ASSA ABLOY

Whitepaper

The move from mechanical to digital locking

Benefits, costs and strategic challenges for decision-makers

Experience a safer
and more open world

Introduction

In an era defined by rapid organizational change, evolving compliance requirements, and growing security threats, traditional mechanical locking systems remain a foundational security measure but are increasingly complemented by advanced access control technologies. This whitepaper explores the strategic shift from mechanical to digital access management. It also introduces CLIQ®, ASSA ABLOY's smart key solution designed to meet the demands of modern premises.

What you will learn
This whitepaper provides decision-makers, facilities managers, and security professionals with a comprehensive overview of:

● **The growing need for flexible and secure access**
Understand how changing work patterns, remote site management, and regulations like NIS2 are reshaping access management requirements.

● **Digital versus mechanical locking systems**
Compare the strengths and limitations of both systems, including traceability, scalability, and cost implications.

● **Strategic challenges in facilities management**
Learn how digital access solutions address issues like service contracting, cyber threats, and total cost of ownership.

● **The CLIQ solution from ASSA ABLOY**
Discover how CLIQ combines the familiarity of mechanical keys with the intelligence of digital access, offering wire-free installation, programmable smart keys, and seamless integration with other systems.

● **Security, sustainability, and cost benefits**
Explore how CLIQ enhances compliance, reduces energy usage, and delivers long-term savings through efficient key management and reduced liability risks.

● **Real-world use cases**
Gain valuable insights into the successful deployment of CLIQ in the entertainment, critical infrastructure, healthcare and commercial building sectors across Europe.

Whether you're planning a full transition to digital access or seeking a hybrid solution, this whitepaper equips you with the knowledge to make informed, future-ready decisions.

Contents

The growing need for security and flexibility

Evolving security demands call for smarter access solutions

Changing work patterns, increased connectivity of business systems, operational agility targets, and the growing importance of mobility – including for security staff – are pushing static access systems to, and sometimes beyond, their capabilities. Traditional mechanical security, after all, was designed in an era where fast-changing organizations and sectors were the exception, not the norm. The landscape looks very different today. **Management flexibility, including for access, is an expectation.**

On top of this, holistic approaches to security also require organizations to track, rather than simply facilitate, user access. National and regional legislation such as NIS2, an EU-wide cyber security law which tightens the minimum requirements for IT security in a broad range of strategic industries, is extending its reach to many additional sectors.

The NIS2 directive in particular calls for an all-hazard approach: impacted organizations must not only implement cyber security measures but also take precautions to **physically protect their infrastructures**. The earlier that companies begin preparing their physical security protocols for NIS2, the better. During assessments, security officers should thoroughly evaluate existing security, including access control and locking systems, to determine their long-term effectiveness.

For more details on how NIS2 affects you, download our NIS2 whitepaper. ↗

Increasing requirements for secure and flexible access management

Evolving work patterns

Increased connectivity

Regulatory pressures

Sector-specific challenges

Importance of mobility

Older mechanical locking systems can potentially pose significant liability risks for operators, especially if patent protection has expired. In these cases, locksmiths are no longer required to contact the manufacturer, and key copies may be made without verification. This represents a serious security risk. Companies may have to bear the costs of potential service disruptions themselves if they cannot demonstrate adequate protective measures. In addition, effective key management for mechanical systems can be difficult to organize, leading to the security risk of unauthorized but valid "lost keys" in circulation.

The European Commission has estimated that over 160,000 entities will now fall under the scope of NIS2.[1] **The most impacted sectors are likely to be infrastructure, finance/banking, healthcare, energy, transport, and ICT sites such as data centres.**

Many sectors also face individual challenges in balancing accessibility with security. In healthcare, nurses and other staff need fast access to medicines; but this should not be available to everyone. In multi-residential housing, service providers and maintenance contractors require flexible access; but it must be secure and time-limited. In the utilities sector, sites are often remote and/or widely dispersed; stations must be securely locked but also accessible quickly in an emergency.

Greater security in all these facilities – and all kinds of properties across multiple sectors – means that those responsible need more control over who is allowed to enter a building or room. This can be time-consuming and piecemeal with a mechanical-only locking solution.

The key to more efficient building and access management is digital. However, there is no need to choose definitively between keys and digital control: with a smart key system, businesses reap the benefits of both.

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[1] https://eur-lex.europa.eu/eli/dir/2022/2555/oj/eng
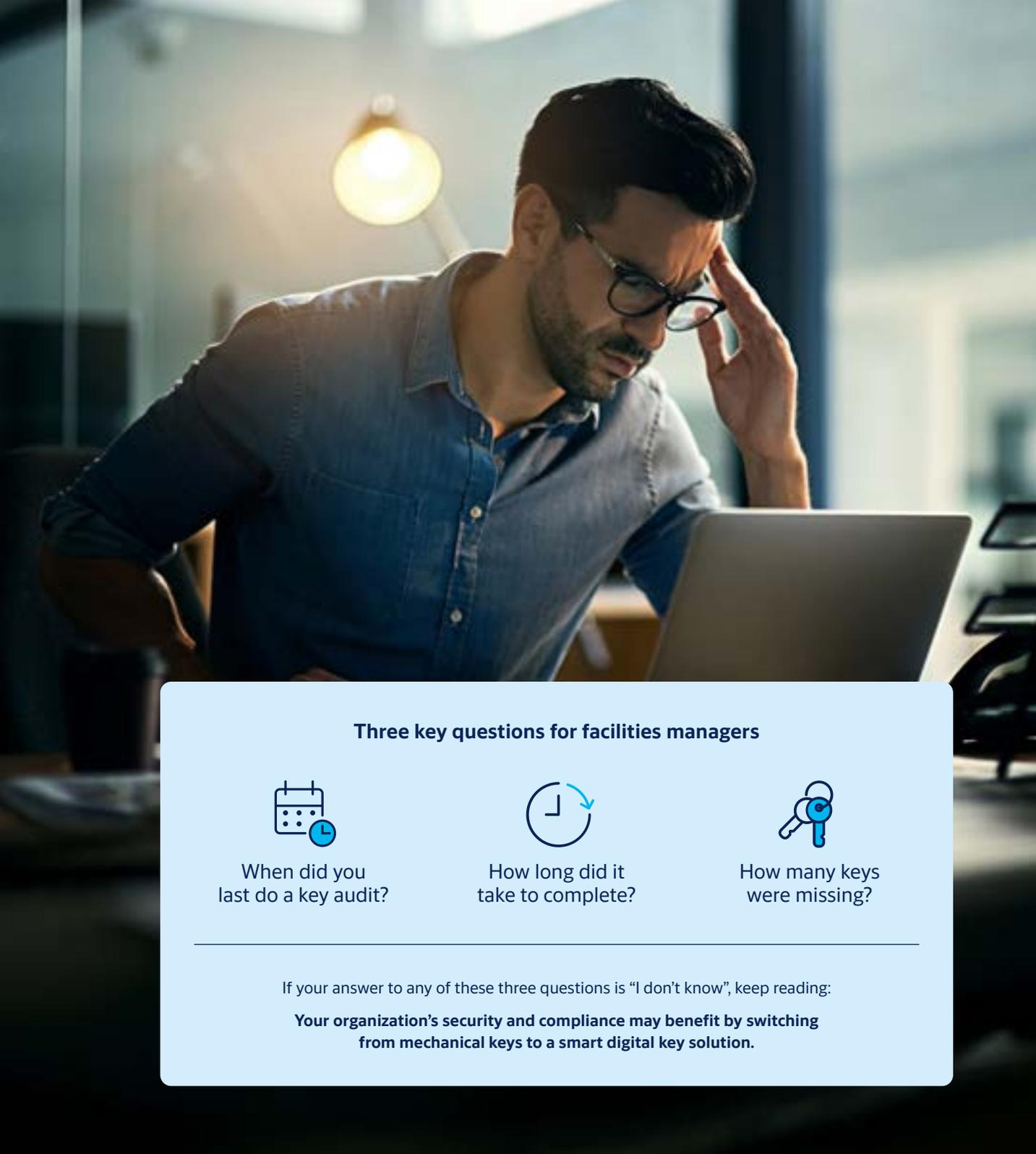
What modern organizations need from building access

Can a legacy mechanical-only locking system based on manual key management meet all your challenges — and further challenges not yet apparent — now and far into the future?

For both businesses and public organizations, it seems that digital systems have significant advantages. Yet one highly valued benefit of mechanical key security is its familiarity. Manual locking technology is trusted and road-tested. Mechanical locking elements have proven themselves over time in many different environments. In some cases, they may still provide the most suitable option.

Against this, a digital solution offers the ability to change access authorizations flexibly, and much quicker than with a physical key exchange or spreadsheet (assuming the management software for any digital solution is intuitive). A digital credential, such as a smart key, can be programmed or de-authorized in seconds, negating the threat of a lost key in circulation, not to mention the cost of changing cylinders and re-keying.

The ability for building technology to connect solutions for access, fire protection and escape routes, for example, may also enhance user safety and facilities management. These are just two from many potential benefits.

Three key questions for facilities managers

When did you
last do a key audit?

How long did it
take to complete?

How many keys
were missing?

If your answer to any of these three questions is "I don't know", keep reading:

Your organization's security and compliance may benefit by switching from mechanical keys to a smart digital key solution.

Strategic challenges on the facilities management landscape

The pace of organizational change:
Upscaling, downsizing, multiple locations coming onstream faster than ever before

A boom in service contracting:
Many building functions are now handled by third-party providers rather than employees

Budget and ongoing costs:
A greater focus now shines on the total cost of ownership, rather than just initial outlay

Legacy systems which do 'just enough':
Justifiable new solutions must offer gradual introduction and easy scalability

Increasingly sophisticated cyber threats:
In 2024, IBM estimated the average cost of a data breach to be over 4.2 million euros[2]

Adaptability of any chosen business solution:
Planning horizons must be able to react quickly to sudden macro-market changes

Demand for efficiency improvements:
Workflow/organizational siloes are targeted for more connected solutions

[2] www.ibm.com/reports/data-breach

Key considerations for moving to digital access

Of course, it is not a case of simply flicking a switch from mechanical to digital smart key management. Lots of factors must be considered before long-term decisions are made. Worth noting in particular:

- **Scalability** over time must be apparent, as many organizations have large systems they cannot change all at once – making practicality and ease of installation essential

- **Convenience** is relevant to every organization, especially in this era of digital natives, but calculations are different for small businesses versus large organizations with many different service providers for whom they constantly issue new keys and block lost ones

- **Audit capability** can be automated for every cylinder and user with a digital solution, which may be a major benefit for compliance; manual access tracking is either time-consuming or, in most cases, impractical

- **Costs** are always an issue, because digital locking solutions may require a level of investment which is initially higher than for a mechanical system

- **Reliable knowledge** of a market which is very diverse with manufacturers offering a universe of different systems and solutions

Digital key systems versus mechanical locking systems

How digital keys transform access management

Digital key locking systems offer greater flexibility than mechanical solutions when it comes to assigning access authorizations. This is because the digital door lock, known as a cylinder, cannot be released mechanically without approval from its electronics. **Digital authentication decides whether the keyholder is permitted access.** Programmable smart keys simply replace the old mechanical keys.

This level of digital control over keys and cylinders enables exceptional flexibility in storing and changing authorizations. It makes facilities management more agile, enabling a quick and adequate response to operational processes, organizational changes and even emergencies. The ability to change access rights remotely, rather than visiting every keyholder in person, saves significant admin time (and therefore, costs).

In addition, monitoring and filtering who can go where – **and at what times** – ensures staff and visitors move safely into and around a building. Intelligent digital access management enables staff to optimize work patterns and therefore efficiency. It also helps businesses implement hybrid working.

Mc Kinsey & Company research had identified that flexible or "hybrid" work patterns positively impact employee motivation, health and innovation.[3] Office-based working, telecommuting, work-from-home (WFH), co-working spaces and hotdesking are all now part of the mix – and increasingly important for effective recruitment and retention of the best staff. Digitalization of access puts facilities management teams at the heart of these changes.

[3] www.mckinsey.com/capabilities/people-and-organizational-
    performance/our-insights/the-organization-blog/hybrid-can-be-healthy-
    for-your-organization-when-done-right ⬈

Advantages of smart key locking systems

Timely blocking of lost or misplaced keys

Time-based, not blanket, allocation of access authority

Traceability, automatic audits and tracking of access

Difficulty of making unauthorized key copies

Quick allocation, change or revocation of access rights

Potential to integrate access with other business processes

In general, digital locking cylinders are considered to have a longer service life than mechanical cylinders because site security is not threatened when a key is lost, so locks do not need to be changed so frequently. Unlike mechanical solutions, losing a key in critical areas does not compromise the security of the entire system. However, as mechanical systems are still in use in many places today – and have been in service for 20, 30 or more years – the duration of use likely depends on the intended purpose, physical environment, and so on.

For a detailed overview of the relative costs and benefits of digital access versus mechanical locking, see Appendix I. ⬈

"Dynamism and flexibility are the hallmarks of every successful organization, including in how they manage security. Access management has a role to play in helping facilities management teams make their contribution to meeting efficiency, cost reduction and sustainability targets, while performing core functions better than ever. Static access management solutions can hinder a business' ability to react quickly and flexibly. A digital solution, in contrast, delivers concrete financial and operational benefits beyond just user safety and security. It's faster, more flexible, and more powerful. It prepares an organization's access for what's ahead."

Hanna Sillanpää
Director & Head of Product Line Management for Key-based Digital Cylinders at ASSA ABLOY

CLIQ – smart key access from ASSA ABLOY

Where mechanical reliability meets digital innovation

The core CLIQ concept was born in 1997 with the ambitious goal to combine the usefulness of a mechanical master-key system with the versatility of online access control, offering both functionality and affordability.

CLIQ has evolved greatly since then and today provides powerful digital access management capabilities for not only doors, but many other applications. CLIQ is an offline, battery-powered digital locking system, meaning it doesn't require wiring or a constant network connection at the access point. Instead, it uses smart, battery-powered keys that can be programmed to open various types of wire-free cylinders. This innovative solution overcomes many everyday challenges of mechanical systems.

It combines the familiarity of traditional keys and cylinders with the flexibility of digital access management, all while requiring just one key for any type of access point.

Since its introduction, CLIQ has been adapted in various parts of ASSA ABLOY, with different versions tailored to specific markets all over the world, everywhere master-key systems play a significant role. Easy to install and straightforward to run, CLIQ simplifies security for premises of every size and type.

What is CLIQ?

CLIQ is a straightforward key-based system which transforms mechanical into high-security digital access management. It gives businesses the flexibility to manage all their building access points, maximizing efficiency and security. A CLIQ system minimizes the risk from lost and stolen keys and saves the time and money spent changing mechanical cylinders.

For maximum convenience, site users carry one programmable key with optional Bluetooth® functionality. Their personalized CLIQ key opens not just authorized doors, but also cabinets, mailbox systems, gates, lockers and more. All the energy needed to power a CLIQ cylinder's electronics is inside the user key.

So, a CLIQ system brings control and convenience without the expense and disruption of electrical cabling: All CLIQ cylinders are fast and wire-free to fit, without any need for drilling.

Keys are easy to program with flexible access rights and simple to manage using intuitive local or web-based software. For added security, keys may be set to require regular revalidation via wall or portable programming devices, or via Bluetooth and a smartphone app. On-demand audit trails indicate where any keyholder has used their key.

With CLIQ, any organization can benefit from intelligent, flexible, key-based digital access management.
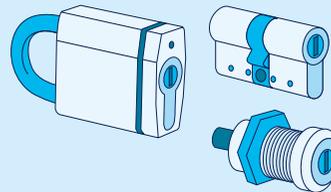
The CLIQ system at a glance

Software and apps

+

Programming devices and readers

+

Programmable keys

+

Cylinders and padlocks

CLIQ can help facilities managers address the following challenges:

Control the building: decide who goes where and when, by issuing individual access for each user; lost keys are blocked quickly

Save everyone's time: eliminate the need to manage multiple keys, change cylinders due to lost keys or search for a keyholder

Fit fast and wire-free: swap an existing mechanical cylinder for a CLIQ cylinder and mount it quickly with just one screw

Protect all access points: secure doors, gates, cabinets, lockers, mailbox systems, server cabinets, machines, alarm systems, and more, with one single system

Enhance operational efficiency: connect complementary systems through a wide choice of integrations

Transform complexity into clarity with CLIQ

Right person

Right locations

Right times

Full audit transparency

Why CLIQ?

For more than two decades, CLIQ technology has been successfully deployed to safeguard some of Europe's most sensitive and challenging premises, including critical infrastructure. It has brought flexible digital access management – based on familiar keys and cylinders – to schools, hospitals, energy and other utilities, small businesses, sports venues, offices, and almost every other type of site. Constant upgrades and developments in the technology, software, and device range keep premises safe from evolving physical and cyber threats, and ensure users enjoy a modern, seamless building experience.

A range of more than 60 cylinder and padlock types offer a digital solution for almost any application, indoors or outside, even in extreme weather. CLIQ cylinders fit flush, which limits vandalism and unintentional damage during daily use. To ensure access is future-proofed, CLIQ can also integrate with other security platforms. It can easily scale from a few access points to thousands across multiple locations – ideal for growing organizations.

For facilities and security managers

- Drive ROI and streamline security management
- Cut hidden costs of manual systems by improving daily workflows
- Easily audit key usage for smoother compliance
- Integrate CLIQ with your existing system for centralized control
- Choose SaaS or self-hosting – your system, your way

"We had to find a way in which paramedics could get access to drugs over a large geographical area, but we also needed to ensure the system was compliant, with auditability for security purposes."

Gavin Mooney
Advanced Paramedic Practitioner and Trust Medication Safety Officer at London Ambulance Service

Read case study ⬀

London Ambulance Service
London, United Kingdom

"Wire-free installation was simple and quick: only two weeks, when no events were taking place in the stadium, were available for the conversion of all [2,500] doors."

Lukas Angenendt
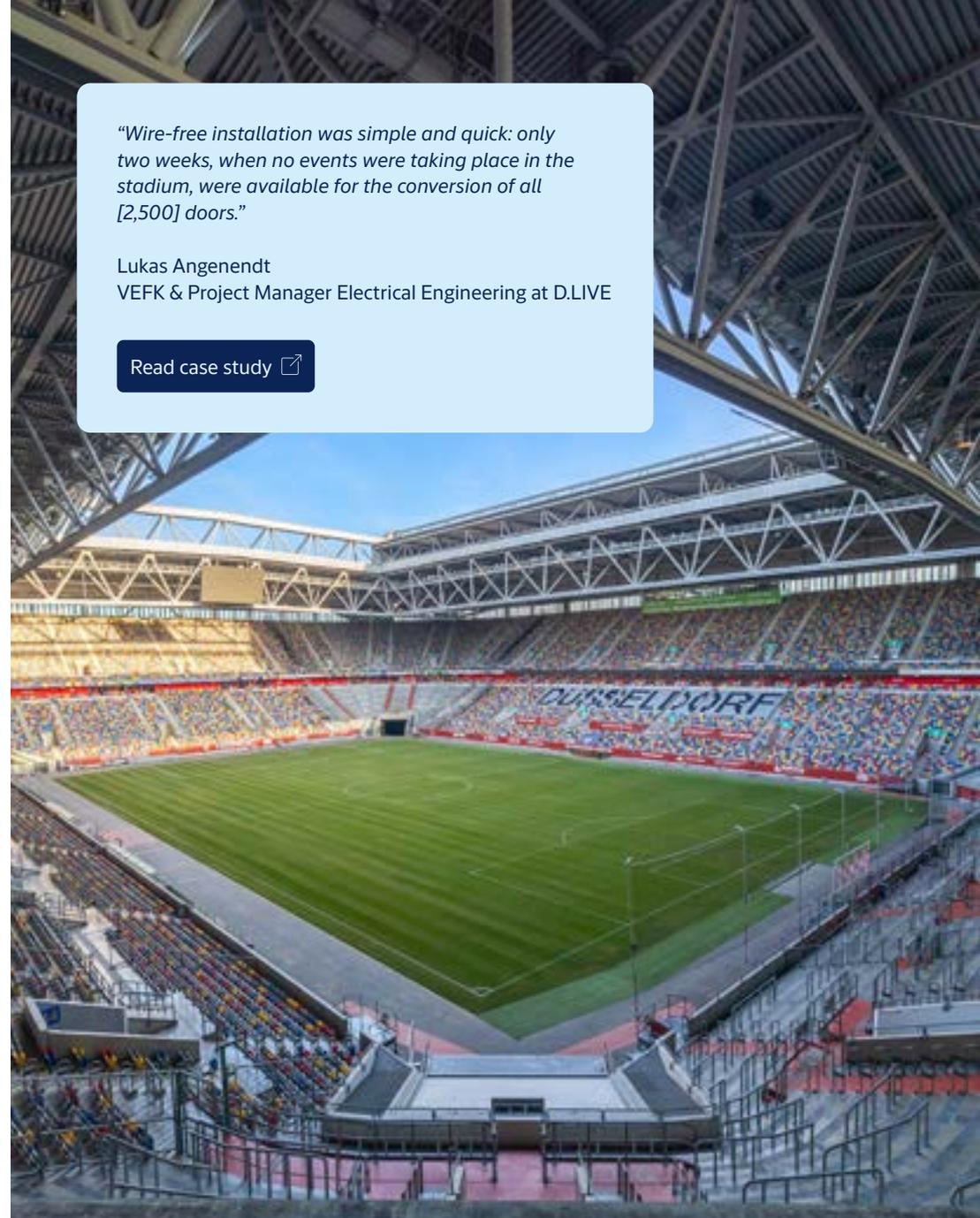VEFK & Project Manager Electrical Engineering at D.LIVE

Read case study ↗

For installers

● Fit fast and wire-free because power is inside the key

● Simply remove the mechanical cylinder and slot in a CLIQ cylinder

● Choose from more than 60 different cylinder and padlock types

● Save time as cylinders don't need replacing when keys are lost

MERKUR SPIEL-ARENA Multi-purpose venue
Düsseldorf, Germany

"We can administer keys for external suppliers whenever they need access to our premises."

Jan Adamek
Operational & Technical Director at CHEVAK
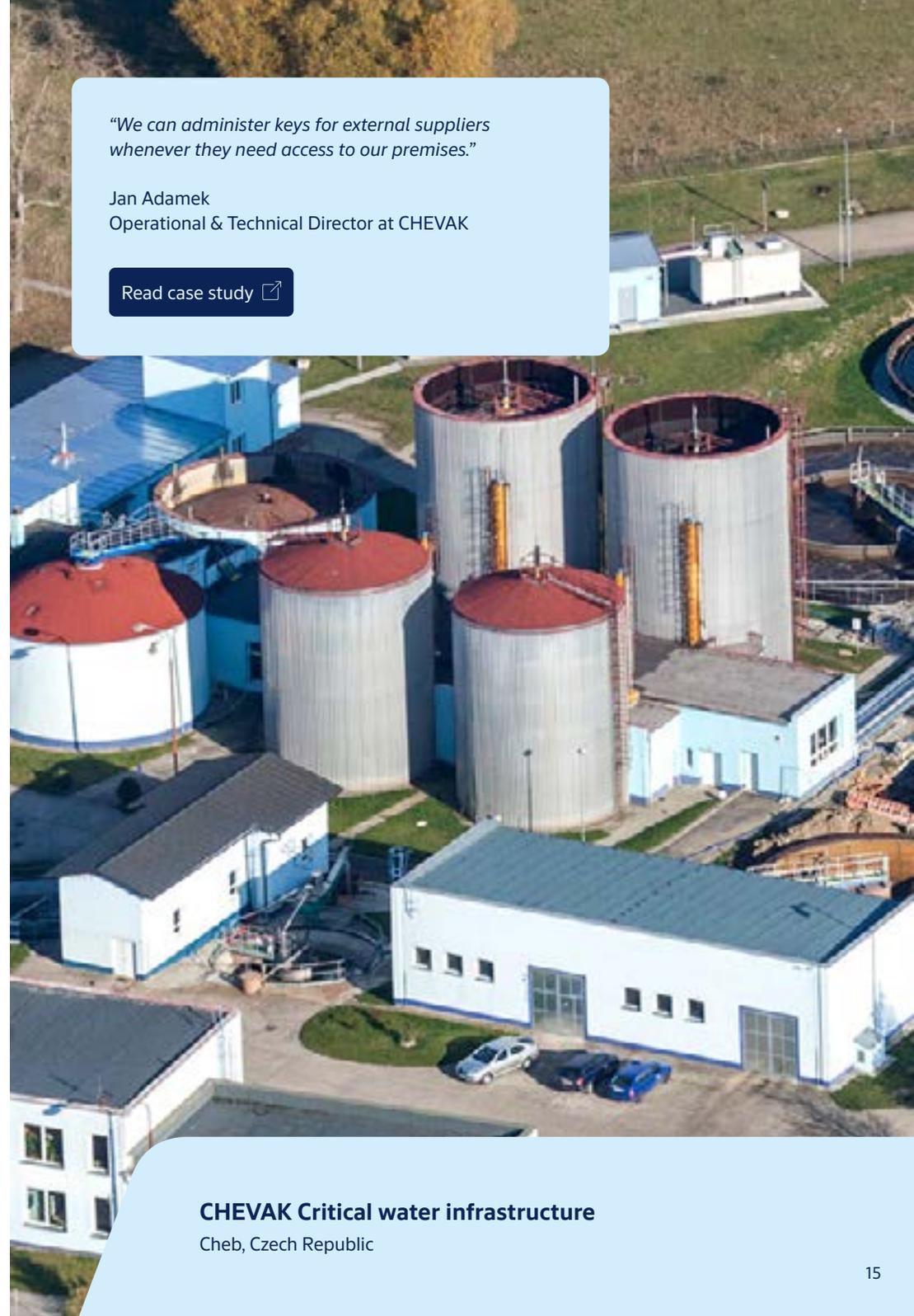
Read case study ⬏

For system administrators

- ●━━ Block lost keys remotely and quickly program new ones to maintain site security
- ●━━ Simplify contractor and service provider management with flexible access scheduling
- ●━━ Program access on-site or remotely, which speeds up workflows and boosts security
- ●━━ Add time restrictions and key revalidation to personalized access permissions
- ●━━ Choose local, app or web-based management software to meet your individual needs

**CHEVAK Critical water infrastructure**
Cheb, Czech Republic

For building/site users

- Carry one key to unlock almost every access point
- Update access rights on the go via Bluetooth and your mobile
- Easily replace key batteries without time-wasting trips to see an administrator
- Transition hassle-free to digital access as CLIQ works just like your existing keys
- Choose local, app or web-based management software to meet your individual needs

"The eCLIQ system is very user-friendly. My employees are very happy with the way the keys work."

Rutger Barendse
Manager Security at D&B The Facility Group

Read case study ⬀
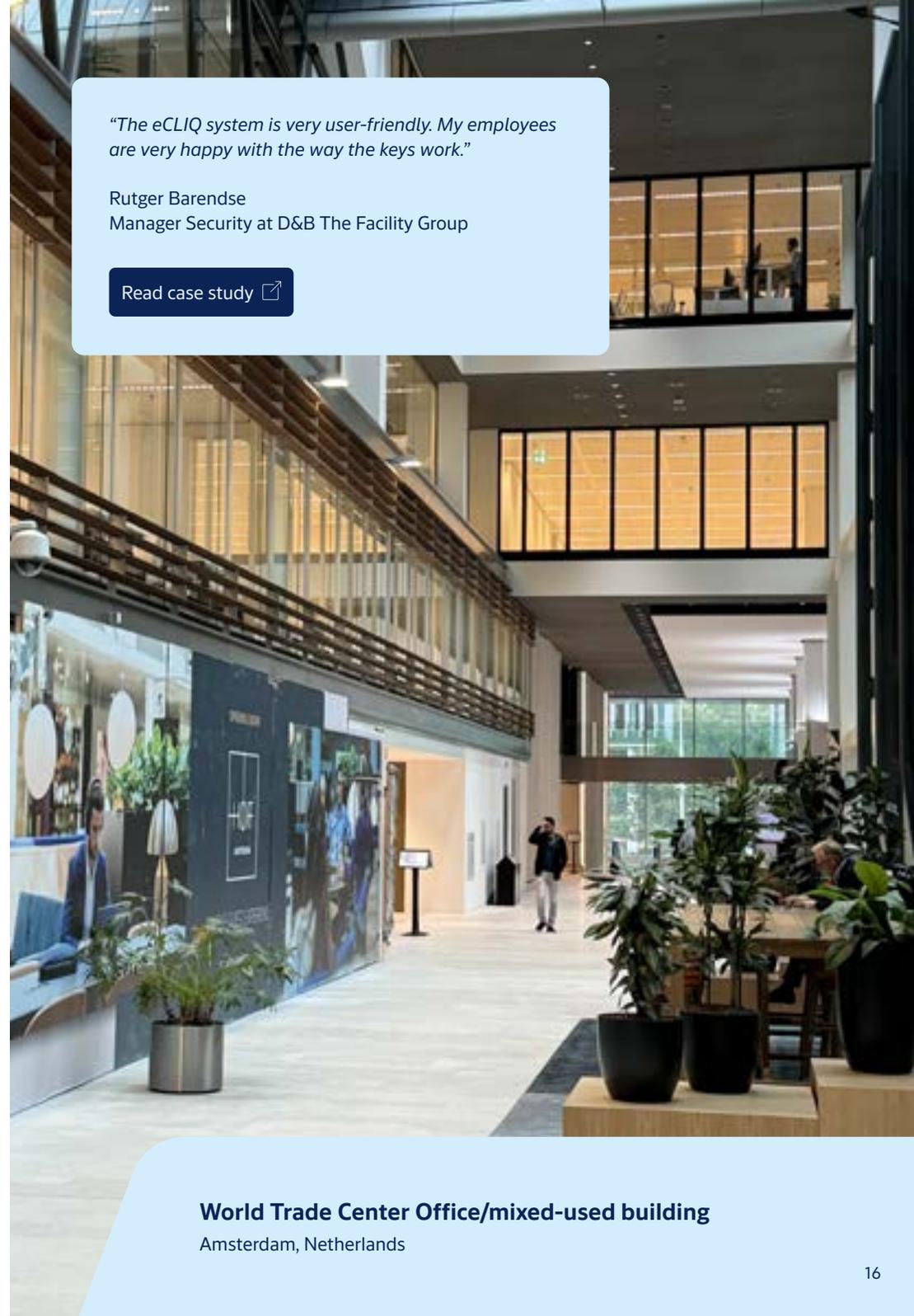
World Trade Center Office/mixed-used building
Amsterdam, Netherlands

Which CLIQ family is right for me?

eCLIQ
Fully electronic version

- One mechanical key profile plus electronic coding
- Maximum digital flexibility
- Maintenance-free for up to 200,000 cycles, reducing costs

ABLOY PROTEC² CLIQ
Electromechanical version

- Multiple mechanical key profiles plus electronic coding
- Easy, cost-efficient management alongside mechanical cylinders within one system
- Custom-made cylinders for all access points in industrial applications

Key questions:
security, sustainability,
total cost of ownership,
return on investment

Security: Why is CLIQ more secure than my existing system?

CLIQ instantly upgrades site safety and security by simplifying the issuing of authorized keyholders with time-limited, flexible access. Audit trails and verified timestamps are available anytime from CLIQ's intuitive software interface, either CLIQ Local Manager installed on-site or CLIQ Web Manager, accessible securely from anywhere with an internet connection.

Unlike mechanical systems, CLIQ keys cannot be duplicated and are free from the risks of expired patents and untraceable lost keys.

Electronic components inside a CLIQ cylinder are purpose built with a proprietary microchip, which helps prevent re-engineering and hacking, therefore contributing to an organization's overall cyber security.

All sensitive communication among CLIQ elements, such as keys, cylinders and programming devices, is encrypted and protected against manipulation; sensitive data within the CLIQ elements is also encrypted when devices are at rest.

CLIQ's secure Web Manager software is available as SaaS, as well as via in-house, on-premise installation or a dedicated SaaS set-up.

The technical edge: what's inside?

- CLIQ's **proprietary chip** offers high protection against digital manipulation and prevents key copies

- Wire-free cylinders are powered by a battery inside the key with a typical **lifetime of 10 years**

- Standards and **compliance** are built-in: EN 15684 & 16864; SKG; VdS; ATEX; up to IP68 and more

Sustainability: How can choosing CLIQ contribute to improved energy performance?

Choosing CLIQ over comparable – including wired – digital access solutions can help organizations meet environmental targets as part of an overall sustainability strategy.

Unlike many other digital access systems and technologies, CLIQ cylinders do not use mains electricity. They are wire-free, installed without any cabling, which minimizes disruption to the building fabric and cuts the number of journeys installers must make. The process is fast and non-invasive.

The microelectronics inside a CLIQ cylinder and key are powered by a standard battery inside every key, with a typical battery lifetime of 10 years between changes for standard user keys. This further reduces energy use and maintenance needs.

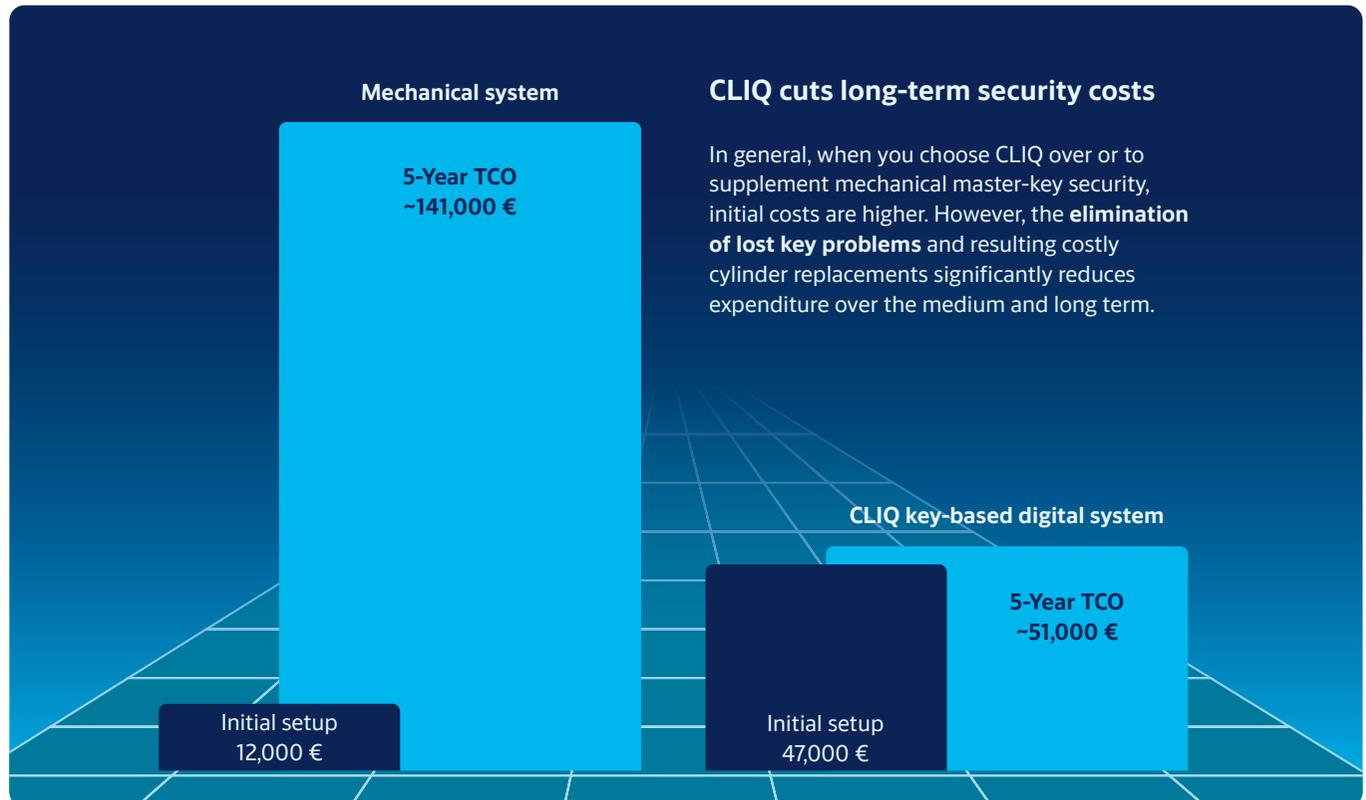# Total cost of ownership: What difference does CLIQ make?

In-house experts from ASSA ABLOY modelled a typical 100-door facility, comparing total cost of ownership over five years between mechanical security and CLIQ.

The differences at various stages through the life-cycle are broken down in the following table.

	Mechanical system	CLIQ key-based digital system
Initial setup	12,000 € (cylinders, keys)	47,000 € (cylinders, keys, programming devices, software)
Rekeying	124,000 € (key and cylinder replacement, costs for loan or new cylinders, installation and order processing)	2,600 € (key replacement and administrative costs)
Cylinder changes (repurposing*)	3,200 €	0 €
Turnover costs	1,600 €	1,400 €
5-Year TCO	~141,000 €	~51,000 €

Scenario

Security level:	very high
Number of keys:	200
Number of doors:	100
Cylinder changes per year:	2
Lost keys per year:	8 (based on a loss ratio of 4 %)
Period under review:	5 years

* Costs arising from conversion, extension, new door leaves, etc.

Mechanical system

5-Year TCO ~141,000 €

Initial setup 12,000 €

CLIQ key-based digital system

5-Year TCO ~51,000 €

Initial setup 47,000 €

CLIQ cuts long-term security costs

In general, when you choose CLIQ over or to supplement mechanical master-key security, initial costs are higher. However, the **elimination of lost key problems** and resulting costly cylinder replacements significantly reduces expenditure over the medium and long term.

ROI: How does CLIQ help reduce costs and increase value?

As well as reducing total cost of ownership (TCO), as the previous table shows, CLIQ offers adopters a significant and ongoing return on investment (ROI), particularly in terms of enhanced security and lower costs – especially the "hidden costs" stemming from overlooked workflow inefficiencies. Programmable keys eliminate the need for costly rekeying when someone loses one, for example.

Remote access management may allow for reduced on-site headcount and therefore overheads. Audit trails and access logs cut the costs of manual compliance checking.

In sectors with complex access needs – such as utilities, healthcare, and education – a CLIQ solution optimizes the allocation of limited resources, and its flexibility and scalability enable businesses to evolve without growing pains.

Conclusion

CLIQ empowers organizations to digitalize access with confidence

Switching from mechanical to digital access with ASSA ABLOY's CLIQ system empowers organizations to meet modern security, compliance, and operational demands with confidence. CLIQ combines the trusted familiarity of mechanical keys with the flexibility and intelligence of digital access management – without the need for wiring or complex infrastructure.

With features like programmable smart keys, encrypted communication, audit trails, and time-based access, CLIQ enhances security while simplifying administration. It reduces long-term and hidden costs, minimizes the risks of lost or copied keys, and supports sustainability goals through energy-efficient, wire-free installation.

Whether for critical infrastructure, healthcare, education, or commercial buildings, CLIQ offers a scalable, future-ready solution that adapts to evolving needs – making it a smart investment for any organization looking to modernize its access management.

When they choose ASSA ABLOY's award-winning CLIQ solution, organizations digitalize with confidence and get their access ready for what's ahead.

CLIQ in brief

Initial investment offset by significant long-term savings

Reduced threat from lost keys or unauthorized copies

Familiar key-based operation suitable for all age groups

Dramatically reduced risk and liability for security breaches

Administrative efficiency and improved compliance tracking

Flexible access without wires or new physical hardware

Robust devices with minimal power used at the door

Appendix I. Cost-benefit comparison: Mechanical locking vs. CLIQ

		Mechanical system	CLIQ key-based digital system
	Initial investment (hardware)	Lower upfront investment per cylinder and key	Higher per unit investment for digital cylinders and keys
	Installation	Low to moderate	Comparable (uses existing hardware; no wiring needed)
	Access changes	Manual rekeying or extension of the master-key system required (labour and parts)	(Remote) key reprogramming; no hardware changes
	Lost/stolen keys	High cost: must rekey or buy new cylinders and redistribute keys	Low cost: block key remotely, reassign access digitally
	Audit trail	Not available	Built-in access logs per user/lock
	Time-based access	Not possible	Fully supported (e.g. only allow access Mon–Fri 8 am–5 pm)
	Ongoing admin cost	High (manual tracking, physical key control)	Lower (centralized management from software)
	Scalability	Manual master-key management quickly becomes complex	Designed for scalability with cloud and mobile tools to boost efficiency
	Security risk	High: No way to control duplication or usage	Low: Access is encrypted, traceable, and revocable
	Compliance support	Difficult to prove who accessed where and when	Easy to generate reports and logs for audits
	Battery/electronics maintenance	N/A	Low: CLIQ keys are battery-powered, typically lasting 10 years between changes for standard user keys

Make your access ready for what's ahead

Digital with confidence

Experience a safer
and more open world

ASSA ABLOY