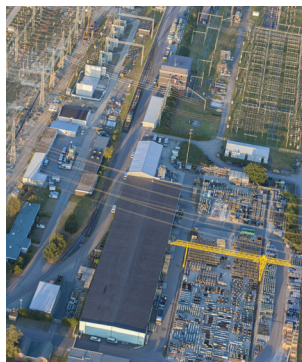


Electric Power/Natural Gas



The power of untapped potential

How US utilities can transform their distribution systems

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The power of untapped potential: How US utilities can transform their distribution systems

It's time for utilities to tap into distribution to find new sources of value. Here's how.

Distribution is the “last mile” of the process that moves electricity from power plants and into homes and businesses. This is a complex system, vulnerable to weather and other disruptions; utilities have therefore tended to focus on making sure the system has robust technical capabilities and a degree of redundancy. That must still be a priority. At the same time, though, distribution could also become a source of value for both ratepayers and utilities.

In recent years, distribution has been somewhat neglected, as generation and transmission have won the lion's share of attention. Efforts to improve distribution have often been piecemeal. For example, the implementation of uncoordinated software solutions in the 1980s and 1990s for everything from work management to outage notifications to customer communications left a hodgepodge of systems. With regard to management structures, organizations have oscillated between centralization and decentralization.

Given these conditions, distribution is ripe for change—and the investment climate is also improving. A number of state-utility commissions have been upgrading requirements for distribution infrastructure. Some are offering regulated utilities the chance to increase capital spending to improve the grid without having to make a new rate case. At the same time, governments are demanding higher efficiency and better value to the customer.

It's an opportune moment for utilities to find new sources of value throughout the distribution process, from work generation, engineering, and priority setting to material and equipment preparation and execution (Exhibit 1). These developments could bring savings of 10 to 20 percent while also delivering marked improvements in customer satisfaction, reliability, and safety.

Two principles can be applied widely. First, adapt best practices from other industries that have gone through

Exhibit 1 Utilities can address waste and inefficiency throughout the distribution system.

	Description	Work streams
Work generation and engineering	<ul style="list-style-type: none"> Asset and line capacity planning for system Development of project and customer estimates and designs 	<ul style="list-style-type: none"> Engineering and support Contractor management
Supervision and scheduling	<ul style="list-style-type: none"> Schedule work based on short- and long-term requirements Manage and coach crews and technicians 	<ul style="list-style-type: none"> Supervisors
Material/equipment preparation	<ul style="list-style-type: none"> Order and stage materials required to complete work Ensure appropriate fleet size and mix 	<ul style="list-style-type: none"> Fleet/materials
Execution	<ul style="list-style-type: none"> Physical construction and maintenance of distribution assets Read meters; connect/disconnect customers 	<ul style="list-style-type: none"> Construction Meter-reading operations

such transformations and tailor them to the distribution environment. Second, engage employees from the start; top-down solutions will not generate enough buy-in to be successful in the long run.

Here is how to start the process and keep it moving.

Step one: Make the case for change

The complex nature of distribution, along with the industry's patchy record of implementing change, means that there has to be a consistent and engaging story that all the different stakeholders—employees, ratepayers, and regulators—can understand. One element has to deal with safety: it's important to communicate to employees clear expectations on work practices so that legitimate concerns about safety do not become barriers to change. Another element should take the form of metrics: it's a good idea to set ambitious targets so that everyone knows what the goals are and can get excited about meeting them.

At one large regulated utility, senior leaders visited each service center to talk with frontline supervisors and employees about how changes in the market, such as the deregulation of generating assets and the prospect of competitive transmission, were putting pressure on the organization. In distribution, the leaders argued that it was better—indeed, urgent—to change before additional regulatory pressures forced them to. This argument engaged employees and fostered a useful sense of urgency. Within two months, almost every distribution employee was participating in some way in the effort to change, whether it was leading ride-alongs or attending brainstorming sessions and workshops.

Step two: Identify opportunities

Transformations take time, so it's important to establish momentum. For a start, it's useful to put together a cross-functional team—from meter services to construction to engineering to support—with the task of generating a large number of actionable ideas that the front line will back. Then choose a high-impact, short-term pilot project (two months or less) that the team can deliver quickly and thus demonstrate that their ideas can become reality.

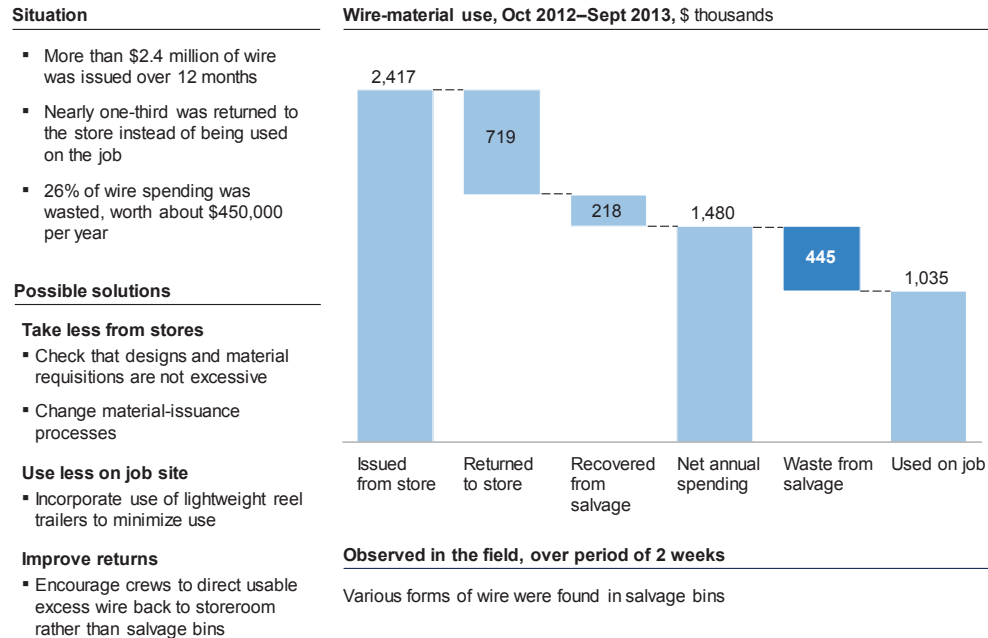
In supervision and scheduling, a close look at performance indicators, such as the effectiveness of scheduling and supervisors' time spent in the field, can help the organization assess the strength of its management systems. One company examined how it used its line-service crews and found they were spending a quarter of their time on orders driven by customer-owned rather than utility-owned equipment. By instituting a fee if the equipment turned out to be owned by the customer, the utility shifted the burden back to the customer and was able to deploy its resources to higher-value work. This was a simple, profitable fix. Another place to look for value is in material preparation. One common reason for waste is not having the right material or equipment on hand for the job. One utility did a detailed analysis of its truck-stock inventory to identify the most used and needed materials. Within weeks, its sites were able to cut inventory by 20 percent.

In another case, a utility's warehousing organization found that it had issued about \$2.5 million worth of wire for installation and replacement in the previous year. Less than half actually got used on the job; a quarter was simply wasted. At any given job site, it was easy enough to see wire in bins or on the ground. Once the company identified the waste, it took three actions: checking requisitions more carefully to make sure that enough wire, but no excess, was issued; buying lightweight reel trailers to minimize the waste that occurred when crews transported wire on the truck; and encouraging crews to send extra wire back to the storeroom rather than throwing it away (Exhibit 2). The results were immediate. Similar small changes across a range of materials can add up to substantial savings surprisingly fast—and get employees interested in doing more.

Step three: Rank opportunities on the basis of greatest value delivered

It's important to get frontline staff involved in figuring out how to cope with the most important issues. The effort can be as simple as hosting brainstorming sessions in which participants are asked to evaluate the business case for each topic. This bottom-up approach helps commit frontline staff to the process, which matters when it comes time to execute the most promising ideas.

Exhibit 2 One utility reduced wire waste and saved money.



Source: McKinsey analysis

A comprehensive scheduling program is one area of high potential value. While utilities all have software systems that track work requests, the ultimate decisions about what to do and when tend to rest with frontline supervisors, thereby increasing the amount of time they spend in the office rather than out in the field assisting with crews. By standardizing the approach that distribution service centers use to prioritize work and using dedicated scheduling personnel (who are separate from line supervisors), major sources of waste—such as repeat trips for short jobs, time spent waiting, and multiple trips to and from the service center—are diminished. Managers can deploy easy-to-use work-planning tools that mitigate the impact of uncertainty from weather or other disruptions; meanwhile, frontline supervisors can focus on ensuring efficient, effective, and safe execution of the work itself. We have found that reducing avoidable delays is the single most important way distribution organizations can generate value. Indeed, as much

as 80 percent of the benefit from distribution transformations comes from frontline-productivity improvements.

The following are important principles of effective scheduling:

- Separate administration from line scheduling and frontline supervision by creating three distinct scheduling roles—an administrative gatekeeper to help ensure work is ready to be scheduled, a dedicated scheduler with frontline experience, and line supervisors who are focused entirely on in-the-field execution.
- Balance longer-term preventive maintenance or asset improvements against shorter-term customer work.
- Organize crews to minimize disruption, for example, by designating specific crews for first-response or emergency work.

Exhibit 3 Scheduling tools increase productivity by efficiently matching crew capacity to planned work.

<u>Key tools implemented</u>	<u>How they improve productivity</u>
<ul style="list-style-type: none"> ▪ Job-duration checklist: spreadsheet creates accurate estimate of time required to complete job, including travel, administration, and loading 	<ul style="list-style-type: none"> ▪ Enables coordinator to quickly and accurately estimate time required for any specific job so that work can be matched to crew capacity
<ul style="list-style-type: none"> ▪ Resource matrix: visual-management board shows hours in day and days of week that can be used for work 	<ul style="list-style-type: none"> ▪ Enables coordinator to fill entire day for each crew: <ul style="list-style-type: none"> – Prevents crew from returning to service center midday to load – Prevents short jobs from taking more days than necessary – Ensures crew schedule is fully loaded
<ul style="list-style-type: none"> ▪ Job jar: queue of short (2 hours or less) jobs organized by geography to fill downtime at end of each shift 	<ul style="list-style-type: none"> ▪ Fills schedule with productive work ▪ Prevents cherry-picking of easy jobs
<ul style="list-style-type: none"> ▪ Scheduling tracker: spreadsheet enables administrator to track key metrics (loading, execution, job-jar hours, and causes of delay) 	<ul style="list-style-type: none"> ▪ Enables scheduling team to easily and accurately track processes ▪ Facilitates communication between scheduling team and frontline supervisor ▪ Identifies recurring causes of delays

Source: McKinsey analysis

- Set weekly and monthly meetings to discuss performance and incorporate further refinements.
- Place easy-to-understand tools, such as spreadsheets and “job jars,” throughout the organization to track progress (Exhibit 3).

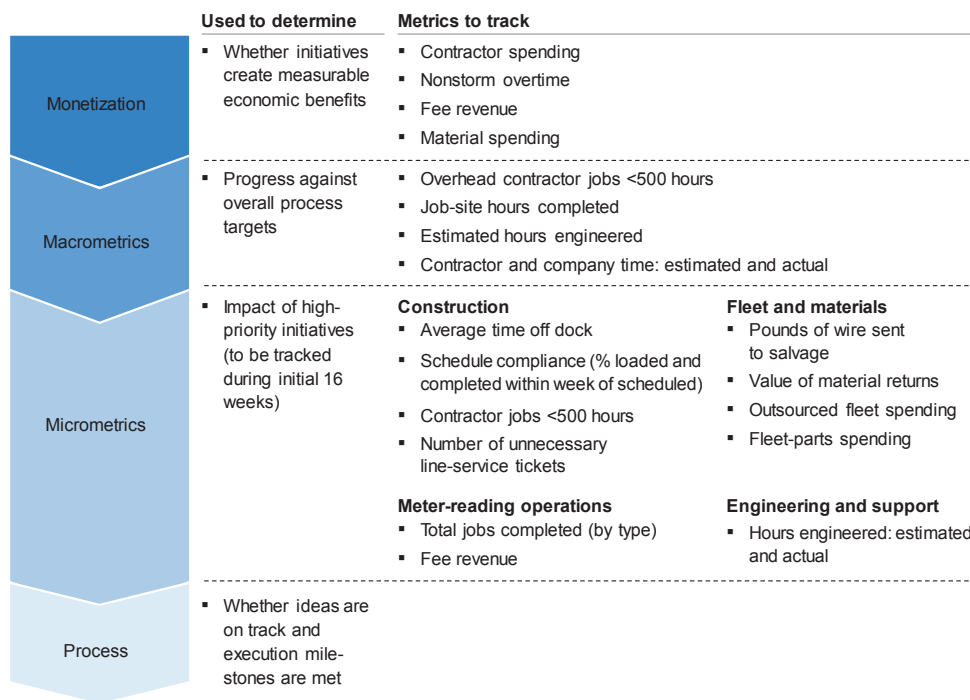
Step four: Develop a monetization strategy

Despite the evidence, some utilities continue to question the value of improving in-house productivity. Because most labor costs in distribution are fixed, they argue, there can be no real savings without cutting head count. “Look,” they’ve said, “if we improve the efficiency of our distribution line crew, we can pack

our workers’ day with more construction tasks, but these will run out. What do we do with the person-hours that productivity has freed up? How does that make us money?”

Prior to the launch of a change program, it is important to designate a full-time leader who is accountable for delivering against the metrics. There should also be functional leaders responsible for a single major sector, such as construction, meter revenue, fleet, materials, or engineering. Finally, the team should develop a set of metrics to monitor progress (Exhibit 4). The important thing is to communicate what is in play. Frontline workers want, and deserve, to know; in the absence of communication, they will tend to assume the worst.

Exhibit 4 Organizations can develop and monitor a comprehensive set of metrics to track progress.



Source: McKinsey analysis

Step five: Create a team responsible for sustainable improvement

Most new value creation in distribution will come from changes that take a year or more to implement. To create a strong foundation and a culture of continuous improvement, four elements are required: an organizational structure with defined roles and responsibilities, respected change agents, training and skill building, and well-defined goals.

Prior to the launch of a change program, it is important to designate a full-time leader who is accountable for delivering against the metrics. There should also be functional leaders responsible for a single major sector, such as construction, meter revenue, fleet, materials, or engineering. Finally, the team should develop a set of metrics to monitor progress. These

metrics should be updated regularly and tracked centrally. Without such monitoring, engagement will dwindle and no one will be able to tell what is going on.

The distribution opportunity

Can this five-step approach work? Yes. One Midwestern utility found itself spending more and more on distribution, even as business conditions tightened. In addition, its reputation for safety had been hurt by a series of preventable injuries and vehicle accidents.

The company undertook an intensive 16-week effort to set the organization on a longer-term, multiyear journey to turn things around; this included brainstorming sessions, “learn by doing” teams, and the creation of a two-year transformation plan. The latter included a clear strategy to monetize productivity

Exhibit 5 One company reduced staffing requirements for pole replacement.

	Before	After	Impact
Crew and vehicle scheduling	<ul style="list-style-type: none"> ▪ Crews each take 3 or 4 men and 2 trucks to job each day 	<ul style="list-style-type: none"> ▪ Pole-setting crews use 2 men and 1 truck to perform digging and setting of poles ▪ Pole-transfer crews use 3 men and 1 truck to perform line transfer 	<ul style="list-style-type: none"> ▪ Greatly reduced hours per pole: <ul style="list-style-type: none"> – Eliminated idle crew members – Minimized changeover time
Morning time improvement	<ul style="list-style-type: none"> ▪ ~95 minutes in service center led to crews having just 5.5 hours of productive job-site time per day 	<ul style="list-style-type: none"> ▪ Condensing morning time meant up to 6.5 hours of productive job-site time a day 	<ul style="list-style-type: none"> ▪ Company can conduct 2 full transfer operations per day, facilitating use of dedicated transfer crews
Material delivery	<ul style="list-style-type: none"> ▪ Crews either haul their own poles or have them delivered in a pile near work site 	<ul style="list-style-type: none"> ▪ Poles are always delivered ▪ Each new pole is placed optimally, near pole to be replaced, and faces in correct direction 	<ul style="list-style-type: none"> ▪ This saves 1.0–1.5 hours per pole ▪ Increased safety from less dragging of poles around work site
Traffic control	<ul style="list-style-type: none"> ▪ Crews spend 30–40 minutes setting up and tearing down their own traffic control devices 	<ul style="list-style-type: none"> ▪ Contractors set up devices 	<ul style="list-style-type: none"> ▪ 1–2 hours per pole avoided
Sample impact Using this approach, a simple 4-pole replacement job could yield savings: <ul style="list-style-type: none"> ▪ 42% fewer person-days ▪ 87% reduction in line-truck use ▪ 50% less bucket-truck use 			

Source: McKinsey analysis

Exhibit 6 The company also improved fleet-maintenance operations.

Analyze preventive maintenance	Roll out optimization techniques	Benefits of new process
<ul style="list-style-type: none"> ▪ Average time to preventive-maintenance jobs was 108 minutes in 2012–13 ▪ Repair expenses were relatively high, at \$700,000 and 4,000 technician hours per year ▪ Warranties were at risk of being voided due to noncompliance with manufacturers' preventive-maintenance recommendations 	<ul style="list-style-type: none"> ▪ Limited interruptions of preventive maintenance ▪ Optimization and collective problem solving reduced 73%: <ul style="list-style-type: none"> – Eliminated unnecessary steps – Reduced wasted motions – Simultaneous operations (eg, rotating tires while oil is filling) 	<ul style="list-style-type: none"> ▪ Cultural change <ul style="list-style-type: none"> ▪ Sign of frontline empowerment and ownership of results ▪ Fleet techs are proof of concept for single minute exchange of dies and hope to inspire other areas ▪ Desire for continuous improvement: 9 additional ideas generated; other processes to be reviewed ▪ Decreased maintenance costs <ul style="list-style-type: none"> ▪ Increased capacity for more preventive maintenance on heavy-use vehicles to reduce repair expenses ▪ Bring back external spending on maintenance and repairs

Source: McKinsey analysis

improvements by reinvesting savings into long-delayed reliability projects. More than 90 percent of employees got involved in initiatives such as making pole replacement more efficient (Exhibit 5), improving scheduling and job-briefing procedures, and dramatically reducing the time to complete preventive maintenance on fleet vehicles (Exhibit 6).

Early successes in these pilot districts demonstrated the potential to achieve significant cost savings (up to 20 percent) while also improving grid reliability through increased capital spending and better employee engagement.

Enhancing the appeal of these distribution-centered change programs is that these principles can be applied to other functions, such as substation operations.

Electric utilities must reinvent themselves; those that delay or refuse could become victims of consolidation. Those that seize the day, however, can generate significant and lasting value for their shareholders, customers, and employees. At a time when the pressures on US utilities are unprecedented in their size and scope, regulated players need to develop innovative competitive strategies. Transformation in distribution is one such opportunity. Doing so requires commitment from both leaders and frontline staff, but it can deliver substantial value across all the most critical dimensions—efficiency, reliability, customer service, and safety.

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