

Aktuální trendy v prediktivní údržbě

Odborný seminář Webinář 8-Nov 2022

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CEO společnosti Neuron soundware



About Neuron soundware

We are proud of our achievements



- We develop **Artificial Intelligence algorithms** working with the physical parameters of machines.



- We provide end-to-end solution including **Industrial IoT** edge computing capable device and sensors.



- We are optimizing** the industrial process output, lowering operating cost, optimizing machine maintenance and reducing impact of industrial production on environment.

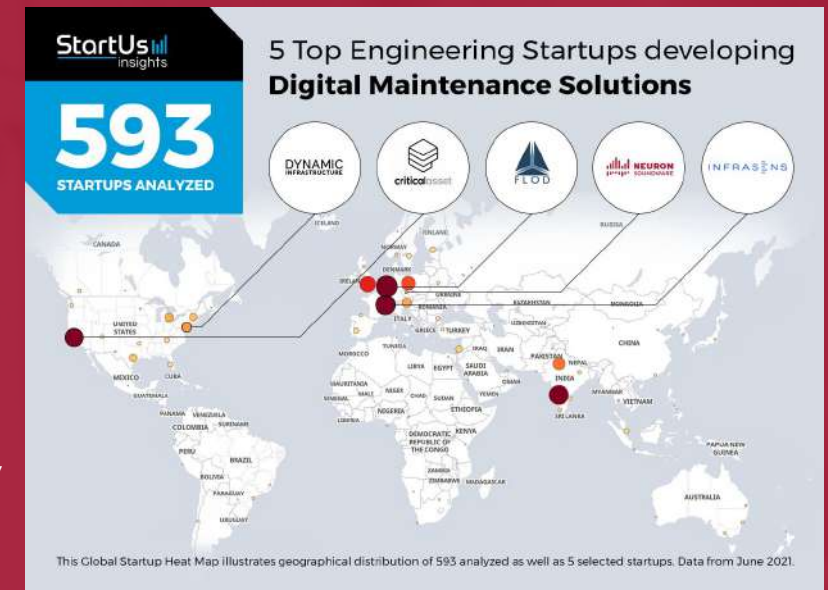


- We have collected and analyzed more than **600 millions samples** of variety of machines.



- Our solution was **recognized by 7 Global industrial awards**.

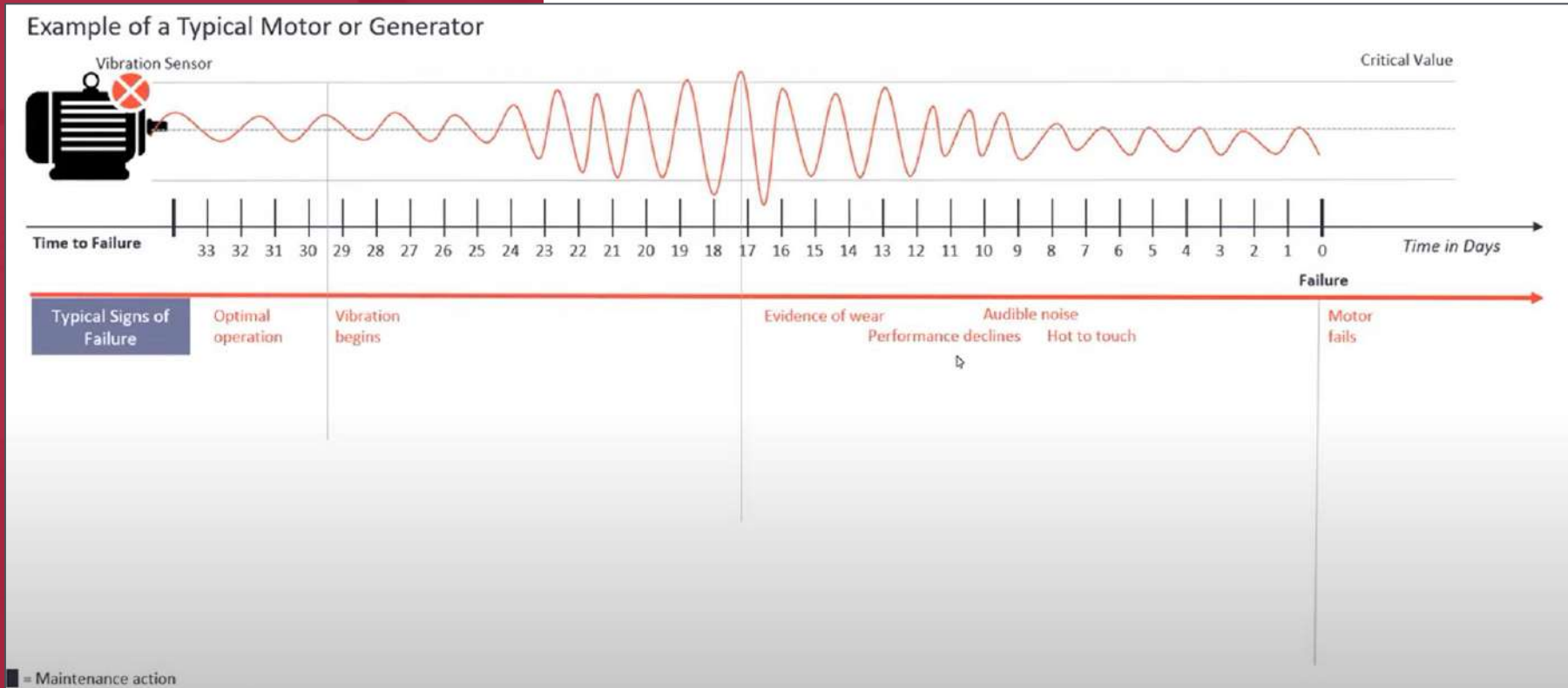
Neuron soundware provides the leading innovation - recognised by many analyst and OEMs testing our technology



Obsah dnešního odborného semináře

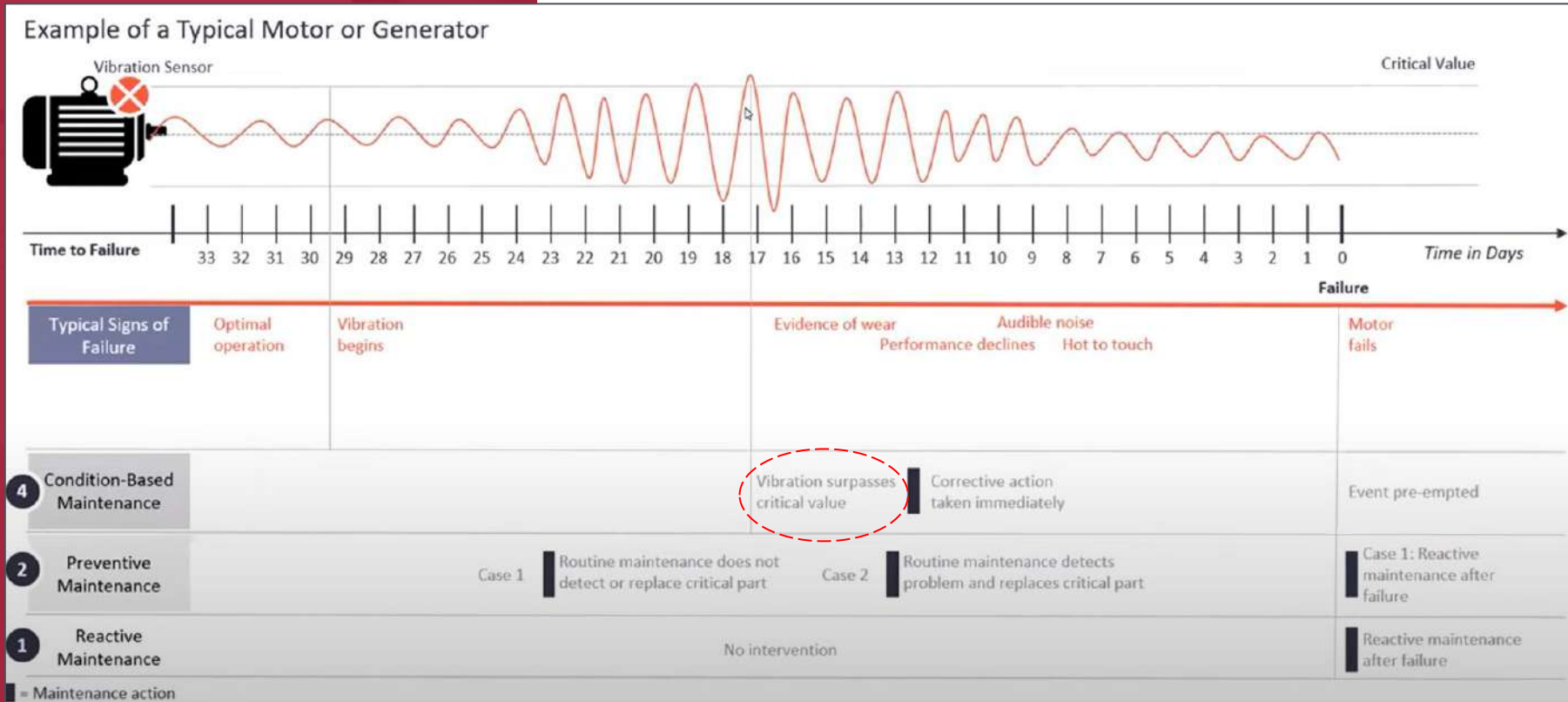
- Stávající trendy pro dosažení nulového času neplánovaných odstávek
- Použití moderních technologií IoT pro efektivní monitoring zařízení - case study + přínosy
- Jak může efektivní údržba a plánování snížit spotřebu energií

What is the difference



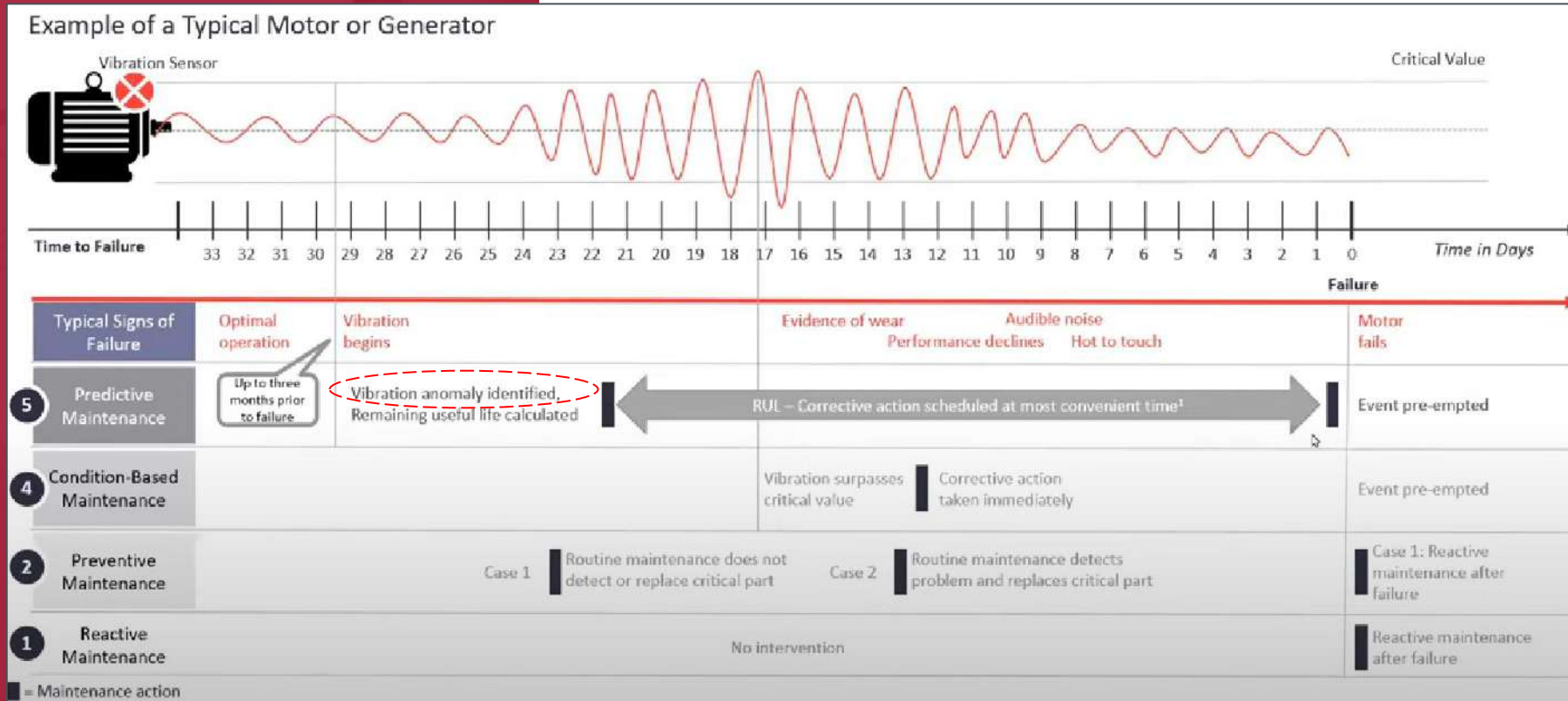
Example of damage and sings of failure

What is the difference



Routine maintenance (Preventive actions) or Condition-Base (vibration superpasses)

What is the difference



Predictive maintenance (vibration anomaly identified)

HVAC Unit example

The character of the noise changed, which was recognized by the algorithm.

Later the start of the increase of the vibrations (VelocityRMS) and months before reaching the critical threshold value was noticed.



The maintenance team confirmed the need to replace the bearings. The activity is being scheduled.

The benefits of Predictive maintenance implementations

Highly positive ROI

45% has amortization in less than 12 months.
83% in less than 24 months.

+25%

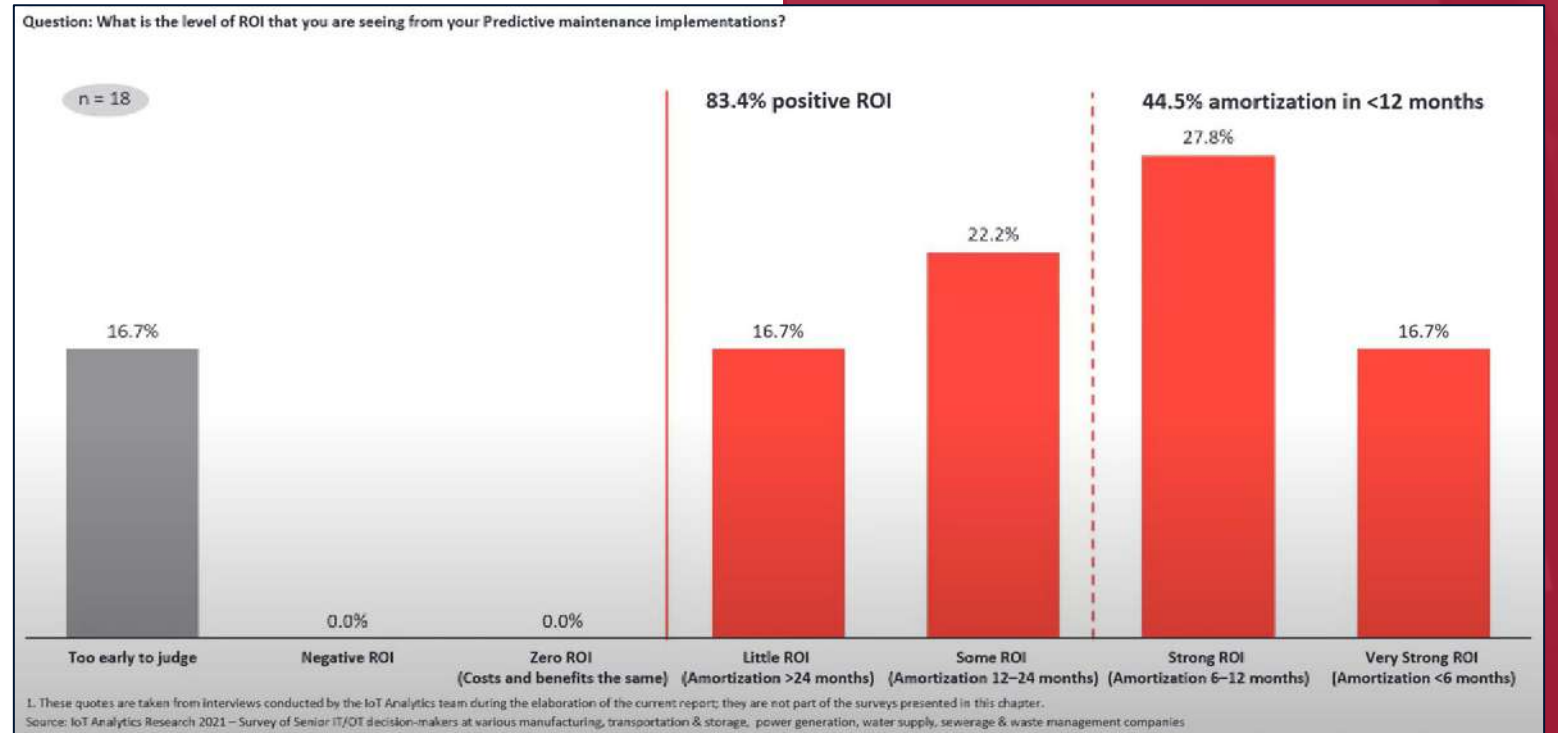
Productivity
increase

-35%

Reduction in
maintenance
cost

-60%

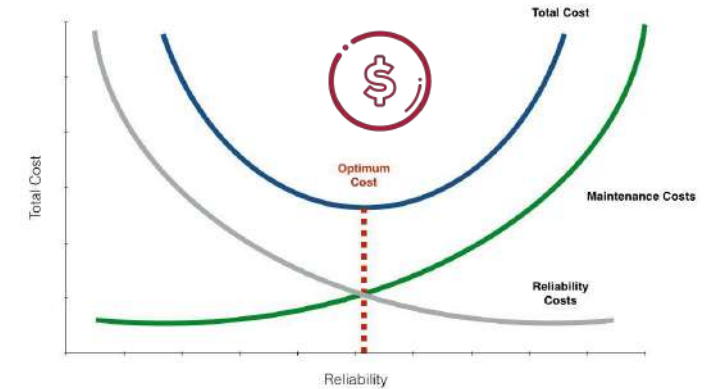
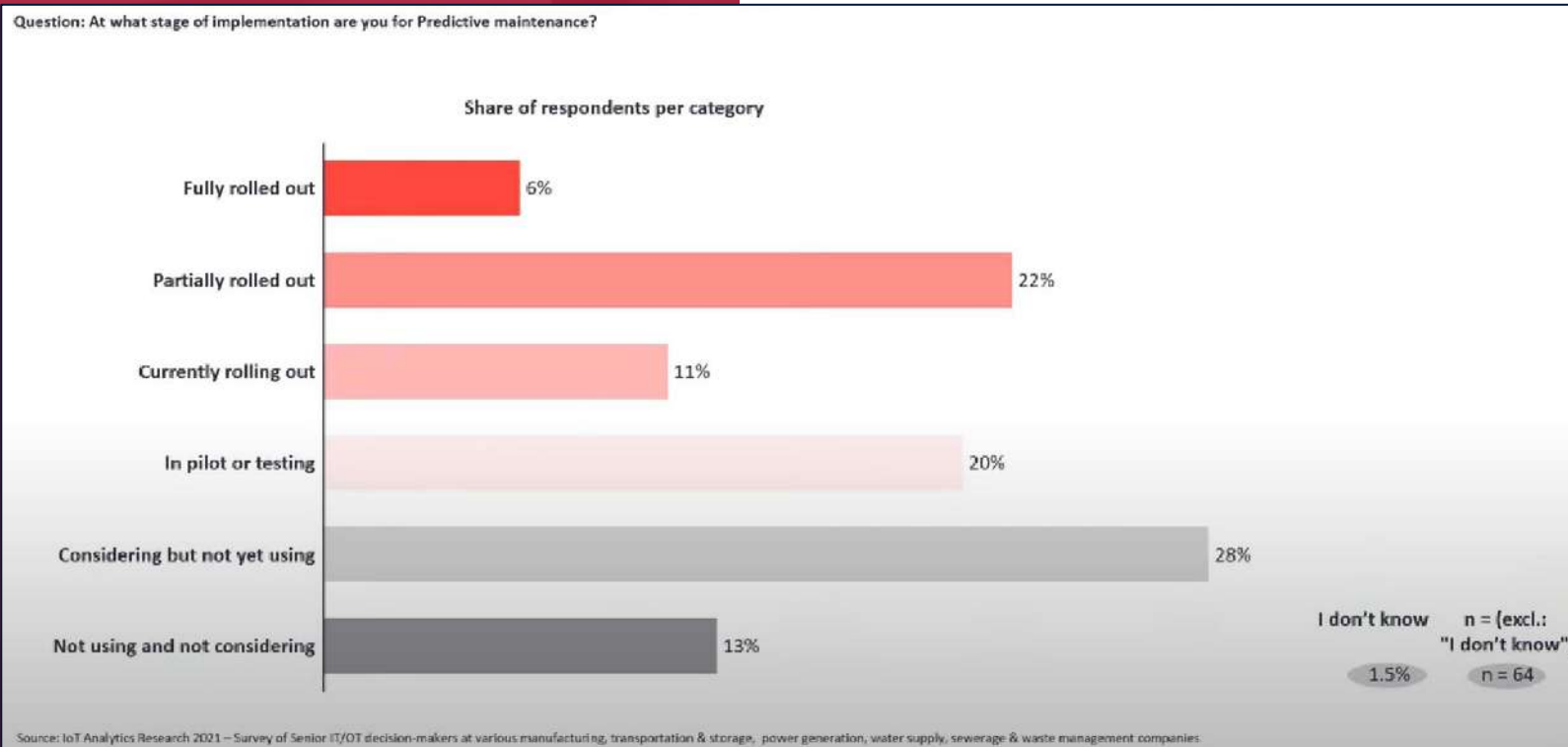
Reduction in
breakdowns



Level of adoption

Only 6% of companies has implemented Predictive maintenance.

The most of them use time-based service activities or run-till-breakage approach, when the machine is fixed/replaced after it is broken.



The optimal overall cost of operation needs to consider both - reliability and maintenance cost. Some operators are looking for increasing reliability and others for lowering the maintenance by optimising the personal and material cost.

Predictive maintenance

Industrial Metaverse



Industrial Metaverse will allow a better experience & simpler data visualization and response for the workers.

It is a nature evolution for the most advance companies currently used typically for a specific training purposes.

Hitachi Examples of Metaverse Solutions

Kevin O'Donovan

Nuclear Virtual Reality Solution (VRS) tool to help nuclear power plant operators train personnel for an outage, operations and maintenance work

Design Support Tool Utilizing VR and AR Aimed at Manufacturing Facilities

The slide is titled 'Hitachi Examples of Metaverse Solutions'. It features a video player with a speaker icon and a small video feed of Kevin O'Donovan. The main content is divided into two sections. The top section shows a 3D rendering of a nuclear power plant with three cooling towers emitting steam. Below this is a blue text box with white text describing a 'Nuclear Virtual Reality Solution (VRS) tool'. The bottom section shows a person wearing a VR headset. Below this is another blue text box with white text describing a 'Design Support Tool Utilizing VR and AR Aimed at Manufacturing Facilities'.

Augmented Reality Demo: T-System and Neuron soundware

- <https://www.neuronsw.com/blog/when-augmented-reality-meets-predictive-maintenance-ai/>
- <https://www.youtube.com/watch?v=gfgOzPOi-2k>

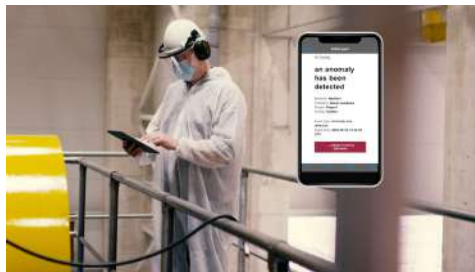
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Our solution

End-to-end System

We developed artificial intelligence algorithms for industry applications.



**PREDICTIVE
MAINTENANCE**



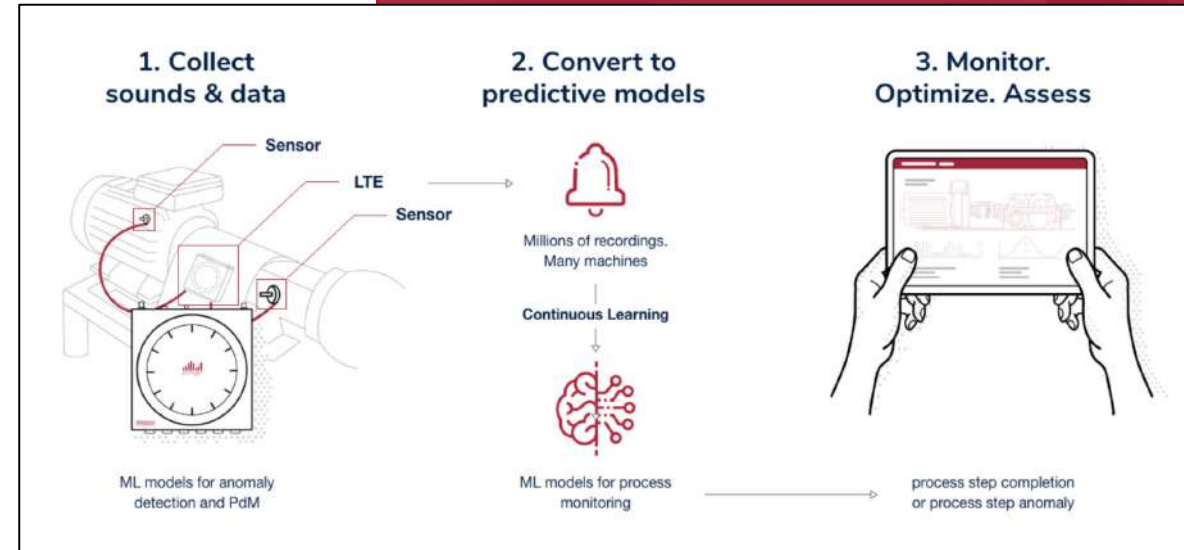
**QUALITY
ASSURANCE**



**END-of-LINE
TESTING**



**PREDICTIVE
ANALYTICS**



The solution: Hardware

Hardware: nEdge™



Edge computer

- Processes sound data locally
- AI on the edge device
- Instant machine health check
- LTE & LAN connectivity
- 6-12 sensor inputs

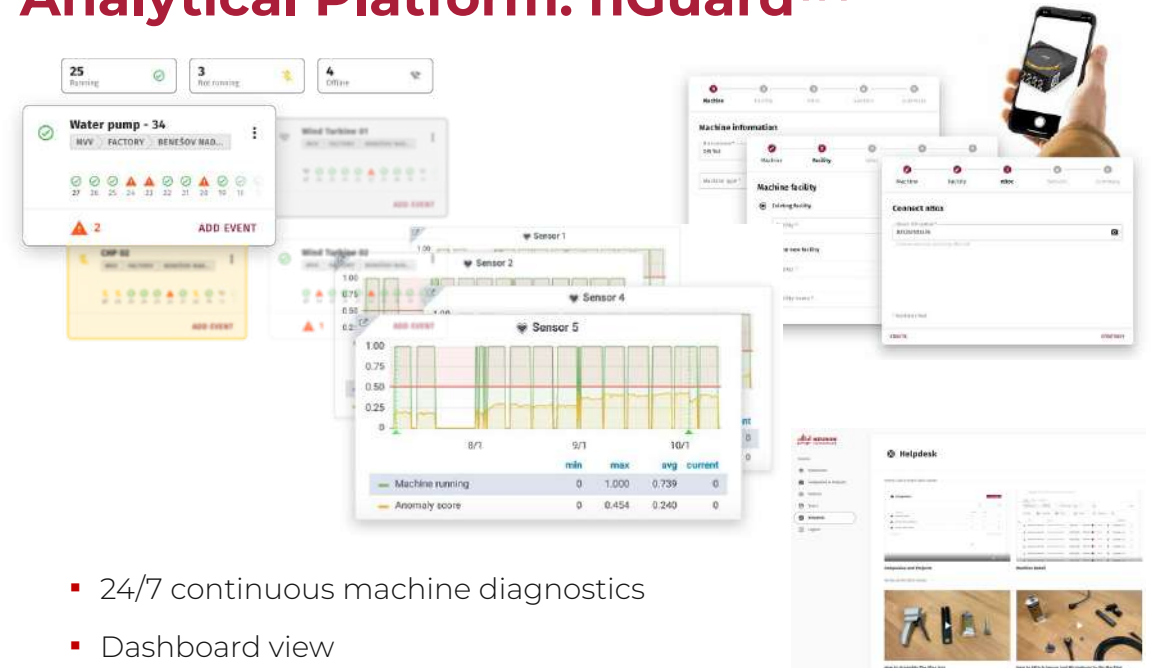
Sensors

- Certified for explosive environments
- Non-invasive installation
- Broad frequency range



The solution: Software

Analytical Platform: nGuard™



- 24/7 continuous machine diagnostics
- Dashboard view
- Installation videos and manuals
- Easy installation and quick time-to-service
- Combined state-of-the-art AI with traditional diagnostic methods
- Top-5 globally in AI detection from machine sounds
- On-boarding wizard
- One-click training of AI

Main customers

Installation at 25+ sites

We are proud to collect customer experience across different processes, assets, geographies and segments. You can find our solution anywhere from paper mills to automotive assembly, anywhere from compressors to industrial grinders, anywhere from Germany to Malaysia. We are one of TOP 5 startups engineering Digital maintenance solution of the future.



SunChemical



ŠKODA



ArcelorMittal

T Systems



HI-LEX

AGC



Eurus Energy



ABB

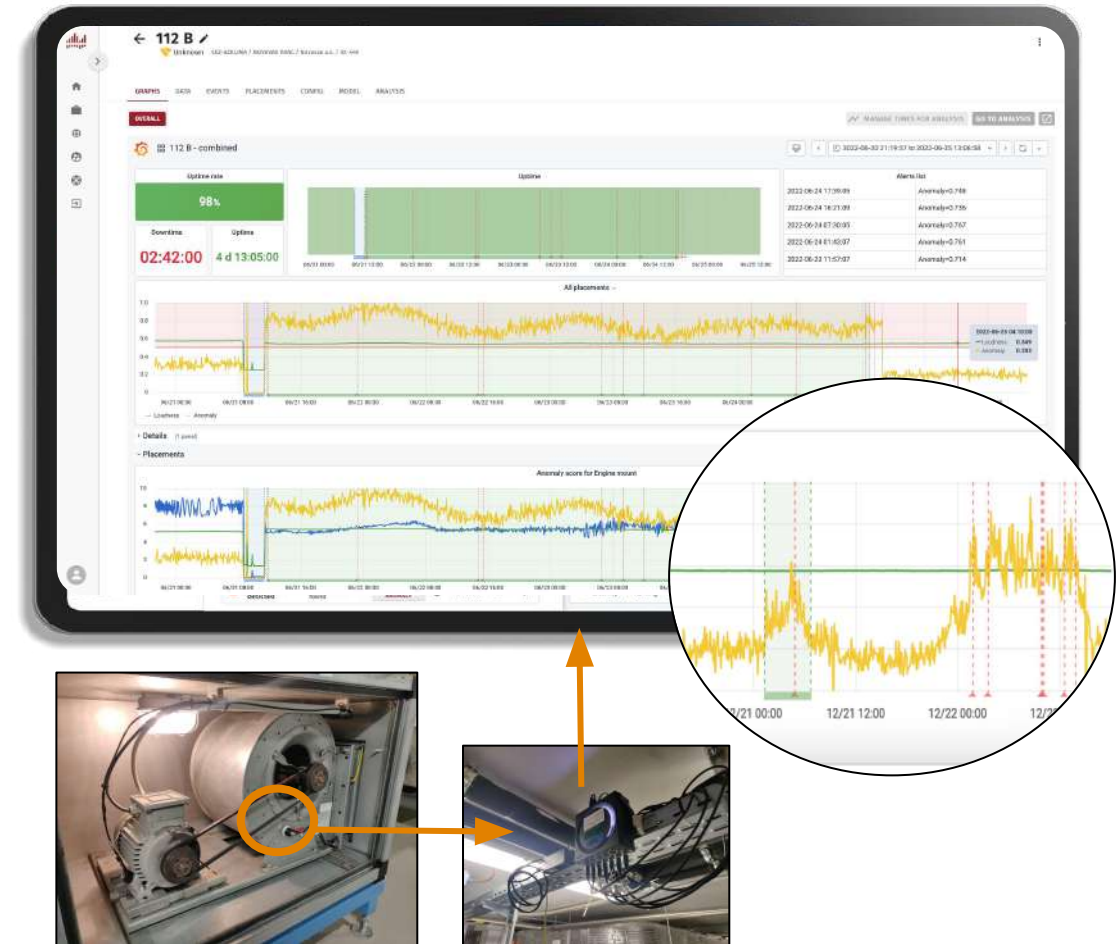


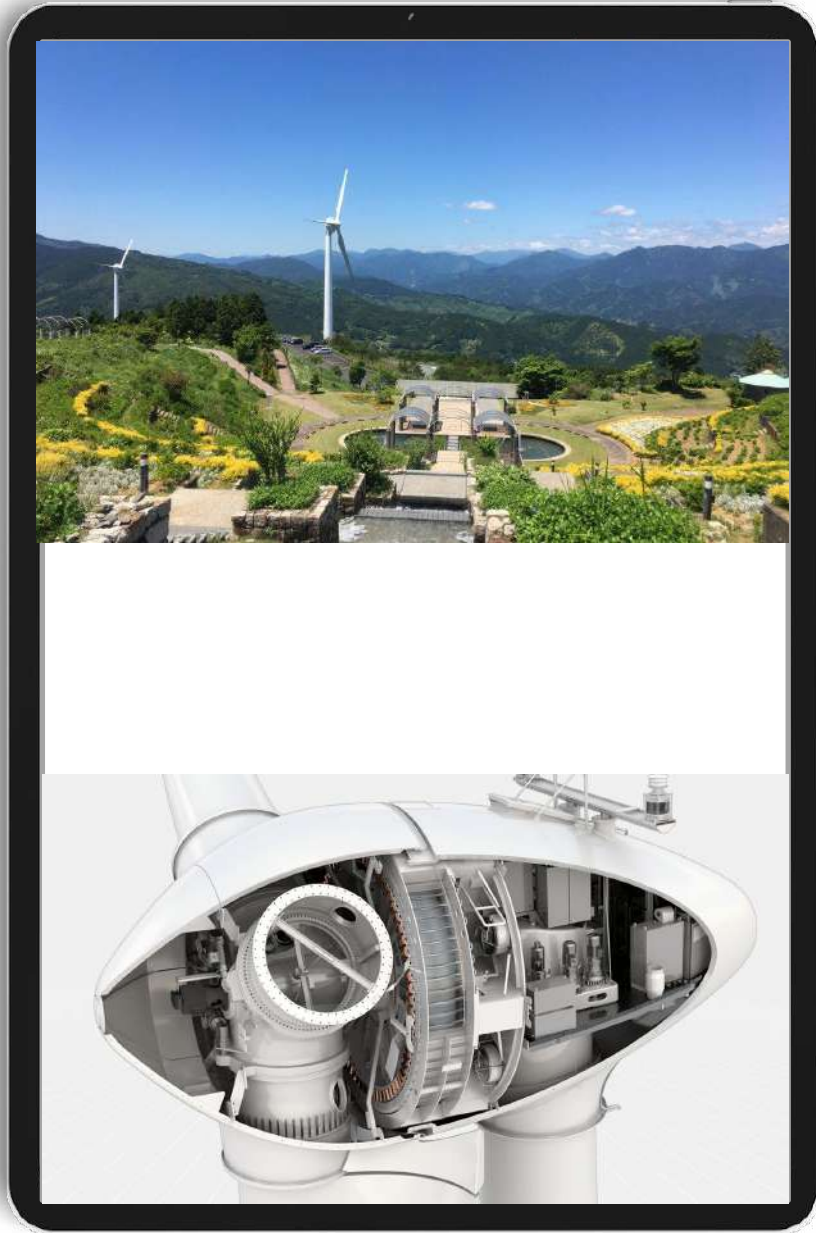
Machine type: HVACs

ČEZ ESCO, a.s.

"Optimizing the maintenance process of operated or serviced equipment leads to a significant reduction in costs."

Aneta Formánková,
Product and Innovation
Specialist,, ČEZ ESCO, a.s.





Case Study

Monitoring of ENERCON E-70 E4 Otoyo Wind Farm in Japan



PROBLEM: Wind Farm operator does periodical checks of equipment by both visual inspection and by “listening” to the components. This is performed by qualified ground crews. Customer is looking for a solution that would help increase inspection intervals without sacrificing reliability, or safety.



SOLUTION: Microphones and structure borne sensors, along with nGuard platform provide the operator with not just the ability to listen to the components off site, it also monitors the wind turbine 24/7 using anomaly detection.



BENEFIT:

- ✓ Extending the inspection interval without sacrificing safety and reliability
- ✓ Preventing damage of the machine - notification sent directly to customers system when NSW solution detects suspicious sound
- ✓ Remote monitoring of a critical asset for fraction of the usual price
- ✓ Correlative data to measure efficiency
- ✓ Unsolvable problem by conventional monitoring systems is covered by Neuron soundware with the added bonus of anomaly detection.

Case Study

Monitoring of MWM Deutz TCG2020V12 Heat & Power generation plant in Czechia



PROBLEM: Cogeneration units are - as a critical infrastructure - required to be operational at a moments notice by State. If they are not, the plant operator loses on government subsidies, or is penalised. Ensuring the power & heat generation fleet is in operational state requires constant presence of monitoring and servicing crews as well as earlier than usual exchange of parts - seized cylinder or burned down generator can take days, even weeks, to repair. This significantly lowers the profit margin.

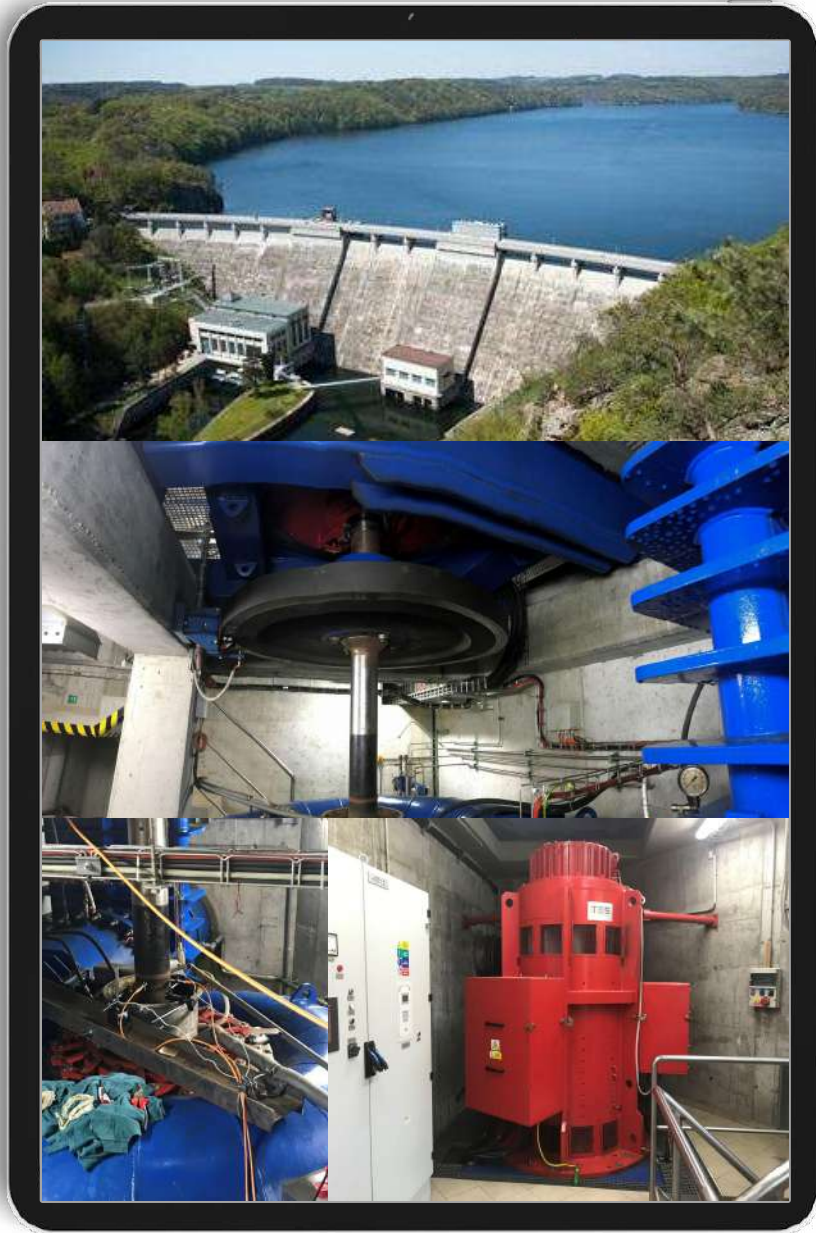


SOLUTION: An IoT sensor-equipped nGuard solution monitors both the gas engine itself and the generator. Alerts are sent to the plant operators to either turn the engine off or schedule maintenance - based on suggestions from our diagnosticians.



BENEFIT:

- ✓ Saving maintenance costs and increasing maintenance efficiency
- ✓ Preventing damage of the machine - notification sent directly to customers system when NSW solution detects suspicious sound
- ✓ Reduced penalties for plant operator
- ✓ Remote health monitoring for servicing purposes
- ✓ Better work conditions for plant workers



Case Study

Monitoring of Francis turbine Vranov Hydroelectric dam in Czechia



PROBLEM: 2011 Addition to the original power plant built in 1934 is a small 1 MW hydroelectric generator. Main issue comes from variable flow of water. This is negated by a control valve at the intake of the Francis turbine, but the vibration from the turbulent water causes increased bearing wear and the operator previously had imbalance issues. Shortage of skilled workers and long waiting periods for material mean 2 month long outages at minimum



SOLUTION: Sensors located at the bearing housings and intake valve help determine bearing health. This helps customer in scheduling maintenance, ordering material and hiring external workers. 24/7 monitoring and nGuard platform offer more flexibility than standard vibrodiagnostics.



BENEFIT:

- ✓ Increased service interval
- ✓ Preventing unnecessary outages
- ✓ 24/7 live monitoring



**IF A MACHINE EXISTS
WE CAN MONITOR IT**

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Energy savings

More efficient machines and processes

The energy savings can be achieved by several factors:

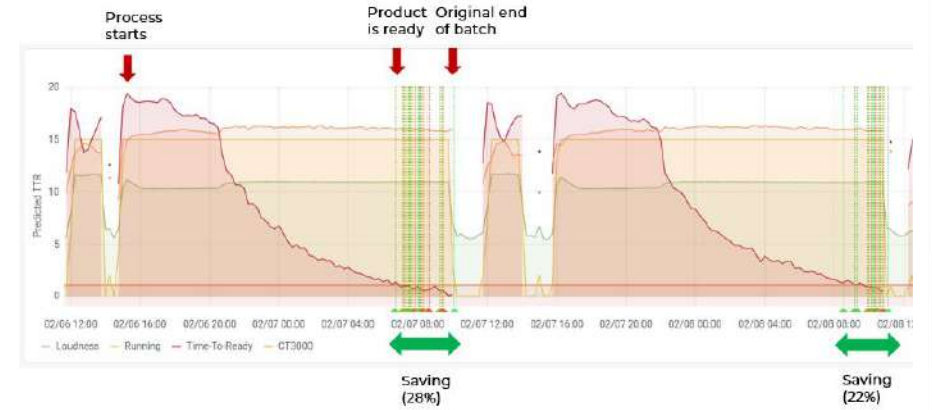
- **Well maintained machines use 8% less** energy
- **Shorten production cycles** - a custom algorithm (e.g. grinding)
- **Less waste** - discover a quality issues sooner
- **Measure the consumption** and remove the costly peaks

Coffee machine energy usage at measured by our new nEdge 2.0 device.



Case Study

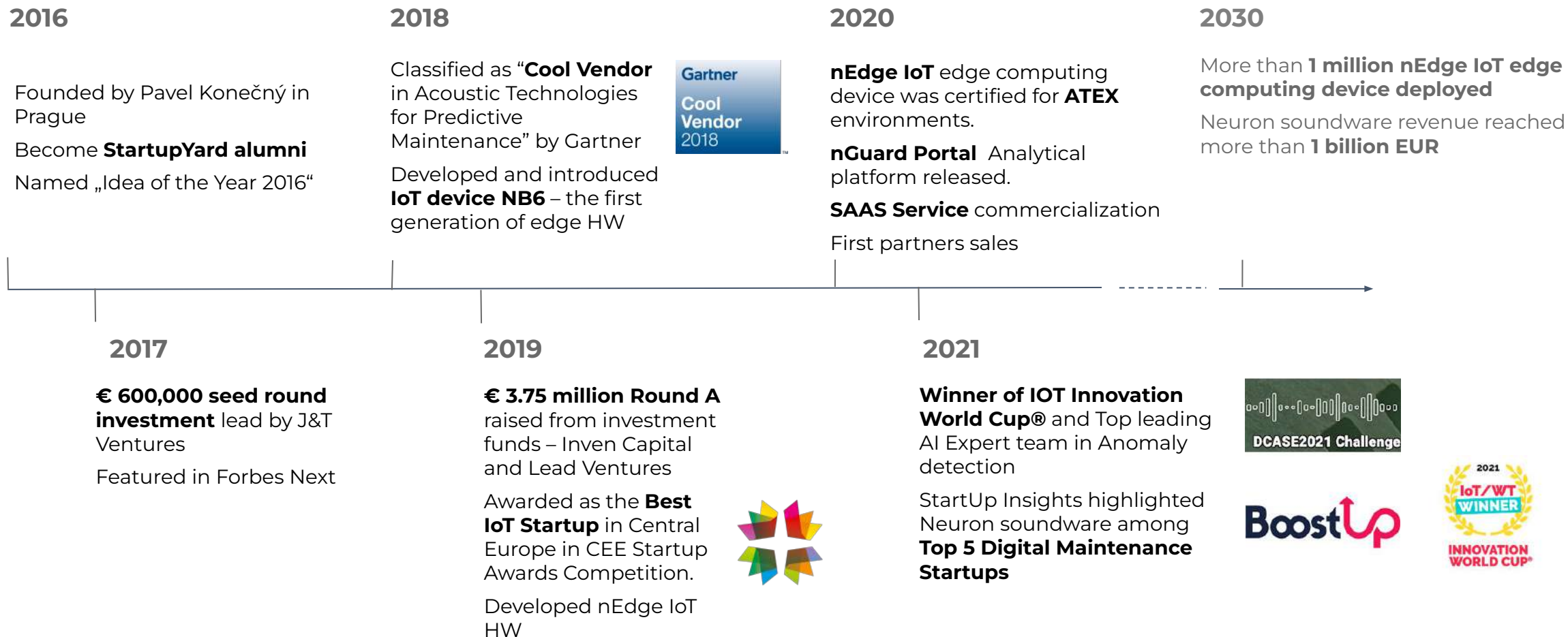
Grinding optimization



Switching from a defined cycle to a ready-product driven cycle will result in an average saving of 1-2 hours per production batch and can increase **production efficiency by 11%** by better organizing the product flow. Besides that, the customer will save energy costs, reduce service intervals, and extend the machine lifetime.



Our history



IPC

AutoCont

ve spolupráci s



Děkujeme za pozornost.

Zaujala Vás tato technologie nebo se chcete prostě jen dozvědět více?

Neváhejte nás kontaktovat, některý z našich obchodníků Vaše dotazy rád zodpoví.

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