

Report on UK Mission to New Zealand on Agricultural Biotechnology and Biofuels

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British High Commission, Wellington, New Zealand

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Summary:

UKTI and the British High Commission in New Zealand worked together in early 2009 to bring seven UK biofuel and biotechnology specialists to New Zealand at the time of NZBio, New Zealand's annual industry/research conference in biotechnology, with delegations from Manitoba, Australia and the UK participating.

The mission was sponsored by the UK Foreign and Commonwealth Office through its Strategic and Small Projects funds¹ and supported by UKTI and NZBio. The High Commission in New Zealand created the post of Science and Innovation Promoter in mid-2007, jointly sponsored by DIUS, UKTI, NZTE, InvestNI and FCO, to promote research links between British and New Zealand research and technology institutions.

The mission dealt with both the commercially orientated R&D end of the spectrum and the Trade and Investment end. UKTI Auckland deals with participants at the trade/investment level, while the High Commission deals with R&D. Mission participants attended the NZBio annual conference in Auckland from March 9-11 (<http://nzbio2009.co.nz>), plus a UK-NZ workshop on March 12.

Four UK speakers gave presentations at a UKTI-hosted conference session on March 10. On March 12, following NZBio, the UK hosted a one-day workshop in Auckland for organisations seeking potential UK-NZ collaborations in their work. Seven UK organisations entered dialogue with 14 New Zealand counterparts on potential collaborative research which showed promise of leading on to IP exploitation. Press interviews were arranged with Radio New Zealand, the National Business Review, Dominion Post, and articles arranged with three specialist publications.

As an immediate result of discussions, two strong collaborative opportunities arose, four proposals are being written, and some 30 contacts meriting follow-up were made.

Meeting Objectives:

The intent of the mission was to pursue collaborative research agreements that should lead to commercial exploitation within a reasonable time frame. They facilitated individual discussions with New Zealand organisations, with a view to moving towards agreements involving one or more of:

- collaborative research, covering IP discovery and use and providing templates for business collaboration (even if the research is in the pre-competitive stage);
- inward or outward investments;
- sales or purchases of IP or products

¹ PSF LCHG SC 000434 Task: 0.1 Expenditure type: Programme spend. Expenditure organisation: GEID.SDBG Economic Governance / GOF and PEPSIG003 Task Number: 1.0; Expenditure Type: Programme Spend; Expenditure Organisation: Wellington, NZ; Beneficiary: LON London

Persons Attending from the UK, and their Initial Feedback

Seven UK delegates attended the meetings in Auckland

- | | |
|--|--|
| 1. Paul Sallis, Newcastle University | - Algal biofuels |
| 2. Khalid Shukri, Scionix, London | - Biofuels |
| 3. Catherine Side, Inside Consulting | - Biofuels, Algae, Animal health Food |
| 4. Andrew Shearer, Neem Biotech | - Methane reduction |
| 5. Ronnie Georghiou, IP Pragmatics | - Animal Health, Aquaculture and |
| 6. Marcel Jaspars, Bioscience for Business KTN | - Marine and Medical Biotechnology, Biofuels |
| 7. Michael Welsh, Agri-Food & Biosciences Institute | - Animal health |

And

Paul Tuckley, UK Trade and Investment, Auckland Paul.Tuckley@fco.govt.uk
Todd Hewitt, UK Trade and Investment, Auckland Todd.Hewitt@fco.govt.uk
John Waugh, UK Trade and Investment, Auckland John.Waugh@fco.govt.uk
Julia Thevessen, UK Trade and Investment, Auckland Julia.Thevessen@fco.govt.uk
Steve Thompson, British High Commission, Wellington... steve.Thompson@fco.govt.uk

Khalid Shukri, Scionix, London: Made contacts with **Drs Steve Wratten, Lincoln University and Azam Ali, AgResearch, Lincoln**. One strong possibility for collaboration arose.

Catherine Side, Inside Consulting: identified ten significant contacts, with five confidentiality agreements signed and four proposals under way.

Andrew Shearer, Neem Biotech: reported eight promising contacts for collaboration, licensing and partnerships. He will also keep in touch with the Australian market via UKTI's Joe Dodd

Ronnie Georghiou, IP Pragmatics: identified three promising contacts in New Zealand.

Marcel Jaspars, Bioscience for Business KTN: followed up a number of contacts, including Malaghan Institute (Jacquie Harper), and potential for exchange of material.

Michael Welsh, Agri-Food & Biosciences Institute: Made seven useful contacts on agriculture, nanotechnology and vaccines

Persons Attending from New Zealand, and their Initial Feedback

Fifteen New Zealand parties attended the meetings in Auckland:

AgResearch - Dr Azam Ali, AgResearch, Lincoln. Azam.ali@agresearch.co.nz; Wayne Hein, AgResearch. Wayne.Hein@agresearch.co.nz

AgResearch Grasslands Research Centre: Dr. Nicholas Roberts, Private Bag 11008, Palmerston North, NZ. T:+64 6 351 8207
Nick.Roberts@agresearch.co.nz

Agricultural Biological Engineering Ltd: Donald McNally, Managing Director, 182 Queen Street, Pukekohe 2120, NZ. T:+64 9 238 4988 nzaes@xnet.co.nz

Ancare Scientific - Dr Colin Harvey, CEO PO Box 36240, Northcote 0748, Auckland
Colin.harvey@ancarescientific.co.nz

Bernie Radford, consultant. Bernie@baricorp.co.nz

BioCommerce Centre, Melanie Kiessner, Business Manager, PO Box 1210, Dairy Farm Road, Palmerston North 4440, D:+646 352 0117 M:+64027 5353 310 www.biocommerce.co.nz melanie@biocommerce.co.nz

British New Zealand Trade Council: Peter Isaac, Executive Director, Central House, 21 Brandon Street, Wellington, NZ. T:+644 499 2797 Peter.Isaac@xtra.co.NZ

Cawthron Institute: Mike Packer, Senior Scientist, 98 Halifax Street, Nelson NZ. T:+643 539 3233 M:+6421 059 8648 mike.packer@cawthron.org.nz

IP Pragmatics, Auckland - Karin Schofield Karin.schofield@ip-pragmatics.com

Lincoln University - Professor Steve Wratten WrattenS@lincoln.ac.nz

Max Morley: Consultant working with NZ companies who are keen to extend their technologies internationally boatie@ihug.co.nz T+64 9 238 1257 M+64 27 273 6930

Natural Systems Ltd Ian Bywater, General Manager, PO Box 41032, Christchurch 8023, T:+643 376 5549 M:+6427 579 6333 ian.bywater@naturalsystems.co.nz

New Zealand Trade & Enterprise: Dr Chris Boalch, Level 12, ANZ Centre, 23-29 Albert St, Auckland, T:+649 302 5419 Chris.Boalch@NZTE.govt.NZ

Primorus Clinical Trials Ltd: Jo Kepple, Director - Business Development and Dr Alison Luckey. St Georges Hospital, Private Bag 4737, Christchurch 8014 Ph: +64 (0) 3355 1718 www.primorus.com
jo.kepple@primorus.com

Other Contacts during NZBio

Quantec - Rod Claycomb, PhD, Managing Director, Quantec Limited, PO Box 11004, Hamilton, NZ (to meet A Shearer, C Side) rod.claycomb@quantec.co.nz

Meat & Wool NZ Ltd - Dr Max Kennedy, R&D Strategy Manager, to meet with delegates on animal health and greenhouse gases, March 9 Max.Kennedy@MeatandWoolNZ.com

Fonterra - Alan Rogers Alan.Rogerson@fonterra.com

Bernie Radford reported 5 contacts with joint development potential. Mile Packer noted several commonalities with Cawthron. Ian Bywater discussed Newcastle's Shetland Isles project with Paul Sallis. Steve Wratten linked Scionix with Solid Energy NZ's Biodiesel NZ project (Andy Matheson). Neem Biotech will meet with AgResearch. Chris Boalch of NZTE expressed interest in the FRST/Biodiesel/Chevron/Lincoln University partnership.

Evaluation and Follow-up

An initial questionnaire to UK and NZ participants provided the following feedback at the end of the event, rated on a scale of: (scale 1=not at all, 2=some, 3=significant amount, 4=greatly):

Questions asked immediately following the Agricultural Biotechnology and Biofuels Mission, March 12, 2009	UK Average and range	NZ Average and range
1. Has your ability to access international expertise, resources and/or facilities been increased as a result of participation in this event?	3.2 (2-4)	2.6 (2-3)
2. Do you intend to initiate or expand an international collaboration leading to one or more joint research projects wholly or partly as a result of this event?	3.3 (2-4)	2.7 (2-3)
3. To what extent did this event meet your objectives for attending it?	3.7 (3-4)	3.1 (2-4)
4. To what extent did the event lead to significant new business opportunities?	3.2 (2-4)	2.6 (2-4)
5. How would you rate the information received before the event?	3.3 (3-4)	3.0 (1-4)
6. How would you rate the practical arrangements for the event?	3.7 (3-4)	3.7 (3-4)

Individual comments:

...Thoroughly worthwhile...Useful contacts...info not spectacular...Learned a lot about NZ...Exceeded expectations...Number of leads...Well organised...Sufficient background...Personal care...Significant benefit to us...Good info...Very worthwhile.

The follow-up activity will be to evaluate participant's views of the mission over the coming months, and to encourage institutions to finalise collaborative research agreements that would contain clauses covering IP discovery and use. While the research will initially be in the pre-competitive stage, the agreement should provide a useful template for further business collaboration as useful IP is developed. Further evaluation will be carried out at the six-month stage.

Meeting Agenda - Thursday 12 March 2009

Heritage Hotel, 35 Hobson Street, Auckland, New Zealand

Tel: +64 9 379 8554 www.heritagehotels.co.nz/auckland

- 10:00 Arrival and coffee
- 10:15 Welcome by UKTI Director, John Waugh
- 10:20 Update on agenda and purpose for discussions -Steve Thompson
- 10:30 Five-minute presentations by UK and NZ participants, outlining their current work, areas of interest, and collaborations sought. (laptop and projector available for memory sticks)
- 12:15 Luncheon speech: Chris Boalch, New Zealand Trade and Enterprise
- 12:30 Lunch
- 13:30 Presentations continued, including spaces and opportunities provided for pre-arranged and spontaneous meetings between organisations. Tea and coffee available during the afternoon
- 15:30 Wrap-up for the day and refreshments.

Backgrounds on UK Participants

Paul Sallis, Senior Lecturer in Environmental Engineering, Civil Engineering and Biosciences, Newcastle University, Ridley Building, Claremont Road, Newcastle upon Tyne, NE1 7RU, UK
p.j.sallis@newcastle.ac.uk



My interests focus on the control of pollutants in the environment, primarily in relation to municipal and industrial wastewater treatment, and the treatment of drinking water. My research also involves the development of novel treatment technologies in these areas relevant to both developed and developing countries.

Specifically: - the fate and control of chemical micropollutants and oestrogens (EDC) in wastewater treatment plants and the environment.

- biodegradation of halogenated (chlorinated) compounds in industrial effluents. - biochemical pathways of bacterial dehalogenation. - anaerobic digestion of industrial wastewater

- novel membrane anaerobic reactor treatment technologies
 - production and fate of chlorinated trace gases in landfill leachates. - degradation of chlorinated herbicides during anaerobic digestion. - sustainable production of point-of-use water purification technologies (ceramic filters) for developing countries.

Sector of interest: Algal biofuels, particularly biogas generation from seaweeds.

Research Objectives: To design an anaerobic digestion facility for the production of biogas (methane) for heating and electricity generation from seaweeds and marine wastes from aquaculture. The system would be particularly effective in providing power in more outlying New Zealand communities. I am leading a similar programme with the Shetland Islands but see an excellent opportunity for rolling out the technology into New Zealand.

Intended commercial outcome: I would be interested to explore the funding landscape, in particular industrial funding for the construction of a pilot plant processing New Zealand seaweeds and aquaculture wastes.

Prospects in New Zealand: Particularly interested in meeting with Natural Systems Ltd (www.naturalsystems.co.nz, Ian Bywater, MD. Unit 6a, 3 Settlers Crescent, Ferrymead, PO Box 1551, Christchurch 8247 +64 3 376 5547. *BioGenCool System Produces Energy from Dairy Farm Effluent and Provides for the Snap Cooling of Milk on Dairy Farms*). Also any aquaculture company that would have a potential waste stream that could be utilised.

Presentation at the workshop: Energy From Waste: Realising Aquacultures Potential

Biogas generation has great potential for New Zealand, particularly for power generation in more isolated communities that would have access to the marine raw materials, either aquaculture waste of seaweed harvesting. I am developing a similar system for the Shetland Islands and have the full backing of the Shetland Council, Shetland Seafood Development Programme and the 3 largest salmon producers in the islands.

Dr Khalid Shukri, Director Scionix Ltd, 298 Regents Park Rd, Finchley, London, N3 2UA, UK
khalid@genacys.co.uk



Scionix is a spin out of the University of Leicester. Scionix is involved in a large (~£2M) TSB funded project in biodiesel. Our interest is using our patented technology for the purification of the biodiesel using our unique ionic liquids. Scionix is looking for companies interested in the manufacture of biodiesel and with the long-term aim to set up joint ventures and work with these companies to incorporate our technology.

Sector of interest: Biofuels

Research Objectives: using our patented technology for the purification of the biodiesel

Intended commercial outcome: we are looking for companies working with biodiesel so that we can jointly develop and commercialise

Prospects in New Zealand: Any company that deals with biodiesel (eg. Ecodiesel Limited),
bogilvie@pacificchannel.com

Presentation at the workshop: Washing glycerol out of the biodiesel

Catherine Side, Director, Inside Consulting, 5 Short St, Pangbourne RG8 7NE, UKCatherineSide@aol.com

Catherine Side is a consultant with nearly 20 years service in business and strategy development in food, pharma and biotech ingredients and technologies. She has particular interests in functional foods and ingredients, marine biotechnology and ingredients, and sustainability in the food industry. She represents the interests of Acumentia, a group of some 40 consultants helping clients in all aspects of business in the bioscience sphere.

With a strong background in the Biological Sciences from Cambridge University, Catherine has made a successful career in the sales and marketing of ingredients and intermediates for food, pharmaceuticals and biotechnology, with extensive experience abroad, including senior positions in an ingredients company in the USA and Canada and product launches in many countries world-wide. Since 1991, Inside Consulting has provided cost-effective and professional Business Development and Interim Management for companies and public sector bodies. Inside Consulting publishes an occasional Newsletter, the InSiDE Track.

Sector of interest: Biofuels, Algae, Animal health – vaccines and biocides (have worked extensively with UK Veterinary Laboratories Agency), Exploitation of biotechnology, Partnering

Research Objectives: Biofuels and algae. Worked on fuel alcohol in the USA and developed and sold enzyme systems to all sizes of commercial “gasohol” operations, and have maintained an active interest in the area. The UK has recently started the Algal Fuels Initiative, which I subscribe to. I have located a start up company in Auckland with novel algal technology. Another group of interest is the UK’s Bioscience for Business Knowledge Transfer Network.

Intended commercial outcome: My interests are in personally working with the NZ companies to advance their business prospects and to introduce to other consultants in our group who may provide further services, or act as a broker for partnerships.

Prospects in New Zealand: Fonterra, Tatua, Westland Milk, Vital foods, AgResearch, Plant and Food Research and IRL, Quantec, A2 Corporation, Ancare Scientific, Ecodiesel, Keratec Ltd, Pacific Edge Biotechnology Ltd, Seperex Nutritionals (Otago), Southern Cross Biotechnologies (Thames, Coromandel Peninsula), Summit Quinphos, ZyGEM

Presentation at the workshop: The Algal Biofuels Initiative in the UK; Bioscience for Business KTN update; Opportunities to use consultants for commercialisation of technologies.

Andrew Shearer, Director of Marketing, Neem Biotech Ltd Units 1-3 Willowbrook Lab Units, Llandogo Rd, St Mellons, Cardiff. CF3 0EF Mobile 00447976106350 Office 00442920794796

www.neembiotech.comandrewshearer@neembiotech.com

Andrew Shearer is Marketing Director and a Founder Investor of Neem Biotech Limited based in Cardiff, Wales. Neem Biotech specialises in the development of cost effective solutions to extract, separate and purify, active compounds from plant and marine sources.

Neem holds two production patents for the volume production of allicin from garlic and purification of azadirachtin from the Neem tree. NBT is interested in undertaking funded extraction research in plant and marine extracts, where the client is looking to increase yields of a particular known compound. We undertake our own HPLC analysis and supply garlic extracts in bulk to the human OTC market. We have worked with Professor Jamie Newbold of Aberystwyth University studying the effects of ~2000 plant extracts on ruminant methane emissions. NBT’s garlic extract with standardised allicin came out on top in terms of methane reduction in the artificial rumen model RUSITEC. Limited in vivo tests show concurring results, together with evidence of increased live weight gain and feed efficiency.

Working with a sister company, NBT has developed a marketing brand to support the launch of a novel B2B2C business for generating credits from methane reduction. We are enthusiastic to discuss with partners and potential investors to collect further data with which to develop this business in scope and reach.

We also seek opportunities to exploit our technology in broader animal health markets, including mastitis.

Sector of interest: Methane reduction, bovine TB, mastitis using plant extracts.

Research Objectives: The main objective for Neem Biotech is to find partners to undertake in vivo research with our garlic extract on methane reduction in ruminants from in vitro work done with our extract at Aberystwyth University by Professor Jamie Newbold, to provide sources of funding for this research and look for commercial licensing opportunities.

Intended commercial outcome: We are looking for a partner in NZ who has manufacturing facilities in order that the extract would be produced in NZ by our patented production method.

Prospects in New Zealand: Quantec; AgriHealth Ltd-Ed Catherwood, Managing Director, M+6421 821 421 ed@agrihealth.co.nz; Trinity Bioactives-CEO Geoff Todd todd.geoff@gmail.com; AgResearch (H Clark) Following Jamie Newbold's visit to NZ last year, Neem would like to pick up on the contacts made in New Zealand regarding methane reduction in ruminants.

We have recently developed a stable garlic extract for which we have recently filed a patent on the production method. I would also like to talk to contacts with research and commercial interest in solutions for Bovine TB, mastitis, campylobacter in chickens, avian flu, animal MRSA, together with foot rot and orf in sheep. We are keen to exploit the potential of our garlic extract as an anti bacterial, anti fungal, anti viral and anti protozoal properties of our product. I would like to talk to anyone interested in our expertise in developing low cost solutions for extracting active compounds from natural sources. We would like to point them to our website at www.neembitech.com

Ronnie Georghiou Senior Business Development Manager, The InterAct Partnership, C/O IP Pragmatics Ltd, 1 Quality Court, Chancery Lane, London WC2A 1HR UK
ronnie.georghiou@jp-pragmatics.com

Sector of interest: Agriculture (namely Animal Health & Aquaculture) and Food

Research Objectives: InterAct is interested in collaborative research opportunities in the areas of **novel detection** (e.g. molecular-based animal feed testing, PCR-based assays for infectious veterinary diseases affecting livestock or aquaculture, Point-of-Care Lateral Flow Device for detecting Avian influenza) and **novel vaccines and vaccine delivery technologies** (e.g. Salmonella and necrotic enteritis, Brucella vaccines).

Intended commercial outcome: The InterAct partnership co-markets a range of commercial services that includes the joint marketing of VLA, CSL and HPA proficiency testing (PT) services (e.g. Food Analysis Performance Assessment Scheme, Lab Environmental Analysis Proficiency, Food and Water Microbiology PT Schemes and Veterinary Lab PT Schemes) leading to enhanced sales income.

Presentation at the workshop: InterAct - Opportunities for Collaboration and Licensing in the Agricultural, Food and Health Sectors

Marcel Jaspars, Professor of Organic Chemistry, Bioscience for Business Knowledge Transfer Network (BfB-KTN) Science Manager for Marine and Aquatic Biotechnology

m.jaspars@abdn.ac.uk



Marcel is professor of organic chemistry at the University of Aberdeen. His group researches functions and applications of marine natural products to determine their biological role as well as their use in biomedicine. Marcel is Chair of the editorial board of the Royal Society of Chemistry journal "Natural Product Reports" and is a visiting Professor at MabCent at the University of Tromsø, Norway. Marcel also consults for a number of UK marine biotechnology companies.

Launched in 2006, Bioscience for Business is a UK Knowledge Transfer Network (KTN) that brings together bioscientists from the white, green and blue bioscience sectors. These are industrial biotechnology, plant & crop science and marine & freshwater aquatic sciences so uniquely combining the cross-sector interactions that enable

different disciplines to network for the benefit of the UK.

Working in partnership with the National Non-Food Crops Centre, Bioscience for Business brings together members covering a wide range of interests from researchers to end users of the technologies.

Reporting to the [Technology Strategy Board](#), the KTNs are designed to improve the UK's innovation performance by increasing the breadth and depth of the knowledge transfer of technology into UK-based businesses and by accelerating the rate at which this process occurs. (www.biosciencektn.com/)

Sector of interest: Marine and Freshwater Biotechnology, Medical Biotechnology and Biofuels

Research Objectives: will be feeding back to the UK BfB-KTN to link to UK companies and academics in our network

Intended commercial outcome: will be feeding back to the UK BfB-KTN to link to UK companies and academics in our network

Prospects in New Zealand: IRL and others in marine biotech area, biofuels and medical biotechnology
Presentation at the workshop: Bioscience for Business Knowledge Transfer Network

Dr Michael D. Welsh, Senior Scientific Officer, Agri-Food & Biosciences Institute (AFBI), Veterinary Sciences Division. Bacteriology Branch, Stoney Road, Stormont, Belfast BT4 3SD UK T+44 (0)28 90525642

michael.welsh@afbini.gov.uk

Sector of interest: Animal health, particularly infectious disease control through immunology based diagnostic tests and vaccination strategies (e.g. bovine TB and related infections). Plant and Crop Science, Agricultural Economics, Environmental Economics, Environment and Land Use, Fisheries & Aquatic Ecosystems, Food Technology

Research Objectives: translation of human near patient technology for application to veterinary diagnostic testing (pen side test) and the wider agri-food sector.

Intended commercial outcome: AFBI is keen to commercialise research and to look for commercial exploitation agreements. We are in the process of completing the filing of a patent application for a diagnostic device and wish to explore commercial partnering for device development and manufacture (veterinary and human application).

Prospects in New Zealand: Companies involved in R&D associated with veterinary vaccines and diagnostic testing for infectious diseases. Interested in making links with commercial partners that could partner AFBI in exploiting new technology that could form the basis of new products and services.

Presentation at the workshop: R&D: Field problems to laboratory solutions

Background on New Zealand Organisations

AgResearch

AgResearch is one of New Zealand's Crown Research Institutes. It comprises a number of renowned research centres but most importantly it is made up of individual scientists, technicians and their teams whose work targets the key issues faced by the pastoral and food industries and leads to innovative products and systems that benefit all New Zealanders. Essentially, AgResearch's role is to help New Zealand remain the leading producer of pre-eminent pastoral products in the face of significant international challenges. To provide the research and development needed to help create wealth in the pastoral and biotechnology sectors, we have three main research areas: Agriculture and Environment; Food and Health; Applied Biotechnologies. They are supported by (as at March 2005): 1310 staff (954 Full Time Equivalents); 670 professional science staff, with 264 holding a PhD; 41 business development and commercialisation implementation staff; and 243 support staff.

Five major research centres: Ruakura in Hamilton, Grasslands in Palmerston North, Wallaceville in Upper Hutt, Lincoln near Christchurch and Invermay near Dunedin. Numerous shared research and farm facilities throughout New Zealand.

Agricultural Biological Engineering Ltd. T:+64 9 238 4988

We are a firm consulting agricultural engineers sourcing up to NZ\$1M shareholder capital for the commercial development of a photobioreactor system (PBR) for growing algae for biofuel and fine chemical production. Our system uses light emitting diodes (LED) to provide photosynthetic active radiation at a cost less than using sunlight providing 24hr biomass production on an industrial scale and configuration not possible using conventional sun-driven ponds, raceways and PBR. On the basis of trial results our system has been endorsed by leading algae and plant science researchers who say our system represents a paradigm shift in PBE design and potential productivity

Ancare NZ: +649 4894060: PO Box 36240 Northcote.

Ancare is a market leader in the animal health market in NZ and has a strong position in Australia. The company specialises in developing novel parasiticides. <http://ancare.co.nz>

Antipodean Pharmaceuticals Inc. 16 Viaduct Harbour Avenue, Auckland T+649 309 0803

Antipodean is a clinical-stage pharmaceutical company developing targeted molecules that prevent oxidative damage to endothelial, epithelial and hepatic cells leading to apoptosis and fibrosis. Its lead product, MitoQ, has recently demonstrated the ability to significantly reduce elevated liver enzymes in a human clinical study of Hepatitis C (HCV) infected patients conducted in New Zealand. The drug has also been shown to be well tolerated in both human clinical and preclinical studies. An IND application was approved to conduct clinical

studies up to one years duration in the US. In addition to the human clinical data demonstrating a positive impact on patients with inflamed livers, the Company also has data from animal studies with MitoQ which demonstrate activity in treating liver disease, insulin resistance, cardiac inflammation, kidney damage in Type I diabetes, as well as hypertension. Further studies in atherosclerosis and ethanol-induced liver damage are in process. The Company believes that the targeted antioxidant properties and the strong safety profile of the drug make it an excellent development candidate for a wide variety of diseases known to be impacted by oxidative stress, including HCV patients and patients with liver inflammation and fibrosis (Non-alcoholic Fatty Liver Disease (NAFLD) and Non-alcoholic Steatohepatitis (NASH)). In addition, the vast number of sufferers of cardiometabolic syndrome, including patients having or at risk for Type II diabetes, hypertension and atherosclerosis, are prime candidate for MitoQ therapy. In total, there are potentially tens of millions of patients in the US, creating a multi-billion dollar revenue opportunity.

The impact of oxidative stress in wide array of diseases in humans is well established, including its role in atherosclerosis, sepsis, steatohepatitis, diabetes, as well as in Parkinson's and Alzheimer's disease. However, treatment with antioxidants such as vitamin E or ubiquinone has largely been only modestly effective at best. The difficulty lies in the fact that the primary generators of reactive oxygen species are the mitochondria, and reaching such a highly charged and lipophilic environment with enough compound to be effective is beyond the capabilities of currently available antioxidants. MitoQ has been engineered and proven to accumulate preferentially inside mitochondria, addressing oxidative stress at the source, significantly decreasing mitochondrial dysfunction and the diseases associated with it. Antipodean is prepared to outlicense MitoQ for therapeutic indications other than dermatology and hepatology. Antipodean, located in Auckland, New Zealand, is a private company that was organized to advance promising therapeutic candidates to the proof of concept stage in humans, and then to seek development partners to advance its products further. The Company operates on essentially a virtual basis, with minimal overhead, utilizing a strong network of consultants and advisors to advance its products.

BioCommerce Centre, Palmerston North. www.biocommercecentre.co.nz

BCC is an innovation centre focused on three areas: Investment - We raise money and inject cash into local technology businesses. Start-ups and Growth - We provide support and business mentoring to start-ups and early-stage companies. Tech Transfer - We solve industry problems by transferring new technologies from lab to marketplace. Business Manager Melanie Kiessner has a Masters' degree in international politics. Before joining BCC she worked as a research fellow and project manager at the Chair of International Politics at Dresden University, Germany. She managed an international e-Learning project and published on European energy relations. Her areas of expertise are energy politics and project management.

Biogas Energy Ltd. T:+64 (0)3 381 0951 PO Box 3248, Christchurch 8140. s.boelee@strategyworks.co.nz

Strategy Works is a strategic resource, providing expertise to businesses seeking to differentiate, providing business and market development, commercial negotiation and representation, ISO system design and implementation services. We provide services to oil & gas industry participants, major industrial energy users, government organisations plus the chemical, manufacturing and industrial services sectors.

British New Zealand Trade Council. www.bnztc.co.nz

The British New Zealand Trade Council (BNZTC) was established in 1917 and exists to develop and promote bilateral trade, investment and goodwill between the United Kingdom and New Zealand. The BNZTC has branches in Auckland and Wellington, its members include a broad cross section of New Zealand entities doing business in the UK and UK entities doing business in New Zealand.

B2P Ltd.

B2P Ltd is a global company based in Auckland, New Zealand. B2P's products are patented (or patents pending) around the world. The technology and company was developed by Dr. Rosemary Sharpin, Auckland, New Zealand. Some of the original work 10-14 years ago was developed in collaboration with the NZ Dairy Research Institute and NZ dairy factories. The basic principle of B2P™'s product range is to quantify the level of bacteria present (currently total coliforms and *E. coli*) within various substances on site and in real time, without the hassle of transporting (thereby risking the integrity of) the sample, waiting days for a result, nor the multi level complications of potential contamination and sub sampling of lab testing. However, the B2P results have of course been calibrated with those obtained by traditional lab techniques (including agar plates) and MPN (most probable number).

Cawthron Institute

Cawthron provides research-based solutions to enable the sustainable management and development of New Zealand's coastal and freshwater systems and resources for the benefit of the region and the nation. Cawthron's funding comes from the Foundation for Research, Science & Technology and a range of commercial clients to which it provides consulting and analytical services. Cawthron employs over 180 scientific and technical staff based in Nelson and Marlborough. Cawthron is a unique organisation in the New

Zealand science and research community. Established in 1919, it: 1. Is New Zealand's largest, independent, community-owned research centre, with over 180 scientific and technical staff based in Nelson and Marlborough 2. Undertakes research and development at its aquaculture facility; focused on wealth creation through aquaculture with a strong focus on shellfish 3. Is recognised as a New Zealand and world leader in the protection and restoration of coastal and freshwater ecosystems 4. Provides practical science and technology solutions to enable the sustainable management and development of New Zealand's natural resources 5. Undertakes key research to protect New Zealand from invasive organisms which threaten native species and ecosystems 6. Provides high quality analytical services to underpin the integrity of New Zealand products for domestic and international consumption

Lincoln University <http://www.lincoln.ac.nz/section671.html>

The Centre for Viticulture and Oenology (V&O) acts as a focus for interdisciplinary research on wine, from soil to glass, at Lincoln University. It was established in 1998 in recognition of the wide range of specialist topics that contributed to the teaching and research programmes. The objectives of the research centre are:

1. To increase value to the New Zealand wine industry through improved understanding of the relationships between environment, viticultural practices and wine quality.
2. To provide the expertise required by New Zealand as a producer of high quality wine by training people with innovative vineyard management, wine-making and wine business skills.
3. To become an internationally recognised centre for research associated with Pinot noir.
4. To develop expertise in research on the social and cultural aspects of wine production and consumption.

To create research synergies and enhance research output through an interdisciplinary approach to viticulture and wine oriented research. **Contact:** [Roland Harrison](#) Director, Centre for Viticulture and Oenology

IP Pragmatics www.ip-pragmatics.com

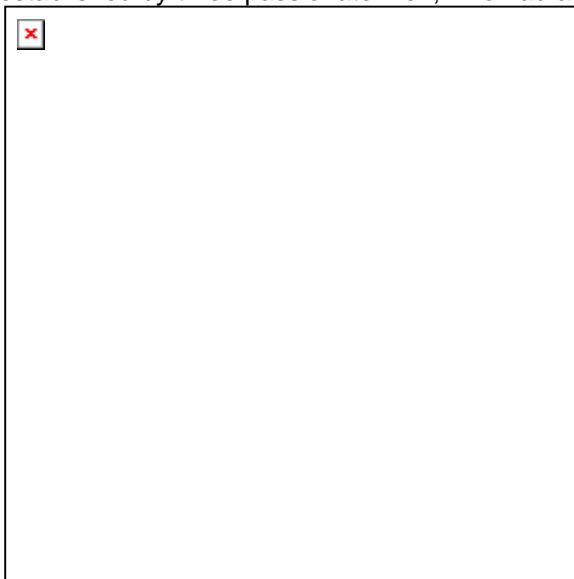
IP Pragmatics was founded in 2000. Initially the company was primarily focused on providing patent services to life science companies. In this period it built up a loyal client base of mainly European-based SME biotechnology companies for whom it provided basic and strategic patent support. In 2003 the company expanded to provide business development consulting services across all aspects of early stage technology commercialisation. The company has been very successful in building its IP consulting client networks at academic institutions, life science companies and investor organisations. It now works with leading research organisations; both government and commercial, in UK, North America, New Zealand, Europe and Japan, helping these organisations maximize value through effective exploitation of their IP assets. From 2005 the company added to its IP product offering with the foundation of the IP Services division. The IP Services division offers a unique combination of IP management tools and services to assist IP owners with the efficient management of these important assets. This expansion has been achieved through the formation of successful strategic partnerships and through the acquisition of NetsPat Limited.

Meat and Wool NZ <http://meatandwoolnz.com> PO Box 121 Wellington 6140 T:+644 471 6026

Meat & Wool New Zealand is the industry good body for red meat and wool. It is funded by livestock producers through levies on all beef, sheep and goats slaughtered and on all wool sold. This income is used primarily to increase preference for New Zealand wool and red meat internationally and domestically; to maintain and extend trade access for New Zealand wool and red meat; in funding research and development to provide solutions that will help improve New Zealand farm returns; and to provide wool technical advice. Meat Biologics Research Ltd (MBRL) is developing innovative added value products from New Zealand meat to meet the demands of the nutraceutical and food industries worldwide. MBRL commissions leading scientific research to develop these products and to support product claims.

Natural Systems Ltd. Christchurch www.naturalsystems.co.nz

NSL was established by three passionate men, who had a shared vision of the need for sustainable energy



solutions. From early beginnings they identified market opportunities for the generation of energy from biomass in the New Zealand dairy industry. With nurturing and development it has become a significant project on a major North Canterbury Landcorp dairy farm. Natural Systems has a portfolio of technologies which it applies to energy related projects. These projects are at varying stages of development (from proof of concept through to manufacture and deployment). The culture of Natural Systems is one of identifying opportunities and making the most of them. One example of the opportunities explored by Natural Systems is the CurrentCost electricity dashboard. We are exploring the ways and means of improving the information available to electricity users. Energy use at our Christchurch Office is outlined below (for the latest 24 hour period). The agriculture sector is a major user of energy. This is especially so for dairy farmers whose electrical costs in the dairy shed are significant including pumps, water heating, chillers and vacuum pumps. In addition there is a requirement for improved effluent processing and disposal from the dairy shed out to the paddock. The decision was made therefore to develop a way of using a source of energy readily available on the farm but currently underutilised.

New Zealand Trade & Enterprise www.nzte.govt.nz

New Zealand Trade and Enterprise (NZTE) is the government's national economic development agency. We work to stimulate economic growth by helping to boost export earnings, strengthening regional economies, and delivering economic development assistance to industries and individual businesses. As a global organisation, we use our knowledge and contacts in overseas markets to connect New Zealand businesses with trade and investment opportunities.

Primorus Clinical Trials Ltd www.primorus.com/primorus/

Primorus clinical trials is a specialist early phase clinical trials unit with a unique performance based approach to conducting clinical trials. We combine a friendly Kiwi attitude with international experience to create a working environment sought after by both staff and clients. As a specialist unit we focus on tailoring the trial process to the individual needs of pharmaceutical and biotechnology companies with a focus on client partnering and developing relationships. Our processes utilise in house monitoring performed by experienced monitors who have previously monitored on behalf of multinational pharmaceutical companies. These monitors design the performance indicators required to exceed international standards in conjunction with the tailored requirements of individual clients.

Quantec www.quantec.co.nz

Quantec is based in Hamilton, New Zealand, in the heart of one of the world's most renowned dairying regions. The Waikato Region is home to over a third of New Zealand's dairy farms. New Zealand's dairy production is almost exclusively grass-fed, pastoral grazing-based production, resulting in some of the highest content of milk solids in the world from a relatively low-stress environment. In addition to being a rich source of traditional milk components, the cow's mammary gland produces a suite of components in response to various physiological challenges. As a result of more than a decade of researching ways to capture high-value bioactives from this rich source of milk, Quantec has discovered a novel fraction in milk which it is exploiting for various applications. Quantec is open to commercial and/or investor partnerships to complete the development phase of this naturally-derived NZ-milk based ingredient and its various applications.

Topical Notes on Biofuels

Biggest ever public investment in bioenergy to help provide clean, green and sustainable fuels -

www.bbsrc.ac.uk/media

The biggest ever single UK public investment in bioenergy research has been announced today (27 January) by the main funding agency for the biosciences - the Biotechnology and Biological Sciences Research Council (BBSRC). The £27M BBSRC Sustainable Bioenergy Centre has been launched to provide the science to underpin and develop the important and emerging UK sustainable bioenergy sector - and to replace the petrol in our cars with fuels derived from plants.

Sustainable bioenergy offers the potential to provide a significant source of clean, low carbon and secure energy, and to generate thousands of new 'green collar' jobs. It uses non-food crops, such as willow, industrial and agricultural waste products and inedible parts of crops, such as straw, and so does not take products out of the food chain. Minister of State for Science and Innovation, Lord Drayson, said: "Investing £27 million in this new centre involves the single biggest UK public investment in bioenergy research. The centre is exactly the sort of initiative this country needs to lead the way in transforming the exciting potential of sustainable biofuels into a widespread technology that can replace fossil fuels. "The centre is a great example of the UK investing in innovative areas which have the benefits of creating new green collar jobs as well as helping us to meet the global challenges of climate change and reducing carbon emissions."

The BBSRC Sustainable Bioenergy Centre is focussed on six research hubs of academic and industrial partners, based at each of the Universities of Cambridge, Dundee and York and Rothamsted Research and two at the University of Nottingham. Another 7 universities and institutes are involved and 15 industrial partners across the hubs are contributing around £7M of the funding. The Centre's research activities will encompass many different stages of bioenergy production, from widening the range of materials that can be the starting point for bioenergy to improving the crops used by making them grow more efficiently to changing plant cell walls. The Centre will also analyse the complete economic and environmental life cycle of potential sources of bioenergy. This means the researchers will be working to make sustainable bioenergy a practical solution by improving not only the yield and quality of non-food biomass and the processes used to convert this into biofuels but ensuring that the whole system is economically and socially viable.

BBSRC Chief Executive, Prof Douglas Kell, said: "The UK has a world leading research base in plant and microbial science. The BBSRC Sustainable Bioenergy Centre draws together some of these world-beating scientists in order to help develop technology and understanding to support the sustainable bioenergy sector. The Centre is taking a holistic systems-level approach, examining all the relevant areas of science needed for sustainable bioenergy and studying the economic and social impact of the bioenergy process. "By working closely with industrial partners the Centre's scientists will be able to quickly translate their progress into practical solutions to all our benefit - and ultimately, by supporting the sustainable bioenergy sector, help to create thousands of new 'green collar' jobs in the UK."

The BBSRC Sustainable Bioenergy Centre (BSBEC) is an innovative £27M academic-industry partnership that will help to deliver the science to underpin development in this important and emerging sector. The funding of the Centre has been guided in part by the recommendations of a review of BBSRC's bioenergy research portfolio published in 2006. The review was chaired by then Council member, Prof Douglas Kell.

UK directs 27 million pounds to biofuels research push - London, Jan 27 Reuters

The British government and 15 businesses including Royal Dutch Shell BP and SABMiller directed 27 £m (\$38.10m) on Tuesday for research on new biofuels that do not use up food. It is Britain's biggest ever public investment in bioenergy. The money will fund research at six centres around Britain with the goal of replacing petrol in cars with fuels derived from willow, straw and other non-food crops, government officials and scientists said. Focusing on these plants along with industrial and agricultural waste - such as unused corn husks - offers the potential to provide a major source of clean, low carbon energy without using up farmland needed to produce food, they added. "The challenge for biofuels is whether we can make the fuels sustainable and efficient enough," Britain's Science Minister Lord Paul Drayson told reporters. "So in this sense this is a very smart investment and addressing a demand that is already there."

Biofuels are mainly produced from food crops such as wheat, maize, sugar cane and vegetable oils. Advocates see them as a way to cut greenhouse gas emissions that contribute to climate change but some environmental groups have argued they may worsen the problem by contributing to the destruction of rain

forests. Europe is looking to biofuels to help cut greenhouse gas emissions with the European Parliament mandating that 10 percent of EU transport fuel should come from renewable sources by 2020. The investment in the Biotechnology and Biological Sciences Research Council can help meet this target with a locally-grown fuel source that could help prevent destruction of rain forests, those involved in the project said. "At the moment we make biofuels from food crops," said Angela Karp a scientist at Rothamsted Research, one of the six research centres. "This diverts crops from the food chain and it takes intensive energy to grow the crops." The researchers are first focusing on willow and straw, looking for ways to boost their yields and figure out how best to extract the sugars that can be turned into fuel. A hurdle is that it is harder to tap sugars from these plants than from food crops such as maize and different ways to do this efficiently need to be sought, the researchers said. Research will also take place at centres based at the Universities of Cambridge, Dundee, York and two at the University of Nottingham. Another seven universities and institutes along with the fifteen businesses will contribute to research ranging from bioenergy production to analysing economic, social and environmental impacts of biofuels. (Reporting by Michael Kahn; Editing by Anthony Barker).

Unlocking New Zealand's Bioenergy Potential

Press Release: Bioenergy Association 26 February 2009

The Bioenergy Association of New Zealand (BANZ) is calling on the Government to follow the lead set by other leading economies in these times of economic slowdown by investing in New Zealand's natural and sustainable resources. BANZ says that bioenergy is receiving increasing attention in recent months, largely because of the role it can play in creating jobs, lowering energy costs and directly benefitting local economies. The time is right to invest in bioenergy. Convener of the BANZ Wood Fuel Interest Group and Chairman of BANZ, Rob Mallinson said, "There is a pressing global need to stimulate national economies with programmes which bring lasting benefits. European countries and the US are making almost daily announcements on the various infrastructure investment programmes which they are implementing. New Zealand is running the risk of getting left behind".

Mr Mallinson also noted that this unparalleled investment in infrastructure is also presenting an opportunity to reduce the carbon intensity of these various country's economies and public sectors. Bioenergy – renewable energy sourced from wood and other forms of biomass – is one technology which has received increasing attention in recent months, largely because of the role it can play in creating jobs, lowering energy costs and directly benefitting local economies. The fact that it's a low-carbon energy source is the icing on the cake. Mr Mallinson added that New Zealand is better placed than most countries to utilise its ample wood resources to make massive strides towards the low carbon economy of the future saying, "New Zealand already sources around 40% of its industrial energy from wood, but almost all of this is produced and consumed in our highly efficient lumber and paper industries, with very little uptake outside this traditional sector. This is in marked contrast to Europe, where wood accounts for over 50% of their total renewable energy production and is used in all sectors of the economy."

BANZ says wood energy is cheaper than fossil fuels, and its production can bring considerable economic benefits to the local businesses that make up the supply chain, not to mention the reduction in running costs it delivers to those using it. Evidence from Austria confirms the dual benefits wood offers – in two decades Austria now employs 10,000-15,000 people in its wood heating industry. Still more are employed in the wider bioenergy industry, which provides in excess of 12% of the country's total primary energy requirements. Modern wood-fired boilers are clean burning and highly efficient, offering instant benefits over fuels such as coal and oil. They're also capable of producing high-grade heat and steam for a wide range of applications, giving them the advantage over other forms of weather dependent renewables, which can often only supply low-grade or intermittent energy.

Investment in biomass is proven the world over to create and sustain jobs, reduce the production costs of those adopting it and bring a wealth of other direct and indirect benefits to local economies. Increasing investment and support for bioenergy in New Zealand will bring the country rich rewards, not just now, but long into the future, as we utilise the home-grown renewable resource that surrounds us. Benefits flow to installers and contractors in the short term, creating wealth in local communities which is then sustained along the life of the project, as sawmillers, chipping contractors, foresters, delivery companies and service agents take care of fuel supply and system maintenance.

Rob Mallinson said "New Zealand has taken its first tentative steps towards creating a viable bioenergy industry, largely through EECA's Wood Energy Grant Scheme and Renewable Heating in Schools programme. But there is much more that can be done if we're to make the most of the opportunity of bioenergy. Meaningful direct investment and grant programmes which learn from global good practice, adapted for New Zealand's unique position in the global economy, would provide both immediate benefits, as

well as long-term improvements in the performance of our economy”.

Who is doing What?

United States of America - The U.S. House of Representatives passed the American Recovery and Reinvestment Act of 2009 on 28th January 2009. The legislation is designed to stimulate the economy in a number of ways, and includes several provisions relating to the renewable energy and biofuels industries. In total, US\$2,000,000,000 will be for expenses necessary for energy efficiency and renewable energy research, development, demonstration and deployment activities, to accelerate the development of technologies, of which not less than US\$800,000,000 is for biomass.

European Union - The European Union Biomass Action Plan preceded the current economic crisis, but emphasised the benefits of public investment in biomass energy sources. The plan highlights the 50% contribution that biomass makes to renewable energy production in the EU, and targets a doubling of capacity by 2010. Such an achievement, says the EU, would not only reduce carbon dioxide emissions by an estimated 209 million tonnes per annum, but could also bring direct employment for between 250,000 and 300,000 people.

UK Stern Report – Leading Economist Lord Stern is calling for an immediate £277bn global fund to generate clean power, insulate homes and create jobs. The February 2009 Report assesses the likely success of investment in a variety of green policies. It says the most effective of these could be energy efficiency measures for homes and public buildings, boiler replacement programmes, efforts to fit cleaner appliances and lights, and a switch to renewable sources of heat, such as biomass. The report says action on cutting emissions remained urgent and putting off cuts would increase the risks of global warming. But convincing people of the importance of a comprehensive framework to cut emissions could unleash a "wave of creativity and innovation in greening the economy" and a better foundation for economic growth than the dot.com boom or the housing bubble.

The Bioenergy Association of New Zealand (BANZ) was established in 2001 to promote and coordinate the development of a bioenergy industry in New Zealand. BANZ provides a central focus point for liaison with Government agencies, the dissemination of information amongst the industry and long-term positioning of bioenergy into New Zealand's energy system. Members include anyone with a commercial interest in bioenergy - sawmillers, wood processors, energy suppliers, energy researchers, consultants, manufacturers and investors.

Biomass is derived from different types of organic matter, with millions of tonnes of wood residues generated annually in New Zealand through the large forestry and sawmilling sector. Agricultural waste (animal litter and crop residues) or urban waste including demolition wood and household waste can also be used as feedstocks for various types of bioenergy. Biomass can be used for heating, for producing electricity and for transport biofuels. The use of biomass significantly reduces greenhouse gas emissions. The carbon dioxide it gives off when it is burned is counterbalanced by the amount absorbed when the plant in question was grown.

*Dr Steve Thompson
Science and Innovation Promoter
British High Commission
Wellington, New Zealand*