



Ricardo
Energy & Environment

Delivering resource efficiency and waste management solutions



Our track record

Ricardo Energy & Environment* provides governments, industry and international agencies with expert analysis, advice, data and economically sustainable solutions. For over 40 years we have helped our clients to solve pressing global energy and environmental challenges.

This track record can be traced back to the development of innovative air quality measurement and management techniques that helped overcome the infamous 'killer smogs' of the 1950s. Our heritage also includes the Government's team of expert advisers that pioneered renewable energy technology and energy efficiency techniques following the oil price shocks of the early 1970s and resource efficiency support programmes in the 1990s.

With environmental themes colliding ever more rapidly, our deep and broad expertise enables us to develop integrated solutions to complex environmental and sustainability issues.

Our specialist expertise is underpinned with cross-cutting excellence in:

- **Economics and modelling.**
- **Information and data management.**
- **Stakeholder management.**
- **Dialogue and communications.**
- **Innovation and knowledge transfer.**

Key clients

Our key clients include the European Commission, several UK Government departments, the Welsh Government, the Scottish Executive, Zero Waste Scotland, WRAP, the Welsh Local Government Association, the Environment Agency, the Green Investment Bank, numerous local authorities (e.g. North London Waste Authority, Essex Waste Partnership, Stafford Borough Council and West Sussex CC), many major private sector organisations (e.g. Amey, i2i Events Group, Ingenious, Mayer Brown, Pfizer, Sener, Spectris, Urbaser and Veolia), international aid agencies (e.g. the European Bank for Reconstruction & Development, the World Bank, the Asian Development Bank) and international authorities (e.g. Cairo Governorate and Zero Waste South Australia).

For almost four decades, Ricardo Energy & Environment has worked in partnership with governments and other organisations to deliver resource efficiency and waste management support services around the world. In addition, we provide carbon management expertise to many of the UK's largest private sector organisations.

We have been providing high-level waste management consultancy advice in the UK and internationally for the last 30 years. In this time, we have helped public and private sector organisations to address complex issues and to balance environmental, social and economic concerns – including strategy and options appraisal; collection, treatment and disposal services; and infrastructure design, procurement and delivery.

Ricardo Energy & Environment's Resource Efficiency and Waste Management Team has established itself at the forefront of the UK market by being dedicated to detail, fully appreciating clients' needs and recruiting outstanding specialist resource efficiency and waste management consultants.

Our specialist waste and resource management consultancy support services include:

Resource efficiency

- Circular economy business models and supply chain management.
- Site auditing and waste management plans.
- Life cycle assessment (LCA) of products, services and policies.
- Environmental product disclosure.
- Third-sector engagement and re-use initiatives.

Stakeholder engagement, communications and behaviour change

- Recycling communications and behaviour-change campaigns (service change, contamination, materials capture).
- Policy/infrastructure dialogue and engagement, siting and planning consultation.
- Public consultation, stakeholder engagement and attitudinal surveys.
- Quantitative and qualitative research activities.

Policy and strategy

- Product policy guidance and packaging analysis.
- Waste management scenario development and option appraisals.
- Cost-benefit analysis (CBA) and policy impact studies.

Strategy and service reviews

- Waste management strategy reviews and action planning.
- Waste and recycling collection service advice and peer reviews.
- Waste management service design, specification and procurement support.
- Public realm and street scene service benchmarking, service design and partnership working.
- Operational waste service reviews, and time and motion studies.
- Valuing and outsourcing commercial waste services.

Policy, service and infrastructure implementation

- Waste prevention strategy, implementation and monitoring.
- Waste flow modelling and analysis.
- Market assessments, competitor analysis and facility feedstock searches.
- Waste infrastructure design, planning, permitting and engineering.
- Site and facility planning and legislative guidance.
- Waste treatment technology reviews – anaerobic digestion (AD), mechanical biological treatment (MBT), composting, energy from waste (EfW) and advanced thermal treatment (ATT).
- Technical and commercial due diligence and expert witness work.

Monitoring and evaluation

- Waste composition and characterisation studies.
- Carbon footprint assessments.
- Waste and Resources Assessment Tool for the Environment (WRATE) modelling and analysis of treatment solutions.
- Emissions monitoring and reporting.
- Odour and health assessments.

Training

- Capacity building, mentoring and bespoke training.

“Ricardo Energy & Environment’s technical advisers have played a key role in developing a first-class waste management service in West Sussex.”

Peter Robinson, Contracts Manager, West Sussex County Council

“The work undertaken by Ricardo Energy & Environment clearly identified where we should concentrate our development efforts within our portfolio of UK sites.”

David Longden, Project Development Manager, BioEssence

“The Business Resource Efficiency programme [delivered by Ricardo Energy & Environment] made a significant contribution to achieving WRAP’s business plan targets.”

Carl Nichols, Head of Business and Markets, WRAP

“The insights provided by Ricardo Energy & Environment and the clarity of their modelling and financial forecasting were critical to underpinning the Council’s future service provision and budgeting decisions.”

Verity Palk, Waste Services Manager, Cornwall Council

Key contacts



Adam Read

Practice Director, Resource Efficiency and Waste Management

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- Practice Director responsible for overall business delivery, recruitment and strategy.
- Ricardo Energy & Environment key account manager for WRAP and Kent CC.
- Client relationship manager for Veolia, Amey, Urbaser and Suez.
- Member of the International Solid Waste Association’s Communications Working Group with 20 years’ experience.
- Expert in strategic decision-making, procurement, technologies and stakeholder engagement.



Andy Maunder

Group Business Manager

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- Waste and resource efficiency project director with over 16 years’ experience.
- Member of the Chartered Institution of Wastes Management (CIWM) Special Interest Group for Waste Prevention.
- Ricardo Energy & Environment framework contract management for WRAP, the Department for Environment, Food and Rural Affairs (Defra) and the Environment Agency.
- Expert in pro-environmental behaviour change research, social marketing and household waste prevention.



Manjit Kahlon

International Business Manager

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- Ricardo Energy & Environment international business development manager.
- Over 26 years of experience advising international institutions and private sector companies.
- Registered environmental auditor with the Institute of Environmental Management & Assessment (IEMA) for the last 24 years.
- Internally recognised for providing technical support underpinned by excellent business acumen.
- Expert in waste strategy, implementation planning, capacity building and institutional strengthening.

“The completion of the report was in no small part down to the assistance and hard work that was provided by Ricardo Energy & Environment. I would like to thank Ricardo Energy & Environment in assisting the Clyde Valley Waste Partnership on achieving an excellent result.”

Kenneth Wilson, Head of Land Services, North Lanarkshire Council

“Ricardo Energy & Environment really understood our needs and challenged senior management to review our processes. Ricardo Energy & Environment were knowledgeable, engaged and committed!”

Ian Williams, Municipal Services Director, Veolia Environmental Services

“The standard of service received from Ricardo Energy & Environment has been consistently high over the life of the contract to date. This has been evidenced by the timely delivery of professional advice and reports to the satisfaction of the client.”

Alex Creecy, Technical Manager (Waste PFI), Essex County Council



Brian Mayne

Regional Director for Wales

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- Regional Director for Ricardo Energy & Environment waste and resource efficiency work in Wales.
- Expert in public sector waste procurement (collection, treatment and disposal) and adviser to the Welsh Assembly.
- Skilled in waste operations, service reviews and communications campaign development.
- Qualified trainer and facilitator, with an interest in third-sector models and project delivery.



Jamie Pitcairn

Regional Director for Scotland

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- Regional Director for Ricardo Energy & Environment and project director for resource efficiency workstreams in Scotland.
- Adviser to the Scottish Government on national waste strategies and policy implementation.
- Technical specialist in business waste with over 12 years of project strategy development and delivery.
- Chartered waste manager and chair of the CIWM Scottish Business Waste and Resources Strategy Group.



Simon Gandy

European Commission Manager

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- Ricardo Energy & Environment's European Commission Manager.
- Over 13 years of experience including producer responsibility, sustainability and life cycle assessment type work.
- Leading analysis on matters such as waste arisings, waste flow calculations and waste infrastructure studies.
- Ricardo Energy & Environment's modelling knowledge leader and corporate quality assurer.

Sector contacts

Resource scarcity, productivity and business resilience



For more information, please contact Robert Epsom

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Measuring and monitoring resource usage; assessing options for businesses through on-site visits; action planning to prioritise focus areas for resource scarcity; supply chain analysis; product and packaging analysis; LCA reporting; carbon footprinting; green procurement programmes; procurement strategy development; programme and project management (PRINCE 2); technology assessments; feasibility assessments; technology reviews to assess disassembly; economic modelling; sector benchmarking; best practice analysis; staff briefings and training.

Auditing and resource optimisation – helping to understand waste streams and deliver on-site savings



For more information, please contact Nia Owen

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Baseline assessment of site or processes; waste composition and characterisation studies to enable futureproofing decisions regarding upcoming legislation; legislative compliance testing; duty-of-care audits; environmental management system checks and reports; corporate social responsibility data collection and reporting; benchmarking; target setting; action planning; staff briefings and training; paper-trail audits; waste minimisation assessments; health and safety audits.

Circular economy – delivering more resource efficient and circular solutions



For more information, please contact Jess Twemlow

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Circular economy business models; bio-loops; management, planning and innovation for the food & drink and construction & demolition sectors; engagement programmes and training sessions; SME training and capacity building; technical support on waste auditing and supply chains; resource efficiency in the healthcare industry; sustainable procurement principles; asset sharing and re-use opportunities; minimising packaging waste in the hospitality and food service sector; re-use target options.

Waste modelling and LCA – helping to understand future scenarios and compare system performance



For more information, please contact Lorna Pannett

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LCA (including use of SimaPro and EcoReport); CBA; options appraisal; sensitivity analysis; mass balance assessment; energy balance assessment; carbon footprinting; sustainability appraisal for planning applications; multi criteria assessment; risk assessment; economic valuation; stack dispersion modelling; waste collection modelling (KAT) including route optimisation; waste flow model development and peer review; WRATE expertise (process development, scenario modelling and peer review).

Operational service reviews – helping improve efficiencies and deliver effective partnering solutions



For more information, please contact Steve Brown

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Waste management and street care operational reviews; optimising performance advice; composition and characterisation studies; set-out monitoring; materials capture rate analysis; customer feedback surveys; sitebased assessments and visual inspections; benchmarking performance and best practice; time and motion studies; vehicle load analysis; re-routing studies; efficiency ratings; CBA; contract monitoring; enforcement advice; trade waste scheme analysis and options; operational staff assessments and engagement.

Public and stakeholder engagement – improving policy-making and decision-making



For more information, please contact James Tweed

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Designing and delivering public and stakeholder engagement projects; identifying salient issues that can help inform policy-making; creating collaborative approaches to help move policies forward; delivering face-to-face and online consultations and dialogues; facilitating events with all sections of the community including hard-to-reach groups and senior stakeholders; providing in-depth analysis of multi-method engagement projects.

Communications – helping to target users and stakeholders



For more information, please contact Gareth Morton

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Developing communications and engagement strategies; campaign design and branding; adoption of Recycle Now, Recycle for Scotland and Love Food Hate Waste iconography and campaign materials; PR and media liaison; website development; consultation design and delivery; site planning engagement; events management; facilitation; members' briefings; doorstep campaigns; educational materials; outreach events; literature design; opinion polls and surveys (face to face, online and telephone); facility user surveys; customer feedback; campaign monitoring and analysis.

Procurement and bid support – helping to contract out waste services and new infrastructure



For more information, please contact Hannah Lawrie

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Contract review and performance analysis; staff and member training; procurement strategies; PRINCE2 project management; options appraisal; technology assessments; mass flow modelling; sensitivity analysis; business case development; market testing; pre-qualification questionnaire development and evaluation; tender documentation design (specification, performance measurement framework, instructions to tenderers, technical requirements, evaluation frameworks, etc), tender evaluation; private sector bid support; bid negotiation and dialogue support.

Waste technologies and technical due diligence – helping to choose the right process for projects and localities



For more information, please contact Phil White

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Thermal and ATT; MBT and mechanical heat treatment; AD; composting; options appraisal; procurement; technical due diligence; expert witness; best available technique (BAT) assessment; process optimisation; independent certification; performance testing; composition analysis; composition risk; materials recovery facility (MRF) design; commercial & industrial (C&I) waste recovery; market assessment; commercial risk; regulatory review; project monitoring; refuse derived fuel and solid recovered fuel (RDF/SRF) specification.

Waste market research – helping to source feedstocks, inform facility development decisions and site selection



For more information, please contact Simone Aplin

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Waste management facilities location and status; local authority residual, organic and recycling contracts; competitor analysis regionally and nationally; capacity gap analysis; geographic information system mapping; municipal solid waste (MSW) arising and local authority recycling rates; C&I waste research; feedstock identification; site assessment – feedstock and competition; business development analysis – regional opportunities; offtake opportunities – heat, SRF, recyclables; bespoke short-term research tasks and ongoing data analysis.

Environmental permitting, planning and licensing – helping to deliver solutions and protect communities



For more information, please contact Simon Ford

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Technical and financial feasibility studies; technical and environmental input into planning applications; environmental permit applications; Animal By-Products Regulations applications; environmental assessments; contaminated land assessment and management plans; landfill gas modelling and management; air quality monitoring, modelling and assessment; human health risk assessments; odour dispersion modelling; ecology; wind energy studies; site audits; post closure plans.

Ricardo Energy & Environment – providing all-round support to public and private sector organisations on resource efficiency and waste management policies and services



Case studies

Future resource risks faced by UK businesses

As part of Defra's Sustainable Consumption and Production programme, Ricardo Energy & Environment was commissioned to identify future resource risks faced by UK business. The work involved identifying resources most at risk of future scarcity and considering how businesses could manage these difficulties to ensure future resilience. Having identified 10 priority resources, our waste operations team undertook stakeholder engagement activities with representatives from a diverse range of industries to provide an insight into how businesses perceive resource risk and their level of awareness of the issues. The project considered economic and competitive impacts and timescales over which threats may operate through the development of scenarios. The work provided the UK Government with an initial assessment of the resource issues facing the UK and how businesses may wish to address them. This research was used to inform the Government's Resource Security Action Plan.

WRAP and Zero Waste Scotland business resource efficiency

Improving the resource efficiency of UK businesses is a key aim for Government and its agencies. Ricardo Energy & Environment was a major service provider to Defra, WRAP and Zero Waste Scotland in this area. Our work ranged from strategic research about target business sectors to implementation support. Our resource efficiency team created the comprehensive online training package 'On Course for Zero Waste'. Our experts also provided advice and support on business growth strategies to WRAP's closed loop economy team to strengthen the recycling and reprocessing capacity in England for key target materials. Independent impact assessment of the services we provided in the first year of the framework contract identified significant outcomes achieved by business users with over 2 million tonnes of materials diverted from landfill.

Comprehensive Waste Management Strategy in Arriyadh City, Saudi Arabia

Ricardo Energy & Environment was appointed by the ArRiyadh Development Authority to deliver a comprehensive integrated waste management strategy and associated implementation plans for the City of Riyadh, Saudi Arabia. The rapid development of the city's metropolitan area presents major environmental challenges as population growth gives rise to large increases in the generation of waste. Ricardo Energy & Environment's team is undertaking a detailed baseline analysis of waste arisings by sector, current services, policies and solutions. The team is developing a detailed assessment of waste composition; undertaking detailed modelling of city growth and infrastructure needs; and engaging with a wide range of stakeholders to identify priority sites, issues and options. Following a fully costed options appraisal, the new City Waste Strategy will be developed, with accompanying Action Plans, to drive resource and energy recovery, improve service access and quality, and position the waste management sector at the heart of the city's growth.

European Pathway to Zero Waste – barriers and solutions to waste infrastructure delivery in the South East of England

As part of the European Pathway to Zero Waste programme (EPOW), the Environment Agency commissioned Ricardo Energy & Environment to report on the barriers to waste infrastructure development in London and the South East of England. Our experts explored issues associated with finance, planning permissions, public perceptions, waste technologies and market conditions that create the greatest uncertainties for proposed waste developments. We designed and delivered 16 stakeholder workshops for industry specialists including developers, planners, funders and technology specialists. We also brought together and analysed the wide range of views and ideas generated by the workshops. The final report provided recommendations to help consolidate the waste infrastructure landscape in the region and suggested solutions to many of the obstacles encountered by developers.

Waste Infrastructure and Contracts Technical Advisor, West Sussex County Council

Waste management contracts are often the most complex procurements undertaken by local authorities, which require specialist advice at all stages of the process. Ricardo Energy & Environment has worked with West Sussex County Council since 2004, initially in the development of its waste management strategy and then in options appraisal, business case development and, finally, acting as technical advisers for the procurement of new infrastructure and services. We have assisted the Council in procuring household waste recycling services and a 25-year contract to treat residual household waste through an MBT facility. Our specialists also advised the Council on the procurement of appropriate end uses of the RDF to be produced by this facility.

Case studies

Shanks's organic waste procurement contracts

As part of an ongoing working relationship, Shanks commissioned Ricardo Energy & Environment to provide technical resources and expertise throughout the Invitation to Submit Outline Solutions, Invitation to Submit Detailed Solutions and Call for Final Tenders stages of two organic waste procurement processes in South Wales. The role of our waste procurement team included writing detailed method statements, undertaking WRATE modelling of the proposed solutions and leading on waste transport planning issues. Our experienced technical team enhanced Shanks's bid with in-depth knowledge and understanding of the technical solution (anaerobic digestion), the requirements of the competitive dialogue process and local market intelligence. Our procurement experience allowed us to critically review Shanks's bid and improve the quality of its submission.

Surrey Waste Partnership – improving joint working project

The Surrey Waste Partnership commissioned Ricardo Energy & Environment to develop opportunities for efficiency gains or cost savings on waste management services across the county. Data were collected from all 12 Partnership authorities covering waste disposal and collection services, policies and performance. This enabled a benchmarking analysis of services across the county and Partnership to be carried out. Our team developed, modelled and evaluated a series of the most significant opportunities identified for further consideration by the partners. Key proposals included sharing operational data to benchmark performance; working together to ensure best price for contracted services or recyclable materials is achieved; and the joint procurement of new collection services, with greater alignment of service configuration and performance. We enabled the Partnership to move ahead to explore new governance systems, review the current recycling credit system and procure new green waste treatment capacity.

Enviroparks waste landscape review

Enviroparks had been granted full planning permission for an eco-park at Hirwaun in South Wales. Enviroparks commissioned Ricardo Energy & Environment to undertake a waste landscape review of South Wales, including a study of municipal solid waste and construction & industrial waste arisings, current treatment and disposal routes, a review of local authority procurement activities, an assessment of local competitor activities, and proposed facilities. Our due diligence team reviewed a wide range of available data to build up an accurate picture of waste sources, treatment and disposal facilities in the region. This provided Enviroparks with a clear overview of waste activities and competition in the area, and helped shape the company's future business development strategies. Ultimately, our specialists helped determine Enviroparks' key target feedstock supplies that were going to landfill, while enabling the company to consider future investments and partnerships.

Assessment of development and demonstration activities in EfW technologies

The Energy Technologies Institute (ETI) commissioned Ricardo Energy & Environment to assess the development and demonstration activities for a range of EfW technologies. The project reviewed ATT and AD technologies. Our due diligence team identified over 60 operational AD plants worldwide and four potential opportunities for disruptive or step-change innovations in the market. For the ATT assessment, we produced a catalogue of 165 different ATT technologies. Our experts found very few operational ATT processes handling waste, but there were many examples of problems and failures. By investigating the successful and unsuccessful projects, it was possible to identify common themes in both groups, and to consider how future developments might resolve such issues. This has informed ETI and Government thinking around technology innovation and delivery.

Cairo solid waste management pre-feasibility study

Ricardo Energy & Environment was commissioned by the European Bank for Reconstruction & Development (EBRD) to support the Cairo Governorate which was seeking to develop a comprehensive municipal solid waste management programme that would provide a new contractual framework, new efficient services and improve the quality of the solid waste management service. The project focused on waste management activities including waste collection, transport to transfer points and final disposal sites, and recovery and recycling of organic and non-organic fractions of the waste. The work included examining a possible public-private-partnership structure, preparing a baseline assessment, conducting a contract review to determine the best option(s) and facilitating a workshop in Cairo for key stakeholders.

- Ricardo Energy & Environment has been one of the UK Government's top advisers on resource efficiency and waste management issues for nearly 30 years.
- Ricardo Energy & Environment has helped UK businesses save over £2 billion through our management of Envirowise, the WRAP Business Resource Efficiency programme and Zero Waste Scotland's Resource Efficient Scotland programme.
- Ricardo Energy & Environment has supported environmental initiatives for the improvement of air quality and waste management practices in the Capital City of the Kingdom of Saudi Arabia. The work comprised developing networks to gather data and bespoke information management systems, and the development of associated strategies and implementation plans.
- Ricardo Energy & Environment has helped reduce the UK's annual CO₂ emissions by 3.1 million tonnes through the projects we manage.
- Ricardo Energy & Environment is at the forefront of the procurement of new waste services, infrastructure solutions and partnering arrangements in the UK and in diverse regions such as the Middle East, Australia and South East Asia.
- Ricardo Energy & Environment has led groundbreaking studies on resource scarcity, risks and mitigation for Defra and the Scottish Government.
- Ricardo Energy & Environment has been developing leading LCA methodologies in the UK for 30 years.
- For over 10 years, Ricardo Energy & Environment, on behalf of UK Government, managed Sciencewise, the UK's national centre for public dialogue in policy-making involving science and technology issues.

For more information about Ricardo Energy & Environment's resource efficiency and waste management services, please contact:

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For more information on how Ricardo Energy & Environment can provide you with resource efficiency and waste management solutions please contact one of our experts at enquiry-ee@ricardo.com or +44 (0) 1235 753000