

CLARITECH FOCUS BILLING

Energy Billing for Telecom and Datacenter Operations



INTRODUCTION

A primary benefit of FOCUS standardized energy data from the wide variety of power equipment in the network is that standardized energy data can be combined with other data sources. Energy billing in data center and telecom networks is a great example of how standardized energy data, combined with external data sources, can be used to create completely new functionality in the network.

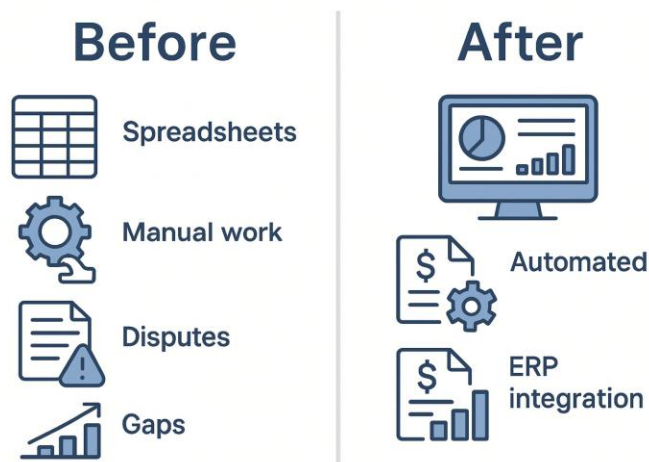
FOCUS Billing is an open-source based, cloud-native energy billing utility built for data center operators, towercos, and mobile network providers to modernize energy cost management at scale — and prepare for the demands of AI.



FOCUS Billing supports energy metering across thousands of diverse sites, normalizing multi-vendor data into a reliable, scalable, and audit-ready billing and enabling scheduled professional reporting, bills, and modern integration to ERP systems. Designed to eliminate the expense of spreadsheets, manual intervention, and hardware vendor lock-in, FOCUS enables automated billing without introducing proprietary tools or siloed data.

CURRENT BILLING CHALLENGES

- **Proprietary Products Fragment Data:** In almost any existing network, smart meters, generators, PDUs, rectifiers, multi-circuit panels, and software API's all speak different “languages” in reporting data on themselves. Each hardware vendor has largely produced their own equipment's management interface in order to differentiate their products from other competitors, not to adhere to any standard. You can read more about this core problem in our post, "Why Network Energy Problems Go Unsolved - And How To Fix Them."
- **Gaps & Rollovers:** Meters get replaced, reset, or go offline, leaving gaps in usage data requiring manual estimates be made.



- **Tariff Complexity:** Electricity pricing varies by time-of-day, seasonal thresholds, demand charges, and taxes — often requiring custom formulas that spreadsheets can't reliably handle.
- **Manual Workflows:** Billing is often built on semi-automated spreadsheets, leading to human error, high cost to maintain, slow reconciliation, disputes, and unhappy customers.

Why FOCUS Billing?



Smart Collection & Data Integrity

- **Collection** - FOCUS Billing gathers data directly, relying on our FOCUS method, from meters and systems via APIs, time-series databases (e.g., InfluxDB), and file drops (XML/CSV).
- **Integrity** - FOCUS Billing handles data validation, gap-filling (interpolation or estimation), unit normalization, and tagging, with accompanying audit trail.

No-Code Tariff Engine

- Apply **flexible multi-tiered tariff models** using a visual "Tariff Builder", supporting versioned rules, demand thresholds, seasonal rates, and multi-currency logic.
- **Audit** - Formulas are stored with version control for audit purposes.

Professional, Auditable Billing

- **Report** - Drag-and-drop report builder outputs bills in PDF, Excel, XML, or via API.
- **Audit** - Every data point: source meter, data transformation method, quality flag, and tariff calculation path can be audited and verified.
- **Schedule** billing runs and integrate with your ERP via secure API.

Cloud-Native Scale & Security

- **Scale** - Deployed on Kubernetes with Kafka-based streaming to scale for any size network.
- **Secure** - Enterprise-grade security with RBAC, encryption, tenant isolation, and immutable audit logs.
- **Observe** - Full observability through Prometheus and Grafana; supports blue/green deployments and auto rollbacks.

Business Benefits

- **Faster Billing Cycles:** Reduce billing timelines from days to hours with automation and scheduling. Onboard new tenants quickly.
- **Fewer Disputes:** Clear, traceable billing eliminates ambiguity and builds customer trust.
- **Improved Cash Flow:** Accelerate revenue recognition and reduce unbilled energy.
- **Lower Cost of Ownership:** Immediate labor savings by eliminating spreadsheets and manual intervention while scaling across regions and tenants. Analysts and energy managers can define tariffs and generate reports - no IT ticket necessary.
- **Sustainability Insights:** Integrate usage and emission metrics for compliance and corporate ESG initiatives.



FOCUS ALLOWS NEW BUSINESS MODELS

Energy-as-a-Service (EaaS) Models

Enterprises are shifting to usage-based energy cost models aligned with SLAs and consumption - a natural fit for FOCUS Billing's ability to integrate to other data sources such as SLA.

ESG Reporting

Stakeholders demand visibility into carbon footprint and renewable energy mix. FOCUS tracks actual and estimated energy usage with quality flags and can be combined with energy source data, enabling ESG reporting.

Billing Information for Internal Energy Efficiency

Use generated billing data as part of your own internal energy efficiency efforts.

AI Integration

FOCUS architecture ensures that standardized data and billing from FOCUS will be prepared for whatever comes next.



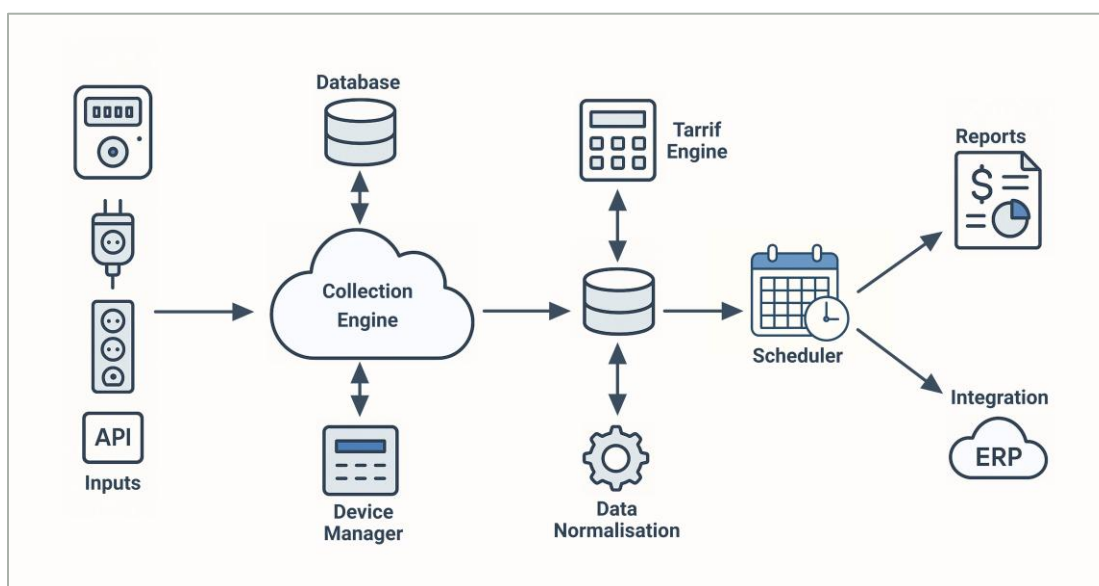
Conclusion

FOCUS Billing transforms energy billing from a manual legacy bottleneck into a streamlined revenue source and competitive advantage. Whether you operate 50 sites or 50,000 meters, FOCUS delivers transparent, automated, and scalable energy billing - ready for the future.

ARCHITECTURE

Collection Engine

- Connects to time-series databases (InfluxDB & others), SQL systems, XML/CSV/Excel files, and APIs
- Supports scheduled pulls or real-time streams
- Ensures data quality through validation, de-duplication, and unit normalization
- Handles late-arriving data and maintains stable billing



Data Standardization Module

- Detects missing intervals, abnormal spikes, meter rollovers, or replacements
- Performs linear interpolation, carry-forward, or contractual estimation methods
- Tags each value with a quality flag (Raw, Interpolated, Estimated, Manual)
- Provides complete audit trails for regulatory compliance.

Tariff Engine

- Allows creation of tariffs by combining time-of-use calendars, consumption thresholds, and fixed/demand charges
- Visual “Tariff Builder” offers drag-and-drop blocks and a formula engine built for energy billing, including operators and references relevant to tariff calculations
- Each tariff formula is versioned, logged, and stored to reproduce past bills exactly
- Supports multi-currency billing and tax application

The screenshot shows the 'Tariff Builder' interface. It is divided into three main sections: 'Blocks', 'Tier 1', and 'Version History'.
 - The 'Blocks' section on the left contains three draggable blocks: 'Start Date', 'Season', and 'Rate'.
 - The 'Tier 1' section in the center contains a visual formula engine. It has a 'Start Date' block followed by a 'Formula' field. Below this is a 'Season' block. Then, there are two rows: 'Demand Charge' with a value of '120 €/MWh' and 'Rate' with a value of '0.38 €/kWh'. At the bottom of Tier 1 is a '+ Add block' button.
 - Below Tier 1 are 'Tier 2' and 'Tier 3' sections, each with a '+ Add block' button.
 - The 'Version History' section on the right lists three versions: 'Version 3' (10 minutes ago), 'Version 2' (Yesterday), and 'Version 1' (2 days ago). A 'Save' button is located at the bottom right of the interface.

Report Builder

- Drag-and-drop UI for assembling billing reports
- Group data by customer, site, or meter hierarchy
- Generate outputs in multiple formats: database tables, XML, PDF, and Excel
- Built-in traceability:
 - Source data: which meter(s), which timestamps, which readings were used
 - Transformations: whether data was raw, interpolated, or estimated, and which method was applied
 - Tariff rules: which tariff components, thresholds, or time-of-use bands were applied
 - Formula execution: the exact calculation path (e.g., 400 kWh @ €0.15 + 200 kWh @ €0.38)
 - Quality flags: showing if a number is raw, interpolated, or estimated
 - Audit metadata: who ran the billing job, at what time, with which tariff version

Scheduler & Orchestration

- Automates billing runs on fixed monthly dates or custom schedules
- Supports retries, backfill, and approval workflows
- Ensures consistent execution through workflow orchestration

Northbound API & Integrations

- REST APIs expose all metadata, readings, bills, and reports
- Integration with data analytics tools such as Tableau ©
- Webhooks notify external systems about billing events or anomalies
- Push exports via SFTP for integration with ERP/financial systems
- Kafka topics support real-time streaming to external platforms

TECHNICAL FEATURES

Security & Compliance

- Role-based access control with roles like Viewer, Analyst, Manager, and Admin
- Tenant isolation with row-level security in the database
- Encryption in transit (TLS 1.2+) and at rest (AES-256)
- Immutable logs for audits; GDPR-ready retention controls

Scalability & Resilience

- Deployed as microservices on Kubernetes
- Kafka provides high-throughput event streaming
- Horizontal scaling supports 10,000+ meters seamlessly
- Fault tolerance ensures uninterrupted billing even if sources fail

Observability & Operations

- Integrated with Prometheus and Grafana dashboards
- End-to-end tracing with OpenTelemetry (full visibility of billing runs across all microservices, in one correlated view)
- Alerts for ingestion failures, data gaps, or tariff misconfigurations
- Blue/green deployments and automatic rollbacks for safe updates

More info at www.claritech.io