OUR EMISSIONS JOURNEY

1999

The City joins the UN Climate Protection Program. **(2)**

2011

Corporate Emissions Reduction Strategy (CERS) is developed, aimed at reducing the City's dependence on carbon. **(3)**

2014

Introduction of the Solar Plan to install solar systems on roofs across the city. **(4)**

The City begins LED light retrofits in council buildings and public areas. **(5)**

2015

Installation of the RAC Highway electric vehicle charging station in the city centre. **(6)**

2017

Introduction of geothermal heating at the MARC. **(7)**

2018

Western Power and Synergy Powerbank Trial in Meadow Springs. **(8)**

2019

Commitment to fuel efficient council vehicles. **(9)**

Future Vehicles Expo held in Mandurah. **(9)**

The City investigates the feasibility of a district cooling system in Madjar Square. **(10)**

The City begins developing the Integrated Transport Strategy to improve public transport around Mandurah. **(13)**

Several hybrids and one EV are added to the city fleet. **(11)**

2020

An investigation of hydrogen power begins including the formation of a NERA cluster and support of Hazer's Hydrogen Mobility Hub. **(14-15)**

The City investigates the feasibility of cogeneration at the MARC. **(12)**

2021

The City begins working with WALGA to define an energy roadmap including entering into a Power Purchase Agreement. **(16)**

The City commits to sending waste to the Waste-to-Energy Plant. **(18)**

Through the Cities Power Partnership, the City commits to five pledges to improve sustainable power use. **(17)**

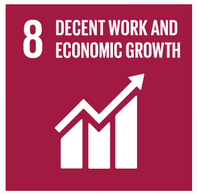
The future

More projects to come to reduce our City's emissions.

Follow the page numbers to learn more about each project!

CITY OF MANDURAH

1999 United Nations Cities for Climate Protection



Cities for Climate Protection (CCP) asked cities to commit to including climate change actions in their city plans. This includes decreasing greenhouse gas emissions, improving air quality, and increasing sustainable actions.

2011 Corporate Emissions Reduction Strategy (CERS)

In 2010, the City achieved a **57%** reduction in carbon emissions from **1999**, but this relied on buying **carbon offsets** and investing in the national **GreenPower** initiative. **CERS** aims to reduce our overall carbon use and help us switch to using more renewables and energy-efficient ways of doing things.

What are carbon offsets and why don't we want to rely on them?

Carbon offsets are investments into projects that will reduce carbon emissions by the same or part of the amount of carbon produced through your activity (energy, production, transport etc.). Therefore activities/projects can produce more carbon emissions than recommended by the City, but this is *offset* by reduced emissions in a different area.

Buying carbon offsets doesn't reduce the amount of carbon produced worldwide, and carbon offsets only account for part of the City's emissions.

What is GreenPower and why don't we want to rely on this?

GreenPower is a federally managed initiative that allows customers to pay an extra amount on top of their power bills. This extra amount is invested in renewable energy projects. This doesn't reduce the amount of carbon emissions produced globally and cost the city $800,000 yearly during the 1999-2010 period.

The City of Mandurah aims to instead use this money to invest directly in renewable energy sources within the city, and conservation projects such as community tree planting and the **Bushland Buyback Scheme.**

Renewable Energy

The City is also working with Western Power to support load shifting as we rely on more renewables. As renewables (especially solar) may not be generated during the peak use times (in the evenings), there are greater costs with using power at this time. Therefore, the city is identifying how we can better store and use our energy in off-peak periods, increasing energy efficiency and decreasing costs for our community.

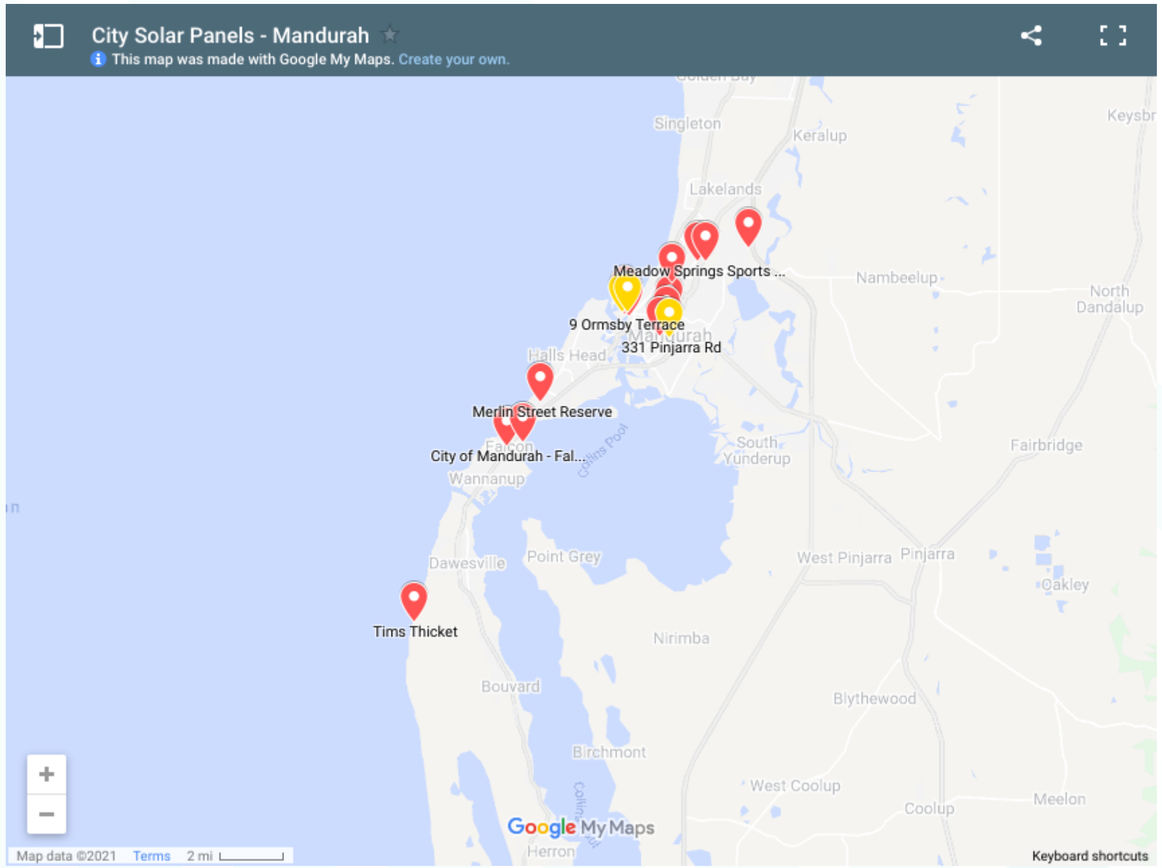
Related

Bushland Buyback scheme

Load Shifting

2014 Solar Plan

Since 2014 the City has installed 17 solar systems on the rooftops of city-owned buildings across the city. These systems total **643kW** capacity, with an annual carbon reduction of **836 tonnes CO2-e**. We expect to complete a further **190kW** in solar systems by **2026.**



What is a W, kW, or MW?

W stands for **watt** and it is a measure of electrical power. A **kilowatt (kW)** is **1,000 watts** and a **megawatt (MW)** is **one million watts**. kW on your power bill shows how much electricity your lights or appliances use every day.
Our largest solar panel system installed in the City produces about **183MW** or **183,000kW** of energy each year. **This is enough to power almost 101,667 cycles of a dishwasher!**

1MW Solar Farm

The City is also looking into a **1MW Solar Farm** offsite to supply more power to the city, not currently supported by the panels in place. This would result in a carbon reduction of **1,700 tonnes CO2-e per year.**

2014 LED Lighting

In 2014, the City began a city-wide **LED retrofitting** project. **LED retrofitting** means adding new lights to existing light features. This reduces the need for new construction, helps to reduce cost and wastage, and maintains the history of our area. Better lighting in our outdoor spaces also creates safer and more enjoyable spaces.

LED PROJECTS

1. LED lights in public areas – The City has installed LED lighting in buildings, car parks, reserves, and sporting grounds across the city, with a further **115 sites** to be completed by **2026**.

2. LED lighting in council buildings – Replacing fluorescent lighting with LED tubes in council buildings reduces florescent tubing landfill waste and emissions by **100 tonnes of CO2-e per year.**

3. Solar LED lighting – As part of our solar plan, we have installed solar power LED lights across several reserves. These contribute to the annual reduction in carbon use and cut costs required to link up lights to the grid (mains power).

4. LED Street Lighting – Non-LED street lighting contributes **25%** of the City's total carbon emissions, so this is a focus area for the City. We are investigating LED Street lighting which would reduce emissions by **2,000 tonnes of CO2-e** over the lifespan of the light.

22 solar powered bollards along the Mandurah Quays Foreshore (left)

Related

Why Install LED Lighting?

WAGLA LED Streetlighting

How much have LED retrofits reduced emissions by?

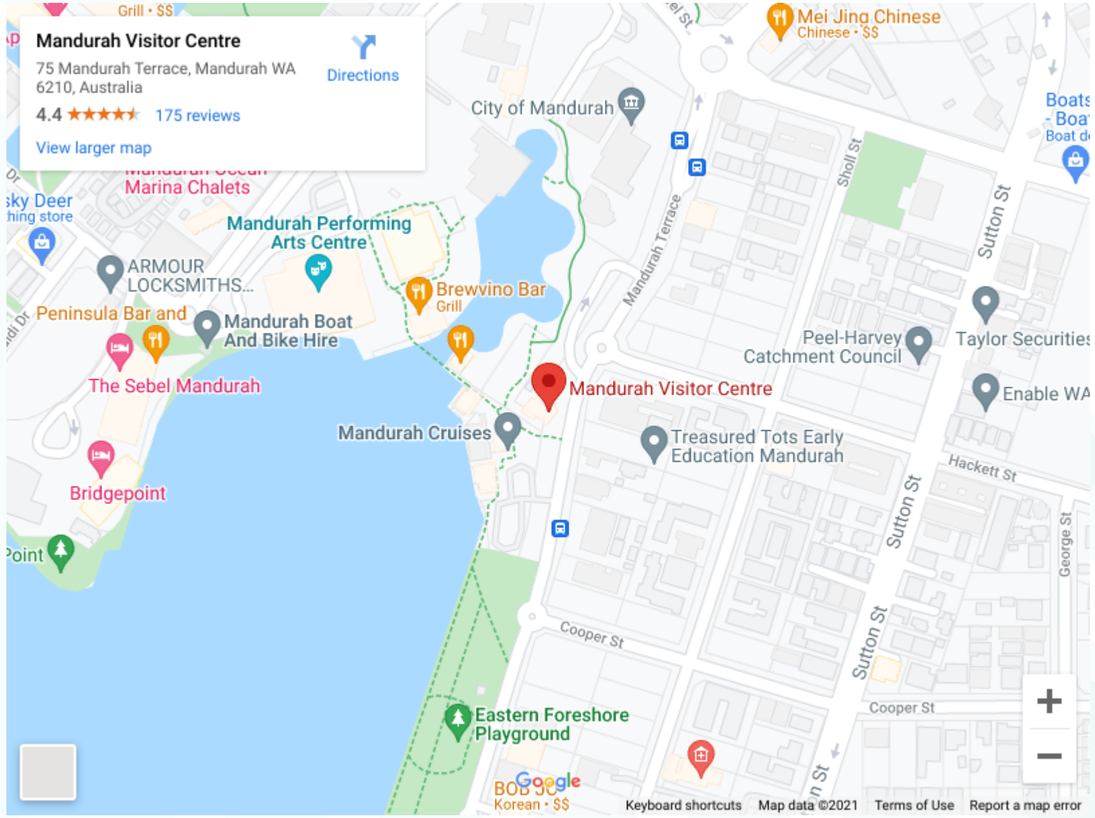
50% in carparks

15% in buildings

FAST FACT!

New LED lighting requires less energy than existing fluorescent bulbs as the reaction which occurs in an LED bulb mainly releases energy as light. In comparison, fluorescent bulbs release around **20%** more of their energy in heat – **have you noticed LED lights don't get as hot?**

2015 RAC Electric Highway Charging Station



We want to make it easier for our community to try sustainable alternatives like electric cars. So, we installed a fast **DC Electric Vehicle charging station** at the Mandurah Visitor Centre.

Related

RAC Electric Highway Network

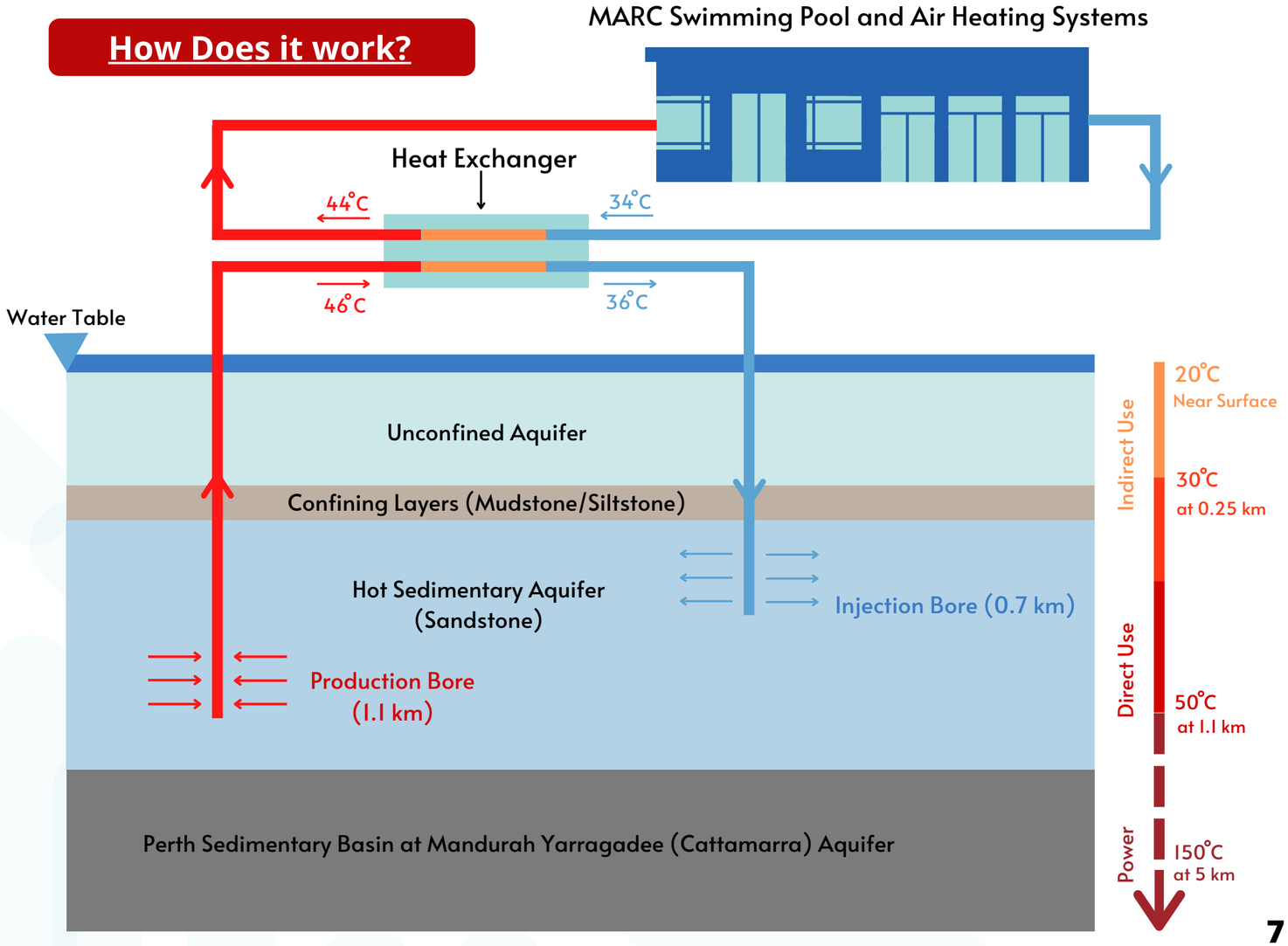
2017 Geothermal at the MARC

The largest increase in renewables in the city was the introduction of geothermal heating at the MARC. The system uses heat extracted from groundwater **nearly 1 km underground** to heat the water in the pools and provide space heating within the centre. This has reduced the dependence on gas heating in the centre and we avoid **286 tonnes CO2-e emissions each year**.

This is equal to installing approximately 220 solar panels!

Related

MARC development project details



2018 PowerBank Trial

Western Power and Synergy launched their first community Powerbank trial here in Mandurah. This trial aimed to boost the battery storage of solar power for residential homes. For **$1 per day**, residents can store their excess solar power in the community battery and draw on this during peak use periods in the evening. **Daily storage allows residents to access more of the power that they generate and gives them savings on their bills**.

Since the initial trial in Meadow Springs, the project has continued in Falcon and Ellenbrook.

Related

PowerBank Trial Western Power

Synergy PowerBanks

2019 Low Energy Vehicles

The City has committed to greater fuel-efficient vehicles, choosing to buy vehicles with **7L/100km or less fuel efficiency**. We have already seen an **18% decrease in CO2 e-** emissions from council vehicles **since 2011**.

In **2019**, the city hosted the **Future Vehicles Expo** which showed some of the hybrids, electric, and alternative forms of transport – scooters and bikes – on the market. This event aimed to encourage our community to think about transport alternatives.

FAST FACT!

Based on Electric Vehicle Council statistics around $14 worth of electricity will drive you as far as around $50 of petrol.

Related

How Green is my Car?

2019 District Cooling Network

What is a District Cooling Network?

A **district cooling network** is made up of a central power plant that cools and stores water and a network of buildings connected to this plant. The power plant pumps out this cooled water into the air-conditioning of each building, and once it has been used the water returns to be cooled again.

In Mandurah, district cooling will increase the energy efficiency of the air conditioning of buildings in Mandjar Square by replacing multiple air conditioner units with one central plant. This reduces resources – air conditioning units, cabling, cooling towers - and electricity consumption. This project will reduce yearly carbon use by **250 tonnes CO2-e.**

Related

[District Cooling at Council (minutes)]
[What is a district cooling network?]
[District Cooling: A Climate Solution]

In the future, renewable sources could also be used to power the central energy plant. This combination will decrease the environmental impact even further.

2020 Electric Vehicles at Council

In 2020 FleetCarma completed an evaluation on the type of vehicles and driving done by City employees. Based on this, the City is able to choose the best electric vehicles for the most common kinds of driving and make the most efficient switch. The introduction of several hybrids and one fully electric vehicle to the fleet will remove **1,200 tonnes of CO2-e from the City's annual carbon use.**

FAST FACT!

Smooth braking and acceleration allow more energy to be recaptured while driving and reduces how often the electric vehicle needs to be charged. So safe driving is more efficient driving!

Related

FleetCarma

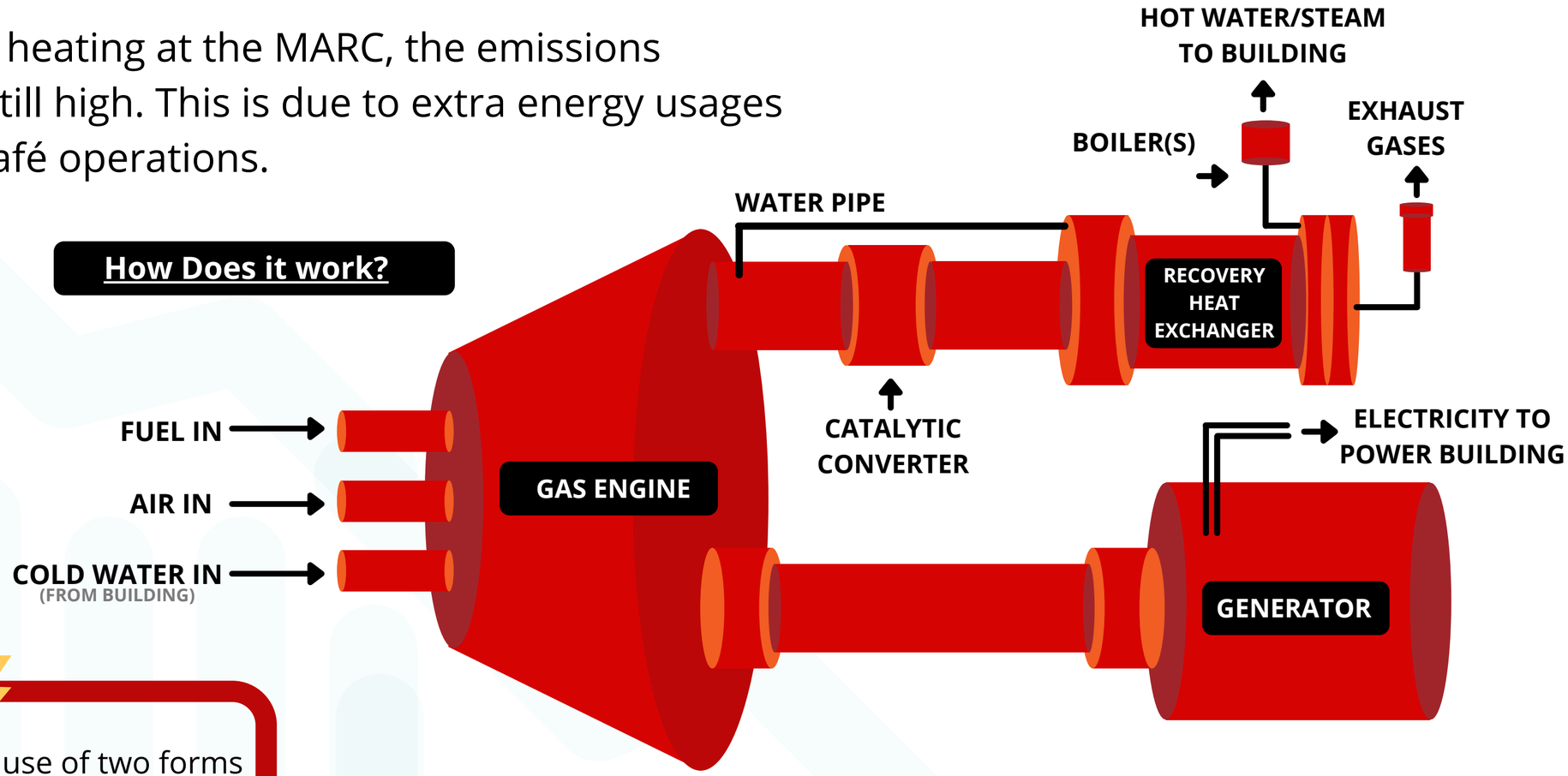
EVs or Hybrids – Are they better than petrol cars?

2020 Cogeneration at the MARC

Despite the use of geothermal heating at the MARC, the emissions caused by energy use here is still high. This is due to extra energy usages such as lighting, pumps, and café operations.

The City is exploring the possibility of **cogeneration** to both heat and power the facility, reducing energy costs from electricity use at **950 tonnes of CO2-e per year.**

How Does it work?



FAST FACT!

Cogeneration is the production and use of two forms of energy: high-temperature heat and electricity produced at the same time from a single fuel source.

Related

Geothermal Electricity and Combined Heat & Power

2020 Integrated Transport Strategy

Ongoing reconfiguration of Mandurah's transport network to promote active public transport, including new train stations and updating the bus network. We are also updating footpaths and cycle paths to help our community feel safe choosing to walk or cycle around the City.

Getting you there faster, easier, and more sustainably.

FAST FACT!

The average light vehicle (car) in Australia emits **182g of CO_2 per kilometre**. With **19,589** Mandurah locals choosing to drive to work each day, this is a lot of emissions!

For now, the current Transperth system is still more sustainable than driving - see if you can get where you need to go by public transport.

Scan the QR code to plan your journey →

2020 NERA Cluster

The Peel and South-West Metro Hydrogen Technology Cluster

The City is supporting the research and application of hydrogen power in Mandurah through the **NERA cluster program**. This program is a collaboration with Murdoch University, local governments, and power companies across the Perth and Peel region. By collaborating, the network can bring together regional strengths to build a national approach to hydrogen power.

Hydrogen power in the city will support **hybrid cars, 'green' steel and aluminium manufacturing, and an extra off-grid renewable energy supply**. It will work with other renewable energy sources and energy efficiency actions already in place.

The project also provides opportunities for further education and jobs to support the new technology.

"As we progress our plans to Transform Mandurah, the use of hydrogen could have significant impacts towards how we create jobs for our future, and how we tackle climate change"
– Mayor Rhys Williams

What is Hydrogen, how does it work as a fuel, and what are the challenges that the NERA cluster is trying to overcome?

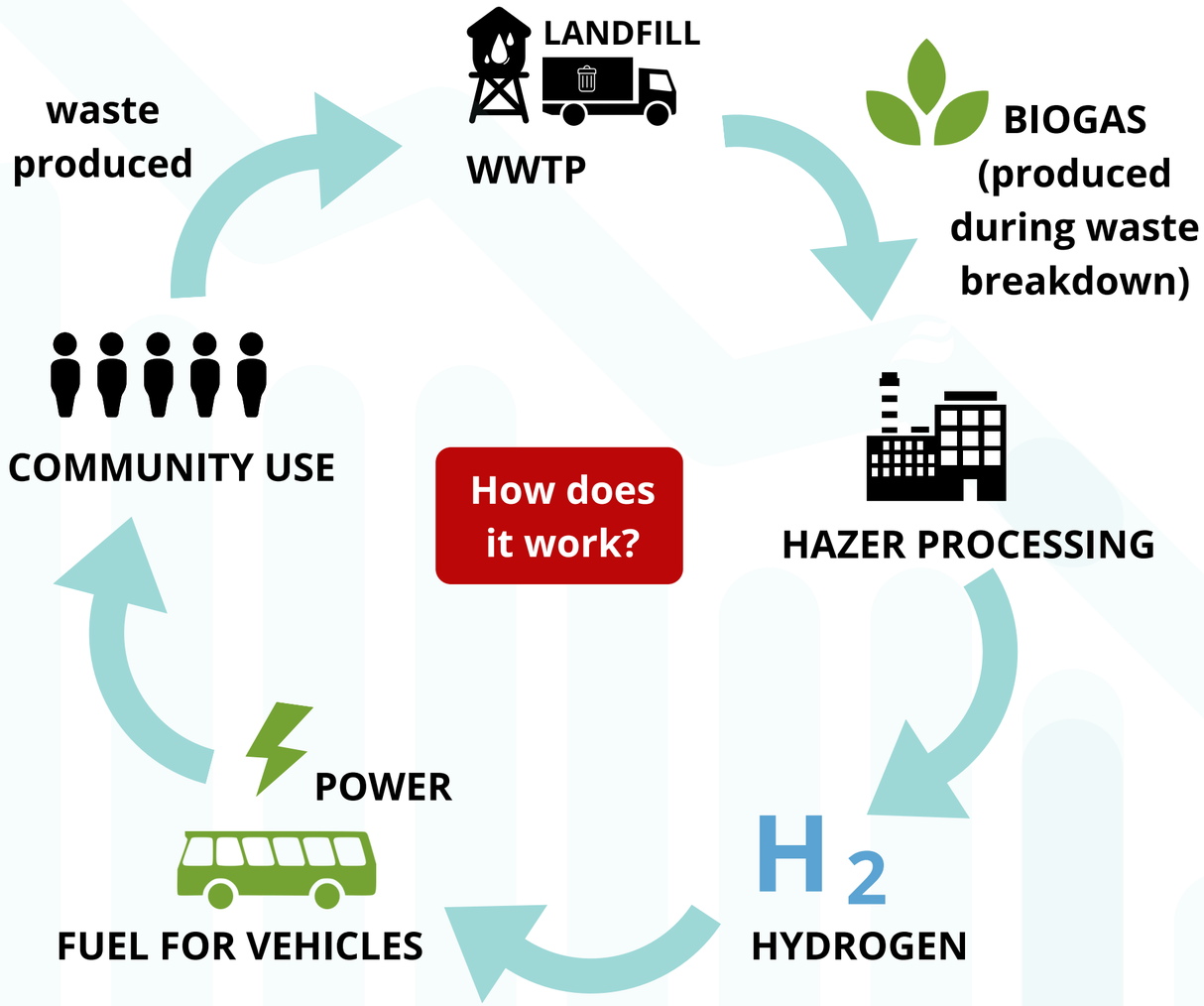
Related

NERA Cluster in Mandurah

What is NERA?

www.h2cluster.com.au

2021 Hydrogen Mobility Hub



To reduce the City's dependence on fossil fuels for transport, the City is supporting the development of Hazer's Hydrogen Mobility Hub. This hub produces **hydrogen gas (H_2)** from the **methane (CH_4)** produced during wastewater treatment at the Woodman Point Wastewater Treatment Plant.

This project comes under the State Government's Renewable Hydrogen Fund and aims to provide cleaner hydrogen fuel for:

1. Buses (Public and private operations)
1. Passenger cars
2. Rubbish collection vehicles
1. Ecotourism boats
2. Hydrogen tube trailer and tractors

FAST FACT!

Methane (CH_4) acts as a greenhouse gas in the same way as **carbon dioxide (CO_2)** and is included in the totals of **CO_2-e emissions** calculated by the city.

2021 Energy Sustainability and Renewables Project

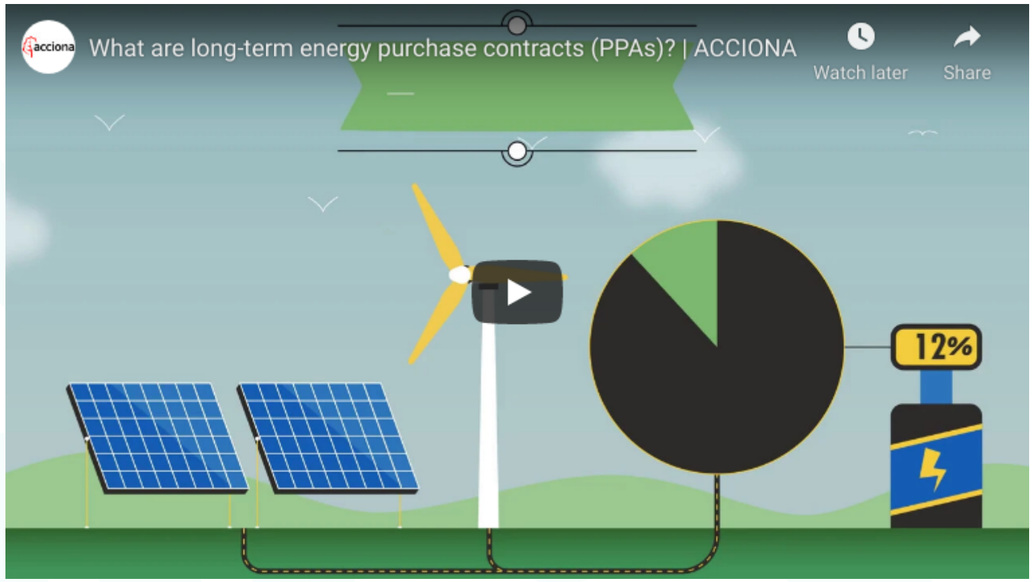
Western Australia Local Government Association **(WALGA)** has put together an **energy roadmap** for local councils to identify areas that can be powered by renewable energy sources. As a City we are collaborating with WALGA and other local councils to increase demand for renewables and negotiate bulk buying through the following roadmap:

1. Identify electricity demand that is not supported by current onsite renewable projects.
2. Enter into a **Purchase Power Agreement (PPA)** which will supply long-term offsite renewable energy supply.
3. Identify areas of the cities that rely on gas power.
4. Secure further renewables purchasing to support this gas power.
5. Introducing green vehicles – fuel-efficient, hybrid, or electric – to support council functions.

With other members of WALGA, we have entered into a **PPA** with Synergy that will allow us to transition to 100% of our contestable energy supply provided by renewable energy in the next three years.

What is a Power Purchase Agreement?

A long-term agreement between a customer and power supplier for renewably generated power into the future. This is different from a normal energy contract as the customer is paying for energy that will be produced at the current price, rather than the energy that they use at an increasing rate over time.



Related

What is a PPA?

WALGA Energy Sustainability and Renewables Project Updates

2021 Cities Power Partnership

What is the Cities Power Partnership?

CCP is a network of cities across Australia that are tackling power challenges. We use this partnership to set goals and share knowledge and resources.

The City of Mandurah has committed to five pledges to improve our sustainable power usage, with progress reports on these pledges required every year. These pledges align with our current projects and our future goals seen across this timeline.

The City's CCP Pledges

- **Install renewable energy (solar PV and battery storage) on council buildings.**
- **Facilitate large energy users collectively tendering and purchasing renewable energy at a low cost.**
- **Encouraging sustainable transport use such as public transport, walking, and cycling through council transport planning and design.**
- **Power council operations by renewable energy, and set targets to increase the level of renewable power for council operations over time.**
- **Roll out energy efficient lighting across the municipality.**

2021 Waste Management

From 2021 the city will reduce our landfilling and move our waste to the **Avertas Waste to Energy (WtE) Plant** in Kwinana. This WtE Plant will be the first of its kind in Australia. The plant works on a circular economy approach, where:

1. Our everyday waste is burnt, treated, and turned into important elements in construction and metal works
2. The steam produced in combustion powers a turbine and generates electricity.

How does it work?

Greenhouse gases in landfilling come from transport, treatment, and **methane (CH_4)** released by the waste when it starts to break down. Landfilling also puts off the problem of waste and waste treatment to future generations.

The plant can process **400,000 tonnes per year** of general waste. This means there is a large reduction in CO emissions each year resulting in a significant reduction in CO emissions and **36MW of baseload electricity to the grid**.

This is equal to taking 85,000 cars off Perth's roads and powering 50,000 households every year.

Related

The Waste Management and Resource Recovery Association Energy from Waste fact sheet

Avertas Energy: FAQs

Avertas Energy: preserving our air quality.

What is a circular economy?

A circular economy is a closed system that transforms waste for reuse.

What is baseload electricity?

Baseload electricity is the amount of energy continuously provided by the plant, not in peak periods.