The Business Value of Enterprise Energy Management at DFW Airport

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ABSTRACT

The Dallas/Fort Worth International Airport has a long track record of success in conventional energy management. For 20 years, this technically oriented program existed principally as an initiative of the airport's maintenance department, and flourished in a stable environment characterized by plentiful resources and little competitive pressure. Although successful in producing technical accomplishments and cost reductions, the program never achieved broad corporate impact.

In the mid-1990s, under the leadership of a new CEO, DFW adopted a business-oriented posture focusing on service quality and competitiveness. Although slow to adapt to the changing internal and external environments, by 1999 the maintenance department succeeded in reinventing itself by radically changing its business model and adapting its structure and processes to the new competitive landscape. New department leadership leveraged existing core competencies to recreate the energy management program with an enterprise orientation. They were subsequently able to demonstrate to executive management how the new model supported strategic business objectives and directly contributed to DFW's competitive advantage. Enterprise energy management was represented as a core business function that supported internal objectives (business growth, customer satisfaction, asset renewal) and addressed external factors (electric industry deregulation, environmental issues) by virtue of its positive impact on cost effectiveness, asset productivity and performance, resource utilization, and regional public policy.

Having established credibility and demonstrated the business value of enterprise energy management, the department received unpar-

alleled support from the DFW executive team and board of directors. Corporate policies were enacted to mandate energy efficiency, commissioning, clean fuel vehicles, and energy efficient building codes. New business strategies were developed, including energy master planning, evaluation of large-scale onsite power generation, and adoption of sustainable practices in investment evaluation, design, construction, operation, and procurement. Substantial financial and human resources were committed to support program objectives, and the maintenance department was renamed energy and asset management to signal its new stature and enterprise orientation. These outcomes reflected DFW's renewed, top-down commitment to enterprise energy management as a source of competitive advantage, and its persistence over time has confirmed the validity of the basic value proposition.

BACKGROUND

The DFW International Airport, which first opened to traffic a few minutes past midnight on January 13, 1974, is jointly owned by the cities of Dallas and Fort Worth, and is governed by the DFW Airport Board. Today, DFW is the world's third busiest airport, serving over 53 million passengers a year. The airport maintenance department manages the airport board's multi-billion dollar facility and infrastructure asset portfolio and provides a variety of services, including energy management, thermal energy production and distribution, potable water and sewer system operation, transit system operation, facility management, fleet management, and infrastructure repair and renewal. The original airport maintenance department organizational structure was purely functional in design, and its business processes were dominated by a task orientation.

An energy management program was initiated at DFW soon after the airport opened. This program was managed as an airport maintenance department function, and it achieved many notable technological successes. The program's objectives consisted solely of sound operating and maintenance practices, retrofits of existing systems, and the incorporation of energy efficient technology in new construction. Significant economic benefits and reductions in energy consumption were produced; however, energy management remained a department-level initiative with modest recognition of its value at the corporate level.

Little change occurred within the department over the next 20 years, as competitive pressures were virtually non-existent and resources relatively plentiful. The energy management program remained focused on applications of technology, and achieved relatively little visibility at the corporate level.

MOTIVATION AND OPPORTUNITY TO CHANGE

The early 1990s saw the entire commercial aviation industry experience severe financial losses, resulting in strong pressures on airports to reduce operating costs. In 1993, a new chief executive officer assumed leadership of the DFW airport board. He established a vision of "running the airport like a business." The next several years produced corporate-level reorganizations, creating various business development-oriented units, an aggressive program of diversifying airport revenues, and a continuation of the cost containment focus.

The airport maintenance department was slow to respond to these changes in the internal and external environment. Consequently, the department came to be viewed by senior management as resource intensive, inflexible, dominated by an internal perspective (e.g., maintenance as an end in itself rather than a means to achieve a corporate goal), and out of alignment with the evolving corporate culture and business objectives. The tenure of a new vice president selected in 1994 produced limited improvement in airport maintenance, and the author, a 12-year member of the department's management team, replaced him in 1997. The CEO personally communicated to the author the need to change the department and bring it into alignment with the new corporate model.

Under this new leadership and with a mandate to change, a comprehensive performance improvement program was designed and implemented, resulting in a near total revision of the department's structure and business processes.

Reinvention

The result was a comprehensive program designed to reinvent the airport maintenance department at its most fundamental levels, including:

- Role and direction
- Strategies and processes

- Structure and image
- Culture

A major objective was to establish a clear direction and shared set of values. A comprehensive situation analysis was performed, and from it goals, strategies, and objectives were developed and implemented. One major outcome involved changing the department's core business model to one employing a total asset management approach. The total asset management model incorporates the full life cycle of an asset from acquisition through decommissioning, and thus requires an enterprise orientation. From this broader perspective, the department began to evaluate its core business functions and competencies.

Assessing the Existing Energy Management Program

From his background in energy engineering, the author was strongly committed to energy management as a core business function and a core competency of the department. Viewed from a total asset management (i.e., life cycle) perspective, he considered energy management as a potential source of strategic value to a capital asset-intense enterprise such as a large commercial airport.

In evaluating the department's energy management program, a basic SWOT analysis was conducted. It concluded that major strengths were of expertise in technical energy management, best-in-class district energy system operation, and a willingness to change in order to improve. Major weaknesses included the basic lack of alignment with corporate organization and strategic business objectives and the resulting lack of internal credibility.

The mandate to change established by the CEO introduced a major opportunity to recreate the existing energy management program as an enterprise business function. A second was identified in the impending deregulation of the electric utility industry in Texas, and its foreseeable impact on electricity consumers. Ironically, deregulation also created a certain threat as business entities evolving or materializing to operate in the future deregulated markets began approaching key decision makers with various alternatives. The result was a series of mixed messages relative to the viability of energy management as a core airport business function.

SELLING ENTERPRISE ENERGY MANAGEMENT

Upon concluding that energy management, if applied with an enterprise orientation, would contribute fundamentally to the airport's core business success, it also became apparent that selling this concept could provide a critical means of demonstrating the maintenance department's value-added contributions and corporate alignment.

The basic strategy developed to sell enterprise energy management involved leveraging a currently successful business operation against a new opportunity. This strategy would establish credibility internally and then explicitly link energy management outcomes to key business objectives. In this case, the maintenance department's district energy (DE) system operation (thermal energy production & distribution business process) was leveraged against the opportunity presented by deregulation of Texas' electric markets. The airport DE system's full cost of service had been benchmarked at best in class levels for years, demonstrating efficient operation and capable management. Numerous business entities positioning themselves for the post-deregulation marketplace were approaching the airport about selling or outsourcing the DE system. The physical facilities and operating/financial records were opened to all business entities desiring to make a proposal to purchase or contract for O&M of the DE system. The low number and limited nature of responses demonstrated forcefully the success of the airport's DE system operation in the competitive marketplace. Consequently, the department now had a platform for initiating a dialog with the CEO regarding energy management and airport business objectives.

Gaining an Audience

The opportunity to sell the business value of enterprise energy management to the CEO came during a presentation on the results of the DE system acquisition and/or outsourcing proposal process. The publicity associated with impending deregulation in Texas and the associated business offers being conveyed directly or indirectly to the CEO stimulated his direct personal interest in the internal analysis. His interest in evaluating the changes being implemented in the maintenance department also predisposed him to participate actively in the dialog.

As the department vice president, the author, along with the utility business unit manager, delivered the presentation and key messages to the CEO and the executive vice president of development.

The results of the process established several critical assurances to the executive team:

1. The department management team's willingness to evaluate and embrace change.
2. Their comprehension of corporate business objectives and ability to manage in alignment with them.
3. Energy management as a core competency.

The circumstances also provided an opportunity to extend the discussion and present potential energy management outcomes in the specific context of the airport's $2.5 billion expansion program, then in its initial programming stages. Energy management strategies supporting four vital strategic objectives were proposed:

1. Airport development (expansion and redevelopment of the DE system).
2. Infrastructure renewal (renew 30-year-old assets).
3. Electric utility deregulation (position the airport to operate cost-effectively in competitive energy markets).
4. Air emission reductions (reduce point source emissions to comply with regulatory mandates).

Two principal challenges had to be overcome to convince the CEO of the business value of maintaining ownership and management of the DE system, as well as significantly increasing the capital invested in that particular enterprise. Countering the differing viewpoints of other influencers, primarily outside firms, and demonstrating that risks (real and perceived) associated with the proposed changes were manageable, proved to be essential in selling the results of the analysis and the proposed changes.

Key Messages

The airport strategic plan developed in 1999 identified two key elements of success for DFW: the capacity to grow by developing its facilities and infrastructure and a low operating cost structure. To communicate to the CEO how enterprise energy management would contribute to key business objectives, program outcomes were linked to these basic success factors.

An inherent factor in a large commercial airport's ability to grow is the need to attain necessary environmental approvals. Virtually all major commercial airports are located in urban areas with moderate to severe air quality issues. Thus, the emission reductions that would be created by decreasing energy consumption, including those originating on the airport and those resulting from regional power generation, constituted a key message linking energy management explicitly to enterprise business objectives. Similarly, reducing the demand on the airport's energy production and delivery infrastructure would result in improved asset utilization, thus enabling additional development from the existing fixed asset base and deferring capital expansion.

The contribution of an effective energy management program to a low overall operating cost structure was fairly easy to demonstrate. The existing program's track record of demonstrated success in reducing cost and consumption and the additional benefits that would result from broader application formed another key message.

Finally, a number of other strategic business objectives were eventually shown to benefit from enterprise energy management outcomes, including:

Objective—Customer-friendly facilities.
Benefit—Improved asset performance and occupant comfort/satisfaction.

Objective—Industry leading environmental programs and practices.
Benefit—Emission reductions, reduced natural resource use, energy efficient building code, purchasing policies.

Objective—Revenue growth.
Benefit—Tenant energy supply chain management, expanded thermal energy services.

Objective—Total asset management.
Benefit—Commissioning, lifecycle cost analysis.

Objective—Superior management.
Benefit—Industry leading energy and environmental programs.

In some cases, the success metrics proposed to evaluate the effectiveness of enterprise energy management were qualitative in nature

and described as enhancements along the airport's value chain (i.e., industry leadership, reduced resource use). In others, explicit quantitative measures were offered (i.e., percent reductions in lifecycle cost due to commissioning, energy use reductions resulting from efficient code and purchasing policy, emissions reduced, etc.).

Outcomes

In general, the presentation of the results of the DE system acquisition/outsourcing proposal process produced four explicit outcomes:

1. CEO and executive agreement with the proposal to continue internal O&M of the airport's DE system.

2. Approval of the proposed alternative reconfiguration of the DE system expansion programmed in support of the airport capital development program to also address renewal of the aging energy infrastructure, flexibility required to operate effectively in deregulated energy markets, and reduction of regional air emissions. This resulted in an increased investment in the project of approximately $88 million.

3. Direction to pursue detailed engineering and economic analysis of incorporating combined heat and power to supply 100 percent of the airport's total electric power needs.

4. The opportunity to provide a full briefing to the airport board of directors on energy management accomplishments and proposals.

More important, an ongoing dialog with the CEO and executive team on energy issues was initiated, as was their appreciation of, and commitment to, the business value of energy management. This commitment was initially signaled to the organization through the approval of the DE system expansion and reconfiguration recommended. In approving a four-fold increase in the capital investment originally programmed and conferring control over the project's design intent and operating business plan to the maintenance department, a powerful and unmistakable message of support was delivered.

The CEO's continued commitment was further communicated in both formal and informal ways. Formal corporate statements of

policy were adopted, establishing principles in support of energy efficiency, commissioning of all new airport construction, industry collaboration to expand the availability of efficient technologies, and support for legislative action creating incentives to stimulate deployment of clean and efficient technologies. Revisions to a number of existing business processes and the adoption of new ones were also authorized, including:

- Reorganization to create an energy and facility services business unit.
- Participation in a retail electric competition pilot program.
- Strategy for energy procurement and management of this function with internal energy staff.
- Adoption of the International Energy Conservation Code.
- Development of a strategic energy management plan.

In addition, it became easier to secure approval for resources and participation in initiatives to elevate the visibility and influence of the airport's energy management accomplishments. Examples include:

- Addition of energy engineer and energy analyst positions to augment the energy manager's staff.
- A full-time staff position to function as the airport's commissioning authority.
- Annual investments in energy efficiency projects identified in the airport's 10-year capital program.
- Application for, and acceptance of, numerous grants for energy audits and demonstration or acquisition of clean and efficient technologies.
- Participation in federal, state, and NGO initiatives to study airport energy use, sustainable practices, etc.

- Memberships in high-profile organizations and initiatives including Energy Star, Rebuild America, U.S. Green Building Council, Texas Energy Partnership, etc.

Informal means included continued visibility of energy management objectives, accomplishments, and plans at the CEO and board of director levels through regular briefings.

The airport's reconstituted energy management program has since been recognized by industry and governmental organizations, the trade press, and with regional, state, and international awards. In a telling measure of the CEO's continuing commitment, in 2003, he directed the maintenance department be renamed energy and asset management to more accurately reflect its enterprise orientation.

CONCLUSION

For 20 years, DFW Airport's conventional energy management program produced technical achievements, but as a maintenance department initiative, remained limited in application, visibility, and impact. As the commercial aviation industry was subjected to severe competitive pressure, the lack of an enterprise orientation resulted in the department being out of alignment with the evolving corporate culture, creating the necessity to change. New leadership leveraged the department's core competency in technical energy management against new opportunities presented in the pending deregulation of Texas' electric market and the airport CEO's desire for performance improvement to recreate the program with an enterprise orientation. An initial audience with the CEO evolved into an ongoing dialog regarding the strategic implications of energy issues for the airport. Ultimately, the business value of energy management applied on an enterprise basis was successfully demonstrated, and a top-down commitment to it as an important contributor to the airport's competitiveness was realized.

The process of reinventing DFW's energy management program and gaining the CEO's commitment to it may offer a few lessons for consideration by other similarly situated organizations:

- Critically evaluate (situation assessment) existing energy management programs and practices.

- Seek alignment of energy management program and practices with corporate strategies and business objectives.
- Identify energy management contributions to the corporate value chain.
- Link energy management outcomes to key business objectives (key messages).
- Demonstrate (or establish) and then leverage credibility (personal and/or organizational) for access and/or to reinforce the key messages.
- Know your audience (CEO's perspective, critical issues, success metrics).
- Understand associated risks (real and perceived) and show they are manageable.

ABOUT THE AUTHOR

Rusty T. Hodapp has over 22 years of diversified experience in energy, facility, and infrastructure asset engineering and management. He has held engineering and management positions with Texas Instruments, Mobil Oil, and for the past 17 years, the Dallas/Fort Worth International Airport Board. Mr. Hodapp is currently the vice president of energy and asset management for DFW, where he leads a department responsible for the maintenance, repair, and renewal of the airport's $6 billion infrastructure asset portfolio, including public works, energy systems, utilities, facilities, transit system, and fleet vehicles. Mr. Hodapp earned his Bachelor of Science in chemical engineering from Colorado State University and his MBA with honors from the University of Texas at Arlington. He has completed post-graduate studies in management science, is a Registered Professional Engineer in the State of Texas, holds professional certifications in energy management and procurement from the Association of Energy Engineers and is a LEED accredited professional. He received AEE's International Corporate Energy Manager of the Year award in 2003 and is currently serving as vice-president for Region IV.

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