

# Research and Innovation Fund – Shortlisted Projects

November 2018



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## Background

The aim of the LGNSW Research and Innovation Fund is to support new areas of research, policy development and innovation for the advancement of local government in NSW. Its purpose is to fill gaps in the evidence base, explore emerging issues, promote informed discussion and debate, and encourage the development of research capacity within the sector.

LGNSW have allocated seed funding for the first year of operations, and our intention is to leverage this investment by selecting projects of broad sector application and then seeking to attract council, industry and university partners.

Councils were invited to put forward proposals for new research, policy development and innovation with broad application for local government across NSW, and Expressions of Interest were due by COB Monday 15 October 2018. Criteria for success within this fund were:

- Alignment with the LGNSW Policy Principles
- Important for the local government sector as a whole
- Council funding contributions; and
- Capacity to attract other project partners

Forty-five Expressions of Interest were received and a number of councils and university researchers did not lodge an EOI but expressed an intention to lodge next year. LGNSW has appointed an Advisory Committee to assess the proposals, and the committee met in early November to select a short list of projects. This document contains the full EOI received from each council for each of the four shortlisted project.

The purpose of this document is to invite all councils in NSW to participate in the shortlisted projects as industry partners. University partners will work with each of the projects to prepare for an ARC Linkage application.

LGNSW funds will be allocated to the shortlisted project which attracts the highest levels of support from NSW councils, and we will aim to lodge a linkage application by the end of 2018.

## Invitation to Collaborate

Councils are asked to respond to our 'Invitation to Collaborate' by 5pm on Tuesday 27th November. Tell us which of the four topics you think should be selected, and whether your Council would like to collaborate or provide funding to support this innovation. The form will ask you to choose a project, and will also ask whether you would like to:

### Share Information and Participate in Discussions

- Invite researchers to address community and council forums
- Attend research meetings and forums
- Distribute research outcomes to interested councillors, staff and community

### Participate in Research

- Participate in project design and setting research parameters
- Offer a local site as another project case study
- Facilitate the duplication of research activities in your local area
- Provide subject matter expertise and guidance

### Provide a Funding Contribution

- In-kind contributions might include staff, councillor and community time on the above activities or
- Cash contributions towards the project.

Please feel free to approach the project contact to discuss the project, and to express your interest we ask that you complete the collaboration form on the LGNSW website at <https://lgnsw.org.au/key-initiatives/research-and-innovation-fund> by **Tuesday 27th November at 5pm.**

<b>Council</b>	<b>Blacktown City Council</b>
<b>Contact name</b>	Agnes Brejzek
<b>Title</b>	Strategic Planner
<b>Contact details</b>	agnes.brejzek@nsw.gov.au 98396512
<b>Project name</b>	<b>Greening the Greyfields - a new approach for community-co design</b>
<b>Contribution</b>	\$20,000
<b>Supporting documents</b>	
<b>Policy Principles</b>	Infrastructure
	Planning
	Environment
	Social and community
<b>Your Council's Role</b>	<p>Greening the Grey fields project will be informed and supported by specialist staff in several Council service units, including, Strategic Planning, department of environment, social planning and Blacktown architects.</p> <p>It will also receive support from UNSW City Futures research Centre. In addition to this support, Blacktown City council will contribute \$20,000 worth of 0.15 FTE in-kind time of one of the strategic planners.</p> <p>Greening the Grey fields is a high-profile project in Western Sydney and its status is already recognised by the Committee of Sydney. The outcomes of the project will be followed closely by staff, councillors and internal/external stakeholders. Its outcomes will be widely reported through council's communication channels, and academic and professional reports.</p> <p>This will be reported outside. Council, in the academic and non-academic outlets.</p> <p>Community co-design is part of a much larger project that aims to provide new models for urban redevelopment for municipal and state government. The broader name of the collective work is "Greening the Greyfields" and it is currently operational in Blacktown City Council, Maroondah City Council (Vic) Knox City Council (Vic) and Christchurch City Council (NZ). Initial project funders were always of the view that the outcomes of the grander project could be abstracted, documented and then applied in other councils and states. This is proving to be the case as the number of participants grows and our</p>

	<p>methodologies expand to cover new territories with vastly different legislative, statutory and policy aims.</p>
<p><b>Potential Business Partners</b></p>	<p>Councils, Businesses and Community</p> <p>Greening the Grey fields is well supported within Blacktown council. Our Steering Committee includes strategic planners, design and architect experts, social planners, UNSW researchers and senior manager members.</p> <p>Evaluating the benefits of this project and given the interest we recently had from the Committee of Sydney it is likely that other agencies such as: The Greater Sydney Commission, Department of Environment and Heritage, Department of Planning, UNSW etc. may be interested in providing additional in-kind or cash contributions to the project.</p> <p>In terms of business, this project may unlock difficult to redevelop precincts close to public transport and existing infrastructure for development and create new opportunities.</p> <p>We are building a policy framework, consisting of several modules, such as feasibility studies, community consultation plan, a library of building typologies, legal framework, design principles and reports and the scenario planning tools such as Envision and RAISE. The sharing of information will also include training sessions for the digital planning tools we developed such as Envision, RAISE and ESP. Using our developed framework, any council in NSW could potentially identify, analyse and redesign precincts for redevelopment, engage with the community and implement redevelopment.</p>
<p><b>Potential University Partners</b></p>	<p>The Project proposal has been developed by UNSW's City Futures Research Centre in collaboration with Blacktown City Council and the strategic planning department.</p> <p>This project is partly financed by BCC, CRC for Low Carbon Living, UNSW and Swinburne University. As the CRCs will cease soon, new funding must be obtained to continue this project to implementation and evaluation.</p> <p>It builds on an ongoing research and project which has been developed and delivered by these parties over the past two years. If successful, it is the intention of the City Futures Research Centre to apply for ARC linkage program funding for the Greening the Grey fields.</p>

## Significance

By 2036 the City of Blacktown is forecast to grow to approximately 500,000 people and 180,000 dwellings. The majority of new dwellings will be delivered through urban infill, with particular focus on a 2km radius around Blacktown CBD.

The Blacktown Masterplan report promotes higher density forms of housing, a mixture of employment uses, continued improvements to the public domain, provision of pedestrian oriented streets, open spaces and green linkages. It identifies key gateway sites, infrastructure provisions, and the need to capitalise on employment opportunities created by catalyst developments, within an environment of design excellence. Considering the objectives of the Masterplan, this project provides a unique opportunity to implement this broad strategy within a specific case study and location. What's more, the project is scalable and can be expanded to other location across the Sydney metropolitan area.

The project is of significance to metropolitan councils in Australia because it is a unique multi-purpose sustainable transport and urban infill case study which other councils can learn from and implement. The Committee of Sydney recently published a new report titled Smart Engagement. The report demonstrates the value of digital planning tools. The report features City Futures' Community co-design of low carbon precincts for urban regeneration in established suburbs as a project to demonstrate how scenario planning tools such as Envision, and ESP tools can be used. This was an indication of the important impact this project can make across the NSW local government sector.

This work is based on an ongoing project titled: 'Community co-design of low carbon precincts for urban regeneration in established suburbs' started in 2016 as collaboration between UNSW and Blacktown City Council. The project has now been renamed to 'Greening the Greyfields'. The group have published or took part in several publications as listed below:

The Committee of Sydney Smart engagement report: [http://www.sydney.org.au/wp-content/uploads/2015/10/Smart\\_Engagement\\_2018.pdf](http://www.sydney.org.au/wp-content/uploads/2015/10/Smart_Engagement_2018.pdf) Gudes, O., Glackin, S., Pettit, C. (2018). Designing precincts in the densifying city - the role of planning support systems. 3rd International Conference on Smart Data and Smart Cities. Delft, Netherlands: 4–5 October 2018. <https://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XLII-4-W11/3/2018/> CFRC Newsletter, September 2018: "Smart Engagement in Blacktown" [https://mailchi.mp/fbe/cfrc-newsletter\\_sept-2017-nu1fsqe8lh-2791677?e=e33f9dce94](https://mailchi.mp/fbe/cfrc-newsletter_sept-2017-nu1fsqe8lh-2791677?e=e33f9dce94) CFRC Newsletter, March 2018: "Taking City Analytics, ESP and EVISION out west" <https://us8.campaign-archive.com/?e=&u=e6cb0ecd5cb96e3c626141450&id=0ef2bfa7e3> Gudes, O., Pettit, C., Glackin, S. & Leith, A. (2017). A data-driven collaborative-planning approach for developing sustainable medium-density housing in cities. State of Australian Cities National Conference. Adelaide, Australia: University of Adelaide, 28–30 November. [https://www.dropbox.com/s/50e7fpm6he98s8d/SOAC2017\\_0216\\_paper\\_Version4.pdf?dl=0](https://www.dropbox.com/s/50e7fpm6he98s8d/SOAC2017_0216_paper_Version4.pdf?dl=0)

## New Council Partners

The project is currently operating in four municipalities and new participants would be valuable. By joining the project municipalities will have access to:

- UNSW training in ENVISION and Envision Scenario Planner (ESP); the 2D and 3D software packages designed for the Greyfields challenge. Opportunities also exist

for training in value capture and feasibility assessment modules. There is also the opportunity for entering municipal data into the system.

- Bespoke housing typologies developed for the body of work. All typologies have been tested for financial, statutory and environmental feasibility.
- Greening the Greyfields Playbooks; these three manuals encompass the methodologies for municipal government, landowners and developers; illustrating how to go about formulating a Greyfields policy and how to implement regeneration precincts. The manuals include sections on
  - Whole of government approaches to policy alignment and implementation;
  - Engagement methodologies and techniques;
  - Feasibility methodologies;
  - Statutory methodologies for change and development of development incentives;
  - Political alignment and de-risking;
  - Governance practises;
  - Legal options for land-owners; and
  - Design guidelines.

In return for access to these resources and the broader project, there is an understanding that new municipalities will have to contribute to the project. Existing partners have developed the above, but there is more work to do, particularly in the NSW context. Areas which currently need additional work are:

- A NSW assessment of statutory regulation and how to allow for development concession/zoning uplift based on citizen-based lot amalgamation.
- Reassessing the feasibility of typologies in the Sydney context.
- Providing methods for town planning in a dynamic environment, where the total number of residents volunteering in the amalgamation project is unknown.
- Any parallel work regarding one or more of the modules would refine our approach and would support the project.

### **Project Overview**

Australia's cities face significant social, economic and environmental challenges, driven by population growth and rapid urbanisation. The pressure to increase housing availability will lead to greater levels of high-density and medium-density stock. However, there is enormous political and community pushback against this.

One way to address this challenge is to encourage medium-density living solutions through "precinct" scale development. Precinct-scale development has the potential to



include additional hard and soft infrastructure that may offset the perceived negativities of higher densities.

In addition, we propose to develop scenario planning tools to ensure planning has the necessary evidence. In this project, we will focus on a case study in the City of Blacktown, Western Sydney, New South Wales, Australia. By 2036 Blacktown is forecast to grow to approximately 500,000 people (an increase of over 30%) and 180,000 dwellings. Most new dwellings will be delivered through urban infill.

The Blacktown master plan promotes higher density housing, mixed employment uses and continued improvements to the public domain.

Our proposal provides a unique opportunity to implement this broad strategy within a specific case and location. Specifically, this project aims to encourage co-design process and implement a new approach for precinct level planning while using data driven approach based on cutting edge scenario planning tools.

**Entry Id: 42**

<b>Council</b>	<b>Inner West Council</b>
<b>Contact name</b>	Nick Chapman
<b>Title</b>	GreenWay Place Manager
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<b>Project name</b>	<b>Evaluating the benefits of the GreenWay - A Living Laboratory</b>
<b>Contribution</b>	\$30,000
<b>Supporting documents</b>	greenway_living_laboratory_fact_sheet__oct_2018.pdf
<b>Policy Principles</b>	Economic
	Infrastructure
	Planning
	Environment
	Social and community
	Governance
	Accountability
<b>Your Council's Role</b>	<p>The GreenWay Place Management Program is managed by Inner West Council's GreenWay Place Manager, located in the Strategic Planning Service Unit. The GreenWay Missing Links capital works delivery project is managed by council's Project Manager GreenWay Delivery, located in the Parks, Trees and Sportsfields Service Unit. Staff from these two units already contribute significant time to the successful development and delivery of the GreenWay Program and capital works project (equivalent to 2.5 FTE's per annum)</p> <p>The Green Place Manager is the principal contact for the GreenWay Living Laboratory Project and has been involved in project teaching and research work with UNSW City Futures Research Centre for several years.</p> <p>The GreenWay Living Laboratory project will be informed and supported by specialist staff in a number of Council service units, including Sustainability and Environment, Strategic Planning, Roads, Parks, Recreation, Community Services and Culture. It will also receive support from equivalent service areas in the City of Canterbury Bankstown. In addition to the cash contribution to the Living Laboratory project, these two councils will jointly</p>

	<p>contribute an equivalent of 0.25 FTE per annum through in kind staff support.</p> <p>The GreenWay is a high profile project in the Inner West Council and its status is already recognised in Councils' Community Strategic Plan, through council's regular communication channels and through the dedicated GreenWay website at <a href="http://www.greenway.org.au">www.greenway.org.au</a>.</p> <p>The GreenWay Program and Missing Links capital works delivery project contribute to Inner West Council's 5 key objectives in its Community Strategic Plan. The outcomes of the Living Laboratory project will be followed closely by staff, councillors and internal/external stakeholders. Its outcomes will be widely reported through council's communication channels, summarised above.</p>
<p><b>Potential Business Partners</b></p>	<p>The GreenWay Program is widely supported within and beyond council. Our GreenWay Steering Committee includes councillors, established community groups (Friends of the GreenWay, Inner West Environment Group, Inner West Bike Users Group), resident representatives and specialist council staff.</p> <p>The Missing Links Capital Works delivery project is funded by Inner West Council, City of Canterbury Bankstown and several state agencies eg RMS, TfNSW and Dept. Environment and Planning.</p> <p>Evaluating the benefits of multi-purpose green corridors like the GreenWay is already of considerable interest to state agencies such as NSW Government Architect and the Greater Sydney Commission. As the GreenWay Living Laboratory Project gathers momentum, it is quite likely that the above agencies may be interested in providing in kind or cash contributions to the project in the future.</p> <p>Some small sections of GreenWay Missing Links are being delivered as works in kind by developers. There's a possibility that the development sector may be interested in contributing to the Living Laboratory project in the future as a best practise example of designing and delivering a healthy, liveable multi-purpose corridor through a densely developed part of Sydney.</p>
<p><b>Potential University Partners</b></p>	<p>The GreenWay Living Laboratory Project proposal has been developed by UNSW's City Futures Research Centre in collaboration with the GreenWay Place Manager at Inner West Council. It builds on research and project teaching work about the GreenWay which has been developed and delivered by these parties over</p>

	<p>several years. Inner West Council also has research relationships with other university consortia eg Monash University Water Sensitive Cities CRC.</p> <p>It is the intention of the City Futures Research Centre to apply for ARC linkage program funding for the GreenWay Living Laboratory Project.</p>
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**Significance**

The Cooks River to Iron Cove GreenWay has been developed over the past 20 years by the Inner West community in collaboration with the four council's who's LGA's the corridor passes through - Leichhardt, Marrickville, Ashfield and Canterbury councils.

Following the amalgamation of these councils, the project is now sponsored by Inner West Council and City of Canterbury Bankstown.

The GreenWay project is of significance to metropolitan councils in Australia because it is a unique multi-purpose sustainable transport and urban environmental corridor which other councils can learn from. It is the product of an alliance between four inner city councils and its innovative qualities have been recognised in numerous ways. For example, it is a case study for the NSW Government Architect's Green Grid and for the Heart Foundation's healthy, liveable cities websites (see links below).

In 2017 it won the the Greater Sydney Commission's "great community-led project award". The GreenWay is identified by the Commission as the no. 1 priority Green Grid project in the Eastern Sydney District Plan. <http://www.greater.sydney/district-plans>  
<http://www.greater.sydney/greater-sydney-planning-awards#award2>  
<http://www.healthyactivebydesign.com.au/case-studies/the-greenway>  
<http://www.governmentarchitect.nsw.gov.au/resources/case-studies/2017/11/the-greenway>  
<http://www.governmentarchitect.nsw.gov.au/articles/2017/06/sydney-green-grid>

**Project Overview**

Using the Cooks River to Iron Cove GreenWay in Sydney's inner west as a living laboratory, this study aims to understand the many benefits and challenges of urban greenways. The study will develop a framework to measure the multiple benefits and challenges of the GreenWay as the Central and Southern Missing Links Project is completed. Using longitudinal research, focused on before and after monitoring of the GreenWay Missing Links Project, a range of issues will be evaluated.

These include active travel rates (cycling, walking and light rail usage), and benefits across social, health and environmental criteria. Broadly, the study will identify current knowledge and theory gaps in determining effective ways to evaluate the impact of new active transportation infrastructure in urban greenways.

**Entry Id: 11**

<b>Council</b>	<b>Nambucca Shire Council</b>
<b>Contact name</b>	Paul Gallagher
<b>Title</b>	Assistant General Manager - Engineering Services
<b>Contact details</b>	<a href="mailto:paul.gallagher@nambucca.nsw.gov.au">paul.gallagher@nambucca.nsw.gov.au</a> 0409129721
<b>Project name</b>	<b>Recycled materials trial: using Plastiphalt in road works</b>
<b>Contribution</b>	\$300,000
<b>Supporting documents</b>	
<b>Policy Principles</b>	Environment
	Infrastructure
<b>Your Council's Role</b>	<p>Council has two projects on the capital works road rehabilitation program for this financial year being Back Street and Mann Street in Nambucca Heads.</p> <p>With the recent China Sword National policy not to accept recycled materials we are endeavouring to look at ways of increasing the use of recyclable materials. As we already have a very good recycling ethos within the Shire - Council has identified two road rehabilitation projects to use using Plastiphalt</p> <p>The wearing surface would have traditional asphalt placed on it and there is an opportunity to paved the surface incorporating recycled materials with plastic and glass modified asphalt which will see approximately:</p> <ul style="list-style-type: none"> <li>• 530,000 plastic bag equivalents</li> <li>• 168,000 glass bottle equivalents</li> <li>• 12,500 toner cartridges</li> </ul>
<b>Potential Business Partners</b>	DOWNER– Reconomy Transport and Infrastructure NSW RMS NSW EPA WOOLWORTHS
<b>Potential University Partners</b>	Open to all universities to become involved with the monitoring and further development
<b>Significance</b>	With the recent China Sword National policy not to accept recycled materials this is an opportunity for LG to look at ways of increasing the use of recyclable materials.

For Councils using asphalt in their road works the laboratory tests indicate the new asphalt will increase pavement life by 15 per cent, sustain increased traffic count volumes of 20 per cent while reducing the pavement thickness by 10 per cent.

**Project Overview**

This is a great initiative with respect to enhancing recycling –in particular related to the dreaded plastic shopping bags.

Council intend to do the road construction project with “Plastiphalt” for the road pavement wearing surface. There will be no noticeable difference in the look or the vehicular ride over standard asphaltic concrete as the glass is coarse sand (4mm minus) replacement and the plastic and toner are polymer additives that enhance the durability and performance of the product. The laboratory tests indicate the new asphalt will increase pavement life by 15 per cent, sustain increased traffic count volumes of 20 per cent while reducing the pavement thickness by 10 per cent.

**Entry Id: 2**

<b>Council</b>	<b>Tenterfield Shire Council</b>
<b>Contact name</b>	Terry Dodds
<b>Title</b>	CEO
<b>Contact details</b>	t.dodds@tenterfield.nsw.gov.au      0400263 932
<b>Project name</b>	<b>Waste to Energy at a Local Scale Feasibility Study Project</b>
<b>Contribution</b>	0
<b>Supporting documents</b>	
<b>Policy Principles</b>	Economic
	Environment
	Social and community
<b>Your Council's Role</b>	<p>If Tenterfield Shire Council is successful in gaining the required resources from additional council partners, higher levels of government or their agencies, or our association, a decision support matrix will be developed that will provide a blueprint for councils to properly assess how they manage landfills.</p> <p>Just as importantly, a non-biased study across social, environmental and economic paradigms, will provide accurate information to inform policy makers.</p>
<b>Potential Business Partners</b>	<p>On 12 November, Cr Katrina Humphries, Chairperson of the Country Mayors Association of New South Wales, wrote to all regional and rural council mayors and general managers seeking financial contributions of \$15,000 each. Whilst there will be an application for funding presented to the Australian Renewable Energy Agency it would be an optimum result to fund the entire study from Local Government resources and have full control.</p> <p>Whilst it isn't expected that the study will cost the total potential sum able to be theoretically generated it also isn't expected that every council has the resources to contribute. If we find we have excess funds, then the payments by councils will be reduced in proportion.</p> <p>To date Tenterfield Shire Council, Regional Development Australia – Northern Inland, Moree Plains Shire Council, Whitsunday Regional Council and Goulburn Mulwaree Council have pledged a total of \$90,000.</p>

<b>Potential University Partners</b>	<p>If Tenterfield Shire Council and our partners were to obtain funding our intent would be to invite Macquarie University's Macquarie Partnerships to express an interest, and other universities with a commercial research business arm.</p> <p>Universities with business units is the preferred choice, as they can be held accountable from a contractual stance, just like any other consultant.</p> <p>There will undoubtedly be many universities with business units. Using Macquarie Partnerships as an example, Macquarie has two Professors that are leading lights regards not only renewable energy, including W2E, but chemical and electrical engineering. Prof Vlad Strezov (PhD Chemical Engineering) and Professor Graham Town (PhD in Electrical Engineering) are internationally renowned in their field. The Dean of the Faculty of Engineering did his PhD on renewable energy.</p>
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**Significance**

Councils are increasingly coming under pressure on waste, whether it be problems with recyclables, costs of implementing new waste systems or simply costs of disposal – either locally, or shipping waste elsewhere.

Waste to Energy is one of the range of solutions which may be able to assist decrease the amount of waste going to landfill. Technologies are well developed overseas, and can perform to extremely high environmental standards. Many of these projects are, however, very large and only applicable at high population levels.

The question the study needs to answer is: *What is the smallest scale at which economic waste to energy projects can occur?*

Western Australia is making significant progress in this area, including in regional areas at Port Hedland, however one single project at the smaller scale is not indicative of the range of regional needs within NSW or indeed elsewhere in Australia.

There is a Waste to Energy Policy in NSW, but it is a very difficult path not only to gain approval, but to even gain interest from the wider industry; both in Australia and internationally. The policy is under review, and Country Mayors recently resolved to request the full involvement of regional councils in that review.

To fully participate in this review, we need to have our own independent work done that focuses on the needs of regional councils. Policy change is needed, for Waste to Energy to take its place as part of the waste hierarchy and the waste to energy supply mix.

Regional councils have specific issues of lower population densities, longer travel distances and higher overall costs. There is a strong view that policy needs to consider



regional areas in a different way to, say, Western Sydney. In short, the cookie cutter approach currently fails regional areas.

The study will look, among other things, at:

- What is the overall legislative and regulatory context?
- What are the available technologies that can meet appropriate environmental standards?
- Which of these are scalable to regional areas?
- How do the economics of waste to energy work, including issues such as gate fees, operating costs, but also looking at avoided costs such as lower costs to landfill, lower transport costs and the like.
- What are the environmental offsets gained; reduction in methane, sulphur, leachate and CO<sub>2</sub>.
- What are the practical operational aspects that need to be resolved, including site location, energy output and grid connections, financing, maintenance and management of risk?
- Other than electricity production, what other uses are available; diesel production, steam for industry, biogas etc.
- How can we be confident of the technologies, and the science behind them? Fully independent experts need to review this – people with no industry or regulator ties.

Case study areas will be chosen to be representative of a wide range of regional contexts.

### **Project Overview**

The purpose of this project is to conduct a comprehensive feasibility study to convert municipal and other sources of waste into energy (W2E) at a local scale.

There are multiple components to a W2E Project, all of which will contribute to a complex decision support matrix and eventually each project 'gateway process';

- A. Environmental Regulations, Compliance and Audit (and required policy amendments)
- B. Methods to convert waste to energy(W2E)
- C. Legal and Commercial Contracts
- D. Operations and Logistics
- E. Governance and Control
- F. Finance
- G. Conclusion and decision support matrix

The feasibility study will determine whether the combination of changed circumstances is enough to warrant a pilot plant being built in this point in time – and potential locations.

It will also determine what the smallest possible scale is - taking into consideration the tyranny of distance and the subsequent transportation costs.

Lastly, the feasibility study will also determine whether councils across NSW and perhaps Australia, who are in a position to convert waste to energy, are able to form a cooperative sales arrangement through a partnership with a lower to medium tier power generator. This would enable different tariffs to be paid to the 'cooperative'.

Lastly, the study will investigate the offset environmental (pollution) costs such that the environmental economics as well as the financial economics can be understood.

**Entry Id: 43**