

Product Overview

Demand Response Management System



An overview of the Ventyx Smart Grid solution for demand response programs, distributed energy management & commercial operations.

Utility Smart Grid programs seek to increase operational efficiencies to maximize and optimize the use of Distributed Energy Resources (DER) including renewables, and to help the energy consumer make more informed choices about how and when they use power. The Ventyx DRMS enables support of the commercial and retail utility operations that are required to deliver effective demand response programs, distributed energy management, and resource optimization for successful Smart Grid deployments.

Ventyx DRMS delivers important benefits to the utility Smart Grid program:

- Improving distribution monitoring, control, and optimization through the development, optimization, and dispatch of Virtual Power Plants;
- Enhancing renewables facilitation through the development, communication, marketing, and implementation of Smart Grid programs that incent the energy consumer to make 'Green Choices';
- Turning Advanced Metering Initiatives (AMI) into commercially actionable information through analysis of consumption data to optimize Demand Response capabilities;
- Leveraging the power of dynamic Virtual Power

Plant optimization to support microgrids for reliability and resilience enhancement;

- Leveraging, forecasting and optimizing the impact of plug-in hybrid electric vehicles;
- Fully integrating the consumer into energy markets and grid operations through Smart Grid programs including: In-home price signaling; In-home load signaling; In-home environmental signaling; Voluntary reduction programs; Green choices programs; and
- Bidding power into ISO markets as an integrated Load Serving Entity and Curtailment.

Demand Response Programs & Distributed Energy Management – DRMS supports program design, customer enrollment and preference tracking. Demand Response and Distributed Energy Resources are aggregated into actionable resources through Virtual Power Plants. This includes benefits calculations for use in program design, day ahead and real time operations forecasting and aggregations of DER into virtual power plants, and performing billing determinant computations based on customer tariffs.

Unit Commitment & Resource Optimization – DRMS enables utility portfolio optimization by supporting unit commitment and dispatch for

complex portfolios that include the full range of portfolio components, including generation, storage, renewables, Virtual Power Plants and complex contracts. Key outputs are the price and emissions signaling for communications to commercial systems, and to customer portals. DRMS enables utilities to realize the benefits of renewables, distributed energy, and demand response in terms of daily operations, and mid-to-long term investment in portfolio and infrastructure expansion.

Optimize Decisions – To facilitate the speed of decision making required to dispatch distributed energy resources, and to provide a comprehensive portfolio view, Ventyx's DRMS solution includes an operations dashboard that brings all portfolio elements into a framework and view for final execution of decisions, and reporting of the forecast and execution results. The dashboard is used to dispatch the Virtual Power Plants and to initiate the signals to the underlying control systems for interruption and recording of results.

DRMS Retail Operations

Energy Operations Management for Demand Response Program

Design, Billing and Benefit Reporting

DRMS Retail Operations provides support to understand the aggregated capabilities of the installed distributed energy resources, as well as to compute benefits and billing determinants at an aggregated, and end-use customer level. Smart Grid Retail offers utility data management, customer contract management, revenue and load forecasting, load profiling and aggregation, and meter results data management in a single system. DRMS Retail is used to aggregate the dispatchable distributed energy resources into Virtual Power Plants and to track results from utility operation of the Virtual Power Plants. DRMS Retail is widely used across North America and Europe to streamline operations, reduce costs, and add value to retail supply and distribution organizations.

DRMS Retail Operations Features:

Load and Revenue Forecasting – DRMS Retail provides bottom-up load and revenue forecasts based on service dates, usage history, and product types for each individual account, service location, or meter, as well as the ability to aggregate these to a commercial operations level. The application supports all utility provided load profiles, as well as the ability to build your own load models utilizing historical meter,

device, and weather data. DRMS Retail automates the challenging steps involved in producing forecasts, resulting in more time to focus on detailed analysis.

Program Pricing and Management – DRMS Retail includes a library of standard product types as well as a powerful formula editor to support user-defined products and programs. The product and program models include the energy supply costs, DRMS Retail price offerings, and current utility rates or competitor prices. The pricing analysis engine calculates the cost to serve with the new program, revenue, margin, and customer savings. Also inherent to the system is the DR program enrollment process.

Meter Results Data Management – DRMS Retail is ideal for handling the associated collection, translation, and analysis of meter consumption data from traditional and smart meters. It can be configured to routinely retrieve and translate usage data from meter-reading systems, legacy systems, or metering service providers to store in the meter results data management system for producing new forecasts, computing complex billing determinants, and for computing overall program benefits and costs.

Load Profiling and Meter Aggregation – DRMS Retail supports multiple load profiling methods, such as Proxy Day, Dynamic Load Profiling, and weather-based Regression Modeling. In addition, the application provides numerous standard functions to access, manipulate, validate, and aggregate meter or device data.

Complex Billing – DRMS Retail produce the complex billing determinants associated with the evolving complex tariffs for Smart Grid demand response programs. The complex billing supports time of use (TOU), tiered pricing, block pricing, green pricing, and other options. DRMS Retail has granularity for retail level determinants and integrates to CIS systems for a complete billing solution. DRMS Retail also has granularity for billing of large agreements such as power purchase agreements taking into account the related complexity of the energy operations associated with the billing elements.

DRMS Retail for Scheduling, Settlement, and Market Communications – Smart Grid Retail provides integrated communications to multiple scheduling entities, including ISOs/RTOs. Load forecasts and bilateral transactions can be converted into bids and schedules for automated submission and tracking. Settlement statements and reports are automatically downloaded from the ISO website for shadow settlement and dispute analysis.

DRMS Retail Operations Benefits:

DRMS Retail streamlines operations to reduce costs, maximize margins, and enable rapid execution of strategic business decisions.

Other key benefits include:

- Management and tracking of Demand Response and Distributed Generation assets
- Definition and management of Smart Grid customer incentive and compensation programs
- Creation of Virtual Power Plants consisting of Smart Grid Customers, Programs and Devices
- Demand Response Event forecasting and management
- Demand Response Event reporting of economic and environmental benefits
- Calculation of Smart Grid Program related bill determinants.

DRMS Commercial Operations

Short term energy portfolio resource optimization for unit commitment and economic dispatch

DRMS Commercial optimizes a portfolio's Smart Grid operational requirements by modeling detailed unit operating constraints and market conditions to provide a generation schedule for energy and ancillary services, fuel nominations, supporting the evaluation and pricing of potential short-term transactions, and facilitates the analysis and simulation of deterministic scenarios.

Smart Grid Commercial Operations Features:

- Portfolio Optimization – Mixed Integer Linear Programming (MILP) provides modeling richness to truly optimize the most complex problems e.g. Virtual Power Plants, Distributed Generation, CCGT, CHP, pumped storage, and the simultaneous optimization of hydro and thermal. The solution architecture easily accommodates the set of ever changing modeling requirements.
- Emissions & Renewables – DRMS Operations integrates renewable resources in the portfolio and emissions to create both environmental and price signals.

- Decision Support for Physical Trading – Reduced costs, improved profitability and the ability to manage risk are all integral components of operations management software. DRMS Commercial allows users to price standard trades.
- Fuel Management and Pipeline Modeling – Reducing fuel costs through enhanced portfolio optimization to determine the best use of scarce fuel is a key operational requirement. DRMS Commercial produces hourly and aggregated fuel nominations by Electric or Gas Day. Fuel blending capabilities optimize the mix of available fuels considering commodity cost, emission costs and limits. Modeling complex pipeline networks with multi volumetric constraints and costs is necessary to achieve maximum profitability.
- Simulation Scenarios – “What if?” analysis improves operational decisions and helps manage the risks associated with unexpected events. DRMS Operations utilizes an easy to use interface to analyze and compare sensitivity studies.
- Post Analysis for Improved Operations – The ability to import and simulate, using actual data, and compare this data with forecasted scenarios enables feedback into the operational processes to improve efficiency

DRMS Commercial Operations Benefits:

Portfolio Optimization of resources is heavily dependant on timely and accurate operational decisions. Unit commitment and dispatch schedules, fuel consumption forecast, options implementation, commodity arbitrage and bidding decisions, Virtual Power Plants, and Distributed Generation Resources are some examples of the operational decisions to minimize cost or maximize profits that utilities need to perform under uncertain and always changing variables.

Improved unit commitment and dispatch significantly increase profitability. DRMS Commercial utilizes the latest advances in mathematical programming techniques (Mixed Integer Linear Programming) combined with Ventyx's domain expertise to deliver the market leading application.



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