Lifting the Limits
Improving Field Force
Productive Time
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EXECUTIVE SUMMARY

While utility management teams address a host of emerging and complex issues that are shaping the industry’s future, more fundamental challenges continue to exist within the day-to-day business. And unlike with the game-changing issues, where strategic “wins” are hard to confirm, tangible performance gains can be directly captured within the core transmission and distribution business by simply paying attention to a visible, but often ignored, element—field force productive time. In the network business, achieving high productive time remains an elusive challenge that won’t be solved without focused management attention and commitment.

Increasing productive time by more effectively leveraging existing resources is imperative for coping with future financial constraints. The journey toward improved productivity begins with a comprehensive up-front assessment of inefficient and unproductive practices across the entire work management life cycle and concludes with reshaping perspectives and expectations throughout the field force. Our recent experience suggests that meaningful increases in productive time can be accomplished by optimizing how work is planned, scheduled, and performed; expanding the skill sets of the existing workforce (including managers); standardizing work practices; and better leveraging underlying information technology and reporting tools. Any failure to accomplish these goals likely stems from a lack of management focus rather than from immovable structural limitations.
Much has been written about the myriad opportunities and challenges facing the utility sector, including impending carbon legislation, nuclear renaissance, renewable portfolio standards, grid modernization, plug-in electric hybrids, and federal government programs to support these initiatives. Management has rightfully dedicated much of its time to developing strategies and responses to these opportunities and challenges, while simultaneously navigating through an economic crisis that has resulted in real decline in consumption, lower wholesale power prices, and low to no earnings growth. While these strategic topics are likely to remain at the top of management’s agenda in the near term, there are also fundamental issues within the core business that require significant attention and continuous improvement.

Utilities find themselves struggling with an aging infrastructure that requires not only refurbishment and replacement, but also upgrading and renewal to meet the requirements of an intelligent grid and the demands of a carbon-constrained world. In this daunting environment, utilities will be forced to do more with what they currently have just to keep pace. In an attempt to deal with this new reality, and in response to the current economic environment, many utilities have undertaken a variety of initiatives. These range from the simple (freezes, budget cuts, and process improvement) to the complex (enterprise transformation). In many cases, these programs have failed to deliver on their promises because companies did not reshape their operating models in a way that would facilitate and support sustainable success. For many companies that have realized benefits in the past, further efforts to constrain costs are often viewed as either reaching the point of diminishing returns or requiring unacceptable changes to service levels to achieve meaningful results. However, such perceptions fail to acknowledge the fundamental truth that in the network business, the potential for improvement has only just begun to be addressed.

While no magic bullet exists to overcome the industry’s challenges, there is a relatively untapped area of value that holds significant promise: increasing productivity. Although there are many definitions for productivity improvement, “doing more with the same” is the simplest to envision. Improving productivity is perhaps the utility industry’s most significant opportunity to effectively rethink resource consumption, respond to current conditions, and advance on at least a few needed programs without increased infrastructure or operational risk or degradation of service levels.
Before addressing the causes of productivity gaps or how to eliminate them, it is important to understand that productivity must be managed across the entire life cycle of a network operation—from work identification to planning to execution to variance analysis and performance measurement (see Exhibit 1). Within this integrated chain, inefficiencies in one area can have a carryover effect in other areas, resulting in schedule delays, cost overruns, and reduced service or reliability levels. Adding to this complexity, the life cycle requires the alignment of a complex series of activities not only for routine and planned work but also for unforeseen and emergent work.

While the term productivity is generically used throughout the utility industry, its definition and application are far from universal. One definition—an inappropriate one—is the level of output derived for a given level of input. For example, labor productivity can be defined as the amount of work completed per hour. Yet this definition fails to take into account the most critical aspect of the work itself: the desired outcome. In fact, our experience suggests that the majority of utilities do not actively focus on the underlying heart of productivity management because they don’t correctly define it. Rather than viewing productivity as “output for input,” utilities need to consider productive time—a measure of effectiveness and not simply efficiency. Moreover, it is our premise that the workforce generally is well-intentioned and diligent. It is the limitations that are placed on the workforce that are the constraints on productive time.

Paradoxically, many companies have invested millions of dollars into sophisticated work management applications while failing to exploit the productivity management capabilities inherent in these systems. Rather than maintain and utilize compatible work units to measure and manage actual productivity, utilities are using proxies such as cost, schedule, job throughput, and backlogs to estimate productivity.

Managing productive time should be at the center of any utility operations improvement and cost-effectiveness initiative; however, the value associated with managing productive time can be difficult to demonstrate.

Exhibit 1
Work Management Life Cycle

Source: Booz & Company
Studies have found that productive time typically accounts for, on average, about 30 to 35 percent of an eight-hour shift, with a range between 20 and 50 percent, and potential highs of 55 to 60 percent under very favorable network conditions, based on work volume, work type, and activity density (see Exhibit 2).

We have found that unproductive practices and processes are embedded throughout most individual work order planning and execution activities. Even small improvements in productivity can yield significant benefits when applied to the large volume of work undertaken every year. The challenge for most organizations is to recognize these small opportunities and appreciate the leverage inherent in them.

A recent analysis performed by Booz & Company for a major Midwestern investor-owned utility revealed a significant gap between perceived and actual productivity levels. In this case, front-line management estimated productivity at 50 to 65 percent across the network system. Although this was borne out for some contract personnel, field measurement for company employees revealed a system-wide productivity average of roughly 35 percent (or approximately two hours and 45 minutes per eight-hour shift). Excessive time was spent by crews locating tools and parts, in transit to job sites, participating in poorly scheduled training, and waiting for a variety of logistical issues to be resolved prior to work commencement (see Exhibit 3). Not surprisingly, at the core the organization lacked an effective planning and scheduling process, which allowed these problems simply to cascade.

Understanding this gap was eye-opening for management. Even more illuminating was the leverage opportunity implied from improved productivity. In this example, the gap between current reality and top-quartile performance represents nearly 20 percent of deployed resources, or 1.5 hours of excess, non-value-added activity per eight-hour shift. Managers commonly perceive that by freeing up these 1.5 hours, they are creating an additional 20 percent resource capacity; however, increasing “wrench time” from 35 to 55 percent actually translates to a nearly 60 percent boost in the organization’s capacity to do work. Increasing productivity on this scale may free up resources to address infrastructure investment demands, shrink the ever-increasing backlog of work, and improve service levels and cost performance in the process.

The high “cost” of productivity leakages comes into clear focus when examining labor rates and overtime. In an industry where overtime costs

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**Exhibit 2**

**Industry “Wrench Time” Observations and Targets**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Wrench Time (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilities</td>
<td>20%</td>
</tr>
<tr>
<td>Refining</td>
<td>65%</td>
</tr>
<tr>
<td>Upstream Oil &amp; Gas</td>
<td>65%</td>
</tr>
<tr>
<td>Physical Asset Management Handbook</td>
<td>50%</td>
</tr>
<tr>
<td>Orbit</td>
<td>60%</td>
</tr>
<tr>
<td>Power Engineering</td>
<td>55%</td>
</tr>
<tr>
<td>SAMI</td>
<td>30%</td>
</tr>
<tr>
<td>Aberdeen Group</td>
<td>25%</td>
</tr>
<tr>
<td>EPRI Nuclear</td>
<td>20%</td>
</tr>
<tr>
<td>Booz &amp; Company Experience</td>
<td>65%</td>
</tr>
<tr>
<td>Published Domain</td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td>59%</td>
</tr>
<tr>
<td></td>
<td>49%</td>
</tr>
<tr>
<td></td>
<td>40%*</td>
</tr>
</tbody>
</table>

* 40% or higher

Source: Booz & Company analysis
spend, utilities are reducing off-hours work, and allowing backlogs to build, in an effort to constrain spending. For many utilities, overtime costs per employee can range from 50 to 100 percent of base pay, assuming no break between working shifts. Though it is unrealistic to assume that all overtime can be eliminated, management must balance the trade-off between hiring new employees, who require time to become fully productive, and paying additional overtime to experienced workers. Quickly reducing overtime levels can have negative consequences, including increased backlogs, longer service times, and reduced work quality. These risks, if not managed, can affect an asset’s long-term performance and reliability and have lasting adverse effects that exceed near-term benefits.

Increasing productive time represents an efficient and economical way to address this issue. The beginning-of-day prep time, job setup, materials inventory and handling, travel time, and end-of-day close time are just some of the areas that can be quickly improved to increase productivity and reduce the need for incurring overtime or hiring additional workers. In a recent client example, the time spent gathering tools and parts (particularly the right ones) and contractor wait time were deemed excessive and the key drivers of productivity leakages, suggesting a need to retool planning and scheduling practices. Tackling the embedded losses in the core schedule composition and workday plan itself by determining the right priorities, correct crew composition, and best use of resource skills and knowledge is another area that leads to increased productive time.

Compounding the complexity of addressing field force productivity is the impact of an aging workforce. As experience is drained from supervisory and management ranks, less experienced managers will need better tools and information to understand how their crews are performing, rather than being able to rely on experience and intuition. It is important that training programs and incentives reward efficiency, as well as reinforce the importance of adhering to strict standards and processes in an effort to establish and embed a performance mind-set. Newer employees will also need to be empowered to solve problems commensurate with their experience levels because the traditional centralized decision-making model will cripple productivity if every situation requires a call or trip back to the service center. Employees must understand that change is necessary and expected as the business and financial environment they operate in transforms around them.

**Exhibit 3**
**Productivity Analysis (Client Example)**

<table>
<thead>
<tr>
<th>Work Hours</th>
<th>Total Hours Worked</th>
</tr>
</thead>
<tbody>
<tr>
<td>5% Cleanup</td>
<td>5% Locate Tools</td>
</tr>
<tr>
<td>10% Locate Parts</td>
<td>10% Paperwork &amp; Administrative Processes</td>
</tr>
<tr>
<td>15% Transportation</td>
<td>20% Waiting</td>
</tr>
<tr>
<td>35% Wrench Time</td>
<td>55% Top Quartile</td>
</tr>
</tbody>
</table>

- “Parts are stored in a separate building. It takes up to 30 minutes to get a part”
- “Craft labor is in charge of fetching their parts and tools”
- “Time and work reporting processes may take up to 1 hour per day for each craftsmen, depending on level of work order detail”
- “During every overhaul, we have to wait for elevators”
- “Coordinating cranes to move major pieces of equipment is a big issue”
- “I know that a supervisor is good when I walk into the break room at 9 a.m. and there’s nobody there”

Source: Booz & Company analysis
Productivity improvement focuses not on working harder, but on working smarter (doing the right work, at the right time, with the right information and materials, in the right way). It entails identifying and removing the barriers that prevent employees from doing their jobs in an effective and efficient manner. Yet without insight into current productivity levels and drivers, it is difficult to identify roadblocks and “size the prize” of dedicating resources to removing them.

We have found that companies can make meaningful improvement in workforce productivity by vastly improving how work gets planned and scheduled, reevaluating how and by whom work is performed, standardizing the way work processes are executed, and leveraging existing technology and tools to provide the insight required to improve performance. While these suggestions may seem obvious, the rub lies in integrating them across the work management life cycle while operating in a real-time, dynamic environment.

Planning and scheduling: Planning and scheduling work is perhaps the most critical aspect of maximizing field force productivity. Ensuring that the right workers, equipment, and materials are in the right place at the right time is vitally important to optimizing resource productivity. The consistent application of design standards, compatible units, policies, and
procedures greatly enhances planning
effectiveness and allows for accurate
and robust schedules to be developed.

Frequently, productivity shortfalls
originate in the planning phase of the
work management life cycle. Planning
at many utilities still tends to be per-
formed manually (i.e., by marking up
a printed spreadsheet), inconsistently
within departments or regions, and for
the short term (i.e., one week to one
month ahead). Oftentimes planning
tools, design standards, and work
management processes and procedures
are well established and in place, but
are simply not utilized. This manual,
ad hoc, and near-term focus handcuffs
supervisors and workers and prohibits
them from thinking longer term to
solve more systemic problems. At the
same time, there is a risk in relying
too heavily on sophisticated planning
software and tools as the solution to
all planning problems. The challenge
is to assemble a plan that optimally
balances workload and resources by
giving workers the proper tools and
placing the proper level of responsibil-
ity and accountability with each super-
visor and worker to more efficiently
schedule tasks, taking into account the
longer-term planning horizon.

Unfortunately, even the best planning
and scheduling efforts are often for
naught. Emergent work, in the form
of emergencies or expedited customer
requests, can quickly overwhelm the
system, leaving the planned sched-
ule in disarray. In our experience it
is not uncommon to see 70 percent
or more of work scheduled a week
in advance, 50 percent or more of
work scheduled one day in advance,
and only 25 percent of work ulti-
mately completed as scheduled. When
processes designed for a one-week
turnaround are routinely used for
same- or next-day work completion,
the system inevitably breaks down.
The repercussions can be significant
and include increased crew travel
and waiting time, increased material
management expenditures, and exces-
sive overtime, to name a few. While
emergent work cannot be completely
avoided (because of storms, emergen-
cies, etc.), a dedicated and focused
effort should be made to minimize
emergent work to the extent possible, given its impact on overall productivity (see Exhibit 4), and to isolate the schedule to the extent practicable. It is important to note that intermediate priority work is designed to follow a three- to seven-day origination-to-finish process. Completion of this type of work in less than one day not only precludes adequate job preparation, but also adversely affects the ability to effectively handle high-priority work without incurring overtime.

**Integrated workforce optimization:** Managing both internal and external labor is another key area where utilities can focus to drive productivity improvement. Historically, the decision to outsource has been made entirely from a financial or capabilities perspective to reduce fixed costs. Outsourcing work while lacking adequate contractor management skills and capabilities can quickly lead to higher, rather than lower, total costs. Understanding the productivity levels of both the internal and external workforces can help to ensure the optimal assignment of work, as well as to identify best practices and potential improvement areas. Our recent client experience provides some evidence of this. Observed productivity for contractors was significantly greater—55 to 60 percent versus 35 percent—than for internal company resources. Some of this difference could be explained by variations in work rules and by the nature of the jobs that were typically

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**Exhibit 4**
Emergent Work Impact (Client Example)

<table>
<thead>
<tr>
<th>Service Request Prioritization Matrix*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>P1</td>
</tr>
<tr>
<td>P2</td>
</tr>
<tr>
<td>P3</td>
</tr>
</tbody>
</table>

**Impacts of Service Request Prioritization on Labor Effectiveness**

- P1 Prioritization: 1.8%
- P2 Prioritization: 1.5%
- P3 Prioritization: 1.6%
- Total: 5.0%

*Sample size: 3,280 electric service requests representing 39,524 man-hours.
Source: Booz & Company; Passport
assigned to contractors. However, field observations revealed additional differences, including the way contractors managed work. Contractor supervision was generally much more visible in the field and played an active role in identifying and mitigating productivity hurdles. Likewise, contractors put much more effort into planning the work and coordinating external requirements such as switching and materials management.

The contractor assessment also involved a detailed cost study to support recommendations for workforce optimization. The company discovered that design and work management solutions failed to provide adequate information to quantify the amount of work completed or the labor consumption against that work. In short, the company lacked the tools to identify internal costs by work type to support decisions about the allocation of the work. The insights gained from the field assessment were not only that adopting those best practices would lead to improved company productivity, but also that the organization needed to improve processes and technology utilization to facilitate workforce integration optimization and further drive productivity gains.

**Broadening skills:** Broadening the skill set of field workers is yet another way to enhance the productivity of the workforce. For example, training distribution crews to perform their own switching can limit waiting and does not tax other crews. Alternatively, gas maintenance workers can be cross-trained in areas such as meter replacement, customer turn-ons and turnoffs, and disconnects to support the electric side of the business. Maintaining a multi-skilled workforce can allow field crews to complete work in a single trip, when traditionally the same project would have required two or more trips by different crews. Multi-skilling is not easy and requires broad job classifications, revamped training programs, flexible work rules, and updated safety programs to fully capture the productivity benefits. It also requires ongoing vigilance by management to continually enforce the proper behaviors in the field.

The importance of broadening skills, in light of an aging workforce and its associated issues, takes on added urgency. Focusing on this dimension facilitates knowledge transfer, provides

**Maintaining a multi-skilled workforce can allow field crews to complete work in a single trip rather than in two or more trips by different crews.**
flexibility to cover absenteeism, and ensures workforce continuity in critical operational areas. Additionally, broadening skills leverages the apprenticeship and on-the-job learning models that already exist at most companies, allowing workers to get practical experience and training from the seniors they will eventually replace.

**Work process standardization:**
Productivity can also be managed through execution standardization, where work processes allow for the development of robust compatible work units that are modified when required to make them continually relevant. These compatible units are critical to tracking, reporting, and improving productivity. In our experience, compatible work units are often not believed and schedules are modified by planners and supervisors to fit their experience and understanding.

Using compatible units that have not been maintained and updated can have a significant impact (see Exhibit 5). In this example, estimates coming from design and engineering consistently overstate the level of resources required to complete the work. The client felt that its workforce was extremely productive as it was consistently under budget. A closer look revealed that the “real” productivity driver was poor data and application.

*Exhibit 5*
**Compatible Units (Client Example)**

![Graph showing labor hour estimates to actual activities under 150 hours.](source: Booz & Company analysis)
Variances between an individual compatible work unit and actual outcomes can be quite high with no feedback to designers. Compatible work units need not be perfect, but they must be consistent and effective to provide a reliable measurement “yardstick.” Compatible work units, if utilized effectively, allow for the measurement of productivity by comparing the labor consumed for completed work over time to the cumulative standard labor requirements to complete that work. If, for a defined time period, less labor is consumed than standard requirements call for, it means that productivity exceeded planned levels. If fewer units are completed, productivity is below standard levels. Productivity measurement becomes increasingly more accurate as more and more measurement periods become available, and corrective action can be taken where indicated. Similarly, when areas with particularly high productivity are identified, they can be analyzed to determine best practices, which can then be shared with other areas. Incorporating these best practices may involve drastic changes in work management enablers such as systems, workflows, templates, and interfaces to increase efficiencies across all aspects of the process. Having an efficient and effective feedback loop in place is necessary to continually improve utility operating processes.

Leveraging technology and information: Finally, the recent investments that many utilities have made in work management tools must be utilized to measure, track, and report worker productivity. Many utilities have purchased and installed work management systems (including hardware and software), but a lack of user training, reliable information, or process requirements has resulted in inconsistent or limited usage. We have found that, when expedient, supervisors and management tend to rely on their experience to manage productivity, rather than on information and an established fact base. Leveraging the work management system capabilities already in place can have a significant impact on day-to-day productivity, but only if these obstacles are addressed.

Another aspect of leveraging technology is the ability to extract relevant information from the plethora of data captured and provide managers with insights about where improvements can be made. Once the right information is identified, both consistency and accountability must be ensured across the entire workforce to accurately capture and report the necessary data. Designers, work planners and schedulers, supply chain personnel, and other key operating personnel must use the system consistently to provide reliable measurement and feedback loops. We have found that if the data being collected is actually used to provide insight into operating performance, employees are more likely to utilize the work management system as intended. The optimal mix of data will contain both the quantity and quality necessary to provide robust and actionable information.
CONCLUSION

Focusing on these few, but powerful, areas will enable efficiencies across the work management life cycle and can be embedded in a comprehensive productivity program without undue and prolonged disruption. However, most companies lack the requisite insights into performance improvement because they do not understand their current levels of performance. It is important to realize that enhancing productivity will require companies to rethink their operating models to eliminate the inherent barriers to productivity improvement and facilitate the effective and efficient execution of work. While this type of improvement may seem elusive and difficult to sustain, increasing field force productive time is a critical enabler to meeting cost and performance targets for network operations in the future. Watch for the results of our industry survey on this topic in an upcoming Perspective, exploring how companies have tackled the challenges across the work management life cycle.
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