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# Biomass Power, Biogas and Biodiesel Production Training Course

6 – 10 December 2026
Kuala Lumpur

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Registered in the United Kingdom and Saudi Arabia

# Biomass Power, Biogas and Biodiesel Production Training Course

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Biomass Power, Biogas and Biodiesel Production is a 1-week training course for plant engineers, energy project developers and operations staff, who leave with a biomass and biodiesel option comparison sheet for their own site or portfolio. Agricultural residues, wood fuel, food waste and used cooking oil are now treated as energy assets, and choosing the wrong conversion route locks in poor availability for decades. Jupiter Prime Training runs this course on biomass power, biogas and biodiesel production.

## Why Biomass Power, Biogas and Biodiesel Matters Now

Three forces shape bioenergy decisions today: industrial and municipal owners who want dispatchable low-carbon heat and electricity, waste producers under pressure to divert organic material from landfill, and fuel buyers who demand traceable feedstock with credible sustainability evidence. A plant built on an unreliable fuel supply, a digester fed beyond its organic loading limit or a biodiesel unit that misses fuel specification loses money and public trust quickly. The course rests on mass and energy balances, fuel property testing and life-cycle greenhouse gas accounting, applied consistently across solid, gaseous and liquid routes.

## Who Gains Most from Biomass Power, Biogas and Biodiesel

- Engineers responsible for boiler, gasifier or digester performance, fuel handling and ash systems on operating plants.
- Developers who screen feedstock catchments, size conversion units and prepare investment cases for bioenergy projects.
- Operations supervisors who manage fuel reception, storage, moisture control and daily process stability.
- Process specialists responsible for oil pretreatment, reaction conditions and fuel quality in biodiesel production.
- Sustainability and procurement staff who verify feedstock origin, contracts and emissions evidence.

Utilities, food processors, sawmills and waste operators gain most when engineering, operations and procurement colleagues attend together and agree one view of feedstock risk.

## Biomass Power, Biogas and Biodiesel Capabilities

Participants practise turning feedstock data and process chemistry into conversion choices that hold up on site and in front of investors.

- Assess a feedstock catchment for volume, seasonality, moisture and haul distance — the fuel supply decision behind any plant.
- Calculate net calorific value and boiler or gasifier output from proximate and ultimate analysis — the sizing decision for engineers.
- Specify ash and slagging controls from fuel chemistry — the maintenance decision operations staff must own.
- Design an anaerobic digestion feeding regime using organic loading rate and retention time — the biogas yield decision.
- Weigh catalyst, methanol ratio and oil pretreatment for transesterification — the fuel quality decision for biodiesel units.
- Build a scored comparison of conversion routes with sustainability criteria — the investment decision for developers and boards.

## Key Biomass Power, Biogas and Biodiesel Terms

- Proximate analysis — laboratory split of a fuel into moisture, volatile matter, fixed carbon and ash, used to predict combustion behaviour.
- Gasification — partial oxidation of biomass at high temperature to produce a combustible gas of carbon monoxide, hydrogen and methane.
- Organic loading rate — the mass of volatile solids fed to a digester per unit of volume each day.
- Digestate — the nutrient-rich material left after anaerobic digestion, used as fertiliser when quality allows.
- Transesterification — reaction of vegetable oil or animal fat with methanol and a catalyst, producing fatty acid methyl esters and glycerol.
- Free fatty acids — degraded oil components that form soap with alkaline catalysts and require acid pretreatment before conversion.

## Biomass Power, Biogas and Biodiesel Day by Day

## Day 1: Feedstock Supply Chains and Fuel Properties

- Feedstock Catchment Mapping — Securing Year-Round Volume Within Viable Haul Distance
- Proximate and Ultimate Analysis — Predicting Heating Value and Emissions
- Moisture, Drying and Storage Losses — Protecting Fuel Quality Before Conversion
- Pelleting, Chipping and Densification — Cutting Transport and Handling Costs
- Supply Contracts and Fuel Specifications — Sharing Quality Risk With Suppliers

## Day 2: Combustion and Gasification for Power and Heat

- Grate, Fluidised Bed and Suspension Firing — Matching Furnace Type to Fuel
- Steam Cycle and Combined Heat and Power — Choosing Electrical Versus Heat Output
- Fixed Bed and Fluidised Bed Gasifiers — Producing Clean Syngas for Engines
- Tar Formation and Gas Cleaning — Protecting Engines and Turbines Downstream
- Ash Fusion, Slagging and Fouling Indices — Planning Soot Blowing and Outages

## Day 3: Anaerobic Digestion and Biogas

- Digester Microbiology and Process Stages — Keeping Methanogens Productive and Stable
- Organic Loading Rate and Retention Time — Setting Daily Feeding Limits
- Co-Digestion of Manure, Food Waste and Crops — Balancing Carbon and Nitrogen
- Biogas Upgrading and Hydrogen Sulphide Removal — Preparing Gas for Engines or Grid
- Digestate Treatment and Nutrient Use — Turning Residue Into Saleable Fertiliser

## Day 4: Biodiesel by Transesterification

- Oil and Fat Feedstock Grades — Pricing Virgin Oil Against Used Cooking Oil
- Acid Esterification Pretreatment — Handling High Free Fatty Acid Feedstock
- Alkaline Catalysis and Methanol Ratio — Driving Conversion While Limiting Soap
- Glycerol Separation, Washing and Methanol Recovery — Lowering Operating Cost
- Fuel Property Testing and Cold Flow — Meeting Buyer Fuel Specifications

## Day 5: Comparing Bioenergy Routes in Practice

- Mass and Energy Balance Across Routes — Testing Day 1 to Day 4 Assumptions
- Life-Cycle Greenhouse Gas Accounting — Evidencing Feedstock Sustainability Claims
- Levelised Cost of Energy and Fuel — Ranking Projects on Comparable Terms
- Operational Risk Register for Bioenergy Plants — Linking Fuel, Ash and Process Failures
- Option Scoring and Recommendation — Completing the Route Comparison for Decision Makers

## Applying Biomass Power, Biogas and Biodiesel After the Course

- Lead a fuel sampling round on site feedstock, using proximate analysis results to revise boiler or gasifier settings and ash removal intervals.
- Run a feeding trial review for a digester or biodiesel unit, comparing organic loading or free fatty acid levels with yield and quality records.

## Biomass Power, Biogas and Biodiesel Questions FAQ

### What is biomass power, biogas and biodiesel production, and why does it matter now?

It is the conversion of organic residues and oils into electricity, heat, gas and liquid fuel. It matters now because organisations want low-carbon energy from waste streams, and conversion choices decide plant reliability and sustainability evidence for decades.

### Which roles gain most from biomass power, biogas and biodiesel training?

Plant engineers, project developers, operations supervisors and process specialists gain most. Procurement and sustainability staff also benefit, because feedstock contracts and emissions evidence shape every project you run or assess.

## How does biomass power, biogas and biodiesel training differ from a general renewable energy course?

It focuses on fuel chemistry and conversion processes rather than solar, wind or grid topics. You work through combustion, gasification, digestion and transesterification in detail, and it leaves ethanol fermentation to separate courses.

## What do participants bring back from biomass power, biogas and biodiesel training?

You bring back a scored comparison of conversion routes for your own feedstock. It sets out energy balances, costs, ash and quality risks and sustainability evidence in a form decision makers can review.

## Biomass Power, Biogas and Biodiesel: The Way Forward

The biomass and biodiesel option comparison sheet first informs which conversion route deserves detailed feasibility work. Developers, plant engineers and procurement leads use it to align fuel contracts, equipment choice and sustainability evidence. After its first use, revisit the feedstock assumptions, because moisture, price and availability shift with seasons and markets more than conversion technology does.