



The Online Monitoring Business Model

Turning Installed Base into profits

Introduction

Machine Builders and OEMs have a long history of supporting their equipment in the field. Service of this type is viewed as a competitive differentiator, a source of customer satisfaction, and often a profit generator. Successful organizations in the industry have a staff of engineers, technicians, mechanics, or others charged with assisting customers in their maintenance and continued operation of the machinery long after the sale. For most organizations, this bundle of services could be broken into five categories:

1. Machine start-up and commissioning.
2. Warranty support.
3. Spare parts and consumables after the initial purchase.
4. On-site service after the warranty period.
5. Preventative maintenance via periodic onsite check-ups.

Employing this category breakdown, let us explore the issues and advantages of each of the five, then explore an exciting new option.

Machine Start-up and Commissioning

For all but the smallest self-contained machines, this one is part of the selling process. The machine is shipped to the end-user and soon after one or more of your service technicians travels to the customer location to make final connections, do a little fine-tuning, and possibly introduce customer staff to the machine's operating nuances.

For the most part, this is viewed as a necessity of doing business. Yet, often the service person discovers important points about the customer's internal ability to handle future issues.

Things like lacking special tools, programming devices, and other equipment needed to keep the machine running are exposed; the lack of important skills also becomes apparent.

Experience dictates many qualified service engineers can predict future needs for further assistance.

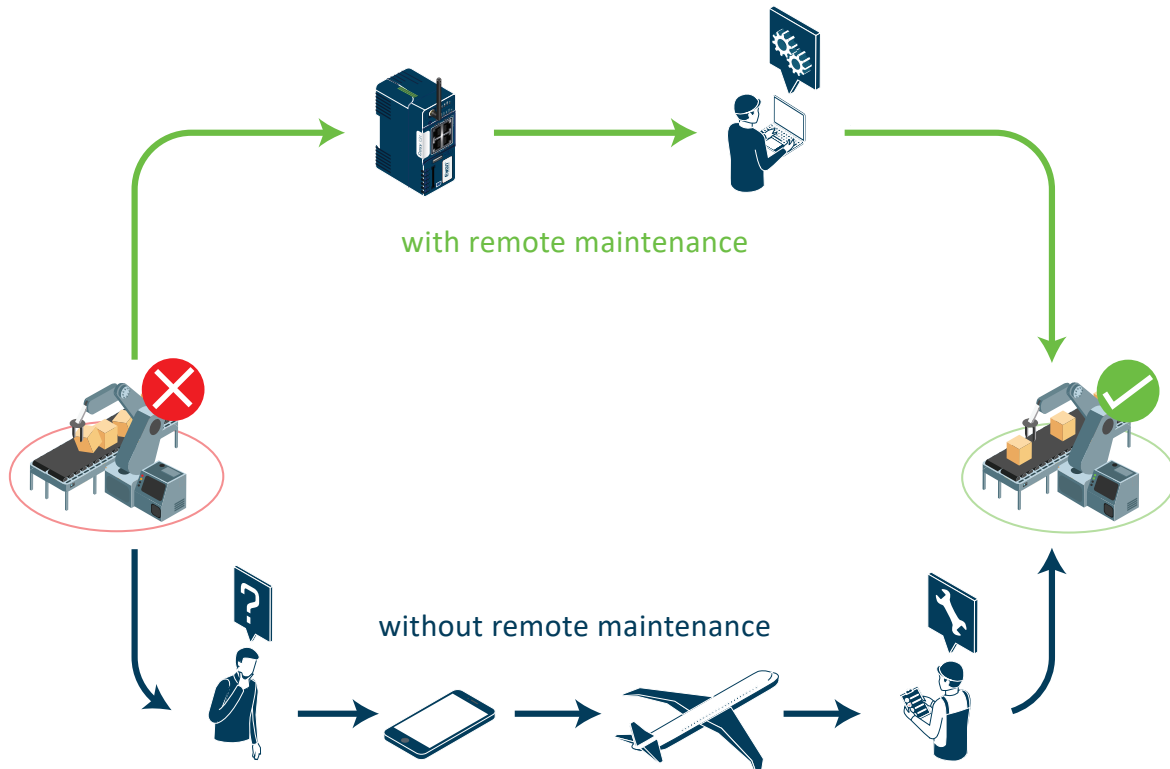
Warranty Support

Conversations with dozens of OEMs and machine builders point to the practice of providing a warranty period for machines shipped to their customers. Typically, this ranges from six months to a couple of years. During this period, the company guarantees trouble-free operation and technical support.

End-users experiencing issues call into the service or engineering team of the equipment supplier with questions on operations, troubleshooting, and thoughts on how to maximize machine performance. Many times, issues are resolved over the phone, but when no simple fix is determined the OEM is required to dispatch a service worker out to the customer location.

Since the issues are often deemed an emergency by the customer, the trips are distracting, costly, and time-consuming. Many service managers are frustrated by the lost resources created when the customer's issue turns out to be an operator error rather than a machine issue. Further, some calls require simple electronic tweaks which require only minutes to perform yet consume thousands in travel time.

A few progressive companies have begun equipping their products with remote access and troubleshooting capabilities. Time and again, the service managers of these departments report trips to the field saved and financial benefits resulting from connecting to the machine electronics and exploring potential issues from the engineering office rather than via a 10-foot programming cable on the customer's shop floor.



Spare Parts and Consumables after the Initial Purchase

If the OEM's machine uses custom, unusual or hard to find parts, spare parts and consumables may be part of the service offering. This service is important to the unsophisticated end user who may not have access to alternative sources of parts. Offering up these parts and consumables as a service offsets the cost associated with constantly helping end users identify a source for the parts on the open market. Further, the practice ensures there will be no unexpected downtime associated with the customer installing a component that does not fully meet the needed specifications.

Many pure OEMs have great success in generating revenue in this category. This is especially true when the machine contains patented elements such as custom printed circuits, mechanical devices, cutters, or other parts that cannot be easily sourced elsewhere. Several OEMs report this has become an important revenue source with **over 20 percent of their business coming from the OEM's installed base.**

To grow this business, the OEMs have worked with suppliers to develop catalog numbers that can only be purchased from the company building the machine. According to services expert, Jon Prescott of Scante, progressive OEMs with an eye for growing revenues have taken advantage of the fact that a typical machine consumption of repair parts is equivalent to the initial cost of the machine over the equipment's lifetime.



On-site Service after the Warranty Period

It is not uncommon for customers to experience issues that lay beyond their skillset and to request on-site service. But, there are inherent issues associated with these. First, the customer generally perceives their issue as an emergency. They expect an instantaneous response. This creates issues with man-power scheduling for the machine builder and certainly has resulted in many of the service technicians growing dissatisfied with their work/life balance as emergencies often occur over holiday, weekends, or on the day of their kid's big game back at home.

The issues impact customer satisfaction as well. Since the burden of travel costs is part of the billing, they see these situations as expensive; some would say exorbitantly expensive. They often delay calling in qualified service people until after spending several shifts/days trying to correct the issue in-house. This creates added pressure due to additional lost production time.

Finally, it is humanly impossible for the service technician to carry every potentially needed part with them on their trip to the customer. The result is multiple days spent at the customer site while the needed repair parts are air-shipped to the customer. This adds an extra layer of cost and frustration to the customer.

Preventative Maintenance and Annual On-site Checkups

Periodically reviewing machine operation in the field is an effective tool for eliminating downtime and determining if problems loom in the near-term future. Experienced service persons can spot issues with wear and improper maintenance. They may even install upgrades for components known to fail after a defined period of operation. A typical check might consist in reviewing the status of inline hydraulic or air lines and filters, batteries used in sensors or processors, and when applicable, upgrading programmable devices with the latest firmware revision.

Research points out that customers signing up for such services are more likely to purchase additional machines as their operations expand. Furthermore, when service techs are trained to look for the right signs, new leads and additional business opportunities can be developed.

For the customer, the on-site nature of this work and travel expenses is still a cost issue. However, customers with multiple machines can amortize the travel costs over several machines thus driving the per-machine cost down. For the OEM/Machine Builders, the travel can be planned and used to fill in unscheduled time, which drives down some of the human costs associated with on-site visits.

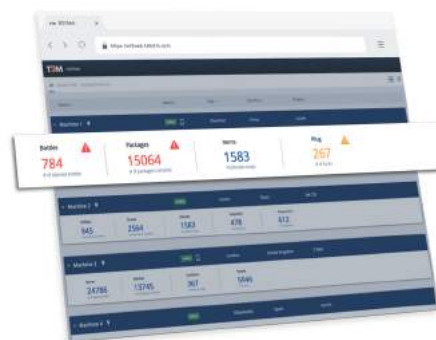
Nevertheless, travel is still required, and customers often complain when a machine breaks down unexpectedly a short time after one of the visits. This raises the customer question as to the overall worth of the process. "Why didn't your guy spot this when he was here?" is a common customer statement.

Introducing a New Service Model

Online Monitoring

Technology breakthroughs have created a low-cost methodology for solving many of the issues tied to the existing service models. It provides value to the customer and opens the door to a long-term revenue stream for the OEM/ Machine Builder.

In this model, you will monitor your machines for a broad range of issues remotely. The information can be used to predict potential problems before they happen thus avoiding downtime. Customers will pay an easily justified annual subscription fee for your service. Fees will vary depending on the level of diagnostics provided.



The types of diagnostics provided are limited only by your imagination. The table below demonstrates a sampling of potential monitoring points:

Monitoring Point	Explanation
Machine cycle time	Machine cycle times can be affected by poor setups, hydraulic system issues, and many other things. Monitoring the cycle time over the life of the machine provides a tool for measuring machine health and improving output.
Temperatures, pressure and lubrication levels	Most machines have critical temperatures, pressures, and lubrication levels. Machines using hydraulics are impacted by fluid pressure. Equipment used to shape or form plastics employ a heat source. Incorrect temperatures generally create issues with the product/part being made. Monitoring these creates value to the customer in better machine usage.
E-stops experienced	An excessive number of emergency stops could point to an issue, perhaps even a safety issue. Operator error? Machine Jam? Other issue? Monitoring these over an extended time can improve the equipment's operation or expose flaw that need attention.

Operator stops	Operator stops can be the result of many issues impacting the work of the machine. Poorly trained operators may stop a machine several times mid-cycle to make unnecessary corrections. Conversely, issues with alignment, poor sensors, and many other variables create circumstances where the stop is necessary. Tracking these allows the OEM/Machines builder to understand the situation and suggest corrective action.
Replacement of filters or other issues	Busy or untrained maintenance departments often lack a regularly scheduled maintenance of machines. Poor airflow, issues with the quality of plant air required for proper pneumatic operation can impact the life of machines. Hydraulic systems with a clogged filter can impact system pressure and affect machines. Tracking these remotely provides a tool for keeping the machine up and running correctly.
Low battery levels	Many devices use batteries. A low battery can impact machine operation. Since battery life can now exceed three or more years, they are easy to miss and often fall off the maintenance schedule of the end user's internal service department.
Restart errors or improper starting sequences	Typically restart errors occur because a machine was improperly started mid-cycle during maintenance. These often create issues with the quality of the operation. Running with the machine not fully synchronized may create unexpected wear on mechanical components.
Sensor failures	Critical sensors may fail because of dirt and contaminants. They may also fail due to position related issues caused by vibration or external mechanical problems such as being hit by other equipment or misaligned during routine maintenance. Understanding these points can reduce downtime and improve machine operation in general.
Vibration tied to mechanical wear	As bearings and other rotating equipment wears the vibration pattern changes. Developing a historical record of vibration can alert the user to pending failures. This type of analysis has historically been reserved for major equipment because of cost. New technology moves the premise to other machines.
Number of machine cycles	Mechanical wear impacts machines. The odometer on an automobile serves as a system to suggest the replacement of many components. Factory equipment has the same need. Proactively replacing critical parts before they fail has been proven to greatly reduce unplanned downtime.

Machine monitoring as a service is more than just about the OEM/Machine Builder looking over the machine. In many cases, the companies providing the service allow the final customer to remotely monitor the equipment as well. For example, many waste water applications find the ability to check in on remote stations to be necessary. The effort eliminates the need for a person to travel to the remote site daily just to check on the station's operational health.



The baler industry manufactures the equipment to compact and bail scrap materials which include everything from cardboard and paper to recycled metals and plastics. In many instances, their machines are both mission-critical and deployed at remote locations. The wide-ranging customer base for this type of machine typically does not have technicians on site to support the complex systems employed to maximize productivity. Remote monitoring opens the doors to greater machine productivity with fewer scheduled inspection visits; a win-win for customers and OEMs alike.

Another potential use for this type of technology, which, while not directly tied to the machine operation, still makes sense to explore: The presence of various gases can indicate many things. For instance, in some settings, the release of the wrong gas creates a safety issue. In process-driven applications, advanced sensing indicates issues in the chemical settings of the process. The ability to remotely monitor and track levels in both applications creates a safer and perhaps more efficient operation.

Although industry experts and futurists write incessantly about the dream of a super-advanced Artificial Intelligence (AI) system tied to machines (which will be here someday), there is a massive benefit to monitoring today.

Customers are already Migrating to this Service

For customers, the elimination of unplanned downtime has become paramount to ongoing success. Many larger end users have invested heavily in preventative and predictive maintenance. **Fortune Business Insights** sees the predictive maintenance experiencing a 29.6 percent compounded growth rate through the end of 2026.

End customers are open to the idea. Better still, they expect and are willing to pay for the service. New manufacturing trends push for the elimination of both redundant/back-up machinery and maximized output. Overall Equipment Effectiveness, often referred to as OEE, is a metric used to calculate and score all the elements of machine effectiveness in the manufacturing process. It combines availability, utilization, performance, and quality metrics into the score. It summarizes the efficiency of a machine, cell, or production line during the manufacturing process. While a perfect OEE score is 100 percent, anything reaching 85 percent is considered world-class. Sadly, many factories still fall in the 60 percent range, and their managers are striving to improve the number. Predictive maintenance plays an important role in this effort

The Big Companies have started offering Remote Monitoring

The major automation equipment providers have launched businesses tied to this point. Each offers a slightly different subset of solutions, but all offer up the same concept – Remote Support. For example, Rockwell Automation offers several layers of support. Their TechConnect support provides access to a team of product specialists who assist in resolving production issues, improving maintenance personnel efficiency, and diagnosing technical issues. Also, Rockwell Automation offers what they call, “Predictive Maintenance as a Service.” This service monitors many of the issues previously outlined in the table above.



Siemens puts a slightly different spin on the concept of remote monitoring with what they call, “Predictive Services.” They go on to say this,

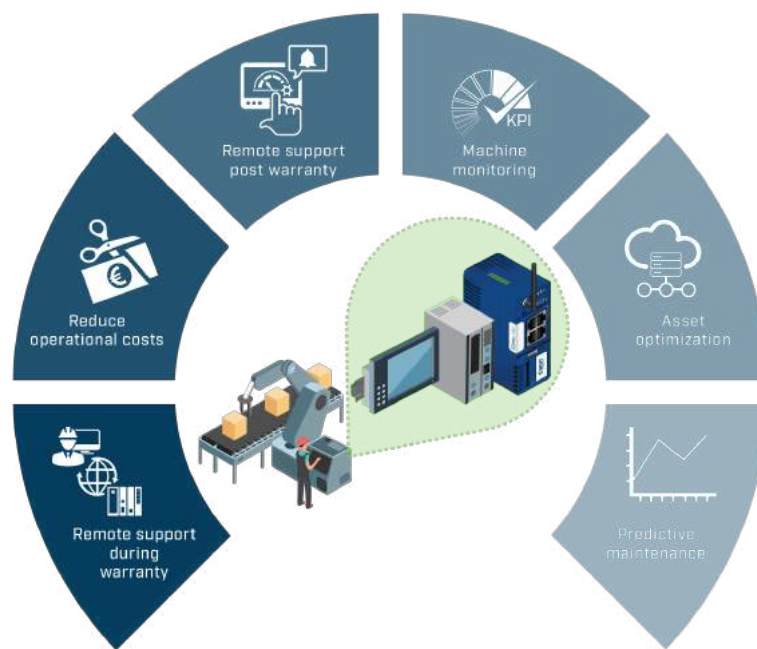
“With Predictive Services, thanks to the accumulated know-how of our service experts combined with cutting-edge technologies like artificial intelligence, you can see into the future and avoid unpleasant surprises through optimized maintenance planning.”

ABB has trademarked the term “ABB Ability” with a collection of remote monitoring and support services that are tailored to individual industries – Automotive, Food and Beverage, Manufacturing, and about a dozen more.

Similar types of remote monitoring, predictive maintenance, and general support offerings have been established by Schneider Electric via their EcoStruxure Asset Advisor and Connected Service Hub service offerings, and by Omron who provides condition monitoring services under the “PdM” moniker.

Why You (the OEM/Machine Builder) can do it better

While it could be argued these behemoths have a greater understanding of the issues arising in the use of electronic control in automation systems, their knowledge is one dimensional and probably tied directly to their product offerings. Your machines are a combination of technologies – electronic controls, pneumatics, hydraulics, and complex mechanical systems. Furthermore, it is impossible for them to possess the machine-specific drawings, design criterium, and other important background data your company maintains.



It makes good sense for you to be in the Monitoring Support Business

There are four main reasons for an OEM/Machine Builder to develop their fee-based monitoring business:

1. Further developing customer intimacy.
2. Machine design improvement.
3. Competitive positioning.
4. Financial impact to your service organization.

To review how these are intertwined requires a little additional thinking.

Customer intimacy



Rather than closing out the purchase of your equipment at the end of the warranty period, the relationship continues for the entire life of the machine. The support team's involvement changes from periodic and infrequent visits to ongoing. Most customers will see your periodic reminders for routine maintenance needs, suggestions for improvement, and proactive calls as a display of caring customer service. Along the way, the uptime of your machine will improve, and you will have the information to prove it. Customers value productive time and while you will not be "competitor proof," selling against you will be more difficult.

Machine design improvement

Normally machine design issues are filtered by those providing feedback. Your sales team, customers, service people making visits are all sources of information and all subject to their own set of prejudices. Because monitoring machine issues live removes any filter, you can determine not only the design issue but the circumstances which may lead to the issue. Armed with this information, modifications can be suggested both as retrofits in the field and future designs. The result is a more productive machine and a competitive edge for your customer.

Competitive positioning



Remote monitoring is equal parts predictive maintenance and IIoT implementation. Earlier, we cited the growth of predictive maintenance, but the statistics of IIoT use is even more impressive. According to a survey conducted by IIoT World, "Fewer than 2% of respondents are not considering an implementation (of IIoT) within the next 12 months." OEM/Machine Builders offering an IIoT related offering will be perceived as technological leaders. Simply stated, if you have an offering and your competitor does not, you win.

Financial impact

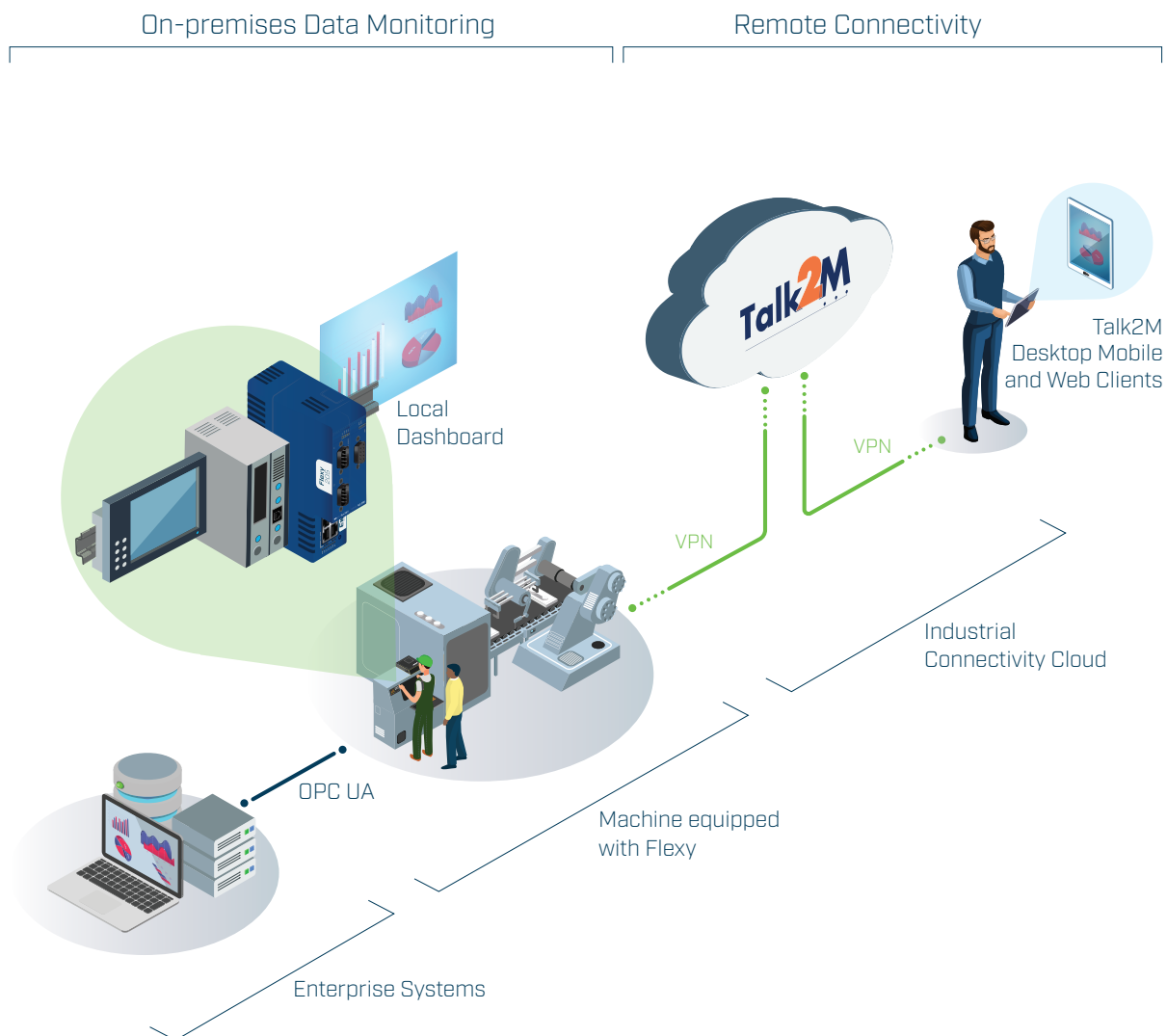
Remote monitoring and related services drive a whole new revenue stream to the OEM/Machine Builder market. Not only is this new cash flow, but it is also a predictable and smooth source of revenue. Not only will there be additional revenue from the services, but it further positions your organization to capitalize on additional sales of machine updates, spare parts, and other more traditional offerings.

Technology makes Remote Monitoring easy

Breakthroughs in technology have broken down the once costly barriers to getting into the business. More importantly, the technology is not costly, certainly not a capital expenditure at well under a thousand dollars. Ewon has products that can easily be configured to begin the process without a great deal of training or extra hardware.

Most companies find they already have the right people on board to make this happen. Existing engineers and technician can be scheduled to review data which is automatically logged on the Ewon device. Monitoring does not need to be a 24x7x365 operation. Instead, the tasks associated become a scheduled weekly activity.

The connectivity looks like this:



Launching your business model

Begin by answering this set of questions:

1. Does it make sense for your company to offer remote monitoring?
2. Would your customers see the improved uptime and operational efficiency as a benefit?
3. How might offering this service impact customer intimacy?
4. Could you better understand how your equipment is used by the customer and be able to make suggestions to improve their efficiency?
5. Would your team be able to provide better customer training if you understood more about the daily “life” of the equipment in the field?
6. How many machines do you have in the field?
7. What would be a reasonable fee for the extra production produced?
8. Do you have a friendly customer who might allow you to prototype your service?

Why could Ewon be part of your plan?

Ewon has built a reputation as the industry leader in remote programming and troubleshooting of automation equipment. Focusing on the issues of the OEM/Machine Builder, their equipment has made connecting to devices in the field easy and cost-effective.

Utilizing their Talk2M cloud associated with their OT gateways takes the worry and engineering time out of the equation. So, it makes sense they would be the leaders in remote monitoring technology.

Ewon’s popular Flexy gateway features the ability to easily begin monitoring equipment remotely. The solution is a risk-free and easy “out of the box” solution that requires no special networking skills.

Because data is stored locally, machine key performance indicators (KPI) can be monitored without bogging down networks or overflowing data storage buffers on the central monitoring device.

The setup is end customer-friendly because the communications are secure and designed not to put a load on the customer’s network.

Reviewing the points of this paper

- Remote monitoring of machines in the field enhances uptime and adds value.
 - Customers like yours are investing in the kind of predictive maintenance remote monitoring offers.
 - The customer's acceptance of a remote monitoring program is high and continues to grow.
 - Nobody, not even the Automation giants, understands your machines like you do.
 - The cost of entry into the remote monitoring business is low. You already have the staff needed to make it work on your team.
 - Ewon makes the process easy – no special network/communications skills are required.
 - Companies with a foundation and experience in remote monitoring will be positioned to expand their offerings as new technology arrives.
- Finally...
- Remote monitoring is an exciting new opportunity for the service departments of OEM/Machine Builders to add to their organizations' revenues.

Remote Monitoring is the Answer and Now is the Time

Industrial publications are fully abuzz with the promise of the Industrial Internet of Things (IIoT). Often this hype is linked to “Star Wars-like” futuristic advances in Artificial Intelligence (AI). Certainly, these breakthroughs will provide even deeper value to both OEMs and their end users customers, but their promises still lie just over the horizon. Remote monitoring lays a solid foundation for the future – today.

Why wait for the future?

Remote monitoring gives you a “low-hanging fruit” opportunity, with good returns achievable rapidly. Your organization will become more competitive today, gain a better access to customers and a keener understanding of the what your customers value.