FUSION

Linking your business into the Energy-from-Waste and Bioproducts supply chains, and beyond
Foreword

The West Midlands has long been a centre of innovation and production; generating new ideas, products and technologies since we led the world’s first Industrial Revolution. Our region’s strong manufacturing base today is, in-part, a reflection of our rich industrial history. With so many world class products made here, we face mounting pressure to modernise our production processes and find sustainable energy and waste-management solutions. This pressure has helped to drive our Low Carbon sector, making it the most productive sector in the West Midlands, with GVA per employee far outstripping the national average.

The huge potential that Low Carbon has in our region has prompted me and my team to take a number of actions to support the sector. Our recently-launched regional Industrial Strategy has set a number of targets to help low carbon businesses and organisations meet their full potential. This includes a commitment to clean growth – aimed at inspiring innovative new approaches to energy generation, storage and transmission.

The Fusion Guide, produced by the European Bioenergy Research Institute (EBRI) at Aston University, offers regional businesses a way of linking into the Low Carbon sector. With Energy-from-Waste and Bioproduct supply chains expanding rapidly, businesses need to be made aware of the wide variety of specialisms that our region has to offer. The Fusion Guide does a brilliant job of making this process easier for businesses, and I commend EBRI for their work.

Andy Street
Mayor of the West Midlands
Introduction

Over the past three years we have been working with business leaders based in the West Midlands to find opportunities to generate energy and develop new products from waste. Over this period the market has grown and developed in response to the changing views of society, the shifting economic picture and changes in incentive structures.

The recognition of the problems caused by plastic waste, the importance of clean air and the increasing role of renewables in the energy mix has seen a move of things that could have been seen as marginal concerns to the mainstream centre stage. The disruption of energy markets combined by the growth of the internet of things has generated completely new fields of opportunity for services that would have been previously unimaginable.

The increasing awareness of possibilities is now driving a focus on the search for new commercial opportunities and business models. Going forward the challenges are to support the drive towards innovation with well-founded market knowledge, scientific and engineering expertise as well as creating a bridge between research activity and the needs of industry.

Over the next three years we shall continue to provide an unbiased and factually grounded assessment of new business and technical concepts and provide access to the knowledge needed to succeed. We shall work with companies to find the skills and resources to help them develop and deliver new competitive products and services.
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## Contact the Editor

Irene Watkinson, EBRI, Aston University .................................................. 84
T: 0121 204 3383  E: bioenergy@aston.ac.uk  
W: www.aston.ac.uk/ebri/business  www.bioenergy-for-business.org
UK based, globally exporting manufacturing supplier of large, custom flanges up to 2,000 mm Ø. Included tubesheets, filter plates and flanges to international standard e.g. B16.36, B16.47. Delivers complete pipeline packages – flanges, fittings, fasteners, pipe, tube and gaskets. Through our supplier network, products we do not manufacture in house, we can source and deliver alongside.

**Products**
- Complete Pipeline Packages
- Tubesheet | Shell & Tube Heat Exchanger
- Large & Custom Flanges
- CNC Machined Components

Continued on next page...

www.alexandercomley.com
# Alexander Comley

<table>
<thead>
<tr>
<th>Product / Service</th>
<th>Benefit / Unique Selling Point</th>
<th>Web page / YouTube link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete Pipeline Packages</td>
<td>Flanges, fittings, fasteners, pipe, tube and gaskets.</td>
<td>Click here</td>
</tr>
<tr>
<td>Tubesheet</td>
<td>Shell &amp; Tube Heat Exchanger</td>
<td>Manufacture in house up to 2,000 mm Ø.</td>
</tr>
<tr>
<td>Large &amp; Custom Flanges</td>
<td>To bespoke technical drawings or International Standard e.g. B16.36, B16.47, up to 2,000 mm Ø.</td>
<td>Click here</td>
</tr>
<tr>
<td>CNC Machined Components</td>
<td>Turned parts on suite of in-house CNC machines.</td>
<td>Click here</td>
</tr>
</tbody>
</table>

## Opportunities
Alexander Comley Ltd is interested in finding new markets. It is currently established in the hydrocarbon sector and is looking to transfer engineering skills to the renewables sector.

## Geographical Coverage
Open to enquiries from around the world.

---

**Alexander Comley Ltd**  
1 Dandy Bank Road  
The Pensnett Estate  
Kingswinford  
West Midlands

**Andrew Johnson**  
T: 01384 401080  
E: ajohnson@alexandercomley.com

**General information**  
E: sales@alexandercomley.com  
www.alexandercomley.com
Astwood Design Consultancy

Creative Agency

Bidford on Avon, Warwickshire

Astwood is a multi-disciplined creative agency with over 30 years experience. Our services include design, branding, print, web, exhibition design and graphics as well as digital media work including animation, video and augmented reality.

Our loyal client base includes organisations such as National Composites Centre, NFU, SITA Trust, European Corporate Governance Research Foundation, and Biotechnology and Biological Sciences Research Council.

We have a studio of six full-time creative staff and a bank of trusted freelancers. Supporting this key resource are the account management, finance and office services teams.

Examples of our work can be viewed on the flip book link supplied: http://astwoodconnect.co.uk/work

We would be more than delighted to help with any projects you may have, we are just a call away.

Products and Services

- Creative Design
- Print
- Web
- Animation
- Augmented Reality

Continued on next page...

www.astwood.co.uk
### Astwood Design Consultancy

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<tbody>
<tr>
<td>Creative Design</td>
<td>Our talented creatives are bursting with ideas that exceed expectations time after time.</td>
<td><a href="#">Click here</a></td>
</tr>
<tr>
<td>Print</td>
<td>First class print at competitive prices, delivered on time, every time.</td>
<td><a href="#">Click here</a></td>
</tr>
<tr>
<td>Web</td>
<td>Stunning professional bespoke websites that stand out head and shoulders above the crowd.</td>
<td><a href="#">Click here</a></td>
</tr>
<tr>
<td>Animation</td>
<td>Stunning animation that gets your message across at competitive rates.</td>
<td><a href="#">Click here</a></td>
</tr>
<tr>
<td>Augmented Reality (AR)</td>
<td>We believe that this will be a huge part of future communications and have created several AR projects to the delight of the clients that commissioned them.</td>
<td><a href="#">Click here</a></td>
</tr>
</tbody>
</table>

### Opportunities

Astwood is an agency that works both nationwide and in mainland Europe. We would be delighted to hear from any prospective clients that need our expertise.

### Geographical Coverage

Open to enquiries from around the UK and Europe.

---

**Astwood Design Consultancy**

Astwood House
67 High Street
Bidford on Avon
Warwickshire
B50 4BG

**Salim Bhayat**
T: 01789 778111
E: [salim@astwood.co.uk](mailto:salim@astwood.co.uk)

**General information**
E: [salim@astwood.co.uk](mailto:salim@astwood.co.uk)

[www.astwood.co.uk](http://www.astwood.co.uk)
Biochar Ltd

Biochar - Producer and Retailer

Bromyard, Herefordshire

Biochar is a form of charcoal, rich in carbon which has a number of uses including:

- Soil amendment and conditioner e.g. for garden soil and potting compost
- Water treatment and filtering
- Odour control e.g. in digestate
- Industrial applications
- Carbon sequestration
- Fuel

Biochar Ltd specialises in manufacturing and selling biochar made from untreated waste softwood offcuts sourced from local timber merchants, and other waste streams such as orchards and farmlands.

The founders of the company have developed their own unique on-site technology and process to create the char. The wood offcuts are chipped and put in an oven to dry using excess heat from a furnace they have built on their Herefordshire site. The chips are then transferred into a pyrolyser and heated to a high temperature in the absence of oxygen, resulting in organic biochar.

Products and Services

- Biochar manufacturer
- Biochar retailer

Continued on next page...
### Biochar Ltd

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<tbody>
<tr>
<td>Biochar manufacturer</td>
<td>The biochar is manufactured from locally sourced untreated woody biomass.</td>
<td>Call us to discuss further.</td>
</tr>
<tr>
<td>Biochar retailer</td>
<td>Organic biochar available to help you nourish soil, enhance growing conditions and obtain better soil structure. See previous page for further uses and benefits.</td>
<td>Call us to discuss further.</td>
</tr>
</tbody>
</table>

#### Opportunities

Biochar Ltd is open to enquiries from:
- Anaerobic Digestate (AD) industry
- Arboretums
- Arborologists
- Compost Manufacturers
- Farmers
- Foresters
- Horticulturists
- Research Institutes
- Soil Companies
- Water Treatment Companies

#### Geographical Coverage

Herefordshire and other parts of the UK.

---

**Biochar Ltd**

Burghope
Pencombe
Bromyard
Herefordshire
HR7 4RT

**Tony Brazier**

T: 07974 526836

**Edward Brazier**

T: 07413 386338

E: biochar.ltd@yahoo.com
Biofuel Evolution is a clean technology smart energy start-up built on the blockchain.

Our technology converts mixed food and agricultural waste into clean, localised and decentralised bioenergy. The clean energy generated can then either be used by consumers, redistributed back into the energy grid or sold on to third parties via the blockchain.

Our passion is to create a better, more sustainable planet for future generations, by improving the way in which energy is generated, waste is managed and the planet’s resources utilised.

Products
- BeBlock - converts food waste into clean, sustainable electricity
- Advanced bioethanol and other second-generation biofuels made from mixed food waste
- Blockchain platform

www.biofuelevolution.com
Biofuel Evolution

<table>
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<tr>
<td>BeBlock</td>
<td>BeBlock converts food waste that is created in the home and commercial establishments, as well as agricultural waste into clean, sustainable electricity rather than going to landfill or incineration plants.</td>
<td>Click here</td>
</tr>
<tr>
<td>Advanced bioethanol and other second-generation biofuels made from mixed food waste</td>
<td>Advanced bioethanol can be utilised as a stand-alone liquid biofuel to power vehicles, heat district buildings, fuel Solid Oxide Fuel Cells (SOFCs), or as a clinical cleaning solvent. We are also exploring the possibility of creating a process which produces biomethanol that can either be used as a stand-alone liquid fuel or to power a Direct Methanol Fuel Cell (DMFC).</td>
<td>Click here</td>
</tr>
<tr>
<td>Blockchain platform</td>
<td>Our blockchain technology will be used to build a simple, blockchain-based buying, selling and billing model helping to remove one of the largest barriers currently preventing users from adopting sustainable electricity on a large-scale.</td>
<td>Click here</td>
</tr>
</tbody>
</table>

Opportunities

Biofuel Evolution

- Companies and organisations seeking our technology to enhance their energy efficiency and reduce their carbon footprint
- High food-waste producing SME market (B2B) - specifically:
  - Airports
  - Caterers
  - Pubs
  - Public buildings such as academic (schools & universities), hospitals, museums & prisons
  - Golf courses
  - Hotels
  - Restaurants
  - Retail outlets
  - Sports stadiums
  - Food producers (such as growers or processing facilities i.e. agricultural companies)
- Value-from-waste markets
- Waste-to-energy markets

Geographical Coverage

Open to enquiries from around the world.

Biofuel Evolution Ltd
The Apex
2 Sheriffs Orchard
Coventry
CV1 3PP

Jaymish Patel
T: 07905 182539
E: jaymish.patel@biofuelevolution.com

General information
E: info@biofuelevolution.com

www.biofuelevolution.com
Colin Roach Video Productions

Colin Roach is a video production specialist with over 25 years experience in making videos - a hobby that became his full time career.

He has a long association with Aston University having worked 16 years in their media department and now he runs his own video production company which has been producing the latest videos for EBRI.

His company, Colin Roach Video Productions (CRVP), has a relaxed and professional approach to making videos, from training and learning materials to corporate promos and event capture. His company motto is “Work with me to create a video that works for you”.

**Products and Services**
- Corporate Promotional Videos
- Graphics and Animation
- Live Event Capture
- Training and Learning

Continued on next page...

www.crvp.co.uk
Colin Roach Video Productions (CRVP)

<table>
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<tr>
<td>Corporate Promotional Videos</td>
<td>Promote your company’s products or services with a professionally made video, personally tailored to how you’d like it.</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Graphics and Animation</td>
<td>Motion graphics can help describe and sell a company’s service. CRVP can work with you to create these interesting visualisations.</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Live Event Capture</td>
<td>For staff that can’t attend an event, why not have it captured by CRVP for viewing later or even edited into an exciting highlights package?</td>
<td>[Click here]</td>
</tr>
</tbody>
</table>

Training and Learning
Work with Colin’s extensive experience in Education to create suitable learning videos that educate and inform your audience.

Opportunities
CRVP would like to hear from any UK based SME that is interested in creating video content for their website.

Geographical Coverage
Open to enquiries from around the UK.

Colin Roach Video Productions
36 Langcomb Road
Shirley
Solihull
West Midlands
B90 2PR

Colin Roach
T: 07413 313350
E: colin@crvp.co.uk

www.crvp.co.uk
Eccleshall Biomass

Low Carbon / Renewable Energy Production Plants

Eccleshall, Staffordshire

Eccleshall Biomass develops/acquires/funds/builds and operates low carbon or renewable energy production plants.

These plants provide energy to adjacent businesses, and can supply power, heat and/or refrigeration.

Its plant at Eccleshall is able to supply 8 MW of heat at competitive terms, and is adjacent to four hectares of land designated for development.

Products

- Low carbon or renewable energy
- Wood chips
- Ash from combustion of wood

Continued on next page...

www.eccleshallbiomass.co.uk
### Opportunities

Eccleshall Biomass is open to enquiries from around the UK.

### Eccleshall Biomass

Raleigh Hall Industrial Estate
Eccleshall
Staffordshire
ST21 6JL

**Craig Ibbetson**
T: 07769 740814
E: craig.ibbetson@regenfuels.co.uk

**General information**
info@eccleshallbiomass.co.uk

www.eccleshallbiomass.co.uk

<table>
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<tr>
<th>Product / Service</th>
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<tbody>
<tr>
<td>Low carbon or renewable energy</td>
<td>Generation plant located close to point of use to minimise cost of energy transmission.</td>
<td>Click here</td>
</tr>
<tr>
<td>Wood chips</td>
<td>BSL accredited supplier of dried and screened wood chips suitable for use in biomass boilers.</td>
<td>Click here</td>
</tr>
<tr>
<td>Ash from combustion of wood</td>
<td>Rich in potash, high lime value and is pozzolanic in nature.</td>
<td>Click here</td>
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</tbody>
</table>
Edenviro Biomass

Biomass Fuel and Management of Organic Waste

Clee Hill, Shropshire

Edenviro Biomass specialises in the production and trading of biomass fuel and the management of organic waste.

We offer a range of products, services and solutions designed to help our clients save money and the environment.

Products and Services
- Wood Chips
- Small Woody Material
- Bark
- Digestate and Digestate Fibre

Continued on next page...

www.edenvirobiomass.co.uk
### Edenviro Biomass

**Opportunities**
Edenviro is interested in seeking new opportunities in new markets.

**Geographical Coverage**
Open to enquiries from around the West Midlands.

<table>
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<tbody>
<tr>
<td>Wood Chips</td>
<td>Wood chips produced from small branches and arisings during site clearance.</td>
<td>Click here</td>
</tr>
<tr>
<td>Small Woody Material</td>
<td>Small woody particles screened from wood chips are ideal for making compost.</td>
<td>Click here</td>
</tr>
<tr>
<td>Bark</td>
<td>Bark resulting from wood chipping. This product needs to be graded and further treatment to comply with standards.</td>
<td>Click here</td>
</tr>
<tr>
<td>Digestate and Digestate Fibre</td>
<td>The digestate is the liquid extracted from an Anaerobic Digestor (AD) plant. It is typically rich in nutrients for example Nitrogen. Our site separates the fibres from the liquid. We are looking for opportunities to compost this material.</td>
<td>Click here</td>
</tr>
</tbody>
</table>

---

**Edenviro Biomass Ltd**
Titterstone Lea
Clee Hill
Shropshire
SY8 3PW

**Eric Dauleu**
T: 07532 330043
E: [eric.dauleu@edenvirobiomass.co.uk](mailto:eric.dauleu@edenvirobiomass.co.uk)

**Jon Terry**
T: 07977 187399
E: [jon.terry@edenvirobiomass.co.uk](mailto:jon.terry@edenvirobiomass.co.uk)

**General information**
E: [info@edenviro.co.uk](mailto:info@edenviro.co.uk)

[www.edenvirobiomass.co.uk](http://www.edenvirobiomass.co.uk)
Eliane Champagne’s business activities focus on the sale of personalised bottles of champagne.

It is also involved in the recycling of corks to create a range of useful items. The founder of the business Eliane Yebkal summarises, “I took the decision to enter the recycling market when I decided to diversify to expand the sales of my business. This new activity is an oxymoron idea that links alcohol with the creation of useful items for society”.

The company was founded in 2014, and has since grown its reputation through research and development, cost reduction and market analysis. By linking to several networks it has formed key partnerships and expanded its business to business (B2B) sales.

Previously based in Warwickshire, Eliane Champagne is now based in London.

**Products**
- Personalised bottles of champagne
- Safety items
- Plus other items under development

Continued on next page...

www.elianechampagne.com
Opportunities
Eliane Champagne is interested in exploring new markets for its products, particularly those that include luxury products in their portfolio.

She is also seeking alliance in the area of Intellectual Property Rights.

Geographical Coverage
Open to enquiries from around the UK, Europe, USA, Asia and Canada.

Eliane Champagne
27 Old Gloucester Street
London
WC1N 3AX

Contact
Eliane Yebkal
T: 07787 513432
E: elianeyebkal@outlook.com

www.elianechampagne.com
Phil Beardmore’s goal is to give you the confidence to control rising energy and water costs in your home or business.

He can give you the confidence to take action on energy saving that will make a lasting difference—to your financial bottom lines, and to help you “do your bit on climate change”.

Services
- Energy Management
- Renewable Energy
- Water Saving
- Energy and Water Procurement and Brokering
- Using Smart Data to Reduce your Running Costs and Increase Profitability

Continued on next page...

www.energyconfidence.co.uk
Energy Confidence with Phil Beardmore

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<tr>
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<tbody>
<tr>
<td>Energy Management</td>
<td>Help on making the business case for saving energy in your company.</td>
<td>Click here</td>
</tr>
<tr>
<td>Renewable Energy</td>
<td>Advice on whether renewable energy is right for your business.</td>
<td>Click here</td>
</tr>
<tr>
<td>Water Saving</td>
<td>Water saving is often overlooked and can have a very short Return On Investment (ROI).</td>
<td>Click here</td>
</tr>
<tr>
<td>Energy and Water Procurement and Brokering</td>
<td>Energy companies give their best prices to customers who use a broker.</td>
<td>Click here</td>
</tr>
<tr>
<td>Using smart data to reduce your running costs and increase profitability</td>
<td>Showing you how to use smart metering data effectively and save money.</td>
<td>Click here</td>
</tr>
</tbody>
</table>

Opportunities
Energy Confidence with Phil Beardmore is seeking new opportunities with small businesses who are interested in cost-effective ways of managing their energy and water costs.

Geographical Coverage
Open to enquiries from around the UK.

“Are you worried about rising energy and water costs?
Do you want to do your bit on climate change?
I founded Energy Confidence to help you feel that you are doing the right thing to save energy and water in your home or business.
Contact me today to see how I can help.”

Phil Beardmore

Energy Confidence with Phil Beardmore
The Transfer
The Old Print Works
498-506 Moseley Road
Birmingham
B12 9AH

Phil Beardmore
T: 07791 839025
E: hello@energyconfidence.co.uk
www.energyconfidence.co.uk
Exergy

Engineering

Coventry

Exergy is an engineering company, which was founded in 2011. We develop, engineer and undertake projects that contribute to our goal of a low carbon, sustainable future. We excel at designing and implementing strategies and technologies that optimise the use of resources in industries and buildings. In the last seven years, we have been heavily involved in research and innovation projects in sustainable processes, green building and cities, plus circular economy sectors.

Products and Services

- Process Development
- Process Modelling
- Scale-up & Plant Design
- Techno-Economic Assessment
- Sustainable Building Design & Certification
- Building Information Modelling
- Renewable Energy Systems
- Resource Efficiency & Optimisation

www.exergy-global.com
<table>
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</table>
| Process Development | Our commercial offer and current process development expertise includes, but is not limited, to the following feedstocks, processes, technologies and products:  
  - VALORISATION OF FEEDSTOCKS: Municipal solid waste (MSW), wastewater, agricultural waste, food waste, algae, gaseous effluents, pulp and paper, and side streams.  
  - PROCESSES / TECHNOLOGIES: Pre-treatments (e.g. hydrolysis), fermentation, algae cultivation and valorisation, thermochemical conversion (pyrolysis, gasification, incineration), anaerobic digestion, energy and mass optimisation, and downstream processing.  
  - PRODUCTS: Alcohols and acids, building blocks, bioactive compounds, proteins, fertilisers, biopolymers (monomers), biofuels, chemicals. | Click here |

| Process Modelling | Process Modelling is the foundational step for further process development, whether it is to demonstrate scalability, repeatability or applicability, or to de-bottleneck, improve and optimise the existing processes. This allows us to predict the behaviour of chemical, physical and other technical processes and unit operations in a simulated environment, providing insight into how a process will behave in reality. | Click here |

| Scale-up & Plant Design | We provide solutions and guidance through the complex engineering challenges encountered when designing a plant or scaling up a process. | Click here |

| Techno-Economic Assessment | A techno-economic assessment (TEA) determines the feasibility of a particular process or technology. The result of the evaluation helps determine the next steps of development. For example, whether the process should be progressed to a commercial stage, modified, or researched further. Our team of engineers can evaluate any process at various stages of development. | Click here |

| Sustainable Building Design & Certification | We deliver robust and future-proof design solutions to maximise the whole life-cycle performance of buildings and minimise the use of and need for critical resources such as energy, water and raw materials. | Click here |

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<tbody>
<tr>
<td>Building Information Modelling</td>
<td>At Exergy, we pride ourselves on improving the speed and efficiency of the construction processes through the use of Building Information Modelling (BIM).</td>
<td>Click here</td>
</tr>
<tr>
<td>Renewable Energy Systems</td>
<td>We can help you identify the system that best fits your requirements, ensuring you achieve optimal performance and the expected benefits. From small-scale geothermal installations through to industrial solar farms, and from feasibility studies through to construction-ready designs, we offer our clients comprehensive support, tailored to suit their needs.</td>
<td>Click here</td>
</tr>
<tr>
<td>Resource Efficiency &amp; Optimisation</td>
<td>We have developed a proprietary methodology, Galileo’s Eye®, to analyse the performance of your buildings and processes, providing an optimised strategy to improve their efficiency.</td>
<td>Click here</td>
</tr>
</tbody>
</table>

**Opportunities**

Exergy is seeking new market opportunities with the following type of organisations:

- Technology developers
- Manufacturers
- Operating plants (from food, pharmaceuticals, chemicals to Oil & Gas)
- Waste treatment and management companies
- Research institutes and organisations
- Industrial R&D departments

**Geographical Coverage**

Open to enquiries from around the world.

---

**Exergy Ltd**
Coventry Innovation Village
Office IV7
Cheetah Road
Coventry
CV1 2TL

**Yaying Chen**
T: 024 7615 8171
E: ychen@exergy.uk.com

www.exergy-global.com
Established in 2015, the Family Business Practice is a unique Midlands-based Business Development organisation for owner-managed and family businesses, as well as businesses that supply owner-managed and family businesses.

The Family Business Practice is the brainchild of Peter Roper, the Family Business Man. He wanted to build a network of owner-managed and family businesses who understand that family businesses are different. In doing so, he wanted to help some of the 3 million family businesses in the UK to feel more valued and be more celebrated than they sometimes are.

Today, the Practice has over 90 members in the West Midlands ranging from husband-and-wife consultancies to businesses employing over 200 people. The one thing they all have in common is that they are all family businesses and they think, act and do differently to their corporate equivalents.

Services
- Family Business Planning
- Family Business Succession Planning
- Family Business Sales Development
- Family Business Development Strategy
- Family Business Staff Development
- Family Business Multi Generation Development
- Family Business Values and Purpose
- Family Business Communication
- Family Business Social Responsibility
- Family Business Networking Development

Continued on next page...

www.familybusinesspractice.com
Family Business Practice

<table>
<thead>
<tr>
<th>Product / Service</th>
<th>Benefit / Unique Selling Point</th>
<th>Web page / YouTube link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>Creating the route map for the family within the business.</td>
<td>Click here</td>
</tr>
<tr>
<td>Succession Planning</td>
<td>The analysis, implementation and development of future generations within the business.</td>
<td>Click here</td>
</tr>
<tr>
<td>Sales Development</td>
<td>Learning to create a clear definable strategy for making the most sales as a family business.</td>
<td>Click here</td>
</tr>
<tr>
<td>Development Strategy</td>
<td>A clear plan of the business and where it is headed.</td>
<td>Click here</td>
</tr>
<tr>
<td>Staff Development</td>
<td>How to maximise the talents of all staff members to the benefit of the business and its workers.</td>
<td>Click here</td>
</tr>
<tr>
<td>Multi Generation</td>
<td>How to create a road map for future generations of family and non family members.</td>
<td>Click here</td>
</tr>
<tr>
<td>Development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Values and Purpose</td>
<td>How to maximise the business opportunity though a consistent message and ethos.</td>
<td>Click here</td>
</tr>
<tr>
<td>Communication</td>
<td>How to develop and consistently promote the family business image within its market place.</td>
<td>Click here</td>
</tr>
<tr>
<td>Social Responsibility</td>
<td>How to identify, promote, engage and implement both staff and local communities in a cohesive and consistent way.</td>
<td>Click here</td>
</tr>
<tr>
<td>Networking Development</td>
<td>How to create and implement an effective networking strategy with all clients, suppliers and partners.</td>
<td>Click here</td>
</tr>
</tbody>
</table>

Opportunities
Open to enquiries from around the UK.

Family Business Practice
Cleobury Country Centre
Love Lane
Cleobury Mortimer
Shropshire
DY14 8PE

Peter Roper
T: 01299 382000
E: peter@familybusinessman.com

General information
E: membership@familybusinesspractice.com

www.familybusinesspractice.com
Freeland Horticulture

Soil and Compost

Kent, plus locations around the UK, including Coventry

Freeland Horticulture Ltd has nine soil blending operations situated throughout England and Wales, and two composting operations in Doncaster and Cardiff. These sites collectively produce approximately 400,000m$^3$ of soils for the landscape, construction and housing markets. We are also the largest purchaser of 0-10mm PAS 100 compost.

Freeland Scientific Ltd has a site in East Sussex for the manufacture of CompostManager and Preventit monitoring equipment.

Products and Services

- Bulk Soil - to agreed specifications
- Bagged Soils
- Preventit - for early detection of fires in waste piles
- CompostManager
- Temperature Probes for stockpiles
- PAS 100 compost
- Specialist Soils – design and specification
- On-site Blending

Continued on next page...

www.freelandhorticulture.co.uk
Freeland Horticulture

**Product / Service** | **Benefit / Unique Selling Point** | **Web page / YouTube link**
---|---|---
Bulk Soil - to agreed specifications | Made to BS3882 and reliable. | [Click here](#) |
Bagged Soils | Made to BS3882 and reliable. Delivery to your door. | [Click here](#) |
Preventit - for early detection of fires in waste piles | Thermal datalogging probes and strings. | [Click here](#) |
CompostManager | Unique system for management of composting windrows and PAS 100 compliance. | [Click here](#) |
Temperature Probes for stockpiles | Wireless temperature probes for monitoring storage piles. | [Click here](#) |
PAS 100 compost | Supply of PAS 100 compost for horticultural applications to replace peat. | [Click here](#) |
Specialist Soils – design and specification | Unique bespoke soil requirements for specific requirements. | [Click here](#) |
On-site Blending | Manufacture of bespoke soils on site. | [Click here](#) |

**Opportunities**
Freeland Horticulture would like to be involved in fire protection of waste management sites as part of fire prevention plans, and is interested in trading in the following geographical areas:

**Geographical Coverage**
*UK: Soils, CompostManager and Preventit*  
*Europe: CompostManager and Preventit*  
*USA, New Zealand and Australia: Freeland Horticulture have products in many countries - agents would be helpful.*

Freeland Horticulture Ltd and Freeland Scientific Ltd  
Rosedale Nursery  
College Road  
Hextable  
Kent  
BR6 7LT

Philippa Lambourne  
T: 01322 667076  
E: [philippa@freelandhorticulture.co.uk](mailto:philippa@freelandhorticulture.co.uk)  
[www.freelandhorticulture.co.uk](http://www.freelandhorticulture.co.uk)
FuturEnergy is a systems integration and research and development company operating within the renewables technology and energy generation sectors. Design and manufacturing services are offered for one-off, prototype and productionisation of client units.

A waste-to-energy plant processing end-of-life tyres (also suitable for plastics) at up to 1t/hr is now in operation.

Products include the AirForce® 1 and AirForce® 10 small-wind turbines, both using in-house designed and manufactured generators. The 1kW unit is aimed at battery charging and off-grid installations with the 10kW suitable for on or off-grid applications. A Turbine Monitoring and Automatic Stop System (TMASS) provides full system protection.

**Products and Services**
- Research, design, and manufacturing services to renewable technologies
- AirForce® 1 1kW small wind turbine (domestic)
- AirForce® 10 10kW small wind turbine (domestic and small industrial)
- Turbine Monitor and Auto-Stop Switch (TMASS)
- Design for certification consultancy and design services

Continued on next page...
## Opportunities
FuturEnergy is seeking new market opportunities in the following area:

- Exploitation of emerging bio-tech and ag-tech processes.

## Geographical Coverage
Open to enquiries from around the world.

### Product / Service | Benefit / Unique Selling Point | Web page / YouTube link
--- | --- | ---
Research, design and manufacturing services to renewable technologies | Fast prototyping, productionisation and systems integration. | Click here
AirForce® 1 1kW small wind turbine (domestic) | Robust, reliable, proven, durable, (over 7,000 in service). | Click here
AirForce® 10 10kW small wind turbine (domestic and small industrial) | Suitable for class IIA wind areas with >20-year operational design life. | Click here
Turbine Monitor and Auto-Stop Switch (TMASS) | Monitor and automatic turbine protection system with web monitoring. | Click here
Design for certification consultancy and design services | Modification of designs to achieve certification (pre-production units). | Click here
ECOGI, developed by Gemidan Ecogi A/S, is a top performing pre-treatment technology for source separated food waste that produces a superior quality substrate for biogas production using Anaerobic Digestion (AD).

ECOGI’s independently verified and commercial scale tested key performance outcomes include:

- Ability to treat feedstocks that contain over 20% physical contamination
- Organic materials capture rate of over 95%
- Substrate purity from physical contamination of 99.96%

ECOGI’s substrate is proven to enhance gas yield, reduce digester retention time and produce a virtually contamination free digestate.

Gemidan Ecogi A/S’s service package includes bespoke design, manufacture, installation and on-going maintenance for ECOGI installations.

Products and Services

- ECOGI food waste pre-treatment technology
- ECOGI food waste pre-treatment technology – independently verified key performance outcomes.
- Be-spoke layout design service
- Fully automated operation and process management system
- Remote process monitoring and fault identification
- Customer defined service support and maintenance packages

Continued on next page...
Gemidan Ltd (Gemidan Ecogi A/S)

Opportunities
Gemidan is seeking new market opportunities in the following areas:

- All bioresource recovery initiatives requiring the pre-treatment of waste streams containing organic materials to remove physical (non-organic) contaminates.
- New opportunities in the food waste Anaerobic Digestion and biogas sector
- Developing new bio-resource recovery processes from food waste feedstocks
- Initiatives to recover energy or material resources from mixed residual municipal waste

Geographical Coverage
Open to enquiries from around the UK.

Enquiries from all around the world welcomed with a response within 48 hours.

Product / Service | Benefit / Unique Selling Point | Web page / YouTube link
--- | --- | ---
ECOGI food waste pre-treatment technology | One stop shop for Danish high-performance technology - manufactured, installed and commissioned. | [Click here](#) [Also click here](#) |
ECOGI food waste pre-treatment technology – independently verified key performance | Awarded EU Environmental Technologies Verification ‘Statement of Verification February 2016’. | [Click here](#) |
Bespoke layout design service | ECOGI installations individually designed to meet client’s individual space and operational needs. | [Click here](#) |
Fully automated operation and | Lower operational costs due to reduced | |
Remote process monitoring and fault identification | Facility for 24/7 remote operations monitoring via internet connection. | |
Customer defined service support and maintenance packages | Supporting customers to maximise their processing potential. | |

Gemidan Ltd
(Gemidan Ecogi A/S)
The Hollies
Chester Road
Whitchurch
Shropshire
SY13 1LZ

Tony Pickess
T: 07718 982610
E: [tony@gemidan.dk](mailto:tony@gemidan.dk)
www.ecogi.dk
Glued

Marketing and Graphic Design

Leamington Spa, Warwickshire

We work on organisational pride, through a combination of culture and brand. If you are an SME leader or owner/manager and are concerned your people don’t get it OR that your customers underestimate the value you deliver... then we dig deep within and around your organisation and discover the insights that prove the valuable difference made.

We express that in a compelling and engaging way to motivate your people and suppliers, and attract customers and prospects.

Services

- Insight Research
- Insights Workshops
- Re-branding
- New Branding
- Marketing and Design

Continued on next page...

www.gluedlimited.co.uk
Glued Ltd
The Warehouse
44 Oxford Street
Leamington Spa
CV32 4RA

Rob Harrison
T: 07787 557197
E: robharrison@gluedlimited.co.uk

www.gluedlimited.co.uk

### Opportunities
Glued would like to be involved in the engineering, manufacturing and professional services markets.

### Geographical Coverage
Open to enquiries from the West Midlands.

### Product / Service | Benefit / Unique Selling Point | Web page / YouTube link
--- | --- | ---
Insight Research | Understanding people’s motivations and perceptions in and around your business. | Click here
Insights Workshops | Develop a deeper understanding of your competitive positioning. | Click here
Re-branding | Realising and re-telling your story for new circumstances. | Click here
New Branding | Articulating and marketing a new proposition. | Click here
Marketing and Design | Solve complex branding challenges. | Click here

---

Web page / YouTube link

[Click here](#)
Harrington Woodfuel

Firewood / Biomass Production

Wythall, Worcestershire

Harrington Woodfuel specialises in firewood and biomass production for the UK market.

Products
- Standard size logs (9.5”)
- Boiler logs (20”)
- Pizza logs (10”)
- Hobbit logs (8”)
- Oxford Gourmet Charcoal Company

Continued on next page...

www.harringtonwoodfuel.co.uk
## Opportunities

Harrington Woodfuel is seeking new market opportunities in the following area:

- Energy-from-waste

### Geographical Coverage

Open to enquiries from the West Midlands and all other parts of the UK.

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## Harrington Woodfuel

<table>
<thead>
<tr>
<th>Product / Service</th>
<th>Benefit / Unique Selling Point</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Standard size logs (9.5”)</td>
<td>Kiln dried, Woodsure/Ready to Burn certified and consistent size.</td>
<td>Click here</td>
</tr>
<tr>
<td>Boiler logs (20”)</td>
<td>Cut and split specifically for domestic Biomass Boilers in the UK.</td>
<td>Click here</td>
</tr>
<tr>
<td>Pizza logs (10”)</td>
<td>Certified fuel for the restaurant industry, specifically for woodfired ovens.</td>
<td>Click here</td>
</tr>
<tr>
<td>Hobbit logs (8”)</td>
<td>Cut and split specifically for small domestic stoves/ camping stoves.</td>
<td>Click here</td>
</tr>
<tr>
<td>Oxford Gourmet Charcoal Company</td>
<td>Grown in Britain certified charcoal.</td>
<td>Click here</td>
</tr>
</tbody>
</table>

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### Harrington Woodfuel Ltd

Avaro  
Glenfield  
Middle Lane  
Worcestershire  
B38 0DG

### Contact

Matthew J. Downes  
T: 01564 795188  
E: mail@harrington-wf.com

www.harringtonwoodfuel.co.uk
Jones Newton is a UK consultancy helping growing SMEs to take their business to the next level. Our mission is to be your champion and supporter, to deliver tools to help accelerate your business’s growth in new and existing markets.

Our Strategic Marketing approach is a process of assessment and decision-making to review and to bring new power to your business. Our significant industrial experience means that we work alongside you more effectively to establish clarity and focus in your decision making, help you secure the market intelligence that you need, and to invest in your team's skills and knowledge.

Services

- Market-focussed business strategy - team workshops and one-to-one sessions.
- First-time coaching - support for members of your team who are doing sales or marketing for the first time.
- Market research - desk research and management of outsourced primary research projects.
- Marketing review - a comprehensive assessment of the key messages that you are actually communicating, how well they align with your strategy and how to raise your game.

Continued on next page...

www.jonesnewton.co.uk
## Jones Newton

<table>
<thead>
<tr>
<th>Product / Service</th>
<th>Benefit / Unique Selling Point</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Market-focussed business strategy - team workshops and one-to-one sessions.</td>
<td>Will help you to understand not only what has made you successful to date, but how to create real value for your customers in the future.</td>
<td>Click here</td>
</tr>
<tr>
<td>First-time coaching - support for members of your team who are doing sales or marketing for the first time.</td>
<td>Tailored training and guidance to improve business performance and accelerate results.</td>
<td>Click here</td>
</tr>
<tr>
<td>Market research - desk research and management of outsourced primary research projects.</td>
<td>Maximise your ROI - ensure your research objectives fully support your business objectives.</td>
<td>Click here</td>
</tr>
<tr>
<td>Marketing review - a comprehensive assessment of the key messages that you are actually communicating, how well they align with your strategy and how to raise your game.</td>
<td>Refresh your marketing messages - over time marketing materials and content can become disconnected from a business's strategy.</td>
<td>Click here</td>
</tr>
</tbody>
</table>

### Opportunities

Open to enquiries from around the West Midlands and UK.

---

**Jones Newton**
360 Higham Lane
Nuneaton
Warwickshire
CV11 6AP

**Jenny Rohde**
T: 07767 205969
E: jenny.rohde@jonesnewton.co.uk

www.jonesnewton.co.uk
Kew Projects

Renewable Energy

Aldridge, Walsall

We are an innovative renewable energy business, currently constructing a first of a kind advanced thermal conversion plant, which will accept a range of waste and biomass types and convert them into a range of energy vectors, including electricity, heat, renewable diesel and Hydrogen.

Our modular build plant is small scale, operating economically and efficiently at < 10MWe. It is ideally suitable for embedding into industrial facilities, energy parks or residential areas to provide cheap and renewable low carbon energy vectors, from local waste types.

Products and Services

- Renewable Electricity
- Renewable High Temperature Heat
- Renewable Diesel
- Modular Build
- Operates at Pressure
- Flexible Feedstock
- Small Scale – Easy to obtain consent
- Planning and Permit Consent
- Ultra Low Emissions
- Operational Flexibility

Continued on next page...

www.kew-tech.com
Kew Projects

**Opportunities**
Kew Projects are seeking opportunities in any renewable energy market or replacing fossil fuels in an industrial process. The decarbonisation of the HGV fleet is also of interest with our renewable KEW diesel being a perfect fossil fuel substitute.

**Geographical Coverage**
Open to enquiries from around the world.

<table>
<thead>
<tr>
<th>Product / Service</th>
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<th>Web page / YouTube link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewable Electricity</td>
<td>Low Carbon / Renewable / Cheap / Local / Ultra low emissions.</td>
<td>Click here</td>
</tr>
<tr>
<td>Renewable High Temperature Heat</td>
<td>Low Carbon / Renewable / Cheap / Local / Ultra low emissions.</td>
<td>Click here</td>
</tr>
<tr>
<td>Renewable Diesel</td>
<td>Low Carbon / Renewable / Ultra low emissions to replace fossil derived diesel.</td>
<td>Click here</td>
</tr>
<tr>
<td>Modular Build</td>
<td>Quick, easy and simple to assemble reducing construction risks.</td>
<td>Click here</td>
</tr>
<tr>
<td>Operates at Pressure</td>
<td>Operating at Pressure results in a far smaller plant footprint.</td>
<td>Click here</td>
</tr>
<tr>
<td>Flexible Feedstock</td>
<td>The plant, subject to permit, can accept a wide range of waste types including hazardous waste.</td>
<td>Click here</td>
</tr>
<tr>
<td>Small Scale – Easy to obtain consent</td>
<td>The plant is able to operate under a simple local authority SWIP.</td>
<td>Click here</td>
</tr>
<tr>
<td>Planning and Permit Consent</td>
<td>The regulatory consent was secured in under 12 weeks with zero opposition.</td>
<td>Click here</td>
</tr>
<tr>
<td>Ultra Low Emissions</td>
<td>The plant can operate within Air Quality Control Zones (Wednesbury).</td>
<td>Click here</td>
</tr>
<tr>
<td>Operational Flexibility</td>
<td>The plant can seamlessly switch from producing electricity to producing Hydrogen.</td>
<td>Click here</td>
</tr>
</tbody>
</table>

**Kew Projects Ltd**
Ashlar House
115 Walsall Road
Aldridge
WS9 0AX

Mark Johnson
T: 07534 839093
E: mjohnson@kew-tech.com

www.kew-tech.com
Konduit

Market Research

Warwick

Finding and developing project opportunities and partners for companies looking to trade and invest in the UK.

Products and Services
- Market Research
- Finding Partners
- Sales and Marketing
- Setting Up
- Joint Ventures / Mergers and Acquisitions (M&As)
- Interim Management

Continued on next page...

www.konduit.co.uk
<table>
<thead>
<tr>
<th>Product / Service</th>
<th>Benefit / Unique Selling Point</th>
<th>Web page / YouTube link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Research</td>
<td>Gaining a detailed understanding of the market and its opportunities.</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Finding Partners</td>
<td>Search and select the most suitable partners for each project opportunity.</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Sales and Marketing</td>
<td>Finding and communicating with customers and building relationships.</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Setting Up</td>
<td>Building a strong market presence.</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Joint Ventures / Mergers and Acquisitions (M&amp;As)</td>
<td>Finding and negotiating suitable investment opportunities.</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Interim Management</td>
<td>Cost-effective and flexible, including trouble-shooting.</td>
<td>[Click here]</td>
</tr>
</tbody>
</table>

**Opportunities**
Konduit is working in a number of sectors with sustainability at its core, and is open to new approaches / opportunities.

**Geographical Coverage**
Open to enquiries from around the world.

---

**Konduit Ltd**
Innovation Centre
Technology Park
Warwick
CV34 6UW

**Wolfgang Dieter**
T: 01926 623280
E: wdieter@konduit.co.uk

**General information**
E: info@konduit.co.uk

www.konduit.co.uk
Lodge Cottrell

Energy-from-Waste Systems

Halesowen

Suppliers of innovative small-scale Energy-from-Waste systems.

Products and Services
- Energy-from-Waste systems

Continued on next page...

www.lodgecottrell.com
### Opportunities
Lodge Cottrell is seeking new opportunities in any industrial market that could use Energy-from-Waste (EfW) conversion technology.

### Geographical Coverage
Open to enquiries from around the UK.

<table>
<thead>
<tr>
<th>Product / Service</th>
<th>Benefit / Unique Selling Point</th>
<th>Web page / YouTube link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy-from-Waste systems</td>
<td>Our Energy-from-Waste (EfW) systems convert any bio-organic feedstock into valuable energy outputs.</td>
<td>Click here</td>
</tr>
</tbody>
</table>

#### Thermo-Catalytic Reforming (TCR®)

**Key Innovations**
- Self-replenishing catalyst
- Tar avoidance
- High product quality
- Robust for industrial use
- >80% energy efficiency
- Low emissions

---

Lodge Cottrell
Trinity Point East
Halesowen
B63 3HY

**Maurice Bottomley**
T: 0121 504 9200
E: mbo@lodgecottrell.com

www.lodgecottrell.com
Here at Low Volume Buying we help our clients take their ideas and turn them into reality with low volumes, prototypes and sensible costs and quality.

- Are you a Manufacturing, Engineering company, Entrepreneur or Academic?
- Do you feel frustrated by the lack of companies that will help you, or of the high cost of parts when sourcing low volumes?
- Do you feel annoyed by the lack of response from large companies that never respond to you?
- Could your business benefit from reduced costs, quality parts, on time delivery?
- Are you looking for procurement support and design of your products all under one roof?

We offer:

- Low volume parts and materials at sensible prices with on time deliveries
- A professional in-house procurement and design service
- Total cost management review for your company / product
- We have a comprehensive, global buying network
- We can turn your prototype idea into reality and production

Products and Services

- Low volume buying
- Product design
- Prototype production
- R&D tax credits
- Material and supplier reduction
- Assistance with ISO 14001

Continued on next page...

www.lowvolumebuying.co.uk
<table>
<thead>
<tr>
<th>Product / Service</th>
<th>Benefit / Unique Selling Point</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Low Volume Buying</td>
<td>We support various industries with low volumes up to 10,000 units per annum.</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Product Design</td>
<td>We take our clients’ ideas and turn them into CAD (Computer Aided Design) with the help of Solidworks®.</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Prototype Production</td>
<td>When we have the client’s sign-off on the CAD we then obtain costs and source components for testing and</td>
<td>[Click here]</td>
</tr>
<tr>
<td>R&amp;D Tax Credits</td>
<td>We keep a comprehensive record of our client’s R&amp;D project and then help them to recover some of their costs.</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Material and Supplier reduction</td>
<td>Many clients just buy ad-hoc materials from many suppliers, Low Volume Buying can help keep control on costs, materials and suppliers.</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Assistance with ISO 14001</td>
<td>Having introduced ISO 14001 Environmental accreditation to a local company in the Midlands, we can do this for you too.</td>
<td>[Click here]</td>
</tr>
</tbody>
</table>

**Opportunities**

Open to enquiries from around the UK, Europe and the USA.

---

**Low Volume Buying & Design Ltd**

35 Larkfield Way  
Allesley Green  
Coventry  
CV5 7QB

**Ian Hughes**  
T: 0121 573 0224  
M: 07944 909830  
E: ian@lowvolumebuying.co.uk

www.lowvolumebuying.co.uk

---

**European Union**  
European Regional Development Fund
Discover How to Grow Your Business in a Sustainable Way
Growing your business can be difficult. There is a lot of competition and noise in the marketplace. You can feel overwhelmed by the various off-line and on-line marketing options. When you do breakthrough, new customers and clients are often understandably untrusting.

There is now a proven way to grow your business with the customers and clients you want in a sustainable way. We can help you:
- Devise your marketing strategy and plan
- Develop your campaign calendar which shows who does what and when over the year, and train your staff in how to do it
- Produce your key content of a variety of marketing and communication tools
- Craft your copywriting

The Marketing Engineer works with professionals and technology companies who have a pretty full order book and want to take their business to the next level. We are different to your usual marketing consultancy. Our lead Marketing Engineer has a PhD in electronic engineering and brings a systematic approach to marketing which resonates with technology companies.

We have also developed the TechWork. This is a growing membership group in the West Midlands which helps companies to understand technology and the solutions it offers.

If you have ever wondered why marketing can be so difficult and how you can make it much easier, then go to our website and watch our free 5-minute video on the Big Marketing Secret. Contact us to discuss our special marketing strategy and plan package - your first step to sustainable and predictable business growth.

Continued on next page...

www.TheMarketingEngineer.co.uk
Opportunities
The Marketing Engineer is interested in seeking new opportunities with:
- Universities, Research Institutes, LEPs, Catapults etc. who want to engage with SMEs in the manufacturing, engineering and technology sectors.
- The professional service sectors who want to expand their client base and engage with companies in the manufacturing, engineering and technology sectors.

Geographical Coverage
The Marketing Engineer has professional clients across the UK. The focus of its work with Universities, LEPs, Catapults etc. is currently limited to the West Midlands but we are looking to grow.
Midland Automation Technology (MATL)

Electrical, Control, Automation & Engineering Solutions

Worcester

Design and Engineering Consultants
Incorporated in 1993, MATL is a family-owned and well organised limited company with many years of electrical, control, automation and engineering solutions experience specialising in driving high quality information management, eliminating design errors and reducing change through early planning, so delivering a successful project. We are ISO 9001/14001 but are flexible, professional and approachable through building up strong and long-lasting relationships.

Bespoke engineering and technological solutions
Our expertise ranges from optioneering, procedural improvements, compliance, technical specifications through to full design and build solutions. Although we specialise in delivering automation and control systems, developing the most suitable options in harmony with the client, user and legislative requirements, we remain open-minded to options that can meet the balance of cost, quality and time.

www.matl.co.uk

Continued on next page...
<table>
<thead>
<tr>
<th>Product / Service</th>
<th>Benefit / Unique Selling Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conception and Outline Design</td>
<td>With our bespoke design service, we develop the initial concept proposals through feasibility and further designs to provide a rapid agreement of the workable options, targeted costs and programmes for the project in full collaboration with the project owner.</td>
</tr>
<tr>
<td>Assessment Consultancy</td>
<td>Essential for maintenance, MATL provides a survey, inspection and reporting service to identify plant conditions, state, operation and potential complications, and offer potential solutions to keep your plant or system running efficiently.</td>
</tr>
<tr>
<td>Detailed Automation Design</td>
<td>From the outline information, we develop detailed design of automation systems using specifications, schedules and drawings to enable procurement, construction, commissioning validation, operation and maintenance of plant functional control systems within safe parameters.</td>
</tr>
<tr>
<td>Mechanical and Services Design</td>
<td>Where solutions require alternative approaches we develop designs through drawing, modelling and specification to resolve. We also detail design and plan layouts of essential services to enable procurement, construction, testing and maintenance of pneumatic, hydraulic and electrical services.</td>
</tr>
<tr>
<td>3D Modelling</td>
<td>To enhance visual evaluation of a project, we develop virtual models of equipment, plant and services using up-to-date 3D modelling software. Our extended development team enables you to see and experience the project prior to construction, ensuring improved collaboration between design disciplines.</td>
</tr>
<tr>
<td>Regulation and Conformity</td>
<td>A structured approach to compliance management is critical to meeting the regulatory requirements. MATL can equip you with the strategy for applying CE Certification through conformance analyses and organisation of the technical file to ensure you meet compliance criteria.</td>
</tr>
<tr>
<td>Safety and Risk</td>
<td>Utilising risk estimation and evaluation, MATL can provide the information required to identify and incorporate inherent safety, safety functionality and additional safety requirements into the early stages of the developing design.</td>
</tr>
<tr>
<td>Manuals and Operational Documentation</td>
<td>Accurate and comprehensive operational documentation is vital for good maintenance and minimal downtime. Technical packs and O&amp;M documentation are often left to last. In collaboration with the team, we collate, manage and assemble the documents so that operational and maintenance information is available at the right time.</td>
</tr>
</tbody>
</table>

Continued on next page...
Opportunities
MATL is looking to expand and develop existing expertise in the following fields:

- Biomass handling and processing
- Energy-from-waste
- Water and wastewater treatment
- Chemical processes
- Materials and aggregate handling
- Information management

Geographical Coverage
Open to enquiries from around the world.

Midland Automation Technology Ltd
Broadfield Crescent
Fernhill Heath
Worcester
WR3 7TN

Peter Francis
T: 01905 888174
E: engineering@matl.co.uk

General information
E: engineering@matl.co.uk

www.matl.co.uk
Millson Engineering

Pelleting and Process Equipment

Kidderminster

Suppliers of pelleting and process equipment to the biomass industry. We specialize in biomass pelleting and associated plant, and have supplied and installed equipment and complete turnkey plants for the production of wood pellets as well as supplying equipment and expertise for many other successful biomass ventures. We offer spare parts and consumables, as well as pellet die refurbishment and roll shells.

Products & Services

- Pellet Press (new / used)
- Turnkey Projects
- Die Refurbishment / Replacement
- Roll Refurbishment
- Consultancy
- Contract Pelleting

Continued on next page...

www.millsonengineering.com
Millson Engineering

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<thead>
<tr>
<th>Product / Service</th>
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<th>Web page / YouTube link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pellet Press (new / used)</td>
<td>Create more storage capacity / reduce transport costs / higher bulk density / reduce moisture content.</td>
<td>Click here</td>
</tr>
<tr>
<td>Turnkey Projects</td>
<td>Design, build and commission full turnkey projects.</td>
<td>Click here</td>
</tr>
<tr>
<td>Die Refurbishment / Replacement</td>
<td>Prolonging the useful life of the pellet die.</td>
<td>Click here</td>
</tr>
<tr>
<td>Roll Refurbishment</td>
<td>Millson carry a large range of roll shells and bearings in stock to ensure a quick turnaround.</td>
<td>Click here</td>
</tr>
<tr>
<td>Consultancy</td>
<td>50+ years in the pelleting industry. 12 years in the biomass industry.</td>
<td>Click here</td>
</tr>
<tr>
<td>Contract Pelleting</td>
<td>Millson Engineering have the ability to carry out contract pelleting of customer products to allow formulation variations to be validated, or new products to be evaluated.</td>
<td>Click here</td>
</tr>
</tbody>
</table>

Opportunities
Millson Engineering is seeking new markets in the area of biomass pelleting.

Geographical Coverage
Open to enquiries from around the UK.
Recycling advice & collection services for businesses & organisations
Conveniently based in the Black Country, we collect a range of business waste in our local area. We are a passionate company when it comes to your waste, we believe that it is a resource that should be considered very carefully when deciding how to handle and dispose of it.

Recycling is a complex issue, we can advise on the most practical method while also focusing on the environmental impact. A great benefit of being located in the same area is that we can always visit you and offer any further requirements you may need with a quick response. Great for busy times.

Services include:
- General waste collection
- Recycling collection
- Food waste collection

www.moduswaste.co.uk
## Modus Waste & Recycling

<table>
<thead>
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<tbody>
<tr>
<td>General Waste Collection</td>
<td>Focused on reducing waste and maximising recycling. We are dedicated to finding the waste our community creates and giving it a new life. We believe in not just managing and collecting your waste, but in the value of the material you are disposing of. Your business waste can become green renewable energy, or even a new product.</td>
<td><a href="#">Click here</a></td>
</tr>
<tr>
<td></td>
<td>- Glass Recycling</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Food Waste</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Dry Mix Recycling</td>
<td></td>
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<tr>
<td></td>
<td>- Paper Recycling</td>
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<tr>
<td></td>
<td>- Cardboard Recycling</td>
<td></td>
</tr>
<tr>
<td>Recycling Collection</td>
<td>Everyday items such as cardboard, paper, plastics and metal tins can be stored together in the same container. The recyclable waste from your business can then be easily collected, from there it will go on to be processed into usable everyday items once again.</td>
<td><a href="#">Click here</a></td>
</tr>
<tr>
<td>Food Waste Collection</td>
<td>Can be bagged up just like general waste into separation bins. The food waste you produce can become rich nutritious fertilizer to grow more food with. And the gas that's created during this process can become Green Clean Energy.</td>
<td><a href="#">Click here</a></td>
</tr>
</tbody>
</table>

### Opportunities

Modus is interested in finding new opportunities in recycling and food waste separation programmes.

### Geographical Coverage

Open to enquiries from around the West Midlands.

---

**Modus Waste & Recycling**  
First Floor, 103-107 Bridgnorth Road  
Stourbridge  
DY8 3NY

**Oliver Lloyd**  
T: 01384 671900  
E: oliverlloyd@moduswaste.co.uk

[www.moduswaste.co.uk](http://www.moduswaste.co.uk)
Op-tec Systems

Control and Automation System Solutions

Operate across UK

Creating control and automation system solutions: giving you the best by understanding your process fully, designing programs conscientiously, processing data precisely, testing outcomes thoroughly, recording histories exhaustively and presenting results clearly so that performance may be verified, problems corrected, and the plant is allowed to reach its full potential.

Products and Services

- Control systems design, integration, security, data acquisition and software maintenance.

www.op-tec.co.uk

Continued on next page...
### Opportunities
Op-tec Systems is interested in finding new markets in the renewable energy, agriculture and food production sectors.

### Geographical Coverage
Open to enquiries from around the UK.

<table>
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<tbody>
<tr>
<td>Control systems design, integration, security, data acquisition and software maintenance.</td>
<td>Innovative hardware, stable software, creative programming, accurate control, flawless operation.</td>
<td>Click here</td>
</tr>
</tbody>
</table>

---

**Op-tec Systems Ltd**  
Stockport Business and Innovation Centre  
Broadstone Road  
Stockport  
SK5 7DL

**Richard Banyard**  
T: 0161 660 4294  
E: richard.banyard@op-tec.co.uk

www.op-tec.co.uk
PyroGenesys is developing an advanced thermal renewable energy technology to convert waste biomass and co-products into renewable heat, electricity and value-added commodities. Once our prototype has been successfully tested, we will be seeking companies that are interested in hosting pilot plants on potential demonstration sites that produce between 1 to 250 tonnes per day (wet or dry) of waste biomass and/or co-products. An energy-from-waste and bioproducts feasibility study will be produced for all partners that host a PyroGenesys pilot plant.

Products and Services
- Bioenergy Project Consultancy
- Turn-key bioenergy projects
- Cost-effective biochar alternatives

www.pyrogenesys.com
Opportunities
PyroGenesys is seeking new opportunities in the following areas: Brewing and distilling industries / Food and bakery manufacturers / Poultry rearing (egg and meat) / Wastewater sludge processing / Anaerobic digestate processing / Refugee camps

Geographical Coverage
Open to enquiries from around the UK, Europe, China, Middle East, Sub Saharan Africa, South Asia and the Caribbean, and other parts of the world.

Product / Service | Benefit / Unique Selling Point | Web page / YouTube link
---|---|---
Bioenergy project consultancy | Specialist engineering expertise in pyrolysis; gasification; sludge treatment; process design; emissions monitoring and control; HAZOP and environmental impact assessments. | Click here

Turn-key bioenergy projects. | Using our proprietary (patent pending) technology, PyroGenesys will soon offer businesses the ability to convert their waste biomass and co-products into renewable heat. | Click here

Cost-effective biochar alternatives | PyroGenesys will soon commence production of a variety of engineered biochar alternatives, to replace the use of costly commodities such as activated carbon. | Click here

PyroGenesys Ltd
Faraday Wharf
Holt Street
Birmingham
B6 4BB

Simon Ighofose
T: 07905 059447
E: simon@pyrogenesys.com

General Enquiries
info@pyrogenesys.com

www.pyrogenesys.com
Rowleys Commercial Energy Assessment

Energy Assessment Services

Grantham, Lincolnshire and nationwide

Rowleys Commercial Energy Assessment Limited is a leading provider of energy assessment services nationwide. We complete all forms of energy assessment, calculations and certification as required by the Energy Performance of Buildings Directive (EPBD) Regulations and related legislation. This includes energy calculations for new build projects (BRUKL, SAP and SBEM), assessments of existing buildings (EPC, DEC, ACEI, Section 63 Action Plans, MEES) and whole organisation assessments (e.g. ESOS). Our team of experienced accredited assessors are available to assist you with achieving compliance during even the most bespoke and demanding projects. Contact us now for further information or assistance.

Products and Services

- Air Conditioning Energy Inspections
- Building Regulations
- Display Energy Certificates
- Energy Performance Certificates
- Specialist Energy Consultancy

www.onestopepc.co.uk
# Rowleys Commercial Energy Assessment

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<thead>
<tr>
<th>Product / Service</th>
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<tbody>
<tr>
<td>Air Conditioning</td>
<td>Required where buildings are fitted with 12kW or more of cooling, our assessors cover both Level 3 &amp; 4 systems allowing us to provide a full range of independent assessments.</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Energy Inspections (ACEI / TM44)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building Regulations</td>
<td>Commonly known as BRUKL, SAP or SBEM, our team can provide a full range of calculations covering domestic and non-domestic buildings.</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Part L Energy Calculations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display Energy Certificates (DEC)</td>
<td>Monitor your building’s energy consumption and compare it to other similar organisations to keep your costs under control.</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Energy Performance Certificates (EPCs)</td>
<td>Accurate domestic and non-domestic EPCs to meet your business needs.</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Specialist Energy Consultancy (ESOS, MEES &amp; Section 63)</td>
<td>Bespoke expert support to achieve compliance whilst minimising cost and business disruption.</td>
<td>[Click here]</td>
</tr>
</tbody>
</table>

## Geographical Coverage

Rowleys Commercial Energy Assessment is open to enquiries from around the UK.

---

Rowleys Commercial Energy Assessment
7 High Street
Harlaxton
Grantham
Lincolnshire
NG32 1JB

Doug Hough
T: 01476 850383
E: rcea@onestopepc.co.uk

www.onestopepc.co.uk
Severn Group are mechanical and electrical contractors with over 50 years of experience. Our expertise is employed in the commercial sector with a comprehensive range of electrical and mechanical services. Coupled with this, we have comprehensive experience in the Anaerobic Digestion sector having installed and commissioned over 12 large sites across the UK and counting.

Products and Services

- Mechanical Heating and Hot Water Systems (Gas / Oil / Biomass)
- Electrical Installation and Maintenance (PV)
- Ventilation
- Plant Room Re-fits
- Pipefitting and Welding
- Air Conditioning
- Automatic Controls and BMS
- Emergency Call-Outs

Continued on next page...

www.severn-group.co.uk
Severn Group

Opportunities
Severn Group is seeking new opportunities in the following areas:

- LED lighting installation in factories and the education sector
- Electric Vehicle charging points
- Biomass boiler installation
- Plantroom upgrades

Geographical Coverage
Open to enquiries from around the UK.
Tudor Griffiths Group

Biomass Fuel

Shropshire

Tudor Griffiths Group is made up of the following divisions: a network of eight builders merchant branches, 12 ready-mixed concrete plants, two sand and gravel quarries, a sea-dredged sand operation, electrical services, renewable energy, biomass facility, skip hire, recycling services and waste management.

Products and Services

- Biomass Fuel: Virgin Chip, G30 – G50
- Sawdust
- Animal Bedding
- Biomass Fuel: Recycled Grade A Shred
- Animal Bedding
- Drying Facilities

Continued on next page...

www.tggroup.co.uk
<table>
<thead>
<tr>
<th>Product / Service</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Biomass Fuel: Virgin Chip, G30 – G50</td>
<td>Virgin wood supplied from sustainable and reputable (FSC certified) sources, all within 50 miles of the biomass plant. The virgin wood is then chipped on site.</td>
<td>Click here and here</td>
</tr>
<tr>
<td>Sawdust Animal Bedding</td>
<td>Sourced directly from our (FSC certified) supply chain and dried on site in our 3,000 sq. m. drying facility to the required moisture for use as animal bedding.</td>
<td>Click here</td>
</tr>
<tr>
<td>Biomass Fuel: Recycled Grade A Shred</td>
<td>Using material recovered through our waste management process and also directly sourced from the industry, all processed on site to produce a 40mm shred.</td>
<td>Click here</td>
</tr>
<tr>
<td>Animal Bedding</td>
<td>Grade A fines used for animal bedding, a bi-product from the screening of the 40mm Grade A shred.</td>
<td>Click here</td>
</tr>
<tr>
<td>Drying Facilities</td>
<td>Our 3,0000 sq. m. biomass plant and drying facility has seven 1 x megawatt boilers that can offer a drying service for the drying of logs, kiln dry timber and contract woodchip drying.</td>
<td>Click here and here</td>
</tr>
</tbody>
</table>

**Opportunities**

Tudor Griffiths would like to be involved in biomass fuels, animal bedding and drying opportunities.

**Geographical Coverage**

![Tudor Griffiths Group](image)

Tudor Griffiths Group
Wood Lane
Ellesmere
Shropshire
SY12 0HY

**Kevin Gardiner**
T: 01691 626262
E: kevin.gardiner@tggroup.co.uk

**General Enquiries**
E: enquiries@tggroup.co.uk

www.tggroup.co.uk
Development and production of patented, clean energy and hydrogen equipment (30-3000 kWe), using mixed wastes as feedstock.

Participation in community-scale energy projects worldwide.

Promotion and marketing of solar cooling equipment, clean diesel engines using hydrogen doping and direct-drive vertical axis wind turbine (VAWT) generators.

Products and Services
- Containerised CHP generator (30-3000 kW), using mixed waste as feedstock
- Containerised solar/waste heat chiller for foods and human comfort
- Containerised CHP hydrogen generator (10-1000 m³/h), using mixed wastes as feedstock
- Clean diesel engines using only native fuel
- Brushless electric motor/generator, especially for VAWT wind turbines

Continued on next page...

www.landgenerator.com
Unicorn Power

Geographical Coverage
Open to enquiries from around the world, and would particularly like to be involved in North and South America, Asia, Africa and Australia.

Product / Service | Benefit / Unique Selling Point | Web page / YouTube link
--- | --- | ---
Containerised CHP generator (30-3000 kW), using mixed waste as feedstock | Inexpensive, emissionless, containerised, modular, on/off-grid, financing. | Click here
Containerised solar/waste heat chiller for foods and human comfort | Inexpensive, no fuel cost, containerised, modular, off-grid, financing. |  
Containerised CHP hydrogen generator (10-1000 m³/h), using mixed wastes as feedstock | Inexpensive, emissionless, containerised, modular, on/off-grid, financing. | Click here
Clean diesel engines using only native fuel | On-board hydrogen doping, native fuel only, 5x more efficient than electrolysis. |  
Brushless electric motor/generator, especially for VAWT wind turbines | Enables direct, transmission-less turbine drivetrain, inexpensive, easily customised, 1 kW - 5 MW size, superior reliability - low maintenance, non-round embodiments possible. |  

Unicorn Power
23A Charles Gardner Road
Leamington Spa
CV31 3BG

Martin Mizera
T: 07468 610681
E: mmizera@landgenerator.com

General Information
E: office@landgenerator.com

www.landgenerator.com

Unicorn Power
United Travel specialises in travel services to China and the Far East, such as business trips, private tours and visa arrangements. The company has been established for over 30 years, and is the UK’s leading specialist tour operator to China.

United Travel specialises in tailor made holidays according to your requirements - so you’re not just admiring the top sights but truly discovering them. You can trust that we will expertly guide you through your travel adventure, wherever you choose to explore.

Products and Services
- China Visa Service
- Business Travel
- Private Travel
- Hotel and Conference Arrangements
- Flight Bookings
- China and Far East Tours

Continued on next page...

www.united-travel.net
### United Travel

#### Opportunities

- Businesses looking to start / expand into China and the Far East
- Companies seeking assistance with their trips abroad / nationwide
- Those looking for assistance with travel arrangements and visas between the UK and China
- Department stores / retail outlets / museums interested in targeting overseas visitors visiting the UK

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<tbody>
<tr>
<td>China Visa Service</td>
<td>United Travel provides Visa arrangement services, saving you from all that hassle, and meaning more time to do what you want.</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Business Travel</td>
<td>From flights and visas to accommodation and transportation. United Travel has got the expertise and knowledge you need to make your business trip a success.</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Private Travel</td>
<td>As experts in tailor-making holiday experiences for those who know and enjoy the finer things in life, why not add some extra special items to your holiday booking?</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Hotel and Conference</td>
<td>United Travel is devoted to making your trip extra special, which is why we can help with accommodation to suit every budget, as we’ve negotiated the best deals with our hotel partners especially for you.</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Hotel and Conference</td>
<td>United Travel is devoted to making your trip extra special, which is why we can help with accommodation to suit every budget, as we’ve negotiated the best deals with our hotel partners especially for you.</td>
<td>[Click here]</td>
</tr>
<tr>
<td>Flight Bookings</td>
<td>United Travel can tie in hotels, flights, upgrades to ensure you get the most enjoyable journey, so that you</td>
<td>[Click here]</td>
</tr>
<tr>
<td>China and Far East Tours</td>
<td>UKs leading specialist tour operator to China and the Far East, saving you time, money and hassle.</td>
<td>[Click here]</td>
</tr>
</tbody>
</table>
BIOCare® products provide the latest in white biotechnology and bring clean solutions directly to help you address your ‘Environmental Challenges’. Our specialty microbial and chemical cleaning products incorporate the latest “White Microbial Technology” to provide all your cleaning requirements for industrial and professional use.

We also have products containing the latest Reactive Barrier Technology. This is a specialised micro emulsion which provides an optional sustained release system – this means that the reactive barrier can be turned on or off depending on the situation giving you added Biosecurity and protection between cleans.

**Products and Services**
- Biocare General Purpose Cleaner
- Biocare Odour Neutraliser
- Biocare MicroCleanPlus
- Biocare Toilet Cleaner & Descaler
- RWT – Recycled Water Treatment
- Steri-7 Xtra Multi-Purpose Cleaner
- Steri-7 Hand Wash
- Steri-7 Hand Rub
- Steri-7 Biocidal Hand Wipes
- Legionella Control Advice

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www.watermanbiocare.co.uk
# Waterman Biocare Technologies

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</thead>
<tbody>
<tr>
<td>Biocare General Purpose Cleaner</td>
<td>Biocare GPC is a biodegradable, environmentally safe and efficient all-in-one product for cleaning, deodorising, and removing stains from hard and soft surfaces.</td>
<td><a href="#">Click here</a></td>
</tr>
<tr>
<td>Biocare Odour Neutraliser</td>
<td>Comprises a unique and highly effective modern chemistry with a specialised blend of natural bacterial cultures to instantly encapsulate any malodour molecule and render it undetectable whatever its source.</td>
<td><a href="#">Click here</a></td>
</tr>
<tr>
<td>Biocare MicroCleanPlus</td>
<td>A unique, highly dilutable liquid concentrate for degreasing and cleaning a variety of hard surfaces.</td>
<td><a href="#">Click here</a></td>
</tr>
<tr>
<td>Biocare Toilet Cleaner &amp; Descaler</td>
<td>A unique bio-based, descaling toilet cleaner combining a widely approved biocide.</td>
<td><a href="#">Click here</a></td>
</tr>
<tr>
<td>RWT – Recycled Water Treatment</td>
<td>A water-based liquid that consists of highly biodegradable surfactants, builders and selected bacterial cultures which makes any oils, hydrocarbons and organics readily available to the bacteria, encouraging biodegradation, and resulting in a very effective cleaning and odour control programme.</td>
<td><a href="#">Click here</a></td>
</tr>
<tr>
<td>Steri-7 Xtra Multi-Purpose Cleaner</td>
<td>Containing Reactive Barrier Technology this multi-purpose High Level Disinfectant Cleaner works in seconds as is proven to kill the most life threatening of pathogens.</td>
<td><a href="#">Click here</a></td>
</tr>
<tr>
<td>Steri-7 Hand Wash</td>
<td>This range of fast acting (non-alcohol based) foaming hand wash provides an extraordinarily high-level of hygienic protection in the battle against infection.</td>
<td><a href="#">Click here</a></td>
</tr>
<tr>
<td>Steri-7 Hand Rub</td>
<td>Perfect for when water is not available, this hand rub is highly effective against E.Coli, Salmonella, Listeria, MRSA &amp; C.Diff.</td>
<td><a href="#">Click here</a></td>
</tr>
<tr>
<td>Steri-7 Biocidal Hand Wipes</td>
<td>These wipes can be used wherever the highest standard of disinfection is required and contains Reactive Barrier Technology.</td>
<td><a href="#">Click here</a></td>
</tr>
<tr>
<td>Legionella Control Advice</td>
<td>A one-stop shop for all your Legionella Control needs.</td>
<td><a href="#">Click here</a></td>
</tr>
</tbody>
</table>

## Opportunities


## Geographical Coverage

Open to enquiries from around UK and Europe.
According to a report from the Food and Agriculture Organization of the United Nations (FAO), the world loses or wastes nearly a third of the food produced for human consumption. This fact has sent shock waves across the globe and led to calls for action by world leaders and civil society groups. What magnifies the concern is that the food loss and waste is occurring at a time of increasing food prices and worsening food insecurity for many. The issue is of high importance for FAO and governments in their efforts to combat hunger, food insecurity and malnutrition, at the same time enabling inclusive and efficient agricultural and food production systems.

During agricultural production, post-harvest handling and storage, processing, distribution and consumption of food, large amounts of wastage are accumulated. Food losses and waste have a negative impact on the environment since they represent a waste of production factors and energy resources, and contribute to greenhouse gases emissions.

Anaerobic digestion is a process that involves the breakdown of biodegradable organic material, in the absence of oxygen, by micro-organisms. It is broadly used to treat organic wastes, such as manures, energy crops, as well as, domestic and commercial food waste. Typically, two streams are produced: biogas and digestate.

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The biogas is mainly a mixture of 60% methane (CH4) and 40% carbon dioxide (CO2). The biogas can be combusted directly in a combined heat and power (CHP) plant to generate electricity and heat to power on-site equipment, and the excess electricity can be exported to the National Grid. Alternatively, it can be upgraded to biomethane - through the removal of carbon dioxide - that leaves a product similar to natural gas (with greater than 95% methane content), which can be injected in the gas grid and be used as a vehicle fuel.

The digestate can be used as a fertiliser, as it is rich in nutrients such as nitrogen, phosphorus and other elements required for healthy plant growth and fertile soil. There are strict standards governing the materials that can be used to produce quality compost and biofertiliser for use in agriculture. These are defined in the British Standards Institution’s Publicly Available Specification 100 (PAS 100) for compost and PAS 110 for biofertiliser.

Additionally, composting can be used to treat food and garden waste mixtures. An efficient composting unit ensures that composting takes place in an enclosed environment, with precise temperature control and monitoring. Facilities which process organic waste, according to BSI PAS 100 and the Quality Protocol for compost, produce products that are no longer considered a waste by the Environment Agency.

As modern society moves towards an increasing level of urbanisation, accompanied by a growing population that constantly demands higher consumption of goods and greater energy needs, the topic of waste management and energy/material/nutrient recovery from waste becomes central for future scenarios of sustainable development.

“Gaseous renewable energy carriers, such as renewable ‘green gas’ can have a considerable impact on future energy systems, and play a key role in decarbonising heat and transport.”

Dr Nikolaos Venetsaneas, Business Research Associate, Biological Processes, EBRI
In the UK during the past 15 years there has been an ongoing demand and drive to update and change the waste and recycling sectors. With the current target for the recycling rate from all household waste, being set at 50% by 2020, the UK is on track to meet this. However, to this day the current recycling rate remains still at 45.2%, leaving space for further improvement and best practice to be applied.

Following the principle of waste hierarchy, with prevention being the preferred option and landfill being the least favourable option since it includes no recovery of either materials or energy, there have been a number of initiatives across a variety of sectors. The impact of these initiatives has affected not only the waste and recycling sectors but also a number of other areas such as supply chain, research, energy generation, policy, transport/logistics, engineering and manufacturing, as well as alternative sustainable biomaterial production, and has even crossed over fields such as bioenergy that a few years ago would be unthinkable.

The role of advanced thermal technologies, in this aspect sits within tertiary recycling practice as it not only recovers materials, but can also create new products and facilitate ease of handling. Waste materials such as multi-layer packaging, residual mixed waste, waste tyres or mixed waste plastics are not easily separated and in

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most instances not even recycled, but can be converted into gas or liquid fuels, or separated into different material streams eventually allowing material recovery. Pyrolysis and gasification are processes that have the capacity to treat such tricky waste streams, and both can play a part in the waste hierarchy. Although, there is not an abundance of successful commercial examples, there are a number of planned installations that are aiming to recover materials such as aluminium from multi-layer packaging, carbon black from waste tyres, and even convert waste plastics into liquid fuels, to name a few.

At the moment, there are a number of planned gasification plants in the UK, that once operational will contribute to the UK versatile energy generation matrix, making use of support incentives like Contract for Difference (CfD), Renewables Obligation Certificates (ROCs) and most recently the Renewable Transport Fuel Obligation (RTFO) scheme, which incentivises fuel generation from residues. These technologies are perceived to be cleaner in comparison to combustion, but could also hold a dual role, in energy generation and tertiary treatment of non-recyclable waste fractions. Slowly and steadily, the world of waste is changing into a world of opportunities, whether that is recovering and recycling materials, generating energy, preventing waste generation by raising awareness, or even changing the packaging materials produced and substituting them with sustainable biopolymers. The future landscape will not be the same. Production of sustainable bioproducts from waste materials such as coffee cups made from the waste coffee husk; new packaging materials made from biopolymers extracted from potato starch or shrimp shells; charcoal production from agricultural waste that is incorporated into beauty products and eco-friendly organic fertilisers are only a number of exciting developments that are transforming the way we see waste and its hidden value.

References


2 Residual mixed waste refers to the waste that cannot be further separated and in some instances is used to create what is known as Refuse Derived Fuel (RDF) or Solid Recovered Fuel (SRF) which is used in Energy from Waste (EfW) applications like combustion or gasification.

“Pyrolysis and gasification are processes that have the capacity to treat tricky waste streams, and both can play a part in the waste hierarchy.”

Dr Konstantina Stamouli
Business Research Associates, Thermal Processes, EBRI
The organisation of society has been and will continue to be steered by access to energy. This will not change in the future, however, resources and consumption patterns have been extremely dynamic during the 21st century and will continue to change rapidly. Driven by social, environmental, political and economic concerns, the integration of renewable sources of energy is already astonishing and the energy revolution is beginning to turn into potentially one of the most radical and accelerated technology transitions in modern history. Although fossil fuels are still the main source of energy in Europe (77% of the energy mix), the integration of renewable resources has been increasing rapidly. In 2010, solar photovoltaics (also known as solar PV) was the largest source of new installed capacity with wind installations in third place (after gas). This means that it is likely that the targeted reduction of 20% in greenhouse gas (GHG) emissions by 2020 (compared to 1990 levels) will be met, which has been confirmed by data collected by the European Environmental Agency (EEA).

In the UK, fossil fuel dependency has gone down from 91 to 80%, with the largest contribution to this reduction coming from the energy generation sector. As in the rest of Europe, transport keeps being the sector with strongest dependency on petroleum derived fuels (see pie charts on next page). The progressive integration of renewable resources into energy generation already has shown astounding results, with record breaking renewable generation shares observed during the last two years. Since the introduction of the Climate Change Act in 2008, the share of low carbon energy generation increased from 19% to a record of 53% in the spring of 2017. The 21st of April 2017 was the first day since the industrial revolution where the energy system was free from coal powered generation. A new record was
established in April 2018 when all coal-fired plants were offline for three days in a row. These changes have translated into a significant reduction in general emissions, reaching 43% in GHG and 38% in carbon dioxide during 2017 compared to 1990. Total emissions from energy generation processes were cut 57% during the same period\(^2\). Most of the generation capacity available in the UK can now be classified as low carbon and transmission generated capacity is now only 55 to 66% of the total generation capacity, with the rest being covered by distributed or localised generation systems.

The UK’s adoption of more sustainable energy resources has changed the role of the consumers, including residential consumers, businesses, organisations and district network operators. They have gradually abandoned their passive role within the energy system, evolving into generators and managers of their own.

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A View of the UK’s New Energy System...

energy. Together with the uptake of distributed generation and electric vehicles, this new consumer role has resulted in new challenges for the existing energy system. The importance of local networks has grown significantly, turning distribution network operators (DNOs) into distribution system operators (DSOs) who are capable of not only maintaining the network, but also managing local electricity generation and use.

A large number of innovative smart solutions will be required as the system turns more decentralised, disaggregated and multivector, where many solutions will have to come together for the system to work and all the stakeholders benefit from it. New technical and business challenges are arising as new roles and interactions are created in the transition towards a low carbon energy system. The development and integration of innovative solutions within different levels of the energy system are an opportunity to provide technologies and services that were not required before. These solutions have to consider the system as a whole to make sure they are all compatible and synergistically improve the efficiency of the energy system.

A good example of new business opportunities arising is the smart integration and management of electric vehicles (EVs), which will not only be key in breaking transport’s dependency on fossil fuels, but also represents an opportunity to provide flexibility to the energy system. Different business models are being developed so EVs can provide grid services from which owners can also get an extra income, such as demand response and active network management. The implementation of bi-directional charging, commonly referred to as vehicle-to-grid (V2G), could also provide the system with additional balancing services by enabling the use of the power in the vehicle’s battery. Smart solutions will allow to charge the EVs when demand is low and there is an excess of electricity, and will discharge the battery providing support power when demand surpasses supply. The use of V2G will be more relevant as the share of intermittent renewable generation from solar PV and wind increases, with a potential flexible capacity of 370GW from all EVs on UK roads.

“According to the EEA, registration of battery EVs went from 700 in 2010 to 97,000 in 2017. Uptake keeps increasing, with sales growing 51% between 2016 and 2017. The UK, together with France and Germany, are the countries with highest uptake in recent years.”

References
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