



# **DIGITALIZING ENERGY & UTILITIES MANAGEMENT**



# INTEGRATED ENERGY & UTILITIES MANAGEMENT

Viridis offers solutions to cover all phases of energy and utilities management cycle, combining operations and management perspectives. Viridis's products are seamlessly integrated, providing flexibility for smaller companies that have basic energy & utilities management demands as well as for global corporations with advanced requirements.

**Viridis Tracking:** Monitors consumption, generation, emissions, and energy & utilities conversions through all operations. Manages distribution networks and executes automatic correlations of equipment energy performance based on registered events, process variables, and operational data.

**Viridis Planning:** Absorbs all corporate activities in energy & utilities management, including supply contract management, direct and indirect cost distribution, consumption forecasting, energy planning, simulation of different consumption and supply scenarios, and budget management.

**Viridis Efficiency:** Promotes energy and operational efficiency initiatives in order to identify useless energy, waste, best operational practices, savings, avoided costs, and continuous improvement cycle management, directly assisting teams to reduce energy & utilities consumption.

**Viridis Intelligence:** Provides advanced computational intelligence models to optimize supply and generation strategies, model and optimize large processes, execute probabilistic simulations, and perform sensitivity analysis.

**Viridis Platform:** The backbone of the Viridis product family, offering the state of the art in IoT, big data, analytics, cloud computing, DevOps, computational intelligence, and mobile technologies for digital transformation and Industry 4.0 applications.





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## END-TO-END ENERGY & UTILITIES MANAGEMENT

Viridis integrates all phases of energy and utilities and management cycle, providing a comprehensive view of consumption, generation, and emissions.

Viridis interprets everything that happens in your operation and relates it to energy flows. Discover the energy costs for each product type, and which operators, teams, or shifts consume less energy in processes, or even which production plans and setup parameters generate more savings.

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## MANAGE GRIDS AND METERS

Viridis automatically retrieves data, calibrates meters, and monitors measurements. Viridis Tracking manages the entire metering infrastructure, connecting to meters either directly, or indirectly via other middleware such as PIMS and automation systems. Viridis automatically ensures consistency of sub-metering hierarchies and detects meter failures as well as fluid leakages and current leakages.

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## INTELLIGENT TARGETS

How can you set consumption targets that are appropriate for various production scenarios? Viridis Efficiency calculates adaptive targets that consider all variables affecting energy consumption. Keep your operators engaged and give them targets that make sense in each production context.

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## AUTOMATIC DATA CLEANSING

No more data inconsistencies: Viridis Tracking employs a wide variety of advanced data quality heuristics to identify and fix data problems automatically. The more reliable the data, the more informed your decisions will be.

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## CONTROL YOUR ENERGY IN REAL TIME

Control energy consumption and generation in real time with Viridis Tracking. Be ready to respond immediately to every situation. Exploit savings opportunities as processes are executed.

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## FILL THE GAP BETWEEN AUTOMATION AND CORPORATE SYSTEMS

Viridis provides close integration with other engineering and information systems used by the company, from automation (PIMS, PLCs, SCADAs, energy meters) to management systems (SAP and other ERPs, MES, and IT systems). Viridis manages all energy and utilities data, avoiding data inconsistencies and duplicates.

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## GET TO KNOW WHY

Viridis Efficiency interprets everything that happens in your operation and compares it to your energy flows. Discover not only how much energy is being consumed, why your operational efficiency is increasing or decreasing. Determine which external factors impact your consumption metrics, and plot a course towards better energy efficiency.

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## FORECASTING AND ENERGY SIMULATION

Let Viridis Planning simulate and predict the entire energy cycle in your plant, from consumption to generation. You can preview the behavior of individual pieces of equipment, an entire line, or the entire plant.



# VIRIDIS: COMPLETE SOLUTION FOR ENERGY & UTILITIES MANAGEMENT

## ENERGY & UTILITIES CONTRACT MANAGEMENT

Use Viridis Planning to oversee all technical and commercial clauses in energy contracts. Viridis automatically forecasts consumption and generation figures to simulate the financial execution and behavior of a portfolio of contracts over time. Assess multiple demand and supply scenarios, define optimal strategies, and reduce energy & utilities planning risks.

## DISCOVER THE BEST ENERGY MATRIX FOR YOUR PRODUCTION PLAN

Ensure that you have the most efficient and up-to-date strategy every time a production plan is altered or whenever the availability or price of energy and utilities changes. Use Viridis Planning to forecast and simulate how your operation consumes energy and utilities over time, and Viridis Intelligence to automatically develop a strategy that minimizes total costs.

## GET TO KNOW YOUR REAL ENERGY & UTILITIES COSTS

Viridis Planning measures and automatically assigns all energy & utilities costs to cost centers, ledger accounts, and production orders. Through configurable costing rules, you define the criteria by which direct and indirect costs are calculated and allocated.

## SECURITY, RELIABILITY, AND AGILITY

The Viridis platform is based on state-of-the-art technology. All Viridis products work in distributed clusters that provide horizontal scalability for storage and processing power as well as a high-availability environment. Viridis clusters may be commissioned onsite or on the cloud, and include options such as federated authentication, private cloud, encrypted communications and storage, among other features to provide the highest level of reliability and security.





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## ADVANCED ENERGY ANALYTICS

It is not sufficient to transform data into information. Viridis Intelligence leverages machine learning and computational intelligence technologies to generate simulations, optimizations, and quantitative analyses, supplying new information about on energy behavior and radically improving your decision-making process.

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## PAVE THE WAY TOWARD ISO 50001

Automate measurements and management of energy efficiency projects and initiatives. For every new project, you identify measurement criteria, establish baselines, and follow up on implementation actions. Afterwards, check out the savings obtained with each initiative, and let Viridis calculate the ROI of each initiative as well as the return of the whole portfolio.

## AUDIENCE

Viridis solutions have been developed to support of a wide range of sectors, incorporating details of process, production lines, and equipment inherent to each type of operation. Viridis solutions are applicable in companies where energy and utilities management can create a competitive advantage, such as:

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### INDUSTRIAL OPERATIONS

Steel, mining, chemicals, agribusiness, food, drinks, paper and cellulose, cement, automotive, metalworking, consumer products, oil and gas, textiles, foundries, ferroalloys, non-ferrous metals, machines and equipment, among others.

## COMMISSIONING

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### CLOUD

Model of commissioning in the cloud using Cloud Computing environments fully managed by Viridis, with the option of environments in the public cloud or a private cloud. There is also the option of using the client's own existing contracts with their current cloud providers. In all cases, data communication with the sites is performed by the Viridis IoT Gateway, a technology developed by Viridis exclusively to provide bi-directional integration in real time with multiple local systems, in addition to performing edge analytics.

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### BEHAVIOR ALERTS

Whenever a managed aspect (such as specific consumption, power demand, or data quality) goes out of bounds, Viridis Tracking and Viridis Efficiency will send automatic notifications via the Viridis Mobile App (available for iOS and Android), email, SMS, the automation network, or even create a predictive maintenance order automatically.

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### DISTRIBUTED OPERATIONS

Sanitation, telecommunications, retail chains, financial institutions, education networks, hotel networks, among other sectors with dozens, hundreds, or thousands of consumption units.

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### ON-PREMISES

All operations in the environment can be controlled by the staff of the client or optionally delegated to the Viridis team.



# TAILORED TO YOUR NEEDS

## ANYTIME, ANYWHERE

Smartphone, tablet, desktop, web, and even video wall: access Viridis any way you want, without the need for dedicated servers or additional software.

## DISTRIBUTED OPERATIONS IN MULTIPLE SITES

Companies with distributed operations in multiple sites may take advantage of the scalability of the Viridis platform to manage the whole group from a single cluster of servers. Corporate managers are able to track consumption, generation, and efficiency metrics from any site in real time, regardless of geographical location.

Teams responsible for specific pieces of equipment can benchmark their assets with others in distant locations. Teams responsible for energy and utilities management can plan and budget for the whole group, with integrated, up-to-date information. Functional and specialist teams can use the Viridis platform to power integrated operations centers as well as to provide mobile access for those on the road. Viridis solutions eliminate distances and integrate teams all across the enterprise.

## ENHANCE THE PRODUCTIVITY OF ENERGY & UTILITIES MANAGEMENT TEAMS

Viridis saves time for energy and utilities management professionals by automating a comprehensive range of management routines. Instead of spending hours in front of spreadsheets merging data and monitoring reports, teams can invest their time better and concentrate effort where it matters the most: improving the company's energy efficiency.

## RISK MITIGATION

React quickly and precisely to operational incidents. Viridis optimizes the operational continuity of industrial plants and anticipates the best solution to an extensive variety of equipment, leakage, input, or supplier-related problems.

## DIRECT COST REDUCTION

Viridis integrated solutions can be expected to reduce around 10% of the whole energy & utilities matrix, with no further investments necessary. In some cases the reduction may be even more significant, depending on the nature of the business, operational characteristics, and management maturity of each company.

## FLEXIBILITY FOR YOUR BUDGET

Viridis products can be acquired or incorporated into a budget in one of two ways, according to the your company's budgeting preferences. Either model may be independently used for onsite or on-demand installations.

### OPEX

Subscription service, implementation projects and added services, accounting as operating costs, including for tax purposes.

### CAPEX

Integrated package that can be treated as a depreciable asset and includes everything necessary for a complete integration of the Viridis platform for a specified period.

# SOLUTIONS

## PRODUCTS

## MODULES



### INTELLIGENCE



Statistical  
Modeling



Simulation



Optimization



### EFFICIENCY



Advanced  
Consumption



Advanced  
Generation &  
Conversion



Emissions



Balances



Benchmarking



Continuous  
Improvement



Savings  
& Cost  
Avoidance



### PLANNING



Forecasting



Planning &  
Simulation



Contracts



Budgeting



Accounting



### TRACKING



Energy &  
Utilities



Meter  
Grids



Equipment



Consumption



Generation &  
Conversion



Stock



### PLATFORM



System



Configuration



IoT Gateway



Data  
Ingestion



Data  
Quality



Historian



Infoboards

## DIGITAL TRANSFORMATION & INDUSTRY 4.0



Mobility



IoT



Big Data



Analytics



Computational  
Intelligence



DevOps



Cloud





## PLATFORM



### SYSTEM

Viridis products have a responsive, multi-platform web interface (available in a variety of media including web, mobile, and video walls) and include an Integrated Help Center that includes a Learning Center, FAQ, Support Channel, and Download Center, among other resources.



### CONFIGURATION

Viridis is highly configurable and adaptable. The Viridis platform can be installed in companies of any size, in any vertical, and of any management maturity level.



### IoT GATEWAY

Connects Viridis to operational and enterprise system. The Viridis IoT Gateway integrates with legacy systems in real time, reliably and securely, managing data from thousands of data sources.



### DATA INGESTION

Viridis's platform collects and manages automatic measurements, manual entries, and formula-based virtual meters. The data ingestion module controls all of the data flow between Viridis IoT Gateways and the multiple data processing steps performed by the platform.



### DATA QUALITY

Sophisticated mechanisms for data quality problem detection and automatic cleansing, enabling the processing of data from thousands of sources in real time, without human intervention.



### HISTORIAN

In addition to real-time monitoring, the ability to store and instantly vast numbers of historical measurements, and operational data is another highlight of the Viridis platform. Automatically create a comprehensive historical analysis database and leverage the power of historical data across the entire enterprise.



### INFOBOARDS

Viridis features user-customizable displays including reports, dashboards, scorecards, process models, and many others.







## TRACKING



### ENERGY & UTILITIES

Configure multiple energy inputs and utilities, including electricity, solid, liquid, and gaseous fuels, steam, compressed air, air gases, different types of water, and many more.



### METER GRIDS

Configure meter grids and organize meters in hierarchies or busbars. Balance of metering grids and take advantage of automatic leakage detection.



### EQUIPMENT

Configure all processes and equipment describing your company's operations, from multiple sites to each individual piece of equipment, modeling all intermediate organization levels passed.



### CONSUMPTION

Control energy consumption by collecting all measurements from the plant to provide a consolidated view of energy use. Manage consumption KPIs and their targets in real time. Monitor specific consumption by time, produced amount, or by any other operational variable used in the company.



### GENERATION & CONVERSION

Control energy generation and cogeneration using byproducts of other production processes. Manage performance indicators in real time and analyze generation and conversion efficiency. Manage specific generation by time, produced amount, or any other operational variable used in the company.



### STOCK

Monitor the levels of stockable energy inputs and manage inventory.



## PLANNING



### FORECASTING

Display projected consumption, generation, or emissions for individual pieces of equipment, production lines, or the entire plant. Automatically take into consideration all changes to production and operational plans.



### PLANNING & SIMULATION

Enable multiple scenario planning taking into consideration the distribution of production steps over time. Dynamic simulations consider the latest operational and production plans along with individual equipment models to precisely forecast energy & utilities consumption under a range of assumptions.



### CONTRACTS

Manage contracts and energy input costs considering terms such as seasonal rates, contracted demand, take-or-pay clauses, fines, taxes, and other factors.



### BUDGETING

Manage the entire energy budgeting cycle from within Viridis. Orchestrate decentralized budgeting and consolidation. Automatically connect to external ERP or budgeting systems to retrieve data, publish plans, and monitor execution.



### ACCOUNTING

Rule-based energy costing system, capable of allocating direct and indirect costs to ledger accounts, cost centers, production orders, in addition to automatically integrating with accounting systems and ERPs.



## EFFICIENCY



### ADVANCED CONSUMPTION

Manage best marks, adaptive targets and flexible targets based on context. Manage consumption correlations automatically by fractioning average energy performances based on different contexts. Highlight cause-and-effect relationships and the aspects of the operation that positively or negatively influence the efficiency of each piece of equipment.



### ADVANCED GENERATION & CONVERSION

Manage best marks, adaptive targets, and flexible targets based on context. Manage generation and conversion indicators automatically, as well as their correlation with other influencing variables.



### EMISSIONS

Automatically monitor greenhouse gases, liquid and solid waste emissions, environmental impact indicators, and sustainability. Manage specific emissions by time, produced amount, or any other variables. Create sustainability dashboards, targets, and environmental impact indicators.





## BALANCES

Viridis calculates and manages mass and energy balances for specific pieces of equipment, production lines, or the entire plant.



## BENCHMARKING

Compare energy performance indicators for similar pieces of equipment, production lines, or entire industrial plants. Identify which operational parameters are responsible for different levels of energy performance and close the gaps in your operation.



## CONTINUOUS IMPROVEMENT

Viridis includes a set of tools that enable the execution of PDCA cycles for energy management, including the measurement and verification of energy efficiency initiatives. Viridis also supports the execution of practices defined by ISO 14001.



## SAVINGS & COST AVOIDANCE

Compare energy efficiency levels in relation to baseline periods, analyzing cause and effect and identifying which incidents, events, energy efficiency initiatives, and other factors have positively or negatively influenced efficiency levels. Simulate financial costs saved or avoided as a result of energy efficiency operations.



## INTELLIGENCE



### STATISTICAL MODELING

Collection of statistical modeling tools that can be applied to the historical data repository for deeper analysis of equipment and processes.



### SIMULATION

Advanced probabilistic simulation features, sensitivity analysis, stochastic evaluation of models, and other sophisticated tools focused on predicting behavior of equipment and processes.



### OPTIMIZATION

Mathematical optimization features focused on finding optimized strategies for a variety of operational situations. Includes resources for minimizing energy and utilities supply costs for equipment, processes, production lines, units, sites, or the entire company.







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