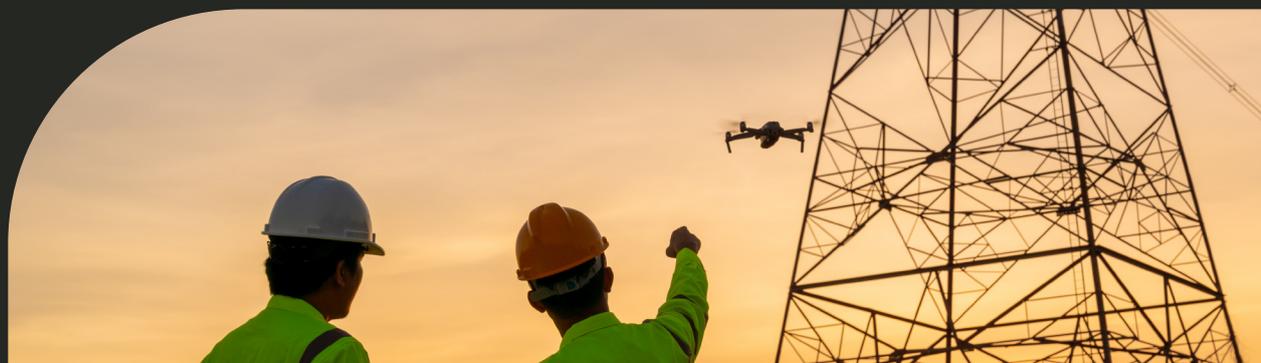




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## A trilogy of considerations:

Reducing O&M costs  
through inspection data



Energy is everywhere, it's essential to our lives and keeps our world in motion. The electric grid is **one of the largest and most important machines in the world.\*** The need for reliable energy is fundamental to our future, therefore a robust and safe electric grid is necessary for the reliable delivery of energy. However, the truth is that utilities have been around for over 100 years, and so have parts of the energy infrastructure and the inspection, maintenance methods and tooling that they have been utilizing.

With the passing of time, grids have expanded and aged, and grid operators have faced many challenges. We have an **immense challenge ahead** of us **to modernize grid inspections** to support dealing with challenges like aging infrastructure, safety concerns, compliance, asset inventory management, connecting low carbon technologies, climate change and on top of addressing all of that, there is the pressure to control and even decrease operations and maintenance (O&M) costs.

After in-depth research and interviews with various subject matter experts, we have boiled down the expert insights to **3 key areas** which close the gaps on some of the fundamental disconnects the industry faces during this modernization phase and will help those looking for a way to get ahead of the curve.



## 1 Utilizing asset data beyond the inspection

As stated already in 2006, **data is the new oil** – an untapped resource dependent on a refinement process to become valuable. It may be common knowledge that **data is the number one resource of the world today** as we are moving further in digitalizing our societies, but for utilities the digitalization journey is still in its early stages. It takes time to move the biggest machine in the world; the power grid, into a digital era, but the **data**, and the **asset data** gathered during inspections in particular will be a **fundamental resource**. If refined correctly, it can be **utilized far beyond the inspection and reduce O&M costs**.



When you review your current inspection methodology and plan your future inspection, the instant metric you want to improve is the cost of your inspection, you tend to focus on tangible metrics like cost per pole or mile, return of investment of the new method – these are all fundamentally important. But to truly reduce your O&M costs across the business you need to look beyond the inspection method and associated costs and incorporate key performance indicators on the usability of the data beyond the inspection.

A group of the largest utilities in the world **spent 142 billion USD on upgrades and modernization in 2021** alone to withstand the increasing demand of power\* – **how much of that was based on accurate data?**

To truly utilize the value in the data gathered during an inspection you need to know how you will be incorporating the newly collected, accurate infrastructure data into your asset management strategy, the departments using it and their workflows. **How are maintenance teams going to utilize this data in their planning and prioritization of capital projects?** Alarmingly, **only 5% of maintenance activities** in the electric-power industry are based on a data-driven, predictive approach,\* really highlighting the “untapped” potential of this resource. To shift the paradigm towards predictive maintenance you need to have a **plan for keeping the data current**, and **use past inspection data to plan your next**, feeding back historical data to get end-to-end value, and in turn decrease the cost of maintaining and inspecting the grid with current, accurate, accessible image-based data.

\*Deloitte 2022

\*McKinsey

## 2 Being realistic with emerging technologies

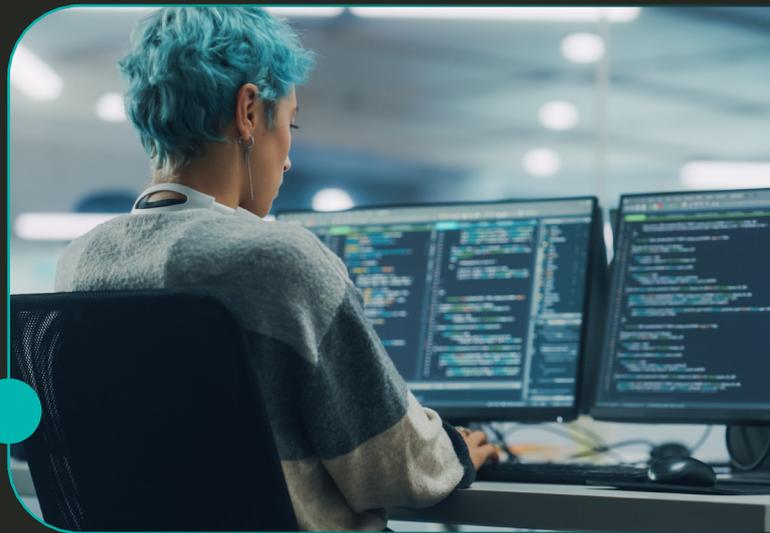
There is much to be considered with what we already know about our grid, but there is even more to gain with recent technological advancements that were once unheard of. These new disruptive technologies are changing life around us as well as the way we do inspections, and presenting us with new value and challenges.

Today, reliable energy comes from a collective effort between humans and technology. This collaboration is constantly evolving, and the need to adapt becomes imperative to utilities around the world. Artificial Intelligence (AI) is one of those core technologies which is helping to manifest the synergies of utility experts combined with the accessibility and speed of cloud computing. New technologies are exciting, but sometimes hard to adapt without understanding the whole panorama. **Every technology has its limits**, it's important to understand what these new technologies offer, how they fit into the utilities operating model today, and how they **eventually evolve business processes** to realize the true power of these synergies in the future. You need to set realistic expectations of AI and plan accordingly, here are our quick tips:

- **AI is not the magic bullet** that will automate all of your inspections overnight and reduce your O&M costs! – AI is a **gradual process** and you need to plan which defects you want the AI to detect and ensure that the technology you are going for has AI models for the defects within your scope and **enough training data** to support the detection of the defect.



- **AI alone will not work** – you need solutions where you have the **subject matter expert in the loop**. This is so the AI can learn over time and make recommendations with more precision and accuracy and leave your subject matter experts with time **to focus on high value activities**.



- You need to focus on the **whole inspection methodology**, this includes the process, scope, budget, capture technology, AI software, image processing software, subject matter expertise and tooling. The desired outcome is dependent on the methodology you use, not all virtual inspections are the same just like not all AI is the same. Do your homework and evaluate the whole end-to-end process.

**So how can AI help with reducing your O&M costs?** Well if done right, once the inspection data is captured, you need to be able to structure the asset data so you can analyze it, in a cost-effective manner. Going through hundreds of images manually is time consuming, and a mundane task that your subject matter experts should not be wasting their time on (because time is money), **their expertise needs to be applied to high value tasks** and AI has become a leading tool to speed up the manual processes for better allocation of subject matter experts time and knowledge.

Best-in-class inspection software with AI will structure your images to assets, run your photos through models and work with your subject matter experts to improve itself and learn from the user input. Subject matter experts have the ability to organize images by asset, tag them with important metadata and identify defects, but with AI software at hand, the majority of all those tasks are taken care of, and the subject matter expertise are applied to more quality control instead of countless hour of classification work. In summary, **AI is a great sidekick but the real superhero is still your SME!**

### 3 Focus on your knowledge capture

One of the challenges for utilities in the energy market is quite unique, and a tough one: The infrastructure is aging at the same time as the demand and reliance on power is at an all-time high, and the workforce, who have helped keep this giant machine running, is aging at the same time. In the next 5 to 10 years, **25% of the workforce** in the US\* **is set to retire**, taking first-hand knowledge and experience with them. The need for knowledge retainment and digitizing data has never been greater.

You cannot move forward if you are unable to leverage previous learnings from the countless lessons learned from years of inspections, **as there is (or at least has been) a lot of subjectivity in the classification of defects in the field.** Many utilities have missed major defects, resulting in serious consequences, outages and high spending, not because they did not have data of the asset, but because the analysis, decision and appropriate action took too long. **Time is at the center of many challenges** in the power industry, and the time for action to get ahead of the curve is right now.

So, if the superhero is your subject matter expert and AI is the sidekick, it is safe to say that **disorganized, unprocessed data of poor quality is the villain of the story.** Think about the oil again; the refinement process is what makes it valuable, so for inspection data to become an organization wide resource it requires both improving the data quality to make it actionable and trustworthy, and structuring data to effectively make it accessible.



By following **best practices** for capture, analysis and management of the data a lot of the issues can be avoided. First, **understand the value of data** and **integrate data analytics** to be an active part of the planning, as well as the inspection process. Changing the best practices and adapting your inspection process to **treat asset data as a valuable resource** will benefit the entire organization and assist in better and quicker data-driven decisions with the right tooling in place.

You can **reduce your O&M costs** by **leveraging the data to better prioritize capital projects** and, **identify faulty assets out in the field – remotely**, saving valuable time, costs and improving the safety of workers as well as a reliable power supply. Accessible, enriched defect documentation, along with historical data residing in one system with quick loading times will play a critical role in digitalizing the energy industry.

## So what is next!

As you plan your operations and maintenance programs with reducing costs in mind; consider the discussion points above and **remember this is a journey**. Have **realistic success metrics** and **expectations** on what you can achieve with the approach you are choosing. Some utilities have the desire to rely on an all AI-enabled virtual inspection model and want to focus on the performance of the AI only.

The truth is that you need to **begin with the end in mind** and **advance slowly**. It's not efficient nor realistic to begin by throwing out your current inspection process. All inspection types have strengths, focus areas and weaknesses, and can scale up and down at different levels, including the newest ones. To design a program that meets your objectives, you need to weigh all of this in. **Change doesn't mean replace**. Complementing traditional inspection styles with virtual inspections is the first step towards digitalization, an evolutionary step. Start small and build institutional knowledge within your organization. Virtual inspections can detect certain defects that are almost impossible with other methods, so you can use it to complement the line crew, help see your blind spots, and get a **higher percentage of defect detection**. Using new methods may allow you to scale back others, which can **save time and resources**.





As you continue to modernize your inspection processes, you'll find the right balance between using various inspection methods and this will prepare you to enhance your operations further. These technologies open the door to the future and higher levels of automation.

Recently we worked with two utilities to move over **\$10 Million** on **inspection costs from O&M to capital** by creating a digital asset inventory of their system and localizing a state-of-the-art inspection software. Transitioning to a digitalized tomorrow is a partnership, to find out how to start - **contact us today.**

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