Alternative Fuels
Capability Statement
About GHD

For more information, visit www.ghd.com
Any fuel for internal combustion engines and other combustion systems that is partially or wholly derived from a source other than petroleum is classified as an alternative fuel. Importantly, it must be less damaging to the environment in the full life-cycle analysis than the fossil fuel equivalent. Biomass-to-liquids (BTL) or XTL (X=MSW, waste, coal) and conventional gas-to-liquids (GTL) derivatives and products, as well as hydrogen, may all be considered as alternative fuels.

The International Energy Agency (IEA) 2 °C scenario (2DS) lays out a deployment pathway and an emissions trajectory consistent with a 50% chance of limiting average global temperature growth to 2 °C. To achieve this the IEA has estimated a ten-fold increase in biofuel production will be required over the next 40 years. The IEA expects the majority of the biofuel growth will be from advanced biofuels.

Countries with large areas of arable land, established agricultural, forestry and engineering industries and excellent solar resource should be positioning to contribute significantly to the projected biofuel requirements. Countries that are not rich in fossil fuel inventory can improve their security of supply with such diversification.

GHD is committed to alternative fuels and especially biofuels as a key to reducing the transportation sector's environmental footprint. We see significant opportunities to stimulate new rurally based economies encompassing feedstock cultivation, water and land management as well as harvesting, initial processing and transport logistics.
GHD’s comprehensive services for a typical project include:

- Feedstock supply chain and development where needed
- Stakeholder engagement & social sustainability
- Environmental impact assessment
- Permitting and approvals
- Technology selection and supporting development
- Investment, policy & economics materials
- Business case development
- Transport and logistics studies
- Geotechnical, siting and site selection
- Power generation, grid connection, distribution
- Processing modelling and facility design (full discipline service)
- Water management
- Risk and safety management
- Asset management
- Building services engineering
- Contracting strategy & construction management, EPCM services

For more information visit https://www.ghd.com/en-au/services/services.aspx
Whole of Life Services

From market studies and strategic advice, technology selection through to construction-phase services and technical due diligence, GHD has the capability and experience to support Alternative Fuel companies throughout the full life cycle of their projects.
For GHD’s hydrogen-related capability please click here
## Alternative Fuels Experience

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<th>Project</th>
<th>Job Scope</th>
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<td>Advanced Lignite Development Program – FEED for lignite to coal and oil project – Ignite Energy</td>
<td>GHD undertook conceptual and FEED services for a commercial demonstration plant to convert brown coal to high quality coal and oil. This included site selection studies, integrating the core technology with the other necessary unit operations, some support systems and balance of plant option studies and the generation of early phase FEED deliverables.</td>
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<td>Waste tyre management in Australia (confidential client)</td>
<td>GHD delivered a situation review of current regulations, policy, management practices and incentives for recycling of end-of-life tyres of all types across Australia. This included a review of current landfill levy settings, tyre waste acceptance at landfills, storage and stockpiling restrictions and penalties for improper tyre disposal. A high level overview of current and emerging resource recovery and recycling practices and technologies applied to the management of waste tyres in Australia was included in the report, as well as current tyre disposal costs in specified regions.</td>
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<td>Biomass to Liquid Fuels Project (confidential client)</td>
<td>GHD has been engaged in an owner’s engineer role to develop the first large commercial scale integrated Biomass to Liquids (BtL) facility in Australia producing transportation fuels from Lignocellulosic biomass. The services have included arranging experimental and analytical work to define a project design basis, technology selection, conceptual engineering and rough order cost estimating to support overall project definition. The integrated project scope also includes environmental approvals, execution planning and community engagement services for multiple potential locations.</td>
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<td>T1 Project - Tourian Renewables Limited</td>
<td>GHD completed the Front End Engineering Design (FEED) for an innovative project in Teesside, UK, that will make valuable products such as fuels, oils or chemicals from waste plastic. The project involved close collaboration between our teams in the UK and Australia to draw on our extensive knowledge of mechanical, electrical, civil, and process engineering. The project team deployed specialist technical process design knowledge alongside multi-disciplinary engineering to develop a robust FEED. The team also undertook 3D modelling for physical layout of the plant and equipment to determine the optimum way in which to create the required end products.</td>
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<td>Latrobe Valley Hydrogen Energy Supply Chain Project – JPowe</td>
<td>GHD has supported Kawasaki Heavy Industries and JPowe in developing a pilot scale project to convert brown coal to hydrogen for export and use as a clean fuel. This support started at the earliest feasibility stage and has included helping obtaining grants and a project site. GHD is currently coordinating integrated detail design of the facility that involves a number of technology packages from different suppliers. GHD will also be designing the facility process control system and managing operational readiness as part of the EPcM award.</td>
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<td>Cloncurry biofuels project</td>
<td>GHD teamed with IAS to deliver a biofuels cropping trial development for potential commercialisation by MITEZ and Cloncurry Shire Council. The project involved establishing a crop trial facility as an initial step in exploring a viable biofuels business. Some key research objectives for the project included demonstrating the use of treated wastewater as an irrigation medium, intensifying biomass energy and improving forage crop production capacity by making optimal use of land and other resources.</td>
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<td>Replacement of natural gas for a boiler with waste-derived shredded wood and solid recovered fuel (SRF)</td>
<td>GHD was engaged to evaluate feasibility of converting a food industry business in Victoria from gas-fired boilers to a 30 MWt biomass-fuelled steam generation system. The study required sourcing a range of alternative fuels, and modelling capital and operating costs, from waste-derived shredded wood, solid recovered fuel (SRF) and agricultural residues.</td>
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<td>Waste tyre and oil management in North Queensland</td>
<td>GHD delivered a situation review of current management and disposal practices for waste tyres and waste oil in northwest Queensland, supporting a biofuels industry development project in the Cloncurry region incorporating irrigated biomass cropping trials. Waste tyres and oil in the northern Queensland region were identified as potential biomass energy feedstock supplement options during non-cropping periods in the biofuels industry development concept.</td>
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<td>Biofuels Research Report</td>
<td>A confidential client engaged GHD to prepare a biofuels industry status report. The purpose of the report was to provide the client with a comprehensive and consolidated knowledge basis to increase their understanding of both the domestic and international biofuels markets. It addressed the various types of biofuels, conventional and alternative technologies, transport requirements and supporting government policies. The understanding will enable the client to identify preferred pathways for Australia and would promote improved engagement with policymakers and industry stakeholders.</td>
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<td>Technical review of ARENA funding application – Hydrothermal Liquefaction</td>
<td>GHD performed technical due diligence on an application for ARENA funding for a hydrothermal liquefaction project intended to produce fuel from sewage biosolids. This included GHD providing advice about project execution and project delivery models.</td>
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Malcolm Rushin
Service Line Leader
Hydrocarbons and Chemicals
Malcolm has over 27 years experience in the Hazardous Chemicals and Oil & Gas Industries in Australia and the UK that has included significant periods in design, project management, construction, commissioning and operations. He is responsible for coordinating the related technical resources across Australia. With this broad range of experience, Malcolm is skilled at structuring projects for complex processing facilities and then organising and prioritising the necessary works and has lead process roles on some of GHD’s Alternative Fuel projects. Malcolm is skilled at overseeing complex process design works using a flexible approach focused on simplifying decisions, and prioritising and resolving key issues.
Malcolm.rushin@ghd.com
+61 7 3316 3735

Retha Coertzen
Alternative Fuels Specialist - Australia
Margaretha has 17 years of process engineering experience, of which more than 10 years have been in Australia in Resources and Oil & Gas. She has a strong background in pyrolysis, gasification and other solids processing technologies and extensive experience in process modelling of complex process systems including gas and water treatment, cost estimation, equipment design and selection and concept development from feedstock to final process flow sheet and equipment design. Margaretha has developed a deep understanding of biomass projects, including the handling and processing of biomass for liquid fuels and energy production.
Margaretha.coertzen@ghd.com
+61 7 3316 3166

David Maunder
Alternative Fuels Specialist - UK
David has an extensive track-record in the power generation, renewable energy and waste management sectors. He has substantial commercial experience that is built on an engineering background. He has worked in capital project development, in manufacturing industry, in policy support for governments, and in the management of research, development and demonstration programs.
david.maunder@ghd.com
+44 191 731 6100