# 7 Types of Biofuels Used in Generators and Their Advantages

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**Reading Time:** 8-10 minutes

**Target Audience:** Construction, Mining, and Procurement Professionals

## Introduction

Traditional diesel generators face unprecedented environmental scrutiny across Australian industries. With carbon reduction targets tightening and sustainability reporting becoming mandatory for major operations, forward-thinking businesses are discovering that biofuel generators deliver both performance and environmental responsibility.

The shift isn't just about being green—it's about smart business. From construction sites in Sydney to remote mining operations in Western Australia, companies are finding that biofuel generators offer fuel price stability, reduce regulatory compliance risks, and often qualify for government incentives that directly improve profitability.

This guide explores seven proven biofuel types transforming Australia's power generation landscape, providing practical applications, current availability data, and detailed cost analysis specifically for Australian businesses.

## Why Biofuels Matter for Australian Generators

### Environmental Benefits That Meet Australian Carbon Targets

Australia's commitment to net-zero emissions by 2050 is reshaping industrial operations. The federal government's Safeguard Mechanism requires large facilities to keep emissions below baseline levels, with financial penalties for exceeding limits.

**Source:** [Australian Government Department of Industry - Safeguard Mechanism](https://www.industry.gov.au/policies-and-initiatives/climate-change-and-energy/climate-change/safeguard-mechanism) - March 2025

For businesses operating generators, biofuels deliver immediate, measurable emissions reductions:

* **Biodiesel (B20):** 15-20% reduction in carbon emissions compared to traditional diesel
* **Biodiesel (B100):** Up to 85% reduction in lifecycle carbon emissions
* **Bioethanol:** 60-70% reduction when produced from Australian agricultural waste
* **Biogas:** Carbon-neutral operation when sourced from waste streams

### Cost Benefits and Fuel Price Stability

Traditional diesel prices in Australia have swung dramatically, ranging from AUD $1.20 to AUD $2.10 per litre over the past three years. Biofuels offer greater price stability through local production, government support, and waste stream utilisation.

**Current Australian Biofuel Pricing (September 2025):**

* Biodiesel (B20): AUD $1.45-$1.65 per litre
* Biodiesel (B100): AUD $1.70-$1.95 per litre
* Bioethanol (E85): AUD $1.25-$1.50 per litre
* Biogas: AUD $0.85-$1.10 per cubic metre equivalent

**Source:** [Bioenergy Australia - Fuel Price Analysis](https://bioenergy.org.au/resources/fuel-pricing/) - September 2025

## The 7 Types of Biofuels for Generators

### Type 1: Biodiesel (B20-B100) - The Practical Choice

**What It Is**

Biodiesel is produced from recycled cooking oil, animal fats, and agricultural crops like canola and sunflower. The number indicates the percentage of biodiesel in the fuel mix.

**Australian Availability**

Australia has well-established biodiesel production with major suppliers across all states. Distribution networks exist in major cities with regional delivery available. Supply reliability is excellent with over 250 million litres produced annually.

**Generator Compatibility**

Most diesel generators can run on biodiesel blends up to B20 without modification. Higher concentrations may require fuel system component upgrades and more frequent fuel filter replacement.

**Key Advantages**

* 85% reduction in carbon emissions with B100
* Excellent cold weather performance with proper additives
* Improved lubrication properties extend engine life
* Supports Australian agricultural and waste industries

**Real-World Applications**

* Construction sites using B20 biodiesel have achieved 15% emissions reduction
* Mining operations have successfully trialled B50 biodiesel in backup generators
* Data centres use B20 biodiesel for emergency backup power systems

### Type 2: Bioethanol (E85-E100) - The Agricultural Solution

**What It Is**

Bioethanol is produced through fermentation of sugarcane, grain crops, and agricultural waste. Australia's strong sugarcane industry in Queensland provides excellent raw material access.

**Australian Availability**

Limited but growing availability, primarily in Queensland. Current production capacity is 400 million litres annually, with expansion planned.

**Generator Requirements**

Ethanol requires specialised generator engines with ethanol-compatible fuel systems, modified fuel injection systems, and cold starting systems for southern Australian conditions.

**Key Advantages**

* 60-70% reduction in carbon emissions
* Renewable source from agricultural crops and waste
* Supports Australian farming industry

**Best Applications**

* Events industry for outdoor festivals and concerts
* Agricultural operations using locally-produced ethanol
* Remote applications with limited diesel supply

### Type 3: Biogas (Methane from Organic Waste) - The Zero-Waste Solution

**What It Is**

Biogas is produced through anaerobic digestion of organic waste including landfill gas, agricultural waste, and sewage treatment byproducts.

**Australian Availability**

Over 240 landfill sites across Australia with gas capture potential. Current capacity is 1,200 GWh annually with rapid expansion planned.

**Generator Requirements**

Biogas requires specialised gas engines with gas treatment systems, methane concentration monitoring, and safety systems for gas handling.

**Key Advantages**

* Converts waste streams into useful energy
* Continuous production from waste sources
* Carbon neutral lifecycle emissions
* Often cheaper than traditional fuels when waste streams are locally available

**Ideal Applications**

* Waste management facilities using on-site biogas
* Agricultural operations generating power from animal waste
* Industrial sites utilising organic waste streams

### Type 4: Wood Pellets/Biomass - The Forestry Solution

**What It Is**

Wood pellets are compressed wood waste and agricultural residues. Australia's extensive forestry industry provides abundant raw materials.

**Australian Supply**

Robust supply infrastructure across forested regions with production capacity of 1.2 million tonnes annually.

**System Requirements**

Biomass generators use specialised systems including biomass boilers with steam generators, automatic pellet feeding systems, and ash handling systems.

**Key Advantages**

* Abundant Australian forestry and agricultural residues
* Carbon neutral cycle as growing trees absorb CO2 released during combustion
* Reduces dependence on imported fuels
* Supports regional forestry and agricultural communities

**Best Applications**

* Remote locations with limited fuel delivery access but forestry resources
* Long-term power generation with fuel storage capacity
* Industrial heating and combined heat and power systems

### Type 5: Straight Vegetable Oil (SVO) - The Simple Solution

**What It Is**

Straight vegetable oil uses unprocessed cooking oil or purpose-grown oil crops as direct fuel replacement for diesel.

**Australian Supply**

Variable commercial supply chains through rural oil seed crop production, commercial kitchen waste oil, and on-farm oil processing.

**Generator Requirements**

SVO requires significant modifications including two-tank systems with fuel preheating, modified fuel lines for higher viscosity, and temperature control systems.

**Key Benefits**

* Minimal processing compared to biodiesel production
* Can be produced locally or regionally
* Often cheaper than commercial biofuels when locally sourced

**Important Limitations**

* Requires heating systems for operation below 15°C
* Substantial generator modifications required
* Limited commercial availability requiring local sourcing

### Type 6: Algae Fuel - The Future Technology

**What It Is**

Algae fuel is produced from cultivated algae converted to biodiesel or bioethanol. Algae offers high yield potential without competing with food crops.

**Current Development Status**

Currently in research and pilot project phase through CSIRO and university programmes. Commercial availability expected within 5-10 years.

**Exceptional Advantages**

* Produces 10-50 times more fuel per hectare than traditional crops
* Doesn't compete with agricultural land for food production
* Rapid growth with algae doubling biomass every 24-48 hours
* Excellent growth conditions in Australian sunshine

**Future Applications**

* Large-scale power generation for industrial applications
* Remote operations with self-contained systems
* Integrated systems combining algae production with wastewater treatment

### Type 7: Waste Oils - The Circular Economy Solution

**What It Is**

Waste oils include used motor oil, hydraulic fluids, and industrial waste that can be processed into generator fuel after treatment and purification.

**Australian Collection Networks**

Well-developed systems exist with collection capacity over 200 million litres annually across service stations, automotive workshops, and industrial facilities.

**Environmental Benefits**

* Diverts waste streams from environmental disposal
* Often lower cost than virgin biofuels when processing infrastructure exists
* Supports waste reduction and resource recovery objectives

**Suitable Applications**

* Industrial facilities generating significant waste oil
* Waste processing operations specialising in oil recovery
* Remote mining operations with substantial used oil from equipment

## Australian Regulatory Environment

### Federal Support Framework

Australia's renewable energy framework provides strong support through the Renewable Energy Target (33,000 GWh by 2030), National Energy Productivity Plan (40% improvement by 2030), and Technology Investment Roadmap (AUD $20 billion investment).

**Source:** [Department of Industry, Science, Energy and Resources](https://www.industry.gov.au) - Energy Policy Update 2025

### Carbon Credit Opportunities

Australian Carbon Credit Units (ACCUs) are available for qualifying biofuel activities, creating additional revenue streams. Current ACCU prices range from AUD $35-45 per tonne CO2 equivalent.

**Source:** [Clean Energy Regulator - Carbon Credits](https://www.cleanenergyregulator.gov.au) - Market Update 2025

## Implementation Considerations

### Supply Chain Strategy

**Urban Areas:** Established distribution networks for biodiesel and bioethanol with regular delivery schedules.

**Regional Areas:** Limited networks requiring advance planning, higher delivery costs, and on-site storage capacity.

**Recommended Approach:**

1. Maintain dual fuel capability for supply chain resilience
2. Develop relationships with regional biofuel suppliers
3. Invest in appropriate storage systems
4. Ensure alternative fuel availability during disruptions

### Modification Costs

**Typical Australian Market Costs:**

* Biodiesel B20: AUD $500-$1,500 per generator
* Biodiesel B100: AUD $2,000-$5,000 per generator
* Biogas: AUD $10,000-$25,000 per generator

### Return on Investment

**Example (Medium-sized Construction Company):**

* Initial Investment: AUD $50,000 (10-generator fleet for B50 biodiesel)
* Annual Fuel Savings: AUD $15,000 (including carbon credits)
* Payback Period: 3.3 years
* 5-year Net Benefit: AUD $125,000

## Conclusion and Next Steps

The transition to biofuel generators represents a strategic business decision addressing regulatory compliance, cost management, and competitive positioning. Australian businesses that act now gain significant advantages over competitors who delay this inevitable transition.

### Implementation Roadmap

**Phase 1:** Assessment (Weeks 1-2) - Evaluate current fleet and operational requirements

**Phase 2:** Pilot Testing (Weeks 3-6) - Start with biodiesel B20 on equipment subset

**Phase 3:** Supply Chain Development (Weeks 4-8) - Establish supplier relationships

**Phase 4:** Staff Training (Weeks 6-10) - Implement comprehensive biofuel handling training

**Phase 5:** Full Implementation (Weeks 8-16) - Roll out programme across entire operation

### Recommendations by Business Type

**Construction Companies:** Start with biodiesel B20 for immediate compliance benefits in major cities where supply chains are established.

**Mining Operations:** Evaluate biogas for waste-to-energy projects and biodiesel B50-B100 for remote operations to reduce supply dependence.

**Procurement Managers:** Develop framework agreements with suppliers and create cost-benefit analysis tools for different biofuel options.

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**Ready to explore biofuel generators for your operations?**

**Contact Green Power Solutions today:**

Phone: 1800-GREEN-POWER (24/7 emergency consultations)

Email: sustainability@greenpowersolutions.com.au (4-hour response guarantee)

**Free Resources:**

* Complete Australian Business Guide to Biofuel Generators (20-page guide with cost calculators)
* Interactive Environmental Impact and Cost Savings Calculator
* 30-minute specialist consultation
* Free generator fleet compatibility assessment

**Green Power Solutions** - Australia's trusted partner for sustainable power generation across construction, mining, and industrial operations.

*This article represents current market conditions as of September 2025. Fuel prices and regulations may vary by location. Always consult qualified specialists before making equipment modifications.*