

Optimise Your Investments **in IoT** **Testing**

Cost-efficient and flexible ways to
manage device testing

Optimise Your Investments in IoT Testing

Overview

For organisations working on IoT devices, battery testing and power management can be a major challenge. Managing this challenge efficiently will increase your opportunity from advances in artificial intelligence (AI), communications (5G NR), device automation (IoT) and industrial automation (IIoT). Virtually every sector will be affected, including manufacturing, transport, healthcare, agriculture, construction and more. Together, these developments signify the start of the Fourth Industrial Revolution (Industry 4.0).

Soon, 5G networks, devices and services will be coming online. In conjunction with IoT devices, the combination of 5G's increased bandwidth, greater speed and lower latency will give rise to applications that were previously considered impossible. Theoretical maximum speeds of 10 Gbps and an expected 10-year battery life for low-power sensors and machine-type devices mean that a massive wealth of data can be collected, analysed and acted on.

In the era of IoT and 5G, new products will flood the market, increasing the burden on R&D teams and test equipment, and making operational efficiency and productivity even more of a competitive advantage.

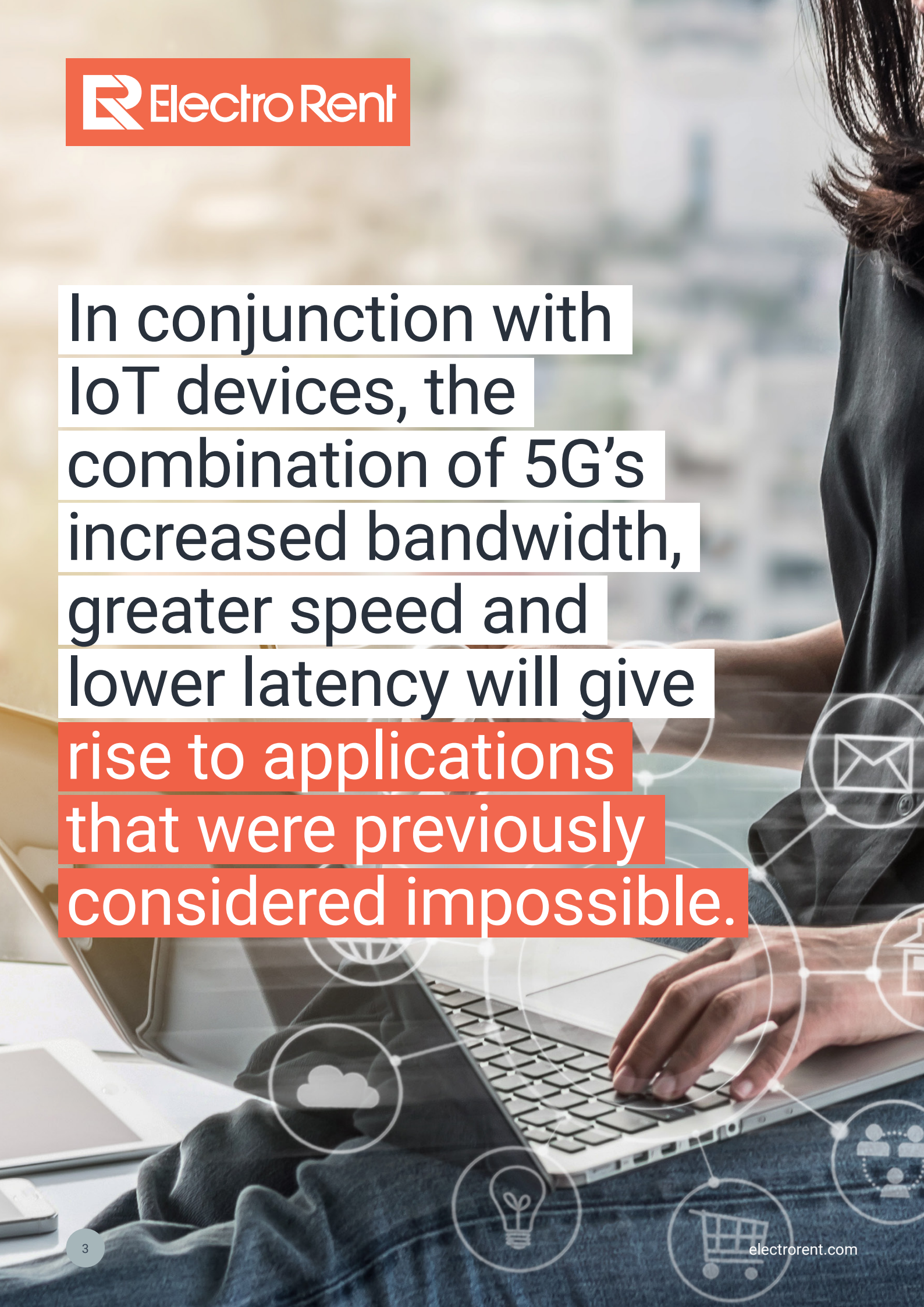
IoT in manufacturing

Next-generation manufacturing, also known as 'Industrial Internet of Things' or the so-called smart factory, will leverage machine learning, cloud robotics and IoT to speed

the flow of data across a factory. Using machine-to-machine communication, automated production systems will share real-time streams of data, images and video so they can learn and improve – largely on their own.



In the era of IoT and 5G, new products will flood the market, increasing the burden on R&D teams and test equipment, and making operational efficiency and productivity even more of a key competitive advantage.

A person is shown from the side, wearing a dark shirt, typing on a silver laptop. The background is a blurred cityscape. Overlaid on the image are several white circular icons connected by a network of lines, including a cloud, a lightbulb, a shopping cart, a house, a mail envelope, and a group of people.

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IoT in transport

A transport revolution is also underway, with electric vehicles, autonomous vehicles and ride-sharing vying to disrupt the traditional automotive business model. In the not-too-distant future, personal vehicle ownership may be replaced by autonomous electric vehicles (EVs) operated by ride-hailing services and summoned by the user's smartphone (Transportation as a Service, or TaaS).

Connectivity will also bring a future where cars communicate with each other, the infrastructure, pedestrians, cyclists, data centres and networks via IoT devices. All of this is known as vehicle-to-everything (V2X).

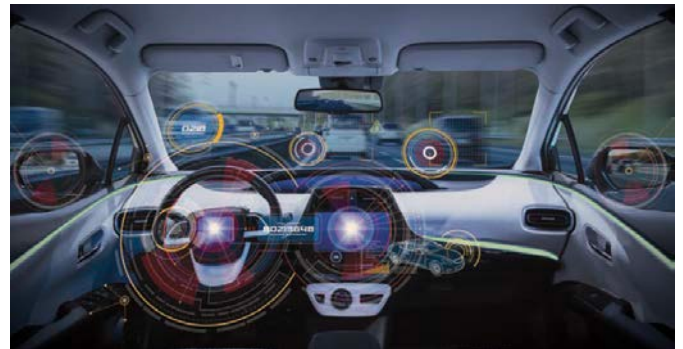
IoT in healthcare

In healthcare, the power of IoT and 5G mean that mass patient monitoring and remote medical treatment become possible, extending the reach of patient care, reducing hospital visits and lowering costs. With artificial intelligence and machine learning, mass analysis of patient records can identify early warning signs of serious conditions. Remote robotic telesurgery also becomes practical, allowing for physical distance between surgeon and patient. The potential benefits of telesurgery include improved precision, lower invasiveness, reduced trauma, faster recovery times and, ultimately, lower healthcare costs.



IoT for consumers

On the consumer side, we have already seen a proliferation of smart home devices, including security systems, lighting controls, HVAC/comfort systems and appliances. Wearables will also proliferate, with many devices having the capability to monitor various health metrics. Soon, we will see smart buildings and the first smart cities, and benefit from automated traffic and utility grid management systems.



Meeting the IoT challenge

As the pace of innovation quickens, engineers, designers, suppliers and manufacturers will face increased pressure to get to market faster. For IoT devices, each generation of products needs to be smaller, more robust, easier to configure and use less power than previous designs, adding to the list of challenges.

Since so many IoT devices are battery powered, energy-efficient functioning is critical. Low-power components must be used, along with techniques to de-energise these components when not in use. For optimised battery life, components must be tested under realistic scenarios and conditions to ensure that the right components are chosen to maximise the life of IoT devices.

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What does this mean for me?

Ensuring the integrity of device power is a critical success factor. R&D engineers and lab managers need high-quality test and measurement tools to get the job done efficiently. Programme managers, finance teams and procurement need to ensure that the solutions are cost-effective.

Companies will need trusted partners that can provide brand-independent guidance on product selection and financing options, as well as recommendations to streamline and optimise the test fleet, increasing operational efficiency and employee productivity.

Today's challenges include:

- Increased need for better ROI in R&D labs and for testing/verification
- Pressure to reduce development times and increase time-to-market
- The need for regulatory testing on power
- The consumer need for extended battery life

To get the most from investments in test and measurement equipment, leading companies across industries gain leverage by:

- Increasing speed-to-market
- Optimising test equipment usage
- Reducing capital cost and associated recurring costs for maintenance and repair
- Examining true cost of ownership
- Improving R&D test equipment utilisation

1. Increase speed-to-market

Customised sourcing solutions may offer the best balance of cost and flexibility.

What if you could have the equipment you need, exactly when you need it, and only for as long as you need it? Many companies, including global semiconductor and device manufacturers, use renting to manage fluctuating projects, fulfil urgent or short-term testing needs and increase speed-to-market.

Consumer IoT and IIoT will result in significantly higher demand for product testing and verification services. In combination with 5G networks, IoT may be the catalyst that accelerates widespread change across industries and society.

The proliferation of consumer devices for smart homes, IoT sensors for smart buildings and cities, and increased manufacturing efficiency via widespread adoption of cloud robotics means that the testing world may change significantly in the near future. In addition, with automated data transfer and V2X communication, the interconnectedness of society is set to increase exponentially. By 2020, Gartner predicts that there will be more than 20 billion connected devices.

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For companies that need multiple pieces of test equipment for a wide range of projects and timelines, customised sourcing solutions may offer the best balance of cost and flexibility. At one end of the spectrum, when the need is continuous, as on a production line, or when the product is established and constantly in use, an outright purchase or long-term lease may be appropriate.



At the other end, when the equipment is needed periodically – even up to intervals of several years or more – renting can represent significant savings. Importantly, renting offers the flexibility to return, change or upgrade the equipment at any time if needs change. Many leading telecommunications, semiconductor and device manufacturers find that actively managing this process makes a difference to their profitability. However, many companies still incur unnecessary costs due to habit or through the notion that outright asset ownership is always preferable.

Renting offers the flexibility to return, change or upgrade the equipment at any time if needs change. Many leading telecommunications, semiconductor and device manufacturers find that actively managing this process makes a difference to their profitability.

Whether you need week-to-week support for a short-term project, or long-term solutions for several years, renting ensures continued access to the latest technology without the associated long-term ownership costs. Maintenance and calibration are covered by all rental agreements. Optimise utilisation by renting only what you need, only when you need it.

With renting, your organisation can get to market faster, at lower cost. You can forget about ownership expenses, avoid maintenance and calibration costs and technological obsolescence, free up cash for other investments and acquire and dispose of equipment, as needed, to fulfil urgent needs or short-term requirements.

Soon, people will interact with billions of connected devices to share massive amounts of information. This means that a flood of devices will need testing and verification.

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2. Optimise test equipment usage

Market leaders use savvy sourcing techniques to increase profitability.

Using the cloud, a variety of IoT sensors will be used across industries for automated data transmission and remote device control. In the Internet of Everything era, connectivity will become commonplace.

Soon, people will interact with billions of connected devices, sensors, machines and vehicles to share massive amounts of data, images and video. This means that a flood of devices will need testing and verification.

While many companies continue to purchase test assets outright for full ownership, this dated strategy involves many upfront and recurring ownership costs:

- Sales and property taxes in some regions
- Cost of capital, financing and interest
- Annual expenses for calibration, maintenance and repair
- Opportunity cost of capital and equipment downtime
- The cost to track and manage assets
- Many other costs

In dynamic R&D environments, trying to achieve optimal efficiency with a single acquisition strategy – such as purchasing assets outright for full ownership – is unlikely to produce the best results. That's not to say that outright ownership is not appropriate in certain circumstances. However, expertise in test equipment sourcing is required to discern the optimal (most cost-effective) mix of purchase, certified pre-owned, lease and rental equipment for your entire asset pool.

In dynamic R&D environments, trying to achieve optimal efficiency with a single acquisition strategy – such as purchasing assets outright for full ownership – is unlikely to produce the best results. Expertise is required to discern the most cost-effective mix of purchase, certified pre-owned, lease and rental equipment for your entire asset pool.

For long-term projects, where no changes are expected or the equipment will be in use for many years, a purchase or long-term lease might be best. Often, a pre-owned option may be available, which will drive large savings. For short-term projects, where the timeline is less certain or testing protocols or requirements might change, renting could be an ideal solution. In many cases, renting or leasing is often more cost-effective than outright purchase. A business case is available to show how the numbers compare with our free rent-vs-buy analysis.

Optimise Your Investments in IoT Testing

Based on current and intended future utilisation, a mix of acquisition methods often saves money, reduces the size of the asset pool and eliminates the expense of unintended, redundant or duplicate purchasing of equipment. Leading companies use a mix of sourcing strategies to mitigate risk, save time and money, shorten procurement cycles, improve labour utilisation and avoid unnecessary spending.

Consider a mix of acquisition methods to accomplish your testing objectives. By leveraging the right product and sourcing information, R&D managers and test engineers can choose the best combination of equipment and sourcing methods on a case-by-case basis – without the need for compromise.



It's all about having the right test equipment at the right time so projects get done quickly, on time and under budget. With a combination of acquisition methods companies gain the flexibility to return, exchange or upgrade certain equipment if conditions or project needs/timelines change. Among the many benefits of renting and leasing is avoiding technological obsolescence.

With renting, when new technology arrives, you can simply return the equipment and upgrade to the latest technology. You pay only for what you use, return it when you no longer need it, and avoid long-term ownership costs for calibration, repair, downtime and taxes. Renting also allows you to try before you buy.

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3. Reduce capital cost and recurring expenses

Many R&D managers cite cost-of-test as one of their biggest concerns.

Across all business sectors, there are increasing demands to improve operational efficiency, forcing organisations to keep a close eye on costs as they pursue rapidly evolving market opportunities in IoT. Within R&D, testing and verification is an area that holds great opportunity for improvement. Research from Frost & Sullivan shows that many test assets are purchased each year to satisfy existing needs without considering future requirements.

Optimise Your Investments in IoT Testing

Power management in IoT is a challenging and rapidly changing area. Which equipment do I need, and when? Will it change in the future? Sometimes, engineers may order equipment to meet certain specifications and find that it quickly becomes obsolete. However, once the capital investment has been made, it is usually too late.

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Furthermore, the outright purchase of test assets restricts funding that may be needed elsewhere. Asset ownership represents a long-term commitment that may present a

challenge if testing standards or protocols change, or if equipment needs evolve – as might be the case with IoT. Outright asset ownership involves many annual and recurring costs that are often overlooked. Some of these include:

- Sales and property tax in some regions
- Cost of capital, financing and interest
- External cost and labour for calibration, maintenance, repair and downtime
- Cost for tracking, logistics, security and storage for unused or under-utilised assets
- The cost of using outdated or technologically obsolete equipment

To stay competitive and ahead of the competition, industry leaders are always looking to optimise their spending on test equipment and explore other, more cost-effective ways to achieve similar outcomes with lower expenses and fewer associated costs.

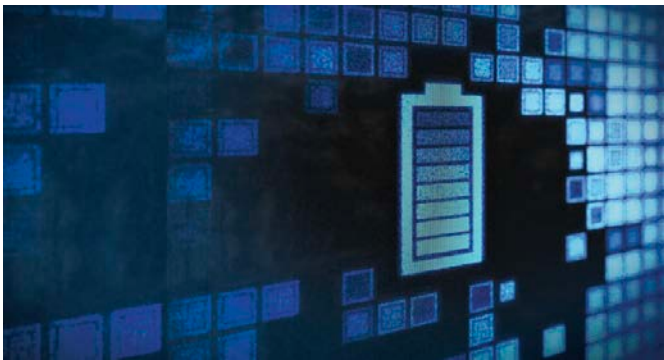
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4. Understand the true cost of ownership

Tailor the sourcing method to accommodate current needs and future intended use.

There are a variety of acquisition methods to consider. Depending on needs, there is likely to be more than one procurement option to meet current and future objectives. The reality is that the upfront purchase price is only half the story. When you consider all ownership costs, both upfront (e.g. purchase price) and recurring (e.g. repair and calibration), the real cost becomes apparent.



There are many costs to consider. There is the cost of capital, interest and financing, as well as depreciation, which starts immediately. On an annual basis, there will be costs for calibration and maintenance, as well associated labour and management time for these expenses. At some point, repairs may also be needed. There are also recurring yearly costs for managing each test asset, including procurement and vendor sourcing, asset management and tracking, inventory control, shipping and logistics, and security and storage.

The reality is that the upfront purchase price is only half the story. When you consider all ownership costs, both upfront (e.g. purchase price) and recurring (e.g. repair and calibration), the real cost becomes apparent.

If the equipment becomes obsolete or no longer meets project requirements, additional funds may be needed to upgrade or buy another unit. When you take these factors into account, the real cost of ownership is often close to twice the original purchase price.

In many cases, the true cost of ownership is simply overlooked. It is only later, when audits are undertaken, that it becomes apparent that money was spent unnecessarily. To understand the true cost of test equipment, consider all the expenses involved.

Optimise Your Investments in IoT Testing

Many organisations mitigate risk and uncertainty by considering some simple but essential questions prior to making decisions. Knowing the answers to these questions can lead to informed decision-making and smart choices. In our experience, making informed decisions around product selection and financing alternatives can be just as important as technical equipment specifications.

Below are some questions to consider:

What is the estimated use timeline?

- How long will the equipment be needed?
- Is it for sporadic use or continuous use?
- Is it for a specific project or initiative?
- Is there guaranteed use beyond the intended period?

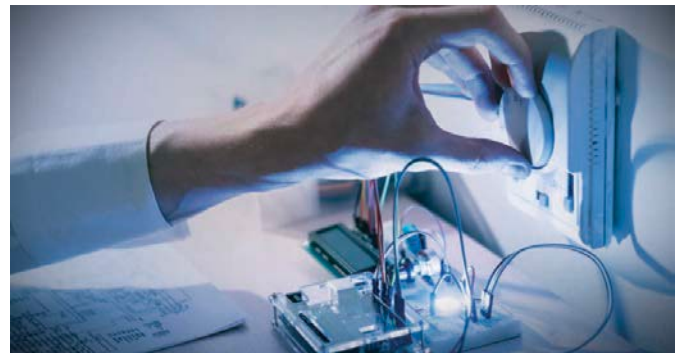


What is the product lifecycle?

- Is it a new product with likelihood of change, or an established product?
- What is the risk of obsolescence?
- Are there frequent upgrades?

What are the financial priorities?

- Is capital limited?
- How important is cash flow?
- What is the cost of borrowing or internal rate of return?



What is the likelihood of change?

- Is the environment dynamic?
- Do you need flexibility to respond to changing market conditions?

How will equipment be managed, tracked, calibrated and maintained?

- Will regular calibration and maintenance be performed? By whom?
- Does an asset management system exist?
- Is there staff allocation to track and manage assets?
- Who will keep everyone informed about asset status? How will they do so?
- If there are multiple units in operation at different sites, who will manage the logistics?

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How will asset disposal be managed at end-of-life?

- How will you dispose of unwanted or obsolete equipment?
- Can you free up cash for new investments by selling obsolete equipment?

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5. Improve R&D test equipment utilisation

To reduce R&D test spending, consider asset optimisation services.

With increased attention on spending and ROI, R&D departments are coming under greater scrutiny. Whether you represent a medium or large organisation or a start-up, you will want to be able to focus on your core technology and not divert your resources on expensive test equipment.

Globally, leading companies are streamlining their operations and reducing costs to improve both operational efficiency and employee productivity. Efforts are underway to gain higher visibility in the test asset pool, reduce expenses, and improve asset sharing and equipment utilisation.



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Compounding the problem, asset information in many companies is maintained via a variety of inaccurate/incomplete spreadsheets or partial software solutions not designed for test and measurement equipment. Without reliable data on the total asset pool and an effective way to track calibration and repair activities, time-consuming re-testing is often required, increasing expenses and delaying projects.

To increase utilisation and optimise spending, many companies engage with trusted third parties to implement asset management software systems, or in some cases, to completely manage the entire optimisation process as an outsourced activity.



Optimise Your Investments in IoT Testing

Unfortunately, many companies end up with too many assets in their test pool and very low utilisation. According to Frost & Sullivan, 'the typical utilisation of test assets at many companies is in the 30% range'. This surplus of equipment that doesn't fit requirements is also costly to track, manage and maintain. In our interactions with clients across industries, we find that companies tend to suffer from a variety of system and process inefficiencies, including:

- Lack of a centralised system to track equipment
- Legacy systems that prevent visibility in the asset pool
- Ongoing project delays and cost overruns due to equipment unavailability
- Severe technological obsolescence with utilisation rates lower than 20%
- No way to track maintenance, calibration and repair

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Collectively, these issues have a tremendous cost – actual and opportunity – to each organisation. Real costs include equipment overspending, redundant purchasing, high testing costs and project delays.

Hidden costs include:

- Low asset utilisation and employee productivity
- The opportunity cost of capital from having more assets than needed
- Reduced operational efficiency from inefficient asset tracking systems and processes
- Outright purchasing with recurring ownership costs, when renting may have served the need

To increase utilisation and optimise spending, many companies engage with trusted third parties to implement asset management software systems, or in some cases, to completely manage the entire optimisation process as an outsourced activity. Both options allow organisations to focus on their own core competencies, while leaving the optimisation of test assets and related spending to those with experience and expertise in these areas.

With Electro Rent's asset optimisation solutions, engineering and R&D teams can quickly and easily track and manage test assets and allocate project costs. These systems can also maintain and track repair and calibration history, calibration certificates, cost-of-test, rental and lease expirations and provide advance notifications when calibration is due, or rentals are about to expire. By being well informed about all the options, R&D managers and test engineers can choose the best combination of equipment and sourcing methods on a case-by-case basis, without the need for compromise.

Conclusion

As technologies like IoT, IIoT, cloud robotics and automation evolve, there will be increased demand for testing and verification, especially to support the challenges of power management. Market requirements and testing standards may change. To mitigate this risk and reduce upfront and ongoing costs, leading companies use a mix of sourcing techniques that allow their R&D groups and engineers to get what they need, when they need it, at the lowest cost.

To become more competitive and profitable, companies should reconsider the way they source test equipment. There are many new ways to acquire, manage and optimise investments in test equipment, and leading organisations have become more efficient and profitable with this approach.

With over 40 years of experience, Electro Rent is well positioned to provide advice and recommendations and to help users make more informed decisions regarding product selection, acquisition method and asset optimisation. We offer an array of sourcing and asset optimisation solutions across the entire project lifecycle, from concept and prototyping to development and full-scale production. Instruments can be sourced via new or Certified Pre-Owned purchase, renting and rent-to-buy programmes.

Our goal is to lower the cost-of-test by helping clients deploy equipment when and where it's needed in the most cost-efficient way. As a leading global supplier for test and technology, rental and asset optimisation solutions, Electro Rent specialises in delivering innovation and continuous improvement to optimise client investments in test equipment. Since inception this has been our primary focus, and it remains our guiding principle today.

We have a proven track record of reducing testing and asset costs for world-class organisations across many different industries. We have helped numerous organisations generate more value from their test fleet by disposing of under-utilised, technologically obsolete or unwanted equipment; manage peak demand with renting or leasing; reduce duplicate asset purchasing; and maximise value from unnecessary assets.

Leading companies rely on Electro Rent to help them:

- Understand utilisation rates to make more informed, data-driven decisions
- Optimise the number of assets in service to reduce overall asset and testing costs
- Divest test assets to generate capital for high-demand assets
- Leverage renting and leasing to avoid significant ownership costs
- Minimise or eliminate duplicate asset purchasing by understanding future resource needs
- Optimise rent vs buy decisions based on current and intended future utilisation
- Increase innovation, speed product development and avoid technological obsolescence



Rent



Easy access to our large, global inventory without the high cost of ownership



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Cost effective equipment solutions tailored to your needs



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Asset Optimisation



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