

Sweep Sustainability Reporting Platform

Product Requirements Document (PRD)

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Stakeholders: Engineering, Design, Sales, Customer Success, Compliance

1. Purpose and Scope

1.1 Product Vision

Sweep is a comprehensive sustainability reporting platform that transforms how organizations collect, manage, and report Environmental, Social, and Governance (ESG) data. The platform empowers companies to move from fragmented, manual ESG reporting processes to an integrated, automated, and audit-ready system that drives meaningful sustainability outcomes.

1.2 Business Objectives

- Enable organizations to achieve regulatory compliance with global ESG reporting standards
- Reduce ESG data management overhead by 80% through automation and AI-powered tools
- Provide enterprise-grade data integrity and audit trails for sustainability reporting
- Support strategic decision-making through real-time insights and forecasting capabilities
- Facilitate collaborative decarbonization across value chains and supplier networks

1.3 Product Scope

The Sweep platform encompasses:

- **Data Collection & Integration:** Automated ingestion from multiple sources and formats
 - **Data Management:** AI-powered cleansing, validation, and calculation engines
 - **Compliance Reporting:** Multi-standard reporting capabilities (CSRD, SFDR, ISSB, GRI, CDP, GHG Protocol)
 - **Analytics & Insights:** Real-time dashboards, trend analysis, and emission hotspot identification
 - **Collaboration Tools:** Supplier onboarding, value chain management, and workflow automation
 - **Forecasting & Planning:** Scenario modeling and financial impact assessment
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2. Target Users and Stakeholders

2.1 Primary Users

User Type	Role Description	Key Needs
Sustainability Managers	Lead ESG data collection and reporting initiatives	Centralized data management, automated calculations, compliance tracking
ESG Analysts	Perform data analysis and generate sustainability reports	Data quality tools, visualization capabilities, audit trails
Compliance Officers	Ensure adherence to regulatory requirements	Multi-standard reporting, documentation management, audit readiness
C-Suite Executives	Strategic decision-making and stakeholder communication	Executive dashboards, performance insights, risk assessment

2.2 Secondary Users

User Type	Role Description	Key Needs
IT Administrators	Manage platform configuration and integrations	System administration, security controls, data governance
Procurement Teams	Manage supplier ESG requirements	Supplier onboarding, collaboration workflows, performance tracking
Auditors (External)	Validate ESG data and reporting accuracy	Audit trails, data lineage, documentation access
Facility Managers	Provide operational data inputs	Data input interfaces, mobile access, workflow notifications

2.3 Market Segments

- Enterprise Corporations (1,000+ employees): Complex multi-location operations requiring comprehensive ESG reporting
 - Mid-Market Companies (250-1,000 employees): Growing sustainability requirements with limited dedicated resources
 - Public Companies: Regulatory compliance focus with stakeholder reporting needs
 - Private Equity Portfolio Companies: ESG due diligence and value creation initiatives
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3. Functional Requirements

3.1 Data Collection and Integration

3.1.1 Data Source Management

- REQ-DC-001: Support automated data ingestion from 50+ common enterprise systems (ERP, HRIS, facilities management, utility systems)
- REQ-DC-002: Enable manual data upload via CSV, Excel, and API endpoints
- REQ-DC-003: Provide real-time data synchronization with configurable refresh intervals
- REQ-DC-004: Support multiple data formats and units with automatic conversion capabilities
- REQ-DC-005: Maintain data lineage and source tracking for all ingested information

3.1.2 Emissions Data Management

- REQ-EM-001: Calculate Scope 1, 2, and 3 emissions using latest IPCC and GHG Protocol methodologies
- REQ-EM-002: Support location-based and market-based Scope 2 calculations
- REQ-EM-003: Provide comprehensive Scope 3 category coverage (all 15 categories)
- REQ-EM-004: Enable custom emission factor management and regional variations
- REQ-EM-005: Support carbon accounting for renewable energy certificates and offsets

3.1.3 Environmental KPI Tracking

- REQ-ENV-001: Track water consumption, withdrawal, and discharge metrics
- REQ-ENV-002: Monitor energy consumption by source (electricity, natural gas, renewable)
- REQ-ENV-003: Manage waste generation, diversion, and disposal data
- REQ-ENV-004: Support biodiversity and land use impact metrics
- REQ-ENV-005: Enable custom environmental KPI definition and tracking

3.2 Data Quality and Processing

3.2.1 AI-Powered Data Cleansing

- REQ-DQ-001: Automatically identify and flag data anomalies and outliers
- REQ-DQ-002: Detect and merge duplicate records using ML algorithms
- REQ-DQ-003: Validate data completeness and accuracy against predefined rules
- REQ-DQ-004: Provide data gap identification and filling recommendations
- REQ-DQ-005: Generate data quality scores and improvement recommendations

3.2.2 Automated Calculations

- REQ-CALC-001: Perform real-time calculations for all ESG metrics
- REQ-CALC-002: Support allocation methodologies (revenue-based, employee-based, floor area)
- REQ-CALC-003: Enable custom calculation formulas and business rules
- REQ-CALC-004: Provide calculation transparency and audit trails

- REQ-CALC-005: Support multi-currency financial calculations with exchange rate management

3.3 Compliance and Reporting

3.3.1 Multi-Standard Reporting

- REQ-REP-001: Generate CSRD-compliant reports with ESRS alignment
- REQ-REP-002: Support SFDR Principal Adverse Impacts (PAI) reporting
- REQ-REP-003: Provide ISSB S1 and S2 standard compliance
- REQ-REP-004: Enable GRI Standards reporting across all topic areas
- REQ-REP-005: Support CDP Climate, Water, and Forests questionnaire preparation
- REQ-REP-006: Generate GHG Protocol-compliant inventory reports

3.3.2 Report Generation and Management

- REQ-RGEN-001: Provide customizable report templates and branding options
- REQ-RGEN-002: Support multiple export formats (PDF, Word, Excel, JSON, XML)
- REQ-RGEN-003: Enable automated report scheduling and distribution
- REQ-RGEN-004: Maintain version control and approval workflows for reports
- REQ-RGEN-005: Provide multi-language report generation capabilities

3.4 Analytics and Visualization

3.4.1 Dashboard and Insights

- REQ-DASH-001: Provide real-time executive dashboards with key ESG metrics
- REQ-DASH-002: Enable customizable dashboard creation for different user roles
- REQ-DASH-003: Support drill-down capabilities from summary to detailed data
- REQ-DASH-004: Provide emission hotspot identification and ranking
- REQ-DASH-005: Enable benchmark comparisons against industry peers and standards

3.4.2 Forecasting and Scenario Planning

- REQ-FORE-001: Provide emission trajectory forecasting using historical data and trends
- REQ-FORE-002: Enable scenario modeling for decarbonization strategies
- REQ-FORE-003: Calculate financial impact of sustainability initiatives
- REQ-FORE-004: Support target setting and progress tracking against SBTi methodologies
- REQ-FORE-005: Provide Monte Carlo simulation for risk assessment

3.5 Collaboration and Workflow Management

3.5.1 Supplier and Value Chain Management

- REQ-SUP-001: Enable supplier onboarding with ESG data collection workflows
- REQ-SUP-002: Provide supplier performance scoring and ranking
- REQ-SUP-003: Support collaborative decarbonization project management
- REQ-SUP-004: Enable supplier data sharing and transparency controls
- REQ-SUP-005: Provide supplier engagement tracking and communication tools

3.5.2 Workflow Automation

- REQ-WF-001: Support configurable approval workflows for data and reports
 - REQ-WF-002: Provide automated notifications and escalation procedures
 - REQ-WF-003: Enable task assignment and progress tracking
 - REQ-WF-004: Support integration with enterprise workflow systems
 - REQ-WF-005: Provide audit trail for all workflow activities
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4. Non-Functional Requirements

4.1 Performance Requirements

- NFR-PERF-001: System response time < 2 seconds for standard queries
- NFR-PERF-002: Support concurrent users up to 1,000 per tenant
- NFR-PERF-003: Process data imports up to 1GB within 10 minutes
- NFR-PERF-004: Dashboard refresh time < 30 seconds for complex visualizations
- NFR-PERF-005: 99.9% uptime availability (maximum 8.77 hours downtime per year)

4.2 Scalability Requirements

- NFR-SCALE-001: Support horizontal scaling to accommodate growth
- NFR-SCALE-002: Handle 10TB+ of historical ESG data per enterprise client
- NFR-SCALE-003: Support 100+ simultaneous data source integrations
- NFR-SCALE-004: Enable multi-tenant architecture with data isolation
- NFR-SCALE-005: Support global deployment across multiple regions

4.3 Security Requirements

- NFR-SEC-001: Maintain SOC 2 Type II certification
- NFR-SEC-002: Achieve and maintain ISO 27001 certification
- NFR-SEC-003: Implement end-to-end data encryption (in transit and at rest)
- NFR-SEC-004: Provide role-based access control with granular permissions

- **NFR-SEC-005:** Support single sign-on (SSO) integration with enterprise identity providers
- **NFR-SEC-006:** Maintain comprehensive audit logs for all user activities
- **NFR-SEC-007:** Implement data loss prevention (DLP) controls

4.4 Usability Requirements

- **NFR-UX-001:** Achieve System Usability Scale (SUS) score > 80
 - **NFR-UX-002:** Support responsive design for mobile and tablet devices
 - **NFR-UX-003:** Provide multilingual interface support (English, French, German, Spanish)
 - **NFR-UX-004:** Ensure WCAG 2.1 AA compliance for accessibility
 - **NFR-UX-005:** Provide contextual help and guided workflows for new users
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5. Technical Requirements

5.1 Architecture Requirements

- **TECH-ARCH-001:** Implement microservices-based architecture for modularity and scalability
- **TECH-ARCH-002:** Use cloud-native technologies with containerization (Docker, Kubernetes)
- **TECH-ARCH-003:** Implement API-first design with comprehensive REST and GraphQL APIs
- **TECH-ARCH-004:** Support multi-cloud deployment (AWS, Azure, GCP)
- **TECH-ARCH-005:** Implement event-driven architecture for real-time data processing

5.2 Technology Stack

- **TECH-FRONT-001:** React.js frontend with TypeScript for type safety
- **TECH-BACK-001:** .NET Core microservices for business logic and API layers
- **TECH-BACK-002:** Python services for AI/ML processing and data analytics
- **TECH-BACK-003:** Java services for high-performance data processing
- **TECH-DATA-001:** PostgreSQL for transactional data storage
- **TECH-DATA-002:** Time-series database (InfluxDB/TimescaleDB) for metrics data
- **TECH-DATA-003:** Document database (MongoDB) for unstructured data
- **TECH-CACHE-001:** Redis for caching and session management

5.3 Integration Requirements

- **TECH-INT-001:** Support REST API integrations with 500+ requests per second capacity
- **TECH-INT-002:** Implement webhook-based real-time notifications
- **TECH-INT-003:** Provide pre-built connectors for top 20 enterprise systems
- **TECH-INT-004:** Support SFTP/FTP for legacy system integrations

- **TECH-INT-005:** Enable EDI transactions for supply chain data exchange

5.4 Data Requirements

- **TECH-DATA-004:** Implement automated daily backups with 7-year retention
 - **TECH-DATA-005:** Support data archiving and purging policies
 - **TECH-DATA-006:** Provide data export capabilities in multiple formats
 - **TECH-DATA-007:** Implement data versioning and historical tracking
 - **TECH-DATA-008:** Support data residency requirements by region
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6. Acceptance Criteria

6.1 Core Functionality Acceptance Criteria

Data Collection and Processing

- ☐ Successfully ingest data from 10 different source types without manual intervention
- ☐ Process 100,000 data points with < 0.1% error rate in automated calculations
- ☐ Complete data quality validation scoring for all ingested datasets
- ☐ Demonstrate real-time data synchronization with < 5-minute latency

Compliance Reporting

- ☐ Generate compliant reports for all 6 supported standards (CSRD, SFDR, ISSB, GRI, CDP, GHG Protocol)
- ☐ Pass third-party audit validation for generated reports
- ☐ Complete report generation in < 30 seconds for standard templates
- ☐ Maintain audit trail completeness for 100% of data transformations

User Experience

- ☐ Achieve user onboarding completion in < 30 minutes for standard configuration
- ☐ Demonstrate dashboard load times < 3 seconds for complex visualizations
- ☐ Pass accessibility testing for WCAG 2.1 AA compliance
- ☐ Complete user acceptance testing with > 90% satisfaction score

6.2 Performance Acceptance Criteria

- ☐ Support 500 concurrent users with < 2-second response time
- ☐ Process 1GB data import in < 10 minutes
- ☐ Maintain 99.9% uptime over 30-day testing period
- ☐ Demonstrate automatic scaling during peak usage scenarios

6.3 Security Acceptance Criteria

- ☐ Pass SOC 2 Type II audit with zero critical findings
 - ☐ Complete penetration testing with no high-severity vulnerabilities
 - ☐ Validate encryption for all data in transit and at rest
 - ☐ Demonstrate secure multi-tenant data isolation
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7. Exclusions and Limits

7.1 Functional Exclusions

- **Social and Governance Modules:** Initial release focuses on environmental data; S&G modules planned for subsequent releases
- **Advanced AI/ML Analytics:** Complex predictive modeling and AI-driven insights beyond data quality and basic forecasting
- **Financial Data Integration:** Direct integration with accounting systems for financial ESG metrics (planned for v2.0)
- **Blockchain Integration:** Distributed ledger capabilities for supply chain transparency
- **Mobile Application:** Native mobile apps (responsive web interface provided)

7.2 Technical Limitations

- **On-Premises Deployment:** Platform designed for cloud-only deployment
- **Legacy System Support:** Limited support for systems older than 10 years
- **Real-Time Streaming:** Batch processing model; real-time streaming limited to specific use cases
- **Custom Development:** No client-specific customization; configuration-based customization only

7.3 Data Limitations

- **Historical Data:** Import limited to 10 years of historical data
- **Data Volume:** Single tenant limited to 50TB of total storage
- **API Rate Limits:** 1,000 API calls per hour per client
- **Concurrent Integrations:** Maximum 50 active data source integrations per tenant

7.4 Compliance Limitations

- **Regional Variations:** Standard frameworks supported; country-specific variations require additional configuration
- **Industry Standards:** Focus on cross-industry standards; sector-specific standards (e.g., banking, oil & gas) in roadmap
- **Emerging Regulations:** New regulations supported 6-12 months post-finalization

8. Workflow Overview

8.1 Data Collection Workflow

1. Data Source Configuration

- └─ Connect to enterprise systems (ERP, HRIS, utilities)
- └─ Configure data mapping and validation rules
- └─ Set up automated synchronization schedules

2. Data Ingestion and Processing

- └─ Automated data extraction and loading
- └─ AI-powered data cleansing and validation
- └─ Duplicate detection and resolution
- └─ Data quality scoring and flagging

3. Calculation and Transformation

- └─ Apply emission factors and calculation methodologies
- └─ Perform automated calculations (Scope 1, 2, 3)
- └─ Convert units and normalize data
- └─ Generate derived metrics and KPIs

8.2 Reporting Workflow

1. Report Configuration

- └─ Select reporting standard and template
- └─ Define reporting period and organizational boundaries
- └─ Configure data aggregation rules

2. Report Generation

- └─ Automated data compilation and validation
- └─ Apply standard-specific calculations
- └─ Generate visualizations and summaries
- └─ Create draft report for review

3. Review and Approval

- └─ Multi-level review process with stakeholder notifications
- └─ Data validation and quality checks
- └─ Approval workflow execution
- └─ Final report publication and distribution

8.3 Supplier Collaboration Workflow

1. Supplier Onboarding

- Send invitation and access credentials
- Provide data collection templates and guidance
- Set up data sharing permissions and workflows

2. Data Collection and Management

- Supplier self-service data entry
- Automated validation and quality checks
- Data review and approval by procurement team
- Integration with customer's sustainability metrics

3. Collaboration and Improvement

- Performance scoring and benchmarking
- Collaborative target setting and tracking
- Initiative planning and progress monitoring
- Regular communication and reporting

9. KPIs and Milestones

9.1 Product Success Metrics

Category	KPI	Target	Measurement Period
User Adoption	Monthly Active Users	80% of licensed users	Monthly
Data Quality	Data Accuracy Rate	> 99.5%	Ongoing
Performance	Average Response Time	< 2 seconds	Daily
Customer Success	Time to First Value	< 30 days	Per customer
Compliance	Report Generation Success	100% for all standards	Monthly

9.2 Business Impact Metrics

Category	KPI	Target	Measurement Period
Efficiency	Reporting Time Reduction	80% reduction vs. manual	Per reporting cycle
Cost Savings	Customer TCO Reduction	60% vs. alternatives	Annual
Revenue Growth	Annual Recurring Revenue	150% YoY growth	Quarterly
Customer Satisfaction	Net Promoter Score (NPS)	> 70	Quarterly
Market Position	Market Share Growth	Top 3 in ESG software	Annual

9.3 Development Milestones

Phase 1: Foundation (Q1-Q2 2026)

- ☐ M1.1: Core data ingestion and processing engine (Month 3)
- ☐ M1.2: Basic calculations for Scope 1, 2, 3 emissions (Month 4)

- ☐ **M1.3:** Multi-tenant architecture and security framework (Month 5)
- ☐ **M1.4:** React.js frontend with core dashboards (Month 6)

Phase 2: Compliance and Reporting (Q3 2026)

- ☐ **M2.1:** CSRD and GHG Protocol reporting capabilities (Month 7)
- ☐ **M2.2:** Report generation and export functionality (Month 8)
- ☐ **M2.3:** Data quality and validation tools (Month 9)

Phase 3: Collaboration and Intelligence (Q4 2026)

- ☐ **M3.1:** Supplier onboarding and collaboration workflows (Month 10)
- ☐ **M3.2:** AI-powered insights and recommendations (Month 11)
- ☐ **M3.3:** Forecasting and scenario planning tools (Month 12)

Phase 4: Scale and Optimization (Q1 2027)

- ☐ **M4.1:** Additional reporting standards (SFDR, ISSB, CDP) (Month 13)
- ☐ **M4.2:** Advanced analytics and benchmarking (Month 14)
- ☐ **M4.3:** Enterprise integrations and APIs (Month 15)

9.4 Risk Mitigation Milestones

- ☐ **R1:** Security certifications (SOC 2, ISO 27001) completed by Month 8
 - ☐ **R2:** Performance benchmarking and optimization by Month 10
 - ☐ **R3:** Disaster recovery and business continuity testing by Month 12
 - ☐ **R4:** Compliance validation with external auditors by Month 14
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Appendices

Appendix A: Glossary of Terms

- **CSRD:** Corporate Sustainability Reporting Directive
- **SFDR:** Sustainable Finance Disclosure Regulation
- **ISSB:** International Sustainability Standards Board
- **GRI:** Global Reporting Initiative
- **CDP:** Carbon Disclosure Project
- **GHG Protocol:** Greenhouse Gas Protocol
- **SBTi:** Science Based Targets initiative
- **ESRS:** European Sustainability Reporting Standards

Appendix B: Regulatory Requirements Summary

[Detailed breakdown of each supported reporting standard and specific requirements]

Appendix C: Integration Specifications

[Technical specifications for supported integrations and APIs]

Document Approval

Role	Name	Date	Signature
Product Owner	[Name]	[Date]	[Signature]
Engineering Lead	[Name]	[Date]	[Signature]
Design Lead	[Name]	[Date]	[Signature]
Security Lead	[Name]	[Date]	[Signature]

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