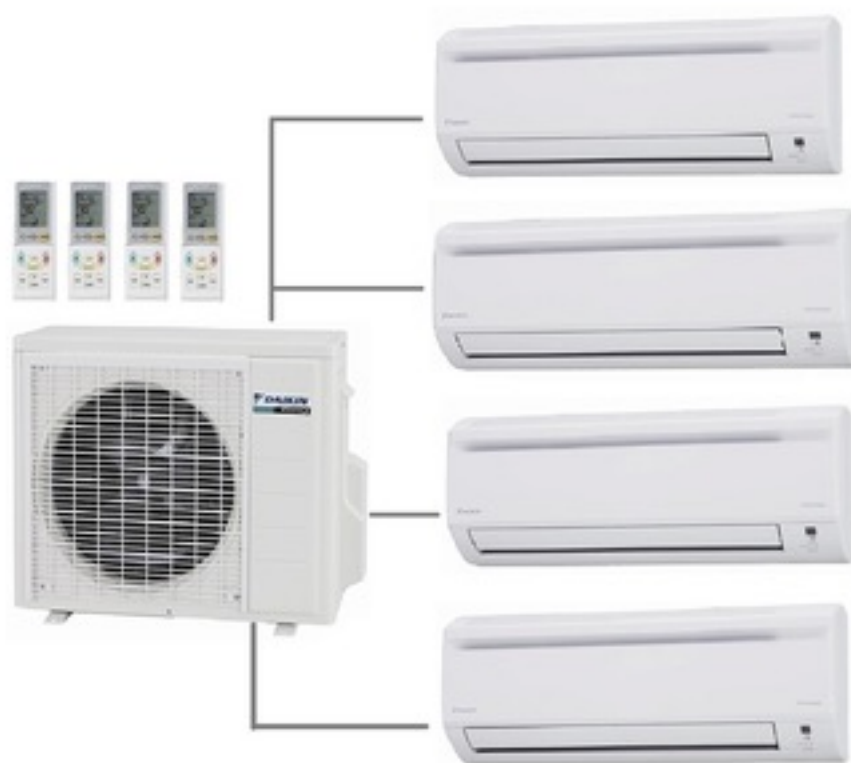
- **Poll: Water heating**
- Electric-powered, but highly efficient
- Transfer heat energy from outside air to a storage tank using a refrigerant with a very low boiling point
- 3 to 5 times more energy efficient than electric or gas hot water systems
- Can be set to operate at specific times (e.g. powered by solar)
- Read the MCPH heat pump FAQ on our website: mcph.org.au/resources/



Reverse cycle split systems

- **Poll: space heating**
- Air conditioners and heaters
- Also known as heat pumps
 - Uses the same technology as a heat pump hot water system and fridge
- You may already have one!
- About 3 – 5 times as efficient as other heaters
- Rated at 4.6kW might only draw 1.2kW of power, and only for periods of time
- Can come as single units, 'multi-head' units (connected to one heat pump) or ducted units

Multi-head split system



Induction cooktops

- Most efficient form of stove
- Uses electromagnetic waves to heat the cooking vessel
- Works with cast iron, certain stainless steel and induction-specific cookware
- No in-home pollution or health concerns of gas
- Very controllable and programmable, unlike electric resistive
- Doesn't heat the kitchen
- Easy to clean; safer to use



Actions:

- Visit mcph.org.au
- Register for a free, no-obligation quote or a free consultation
- Plan ahead to replace your hot water system at its end of life
- Use your reverse cycle AC as a heater!
- Take a step-by-step approach



Workshop summary:

- MCPH established to support community to access cheaper, cleaner energy and deliver community energy projects
- Our grid is evolving to be smarter and cleaner, but more complex
- Renewable content is highest during the day

- Different appliances consume vastly different amounts of energy
- It might be worth switching retailer
- Develop “energy consciousness”
- Efficient appliances are cheaper to run
- Improve your home’s ‘thermal envelope’
- Investing in solar is one of the best things you can do with your money – the rate of return is greater than most interest rates

- A heat pump hot water system can reduce your total home energy use by over 10%
- Reverse cycle split systems are the most efficient heaters AND coolers
- Induction cooktops are often the final frontier when going all-electric and getting off gas



Knowing more about how you
get your energy and how you
use it can save you money and
reduce carbon emissions.

It's also one more step towards a
zero-carbon future.

For more energy advice for your home, business or community, visit:

- Metro Community Power Hub: <https://www.mcph.org.au>
- Yarra Energy Foundation: <https://www.yef.org.au/>
- Sustainability Victoria: <https://www.sustainability.vic.gov.au/>

Further resources:

- Energy Rating: <https://www.energyrating.gov.au/>
- Renew: <https://www.renew.org.au/>
- Solar Victoria: <https://www.solar.vic.gov.au/>
- Energy (Victorian Government): <https://www.energy.vic.gov.au/>
- Victorian Energy Compare:
<https://www.compare.energy.vic.gov.au/>



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