# Master Compliance Overview — Biogas & Biodiesel

This document provides a consolidated analysis of the key regulatory, quality, and safety obligations governing the dual operation of a food waste-to-biogas facility and a Used Cooking Oil (UCO)-to-biodiesel facility within the UK and EU. It serves as a master reference for strategic planning, operational management, and audit readiness.

### **Key Insights**

* **Dual-Loop Complexity:** The project operates two distinct but interconnected value chains, each with its own specific regulatory nexus. The biogas loop is dominated by UK-centric environmental permitting, waste handling (ABP), and process safety (DSEAR). The biodiesel loop is heavily influenced by EU/UK market access rules (RTFO, RED II/III), supply chain integrity (ISCC), and product quality (EN 14214).
* **Feedstock Integrity is Paramount:** For both loops, the classification and traceability of feedstock are critical compliance points. For biogas, this means strict adherence to Animal By-Products (ABP) regulations to manage biological risk. For biodiesel, this involves rigorous ISCC certification and mass balance accounting to prevent fraud (e.g., adulteration with virgin oils) and secure the economic benefit of “double-counting” under the RTFO.
* **Safety as a Prerequisite:** The presence of methane (biogas) and flammable chemicals like methanol (biodiesel) makes compliance with DSEAR (Dangerous Substances and Explosive Atmospheres Regulations) non-negotiable. Hazardous area classification (zoning) and the use of ATEX-certified equipment are foundational safety and permitting requirements.
* **“End-of-Waste” is a Commercial Goal:** Achieving quality standards like **PAS 110** for digestate and **EN 14214** for biodiesel is not just a compliance task; it is a commercial necessity. These certifications transform a ‘waste’ material into a marketable product (biofertiliser and transport fuel, respectively), unlocking revenue streams.

## **1. Lifecycle Compliance Map**

The following diagram illustrates the two primary operational loops and maps the critical compliance checkpoints at each stage.

Diagram showing two parallel lifecycles: Food Waste to Biogas/Biofertiliser and Used Cooking Oil to Biodiesel. Each stage has associated regulations. *(Conceptual Diagram: A visual representation of the table below)*

### **Biogas Lifecycle: Food Waste to Energy & Biofertiliser**

| Stage | Activities | Key Regulations & Standards | Primary Focus |
| --- | --- | --- | --- |
| **1. Feedstock Sourcing** | Collection of food waste from commercial/municipal sources. | - Waste Duty of Care - EWC / LoW Code Classification - **Animal By-Products (ABP) Regulations** | Legal transfer, waste classification, and ensuring only permitted ABP categories (primarily Cat 3) are accepted. |
| **2. Transport & Reception** | Transport to facility, weigh-in, and initial storage. | - Waste Carrier Registration - **Environmental Permit** - ABP Regulations (Site Approval & Segregation) | Preventing contamination, ensuring carrier legitimacy, and maintaining “unclean” vs “clean” area separation. |
| **3. Anaerobic Digestion** | Feedstock processing in digesters. | - **Environmental Permit** - **DSEAR** (Zone 0/1 inside tanks) - PAS 110 (Process Monitoring) - HSWA 1974 | Operational safety, process control (time/temp), and managing explosive atmospheres. |
| **4. Energy Conversion** | Biogas cleaning, storage, and use in CHP or upgrading. | - **DSEAR** (Zoning around gas equipment) - **ENA EREC G99** (Electricity Grid Export) - **GS(M)R** (Biomethane Grid Injection) | Grid compliance, equipment safety (ATEX), and managing high-pressure gas systems. |
| **5. Product Management** | Storage and quality testing of digestate. | - **PAS 110** / Biofertiliser Certification - Environmental Permit | Achieving “end-of-waste” status by meeting stringent quality and stability limits. Preventing contamination. |
| **6. Distribution & Sale** | Sale of electricity/biomethane; supply of biofertiliser. | - Energy Offtake Agreements - PAS 110 User Information Sheets | Fulfilling contractual obligations and providing end-users with correct product information. |

### **Biodiesel Lifecycle: UCO to Transport Fuel**

| Stage | Activities | Key Regulations & Standards | Primary Focus |
| --- | --- | --- | --- |
| **1. Feedstock Sourcing** | Sourcing UCO from certified suppliers (collectors). | - Waste Duty of Care - **ISCC Certification** (Supplier Verification) - Cross-border Shipment (Annex VII, if applicable) | **Fraud Prevention**. Verifying supplier certification and chain of custody. Due diligence on Points of Origin (PoO). |
| **2. Transport & Reception** | Transport to facility, weigh-in, and mass balance entry. | - Waste Carrier Registration - ADR Transport Regulations (UN 3082) - **ISCC Mass Balance System** | Safe transport of materials and accurate accounting of incoming certified feedstock. |
| **3. Pre-treatment & Processing** | UCO filtering and transesterification process. | - **Environmental Permit** - **REACH / CLP** (Methanol, Catalysts) - DSEAR (Flammable chemicals) - HSWA 1974 | Chemical safety, emissions control (VOCs), and managing fire/explosion risks from methanol. |
| **4. Product Finishing** | Biodiesel washing, drying, and by-product separation (glycerine). | - Environmental Permit - Waste Management (for glycerine) | Ensuring product purity and proper handling of all output streams. |
| **5. Quality & Storage** | Batch testing against standards and storage. | - **EN 14214** (Quality Specification) - DSEAR (Zone 2 around tanks) | Rigorous quality control to produce a Certificate of Analysis (CoA) for every batch. |
| **6. Distribution & Sale** | Sale of biodiesel to obligated fuel suppliers. | - **UK RTFO** (Claiming RTFCs) - **EU RED II / III** (Sustainability Proof) - **HMRC Excise Duty** | Proving sustainability to claim certificates (double-counting), fulfilling tax obligations, and market compliance. |

## **2. Detailed Regulatory & Certification Requirements**

This section details the core compliance obligations identified in the lifecycle map.

### **Facility-Wide & Foundational Compliance**

| Regulation / Act | Description | Key Obligations |
| --- | --- | --- |
| **Environmental Permit** | Legal document from the Environment Agency (or NRW/SEPA) setting operational limits. | - **Pathway:** Standard Rules (e.g., SR2021 No 7 for biogas) if criteria met; otherwise, a full Bespoke application is required. Biodiesel will likely require a Bespoke permit. - **Management Systems:** Must have a written Environmental Management System (EMS). - **Plans:** Requires approved Odour, Noise, Fire Prevention, and Accident Management Plans. - **Compliance:** Adherence to all permit conditions, monitoring, and reporting schedules. |
| **Health & Safety at Work Act 1974 (HSWA)** | The foundational UK law for workplace health, safety, and welfare. | - **Policy:** A written H&S policy is mandatory (>5 employees). - **Risk Assessments:** Must conduct assessments for all work activities (under MHSWR 1999). - **Responsibilities:** Clearly defined roles for management and employees. |
| **Duty of Care (Waste)** | Legal responsibility for waste from production to disposal. | - **Containment:** Store waste securely to prevent escape. - **Transfer:** Only use registered waste carriers and permitted sites. - **Documentation:** Complete Waste Transfer Notes (WTNs) and retain for 2 years (3 for hazardous). |
| **REACH & CLP** | EU/UK regulations for chemical safety (Registration, Classification, Labelling). | - **Role:** As a “Downstream User,” the primary duty is to follow Safety Data Sheet (SDS) instructions. - **Inventory:** Maintain a full inventory of all chemicals (Methanol, catalysts, lab reagents). - **Labelling:** Ensure all containers are correctly labelled with CLP pictograms and information. |

### **Process Safety**

| Regulation | Description | Key Obligations |
| --- | --- | --- |
| **DSEAR 2002** | Management of risks from dangerous substances and explosive atmospheres. | - **Risk Assessment:** Identify flammable substances (biogas, methanol) and ignition sources. - **Area Classification (Zoning):** Create and maintain drawings defining Zones 0, 1, and 2 based on risk. - **Control Measures:** Use appropriate ATEX-rated equipment, implement a “Permit to Work” system for hot work, and ensure effective ventilation and gas detection. |

### **Feedstock & Supply Chain**

| Regulation / Standard | Description | Key Obligations |
| --- | --- | --- |
| **ABP Regulations** | Governs the handling and use of Animal By-Products to prevent disease. | - **APHA Approval:** The biogas facility must be approved by APHA to process ABPs. - **Segregation:** Physical, floor-to-ceiling separation of “unclean” (raw ABP) and “clean” (digestate) areas. - **Traceability:** Retain commercial documents for all ABP consignments for at least 2 years. |
| **ISCC Certification** | International Sustainability & Carbon Certification for bio-based supply chains. | - **System:** Must be certified to handle and process ISCC-certified UCO. - **Mass Balance:** Maintain a meticulous mass balance ledger, subject to annual audit. - **Due Diligence:** Vet all suppliers to ensure they hold valid ISCC certificates. Obtain Proof of Sustainability (PoS) for every delivery. |
| **Cross-Border Waste Shipment** | Governs the movement of waste between countries (EC No 1013/2006). | - **Annex VII:** For “green-listed” waste like UCO, an Annex VII form must be completed and accompany the shipment. - **Contract:** A valid contract must be in place with the consignee before shipment. - **Record Keeping:** Retain completed Annex VII forms for at least 3 years. |

### **Product Quality, Sale & Market Access**

| Standard / Regulation | Description | Key Obligations |
| --- | --- | --- |
| **PAS 110:2014** | Specification for producing quality-assured biofertiliser (digestate). | - **QMS & HACCP:** Implement a Quality Management System and a Hazard Analysis Critical Control Points plan. - **Testing:** Conduct regular sampling and testing against strict limits for contaminants and pathogens. - **Certification:** Required for enrollment in the Biofertiliser Certification Scheme to achieve “end-of-waste” status. |
| **EN 14214** | European quality standard for FAME biodiesel (B100). | - **Batch Testing:** Every batch of finished biodiesel must be tested against key parameters (e.g., Ester Content, Viscosity, Water Content, Oxidation Stability). - **Certificate of Analysis (CoA):** A CoA must be generated for each batch and provided to the customer. |
| **UK RTFO** | Renewable Transport Fuel Obligation; mechanism for promoting renewable fuels in the UK. | - **Registration:** Register with the Department for Transport (DfT) as a fuel supplier. - **RTFCs:** Claim RTFCs for supplied biodiesel. UCO-based fuel is eligible for **2 RTFCs per litre** (double-counting). - **Reporting & Verification:** Submit periodic reports and undergo an annual independent verification audit. |
| **EU RED II / RED III** | EU Renewable Energy Directives setting sustainability and GHG-saving criteria. | - **GHG Savings:** Demonstrate that the biodiesel meets the required GHG saving threshold (>65%). - **Traceability:** Compliance is proven via ISCC certification and tracked in the Union Database for Biofuels (UDB). |
| **HMRC Excise & Fuel Duty** | Governs the taxation of fuels in the UK. | - **Registration:** Register with HMRC for the “Biofuels and Other Fuel Substitutes” scheme. - **Reporting:** Submit regular returns (e.g., Form HO930) and pay duty on fuel released to market. Volumes must align with RTFO reports. |

## **3. RACI Matrix for Compliance Management**

This matrix outlines the roles and responsibilities for key compliance activities.

**Roles:** \* **MD:** Managing Director \* **PM:** Plant Manager \* **CO:** Compliance Officer \* **HSM:** Health & Safety Manager \* **FM:** Finance Manager \* **OT:** Operations Team

| Compliance Activity / Document | MD | PM | CO | HSM | FM | OT |
| --- | --- | --- | --- | --- | --- | --- |
| **Environmental Permitting (Application & Variation)** | **A** | R | C | C | - | I |
| **Environmental Permit (Operational Compliance)** | I | **A** | R | I | - | R |
| **HSWA Policy & Management System** | **A** | R | I | R | - | I |
| **ABP Regulations & APHA Liaison** | I | **A** | R | - | - | C |
| **PAS 110 / Biofertiliser Certification** | I | **A** | R | - | - | R |
| **DSEAR Risk Assessment & Control** | I | R | C | **A** | - | R |
| **G99 / GS(M)R Grid Compliance** | I | **A** | R | I | - | I |
| **ISCC Certification & Audits** | I | R | **A** | - | - | C |
| **EN 14214 Quality Control** | - | R | C | - | - | **A** |
| **RTFO Reporting & Verification** | I | C | **A** | - | R | I |
| **HMRC Excise Duty Reporting** | I | C | C | - | **A** | I |
| **Duty of Care (Waste Management)** | - | **A** | R | I | - | R |
| **REACH / CLP & Chemical Safety** | - | R | C | **A** | - | C |
| **ADR Transport Compliance** | - | R | **A** | - | - | I |

***Key:*** **R** - Responsible (Does the work); **A** - Accountable (Owns the work); **C** - Consulted (Provides input); **I** - Informed (Kept up-to-date)

## **4. Strategic Considerations & Gap Analysis**

### **Key Strategic Risks**

* **Feedstock Fraud (Biodiesel):** The economic incentive for double-counting UCO creates a high risk of fraudulent supply chains (e.g., virgin palm oil mislabelled as UCO).
  + **Mitigation:** **Do not rely solely on supplier self-declarations.** Mandate ISCC certification for all suppliers, conduct rigorous due diligence, scrutinize PoO audits, and consider periodic independent lab testing of incoming feedstock to verify FFA content and other markers.
* **Regulatory Evolution:** The regulatory landscape, particularly for renewables (RED III) and waste, is constantly changing.
  + **Mitigation:** The Compliance Officer must actively monitor regulatory updates from the EA, DfT, HSE, and EU bodies. A subscription to a professional regulatory update service is recommended.
* **Permit Breach:** Failure to adhere to Environmental Permit conditions (e.g., emissions limits, odour complaints) can lead to enforcement action, fines, and reputational damage.
  + **Mitigation:** Implement robust operational controls and monitoring linked directly to permit conditions. Ensure the EMS is a live system, not just a document. The “Evidence Register” below is a key tool for this.

### **Compliance Gap Analysis Checklist**

This checklist is a high-level tool to track readiness against major compliance milestones.

| Category | Item | Status (Not Started / In Progress / Complete) | Notes / [Placeholder for Date] |
| --- | --- | --- | --- |
| **Permitting & Approvals** | Biogas Environmental Permit Granted |  |  |
|  | APHA Site Approval for ABP Processing Granted |  |  |
|  | Biodiesel Environmental Permit Granted |  |  |
|  | HMRC Approval as Biofuels Producer Granted |  |  |
| **Operational Systems** | Biogas DSEAR Risk Assessment Completed & Signed Off |  |  |
|  | Biogas Hazardous Area Classification Drawings Finalised |  |  |
|  | Biodiesel DSEAR/Chemical Risk Assessment Completed |  |  |
|  | HSWA Policy Published & Communicated to all staff |  |  |
|  | REACH/CLP Chemical Inventory Completed & SDS Library established |  |  |
| **Quality & Certification** | PAS 110 QMS / HACCP Plan Implemented for Biogas |  |  |
|  | Enrolled in Biofertiliser Certification Scheme |  |  |
|  | ISCC Certification Achieved for Biodiesel Facility |  |  |
|  | EN 14214 QC Procedure and Lab Capability established |  |  |
| **Commercial & Market** | G99 Connection Agreement / FON Received from DNO |  |  |
|  | GS(M)R Network Entry Agreement Executed (if applicable) |  |  |
|  | Registered with DfT for RTFO Reporting |  |  |
|  | Independent Verifier for RTFO Appointed |  |  |
|  | ADR Transport Procedures Confirmed & Implemented |  |  |

## **5. Live Evidence Register (Template)**

This template should be maintained as a live document to provide a clear, auditable trail of compliance evidence.

| Compliance Area | Regulation / Standard | Evidence Required | Evidence Location | Review Date | Status (Compliant / Action Required) |
| --- | --- | --- | --- | --- | --- |
| **Example: Odour Mgt.** | Environmental Permit, Condition 3.3.1 | Daily odour checks log; Complaint investigation records; OMP annual review minutes. | Digital: S:\Compliance\Permit\Odour | [Placeholder] | Compliant |
| **Example: Feedstock** | ISCC EU, Principle 2.2 | Supplier ISCC certificates; Incoming PoS documents; Mass balance spreadsheet. | Digital: S:\Compliance\ISCC\Audits | [Placeholder] | Compliant |
| **Example: Safety** | DSEAR, Reg 5 | DSEAR Risk Assessment report; Hazardous Area Classification drawings. | Digital: S:\HealthSafety\DSEAR | [Placeholder] | Compliant |
| **[Placeholder]** |  |  |  |  |  |
| **[Placeholder]** |  |  |  |  |  |
| **[Placeholder]** |  |  |  |  |  |

## **6. Sources**

* ADR transport UCO biodiesel regulations.md
* cross-border waste shipment Annex VII documentation.md
* DSEAR regulations biogas facilities risk assessment UK.md
* EN 14214 biodiesel fuel standard.md
* EU RED II RED III biodiesel UCO.md
* EWC LoW codes waste classification.md
* Health & Safety at Work Act HSWA requirements UK.md
* ISCC certification biodiesel UCO.md
* master compliance document outline.md
* PAS 110 digestate quality standards UK.md
* REACH CLP regulations biogas biodiesel chemicals.md
* UK biogas Animal By-Products ABP feedstock regulations.md
* UK biogas energy offtake compliance CHP G99 GSMR.md
* UK biogas environmental permitting Environment Agency NRW SEPA.md
* UK Duty of Care waste management.md
* UK EU biodiesel Used Cooking Oil UCO regulations.md
* UK EU biogas food waste anaerobic digestion regulations.md
* UK EU waste management legal frameworks.md
* UK RTFO biodiesel UCO.md