

# SUSTAINABLE TASMANIA

A PROPOSAL TO
ESTABLISH A TASMANIAN
AGRIBUSINESS ENERGY
CO-OPERATIVE

A collaborative venture to set up and run a self-sustaining Agri Business Energy Cooperative, 100% owned by Tasmanian farmers, graziers and agribusiness members (Sustainable Tasmania www.sustaintas.com.au). The Energy Cooperative would exist specifically for generating, buying, and selling renewable power from their own, dedicated, renewable generation sources with a view to providing relief from current power prices, and stable power prices into the future.

Submission to the Premier's Economic & Social Recovery Council from:-

- Gravitas Energy / G-Power
- Royal Agricultural Society of Tasmania

# Proposal for a Tasmanian 'Agribusiness Energy Co-operative'

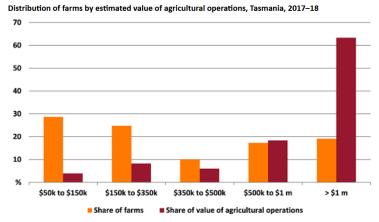
With seed funding this cooperative can address a range of energy issues facing the agricultural sector and facilitate the Governments objectives as articulated in Tasmania's Sustainable Agri-food Plan 2019 -2023 including the goal to grow the annual value of the sector to \$10 billion by 2050. It will also assist toward meeting the Government's targets as stated in the Draft Tasmanian Renewable Energy Action Plan 2020.

# Agriculture in Tasmania

In 2018–19, the gross value of agricultural production in Tasmania was \$1.6 billion, which was about 3 per cent of the total gross value of agricultural production in Australia (\$60 billion). This is delivered across over 79,000 farms with 54% having an estimated value of agricultural operations (EVAO) under \$350,000. In comparison 19 per cent of farms in the state had an EVAO of more than 1 million and accounted for an estimated 63 per cent of the total value of agricultural operations in Tasmania in 2017–18. (Source ABS 2019)

Number of farms, by industry classification, Tasmania, 2017–18						
Industry classification	Tasmania		Australia			
	Number of farms	% of Region	Number of farms	Contribution of Tas to Australian total %		
Beef Cattle Farming (Specialised)	518	26	21,919	2		
Dairy Cattle Farming	374	19	5,384	7		
Sheep Farming (Specialised)	313	16	8,443	4		
Vegetable Growing (Outdoors)	245	12	2,545	10		
Sheep-Beef Cattle Farming	178	9	5,221	3		
Other Crop Growing nec	46	2	563	8		
Grape Growing	45	2	2,561	2		
Stone Fruit Growing	43	2	446	10		
Apple and Pear Growing	39	2	404	10		
Berry Fruit Growing	36	2	386	9		
Horse Farming	31	2	1,477	2		
Other	111	6	29,674	0.4		
Total agriculture	1,979	100	79,021	3		

Note: Estimated value of agricultural operations \$40,000 or more. Industries that constitute less than 1 per cent of the region's industry are not shown. nec not elsewhere classified.



Note: Only farms with an EVAO of \$50,000 or more in 2017–18 are included in these data. The scope of ABS Rural Environment and Agricultural Collections changed in 2015–16 to include only agricultural businesses with an EVAO of \$40,000 or greater. Source: Australian Bureau of Statistics 2019

Sustainable Tasmania Proposal (Gravitas Energy, G-Power, Royal Agricultural Society of Tasmania)

"The Tasmanian Government has an ambitious goal to increase the annual value of the agricultural sector to \$10 billion by 2050. To reach \$10 billion, the sector will need to grow at more than double the growth rate experienced in the last 20 years." Jeremy Rockliff, Tasmanian Agriculture Research Development and Extension for 2050 White Paper.

Innovation is seen as critical to achieving such an ambitious goal as is further research and development conducted in a targeted and strategic manner. It is also noted that sustainability principles must underpin the necessary innovation to maximise the long term benefits of any such investment (Tasmania's Sustainable Agri-food Plan 2019 – 2023).

Energy will, therefore, be a critical factor in ensuring our producers have the capacity to grow and innovate while working toward a sustainable production regime. That includes both consumption and generation. There are few better resources for renewable energy generation in Tasmania than Tasmanian farms.

- They occupy larger land holdings right across the State.
- Their energy consumption is more often than not seasonal.
- They tend to have large structures suited to solar installations on site and water resources that could potentially harness mini-hydro schemes.
- Energy can be 'harvested' by utilising marginal areas on farm not suited to sustainable agricultural production.
- Technologies such as mini hydro, wind, waste to energy and wave are evolving in a manner that will shortly see them as highly suitable options for primary producers.
- Energy costs represent a significant cost to primary producers including transmission and metering charges for multiple meters as is typically required across the majority of farms in Tasmania.



In Tasmania today, high, and ever rising (+/- 30% this year), electricity prices are directly affecting Agri business profitability and causing anxiety and uncertainty over future investment decisions. 2018.

# **Tasmania-First Energy Policy**

"Our Tasmania-First Energy Policy includes a target to deliver not only 100 per cent clean energy by 2022 but the lowest-cost regulated electricity in Australia for residential and small business customers by 2022.

We have set a target to double our renewable generation with a target of 200 per cent of our current needs by 2040. Our Tasmanian Renewable Energy Target, or 'TRET', is a world-leading aim." (Guy Barnett, The Draft Tasmanian Renewable Energy Action Plan 2020)

The Royal Agricultural Society of Tasmania (RAST) has been representing Tasmanian farmers and graziers since 1822. Gravitas Energy team have been selling solar power in Australia for 11 years and investing and supplying renewable solar power to Tasmanian farmers for the last 5 years.

These two entities have a unique insight into, and detailed knowledge of, the renewable power market and the energy needs of the Tasmanian Agri sector, based on hundreds of first-hand meetings.

This unique understanding has lead RAST and Gravitas to the conclusion that there is a unique opportunity in Tasmania for a collaborative venture to set up and run a selfsustaining Co-operative, owned by the Tasmanian farmers and agribusiness, and supported by the Tasmanian government.

The **Agri Business Energy Co-operative**, "Sustainable Tasmania", would exist specifically for generating, buying and selling renewable power using G-Power as a new energy provider in Tasmania from dedicated renewable energy sources with a view to providing relief from currently high power prices as well as stable power prices into the future.

The Co-op will use renewable power from participating farmers generation as well as dedicated, purpose built sources:

- 60MW, commercially sustainable, fully funded renewable energy generator that comprises solar and wave as baseload energy generation with energy storage devices (batteries and mechanical flywheel) to assist in stabilisation of output. At North West Tasmania 'Eagle Rock Renewables Farm' (ERRF).
- Conventional Waste-to-Energy plants (WtE).
- Also from member Agri businesses that are generating excess power, using peer-topeer methodology.

This solution will also support grid stability and improve quality and reliability of power available by actively managing and regulating all sources of power and utilising storage as required to even the load.

The Energy Co-op will sell dedicated renewable power, generated by their own dedicated solar farm and generating members, to Agri business members at ~ 20c per Kwh – which equates to approx. 30% saving in power costs. This will not only provide an immediate 30% relief in their power costs, but also provide stable power prices for the whole sector for 25 years into the future.

With all profits to be distributed to members with the intention that this would be a source of additional financial support to members in times of need and/or hardship.

# <u>Immediate Benefits of the Energy Co-op to Tasmania, and the Tasmanian</u> Government

This is not an expensive, short-term subsidy. The Energy Co-op is a permanent solution, delivering measurable economic benefits for the Agri members for 25 years or more, at **no** ongoing cost to the Government. This model has been successfully utilised both internationally and in Australia including Bolivia, Belgium, Canada, France, Germany, Portugal, Spain, Switzerland, UK, and the USA.

- Immediate relief from ever-rising electricity prices. Power prices are a recognised problem with a growing negative impact on expansion of a significant economic sector of Tasmania - Agri businesses.
- The proposed \$3.5M investment by Government will result in the Energy Co-op. delivering a minimum of a \$7M\* direct, 100% targeted, economic injection to the Agri sector member businesses in the first year of the operations, rising to some \$35m annual direct economic contribution as the time goes. (\*based on 72 million kWh's output at an approximate \$0.10 saving per kWh).
- Added to the multiplier effect of that direct economic benefit, is the long-term economic benefit to Tasmania of the investment certainty in the sector created by Agri businesses knowing their power price will remain low for 25 years.
- The co-operative will empower Tasmania's agricultural community to take responsibility for their own economic well-being by reducing their own power costs today and for 25 years into the future, encouraging further investment.
- A permanent solution. Electricity subsidies tend to be a short term band aid measure. They are expensive and not sustainable. The Energy Co-op is a permanent solution, delivering direct measurable economic benefits for its members for 25 years or more, at no ongoing costs to the Government after the proposed \$3.5m investment.
- The Energy Co-op promotes effective use of government funding through a collaborative implementation in which all stakeholders have active engagement in seeing the project succeed.
- The Energy Co-op Is fully aligned with current Tasmanian agricultural and energy policies.
- The Energy Co-op is a project that will be fully supported by constituents who identify with the key characteristics of the project:
  - Renewable power
  - Relief from rising power prices
  - Support for Tasmania's Agribusiness community
  - Tasmanian Innovation and self-reliance.

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- The Energy Co-op will create immediate jobs state wide in:
  - Attracting and managing members (12)
  - Establishing a local trading desk (3)
  - Installation and maintenance of systems across the State through local subcontractors including a number of apprenticeships (> 40)
  - Management and accounting (3)
- The introduction of new sustainable renewable energy technology including wave, plasma waste to energy, flywheel and next generation solar and battery technologies

## Supporting Tasmania's Renewable Power Targets

The Energy co-op is not a disruptive solution. On the contrary, it is fully supportive of Tasmania's Renewable Power targets and strategies. With forecast solar and wave generation of 300MWh to 400MWh within 3 years, vs state-wide generation of 11,000+ MWh, and also supporting Grid Stability and improving quality of power available the total Cop-op dedicated generation will not adversely disrupt existing energy markets, but will contribute commercially sustainable and renewable generation to Tasmania's renewable future targets.

#### Community returns

A collaborative project generating profits that are used for the collaborative good.

The Co-op is intended to be a profitable organisation. There are three revenue streams for the Co-op, coming in via three sources:

- 1. The 2c/kWh margin on the kWhs bought and sold through the Co-op Power Retail Co. This will equate to \$1.5M pa by the end of Year 1 based on 2500 participating NMIs, rising to between \$6M and \$9M per annum by end of Year 3.
- 2. All profits made by Service Co from sales of Solar PV installations to Agri businesses will be paid to the Co-op from the Service Co. This income is forecast to be \$1M per annum by end of Year 1, rising to \$3M by end of Year 3.
- 3. Margin on future distribution of Wave Generation and WtE as display solutions, paid by Gravitas.

It is envisaged that the profits accrued by the Co-op will be re-invested into the general welfare of Tasmanian Agri communities. This may be by way of a hardship fund, R&D fund to improve agricultural outcomes, low or no interest finance and other welfare projects.

Use of Co-op generated funds in this way can go a long way to supporting a sense of social cohesion, empowerment and creative resourcefulness being applied for their own beneficial outcomes.

# Continuing Partnership

Gravitas Energy has exclusive rights to the world first commercially viable Wave Power technology, and the latest Waste-to-Energy plants as well as the latest energy storage and grid stabilisation equipment.

## Co-op Membership

"The agricultural sector directly employs around 10,000 people. When primary production is combined with dependent downstream processing, it delivers around a third of Gross State Product, about a third of employment and a quarter of all overseas exports."

Source: Brand Tasmania <a href="https://www.brandtasmania.com/agriculture/">https://www.brandtasmania.com/agriculture/</a>

The Energy Co-op could be 25% owned by The Royal Agricultural Society of Tasmania (RAST), with the balance owned by member businesses from the following sectors:

- Agriculture
- Livestock
- Fisheries
- Wine, spirits & beer

- Aquaculture
- Dairy
- Forestry

#### Proposed Collaborative Partner Contributions:

#### TAS Government Contribution

1. Financial support / seed funding for the first 12 months of operations. Detailed in the schedules, the Co-op start-up funding totals \$3,500,000. The funding requirement will cover establishment and set-up costs and has been designed so that at the end of the first 12 months of operations the Energy Co-op is fully commercially sustainable and able to continue without any further government financial support.

As explained previously, this \$3.5M investment will result in a direct \$7M+ funding contribution to the Agri sectors in energy savings in the first year of the solar farm operating.

2. All excess energy that is not consumed by the members will be made available to a general market via G-Power energy retail trading desk.

#### Gravitas / G Power Contribution

Gravitas Team have 20+ years' experience in solar PV supply. For the last five years they have invested in Tasmania building a business supplying farmers and agribusinesses with leading edge high quality and cost-effective solar PV power.

Gravitas has funded and established G-Power, and energy retailer now operating in the Tasmanian market including generation, distribution and peer to peer trading facilities.

Based on that Tasmanian experience, in conjunction with RAST, Gravitas devised the Co-op concept, and are bringing their know-how to the Co-op venture. Gravitas are contributing:

- A turn-key fully developed renewable power solution including solar farms, peer-topeer trading, full function billing and metering software. There will be a further 5 Renewable Energy Generators in the first 3 years.
- A fully self-sustaining sales model for the Co-op. All profits generated by the Co-op and the Co-op Services entity will go directly to the Co-op to support Co-op initiatives including R&D, investments loans to members and hardship grants as determined by the Co-op.
- Gravitas' 11 years' experience in selling and delivering over 15,000 solar installations. They are contributing their extensive sales and installation experience setting up and training the Co-op Renewable Power sales team by way of consulting services. This sales team will be a primary engine for the financial sustainability of the Co-op. Gravitas will not only consult in setting the team up, but also in training the team members, and providing ongoing sales management going forward.
- The Gravitas "Sales Quotation and Order System" A unique software selling tool that is based on 11 years of software development.
- Their contacts for the supply and installation of the renewable power systems.
- Know-how around some of the enabling technology such as retail billing and peer-topeer billing that will enable Energy Co-op members to buy and sell renewable power.
- Exclusive access to Australia-first future renewable power sources such as Wave Power, and waste to energy technologies

#### Agri Businesses, Farmers, and Graziers Contribution

They will be the Energy Co-op members, and their power purchases will be the market for the renewable power. It is their requirement for lower power prices and stable future power prices that is the driver behind this venture. Their desire to be responsible for their own wellbeing is the motivator.

The profits that the Energy Co-op makes will be re-invested in support or welfare schemes for the member businesses. This could be in the form of no-interest loans, drought or fire relief and contributions to research and development.

#### **RAST Contribution**

RAST will provide full management, administrative and accounting functions for the Energy Co-op. This is a logical role for RAST and fits in with their near 200 year charter of providing assistance to the Agri business sector of Tasmania. It also aligns with RAST's recently developed new strategic direction whereby they intend to deliver more for the agricultural

sector in ensuing years aside from the Royal Hobart Show. Such a business model will enhance the future viability of RAST and the Royal Hobart Show. It will also deliver a desperately needed service to agriculture in the State by providing certainty around energy costs and opportunities for other on-farm renewable energy income steams to be developed.

Utilising the existing RAST structures to support and nurture the Energy Co-op is a key plank toward achieving this. Another will be the development of the Hobart Showground precinct in a manner that incorporates significant renewable energy projects that will feed into the Co-op as well as support affordable housing and other uses on site. It is envisaged the Coop will become a major component of a social, affordable and private home ownership model for up to 460 medium density dwellings on the current showground site through the delivery of cost effective energy.

In many ways this is what the future of RAST should be. Helping to realise new, innovative, and commercially viable ways of assisting Agri businesses.

## Co-op Renewable Power Sources

- 1. Solar PV: The most established and 'known' of the renewable power sources. There are other solar farms proposed that will each have long term PPAs with the Co-op including the Eagle Rock Renewable Farm on the North West Coast.
- 2. Wave Power: Wave power is unique in renewable power technologies because it provides baseload renewable power. In the right site, a wave farm will produce power 4 times more efficiently than solar, 24/7 for 365 days a year.

When combined with Solar and Wind, Wave power will give Tasmania the first baseload renewable power platform.

Gravitas have exclusive rights to the world's first commercially viable Wave Power technology. Gravitas are making the Co-op their distribution partner for Wave Power in Tasmania and subsequently a distribution partner for Australia. Tasmania and the Co-op will have the first Australian Wave Power plants.

NB: This is a first for Australia, but it is not an R&D project. These wave plants are the 2<sup>nd</sup> generation wave power plants and have been installed and working overseas for many years.

The funding proposal includes \$400,000 for the engineering, certification, and feasibility work needed for first the Wave power plant.

3. Waste-to-Energy: Third Generation Microwave Steam Plasma Gasification Plant to be commissioned at Midlands for handling waste from Hobart tips as well as prescribed waste that need specialised solutions

Dumping waste in landfill is becoming increasingly impossible. Scarcity of available land, and added transport costs make it very expensive, and environmental damage is a major issue. Toxic chemicals leach into the land and water tables, and landfill produces enormous amounts of methane gas, the number one greenhouse gas. Traditional incineration is one answer, but it produces large amounts of particulates, Co2, dioxins, mercury, and finally the

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remaining waste is a highly toxic and dangerous fly-ash that needs to be dumped into landfill sites.

Developed by the National Institute of Fusion Technology in Korea, Microwave Steam Plasma (MSP) is the newest, cleanest, most compact form of waste-to-energy gasification. MSP plants can operate anywhere between 3,000 to 14,000 °C, and convert waste into plasma (superheated, charged gas) and break down the waste into Syngas (H2 + CO). The syngas can be used as fuel to generate electricity.

Every 100 tonnes-per-day of municipal waste will generate on average, net 25,000 MWh of power (33,000 MWh gross power generation, less power for the plant).

The process has near zero emissions (see table below). The only residual material is a glasslike slag that is used for road-base. Nothing is sent to landfill. Waste feedstock can be:

- Municipal Solid Waste (MSW)
- Hazardous Medical waste
- Construction waste including paint/glue/MDF
- Biomass (wood/plant/animal)
- Industrial waste
- All plastic waste including PVC

#### **Near Zero Emissions**

Pollutant	Recently Permitted Incineration Facilities	MSP Plant
Nitrogen Oxides (ppm/vol)	110 - 205	20
Particulates (mg/m3)	16 - 27	0.3
Sulphur Dioxide (ppm/vol)	26 – 29	1
Hydrogen Chloride (ppm/vol)	25-29	0.2
Carbon Dioxide (ppm/vol)	100	2
Mercury (ug/m3)	30 – 80	0.005
Dioxins – PCDD/PCDF (ng/m3)	30-60	0.002 x 10 <sup>-6</sup>

## Potential for Plasma Gasification to provide Aggregated Waste Solution

Initial discussions with Mornington Park waste transfer station have indicated they receive some 120 tons per day of municipal solid waste, almost all of which is sent to landfill. This waste stream would make the Plasma Gasification plant commercially viable. That first Plasma Gasification plant would reduce the waste going to landfill to near zero.

Importantly however, there are a number of Tasmanian businesses producing waste streams that are, in each standalone case, not commercially viable for gasification or for other waste to energy solutions.

The proposal is that Mornington Park can install a far larger Plasma Gasification plant, with multiple gasification units, and can aggregate non-commercial volumes of waste feedstock into a commercial viable volume of waste.

**One example**: All aluminium smelters share a common waste disposal problem – hazardous waste called Spent Pot Liners (SPL).



The pot linings are removed by being broken up. The contaminated carbon lining material that is removed is referred to as first cut SPL. The contaminated refractory lining material is referred to as second cut SPL. As the SPL is

removed it breaks up into different sized pieces ranging from large blocks to fine granular pieces.

During the operation of the pots, substances, including fluorides, cyanides and aluminium are absorbed into both cell linings.

Both first and second cut SPL are hazardous waste due to:

- toxicity leachable fluoride and cyanide compounds, with fluoride levels often around 10 parts per hundred (%)
- corrosiveness high pH due to the presence of alkali metals and oxides
- reactivity with water producing toxic, explosive, and inflammable gases.

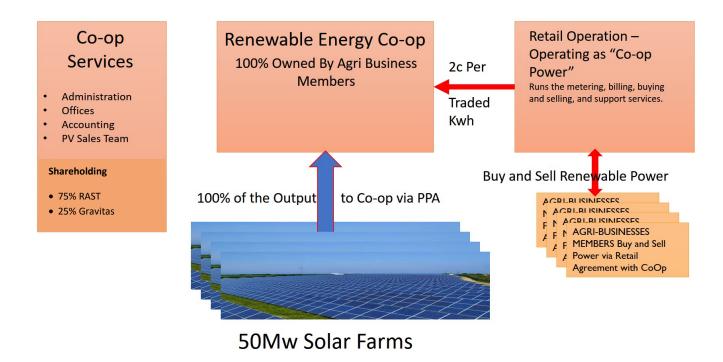
Spent Pot Liners create a disposal problem and usually end up being stockpiled in or near smelters. Tasmania's Pacific Aluminium produces an estimated 9,000 tons of spent pot liners every year posing a significant hazardous waste disposal problem,

However, spent pot liners are also made of 100% carbon, and make a perfect fuel for Plasma gasifiers and would in fact be a significant waste stream for the Plasma gasification plant aggregation feedstock.

Aggregation of these and many other waste streams can a) reduce landfill requirements to zero, b) contribute a huge part to keeping Tasmanian environment clean, and finally, generate considerable quantities of 'renewable' electric power.

The funding proposal includes \$250,000 for a bankable feasibility study including working with Government on possible aggregated waste stream analysis and for the implementation of this Gen III plasma Waste-to-Energy technology.

#### Structure



The Energy Co-op is a special purpose Co-op.

It exists solely to operate a source of renewable power for the Agri business members. This work is all highly technical however, and we cannot expect the Co-op to have the skills or the experience to run the operation.

Instead RAST and Gravitas, will provide the necessary skills and knowledge transfer for the effective and profitable operation of the Energy Co-op.

As can be seen in the structure diagram, the proposal is for the Co-op to be administered by a contracted business, "Co-op Services Pty Ltd". this will be a service delivery company. Co-op Services will administer the staff, accounting, sales, marketing and member services, as well as operating the Solar PV Sales Team. In addition, Co-op Services will manage the appraisal and engineering requirements for all the renewable power sources, including Solar, Wave, and Plasma.

Co-op Services will be 75% owned by RAST, and 25% owned by Gravitas, and operate on a 10-year service and consulting contract. However, Co-op Services will not retain any profits. Under the terms of the contract, Co-op Services will pay all annual profits to the Co-op. In addition, there will be no bonus payments (other than sales commissions) paid to any staff or directors of Co-op Services.

The intent is that Co-op Services is not only a skill and know-how centre, but that it operates on behalf of the Co-op, and makes profits on behalf of the Energy Co-op.

# Start-up Investment – First 12 months

Sustainable Tasmania Agri-business energy co-operative	
Seed Funding required	
Professional Services - Legal, Tax, Consulting, Contracts	\$300,000.00
Set up of sales team (this is the foundation of the Co-op)	\$300,000.00
Management and consulting services for solar farm, PPA, Plasma - 2x 150	\$300,000.00
Fees for ongoing Solar Farm and wave/plasma investment fund raising	\$175,000.00
Management: CEO / CFO	\$350,000.00
Staff – Other	\$375,000.00
Retail White Label set up. Metering and billing set up	\$200,000.00
Marketing	\$300,000.00
Wave Power: Engineering & Certification	\$400,000.00
Plasma: Waste stream analysis and feasibility study	\$200,000.00
Exclusive 12 month licence for all Gravitas IP including all quoting and SOP	\$350,000.00
Rent - two offices north & south inc utilities & fitout	\$150,000.00
Contingency	\$100,000.00
Total 12 months	\$3,500,000.00

## **Energy Co-op Outcomes**

The Tasmanian Energy Co-op will be a world class model of renewable energy collaboration between the Agri Business sector, Government and Private industry.

The Energy Co-op will also bring to the State a number of firsts:

- Tasmania, and Tasmanian agri-business will be the first anywhere to have a profitmaking, self-sustaining Co-op that will guarantee approx. 30% lower power prices today, and stable, fixed prices for the next 25 years.
- Tasmania benefits from a stronger agri-business sector with increased profits stemming from green locally generated renewable power.
- The combination of Solar, Flywheel, Wave, and Plasma will give Tasmania Australia's first State with <u>baseload</u> renewable power generation.
- First in Australia to have commercial wave power.
- First to have zero landfill and an integrated aggregated waste to energy process.
- Discretionary funds generated to support agriculture in R&D, investment and hardship.

Sustainable, permanent Tasmanian relief from high power prices, delivering measurable and direct economic benefits for Tasmanian agriculture for 25 years and beyond, at no ongoing cost to the Government.

This proposal contributes positively to the PESRAC Interim Report July 2020 immediate priorities for:

- Building the capacity of small and medium businesses
- Skills & Training Resourcing for Sectors that are Driving Recovery
- Major Project Facilitation
- Job Placement Service regional
- Apprenticeship & Traineeships
- Prioritising Regional Infrastructure
- Food Security

Written and submitted by:

Roman Voloshin

**Chief Executive Officer** 

Gravitas Energy / G-Power

roman.voloshin@gravitasenergy.com.au

0402 318 973

Scott Gadd

**Chief Executive Officer** 

Royal Agricultural Society of Tasmania sgadd@hobartshowground.com.au

0417 322 460