

TOM FARRELL INSTITUTE ANNUAL REPORT

Regional Solutions for a Sustainable Future



Vision:

To champion regional solutions for a sustainable future within the University and the wider community on the local and global regions.

Mission:

- Be a centre of excellence in environmental research and its application
- Build University and community partnerships to meet the environmental challenges of the future
- Advance the development and application of environmental knowledge
- Integrate cultural, social and economic values into environmental solutions



About Us

The Tom Farrell Institute for the Environment (TFI) is a multidisciplinary organisation which is well placed within the University of Newcastle to engage with Australia's leading professionals involved in the broader environmental fields. Since its establishment in 2006, the TFI has steadily grown and its outreach extends throughout Australia and Internationally.

The Tom Farrell Institute for the Environment is led by Prof Tim Roberts and staffed by a team of five experienced environmental sustainability researchers, teachers and communicators. The TFI has national and regional links with industry, government and community as well as strong connections within the University of Newcastle and the higher education sector.

Each team member plays an active role in fostering relationships within these spheres and developing projects that have multiple functions such as enhancing biodiversity end ecological resilience, environmental education for schools, and community engagement initiatives. As an advocate for sustainable solutions, often to complex problems entrenched in vexed and unsustainable practices, we are in a politically neutral but powerful position to innovate new paths to a resource efficient and environmentally sustainable future. Significant contributions include:

- "Diamonds from Coal" program which promotes strategies for using the region's coal sector as a market and launchpad for the region's clean-tech sector – especially in Energy, Transport, Manufacturing and Innovative Land use. It also includes other programs looking at leveraging defence, agricultural, transport and urban development industries for clean-tech sector development.
- The conception, initiation and launching of the Hunter Valley Electric Vehicle Festival (HVEVF) to engage the Hunter in capturing the electro-mobility opportunity. The HVEVF has

been a significant annual event of the region since its initiation in 2011 and is the premier event for the Hunter on the National Science Week calendar and addresses the need for policy, industry and skills development as well as community support by delivering three targeted events:

- A clean energy and transport policy workshop to support vision making, strategy development, networking, planning and regional cluster development)
- An electric vehicle show day to showcase Hunter manufacturing and enable the community to experience a wide range of electric vehicles from bicycles to trains.
- The EV Prize competition to build interest in regional skills development and vehicle innovation.
- The strategy is to develop the festival over the next three years to establish it as a significant ongoing regional event of state and national importance. This will provide a point of focus for regional industry development and provide a platform to market the Hunter and University of Newcastle on the State, National and International stage.
- Conservation studies in the Lower Hunter Valley to develop a research and education program that would deliver sustainable conservation and biodiversity initiatives, ecotourism and sustainable development in the 10,000 hectares of the Donaldson Conservation Trust area and to improve resilience of local plants to the impacts of climate change by development

of green corridors that link isolated patches of bushland to core habitat areas - funded by the Donaldson Conservation Trust and the Clean Energy Future Biodiversity Fund, and Caring for our Country Grants totalling in excess of \$4,500,000 AUD.

- Delivery of the annual
 "Best Practice in Ecological Restoration of Mined Lands
 Conference" in Singleton since 2011 as per contracts with
 NSW government Office of
 Environment and Heritage.
- A range of water and wastewater studies relating to water supply, stormwater runoff and wastewater treatment/reuse, contaminant export, on-site reuse of coal seam gas water and smart-metering water use to determine diurnal water use patterns (these are very important for revealing the detail of water and energy systems).
- Expertise in water-sensitive urban design.
- Education for sustainability as a major imbedded program in the curriculum at tertiary, secondary and primary level.
- In addition the TFI offers the gateway for business and the community at large to access the research capability of the University of Newcastle at large in matters relating to regional solutions for a sustainable future. World class expertise in climate change, renewable energy, photovoltaics, water, regional planning, and sustainability is available through this gateway.

Director Report

The years have travelled quickly and TFI continues to thrive with tremendous inputs from our loyal staff, the TFI Advisory Board and a host of equally loyal volunteers. The Tom Farrell Institute has continued to contribute to regional and University decision making and governance through active participation in the University Committee for Environmental Sustainability, the Callaghan Campus Landscape Advisory Committee, the Newcastle City Council Environmental Advisory Committee, the Board of Together Today, the Great Eastern Ranges Hunter Working Party, the Board of the CB Alexander Foundation at Tocal Agricultural College, the Hexham Swamps and Kooragang Island Rehabilitation Committee and Our Green Corridor Coalition Executive, and through advising on environmental and sustainability issues for regional planning, especially for local government.

Research activity and industry consultations have continued to grow over these past two years: the ongoing support of the Donaldson Conservation Trust has allowed us to carry out important ecological studies of the Richmond Vale Rail line with a view to potential ecotourism in that area west of Minmi; with the funds from the Federal Biodiversity Fund our Stepping Stones Project in the Hunter Valley Great Eastern Ranges Corridor under the guidance of Gabriel Anderson has made significant progress creating, protecting, enhancing and linking key habitat to increase ecosystem function and resilience.

The Electric Vehicle Festival and the conferences on Rehabilitation of Mined Lands and Biomass that the TFI team ran over these two years have been very successful and well-attended.



I continue with my weekly environmental talk on 2NURFM and my staff continue to produce our Newsletter sent out to some 1800 persons and regularly post on the TFI social media sites. Indeed our Facebook page receives much attention due to the interesting and relevant selection of uploads made regularly by the TFI team.

> "Our 2013 community engagement was significantly higher than previous years"

Being able to host DAAD interns from Germany, to participate in the environmental governance of the region, to undertake new and exciting research projects with industry partners and to bring environmental sustainability to the community are some of the joys.

> Professor Tim Roberts, Director

Z. Roberts

Our Team









Professor Tim Roberts

Director

Professor Tim Roberts is the Director of The Tom Farrell Institute for the Environment.

Professor Roberts took up the position of Director, following the completion of his tenure as Dean of Research at JCU Singapore. His previous tenure was as inaugural Dean of the Singapore campus of the University of Newcastle, Australia.

In line with his appointment as Conjoint Professor in Biology he continues to be active in research in the laboratory of his long-time collaborator, Associate Professor Hugh Dunstan, at the University of Newcastle. He has published 100 papers.

Professor Tim Roberts' researcher profile www.newcastle.edu.au/profile/tim-roberts

Dr Steven Lucas

Project Director

Steven has over 10 years of experience in sustainable water (and soil) management and has contributed to the development of water systems understanding. Dr Lucas has been involved in:

 Analysis of centralised and decentralised water supply systems, wastewater treatment systems and stormwater systems and developing sustainable approaches to sourcing fit-for-purpose water at the point-of-use and integration of available mains water, rainwater, stormwater and wastewater systems, and water quality, irrigation practices and soil/water dynamics

Dr Steven Lucas' researcher profile www.newcastle.edu.au/profile/steven-lucas

Dr Gary Ellem

Project Director

Dr Gary Ellem received his PhD in Biophysics from the University of Newcastle, and followed on to lecture in Biology and Ecology. His recent work has focussed on modelling and analysis of the scale and economics of alternative energy, sequestration and land management systems, as well as the development of innovative biomass technologies such as microalgae. His doctoral studies were focused on the biophysics of shell shape in molluscs and he holds IP in a number of fields including radio position finding techniques, the thermal processing of biomass and photobioreactor design for the mass cultivation of microalgae. Dr Gary Ellem's researcher profile www.newcastle.edu. au/profile/gary-ellem

Danielle Lloyd-Prichard

Project Officer

Creative and results-driven engagement professional with an 18-year record of achievement in coordinating, developing, promoting, delivering and evaluating environmental sustainability programs across the Northern Territory and Hunter Region of Australia. Excellent skills in communicating, inspiring and motivating others to implement simple solutions to complex environmental issues using a hands-on, lead by example management style which fosters a culture of teamwork, shared mission and dedication to excellence and the environment.

Danielle Lloyd-Prichard's staff profile www.newcastle.edu.au/profile/danielle-lloyd-prichard



Belinda McNab

Executive Officer

Belinda has been with the TFI since soon after it began in 2006. A highly experienced professional, Belinda is responsible for ensuring the smooth day-to-day running of the Institute and its various functions, including staff supervision, financial management, event management and graphic design. She is a passionate graphic designer and has a number of years' experience using her skills to assist advertising and marketing for various events that the Institute holds. Belinda has extensive experience in event coordination and management, and has been instrumental in bringing our many events such as forums, conferences and large scale shows to fruition.



Nigel Stace Project Officer

Nigel is a proactive and dynamic member of the Tom Farrell Institute team. Nigel commenced with the Institute in 2014 in the role of events coordinator. He is instrumental in pulling together our two major conferences that are held each year, as well as assisting with our Hunter Valley Electric Vehicle Festival.



Latha Lewis Project Officer

Latha is a graduate Chemical Engineer with a Master of Environmental Studies from the University of Newcastle. She has broad work experience in environmental management, having previously worked for Newcastle City Council and the UoN as well as in consultancy. She is now a Project Officer at the TFI, organising the annual Hunter Valley Electric Vehicle Festival (HVEVF).



Peter Stevens

Qualified in Architecture and Environmental Management, with thirty years of experience in design and land management, Peter has recently completed RhD studies in stemming soil erosion and securing water in Australian landscapes using a micro topographic system demonstrated at the UoN between 1992 and 1996.

Peter lectures in the School of Architecture and Built Environment Master's program on Disaster Preparation and Sustainability.



Margaret Williams

The TFI is fortunate to have the volunteer support of Margaret one day a week. Duties include checking information for funding but not applying for the funds. Other duties tend to be variable depending on what is necessary. These duties could include photocopying, laminating, making booklets and the general tasks needed in an office.



Key achievements

The Tom Farrell Institute for the Environment is involved in numerous research projects, and community engagement activities. The highlights of each are listed here:

Research Projects

Project 1: Donaldson Conservation Trust (DCT) supported by the Donaldson Conservation Trust (DCT)

Project 2: Green Corridor Stepping Stones Project supported by the Biodiversity Fund, Research Partner: Great Eastern Ranges Initiative – GERI

Project 3: Bird Monitoring in the Hunter Valley, Research Partner: DCT and Great Easter Ranges Initiative – GERI

Project 4: Soil Quality Monitoring and Beneficial Reuse of CSG Production Water, Research Partner: Fodder King Ltd

Project 5: Event-based Storm-water run-off monitoring, Research Partner: WetlandCare Australia

Project 6: Investigating the use of recycled organic and mineral waste as reactive filter media for improving storm-water quality, Research Partner: Star Water

Project 7: Undertaking dissolution tests on a range of coal types with respect to Environmentally Hazardous Substance classification as per MARPOL Annex V, Research Partner: Xstrata Coal and Introspec Consulting

Project 8: Investigating the potential health implications

of coal dust in rainwater, Research Partner: Xstrata Coal and Introspec Consulting

Project 9: Using smart-meters to determine diurnal water use patters to provide improved modelling inputs to simulate integrated water cycle management, Research Partner: RedSkink

Our 2013/14 research was well regarded by peers, having published 16 papers & reports

Project 10: Source-Tracking faecal contamination in natural waterways using multiple techniques, Research Partner: NSW Shellfish Association and NSW Food Authority

Project 11: Investigating the efficacy of polymer filters in removing hydrocarbons from industrial run-off, Research Partner: CiAgent & EnviroPacific Services

Project 12: Investigating the fouling characteristics of various types of membranes used in wastewater treatment in order to improve efficacy, Research Partner: Permeate Partners

Project 13: The Richmond Vale Rail Trail Vegetation Communities, Research Partner: Newcastle Cycleway Movement, and Cessnock City Council

Committee Memberships

- Great Eastern Ranges
 Committee
- University of Newcastle Committee for Environmental Sustainability
- Together Today Board
- Newcastle City Council Environmental Sustainability Committee
- Callaghan Campus Landscape
 Consultative Group
- Newcastle Now Committee
- Hexham Swamp Kooragang Wetlands Rehabilitation Committee
- CLEANaS Steering Committee



2013 Events

- Newcastle Show Information Booth
- Free Teacher EV Workshop, In collaboration with Hunter TAFE
- "My 84 year Journey Through Learning and Life" Dr Mary E. White DSc
- Conservation Volunteers

 Connecting People With Our Environment, Friends of Conservation Volunteers program
- Conservation, Marine & Environment presents "Beyond Zero Emissions Seminar",
- Beyond Zero Emissions Seminar,
- Tocal Field Days
- Ceramic Fuel Cells and the Smart Grid
- HVEVF Transport Innovation Workshop
- Biomass based Cleantech Industry Development,
- Sustainability Assessment Policy, Plans and Projects
- Biology Seminar, "Gaia She's a tough bitch" An art/science approach to unravelling James Lovelock's Gaia Theory",
- The Planning White Paper: Growth, Certainity and Engagement
- Environmental Defenders Office Workshop on the new Planning Legislation
- Climate Change Forum Lessons for Renewal – Featuring Allan Jones MBE, Chief Development Officer, Energy and Climate Change, City of Sydney
- Central Coast Innovation Summit
- Keep Your Options Open in a Carbon Focused Future, Biodiversity Conservation Event Series
- Green Day Merewether High School
- Climate Adaptation Conference, National Climate Change Adaptation Research Facility
- Environmental Risk Accounting

to encourage Sustainable, Adaptive management practices – Associate Prof Kala Saravanamuthu

- Citizen Science to Help Manage Feral Animals, Peter West, Invasive Animals CRC
- Energy Hunter Helping Businesses become more Energy Efficient
- The Future is Electric! Solar Sailor cruise and public lecture
- Our City Our Future Lecture Series
- "Gaia She's a tough bitch" Biology Seminar, School of Environmental and Life Sciences, An art/science approach to unravelling James Lovelock's Gaia Theory.
- Bush Blitz Symposium Adding to Australia's Biodiversity Picture
- Diamonds from Coal Dr Gary Ellem
- Bioenergy Industry Development Commercialisation and Production – Dr Gary Ellem
- 3rd EV Festival Cameron Park International Kart Raceway
- Developing Sustainable Mining and Agricultural Industry Collaboration – Dr Gary Ellem
- Youth Leading the World Congress 2013, OzGreen
- Annual Don Morris Bush Walk at the University of Newcastle
- Biomass 2013 Conference
- Best Practice Ecological Rehabilitation of Mined Lands Conference
- Air Pollution and Health
 Community Scientific
 Engagement Forum,
- Community Scientific Engagement Forum,
- Ride to work day
- Hunter Valley Electric Vehicle Festival
- International Volunteer Day Campus Engagement Activity – Landcare clean-up and Habitat Hike

2014 Events

- A Community University Partnerships: A hands-on workshop with a world leader, Professor Angie Hart – University of Brighton (UK)
- Community Engaged Research: Towards Effective Communities of Practice at UoN Professor Angie Hart – University of Brighton (UK)
- Native Bee Workshop Dr Tim Heard
- Landcare Lunch and Habitat Hike, Hunter Region Landcare
- Free Design Workshop:Curvilinear patterned landscapes to secure water in soils
- Reducing Greenhouse Gas Emissions from Food and Fibre Production
- Making money from patents, Professor Michel Lefebvre
- Community Planting Event, HRLandcare Network, TFI, UoN
- Ireland's "Green" Shore: Tracking Contamination in the Environment, Associate Professor Phillip Geary
- Environmental Research Workshop: Biodiversity and Social and Economic Valuation, Taha Chaiechi
- Landcare Event 'Solar Water supply; Solar Economics; and Incentives', HR Landcare Facilitator, Solar Plumbing Solutions
- Green Drinks, Regional Landcare Facilitator
- An afternoon with sustainability experts David Holmgren and Nicole Foss, Permaculture Hunter,
- Energy 2050: The Future of Energy in Australia
- Planting and Creek Clean-up Day
- 4th Electric Vehicle Festival
- Mulching Monday, HRLandcare Network
- CycleSafe Network Proposal, Newcastle Cycleways Movement

- Powerful Owl Discovery Walk
- Picnic at the Swamp Celebrating the Don Morris Walk and the Indigenous Culture Walk
- Habitat Hike on the Don Morris Walk
- Creek naming ceremony and Family Fun Activities, Heaton Primary School,
- Wetland Walk and Community Planting Day
- Mine Rehabilitation Conference
- Uni Callaghan Landcare Planting
 Day
- Native Bee Workshop Dr Tim Heard
- Ride 2 Work Day 2014
- Uni Callaghan Landcare Planting Day
- Bikefest Newcastle Expo, Heart
 Foundation
- Wonderful Wednesday Mulching, Hunter Region Landcare
- Energy Efficiency Expo
- Clean Energy Regional Responses 2014







Publications

Publication of the Australian Stingless Bees – A Guide to Sugarbag Beekeeping by John Klumpp – Earthling Enterprises and the Tom Farrell Institute for the Environment

Richmond Vale Rail Track Report

McConville, Anna, et al. "Contrasting habitat use of morphologically similar bat species with differing conservation status in south-eastern Australia." Austral Ecology 39.1 (2014): 83-94.

Ellem, Gary & Tyson Nik "Fast charge batteries and in route charging – an emerging option for low cost freight electrification" Conference On Railway Excellence, Adelaide, 5 – 7 May 2014

Lucas, Steven & Planner John H Elsevier "Environmentally Hazardous Substance (EHS) requirements for coal cargo" Marine Pollution Bulletin 2014 in press.

McConville A, Law BS, Mahony MJ (2013) Are Regional Habitat Models Useful at a Local-Scale? A Case Study of Threatened and Common Insectivorous Bats in South-Eastern Australia. PLoS ONE 8(8): e72420. doi:10.1371/journal. pone.0072420

McDonald, Kevin, 'The Don Morris Walk - An Illustrated Guide' 2nd edition, 2013

McConville A, Law BS, Penman T & Mahony MJ (2013) Contrasting habitat use of morphologically similar bat species with differing conservation status in south-eastern Australia. Austral Ecology (2013 in press)

Anna McConville, Bradley Law (2013): Observations on the roost characteristics of the East-coast Free-tailed Bat Mormopterus norfolkensis in two different regions of New South Wales. Australian Zoologist 36: 355-

Lucas SA, Lee CC, Love E (2013) The performance of recycled organic and mineral materials as reactive filter media based on column studies and MUSIC v5 modelling, NSW Stormwater Industry Association Conference, 17th – 19th September 2013, Blue Mountains NSW.

Lucas SA, Planner J (2013) MARPOL Annex V and Environmentally Hazardous Substance (EHS) requirements for coal cargo residues, 11th International Congress on Bulk Materials Storage, Handling and Transportation, 2nd – 4th July, The University of Newcastle NSW.

Lucas SA, Lee CC, Love E (2013) The performance of recycled organic and mineral materials as reactive filter media, ICSWHK 2013 – 2nd International Conference on Solid Waste 2013: Innovation in Technology and Management, 5th – 8th May 2013, Hong Kong.

Book Chapter: Sustainability Assessment Tools in Higher Education – Mapping Trends and Good Practices at Universities Around the World. Ed(s) W Filho, S Azeiteiro; and C. Jabbour: "The Low Carbon Curriculum at the University of Newcastle, Australia" Elizabeth Date-Huxtable, Gary Ellem, Tim Roberts.

Conference paper: P Stevens, S Lucas, T Roberts 'Scale and abundance' International Urban Design Conference, Sydney (Sept. 2013)

Declan Kuch, Gary Ellem, Mark Bahnisch, Stephen Webb: ACOLA ARC LASP Program Securing Australia's Future Project # 6 Engineering Energy: Unconventional Gas Production: Social License and Communications Report, January 2013

OPEN @ ACCESS Freely available online		
Are Regional Habitat Models Useful at a Local-Scale? A Case Study of Threatened and Common Insectivorous Bats in South-Eastern Australia Ana McConville', Batty S. Law, Michael J. Mahony'	Permit de la Carlos de Car	
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Conference Presentations 2013 – 2014

Conference	Presenter	Title
Best Practice Ecological Rehabilitation of Mined Lands Conference 12 September 2013	Gabriel Anderson, Facilitator, Hunter Valley Great Eastern Ranges Initiative	The Great Eastern Ranges and the Stepping Stones Project
Best Practice Ecological Rehabilitation of Mined Lands Conference 12 September 2013	Professor Tim Roberts, Director Tom Farrell Institute	Session One: Strategic Planning, Landscape Ecology and Connectivity - Chair
Biomass 2013 International Conference 11 September 2013	Dr Gary Ellem, Program Manager, Future Industries	Slurry Based Biofuels.
Biomass 2013 International Conference 11 September 2013	Professor Tim Roberts – Director Tom Farrell Institute	Session One: Biomass Feedstock 1 – Chair
Mine Rehab Conference 2014 – Best Practice Ecological Rehabilitation	Peter Stevens, Tom Farrell Institute	Fertile Mines
Mine Rehab Conference 2014 – Best Practice Ecological Rehabilitation	Lisa Zillig, Visiting Intern, Tom Farrell Institute	Overview of the Regulation and practice of open cut coal mines in Germany
Clean Energy Regional Responses 21 November 2014	Dr Gary Ellem, Project Manager The Tom Farrell Institute	ASAVI future for transport
Clean Energy Regional Responses 21 November 2014	Dr Gary Ellem, Project Manager, Tom Farrell Institute	Fast charge batteries and in route charging – anemerging option for low cost freight electrification
Clean Energy Regional Responses 21 November 2014	Julia Sierck, Intern, Tom Farrell Institute – DAAD Scholarship	Germany's energy transition to reduce emissions by at least 80% by 2020 compared to 1990.m

Public Forums

Australian Earth Sciences Convention – Scientific Program and Convention Information – Sustainable Australia 7-10 July 2014 – The Future of Energy in Australia - Energy 2050 – Prof Iain Stewart (Geoscience Communication at Plymouth University (UK), Dr Gary Ellem (UoN), Prof Ben Hankamer (University of Queensland, Institute for Molecular Bioscience), Dr Tony Irwin (Technical Director SMR Nuclear Technology), Dr Alex Wonhas (CSIRO), Ms Rachel Connell (Director, Office of Coal Seam Gas, NSW Trade and Investment)





2013 Highlights

Electric Vehicle Festival

Racing for science engagement was the theme of the 3rd annual EV Prize challenge held on Sunday 18th August during National Science Week. Over 50 teams designed, built and raced electric vehicles around the tight circuit at Newcastle Kart Raceway.

Fantastic efforts by 24 Hunter High School teams resulted in 36 custom designed electric bikes competing in the Schools Single Seat Hub and Chain Classes. Lambton High (Hub) and Belmont Christian College (Chain) took out pole positions and Bishop Tyrrell College (Hub) and Belmont Christian College (Chain) finished first in the Endurance Races.

Other winners were Hunter TAFE TVET Design award, Whitebridge High Entrepreneurial award, St Mary's High Team Spirit, and Maitland Grossmann High EcoGeekFactorX award. In the open divisions, The University of Newcastle's "UNRacingEV" team won the 1500 class, Team Pricharged won the open single division, and Grinmore Pedaless won the dual seat division.

The 1300+ spectators on the day experienced the sights and sounds of an electric transport future. The enthusiasm and skills of competitors was infectious and the support from local industries encouraging, as teams tweaked the electrotechnologies of their builds for optimum performance on the track.

The demonstrations on the day included an electric go kart, three Sinclair C5s, these are pedal electric single seat vehicles that were mass produced during the mid-80s in the UK, and the locally made ELMOFO, a high performance Electric Radical SR8 Race Vehicle featuring some of the highest performance EV components currently available. And for the first time in its short history, a Western Australian team 'Coulomb Motorsport' entered the open single seat division of the EV Prize.

Sponsorship for the 2013 EV Prize generated an impressive cash prize

pool of \$8700 and over \$7000 worth of additional prizes including bike accessory kits, a suncooker, an electric bike, and sporting adventure vouchers. The major cash sponsors of the event were National Science Week (\$15 000), ME Program (\$13000), Port Waratah Coal Services (\$10000), Lake Macquarie City Council (\$7000), NuCoal (\$3000), Hunter TAFE (\$2000) and Newcastle Innovation (\$2000). Generous in kind support valued over \$75 000, was received from the ME Program, NBN Television, Charlestown Rotary, EVMotorcycle, Catavolt, EV Nova, Eagle Electric Bikes and students and staff from the University of Newcastle.

Feedback on the 2013 EV Prize was gathered from exit surveys of participants, informal discussions with organisers, sponsors and team managers, and a formal debrief session with focus aroups. There was overwhelming support and praise for the EV Prize competition as a fantastic, fun and innovative proving ground for representing the capability of young people, industries, research and education institutions of the Hunter Region in the electrotechnology space. The EV Prize raises the level of innovative practice and promotes opportunities for high school students in an evolving economy. 94% of high school participants agreed that after participating in the EV Prize they are motivated to learn more about science, mathematics, design and technology.

Interest in this event continues to grow and all teams from the 2013 EV Prize are planning on returning to the track to compete in 2014. Electric vehicle enthusiasts are now calling for more opportunities to see and test these vehicles, so in 2014 The Tom Farrell Institute will combine the EV Show with the EV Prize on Sunday 17th August at the Newcastle Kart Raceway for Australia's largest electric bike grand prix and show.





TFI Project Briefing 14/05/2013 – Biomass Based Cleantech Industry Development

We are keen to expand our cleantech industry development focus transport innovation and manufacturing into biomass area has been strategically selected due to the existing regional capabilities and markets. In the case of biomass processing our regional capabilities are in the area of high temperature thermal processing, and key regional markets are in the area of land/soil rehabilitation and diesel liquid fuel use.

We are actively developing areas of land/soil rehabilitation and the use of biomass residues as a processing feedstock via our 'Biomass 2013' and 'Best Practice Mined Lands Rehabilitation' conferences held Singleton during September this year. These conferences act as a forum for ideas and industry networking which support industry development. In addition, we have a number of active research projects in association with the Crucible Group Pty Ltd, who now have a commercial scale prototype biomass converter running at Vales Point Power Station. This provides a unique global opportunity for investigating value adding products from biomass char in association with one of the world's most innovative scale production facilities.

The TFI has projects covering two key values adding product directions – the use of biomass char in soils for agriculture and rehabilitation, and the processing of biomass char into a fuel oil replacement for internal combustion engines.

Patrice Newell and Nina Herbertson are investigating sources of biomass residues in the Hunter and the effectiveness of biomass char as a soil amendment in agricultural and mined lands rehabilitation. This work is part of a partnership between the TFI, the Crucible Group, The Muswellbrook Mine and Muswellbrook City Council. The TFI's Dr Steven Lucas has also partnered with Prof Joe Bidwell to supervise an Honours student Ross McGregor investigating the use of biomass char in ameliorating salinity scalds in exposed soils in association with Santos.

We have recently had a Researchers in Business (RiB) grant approved through Enterprise Connect with the Crucible Group as the industry partner to investigate the use of finely ground char as a slurry based fuel for internal combustion engines (slow to medium speed diesel engines and gas turbines). Dr Gary Ellem will work with the Crucible Group to investigate the processing challenges, applications, markets and pathways to fuel industry development for chars from the crucible biomass conversion process.

2013 Highlights cont...

Other Community Engagement 2013

- Newsletter, Facebook profile, Website activity
- A monthly newsletter was sent to 2000+ subscribers in 2013
- Facebook followers increased through regular engagement
- Solar cooking
- TFI World Café
- 2NURFM regular radio program
- Skills on show display at Newcastle Show,
- Hunter Business Review Business Exhibition and conference,
- Tocal Field Days as part of the Hunter Innovation Festival
- BZE Book Launch
- External Relations Industry
 Interactions
- Open Day
- Teachers Workshop
- Graduate Careers Expo
- Nusec
- Hunter Coal Environment Group
- CEDA Infrastructure Integration and Economic Development in the Hunter Region
- Newcastle University
 Toastmasters Club
- Smart Energy Expo
- Living Smart Festival
- Newcastle Now Committee
- Timebanking

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2014 Highlights

Electric Vehicle Festival

The Hunter has just hosted the nation's largest and most comprehensive electric vehicle festival over the weekend of the 16 & 17th of August. EV Fest 2014, managed by the Tom Farrell Institute, saw more than 5,000 people enjoy the exhibits, demonstrations and racing at the Newcastle Kart Racing Club track facility in Cameron Park.

The event is a major highlight on the National Science Week calendar and was designed to both build public interest in electric transport and encourage the development of science, technology, engineering and math based careers.

Showcased on the track and on display were the cream of electric and hybrid manufacturers from the sharp and polished four-door Tesla - with its 0-100Km/h in 4.4.seconds power and its range of 500 Km; the home-grown Catavolt superbike, Varley superbike and bus and ELMOFO Radical; and a swag of ready-to-buy commercial two-wheelers and four-wheelers, from mobility vehicles to cars and delivery vans. Complementing these were the innovative vehicles built from the ground up by students and enthusiasts from across Australia who braved the weather conditions to put their machines to the test on the track. Prize money totalling \$9,000 was distributed across eleven categories.

The winners were: Grinmore Pedaless (taking out three prizes), Macquarie College (two prizes), Belmont Christian College, Maitland Grossman High 'Bluebird', Newcastle High 'Novadrift1', Bishop Tyrell Anglican College, 'ELMOFO' and 'Quiet Rush'. Despite the threat of rain, it was heartening to see how young people take up the challenges of life and how teachers and students alike become absorbed in the creative process. On display were examples of welding and metal work, composite materials, Computer Aided Design (CAD), laser cutting and CNC machining, as well as 3D printing.

Both the locally-built Catavolt superbike and the sleek ELMOFO four wheeler have won in open competition – the Catavolt with a world championship at Daytona, Florida; and the ELMOFO recently making history, in what is believed to be a world first, by becoming the first electric car to win a race against petrol vehicles in a sanctioned race event at Wakefield Park Raceway near Goulburn. The race winning electric Radical SREV was built by Newcastle -based Solar PV systems firm Solar Power Australia. Imagine 0 to 100 km/h in 3.5 seconds, 0 to 160 km/h in 6.5 seconds and a top speed of 265 km/h.

After such a great weekend it's hard not to think that our future is in good hands with such interest and skills shown by the region's young people in advanced manufacturing and new technologies. Planning for EV Fest 2015 will begin shortly, with sponsors and venues being sought to keep this event of National significance in the Hunter.



2014 Highlights cont...

Clean Energy – Regional Responses 2014 Conference.

This year's Clean Energy Conference was a success. The conference was held in the rural setting of Kurri Kurri TAFE on 21 November 2014. The turnout was great, over 120 people attended on the day including some Government officials such as Leslie Williams, NSW Parliamentary Secretary for Renewable Energy, and Mr Clayton Barr, MP State Member for the Electorate of Cessnock. The day commenced with an official opening by Mr Clayton Barr, followed by presentations from 30 speakers who spoke on a range of topics covering the growing move to renewable energy. Aside from this there were also 4 exhibitors and 7 Poster Presenters. After the Conference had concluded, attendees were invited to the Conference Dinner to further discuss topics raised at the conference. 36 people attended the dinner. Overall the feedback received from the day was very positive, 100% of the surveys stated the conference was adequate and 95% stated recommendation of the conference would be made to others



Best Practice Ecological Rehabilitation of Mined Land Conference

The objectives of this conference are to showcase research and practice and regulation aimed at generating biodiversity and adaptive reuse through rehabilitation of mined land; look at current and emerging best practice approaches to mine rehabilitation activities via case studies along with their achievements and lessons; discuss and identify measures for assessing post mining rehabilitation activity outcomes and their contribution towards biodiversity.

170 attendees: miners, students, consultants

Sponsorship of \$10,000 from OEH and \$2,000 from HCEG

Topics covered:

- Ecological restoration and rehabilitation science, research and or best practice
- Case studies along with achievements and lessons
- The regulatory environment now and the future
- Biodiversity assessment

TFI partnered in this Conference by the Biodiversity Assessment and Conservation section of the Office of Environment and Heritage, by the NSW Minerals Council and the Division of Resources and Energy of NSW Trade & Investment.

Generally very positive feedback with compliments for the range of speakers, relevance, organisation/ timing/ schedule, networking opportunities, and venue.

We received overwhelming support to hold the event again in 2014.

Some of the comments:

Thank you for the invitation – it was a very interesting and enjoyable conference. Phil Wood, Natural Reserves Conservation Officer | Open Space & Leisure Services, Gosford City Council

 Thanks for an excellent couple of days out at Singleton. Mike Goodman, Business Adviser, Clean Technology Innovation Centre, Enterprise Connect

- Well done last week. It was a great day! Thanks for all your effort. Patrice Newell, Elmswood, Gundy NSW 2337.
- The event went smoothly, there was a really good 'buzz' in the breaks, and all I spoke to were positive. As a newcomer I certainly learnt a lot. Pauline Dunne Team Leader - Community Engagement Regional Operations Group, OEH







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