

**Title:** Dynamic Systems put ERM in Motion: A Day in the Life

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**Abstract:** This article describes a scenario for the use of a dynamic system for Enterprise Risk Management at Allied Electric Utility (AEU), a hypothetical electric utility in southeast Georgia. The scenario focuses on a single day's events as the VP of Finance uses the system to propose and analyze actions to mitigate a risk with implications for both finance and operations at AEU. The scenario demonstrates the potential for emerging dynamic systems to integrate ERM into day-to-day business management. It also illustrates some of the characteristics businesses will need in dynamic ERM technology.

## Main Text

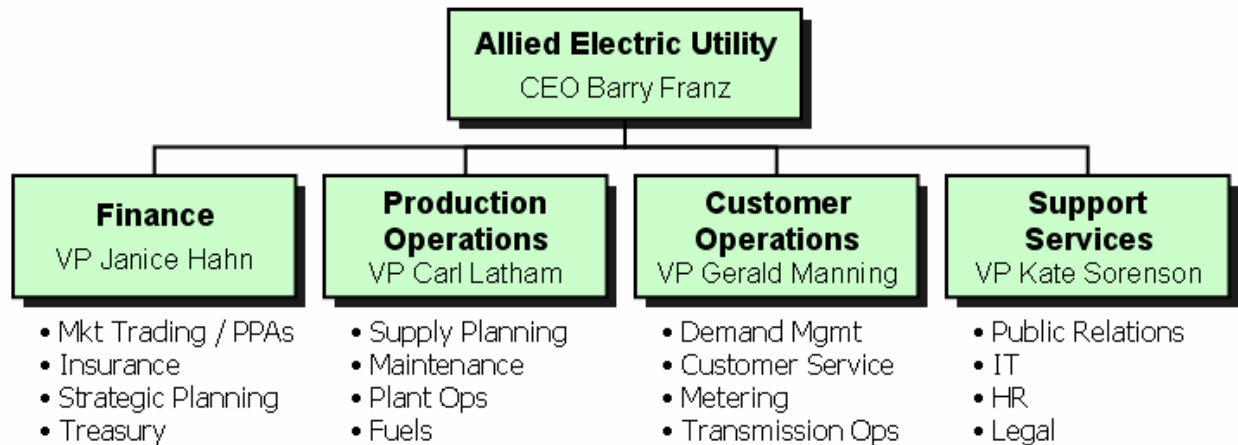
Leading companies are starting to apply newly emerging dynamic systems to integrate Enterprise Risk Management (ERM) into their day-to-day business processes, thus achieving strategic and financial benefits not possible with traditional approaches to ERM. While the principles of Dynamic ERM apply to any organization in any industry, this scenario describes the use of such a system at a hypothetical electric utility, focusing on a single day's events through the eyes of the VP of Finance. Her use of the system to propose and analyze mitigation actions for a risk with enterprise-wide implications illustrates the unique capabilities needed for a Dynamic ERM system to achieve these benefits.

### Dynamic ERM at Allied Electric Utility

Janice Hahn steps back into her office, her mind still buzzing about the lengthy budget meeting. Not having been at her desk since she arrived early this morning, she checks her email and finds a recent message sent by her company's Enterprise Risk Management system titled "Risk Level Increased to High: Peak Season Demand Satisfaction". In other words, there is now a high risk that available sources will not be enough to satisfy customer demand for electricity during the coming peak season.

As she logs into the ERM system for a closer look, Janice thinks back to when she became Vice President of Finance and CFO for Allied Electric Utility (AEU), a large municipally owned electric utility in southeast Georgia. She joined the Risk Management Committee, a small working group of senior executives from each division, and participated in their annual ERM review and analysis process. They updated and prioritized their list of the top risks facing AEU

and designed strategies to mitigate those risks that would be integrated into the annual strategic plan.



**Figure 1: Allied Electric Utility (AEU) Organization**

This annual process helped to establish a common sense of priorities among members of the Risk Management Committee, and to identify some collaborative risk mitigation actions between departments, yet it had still seemed incomplete to Janice. She found it difficult to involve members of her staff who had not taken part in the ERM meetings. Though the committee met from time to time throughout the year, and the annual ERM summary reports became a focus of new activity for several weeks, each report was effectively out of date the moment it was printed and would end up as a dust collector on office shelves throughout the department.

Working with the others on the Risk Management Committee, Janice helped to identify a solution that would enable continuous, active risk management throughout the year and extend and magnify the value of the investment in ERM they were already making. They decided to implement a dynamic ERM system with a suite of advanced capabilities for the intelligent monitoring and management of enterprise-wide risks. Janice and several of her staff played active roles in the cross-functional team that defined the system’s risk management processes through a series of steps including:

- Selecting the risks to be monitored by the system,
- Mapping the relationships among the risks, relevant risk drivers, and AEU’s strategic objectives,
- Identifying internal and external data sources that could provide timely risk information for the system,
- Defining potential actions to mitigate those risks, and
- Setting priorities for the system’s capabilities for suggesting relevant actions, escalating risks, and tracking risk mitigation actions.

After a process of testing and refinement, the ERM system was made available for use by staff in multiple departments.

Now on this Tuesday afternoon, Janice would once again reap the benefits of this work, as she and the rest of AEU had many times since the completion of the system last year.

### **Common Framework for all Enterprise Risks**

On logging in, the first thing Janice sees is the ERM Dashboard, which gives her an overview of AEU's top risks, highlighting those relevant to the Finance department and showing where each fits on a risk matrix. The matrix uses color and position to reflect the system's latest assessment of the level of each risk based on comparing its severity and likelihood to AEU's risk appetite as defined by the Risk Management Committee.

Janice appreciates the way the ERM Dashboard not only gives her flexible access to her division's top risks but also puts them in a larger context. The use of a common framework for all risks lets her compare financial, operational, and strategic risks in the same system. And, by changing the time period, she can view critical risks relevant to short-term operations or long-term strategic planning.

Janice sees that the aggregated risk level for her Finance division is "High" based on the current risk level of those risks associated with the division and her divisional objectives. Considering the email she just received, Janice is not surprised to see that the risk level for her department has been increased. The new high-level risk the ERM system added just this morning, "Peak Season Demand Satisfaction," reflects the possibility that AEU may not have enough production capacity and other guaranteed sources to satisfy its customers' load demand for electricity during the coming summer months, which is the utility's peak demand season.

### **Continuous Risk Monitoring & Proactive Risk Escalation**

Focusing on the problem at hand, Janice takes a quick look at the Alerts section of the Dashboard, where she sees several relevant messages sent to her today by the ERM system. The first tells her that the system downloaded a new seasonal temperature forecast from the National Weather Service's website which showed a high number of local cooling degree days (days with average temperature above 65°F) expected for the summer months. Based on this, the ERM system automatically sent a request to AEU's demand forecasting system to update the forecast for AEU's peak season load demand resulting from the increased use of air conditioning. Janice already suspected that peak season demand satisfaction might become an issue for AEU. Now she knows that it has crossed the threshold to become a High-level risk – and why.

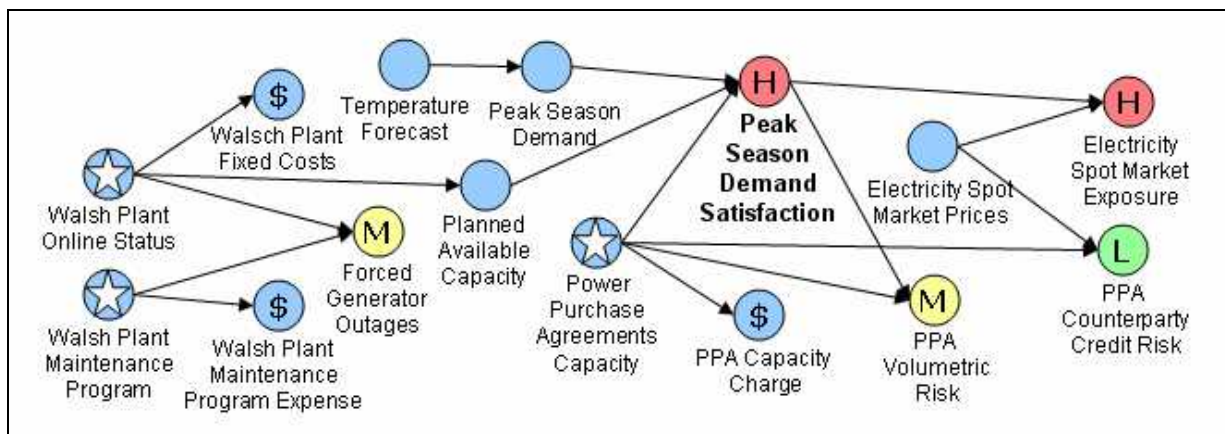
The latest alert indicates that the system has emailed notices to several key personnel, including herself, to ensure they were aware of the risk even if they haven't logged on to the ERM system. Janice feels reassured that the system is continuously monitoring key risks for her department and for AEU, and that it proactively escalates important risks to the attention of appropriate managers and executives – even paging them at home if especially urgent.

### **Visualizing Risk Relationships**

Next, Janice uses the system to analyze the Peak Season Demand Satisfaction risk in more detail. The system's detailed risk analysis not only shows basic information such as the risk assessment level, but also provides current data for key performance indicators that underlie the risk. For example, Janice sees that AEU's reserve production capacity (relative to its forecasted load demand) has dropped far below AEU's minimum targets. If not resolved, this risk could force AEU to buy wholesale electricity on the spot market, where prices are highly volatile and can easily spike by a factor of ten or more in any given week during the peak season, a situation Janice wants to avoid if at all possible.

How can AEU mitigate this risk? To help identify potential points of leverage, Janice opens the Risk Map, which graphically displays the causal relationships between Peak Season Demand Satisfaction and other risks and risk drivers. This *causal model* has been invaluable in helping AEU management better understand risk interrelationships and the relevance of risk management to their day-to-day business activities. Janice sees three risk drivers influencing this risk:

- The new peak load demand forecast,
- AEU's available production capacity, and
- Power Purchase Agreements (PPAs) contracted with other utilities (counterparties) that give AEU the option to buy a limited volume of wholesale electricity at a fixed price to supplement its production capacity.



**Figure 2: Partial Risk Map with Peak Season Demand Satisfaction**

The system also displays mitigation actions that target each of these risk drivers. AEU's Customer Operations division has already implemented demand management programs that encourage its customers to reduce their use of electricity during peak season. Now Janice sees several new actions proposed by the ERM system. These include the Production Operations division's increasing AEU's production capacity and the Finance division's making a small increase in the maximum amount of the PPAs.

### Forecasting & "What if" Scenarios with Causal Modeling

Though the Peak Season Demand Satisfaction risk is important to several divisions, Finance has the primary responsibility for monitoring and managing this risk. Initially, Janice would prefer to resolve this issue within her division without involving Production Operations. So, she uses the ERM system to propose a new action to negotiate a substantial increase in the Power

Purchase Agreements –one large enough to meet the minimum capacity reserves without having to increase AEU’s production capacity.

To assess the effectiveness of this strategy, Janice creates a “what if” scenario in the system based on her proposed action. The ERM system then forecasts the results of increasing the PPAs based on the causal relationships among risks, risk drivers, and AEU’s objectives as defined by Janice and others at AEU during system development. This causal model creates a framework that incorporates a variety of analytical methods. Each of these methods is selected based on which would best model a particular risk or relationship. For example, traditional statistical models based on historical data may be used to forecast basic financial risks, but the ERM system also applies other methods that use expert knowledge to better forecast outcomes in novel situations, which is more effective for modeling operational and strategic risks.

Janice examines the scenario results and sees that increasing the PPAs would successfully mitigate the critical risks associated with satisfying peak season demand. However, such a large increase in the electricity required from counterparty utilities places AEU at risk for having one of these counterparties default on their PPA contract during the peak season. Because the scenario results reflect the total impact of the action on AEU’s portfolio of risks, they include a significant increase in PPA counterparty credit risks even though this risk was not the initial focus of Janice’s analysis.

The scenario results include the impact to expected returns in addition to risk valuations, so Janice can review the complete financial impact of the action. She sees that, although the increase in PPA volume would achieve a net reduction in AEU’s overall risk exposure, most of this benefit would be offset by a large increase in the fixed costs AEU would have to pay to counterparties to secure the higher volumes.

### **Intelligent Planning of Risk Mitigation Actions**

Faced with mixed results for her proposed action, Janice decides to reconsider the actions originally suggested by the ERM system.

During development of the ERM system, Janice and others members of the design team identified and defined actions AEU could take to mitigate any of the risks included in the system. Just as the ERM system continuously monitors risks and uses causal modeling to assess their potential impact on AEU, it also continuously evaluates AEU’s potential risk mitigation actions. The system evaluates combinations of actions based on their overall impact on AEU’s risk levels, financial metrics, and business objectives, and recommends actions using priorities defined by AEU business managers.

Based on the new information for the Peak Season Demand Satisfaction risk, the ERM system recommends three actions:

- Audit and improve maintenance procedures at the Walsh Plant,
- Bring the Walsh Plant online, and
- Increase Power Purchase Agreements (PPAs) by a small amount.

Janice knows that Carl Latham, VP of Production Operations, has been postponing funding for new maintenance initiatives at this reserve peak plant for some time to hold down costs. As a result, he has relied on AEU's other peak load plants while holding the Walsh plant offline to avoid potential service disruptions and repair costs caused by forced generator outages. Bringing it back online would increase the production capacity AEU has available for the peak season. Janice would still need to increase the PPAs to meet AEU's minimum target for capacity reserves, but this increase could be much smaller with the Walsh Plant online.

Since these actions would require significant activity from Production Operations, Janice wants to better understand why the ERM system has recommended them before she pursues them further. She runs another scenario that will show the forecasted result of this set of actions.

Similar to the first scenario, these actions would successfully reduce the critical risks associated with satisfying peak season demand. But in this scenario, the smaller increase in PPAs would significantly reduce the increase in PPA counterparty credit risk. Bringing the Walsh Plant online increases the risk of forced generator outages, but the new maintenance initiative risk would limit the increase of this risk as well.

The Production Operations division would face higher expected costs to run the Walsh Plant and launch the maintenance initiative. However, the Finance division would enjoy expected costs dramatically lower than in the first scenario because it would have to pay much less to the counterparties to secure a small increase in the PPAs, putting the company as a whole far ahead.

### **Dynamic Tracking of Risk Mitigation Actions**

Excited by the potential benefits of this combined strategy, Janice saves the second scenario to make it available to other users of the ERM system and returns to the three recommended actions to plan next steps.

Bringing the Walsh Plant online with a new maintenance initiative would be the responsibility of the Production Operations division. She activates these two actions in the ERM system, which will bring them to the attention of Carl Latham. She also includes comments requesting that he consider these actions for potential implementation, referring him to the saved scenario as a starting point in his evaluation, and mentioning that she would be open to discussing possibilities for joint funding. They could make a joint proposal to the Risk Management Committee to approve the allocation of capital to fund the actions within Production Operations.

Her division would be responsible for negotiating the small increase in PPAs, so she not only activates the action but also assigns it to Chuck Taylor, her department manager for market trading and PPAs, and sets a due date for completing an initial evaluation by the end of the week. Because the ERM system dynamically monitors risk mitigation actions along with other risk information, Janice knows that she will be alerted of any issues, changes, or missed deadlines for any of the three actions in this action plan.

## Dynamic Systems Unleash the Potential of Enterprise Risk Management

Janice logs off the ERM system and glances up at the row of old annual ERM reports that have occupied a section of her credenza for several years. With the new system, ERM has stepped off the shelf to become a dynamic process integrated into the AEU organization.

### SIDEBAR

#### Key Capabilities Required for a Dynamic Enterprise Risk Management System

- Common Framework for all Enterprise Risks
- Continuous Risk Monitoring
- Proactive Risk Escalation
- Visualization of Risk Relationships
- Forecasting with Causal Modeling
- “What if” Scenarios
- Intelligent Planning of Risk Mitigation Actions
- Dynamic Tracking of Risk Mitigation Actions

Companies in many industries are employing Enterprise Risk Management to provide a common risk framework used to manage portfolios of risks, align organizational silos, and improve capital allocation. But limiting your ERM initiatives to an “Annual Manual” review and analysis limits the ongoing benefits your organization can achieve.

A dynamic ERM system can bring timely, relevant risk information to bear in day-to-day decision making processes throughout your organization. Advanced capabilities for intelligent planning, forecasting with causal modeling, and tracking of mitigation actions enable you to harness this information while adapting in new situations to avert threats and realize opportunities.

In today’s rapidly changing business environment, the adoption of dynamic systems can empower your organization to realize the full strategic and financial benefits that ERM promises.