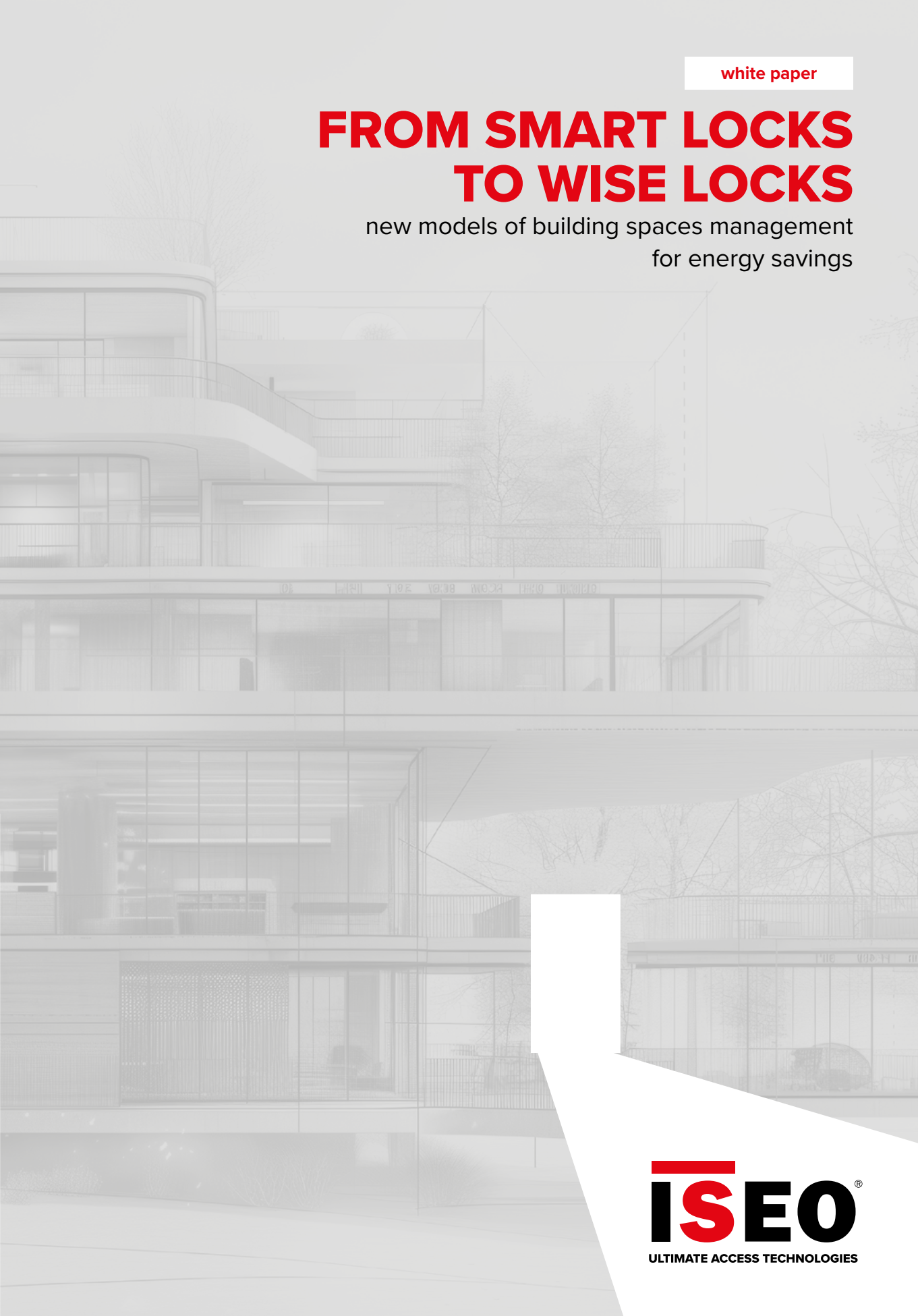
white paper

FROM SMART LOCKS TO WISE LOCKS

new models of building spaces management for energy savings



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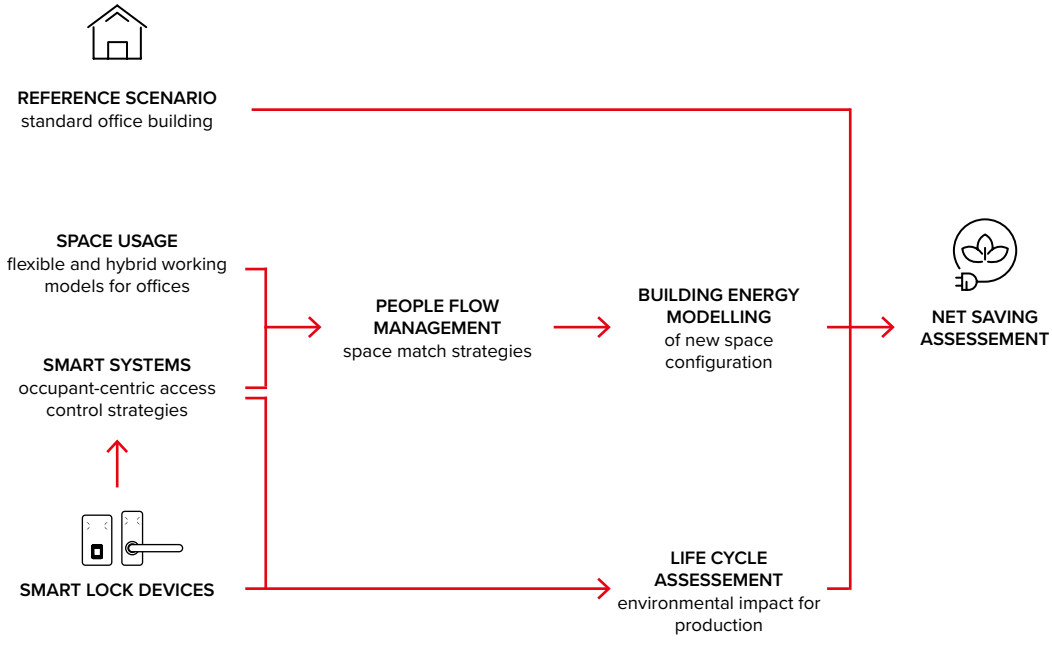
Wise Locking

This comprehensive white paper explores the concept of “Wise Locking” as an alternative approach to conventional smart locking systems. Emphasizing energy savings and operational resource optimization, the paper delves into the application of wise locking systems for enhancing building utilization through **partialization**, **schedule optimization**, and **on-demand occupancy management** in alignment with the dynamic landscape of smart working.

Providing not only a theoretical foundation but also practical insights, case studies, and detailed recommendations, this document proposes the **adoption of wise locking systems as an intelligent strategy for reducing energy consumption**, optimizing resource utilization, and improving overall building management in diverse environments, such as a contribute to positive living. An LCA analysis carried out both for the comparison of the two devices, mechanical vs. electronic, and for the expected impact for the production and installation of the system, also shows how the initial environmental impact can be effectively offset over the service life of the system by the savings achieved through an optimised building management system.



INTRODUCTION

The increasing global demand for energy and environmental concerns have led to the adoption of **innovative solutions to improve building energy efficiency**. However, these solutions have shown limitations in reducing carbon emissions due to material processing. “Energy sufficiency” offers a practical approach to reduce energy demand without compromising user comfort, through smart energy management. In the construction industry, “deep retrofitting” involves extensive modifications that can result in high carbon peaks and discomfort for users. Conversely, innovative energy management strategies, supported by cutting-edge technologies, can significantly contribute to energy sufficiency without requiring large initial investments or causing disruptions. These light and strategic interventions pave the way for significant energy savings and a new approach to energy utilization in buildings.

This white paper explores the gaps between *deep retrofitting* and *light retrofitting*, shedding light on how modest yet targeted interventions can lead to substantial gains in energy savings, especially in the renovation of existing buildings. **Building automation provides context to the evolution of intelligent systems** by emphasizing their transformative potential and promoting systems and technologies that can optimize energy usage, with particular focus on lighting regulation and thermal management.

The research results show a significant decrease in building carbon emissions through the use of intelligent locking systems.

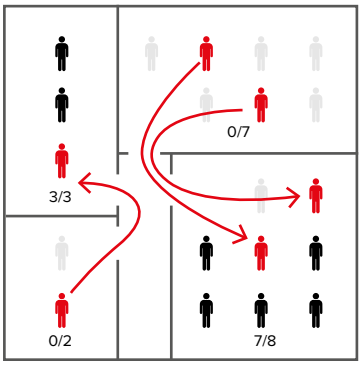
FROM SMART LOCKS TO WISE LOCKS IN BUILDING AUTOMATION

Smart locks are advanced locking mechanisms designed to provide secure access control through electronic and connectivity features. Unlike traditional locks, smart locks leverage communication technologies to enable **keyless entry, remote monitoring, and programmable access permissions**. These locks often integrate with mobile applications or central building automation systems.

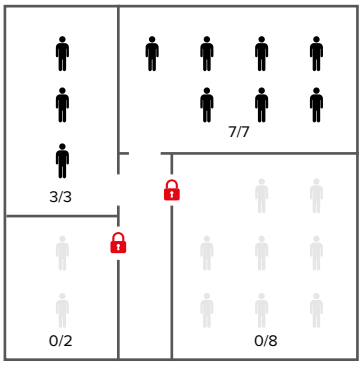
A comprehensive operational plan that incorporates smart locks could promote a lean building automation framework exploiting the capabilities of the building manager in addressing and redirecting people inside the building by a specific operational need.

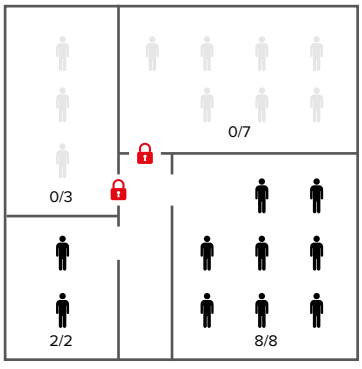
“Wise Locks” could also contribute to energy efficiency by restricting access to specific areas during periods of low activity and integrating with lighting and HVAC systems to optimize energy usage based on human presence.

50% occupancy
inefficiet (fixed desk)



50% occupancy
efficiet - occupancy based on needs
or scheduled conditions (floating desk)





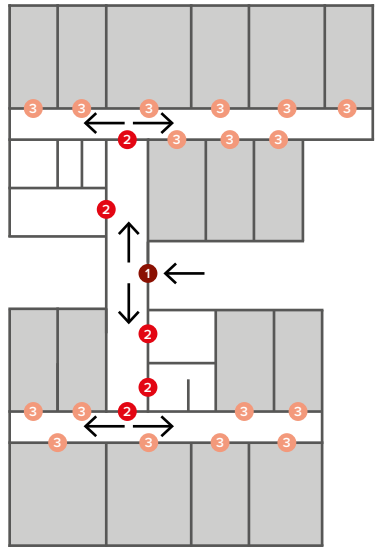
Occupied workstation Unoccupied workstation Wise/Smart lock

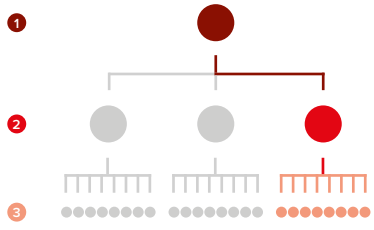
ADAPTIVE WORK MODELS AND BUFFER SPACES

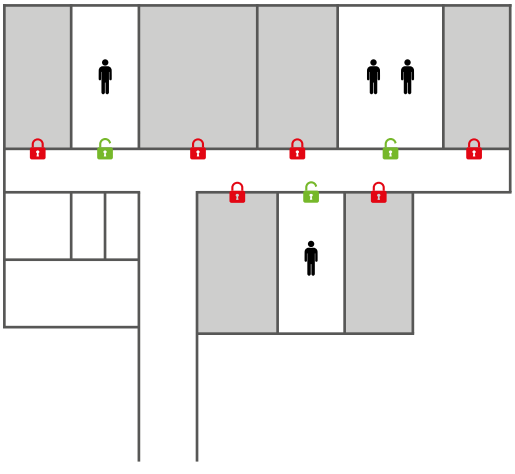
Transitioning to new work models entails adopting smart working practices and flexible schedules, along with **efficient office occupancy management to optimize energy usage**. By linking real-time assessments and forecasts with operational requirements, organizations can reduce unnecessary energy consumption during periods of low occupancy. It's crucial for buildings to be partially adaptable, allowing systems to manage spaces accordingly.

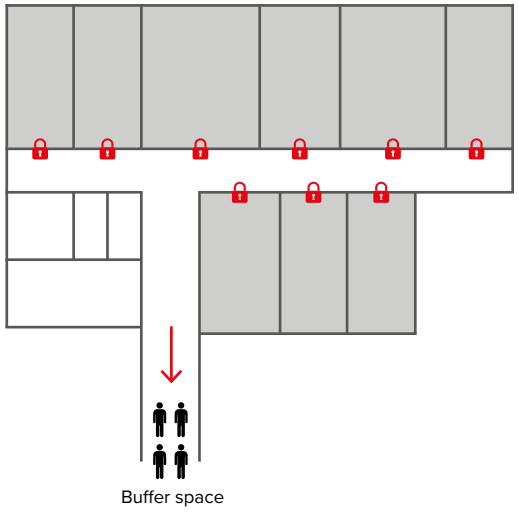
Defining the layout for smart locks begins with analyzing the functions of spaces and the type of occupancy. Subsequently, the hierarchy of doors is examined to determine the flow of people and develop an optimized layout.

In the search for a new energy-saving management model, the concept of buffer spaces emerges as a strategic component. Buffer spaces are designated areas for occupants redirected during periods of variable building usage or in response to flexible work arrangements.









These spaces can serve as versatile environments, seamlessly transitioning between collaborative and individual work settings. Spaces with greater flexibility can accommodate additional occupancy and facilitate the redistribution of individuals when other areas are closed. Consequently, such flexible spaces make ideal candidates for conversion into buffer spaces.

Among the possible operating strategy, the building manager can:

- Consider that in the event of low occupancy of one or more parts of the building, **the users** can be **grouped into a dedicated space**, defined for the purpose.
- **Close a portion of the building**, if this is the most energy-intensive and subject to discomfort conditions at a given time of year.

A CASE STUDY ASSESSMENT

As a summary result, it has been calculated that it is possible to reduce standardized annual costs and primary energy use (estimates relative to the building subject of the study with simplified building systems) by optimally closing half a floor per day.

Equivalent to a 10% reduction in the number of people in the building and with a building closure percentage ranging from 11.6% to 13.2%.

12,9% ISO 17772-2

14,3% ISO 18523-1

REDUCTION OF STANDARDIZED ANNUAL COSTS

The ISO 17772-2 and ISO 18523-1 standards were used to estimate occupancy hours, lighting levels, and other equipment for building energy simulation. The estimation of primary energy use and operational costs involved a simplified assessment methodology considering the efficiency of heating and cooling systems, along with an ideal contribution for ventilation and no optimized shading profiles.

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