

## Energy from Waste services

HRL provides high-end consulting, advisory and technology services to clients in the Energy from Waste (EfW) or Waste-to-Energy (WtE) sector, with expertise that covers the entire project lifecycle from conceptual project development and owner's engineering services through to detailed process and thermal efficiency evaluation, and thermal performance monitoring and optimisation, for operational facilities.

HRL's EfW services include:

- waste resource (e.g. MSW, C&I, C&D, RDF/SRF, wood, agricultural waste, biosolids) evaluation and characterisation, including the provision of waste auditing services for quantification;
- desktop studies, computer modelling and laboratory analysis;
- investigations and feasibility studies;
- pilot-plant and full-scale trials;
- basic engineering design package preparation;
- Owners Engineering advisory services;
- environmental monitoring and compliance advisory services;
- greenhouse (GHG) consulting;
- measurement and optimisation of process plant, including combustion and plant optimisation with CFD modelling;
- energy efficiency auditing;
- materials engineering and plant integrity services;
- project management and implementation.

HRL leverages its domain knowledge and deep historical expertise in both fuel technology (including coal, biomass, oil-shale and various wastes, through to liquid and gaseous fuels), and thermal treatment technologies (including combustion, gasification and pyrolysis), to offer EfW developers and owners independent and trusted advisory services, and provide waste resource suppliers with independently verified compositional data, chemical and thermal characterisation and residue (ash) analytical services.

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A typical EfW facility

With an on-site NATA accredited laboratory, workshop and associated warehouse for pilot plant scale rig preparation, complementing its engineering and project development and delivery experts, HRL offers a unique consulting and advisory service to its EfW clients.

### Challenges

Understanding a waste resource as a fuel and its impacts on technology selection and process operation can be critical to a project's success. Specific challenges may include:

- understanding the fuel resource quality and variability;
- selection of an appropriate EfW or thermal processing technology;
- development of new utilisation options;
- addressing environmental issues and greenhouse gas impacts, including obtaining approvals;
- economic evaluation, risk analysis and project implementation.

### Solutions

HRL works closely with its clients to understand their business objectives and the challenges they face, and then develops customised solutions to meet those needs. Some areas of capability are as follows:

- **Waste audit services;**
- **Feedstock characterisation services** (chemical, physical and thermal analysis of waste resources, including inorganic, trace metal and leachability analysis of ash residues);
- **Feasibility studies** (inclusive of desktop studies, pilot-plant and full-scale trials, for newer technologies or localised application of thermal treatment technologies);

# expertise in action

- **Owners Engineering advisory services.** Specific services include:
  - Owner's requirements documentation;
  - oversight of site investigations;
  - guidance with technology selection;
  - GHG and energy efficiency assessment, and assistance with environmental and planning approvals, and grid/utility connections;
  - key contractor selection;
  - Australian Industry Participation Plan development; and
  - oversight of Engineering, Procurement and Construction (EPC) Contractor's activities
- **Process evaluation, design and implementation,** including co-firing of waste resource fuels (drawing on a fundamental and practical understanding of fuel and materials behaviour in processing plant, HRL can assist clients in designing and evaluating various fuel utilisation techniques and technologies). Specific services include:
  - in-house testing of fuel behaviour including drying, milling/shredding, pelletisation, combustion or gasification, fuel upgrading, biomass co-firing, and conversion to liquid fuels;



A grab crane operating in a waste storage bunker

- constructing and operating bench and pilot-scale equipment to investigate fuel utilisation problems or to develop new solutions;
- basic engineering design package preparation;
- optimising and de-bottlenecking to improve fuel utilisation or increase plant efficiency;
- dust explosibility, spontaneous combustion

and self-heating;

- investigating and controlling deposit formation and corrosion processes;
- plant condition assessment, materials selection, root cause of failure;
- evaluating options for mitigating emissions of pollutants and greenhouse gases including carbon capture;
- developing process designs and completing technical and economic evaluations;
- implementing technical solutions including design and construct.

## Case Studies

HRL staff have been directly involved with a number of EfW developments, including some of the most recent world-scale EfW developments in WA and Victoria. A number of case studies are summarised below:

- **Most of the current EfW project developments in Australia:** Waste characterisation and waste audit services;
- **WtE facility:** Testing and analysis to characterise waste, development of a process for determining the renewable / non-renewable component of the feedstock, assistance with plant performance and evaluation of ash (against EPA waste classification guidelines) and atmospheric emissions to meet environmental regulatory requirements;
- **Alternative fuel in cement kilns:** HRL conducted a high-level feasibility study, examining several waste streams to determine feedstock levels, materials handling and pre-processing technologies for drying and agglomeration. In-house laboratory testing determined chemical composition and energy content, combustion characteristics and fouling, OHS issues and emission levels.
- **Biomass co-firing:** HRL undertook a feasibility study (including pilot scale combustion testing) to determine pre-processing (milling) requirements and viability of biomass for co-firing with coal. The study identified potential improvements in combustion performance, ash loading and reductions in key emissions (SOx and NOx).

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The company's NATA Accredited Laboratories number is 561.

HRL Technology Group's ISO 9001 Quality Management is certified by BSI under certificate FS605116

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