

REWIRING NOOSA

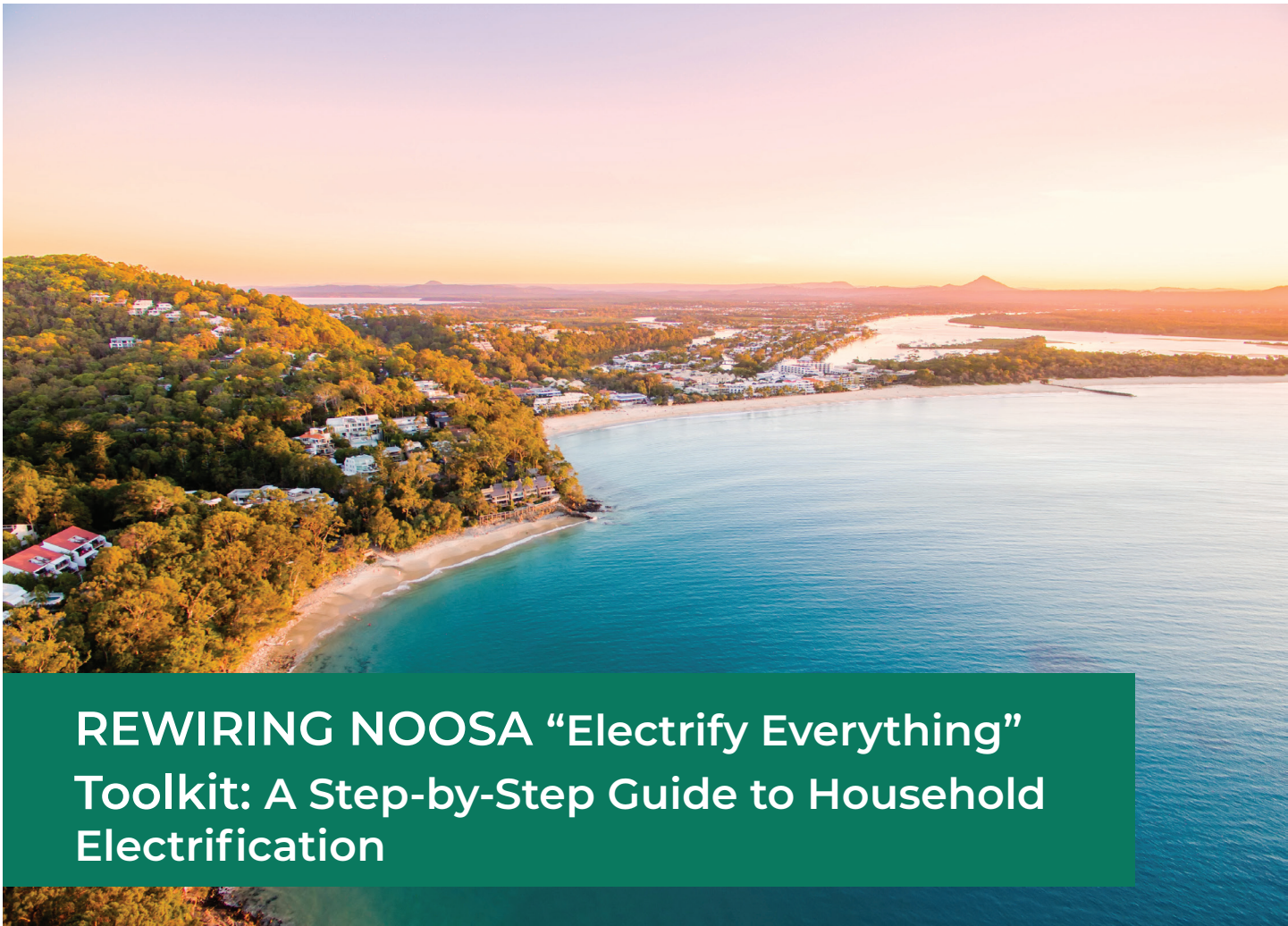
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EMISSIONS
NOOSA

**“ELECTRIFY
EVERYTHING”
TOOLKIT**

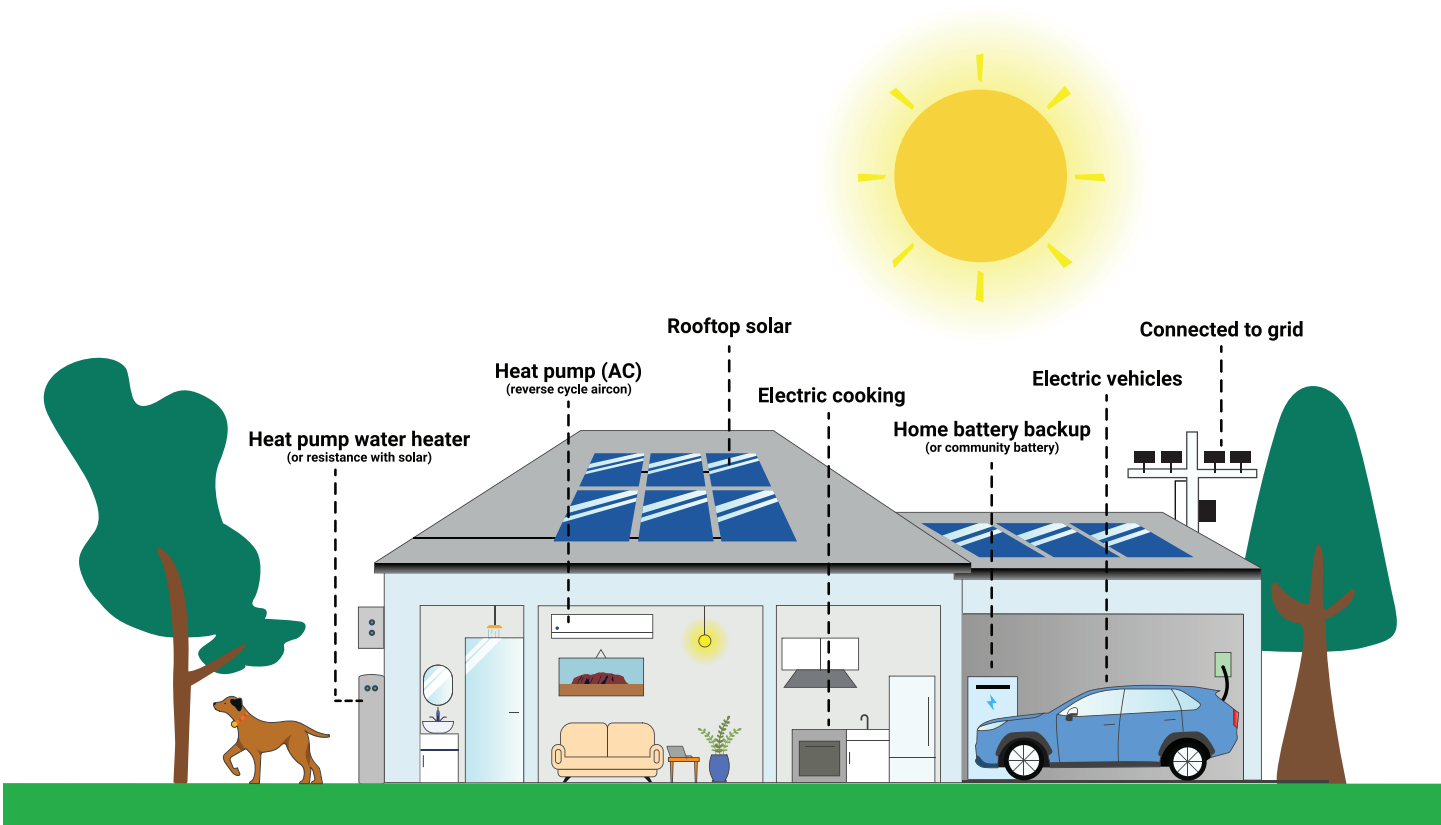
**A STEP-BY-STEP
GUIDE TO HOUSEHOLD
ELECTRIFICATION**

Proudly supported by Noosa Council





REWIRING NOOSA “Electrify Everything” Toolkit: A Step-by-Step Guide to Household Electrification



Are you tired of high household expenses and concerned about the impact of your carbon footprint on the environment? Look no further than switching to all-electric appliances and cars powered by clean electricity in Noosa Shire. Not only will you save up to 50% on your running costs compared to fossil fuel homes, but you'll also make a significant impact on reducing your carbon emissions. By making this simple change, you can help create a cleaner and more sustainable future for our planet. Don't wait - make the switch today and start saving money while making a positive impact on the environment!

Gas and petrol home
Average running costs \$5,300 per year \$53,000 over 10 year lifetime of appliances
<ul style="list-style-type: none"> ▪ Fossil fuel grid electricity ▪ Gas space heater ▪ Gas hot water heater ▪ Gas cooking ▪ Petrol and diesel cars
Energy emissions 9,550 kg CO₂e per year

Electrified home
Average running costs \$1,850 per year \$18,500 over 10 year lifetime of appliances
<ul style="list-style-type: none"> ▪ Rooftop solar and clean electricity ▪ Heat pump (reverse cycle AC) ▪ Heat pump hot water ▪ Induction cooking ▪ Electric cars
Energy emissions ZERO

Green Finance: State and Federal grants and rebates.

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INTRODUCTION

As the world continues to grapple with the effects of climate change, it has become imperative for individuals, communities, and governments to take steps to reduce their carbon footprint. One of the most significant contributors to global warming is the use of fossil fuels for energy, including coal and gas. To reduce greenhouse gas emissions and transition to a low-carbon future, households can electrify their homes by using renewable energy sources like solar power, heat pumps, and electric vehicles.

The “Electrify Everything” online toolkit is designed to provide households with a step-by-step guide to electrify their homes. This toolkit is specifically designed for residents of Noosa Shire, which has abundant sunshine and a high penetration of solar energy. The goal is to help households reduce their energy costs, increase their energy independence, and contribute to the transition to a low-carbon future.

Climate change is a pressing issue that requires immediate action from individuals, communities, and governments worldwide. Fossil fuels, such as coal and gas, are major contributors to global warming, making it essential to transition to renewable energy sources. One of the most effective ways to reduce carbon emissions is by electrifying homes, using clean energy sources like solar power, heat pumps, and electric vehicles. The “Electrify Everything” online toolkit provides a comprehensive guide for Noosa Shire residents to electrify their homes, cutting energy costs, increasing energy independence, and contributing to a sustainable future. With abundant sunshine and high solar energy penetration, Noosa Shire is the perfect location to implement this eco-friendly approach. Join the movement and take steps towards a low-carbon future today.

REWIRING WIDE BAY¹

The planet is heating. Fires and floods are hitting our communities. Beautiful natural places such as the Great Barrier Reef are at risk. This is a plan that would decarbonise Wide Bay as urgently as the science demands and deliver huge savings for households.

Our research shows that Australia can lead the world by electrifying our homes and vehicles and powering them with renewable energy.



\$4,580

Average household savings per year on energy and vehicle costs by 2030.



1,820 jobs

Direct and indirect jobs created from community savings and installation work.



100%

Reduction in household energy emissions.

THE PURPOSE OF THE TOOLKIT

The purpose of the Rewiring Noosa “Electrify Everything” toolkit is to provide households with a comprehensive guide on how to electrify their homes. The toolkit will cover eight ways to electrify a household, including solar power, cooking, heating and cooling, hot water, pool pumps and heaters, home batteries, electric vehicles, and monitoring and control.

The main objective of this toolkit is to encourage households to shift away from using fossil fuels for energy and transition to renewable energy sources. By electrifying their homes, households can reduce their carbon footprint and contribute to a cleaner, greener future.

Another critical objective of the toolkit is to help households reduce their energy costs. By using renewable energy sources, households can generate their electricity, which can significantly reduce their reliance on grid power. Additionally, by using energy-efficient appliances and devices, households can further reduce their energy consumption and save money on their energy bills.

¹ <https://www.rewiringaustralia.org/community/wide-bay>

HOW TO USE THE TOOLKIT

The “Electrify Everything” toolkit is designed to be user-friendly, non-technical, and easily understood. The toolkit will be available as a web-based toolkit that can be accessed from the ZEN Inc. website. Additionally, the toolkit will also be available as a set of PDF pages that can be printed and distributed to the community.

The toolkit will be organised into eight sections, one for each of the eight ways to electrify a household. Each section will be one page, and it will contain information on how to electrify that specific aspect of a household. The sections will be as follows:

Solar:

This section will provide information on how to install solar panels and generate electricity from the sun.

Cooking:

This section will provide information on how to electrify cooking appliances, such as ovens, cooktops, and BBQs.

Heating and Cooling:

This section will provide information on how to electrify heating and cooling appliances, such as air conditioners, heat pumps, and electric heaters.

Hot Water:

This section will provide information on how to electrify hot water systems, such as solar hot water systems, heat pumps, and electric hot water systems.

Pool Pumps and Heaters:

This section will provide information on how to electrify pool pumps and heaters and reduce energy consumption.

Home Batteries:

This section will provide information on how to install home batteries to store excess solar energy and reduce reliance on grid power.

Electric Vehicles:

This section will provide information on how to switch to an electric vehicle and reduce reliance on fossil fuel-powered vehicles.

Monitoring and Control:

This section will provide information on how to monitor and control energy usage in your home and reduce waste.

Each section is non-technical and contains links to current material on the ZEN Inc. website where appropriate. The information is easily understood, and each section is one page to make it easy for households to navigate and find the information they need.

HOUSEHOLD CASE STUDY VIDEO

In addition to the web-based toolkit and PDF pages, the “Electrify Everything” toolkit will also feature a household case study video. The video will showcase a local household in Noosa Shire that has successfully electrified their home. The video will provide an overview of the household’s electrification journey, including the challenges they faced and how they overcame them.

The video will serve as a useful resource for households that are considering electrifying their homes. By showcasing a real-life example of a household that has successfully made the transition to renewable energy sources, the video will provide inspiration and motivation for other households to do the same.

CONCLUSION

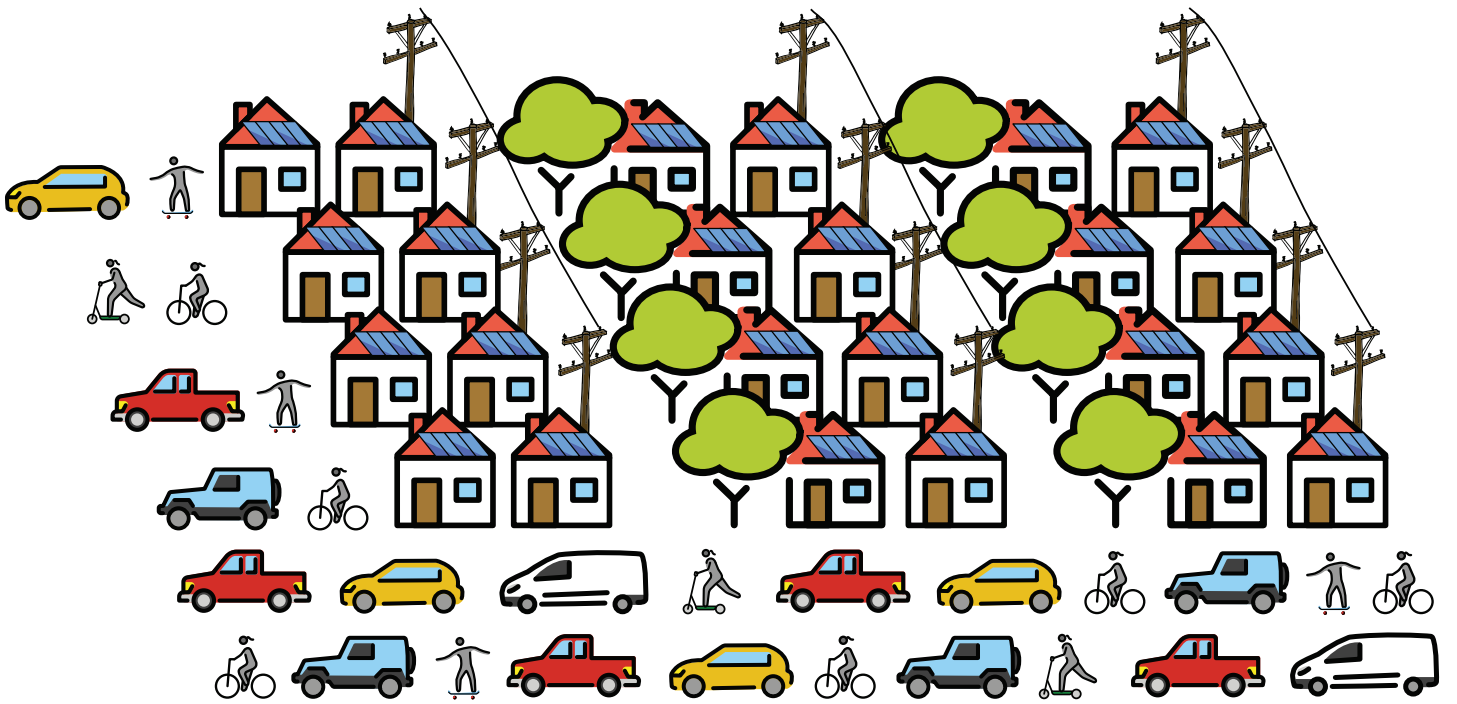
The Rewiring Noosa “Electrify Everything” online toolkit is a comprehensive guide that will help households in Noosa Shire electrify their homes. By providing information on seven ways to electrify a household, the toolkit will help households reduce their carbon footprint, save money on their energy bills, and contribute to a cleaner, greener future.

The toolkit is designed to be user-friendly and easily understood, with non-technical information and links to further resources. Additionally, the household case study video will provide real-life inspiration for households considering electrifying their homes.

By using renewable energy sources like solar power, heat pumps, and electric vehicles, households in Noosa Shire can play their part in the transition to a low-carbon future. The “Electrify Everything” toolkit will help make this transition easier, more accessible, and more affordable for households in the region.

This results in a fantastic opportunity for Australia, to lead the world on climate while saving money for families and putting more jobs into our communities.

At a community level, this means less oil imported from overseas, thousands of jobs in installation and maintenance for the next decade, and millions in energy savings for homes, a lot of which will be spent in the local economy improving the community even more. **It’s a story of community economic abundance, and a once in a lifetime opportunity for Australia.**





CHAPTER ONE: Solar

INTRODUCTION

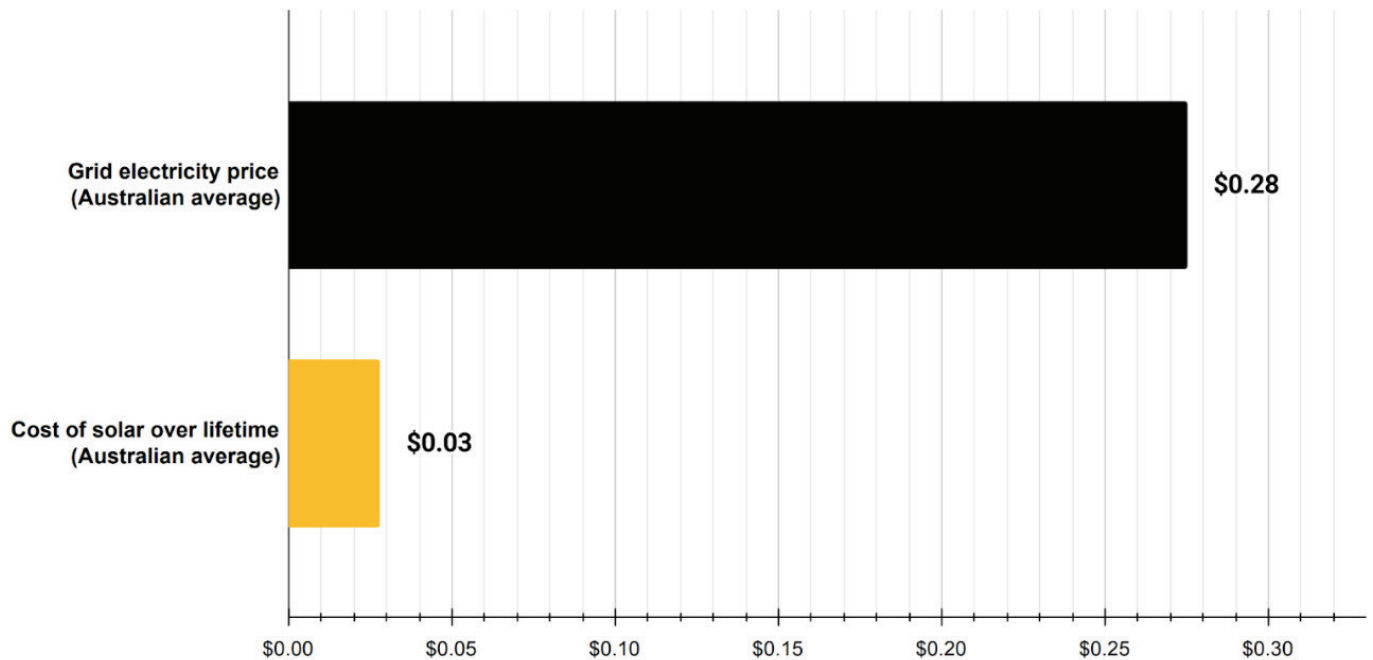
Solar power is becoming an increasingly popular option for households looking to reduce their reliance on grid power and transition to renewable energy sources. Solar panels generate electricity from the sun, and this electricity can be used to power a household's appliances and devices. In this chapter, we will provide information on how to install solar panels and estimate the costs and savings associated with this option.

Luckily in Australia we have access to the cheapest home energy in the world - our rooftop solar. We are the sunburnt country after all.

Over its lifetime rooftop solar costs about 3 cents per kWh, cheaper than any other source of home energy. Combined with a home or community battery it's still cheaper than the grid. When the grid becomes renewable you can use it for backup too, but the cheapest energy will always come from your roof.

Cost of grid electricity vs solar electricity

Solar capacity factor of 17.14%, \$838 /kW 25 year lifetime. SolarChoice & AEMC.



HOW TO INSTALL SOLAR PANELS

Installing solar panels requires a few steps, including:

1. Assessing your household's energy needs: Before installing solar panels, it is essential to determine how much energy your household uses on average. This will help you determine the number of solar panels you need to install to meet your energy needs.
2. Choosing a solar panel system: There are two types of solar panel systems: grid-tied and off-grid. Grid-tied systems are connected to the grid, and any excess energy generated by the solar panels is fed back into the grid. Off-grid systems are not connected to the grid and require batteries to store excess energy.
3. Finding a reputable solar panel installer: It is essential to find a reputable solar panel installer who can assess your household's energy needs, recommend a solar panel system, and install the panels.
4. Obtaining permits: Depending on where you live, you may need to obtain permits before installing solar panels. It is essential to check with your local government to determine what permits are required.
5. Installing the solar panels: Once you have chosen a solar panel system, found a reputable installer, and obtained the necessary permits, it is time to install the solar panels. The installation process typically takes a few days and involves mounting the panels on your roof and connecting them to your electrical system.

COSTS AND SAVINGS

The cost of installing solar panels varies depending on several factors, including the size of the system, the type of system, and the installation costs. On average, a standard 6-kilowatt solar panel system costs between \$5,000 and \$10,000 to install.

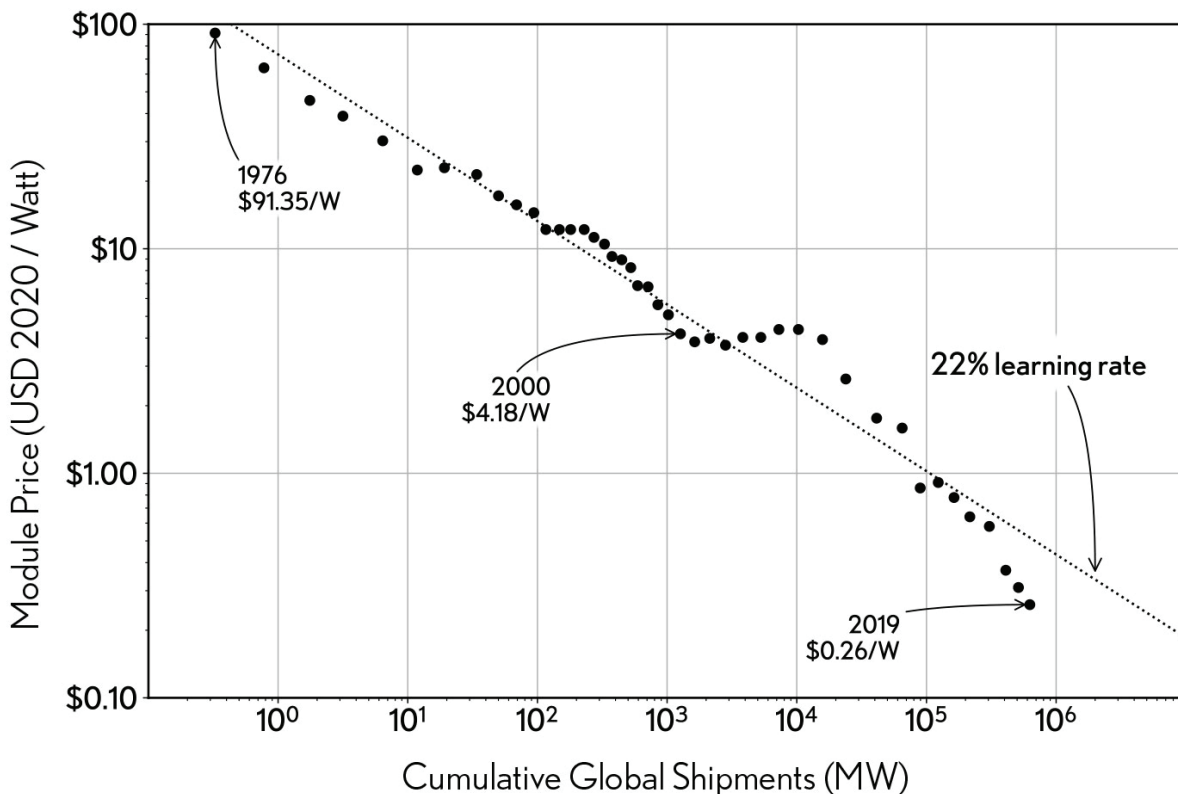
However, the cost of installing solar panels can be offset by the savings generated by using solar power. By generating your electricity, you can significantly reduce your reliance on grid power, which can save you money on your energy bills. The amount of money you can save depends on several factors, including the size of your solar panel system, your energy usage, and the cost of electricity in your area.

To estimate the savings associated with installing solar panels, you can use an online solar calculator. These calculators take into account your energy usage, the size of your solar panel system, and the cost of electricity in your area to estimate your savings.

For example, let's say you install a 6-kilowatt solar panel system, and your average monthly energy bill is \$150. According to the solar calculator, you could save approximately \$1,500 per year on your energy bills. Over the lifetime of the solar panel system, which is typically 25 years, you could save approximately \$37,500.

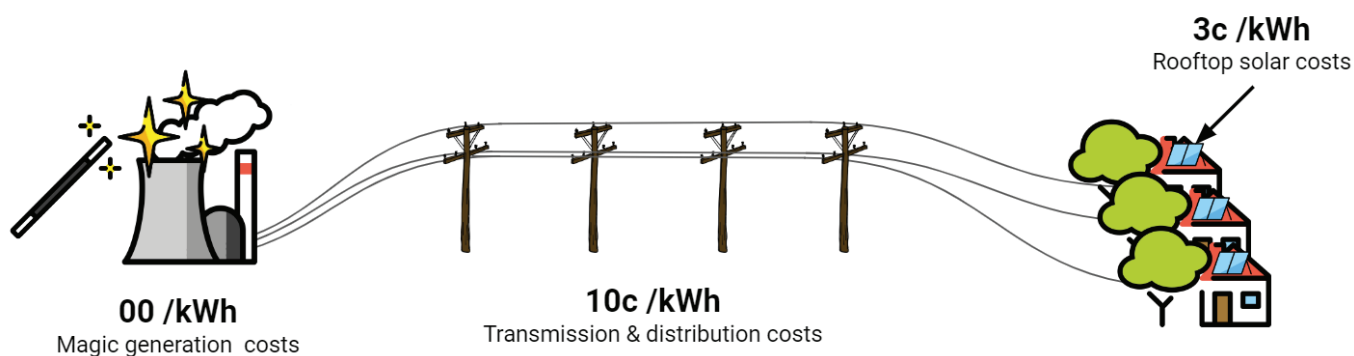
In addition to the savings generated by using solar power, installing solar panels can also increase the value of your home. According to a study by the Lawrence Berkeley National Laboratory, homes with solar panels sell for approximately 4% more than homes without solar panels.

COST OF SOLAR OVER TIME



Australian rooftop solar is so cheap that even a magic power plant providing free energy wouldn't beat it.

The cost of sending that energy over powerlines alone is more than the cost of the energy that comes from your roof. The best option is to power as much of your home off solar as you can.



CONCLUSION

Installing solar panels is an excellent way for households to reduce their reliance on grid power, save money on their energy bills, and contribute to a cleaner, greener future. While the initial cost of installing solar panels can be significant, the savings generated by using solar power can offset this cost over time.

By assessing your household's energy needs, choosing a solar panel system, finding a reputable installer, obtaining permits, and installing the solar panels, you can start generating your electricity and enjoying the benefits of solar power. Additionally, by using an online solar calculator, you can estimate the savings associated with installing solar panels and make an informed decision about whether solar power is right for your household.

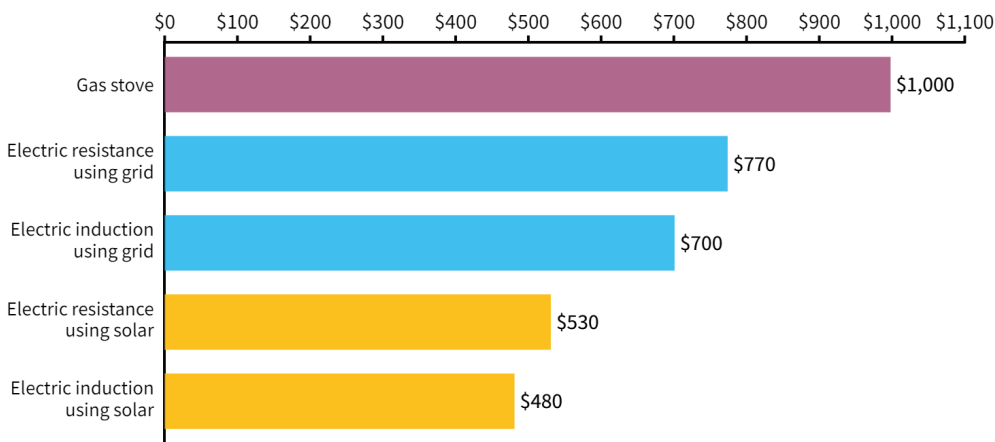


CHAPTER TWO: Cooking

INTRODUCTION

Cooking is an essential aspect of daily life, and households rely on a range of appliances to prepare their meals. Traditionally, cooking appliances have been powered by gas, which is a fossil fuel and contributes to greenhouse gas emissions. However, households can now electrify their cooking appliances by using renewable energy sources like solar power and heat pumps. This chapter will provide information on how households can electrify their cooking appliances, estimate the costs and savings, and provide real-life examples of households that have made the switch.

Stovetop cooking | Lifetime running costs



Based on average Australian stovetop cooking energy use of 200 kWh per year. Solar capacity factor of 17.14%, \$838 /kW. Gas price \$0.15 /kWh. Grid price \$0.27 /kWh. Induction COP 0.785. Resistance COP 0.711. Gas COP 0.304. Solar use 35%. 10 year appliance lifetime.



ELECTRIFYING COOKING APPLIANCES

There are several ways households can electrify their cooking appliances, including ovens, cooktops, and BBQs. The following are some of the most popular options:

- **Electric Ovens:** Electric ovens are a popular choice for households looking to electrify their cooking appliances. Electric ovens use electricity to generate heat, which is then used to cook food. Electric ovens are available in a range of sizes and styles, including freestanding, wall-mounted, and built-in.
- **Induction Cooktops:** Induction cooktops use electricity to generate a magnetic field, which then heats up the cookware. Induction cooktops are more energy-efficient than traditional gas or electric cooktops, as they only heat up the cookware and not the surrounding air. Induction cooktops are also safer, as they do not produce an open flame.
- **Electric BBQs:** Electric BBQs are a popular choice for households looking to electrify their outdoor cooking appliances. Electric BBQs use electricity to generate heat, which is then used to cook food. Electric BBQs are available in a range of sizes and styles, including portable and built-in models.

COSTS AND SAVINGS

The costs and savings of electrifying cooking appliances will vary depending on the type of appliance and the household's energy consumption. The following are some estimated costs and savings for electrifying cooking appliances:

- **Electric Ovens:** The cost of an electric oven can range from \$500 to \$2,000, depending on the size and style. The installation costs will also vary depending on whether the oven is freestanding or built-in. However, households can save money on their energy bills by using an electric oven, as they are more energy-efficient than gas ovens. On average, households can save up to \$100 per year by using an electric oven.
- **Induction Cooktops:** The cost of an induction cooktop can range from \$500 to \$2,000, depending on the size and style. The installation costs will also vary depending on whether the cooktop is freestanding or built-in. However, households can save money on their energy bills by using an induction cooktop, as they are more energy-efficient than gas or electric cooktops. On average, households can save up to \$150 per year by using an induction cooktop.
- **Electric BBQs:** The cost of an electric BBQ can range from \$200 to \$1,000, depending on the size and style. The installation costs will also vary depending on whether the BBQ is portable or built-in. However, households can save money on their energy bills by using an electric BBQ, as they are more energy-efficient than

gas BBQs. On average, households can save up to \$50 per year by using an electric BBQ.

REAL-LIFE EXAMPLES

The following are some real-life examples of households that have electrified their cooking appliances:

- **The Smith Family:** The Smith family decided to electrify their cooking appliances by installing an electric oven and induction cooktop. The cost of the appliances and installation was \$1,500. However, the Smith family has already seen a significant reduction in their energy bills, with savings of up to \$200 per year.
- **The Jones Family:** The Jones family decided to electrify their outdoor cooking appliances by installing an electric BBQ. The cost of the BBQ and installation was \$500. The Jones family has also seen a reduction in their energy bills, with savings of up to \$50 per year.

CONCLUSION

Electrifying cooking appliances is an effective way for households to reduce their carbon footprint and save money on their energy bills. By using renewable energy sources like solar power and heat pumps, households can generate their electricity and reduce their reliance on grid power. Additionally, by using energy-efficient appliances like electric ovens, induction cooktops, and electric BBQs, households can further reduce their energy consumption and save money on their energy bills.

The costs and savings of electrifying cooking appliances will vary depending on the type of appliance and the household's energy consumption. However, households can expect to save up to \$150 per year by using an induction cooktop, up to \$100 per year by using an electric oven, and up to \$50 per year by using an electric BBQ.

Real-life examples of households that have electrified their cooking appliances show that the initial costs of installation can be recouped quickly through energy savings. The Smith family and the Jones family have both seen significant reductions in their energy bills and are contributing to a cleaner, greener future by using renewable energy sources.

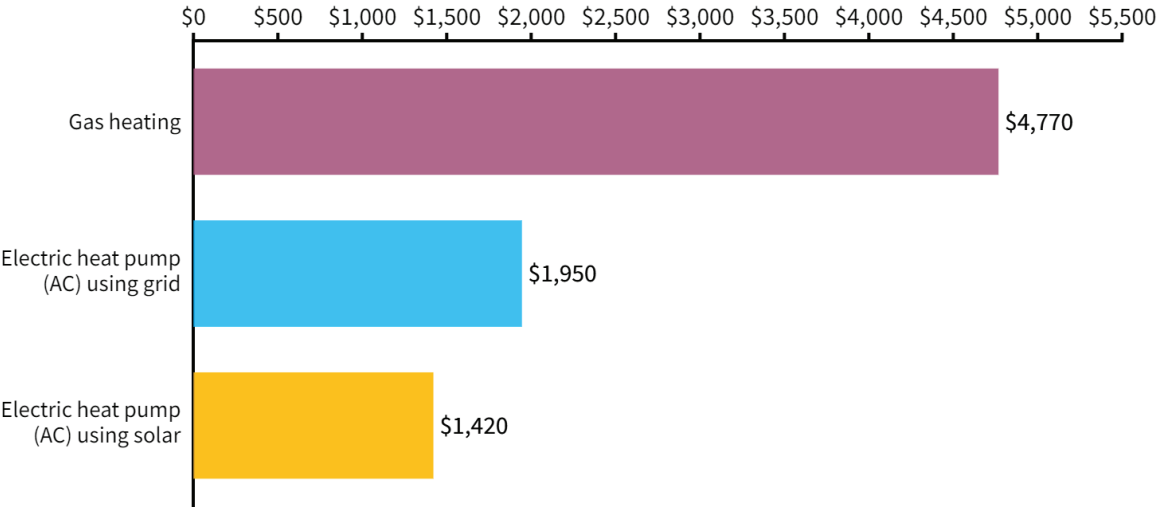


CHAPTER THREE: Heating and Cooling

INTRODUCTION

Heating and cooling are essential aspects of any household, especially in regions with extreme temperatures. However, traditional heating and cooling systems that rely on fossil fuels are significant contributors to greenhouse gas emissions. To reduce carbon emissions and transition to a low-carbon future, households can electrify their heating and cooling systems by using renewable energy sources like heat pumps and solar power.

Space heaters | Lifetime running costs



Based on average Australian heating energy use of 2828 kWh per year. Solar capacity factor of 17.14%, \$838 /kW. Gas price \$0.15 /kWh. Grid price \$0.27 /kWh. Heat pump COP 4.0. Gas COP 0.9. Solar use 30%. 10 year appliance lifetime.



This chapter will provide a step-by-step guide on how to electrify heating and cooling appliances, estimated costs, and savings.

Step 1: Assess Your Current Heating and Cooling System

The first step in electrifying your heating and cooling system is to assess your current system. Determine the type of heating and cooling system you have, its age, and its efficiency. If your current system is old and inefficient, it may be time to replace it with a more energy-efficient system.

Step 2: Choose an Energy-Efficient Heating and Cooling System

The most common energy-efficient heating and cooling systems are heat pumps and solar systems. Heat pumps work by extracting heat from the air or ground and transferring it into your home. Solar systems, on the other hand, use the sun's energy to heat and cool your home.

Heat pumps are a popular choice for heating and cooling because they are highly efficient and can reduce energy consumption by up to 50%. They are also versatile and can be used in different climates. However, the upfront cost of installing a heat pump can be high, ranging from \$3,000 to \$10,000.

Solar systems are another option for heating and cooling your home. They work by using the sun's energy to heat and cool your home. Solar heating and cooling systems can be expensive, with installation costs ranging from \$10,000 to \$30,000. However, they can provide significant savings on energy bills in the long run.

Step 3: Install Energy-Efficient Appliances

Once you have chosen an energy-efficient heating and cooling system, the next step is to install energy-efficient appliances. Energy-efficient appliances like air conditioners, fans, and heaters can significantly reduce energy consumption and save money on energy bills.

When choosing energy-efficient appliances, look for appliances with an Energy Star rating. Energy Star appliances meet strict energy efficiency guidelines set by the US Environmental Protection Agency (EPA) and can save up to 30% on energy bills.

Step 4: Maintain Your Heating and Cooling System

To ensure that your heating and cooling system operates efficiently, it is essential to maintain it regularly. Regular maintenance can help prevent breakdowns, extend the life of your system, and reduce energy consumption.

Regular maintenance includes cleaning air filters, checking refrigerant levels, and inspecting ductwork for leaks. It is also advisable to have a professional inspect and service your heating and cooling system annually.

ESTIMATED COSTS AND SAVINGS

The cost of electrifying your heating and cooling system can vary depending on the type of system you choose and the size of your home. However, the following are estimated costs and savings for different heating and cooling systems.

Heat Pumps

The upfront cost of installing a heat pump can range from \$3,000 to \$10,000, depending on the size of your home and the type of heat pump you choose. However, heat pumps can provide significant savings on energy bills, with savings ranging from 25% to 50%.

For example, suppose you replace an old, inefficient heating and cooling system with a heat pump. In that case, you can save up to \$1,500 per year on energy bills, depending on the size of your home and the type of heat pump you choose.

Solar Heating and Cooling

The upfront cost of installing a solar heating and cooling system can range from \$10,000 to \$30,000, depending on the size of your home and the type of system you choose. However, solar heating and cooling systems can provide significant savings on energy bills, with savings ranging from 50% to 100%.

For example, suppose you install a solar heating and cooling system in your home. In that case, you can save up to \$2,500 per year on energy bills, depending on the size of your home and the type of system you choose.

Energy-Efficient Appliances

The cost of energy-efficient appliances can vary depending on the type of appliance you choose. However, energy-efficient appliances can provide significant savings on energy bills, with savings ranging from 10% to 30%.

For example, suppose you replace an old, inefficient air conditioner with an Energy Star rated air conditioner. In that case, you can save up to \$150 per year on energy bills.

Conclusion

Electrifying your heating and cooling system is an essential step in reducing your carbon footprint and transitioning to a low-carbon future. By choosing energy-efficient heating and cooling systems and appliances, households can significantly reduce energy consumption and save money on energy bills.

Heat pumps and solar systems are popular choices for heating and cooling because they are highly efficient and can provide significant savings on energy bills. However, the upfront cost of installing these systems can be high.

Regular maintenance of your heating and cooling system is also essential to ensure that it operates efficiently and reduces energy consumption.

Overall, electrifying your heating and cooling system can provide significant savings on energy bills and contribute to a cleaner, greener future.



CHAPTER FOUR: Hot Water Systems

INTRODUCTION

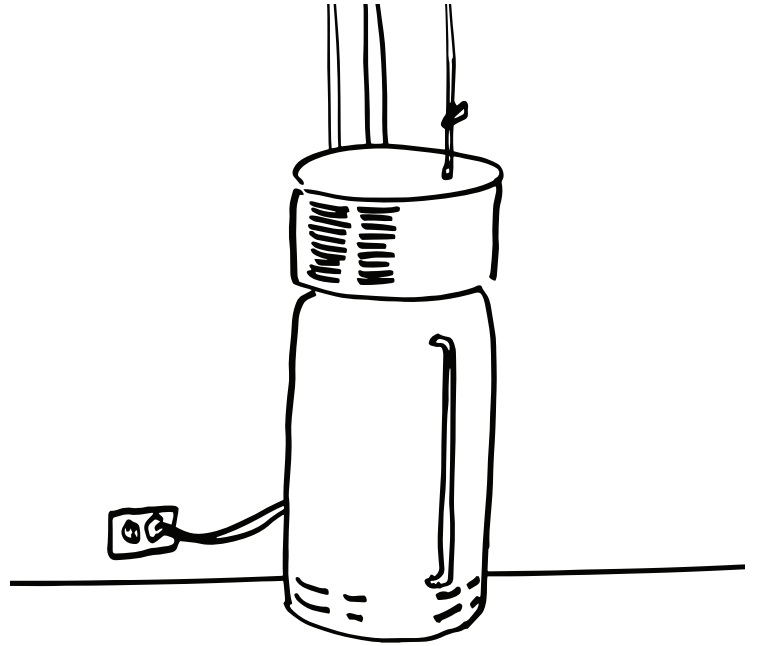
Hot water is an essential part of daily life, and it is also one of the biggest energy users in households. Traditionally, hot water systems have relied on fossil fuels such as gas or electricity generated from coal. However, with the increasing availability of renewable energy sources, households can now electrify their hot water systems using solar hot water systems, heat pumps, and electric hot water systems. This chapter will provide information on how to electrify hot water systems, the estimated costs and savings, and the benefits of using renewable energy sources.

SOLAR HOT WATER SYSTEMS

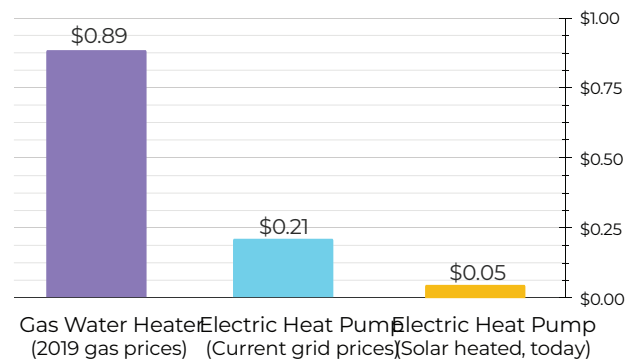
Solar hot water systems use the sun's energy to heat water. They consist of solar collectors that are installed on the roof, a storage tank, and a pump or controller. The solar collectors absorb the sun's energy and transfer it to the water, which is then stored in the tank for later use.

The estimated cost of installing a solar hot water system in Noosa Shire is between \$3,000 and \$7,000, depending on the size of the system and the complexity of the installation. The cost includes the solar collectors, storage tank, pump or controller, and installation. However, rebates and incentives are available to reduce the cost of installation.

The estimated savings from using a solar hot water system are significant. According to the Clean Energy Council, a solar hot water system can reduce hot water energy consumption by up to 90%. This can result in savings of up to \$700 per year on energy bills, depending on the size of the system and the household's hot water usage.



QLD water heating cost for one luxurious shower



Heating the water for a shower with a gas water heater costs about 89 cents with standard gas prices (2019). An electric heat pump water heater costs just 21 cents to provide the same hot shower using grid electricity. Using rooftop solar, that shower costs just 5 cents, over 10 times less than a gas shower. Heat pumps for room heating provide the same cost benefits compared with gas heaters. An electric induction stovetop is cheaper than a gas stove and also provides health benefits inside the home, as the invisible pollutants from gas stoves cause significant negative health impacts.

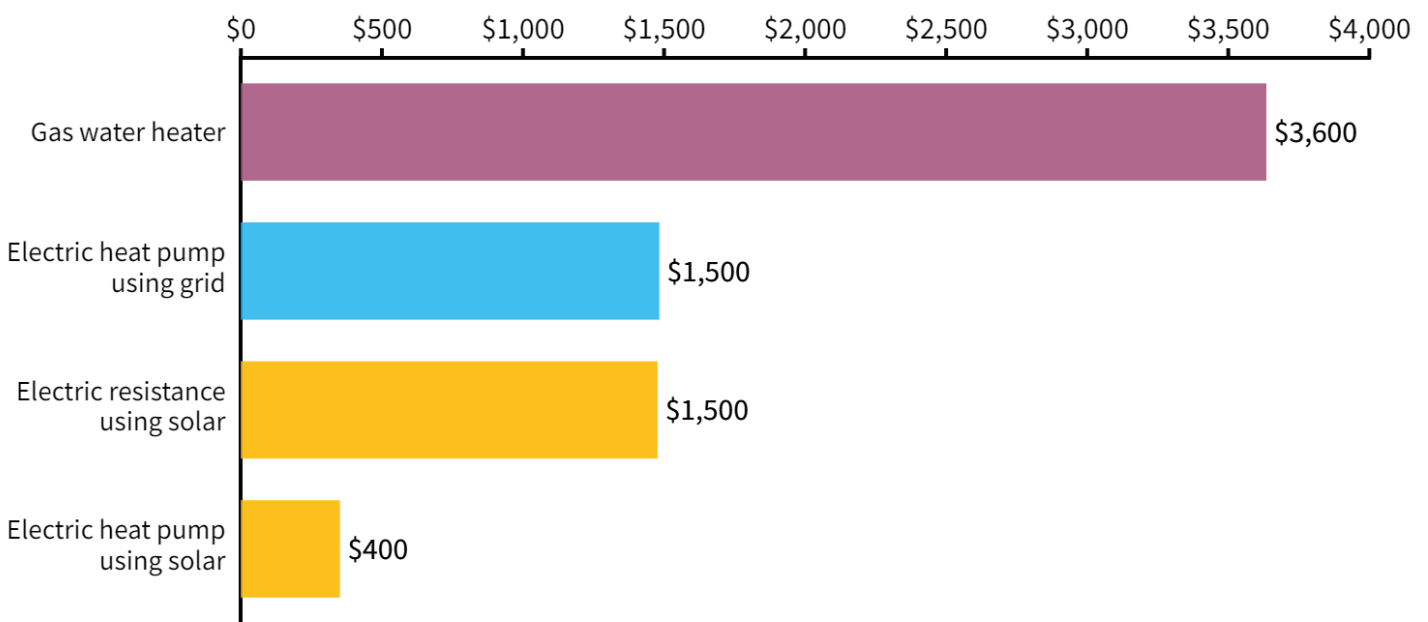
HEAT PUMPS

Heat pumps are another option for electrifying hot water systems. They work by extracting heat from the air or ground and transferring it to the water. Heat pumps are highly efficient and can produce hot water at a fraction of the cost of traditional hot water systems.

The estimated cost of installing a heat pump hot water system in Noosa Shire is between \$3,000 and \$5,000, depending on the size of the system and the complexity of the installation. The cost includes the heat pump unit, storage tank, and installation. Rebates and incentives are also available to reduce the cost of installation.

The estimated savings from using a heat pump hot water system are significant. According to the Clean Energy Council, a heat pump hot water system can reduce hot water energy consumption by up to 65%. This can result in savings of up to \$500 per year on energy bills, depending on the size of the system and the household's hot water usage.

Water heaters | Lifetime running costs



Based on average Australian water heating energy use of 2156 kWh per year. Solar capacity factor of 17.14%, \$838 /kW. Gas price \$0.15 /kWh. Grid price \$0.27 /kWh. Heat pump COP 4.0. Electric resistance COP 0.95. Gas COP 0.9. 10 year appliance lifetime.



ELECTRIC HOT WATER SYSTEMS

Electric hot water systems are the most common type of hot water system in Australia. However, they are also the least efficient and most expensive to run. Electric hot water systems work by heating water using an electric element in the storage tank.

The estimated cost of installing an electric hot water system in Noosa Shire is between \$800 and \$1,500, depending on the size of the system and the complexity of the installation. The cost includes the storage tank and installation. However, rebates and incentives are available to reduce the cost of installation.

The estimated savings from using an electric hot water system are minimal. According to the Clean Energy Council, an electric hot water system can be up to three times more expensive to run than a solar or heat pump hot water system. This can result in higher energy bills, depending on the size of the system and the household's hot water usage.

BENEFITS OF ELECTRIFYING HOT WATER SYSTEMS

There are several benefits to electrifying hot water systems using renewable energy sources. Firstly, it reduces greenhouse gas emissions and helps to mitigate the effects of climate change. According to the Clean Energy Council, a solar or heat pump hot water system can reduce greenhouse gas emissions by up to 75% compared to an electric hot water system.

Secondly, electrifying hot water systems can reduce energy costs and increase energy independence. By using renewable energy sources, households can generate their electricity, which can significantly reduce their reliance on grid power. Additionally, by using energy-efficient appliances and devices, households can further reduce their energy consumption and save money on their energy bills.

Thirdly, electrifying hot water systems can increase the value of a property. Studies have shown that homes with solar or heat pump hot water systems have a higher resale value than homes with traditional hot water systems.

CONCLUSION

Electrifying hot water systems using renewable energy sources like solar hot water systems and heat pumps is a cost-effective and environmentally friendly way to reduce energy costs and greenhouse gas emissions. While electric hot water systems are the most common type of hot water system in Australia, they are also the least efficient and most expensive to run.

The estimated costs and savings for electrifying hot water systems vary depending on the type of system and the size of the household. However, rebates and incentives are available to reduce the cost of installation, making it a more accessible option for households.

By electrifying hot water systems, households in Noosa Shire can play their part in the transition to a low-carbon future. The estimated savings from using renewable energy sources can significantly reduce energy costs, increase energy independence, and increase the value of a property.



CHAPTER FIVE: Pool pumps and heaters

INTRODUCTION

Pool pumps and heaters are essential for maintaining a comfortable swimming pool temperature and ensuring the water is clean and safe to swim in. However, traditional pool pumps and heaters are energy-intensive and can contribute significantly to a household's carbon footprint. In this section of the “Electrify Everything” toolkit, we will explore ways to electrify pool pumps and heaters and reduce energy consumption. We will also provide estimated costs and savings to help households make informed decisions about electrifying their pool equipment.

WHY ELECTRIFY POOL PUMPS AND HEATERS?

Traditional pool pumps and heaters are powered by electricity or gas, both of which are fossil fuels. These fuels emit greenhouse gases, contributing to global warming and climate change. By electrifying pool pumps and heaters, households can reduce their reliance on fossil fuels and transition to renewable energy sources like solar power. Additionally, electrifying pool equipment can result in significant energy savings, reducing households' energy bills and saving money in the long run.

HOW TO ELECTRIFY POOL PUMPS AND HEATERS

There are several ways to electrify pool pumps and heaters. The most common options are:

Variable Speed Pumps

Variable speed pool pumps are designed to operate at different speeds depending on the

pool's needs. They use less energy than traditional single-speed pumps, reducing energy consumption and saving money on energy bills. Variable speed pumps can be powered by solar panels, making them an excellent option for households looking to transition to renewable energy sources.

Costs: Variable speed pool pumps can cost between \$500 and \$1,500, depending on the brand, model, and installation requirements. Solar-powered variable speed pumps can cost between \$2,000 and \$4,000, including installation.

Savings: Variable speed pool pumps can save households up to 90% on their pool's energy consumption, resulting in significant energy bill savings. According to Energy.gov, a variable speed pump can save households up to \$445 per year on their energy bills.

HEAT PUMPS

Heat pumps are an energy-efficient way to heat swimming pool water. They work by extracting heat from the air and transferring it to the pool water, using less energy than traditional gas or electric heaters. Heat pumps can be powered by solar panels, making them an excellent option for households looking to transition to renewable energy sources.

Costs: Heat pumps can cost between \$2,500 and \$5,000, depending on the brand, model, and installation requirements. Solar-powered heat pumps can cost between \$4,000 and \$8,000, including installation.

Savings: Heat pumps can save households up to 80% on their pool heating costs, resulting in significant energy bill savings. According to Energy.gov, a heat pump can save households up to \$2,000 per year on their pool heating costs.

SOLAR POOL HEATERS

Solar pool heaters use solar panels to heat swimming pool water. They are an excellent option for households looking to transition to renewable energy sources and reduce their energy consumption. Solar pool heaters are most effective in areas with abundant sunshine, making them an excellent option for households in Noosa Shire.

Costs: Solar pool heaters can cost between \$3,000 and \$7,000, depending on the brand, model, and installation requirements.

Savings: Solar pool heaters can save households up to 100% on their pool heating costs, resulting in significant energy bill savings. According to Energy.gov, a solar pool heater can save households up to \$3,000 per year on their pool heating costs.

ESTIMATED COSTS AND SAVINGS

The table below provides estimated costs and savings for electrifying pool pumps and heaters in Noosa Shire.

Pool Equipment	Estimated Cost	Estimated Savings
Variable Speed Pool Pump	\$500 - \$1,500	Up to \$445 per year
Solar-Powered Variable Speed Pool Pump	\$2,000 - \$4,000	Up to \$445 per year
Heat Pump	\$2,500 - \$5,000	Up to \$2,000 per year
Solar-Powered Heat Pump	\$4,000 - \$8,000	Up to \$2,000 per year
Solar Pool Heater	\$3,000 - \$7,000	Up to \$3,000 per year

Note: The estimated costs and savings are based on average prices and energy consumption in Noosa Shire. Actual costs and savings may vary depending on household size, pool size, energy consumption, and other factors.

CONCLUSION

Electrifying pool pumps and heaters is an effective way to reduce energy consumption, save money on energy bills, and transition to renewable energy sources. Variable speed pool pumps, heat pumps, and solar pool heaters are all excellent options for households in Noosa Shire. By using these energy-efficient and renewable technologies, households can contribute to a cleaner, greener future while enjoying a comfortable and safe swimming pool. The estimated costs and savings provided in this section can help households make informed decisions about electrifying their pool equipment and reducing their carbon footprint.



CHAPTER SIX: Home Batteries

INTRODUCTION

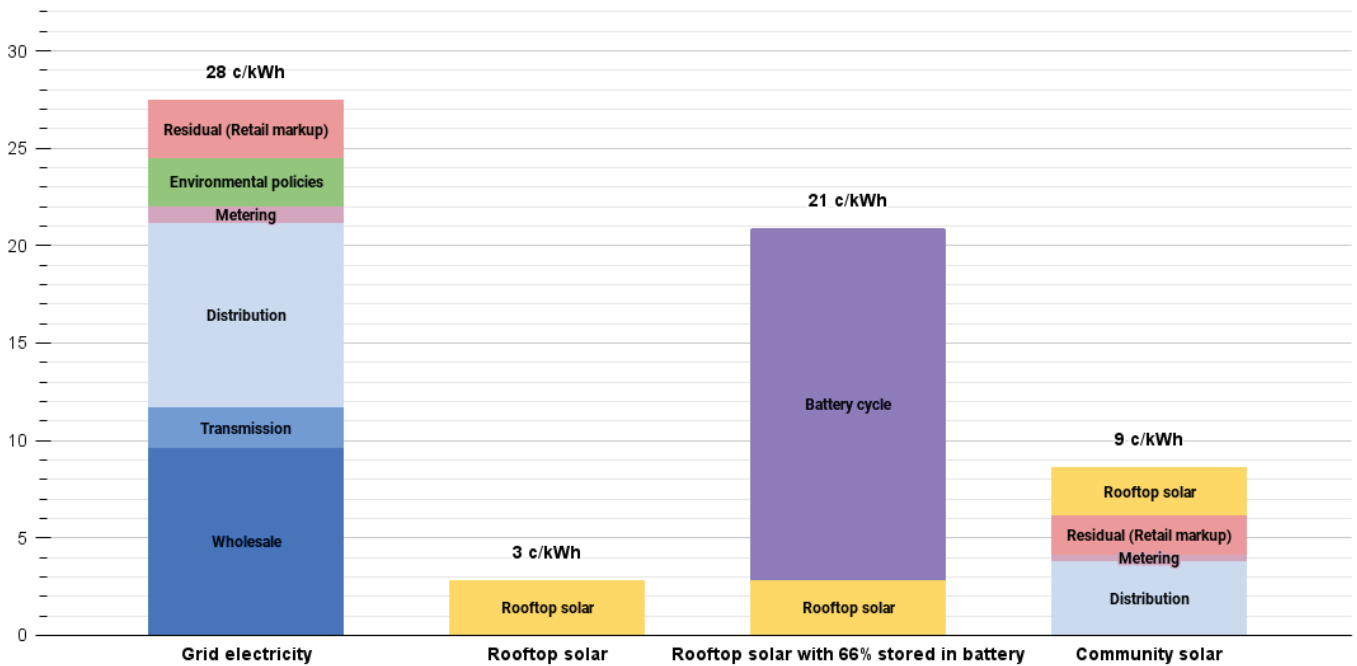
Home batteries are a crucial component of household electrification. They allow households to store excess solar energy generated during the day and use it during the night or during periods of low solar output. By using home batteries, households can reduce their reliance on grid power and increase their energy independence. This section of the “Electrify Everything” toolkit will provide information on how to install home batteries and estimate the costs and savings associated with their use.

Rooftop and community generated solar with batteries are already less than average grid costs. With battery prices falling fast.

The lowest cost energy of the future will come from homes and communities, and then the grid. The grid is an important part of the future, but it should be recognised that likely the best outcome is for most energy to be generated and used locally.

Long distance fossil fuel grid electricity versus rooftop and community solar

Source: AEMC Price Trends 2021. SolarChoice. SolarAnalytics. Capacity Factor 17.14%.



TYPES OF HOME BATTERIES

There are several types of home batteries available in the market, including lead-acid batteries, lithium-ion batteries, flow batteries, and saltwater batteries. Each type has its advantages and disadvantages, and the choice of battery will depend on several factors, including cost, performance, and durability.

Lead-acid batteries are the oldest and most common type of home battery. They are relatively cheap and have a long lifespan. However, they are heavy and bulky and require regular maintenance. Lithium-ion batteries are a newer type of battery that is becoming increasingly popular. They are lightweight, have a high energy density, and require little maintenance. However, they are more expensive than lead-acid batteries and have a shorter lifespan.

Flow batteries are another type of home battery that is gaining popularity. They are highly durable and have a long lifespan. However, they are still relatively expensive and have a lower energy density than lithium-ion batteries. Saltwater batteries are a new type of battery that is still in the early stages of development. They are non-toxic, non-flammable, and have a long lifespan. However, they are still relatively expensive and have a lower energy density than lithium-ion batteries.

COSTS AND SAVINGS

The cost of installing a home battery will depend on several factors, including the type of battery, the size of the battery, and the cost of installation. The cost of a home battery can range from a few thousand dollars to tens of thousands of dollars. However, the cost of home batteries is expected to decrease in the coming years as the technology improves and economies of scale are achieved.

Despite the upfront cost, home batteries can provide significant savings over the long term. By storing excess solar energy, households can reduce their reliance on grid power, which can significantly reduce their energy bills. The amount of savings will depend on several factors, including the size of the battery, the amount of solar energy generated, and the household's energy consumption.

To estimate the potential savings of using a home battery, we can consider the following example. Suppose a household in Noosa Shire generates an average of 20 kWh of solar energy per day and consumes an average of 25 kWh of energy per day. The household can install a 10 kWh home battery to store excess solar energy generated during the day and use it during the night. Assuming an average cost of grid power of \$0.30 per kWh, the household can save up to \$2,190 per year on their energy bills.

However, the actual savings will depend on several factors, including the cost of the home battery, the lifespan of the battery, and the cost of grid power. Additionally, households that generate more solar energy than they consume may be able to sell excess energy back to the grid, further increasing their savings.

INSTALLATION AND MAINTENANCE

Installing a home battery requires professional installation, which can add to the upfront cost. However, the installation process is relatively straightforward and can be completed in a few hours. The installation process will involve connecting the battery to the solar panels and the household's electrical system.

Home batteries require little maintenance, although they may need occasional cleaning and inspection to ensure optimal performance. The lifespan of a home battery will depend on several factors, including the type of battery, the size of the battery, and the household's energy consumption.

CONCLUSION

Home batteries are a crucial component of household electrification. They allow households to store excess solar energy and reduce their reliance on grid power, increasing their energy independence and reducing their carbon footprint. Although the upfront cost of home batteries can be high, they can provide significant savings over the long term. The actual savings will depend on several factors, including the size of the battery, the amount of solar energy generated, and the household's energy consumption.

The “Electrify Everything” toolkit provides households with a step-by-step guide on how to install home batteries and estimate the costs and savings associated with their use. By using home batteries, households in Noosa Shire can contribute to the transition to a low-carbon future and increase their energy independence.



CHAPTER SEVEN: Electric Vehicles (EVs)

INTRODUCTION

The transportation sector is a significant contributor to global greenhouse gas emissions, accounting for approximately 14% of emissions worldwide. One way to reduce these emissions is to switch from fossil fuel-powered vehicles to electric vehicles (EVs). EVs are powered by electricity from batteries, which can be charged using renewable energy sources like solar power. This chapter will provide information on how households in Noosa Shire can switch to EVs, including the costs and savings associated with this transition.

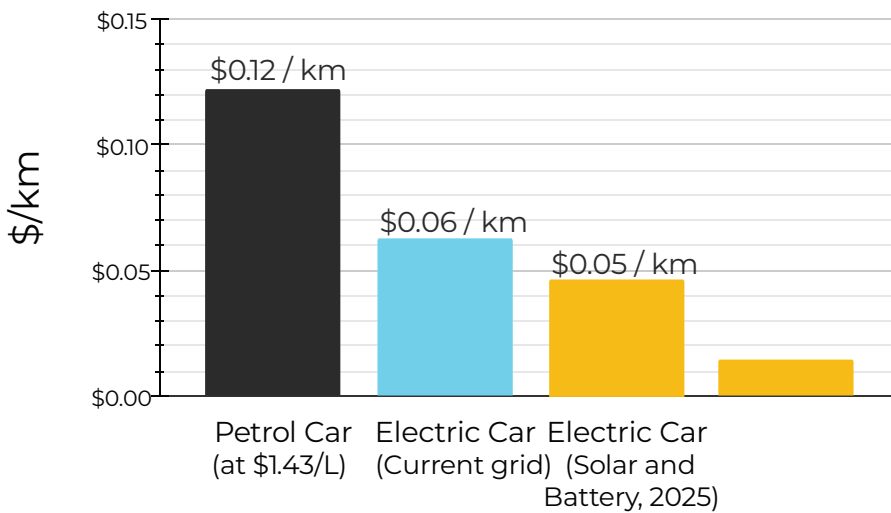
WHY SWITCH TO ELECTRIC VEHICLES?

Switching to EVs has several benefits, including:

- **Reduced greenhouse gas emissions:** EVs produce significantly fewer emissions than fossil fuel-powered vehicles. In Australia, the average emissions from a new petrol car are 180g CO₂/km, while the average emissions from an EV are 0g CO₂/km.
- **Reduced air pollution:** EVs produce no tailpipe emissions, which can improve air quality and reduce health impacts from air pollution.
- **Reduced noise pollution:** EVs are quieter than fossil fuel-powered vehicles, which can reduce noise pollution in urban areas.
- **Reduced fuel costs:** EVs are cheaper to run than fossil fuel-powered vehicles, with lower fuel costs and maintenance costs.

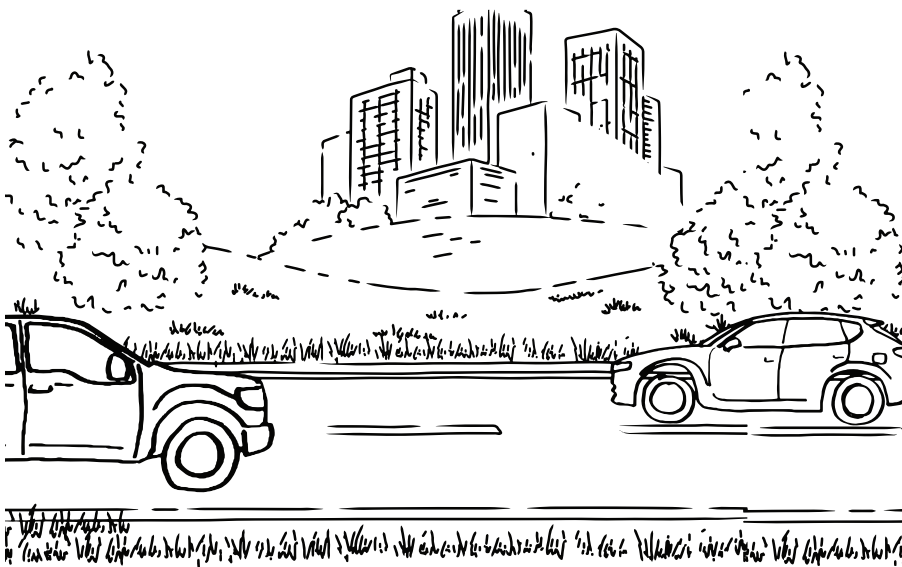
- **Increased energy independence:** By using renewable energy sources like solar power to charge their EVs, households can become more energy independent and reduce their reliance on fossil fuels.

QLD driving cost per km - petrol car versus electric car - mid-size



An electric car costs about 6 cents per km to drive if charged from the grid, compared to a petrol car which costs about 12 cents per km (when petrol is at \$1.43/L).

Charging an electric car with rooftop solar reduces this even further, to about 1 cent a km, over 10 times less than a petrol car.



HOW TO SWITCH TO ELECTRIC VEHICLES

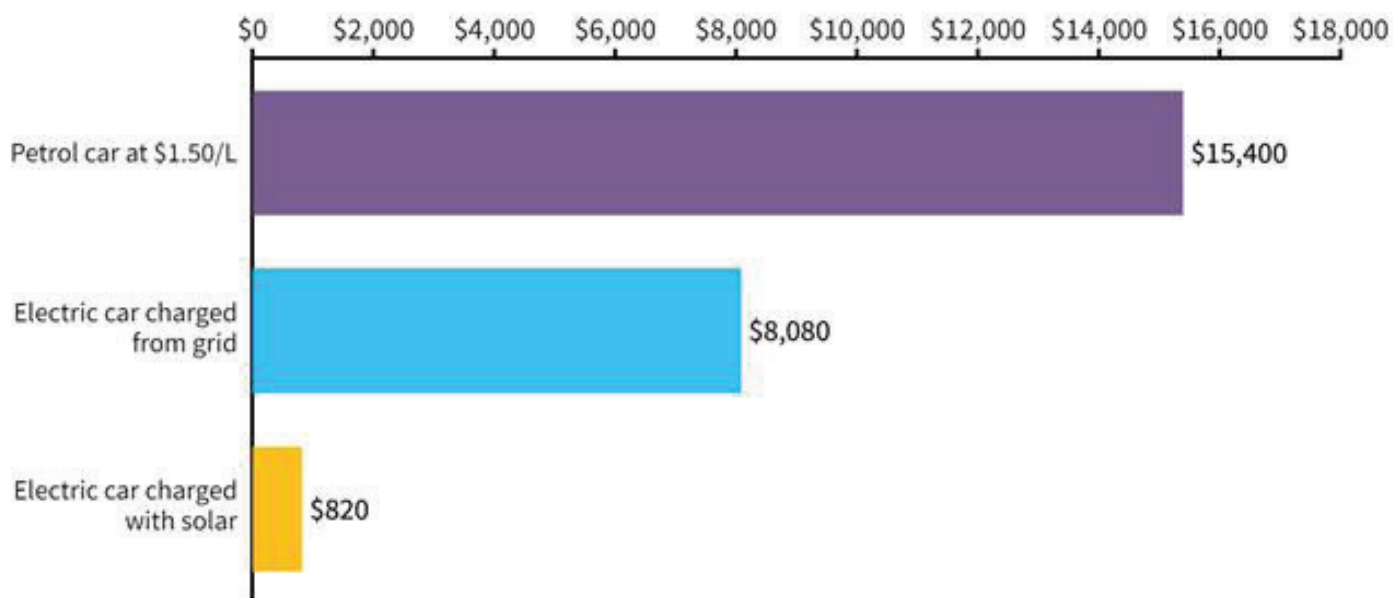
Switching to EVs involves several steps, including:

1. **Researching EV models:** There are several EV models available in Australia, including the Nissan Leaf, Tesla Model S, and Hyundai Kona Electric. It's important to research the different models and their features to find the one that best suits your needs.
2. **Assessing your charging needs:** EVs can be charged using a standard household power outlet, but this can take several hours. Alternatively, households can install a dedicated EV charging station, which can charge the vehicle much faster. It's important to assess your charging needs and determine whether a dedicated charging station is necessary.
3. **Installing a charging station:** If a dedicated charging station is required, households can install one at their home. There are several types of charging stations available, including Level 1, Level 2, and DC fast charging. The cost of installation will depend on the type of charging station and the complexity of the installation.
4. **Purchasing the EV:** Once you've researched different EV models and assessed your charging needs, it's time to purchase the vehicle. The cost of an EV will depend on the model, features, and any government incentives that may be available.
5. **Maintaining the EV:** EVs require less maintenance than fossil fuel-powered vehicles, but they still require regular servicing and maintenance. It's important to follow the manufacturer's recommendations for maintenance and servicing to ensure the vehicle runs smoothly.

COSTS AND SAVINGS

The costs and savings associated with switching to EVs will depend on several factors, including the model of the EV, the cost of electricity, and any government incentives that may be available.

Driving | Lifetime running costs over 10 years



Based on average Australian driving of 12,000km per year. Petrol price \$1.50/L. Grid price \$0.27 /kWh. Solar price \$0.028 /kWh. Solar use 100%. 10 year lifetime.



Here is a breakdown of the estimated costs and savings associated with switching to an EV in Noosa Shire:

COSTS:

- **Purchase cost:** The cost of an EV will depend on the model and features. In Australia, the cost of a new EV ranges from \$44,000 for the Nissan Leaf to \$133,000 for the Tesla Model S.
- **Charging station installation:** If a dedicated charging station is required, the cost of installation will depend on the type of charging station and the complexity of the installation. A Level 2 charging station can cost between \$1,500 and \$2,500 to install, while a DC fast charging station can cost between \$20,000 and \$50,000.
- **Electricity costs:** The cost of electricity will depend on the electricity provider and the time of day. In Noosa Shire, the average cost of electricity is approximately \$0.25/kWh.

SAVINGS:

- **Fuel costs:** EVs are significantly cheaper to run than fossil fuel-powered vehicles, with lower fuel costs and maintenance costs. The cost of electricity to charge an EV is approximately \$0.05/km, while the cost of petrol to drive the same distance is approximately \$0.15/km.
- **Government incentives:** The Australian government offers several incentives for EV owners, including a \$3,000 rebate for new EV purchases and free registration for EVs in some states.
- **Maintenance costs:** EVs require less maintenance than fossil fuel-powered vehicles, which can save households money on servicing and maintenance costs.

CONCLUSION

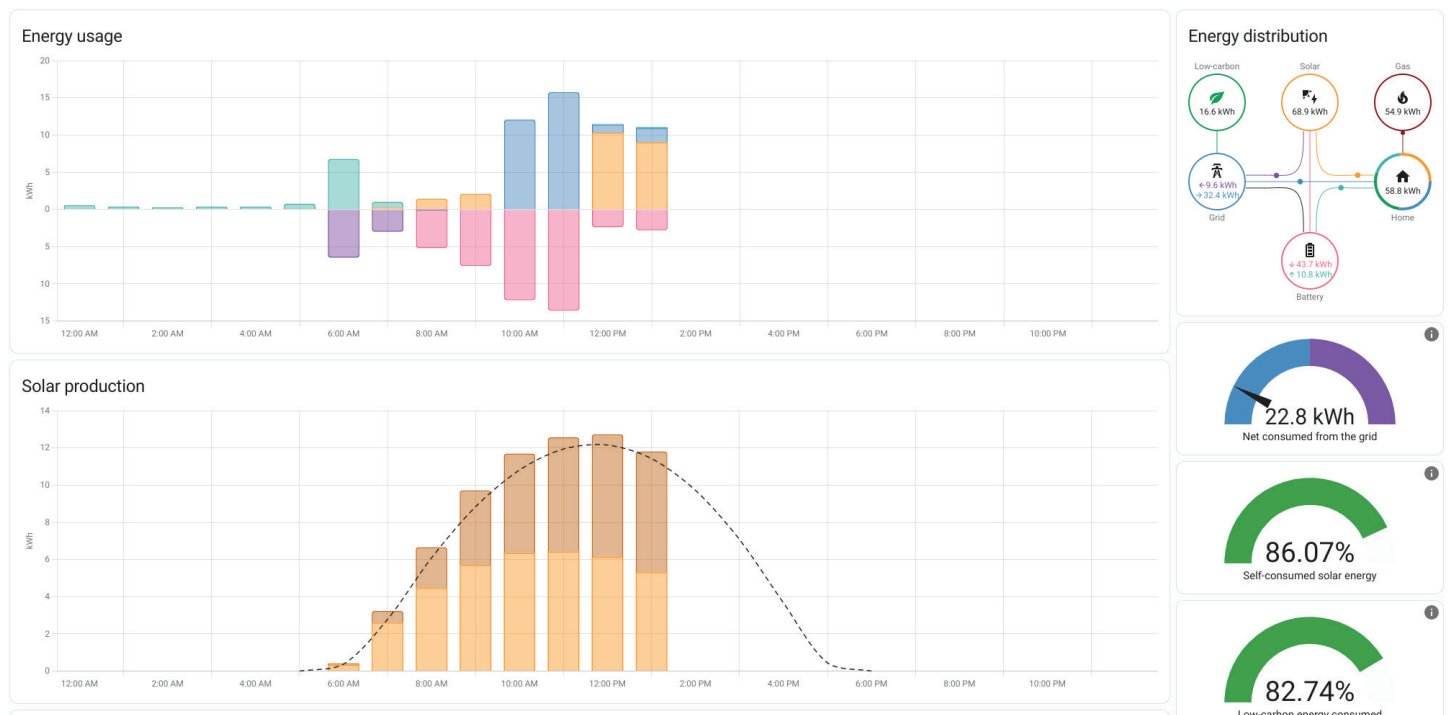
Switching to EVs is a significant step households can take to reduce their carbon footprint and contribute to a cleaner, greener future. While the initial costs of purchasing an EV and installing a charging station can be high, the long-term savings in fuel and maintenance costs can make the investment worthwhile. Additionally, government incentives can help offset some of the costs associated with switching to EVs. By using renewable energy sources like solar power to charge their EVs, households in Noosa Shire can become more energy independent and reduce their reliance on fossil fuels.



CHAPTER EIGHT: Monitoring and Control

INTRODUCTION

Monitoring and control are essential aspects of household electrification. By monitoring energy usage, households can identify areas of high consumption and take steps to reduce waste. Additionally, by using smart home technology, households can control energy usage and reduce their overall energy consumption. This chapter will provide information on how to monitor and control energy usage in your home and reduce waste.



MONITORING ENERGY USAGE

Monitoring energy usage is an essential aspect of household electrification. By monitoring energy usage, households can identify areas of high consumption and take steps to reduce waste. There are several ways to monitor energy usage in your home, including:

1. **Smart Meters:** Smart meters are digital meters that measure energy usage in real-time. They provide households with accurate information on their energy consumption and can help identify areas of high consumption. Smart meters also provide information on the time of day when energy consumption is highest, which can help households adjust their energy usage accordingly.
2. **Energy Monitors:** Energy monitors are devices that provide households with real-time information on their energy consumption. They are usually attached to the electricity meter and can be accessed through a mobile app or a web portal. Energy monitors provide households with information on their energy consumption and can help identify areas of high consumption.
3. **Home Energy Audits:** Home energy audits are comprehensive assessments of a household's energy usage. They involve a professional energy auditor visiting the home and conducting a detailed analysis of energy usage. Home energy audits provide households with a detailed report on their energy consumption and recommendations on how to reduce waste.

COSTS AND SAVINGS

The cost of monitoring energy usage in your home will depend on the method you choose. Smart meters are usually installed by energy providers and are provided free of charge. Energy monitors can be purchased for around \$100-\$200, while home energy audits can cost between \$300-\$500.

The savings from monitoring energy usage can be significant. By identifying areas of high consumption, households can take steps to reduce waste and save money on their energy bills. For example, by identifying appliances that consume a lot of energy, households can replace them with more energy-efficient models, which can save hundreds of dollars per year.

Source	Energy	Cost
Solaredge I1 AC Energy kWh	37.33 kWh	
Solaredge I2 AC Energy kWh	31.56 kWh	
Solar total	68.89 kWh	
Battery Export	10.8 kWh	
Battery Import	-43.7 kWh	
Battery total	-32.9 kWh	
Site Import	32.4 kWh	A\$1.36
Site Export	-9.6 kWh	-A\$1.54
Grid total	22.8 kWh	-A\$0.18
Heating & Cooling (Heat Pump)	15 kWh	A\$0.28
Hot Water (Heat Pump)	1.72 kWh	A\$0.15
Pool Energy	22.5 kWh	A\$0.11
Car (EV)	12.9 kWh	A\$0.49
All lights energy	0.91 kWh	A\$0.08
Dishwasher	0.36 kWh	-A\$0.01
Dryer - energy	0.01 kWh	A\$0.00
Washing Machine	0.01 kWh	A\$0.00
Fridge - energy	1.46 kWh	A\$0.12
Microwave - energy	0.05 kWh	A\$0.00

CONTROLLING ENERGY USAGE

Controlling energy usage is another essential aspect of household electrification. By using smart home technology, households can control energy usage and reduce their overall energy consumption. There are several ways to control energy usage in your home, including:

- **Smart Thermostats:** Smart thermostats are devices that allow households to control their heating and cooling systems remotely. They can be programmed to adjust the temperature based on the time of day and can be controlled through a mobile app or a web portal. Smart thermostats can help households reduce their energy consumption and save money on their energy bills.
- **Smart Lighting:** Smart lighting systems allow households to control their lighting remotely. They can be programmed to turn on and off at specific times and can be controlled through a mobile app or a web portal. Smart lighting systems can help households reduce their energy consumption and save money on their energy bills.
- **Energy-Efficient Appliances:** Energy-efficient appliances consume less energy than standard appliances and can help households reduce their energy consumption. By replacing standard appliances with energy-efficient models, households can save hundreds of dollars per year on their energy bills.

COSTS AND SAVINGS

The cost of controlling energy usage in your home will depend on the method you choose. Smart thermostats can be purchased for around \$200-\$300, while smart lighting systems can cost between \$100-\$200 per room. Energy-efficient appliances can be more expensive than standard appliances, but the savings from reduced energy consumption can make up for the higher upfront cost.

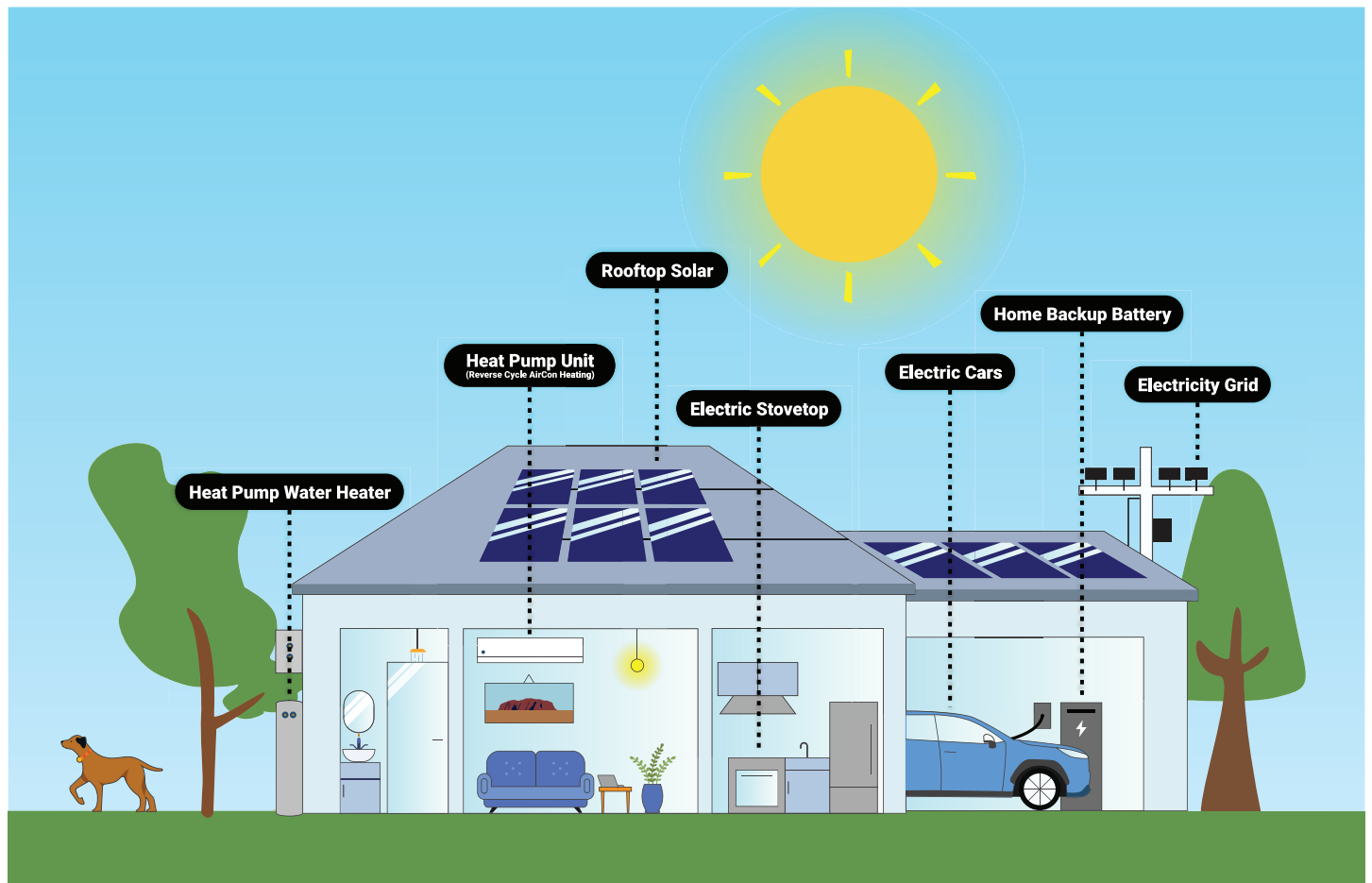
The savings from controlling energy usage can be significant. By using smart home technology, households can reduce their overall energy consumption and save money on their energy bills. For example, by using a smart thermostat to control heating and cooling, households can reduce their energy consumption by up to 20%, which can save hundreds of dollars per year.

CONCLUSION

Monitoring and control are essential aspects of household electrification. By monitoring energy usage and controlling energy consumption, households can reduce their carbon footprint, save money on their energy bills, and contribute to a cleaner, greener future. There are several ways to monitor and control energy usage in your home, including smart meters, energy monitors, home energy audits, smart thermostats, smart lighting, and energy-efficient appliances. The costs and savings of monitoring and controlling energy usage will depend on the method you choose, but the savings from reduced energy consumption can be significant. By using smart home technology and energy-efficient appliances, households in Noosa Shire can play their part in the transition to a low-carbon future.

REWIRING NOOSA “ELECTRIFY EVERYTHING” - A SUSTAINABLE REVOLUTION SWEEPING THE SHIRE

Noosa Shire is leading the charge in a sustainability revolution, with households across the region making the switch to all-electric appliances and cars powered by clean electricity. This shift is not only slashing household expenses by up to 50% compared to those relying on fossil fuels, but it’s also making a significant positive impact on the climate.



This sustainable approach, dubbed “Electrify Everything,” is a key strategy in combating climate change, reducing our carbon footprint and saving a lot of money. It’s a step-by-step guide to household electrification, providing residents with practical advice on how to transition to a more sustainable, low-carbon lifestyle.

Zero Emissions Noosa Inc, supported by Noosa council, is producing an “Rewiring Noosa - Electrify Everything” guide covering eight different technologies and strategies, including rooftop solar PV, heat pump hot water systems, pool pumps and heaters, home batteries, electric vehicles, and energy monitoring and control systems. Through a series of articles in Noosa Today we will provide detailed information on the costs, savings, and benefits of each technology, helping residents make informed decisions about their energy usage.

One of the key benefits of this approach is the potential for significant cost savings. For example, by switching to an electric vehicle, households can save up to \$2,000 per year on fuel and maintenance costs. Similarly, by installing a solar hot water system, households can reduce hot water energy consumption by up to 65%, saving up to \$500 per year on energy bills.

Gas and petrol home
Average running costs \$5,300 per year \$53,000 over 10 year lifetime of appliances
<ul style="list-style-type: none"> ▪ Fossil fuel grid electricity ▪ Gas space heater ▪ Gas hot water heater ▪ Gas cooking ▪ Petrol and diesel cars
Energy emissions 9,550 kg CO2e per year

Electrified home
Average running costs \$1,850 per year \$18,500 over 10 year lifetime of appliances
<ul style="list-style-type: none"> ▪ Rooftop solar and clean electricity ▪ Heat pump (reverse cycle AC) ▪ Heat pump hot water ▪ Induction cooking ▪ Electric cars
Energy emissions ZERO

In addition to the financial benefits, the “Electrify Everything” approach also offers substantial environmental benefits. By using renewable energy sources like solar power to charge electric vehicles and power household appliances, residents can significantly reduce their greenhouse gas emissions, after all we are the Sunshine State. This is a crucial step in mitigating the effects of climate change and transitioning to a low-carbon future.

For those interested in learning more about this sustainable revolution, community consultation sessions are being held at the Cooroy Library at 10am on Monday 20 November and the Noosaville Library at 10am on Friday 24 November. These sessions will provide residents with the opportunity to ask questions, discuss their energy needs, and learn more about the benefits of household electrification.

The “Electrify Everything” revolution is here - and it’s time for Noosa Shire to plug in. By making the switch to clean, renewable energy, residents can save money, reduce their carbon footprint, and contribute to a more sustainable future. Join the sustainable revolution today and help make Noosa Shire a leading light in the fight against climate change.

