CALIFORNIA LANDFILL METHANE REGULATION

Total Compliance Solution White Paper

Surface Emissions	Wellhead & GCCS	Cloud Reporting
Monitoring (SEM)	Field Monitoring	& Documentation
Ωmega™ | GazoScan™	Ωmega™ | FAU-TDL	DataField™ Enterprise

U.S. Patent No. 12,467,857-B2 | CARB LMR is effective January 1, 2027

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1. Executive Summary

California's updated Landfill Methane Regulation (LMR), adopted by the California Air Resources Board (CARB) on November 20, 2025, represents the most stringent landfill gas monitoring standard in the United States — taking effect January 1, 2027. The regulation governs all 188 municipal solid waste (MSW) landfills in California and mandates tighter leak detection timelines, expanded surface emissions monitoring, enhanced wellfield oversight, mandatory remote sensing response protocols, and fully auditable digital documentation.

Ecotec's Ωmega™ Portable Modular Gas Analyzer, combined with the FAU-TDL stationary platform, Gazoscan™ remote methane detector, DataField™ Mobile app, and the DataField™ cloud-based reporting system, delivers a complete, integrated compliance infrastructure that addresses every LMR monitoring requirement from the working face to the regulatory report.

This white paper maps each relavant LMR obligation to the specific Ecotec hardware and software component that satisfies it, providing operators, environmental managers, and compliance consultants with a definitive reference for building an audit-ready monitoring program.

Key Compliance Facts — California LMR (Effective Jan 1, 2027)
Surface methane threshold: 500 ppm instantaneous | 25 ppm integrated
Remote satellite plume detection: Operators must respond with targeted SEM within 10 days
Corrective action deadline: 10 calendar days from exceedance detection
Re-monitoring requirement: Post-repair confirmation measurement required
Wellhead monitoring parameters: CH4%, O2%, temperature, vacuum, flow rate — monthly minimum
Well liquid level recording: Annually
Methane levels at destruction device
Flare combustion temperature: Continuous monitoring required
Annual reporting deadline: March 15 to CARB or delegated air district
Estimated NOV exposure: $10,000–$25,000+ per violation per day at non-compliant sites

2. The California LMR Regulatory Framework

2.1 Background and Authority

California's original Landfill Methane Regulation was first adopted by CARB in 2010 under Assembly Bill 32 (Global Warming Solutions Act) as a discrete early-action greenhouse gas measure. For 15 years it stood as the nation's most advanced landfill methane standard. In September 2025, CARB released sweeping proposed amendments, and on November 20, 2025, the Board voted unanimously to adopt the update — the first major revision since the regulation's inception.

The updated LMR aligns with Senate Bill 1383 (Short-Lived Climate Pollutant Reduction Strategy), which mandates a 40% reduction in statewide methane emissions from 2013 levels by 2030. Landfills are California's second-largest source of methane at more than 21% of statewide emissions, making the LMR a cornerstone of California's climate strategy.

2.2 Who Must Comply

The LMR applies to all 188 MSW landfills that accepted waste after January 1, 1977 and are above the 450,000-ton waste-in-place exemption threshold. Of these:

- 140 are government-owned (cities, counties, special districts)
- 48 are privately owned by operators such as Waste Management, Republic Services, Waste Connections, and Recology
- 153 are currently required to operate a gas collection and control system (GCCS)
- Both active and closed landfills are subject — methane generation continues for decades after closure

2.3 Core LMR Compliance Requirements

The amended regulation creates compliance obligations across four distinct operational domains, all of which must be supported by defensible digital documentation:

Compliance Domain	LMR Requirement	Threshold / Frequency
Surface Emissions Monitoring (SEM)	Walking survey of landfill surface for methane exceedances	500 ppm instantaneous; 25 ppm integrated; quarterly (some sites monthly)
SEM Spacing	Grid-based walking intervals	25-foot spacing (standard)
Corrective Action	Repair initiation upon exceedance	Within 5 calendar days
Re-Monitoring	Post-repair surface confirmation	Required per exceedance
Working Face Monitoring	New gas well installation & monitoring	Monthly once under 15 ft of waste

Compliance Domain	LMR Requirement	Threshold / Frequency
Wellhead Parameters	CH4%, CO2%, O2%, H2S, temperature, vacuum, flow rate	Monthly minimum
GCCS Downtime	Limit collection system downtime	Per new downtime provisions
Perimeter Probes	Migration monitoring	Monthly or permit-specific
Flare Combustion Temp	Continuous temperature monitoring of destruction device	Continuous
Remote Plume Response	Respond to CARB satellite plume notification with targeted SEM	Per notification
Annual Reporting	Submit compliance data to CARB/air district	By March 15 annually
GCCS Efficiency	Methane destruction efficiency	Minimum 99%

3. The Ecotec LMR Compliance Architecture

Ecotec has designed a purpose-built, end-to-end compliance ecosystem for California's LMR. Rather than requiring operators to assemble multiple instruments from different manufacturers — each with separate calibration cycles, data formats, and service contracts — the Ecotec platform consolidates all required monitoring functions into a single, interoperable technology stack.

Ecotec's Four-Layer LMR Compliance Stack
Layer 1 — Surface Emissions Monitoring: Ωmega™ portable analyzer or Inspectra + Gazoscan™ remote scanner
Layer 2 — Wellhead & GCCS Monitoring: Ωmega™ (multi-parameter) + FAU-TDL (stationary, continuous)
Layer 3 — Field Data Collection: DataField™ Mobile app on any Android device
Layer 4 — Cloud Reporting & Audit Trail: DataField™ Enterprise platform

4. Ωmega™ — The Core Portable Compliance Analyzer

4.1 Product Overview

The Ωmega™ Portable Modular Gas Analyzer (U.S. Patent No. 12,467,857-B2) is Ecotec's flagship analyzer purpose-engineered for California's LMR. It consolidates what previously required two separate analyzers — a surface emissions monitor and a wellhead analyzer — into a single, field-ready platform. This architectural advantage eliminates duplicate capital expenditure, duplicate calibration cycles, and duplicate operational risk.

The Ωmega™ measures the five primary gas species required under the LMR: CH_4 (methane), CO_2, O_2, H_2S, and CO. It also measures differential and static pressures and temperature — covering every wellhead parameter specified in the regulation.

4.2 Technical Specifications

Gas	Technology	Range	Resolution	Accuracy	Response
CH_4 (Methane)	TDL (Tunable Diode Laser)	0–10,000 ppm / 0.1–100% vol	1 ppm / 0.1%	±2.5% reading	<10 sec
CO_2 (Carbon Dioxide)	TDL	0.1–100% vol	0.1%	±0.05% vol	<10 sec
O_2 (Oxygen)	TDL	0.1–100% vol	0.1%	±0.05% vol	<10 sec
H_2S (Hydrogen Sulfide)	Electrochemical (EC)	0–999 ppm	1 ppm	±50 ppm	<20 sec
CO (Carbon Monoxide)	Electrochemical (EC)	0–1,000 ppm	1 ppm	±250 ppm	<30 sec
Static Pressure	Transducer	23.5–35.2 "H2O	0.01 "H2O	±0.15 "H2O	N/A
Differential Pressure	Transducer	-10 to +10 "H2O	0.001 "H2O	±0.04 "H2O	N/A
Temperature	Probe	0–212°F	0.5°F	±2°F	<10 sec

4.3 Patented Modular Architecture

The Ωmega™ is built on Ecotec's patented Modular Landfill Gas Measurement Architecture — the core innovation that differentiates it from all competing analyzers. Key architectural features include:

- Smart sensor block assemblies with embedded calibration data — eliminates manual bench calibration cycles

- Automated normalization across sensing modules — ensures measurement consistency as sensors age
- Removable ECC sensor architecture — field-replaceable electrochemical sensors without analyzer return
- Main board processing and communication interface — structured data output to DataField™ Mobile
- Integration with mobile data collection devices — Bluetooth/USB connectivity to DataField™ Mobile app

4.4 How OMEGA Satisfies LMR Surface Emissions Monitoring Requirements

Surface Emissions Monitoring (SEM) is the most labor-intensive and documentation-intensive LMR requirement. The Ωmega™ enables operators to conduct structured, compliant, and defensible SEM walks through the following capabilities:

OMEGA SEM Capabilities

- ✓ Real-time methane concentration display at 1 ppm resolution
- ✓ Continuous reading below and above 500 ppm LMR threshold
- ✓ Structured survey workflow via DataField™ Mobile integration
- ✓ GPS geolocation metadata captured with each measurement
- ✓ Timestamped records for every reading — audit-proof trail
- ✓ Exportable compliance reports directly from DataField™

LMR Requirements Met

- 500 ppm; ppm threshold detection
- Quarterly/monthly SEM documentation
- Exceedance location and timestamping
- Post-repair re-monitoring confirmation
- Working face monitoring requirements
- Remote plume notification response surveys

4.5 How ΩMEGA Satisfies LMR Wellhead Monitoring Requirements

Monthly wellhead monitoring under the LMR requires measurement of methane concentration, oxygen content, differential pressure, temperature, and vacuum for each active gas collection well. The Ωmega™ measures all of these parameters simultaneously in a single connection — eliminating the need for a separate wellhead analyzer:

LMR Wellhead Parameter	OMEGA Measurement	LMR Section
Methane concentration (CH4%)	TDL measurement, 0.1–100% vol, ±0.05% accuracy	Sec. 95464, 95469
Oxygen content (O2%)	TDL measurement, 0.1–100% vol, ±0.05% accuracy	Sec. 95464, 95469

LMR Wellhead Parameter	OMEGA Measurement	LMR Section
Temperature	Probe measurement, 0–212°F, ±2°F	Sec. 95469
Static vacuum/pressure	Transducer, 23.5–35.2 "H2O, ±0.15 "H2O	Sec. 95464, 95469
Differential pressure	Transducer, -10 to +10 "H2O, ±0.04 "H2O	Sec. 95464
H2S (component monitoring)	ECC sensor, 0–999 ppm, ±50 ppm	GCCS performance
CO (optional)	ECC sensor, 0–1,000 ppm	Optional parameter
Flow rate	Calculated	Sec. 95469

4.6 Field Durability — Built for California Landfill Conditions

Physical Specifications

- IP65 ingress protection — dust and water resistant
- Ambient temperature range: 14°F to 140°F
- Pump rate: 72 liters/hour — consistent sample draw
- Dimensions: 7.9" x 3.9" x 2.4" — field portable
- Class 1 Div. 2 certification (pending)

Battery & Operation

- 4–6 hours runtime per battery pack
- Two battery packs included — full day operation
- Designed for daily landfill deployment
- Integrated sample pump — no external accessories
- Data storage via paired DataField™ Mobile device

5. FAU-TDL — Stationary Continuous Monitoring

5.1 Product Overview

The FAU-TDL (Field Analytical Unit — Tunable Diode Laser) is Ecotec's stationary, continuous monitoring solution for in-line landfill gas collection system measurement. Built on NASA-developed TDLAS technology, the FAU-TDL delivers unmatched accuracy with no drift over time and zero cross-gas sensitivity — critical attributes for regulatory defensibility under the LMR.

The FAU-TDL is designed for permanent installation on landfill gas collection headers, sub-headers, and lateral lines. It provides continuous measurement of methane and carbon dioxide concentration with ppm-level sensitivity, enabling detection of GCCS performance deviations before they escalate into reportable exceedances.

5.2 How FAU-TDL Satisfies LMR Stationary Monitoring Requirements

- Continuous CH4 and CO2 monitoring on gas collection headers — supports GCCS efficiency verification
- Oxygen intrusion detection — critical for identifying air infiltration that reduces methane quality and efficiency
- No field calibration required — eliminates calibration gaps that create regulatory exposure
- No drift over time — measurements remain defensible across multiple reporting periods without recertification
- M2M (machine-to-machine) data transmission — raw data transmitted directly to DataField™ Enterprise with no human intervention
- Continuous combustion temperature monitoring support — data fed to DataField™ Enterprise for flare performance documentation
- Integration with AEMS (Automated Equipment Monitoring System) — automated aggregation with other site data streams

5.3 FAU-TDL Key Technical Features

Feature	Specification / Capability
Measurement technology	Tunable Diode Laser Absorption Spectroscopy (TDLAS)
Primary gases	CH4, CO2 (CO, H2S, SO2, O3, NOx optional modules)
Sensitivity	ppb-level detection
Calibration	No field calibration required — self-referencing laser technology
Drift	Zero drift over time — no cross-gas interference
Data output	Real-time to DataField™ Enterprise via M2M protocol

Feature	Specification / Capability
Installation	Header/sub-header/lateral inline installation
Power	Multiple power and mounting configurations available
Enclosure	Weatherproof field enclosure with heat tracing for sample lines
Data	Continuous timestamped records to DataField™ Enterprise platform

5.4 Sentinel — Fixed-Point Landfill Gas Monitor

For strategic monitoring points where a full FAU-TDL inline system is not required, Ecotec's Sentinel provides fixed-point continuous methane and oxygen tracking. The Sentinel is ideal for:

- Monitoring specific header or lateral zones for early gas composition change detection
- Perimeter migration monitoring as a supplement to monthly probe readings
- Above-ground collection system performance checkpoints
- Integration into multi-channel AEMS configurations for enterprise-wide visibility

6. Gazoscan™ — Remote Methane Detection for Targeted SEM

6.1 Product Overview

The Gazoscan™ is Ecotec's long-range, handheld remote methane detector (RMD) using Tunable Diode Laser technology. It enables operators to perform 360° scanning for fugitive surface and penetration emission indications from a safe stand-off distance — up to 330 feet (100 meters) — without walking directly over every grid point.

The Gazoscan™ is particularly valuable under the updated LMR's new requirement for remote plume response: when CARB notifies a landfill operator via satellite detection of a large methane plume, the operator must conduct targeted SEM in the identified zone. The Gazoscan™ enables rapid scanning of the targeted area before committing to a full grid walk.

6.2 LMR Applications for Gazoscan™

Primary LMR Applications

- Rapid triage of satellite-detected plume zones prior to grid SEM walk
- Scanning of inaccessible working face areas excluded from walking SEM
- Stand-off monitoring of slopes and engineered cover areas
- Component leak confirmation from safe operating distance

Technical Specifications

- Detection range: up to 330 ft (100 m)
- Sensitivity: ±5 ppm·m (methane selective)
- Response time: 0.1 seconds
- 360° scanning capability
- Expected analyzer life: 10+ years

The new LMR specifically mandates that operators use technologies such as "handheld or drone-mounted laser scanners to identify leaks in inaccessible areas that are currently excluded from monitoring." The Gazoscan™ is precisely the technology contemplated by this provision.

7. DataField™ Mobile — Field Data Collection Hub

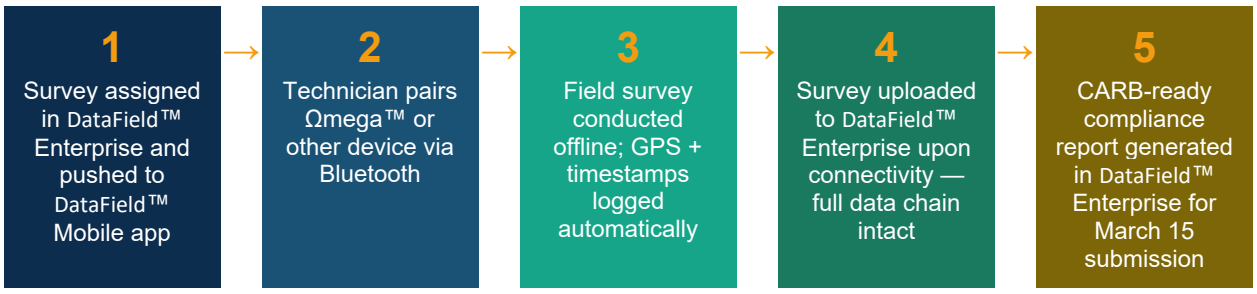
7.1 Overview

DataField™ Mobile is Ecotec's field data collection application. This mobile solution serves as the operational bridge between field analyzers (Ωmega™, Gazoscan™, FAU-TDL, and other Ecotec devices) and the DataField™ Enterprise platform. Every compliance measurement taken in the field — whether a surface emissions walk, a wellhead reading, or a perimeter probe check — flows through DataField™ Mobile and is transmitted to DataField™ Enterprise for storage, reporting, and audit access.

7.2 Core Capabilities

- Instrument communication — Connects directly to the Ωmega™ and other Ecotec analyzers via Bluetooth/USB; data captured automatically without manual intervention.
- Survey types supported — M21 surface emission tests, walking surveys (SEM sweeps, penetration/component monitoring, Gazoscan™ remote scanning), wellhead monitoring, perimeter probe readings
- Assigned survey management — Operators receive pre-assigned survey routes from DataField™ administrators, ensuring no monitoring points are missed and survey coverage is documented.
- Offline data collection — No data connection required during field data collection; surveys are conducted fully offline and uploaded automatically when internet connectivity is restored.
- Notes and photo capture — Technicians can save annotated notes and photographic evidence within the active survey record — valuable for exceedance documentation and repair verification.
- Alarm notifications — Real-time alerts when readings exceed LMR thresholds
- API token authentication — Secure login with role-based access; compliant with data integrity requirements for regulatory reporting

7.3 The DataField™ Mobile Workflow — From Field to Report



8. DataField™ Enterprise — Cloud-Based Compliance Reporting Platform

8.1 Overview

The DataField™ Enterprise solution, operated by Ecotec Solutions, Inc., is the cloud-based data management and compliance reporting platform that closes the loop on the entire Ecotec monitoring ecosystem. It is the regulatory backbone of the system — receiving all field data from DataField™ Mobile and continuous data from stationary analyzers and organizing it into the structured documentation format required by CARB's annual LMR reporting requirements.

DataField™ is not a third-party reporting tool bolted onto a hardware system — it is Ecotec's own purpose-built platform with its roots dated back to 1995 specifically for landfill gas wellhead environmental data management and reporting. The Ωmega and other Ecotec field analyzers to ensure complete data chain integrity from measurement to report. The privacy policy and terms of service for DataField™ Enterprise are maintained directly by Ecotec Solutions, Inc., ensuring operators deal with a single accountable vendor for both hardware and software compliance.

8.2 Core Platform Capabilities

Data Management

- Receives data from all Ecotec portable and stationary analyzers
- Accepts data from third-party analyzers via standard protocols
- M2M data feed from stationary FAU-TDL and Sentinel systems
- Persistent raw data storage — raw data is never overwritten
- Secure cloud infrastructure with role-based user access

Compliance Reporting

- Ad hoc reports, graphs, and data visualizations on demand
- Concentration maps and spatial plotting of SEM survey data
- Wellfield monitoring logs organized by well ID and date
- Exceedance tracking with 5-day repair deadline alerts
- CARB annual report data exports for March 15 submission

8.3 CARB Audit-Ready Documentation

The LMR requires operators to maintain and produce comprehensive records for CARB and air district review. DataField™ Enterprise is designed to satisfy these documentation obligations out of the box:

CARB Documentation Requirement	DataField™ Enterprise Capability
Timestamped surface monitoring records	Immutable records to ensure audit-ready, tamper-proof compliance data

CARB Documentation Requirement	DataField™ Enterprise Capability
GPS-verified monitoring location records	Geolocation metadata captured by DataField™ Mobile, displayed on spatial maps
Wellfield monitoring logs by well and date	Organized wellfield databases with drill-down by well ID, date, or parameter
Exceedance records with repair tracking	Automated 5-day repair deadline tracking; repair notes and photos attached
Annual report data compilation	Data export in CARB-compatible formats for March 15 submission
Surface survey route documentation	Survey path maps with reading color-coded by concentration range
GCCS performance records	Continuous FAU-TDL data archived and retrievable for any period
Remote plume response records	Satellite notification + responding SEM survey linked in same event record
Multi-site portfolio management	Enterprise dashboard for operators managing multiple LMR-subject sites

8.4 Multi-Site Enterprise View

For operators managing portfolios of LMR-subject landfills — particularly relevant for the large government-owned fleets (LA County with 26 permitted sites, San Bernardino County with 31, Kern County with 22) and private operators such as Waste Management, Republic Services, and Waste Connections — DataField™ Enterprise provides an enterprise-level dashboard that aggregates compliance status across all sites simultaneously. Key enterprise capabilities include:

- Cross-site exceedance monitoring — view all active exceedances across the portfolio in one screen
- Portfolio compliance heat map — identify which sites are at highest regulatory risk
- Centralized technician management — assign and track field crews across sites
- Consolidated annual report preparation — compile multi-site LMR reports from a single platform
- Regulatory calendar management — automated alerts for upcoming CARB reporting deadlines

9. Complete LMR Compliance Matrix

The following table maps every major LMR compliance requirement to the specific Ecotec analyzer or platform component that addresses it:

LMR Requirement	Ecotec Solution	Platform Component
Surface emissions monitoring at 500 ppm instantaneous, 25 ppm integrated	Real-time CH4 measurement at 1 ppm resolution	Ωmega™
Quarterly/monthly SEM walking survey	Structured survey workflow with GPS + timestamps	Ωmega™ + DataField™ Mobile
25-foot grid spacing compliance	Georeferenced walking path mapped in DataField™ Enterprise	Ωmega™ + DataField™ Mobile + DataField™ Enterprise
Exceedance detection & documentation	Automatic alarm at threshold; record auto-generated	Ωmega™ + DataField™ Enterprise
5-day corrective action tracking	Deadline alerts in DataField™ Enterprisewith repair verification workflow	DataField™ Enterprise
Post-repair re-monitoring records	Re-survey assigned in DataField™ Enterprise; linked to original exceedance	Ωmega™ + DataField™ Mobile + DataField™ Enterprise
Working face gas well monitoring	Monthly wellhead CH4%, O2%, temp, vacuum	Ωmega™
GCCS header continuous monitoring	Continuous CH4/CO2/O2 — no drift, no field calibration	FAU-TDL (Stationary)
Oxygen intrusion detection	O2 monitoring on all headers with real-time alerts	FAU-TDL + Sentinel
Flare combustion temperature (continuous)	Integrated with AEMS for 24/7 data to DataField™ Enterprise	FAU-TDL / AEMS + DataField™ Enterprise
Perimeter probe monitoring	Monthly readings captured and logged	Ωmega™ + DataField™ Mobile
Remote satellite plume response SEM	Targeted scan + Ωmega™ walkover; event linked in DataField™ Enterprise	Gazoscan™ + Ωmega™ + DataField™ Enterprise
Inaccessible area monitoring (new LMR)	360° stand-off scanning up to 330 ft	Gazoscan™
Component leak monitoring	CLM survey workflow in DataField™ Mobile	Ωmega™ + DataField™ Mobile

LMR Requirement	Ecotec Solution	Platform Component
GCCS well balancing support	Pressure/vacuum data for wellfield optimization	Ωmega™ + DataField™ Enterprise
Timestamped compliance records	All records include instrument-generated timestamps	DataField™ Enterprise
GPS-verified survey documentation	Geolocation metadata on every field record	DataField™ Mobile + DataField™ Enterprise
Annual report compilation (March 15)	CARB-format data export from DataField™ Enterprise	DataField™ Enterprise
Multi-site portfolio compliance	Enterprise dashboard for all LMR sites	DataField™ Enterprise
Third-party data integration	DataField™ Enterprise accepts data from non-Ecotec instruments	DataField™ Enterprise

10. Total Cost of Ownership — OMEGA vs. Traditional Dual-analyzer Stack

A critical consideration for LMR compliance program managers is the total cost of maintaining a compliant monitoring program over time. The traditional approach — using separate surface emissions monitors (such as GEM 5000, SEM 5000, or Envision) alongside separate wellhead analyzers — creates structural cost duplication that the Ωmega™ eliminates.

Cost Category	Traditional Dual Stack	OMEGA Platform	5-Year Savings
Capital: SEM analyzer	$16,000	—	—
Capital: Wellhead analyzer	$16,000	—	—
Capital: Ωmega™ (both functions)	—	$28,600	—
Total Capital	$32,000	$28,600	$3,400
Annual calibration (2 analyzers)	$5,000/yr ($25,000)	Remote digital certification	$4,200/yr
Shipping & rental during calibration	$1,600/yr ($8,000)	Minimal — no analyzer return	$1,400/yr
Maintenance parts & consumables	$1,200/yr ($6,000)	$600/yr ($3,000)	$600/yr
Downtime labor (2 analyzers)	$3,000/yr ($15,000)	$300/yr ($1,500)	$2,700/yr
Total 5-Year Service Cost	$54,000	$10,500	$43,500
TOTAL 5-YEAR OWNERSHIP	$86,000	$39,100	~$47,000 (55%)

Executive Takeaway on Cost

The Ωmega™ is not simply a replacement for one analyzer — it eliminates an entire duplicate monitoring stack.

A 12-site portfolio transitioning from legacy dual-analyzer stacks to the Ωmega™ platform saves approximately $564,000 over 5 years in analyzer costs alone — not counting the additional compliance risk reduction value

from consolidated data management in DataField™ Enterprise.

11. Compliance Risk and Enforcement Context

The financial stakes of LMR non-compliance are significant. The updated regulation imposes escalating obligations with compressed timelines — particularly the 5-day repair mandate and new remote plume notification response requirement. Failure to meet these obligations exposes landfill operators to Notices of Violation (NOVs) from CARB or delegated air districts.

Portfolio Exposure Illustration

Scenario: A 12-site portfolio with an average of 1.5 NOVs per site per year

Average penalty per NOV: $25,000 per day (first 5 days)

Total potential annual exposure: 12 sites × 1.5 NOV × $25,000 × 5 days = $2,250,000

The most common sources of NOVs under the current LMR:

- Missed exceedance documentation
- 5-day repair deadline exceeded without documented corrective action
- Incomplete wellhead monitoring records (missing required monthly parameters)
- SEM coverage gaps — monitoring path does not cover required grid area
- Annual report errors due to manual data transcription mistakes

All five of these NOV sources are directly mitigated by the Ecotec Ωmega™ + DataField™ Mobile + DataField™ Enterprise system.

The Ecotec platform transforms LMR compliance from a reactive, paper-based field operation into a proactive, digitally-verified corporate risk management program. Real-time alerts, GPS-verified survey documentation, automated 5-day repair deadline tracking, and CARB-ready annual reports eliminate the manual process gaps where most compliance failures originate.

12. Deployment and Implementation

12.1 Recommended Implementation by Site Type

Site Type	Recommended Ecotec Configuration
Active landfill — Tier 1 LMR (large, GCCS required)	Ωmega™ (×2–4 units) + FAU-TDL on primary headers + Gazoscan™ + DataField™ Mobile + DataField™ Enterprise
Active landfill — Tier 1 LMR (small, GCCS required)	Ωmega™ (×1–2 units) + Sentinel (fixed monitoring) + DataField™ Mobile + DataField™ Enterprise
Closed landfill — Tier 1 (LFG collection active)	Ωmega™ (wellhead + SEM) + FAU-TDL (header) + DataField™ Mobile + DataField™ Enterprise
Closed landfill — Tier 2 (WIP ≥ 450K tons)	Ωmega™ + DataField™ Mobile + DataField™ Enterprise
Large multi-site operator (10+ sites)	Full Ωmega™ fleet + DataField™ Enterprise dashboard + centralized reporting
SaaS / Compliance-as-a-Service model	Ωmega™ hardware + DataField™ Enterprise subscription (monthly per-site pricing available)

12.2 Implementation Timeline

- Week 1–2: Ωmega™ analzyer delivery, DataField™ Mobile app installation, DataField™ Enterprise account configuration
- Week 2–3: Site survey setup in DataField™ Enterprise — monitoring points mapped, survey routes assigned, technician accounts created
- Week 3–4: Field technician training on Ωmega™ operation, DataField™Mobile workflows, and DataField™ Enterprise review access
- Month 2+: Active LMR compliance monitoring with full audit trail, real-time alerts, and scheduled reporting

12.3 Training and Support

Ecotec provides comprehensive onboarding, field training, and ongoing technical support as part of every deployment:

- Ωmega™ analzyer operation training — including LMR-specific SEM and wellhead workflows
- DataField™ Mobile training — survey assignment, offline data collection, upload verification
- DataField™ Enterprise administrator training — report generation, exceedance management, CARB data export
- Remote support available via TeamViewer — rapid troubleshooting without on-site visits
- FAU-TDL installation and commissioning — heat tracing, sample line configuration, connectivity setup

13. About Ecotec

Ecotec is a 30+-year veteran of gas monitoring and measurement technology, headquartered in Colton, California. Founded with a focus on engineering and consulting for landfills in the 1990s, Ecotec pioneered automated regulatory compliance software in 1994 — predating the initial LMR requirements by 16 years and the upcoming LMR requirements by 33 years. The company combines proprietary hardware (TDL analyzers – portable and stationary) with integrated software (DataField™ Enterprise) to deliver the only fully connected end-to-end greenhouse gas monitoring and compliance reporting ecosystem on the market.

Ecotec's Landfill Heritage

- 30+ years of landfill gas monitoring experience
- First landfill CDM carbon credit project (Novagerar, Brazil, 2001)
- Thousands of analyzers deployed globally across landfills
- Patented TDLAS technology — used across all product lines

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This white paper was prepared by Ecotec Solutions, Inc. for distribution to California landfill operators, environmental compliance consultants, and local enforcement agencies. All LMR regulatory thresholds, timelines, and requirements referenced herein are based on CARB's adopted amendments to the Landfill Methane Regulation as of November 20, 2025, effective January 1, 2027. Operators should consult the current regulatory text at ww2.arb.ca.gov for the most current requirements.