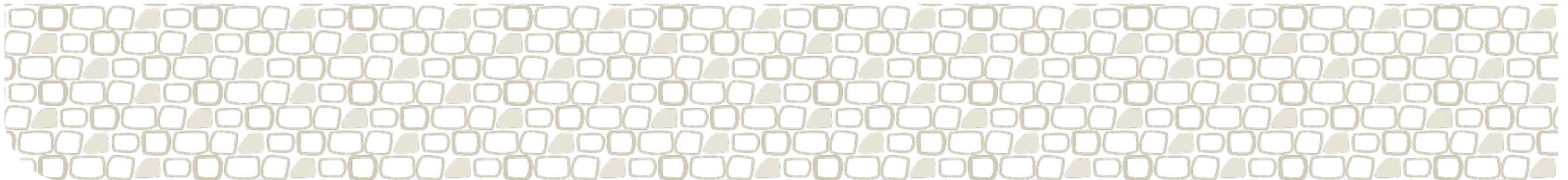


# Welcome

**AFTERNOON SESSION**

**2pm-5.10pm**

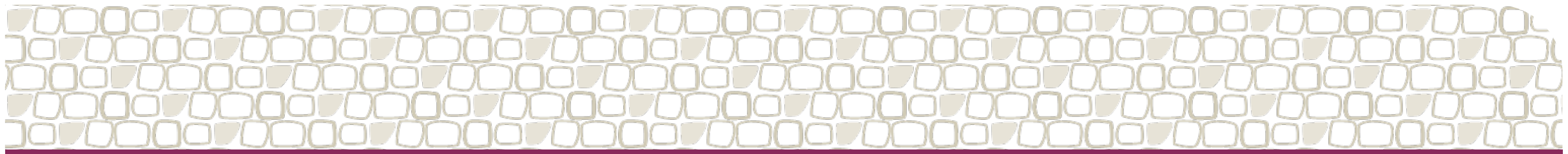


Chair: Darren Fuzzard, CEO

# Introduction



**Ellen O’Gallagher**  
Rural Australians for  
Refugees



# **Sue Teltscher & Jim Taylor Residents**



# Frank Forster

## Enviroshop Newstead

# CLIMATE CHANGE FORUM DECEMBER 2019



**Frank Forster, EnviroShop  
Newstead**



# Goodbye to Gas

- Inefficient
- Non-renewable
- Costly
- Supply security



Bass Strait gas production winding down.

In winter 2025, we have no idea from where ~ half of the gas for NSW, VIC, TAS, SA, and the ACT will come.

Another price shock coming? Anytime before then... is a good time to get off gas!

Charts from AEMO March 2019 "Gas Statement of Opportunities"



Figure 19 Historical actual daily supply and demand balance in the southern states, 2018

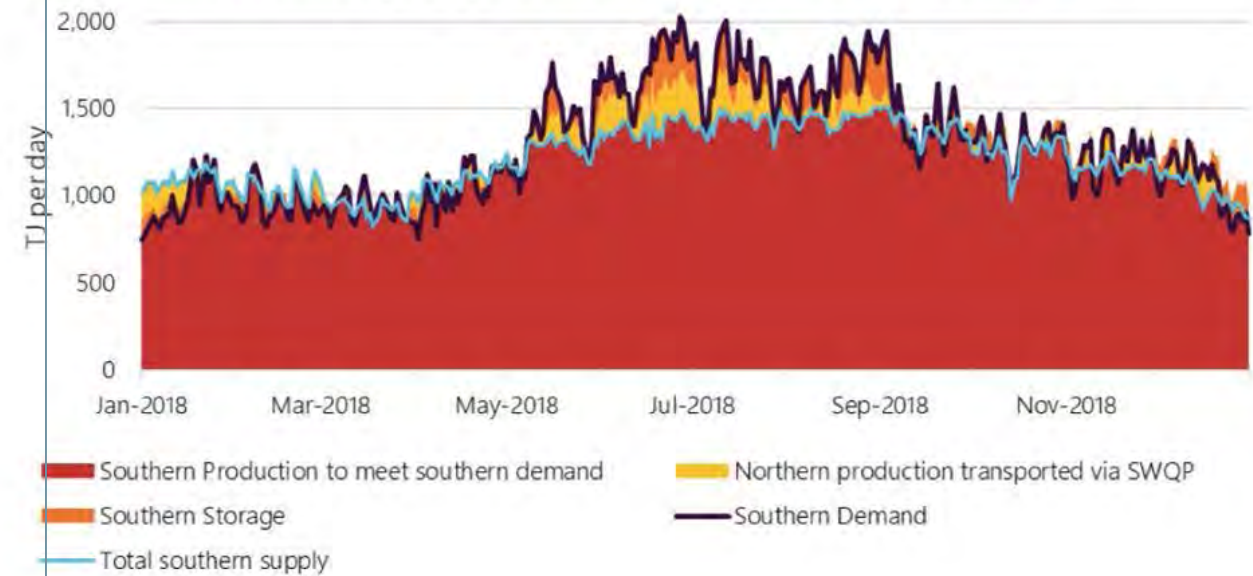
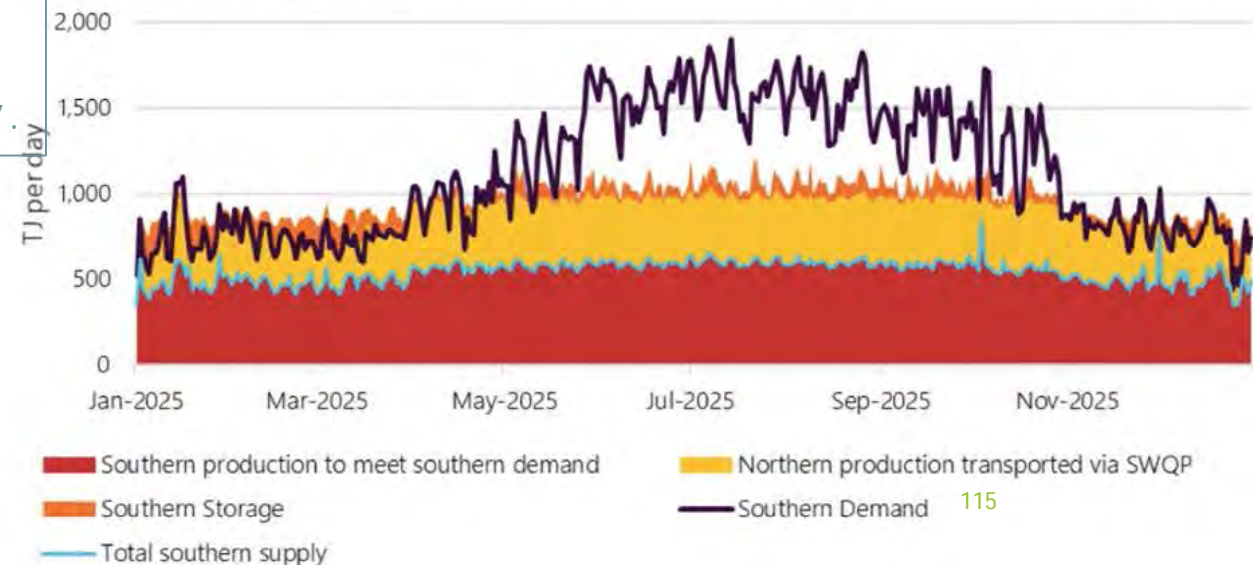


Figure 20 Forecast daily supply and demand balance in the southern states including existing and committed projects, 2025





**The future is electric.  
Natural gas is no longer needed.**



# Benefits of electricity vs others

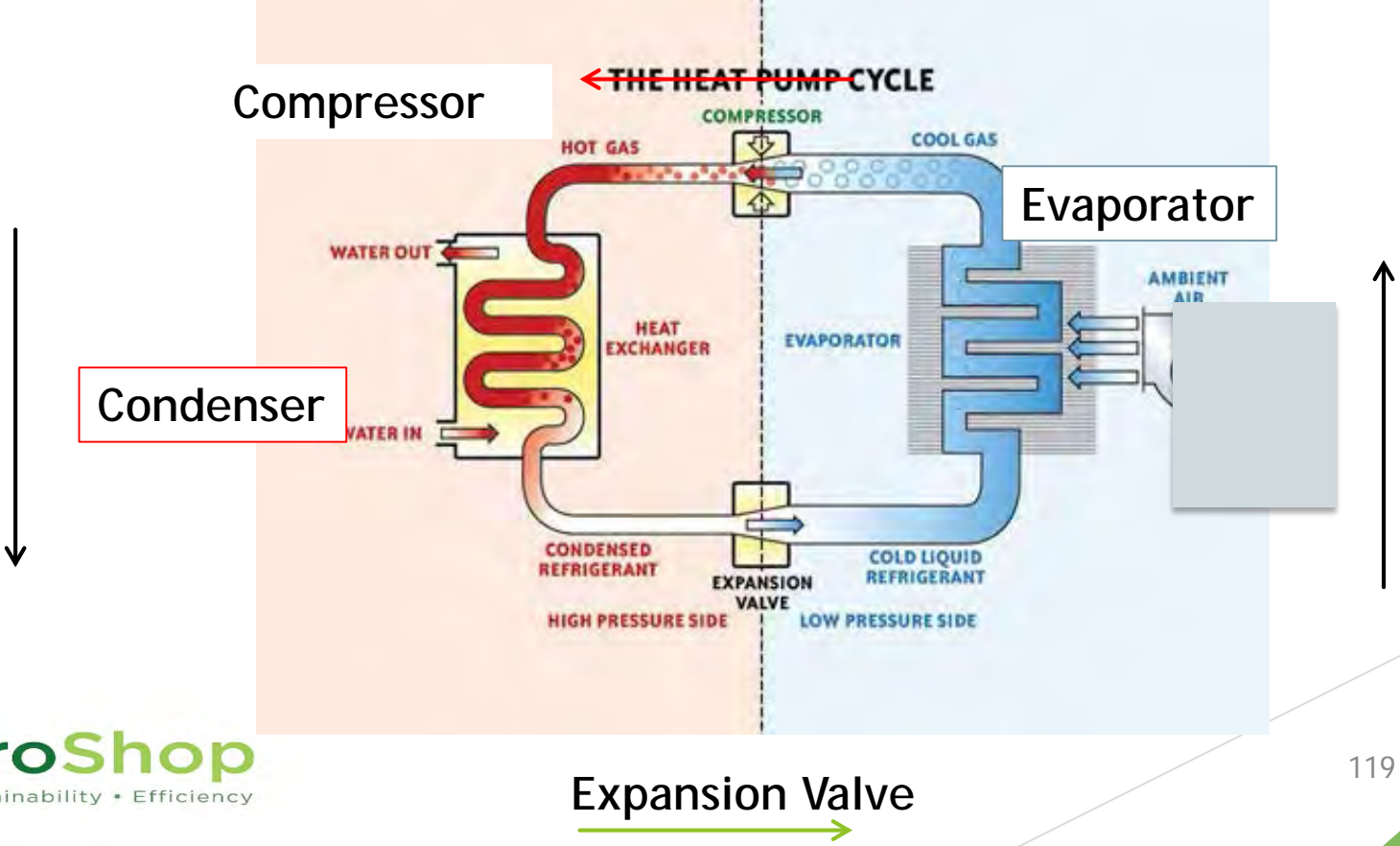
Efficiency	Up to 400-500%	Max 90%	Max 60%
Multiple uses	Yes - all appliances, even BBQ	Heating, Hot Water, Cooking	Heating and Hot Water
Self generation	Yes - solar	No	Maybe - if you have a forest
Storage	Yes - battery	??? - LPG	Firewood
Time of use	Yes - Peak, Off Peak, Battery	No	No
Developing technologies	Yes	No	No
Backup capability	Yes	No	No
Distributed Energy Resources (DER)	Yes	No	No

# 4 major energy demands

- Refrigeration
- Heating
- Cooling
- Hot Water

# Hooray for Heat Pumps

Heat pumps don't create heat. They use a refrigerant cycle to "pump" heat from a cold place to a hot place... in the direction *opposite* to natural heat flow.





Hot-water heat pump example.

1 part of electrical energy produces  
4 parts of hot water energy.

How? 3 parts of renewable heat collected out of "thin" air.



In Australia, hot-water heat pumps receive renewable energy certificates, just like solar PV.



# 3 ways to use renewable energy at home



1) Solar PV  
(20%)

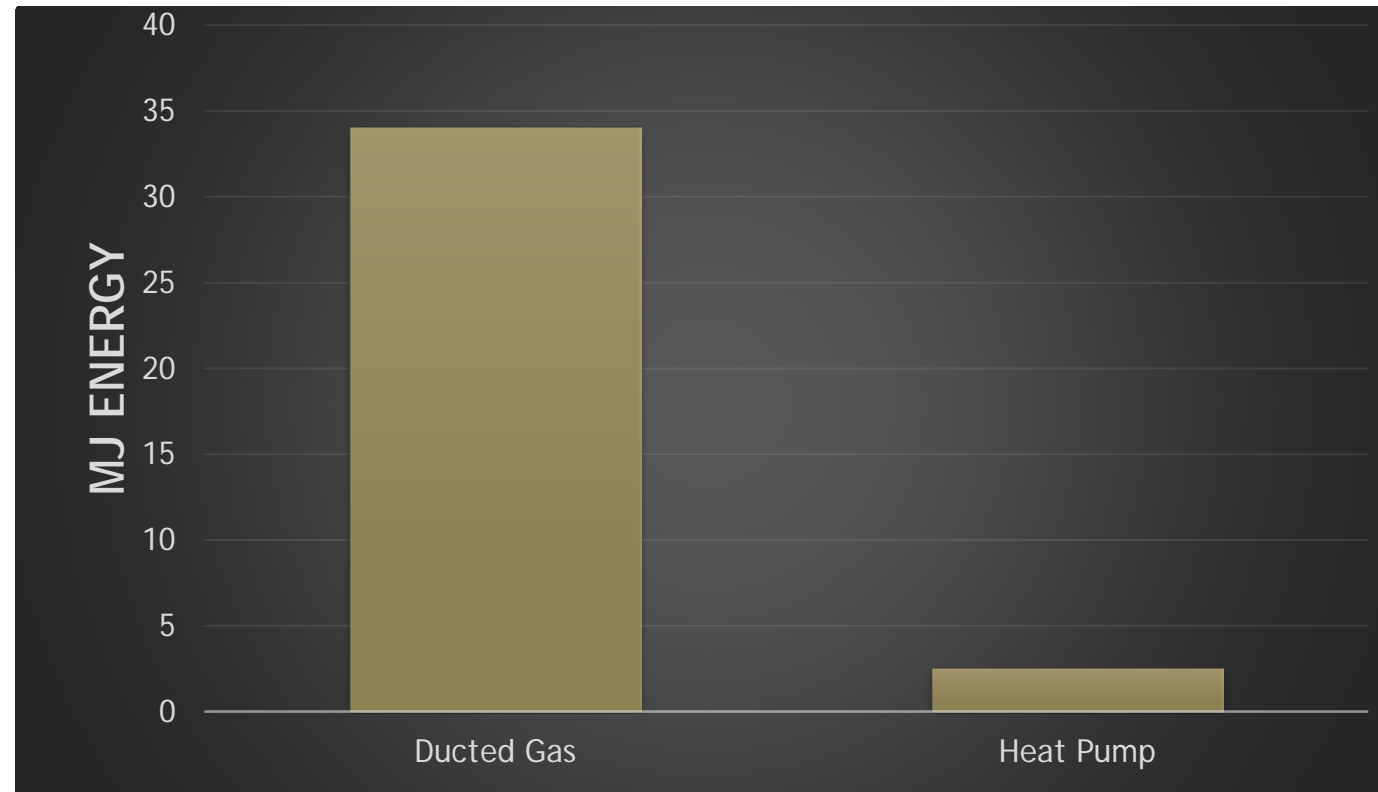
2) Hot-  
water heat  
pump (30%)

3) Space-  
heating  
heat pump  
(50%)





# Space Heating Efficacy



- ▶ **air con using 1/13th the energy of a ducted gas heating system**

# The Challenge

To be carbon free by 2050... Victoria needs to decarbonise 350 homes **every working day** from now until 2050.

# Leaders

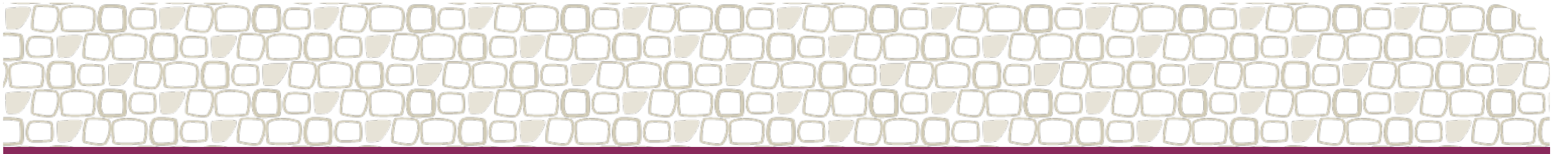
- **ACT – remove requirement to connect to mains gas**
- **Berkeley CA – ban installation of natural gas on new homes**
- **Houston, LA, New Orleans, Albuquerque – ordinances to discourage gas**
- **UK Committee on Climate Change – no new houses with gas by 2025**

# Plus a Plug for EVs



# Role for Councils

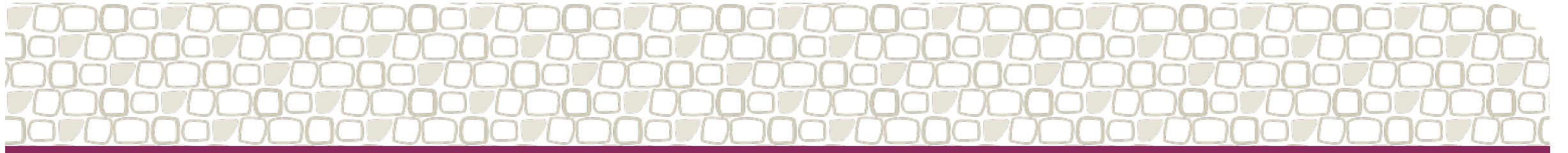
- **Advocate against gas connections for new builds**
- **Promote heat pumps (hot water, heating, cooling) over natural gas**
- **Eliminate mains gas from new subdivisions**
- **Promote EVs and infrastructure**



# Ben Laycock

## CASPA Gallery

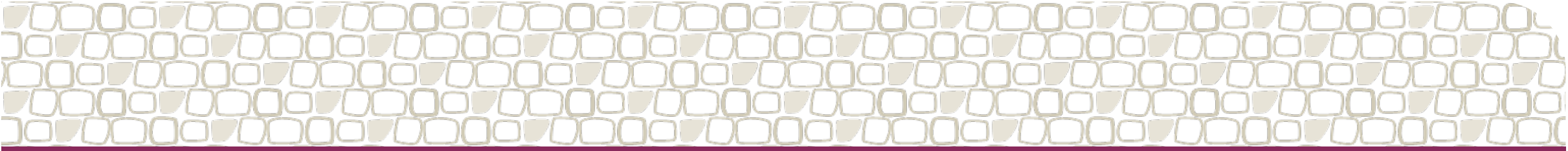




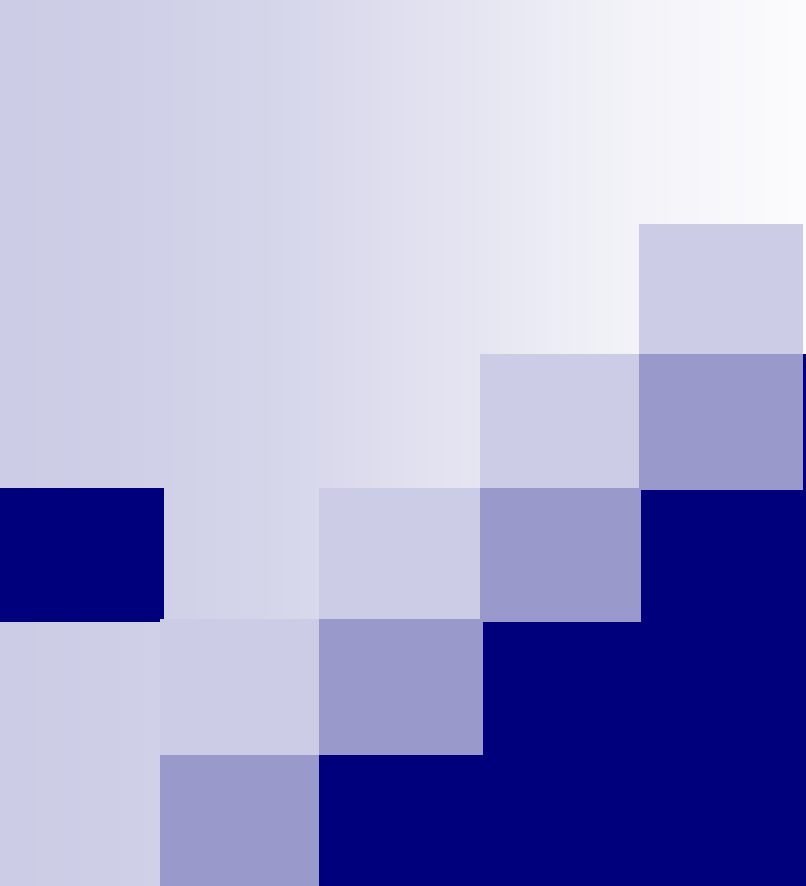
# Students

St Mary's Parish  
Primary School

[www.smcastlemaine.com](http://www.smcastlemaine.com)



**Peter Brain**  
Mount Alexander  
Sustainability Group



**Mount Alexander Shire (MAS):  
Working towards ZNET 2030 –  
the importance of the EUF  
type schemes**

**MAS Council Climate Change Forum**

**Dr. Peter Brain**

**MASG 9<sup>th</sup> December 2019**

## What are the MAS emissions?: CO<sub>2</sub>-e emissions by broad energy sector: MAS versus Victoria (excluding LULU)

	Total CO <sub>2</sub> -e – MAS (tonnes '000)			CO <sub>2</sub> -e per capita – MAS (tonnes)			CO <sub>2</sub> -e per capita – MAS (per cent of Victoria)		
	1997	2005	2017	1997	2005	2017	1997	2005	2017
Stationary Energy Industries	152.7	169.2	146.8	9.2	9.9	7.7	73.4	78.1	80.4
Non-stationary Manufacturing Industries and Construction	7.5	10.6	9.3	0.5	0.6	0.5	37.0	43.0	56.6
Non-stationary Other Sectors	14.7	17.3	17.6	0.9	1.0	0.9	52.3	61.0	58.0
Transport	68.0	75.6	83.7	4.1	4.4	4.4	104.0	106.0	119.0
Oil and Natural Gas (fugitive)	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.8	0.0
Industrial Processes and Product Use – Mineral industry	0.5	0.8	0.1	0.0	0.0	0.0	40.7	58.8	47.6
Industrial Processes and Product Use – Heavy industry	1.6	3.2	3.1	0.1	0.2	0.2	32.7	32.5	27.3
Agriculture	55.9	61.9	64.3	3.4	3.6	3.4	100.4	108.9	139.1
Waste	8.7	7.2	4.3	0.5	0.4	0.2	55.5	52.9	54.1
<b>Total</b>	<b>309.7</b>	<b>345.9</b>	<b>329.2</b>	<b>18.6</b>	<b>20.1</b>	<b>17.3</b>	<b>75.2</b>	<b>80.3</b>	<b>87.6</b>

**By 2017 MAS only 5% down on 2005 emissions after 12 years. Over the next 12 years the reduction has to be 25% to achieve Paris little alone ZNET.**

## **To effectively work towards ZNET the following issues must be understood**

- 1. 260,000 tonnes or 80% of MAS CO<sub>2</sub> emissions are generated from the capital stock installed in MAS.**
- 2. The direct reduction of emissions requires changing or augmenting parts of the \$5.7 billion capital stock (e.g. more energy efficient/use low and/or the greater use of zero emission energy forms).**
- 3. Changing the capital stock invariable requires the expenditure of money and will only be effective to the extent of the actual National/State renewable target.**
- 4. The net cost of reaching emission targets will depend on how far the target departs from the natural depreciation cycle.**



## **To effectively work towards ZNET the following issues must be understood (continued)**

- 5.** To achieve aggressive targets most of the rule changes and financial resources will have to come from higher levels of government/financial sector.
- 6.** The “working towards” acknowledges (1) to (5) that local targets must largely be aspirational. Do the best you can with local resources and constantly point out to higher levels of government what they have to do. Aspiration that must be realised to avoid an unliveable world of repeated destruction and millions of climate refugees from mid century.
- 7.** One available program that goes to the heart of local effort in direct CO<sub>2</sub> reduction is the Environmental Upgrade Finance (EUF) program. Resource it, expand it, and extend it to households.

# The core drivers of CO<sub>2</sub>-e emissions: Capital stocks in Mount Alexander Shire – 2018

	<b>Stock (2018 \$m)</b>
<b>Dwelling stock</b>	<b>3,002</b>
<b>Household equipment</b>	<b>660</b>
<b>Non-residential capital stock</b>	<b>304</b>
<b>Engineering expenditure capital stock</b>	<b>809</b>
<b>Producer equipment capital stock</b>	<b>422</b>
<b>Motor vehicle stock</b>	<b>496</b>
<b>TOTAL</b>	<b>5,694</b>

## Emission reduction expenditures: ZNET 2030 and ZNET 2040 - \$2018 million (based on 2018 benchmarks)

	Value of capital stock	10 Year total		Total expenditures for ZNET	Net cost ZNET		Emission reduction ('000 tonnes)	
		Depreciation expense directly related to CO <sub>2</sub> emissions	Total depreciation expense		2030	2040		
Business and infrastructure	1535	160	740	340	220	20	138.4	
Deep housing retrofit (60% of dwellings) and small solar	3662	113	912	389	276	33	38	Includes three fold increase in small solar
Electric motor vehicles	496	280	280	635	355	130	52.9	
Other (including other transport)	na	na	na	na	201	76	30.7	
Investment in renewables on MAS behalf				133	133	133		
<b>Total</b>	<b>5693</b>				<b>1185</b>	<b>392</b>	<b>260</b>	

# Substantial outside assistance required for ZNET 2030 or ZNET 2040

	<u>ZNET 2030</u>	<u>ZNET 2040</u>
Net cost as % of MAS HDI excluding renewable investment	15.4	2.0

For ZNET 2030 the cost would be equivalent to an 80% increase in the direct tax rate.

With EUF programs (households and business) MAS 10% to 15% of target could be achieved with internal resources.

To achieve the balance the outside rule changes and financial assistance would include:

1. Changes to the Federal Tax act to give zero depreciation allowances for less than best practise investment in energy efficiency and CO<sub>2</sub> reduction.
2. Changes to the Federal Tax Act to give an accelerated depreciation parameter of 2 to 3 for ZNET 2030 and 1.2 for ZNET 2040 for clean energy investments.

## **Substantial outside assistance required for ZNET 2030 or ZNET 2040 (continued)**

- 3. Investment allowances for tax purposes of up to 20% to \$40% for clean energy investments;**
- 4. A statutory Financial Corporation to give grants, low and zero interest loans to eligible households (low income) and businesses (small/strategic) to assist in the funding of the additional costs for ZNET 2030 a total of up to \$400 to \$500 million funding may be required.;**
- 5. Regulation changes requiring deep retrofit inclusion in approvals for major renovations and new dwellings and banning non clean energy household appliances.**

**These would enable EUF type programs to achieve targets.**

**Also required:**

- 1. Ban on ICE vehicles sometime in the 2020s earlier rather latter.**
- 2. Subsidies of between \$10,000 and \$15,000 for new EV to compensate for the early ending of life for ICEs.**

## **The personnel running local EUF schemes would be critical to efficient local ZNET implementation**

**They would know the detailed characteristics of the local capital stock and therefore;**

- 1. The key components in the capital stock important for emissions;**
- 2. The cost in replacing and/or augmenting the strategic parts of the capital stock for emissions;**
- 3. The replacement time table for the strategic parts of the capital stock**
- 4. The relationship between the strategic parts of the capital stock and the rest of the capital stock so they can design more strategic upgrades accessing more of the available depreciation allowances to fund CO2 reduction;**
- 5. The financial requirements of individual businesses so customised financial assistance packages can be designed to allow the accelerated replacement essential for a strong target.**

**BREAK**  
10 minutes





# Keppel Cassidy

## Resident



**David Carré**  
Managing Director,  
Electrologix



# An Engineering Perspective

On the Climate Emergency

David Carré

B Eng (Elec), MIEAust, Functional Safety Engineer (TUV Rheinland #7553/13)



## Our Code of Ethics

- 1 Demonstrate integrity
- 2 Practise competently
- 3 Exercise leadership
- 4 Promote sustainability

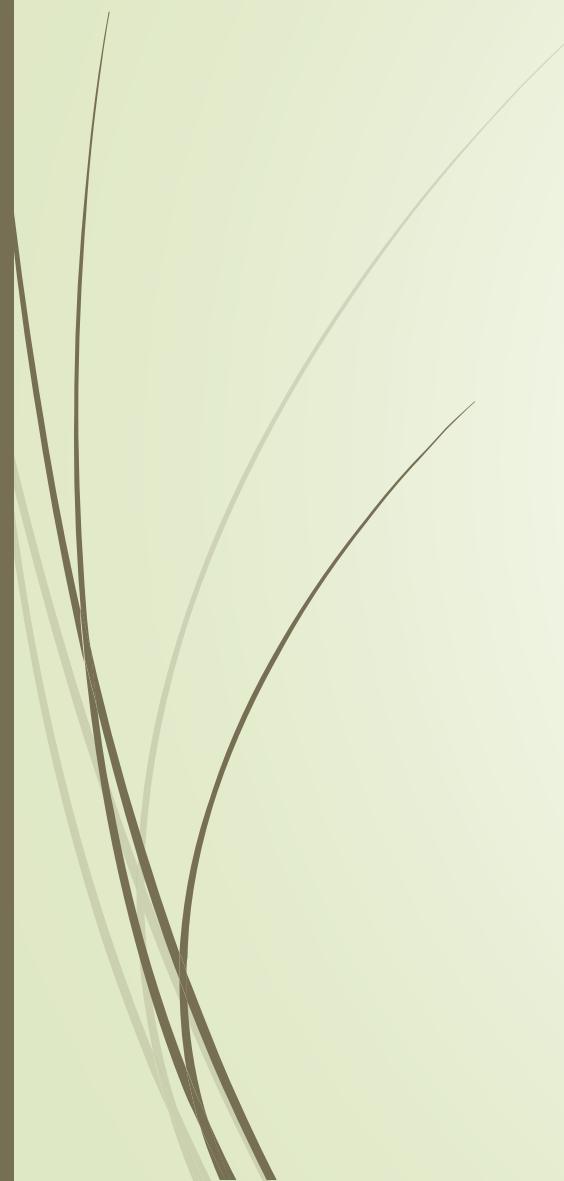
### Exercise leadership

- 3.3 Communicate honestly and effectively, taking into account the reliance of others on engineering expertise
- provide clear and timely communications on issues such as engineering services, costs, outcomes and risks

### Promote sustainability

- 4.1 Engage responsibly with the community and other stakeholders
- be sensitive to public concerns
  - inform employers or clients of the likely consequences of proposed activities on the community and the environment
  - promote the involvement of all stakeholders and the community in decisions and processes that may impact upon them and the environment
- 4.2 Practise engineering to foster the health, safety and wellbeing of the community and the environment
- incorporate social, cultural, health, safety, environmental and economic considerations into the engineering task
- 4.3 Balance the needs of the present with the needs of future generations
- in identifying sustainable outcomes consider all options in terms of their economic, environmental and social consequences
  - aim to deliver outcomes that do not compromise the ability of future life to enjoy the same or better environment, health, wellbeing and safety as currently enjoyed





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## **Practical action to meet the Paris Agreement**

Response to the Climate Change Authority  
Consultation Paper

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August 2019

# The recent evolution of the UN's Understanding of the Risks of Climate Change

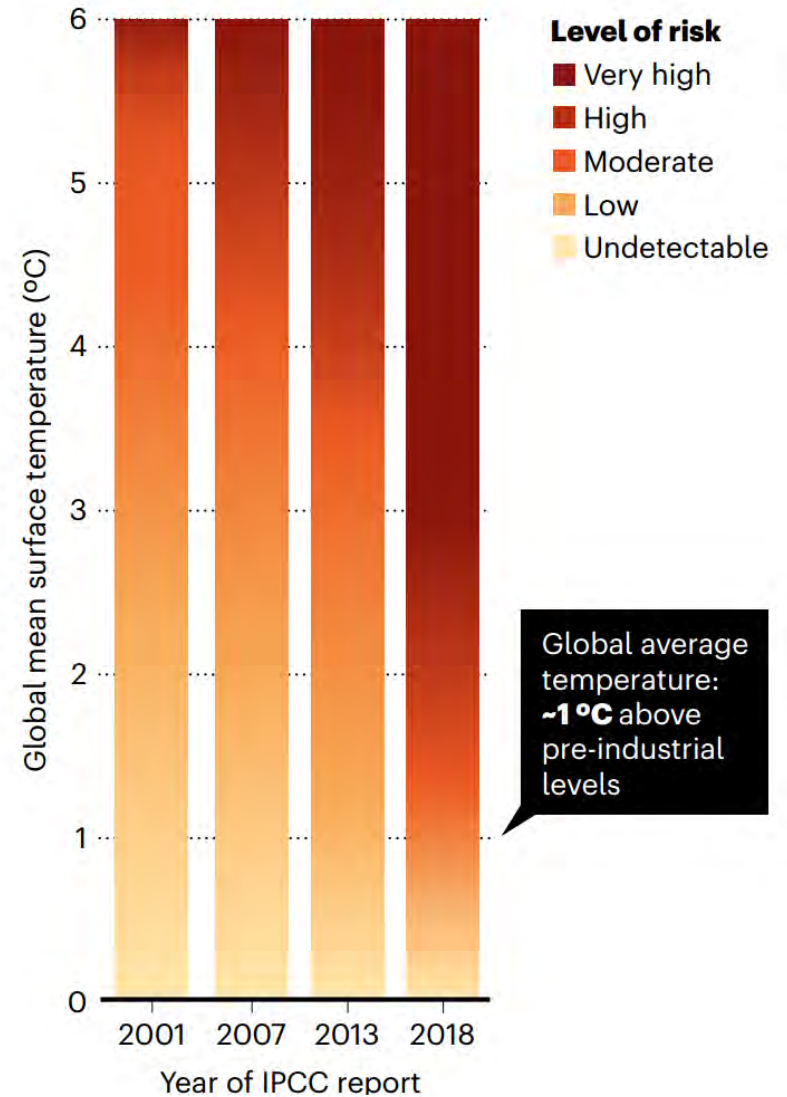
From *Nature* | Vol 575 | 28 November 2019  
*'Climate tipping points — too risky to bet against'*

By Timothy M. Lenton, Johan Rockström, Owen Gaffney, Stefan Rahmstorf,  
Katherine Richardson, Will Steffen & Hans Joachim Schellnhuber

© 2019 Springer Nature Limited

## TOO CLOSE FOR COMFORT

Abrupt and irreversible changes in the climate system have become a higher risk at lower global average temperatures.





## EMERGENCY: DO THE MATHS

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We define emergency ( $E$ ) as the product of risk and urgency. Risk ( $R$ ) is defined by insurers as probability ( $p$ ) multiplied by damage ( $D$ ). Urgency ( $U$ ) is defined in emergency situations as reaction time to an alert ( $\tau$ ) divided by the intervention time left to avoid a bad outcome ( $T$ ). Thus:

$$E = R \times U = p \times D \times \tau / T$$

The situation is an emergency if both risk and urgency are high. If reaction time is longer than the intervention time left ( $\tau/T > 1$ ), we have lost control.

We may have already  
lost control of the  
climate



- We are in the most extreme crisis that humanity has ever faced
- I am optimistic that we can still avert disaster
- ...but it requires decisive leadership & action



# Trevor Scott

## Central Vic Climate Action



# **Samantha Downing**

## Resident

# Climate Change and Transport

Emissions reduction and transport resilience

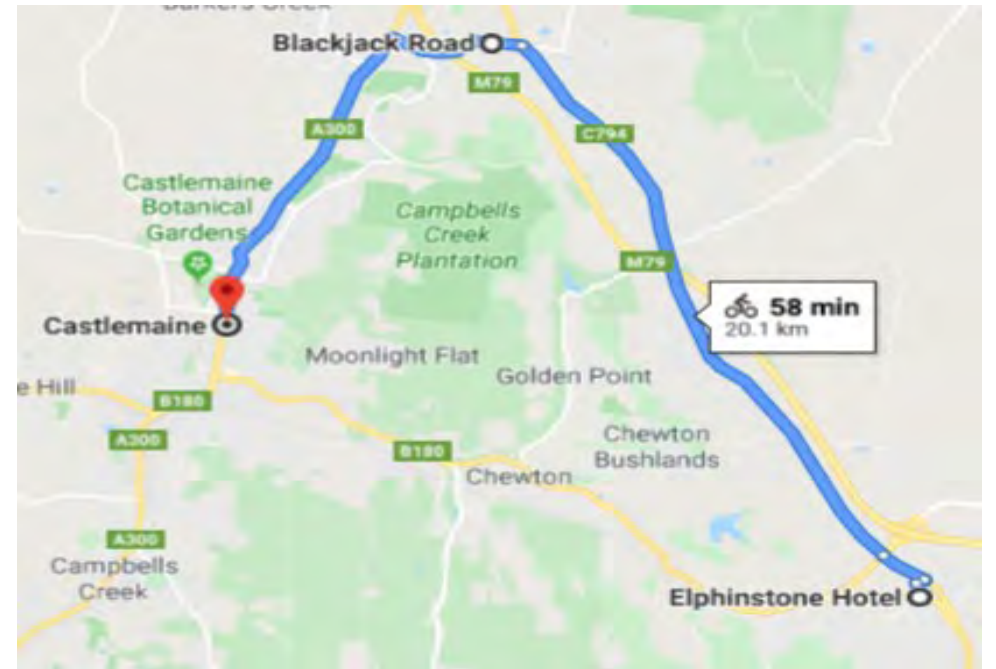
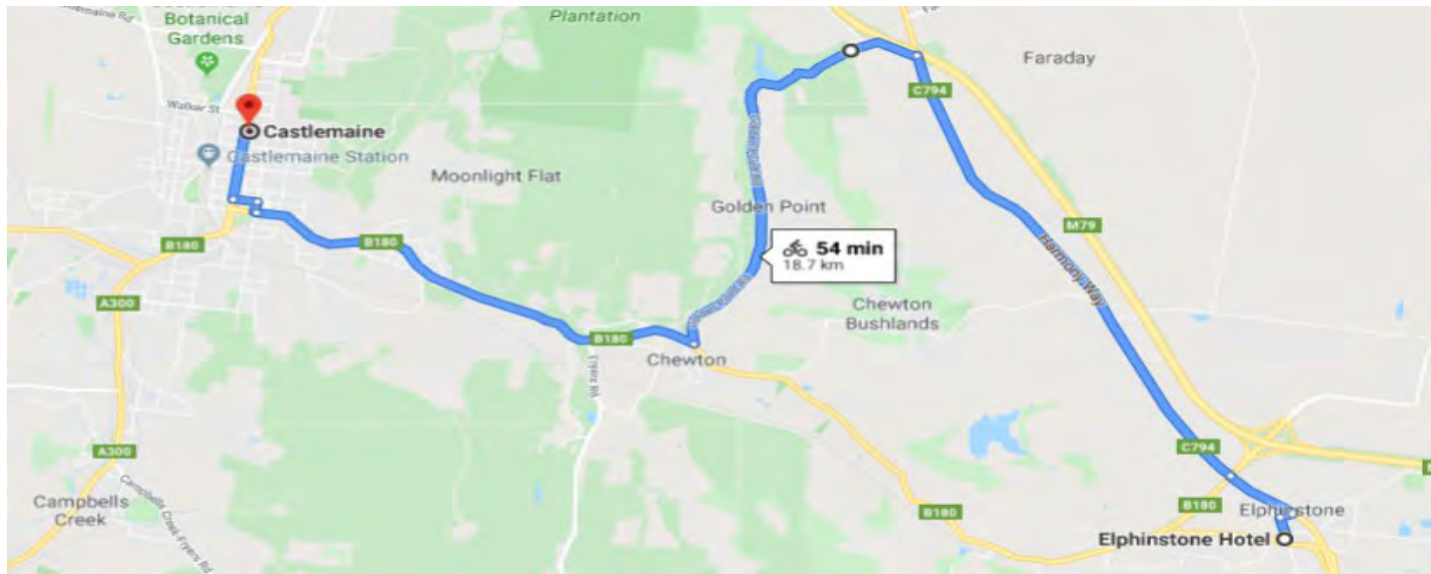
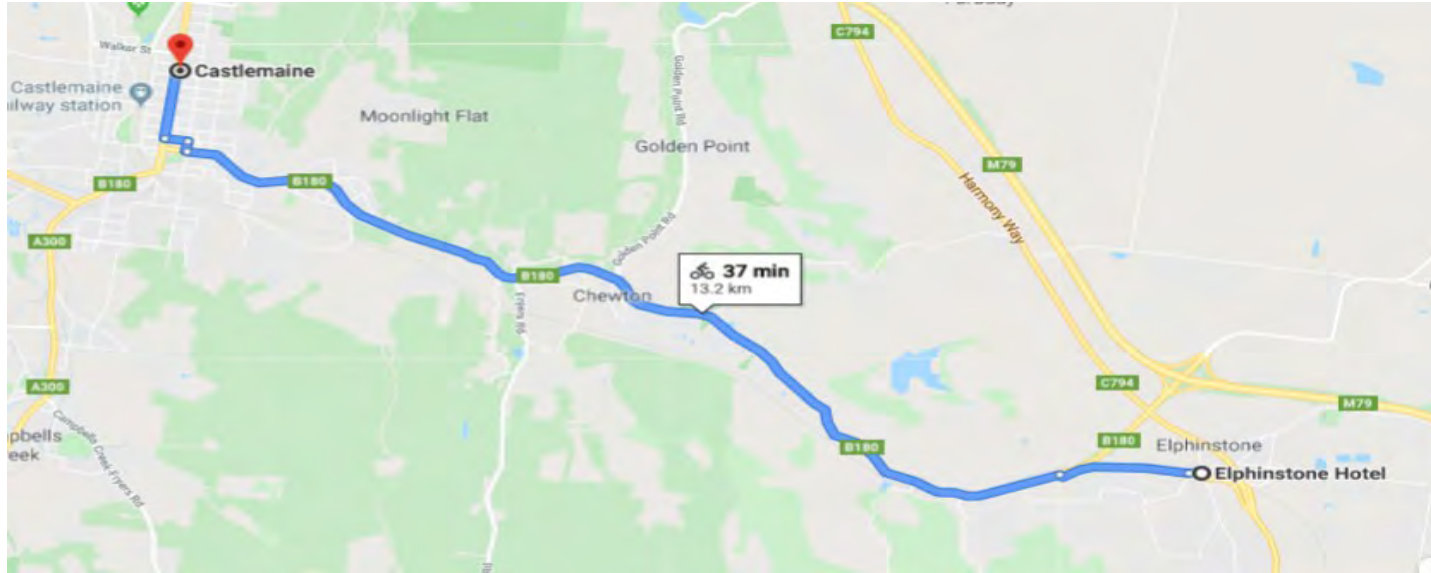
presented by Sam Downing

Transport is Australia's second largest source  
of greenhouse gas pollution (after electricity).

Climate Council



# Cycle dreams and nightmares





# Route 5 Castlemaine via Elphinstone & Chewton

Public transportation between Castlemaine - Taradale

Useful if it:

enables

connections is

reliable

		Monday to Friday					
Service Information		SH		SH			
Morning (am) / Afternoon (pm)		am	am	pm	pm	pm	
Taradale Hall/De La Beche St (Taradale)		7:30	10:20	1:30	4:57	6:15	
Park/High St (Taradale)		7:30	10:20	1:30	4:57	6:15	
Elphinstone Hotel/Wright St (Elphinstone)		7:35	10:25	1:35	5:02	6:20	
Pitman St/Main Rd (Chewton)		7:45	10:35	1:45	5:12	6:30	
Community and Senior Citizens Centre/Main Rd (Chewton)		7:45	10:35	1:45	5:12	6:30	
Town Hall/Main Rd (Chewton)		7:46	10:36	1:46	5:13	6:31	
Adelaide St/Main Rd (Chewton)		7:46	10:36	1:46	5:13	6:31	
Van Heurck St/Duke St (Castlemaine)		7:49	10:39	1:49	5:16	6:34	
Old Wesley Church/Duke St (Castlemaine)		7:50	10:40	1:50	5:17	6:35	
Taylor St/Duke St (Castlemaine)		7:50	10:40	1:50	5:17	6:35	
Merson St/Duke St (Castlemaine)		7:51	10:41	1:51	5:18	6:36	
Railway Ave/Duke St (Castlemaine)		7:52	10:42	1:52	5:19	6:37	
Tourist Information Centre/Forest St (Castlemaine)		7:54	10:44	1:54	5:21	6:39	
Castlemaine RSL/Mostyn St (Castlemaine)		7:55	10:45	1:55	5:22	6:40	
(Castlemaine)							

Connects to 8.12am VLINE service to Melbourne. 8.51 to Bendigo

		Monday to Friday					
Service Information		SH		SH			
Morning (am) / Afternoon (pm)		am	pm	pm	pm	pm	
Castlemaine RSL/Mostyn St (Castlemaine)		9:50	1:05	4:32	5:50		
Castle Motel/Duke St (Castlemaine)		9:51	1:06	4:33	5:51		
Railway Ave/Duke St (Castlemaine)		9:52	1:07	4:34	5:52		
Merson St/Duke St (Castlemaine)		9:54	1:09	4:36	5:54		
Wesley Hill Bakehouse/Duke St (Castlemaine)		9:54	1:09	4:36	5:54		
Old Wesley Church/Duke St (Castlemaine)		9:54	1:09	4:36	5:54		
Van Heurck St/Duke St (Castlemaine)		9:55	1:10	4:37	5:55		
Adelaide St/Main Rd (Chewton)		9:58	1:13	4:40	5:58		
Town Hall/Main Rd (Chewton)		9:58	1:13	4:40	5:58		
Community and Senior Citizens Centre (opp)/Main Rd (Chewton)		9:59	1:14	4:41	5:59		
Pitman St/Main Rd (Chewton)		10:00	1:15	4:42	6:00		
War Memorial/Wright St (Elphinstone)		10:10	1:25	4:52	6:10		
Roderick St/High St (Taradale)		10:14	1:29	4:56	6:14		
Taradale Hall/De La Beche St (Taradale)		10:15	1:30	4:57	6:15		

Express Melbourne to Castlemaine VLINE service arrives at 6.09pm  
Services from Bendigo arrive 5.08, 5.48

## Service Information

SH = School Holidays only (Another bus service covers these runs on school days)

## Carpool / Rideshare



Can council assist to get local systems off the ground?  
Test cases exist, eg. Blauen FahrMit.





Elphinstone - few footpaths, many roads with high speed



EMF - Girona, Spain - council workers and contractors manage mown



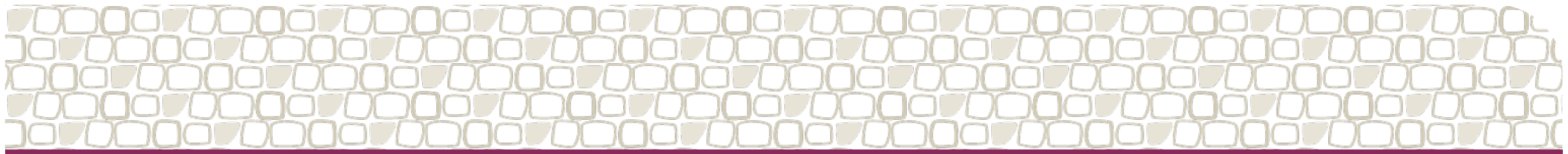


# Merryn Davies

## Resident

**BREAK**  
10 minutes





# Warwick Smith

## Resident

Warwick Smith – Economist and policy analyst

Because of its strong community, breadth of knowledge and experience, and its location, Mount Alexander has the capacity to become a national leader in regional climate change mitigation and adaptation.

Change is the only constant in economic development and Mount Alexander has lived through many dramatic changes in the nature of the economy of the last 200 years, including the shift from agriculture to mining; then the end of the mining era and beginning of manufacturing and food processing as dominant sources of employment. The move to a post-carbon economy is just another of a never-ending series of economic transitions.

The experience of past transitions tells us is that, economically, the sooner we embrace this future the better. Sooner or later a low carbon economy is coming, and it will be those places that are ahead of the curve that will benefit the most from the transition. By acting now, we can plan for an orderly transition and can work collectively to assist those who will be negatively impacted. If we wait, change will be forced upon us with a timeline not of our choosing, minimising our capacity to benefit from new industries.

This is the great benefit of declaring a climate emergency. Our council and our community will be part of deciding what that means for us and how we act on this emergency.

There are people who are fearful of what this declaration might mean for niche activities and events like the hot rod community and the steam train, but the reality is that such things are trivial in terms of emissions compared to our energy, transport and waste systems. It is not particular activities that we need to be concerned about but systems.

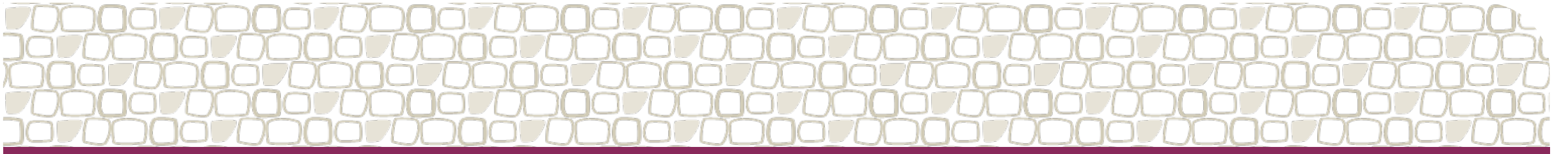
Similarly, there are concerns about the cost implications for MA Shire Council. Council is financially constrained and is already stretched in terms of the services that it delivers. Again, this is a reason to declare the emergency now and start planning and thinking about how to resource action. The alternative to acting now is not the absence of action, it's having action forced upon us at a time not of our choosing.

The early impacts of climate change are already upon us with more unseasonably hot days, more unpredictable rainfall (in a place where rainfall was already very unpredictable), and an expanded fire season. It's time to be

taking action to adapt to the changes that have happened and that are already baked in to our climate future. Trees take a long time to grow, culture takes a long time to change.

As a relatively wealthy community (on a global scale) and one that is on the forefront of climate impacts, we should be doing more than our share of climate change mitigation by reducing our emissions as quickly as we can and discovering new ways to live more lightly on the earth. If communities like ours can't lead the way, then we have to wonder about the capacity of the country and the globe to adequately respond to what is a genuinely the greatest challenge of our times.

This transition will be challenging but it will also create opportunities. By moving early and charting our own path, the potential exists for this process to strengthen our community our economy.



**Tim Todhunter**

Fryerstown Community Reserve  
Committee of Management



# John Clarke

## CSIRO



# Climate Change in Mt Alexander Shire

John Clarke  
CSIRO Climate Science Centre



# Interpreting data - temperature

Range of change from  
VCP19 hi-res models

## Bendigo

Days/yr > 35°C: 13

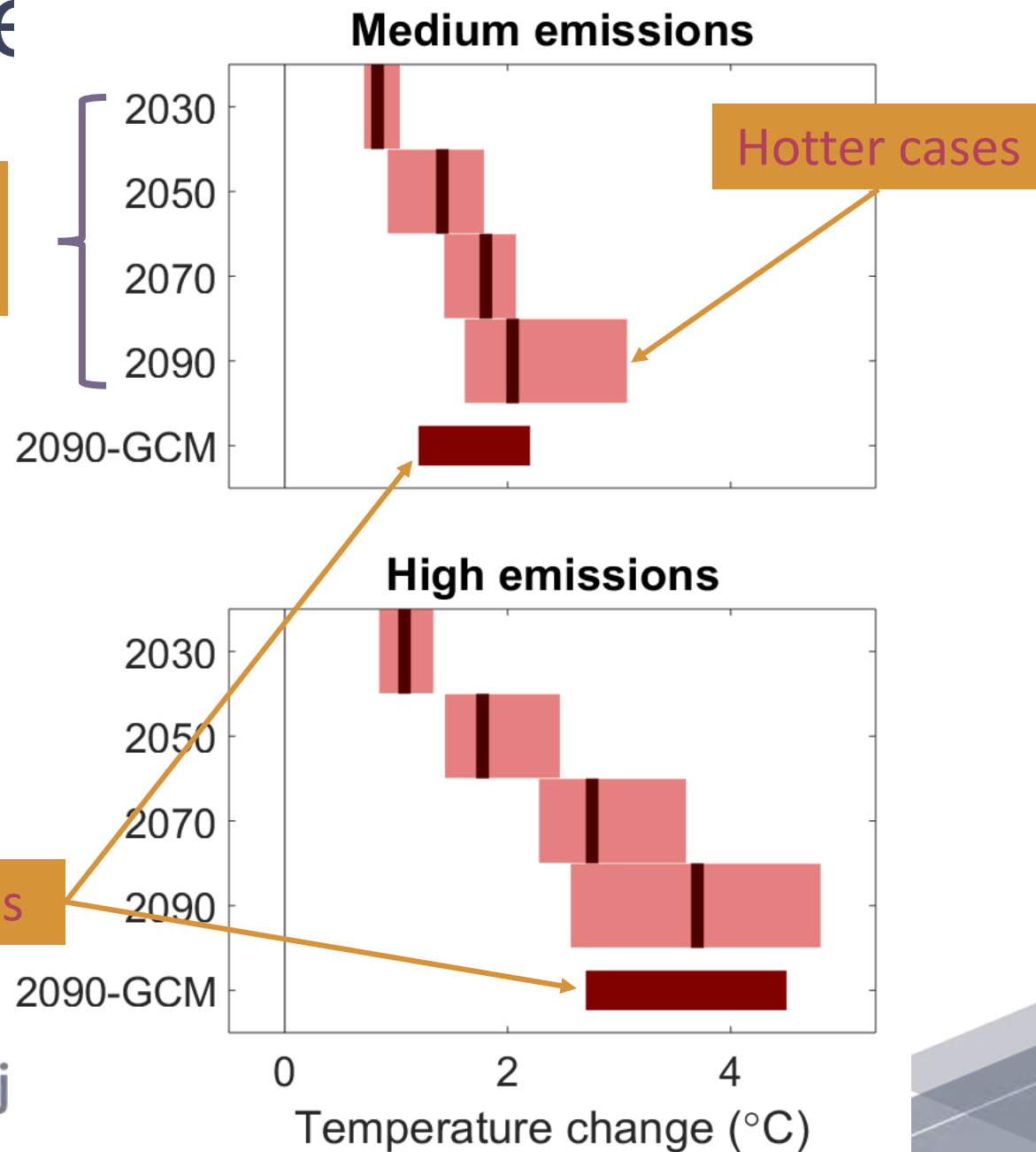
2050s High emissions: 17-30 days/yr

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Nights/yr > 24°C: 0.5

2050s High emissions: 0.9 to 3.4 days/yr

Range from GCMs

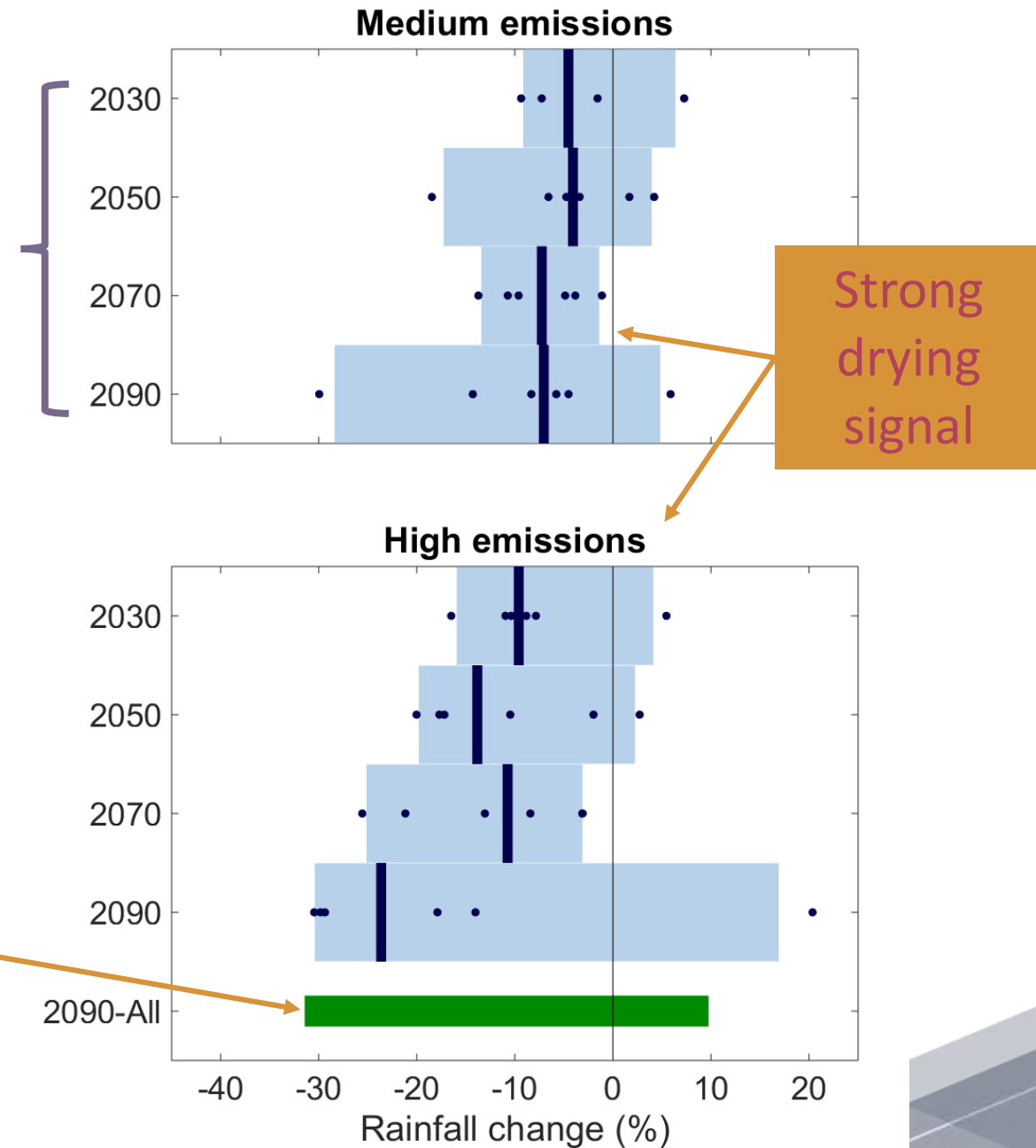


# Interpreting data - rainfa

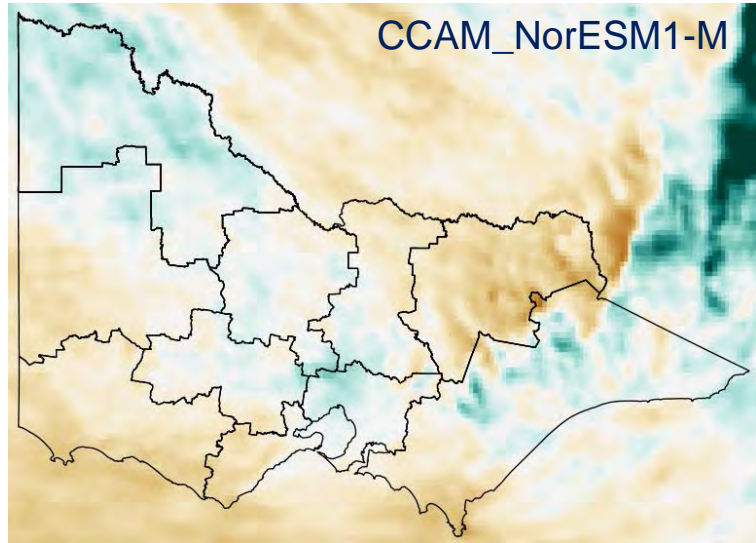
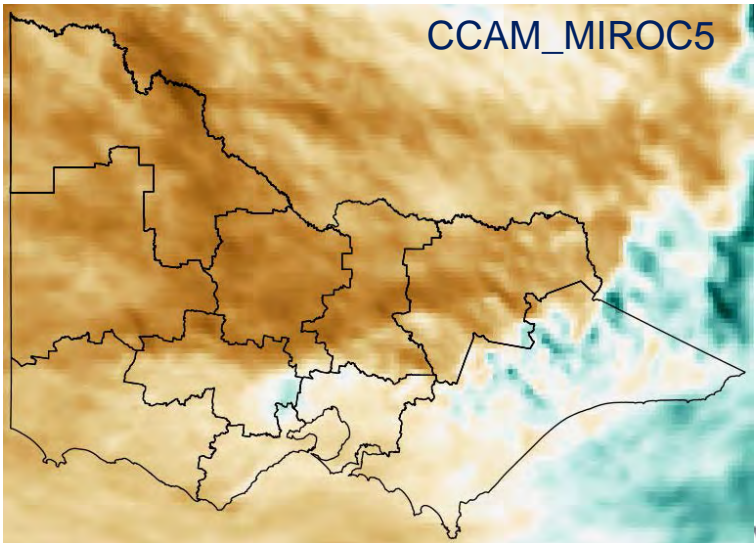
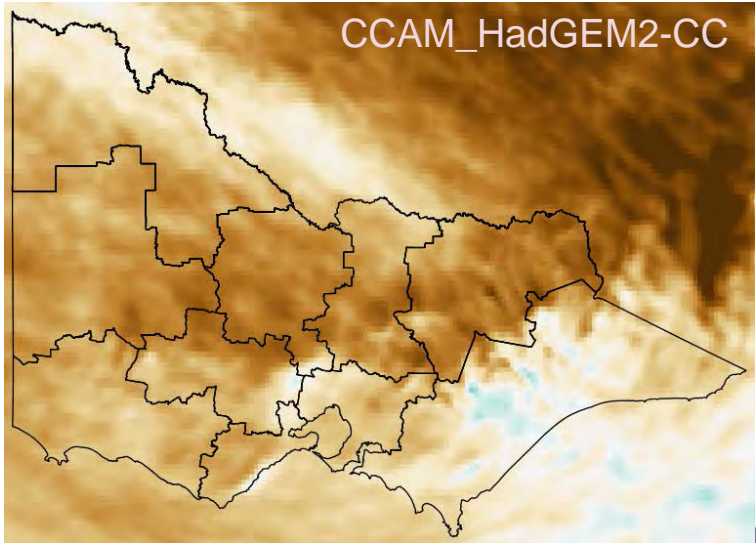
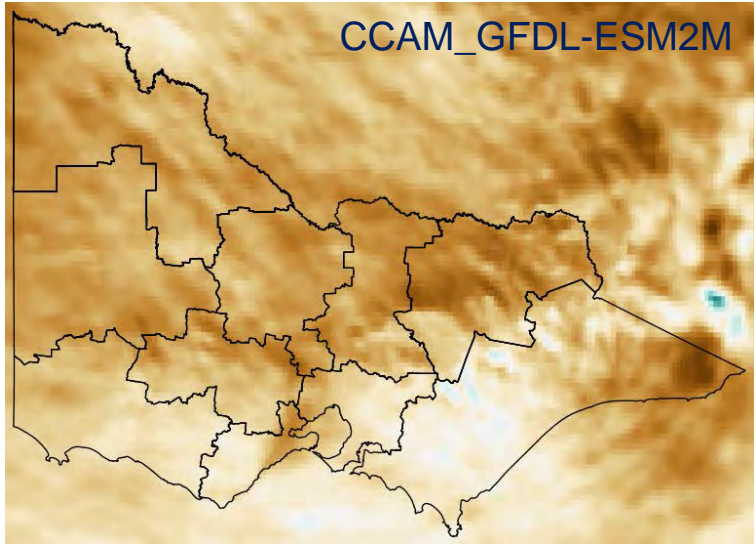
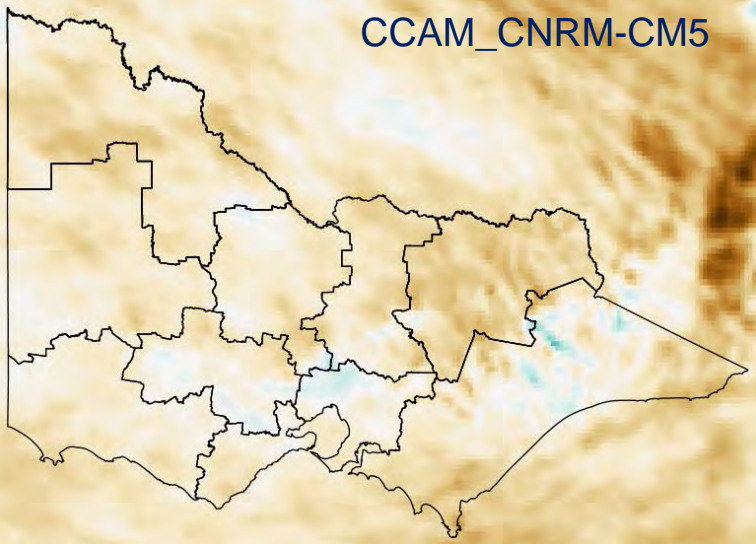
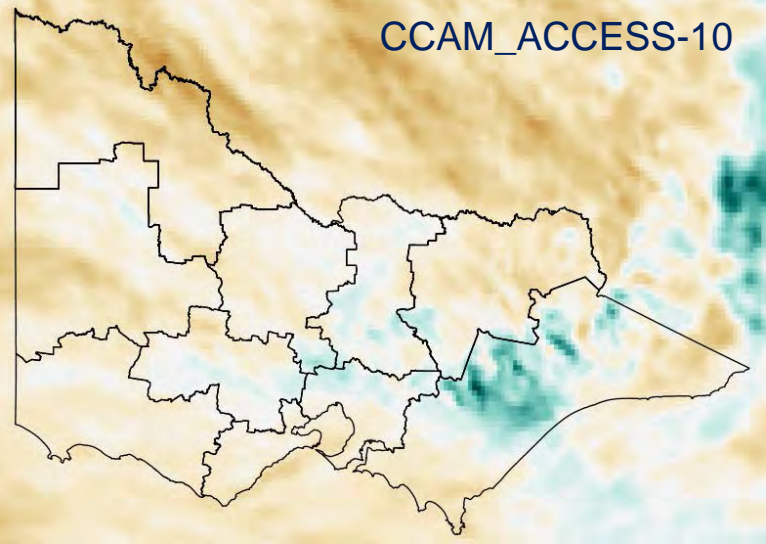
Range of change from  
VCP19 hi-res models

Winter rainfall, Bendigo  
Recent past: 150 mm  
2050s: 5% to 25% less

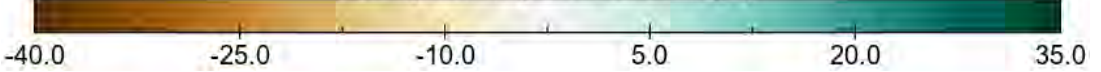
Range from all  
sources (e.g.  
VicCI, GCMs)



# Six simulations: 2050 RCP8.5 winter rainfall



Precipitation (Percent change)



# Thank You

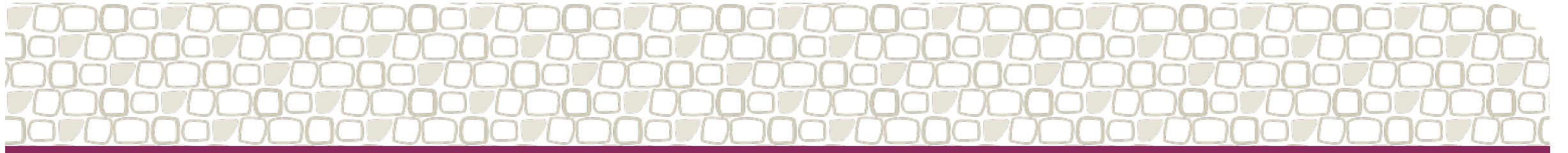
John Clarke

Team Leader Regional Projections

CSIRO Climate Science Centre, Aspendale  
[john.clarke@csiro.au](mailto:john.clarke@csiro.au)

(03) 9239 4620



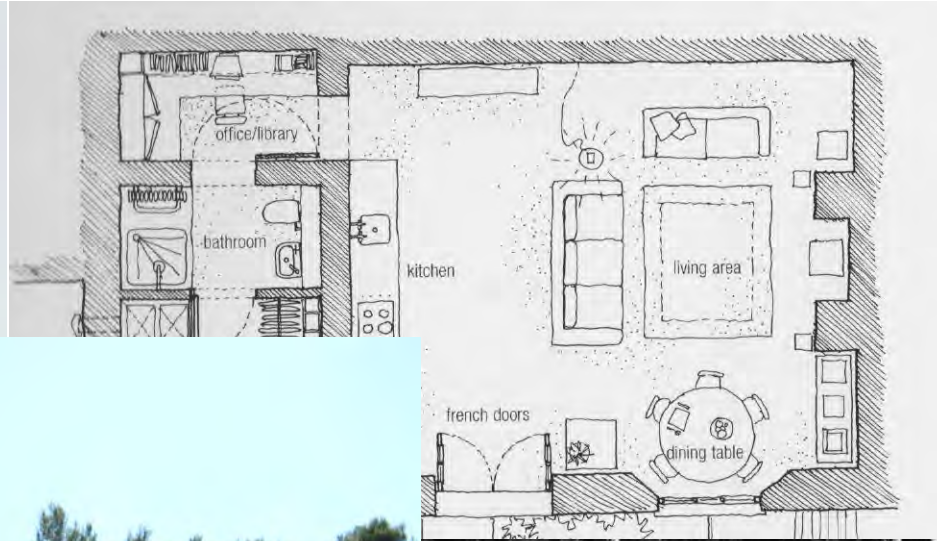


**Anitra Nelson**

Mount Alexander Eco-Housing  
Group, and Resident



# Mount Alexander EcoHousing Group

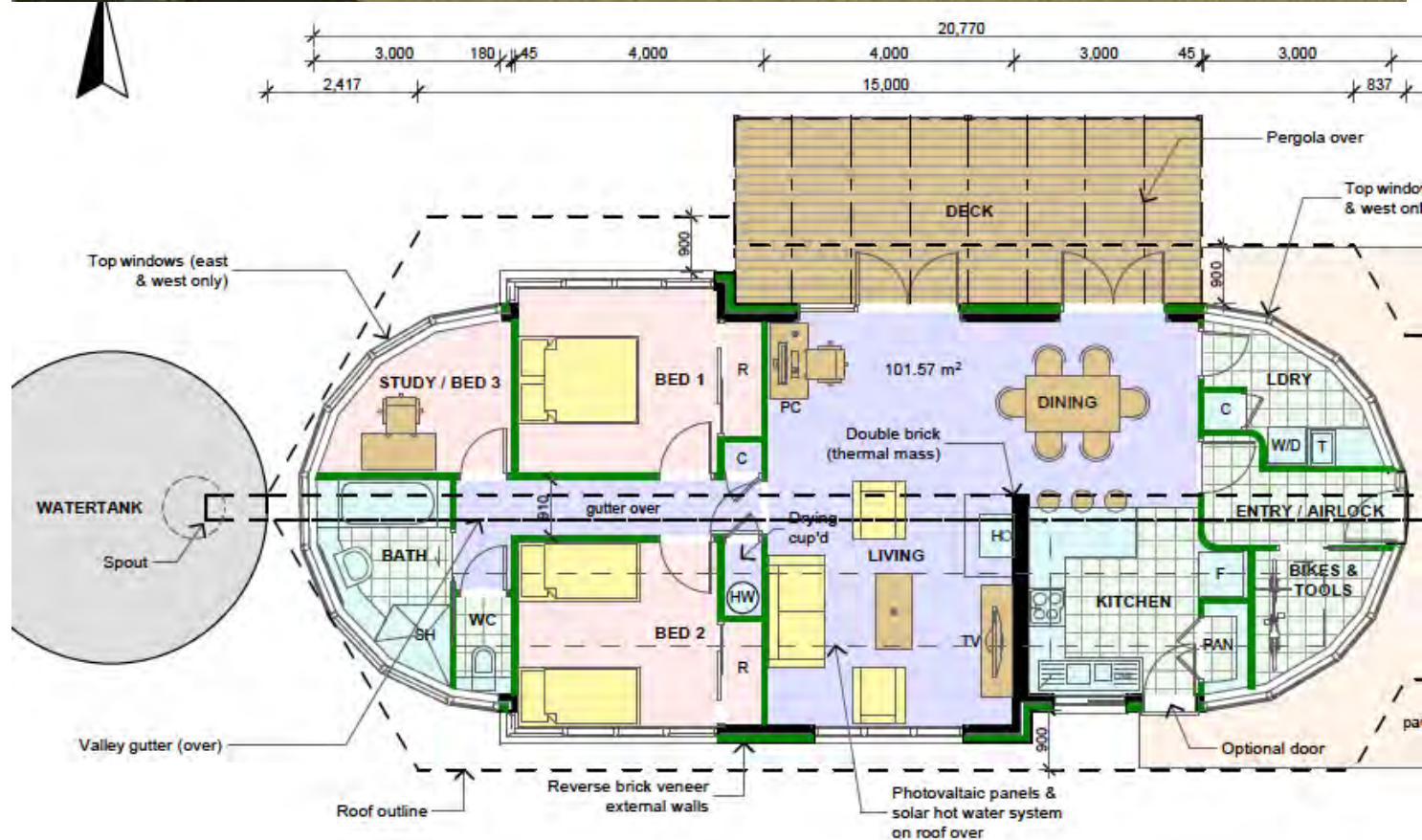


- Affordable
- Modest
- Low carbon
- Comfortable
- Bushfire wise
- Easy to build
- Water-wise landscaping
- Off-grid, collective services

Mount Alexander EcoHousing Group

values:

- DIY/DIO
- Simplicity
- Renewables
- Re-use
- Affordability
- Conservation
- Shared, e.g. cohousing...





# Top down policy meets grassroots efforts

Citizens satisfy needs for affordable and sustainable housing and households live with one planet footprints

## Recommendations:

- revise planning and building application processes
- enable simple self-built dwellings and collective land settlements
- enhance social housing with sustainable renovations and conserve nature
- enable alternative, ecologically sustainable, basic household services
- apply maximum standards (e.g. space p.c.) for homes, land and service use
- flexibly apply planning conditions —  
using ecological principles and affordability criteria.

**THINK ABOUT YOUR  
GLOBAL FOOTPRINT,  
ARE YOU DOING  
ENOUGH TO HELP  
THE ENVIRONMENT?**

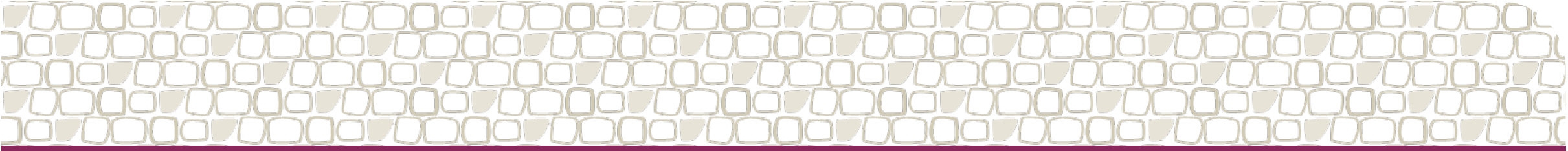


Residents of Mount Alexander Shire  
are knowledgeable and skilled —  
ready to work with local community and council  
to minimise carbon emissions  
and to address local climate change









**Otis Shoell- Roach &  
Greta Kennedy**  
Castlemaine Secondary College



# Leah Mow-Yoffee

## Resident

**CLOSE**

Evening Session  
Resumes at 6pm