Energy Innovations

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GIPPSLAND Smart Specialisation

Developing pathways to support bioenergy sector growth

A Gippsland Bioenergy Development Framework aims to engage local and state government agencies in creating a system-wide response to bioenergy sector growth.

Bioenergy projects across Europe are supported by checklists, toolkits and evaluation frameworks that integrate industry advice and planning guidance. Other renewable energy sectors (e.g. wind and solar) have similar guidelines in Australia. It is envisaged that a Gippsland Bioenergy Project Development Framework, drawing on international examples, could consist of the following elements:

- A checklist of inclusions and exclusions expected in a bioenergy project related to technology and feedstock type;
- Project design methodology that outlines developmental stages related to the planning and regulatory environment;
- Useful steps and practices for working with planners, regulators and potential investors;
- Mapping of the skills and training needs connected with the bioenergy industry, including assessing projects against industry standards, e.g. bioenergy and gasfitter standards;
- An assessment and evaluation matrix to enable critical feedback on proposals coming into the Bioenergy Innovation Group that is contextual, technology based and includes financial and environmental measures; and
- Strategies for developing communications and engagement activities around points such as co-sighting of facilities, co-generation and benefit sharing opportunities.

Wellington Shire Council will co-ordinate development of this framework in partnership with the Smart Specialisation Energy Team, Gippsland local government authorities, bioenergy sector stakeholders and qualified consultants.

Upcoming Events

Smart Futures Series

June 17th - Financing Community Energy Solutions

July 1st - Community Energy for Sporting Clubs

July 15th - Home Energy Solutions

To register for the Smart Future Series webinars follow this link: https://spark.adobe.com/page/PRG5GJJkmm51F/

June 18th – Energy Tech – Unpacking Sustainable-led Recovery

14.00 – 15.00 Zoom webinar and Q& A

https://ft20.sbcaus.com/event/receMMHgECo1HIWZg/guest/

If you have received this eBulletin and have an interest in the Innovation Groups, but have not previously participated, please email:

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Acknowledgement - much of the content in this eBulletin has been contributed by project lead organisations and other Innovation Group members.

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Data on biomass resources to inform bioenergy feasibility and investment

The Gippsland Biomass audit and analysis project will review and update previous audits, analyse various biomass types, and couple this data with planning, regulatory and cost constraints to identify demand centres and suitable locations for bioenergy facilities (biohubs) in Gippsland.

Presently, many bioenergy technologies are widely deployed, but not in Australia. In Victoria, there are in the order of 25 to 30 bioenergy facilities in operation today with enough demand and resources for deploying several hundred more.

Biomass is a primary source of renewable energy, and in 2020 provides around 10% of the world's total primary energy, and over 14% of energy consumed.

In Australia it contributes less than 6% of electricity sent into the grid, and nearly 10% of overall energy output (2020 CEC annual report). Estimates indicate that bioenergy could sustainably contribute between 25% and 33% of the future global primary energy supply (up to 250 EJ) in 2050.

Due to its high capacity factors bioenergy is the only renewable source that can replace fossil fuels in all energy markets – in the production of heat, electricity, and fuels for transport.

Bioenergy can cost-effectively improve energy productivity, provide reliable baseload energy, grow regional economies through development of new supply chains, and reduce carbon emissions as biomass resources are renewable.

Biomass sources come from agricultural and forestry residues, manures and sludges, rendered fats, used oils, human and urban wastes and dedicated energy crops.

Processing biomass also leads to new products, circular supply chains and markets. Conversion of biomass produces many co-products such as:

- nutrients for agriculture
- nutraceuticals
- reducing agents
- nano-carbon
- micro-cellulose
- biochar
- graphene and wood vinegar

This project is led by Gippsland Climate Change Network and Frontier Impact Group partnering with Vic Forests, Agriculture Victoria, Sustainability Victoria, Gippsland Resource Recovery, Gippsland local governments and the Bioenergy Innovation Group.

Sustainability Victoria

Copies of this related and useful report can be found at at this link Guide to Biological Recovery of Organics

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Investigations underway for a solar re-use scheme

The Latrobe Valley Community Power Hub is co-ordinating a research project to identify the opportunities and barriers related to reusing, rather than recycling solar panels.

At present many solar panels are replaced on a ten-year cycle as innovations in technology provide increases in energy density and production.

However, a solar panel has a nominal life of 25 years. Therefore, a waste stream is being generated, even though there is still significant residual life in most panels.

The waste stream has been estimated to be in the order of 6,000 tonnes per year currently.

Sustainability Victoria reports that by 2035 there will be 22,000 tonnes of PV panel waste requiring disposal in Victoria and 100,000 tonnes nationally and will enter a critical stage in Australia from approximately 2023 owing to the wide-reaching deployment of PV panels in the past two decades.

"Global PV module waste is projected to reach 1.7–8 million tonnes by 2030 and 60–78 million tonnes by 2050 which will likely reach the same order of magnitude as global electronic waste" (Rong Deng et. al., UNSW 2019).

A solar panel stewardship scheme would consider the total environmental impact of the use of PV systems by accounting for the lifecycle of the product.

Two major issues first need thorough investigation and evaluation, however, which this project is designed undertake.

1. The first issue relates to the legacy of Small-scale Technology Certificates (STCs) and Large-scale Generation Certificates (LGCs) from when the panels were originally deployed the business case for re-deploying a second-hand solar PV system.
2. The second issue relates to Clean Energy Council approval and registration of solar panels, specifically second-hand panels.

Overcoming these two issues would create an opportunity for a second-hand solar PV market. This would not only contribute to a circular economy but would assist those in the community, for example social housing providers and community organisations, who are reliant on grants to access solar PV due to high cost.

Latrobe Valley Community Power Hub will work with Federation University, Sustainability Victoria, Australia and New Zealand Recycling Platform, DELWP-Energy, the Clean Energy Council and other partners to examine potential ways of overcoming the issues currently constraining emergence of a second-hand solar PV reuse scheme.

A solar-powered amenity block at Heyfield RV Park. with all abilities access, solar heated hot water shower and individual male/female cubicles. Affordable 2nd hand panels could see many more of these projects go ahead.

In the photo - representatives from Heyfield Traders and Tourism Association, Bendigo Bank, Soulspace Studios, Heyfield Community and Resource Centre and the Latrobe

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Leveraging geothermal opportunities in Gippsland

Geothermal has been identified as an area of potential competitive advantage for Gippsland.

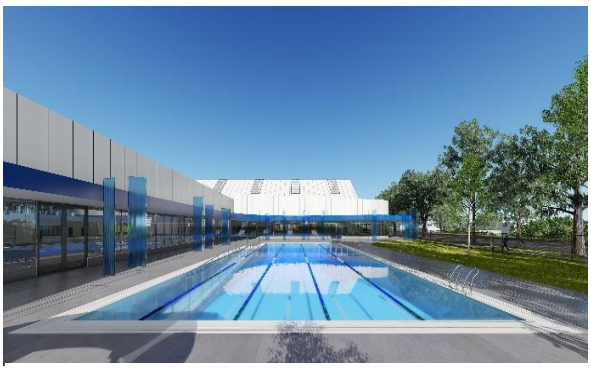
Preliminary work is underway for an online map-based tool that will predict the availability and cost of geothermal energy across the Gippsland region, and suggest potential cost-effective applications for the energy.

The online tool will provide the confidence for business to invest and expand across the region, with the provision of verified real world local data. It will also showcase Gippsland's competitive advantage in the geothermal resource and identify "hot spots" for investment that will grow the region's clean and green economy.

This work is being undertaken by Geological Survey Victoria in partnership with University of Melbourne.

Application of geothermal as sources of heat or energy has high potential in the following settings:

- Hospitals
- Spa and wellness resorts
- Food and fibre processing plants
- Protected agriculture
- Aged care facilities
- Protected agriculture
- Aquatic centres



Concept artwork for the 25mtr outdoor pool at Gippsland Regional Aquatic Centre.

Geothermal in action: Gippsland Regional Aquatic Centre

Designed to have a strong sustainability focus, the Gippsland Regional Aquatic Centre will be the first public aquatic facility in Victoria to incorporate a geothermal heating system.

Geothermal drilling for the Gippsland Regional Aquatic Centre in Traralgon

An environmentally friendly sustainable energy source, geothermal energy will assist in significantly reducing the carbon footprint while also aiding in energy costs savings of around $370,000 per year.

It is planned for the system to tap into the aquifer below Traralgon at a depth of more than 600 metres below ground where the ground water is above 60 degrees Celsius. The heat energy from the water would be taken off via a heat exchanger and the cooled water reinjected back into the aquifer at about 40 degrees.

Latrobe City Council has engaged local businesses Laser Plumbing, Drilltec and AusGeothermal to undertake this project.

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Could Emergency Smart Grids offer a solution to energy supply vulnerability during bushfires?

In 2019 and early 2020 we saw unprecedented impacts on isolated communities resulting from widespread bushfires.

Many rural communities at the end of power lines were cut off from the main electricity supply for days, with some towns for weeks.

The task now is to see what can be learnt from these experiences to inform new end of line power systems that enable energy security.

At the Gippsland Smart Grids Innovation Group meeting on January 29th, 2020, Voices of the Valley presented a proposal for learning from the recent bushfire experiences to inform design of emergency energy systems that could provide back-up power to end-of-line communities.

During extreme bush fire scenarios or other crises, an Emergency Smart Grid could operate in 'Smart mode' providing key services such as electricity, heating, or cooling. At all other times, it could provide the town with reliable, affordable, clean energy, shared through a community energy model.

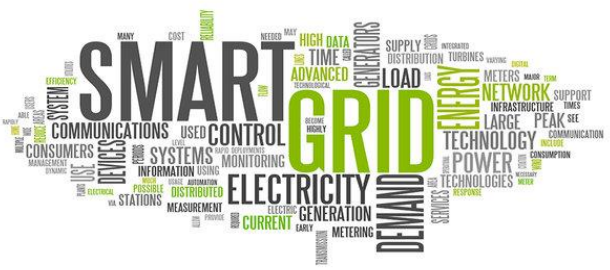
At a follow-up meeting in May 2020, a diverse stakeholder group including representatives from local government, community and state government and emergency services agencies provided feedback to this proposal, with several people demonstrating interest in a design workshop to test the concept further and discuss how to take it forward.

An opportunity has since been identified to start working with stakeholders in East Gippsland Shire, where work with bushfire affected communities is underway and "resilient energy systems for isolated communities" is a theme that continues to emerge through many community forums.

A workshop is scheduled for late June and will bring interested stakeholders together to begin the design discussion, by listening to the community feedback on this issue and building understanding of their experiences and the solutions they feel are needed. If there is strong agreement for an Emergency Smart Grid approach, a plan on how to take it forward would then be developed.

Could Emergency Smart Grids lead to energy innovation in Gippsland?

A global market scan is underway to find and research international examples of where emergency situations have prompted innovations in energy supply and related policies, practices and energy sharing approaches.



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Researchers from the Institute for Sustainable Futures, University of Technology Sydney have been engaged to undertake this work on behalf of the Smart Grids Innovation Group, through the Smart Specialisation Initiative.

They are employing the following questions to determine where such examples might exist and what we might learn from them that might be helpful with the context of Gippsland and Australia.

- **Where are the relevant examples and who should Gippsland be comparing itself to?** e.g. Japan's Fukushima Prefecture, the US's Northeast states, New Zealand's South Island, etc.?
- **What energy services are supplied by these international examples?** (e.g. lights and appliances, refrigeration, hot water, heating, cooling, etc.)?
- **What type/size of DER technologies have been integrated?** (e.g. Solar PV, batteries of various chemistries, diesel generators, geothermal, small wind, electric vehicles)?
- **What are the legal and regulatory challenges?** (e.g. who is responsible, how have they been managed elsewhere, etc.)
- **What other enablers are involved?** (e.g. supportive policy frameworks, close collaboration with local industries, local identity, etc.)

Ultimately this research will provide case studies that could inform a response in Gippsland whilst also contributing to understanding the competitive advantage that Gippsland may have in the field of Emergency Smart Grids.

Early results of this research will be shared with the Smart Specialisation Energy Innovation Groups in August, with the project due for completion in September.

A similar global market scan is also underway in the geothermal sector. More news on that in the next edition.

Proposals recently endorsed through Smart Specialisation

Bioenergy

Name: Gippsland Bioenergy Project Development Framework
Project lead: Wellington Shire Council

Name: Gippsland Biomass audit and analysis
Project lead: Gippsland Climate Change Network and Frontier Impact Group

Community Energy

Name: Solar PV panel reuse feasibility study
Project lead: Latrobe Valley Community Power Hub

Name: Building capacity for community energy leadership in Gippsland
Project lead: University Technology Sydney

Geothermal

Name: Geothermal energy global market scan
Project lead: Hot Dry Rocks Pty Ltd

Name: Geothermal resource mapping and cost and beneficial use tool
Project lead: Geological Survey Victoria and University of Melbourne

Smart Grids

Name: Loch Sport Microgrid
Project lead: Analytical Engines

Name: Emergency Smart Grids – Global Market scan
Project lead: Institute of Sustainable Futures

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