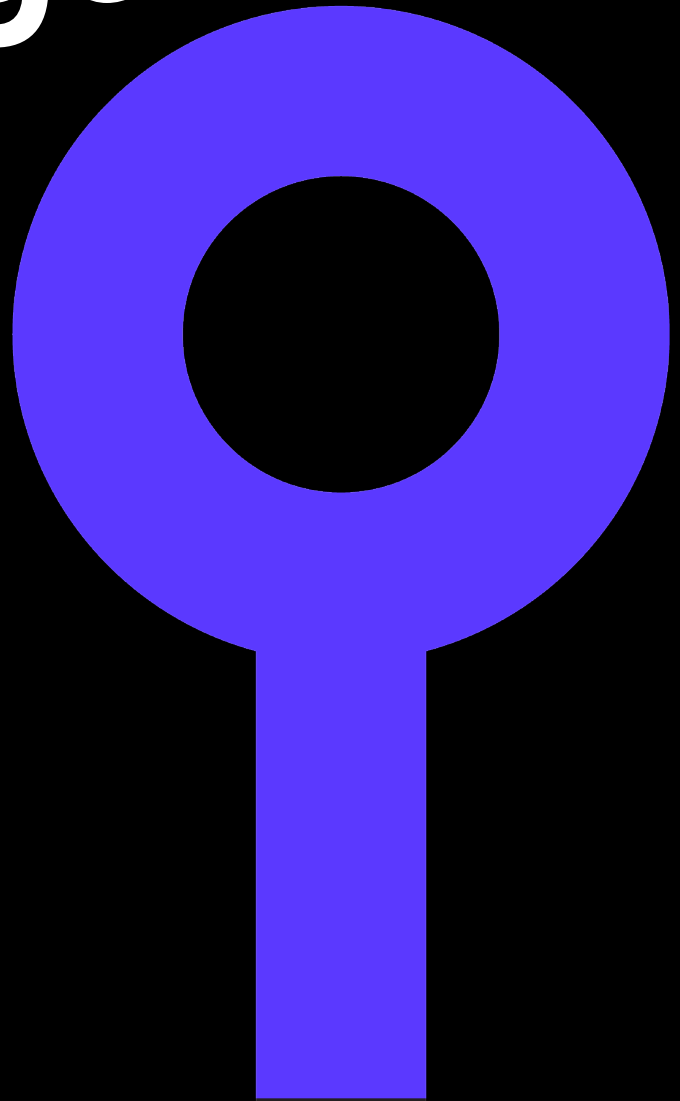


# A guide to the future of smart buildings

(For the future real estate owner)





# Introduction

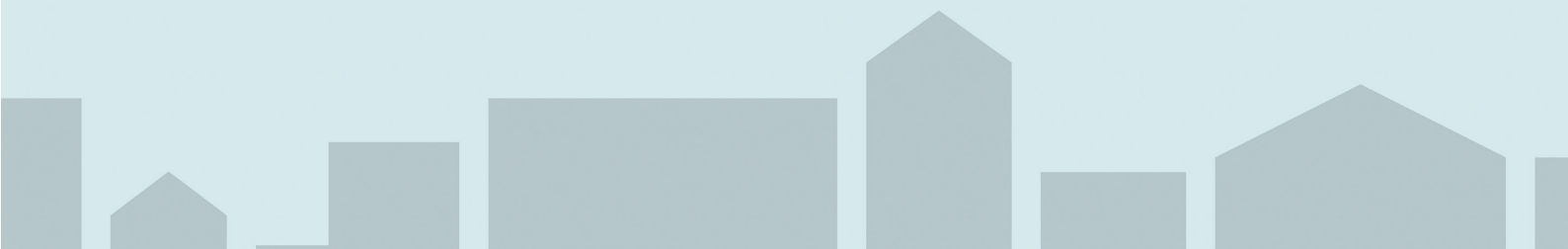
The real estate industry is in the middle of a huge digital transformation.

It's been estimated that billions of internet of things (IoT) devices will be installed in new buildings by 2020, making real estate one of the fastest-growing IoT industries worldwide. As a result, the global market for smart buildings is expected to grow from \$8.5 billion in 2016 to around \$58 billion in 2022.

**However**, as the industry undergoes this transformation process, there are several critical challenges that future real estate owners will have to face and master—before the full potential of smarter buildings can be realized.

In our experience, it's not always obvious to key stakeholders in the real estate industry what kinds of challenges to expect in the wake of this trend. Neither is it straightforward what the business case is for real estate owners investing in IoT solutions and a more data-driven approach.

That's why we have written this guide: to help you better understand the keys to a successful smart building implementation. There is a lot of complex and advanced technology that needs to be put in place. And not only that—to succeed, these technologies need to work efficiently together. This guide approaches these challenges and offers solutions from a business perspective. In our opinion, your smart building investments should not be driven by technical trends but, rather, be the result of business justification.





There are many areas where it is possible to leverage IoT and data to make your buildings, and business, more effective. Here are some of the areas in which smart solutions are already being implemented today:



**Automatic LEED certification**



**Energy performance analytics and optimization**



**Indoor climate analytics and optimization**



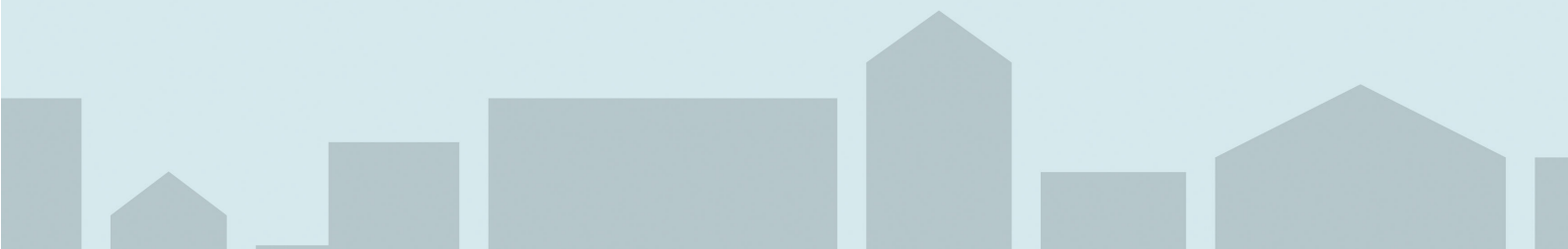
**Auditing for new and refurbishment construction**



**Presence analytics**



**Predictive maintenance**





# What does the future look like for real estate owners?

Looking around the world today, we see more humans moving into urban areas. At the same time, technical innovation is changing our view of how we want to work and live our lives. Environmental trends are also important drivers impacting what we expect from the buildings of the future. These changes are generating new strategic challenges for real estate owners, facility managers, and business management solution providers.

Real estate owners want to increase the value of their portfolio and get paid more for each square meter while, at the same time, driving down the cost of operations. Meanwhile, companies and public organizations are demanding greater operational efficiency, business innovation, and employee satisfaction. One important factor that can drive improvement in all three of these areas is the optimization of offices, factories, and warehouses.

Smart building technologies like the following can help make these optimizations happen:

- IoT devices
- Artificial Intelligence (AI) and machine learning (ML)
- Smarter and more reliable connectivity

These technologies make it possible to deliver a new type of service to the future tenant while, at the same time, boosting the value of real estate and yielding more efficient operations.



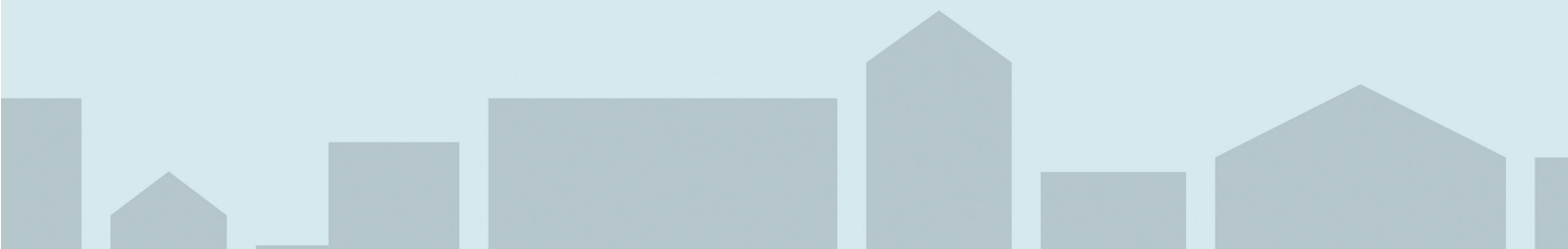


Implementing these technologies to gain business benefits is not an easy task, however, and there are only a few real estate owners who have started the journey. The required investments in these new technologies are often relatively big and involve a lot of business risks. Something that is further complicated by the fact that the competency level among most real estate owner organizations is relatively low. These are all challenges that need to be handled.

**Another key driver behind the smart building trend** is sustainability. Not only do real estate owners need to be able to lower energy consumption and prove that they can live up to the rules and regulations in the sustainability domain, but they also need to be able to master several other aspects of sustainability. This represents opportunities for real estate owners, but also impacts costs as they strive to keep up with certifications.

**Currently, many of the real estate owners** we're having discussions with are focused on a short-term perspective. They want to know how smart building technology can help them get short-term efficiency improvements or become more easily compliant with rules and regulations related to sustainability and environmental certifications. Efficiency improvements can be made in several different areas, but some of the key areas are more efficient energy consumption and predictive maintenance.

**Keeping an eye on the bigger picture is equally important**, however. Traditional real estate owners in the office segment are now being challenged by newcomers in the real estate industry, like AirBnB and WeWork, who are using smart building technology to meet the demands of the future. WeWork, for instance, is offering a completely new level of service and experience compared to what traditional real estate vendors are providing today.

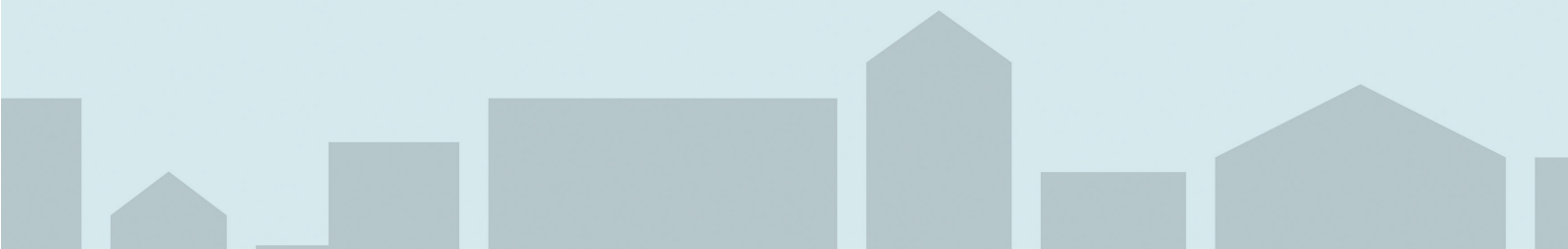




# Your strategy for leveraging data and boosting business results

Successfully building smart buildings and getting the business benefits we all want over time hinges on the real estate owner's ability to utilize all of the new and innovative solutions developed by numerous new smart building solution providers, and integrate these solutions in a smart way.

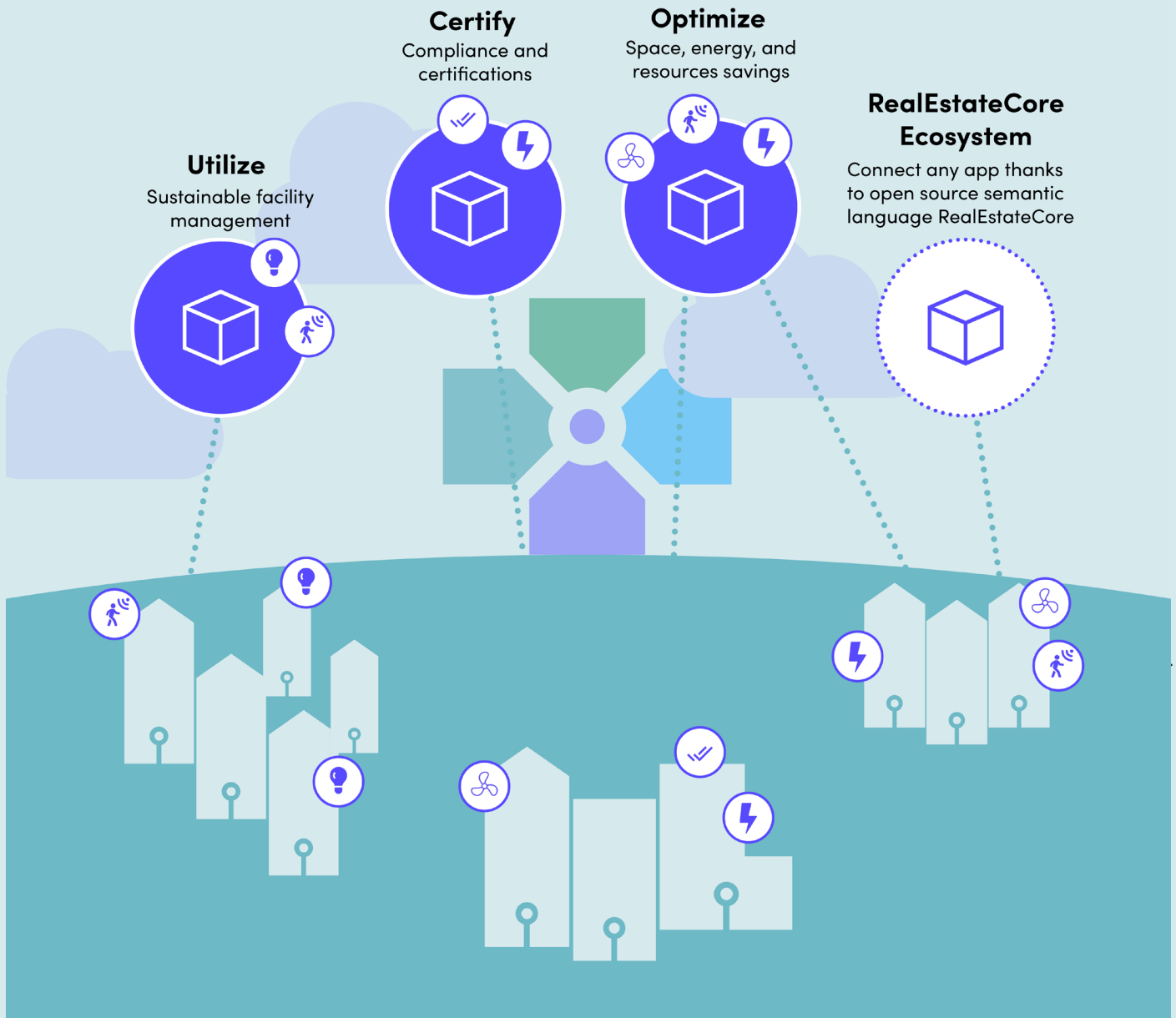
**Real estate owners need to have strategies in place and start implementing horizontal platforms that will make it possible to integrate all kinds of smart building solutions so that data can be shared between systems. Only then can data become truly valuable. Having an operating system in place for managing real estate and connecting the dots between data is the key that allows for optimization and continuous improvement.**



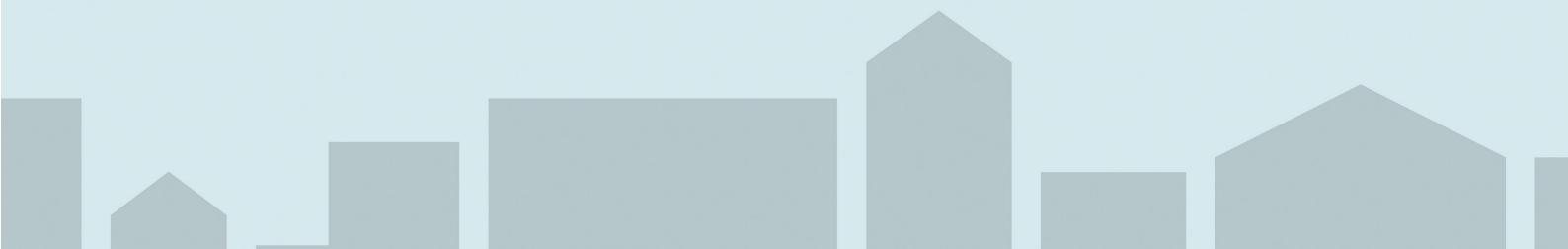


# ProptechOS

An operating system for managing property owners data



*Idun ProptechOS enables complete integration with an operating system for managing property owners' data, with help from a connected set of applications—optimize, utilize and certify—or any other available application that property owners wish to connect with.*



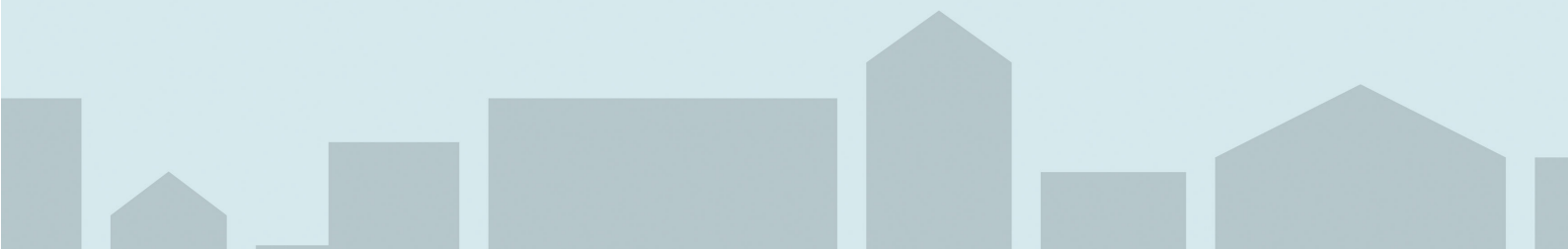


**Smart buildings serve as a vital foundation for the smart cities** of the future. Not only is it important to be able to integrate smart solutions in the building. But it must also be possible to integrate smart city functions and buildings with one another. Integration platforms must be able to handle this challenge too, if we're going to be able to unleash the full potential that will be needed.

**Once horizontal smart building solutions are implemented, new possibilities will open up to charge for the utilization of real estate.** It will also be possible to charge extra for different types of service levels. The data that horizontal smart building solutions will deliver can also give way to new business models based on the data itself.

**This means that the real estate owner who successfully** implements smart buildings will not only be able to handle basic challenges more easily, but they will also be able to unlock completely new opportunities which can have a positive impact on their business. Compared to the current situation, the future of real estate amounts to a drastic transformation—and data is the enabler of that change.

**Besides implementing solutions** that will make horizontal integration possible, real estate owners must look beyond internal operational efficiency goals and start focusing more on the needs of the future tenant.







# Challenges for future real estate owners

Many challenges will need to be handled before the implementation of IoT can become successful from a business perspective. Not least, it's challenging just to develop the business cases for IoT investments. The industry isn't used to doing these kinds of calculations, and there is limited experience-based knowledge available on implementing these solutions and the benefits they deliver.

**Below, we have listed the main challenges we normally come across during our discussions with the real estate owners:**

- Reducing environmental impact – sustainability
- Being able to work more efficiently with different types of certifications for environmental impact like LEED
- Post Covid-19 management. How to make the reentry and usage of the entrances, stairways, offices, etc., Covid-19 compliant, e.g., for traffic flow, cleaning, desk reservations, etc.
- Reaching a new level of efficiency
- Figuring out how to control and monetize the data
- Being able to work together with the many new stakeholders that will be needed in order for smart buildings to become a reality and to leverage a growing ecosystem of different Prop-Tech companies
- Being able to adapt for future demand from the modern tenant
- Getting more flexible and shorter leases
- Becoming a participant in preparing buildings for the Smart City
- Intermediating “soft concepts,” entrants that take the tenant relationship away from property owners
- Encountering new players that tries to take control over the end-tenant (e.g. Airbnb and WeWork)
- Effectively leveraging AI, machine learning, and other data-driven technologies



## Controlling, managing, and monetizing data

**Just like other industries, in real estate,** data is becoming the most valuable resource and the key enabler for capabilities and value creation. Property owners find themselves in a challenging circumstance, with both a low degree of digitalization and maturity, in a setting where the greatest amount of data is created.

**The common denominator of the solution** to this, and all other challenges, is controlling, managing, and making use of data. If the real estate owner doesn't control that data, someone else will. Other players are willing to step in, like WeWork, AirBnB, building automation system suppliers, technology vendors, and more.

## Reducing environmental impact – sustainability

**The key to reducing energy consumption** and increasing the efficiency and usage of existing square meters is operating and using the built environment more efficiently. To do this, control over climate, lighting, usage, etc. needs to be optimized with much higher precision than possible with today's isolated systems.

**In the western world, 40% of all energy** is consumed in buildings. If real estate owners can reduce the energy consumed by e.g. 10%, it will have a huge impact on the environment (and business). We have seen significant improvements in several instan-

ces where real estate owners were able to optimize by combining data in real-time based on energy consumption, solution performance, and cost for energy consumption.

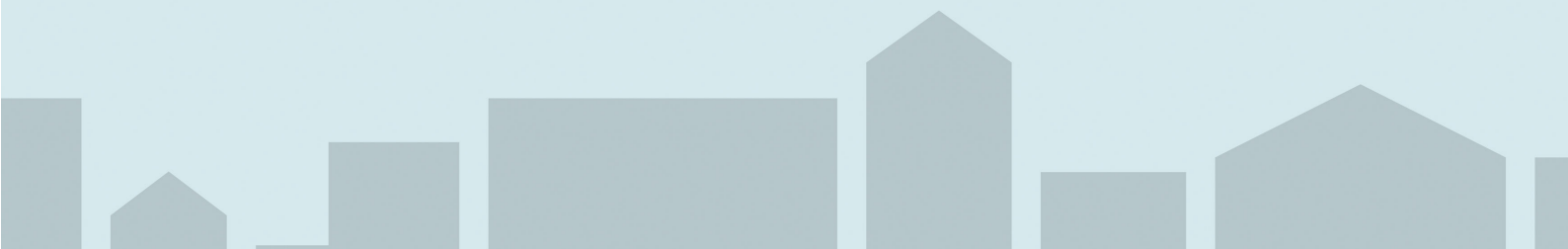
## Effectively leveraging AI, machine learning and other data-driven technologies

**AI and machine learning** will deliver systems and applications that can manage tasks, which currently require human involvement, in a faster or more efficient way than currently possible.

**However, to access data that AI** and machine learning algorithms need for presently unknown uses and applications, central data management and horizontal data platforms are needed. Whenever a new ML application is available for a domain, the amount of data available will determine the value that can be derived from it.

## Operational efficiency

**When it comes to efficient building operations,** the digital transformation represents a huge amount of potential. All aspects of facility management— from the administration to cleaning and technical maintenance— will be challenged, and costs will need to be decreased to keep operations up and running. The digital transformation will also enable real estate owners to deliver a better experience to tenants, where problems can be solved more quickly, or even completely avoided, thanks to predictive maintenance technology.





## Examples of business domains where a case can be built for Smart Building operating system investments

**There are many areas where it is possible to leverage IoT and data to become more effective.** Here are some of the areas where solutions are being implemented already today:

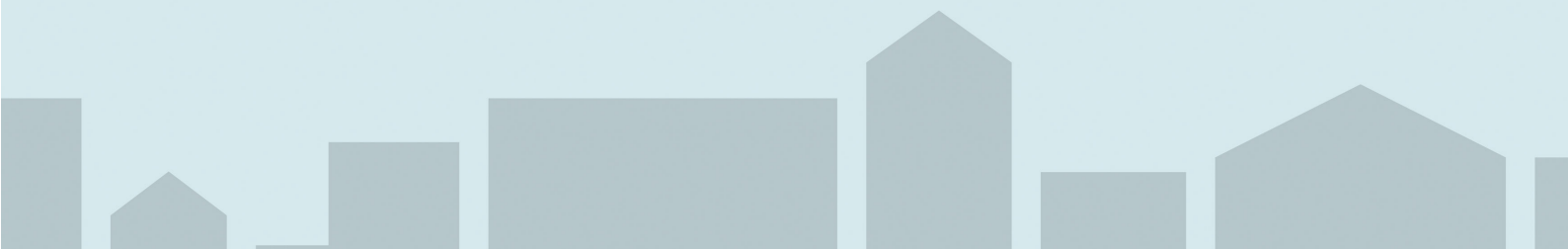
- Automatic LEED certification
- Energy performance analytics and optimization
- Indoor climate analytics and optimization
- Auditing for new and refurbished construction
- Presence analytics
- Predictive maintenance
- Covid-19 management

**The business case** that can be developed for investments in these different solution areas is based on the values that can be generated from each one of them in terms of revenue generation or cost savings.

**The more solutions that are implemented,** the bigger the business case will become. There is also an add-on effect, where new business values and cost savings can be created when combinations of solutions are implemented. A good example of this is Automatic LEED Certification, which contributes to the ability to optimize the indoor climate.

**The solutions mentioned above are just some examples** of solution areas that are being implemented today. New solutions are currently being developed by many different Proptech companies which will open up new possibilities quickly.

**Before you can implement these solutions you need to invest** in a horizontal solution for managing data together with legacy building automation systems, IoT solutions, new communication networks, and business intelligence analytics.





# Data Management is the enabling or limiting factor for Smart Buildings

Making the vision of smart buildings a reality is all about data management.

If various building systems are operating in silos, solving tasks independently within their own systems and building data models, valuable data cannot be combined or exchanged machine-to-machine or building-to-building. But carrying out the integrations needed to enable smart benefits is expensive and time-consuming. And the costs only multiply every time something changes in the underlying system or the amount of data increases.

**The answer is a standardized language.** Having a common language is a critical step in the smart building transformation process. When machines and buildings have a shared language, exchanging data across systems and buildings becomes far easier and more reliable, and the smoothly functioning, game-changing smart applications and solutions real estate owners have been dreaming of finally become possible to implement, operate, and maintain.

**Built on top of RDF ontology,** the foundation for the semantic web, ontologies specific to the real estate trade are the key to making smart buildings work. Two prominent examples are the open-source ontologies Brick Schema and RealEstateCore.

## RealEstateCore

RealEstateCore is an open-source project that bridges existing standards and finds the common denominators. It uses and maps existing standards such as BIM, Haystack, and Brick Schema, and describes the concepts and relationships that occur in the data generated from building systems, such as building structures, ownership, inhabitants, technical systems, sensors, and events. Essentially, it serves as the technical glue and structure that allows a user interface to be created.



## Brick Schema

Brick Schema provides standardized descriptions of detailed technical building assets. This gives building owners an integrated, cross-vendor overview of the various subsystems in a building such as heating and ventilation, lighting, and security systems—as well as the relationships between them.

While RealEstateCore provides a language for property owners' daily administrative operations, when complemented by Brick Schema more in-depth technical descriptions (e.g., for making a SCADA system for optimizing a heat pump) can be obtained.

## Unlocking smart building value

When valuable data flows more freely, formerly complicated system integrations become easier and more reliable, and building managers gain a consistent overview of building operations. And, of course, this means that smart building benefits become far more accessible both now and in the future, as the possibilities continue to grow.

However, a standard ontology for smart buildings is not enough. You also need an operating system that is based on the standards.





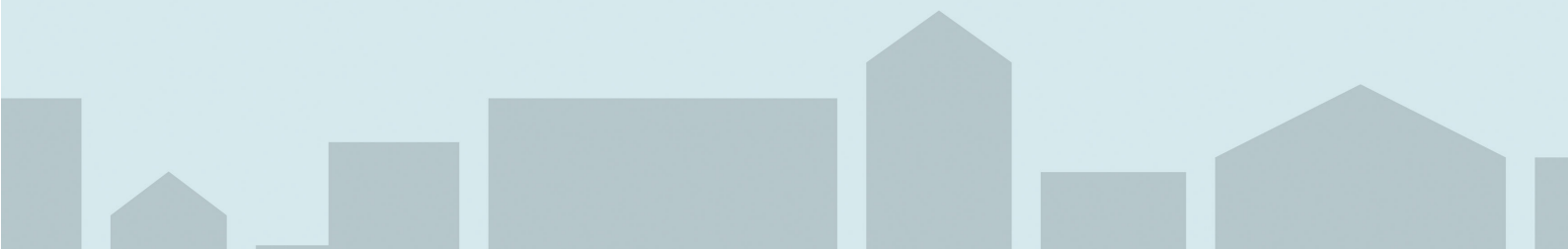
# What does a smart building operating system need to be able to do?

You can compare an operating system based on standard ontologies to financial administration software. How would a company work without a system for financial administration? Standards for bookkeeping and financial transactions won't take you anywhere. You need a platform or operating system that different types of building automation systems, administrative systems, and IoT devices can plug in to.

**With the operating system as a foundation,** you can also develop different types of applications that will solve your business requirements based on the data.

## **The operating system will make it possible to do the following:**

- Plug in standard applications and data sources that are developed based on, for example, RealEstateCore ontology like SCADA, building automation systems, and IoT devices.
- Develop new applications for your different business requirements that leverage the data. You can either develop your own applications and solutions or use readymade Proptech vendors' applications which will make it easy to implement new solutions.
- Optimize and manage property operations based on data.
- Manage the RealEstateCore digital representation and on-site edge technologies of your property portfolio.
- Easily implement different applications and solutions across buildings.
- Integrate the data that you have already collected.





## The value of having a digital twin of your physical real estate

**A digital twin is a digital representation of a physical entity** like a real estate building. It describes physical items and systems that are used for various purposes in a building. This makes it possible to understand how to integrate data and implement AI and machine learning algorithms. It also allows you to simulate the physical world in a digital format, opening up the possibility to optimize both operations and the experience the building offers its tenants.

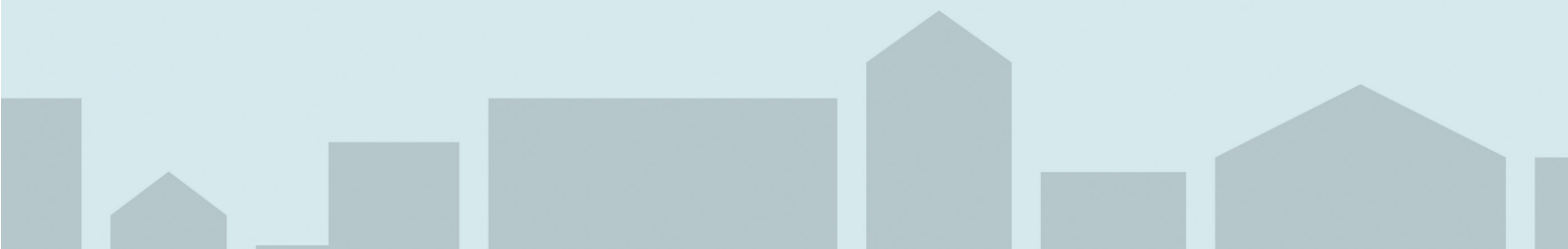
Idun Real Estate is a groundbreaking member of the Digital Twin Consortium founded by the Object Management Group (OMG).

## Implementing standard domain ontology and Property Operating systems

**The first step in the process of implementing a Property Operating system** is creating the RealEstateCore knowledge graph of your building. This is done by transforming (aka onboarding) legacy blueprints, BIM models, tag lists from traditional building automation systems, etc., into RealEstateCore language.

ProptechOS includes a portfolio of connectors for building automation systems and other data sources most commonly used by property owners that makes the process of onboarding easy.

You can approach the implementation of ProptechOS in two different ways. Either you can go broad and implement one specific application (e.g., performance optimization) in several buildings, or you can go deep and implement several different applications and solutions for one building.





## What's your next step?

If you want more information about Idun ProptechOS, you can find that information [\*here\*](#).

We've found that a natural next step for many real estate owners who want to build a future business case based on data is to book a workshop with us. From there, we can discuss your current situation and explore how different applications and solutions that already exist today can significantly improve your business.

If you are interested in a workshop, you can request one [\*\*here\*\*](#).

