Seven Quick Lessons About THE INTERNET OF THINGS

OSIsoft®

The Internet of Things (IoT) promises to reduce energy consumption, transform supply chains and, in general, improve the quality of life for billions of people.

But, it's not going to be easy. IoT will involve getting OT and IT together and figuring out how and when to adopt new technologies such as machine learning or creating protocols for secure data sharing. We know because we've been in this 'new' market for over 35 years. Over 1,000 leading utilities, 95 percent of the largest oil and gas companies and more than 65 percent of the Fortune 500 industrial companies rely on the high-fidelity insights from the PI System to run their businesses. The PI System™ can be found inside offshore oil platforms and food manufacturing facilities. We're helping medical researchers analyze data from wearables and tracking power production across nations.

So what are some of the things to remember about IoT?

You Will Generate Far More Data Than You Think

Variety (in Standards) is the Spice of Life

The Cloud Isn't the Answer to Everything

As Easy to Use as a Faucet

Take it One Step at a Time

It Can Generate Revenue Too

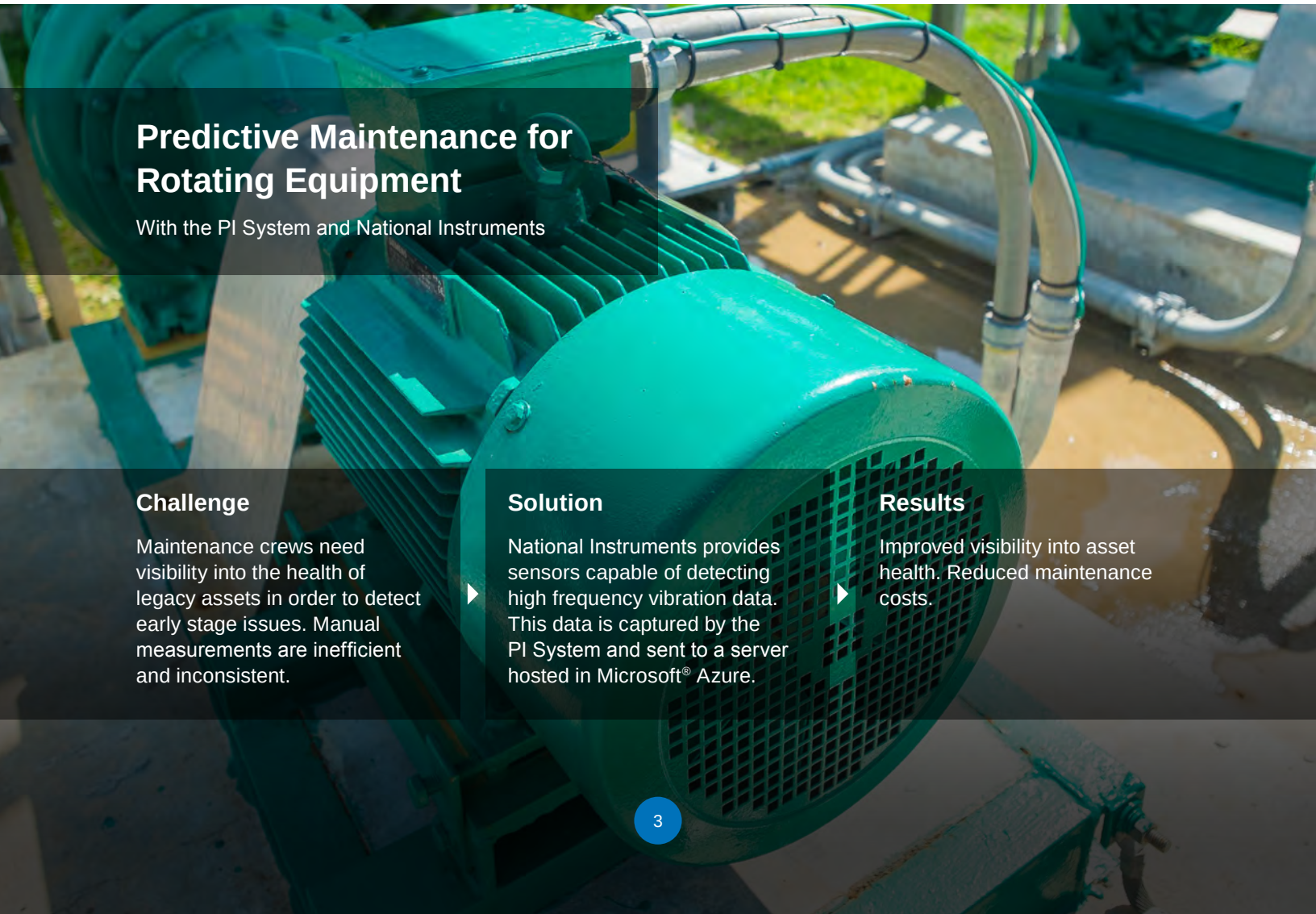
The Benefits Will Be Bigger Than You Think

You Will Generate Far More Data Than You Think

Machines put the Big in Big Data. A smart mining site can generate up to 2 petabytes per day. A building can generate, on average, 250GB a day. The IDC research firm estimates that the world's store of digital data doubles every two years and the growth is largely being driven by devices and, by 2020, 46% of "people" on the Internet will be machines. Harvesting and exploiting this data is the key to becoming more efficient, reducing energy, and moving toward true sustainability. The volume and variety of data will be unprecedented.

With this rate of growth, it's not easy to keep up. Analysts estimate that only 1% of data proliferating from the 30,000 sensors on an oil rig gets used for decision making.

Still, if you can manage it, those data points tell a story. Vibration analysis systems can soak up over 200,000 signals a second and detect shaft mis-alignments, pending failures, and other problems in near real-time – saving millions in repairs and avoided downtime.



Predictive Maintenance for Rotating Equipment

With the PI System and National Instruments

Challenge

Maintenance crews need visibility into the health of legacy assets in order to detect early stage issues. Manual measurements are inefficient and inconsistent.

Solution

National Instruments provides sensors capable of detecting high frequency vibration data. This data is captured by the PI System and sent to a server hosted in Microsoft® Azure.

Results

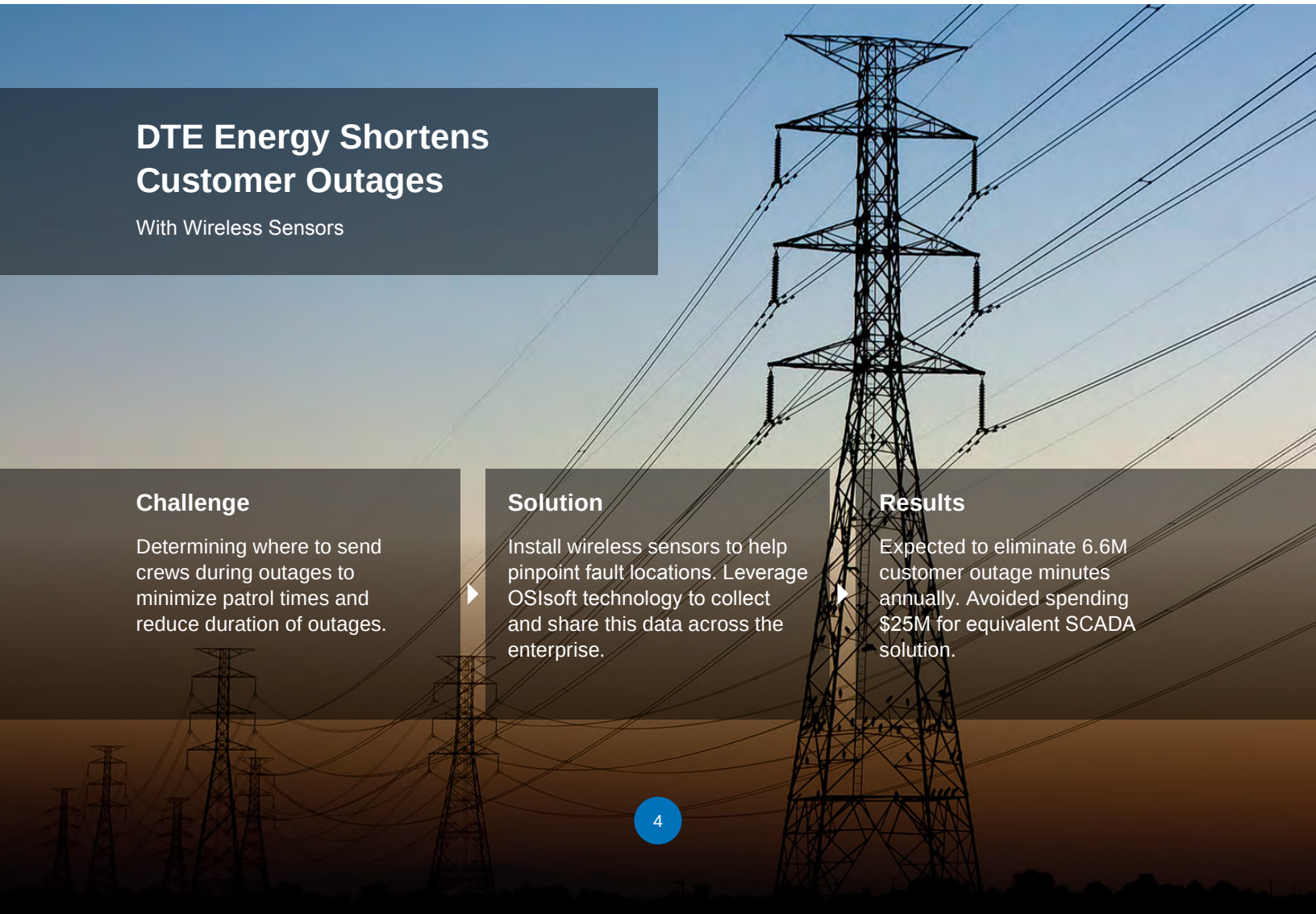
Improved visibility into asset health. Reduced maintenance costs.

Variety (in Standards) is the Spice of Life

Standards proliferate in operational technology (OT). A wind farm, for instance, might actively capture data from over 300,000 “tags” or data points on a continual basis served up in 140 different formats. Different markets have their preferences: OPC and OPC UA are popular with manufacturers. BACnet, meanwhile, is popular in the building management market.

Why such variety? Many of these devices are placed in extremely challenging environments and must last for years without human intervention. In the U.S.A., for instance, the average age of an electrical transformer is over 40 years. Performance trumps convenience.

DTE Energy, the 12th largest utility in the U.S., tracks over 25 million smart meters, IoT gateways, transformers, and other assets across its service territory. Despite the fact that these resource come from different vendors and generate data in a bewildering array of formats, DTE has a clear picture of what’s going on and uses the data to avoid millions of outage minutes and millions of dollars.



DTE Energy Shortens Customer Outages

With Wireless Sensors

Challenge

Determining where to send crews during outages to minimize patrol times and reduce duration of outages.

Solution

Install wireless sensors to help pinpoint fault locations. Leverage OSIsoft technology to collect and share this data across the enterprise.

Results

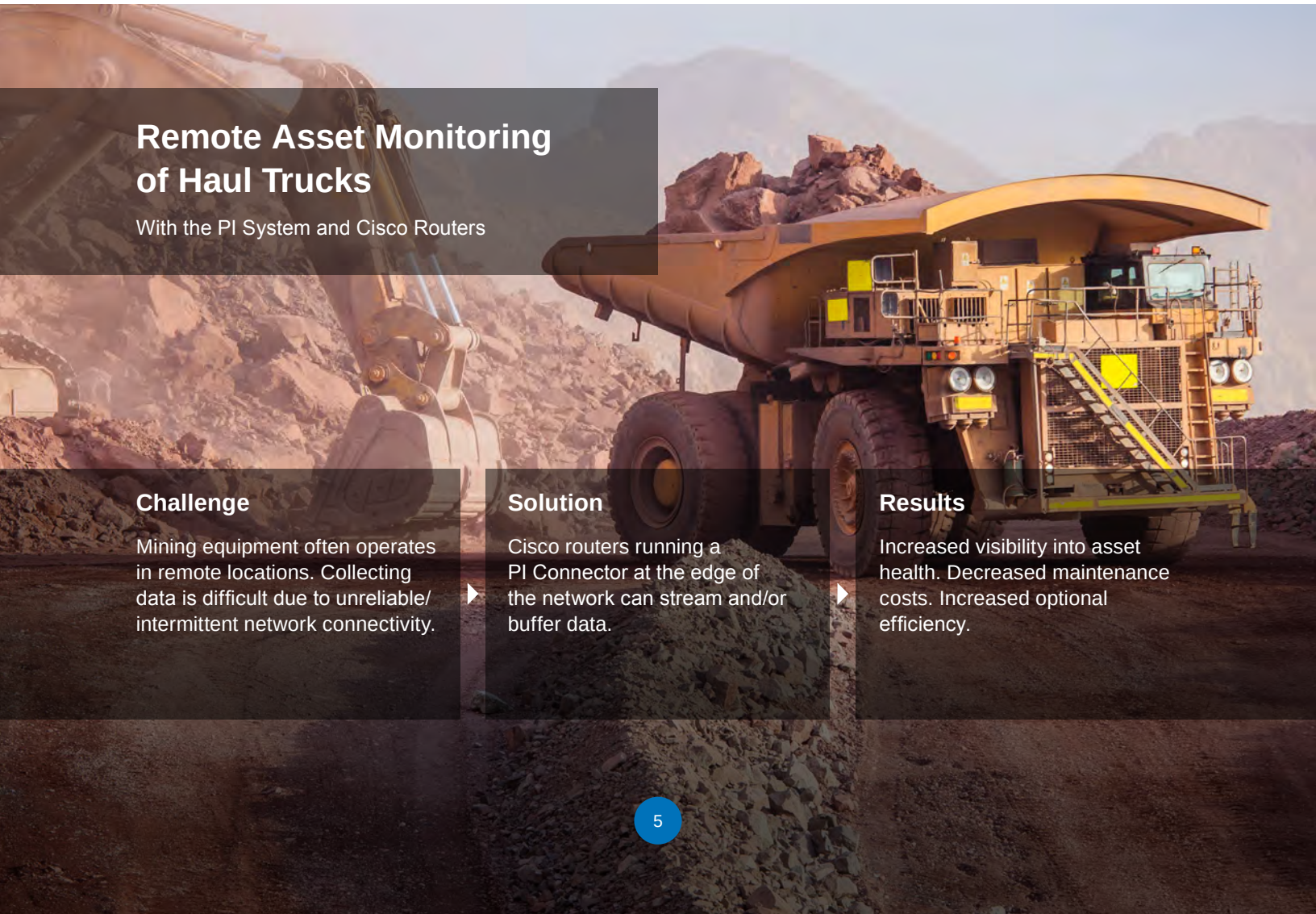
Expected to eliminate 6.6M customer outage minutes annually. Avoided spending $25M for equivalent SCADA solution.

The Cloud Isn't the Answer to Everything

Today's cloud systems are magnificent. You can spin up hundreds of thousands of servers in an instant. Clouds, however, are also often located miles from your devices or your data, driving up computing costs. Wikibon's David Floyer, for instance, estimates that a small offshore wind farm can cut its bandwidth and storage costs by 36% by storing most of the information on the edge rather than ship it all to the cloud. IDC estimates that 40% of data will be generated, analyzed, and stored right where it was born.

Clouds can also be fragile. Even major cloud companies endure outages that can last hours. Not being able to access email or your corporate files for that long can be maddening. But for a pharmaceutical manufacturer, a data outage means having to potentially scrap a production run. A data failure at a refinery can lead to safety issues. Given the risk, many applications simply can't migrate to the cloud.

In addition, latency is a risk. An autonomous car can generate 1GB a second. Autonomous mining trucks generate even more. These vehicles, however, need real-time information for decision-making.



Remote Asset Monitoring of Haul Trucks

With the PI System and Cisco Routers

Challenge

Mining equipment often operates in remote locations. Collecting data is difficult due to unreliable/ intermittent network connectivity.

Solution

Cisco routers running a PI Connector at the edge of the network can stream and/or buffer data.

Results

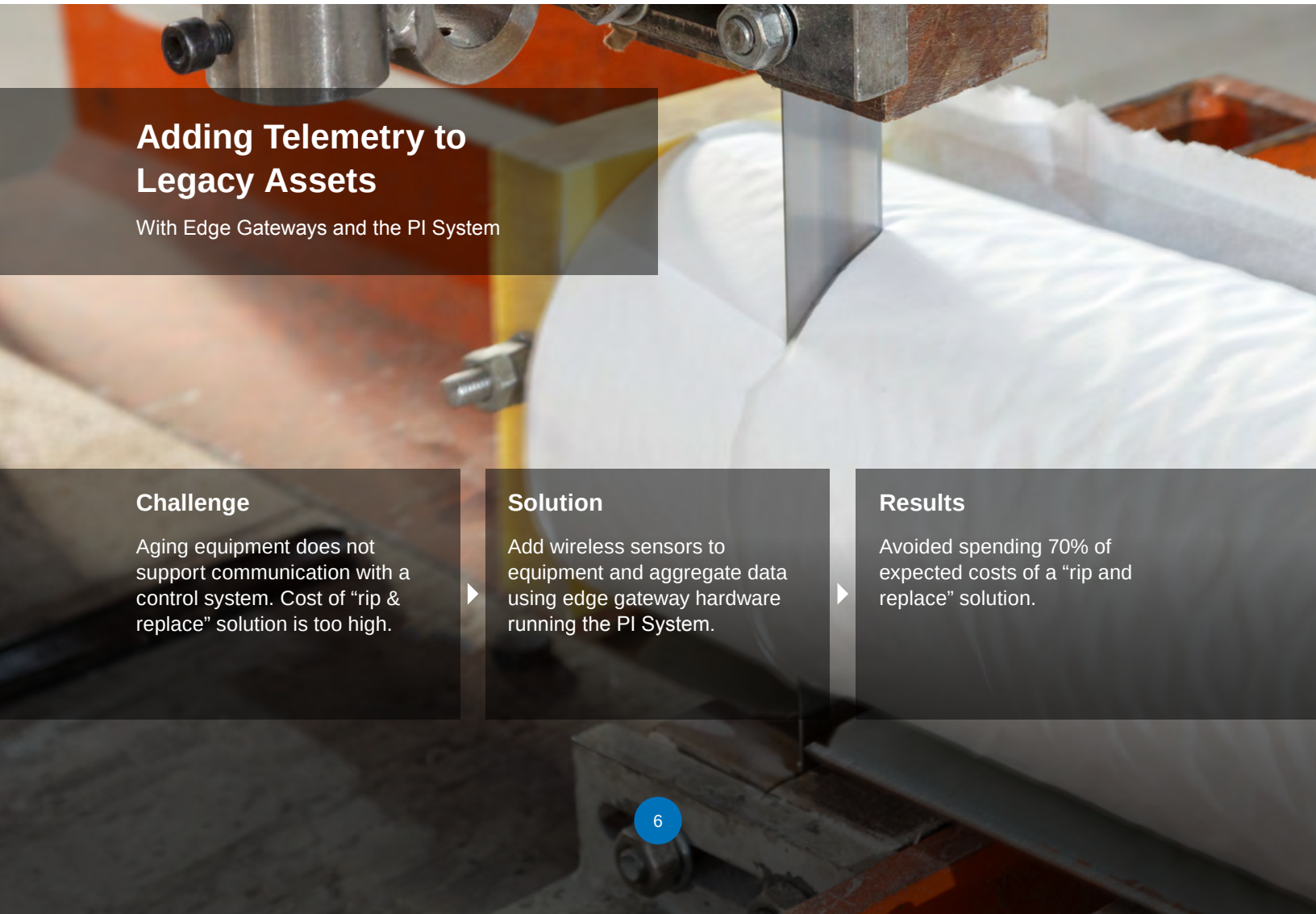
Increased visibility into asset health. Decreased maintenance costs. Increased optional efficiency.

As Easy to Use as a Faucet

Think of the power grid or the water system. They are incredibly complex networks that are at the same time incredibly easy to use. You can attach a wide variety of devices — light bulbs, household appliances, fire hydrants, and faucets — that are all supposed to work perfectly at any time at a moment's notice. Water and power networks are so reliable, in fact, that when they break down it's headline news.

This same infrastructure approach — ease of use, reliability, seamless scalability, broad compatibility — will be absolutely essential in IoT. Customers, service providers, and the original manufacturers, among others will be accessing smart devices with very little training. Different types of hardware will be plugged into networks and removed without edicts being handed down by IT. Your employees and customers will want to run analytics without waiting for data scientists to first scrub the data.

This "faucet" approach also allows companies to bring older equipment and newer equipment into the same console for better visibility. RtTech and JD Irving are working on an effort to wirelessly link saws and other devices — some dating back decades — to its core information systems.



Adding Telemetry to Legacy Assets

With Edge Gateways and the PI System

Challenge

Aging equipment does not support communication with a control system. Cost of "rip & replace" solution is too high.

Solution

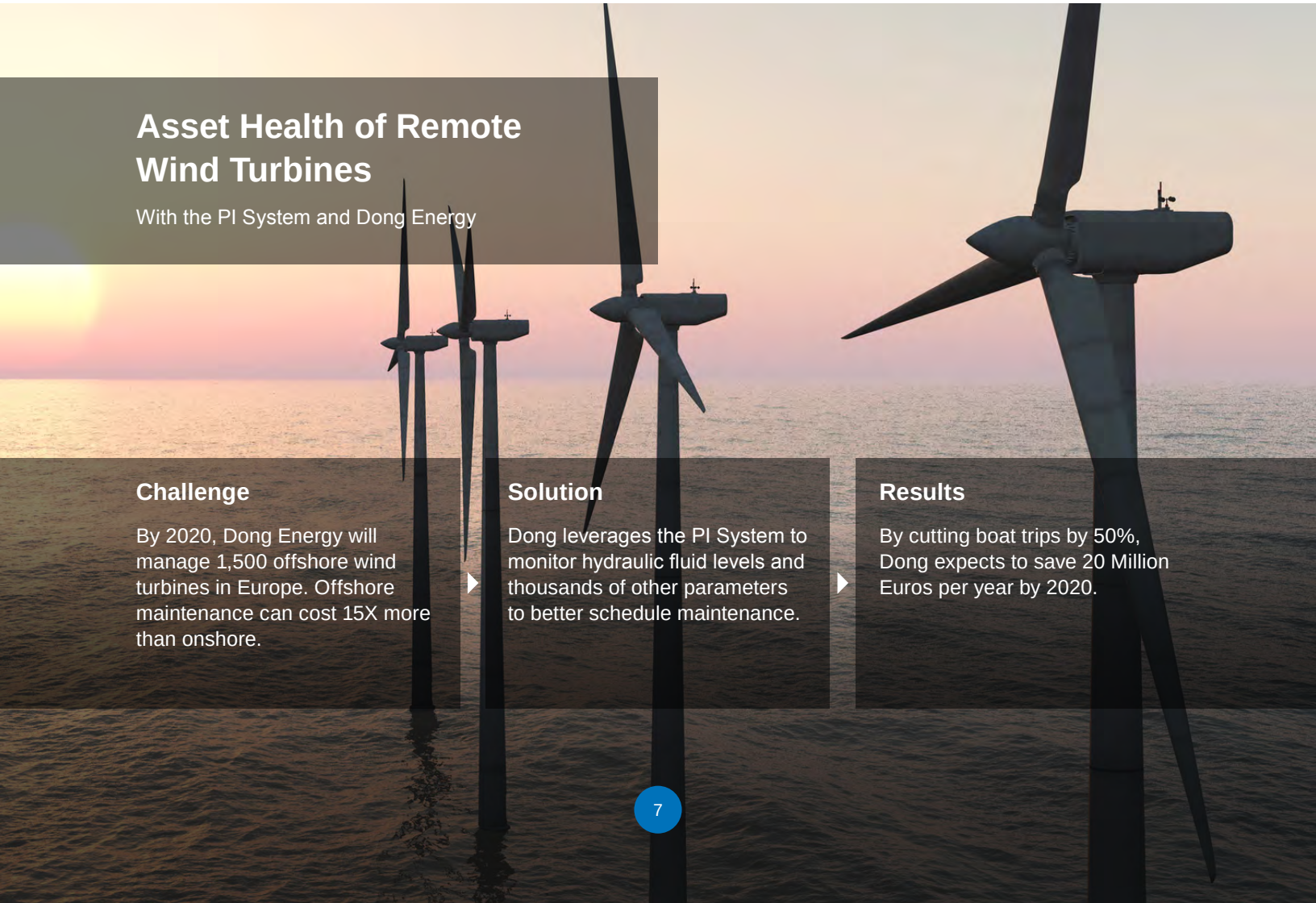
Add wireless sensors to equipment and aggregate data using edge gateway hardware running the PI System.

Results

Avoided spending 70% of expected costs of a "rip and replace" solution.

Take it One Step at a Time

Don't attempt to boil the ocean. A lot of companies tend to start with using IoT for predictive maintenance. Dong Energy uses IoT to cut down the number of times technicians have to boat out to inspect offshore turbines. The company anticipates saving 20 million Euros a year by 2020. Once you can show the ROI, everyone from the CEO on down gets more comfortable with the idea. Since 2010, by using the PI System, MOL, a refiner in Europe, has added $1 billion in EBITDA to its' bottom line by using the PI System for fine-tuning processes and detecting potential problems before they blossom.



Asset Health of Remote Wind Turbines

With the PI System and Dong Energy

Challenge

By 2020, Dong Energy will manage 1,500 offshore wind turbines in Europe. Offshore maintenance can cost 15X more than onshore.

Solution

Dong leverages the PI System to monitor hydraulic fluid levels and thousands of other parameters to better schedule maintenance.

Results

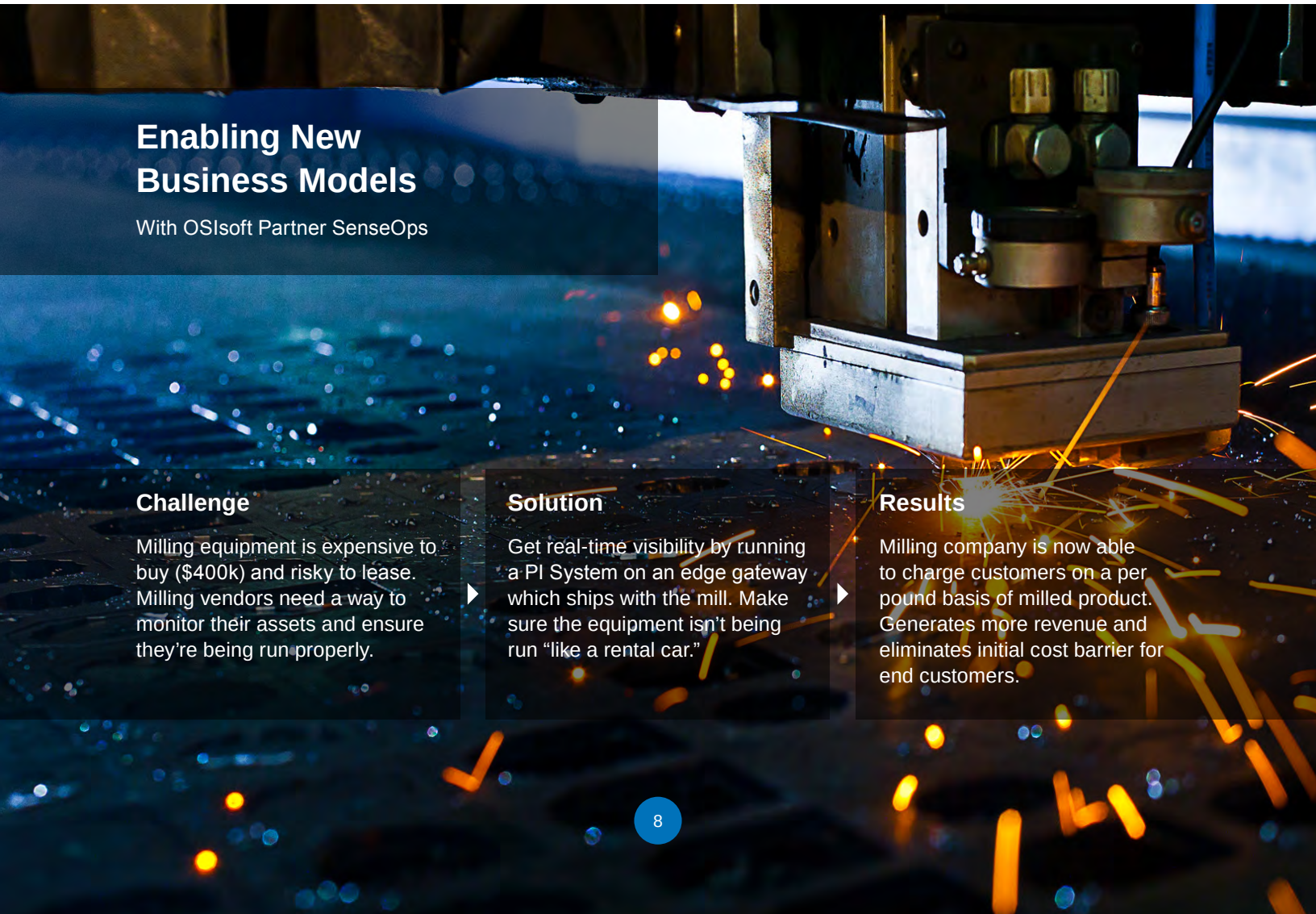
By cutting boat trips by 50%, Dong expects to save 20 Million Euros per year by 2020.

It Can Generate Revenue Too

When people think of IoT, they often think of cost savings. It can reduce energy, cut emissions, etc. But it's also going to serve as a basis for selling new services such as predictive maintenance. In the future, every product will have an attached service.

FlowServe, a pump maker that can trace its roots back to the 1790s, has added connected services to its products so it can warn customers of potential problems or serve up 3D CAD drawings for technicians in the field. One early customer avoided over $600,000 in repairs and downtime through the service.

Meanwhile, startups like SenseOps, are using operational data and portable servers to sell heavy equipment as a service.



Enabling New Business Models

With OSIsoft Partner SenseOps

Challenge

Milling equipment is expensive to buy ($400k) and risky to lease. Milling vendors need a way to monitor their assets and ensure they're being run properly.

Solution

Get real-time visibility by running a PI System on an edge gateway which ships with the mill. Make sure the equipment isn't being run "like a rental car."

Results

Milling company is now able to charge customers on a per pound basis of milled product. Generates more revenue and eliminates initial cost barrier for end customers.

The Benefits Will Be Bigger Than You Think

After the struggle and pain, there is reward. You're seeing success stories in a lot of likely, and unexpected, places. Irish Distillers, Pernod-Richard, has launched a plan to cut energy consumption by 50% while doubling production at some of its distilleries by better using data. Syncrude, an oil company in Canada, managed to cut maintenance by 20% with IoT technologies as well as reduce the risk of spinal injuries to employees. Barrick Gold is using data to lower the cost of recovering gold to $700 an ounce. The digital project has also allowed Barrick Gold to reduce environmental deviations which can reduce the risk of fines by 45% in some locations.

The San Diego Padres, meanwhile, are on track to cut resources by more than 25% over the next five years. The team is also looking at ways to more accurately bill concessionaires and those that lease the stadium for utilities.

Reducing Expenses at Petco Park Stadium

With the PI System

Challenge

Provide visibility into operational expenses of running the Petco Park baseball stadium.

Solution

Edge gateways running OSIsoft Technology were installed to monitor the water, gas, and electricity meters throughout the park.

Results

Expected to reduce operational expenses by 25% over the next 5 years.

CONCLUSION

The Internet of Things has huge potential to provide new depths and richness of data about every device, connector, controller, and piece of equipment everywhere in your operations. With a full picture – not only what each thing is doing – but the nuance of how it is doing, how it's performing relative to its environment, when it works best, when it doesn't, and what latent potential you can leverage; a new world of discussion making possibilities (and benefits) opens up. With an open tap of actionable data available to everyone in your company who needs it, you can effectively crowdsource solutions to a range of problems big and small to achieve better results, faster. But making this potential tangible requires realistic goals and grounded plans. The hype has to be weighted by the practical. By creating broad plans with high expectations and grounding them with a realistic, practical, foundation that marries the best of the old with the best of the new you can effectively leverage IoT to make substantial, transformative, changes in your business.

ABOUT OSISOFT

OSIsoft, a global leader in operational intelligence, delivers an open enterprise infrastructure to connect sensor-based data, operations, and people to enable real-time and actionable insights. As the maker of the PI System, OSIsoft empowers companies across a range of industries in activities such as exploration, extraction, production, generation, process and discrete manufacturing, distribution, and services to leverage streaming data to optimize and enrich their businesses. For over thirty years, OSIsoft customers have embraced the PI System to deliver process, quality, energy, regulatory compliance, safety, security, and asset health improvements across their operations. Founded in 1980, OSIsoft is a privately-held company, headquartered in San Leandro, California, U.S.A., with offices around the world. For more information visit www.osisoft.com.

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