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Are you looking beyond the price tag when choosing a new water metering solution?

Guide to how to choose the right water metering solution based on Total Cost of Ownership and Return on Investment.

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Table of content

03	Introduction
04	Understanding the terms: ROI and TCO
06	Case: Herning Vand Denmark
08	The fundament for your decision-making process
10	- Switch to a digital metering solution or not? How to calculate
11	- Start by assessing the lifetime
12	- Initial costs in hardware and installation
14	- Maintenance and replacement costs
15	- Ongoing costs for software and subscriptions
16	- Costs tied to disposing the meter solution
18	- Capturing the value of the meter solution
22	Case: Milcrofton Utility District, United States
24	Everything just in short
26	Case: Vacarisses, Spain

Introduction

In this e-book, we explore why Total Cost of Ownership (TCO) and Return on Investment (ROI) are the metrics that truly matter when taking the next step in digital metering transformation. It explains why it is essential to look beyond the price tag when evaluating new water metering solutions.

While many large utilities already apply a TCO- and ROI-driven approach, smaller and mid-sized utilities often rely heavily on upfront investment cost in RFPs and tender processes. This can result in an incomplete assessment of both the full cost picture and the value potential. Digital static metering offers benefits such as extended asset lifespan, secured water revenue, and improved operational efficiency, and understanding TCO and ROI helps utilities avoid hidden costs and at the same time highlighting the full value potential of the solution.

Focusing solely on investment cost can also prevent utilities from making necessary leap-step decisions. Only looking at the investment cost can prevent utilities from pursuing important digital and transformative progress; progress that is necessary to overcome some of the most predominant sustainability challenges we are facing.

Traditionally, water meter data collection has been resource-intensive, relying on manual readings. While AMR (Automatic Meter Reading) solutions have automated parts of this process, the shift to fully digital meters communicating via AMI (Advanced Metering Infrastructure) represents a major evolution. This transition enables significant improvements in efficiency, water loss reduction, and conservation efforts.

This e-book does not provide an exhaustive list of all cost and value items. However, it highlights the most critical financial considerations for utilities moving further along their digital journey. Regardless of current digital maturity, a TCO and ROI-driven approach is essential to understanding the long-term benefits and building a solid business case for digital metering investments.

We hope you will find this e-book useful.

Understanding the terms TCO and ROI

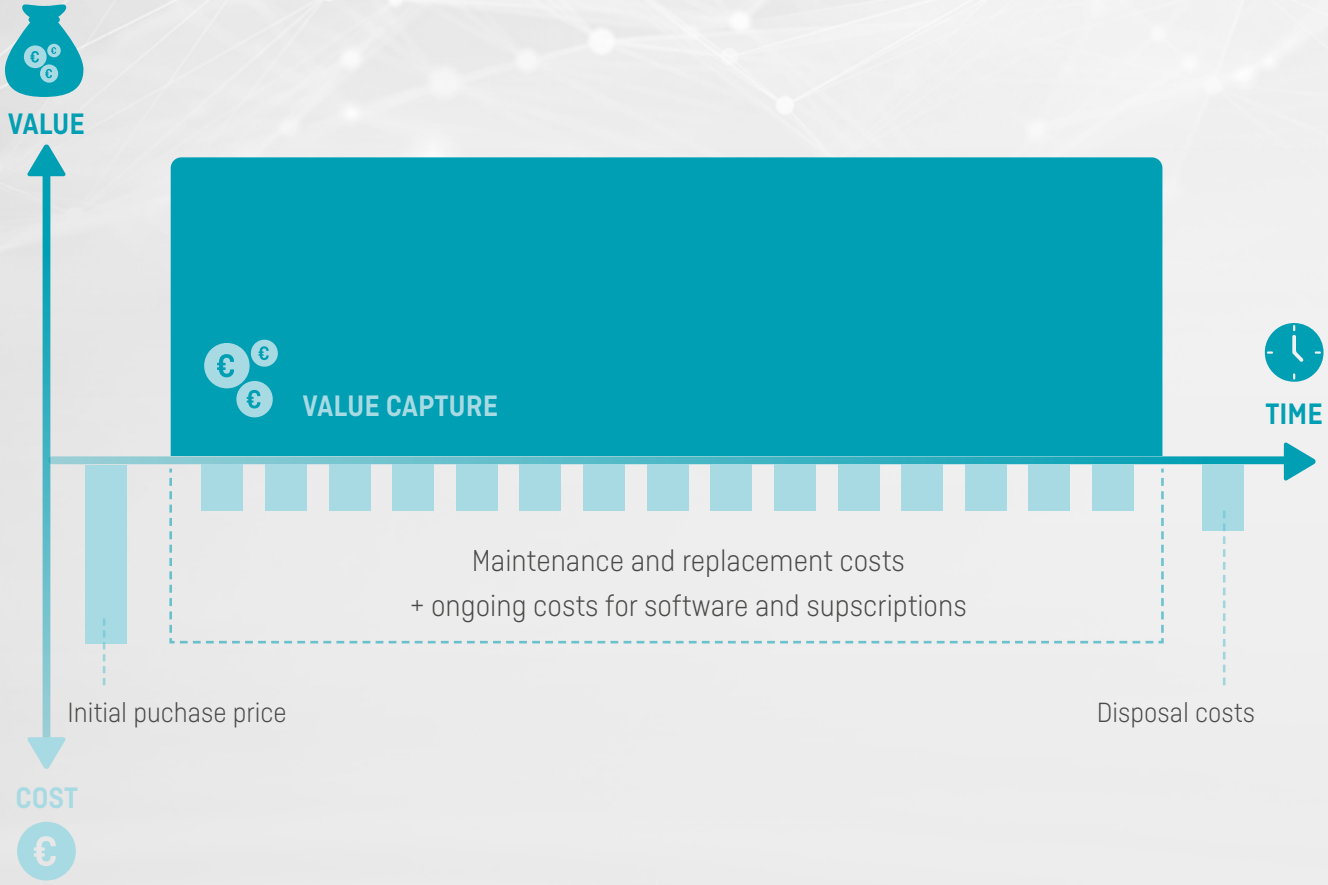
When evaluating major investments, building a business case showing both Total Cost of Ownership (TCO) and Return on Investment (ROI) is an important step towards making informed financial decisions. Whether you are seeking funding from the utility board or an external investor, a well-founded business case is essential.

TCO ACCOUNTS FOR THE CUMULATIVE COSTS OF AN INVESTMENT

Not just the initial cost of meters and software, but all costs tied to owning and operating a solution throughout its expected lifetime. This includes initial costs, installation costs, maintenance costs, replacement costs, and costs tied to disposing of the metering solution.

ROI MEASURES THE FINANCIAL RETURN OR BENEFITS AN INVESTMENT DELIVERS OVER TIME

Essentially how well it pays off. In other words, ROI also accounts for the advantages, gains, and revenues that the solution will provide, and factors in the savings you will unlock along the way and the value you will get.



The model illustrates that applying a TCO/ROI approach contains capturing the value of the solution and the full cost picture

CASE Story

Herning Vand managed to break even 4,8 years after investing in static meters

Herning Vand, a Danish water utility with almost 20.000 metering points and a 734 km distribution network, replaced all mechanical meters with Kamstrup ultrasonic static meters. Years later, they revisited the original business case and were pleased to find the payback period had decreased from 6 to just 4,8 years.



Payback period
4,8 years

207.560 EUR
in annual savings for consumers

98,7%
performance
on hourly values

Results from Herning Vand changing from mechanical to static meters

LEAK DETECTION	**25.730** EUR in annual savings	by identifying and addressing leaks within sections, the company has **reduced total water production by 2%**
NETWORK READINGS	**64.935** EUR in annual savings	by reducing postage costs **from going to automated data collection** via a fixed network
CONTROL READING COST REDUCTION	**41.663** EUR in annual savings	**by eleminating man hours** for control readings of consumers' manual readings
ADMINISTRATIVE EFFICIENCY	**218.330** EUR in annual savings	by reducing the **number of cases** handled by their administration **from 9,000 to just 500** and reducing control and reminders
SEALING COST	**106.166** EUR in one-off savings	**by choosing Kamstrup static meters** instead of mechanical meters, savings in installation costs were realized - among other sealing costs of the meters were obsolete
ASSET MANAGEMENT	**43.565** EUR in annual value creation	by leveraging better data to **optimize the use of staff resources** and optimized asset management
AUTOMATED MOVE-IN/ MOVE-OUT	**23.930** EUR in annual savings	by **eliminating costs of handling consumption data** when citizen move-in or move-out of residences. This is handled 100% automatic
INCREASED REVENUE	**12.868** EUR in annual value creation	By the **higher accuracy** and lower cut-off of the Kamstrup meter has **increased Herning Vands revenue by 1%**

Consumers** have collectively **saved 207.560 EUR** in annual savings thanks to **freeze alarm, leak alarms** and **insurance benefits

The foundation for your decision-making process

A TCO/ROI approach is more than a number-crunching exercise. It is a game-changer that takes you all the way through the decision-making process – with confidence. It will play an important role in three decisive phases:

PREPARING AND EVALUATING REQUEST FOR PROPOSALS (RFP'S)

Preparing RFPs or tender materials and reviewing proposals from several suppliers is time-consuming but crucial. Preparing RFP or tender material in a way that helps you build a detailed TCO/ROI analysis enhances transparency, and allows you to compare costs and values objectively.

1 PHASE

EASING COOPERATION WITH THE FINANCE DEPARTMENT

A TCO/ROI analysis translates a technical project into terms the Finance Department understands. Engage with your Finance Department – or an external financial advisor – and use them as a strategic partner. Let them handle the business case including depreciations, accrued interests etc. You are the water expert. They are the spreadsheet experts.

2 PHASE



CONVINCING BOARDS, INVESTORS OR MAYORS

A TCO/ROI analysis is a format that your stakeholders and decision-makers understand. It therefore plays a key role when seeking approval for your investment.

3 PHASE

Switch to a digital metering solution or not? How to calculate

As mentioned earlier, this e-book explores some of the most critical financial considerations for utilities looking to take the next step in their digital transformation toward a full AMI setup. Which financial parameters to factor in will vary depending on your current solution and the new solution you require.

In other words, your financial calculations will be closely linked to whether your utility is currently using a manual meter reading set-up with worn-out mechanical meters and are looking for a drive-by solution, or if your utility is ready for a full AMI setup.

The core principle, however, remains unchanged: In your financial calculations, always account for the full lifecycle costs (TCO) and the value delivered (ROI).

1. START BY ASSESSING THE LIFETIME

In order to evaluate the costs and value over the full lifetime of a new solution, you need to know the expected lifetime of the solution. It defines the time horizon for your investment and business case. And the longer the lifetime, the further you can defer future replacement purchases.

Some important factors to investigate:

In some markets, regulations require meters to be replaced or reverified after a certain number of years in operation. This is a critical point, of course. In addition to regulatory aspects, it is important to understand the technical lifetime of the meter and what defines it:

- **Static meters** have no moving parts and therefore are not exposed to wear and tear like mechanical meters which have movable parts that wear out over time. Read test reports from independent organisations, and ask potential suppliers for a proven track record on e.g. reverifications and on meter accuracy over the meter lifetime. The higher the accuracy over the full lifetime of the meter, and the better the reverification records, the higher the likelihood that you will not need to replace meters over the years. This also means that you will be able to defer future meter investments.

- The **battery lifetime** of the meter is a defining criterion for meter lifetime. However, it can be hard to estimate as it depends on the environment the meter is installed in. Ask potential suppliers for proven track records e.g. on remaining battery capacity as a function of age, and ask them how they work with optimising battery lifetime and data transmissions.

- Selecting the right **connectivity solution** is a key decision in ensuring a long lifetime for your metering solution. Selecting a standard connectivity solution that offers an extensive ecosystem can be a way to ensure viability of the solution for years to come, avoiding the risk of becoming technologically obsolete.



2. INITIAL COSTS OF HARDWARE AND INSTALLATION

The initial cost includes the full cost of buying and installing the new metering solution. Investing in a new metering solution is a major step for any utility and thus requires a thorough cost calculation that considers the cost of the products, and systems being evaluated and associated hardware and infrastructure costs. Going fully digital will naturally require a higher initial investment.

Some important factors to investigate:

- As discussed above, an important aspect here is to evaluate whether to choose mechanical meters (e.g. with a click-on communication module) or static meters with built-in communication.

  Mechanical meters generally have a shorter feature set and a lower purchasing price but generally also have a shorter lifetime due to wear and will lose accuracy over their lifetime. Due to the construction of mechanical meters, they are also negatively affected by poor water quality, whereas static meters operate relatively unchanged.

- Installation cost covers the man-hours estimated to install all the new meters and potential infrastructure needed as part of the metering solution. The installation time can vary significantly. By choosing high-quality meters, you will benefit from a high first-time installation success rate with minimum hassle of exchanging meters – already early in the installation process.

  Ask potential suppliers for proof of their testing concept: Do they test each meter before leaving production or just samples, and can you get individual test reports for each water meter? The higher the first-time installation success, the lower the installation cost.



- When evaluating going digital, you need to establish a network for the data transmission from the digital meters. The network must ensure that you receive data on a daily basis, providing you with insights into your water distribution network. You need a thorough evaluation of whether to build a private network with transmitters or leverage an already existing public network. While the latter option may look appealing as there is no infrastructure to build, the ongoing expenses will add up, as we shall see later in the chapter about ongoing costs. Also, the roll-out cost will differ significantly between the two options; this time in favour of already existing public networks.
- Investing in a new metering solution typically also involves initial investment in a Meter Data Management (MDM) system and additional analytics software.

Going into your spreadsheet:
The purchase price of the meters themselves, the infrastructure, the MDM system, and the analytics software needed plus the price of the man-hours needed for installation and onboarding.



3. MAINTENANCE AND REPLACEMENT COSTS

Maintenance and replacement costs cover the expenses tied to owning and operating the solution throughout its expected lifetime.

Some important factors to investigate:

- The cost of replacing worn out, defective, and inaccurate meters (e.g. due to humidity in electronics, premature battery depletion, or leaky housing) over the lifetime period, which can be significant. Some utilities report completely worn-out meters or meters running backwards even within a short period after installation. The cost of handling such meters is significant. Ask potential suppliers for proven return rates and compare them.
- The costs related to maintaining and operating the infrastructure of a private network, for example transportation, site rental, and repairs.
- Also remember to factor in the cost of activating a fallback solution securing the utility's activities in case of disturbance on the primary network: How time-consuming is the fallback solution in terms of going onsite to collect data for billing? And how likely is it that the primary network will fail?

Going into your spreadsheet:

The estimated cost of replacing meters (including associated labour costs) due to malfunction or inaccuracy over the meter lifetime; of maintaining/operating the infrastructure of a private network; and of a fallback solution.

4. ONGOING COSTS FOR SOFTWARE AND SUBSCRIPTIONS

The ongoing cost for software and subscriptions covers the cost tied to owning or using software.

Some important factors to investigate:

- Costs tied to software includes expenses associated with the MDM system to collect, store, process, and analyse data from your digital meters. In addition, you may often have other analytics software. These kinds of software are typically paid by a monthly or yearly subscription.
- In case your digital metering solution is based on a public cellular network, the digital meters have built-in communication (such as SIM cards) paid by monthly on-going fees per meter. Such fees quickly add up over the years; on the other hand, you do not need to factor in infrastructure planning and investments like you would in case of a private network.

Going into your spreadsheet:

The estimated ongoing cost of software and subscriptions.

5. COST TIED TO DISPOSING OF THE METERING SOLUTION

The cost tied to disposing of the metering solution at end-of-life includes expenses associated with collecting and properly disposing of the meters. While these costs might not be significant today, they might be of significance tomorrow.

Authorities worldwide are expected to impose stricter regulations on how products are collected, managed, and disposed of, with a strong emphasis on recovery and recycling. This is particularly true for product categories with a high environmental impact or complex material compositions. You should therefore prepare for the future and ask potential suppliers if their products can be disassembled after end-of-life, and how many individual parts of the meters can be recycled or recovered.

Going into your spreadsheet:
The estimated cost of disposing of the hardware of your metering solution at end-of-life.


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6. CAPTURING THE VALUE OF THE METERING SOLUTION

Having reviewed all the costs associated with purchasing, maintaining, and disposing of a new metering solution, we now turn to the value the solution brings. In your TCO/ROI analysis, it is important to include the benefits and added value to ensure an objective and balanced comparison. Your Finance Department can support you with specific calculation methods and how to reflect them accurately in the spreadsheet.

Operational cost savings

A digital metering solution is your way to operational excellence. It provides you with data and insights that allow you to prioritise and process your daily tasks in a completely new way and thereby save on costs. Here are three of the most significant changes to include in your financial calculation in terms of operational cost savings, but there could be several other cost savings tied to the upgrade for your utility:

- Costs of collecting meter data.
  If you are coming from a situation where water meter data is collected by meter reading personnel visiting each individual metering point to register meter consumption (a highly resource-consuming task), the potential savings are often enormous. The time spent on manual meter reading often constitutes a significant cost.

  Furthermore, when your meters (and reading process) are not digital, mistakes are bound to happen. Some people either misunderstand how they are supposed to read their meter or report their usage incorrectly. Some may do it late – if at all – preventing you from billing your customers at the same time or forcing you to use estimated numbers. Even if you have a walk-by or drive-by solution with short-range communication, the potential savings with an AMI solution are significant.

  By choosing a fixed communication network, data from your meters will be transmitted automatically to your software system on a daily basis, making manual data collection obsolete and eliminating the associated operational cost.

- For some utilities, 9 out of 10 customer inquiries relate to consumption and billing issues. With accurate and reliable high-quality meters that retain their accuracy over the full meter lifetime and transmit data on a daily basis to your MDM system, you have the foundations in place for providing exceptional and efficient customer service.

  You can ensure fair and transparent billing, thereby reducing the need for manual interventions and adjustments. You can analyse your reports on the number of calls and other inquiries and historical manual interventions from end-users and calculate realistic cost savings by having all relevant data at hand.

- An AMI solution means access to daily data and thus fast troubleshooting when various events out of the ordinary occur in your distribution network.

  Examples include access to valuable insights from alerts sent from your meters like reverse flow (which may demand immediate attention due to potential contamination), potential bursts, households with zero or suspiciously low consumption, etc. The man-hours saved by having relevant insights at hand can be significant.



Additional water revenue generated
This is associated with the ability to bill end-users accurately for their actual water consumption. This is only possible with high-quality water meters that provide high measurement accuracy and retain it throughout their lifetime. We have seen examples of utilities that have replaced old, worn-out mechanical meters and uncovered previously unbilled water revenue of nearly EUR 1 million annually.

Reduced waterloss
This is associated with early identification and efficient detection of leaks in the water network. Some smart water meters are capable of detecting leaks early by listening for noise patterns in the pipes, allowing utilities or end-users to take prompt action before minor leaks escalate into major problems; leaks that might otherwise go unnoticed for weeks or even months. This early detection reduces water loss and thereby the unbilled water volume.

Additionally, this intelligence provided by smart meters substantially reduces the need for manual labour in identifying and locating leaks. Rather than searching for leaks blindly, your staff can spend their precious time verifying and fixing leaks, thus reducing the cost per identified leak. Ultimately, this will also reduce your maintenance costs for pipe repairs.

In conclusion, the cost savings and value of an intelligent smart metering solution must be fully reflected in the business case. Only then can you make an objective, forward-thinking comparison that drives smarter decisions. And you can get off to a great start by looking beyond the price tag.

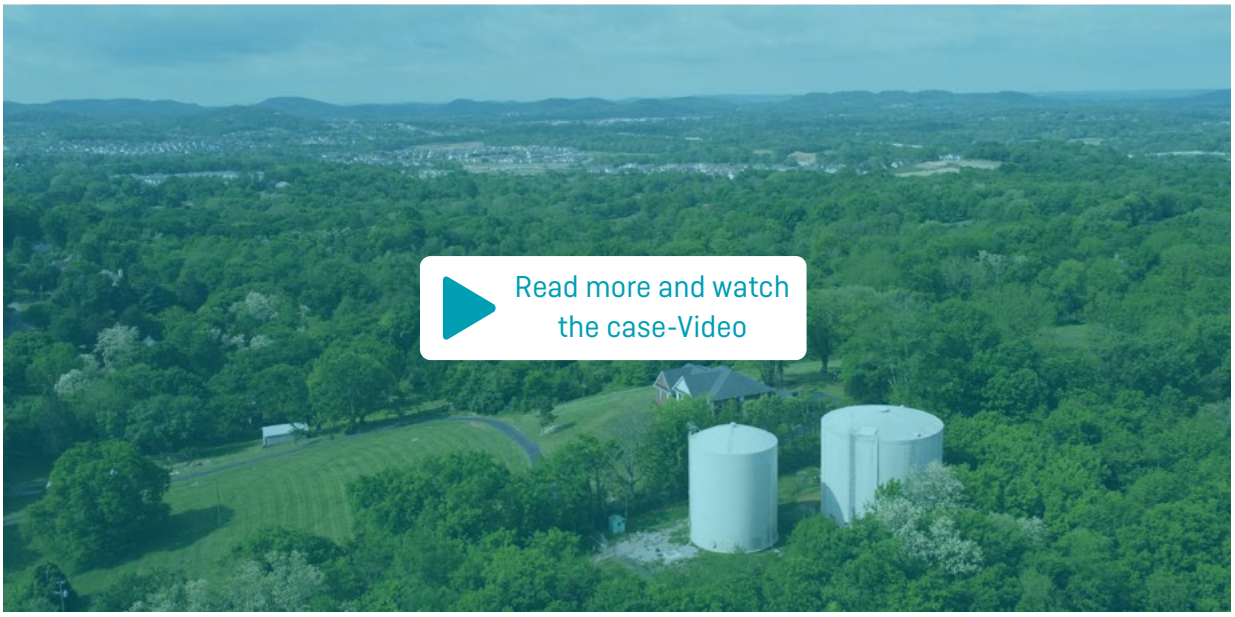
Going into your spreadsheet:
The estimated savings from collecting meter data more efficiently and the savings from reducing your customer service workload. Additionally, factor in the potential increase in water revenue thanks to the long-term accuracy of static meters. Reduced water loss from early leak detection should also be counted, as well as the expected drop in maintenance costs for pipe repairs due to faster identification of issues through smart meter alerts.



CASE Story

Milcrofton Utility District, United States – AMI water metering solution paid for itself

In Franklin, Tennessee, US, the Milcrofton Utility District serves more than 11,000 customers with water. In 2016, Milcrofton suffered from old meters dying from battery life, no longer registering water or meters even turning backwards. Milcrofton decided to transform from a manual reading solution to an AMI.



Recouping **50% ROI in 3 years**

+1 million USD more in revenue from accounting water (while the water purchas e was flatlining)

Operating expenses **reduced with 7%**



Buying a meter system is a huge investment for any utility or municipality and for Milcrofton in the first three years alone, we were able to recoup half of our [total] expenses already."

– Mike Jones, GM, Milcrofton Utility District

Everything – just in short

While this e-book does not provide an exhaustive list of financial parameters to factor into your business case (as these vary from utility to utility), we have shown that the cost picture and the value picture are complex when choosing a metering solution.

We encourage utilities to embrace the Total Cost of Ownership (TCO) and Return on Investment (ROI) metrics when assessing investments. There are two key reasons: First, assessing an investment solely based on the price tag of a solution is a short-term approach that does not offer an objective comparison. This may lead to financial decisions that prove to be suboptimal in the long term. Second, this approach fails to drive the transformational change the water sector urgently needs.

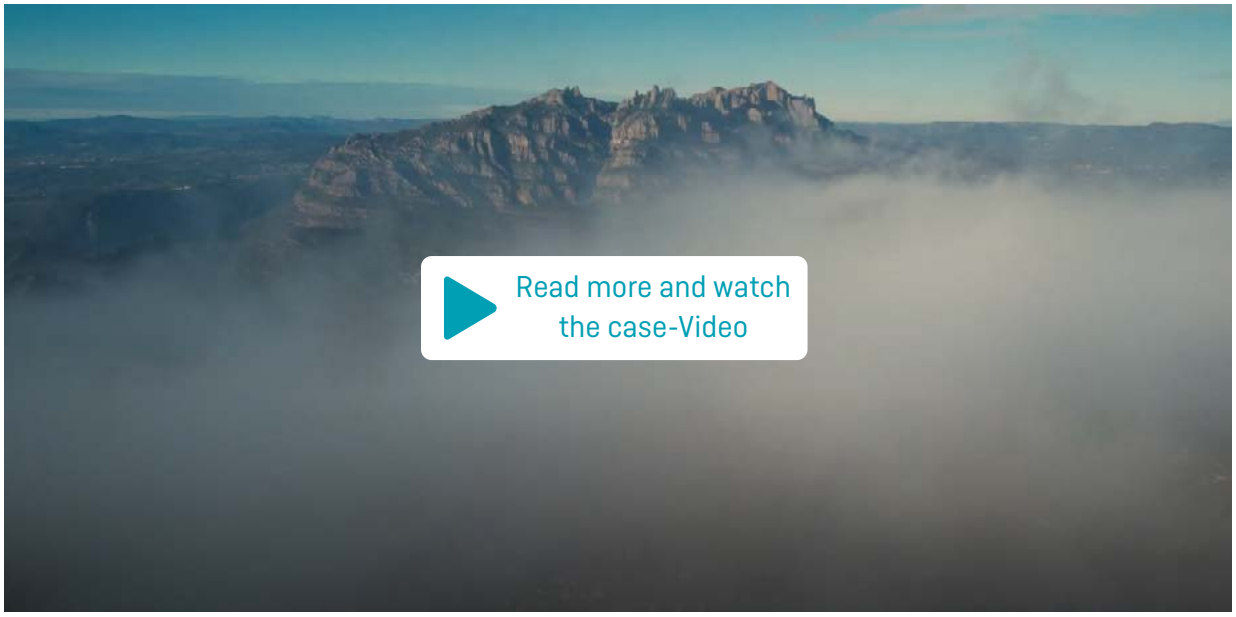
A detailed TCO/ROI analysis, by contrast, provides transparency and equips decision-makers with the right financial tools to evaluate investments. And the TCO/ROI analysis will be your best friend in taking you through the decision-making process – with confidence.



CASE Story

Acoustic leak detection helps Vacarisses reduce water loss and optimise operations

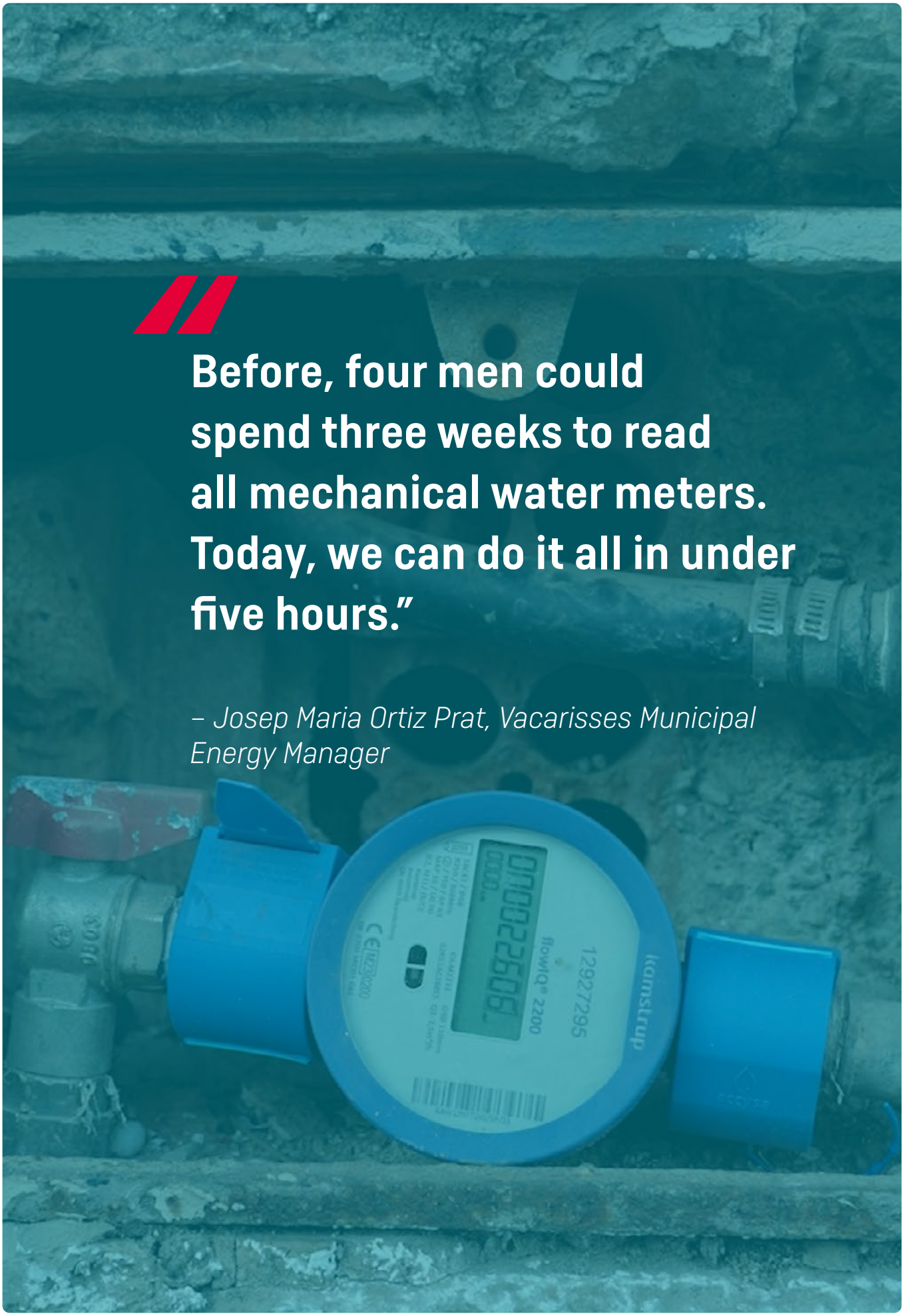
In 2023, Vacarisses near Barcelona, Spain, the local municipality experienced a water loss of approx 40% and decided to exchange their almost 3.000 mechanical meters that had lost between 20% and 100% of their accuracy.



Yearly savings of €70.000

Permanent and **quick way to find leaks** that are not visible in the distribution network

Reduced time
spent on meter readings from 3 weeks to 5 hours



Before, four men could spend three weeks to read all mechanical water meters. Today, we can do it all in under five hours.”

– Josep Maria Ortiz Prat, Vacarisses Municipal Energy Manager



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