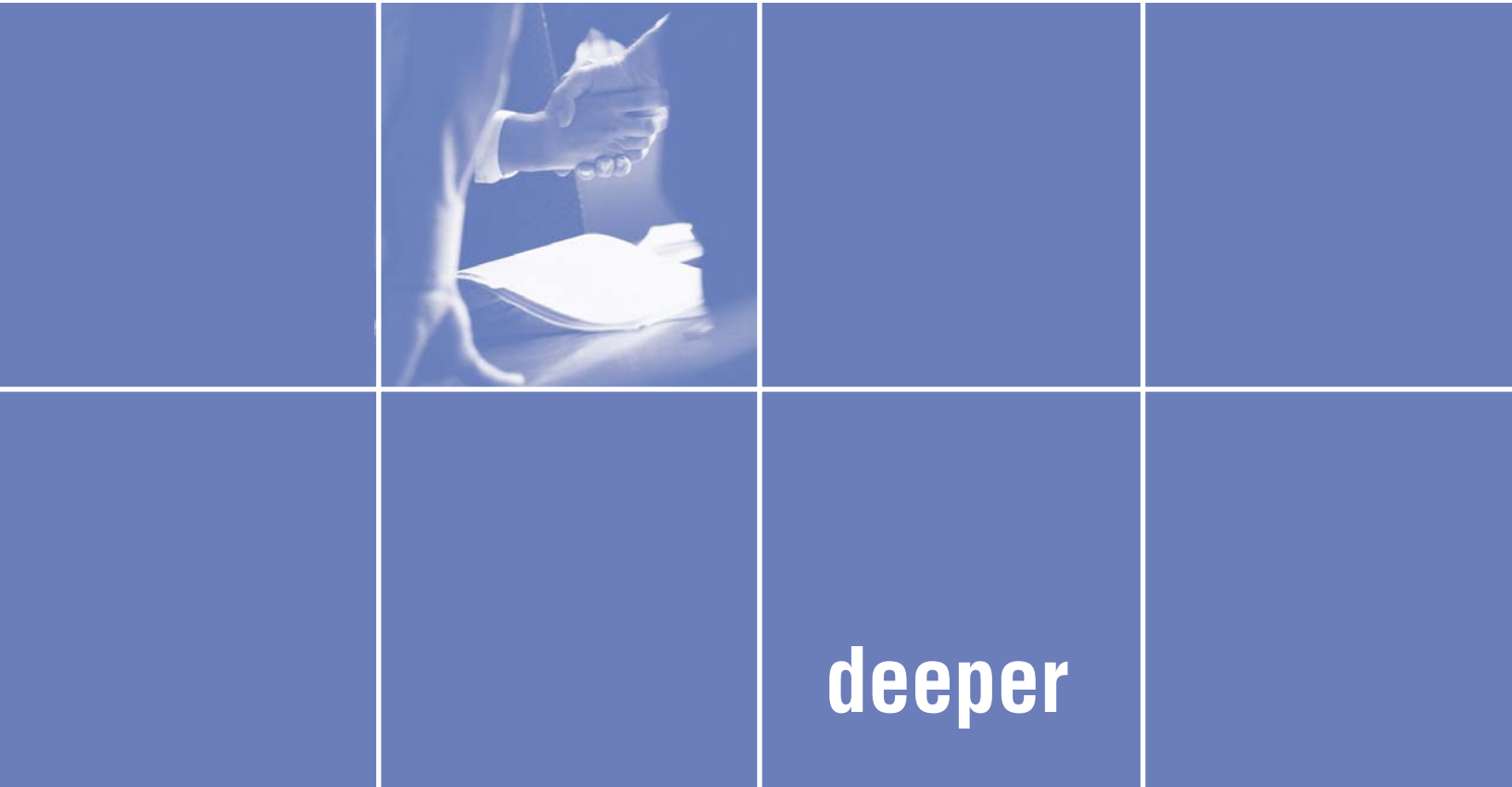




Energy asset optimization



Executive brief

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Contents

- 1 Energy asset optimization
- 2 The asset management context
- 4 Work and asset management
- 8 Conclusion
- 9 About the author
- 9 About IBM Business Consulting Services
- 9 References

Energy asset optimization

After a decade of disappointments, energy and utility companies should establish sound work and asset management programs to reap workload and productivity improvements.

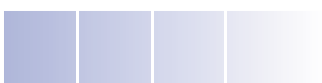
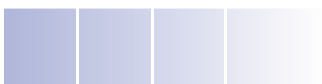
Since the latter half of 2002, the industry has been in a back-to-basics mode of operation. The focus, once on unregulated businesses and acquisitions, has returned to obtaining better utilization of the physical and human assets in the regulated portions of the business.

This focus is not new. Energy and utility companies have been methodically taking three to five percent of cost out of the business for the past decade. However, the situation today is quite a bit different than it has been in the recent past. Financial markets continue to apply pressure for double-digit earnings growth, yet are punishing companies that either remain in unregulated businesses or fail to focus on the core regulated business itself (which is a two to three percent growth business).

As a result, access to capital is constrained. Couple this with increased customer demands and enhanced regulatory scrutiny, particularly from an environmental perspective, and the situation is tenuous.

If that were not bad enough, the market is different than it was a decade ago. First, most of the infrastructure assets are nearing the end of their economic and practical life. This will require large quantities of capital (more than US\$100 billion in North America over the next decade) to either refurbish or replace these assets. Second, a large portion of the workforce will retire over the course of the next three to eight years, taking with them large quantities of institutional knowledge that hasn't been captured or passed on to younger employees.

Third, a couple of disruptive technologies, namely nanotechnology and the hydrogen economy are poised to change all aspects of the regulated electric, gas, water, telecommunications, cable TV, and consumer goods purchase and repair. This last point is mainly an early warning indicator to businesses because, while one can debate the specific timing of when these technologies will change the game, one cannot debate that it will be within the depreciation lifetime of the new assets that companies are deploying today.



Couple these industry-specific findings with the track record of most CIOs and technology deployments over the past five to seven years and you have the recipe for some interesting industry dynamics for the next three years or so. Given this dilemma, what is the head of the energy delivery business unit to do?

The asset management context

Deregulation, for all its warts and pains, did provide the industry with a different way of viewing the business. This new view is from the perspectives of the asset owner, the asset manager, and service providers who implement various parts of the asset management program on behalf of the asset manager.

The asset owner:

- Allocates capital (human and financial) to the asset manager(s). There may be one each for wires, pipes, generation, or exploration and production
- Financially manages a portfolio of assets
- Establishes the risk-adjusted rate of return that each asset manager must use in evaluating capital projects.

Think of the asset owner as an investment banker.

The asset manager:

- Establishes the programs, service level agreements (SLAs), key performance indicators (KPIs) and market clearing mechanisms necessary for the service providers to function efficiently and effectively
- Optimizes the performance of the assets in accordance with the financial goals established by the asset owner.

Think of the asset manager as a program designer and administrator.

Service providers may or may not be from the same organization as the asset manager and they provide one or more of the services shown in Figure 1, on behalf of the asset manager.

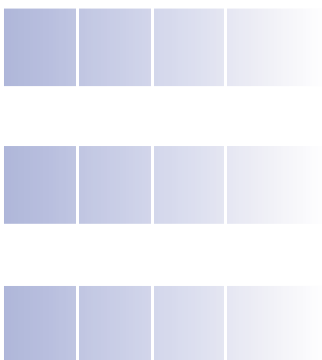


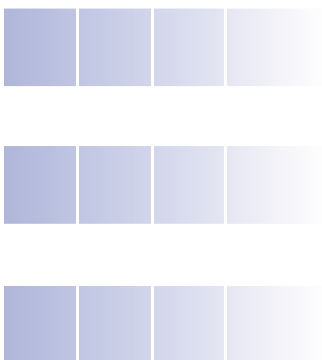
Figure 1. Services provided on behalf of the asset manager.



Source: IBM Business Consulting Services.

Carefully sorting one's core from noncore competencies has been a buzz phrase from consultants for the past decade or more. However, that is not the direct focus of this model. This model emphasizes the need for each portion of the business to realize that it provides products and services to other portions of the business.

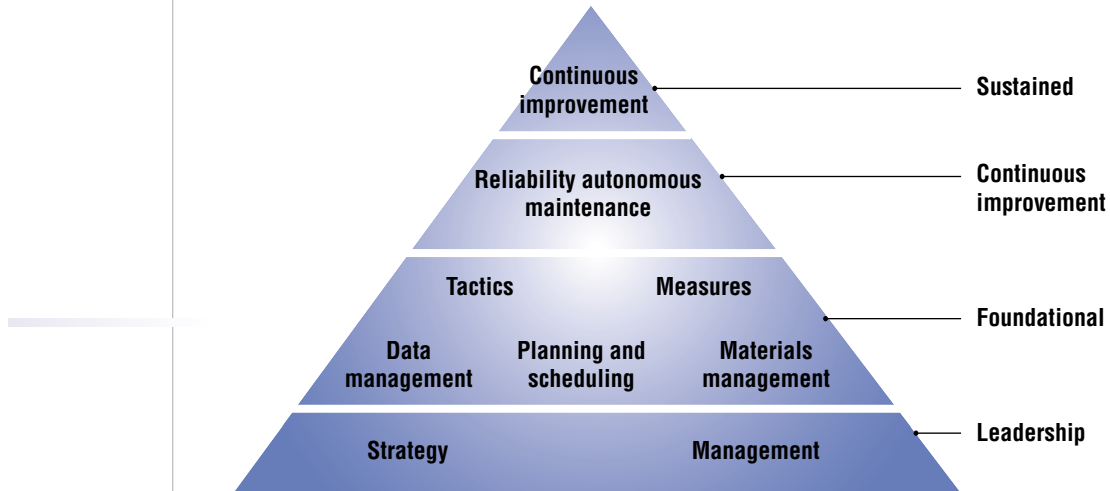
Setting up each of these functions as businesses within a business and establishing the market-clearing mechanism for these products and services to be bought and sold is the key to making this model work. This effort will develop a clear and comprehensive understanding of what it costs to do these functions internally. Once these costs are understood and the KPIs and SLAs are established, it is much easier to benchmark the sourcing of these same products and services externally.



Work and asset management

It's important to establish effective work and asset management programs. They are where most of the gains in workload and effectiveness of the workforces can be expected. Work and asset management phases, described below, can be viewed as a pyramid (see Figure 2).

Figure 2. Work and asset management pyramid.

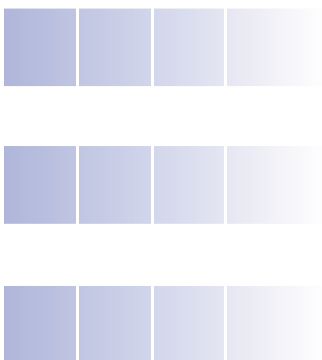


Source: IBM Business Consulting Services.

Many times, companies jump into implementation of applications or programs without having the right leadership and foundation in place. Such endeavors have very predictable results: projects that fail to deliver the touted economic value. As a result, we offer the following advice to asset-intensive industries, like energy and utilities, when looking at work and asset management program and application changes.

Successful work and asset management program changes and implementations start with a strategy grounded in the fundamentals of asset management and 100 percent commitment by the leadership of the organization. The kind of commitment we want to see from leadership is best exemplified by the following analogy.

One day on the farm, the chicken and the hog got into a discussion over who was the most committed to the farmer and his wife's breakfast meal each day. The chicken started the debate by boasting how she laid these wonderful and copious quantities of eggs for the farmer and his wife to enjoy each morning. The hog, after listening for a few minutes, got rather disgusted with such bravado, and said one simple statement of disgust: "at least you are still alive to talk about it."

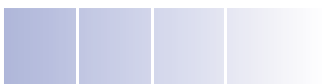
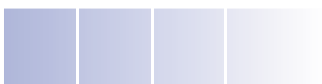


What we are looking for from leadership when it comes to support for these sorts of programmatic changes is a hog's commitment to breakfast.

Once the strategy and leadership commitment are respectively formulated and secured, one can move into laying a firm and strong foundation on which to build a robust and sustainable work and asset management program. The foundation phase includes the following activities:

- Implement standardized design throughout the business unit
- Implement configuration control wherein the as-built configuration is reflected in the critical design and operations documentation in a timely manner
- Identify all your physical assets
- Ascertain the health of your physical assets
- Resolve budget bucket behaviors that cost the business money – e.g., picking up and redeploying a no-load transformer is an operations and maintenance expense whereas getting a new transformer out of the yard and installing it is a capital expense
- Prioritize and allocate capital budget based on improved engineering tools and techniques, as opposed to the old new-load growth, refurbishment of worst performing feeders or circuits, and storm restoration bucket approach
- Do the right work for the right reasons – implement a robust reliability-centered maintenance (RCM) program
- Invest in industrial engineering to measure direct activity
- Build effective work orders and job plans
- Build effective planning and scheduling processes that match the physical maintenance work to the physical assets in the field so as to reduce transport time, materials logistics, and set-up and tear-down time
- Utilize a comprehensive asset database to capture and store information about asset health and work history
- Utilize your work and asset management system effectively.

As a result of laying this firm foundation for a work and asset management program, one should expect to see a 20 to 30 percent reduction in maintenance workload from implementing an RCM program and a 5 to 10 percent increase in crew-direct activity.



Laying the right foundation and building continuous improvement on top of that foundation is critical.

Once the foundation is laid, one can move into the continuous improvement phase. In this phase you want to drive for efficiencies in the overall program. During this phase, companies implement the following types of programs and processes:

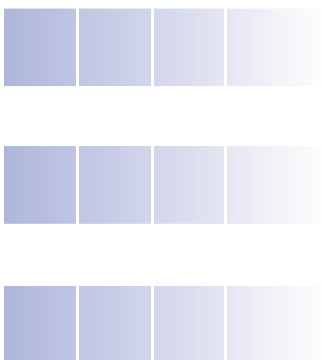
- Continue investment in industrial engineering to measure and report everything causing non-direct activity
- Invest in forensic skills to definitively identify causes of failures
- Implement post-work order completion reviews with craft as major participants
- Implement advanced kitting and staging of materials
- Move to condition-based maintenance.

During this phase you can really drive crew-direct activity.

Today, crew-direct activity, representing the actual hands-on time working on an asset, ranges from 20 to 35 percent depending on the business unit. Generation, transmission substation, compressor stations, and gas liquids processing facilities are on the higher end of the range, while line crews and pipeline crews are at the lower end of the range. So, for every 8 hours worked, only 1.6 to 2.8 hours of that day are hands-on working.

Companies that have successfully implemented the continuous improvement programs have seen the following productivity increases in direct activity:

- *Generation* – 60 percent direct activity is top-quartile and best-in-class achieved by Tennessee Valley Authority in fossil.¹ Hydro generation in a highly unionized environment was 75 percent direct activity²
- *Transmission substation, compressor station, and gas processing facility* – 55 percent direct activity is top-quartile³
- *Field crews* – 45 percent direct activity is top-quartile.⁴

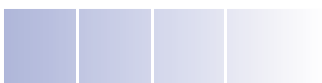
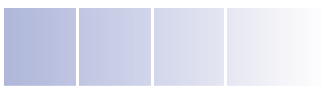
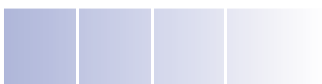


Now that you have been through the continuous improvement phase, you are ready to look to some advanced technologies to drive process and human asset effectiveness even further. We intentionally leave some of these technologies for consideration in this phase, because moving to them prematurely may cause more frustration and disappointment than good.

These advanced technologies include:

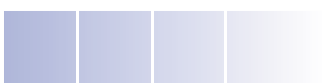
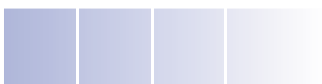
- Trucks as rolling warehouses
- Mobile dispatch of crews based on skills and proximity to the work
- Just-in-time materials delivery
- Exploitation of pervasive computing.

The additional crew productivity and process efficiencies delivered from the deployment of these advanced technologies is unknown in the energy and utility industry for a couple of reasons. First, we are unaware where anyone had done most of these. Second, where companies have deployed mobile dispatch, there have been some foundational issues that prevented the full realization of the business benefits from this technology. However, one only has to look to other industries such as Wal-Mart, in retail, and the automotive industry, to see the potential that these advanced technologies have for our industry.



Conclusion

The generation and regulated wires and pipes portions of the business are under more pressure than ever to drive better utilization of physical and human assets. Laying the right foundation and building continuous improvement on top of that foundation is critical. Following this approach can help answer the call and effectively respond to the pressures being brought on by the asset owner in response to a variety of external market forces.



About the author

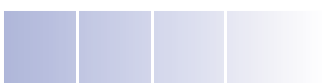
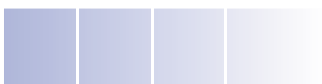
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With consultants and professional staff in more than 160 countries globally, IBM Business Consulting Services is the world's largest consulting services organization. IBM Business Consulting Services provides clients with business process and industry expertise, a deep understanding of technology solutions that address specific industry issues, and the ability to design, build and run those solutions in a way that delivers bottom-line business value.

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