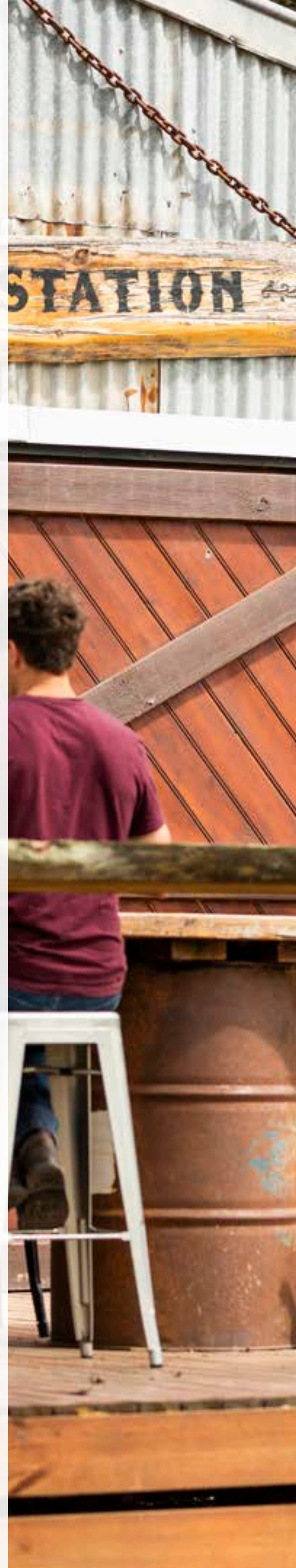




SHAPING
MURRINDINDI'S
FUTURE

Renewable Energy & Circular Economy

**Primary Industry
Entrepreneurial
Discovery Process**





Summary

A full day workshop in Renewable Energy and Circular Economy was held on Monday 12 February 2024 at the Buxton Hall. The workshop supported using the Quad-Helix model, with participants ranging in experience and expertise across industry, government, research, and community. The aim of this workshop was to define the asset further, and link potential opportunities that will create social and economic benefit within the community. A range of opportunities were discussed, with the group unanimously agreeing that Renewable Energy and Circular Economy should progress to Stage 3 – Innovation Working Groups.

Buxton is identified as a prime location (Melbourne University) for pumped hydro power due to its favourable geographical features, including hills, valleys, and proximity to the Goulburn River. The proposition is to leverage existing hydro power stations and explore opportunities in waste-to-energy conversion (circular economy model) to stimulate economic growth and job creation in the region, fostering a strong circular economy.

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Key Assets

Murrindindi Shire falls within a priority zone for hydro power development under the Victorian Government's new entity called VicGrid.

This project is planning improvements to the electricity distribution network with six renewable energy zones developed. Melbourne University have identified potential sites for pumped hydro, with Buxton rated highest in the State because of the topography and proximity to the three hydro distribution lines. Small scale renewable energy is being utilised successfully by businesses through financial incentives offered by government agencies such as Sustainability Victoria.



Strategic Competitive Advantage

Murrindindi Shire enjoys a position as a top potential site for pumped hydro with the hills, the valleys, and the Goulburn River providing geographical opportunity for establishment of a local renewable energy facility.

Researchers have identified Buxton as being the top site in the State with ongoing testing and trialling of various prototype pumped hydro equipment. The main distribution feed from the Snowy Mountains Scheme also runs through MSC to Melbourne (Merton – Kinglake).



Key Challenges

The area experiences inclement weather with high fire and storm damage risks which currently impact on power connectivity.

Environmental damage is also a key consideration due to any construction of potential pipeline or tunnelling.

Future high voltage easements from Buxton to the existing Eildon/ Rubicon hydro power lines that run through Taggerty will need to be considered. Circular economy models will need to consider what is the readily available waste and quantity needed, transport/logistics, and where this will be manufactured. A large concern for the corridor with the creation of new jobs is the suitability of available housing and finding skilled and suitable staff.



Workshop Discussion

Research/ Education – Centre of Excellence

There are strong networks and expertise in the region covering various aspects of renewable energy including pumped hydro, micro hydro, geothermal, floating solar, circular economy models including biochar, food dehydration, heat fertiliser, wind, biodiesel, solar and battery storage, and neighbourhood battery programs. There is need for an advisory service and customer service to educate and problem solve within the Shire.

The centre could provide access to qualified experience and researchers from various Universities. A number of demonstration sites could be used initially to test the design, and to further help educate and market better energy use within the community.



Renewable Energy Projects

A number of potential projects were discussed in detail with an aim to establish a range of small scale demonstration sites across the Shire which will assist further in research, community education, and promote the Renewable Energy Centre of Excellence. Education and demonstration sites will assist businesses and property owners on how to set up a net zero strategy and become sustainable with their energy usage, be able to plan better for emergency, and select a solution that will best suits their needs. These could include;

1. Ground Sourced Heating

Geothermal - An example is Yulara Village - where the township has all been built around pipes that are buried underground for natural heating. More planning, education to support design and installation during construction phase is needed.

2. BioDiesel

Is a renewable, biodegradable fuel manufactured domestically from vegetable oils, animal fats, or recycled restaurant grease. There could be opportunity and benefit to refining this fuel locally for use in tractors.



3. Wind Energy

Wind energy offers the most economical, environmental, and logistical benefits of any energy source. Murrindindi is within a low wind zone and could benefit from low speed turbines. With these kind of wind turbines, it would be possible to continue adding wind energy to the power system without the need for excessive grid oversizing. These are designed to and optimised to harness extremely low wind speeds.

4. Pumped Hydro

It is a configuration of two water reservoirs at different elevations that can generate power as water moves down from one to the other (discharge), passing through a turbine. The system also requires power as it pumps water back into the upper reservoir (recharge). There may be opportunity to build on the existing site at Eildon due to elevation and high rainfall or utilise the Rubicon site. Pumped Hydro is renewable, with substantial component to net zero.

5. Micro Pumped Hydro

Small scale, on farm benefits and can be designed for multiple farm use. Involves utilising a high dam and low dam which creates energy. Can set up smaller scale with solar panels so that during the day when the sun is shining the energy goes into the property / house and Farm, and excess energy is put it back into the Turbine circle to pump. On cloudy days energy is generated by running water from Dam to Dam and then back into the property, house or farming operations.



6. Circular Economy –Green Waste Facility (Pilot Grant Street Grocer)

Pyrolysis is the thermal degradation of an organic substance in the absence of air to produce char, pyrolysis oil, and synthetic gas for example the conversion of wood to charcoal. Biochar is a porous structured charcoal that sequesters carbon, and improves soil structure, with high moisture retention and nutrient availability. A major source of feedstock comes from municipal waste.

Grant Street Grocer, along with Landcare are currently using a food dehydrator to repurpose 150kg of food waste to a soil conditioner/ fertiliser. This along with Biochar could produce a high value product that can be sold to landscape businesses, farmers, and growers. Retired cement truck could be used to rotate the green waste and producing a finished product ready to sell to market.

7. Off Grid Solutions – Community Microgrid

This could provide a safety net for businesses and home owners during emergencies and power outages by having locally owned power generation. Buying and selling of power locally, with some sort of energy bank where power is transferable could help save on power bills. Other ideas include neighbourhood batteries, utilising sugarloaf water supply for other purposes and energy during floods, community ebike paths, and smarter building methods.



Logistics

The larger scale projects including Pumped Hydro will be 5- 10 years in the making before they are actively generating power and the community can see results. Permit approval process is generally 3- 5 years, and then a construction phase of a further 3-5 years. A big consideration is site selection, and pumped hydro will require 2 reservoirs, road access, transmission, and H2O to fill.

Australia has the capability – building, turbine, power electronics (internationally sourced- long lead time), however, regulation and policy will be a contributing factor to its success. A Pumped Hydro project could generate 300 jobs upfront in construction and building, with 10 FTE jobs required for the first 5 years once operating, and ongoing FTE jobs for maintenance. We have extensive local expertise within the Shire, and education will play a key role in further training the community and sharing that knowledge.



Logistics

Further prefeasibility studies will help determine the scale of projects to be undertaken, identifying potential sites for both pumped hydro and micro hydro, what waste/material is available for circular economy models including biochar and food waste dehydrator- to what scale and size is required, what will the end product be and what is the market to sell this product, and will this require a facility, or can this be done using mobile equipment. Having access to national market and supplying power direct to the high voltage transmission is more advantageous than doing things locally- increase exportability to grid up to high voltage. Taking energy and transferring from access to Victoria and sending to Qld as example, will maximise benefit. Less than 5MW does not need a connection, and dams already exist.

Building and maintaining strong partnerships with traditional owners, and other land owners is essential to the success of any project. Investment opportunities might include grants, business loans, proposals, partnerships, government investment or community co-operative model.



Infrastructure

This could include a Green Waste Facility site to process biochar and dehydrate food waste- turning this waste into a high value product to sell – either by way of fertiliser or soil improver. Specialised and specific equipment, technology and machinery to suit the project depending on the scale and size. Roads and good access to sites for maintenance will be necessary.

Policy and Regulation

Understanding regulations and policy/ schemes that may impact construction activities. Considerations with regard to compliance and safety around site, control over the grid usage rights, understanding power supply, water authority and usage with water rights – water law and policy is not currently amenable to pumped hydro and there will be need to engage with regulators, land use strategy, land access and partnerships with traditional owners of the land will be important.

Conclusion

This is a viable opportunity that could be realised in the short and longer term.

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